
Logtalk APIs

Release v3.97.1

Paulo Moura

Dec 30, 2025

CONTENTS

1	Libraries	1
1.1	arbitrary	1
1.1.1	arbitrary	1
1.2	assertions	7
1.2.1	assertions	8
1.2.2	assertions(Mode)	9
1.2.3	assertions_messages	11
1.3	assignvars	12
1.3.1	assignvars	12
1.3.2	assignvarsp	13
1.4	base64	17
1.4.1	base64	17
1.4.2	base64url	19
1.5	cbor	21
1.5.1	cbor	21
1.5.2	cbor(StringRepresentation)	22
1.6	ccsds	24
1.6.1	ccsds	24
1.6.2	ccsds(SecondaryHeaderLength)	25
1.6.3	ccsds_types	32
1.7	code_metrics	33
1.7.1	cc_metric	33
1.7.2	code_metric	35
1.7.3	code_metrics	48
1.7.4	code_metrics_messages	49
1.7.5	code_metrics_utilities	50
1.7.6	coupling_metric	56
1.7.7	dit_metric	57
1.7.8	doc_metric	59
1.7.9	halstead_metric	63
1.7.10	halstead_metric(Stroud)	64
1.7.11	noc_metric	66
1.7.12	nor_metric	68
1.7.13	size_metric	69
1.7.14	upn_metric	70
1.8	core	72
1.8.1	core_messages	72
1.8.2	expanding	73
1.8.3	forwarding	75
1.8.4	logtalk	77

1.8.5	monitoring	92
1.8.6	user	94
1.9	coroutining	95
1.9.1	coroutining	95
1.10	csv	98
1.10.1	csv	99
1.10.2	csv(Header,Separator,IgnoreQuotes)	100
1.10.3	csv_guess_questions	101
1.10.4	csv_protocol	103
1.11	dates	113
1.11.1	date	113
1.11.2	datep	114
1.11.3	time	118
1.11.4	timep	119
1.12	dead_code_scanner	121
1.12.1	dead_code_scanner	122
1.12.2	dead_code_scanner_messages	129
1.13	debug_messages	130
1.13.1	debug_messages	130
1.14	debugger	135
1.14.1	debugger	135
1.14.2	debugger_messages	144
1.14.3	debuggerp	145
1.14.4	dump_trace	157
1.15	dependents	159
1.15.1	observer	159
1.15.2	subject	161
1.16	diagrams	164
1.16.1	d2_graph_language	164
1.16.2	diagram(Format)	166
1.16.3	diagrams	189
1.16.4	diagrams(Format)	190
1.16.5	directory_dependency_diagram	200
1.16.6	directory_dependency_diagram(Format)	202
1.16.7	directory_diagram(Format)	203
1.16.8	directory_load_diagram	207
1.16.9	directory_load_diagram(Format)	208
1.16.10	dot_graph_language	210
1.16.11	entity_diagram	212
1.16.12	entity_diagram(Format)	213
1.16.13	file_dependency_diagram	217
1.16.14	file_dependency_diagram(Format)	218
1.16.15	file_diagram(Format)	220
1.16.16	file_load_diagram	224
1.16.17	file_load_diagram(Format)	225
1.16.18	graph_language_protocol	227
1.16.19	graph_language_registry	231
1.16.20	inheritance_diagram	232
1.16.21	inheritance_diagram(Format)	234
1.16.22	library_dependency_diagram	235
1.16.23	library_dependency_diagram(Format)	237
1.16.24	library_diagram(Format)	238
1.16.25	library_load_diagram	243
1.16.26	library_load_diagram(Format)	244

1.16.27	mermaid_graph_language	246
1.16.28	modules_diagram_support	247
1.16.29	uses_diagram	250
1.16.30	uses_diagram(Format)	251
1.16.31	xref_diagram	253
1.16.32	xref_diagram(Format)	254
1.17	dictionaries	257
1.17.1	avltree	257
1.17.2	bintree	259
1.17.3	dictionaryp	262
1.17.4	rbtree	274
1.18	dif	276
1.18.1	dif	276
1.19	doclet	278
1.19.1	doclet	278
1.20	edcg	280
1.20.1	edcg	281
1.21	events	284
1.21.1	after_event_registry	284
1.21.2	before_event_registry	285
1.21.3	event_registry	287
1.21.4	event_registryp	288
1.21.5	monitor	292
1.21.6	monitorp	293
1.22	expand_library_alias_paths	297
1.22.1	expand_library_alias_paths	297
1.23	expecteds	298
1.23.1	either	298
1.23.2	expected	301
1.23.3	expected(Expected)	306
1.24	fcube	314
1.24.1	fcube	314
1.25	flags	318
1.25.1	flags	318
1.25.2	flags_validator	325
1.26	format	327
1.26.1	format	327
1.27	genint	329
1.27.1	genint	329
1.27.2	genint_core	331
1.28	gensym	333
1.28.1	gensym	333
1.28.2	gensym_core	334
1.29	git	337
1.29.1	git	337
1.29.2	git_protocol	338
1.30	grammars	342
1.30.1	blank_grammars(Format)	342
1.30.2	ip_grammars(Format)	349
1.30.3	number_grammars(Format)	350
1.30.4	sequence_grammars	356
1.31	heaps	360
1.31.1	heap(Order)	360
1.31.2	heapp	361

1.31.3	maxheap	367
1.31.4	minheap	368
1.32	help	369
1.32.1	help	369
1.33	hierarchies	377
1.33.1	class_hierarchy	377
1.33.2	class_hierarchyp	378
1.33.3	hierarchyp	385
1.33.4	proto_hierarchy	389
1.33.5	proto_hierarchyp	390
1.34	hook_flows	393
1.34.1	hook_pipeline(Pipeline)	393
1.34.2	hook_set(Set)	394
1.35	hook_objects	396
1.35.1	backend_adapter_hook	396
1.35.2	default_workflow_hook	397
1.35.3	grammar_rules_hook	398
1.35.4	identity_hook	400
1.35.5	object_wrapper_hook	401
1.35.6	object_wrapper_hook(Protocol)	403
1.35.7	object_wrapper_hook(Name,Relations)	404
1.35.8	print_goal_hook	406
1.35.9	prolog_module_hook(Module)	407
1.35.10	suppress_goal_hook	408
1.35.11	write_to_file_hook(File)	410
1.35.12	write_to_file_hook(File,Options)	411
1.35.13	write_to_stream_hook(Stream)	413
1.35.14	write_to_stream_hook(Stream,Options)	414
1.36	html	415
1.36.1	html	415
1.36.2	html5	418
1.36.3	xhtml11	419
1.37	ids	420
1.37.1	ids	421
1.37.2	ids(Representation,Bytes)	422
1.38	intervals	424
1.38.1	interval	424
1.38.2	intervalp	425
1.39	iso8601	432
1.39.1	iso8601	432
1.40	issue_creator	444
1.40.1	issue_creator	444
1.41	java	445
1.41.1	java	445
1.41.2	java(Reference)	447
1.41.3	java(Reference,ReturnValue)	448
1.41.4	java_access_protocol	450
1.41.5	java_hook	453
1.41.6	java_utils_protocol	454
1.42	json	464
1.42.1	json	464
1.42.2	json(StringRepresentation)	465
1.42.3	json(ObjectRepresentation,PairRepresentation,StringRepresentation)	466
1.42.4	json_protocol	468

1.43	json_lines	469
1.43.1	json_lines	470
1.43.2	json_lines(StringRepresentation)	471
1.43.3	json_lines(ObjectRepresentation,PairRepresentation,StringRepresentation)	472
1.43.4	json_lines_protocol	473
1.44	lgtdoc	476
1.44.1	lgtdoc	476
1.44.2	lgtdoc_messages	479
1.44.3	lgtdocp	480
1.45	lgtunit	492
1.45.1	automation_report	492
1.45.2	coverage_report	493
1.45.3	lgtunit	495
1.45.4	lgtunit_messages	544
1.45.5	minimal_output	546
1.45.6	tap_output	547
1.45.7	tap_report	549
1.45.8	xunit_net_v2_output	551
1.45.9	xunit_net_v2_report	553
1.45.10	xunit_output	554
1.45.11	xunit_report	556
1.46	library	558
1.46.1	cloning	558
1.46.2	counters	559
1.46.3	streamvars	563
1.47	listing	566
1.47.1	listing	566
1.48	logging	569
1.48.1	logger	569
1.48.2	logging	571
1.48.3	loggingp	573
1.49	loops	577
1.49.1	loop	577
1.49.2	loopp	578
1.50	meta	584
1.50.1	meta	584
1.50.2	metap	585
1.51	meta_compiler	596
1.51.1	meta_compiler	596
1.52	metagol	598
1.52.1	metagol	598
1.52.2	metagol_example_protocol	605
1.53	mutations	607
1.53.1	default_atom_mutations	607
1.53.2	default_compound_mutations	609
1.53.3	default_float_mutations	610
1.53.4	default_integer_mutations	611
1.53.5	default_list_mutations	613
1.53.6	mutations	614
1.53.7	mutations_store	616
1.54	nested_dictionaries	619
1.54.1	navltree	619
1.54.2	nbintree	620
1.54.3	nested_dictionary_protocol	622

1.54.4	nrbtree	626
1.55	optionals	628
1.55.1	maybe	628
1.55.2	optional	630
1.55.3	optional(Optional)	634
1.56	options	642
1.56.1	options	642
1.56.2	options_protocol	643
1.57	os	649
1.57.1	os	650
1.57.2	os_types	651
1.57.3	osp	653
1.58	packs	672
1.58.1	pack_protocol	672
1.58.2	packs	676
1.58.3	packs_common	704
1.58.4	packs_messages	717
1.58.5	packs_specs_hook	718
1.58.6	registries	720
1.58.7	registry_loader_hook	732
1.58.8	registry_protocol	733
1.59	pddl_parser	737
1.59.1	pddl	737
1.59.2	read_file	739
1.60	ports_profiler	741
1.60.1	ports_profiler	741
1.61	queues	747
1.61.1	queue	747
1.61.2	queuep	749
1.62	random	755
1.62.1	backend_random	755
1.62.2	fast_random	757
1.62.3	pseudo_random_protocol	760
1.62.4	random	762
1.62.5	random_protocol	765
1.62.6	sampling_protocol	774
1.63	reader	787
1.63.1	reader	787
1.64	recorded_database	796
1.64.1	recorded_database	796
1.64.2	recorded_database_core	797
1.65	redis	803
1.65.1	redis	803
1.66	sets	806
1.66.1	set	806
1.66.2	set(Type)	808
1.66.3	setp	810
1.67	statistics	819
1.67.1	population	820
1.67.2	sample	821
1.67.3	statistics	822
1.67.4	statisticsp	825
1.68	term_io	836
1.68.1	term_io	836

1.68.2	term_io_protocol	838
1.69	timeout	848
1.69.1	timeout	848
1.70	toon	850
1.70.1	toon	851
1.70.2	toon(StringRepresentation)	852
1.70.3	toon(ObjectRepresentation,PairRepresentation,StringRepresentation)	853
1.70.4	toon_protocol	855
1.71	toychr	857
1.71.1	toychrdb	857
1.72	tsv	862
1.72.1	tsv	862
1.72.2	tsv(Header)	863
1.72.3	tsv_protocol	865
1.73	tutor	874
1.73.1	tutor	874
1.74	types	876
1.74.1	atom	876
1.74.2	atomic	878
1.74.3	callable	879
1.74.4	character	880
1.74.5	characterp	882
1.74.6	comparingp	891
1.74.7	compound	894
1.74.8	difflist	895
1.74.9	float	898
1.74.10	integer	900
1.74.11	list	904
1.74.12	list(Type)	906
1.74.13	listp	907
1.74.14	natural	930
1.74.15	number	931
1.74.16	numberlist	935
1.74.17	numberlistp	937
1.74.18	pairs	947
1.74.19	term	952
1.74.20	termp	954
1.74.21	type	961
1.74.22	varlist	966
1.74.23	varlistp	968
1.75	ulid	978
1.75.1	ulid	978
1.75.2	ulid(Representation)	979
1.75.3	ulid_protocol	981
1.75.4	ulid_types	984
1.76	union_find	985
1.76.1	union_find	985
1.76.2	union_find_protocol	987
1.77	uuid	991
1.77.1	uuid	991
1.77.2	uuid(Representation)	992
1.77.3	uuid_protocol	994
1.78	verdi_neruda	996
1.78.1	a_star_interpreter(W)	997

1.78.2	benchmark_generators	998
1.78.3	best_first	999
1.78.4	bfs_interpreter	1001
1.78.5	bup_interpreter	1002
1.78.6	counter	1003
1.78.7	databasep	1007
1.78.8	debug_expansion(Mode)	1009
1.78.9	demodb	1011
1.78.10	dfs_interpreter	1012
1.78.11	flatting	1013
1.78.12	heuristic_expansion(Mode)	1015
1.78.13	iddfs_interpreter(Increment)	1016
1.78.14	interpreterp	1017
1.78.15	magic	1019
1.78.16	magic_expansion(Mode)	1021
1.78.17	rule_expansion(Mode)	1022
1.78.18	shell	1023
1.78.19	shell(Interpreters)	1025
1.78.20	shell_expansion(Mode)	1026
1.79	wrapper	1028
1.79.1	wrapper	1028
1.80	xml_parser	1040
1.80.1	xml	1040
1.81	zippers	1048
1.81.1	zipperp	1048
1.81.2	zlist	1058
2	Directories	1061
2.1	contributions/flags/	1063
2.2	contributions/iso8601/	1063
2.3	contributions/pddl_parser/	1063
2.4	contributions/verdi_neruda/	1063
2.5	contributions/xml_parser/	1063
2.6	core/	1063
2.7	library/	1063
2.8	library/arbitrary/	1063
2.9	library/assignvars/	1063
2.10	library/base64/	1063
2.11	library/cbor/	1063
2.12	library/ccsds/	1063
2.13	library/coroutining/	1063
2.14	library/csv/	1063
2.15	library/dates/	1063
2.16	library/dependents/	1063
2.17	library/dictionaries/	1063
2.18	library/dif/	1063
2.19	library/edcg/	1063
2.20	library/events/	1063
2.21	library/expand_library_alias_paths/	1063
2.22	library/expecteds/	1063
2.23	library/format/	1063
2.24	library/genint/	1063
2.25	library/gensym/	1063
2.26	library/git/	1063

2.27	library/grammars/	1063
2.28	library/heaps/	1063
2.29	library/hierarchies/	1063
2.30	library/hook_flows/	1063
2.31	library/hook_objects/	1063
2.32	library/html/	1063
2.33	library/ids/	1063
2.34	library/intervals/	1063
2.35	library/java/	1063
2.36	library/json/	1063
2.37	library/json_lines/	1063
2.38	library/listing/	1063
2.39	library/logging/	1063
2.40	library/loops/	1063
2.41	library/meta/	1063
2.42	library/meta_compiler/	1063
2.43	library/mutations/	1063
2.44	library/nested_dictionaries/	1063
2.45	library/optionals/	1063
2.46	library/options/	1063
2.47	library/os/	1063
2.48	library/queues/	1063
2.49	library/random/	1063
2.50	library/reader/	1063
2.51	library/recorded_database/	1063
2.52	library/redis/	1063
2.53	library/sets/	1063
2.54	library/statistics/	1063
2.55	library/term_io/	1063
2.56	library/timeout/	1063
2.57	library/toon/	1063
2.58	library/tsv/	1063
2.59	library/types/	1063
2.60	library/ulid/	1063
2.61	library/union_find/	1063
2.62	library/uuid/	1063
2.63	library/zippers/	1063
2.64	ports/fcube/	1063
2.65	ports/metagol/	1063
2.66	ports/toychr/	1063
2.67	tools/assertions/	1063
2.68	tools/code_metrics/	1063
2.69	tools/dead_code_scanner/	1063
2.70	tools/debug_messages/	1063
2.71	tools/debugger/	1063
2.72	tools/diagrams/	1063
2.73	tools/doclet/	1063
2.74	tools/help/	1063
2.75	tools/issue_creator/	1063
2.76	tools/lgtdoc/	1063
2.77	tools/lgtunit/	1063
2.78	tools/packs/	1063
2.79	tools/ports_profiler/	1063
2.80	tools/tutor/	1063

2.81	tools/wrapper/	1063
3	Entities	1065
3.1	Categories	1065
3.2	Objects	1065
3.3	Protocols	1065
4	Predicates	1067
4.1	(/)/2	1067
4.2	(//)/2	1067
4.3	(<)/2	1067
4.4	(<=)/2	1067
4.5	(=:=)/2	1067
4.6	(=<)/2	1068
4.7	(=>)/2	1068
4.8	(=\=)/2	1068
4.9	=~=/ 2	1068
4.10	(>)/2	1068
4.11	(>=)/2	1068
4.12	absolute_file_name/2	1068
4.13	activate_debug_handler/1	1068
4.14	activate_monitor/0	1069
4.15	active_debug_handler/1	1069
4.16	add/1	1069
4.17	add/2	1069
4.18	add/3	1069
4.19	addDependent/1	1069
4.20	after/2	1069
4.21	after/3	1069
4.22	all/0	1070
4.23	all/1	1070
4.24	all_files/0	1070
4.25	all_files/1	1070
4.26	all_libraries/0	1070
4.27	all_libraries/1	1070
4.28	all_score/1	1071
4.29	ancestor/1	1071
4.30	ancestors/1	1071
4.31	apid/2	1071
4.32	apis/0	1071
4.33	apis/1	1071
4.34	append/2	1071
4.35	append/3	1071
4.36	apply/2	1072
4.37	apply/4	1072
4.38	approximately_equal/2	1072
4.39	approximately_equal/3	1072
4.40	arbitrary/1	1072
4.41	arbitrary/2	1072
4.42	archive/1	1072
4.43	arithmetic_mean/2	1072
4.44	array_list/2	1073
4.45	array_to_list/2	1073
4.46	array_to_terms/2	1073

4.47	array_to_terms/3	1073
4.48	as_curly_bracketed/2	1073
4.49	as_dictionary/2	1073
4.50	as_difflist/2	1073
4.51	as_heap/2	1073
4.52	as_list/2	1074
4.53	as_nested_dictionary/2	1074
4.54	as_set/2	1074
4.55	ask_question/5	1074
4.56	assertion/1	1074
4.57	assertion/2	1074
4.58	assignable/1	1074
4.59	assignable/2	1075
4.60	available/0	1075
4.61	available/1	1075
4.62	available/2	1075
4.63	average/2	1075
4.64	average_deviation/3	1075
4.65	before/2	1075
4.66	before/3	1075
4.67	bench_goal/1	1076
4.68	benchmark/2	1076
4.69	benchmark/3	1076
4.70	benchmark/4	1076
4.71	benchmark_reified/3	1076
4.72	bernoulli/2	1076
4.73	beta/3	1076
4.74	between/3	1076
4.75	between/4	1077
4.76	binomial/3	1077
4.77	bit//1	1077
4.78	bits//1	1077
4.79	blank//0	1077
4.80	blanks//0	1077
4.81	body_pred/1	1077
4.82	branch/2	1077
4.83	built_in_directive/4	1078
4.84	built_in_flag/2	1078
4.85	built_in_method/4	1078
4.86	built_in_non_terminal/4	1078
4.87	built_in_predicate/4	1078
4.88	calendar_month/3	1078
4.89	call_with_timeout/2	1078
4.90	call_with_timeout/3	1078
4.91	cat/2	1079
4.92	change_directory/1	1079
4.93	changed/0	1079
4.94	changed/1	1079
4.95	chebyshev_distance/3	1079
4.96	chebyshev_norm/2	1079
4.97	check/1	1079
4.98	check/2	1079
4.99	check/3	1080
4.100	check_option/1	1080

4.101	check_options/1	1080
4.102	chi_squared/2	1080
4.103	chr_is/2	1080
4.104	chr_no_spy/1	1080
4.105	chr_nospy/0	1080
4.106	chr_notrace/0	1080
4.107	chr_option/2	1081
4.108	chr_spy/1	1081
4.109	chr_trace/0	1081
4.110	circular_uniform_cartesian/3	1081
4.111	circular_uniform_polar/3	1081
4.112	class/1	1081
4.113	classes/1	1081
4.114	clause/5	1081
4.115	clause_location/6	1082
4.116	clean/0	1082
4.117	clean/1	1082
4.118	clean/2	1082
4.119	clone/1	1082
4.120	clone/3	1082
4.121	clone/4	1082
4.122	coefficient_of_variation/2	1083
4.123	command_line_arguments/1	1083
4.124	commit_author/2	1083
4.125	commit_date/2	1083
4.126	commit_hash/2	1083
4.127	commit_hash_abbreviated/2	1083
4.128	commit_log/3	1083
4.129	commit_message/2	1083
4.130	compile_aux_clauses/1	1084
4.131	compile_predicate_heads/4	1084
4.132	compile_predicate_indicators/3	1084
4.133	completion/2	1084
4.134	completions/2	1084
4.135	connect/1	1084
4.136	connect/3	1084
4.137	console/1	1084
4.138	contains/2	1085
4.139	control//0	1085
4.140	control_construct/4	1085
4.141	controls//0	1085
4.142	copy_file/2	1085
4.143	counter/2	1085
4.144	cover/1	1085
4.145	cpu_time/1	1085
4.146	current/2	1086
4.147	data/0	1086
4.148	data/1	1086
4.149	data/2	1086
4.150	data_length/2	1086
4.151	date/4	1086
4.152	date/5	1086
4.153	date/6	1086
4.154	date/7	1087

4.155	date_string/3	1087
4.156	date_time/7	1087
4.157	days_in_month/3	1087
4.158	deactivate_debug_handler/0	1087
4.159	debug/0	1087
4.160	debug_handler/1	1087
4.161	debug_handler/3	1087
4.162	debugging/0	1088
4.163	debugging/1	1088
4.164	decide/1	1088
4.165	decide/2	1088
4.166	decode_exception/2	1088
4.167	decode_exception/3	1088
4.168	decompile_predicate_heads/4	1088
4.169	decompile_predicate_indicators/4	1088
4.170	decompose_file_name/3	1089
4.171	decompose_file_name/4	1089
4.172	decrement_counter/1	1089
4.173	default_option/1	1089
4.174	default_options/1	1089
4.175	define_log_file/2	1089
4.176	defined/4	1089
4.177	defined_flag/6	1089
4.178	del_monitors/0	1090
4.179	del_monitors/4	1090
4.180	del_spy_points/4	1090
4.181	delete/0	1090
4.182	delete/1	1090
4.183	delete/2	1090
4.184	delete/3	1090
4.185	delete/4	1090
4.186	delete_all_after/2	1091
4.187	delete_all_after_and_unzip/2	1091
4.188	delete_all_before/2	1091
4.189	delete_all_before_and_unzip/2	1091
4.190	delete_and_next/2	1091
4.191	delete_and_previous/2	1091
4.192	delete_and_unzip/2	1091
4.193	delete_directory/1	1091
4.194	delete_directory_and_contents/1	1092
4.195	delete_directory_contents/1	1092
4.196	delete_file/1	1092
4.197	delete_in/4	1092
4.198	delete_matches/3	1092
4.199	delete_max/4	1092
4.200	delete_min/4	1092
4.201	dependents/1	1092
4.202	dependents/2	1093
4.203	dependents/3	1093
4.204	depth/2	1093
4.205	descendant/1	1093
4.206	descendant_class/1	1093
4.207	descendant_classes/1	1093
4.208	descendant_instance/1	1093

4.209 descendant_instances/1	1093
4.210 descendants/1	1094
4.211 describe/1	1094
4.212 describe/2	1094
4.213 description/1	1094
4.214 deterministic/1	1094
4.215 deterministic/2	1094
4.216 diagram_description/1	1094
4.217 diagram_name_suffix/1	1094
4.218 dif/1	1095
4.219 dif/2	1095
4.220 digit//1	1095
4.221 digits//1	1095
4.222 directories/1	1095
4.223 directories/2	1095
4.224 directories/3	1095
4.225 directory/1	1096
4.226 directory/2	1096
4.227 directory/3	1096
4.228 directory_exists/1	1096
4.229 directory_files/2	1096
4.230 directory_files/3	1097
4.231 directory_score/2	1097
4.232 dirichlet/2	1097
4.233 disable/1	1097
4.234 disable/2	1097
4.235 disable_logging/1	1097
4.236 disconnect/1	1097
4.237 disjoint/2	1097
4.238 disjoint_sets/2	1098
4.239 doc_goal/1	1098
4.240 dot//1	1098
4.241 dowhile/2	1098
4.242 drop/3	1098
4.243 during/2	1098
4.244 easter_day/3	1098
4.245 edge/6	1098
4.246 edge_case/2	1099
4.247 either/3	1099
4.248 empty/1	1099
4.249 enable/1	1099
4.250 enable/2	1099
4.251 enable_logging/1	1099
4.252 enabled/1	1100
4.253 enabled/2	1100
4.254 ensure_directory/1	1100
4.255 ensure_file/1	1100
4.256 entity/1	1100
4.257 entity/2	1100
4.258 entity_info_pair_score_hook/3	1100
4.259 entity_info_score_hook/2	1101
4.260 entity_predicates_weights_hook/2	1101
4.261 entity_prefix/2	1101
4.262 entity_score/2	1101

4.263	enumerate/2	1101
4.264	environment_variable/2	1101
4.265	epsilon/1	1101
4.266	equal/2	1101
4.267	erase/1	1102
4.268	essentially_equal/3	1102
4.269	euclidean_distance/3	1102
4.270	euclidean_norm/2	1102
4.271	exclude/3	1102
4.272	execution_context/7	1102
4.273	expand_library_path/2	1102
4.274	expected/1	1102
4.275	expecteds/2	1103
4.276	explain//1	1103
4.277	exponential/2	1103
4.278	extension/1	1103
4.279	extensions/1	1103
4.280	failed_test_reason//1	1103
4.281	false/1	1103
4.282	fcube/0	1103
4.283	file/1	1104
4.284	file/2	1104
4.285	file_exists/1	1104
4.286	file_footer/3	1104
4.287	file_header/3	1104
4.288	file_modification_time/2	1104
4.289	file_permission/2	1105
4.290	file_score/2	1105
4.291	file_size/2	1105
4.292	file_to_bytes/2	1105
4.293	file_to_bytes/3	1105
4.294	file_to_chars/2	1105
4.295	file_to_chars/3	1105
4.296	file_to_codes/2	1105
4.297	file_to_codes/3	1106
4.298	file_to_terms/2	1106
4.299	file_to_terms/3	1106
4.300	file_type_extension/2	1106
4.301	files/1	1106
4.302	files/2	1106
4.303	files/3	1106
4.304	filter/2	1107
4.305	find/4	1107
4.306	find/5	1107
4.307	findall_member/4	1107
4.308	findall_member/5	1107
4.309	finished_by/2	1107
4.310	finishes/2	1107
4.311	fisher/3	1107
4.312	flag_group_chk/1	1108
4.313	flag_groups/1	1108
4.314	flat_map/2	1108
4.315	flatten/2	1108
4.316	float//1	1108

4.317	fold_left/4	1108
4.318	fold_left_1/3	1108
4.319	fold_right/4	1108
4.320	fold_right_1/3	1109
4.321	fordownto/3	1109
4.322	fordownto/4	1109
4.323	fordownto/5	1109
4.324	foreach/3	1109
4.325	foreach/4	1109
4.326	format/2	1109
4.327	format/3	1109
4.328	format_entity_score//2	1110
4.329	format_object/1	1110
4.330	format_to_atom/3	1110
4.331	format_to_chars/3	1110
4.332	format_to_chars/4	1110
4.333	format_to_codes/3	1110
4.334	format_to_codes/4	1110
4.335	forto/3	1110
4.336	forto/4	1111
4.337	forto/5	1111
4.338	forward/1	1111
4.339	forward/2	1111
4.340	forward/3	1111
4.341	fractile/3	1111
4.342	freeze/2	1111
4.343	from_generator/2	1111
4.344	from_generator/3	1112
4.345	from_generator/4	1112
4.346	from_goal/2	1112
4.347	from_goal/3	1112
4.348	from_goal/4	1112
4.349	frozen/2	1112
4.350	full_device_path/1	1112
4.351	func_test/3	1113
4.352	functional/0	1113
4.353	gamma/3	1113
4.354	generate/1	1113
4.355	generate/2	1113
4.356	generate/3	1113
4.357	generate/8	1114
4.358	genint/2	1114
4.359	gensym/2	1114
4.360	geometric/2	1114
4.361	geometric_mean/2	1114
4.362	get/1	1114
4.363	get_field/2	1114
4.364	get_flag_value/2	1114
4.365	get_seed/1	1115
4.366	gnu/0	1115
4.367	goal_expansion/2	1115
4.368	graph_footer/5	1115
4.369	graph_header/5	1115
4.370	ground/1	1115

4.371	group_by_key/2	1115
4.372	group_consecutive_by_key/2	1115
4.373	group_sorted_by_key/2	1116
4.374	guess_arity/2	1116
4.375	guess_separator/2	1116
4.376	gumbel/3	1116
4.377	hamming_distance/3	1116
4.378	handbook/0	1116
4.379	harmonic_mean/2	1116
4.380	head/2	1116
4.381	head_pred/1	1117
4.382	help/0	1117
4.383	hex_digit//1	1117
4.384	hex_digits//1	1117
4.385	home/1	1117
4.386	hypergeometric/4	1117
4.387	ibk/3	1117
4.388	if_empty/1	1117
4.389	if_expected/1	1118
4.390	if_expected_or_else/2	1118
4.391	if_present/1	1118
4.392	if_present_or_else/2	1118
4.393	if_unexpected/1	1118
4.394	include/3	1118
4.395	increase/1	1118
4.396	increment/0	1118
4.397	increment_counter/1	1119
4.398	init/0	1119
4.399	init_log_file/2	1119
4.400	inorder/2	1119
4.401	insert/3	1119
4.402	insert/4	1119
4.403	insert_after/3	1119
4.404	insert_all/3	1119
4.405	insert_before/3	1120
4.406	insert_in/4	1120
4.407	install/1	1120
4.408	install/2	1120
4.409	install/3	1120
4.410	install/4	1120
4.411	installed/0	1120
4.412	installed/1	1120
4.413	installed/3	1121
4.414	installed/4	1121
4.415	instance/1	1121
4.416	instance/2	1121
4.417	instances/1	1121
4.418	integer//1	1121
4.419	internal_os_path/2	1121
4.420	intersect/2	1121
4.421	intersection/2	1122
4.422	intersection/3	1122
4.423	intersection/4	1122
4.424	invoke/1	1122

4.425	invoke/2	1122
4.426	ipv4/1	1122
4.427	ipv6/1	1122
4.428	is_absolute_file_name/1	1122
4.429	is_alpha/1	1123
4.430	is_alphanumeric/1	1123
4.431	is_ascii/1	1123
4.432	is_bin_digit/1	1123
4.433	is_control/1	1123
4.434	is_dec_digit/1	1123
4.435	is_empty/0	1123
4.436	is_end_of_line/1	1123
4.437	is_expected/0	1124
4.438	is_false/1	1124
4.439	is_hex_digit/1	1124
4.440	is_layout/1	1124
4.441	is_letter/1	1124
4.442	is_lower_case/1	1124
4.443	is_newline/1	1124
4.444	is_null/1	1124
4.445	is_object/1	1125
4.446	is_octal_digit/1	1125
4.447	is_period/1	1125
4.448	is_present/0	1125
4.449	is_punctuation/1	1125
4.450	is_quote/1	1125
4.451	is_true/1	1125
4.452	is_unexpected/0	1125
4.453	is_upper_case/1	1126
4.454	is_void/1	1126
4.455	is_vowel/1	1126
4.456	is_white_space/1	1126
4.457	iterator_element/2	1126
4.458	join/3	1126
4.459	join_all/3	1126
4.460	jump/3	1126
4.461	jump_all/3	1127
4.462	jump_all_block/3	1127
4.463	key/2	1127
4.464	keys/2	1127
4.465	keys_values/3	1127
4.466	keysort/2	1127
4.467	kurtosis/2	1127
4.468	language_object/2	1127
4.469	last/2	1128
4.470	leaf/1	1128
4.471	leaf_class/1	1128
4.472	leaf_classes/1	1128
4.473	leaf_instance/1	1128
4.474	leaf_instances/1	1128
4.475	leap_year/1	1128
4.476	learn/0	1128
4.477	learn/1	1129
4.478	learn/2	1129

4.479	learn/3	1129
4.480	learn_seq/2	1129
4.481	learn_with_timeout/4	1129
4.482	leash/1	1129
4.483	leashing/1	1129
4.484	least_common_multiple/2	1129
4.485	leaves/1	1130
4.486	length/2	1130
4.487	libraries/0	1130
4.488	libraries/1	1130
4.489	libraries/2	1130
4.490	libraries/3	1130
4.491	library/1	1131
4.492	library/2	1131
4.493	library_score/2	1131
4.494	license/1	1131
4.495	line_to_chars/2	1131
4.496	line_to_chars/3	1131
4.497	line_to_codes/2	1132
4.498	line_to_codes/3	1132
4.499	lint/0	1132
4.500	lint/1	1132
4.501	lint/2	1132
4.502	list/0	1132
4.503	list_to_array/2	1132
4.504	listing/0	1132
4.505	listing/1	1133
4.506	loaded_file/1	1133
4.507	loaded_file_property/2	1133
4.508	loaded_files_topological_sort/1	1133
4.509	loaded_files_topological_sort/2	1133
4.510	log/3	1133
4.511	log_event/2	1133
4.512	log_file/2	1133
4.513	logging/1	1134
4.514	logging/3	1134
4.515	logistic/3	1134
4.516	lognormal/3	1134
4.517	logseries/2	1134
4.518	logtalk_packs/0	1134
4.519	logtalk_packs/1	1134
4.520	lookup/2	1134
4.521	lookup/3	1135
4.522	lookup_in/3	1135
4.523	lower_upper/2	1135
4.524	magic/2	1135
4.525	magicise/4	1135
4.526	make_directory/1	1135
4.527	make_directory_path/1	1135
4.528	make_set/3	1135
4.529	manhattan_distance/3	1136
4.530	manhattan_norm/2	1136
4.531	map/2	1136
4.532	map/3	1136

4.533 map/4	1136
4.534 map/5	1136
4.535 map/6	1137
4.536 map/7	1137
4.537 map/8	1137
4.538 map_element/2	1137
4.539 map_reduce/5	1137
4.540 max/2	1137
4.541 max/3	1137
4.542 max_clauses/1	1137
4.543 max_inv_preds/1	1138
4.544 max_size/1	1138
4.545 maybe/0	1138
4.546 maybe/1	1138
4.547 maybe/2	1138
4.548 maybe_call/1	1138
4.549 maybe_call/2	1138
4.550 mean_deviation/2	1138
4.551 median/2	1139
4.552 median_deviation/2	1139
4.553 meets/2	1139
4.554 member/2	1139
4.555 memberchk/2	1139
4.556 merge/3	1139
4.557 message_hook/4	1139
4.558 message_prefix_file/6	1140
4.559 message_prefix_stream/4	1140
4.560 message_tokens//2	1140
4.561 met_by/2	1140
4.562 meta_type/3	1140
4.563 metarule/6	1140
4.564 metarule_next_id/1	1140
4.565 min/2	1140
4.566 min/3	1141
4.567 min_clauses/1	1141
4.568 min_max/3	1141
4.569 modes/2	1141
4.570 module_property/2	1141
4.571 monitor/1	1141
4.572 monitor/4	1141
4.573 monitor_activated/0	1141
4.574 monitored/1	1142
4.575 monitors/1	1142
4.576 msort/2	1142
4.577 msort/3	1142
4.578 mutation/3	1142
4.579 name/1	1142
4.580 name_of_day/3	1142
4.581 name_of_month/3	1142
4.582 natural//1	1143
4.583 new/1	1143
4.584 new/2	1143
4.585 new/3	1143
4.586 new_line//0	1143

4.587	new_lines/0	1143
4.588	next/2	1143
4.589	next/3	1144
4.590	next/4	1144
4.591	nextto/3	1144
4.592	node/7	1144
4.593	nodebug/0	1144
4.594	nolog/3	1144
4.595	nologall/0	1144
4.596	non_blank//1	1144
4.597	non_blanks//1	1145
4.598	normal/3	1145
4.599	normal_element/2	1145
4.600	normalize_range/2	1145
4.601	normalize_range/4	1145
4.602	normalize_scalar/2	1145
4.603	normalize_unit/2	1145
4.604	nospy/1	1145
4.605	nospy/3	1146
4.606	nospy/4	1146
4.607	nospyall/0	1146
4.608	note/2	1146
4.609	note/3	1146
4.610	notrace/0	1146
4.611	now/3	1146
4.612	nth0/3	1146
4.613	nth0/4	1147
4.614	nth1/3	1147
4.615	nth1/4	1147
4.616	null/1	1147
4.617	null_device_path/1	1147
4.618	number//1	1147
4.619	number_of_tests/1	1147
4.620	numbervars/1	1148
4.621	numbervars/3	1148
4.622	occurrences/2	1148
4.623	occurrences/3	1148
4.624	occurs/2	1148
4.625	of/2	1148
4.626	of_expected/2	1148
4.627	of_unexpected/2	1148
4.628	one_or_more//0	1149
4.629	one_or_more//1	1149
4.630	one_or_more//2	1149
4.631	operating_system_machine/1	1149
4.632	operating_system_name/1	1149
4.633	operating_system_release/1	1149
4.634	operating_system_type/1	1149
4.635	option/2	1149
4.636	option/3	1150
4.637	or/2	1150
4.638	or_else/2	1150
4.639	or_else_call/2	1150
4.640	or_else_fail/1	1150

4.641	or_else_get/2	1150
4.642	or_else_throw/1	1150
4.643	or_else_throw/2	1151
4.644	orphaned/0	1151
4.645	orphaned/2	1151
4.646	outdated/0	1151
4.647	outdated/1	1151
4.648	outdated/2	1151
4.649	outdated/4	1151
4.650	outdated/5	1151
4.651	output_file_name/2	1152
4.652	overlapped_by/2	1152
4.653	overlaps/2	1152
4.654	parent/1	1152
4.655	parenthesis/2	1152
4.656	parents/1	1152
4.657	parse/2	1152
4.658	parse/3	1153
4.659	parse_domain/2	1153
4.660	parse_domain/3	1153
4.661	parse_problem/2	1153
4.662	parse_problem/3	1153
4.663	partial_map/4	1153
4.664	partition/3	1153
4.665	partition/4	1153
4.666	partition/5	1154
4.667	partition/6	1154
4.668	path_concat/3	1154
4.669	permutation/2	1154
4.670	pid/1	1154
4.671	pin/0	1154
4.672	pin/1	1154
4.673	pinned/1	1154
4.674	plus/3	1155
4.675	poisson/2	1155
4.676	port/5	1155
4.677	portray_clause/1	1155
4.678	postorder/2	1155
4.679	power/2	1155
4.680	power_sequence/4	1155
4.681	powerset/2	1155
4.682	pp/1	1156
4.683	pprint/1	1156
4.684	predicate/2	1156
4.685	predicate_info_pair_score_hook/4	1156
4.686	predicate_info_score_hook/3	1156
4.687	predicate_mode_score_hook/3	1156
4.688	predicate_mode_score_hook/5	1156
4.689	predicates/2	1156
4.690	prefix/0	1157
4.691	prefix/1	1157
4.692	prefix/2	1157
4.693	prefix/3	1157
4.694	preorder/2	1157

4.695	previous/2	1157
4.696	previous/3	1157
4.697	previous/4	1157
4.698	print_flags/0	1158
4.699	print_flags/1	1158
4.700	print_message/3	1158
4.701	print_message_token/4	1158
4.702	print_message_tokens/3	1158
4.703	product/2	1158
4.704	product/3	1158
4.705	program_to_clauses/2	1158
4.706	proper_prefix/2	1159
4.707	proper_prefix/3	1159
4.708	proper_suffix/2	1159
4.709	proper_suffix/3	1159
4.710	prove/2	1159
4.711	prove/3	1159
4.712	provides/2	1159
4.713	question_hook/6	1159
4.714	question_prompt_stream/4	1160
4.715	quick_check/1	1160
4.716	quick_check/2	1160
4.717	quick_check/3	1160
4.718	random/1	1160
4.719	random/3	1160
4.720	random_node/1	1160
4.721	random_tree/1	1160
4.722	randomize/1	1161
4.723	randseq/4	1161
4.724	randset/4	1161
4.725	range/2	1161
4.726	rdirectories/1	1161
4.727	rdirectories/2	1161
4.728	rdirectory/1	1161
4.729	rdirectory/2	1162
4.730	rdirectory/3	1162
4.731	rdirectory_score/2	1162
4.732	read_file/2	1162
4.733	read_file/3	1162
4.734	read_file_by_line/2	1162
4.735	read_file_by_line/3	1163
4.736	read_from_atom/2	1163
4.737	read_from_chars/2	1163
4.738	read_from_codes/2	1163
4.739	read_only_device_path/1	1163
4.740	read_stream/2	1163
4.741	read_stream/3	1163
4.742	read_stream_by_line/2	1164
4.743	read_stream_by_line/3	1164
4.744	read_term_from_atom/3	1164
4.745	read_term_from_chars/3	1164
4.746	read_term_from_chars/4	1164
4.747	read_term_from_codes/3	1164
4.748	read_term_from_codes/4	1164

4.749	readme/1	1164
4.750	readme/2	1165
4.751	recorda/2	1165
4.752	recorda/3	1165
4.753	recorded/2	1165
4.754	recorded/3	1165
4.755	recordz/2	1165
4.756	recordz/3	1165
4.757	relative_standard_deviation/2	1165
4.758	removeDependent/1	1166
4.759	remove_duplicates/2	1166
4.760	rename_file/2	1166
4.761	replace/3	1166
4.762	replace_sub_atom/4	1166
4.763	rescale/3	1166
4.764	reset/0	1166
4.765	reset/1	1167
4.766	reset_counter/1	1167
4.767	reset_counters/0	1167
4.768	reset_flags/0	1167
4.769	reset_flags/1	1167
4.770	reset_genint/0	1167
4.771	reset_genint/1	1167
4.772	reset_gensym/0	1167
4.773	reset_gensym/1	1168
4.774	reset_monitor/0	1168
4.775	reset_seed/0	1168
4.776	restore/1	1168
4.777	restore/2	1168
4.778	reverse/2	1168
4.779	rewind/2	1168
4.780	rewind/3	1168
4.781	rlibraries/1	1169
4.782	rlibraries/2	1169
4.783	rlibrary/1	1169
4.784	rlibrary/2	1169
4.785	rlibrary_score/2	1169
4.786	rule/2	1169
4.787	rule/3	1170
4.788	rule/4	1170
4.789	run/0	1170
4.790	run/1	1170
4.791	run/2	1170
4.792	run_test_sets/1	1170
4.793	same_length/2	1170
4.794	same_length/3	1170
4.795	save/0	1171
4.796	save/1	1171
4.797	save/2	1171
4.798	scalar_product/3	1171
4.799	scan_left/4	1171
4.800	scan_left_1/3	1171
4.801	scan_right/4	1171
4.802	scan_right_1/3	1171

4.803 search/1	1172
4.804 secondary_header/2	1172
4.805 secondary_header_flag/2	1172
4.806 secondary_header_time/2	1172
4.807 select/3	1172
4.808 select/4	1172
4.809 selectchk/3	1172
4.810 selectchk/4	1173
4.811 send/3	1173
4.812 sequence/3	1173
4.813 sequence/4	1173
4.814 sequence/5	1173
4.815 sequence_count/2	1173
4.816 sequence_flags/2	1173
4.817 sequential_occurrences/2	1173
4.818 sequential_occurrences/3	1174
4.819 serve/3	1174
4.820 set/1	1174
4.821 set/4	1174
4.822 set_element/2	1174
4.823 set_field/2	1174
4.824 set_flag_value/2	1174
4.825 set_flag_value/3	1174
4.826 set_monitor/4	1175
4.827 set_seed/1	1175
4.828 set_spy_point/4	1175
4.829 set_write_max_depth/1	1175
4.830 setup/0	1175
4.831 shell/1	1175
4.832 shell/2	1175
4.833 shell_command/1	1175
4.834 shrink/3	1176
4.835 shrink_sequence/3	1176
4.836 shrinker/1	1176
4.837 sign//1	1176
4.838 singletons/2	1176
4.839 size/2	1176
4.840 skewness/2	1176
4.841 sleep/1	1176
4.842 softmax/2	1177
4.843 softmax/3	1177
4.844 sort/2	1177
4.845 sort/3	1177
4.846 sort/4	1177
4.847 source_file_extension/1	1177
4.848 space//0	1177
4.849 spaces//0	1177
4.850 split/3	1178
4.851 split/4	1178
4.852 spy/1	1178
4.853 spy/3	1178
4.854 spy/4	1178
4.855 spy_point/4	1178
4.856 spying/1	1178

4.857	spying/3	1178
4.858	spying/4	1179
4.859	standard_cauchy/3	1179
4.860	standard_deviation/2	1179
4.861	standard_exponential/1	1179
4.862	standard_gamma/2	1179
4.863	standard_normal/1	1179
4.864	standard_t/2	1179
4.865	start/0	1179
4.866	start_redirect_to_file/2	1180
4.867	started_by/2	1180
4.868	starts/2	1180
4.869	stop/0	1180
4.870	stop_redirect_to_file/0	1180
4.871	stream_to_bytes/2	1180
4.872	stream_to_bytes/3	1180
4.873	stream_to_chars/2	1180
4.874	stream_to_chars/3	1181
4.875	stream_to_codes/2	1181
4.876	stream_to_codes/3	1181
4.877	stream_to_terms/2	1181
4.878	stream_to_terms/3	1181
4.879	subclass/1	1181
4.880	subclasses/1	1181
4.881	sublist/2	1181
4.882	subsequence/3	1182
4.883	subsequence/4	1182
4.884	subset/2	1182
4.885	substitute/4	1182
4.886	subsumes/2	1182
4.887	subterm/2	1182
4.888	subtract/3	1182
4.889	succ/2	1182
4.890	suffix/2	1183
4.891	suffix/3	1183
4.892	sum/2	1183
4.893	superclass/1	1183
4.894	superclasses/1	1183
4.895	suspend_monitor/0	1183
4.896	swap/2	1183
4.897	swap_consecutive/2	1183
4.898	syndiff/3	1184
4.899	tab/0	1184
4.900	tabs/0	1184
4.901	take/3	1184
4.902	temporary_directory/1	1184
4.903	term_expansion/2	1184
4.904	terms_to_array/2	1184
4.905	test/1	1184
4.906	time_stamp/1	1185
4.907	timeout/1	1185
4.908	timestamp/2	1185
4.909	timestamp/8	1185
4.910	today/3	1185

4.911 tolerance_equal/4	1185
4.912 tool/1	1185
4.913 tools/0	1185
4.914 top/3	1186
4.915 top_next/5	1186
4.916 trace/0	1186
4.917 trace_event/2	1186
4.918 transpose/2	1186
4.919 triangular/4	1186
4.920 true/1	1186
4.921 type/1	1186
4.922 type/2	1187
4.923 unexpected/1	1187
4.924 unexpecteds/2	1187
4.925 uniform/1	1187
4.926 uniform/3	1187
4.927 uninstall/0	1187
4.928 uninstall/1	1187
4.929 uninstall/2	1187
4.930 union/3	1188
4.931 union/4	1188
4.932 union_all/3	1188
4.933 unpin/0	1188
4.934 unpin/1	1188
4.935 unzip/2	1188
4.936 update/0	1188
4.937 update/1	1189
4.938 update/2	1189
4.939 update/3	1189
4.940 update/4	1189
4.941 update/5	1189
4.942 update_in/4	1189
4.943 update_in/5	1189
4.944 user_data/2	1190
4.945 uuid_null/1	1190
4.946 uuid_v1/2	1190
4.947 uuid_v4/1	1190
4.948 valid/1	1190
4.949 valid/2	1190
4.950 valid/3	1190
4.951 valid_date/3	1191
4.952 valid_option/1	1191
4.953 valid_options/1	1191
4.954 validate/1	1191
4.955 value/1	1191
4.956 value/3	1191
4.957 value_reference/2	1191
4.958 values/2	1191
4.959 variables/2	1192
4.960 variance/2	1192
4.961 variant/2	1192
4.962 varnumbers/2	1192
4.963 varnumbers/3	1192
4.964 verify_commands_availability/0	1192

4.965	version/2	1192
4.966	version/6	1192
4.967	versions/3	1193
4.968	void/1	1193
4.969	void_element/1	1193
4.970	von_mises/3	1193
4.971	wald/3	1193
4.972	wall_time/1	1193
4.973	weibull/3	1193
4.974	weighted_mean/3	1193
4.975	welcome/0	1194
4.976	when/2	1194
4.977	whiledo/2	1194
4.978	white_space//0	1194
4.979	white_spaces//0	1194
4.980	with_output_to/2	1194
4.981	without//2	1194
4.982	working_directory/1	1194
4.983	write_file/3	1195
4.984	write_max_depth/1	1195
4.985	write_stream/3	1195
4.986	write_term_to_atom/3	1195
4.987	write_term_to_chars/3	1195
4.988	write_term_to_chars/4	1195
4.989	write_term_to_codes/3	1195
4.990	write_term_to_codes/4	1195
4.991	write_to_atom/2	1196
4.992	write_to_chars/2	1196
4.993	write_to_codes/2	1196
4.994	z_normalization/2	1196
4.995	zero_or_more//0	1196
4.996	zero_or_more//1	1196
4.997	zero_or_more//2	1196
4.998	zip/2	1196
4.999	zip/3	1197
4.1000	zip_at_index/4	1197
5	Indices and tables	1199
	Index	1201

LIBRARIES

To load any library (including developer tools, ports, and contributions), use the goal `logtalk_load(library_name(loader))`. To run the library tests, use the goal `logtalk_load(library_name(tester))`. To load an entity, always load the loader file of the library that includes it to ensure that all required dependencies are also loaded and that any required flags are used. The loading goal can be found in the entity documentation.

1.1 arbitrary

category

1.1.1 arbitrary

Adds predicates for generating and shrinking random values for selected types to the library type object. User extensible.

Availability:

`logtalk_load(arbitrary(loader))`

Author: Paulo Moura

Version: 2:35:1

Date: 2024-08-13

Compilation flags:

`static`

Complements:

`type`

Uses:

`fast_random`

`integer`

`list`

`type`

Remarks:

- Logtalk specific types: `entity`, `object`, `protocol`, `category`, `entity_identifier`, `object_identifier`, `protocol_identifier`, `category_identifier`, `event`, `predicate`.
- Prolog module related types (when the backend compiler supports modules): `module`, `module_identifier`, `qualified_callable`.
- Prolog base types: `term`, `var`, `nonvar`, `atomic`, `atom`, `number`, `integer`, `float`, `compound`, `callable`, `ground`.
- Atom derived types: `non_quoted_atom`, `non_empty_atom`, `non_empty_atom(CharSet)`, `boolean`, `character`, `in_character`, `char`, `operator_specifier`, `hex_char`.
- Atom derived parametric types: `atom(CharSet)`, `atom(CharSet,Length)`, `non_empty_atom(CharSet)`, `character(CharSet)`, `in_character(CharSet)`, `char(CharSet)`.
- Number derived types: `positive_number`, `negative_number`, `non_positive_number`, `non_negative_number`.
- Float derived types: `positive_float`, `negative_float`, `non_positive_float`, `non_negative_float`, `probability`.
- Integer derived types: `positive_integer`, `negative_integer`, `non_positive_integer`, `non_negative_integer`, `byte`, `in_byte`, `character_code`, `in_character_code`, `code`, `operator_priority`, `hex_code`.
- Integer derived parametric types: `character_code(CharSet)`, `in_character_code(CharSet)`, `code(CharSet)`.
- List types (compound derived types): `list`, `non_empty_list`, `partial_list`, `list_or_partial_list`, `list(Type)`, `list(Type,Length)`, `list(Type,Min,Max)`, `list(Type,Length,Min,Max)`, `non_empty_list(Type)`, `codes`, `chars`.
- Difference list types (compound derived types): `difference_list`, `difference_list(Type)`.
- List and difference list types length: The types that do not take a fixed length generate lists with a length in the `[0,MaxSize]` interval (`[1,MaxSize]` for non-empty list types).
- Predicate and non-terminal indicator types arity: These types generate indicators with an arity in the `[0,MaxSize]` interval.
- Other compound derived types: `compound(Name,Types)`, `predicate_indicator`, `non_terminal_indicator`, `predicate_or_non_terminal_indicator`, `clause`, `grammar_rule`, `pair`, `pair(KeyType,ValueType)`.
- Other types: `Object::Closure`, `between(Type,Lower,Upper)`, `property(Type,LambdaExpression)`, `one_of(Type,Set)`, `var_or(Type)`, `ground(Type)`, `types(Types)`, `types_frequency(Pairs)`, `transform(Type,Closure)`, `constrain(Type,Closure)`.
- Type `Object::Closure` notes: Allows calling public object predicates as generators and shrinkers. The `Closure` closure is extended with either a single argument, the generated arbitrary value, or with two arguments, when shrinking a value.
- Type `compound(Name,Types)` notes: Generate a random compound term with the given name with a random argument for each type.
- Type `types_frequency(Pairs)` notes: Generate a random term for one of the types in a list of Type-Frequency pairs. The type is randomly selected taking into account the types frequency.
- Type `transform(Type,Closure)` notes: Generate a random term by transforming the term generated for the given type using the given closure.

- `Type constrain(Type,Closure)` notes: Generate a random term for the given type that satisfy the given closure.
- Registering new types: Add clauses for the arbitrary/1-2 multifile predicates and optionally for the shrinker/1 and shrink/3 multifile predicates. The clauses must have a bound first argument to avoid introducing spurious choice-points.
- Shrinking values: The shrink/3 should either succeed or fail but never throw an exception.
- Character sets: `ascii_identifier`, `ascii_printable`, `ascii_full`, `byte`, `unicode_bmp`, `unicode_full`.
- Default character sets: The default character set when using a parameterizable type that takes a character set parameter depends on the type.
- Default character sets: Entity, predicate, and non-terminal identifier types plus compound and callable types default to an `ascii_identifier` functor. Character and character code types default to `ascii_full`. Other types default to `ascii_printable`.
- Caveats: The type argument (and any type parameterization) to the predicates is not type-checked (or checked for consistency) for performance reasons.
- Unicode limitations: Currently, correct character/code generation is only ensured for SWI-Prolog and XVM as other backends do not provide support for querying a Unicode code point category.

Inherited public predicates:

(none)

- Public predicates
 - `arbitrary/1`
 - `arbitrary/2`
 - `shrinker/1`
 - `shrink/3`
 - `shrink_sequence/3`
 - `edge_case/2`
 - `get_seed/1`
 - `set_seed/1`
 - `max_size/1`
- Protected predicates
- Private predicates
- Operators

Public predicates**arbitrary/1**

Table of defined types for which an arbitrary value can be generated. A new type can be registered by defining a clause for this predicate and adding a clause for the arbitrary/2 multifile predicate.

Compilation flags:

static, multifile

Template:

arbitrary(Type)

Mode and number of proofs:

arbitrary(?callable) - zero_or_more

arbitrary/2

Generates an arbitrary term of the specified type. Fails if the type is not supported. A new generator can be defined by adding a clause for this predicate and registering it via the arbitrary/1 predicate.

Compilation flags:

static, multifile

Template:

arbitrary(Type,Term)

Meta-predicate template:

arbitrary(:,*)

Mode and number of proofs:

arbitrary(@callable,-term) - zero_or_one

shrinker/1

Table of defined types for which a shrinker is provided. A new shrinker can be registered by defining a clause for this predicate and adding a definition for the shrink/3 multifile predicate.

Compilation flags:

static, multifile

Template:

shrinker(Type)

Mode and number of proofs:

shrinker(?callable) - zero_or_more

shrink/3

Shrinks a value to a smaller value if possible. Must generate a finite number of solutions. Fails if the type is not supported. A new shrinker can be defined by adding a clause for this predicate and registering it via the shrinker/1 predicate.

Compilation flags:

static, multifile

Template:

shrink(Type, Large, Small)

Mode and number of proofs:

shrink(@callable, @term, -term) - zero_or_more

shrink_sequence/3

Shrinks a value repeatedly until shrinking is no longer possible returning the sequence of values (ordered from larger to smaller value). Fails if the type is not supported.

Compilation flags:

static

Template:

shrink_sequence(Type, Value, Sequence)

Mode and number of proofs:

shrink_sequence(@callable, @term, -list(term)) - zero_or_one

edge_case/2

Table of type edge cases. Fails if the given type have no defined edge cases. New edge cases for existing or new types can be added by defining a clause for this multifile predicate.

Compilation flags:
static, multifile

Template:
edge_case(Type,Term)
Mode and number of proofs:
edge_case(?callable,?term) - zero_or_more

get_seed/1

Gets the current random generator seed. Seed should be regarded as an opaque ground term.

Compilation flags:
static

Template:
get_seed(Seed)
Mode and number of proofs:
get_seed(-ground) - one

set_seed/1

Sets the random generator seed to a given value returned by calling the get_seed/1 predicate.

Compilation flags:
static

Template:
set_seed(Seed)
Mode and number of proofs:
set_seed(+ground) - one

`max_size/1`

User defined maximum size for types where its meaningful and implicit. When not defined, defaults to 42. When multiple definitions exist, the first valid one found is used.

Compilation flags:
static, multifile

Template:
max_size(Size)
Mode and number of proofs:
max_size(?positive_integer) - zero_or_one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

[type](#)

1.2 assertions

object

1.2.1 assertions

Proxy object for simplifying the use of the assertion meta-predicates.

Availability:

```
logtalk_load(assertions(loader))
```

Author: Paulo Moura

Version: 2:0:0

Date: 2014-04-03

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public assertions(_)
```

Remarks:

```
(none)
```

Inherited public predicates:

```
assertion/1 assertion/2 goal_expansion/2 term_expansion/2
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.2.2 assertions(Mode)

A simple assertions framework. Can be used as a hook object for either suppressing assertions (production mode) or expanding them with file context information (debug mode).

Availability:

```
logtalk_load(assertions(loader))
```

Author: Paulo Moura

Version: 2:2:2

Date: 2022-07-04

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public expanding
```

Uses:

```
logtalk
```

Remarks:

```
(none)
```

Inherited public predicates:

```
goal_expansion/2 term_expansion/2
```

- Public predicates
 - `assertion/1`
 - `assertion/2`
- Protected predicates
- Private predicates
- Operators

Public predicates

`assertion/1`

Checks that an assertion is true. Uses the structured message printing mechanism for printing the results using a silent message for assertion success and a error message for assertion failure.

Compilation flags:

`static`

Template:

`assertion(Goal)`

Meta-predicate template:

`assertion(0)`

Mode and number of proofs:

`assertion(@callable) - one`

`assertion/2`

Checks that an assertion is true. Uses the structured message printing mechanism for printing the results using a silent message for assertion success and a error message for assertion failure. The context argument can be used to e.g. pass location data.

Compilation flags:

`static`

Template:

`assertion(Context,Goal)`

Meta-predicate template:

`assertion(*,0)`

Mode and number of proofs:

assertion(@term,@callable) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.2.3 assertions_messages

Assertions framework default message translations.

Availability:

logtalk_load(assertions(loader))

Author: Paulo Moura

Version: 2:2:0

Date: 2018-02-20

Compilation flags:

static

Provides:

logtalk::message_prefix_stream/4

logtalk::message_tokens//2

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.3 assignvars

object

1.3.1 assignvars

Assignable variables (supporting backtracable assignment of non-variable terms).

Availability:

```
logtalk_load(assignvars(loader))
```

Author: Nobukuni Kino and Paulo Moura

Version: 1:7:0

Date: 2018-07-11

Compilation flags:

```
static, context_switching_calls
```

Implements:

public assignvarsp

Remarks:

(none)

Inherited public predicates:

(<=)/2 (=)/2 assignable/1 assignable/2

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.3.2 assignvarsp

Assignable variables (supporting backtracable assignment of non-variable terms) protocol.

Availability:

logtalk_load(assignvars(loader))

Author: Nobukuni Kino and Paulo Moura

Version: 1:0:1

Date: 2019-06-10

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - assignable/1
 - assignable/2
 - (\leq)/2
 - (\geq)/2
- Protected predicates
- Private predicates
- Operators
 - op(100,xfx, \leq)
 - op(100,xfx, \geq)

Public predicates

assignable/1

Makes Variable an assignable variable. Initial state will be empty.

Compilation flags:

static

Template:

assignable(Variable)

Mode and number of proofs:

assignable(--assignvar) - one

Exceptions:

Variable is not a variable:

`type__error(variable,Variable)`

`assignable/2`

Makes Variable an assignable variable and sets its initial state to Value.

Compilation flags:

`static`

Template:

`assignable(Variable,Value)`

Mode and number of proofs:

`assignable(--assignvar,@nonvar) - one`

Exceptions:

Variable is not a variable:

`type__error(variable,Variable)`

Value is not instantiated:

`instantiation__error`

`(<=)/2`

Sets the state of the assignable variable Variable to Value (initializing the variable if needed).

Compilation flags:

`static`

Template:

`Variable<=Value`

Mode and number of proofs:

`(?assignvar)<=(@nonvar) - one`

Exceptions:

Value is not instantiated:

`instantiation__error`

$(=>)/2$

Unifies Value with the current state of the assignable variable Variable.

Compilation flags:
static

Template:
Variable=>Value
Mode and number of proofs:
+assignvar=> ?nonvar - zero_or_one

Exceptions:
Variable is not instantiated:
instantiation_error

Protected predicates

(none)

Private predicates

(none)

Operators

op(100,xfx,<=)

Scope:
public

`op(100,xfx,=>)`

Scope:

public

➡ See also

[assignvars](#)

1.4 base64

object

1.4.1 base64

Base64 parser and generator.

Availability:

`logtalk_load(base64(loader))`

Author: Paulo Moura

Version: 0:10:0

Date: 2021-03-22

Compilation flags:

`static, context_switching_calls`

Uses:

[reader](#)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - parse/2
 - generate/2
- Protected predicates
- Private predicates
- Operators

Public predicates

parse/2

Parses the Base64 data from the given source (atom(Atom), chars(List), codes(List), stream(Stream), or file(Path)) into a list of bytes.

Compilation flags:

static

Template:

parse(Source,Bytes)

Mode and number of proofs:

parse(++compound,--list(byte)) - one_or_error

generate/2

Generates Base64 in the representation specified in the first argument (atom(Atom), chars(List), codes(List), stream(Stream), or file(Path)) for the list of bytes in the second argument.

Compilation flags:

static

Template:

generate(Sink,Bytes)

Mode and number of proofs:

generate(+compound,+list(byte)) - one_or_error

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.4.2 base64url

Base64URL parser and generator.

Availability:

logtalk_load(base64(loader))

Author: Paulo Moura

Version: 0:9:0

Date: 2021-03-10

Compilation flags:

static, context_switching_calls

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - parse/2
 - generate/2

- Protected predicates
- Private predicates
- Operators

Public predicates

`parse/2`

Parses the Base64URL data from the given source (`atom(Atom)`, `chars(List)`, or `codes(List)`) into a URL (using the same format as the source).

Compilation flags:

`static`

Template:

`parse(Source,URL)`

Mode and number of proofs:

`parse(++compound,--types([atom,chars,codes])) - one_or_error`

`generate/2`

Generates Base64URL data in the representation specified in the first argument (`atom(Atom)`, `chars(List)`, or `codes(List)`) for the given URL (given in the same format as the sink).

Compilation flags:

`static`

Template:

`generate(Sink,URL)`

Mode and number of proofs:

`generate(+compound,+types([atom,chars,codes])) - one_or_error`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.5 cbor

object

1.5.1 cbor

Concise Binary Object Representation (CBOR) format exporter and importer. Uses atoms to represent decoded CBOR strings.

Availability:

`logtalk__load(cbor(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2021-03-04

Compilation flags:

`static, context_switching_calls`

Extends:

`public cbor(atom)`

Remarks:

(none)

Inherited public predicates:

`generate/2 parse/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.5.2 cbor(StringRepresentation)

- StringRepresentation - Text representation to be used when decoding CBOR strings. Possible values are atom (default), chars, and codes.

Concise Binary Object Representation (CBOR) format exporter and importer.

Availability:

`logtalk_load(cbor(loader))`

Author: Paulo Moura

Version: 0:11:1

Date: 2021-12-06

Compilation flags:

`static, context_switching_calls`

Uses:

[list](#)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - parse/2
 - generate/2
- Protected predicates
- Private predicates
- Operators

Public predicates

parse/2

Parses a list of bytes in the CBOR format returning the corresponding term representation. Throws an error when parsing is not possible (usually due to an invalid byte sequence).

Compilation flags:

static

Template:

parse(Bytes,Term)

Mode and number of proofs:

parse(@list(byte),-ground) - one_or_error

generate/2

Generates a list of bytes in the CBOR format representing the given term. Throws an error when generating is not possible (usually due to a term that have no CBOR corresponding representation).

Compilation flags:

static

Template:

```
generate(Term,Bytes)
Mode and number of proofs:
generate(@ground,-list(byte)) - one_or_error
```

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.6 ccsds

object

1.6.1 ccsds

CCSDS Space Packet parser with no secondary header parsing. For secondary header support, use `ccsds(Length)` where `Length` is the secondary header size in bytes.

Availability:

```
logtalk_load(ccsds(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2025-12-05

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public ccsds(0)
```

Remarks:

(none)

Inherited public predicates:

apid/2 data_length/2 generate/2 generate/3 parse/2 secondary_header/2
secondary_header_flag/2 secondary_header_time/2 sequence_count/2 sequence_flags/2 type/2
user_data/2 version/2

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.6.2 ccsds(SecondaryHeaderLength)

- SecondaryHeaderLength - Length in bytes of the secondary header when present (0 for no secondary header parsing, or a positive integer).

CCSDS Space Packet parser following the CCSDS 133.0-B-2 standard. Parses binary packet data including optional secondary headers.

Availability:

logtalk_load(ccsds(loader))

Author: Paulo Moura

Version: 0:5:0

Date: 2025-12-15

Compilation flags:

static, context_switching_calls

Uses:

list

reader

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - parse/2
 - generate/2
 - generate/3
 - version/2
 - type/2
 - secondary_header_flag/2
 - apid/2
 - sequence_flags/2
 - sequence_count/2
 - data_length/2
 - user_data/2
 - secondary_header/2
 - secondary_header_time/2
- Protected predicates
- Private predicates
- Operators

Public predicates

parse/2

Parses CCSDS packet(s) from a source into a list of packet terms. The source can be file(File), stream(Stream), or bytes(Bytes).

Compilation flags:

static

Template:

parse(Source,Packets)

Mode and number of proofs:

parse(+compound,-list(compound)) - one_or_error

Exceptions:

Source is a variable:

instantiation_error

Source is neither a variable nor a valid source:

domain_error(ccsds_source,Source)

Source is a valid source but the data cannot be parsed as a CCSDS packet:

domain_error(ccsds_byte_sequence,Bytes)

generate/2

Generates CCSDS packet bytes to a sink from a list of packet terms. The sink can be file(File), stream(Stream), or bytes(Bytes). For file(File) and stream(Stream), writes to the binary file or stream. For bytes(Bytes), unifies Bytes with the generated byte list.

Compilation flags:

static

Template:

generate(Sink,Packets)

Mode and number of proofs:

generate(+compound,+list(compound)) - one_or_error

Exceptions:

Sink is a variable:

instantiation_error

Sink is neither a variable nor a valid sink:

`domain_error(ccsds_sink,Sink)`

Packets is a partial list or a list with an element Packet which is a variable:

`instantiation_error`

An element Packet of the list Packets is neither a variable nor a valid CCSDS packet term:

`domain_error(ccsds_packet_term,Packet)`

`generate/3`

Generates a list of bytes from a CCSDS packet term with an open tail. Mainly used when generating arbitrary CCSDS packets.

Compilation flags:

`static`

Template:

`generate(Packet,Bytes,Tail)`

Mode and number of proofs:

`generate(+compound,-list(byte),--variable) - one_or_error`

Exceptions:

Packet is a variable:

`instantiation_error`

Packet is neither a variable nor a valid CCSDS packet term:

`domain_error(ccsds_packet_term,Packet)`

`version/2`

Extracts the version number from a packet (always 0 for CCSDS Space Packets).

Compilation flags:

`static`

Template:

`version(Packet,Version)`

Mode and number of proofs:

`version(+compound,-integer) - one`

type/2

Extracts the packet type from a packet. Returns telemetry or telecommand.

Compilation flags:

static

Template:

type(Packet,Type)

Mode and number of proofs:

type(+compound,-atom) - one

secondary_header_flag/2

Extracts the secondary header flag. Returns absent or present.

Compilation flags:

static

Template:

secondary_header_flag(Packet,Flag)

Mode and number of proofs:

secondary_header_flag(+compound,-atom) - one

apid/2

Extracts the Application Process Identifier (APID) from a packet.

Compilation flags:

static

Template:

apid(Packet,APID)

Mode and number of proofs:

apid(+compound,-integer) - one

`sequence_flags/2`

Extracts the sequence flags. Returns continuation, first, last, or standalone.

Compilation flags:

`static`

Template:

`sequence_flags(Packet,Flags)`

Mode and number of proofs:

`sequence_flags(+compound,-atom) - one`

`sequence_count/2`

Extracts the packet sequence count (0-16383).

Compilation flags:

`static`

Template:

`sequence_count(Packet,Count)`

Mode and number of proofs:

`sequence_count(+compound,-integer) - one`

`data_length/2`

Extracts the packet data length field value.

Compilation flags:

`static`

Template:

`data_length(Packet,Length)`

Mode and number of proofs:

`data_length(+compound,-integer) - one`

`user_data/2`

Extracts the user data field as a list of bytes.

Compilation flags:

`static`

Template:

`user_data(Packet,Data)`

Mode and number of proofs:

`user_data(+compound,-list(byte)) - one`

`secondary_header/2`

Extracts the secondary header. Returns none if not present, or `secondary_header(Bytes)` with the raw bytes.

Compilation flags:

`static`

Template:

`secondary_header(Packet,SecondaryHeader)`

Mode and number of proofs:

`secondary_header(+compound,-compound) - one`

`secondary_header_time/2`

Extracts time from a secondary header as `cuc_time(Coarse, Fine)` for CCSDS Unsegmented Time Code. Fails if no secondary header or time cannot be parsed.

Compilation flags:

`static`

Template:

`secondary_header_time(Packet,Time)`

Mode and number of proofs:

`secondary_header_time(+compound,-compound) - zero_or_one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.6.3 ccsds__types

Type definitions and arbitrary generators for CCSDS packets.

Availability:

`logtalk_load(ccsds(loader))`

Author: Paulo Moura

Version: 0:5:0

Date: 2025-12-15

Compilation flags:

`static`

Provides:

`type::type/1`

`type::check/2`

`arbitrary::arbitrary/1`

`arbitrary::arbitrary/2`

Uses:

`ccsds(SecondaryHeaderLength)`

`type`

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.7 code_metrics

object

1.7.1 cc_metric

Cyclomatic complexity metric. All defined predicates that are not called or updated are counted as graph connected components (the reasoning being that these predicates can be considered entry points). The score is represented by a non-negative integer.

Availability:

```
logtalk_load(code_metrics(loader))
```

Author: Paulo Moura

Version: 0:5:2

Date: 2024-05-15

Compilation flags:

static, context_switching_calls

Imports:

public code_metrics_utilities
public code_metric

Provides:

logtalk::message_tokens//2

Uses:

list
logtalk
numberlist

Remarks:

(none)

Inherited public predicates:

all/0 all/1 all_score/1 check_option/1 check_options/1 default_option/1 default_options/1
directory/1 directory/2 directory_score/2 entity/1 entity_score/2 file/1 file/2 file_score/2
format_entity_score//2 library/1 library/2 library_score/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory_score/2 rlibrary/1 rlibrary/2 rlibrary_score/2 valid_option/1
valid_options/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.7.2 code_metric

Core predicates for computing source code metrics.

Availability:

`logtalk_load(code_metrics(loader))`

Author: Ebrahim Azarisooreh and Paulo Moura

Version: 0:13:0

Date: 2025-10-06

Compilation flags:

`static`

Extends:

`public code_metrics_utilities`

`public options`

Uses:

`list`

`logtalk`

`os`

`type`

Remarks:

(none)

Inherited public predicates:

`check_option/1` `check_options/1` `default_option/1` `default_options/1` `option/2` `option/3`

`valid_option/1` `valid_options/1`

- Public predicates
 - entity/1
 - file/2
 - file/1
 - directory/2
 - directory/1
 - rdirectory/2
 - rdirectory/1
 - library/2
 - library/1
 - rlibrary/2
 - rlibrary/1
 - all/1
 - all/0
 - entity_score/2
 - library_score/2
 - rlibrary_score/2
 - file_score/2
 - directory_score/2
 - rdirectory_score/2
 - all_score/1
 - format_entity_score//2
- Protected predicates
 - process_entity/2
 - process_file/2
 - process_directory/2
 - process_rdirectory/2
 - process_library/2
 - process_rlibrary/2
 - process_all/1
 - sub_directory/2
 - sub_library/2
- Private predicates
- Operators

Public predicates

entity/1

Scans an entity and prints its metric score.

Compilation flags:

static

Template:

entity(Entity)

Mode and number of proofs:

entity(+term) - zero_or_one

file/2

Prints metric scores for all the entities defined in a loaded source file using the given options.

Compilation flags:

static

Template:

file(File,Options)

Mode and number of proofs:

file(+atom,+list(compound)) - zero_or_one

file/1

Prints metric scores for all the entities defined in a loaded source file using default options.

Compilation flags:

static

Template:

file(File)

Mode and number of proofs:

file(+atom) - zero_or_one

directory/2

Scans a directory and prints metric scores for all entities defined in its loaded source files using the given options.

Compilation flags:

static

Template:

directory(Directory,Options)

Mode and number of proofs:

directory(+atom,+list(compound)) - one

directory/1

Scans a directory and prints metric scores for all entities defined in its loaded source files using default options.

Compilation flags:

static

Template:

directory(Directory)

Mode and number of proofs:

directory(+atom) - one

rdirectory/2

Recursive version of the directory/1 predicate using the given options.

Compilation flags:

static

Template:

rdirectory(Directory,Options)

Mode and number of proofs:

rdirectory(+atom,+list(compound)) - one

rdirectory/1

Recursive version of the directory/1 predicate using default options.

Compilation flags:

static

Template:

rdirectory(Directory)

Mode and number of proofs:

rdirectory(+atom) - one

library/2

Prints metrics scores for all loaded entities from a given library using the given options.

Compilation flags:

static

Template:

library(Library,Options)

Mode and number of proofs:

library(+atom,+list(compound)) - one

library/1

Prints metrics scores for all loaded entities from a given library using default options.

Compilation flags:

static

Template:

library(Library)

Mode and number of proofs:

library(+atom) - one

rlibrary/2

Recursive version of the library/1 predicate using the given options.

Compilation flags:

static

Template:

rlibrary(Library,Options)

Mode and number of proofs:

rlibrary(+atom,+list(compound)) - one

rlibrary/1

Recursive version of the library/1 predicate using default options.

Compilation flags:

static

Template:

rlibrary(Library)

Mode and number of proofs:

rlibrary(+atom) - one

all/1

Scans all loaded entities and prints their metric scores using the given options.

Compilation flags:

static

Template:

all(Options)

Mode and number of proofs:

all(+list(compound)) - one

all/0

Scans all loaded entities and prints their metric scores using default options.

Compilation flags:

static

Mode and number of proofs:

all - one

entity_score/2

Score is a term that represents the metric score associated with a loaded entity. Fails if the metric does not apply.

Compilation flags:

static

Template:

entity_score(Entity,Score)

Mode and number of proofs:

entity_score(@entity_identifier,-ground) - zero_or_one

`library__score/2`

Score is a term that represents the metric score associated with a loaded library source files. Fails if the metric does not apply.

Compilation flags:

`static`

Template:

`library__score(Library,Score)`

Mode and number of proofs:

`library__score(@atom,-ground) - zero_or_one`

`rlibrary__score/2`

Score is a term that represents the metric score associated with loaded source files from a library and its sub-libraries. Fails if the metric does not apply.

Compilation flags:

`static`

Template:

`rlibrary__score(Library,Score)`

Mode and number of proofs:

`rlibrary__score(@atom,-ground) - zero_or_one`

`file__score/2`

Score is a term that represents the metric score associated with a loaded source file. Fails if the metric does not apply.

Compilation flags:

`static`

Template:

`file__score(File,Score)`

Mode and number of proofs:

`file_score(@atom,-ground) - zero_or_one`

`directory_score/2`

Score is a term that represents the metric score associated with loaded source files from a directory. Fails if the metric does not apply.

Compilation flags:

`static`

Template:

`directory_score(Directory,Score)`

Mode and number of proofs:

`directory_score(@atom,-ground) - zero_or_one`

`rdirectory_score/2`

Score is a term that represents the metric score associated with loaded source files from a directory and its sub-directories. Fails if the metric does not apply.

Compilation flags:

`static`

Template:

`rdirectory_score(Directory,Score)`

Mode and number of proofs:

`rdirectory_score(@atom,-ground) - zero_or_one`

`all_score/1`

Score is a term that represents the metric score associated with all loaded source files. Fails if the metric does not apply.

Compilation flags:

`static`

Template:

`all_score(Score)`

Mode and number of proofs:

`all_score(-ground) - zero_or_one`

`format_entity_score//2`

Formats the entity score for pretty printing.

Compilation flags:

`static`

Template:

`format_entity_score(Entity,Score)`

Mode and number of proofs:

`format_entity_score(@entity_identifier,+ground) - one`

Protected predicates

`process_entity/2`

Processes an entity of the given kind.

Compilation flags:

`static`

Template:

`process_entity(Kind,Entity)`

Mode and number of proofs:

`process_entity(+atom,@entity_identifier) - one`

`process_file/2`

Processes a source file using the given options.

Compilation flags:

`static`

Template:

`process_file(Path,Options)`

Mode and number of proofs:

`process_file(+atom,+list(compound)) - one`

`process_directory/2`

Processes a directory of source files using the given options.

Compilation flags:

`static`

Template:

`process_directory(Path,Options)`

Mode and number of proofs:

`process_directory(+atom,+list(compound)) - one`

`process_rdirectory/2`

Recursively process a directory of source files using the given options.

Compilation flags:

`static`

Template:

```
process_rdirectory(Path,Options)
```

Mode and number of proofs:

```
process_rdirectory(+atom,+list(compound)) - one
```

```
process_library/2
```

Processes a library of source files using the given options.

Compilation flags:

```
static
```

Template:

```
process_library(Library,Options)
```

Mode and number of proofs:

```
process_library(+atom,+list(compound)) - one
```

```
process_rlibrary/2
```

Recursively process a library of source files using the given options.

Compilation flags:

```
static
```

Template:

```
process_rlibrary(Library,Options)
```

Mode and number of proofs:

```
process_rlibrary(+atom,+list(compound)) - one
```

`process_all/1`

Processes all loaded source code using the given options.

Compilation flags:

`static`

Template:

`process_all(Options)`

Mode and number of proofs:

`process_all(+list(compound)) - one`

`sub_directory/2`

Enumerates, by backtracking, all directory sub-directories containing loaded files.

Compilation flags:

`static`

Template:

`sub_directory(Directory,SubDirectory)`

Mode and number of proofs:

`sub_directory(+atom,-atom) - one`

`sub_library/2`

Enumerates, by backtracking, all library sub-libraries.

Compilation flags:

`static`

Template:

`sub_library(Library,SubLibrary)`

Mode and number of proofs:

`sub_library(+atom,-atom) - one`

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.7.3 code_metrics

Helper object to apply all loaded code metrics.

Availability:

`logtalk_load(code_metrics(loader))`

Author: Ebrahim Azarisooreh and Paulo Moura

Version: 0:1:0

Date: 2017-12-31

Compilation flags:

`static, context_switching_calls`

Imports:

`public code_metric`

Uses:

`logtalk`

Remarks:

(none)

Inherited public predicates:

`all/0 all/1 all_score/1 check_option/1 check_options/1 default_option/1 default_options/1
directory/1 directory/2 directory_score/2 entity/1 entity_score/2 file/1 file/2 file_score/2
format_entity_score//2 library/1 library/2 library_score/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory_score/2 rlibrary/1 rlibrary/2 rlibrary_score/2 valid_option/1
valid_options/1`

- Public predicates
- Protected predicates

- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.7.4 code_metrics_messages

Message translations for the code_metrics tool.

Availability:

```
logtalk_load(code_metrics(loader))
```

Author: Ebrahim Azarisooreh and Paulo Moura

Version: 0:8:0

Date: 2022-05-05

Compilation flags:

```
static
```

Provides:

```
logtalk::message_prefix_stream/4
```

```
logtalk::message_tokens//2
```

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.7.5 code_metrics_utilities

Internal predicates for analyzing source code.

Availability:

logtalk_load(code_metrics(loader))

Author: Ebrahim Azarisooreh

Version: 0:7:0

Date: 2024-03-28

Compilation flags:

static

Uses:

list
logtalk

Remarks:

- Usage: This is meant to be imported by any metric added to the system.
- Predicate Scope: This is meant for internal use by metrics only. As such, all provided predicates are protected.

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
 - ancestor/4
 - current_entity/1
 - declares_predicate/2
 - defines_predicate/2
 - defines_predicate/3
 - entity_calls/3
 - entity_kind/2
 - entity_property/2
 - entity_updates/3
 - not_excluded_file/3
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

ancestor/4

True if Entity descends from Ancestor, and EntityKind and AncestorKind unify with their respective entity types.

Compilation flags:

static

Template:

ancestor(EntityKind,Entity,AncestorKind,Ancestor)

Mode and number of proofs:

ancestor(?entity,?entity__identifier,?entity,?entity__identifier) - zero_or_more

current_entity/1

True if Entity is a currently loaded entity.

Compilation flags:

static

Template:

current_entity(Entity)

Mode and number of proofs:

current_entity(?entity__identifier) - zero_or_more

`declares__predicate/2`

True if Entity declares Predicate internally.

Compilation flags:

static

Template:

`declares__predicate(Entity,Predicate)`

Mode and number of proofs:

`declares__predicate(?entity__identifier,?predicate__indicator) - zero_or_more`

`defines__predicate/2`

True if Entity defines an implementation of Predicate internally. Auxiliary predicates are excluded from results.

Compilation flags:

static

Template:

`defines__predicate(Entity,Predicate)`

Mode and number of proofs:

`defines__predicate(?entity__identifier,?predicate__indicator) - zero_or_more`

`defines__predicate/3`

Same as `defines__predicate/2`, except Property is unified with a property of the predicate.

Compilation flags:

static

Template:

`defines__predicate(Entity,Predicate,Property)`

Mode and number of proofs:

`defines__predicate(?entity__identifier,?predicate__indicator,?term) - zero_or_more`

`entity_calls/3`

True if a predicate `Caller` within `Entity` makes a `Call`.

Compilation flags:
static

Template:
entity_calls(`Entity`,`Caller`,`Call`)

Mode and number of proofs:
entity_calls(?entity__identifier,?predicate__indicator,?predicate__indicator) - zero_or_one

`entity_kind/2`

True if `Kind` defines `Entity` and is one of category, protocol, or object.

Compilation flags:
static

Template:
entity_kind(`Entity`,`Kind`)

Mode and number of proofs:
entity_kind(+entity__identifier,-entity) - zero_or_one

`entity_property/2`

True if `Property` is a valid property of `Entity`. `Entity` can be either a category, a protocol, or an object.

Compilation flags:
static

Template:
entity_property(`Entity`,`Property`)

Mode and number of proofs:

`entity_property(+entity_identifier,-term) - zero_or_more`

`entity_updates/3`

True if a predicate Updater within Entity makes a dynamic update to Updated (by using e.g. the `asserta/1` or `retract/1` predicates).

Compilation flags:

`static`

Template:

`entity_updates(Entity,Updater,Updated)`

Mode and number of proofs:

`entity_updates(+entity_identifier,?predicate_indicator,?predicate_indicator) - zero_or_one`

`not_excluded_file/3`

True if the file is not being excluded.

Compilation flags:

`static`

Template:

`not_excluded_file(ExcludedFiles,Path,Basename)`

Mode and number of proofs:

`not_excluded_file(+list(atom),+atom,+atom) - zero_or_one`

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.7.6 coupling__metric

Computes entity efferent coupling, afferent coupling, and instability.

Availability:

```
logtalk_load(code_metrics(loader))
```

Author: Ebrahim Azarisooreh and Paulo Moura

Version: 0:14:0

Date: 2024-03-27

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public code_metrics_utilities
```

```
public code_metric
```

Uses:

```
list
```

Remarks:

- Efferent coupling (Ce): Number of entities that an entity depends on.
- Afferent coupling (Ca): Number of entities that depend on an entity.
- Instability (I): Computed as $Ce / (Ce + Ca)$. Measures the entity resilience to change. Ranging from 0 to 1, with 0 indicating a maximally stable entity and 1 indicating a maximally unstable entity. Ideally, an entity is either maximally stable or maximally unstable.
- Abstractness (A): Computed as the ratio between the number of static predicates with scope directives without a local definition and the number of static predicates with scope directives. Measures the rigidity of an entity. Ranging from 0 to 1, with 0 indicating a fully concrete entity and 1 indicating a fully abstract entity.
- Entity score: Represented as the compound term `ce_ca_i_a(Ce,Ca,I,A)`.
- Dependencies count: Includes direct entity relations plus calls or dynamic updates to predicates in external objects or categories.

Inherited public predicates:

```

all/0 all/1 all_score/1 check_option/1 check_options/1 default_option/1 default_options/1
directory/1 directory/2 directory_score/2 entity/1 entity_score/2 file/1 file/2 file_score/2
format_entity_score//2 library/1 library/2 library_score/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory_score/2 rlibrary/1 rlibrary/2 rlibrary_score/2 valid_option/1
valid_options/1

```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.7.7 dit__metric

Analyzes the depth of inheritance for objects, protocols, and categories.

Availability:

```
logtalk_load(code_metrics(loader))
```

Author: Ebrahim Azarisooreh

Version: 0:6:1

Date: 2024-03-28

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public code_metrics_utilities
public code_metric
```

Uses:

```
numberlist
```

Remarks:

- Depth: The depth is the maximum length of a node to the root entity. Lower scores are generally better.
- Inheritance: A level of inheritance defined by either one of specialization, instantiation, extension, importation, or implementation.
- Scoring: The maximum path length is determined for each entity in question.

Inherited public predicates:

```
all/0 all/1 all_score/1 check_option/1 check_options/1 default_option/1 default_options/1
directory/1 directory/2 directory_score/2 entity/1 entity_score/2 file/1 file/2 file_score/2
format_entity_score//2 library/1 library/2 library_score/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory_score/2 rlibrary/1 rlibrary/2 rlibrary_score/2 valid_option/1
valid_options/1
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.7.8 doc_metric

Entity and entity predicates documentation score.

Availability:

```
logtalk_load(code_metrics(loader))
```

Author: Paulo Moura

Version: 0:13:0

Date: 2022-05-05

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public code_metrics_utilities
```

```
public code_metric
```

Uses:

```
list
```

```
numberlist
```

Remarks:

- Score range: Score is a integer percentage where a 100% score means that all expected documentation information is present.
- Score weights: The score is split by default between 20% for the entity documentation and 80% for the entity predicates documentation, Can be customized using the predicate `entity_predicates_weights_hook/2`.
- Score customization: The individual scores of entity `info/1` pairs and predicate `info/2` pairs can be customized using the entity `entity_info_pair_score_hook/3` and predicate `predicate_info_pair_score_hook/4` predicates.

Inherited public predicates:

```
all/0 all/1 all_score/1 check_option/1 check_options/1 default_option/1 default_options/1
directory/1 directory/2 directory_score/2 entity/1 entity_score/2 file/1 file/2 file_score/2
format_entity_score//2 library/1 library/2 library_score/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory_score/2 rlibrary/1 rlibrary/2 rlibrary_score/2 valid_option/1
valid_options/1
```

- Public predicates
 - entity_predicates_weights_hook/2
 - entity_info_score_hook/2
 - entity_info_pair_score_hook/3
 - predicate_mode_score_hook/3
 - predicate_mode_score_hook/5
 - predicate_info_score_hook/3
 - predicate_info_pair_score_hook/4
- Protected predicates
- Private predicates
- Operators

Public predicates

entity_predicates_weights_hook/2

Relative weight between entity documentation and predicates documentation in percentage. The sum of the two values must be equal to 100.

Compilation flags:

dynamic, multifile

Template:

entity_predicates_weights_hook(EntityWeight,PredicatesWeight)

Mode and number of proofs:

entity_predicates_weights_hook(?integer,?integer) - zero_or_one

`entity_info_score_hook/2`

Maximum score for entity info/1 directives.

Compilation flags:
dynamic, multifile

Template:
entity_info_score_hook(Entity,MaximumScore)
Mode and number of proofs:
entity_info_score_hook(?term,?integer) - zero_or_one

`entity_info_pair_score_hook/3`

Score for relevant entity info/1 directive pairs. If defined, the `entity_info_score_hook/2` predicate should be defined accordingly.

Compilation flags:
dynamic, multifile

Template:
entity_info_pair_score_hook(Pair,Entity,Score)
Mode and number of proofs:
entity_info_pair_score_hook(?callable,?term,?integer) - zero_or_more

`predicate_mode_score_hook/3`

Maximum score for predicate mode/2 directives.

Compilation flags:
dynamic, multifile

Template:
predicate_mode_score_hook(Entity,Predicate,MaximumScore)
Mode and number of proofs:
predicate_mode_score_hook(?term,?term,?integer) - zero_or_more

`predicate_mode_score_hook/5`

Score for a predicate mode/2 directive. If defined, the `predicate_mode_score_hook/3` predicate should be defined accordingly.

Compilation flags:
dynamic, multifile

Template:
 `predicate_mode_score_hook(Template,Solutions,Entity,Predicate,Score)`
Mode and number of proofs:
 `predicate_mode_score_hook(?term,?term,?term,?term,?integer) - zero_or_one`

`predicate_info_score_hook/3`

Maximum score for predicate info/2 directives.

Compilation flags:
dynamic, multifile

Template:
 `predicate_info_score_hook(Entity,Predicate,MaximumScore)`
Mode and number of proofs:
 `predicate_info_score_hook(?term,?term,?integer) - zero_or_one`

`predicate_info_pair_score_hook/4`

Score for a predicate info/2 directive pairs. If defined, the `predicate_info_score_hook/3` predicate should be defined accordingly.

Compilation flags:
dynamic, multifile

Template:

```
predicate_info_pair_score_hook(Pair,Entity,Predicate,Score)
```

Mode and number of proofs:

```
predicate_info_pair_score_hook(?callable,?term,?term,?integer) - zero_or_more
```

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.7.9 halstead_metric

Computes Halstead complexity numbers for an entity using a Stroud of 18.

Availability:

```
logtalk_load(code_metrics(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2018-06-08

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public halstead_metric(18)
```

Remarks:

(none)

Inherited public predicates:

```
all/0 all/1 all_score/1 check_option/1 check_options/1 default_option/1 default_options/1
directory/1 directory/2 directory_score/2 entity/1 entity_score/2 file/1 file/2 file_score/2
format_entity_score//2 library/1 library/2 library_score/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory_score/2 rlibrary/1 rlibrary/2 rlibrary_score/2 valid_option/1
valid_options/1
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.7.10 halstead_metric(Stroud)

- Stroud - Coefficient for computing the time required to program.

Computes Halstead complexity numbers for an entity.

Availability:

```
logtalk_load(code_metrics(loader))
```

Author: Paulo Moura

Version: 0:10:0

Date: 2025-01-04

Compilation flags:

static, context_switching_calls

Imports:

public [code_metrics_utilities](#)
public [code_metric](#)

Uses:

[list](#)
[numberlist](#)
[pairs](#)

Remarks:

- Definition of operators: Predicates declared, user-defined, and called are interpreted as operators. Built-in predicates and built-in control constructs are ignored.
- Definition of operands: Predicate arguments are abstracted and interpreted as operands. Note that this definition of operands is a significant deviation from the original definition, which used syntactic literals.
- Pn: Number of distinct predicates (declared, defined, called, or updated).
- PAn: Number of predicate arguments (assumed distinct).
- Cn: Number of predicate calls/updates + number of clauses.
- CAn: Number of predicate call/update arguments + number of clause head arguments.
- EV: Entity vocabulary: $EV = Pn + PAn$.
- EL: Entity length: $EL = Cn + CAn$.
- V: Volume: $V = EL * \log_2(EV)$.
- D: Difficulty: $D = (Pn/2) * (CAn/An)$.
- E: Effort: $E = D * V$.
- T: Time required to program: $T = E/k$ seconds (k is the Stroud number; defaults to 18).
- B: Number of delivered bugs: $B = V/3000$.
- Entity score: Represented as the compound term `pn_pan_cn_can_ev_el_v_d_e_t_b/11`.

Inherited public predicates:

[all/0](#) [all/1](#) [all_score/1](#) [check_option/1](#) [check_options/1](#) [default_option/1](#) [default_options/1](#)
[directory/1](#) [directory/2](#) [directory_score/2](#) [entity/1](#) [entity_score/2](#) [file/1](#) [file/2](#) [file_score/2](#)
[format_entity_score/2](#) [library/1](#) [library/2](#) [library_score/2](#) [option/2](#) [option/3](#) [rdirectory/1](#)
[rdirectory/2](#) [rdirectory_score/2](#) [rlibrary/1](#) [rlibrary/2](#) [rlibrary_score/2](#) [valid_option/1](#)
[valid_options/1](#)

- [Public predicates](#)
- [Protected predicates](#)

- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.7.11 `noc_metric`

Number of entity clauses metric. The score is represented using the compound term `number_of_clauses(Total, User)`.

Availability:

```
logtalk_load(code_metrics(loader))
```

Author: Ebrahim Azarisooreh and Paulo Moura

Version: 0:14:1

Date: 2024-05-08

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public code_metrics_utilities  
public code_metric
```

Provides:

```
logtalk::message_tokens//2
```

Uses:

list
logtalk

Remarks:

(none)

Inherited public predicates:

all/0 all/1 all_score/1 check_option/1 check_options/1 default_option/1 default_options/1
directory/1 directory/2 directory_score/2 entity/1 entity_score/2 file/1 file/2 file_score/2
format_entity_score//2 library/1 library/2 library_score/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory_score/2 rlibrary/1 rlibrary/2 rlibrary_score/2 valid_option/1
valid_options/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.7.12 `nor_metric`

Number of entity rules metric. The score is represented using the compound term `number_of_rules`(Total, User).

Availability:

```
logtalk_load(code_metrics(loader))
```

Author: Paulo Moura

Version: 0:5:1

Date: 2024-05-08

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public code_metrics_utilities  
public code_metric
```

Provides:

```
logtalk::message_tokens//2
```

Uses:

```
list  
logtalk
```

Remarks:

```
(none)
```

Inherited public predicates:

```
all/0 all/1 all_score/1 check_option/1 check_options/1 default_option/1 default_options/1  
directory/1 directory/2 directory_score/2 entity/1 entity_score/2 file/1 file/2 file_score/2  
format_entity_score//2 library/1 library/2 library_score/2 option/2 option/3 rdirectory/1  
rdirectory/2 rdirectory_score/2 rlibrary/1 rlibrary/2 rlibrary_score/2 valid_option/1  
valid_options/1
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.7.13 size__metric

Source code size metric. Returned scores are upper bounds and based solely in source file sizes (expressed in bytes).

Availability:

```
logtalk_load(code_metrics(loader))
```

Author: Paulo Moura

Version: 0:7:1

Date: 2024-05-08

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public code_metrics_utilities
```

```
public code_metric
```

Provides:

```
logtalk::message_tokens//2
```

Uses:

```
list
```

```
logtalk
```

```
numberlist
```

```
os
```

Remarks:

(none)

Inherited public predicates:

all/0 all/1 all_score/1 check_option/1 check_options/1 default_option/1 default_options/1
directory/1 directory/2 directory_score/2 entity/1 entity_score/2 file/1 file/2 file_score/2
format_entity_score//2 library/1 library/2 library_score/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory_score/2 rlibrary/1 rlibrary/2 rlibrary_score/2 valid_option/1
valid_options/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.7.14 upn__metric

Number of unique predicates nodes metric. The nodes include called and updated predicates independently of where they are defined. The score is represented by a non-negative integer.

Availability:

logtalk_load(code_metrics(loader))

Author: Paulo Moura

Version: 0:6:2
Date: 2024-05-15

Compilation flags:
static, context_switching_calls

Imports:
public code_metrics_utilities
public code_metric

Provides:
logtalk::message_tokens//2

Uses:
list
logtalk
numberlist

Remarks:
(none)

Inherited public predicates:
all/0 all/1 all_score/1 check_option/1 check_options/1 default_option/1 default_options/1
directory/1 directory/2 directory_score/2 entity/1 entity_score/2 file/1 file/2 file_score/2
format_entity_score//2 library/1 library/2 library_score/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory_score/2 rlibrary/1 rlibrary/2 rlibrary_score/2 valid_option/1
valid_options/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.8 core

category

1.8.1 core_messages

Logtalk core (compiler and runtime) default message tokenization.

Availability:

built_in

Author: Paulo Moura

Version: 1:145:0

Date: 2025-11-15

Compilation flags:

static

Provides:

logtalk::message_prefix_stream/4

logtalk::message_tokens//2

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.8.2 expanding

Term and goal expansion protocol.

Availability:

built_in

Author: Paulo Moura

Version: 1:1:0

Date: 2016-07-12

Compilation flags:

static, built_in

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - goal_expansion/2
 - term_expansion/2
- Protected predicates
- Private predicates
- Operators

Public predicates

goal_expansion/2

Defines a goal expansion. Called recursively until a fixed point is reached on goals found while compiling a source file (except for goals wrapped using the `{}/1` compiler bypass control construct).

Compilation flags:

static

Template:

goal_expansion(Goal,ExpandedGoal)

Mode and number of proofs:

goal_expansion(+callable,-callable) - zero_or_one

term_expansion/2

Defines a term expansion. Called until it succeeds on all terms read while compiling a source file (except for terms skipped by using the conditional compilation directives or wrapped using the `{}/1` compiler bypass control construct).

Compilation flags:

static

Template:

term_expansion(Term,ExpandedTerms)

Mode and number of proofs:

term_expansion(+term,-term) - zero_or_one

term_expansion(+term,-list(term)) - zero_or_one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

protocol

1.8.3 forwarding

Message forwarding protocol.

Availability:

built_in

Author: Paulo Moura

Version: 1:0:1

Date: 2025-05-15

Compilation flags:

static, built_in

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - forward/1
- Protected predicates
- Private predicates
- Operators

Public predicates

forward/1

User-defined message forwarding handler, automatically called (if defined) by the runtime for any message that the receiving object does not understand.

Compilation flags:

static

Template:

forward(Message)

Mode and number of proofs:

forward(+callable) - zero_or_more

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

object

1.8.4 logtalk

Built-in object providing message printing, debugging, library, source file, and hacking methods.

Availability:

built_in

Author: Paulo Moura

Version: 3:4:0

Date: 2025-11-11

Compilation flags:

static, built_in, context_switching_calls, threaded

Dependencies:

(none)

Remarks:

- Default message kinds: silent, silent(Key), banner, help, comment, comment(Key), information, information(Key), warning, warning(Key), error, error(Key), debug, debug(Key), question, and question(Key).
- Printing of silent messages: By default, silent messages are not printed. These messages are only useful when intercepted.
- Printing of banner and comment messages: By default, banner and comment messages are only printed when the report flag is turned on.
- Printing of help, information, and question messages: These messages are always printed by default as they provide requested output.
- Printing of warning messages: By default, warning messages are not printed when the report flag is turned off.
- Printing of error messages: These messages are always printed by default.
- Printing of debug messages: By default, debug messages are only printed when the debug flag is turned on. The compiler suppresses debug message printing goals when compiling in optimized mode.
- Meta messages: A meta message is a message that have another message as argument and is typically used for debugging messages. Meta messages avoid the need of defining tokenizer rules for every message but can be intercepted as any other message.

- Meta message @Message: By default, the message is printed as passed to the write/1 predicate followed by a newline.
- Meta message Key-Value: By default, the message is printed as “Key: Value” followed by a newline. The key is printed as passed to the write/1 predicate while the value is printed as passed to the writeq/1 predicate.
- Meta message Format+Arguments: By default, the message is printed as passed to the format/2 predicate.
- Meta message List: By default, the list items are printed indented one per line. The items are preceded by a dash and can be @Message, Key-Value, or Format+Arguments messages. If that is not the case, the item is printed as passed to the writeq/1 predicate.
- Meta message Title::List: By default, the title is printed followed by a newline and the indented list items, one per line. The items are printed as in the List meta message.
- Meta message [Stream,Prefix]>>Goal: By default, call user-defined Goal in the context of user. The use of a lambda expression allows passing the message stream and prefix. Printing the prefix is delegated to the goal.
- Meta message [Stream]>>Goal: By default, call user-defined Goal in the context of user. The use of a lambda expression allows passing the message stream.
- Message tokens: at_same_line, tab(Expression), nl, flush, Format-Arguments, term(Term,Options), ansi(Attributes,Format,Arguments), begin(Kind,Variable), and end(Variable).
- Multi-threading applications: Predicates calling methods such as print_message/3, ask_question/5, or compile_aux_clauses/1 may need to be declared synchronized in order to avoid race conditions.

Inherited public predicates:

(none)

- Public predicates
 - print_message/3
 - print_message_tokens/3
 - print_message_token/4
 - message_tokens//2
 - message_prefix_stream/4
 - message_prefix_file/6
 - message_hook/4
 - ask_question/5
 - question_hook/6
 - question_prompt_stream/4
 - trace_event/2
 - debug_handler/1
 - active_debug_handler/1

- activate_debug_handler/1
- deactivate_debug_handler/0
- debug_handler/3
- expand_library_path/2
- loaded_file/1
- loaded_file_property/2
- loaded_files_topological_sort/1
- loaded_files_topological_sort/2
- file_type_extension/2
- compile_aux_clauses/1
- entity_prefix/2
- compile_predicate_heads/4
- compile_predicate_indicators/3
- decompile_predicate_heads/4
- decompile_predicate_indicators/4
- execution_context/7
- Protected predicates
- Private predicates
 - active_debug_handler_/1
- Operators

Public predicates

print_message/3

Prints a message of the given kind for the specified component.

Compilation flags:

static

Template:

print_message(Kind,Component,Message)

Mode and number of proofs:

print_message(+nonvar,+nonvar,+nonvar) - one

`print_message_tokens/3`

Print the messages tokens to the given stream, prefixing each line with the specified atom.

Compilation flags:

`static`

Template:

`print_message_tokens(Stream,Prefix,Tokens)`

Mode and number of proofs:

`print_message_tokens(@stream_or_alias,+atom,@list(nonvar)) - one`

`print_message_token/4`

User-defined hook predicate for printing a message token (see this object remarks).

Compilation flags:

`dynamic, multifile`

Template:

`print_message_token(Stream,Prefix,Token,Tokens)`

Mode and number of proofs:

`print_message_token(@stream_or_alias,@atom,@nonvar,@list(nonvar)) - zero_or_one`

`message_tokens//2`

User-defined hook grammar rule for converting a message into a list of tokens (see this object remarks).

Compilation flags:

`dynamic, multifile`

Template:

`message_tokens(Message,Component)`

Mode and number of proofs:

`message_tokens(+nonvar,+nonvar) - zero_or_one`

`message_prefix_stream/4`

Message line prefix and output stream to be used when printing a message given its kind and component.

Compilation flags:

dynamic, multifile

Template:

`message_prefix_stream(Kind,Component,Prefix,Stream)`

Mode and number of proofs:

`message_prefix_stream(?nonvar,?nonvar,?atom,?stream_or_alias) - zero_or_more`

`message_prefix_file/6`

Message line prefix and output file to be used when printing a message given its kind and component.

Compilation flags:

dynamic, multifile

Template:

`message_prefix_file(Kind,Component,Prefix,File,Mode,Options)`

Mode and number of proofs:

`message_prefix_file(?nonvar,?nonvar,?atom,?atom,?atom,?list(compound)) - zero_or_more`

`message_hook/4`

User-defined hook predicate for intercepting message printing calls.

Compilation flags:

dynamic, multifile

Template:

`message_hook(Message,Kind,Component,Tokens)`

Mode and number of proofs:

`message_hook(+nonvar,+nonvar,+nonvar,+list(nonvar)) - zero_or_one`

`ask_question/5`

Asks a question and reads the answer until the check predicate is true.

Compilation flags:

`static`

Template:

`ask_question(Kind,Component,Question,Check,Answer)`

Meta-predicate template:

`ask_question(*,*,*,1,*)`

Mode and number of proofs:

`ask_question(+nonvar,+nonvar,+nonvar,+callable,-term) - one`

`question_hook/6`

User-defined hook predicate for intercepting question asking calls.

Compilation flags:

`dynamic, multifile`

Template:

`question_hook(Question,Kind,Component,Tokens,Check,Answer)`

Meta-predicate template:

`question_hook(*,*,*,*,1,*)`

Mode and number of proofs:

`question_hook(+nonvar,+nonvar,+nonvar,+list(nonvar),+callable,-term) - zero_or_one`

`question_prompt_stream/4`

Prompt and input stream to be used when asking a question given its kind and component.

Compilation flags:

`dynamic, multifile`

Template:

`question_prompt_stream(Kind,Component,Prompt,Stream)`

Mode and number of proofs:

`question_prompt_stream(?nonvar,?nonvar,?atom,?stream_or_alias) - zero_or_more`

`trace_event/2`

Trace event handler. The runtime calls all trace event handlers using a failure-driven loop before calling the debug event handler.

Compilation flags:

`dynamic, multifile`

Template:

`trace_event(Event,ExecutionContext)`

Mode and number of proofs:

`trace_event(@callable,@execution_context) - zero`

Remarks:

- Unification events: Generated after a successful unification with a fact - `fact(Entity,Fact,Clause,File,Line)` - or a rule head - `rule(Entity,Head,Clause,File,Line)`.
 - Goal events: Generated when calling a goal: `top_goal(Goal,CompiledGoal)` or `goal(Goal,CompiledGoal)`.
-

`debug_handler/1`

Enumerates, by backtracking, all declared debug handler providers. Define a clause for this predicate to declare a new debug handler provider.

Compilation flags:

`static, multifile`

Template:

`debug_handler(Provider)`

Mode and number of proofs:

`debug_handler(?object_identifier) - zero_or_more`

`debug_handler(?category_identifier) - zero_or_more`

`active_debug_handler/1`

Current active debug handler provider if any. There is at most one active debug handler provider at any given moment.

Compilation flags:

`static`

Template:

`active_debug_handler(Provider)`

Mode and number of proofs:

`active_debug_handler(?category__identifier) - zero_or_one`

`active_debug_handler(?category__identifier) - zero_or_one`

`activate_debug_handler/1`

Activates the given debug handler provider. There is at most one active debug handler provider at any given moment. Fails if the object or category is not declared as a debug handler provider.

Compilation flags:

`static`

Template:

`activate_debug_handler(Provider)`

Mode and number of proofs:

`activate_debug_handler(@object__identifier) - zero_or_one`

`activate_debug_handler(@category__identifier) - zero_or_one`

`deactivate_debug_handler/0`

Deactivates the current debug handler provider if any.

Compilation flags:

`static`

Mode and number of proofs:

`deactivate_debug_handler - one`

`debug_handler/3`

Debug event handler. Called by the runtime when the given provider is active.

Compilation flags:

static, multifile

Template:

`debug_handler(Provider,Event,ExecutionContext)`

Mode and number of proofs:

`debug_handler(+object_identifier,+callable,+execution_context) - zero_or_more`

`debug_handler(+category_identifier,+callable,+execution_context) - zero_or_more`

Remarks:

- Unification events: Generated after a successful unification with a fact - `fact(Entity,Fact,Clause,File,Line)` - or a rule head - `rule(Entity,Head,Clause,File,Line)`.
 - Goal events: Generated when calling a goal: `top_goal(Goal,CompiledGoal)` or `goal(Goal,CompiledGoal)`.
-

`expand_library_path/2`

Expands a library alias (an atom) or a compound term (using library notation) into its absolute path. Uses a depth bound to prevent loops.

Compilation flags:

static

Template:

`expand_library_path(LibraryAlias,AbsolutePath)`

Mode and number of proofs:

`expand_library_path(+atom,?atom) - zero_or_one`

`expand_library_path(+callable,?atom) - zero_or_one`

`loaded_file/1`

Enumerates, by backtracking, all loaded files, returning their full paths.

Compilation flags:

`static`

Template:

`loaded_file(Path)`

Mode and number of proofs:

`loaded_file(?atom) - zero_or_more`

`loaded_file_property/2`

Enumerates, by backtracking, loaded file properties.

Compilation flags:

`static`

Template:

`loaded_file_property(Path,Property)`

Mode and number of proofs:

`loaded_file_property(?atom,?compound) - zero_or_more`

Remarks:

- Property `basename/1`: Basename of the file (includes the file extension, if any).
- Property `directory/1`: Directory of the file (ending with a slash).
- Property `mode/1`: Compilation mode of the file (possible values are `optimal`, `normal`, and `debug`).
- Property `flags/1`: Explicit flags used for compiling the file.
- Property `text_properties/1`: List of the file text properties (`encoding/1` and `bom/1`). Empty if no `encoding/1` directive is present and the stream used for reading the file does not have a `bom/1` (or equivalent) property.
- Property `target/1`: Full path of the generated intermediate Prolog file.
- Property `modified/1`: File modification time stamp (should be regarded as an opaque but otherwise comparable term).
- Property `parent/1`: Full path of the parent file that loaded the file.
- Property `includes/2`: Full path of a file included by the file and the line of the `include/1` directive.

- Property includes/1: Full path of a file included by the file.
 - Property library/1: Library alias for the library that includes the file.
 - Property object/3: Identifier for an object defined in the file and the start and end lines of its definition.
 - Property object/1: Identifier for an object defined in the file.
 - Property protocol/3: Identifier for a protocol defined in the file and the start and end lines of its definition.
 - Property protocol/1: Identifier for a protocol defined in the file.
 - Property category/3: Identifier for a category defined in the file and the start and end lines of its definition.
 - Property category/1: Identifier for a category defined in the file.
-

`loaded_files_topological_sort/1`

Returns a list of full paths for all loaded user-defined files sorted by dependencies.

Compilation flags:

`static`

Template:

`loaded_files_topological_sort(Sorted)`

Mode and number of proofs:

`loaded_files_topological_sort(--list(atom)) - one`

`loaded_files_topological_sort/2`

Sorts a list of full paths for loaded files by dependencies.

Compilation flags:

`static`

Template:

`loaded_files_topological_sort(Paths,Sorted)`

Mode and number of proofs:

`loaded_files_topological_sort(+list(atom),--list(atom)) - one`

`file_type_extension/2`

Enumerates, by backtracking, all defined file type extensions. The defined types are: source, object, logtalk, prolog, and tmp. The source type returns both logtalk and prolog type extensions.

Compilation flags:

static

Template:

`file_type_extension(Type,Extension)`

Mode and number of proofs:

`file_type_extension(?atom,?atom) - zero_or_more`

`compile_aux_clauses/1`

Compiles a list of auxiliary clauses. Can only be called during source file compilation, usually from `term_expansion/2` or `goal_expansion/2` hook predicate definitions.

Compilation flags:

static

Template:

`compile_aux_clauses(Clauses)`

Mode and number of proofs:

`compile_aux_clauses(@list(clause)) - one`

`entity_prefix/2`

Converts between an entity identifier and the entity prefix that is used for its compiled code. When none of the arguments is instantiated, it returns the identifier and the prefix of the entity under compilation, if any.

Compilation flags:

static

Template:

`entity_prefix(Entity,Prefix)`

Mode and number of proofs:

`entity_prefix(?entity_identifier,?atom) - zero_or_one`

`compile_predicate_heads/4`

Compiles clause heads. The heads are compiled in the context of the entity under compilation when the entity argument is not instantiated.

Compilation flags:

`static`

Template:

`compile_predicate_heads(Heads,Entity,CompiledHeads,ExecutionContext)`

Mode and number of proofs:

`compile_predicate_heads(@list(callable),?entity_identifier,-list(callable),@execution_context) - zero_or_one`

`compile_predicate_heads(@conjunction(callable),?entity_identifier,-conjunction(callable),@execution_context) - zero_or_one`

`compile_predicate_heads(@callable,?entity_identifier,-callable,@execution_context) - zero_or_one`

`compile_predicate_indicators/3`

Compiles predicate indicators. The predicate are compiled in the context of the entity under compilation when the entity argument is not instantiated.

Compilation flags:

`static`

Template:

`compile_predicate_indicators(PredicateIndicators,Entity,CompiledPredicateIndicators)`

Mode and number of proofs:

`compile_predicate_indicators(@list(predicate_indicator),?entity_identifier,-list(predicate_indicator)) - zero_or_one`

`compile_predicate_indicators(@conjunction(predicate_indicator),?entity_identifier,-conjunction(predicate_indicator)) - zero_or_one`

`compile_predicate_indicators(@predicate_indicator,?entity_identifier,-predicate_indicator) - zero_or_one`

`decompile_predicate_heads/4`

Decompiles clause heads. All compiled clause heads must belong to the same entity, which must be loaded.

Compilation flags:

static

Template:

`decompile_predicate_heads(CompiledHeads,Entity,Type,Heads)`

Mode and number of proofs:

`decompile_predicate_heads(@list(callable),-entity_identifier,-atom,-list(callable)) - zero_or_one`

`decompile_predicate_heads(@conjunction(callable),-entity_identifier,-atom,-conjunction(callable)) - zero_or_one`

`decompile_predicate_heads(@callable,-entity_identifier,-atom,-callable) - zero_or_one`

`decompile_predicate_indicators/4`

Decompiles predicate indicators. All compiled predicate indicators must belong to the same entity, which must be loaded.

Compilation flags:

static

Template:

`decompile_predicate_indicators(CompiledPredicateIndicators,Entity,Type,PredicateIndicators)`

Mode and number of proofs:

`decompile_predicate_indicators(@list(predicate_indicator),-entity_identifier,-atom,-list(predicate_indicator)) - zero_or_one`

`decompile_predicate_indicators(@conjunction(predicate_indicator),-entity_identifier,-atom,-conjunction(predicate_indicator)) - zero_or_one`

`decompile_predicate_indicators(@predicate_indicator,-entity_identifier,-atom,-predicate_indicator) - zero_or_one`

`execution_context/7`

Execution context term data. Execution context terms should be considered opaque terms subject to change without notice.

Compilation flags:

`static`

Template:

`execution_context(ExecutionContext,Entity,Sender,This,Self,MetaCallContext,CoinductionStack)`

Mode and number of proofs:

`execution_context(?nonvar,?entity__identifier,?object__identifier,?object__identifier,?object__identifier,
@list(callable),@list(callable)) - zero_or_one`

Protected predicates

(none)

Private predicates

`active_debug_handler_/1`

Current active debug handler provider. There is at most one active debug handler provider at any given moment.

Compilation flags:

`dynamic`

Template:

`active_debug_handler_(Provider)`

Mode and number of proofs:

`active_debug_handler_(?entity__identifier) - zero_or_one`

Operators

(none)

protocol

1.8.5 monitoring

Event handlers protocol. The handlers are automatically called by the runtime for messages sent using the `::/2` control construct from objects or categories compiled with the events flag set to allow.

Availability:

built_in

Author: Paulo Moura

Version: 1:2:0

Date: 2018-11-29

Compilation flags:

static, built_in

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - before/3
 - after/3
- Protected predicates
- Private predicates
- Operators

Public predicates

before/3

Event handler for before events. A before event handler may prevent a method from being looked up or called by failing.

Compilation flags:

static

Template:

before(Object,Message,Sender)

Mode and number of proofs:

before(?term,?term,?term) - zero_or_more

after/3

Event handler for after events. An after event handler may prevent a method from succeeding by failing.

Compilation flags:

static

Template:

after(Object,Message,Sender)

Mode and number of proofs:

after(?term,?term,?term) - zero_or_more

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

object

1.8.6 user

Pseudo-object representing the plain Prolog database. Can be used as a monitor by defining `before/3` and `after/3` predicates. Can be used as a hook object by defining `term_expansion/2` and `goal_expansion/2` multifile and dynamic predicates.

Availability:

`built_in`

Author: Paulo Moura

Version: 1:6:0

Date: 2024-11-11

Compilation flags:

`static`, `built_in`, `context_switching_calls`, `dynamic_declarations`, `threaded`

Implements:

public `expanding`

public `forwarding`

public `monitoring`

Uses:

`user`

Remarks:

(none)

Inherited public predicates:

`after/3` `before/3` `forward/1` `goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates

- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.9 coroutining

object

1.9.1 coroutining

Coroutining predicates.

Availability:

`logtalk__load(coroutining(loader))`

Author: Paulo Moura

Version: 0:5:0

Date: 2021-12-17

Compilation flags:

`static, context__switching__calls`

Dependencies:

(none)

Remarks:

- Supported backend Prolog systems: ECLiPSe, SICStus Prolog, SWI-Prolog, Trealla Prolog, XVM, and YAP.

Inherited public predicates:

(none)

- Public predicates
 - dif/2
 - dif/1
 - freeze/2
 - frozen/2
 - when/2
- Protected predicates
- Private predicates
- Operators

Public predicates

dif/2

Sets a constraint that is true iff the two terms are different.

Compilation flags:

static

Template:

dif(Term1,Term2)

Mode and number of proofs:

dif(+term,+term) - zero_or_one

dif/1

Sets a set of constraints that are true iff all terms in a list are different.

Compilation flags:

static

Template:

dif(Terms)

Mode and number of proofs:

dif(+list(term)) - zero_or_one

freeze/2

Delays the execution of a goal until a variable is bound.

Compilation flags:

static

Template:

freeze(Variable,Goal)

Meta-predicate template:

freeze(*,0)

Mode and number of proofs:

freeze(+term,+callable) - zero_or_more

frozen/2

Unifies Goal with the goal delayed by Variable. When no goals are frozen on Variable, Goal is unified with true.

Compilation flags:

static

Template:

frozen(Variable,Goal)

Mode and number of proofs:

frozen(@var,--callable) - one

when/2

Calls Goal when Condition becomes true. The portable conditions are: nonvar/1, ground/1, (,)/2, and (;)/2.

Compilation flags:

static

Template:

when(Condition,Goal)

Meta-predicate template:

when(*,0)

Mode and number of proofs:

when(+callable,+callable) - zero_or_more

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.10 csv

object

1.10.1 csv

CSV files reading and writing predicates using the options Header - keep, Separator - comma, and Ignore-Quotes - false.

Availability:

```
logtalk_load(csv(loader))
```

Author: Jacinto Dávila

Version: 1:0:0

Date: 2021-02-02

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public csv(keep,comma,false)
```

Remarks:

```
(none)
```

Inherited public predicates:

```
guess_arity/2 guess_separator/2 read_file/2 read_file/3 read_file_by_line/2
read_file_by_line/3 read_stream/2 read_stream/3 read_stream_by_line/2
read_stream_by_line/3 write_file/3 write_stream/3
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.10.2 csv(Header,Separator,IgnoreQuotes)

- Header - Header handling option with possible values missing, skip, and keep (default).
- Separator - Separator handling option with possible values comma (default for non .tsv and non .tab files or when no file name extension is available), tab (default for .tsv and .tab files), semicolon, and colon.
- IgnoreQuotes - Double-quotes handling option to ignore (true) or preserve (false; default) double quotes surrounding data.

CSV file and stream reading and writing predicates.

Availability:

```
logtalk_load(csv(loader))
```

Author: Jacinto Dávila and Paulo Moura

Version: 2:1:0

Date: 2023-11-15

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public csv_protocol
```

Uses:

```
list  
logtalk  
os  
reader  
type
```

Remarks:

(none)

Inherited public predicates:

guess_arity/2 guess_separator/2 read_file/2 read_file/3 read_file_by_line/2
 read_file_by_line/3 read_stream/2 read_stream/3 read_stream_by_line/2
 read_stream_by_line/3 write_file/3 write_stream/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.10.3 csv_guess_questions

Support for asking questions when guessing the separator and the record arity of CSV files.

Availability:

logtalk_load(csv(loader))

Author: Jacinto Dávila

Version: 1:0:0

Date: 2021-02-03

Compilation flags:

static

Provides:

logtalk::message_tokens//2

logtalk::question_prompt_stream/4

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.10.4 csv_protocol

CSV file and stream reading and writing protocol.

Availability:

logtalk_load(csv(loader))

Author: Jacinto Dávila and Paulo Moura

Version: 2:0:1

Date: 2025-05-07

Compilation flags:

static

Dependencies:

(none)

Remarks:

- Type-checking: Some of the predicate file and stream argument type-checking exceptions depend on the Prolog backend compliance with standards.

Inherited public predicates:

(none)

- Public predicates
 - read_file/3
 - read_stream/3
 - read_file/2
 - read_stream/2
 - read_file_by_line/3
 - read_stream_by_line/3
 - read_file_by_line/2
 - read_stream_by_line/2
 - write_file/3
 - write_stream/3
 - guess_separator/2

- guess_arity/2
- Protected predicates
- Private predicates
- Operators

Public predicates

read_file/3

Reads a CSV file saving the data as clauses for the specified object predicate. Fails if the file cannot be parsed.

Compilation flags:

static

Template:

read_file(File, Object, Predicate)

Mode and number of proofs:

read_file(+atom, +object_identifier, +predicate_indicator) - zero_or_one

Exceptions:

File is a variable:

instantiation_error

File is neither a variable nor an atom:

type_error(atom, File)

File is an atom but not an existing file:

existence_error(file, File)

File is an existing file but cannot be opened for reading:

permission_error(open, source_sink, File)

Object is a variable:

instantiation_error

Object is neither a variable nor an object identifier:

type_error(object_identifier, Object)

Object is a valid object identifier but not an existing object:

existence_error(object, Object)

Predicate is a variable:

instantiation_error

Predicate is neither a variable nor a predicate indicator:

type_error(predicate_indicator, Predicate)

Predicate is a valid predicate indicator but not an existing public predicate:

existence_error(predicate, Predicate)

`read_stream/3`

Reads a CSV stream saving the data as clauses for the specified object predicate. Fails if the stream cannot be parsed.

Compilation flags:

`static`

Template:

`read_stream(Stream,Object,Predicate)`

Mode and number of proofs:

`read_stream(+stream_or_alias,+object_identifier,+predicate_indicator) - zero_or_one`

Exceptions:

Stream is a variable:

`instantiation_error`

Stream is neither a variable nor a stream-term or alias:

`domain_error(stream_or_alias,Stream)`

Stream is not an open stream:

`existence_error(stream,Stream)`

Stream is an output stream:

`permission_error(input,stream,Stream)`

Stream is a binary stream:

`permission_error(input,binary_stream,Stream)`

Object is a variable:

`instantiation_error`

Object is neither a variable nor an object identifier:

`type_error(object_identifier,Object)`

Object is a valid object identifier but not an existing object:

`existence_error(object,Object)`

Predicate is a variable:

`instantiation_error`

Predicate is neither a variable nor a predicate indicator:

`type_error(predicate_indicator,Predicate)`

Predicate is a valid predicate indicator but not an existing public predicate:

`existence_error(predicate,Predicate)`

`read_file/2`

Reads a CSV file returning the data as a list of rows, each row a list of fields. Fails if the file cannot be parsed.

Compilation flags:

`static`

Template:

`read_file(File,Rows)`

Mode and number of proofs:

`read_file(+atom,-list(list)) - zero_or_one`

Exceptions:

File is a variable:

`instantiation_error`

File is neither a variable nor an atom:

`type_error(atom,File)`

File is an atom but not an existing file:

`existence_error(file,File)`

File is an existing file but cannot be opened for reading:

`permission_error(open,source_sink,File)`

`read_stream/2`

Reads a CSV stream returning the data as a list of rows, each row a list of fields. Fails if the stream cannot be parsed.

Compilation flags:

`static`

Template:

`read_stream(Stream,Rows)`

Mode and number of proofs:

`read_stream(+stream_or_alias,-list(list)) - zero_or_one`

Exceptions:

Stream is a variable:

`instantiation_error`

Stream is neither a variable nor a stream-term or alias:

```

    domain_error(stream_or_alias,Stream)
Stream is not an open stream:
    existence_error(stream,Stream)
Stream is an output stream:
    permission_error(input,stream,Stream)
Stream is a binary stream:
    permission_error(input,binary_stream,Stream)

```

`read_file_by_line/3`

Reads a CSV file saving the data as clauses for the specified object predicate. The file is read line by line. Fails if the file cannot be parsed.

Compilation flags:
static

Template:

```
read_file_by_line(File,Object,Predicate)
```

Mode and number of proofs:

```
read_file_by_line(+atom,+object_identifier,+predicate_indicator) - zero_or_one
```

Exceptions:

File is a variable:

```
instantiation_error
```

File is neither a variable nor an atom:

```
type_error(atom,File)
```

File is an atom but not an existing file:

```
existence_error(file,File)
```

File is an existing file but cannot be opened for reading:

```
permission_error(open,source_sink,File)
```

Object is a variable:

```
instantiation_error
```

Object is neither a variable nor an object identifier:

```
type_error(object_identifier,Object)
```

Object is a valid object identifier but not an existing object:

```
existence_error(object,Object)
```

Predicate is a variable:

```
instantiation_error
```

Predicate is neither a variable nor a predicate indicator:

```
type_error(predicate_indicator,Predicate)
```

Predicate is a valid predicate indicator but not an existing public predicate:

```
existence_error(predicate,Predicate)
```

`read_stream_by_line/3`

Reads a CSV stream saving the data as clauses for the specified object predicate. The stream is read line by line. Fails if the stream cannot be parsed.

Compilation flags:

`static`

Template:

`read_stream_by_line(Stream,Object,Predicate)`

Mode and number of proofs:

`read_stream_by_line(+stream_or_alias,+object_identifier,+predicate_indicator) - zero_or_one`

Exceptions:

Stream is a variable:

`instantiation_error`

Stream is neither a variable nor a stream-term or alias:

`domain_error(stream_or_alias,Stream)`

Stream is not an open stream:

`existence_error(stream,Stream)`

Stream is an output stream:

`permission_error(input,stream,Stream)`

Stream is a binary stream:

`permission_error(input,binary_stream,Stream)`

Object is a variable:

`instantiation_error`

Object is neither a variable nor an object identifier:

`type_error(object_identifier,Object)`

Object is a valid object identifier but not an existing object:

`existence_error(object,Object)`

Predicate is a variable:

`instantiation_error`

Predicate is neither a variable nor a predicate indicator:

`type_error(predicate_indicator,Predicate)`

Predicate is a valid predicate indicator but not an existing public predicate:

`existence_error(predicate,Predicate)`

`read_file_by_line/2`

Reads a CSV file returning the data as a list of rows, each row a list of fields. The file is read line by line. Fails if the file cannot be parsed.

Compilation flags:

`static`

Template:

`read_file_by_line(File,Rows)`

Mode and number of proofs:

`read_file_by_line(+atom,-list(list)) - zero_or_one`

Exceptions:

File is a variable:

`instantiation_error`

File is neither a variable nor an atom:

`type_error(atom,File)`

File is an atom but not an existing file:

`existence_error(file,File)`

File is an existing file but cannot be opened for reading:

`permission_error(open,source_sink,File)`

`read_stream_by_line/2`

Reads a CSV stream returning the data as a list of rows, each row a list of fields. The stream is read line by line. Fails if the stream cannot be parsed.

Compilation flags:

`static`

Template:

`read_stream_by_line(Stream,Rows)`

Mode and number of proofs:

`read_stream_by_line(+stream_or_alias,-list(list)) - zero_or_one`

Exceptions:

Stream is a variable:

`instantiation_error`

Stream is neither a variable nor a stream-term or alias:

```
domain_error(stream_or_alias,Stream)
Stream is not an open stream:
existence_error(stream,Stream)
Stream is an output stream:
permission_error(input,stream,Stream)
Stream is a binary stream:
permission_error(input,binary_stream,Stream)
```

`write_file/3`

Writes a CSV file with the data represented by the solutions to the specified object predicate.

Compilation flags:

```
static
```

Template:

```
write_file(File,Object,Predicate)
```

Mode and number of proofs:

```
write_file(+atom,+object_identifier,+predicate_indicator) - one
```

Exceptions:

File is a variable:

```
instantiation_error
```

File is neither a variable nor an atom:

```
type_error(atom,File)
```

File is an atom but cannot be opened for writing:

```
permission_error(open,source_sink,File)
```

Object is a variable:

```
instantiation_error
```

Object is neither a variable nor an object identifier:

```
type_error(object_identifier,Object)
```

Object is a valid object identifier but not an existing object:

```
existence_error(object,Object)
```

Predicate is a variable:

```
instantiation_error
```

Predicate is neither a variable nor a predicate indicator:

```
type_error(predicate_indicator,Predicate)
```

Predicate is a valid predicate indicator but not an existing public predicate:

```
existence_error(predicate,Predicate)
```

`write_stream/3`

Writes a CSV stream with the data represented by the solutions to the specified object predicate.

Compilation flags:

`static`

Template:

`write_stream(Stream,Object,Predicate)`

Mode and number of proofs:

`write_stream(+stream_or_alias,+object_identifier,+predicate_indicator) - one`

Exceptions:

Stream is a variable:

`instantiation_error`

Stream is neither a variable nor a stream-term or alias:

`domain_error(stream_or_alias,Stream)`

Stream is not an open stream:

`existence_error(stream,Stream)`

Stream is an input stream:

`permission_error(output,stream,Stream)`

Stream is a binary stream:

`permission_error(output,binary_stream,Stream)`

Object is a variable:

`instantiation_error`

Object is neither a variable nor an object identifier:

`type_error(object_identifier,Object)`

Object is a valid object identifier but not an existing object:

`existence_error(object,Object)`

Predicate is a variable:

`instantiation_error`

Predicate is neither a variable nor a predicate indicator:

`type_error(predicate_indicator,Predicate)`

Predicate is a valid predicate indicator but not an existing public predicate:

`existence_error(predicate,Predicate)`

`guess_separator/2`

Guesses the separator used in a given file, asking the user to confirm.

Compilation flags:

`static`

Template:

`guess_separator(File,Separator)`

Mode and number of proofs:

`guess_separator(+atom,-atom) - one`

Exceptions:

File is a variable:

`instantiation_error`

File is neither a variable nor an atom:

`type_error(atom,File)`

File is an atom but not an existing file:

`existence_error(file,File)`

File is an atom but cannot be opened for writing:

`permission_error(open,source_sink,File)`

`guess_arity/2`

Guesses the arity of records in a given file, asking the user to confirm.

Compilation flags:

`static`

Template:

`guess_arity(File,Arity)`

Mode and number of proofs:

`guess_arity(+atom,-number) - one`

Exceptions:

File is a variable:

`instantiation_error`

File is neither a variable nor an atom:

`type_error(atom,File)`

File is an atom but not an existing file:

```
existence_error(file,File)
File is an atom but cannot be opened for writing:
permission_error(open,source_sink,File)
```

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.11 dates

object

1.11.1 date

Date predicates.

Availability:

```
logtalk_load(dates(loader))
```

Author: Paulo Moura

Version: 1:2:0

Date: 2014-09-27

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public datep
```

Uses:

```
os
```

Remarks:

(none)

Inherited public predicates:

`days_in_month/3` `leap_year/1` `name_of_day/3` `name_of_month/3` `today/3` `valid/3`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.11.2 datep

Date protocol.

Availability:

`logtalk_load(dates(loader))`

Author: Paulo Moura

Version: 1:1:0

Date: 2005-03-17

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - today/3
 - leap_year/1
 - name_of_day/3
 - name_of_month/3
 - days_in_month/3
 - valid/3
- Protected predicates
- Private predicates
- Operators

Public predicates

today/3

Returns current date.

Compilation flags:

static

Template:

today(Year,Month,Day)

Mode and number of proofs:

today(-integer,-integer,-integer) - one

leap_year/1

True if the argument is a leap year.

Compilation flags:

static

Template:

leap_year(Year)

Mode and number of proofs:

leap_year(+integer) - zero_or_one

name_of_day/3

Name and short name of day.

Compilation flags:

static

Template:

name_of_day(Index,Name,Short)

Mode and number of proofs:

name_of_day(?integer,?atom,?atom) - zero_or_more

name_of_month/3

Name and short name of month.

Compilation flags:

static

Template:

name_of_month(Index,Name,Short)

Mode and number of proofs:

name_of_month(?integer,?atom,?atom) - zero_or_more

days_in_month/3

Number of days in a month.

Compilation flags:

static

Template:

days_in_month(Month,Year,Days)

Mode and number of proofs:

days_in_month(?integer,+integer,?integer) - zero_or_more

valid/3

True if the arguments represent a valid date.

Compilation flags:

static

Template:

valid(Year,Month,Day)

Mode and number of proofs:

valid(@integer,@integer,@integer) - zero_or_one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

➡ See also

[date](#), [timep](#)

object

1.11.3 time

Time predicates.

Availability:

`logtalk_load(dates(loader))`

Author: Paulo Moura

Version: 1:1:0

Date: 2014-09-27

Compilation flags:

`static, context_switching_calls`

Implements:

`public timep`

Uses:

`os`

Remarks:

(none)

Inherited public predicates:

`cpu_time/1 now/3 valid/3`

- [Public predicates](#)
- [Protected predicates](#)
- [Private predicates](#)
- [Operators](#)

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

datep

protocol

1.11.4 timep

Time protocol.

Availability:

`logtalk__load(dates(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2000-07-24

Compilation flags:

`static`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - now/3
 - cpu_time/1
 - valid/3
- Protected predicates
- Private predicates
- Operators

Public predicates

now/3

Returns current time.

Compilation flags:

static

Template:

now(Hours,Mins,Secs)

Mode and number of proofs:

now(-integer,-integer,-integer) - one

cpu_time/1

Returns the current cpu time.

Compilation flags:

static

Template:

cpu_time(Time)

Mode and number of proofs:

cpu_time(-number) - one

`valid/3`

True if the arguments represent a valid time value.

Compilation flags:

`static`

Template:

`valid(Hours,Mins,Secs)`

Mode and number of proofs:

`valid(+integer,+integer,+integer) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

`time`, `datep`

1.12 `dead_code_scanner`

object

1.12.1 `dead_code_scanner`

A tool for detecting likely dead code in compiled Logtalk entities and Prolog modules compiled as objects.

Availability:

```
logtalk_load(dead_code_scanner(loader))
```

Author: Barry Evans and Paulo Moura

Version: 0:15:2

Date: 2024-10-21

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public options
```

Uses:

```
list
```

```
logtalk
```

```
os
```

```
type
```

Remarks:

- **Dead code:** A predicate or non-terminal that is not called (directly or indirectly) by any scoped predicate or non-terminal. These predicates and non-terminals are not used, cannot be called without breaking encapsulation, and are thus considered dead code.
- **Known issues:** Use of local meta-calls with goal arguments only known at runtime can result in false positives. Calls from non-standard meta-predicates may be missed if the meta-calls are not optimized.
- **Requirements:** Source files must be compiled with the `source_data` flag turned on. To avoid false positives due to meta-calls, compilation of source files with the `optimized` flag turned on is also advised.

Inherited public predicates:

```
check_option/1 check_options/1 default_option/1 default_options/1 option/2 option/3  
valid_option/1 valid_options/1
```

- **Public predicates**
 - `entity/1`
 - `file/2`
 - `file/1`

- directory/2
- directory/1
- rdirectory/2
- rdirectory/1
- library/2
- library/1
- rlibrary/2
- rlibrary/1
- all/1
- all/0
- predicates/2
- predicate/2
- Protected predicates
- Private predicates
- Operators

Public predicates

entity/1

Scans a loaded entity for dead code. Fails if the entity does not exist.

Compilation flags:

static

Template:

entity(Entity)

Mode and number of proofs:

entity(+entity__identifier) - zero_or_one

file/2

Scans all entities in a loaded source file for dead code using the given options. The file can be given by name, basename, full path, or using library notation. Fails if the file is not loaded.

Compilation flags:

static

Template:

file(File,Options)

Mode and number of proofs:

file(+atom,+list(compound)) - zero_or_one

file/1

Scans all entities in a loaded source file for dead code using default options. The file can be given by name, basename, full path, or using library notation. Fails if the file is not loaded.

Compilation flags:

static

Template:

file(File)

Mode and number of proofs:

file(+atom) - zero_or_one

directory/2

Scans all entities in all loaded files from a given directory for dead code using the given options.

Compilation flags:

static

Template:

directory(Directory,Options)

Mode and number of proofs:

directory(+atom,+list(compound)) - one

directory/1

Scans all entities in all loaded files from a given directory for dead code using default options.

Compilation flags:

static

Template:

directory(Directory)

Mode and number of proofs:

directory(+atom) - one

rdirectory/2

Scans all entities in all loaded files from a given directory and its sub-directories for dead code using the given options.

Compilation flags:

static

Template:

rdirectory(Directory,Options)

Mode and number of proofs:

rdirectory(+atom,+list(compound)) - one

rdirectory/1

Scans all entities in all loaded files from a given directory and its sub-directories for dead code using default options.

Compilation flags:

static

Template:

rdirectory(Directory)

Mode and number of proofs:

rdirectory(+atom) - one

library/2

Scans all entities in all loaded files from a given library for dead code using the given options.

Compilation flags:

static

Template:

library(Library,Options)

Mode and number of proofs:

library(+atom,+list(compound)) - one

library/1

Scans all entities in all loaded files from a given library for dead code using default options.

Compilation flags:

static

Template:

library(Library)

Mode and number of proofs:

library(+atom) - one

rlibrary/2

Scans all entities in all loaded files in a loaded library and its sub-libraries for dead code using the given options.

Compilation flags:

static

Template:

rlibrary(Library,Options)

Mode and number of proofs:

rlibrary(+atom,+list(compound)) - one

rlibrary/1

Scans all entities in all loaded files in a loaded library and its sub-libraries for dead code using default options.

Compilation flags:

static

Template:

rlibrary(Library)

Mode and number of proofs:

rlibrary(+atom) - one

all/1

Scans all entities for dead code using the given options.

Compilation flags:

static

Template:

all(Options)

Mode and number of proofs:

all(+list(compound)) - one

all/0

Scans all entities for dead code using default options.

Compilation flags:

static

Mode and number of proofs:

all - one

predicates/2

Returns an ordered set of local predicates (and non-terminals) that are not used, directly or indirectly, by scoped predicates for a loaded entity.

Compilation flags:

static

Template:

predicates(Entity,Predicates)

Mode and number of proofs:

predicates(+entity__identifier,-list(predicate__indicator)) - one

predicate/2

Enumerates, by backtracking, local predicates (and non-terminals) that are not used, directly or indirectly, by scoped predicates for a loaded entity.

Compilation flags:

static

Template:

predicate(Entity,Predicate)

Mode and number of proofs:

predicate(+entity_identifier,?predicate_indicator) - zero_or_more

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.12.2 dead_code_scanner_messages

Logtalk dead_code_scanner tool default message translations.

Availability:

logtalk_load(dead_code_scanner(loader))

Author: Barry Evans and Paulo Moura

Version: 0:8:0

Date: 2024-05-07

Compilation flags:

static

Provides:

logtalk::message_prefix_stream/4

logtalk::message_tokens//2

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.13 debug_messages

object

1.13.1 debug_messages

Supports selective enabling and disabling of debug and debug(Group) messages.

Availability:

```
logtalk_load(debug_messages(loader))
```

Author: Paulo Moura

Version: 1:0:1

Date: 2022-05-05

Compilation flags:

```
static, context_switching_calls
```


Provides:

logtalk::message_hook/4

Uses:

logtalk

Remarks:

- Limitations: Debug messages are suppressed by the compiler when the optimize flag is turned on and thus cannot be enabled in this case.

Inherited public predicates:

(none)

- Public predicates
 - enable/1
 - disable/1
 - enabled/1
 - enable/2
 - disable/2
 - enabled/2
- Protected predicates
- Private predicates
 - enabled_/1
 - enabled_/2
- Operators

Public predicates

enable/1

Enables all debug and debug(Group) messages for the given component.

Compilation flags:

static

Template:

enable(Component)

Mode and number of proofs:

`enable(@term)` - one

`disable/1`

Disables all debug and debug(Group) messages for the given component.

Compilation flags:

`static`

Template:

`disable(Component)`

Mode and number of proofs:

`disable(@term)` - one

`enabled/1`

Enumerates by backtracking the components with enabled debug and debug(Group) messages.

Compilation flags:

`static`

Template:

`enabled(Component)`

Mode and number of proofs:

`enabled(?term)` - zero_or_more

`enable/2`

Enables debug(Group) messages for the given component and group.

Compilation flags:

`static`

Template:

enable(Component,Group)

Mode and number of proofs:

enable(@term,@term) - one

disable/2

Disables debug(Group) messages for the given component and group.

Compilation flags:

static

Template:

disable(Component,Group)

Mode and number of proofs:

disable(@term,@term) - one

enabled/2

Enumerates by backtracking the enabled debug(Group) messages for each component.

Compilation flags:

static

Template:

enabled(Component,Group)

Mode and number of proofs:

enabled(?term,?term) - zero_or_more

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

enabled_/1

Table of components with currently enabled debug and debug(Group) messages.

Compilation flags:

dynamic

Template:

enabled_(Component)

Mode and number of proofs:

enabled_(?term) - zero_or_more

enabled_/2

Table of currently enabled debug(Group) per component.

Compilation flags:

dynamic

Template:

enabled_(Component,Group)

Mode and number of proofs:

enabled_(?term,?term) - zero_or_more

Operators

(none)

1.14 debugger

object

1.14.1 debugger

Command-line debugger based on an extended procedure box model supporting execution tracing and spy points.

Availability:

```
logtalk_load(debugger(loader))
```

Author: Paulo Moura

Version: 8:0:0

Date: 2025-12-18

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public debuggerp
```

Provides:

```
logtalk::debug_handler/1
```

```
logtalk::debug_handler/3
```

Uses:

```
logtalk
```

Remarks:

```
(none)
```

Inherited public predicates:

```
debug/0 debugging/0 debugging/1 leash/1 leashing/1 log/3 logging/3 nodebug/0 nolog/3
nologall/0 nospy/1 nospy/3 nospy/4 nospyall/0 notrace/0 reset/0 set_write_max_depth/1
spy/1 spy/3 spy/4 spying/1 spying/3 spying/4 trace/0 write_max_depth/1
```

- Public predicates
- Protected predicates
- Private predicates
 - debugging_/0

- tracing_/0
 - explicit_tracing_/0
 - skipping_/0
 - skipping_unleashed_/1
 - quasi_skipping_/0
 - leaping_/1
 - leashing_/1
 - invocation_number_/1
 - jump_to_invocation_number_/1
 - zap_to_port_/1
 - write_max_depth_/1
 - log_point_/3
 - clause_breakpoint_/2
 - predicate_breakpoint_/3
 - entity_predicate_breakpoint_/4
 - context_breakpoint_/4
 - conditional_breakpoint_/3
 - triggered_breakpoint_/4
 - triggered_breakpoint_enabled_/2
 - file_line_hit_count_/3
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`debugging_/0`

True iff debug is on.

Compilation flags:

`dynamic`

Mode and number of proofs:

`debugging_ - zero_or_one`

`tracing_/0`

True iff tracing is on.

Compilation flags:

`dynamic`

Mode and number of proofs:

`tracing_ - zero_or_one`

`explicit_tracing_/0`

True iff tracing is on due to a call to the `trace/0` predicate.

Compilation flags:

`dynamic`

Mode and number of proofs:

`explicit_tracing_ - zero_or_one`

skipping_/0

True iff skipping.

Compilation flags:
dynamic

Mode and number of proofs:
skipping_ - zero_or_one

skipping_unleashed_/1

True iff skipping (a goal with invocation number N) but showing intermediate ports as unleashed.

Compilation flags:
dynamic

Template:
skipping_unleashed_(N)
Mode and number of proofs:
skipping_unleashed_(?integer) - zero_or_one

quasi_skipping_/0

True iff quasi-skipping.

Compilation flags:
dynamic

Mode and number of proofs:
quasi_skipping_ - zero_or_one

leaping_/1

True iff leaping in tracing or debugging mode.

Compilation flags:

dynamic

Template:

leaping_(Mode)

Mode and number of proofs:

leaping_(?atom) - zero_or_one

leashing_/1

Table of currently leashed ports.

Compilation flags:

dynamic

Template:

leashing_(Port)

Mode and number of proofs:

leashing_(?atom) - zero_or_more

invocation_number_/1

Current call stack invocation number.

Compilation flags:

dynamic

Template:

invocation_number_(N)

Mode and number of proofs:

invocation_number_(?integer) - zero_or_one

`jump_to_invocation_number_/1`

Invocation number to jump to.

Compilation flags:

dynamic

Template:

`jump_to_invocation_number_(N)`

Mode and number of proofs:

`jump_to_invocation_number_(?integer) - zero_or_one`

`zap_to_port_/1`

Port to zap to.

Compilation flags:

dynamic

Template:

`zap_to_port_(Port)`

Mode and number of proofs:

`zap_to_port_(?integer) - zero_or_one`

`write_max_depth_/1`

Current term write maximum depth.

Compilation flags:

dynamic

Template:

`write_max_depth_(MaxDepth)`

Mode and number of proofs:

`write_max_depth_(?non_negative_integer) - zero_or_one`

`log_point_/3`

Table of log points.

Compilation flags:

dynamic

Template:

`log_point_(Entity,Line,Message)`

Mode and number of proofs:

`log_point_(?object_identifier,?integer,?atom) - zero_or_more`

`log_point_(?category_identifier,?integer,?atom) - zero_or_more`

`clause_breakpoint_/2`

Table of clause breakpoints.

Compilation flags:

dynamic

Template:

`clause_breakpoint_(Entity,Line)`

Mode and number of proofs:

`clause_breakpoint_(?object_identifier,?integer) - zero_or_more`

`clause_breakpoint_(?category_identifier,?integer) - zero_or_more`

`predicate_breakpoint_/3`

Table of predicate breakpoints.

Compilation flags:

dynamic

Template:

`predicate_breakpoint_(Functor,Arity,Original)`

Mode and number of proofs:

`predicate_breakpoint_(?atom,?integer,?predicate_indicator) - zero_or_more`

`predicate_breakpoint_(?atom,?integer,?non_terminal_indicator) - zero_or_more`

`entity_predicate_breakpoint_/4`

Table of entity predicate breakpoints.

Compilation flags:

`dynamic`

Template:

`entity_predicate_breakpoint_(Entity, Functor, Arity, Original)`

Mode and number of proofs:

`entity_predicate_breakpoint_(?callable,?atom,?integer,?qualified_predicate_indicator) -
zero_or_more`

`entity_predicate_breakpoint_(?callable,?atom,?integer,?qualified_non_terminal_indicator) -
zero_or_more`

`context_breakpoint_/4`

Table of context breakpoints.

Compilation flags:

`dynamic`

Template:

`context_breakpoint_(Sender, This, Self, Goal)`

Mode and number of proofs:

`context_breakpoint_(?object_identifier,?object_identifier,?object_identifier,?callable) -
zero_or_more`

`conditional_breakpoint_/3`

Table of conditional breakpoints.

Compilation flags:

dynamic

Template:

`conditional_breakpoint_(Entity,Line,Condition)`

Mode and number of proofs:

`conditional_breakpoint_(?object_identifier,?integer,?callable) - zero_or_more`

`conditional_breakpoint_(?category_identifier,?integer,?callable) - zero_or_more`

`triggered_breakpoint_/4`

Table of defined triggered breakpoints.

Compilation flags:

dynamic

Template:

`triggered_breakpoint_(Entity,Line,TriggerEntity,TriggerLine)`

Mode and number of proofs:

`triggered_breakpoint_(?object_identifier,?integer,?object_identifier,?integer) - zero_or_more`

`triggered_breakpoint_(?object_identifier,?integer,?category_identifier,?integer) - zero_or_more`

`triggered_breakpoint_(?category_identifier,?integer,?object_identifier,?integer) - zero_or_more`

`triggered_breakpoint_(?category_identifier,?integer,?category_identifier,?integer) - zero_or_more`

`triggered_breakpoint_enabled_/2`

Table of enabled triggered breakpoints.

Compilation flags:

dynamic

Template:

`triggered_breakpoint_enabled_(Entity,Line)`

Mode and number of proofs:

triggered_breakpoint_enabled_(?object_identifier,?integer) - zero_or_more
triggered_breakpoint_enabled_(?category_identifier,?integer) - zero_or_more

file_line_hit_count_/3

Table of file and line hit counts (successful unifications with clause heads).

Compilation flags:

dynamic

Template:

file_line_hit_count_(File,Line,Count)

Mode and number of proofs:

file_line_hit_count_(?atom,?integer,?integer) - zero_or_one

Operators

(none)

category

1.14.2 debugger_messages

Logtalk debugger tool default message translations.

Availability:

logtalk_load(debugger(loader))

Author: Paulo Moura

Version: 4:0:0

Date: 2025-12-18

Compilation flags:

static

Provides:

```
logtalk::message_prefix_stream/4
logtalk::question_prompt_stream/4
logtalk::message_tokens//2
```

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.14.3 debuggerp

Debugger protocol.

Availability:

```
logtalk_load(debugger(loader))
```

Author: Paulo Moura

Version: 3:6:0

Date: 2025-09-05

Compilation flags:

static

Dependencies:

(none)

Remarks:

- Debugger help: Type the character h (condensed help) or the character ? (extended help) at a leashed port.
- Predicate breakpoint: Specified as a ground term `Functor/Arity`.
- Non-terminal breakpoint: Specified as a ground term `Functor//Arity`.
- Entity predicate breakpoint: Specified as a term `Entity::Functor/Arity`. Entity must be an object or category and may not be ground if parametric.
- Entity non-terminal breakpoint: Specified as a term `Entity::Functor//Arity`. Entity must be an object or category and may not be ground if parametric.
- Clause breakpoint: Specified as an Entity-Line term with both Entity and Line bound. Line must be the first source file line of an entity clause.
- Conditional breakpoint: Specified using Entity and Line for the clause head and a condition. Line must be the first source file line of an entity clause.
- Hit count breakpoint: Specified using Entity and Line for the clause head and an unification count expression as a condition. Line must be the first source file line of an entity clause.
- Triggered breakpoint: Specified using Entity and Line for the clause head and another breakpoint as a condition. Line must be the first source file line of an entity clause.
- Context breakpoint: Specified as a (Sender, This, Self, Goal) tuple.
- Log point: Specified using Entity and Line for the clause head and a message.
- Leash port shorthands: none - [], loose - [fact,rule,call], half - [fact,rule,call,redo], tight - [fact,rule,call,redo,fail,exception], and full - [fact,rule,call,exit,redo,fail,exception].

Inherited public predicates:

(none)

- [Public predicates](#)
 - [reset/0](#)
 - [debug/0](#)

- nodebug/0
- debugging/0
- debugging/1
- trace/0
- notrace/0
- leash/1
- leashing/1
- spy/1
- spying/1
- nospy/1
- spy/3
- spying/3
- nospy/3
- spy/4
- spying/4
- nospy/4
- nospyall/0
- log/3
- logging/3
- nolog/3
- nologall/0
- write_max_depth/1
- set_write_max_depth/1
- Protected predicates
- Private predicates
- Operators

Public predicates

reset/0

Resets all debugging settings (including breakpoints, log points, and leashed ports) and turns off debugging.

Compilation flags:

static

Mode and number of proofs:

reset - one

See also:

[nospyall/0](#)

[debug/0](#)

Starts debugging for all defined breakpoints.

Compilation flags:

static

Mode and number of proofs:

debug - one

[nodebug/0](#)

Stops debugging for all defined breakpoints. Also turns off tracing. Does not remove defined breakpoints.

Compilation flags:

static

Mode and number of proofs:

nodebug - one

See also:

[reset/0](#)

`debugging/0`

Reports current debugging settings, including breakpoints and log points.

Compilation flags:

`static`

Mode and number of proofs:

`debugging - one`

`debugging/1`

Enumerates, by backtracking, all entities compiled in debug mode.

Compilation flags:

`static`

Template:

`debugging(Entity)`

Mode and number of proofs:

`debugging(?entity_identifier) - zero_or_more`

`trace/0`

Starts tracing all calls compiled in debug mode.

Compilation flags:

`static`

Mode and number of proofs:

`trace - one`

`notrace/0`

Stops tracing of calls compiled in debug mode. Debugger will still stop at defined breakpoints.

Compilation flags:

`static`

Mode and number of proofs:

`notrace - one`

`leash/1`

Sets the debugger leash ports using an abbreviation (none, loose, half, tight, or full) or a list of ports (valid ports are fact, rule, call, exit, redo, fail, and exception).

Compilation flags:

`static`

Template:

`leash(Ports)`

Mode and number of proofs:

`leash(+atom) - one`

`leash(+list(atom)) - one`

`leashing/1`

Enumerates, by backtracking, all leashed ports (valid ports are fact, rule, call, exit, redo, fail, and exception).

Compilation flags:

`static`

Template:

`leashing(Port)`

Mode and number of proofs:

`leashing(?atom) - zero_or_more`

`spy/1`

Sets a predicate or clause breakpoint (removing any existing log point or breakpoint defined for the same location, or a list of breakpoints. Fails if a breakpoint is invalid.

Compilation flags:

`static`

Template:

`spy(Breakpoint)`

Mode and number of proofs:

`spy(@spy__point) - zero_or_one`

`spy(@list(spy__point)) - zero_or_one`

`spying/1`

Enumerates, by backtracking, all defined predicate and clause breakpoints.

Compilation flags:

`static`

Template:

`spying(Breakpoint)`

Mode and number of proofs:

`spying(?spy__point) - zero_or_more`

`nospy/1`

Removes all matching predicate and clause breakpoints.

Compilation flags:

`static`

Template:

`nospy(Breakpoint)`

Mode and number of proofs:

`nospy(@var) - one`

```
nospy(@spy_point) - one
nospy(@list(spy_point)) - one
```

spy/3

Sets a conditional or triggered breakpoint (removing any existing log point or breakpoint defined for the same location) at a clause head. The condition can be a unification count expression, a lambda expression, or another breakpoint. Fails if the breakpoint is invalid.

Compilation flags:
static

Template:
spy(Entity,Line,Condition)

Mode and number of proofs:
spy(+atom,+integer,@callable) - zero_or_one

Remarks:

- Unification count expression conditions: $>(\text{Count})$, $\geq(\text{Count})$, $\text{==}(\text{Count})$, $\leq(\text{Count})$, $<(\text{Count})$, $\text{mod}(\text{M})$, and Count .
 - Lambda expression conditions: $[\text{Count},\text{N},\text{Goal}]>>\text{Condition}$ and $[\text{Goal}]>>\text{Condition}$ where Count is the unification count, N is the invocation number, and Goal is the goal that unified with the clause head; Condition is called in the context of user.
 - Triggered breakpoint conditions: Entity-Line .
-

spying/3

Enumerates, by backtracking, all conditional and triggered breakpoints.

Compilation flags:
static

Template:
spying(Entity,Line,Condition)

Mode and number of proofs:
spying(?atom,?integer,?callable) - zero_or_more

nospy/3

Removes all matching conditional and triggered breakpoints.

Compilation flags:

static

Template:

nospy(Entity,Line,Condition)

Mode and number of proofs:

nospy(@term,@term,@term) - one

spy/4

Sets a context breakpoint.

Compilation flags:

static

Template:

spy(Sender,This,Self,Goal)

Mode and number of proofs:

spy(@term,@term,@term,@term) - one

spying/4

Enumerates, by backtracking, all defined context breakpoints.

Compilation flags:

static

Template:

spying(Sender,This,Self,Goal)

Mode and number of proofs:

spying(?term,?term,?term,?term) - zero_or_more

`nospy/4`

Removes all matching context breakpoints.

Compilation flags:

`static`

Template:

`nospy(Sender,This,Self,Goal)`

Mode and number of proofs:

`nospy(@term,@term,@term,@term) - one`

`nospyall/0`

Removes all breakpoints and log points.

Compilation flags:

`static`

Mode and number of proofs:

`nospyall - one`

See also:

[`reset/0`](#)

`log/3`

Sets a log point (removing any existing breakpoint defined for the same location) at a clause head. Fails if the log point is invalid.

Compilation flags:

`static`

Template:

`log(Entity,Line,Message)`

Mode and number of proofs:

`log(@object_identifier,+integer,+atom) - zero_or_one`
`log(@category_identifier,+integer,+atom) - zero_or_one`

`logging/3`

Enumerates, by backtracking, all defined log points.

Compilation flags:

`static`

Template:

`logging(Entity,Line,Message)`

Mode and number of proofs:

`logging(?object_identifier,?integer,?atom) - zero_or_more`

`logging(?category_identifier,?integer,?atom) - zero_or_more`

`nolog/3`

Removes all matching log points.

Compilation flags:

`static`

Template:

`nolog(Entity,Line,Message)`

Mode and number of proofs:

`nolog(@var_or(object_identifier),@var_or(integer),@var_or(atom)) - one`

`nolog(@var_or(category_identifier),@var_or(integer),@var_or(atom)) - one`

`nologall/0`

Removes all log points.

Compilation flags:

`static`

Mode and number of proofs:

`nologall - one`

See also:

`reset/0`

`write_max_depth/1`

Current term write maximum depth. When not defined, the backend default is used.

Compilation flags:

`static`

Template:

`write_max_depth(MaxDepth)`

Mode and number of proofs:

`write_max_depth(?non_negative_integer) - zero_or_one`

`set_write_max_depth/1`

Sets the default term maximum write depth. For most backends, a value of zero means that the whole term is written.

Compilation flags:

`static`

Template:

`set_write_max_depth(MaxDepth)`

Mode and number of proofs:

```
set_write_max_depth(+non_negative_integer) - one
```

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

[debugger](#)

object

1.14.4 dump_trace

Simple solution for redirecting a debugger trace to a file.

Availability:

```
logtalk_load(debugger(loader))
```

Author: Paulo Moura

Version: 1:0:1

Date: 2021-11-12

Compilation flags:

```
static, context_switching_calls
```

Uses:

[debugger](#)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - `start_redirect_to_file/2`
 - `stop_redirect_to_file/0`
- Protected predicates
- Private predicates
- Operators

Public predicates

`start_redirect_to_file/2`

Starts redirecting debugger trace messages to a file.

Compilation flags:

static

Template:

`start_redirect_to_file(File,Goal)`

Meta-predicate template:

`start_redirect_to_file(*,0)`

Mode and number of proofs:

`start_redirect_to_file(+atom,+callable) - zero_or_more`

`stop_redirect_to_file/0`

Stops redirecting debugger trace messages to a file.

Compilation flags:

static

Mode and number of proofs:

`stop_redirect_to_file - one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.15 dependents

category

1.15.1 observer

Smalltalk dependent protocol.

Availability:

logtalk_load(dependents(loader))

Author: Paulo Moura

Version: 1:0:0

Date: 2003-02-09

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - update/1
- Protected predicates
- Private predicates
- Operators

Public predicates

update/1

Called when an observed object is updated.

Compilation flags:

static

Template:

update(Change)

Mode and number of proofs:

update(?nonvar) - zero_or_one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

➡ See also

subject

category

1.15.2 subject

Smalltalk dependent handling predicates.

Availability:

`logtalk_load(dependents(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2003-02-09

Compilation flags:

`static`

Dependencies:

`(none)`

Remarks:

`(none)`

Inherited public predicates:

`(none)`

- Public predicates
 - `changed/0`
 - `changed/1`
 - `dependents/1`
 - `addDependent/1`
 - `removeDependent/1`
- Protected predicates
- Private predicates
 - `dependent_/1`
- Operators

Public predicates

`changed/0`

Receiver changed in some way. Notify all dependents.

Compilation flags:
static

Mode and number of proofs:
changed - one

`changed/1`

Receiver changed as specified in the argument. Notify all dependents.

Compilation flags:
static

Template:
changed(Change)
Mode and number of proofs:
changed(?nonvar) - one

`dependents/1`

Returns a list of all dependent objects.

Compilation flags:
static

Template:
dependents(Dependents)
Mode and number of proofs:
dependents(-list) - one

`addDependent/1`

Adds a new dependent object.

Compilation flags:

`static`

Template:

`addDependent(Dependent)`

Mode and number of proofs:

`addDependent(@object) - one`

`removeDependent/1`

Removes a dependent object.

Compilation flags:

`static`

Template:

`removeDependent(Dependent)`

Mode and number of proofs:

`removeDependent(?object) - zero_or_more`

Protected predicates

(none)

Private predicates

`dependent_/1`

Table of dependent objects.

Compilation flags:

`dynamic`

Template:

dependent_(Dependent)

Mode and number of proofs:

dependent_(?object) - zero_or_more

Operators

(none)

➡ See also

observer

1.16 diagrams

object

1.16.1 d2_graph_language

Predicates for generating graph files in the DOT language (version 2.36.0 or later).

Availability:

logtalk_load(diagrams(loader))

Author: Paulo Moura

Version: 1:3:0

Date: 2025-10-27

Compilation flags:

static, context_switching_calls

Implements:

public graph_language_protocol

Imports:

public options

Provides:

graph_language_registry::language_object/2

Uses:

list

os

term_io
user

Remarks:

(none)

Inherited public predicates:

check_option/1 check_options/1 default_option/1 default_options/1 edge/6 file_footer/3
file_header/3 graph_footer/5 graph_header/5 node/7 option/2 option/3 output_file_name/2
valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.16.2 diagram(Format)

- Format - Graph language file format.

Common predicates for generating diagrams.

Availability:

```
logtalk_load(diagrams(loader))
```

Author: Paulo Moura

Version: 3:16:1

Date: 2025-11-26

Compilation flags:

```
static
```

Extends:

```
public options
```

Provides:

```
logtalk::message_prefix_stream/4
```

```
logtalk::message_tokens//2
```

Uses:

```
graph_language_registry
```

```
list
```

```
logtalk
```

```
modules_diagram_support
```

```
os
```

```
pairs
```

```
type
```

```
user
```

Remarks:

```
(none)
```

Inherited public predicates:

```
check_option/1 check_options/1 default_option/1 default_options/1 option/2 option/3  
valid_option/1 valid_options/1
```

- Public predicates
 - libraries/3
 - libraries/2

- libraries/1
- all_libraries/1
- all_libraries/0
- rlibrary/2
- rlibrary/1
- library/2
- library/1
- directories/3
- directories/2
- rdirectory/3
- rdirectory/2
- rdirectory/1
- directory/3
- directory/2
- directory/1
- files/3
- files/2
- files/1
- all_files/1
- all_files/0
- format_object/1
- diagram_description/1
- diagram_name_suffix/1
- Protected predicates
 - diagram_caption/3
 - output_rlibrary/3
 - output_library/3
 - output_rdirectory/3
 - output externals/1
 - output_files/2
 - output_file/4
 - output_sub_diagrams/1
 - reset/0
 - output_node/6
 - node/6

- edge/5
- output_edges/1
- save_edge/5
- output_missing_externals/1
- not_excluded_file/4
- output_file_path/4
- locate_library/2
- locate_directory/2
- locate_file/5
- ground_entity_identifier/3
- filter_file_extension/3
- filter_external_file_extension/3
- add_link_options/3
- supported_editor_url_scheme_prefix/1
- omit_path_prefix/3
- add_node_zoom_option/4
- message_diagram_description/1
- Private predicates
 - node_/6
 - node_path_/2
 - edge_/5
- Operators

Public predicates

libraries/3

Creates a diagram for a set of libraries using the specified options. The Project argument is used as a prefix for the diagram file name.

Compilation flags:

static

Template:

libraries(Project,Libraries,Options)

Mode and number of proofs:

libraries(+atom,+list(atom),+list(compound)) - one

libraries/2

Creates a diagram for a set of libraries using the default options. The Project argument is used as a prefix for the diagram file name.

Compilation flags:

static

Template:

libraries(Project,Libraries)

Mode and number of proofs:

libraries(+atom,+list(atom)) - one

libraries/1

Creates a diagram for a set of libraries using the default options. The prefix libraries is used for the diagram file name.

Compilation flags:

static

Template:

libraries(Libraries)

Mode and number of proofs:

libraries(+list(atom)) - one

all_libraries/1

Creates a diagram for all loaded libraries using the specified options.

Compilation flags:

static

Template:

`all_libraries(Options)`

Mode and number of proofs:

`all_libraries(+list(compound)) - one`

`all_libraries/0`

Creates a diagram for all loaded libraries using default options.

Compilation flags:

`static`

Mode and number of proofs:

`all_libraries - one`

`rlibrary/2`

Creates a diagram for a library and its sub-libraries using the specified options.

Compilation flags:

`static`

Template:

`rlibrary(Library,Options)`

Mode and number of proofs:

`rlibrary(+atom,+list(compound)) - one`

`rlibrary/1`

Creates a diagram for a library and its sub-libraries using default options.

Compilation flags:

`static`

Template:


```
rlibrary(Library)
```

Mode and number of proofs:

```
rlibrary(+atom) - one
```

library/2

Creates a diagram for a library using the specified options.

Compilation flags:

```
static
```

Template:

```
library(Library,Options)
```

Mode and number of proofs:

```
library(+atom,+list(compound)) - one
```

library/1

Creates a diagram for a library using default options.

Compilation flags:

```
static
```

Template:

```
library(Library)
```

Mode and number of proofs:

```
library(+atom) - one
```

directories/3

Creates a diagram for a set of directories using the specified options. The Project argument is used as a prefix for the diagram file name.

Compilation flags:

static

Template:

directories(Project,Directories,Options)

Mode and number of proofs:

directories(+atom,+list(atom),+list(compound)) - one

directories/2

Creates a diagram for a set of directories using the default options. The Project argument is used as a prefix for the diagram file name.

Compilation flags:

static

Template:

directories(Project,Directories)

Mode and number of proofs:

directories(+atom,+list(atom)) - one

rdirectory/3

Creates a diagram for a directory and its sub-directories using the specified options. The Project argument is used as a prefix for the diagram file name.

Compilation flags:

static

Template:

rdirectory(Project,Directory,Options)

Mode and number of proofs:

`rdirectory(+atom,+atom,+list(compound)) - one`

`rdirectory/2`

Creates a diagram for a directory and its sub-directories using default options. The Project argument is used as a prefix for the diagram file name.

Compilation flags:

`static`

Template:

`rdirectory(Project,Directory)`

Mode and number of proofs:

`rdirectory(+atom,+atom) - one`

`rdirectory/1`

Creates a diagram for a directory and its sub-directories using default options. The name of the directory is used as a prefix for the diagram file name.

Compilation flags:

`static`

Template:

`rdirectory(Directory)`

Mode and number of proofs:

`rdirectory(+atom) - one`

directory/3

Creates a diagram for a directory using the specified options. The Project argument is used as a prefix for the diagram file name.

Compilation flags:

static

Template:

directory(Project,Directory,Options)

Mode and number of proofs:

directory(+atom,+atom,+list(compound)) - one

directory/2

Creates a diagram for a directory using default options. The Project argument is used as a prefix for the diagram file name.

Compilation flags:

static

Template:

directory(Project,Directory)

Mode and number of proofs:

directory(+atom,+atom) - one

directory/1

Creates a diagram for a directory using default options. The name of the directory is used as a prefix for the diagram file name.

Compilation flags:

static

Template:

directory(Directory)

Mode and number of proofs:

directory(+atom) - one

files/3

Creates a diagram for a set of files using the specified options. The file can be specified by name, basename, full path, or using library notation. The Project argument is used as a prefix for the diagram file name.

Compilation flags:

static

Template:

files(Project,Files,Options)

Mode and number of proofs:

files(+atom,+list(atom),+list(compound)) - one

files/2

Creates a diagram for a set of files using the default options. The file can be specified by name, basename, full path, or using library notation. The Project argument is used as a prefix for the diagram file name.

Compilation flags:

static

Template:

files(Project,Files)

Mode and number of proofs:

files(+atom,+list(atom)) - one

`files/1`

Creates a diagram for a set of files using the default options. The file can be specified by name, basename, full path, or using library notation. The prefix `files` is used for the diagram file name.

Compilation flags:

`static`

Template:

`files(Files)`

Mode and number of proofs:

`files(+list(atom)) - one`

`all_files/1`

Creates a diagram for all loaded files using the specified options.

Compilation flags:

`static`

Template:

`all_files(Options)`

Mode and number of proofs:

`all_files(+list(compound)) - one`

`all_files/0`

Creates a diagram for all loaded files using default options.

Compilation flags:

`static`

Mode and number of proofs:

`all_files - one`

`format_object/1`

Returns the identifier of the object implementing the graph language currently being used. Fails if none is specified.

Compilation flags:

`static`

Template:

`format_object(Object)`

Mode and number of proofs:

`format_object(-object_identifier) - zero_or_one`

`diagram_description/1`

Returns the diagram description.

Compilation flags:

`static`

Template:

`diagram_description(Description)`

Mode and number of proofs:

`diagram_description(-atom) - one`

`diagram_name_suffix/1`

Returns the diagram name suffix.

Compilation flags:

`static`

Template:

`diagram_name_suffix(Suffix)`

Mode and number of proofs:

`diagram_name_suffix(-atom) - one`

Protected predicates

`diagram_caption/3`

Creates a diagram caption from the diagram description and the subject and its kind.

Compilation flags:

`static`

Template:

`diagram_caption(Kind,Subject,Description)`

Mode and number of proofs:

`diagram_caption(+atom,+callable,-atom) - one`

`output_rlibrary/3`

Generates diagram output for a library and its sub-libraries using the specified options.

Compilation flags:

`static`

Template:

`output_rlibrary(Library,Path,Options)`

Mode and number of proofs:

`output_rlibrary(+atom,+atom,+list(compound)) - one`

`output_library/3`

Generates diagram output for a library using the specified options.

Compilation flags:

`static`

Template:

`output_library(Library,Path,Options)`

Mode and number of proofs:

`output_library(+atom,+atom,+list(compound)) - one`

`output_rdirectory/3`

Generates diagram output for a directory and its sub-directories using the specified options.

Compilation flags:

`static`

Template:

`output_rdirectory(Project,Path,Options)`

Mode and number of proofs:

`output_rdirectory(+atom,+atom,+list(compound)) - one`

`output externals/1`

Output external nodes using the specified options depending on the value of the boolean option `externals/1`.

Compilation flags:

`static`

Template:

`output_externals(Options)`

Mode and number of proofs:

`output_externals(+list(compound)) - one`

`output_files/2`

Generates diagram output for a list of files using the specified options.

Compilation flags:

`static`

Template:

`output_files(Files,Options)`

Mode and number of proofs:

`output_files(+list,+list(compound)) - one`

`output_file/4`

Generates diagram output for a file using the specified options.

Compilation flags:

`static`

Template:

`output_file(Path,Basename,Directory,Options)`

Mode and number of proofs:

`output_file(+atom,+atom,+atom,+list(compound)) - one`

`output_sub_diagrams/1`

Outputs sub-diagrams using the specified options.

Compilation flags:

`static`

Template:

`output_sub_diagrams(Options)`

Mode and number of proofs:

`output_sub_diagrams(+list(compound)) - one`

reset/0

Resets all temporary information used when generating a diagram.

Compilation flags:

static

Mode and number of proofs:

reset - one

output_node/6

Outputs a graph node.

Compilation flags:

static

Template:

output_node(Identifier,Label,Caption,Contents,Kind,Options)

Mode and number of proofs:

output_node(+nonvar,+nonvar,+nonvar,+list(nonvar),+atom,+list(compound)) - one

node/6

Enumerates, by backtracking, all saved nodes.

Compilation flags:

static

Template:

node(Identifier,Label,Caption,Contents,Kind,Options)

Mode and number of proofs:

node(?nonvar,?nonvar,?nonvar,?list(compound),?atom,?list(compound)) - zero_or_more

edge/5

Enumerates, by backtracking, all saved edges.

Compilation flags:

static

Template:

edge(From,To,Labels,Kind,Options)

Mode and number of proofs:

edge(?nonvar,?nonvar,?list(nonvar),?atom,?list(compound)) - zero_or_more

output_edges/1

Outputs all edges.

Compilation flags:

static

Template:

output_edges(Options)

Mode and number of proofs:

output_edges(+list(compound)) - one

save_edge/5

Saves a graph edge.

Compilation flags:

static

Template:

save_edge(From,To,Labels,Kind,Options)

Mode and number of proofs:

save_edge(+nonvar,+nonvar,+list(nonvar),+atom,+list(compound)) - one

`output_missing externals/1`

Outputs missing external nodes (usually due to unloaded resources) that are referenced from edges.

Compilation flags:

`static`

Template:

`output_missing externals(Options)`

Mode and number of proofs:

`output_missing externals(+list(compound)) - one`

`not_excluded_file/4`

True when the given file is not excluded from the generated output. Excluded files may be specified by full path or by basename and with or without extension. Excluded directories may be listed by full or relative path.

Compilation flags:

`static`

Template:

`not_excluded_file(Path,Basename,ExcludedDirectories,ExcludedFiles)`

Mode and number of proofs:

`not_excluded_file(+atom,+atom,+list(atom),+list(atom)) - zero_or_one`

`output_file_path/4`

Returns the output file path.

Compilation flags:

`static`

Template:

`output_file_path(Name,Options,Format,Path)`

Mode and number of proofs:

`output_file_path(+atom,+list(atom),+object_identifier,-atom) - one`

`locate_library/2`

Locates a library given its name.

Compilation flags:

`static`

Template:

`locate_library(Library,Path)`

Mode and number of proofs:

`locate_library(+atom,-atom) - one`

`locate_directory/2`

Locates a directory given its name or full path.

Compilation flags:

`static`

Template:

`locate_directory(Directory,Path)`

Mode and number of proofs:

`locate_directory(+atom,-atom) - one`

`locate_file/5`

Locates a file given its name, basename, full path, or library notation representation.

Compilation flags:

`static`

Template:

`locate_file(File,Basename,Extension,Directory,Path)`

Mode and number of proofs:

`locate_file(+atom,+atom,+atom,+atom,-atom) - one`

`ground_entity_identifier/3`

Converts an entity identifier to a ground term.

Compilation flags:

`static`

Template:

`ground_entity_identifier(Kind,Identifier,GroundIdentifier)`

Mode and number of proofs:

`ground_entity_identifier(+atom,+callable,-callable) - one`

`filter_file_extension/3`

Filters the file name extension depending on the `file_extensions/1` option.

Compilation flags:

`static`

Template:

`filter_file_extension(Basename,Options,Name)`

Mode and number of proofs:

`filter_file_extension(+atom,+list(compound),-atom) - one`

`filter_external_file_extension/3`

Filters the external file name extension depending on the `file_extensions/1` option.

Compilation flags:

`static`

Template:

```
filter_external_file_extension(Path,Options,Name)
```

Mode and number of proofs:

```
filter_external_file_extension(+atom,+list(compound),-atom) - one
```

```
add_link_options/3
```

Adds url/1, urls/2, and tooltip/1 link options (for use by the graph language) based on the specified path to the list of options.

Compilation flags:

```
static
```

Template:

```
add_link_options(Path,Options,LinkingOptions)
```

Mode and number of proofs:

```
add_link_options(+atom,+list(compound),-list(compound)) - one
```

```
supported_editor_url_scheme_prefix/1
```

Table of prefixes for text editors that supports a URL scheme to open diagram links.

Compilation flags:

```
static
```

Template:

```
supported_editor_url_scheme_prefix(Prefix)
```

Mode and number of proofs:

```
supported_editor_url_scheme_prefix(?atom) - zero_or_more
```

`omit_path_prefix/3`

Removes a prefix from a path, returning the relative path, when using the option `omit_path_prefixes/1`.
Used mainly for constructing directory and file node identifiers and captions.

Compilation flags:

`static`

Template:

`omit_path_prefix(Path,Options,Relative)`

Mode and number of proofs:

`omit_path_prefix(+atom,+list(compound),-atom) - one`

`add_node_zoom_option/4`

Adds node zoom options when using the zoom option.

Compilation flags:

`static`

Template:

`add_node_zoom_option(Identifier,Suffix,Options,NodeOptions)`

Mode and number of proofs:

`add_node_zoom_option(+atom,+atom,+list(compound),-list(compound)) - one`

`message_diagram_description/1`

Diagram description for progress messages.

Compilation flags:

`static`

Template:

`message_diagram_description(Description)`

Mode and number of proofs:

`message_diagram_description(?atom) - one`

Private predicates

`node_/6`

Table of saved nodes.

Compilation flags:
dynamic

Template:
node_(Identifier,Label,Caption,Contents,Kind,Options)

Mode and number of proofs:
node_(?nonvar,?nonvar,?nonvar,?list(compound),?atom,?list(compound)) - zero_or_more

`node_path_/2`

Table of node paths.

Compilation flags:
dynamic

Template:
node_path_(Node,Path)

Mode and number of proofs:
node_path_(?ground,?list(ground)) - zero_or_more

`edge_/5`

Table of saved edges.

Compilation flags:
dynamic

Template:

`edge_(From,To,Labels,Kind,Options)`

Mode and number of proofs:

`edge_(?nonvar,?nonvar,?list(nonvar),?atom,?list(compound)) - zero_or_more`

Operators

(none)

object

1.16.3 diagrams

Predicates for generating all supported diagrams for libraries, directories, and files in one step using the DOT format.

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 2:1:0

Date: 2019-04-07

Compilation flags:

`static, context_switching_calls`

Extends:

`public diagrams(dot)`

Remarks:

(none)

Inherited public predicates:

`all_files/0 all_files/1 all_libraries/0 all_libraries/1 directories/2 directories/3 directory/1
directory/2 directory/3 files/1 files/2 files/3 libraries/1 libraries/2 libraries/3 library/1
library/2 rdirectory/1 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2`

- Public predicates
- Protected predicates

- [Private predicates](#)
- [Operators](#)

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.16.4 `diagrams`(Format)

- `Format` - Graph language file format.

Predicates for generating all supported diagrams for libraries, directories, or files in one step using the specified format.

Availability:

```
logtalk_load(diagrams(loader))
```

Author: Paulo Moura

Version: 2:8:0

Date: 2019-06-13

Compilation flags:

```
static, context_switching_calls
```

Uses:

[list](#)

[os](#)

Remarks:

- Common options: title/1, date/1, output_directory/1, relation_labels/1, node_type_captions/1, exclude_files/1, exclude_libraries/1, url_prefixes/1, omit_path_prefix/1, entity_url_suffix_target/2, and layout/1.
- Limitations: Some of the provided predicates only make sense for some types of diagrams. Also, fine tuning may require generating individual diagrams directly instead of as a batch using this utility object.

Inherited public predicates:

(none)

- Public predicates
 - libraries/3
 - libraries/2
 - libraries/1
 - all_libraries/1
 - all_libraries/0
 - rlibrary/2
 - rlibrary/1
 - library/2
 - library/1
 - directories/3
 - directories/2
 - rdirectory/3
 - rdirectory/2
 - rdirectory/1
 - directory/3
 - directory/2
 - directory/1
 - files/3
 - files/2
 - files/1
 - all_files/1
 - all_files/0
- Protected predicates

- Private predicates
- Operators

Public predicates

`libraries/3`

Creates all supported diagrams for a set of libraries using the specified options. The Project argument is used as a prefix for the diagram file names.

Compilation flags:

`static`

Template:

`libraries(Project,Libraries,Options)`

Mode and number of proofs:

`libraries(+atom,+list(atom),+list(compound))` - one

`libraries/2`

Creates all supported diagrams for a set of libraries using the default options. The Project argument is used as a prefix for the diagram file names.

Compilation flags:

`static`

Template:

`libraries(Project,Libraries)`

Mode and number of proofs:

`libraries(+atom,+list(atom))` - one

libraries/1

Creates all supported diagrams for a set of libraries using the default options. The prefix libraries is used for the diagram file names.

Compilation flags:

static

Template:

libraries(Libraries)

Mode and number of proofs:

libraries(+list(atom)) - one

all_libraries/1

Creates all supported diagrams for all loaded libraries using the specified options.

Compilation flags:

static

Template:

all_libraries(Options)

Mode and number of proofs:

all_libraries(+list(compound)) - one

all_libraries/0

Creates all supported diagrams for all loaded libraries using default options.

Compilation flags:

static

Mode and number of proofs:

all_libraries - one

rlibrary/2

Creates all supported diagrams for a library and its sub-libraries using the specified options.

Compilation flags:

static

Template:

rlibrary(Library,Options)

Mode and number of proofs:

rlibrary(+atom,+list(compound)) - one

rlibrary/1

Creates all supported diagrams for a library and its sub-libraries using default options.

Compilation flags:

static

Template:

rlibrary(Library)

Mode and number of proofs:

rlibrary(+atom) - one

library/2

Creates all supported diagrams for a library using the specified options.

Compilation flags:

static

Template:

library(Library,Options)

Mode and number of proofs:

library(+atom,+list(compound)) - one

library/1

Creates all supported diagrams for a library using default options.

Compilation flags:

static

Template:

library(Library)

Mode and number of proofs:

library(+atom) - one

directories/3

Creates all supported diagrams for a set of directories using the specified options. The Project argument is used as a prefix for the diagram file names.

Compilation flags:

static

Template:

directories(Project,Directories,Options)

Mode and number of proofs:

directories(+atom,+list(atom),+list(compound)) - one

directories/2

Creates all supported diagrams for a directory using default options. The Project argument is used as a prefix for the diagram file names.

Compilation flags:

static

Template:

directories(Project,Directories)

Mode and number of proofs:

directories(+atom,+list(atom)) - one

`rdirectory/3`

Creates all supported diagrams for a directory and its sub-directories using the specified options. The `Project` argument is used as a prefix for the diagram file name.

Compilation flags:

`static`

Template:

`rdirectory(Project,Directory,Options)`

Mode and number of proofs:

`rdirectory(+atom,+atom,+list(compound)) - one`

`rdirectory/2`

Creates all supported diagrams for a directory and its sub-directories using default options. The `Project` argument is used as a prefix for the diagram file name.

Compilation flags:

`static`

Template:

`rdirectory(Project,Directory)`

Mode and number of proofs:

`rdirectory(+atom,+atom) - one`

`rdirectory/1`

Creates all supported diagrams for a directory and its sub-directories using default options. The name of the directory is used as a prefix for the diagram file name.

Compilation flags:

`static`

Template:

rdirectory(Directory)

Mode and number of proofs:

rdirectory(+atom) - one

directory/3

Creates all supported diagrams for a directory using the specified options. The Project argument is used as a prefix for the diagram file names.

Compilation flags:

static

Template:

directory(Project,Directory,Options)

Mode and number of proofs:

directory(+atom,+atom,+list(compound)) - one

directory/2

Creates all supported diagrams for a directory using default options. The Project argument is used as a prefix for the diagram file names.

Compilation flags:

static

Template:

directory(Project,Directory)

Mode and number of proofs:

directory(+atom,+atom) - one

directory/1

Creates all supported diagrams for a directory using default options. The name of the directory is used as a prefix for the diagram file names.

Compilation flags:

static

Template:

directory(Directory)

Mode and number of proofs:

directory(+atom) - one

files/3

Creates all supported diagrams for a set of files using the specified options. The file can be specified by name, basename, full path, or using library notation. The Project argument is used as a prefix for the diagram file names.

Compilation flags:

static

Template:

files(Project,Files,Options)

Mode and number of proofs:

files(+atom,+list(atom),+list(compound)) - one

files/2

Creates all supported diagrams for a set of files using the default options. The file can be specified by name, basename, full path, or using library notation. The Project argument is used as a prefix for the diagram file names.

Compilation flags:

static

Template:

`files(Project,Files)`

Mode and number of proofs:

`files(+atom,+list(atom))` - one

`files/1`

Creates all supported diagrams for a set of files using the default options. The file can be specified by name, basename, full path, or using library notation. The prefix “files” is used for the diagram file names.

Compilation flags:

`static`

Template:

`files(Files)`

Mode and number of proofs:

`files(+list(atom))` - one

`all_files/1`

Creates all supported diagrams for all loaded files using the specified options.

Compilation flags:

`static`

Template:

`all_files(Options)`

Mode and number of proofs:

`all_files(+list(compound))` - one

`all_files/0`

Creates all supported diagrams for all loaded files using default options.

Compilation flags:

`static`

Mode and number of proofs:

`all_files - one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.16.5 directory__dependency__diagram

Predicates for generating directory dependency diagrams in DOT format.

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2019-04-07

Compilation flags:

`static, context__switching__calls`

Extends:

`public directory__dependency__diagram(dot)`

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
 default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
 directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

directory_load_diagram, file_load_diagram

object

1.16.6 `directory_dependency_diagram`(Format)

- Format - Graph language file format.

Predicates for generating directory dependency diagrams. A dependency exists when an entity in one directory makes a reference to an entity in another directory.

Availability:

```
logtalk_load(diagrams(loader))
```

Author: Paulo Moura

Version: 3:1:0

Date: 2025-12-03

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public directory_diagram(Format)
```

Uses:

```
file_dependency_diagram(Format)
```

```
list
```

```
logtalk
```

```
modules_diagram_support
```

Remarks:

```
(none)
```

Inherited public predicates:

```
all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1
```

- Public predicates
- Protected predicates
- Private predicates
 - `sub_diagram_/2`
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`sub_diagram_/2`

Table of directory sub-diagrams to support their generation.

Compilation flags:

`dynamic`

Template:

`sub_diagram__(Project,Directory)`

Mode and number of proofs:

`sub_diagram__(?atom,?atom) - zero_or_more`

Operators

(none)

 See also

`directory_load_diagram(Format), file_load_diagram(Format), library_load_diagram(Format)`

`category`

1.16.7 `directory_diagram(Format)`

- `Format` - Graph language file format.

Common predicates for generating directory diagrams.

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 1:13:0

Date: 2024-12-04

Compilation flags:

static

Extends:

public diagram(Format)

Uses:

list

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
 - remember_included_directory/1
 - remember_referenced_logtalk_directory/1
 - remember_referenced_prolog_directory/1
- Private predicates
 - included_directory_/1
 - referenced_logtalk_directory_/1
 - referenced_prolog_directory_/1
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

`remember_included_directory/1`

Remember included Logtalk directory in the diagram.

Compilation flags:

`static`

Template:

`remember_included_directory(Path)`

Mode and number of proofs:

`remember_included_directory(+atom) - one`

`remember_referenced_logtalk_directory/1`

Remember referenced Logtalk directory in the diagram.

Compilation flags:

`static`

Template:

`remember_referenced_logtalk_directory(Path)`

Mode and number of proofs:

`remember_referenced_logtalk_directory(+atom) - one`

`remember_referenced_prolog_directory/1`

Remember referenced Prolog directory in the diagram.

Compilation flags:

`static`

Template:

remember_referenced_prolog_directory(Path)

Mode and number of proofs:

remember_referenced_prolog_directory(+atom) - one

Private predicates

included_directory_/1

Table of Logtalk directories already included in the diagram.

Compilation flags:

dynamic

Template:

included_directory_(Path)

Mode and number of proofs:

included_directory_(?atom) - zero_or_more

referenced_logtalk_directory_/1

Table of referenced Logtalk directories in the diagram.

Compilation flags:

dynamic

Template:

referenced_logtalk_directory_(Path)

Mode and number of proofs:

referenced_logtalk_directory_(?atom) - zero_or_more

referenced_prolog_directory_/1

Table of referenced Prolog directories in the diagram.

Compilation flags:

dynamic

Template:

referenced_prolog_directory_(Path)

Mode and number of proofs:

referenced_prolog_directory_(?atom) - zero_or_more

Operators

(none)

object

1.16.8 directory_load_diagram

Predicates for generating directory loading dependency diagrams in DOT format.

Availability:

logtalk_load(diagrams(loader))

Author: Paulo Moura

Version: 1:0:0

Date: 2019-04-07

Compilation flags:

static, context_switching_calls

Extends:

public directory_load_diagram(dot)

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

directory_dependency_diagram, file_dependency_diagram

object

1.16.9 directory_load_diagram(Format)

- Format - Graph language file format.

Predicates for generating directory loading dependency diagrams.

Availability:

logtalk_load(diagrams(loader))

Author: Paulo Moura

Version: 3:0:1

Date: 2024-04-01

Compilation flags:

static, context_switching_calls

Imports:

public directory_diagram(Format)

Uses:

file_dependency_diagram(Format)

file_load_diagram(Format)

list

logtalk

modules_diagram_support

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
 - sub_diagram_/2
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`sub_diagram_/2`

Table of directory sub-diagrams to support their generation.

Compilation flags:

`dynamic`

Template:


`sub_diagram_(Project,Directory)`

Mode and number of proofs:

`sub_diagram_(?atom,?atom) - zero_or_more`

Operators

(none)

 See also

`directory_dependency_diagram(Format),`
`brary_dependency_diagram(Format)`

`file_dependency_diagram(Format),`

`li-`

object

1.16.10 `dot_graph_language`

Predicates for generating graph files in the DOT language (version 2.36.0 or later).

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 3:12:0

Date: 2025-10-27

Compilation flags:

static, context_switching_calls

Implements:

public graph_language_protocol

Imports:

public options

Provides:

graph_language_registry::language_object/2

Uses:

list

os

term_io

user

Remarks:

(none)

Inherited public predicates:

check_option/1 check_options/1 default_option/1 default_options/1 edge/6 file_footer/3
file_header/3 graph_footer/5 graph_header/5 node/7 option/2 option/3 output_file_name/2
valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.16.11 entity__diagram

Predicates for generating entity diagrams in DOT format with both inheritance and cross-referencing relation edges.

Availability:

`logtalk__load(diagrams(loader))`

Author: Paulo Moura

Version: 2:0:0

Date: 2014-01-01

Compilation flags:

`static, context__switching__calls`

Extends:

`public entity__diagram(dot)`

Remarks:

(none)

Inherited public predicates:

`all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 file/1 file/2 files/1 files/2 files/3
format_object/1 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3
rdirectory/1 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1`

- Public predicates
- Protected predicates
- Private predicates

- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➞ See also

[inheritance_diagram](#), [uses_diagram](#), [xref_diagram](#)

object

1.16.12 entity_diagram(Format)

- Format - Graph language file format.

Predicates for generating entity diagrams in the specified format with both inheritance and cross-referencing relation edges.

Availability:

```
logtalk_load(diagrams(loader))
```

Author: Paulo Moura

Version: 2:60:0

Date: 2024-12-04

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public diagram(Format)
```

Uses:

list
logtalk
modules_diagram_support
user

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
 - file/2
 - file/1
- Protected predicates
- Private predicates
 - included_entity_/1
 - included_module_/1
 - referenced_entity_/2
 - referenced_module_/2
- Operators

Public predicates

file/2

Creates a diagram for all entities in a loaded source file using the specified options. The file can be specified by name, basename, full path, or using library notation.

Compilation flags:

static

Template:

file(File,Options)

Mode and number of proofs:

file(+atom,+list(compound)) - one

file/1

Creates a diagram for all entities in a loaded source file using default options. The file can be specified by name, basename, full path, or using library notation.

Compilation flags:

static

Template:

file(File)

Mode and number of proofs:

file(+atom) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

included_entity_/1

Table of Logtalk entities already included in the diagram.

Compilation flags:

dynamic

Template:

included_entity_(Entity)

Mode and number of proofs:

included_entity_(?entity_identifier) - zero_or_more

included__module__/1

Table of Prolog modules already included in the diagram.

Compilation flags:

dynamic

Template:

included__module__(Module)

Mode and number of proofs:

included__module__(?module__identifier) - zero_or_more

referenced__entity__/2

Table of referenced Logtalk entities in the diagram.

Compilation flags:

dynamic

Template:

referenced__entity__(Referencer,Entity)

Mode and number of proofs:

referenced__entity__(?entity__identifier,?entity__identifier) - zero_or_more

referenced__module__/2

Table of referenced Logtalk entities in the diagram.

Compilation flags:

dynamic

Template:

referenced__module__(Referencer,Entity)

Mode and number of proofs:

referenced__module__(?entity__identifier,?module__identifier) - zero_or_more

Operators

(none)

➡ See also

`inheritance_diagram(Format),` `uses_diagram(Format),` `xref_diagram(Format),` `library_diagram(Format)`

object

1.16.13 `file_dependency_diagram`

Predicates for generating file contents dependency diagrams in DOT format. A dependency exists when an entity in one file makes a reference to an entity in another file.

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 2:1:0

Date: 2019-06-13

Compilation flags:

`static, context_switching_calls`

Extends:

`public file_dependency_diagram(dot)`

Remarks:

(none)

Inherited public predicates:

`all_files/0` `all_files/1` `all_libraries/0` `all_libraries/1` `check_option/1` `check_options/1`
`default_option/1` `default_options/1` `diagram_description/1` `diagram_name_suffix/1` `directories/2`
`directories/3` `directory/1` `directory/2` `directory/3` `files/1` `files/2` `files/3` `format_object/1`
`libraries/1` `libraries/2` `libraries/3` `library/1` `library/2` `option/2` `option/3` `rdirectory/1`
`rdirectory/2` `rdirectory/3` `rlibrary/1` `rlibrary/2` `valid_option/1` `valid_options/1`

- Public predicates
- Protected predicates

- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

`file_load_diagram`, `directory_load_diagram`, `library_load_diagram`

object

1.16.14 `file_dependency_diagram`(Format)

- Format - Graph language file format.

Predicates for generating file contents dependency diagrams. A dependency exists when an entity in one file makes a reference to an entity in another file.

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 2:28:3

Date: 2024-04-01

Compilation flags:

`static`, `context_switching_calls`

Imports:

public file_diagram(Format)

Uses:

entity_diagram(Format)

list

logtalk

modules_diagram_support

os

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
 default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
 directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
 - sub_diagram_/1
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`sub_diagram_/1`

Table of file sub-diagrams to support their generation.

Compilation flags:

`dynamic`

Template:

`sub_diagram_(File)`

Mode and number of proofs:

`sub_diagram_(?atom) - zero_or_more`

Operators

(none)

➡ See also

`file_load_diagram(Format)`, `directory_load_diagram(Format)`, `library_load_diagram(Format)`

category

1.16.15 `file_diagram(Format)`

- `Format` - Graph language file format.

Common predicates for generating file diagrams.

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 2:14:0

Date: 2024-12-04

Compilation flags:

static

Extends:

public diagram(Format)

Uses:

list

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
 default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
 directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
 - remember_included_file/1
 - remember_referenced_logtalk_file/1
 - remember_referenced_prolog_file/1
- Private predicates
 - included_file_/1
 - referenced_logtalk_file_/1
 - referenced_prolog_file_/1
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

`remember_included_file/1`

Remember included Logtalk file in the diagram.

Compilation flags:

`static`

Template:

`remember_included_file(Path)`

Mode and number of proofs:

`remember_included_file(+atom) - one`

`remember_referenced_logtalk_file/1`

Remember referenced Logtalk file in the diagram.

Compilation flags:

`static`

Template:

`remember_referenced_logtalk_file(Path)`

Mode and number of proofs:

`remember_referenced_logtalk_file(+atom) - one`

`remember_referenced_prolog_file/1`

Remember referenced Prolog file in the diagram.

Compilation flags:

`static`

Template:

remember_referenced_prolog_file(Path)

Mode and number of proofs:

remember_referenced_prolog_file(+atom) - one

Private predicates

included_file_/1

Table of Logtalk files already included in the diagram.

Compilation flags:

dynamic

Template:

included_file_(Path)

Mode and number of proofs:

included_file_(?atom) - zero_or_more

referenced_logtalk_file_/1

Table of referenced Logtalk files in the diagram.

Compilation flags:

dynamic

Template:

referenced_logtalk_file_(Path)

Mode and number of proofs:

referenced_logtalk_file_(?atom) - zero_or_more

referenced_prolog_file_/1

Table of referenced Prolog files in the diagram.

Compilation flags:

dynamic

Template:

referenced_prolog_file_(Path)

Mode and number of proofs:

referenced_prolog_file_(?atom) - zero_or_more

Operators

(none)

object

1.16.16 file_load_diagram

Predicates for generating file loading dependency diagrams in DOT format. A dependency exists when a file loads or includes another file.

Availability:

logtalk_load(diagrams(loader))

Author: Paulo Moura

Version: 2:1:0

Date: 2019-06-13

Compilation flags:

static, context_switching_calls

Extends:

public file_load_diagram(dot)

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
 default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
 directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

file_dependency_diagram, directory_dependency_diagram, library_dependency_diagram

object

1.16.17 file_load_diagram(Format)

- Format - Graph language file format.

Predicates for generating file loading dependency diagrams. A dependency exists when a file loads or includes another file.

Availability:

logtalk_load(diagrams(loader))

Author: Paulo Moura

Version: 2:30:3

Date: 2024-12-05

Compilation flags:

static, context_switching_calls

Imports:

public file_diagram(Format)

Uses:

entity_diagram(Format)

list

logtalk

modules_diagram_support

os

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
 - sub_diagram_/1
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

sub_diagram_/1

Table of file sub-diagrams to support their generation.

Compilation flags:

dynamic

Template:

sub_diagram_(File)

Mode and number of proofs:

sub_diagram_(?atom) - zero_or_more

Operators

(none)

➡ See also

file_dependency_diagram(Format),
brary_dependency_diagram(Format)

directory_dependency_diagram(Format),

li-

protocol

1.16.18 graph_language_protocol

Predicates for generating graph files.

Availability:

logtalk_load(diagrams(loader))

Author: Paulo Moura

Version: 2:0:0

Date: 2014-12-30

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - output_file_name/2
 - file_header/3
 - file_footer/3
 - graph_header/5
 - graph_footer/5
 - node/7
 - edge/6
- Protected predicates
- Private predicates
- Operators

Public predicates

output_file_name/2

Constructs the diagram file basename by adding a graph language dependent extension to the given name.

Compilation flags:

static

Template:

output_file_name(Name,Basename)

Mode and number of proofs:

output_file_name(+atom,-atom) - one

`file_header/3`

Writes the output file header using the specified options.

Compilation flags:

`static`

Template:

`file_header(Stream,Identifier,Options)`

Mode and number of proofs:

`file_header(+stream_or_alias,+atom,+list(compound)) - one`

`file_footer/3`

Writes the output file footer using the specified options.

Compilation flags:

`static`

Template:

`file_footer(Stream,Identifier,Options)`

Mode and number of proofs:

`file_footer(+stream_or_alias,+atom,+list(compound)) - one`

`graph_header/5`

Writes a graph header using the specified options.

Compilation flags:

`static`

Template:

`graph_header(Stream,Identifier,Label,Kind,Options)`

Mode and number of proofs:

`graph_header(+stream_or_alias,+atom,+atom,+atom,+list(compound)) - one`

graph_footer/5

Writes a graph footer using the specified options.

Compilation flags:

static

Template:

graph_footer(Stream,Identifier,Label,Kind,Options)

Mode and number of proofs:

graph_footer(+stream_or_alias,+atom,+atom,+atom,+list(compound)) - one

node/7

Writes a node using the specified options.

Compilation flags:

static

Template:

node(Stream,Identifier,Label,Caption,Lines,Kind,Options)

Mode and number of proofs:

node(+stream_or_alias,+nonvar,+nonvar,+nonvar,+list(nonvar),+atom,+list(compound)) - one

edge/6

Writes an edge between two nodes using the specified options.

Compilation flags:

static

Template:

edge(Stream,Start,End,Labels,Kind,Options)

Mode and number of proofs:

edge(+stream_or_alias,+nonvar,+nonvar,+list(nonvar),+atom,+list(compound)) - one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

object

1.16.19 `graph_language_registry`

Registry of implemented graph languages.

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 1:0:1

Date: 2020-03-25

Compilation flags:

`static, context_switching_calls`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - `language_object/2`
- Protected predicates

- Private predicates
- Operators

Public predicates

`language__object/2`

Table of defined graph languages and their implementation objects.

Compilation flags:
static, multifile

Template:
 `language__object(Language,Object)`
Mode and number of proofs:
 `language__object(?atom,?object__identifier) - zero_or_more`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

object

1.16.20 inheritance__diagram

Predicates for generating entity diagrams in DOT format with inheritance relation edges but no cross-referencing relation edges.

Availability:
 `logtalk__load(diagrams(loader))`

Author: Paulo Moura

Version: 2:0:0
Date: 2014-01-15

Compilation flags:
static, context_switching_calls

Extends:
public inheritance_diagram(dot)

Remarks:
(none)

Inherited public predicates:
all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 file/1 file/2 files/1 files/2 files/3
format_object/1 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3
rdirectory/1 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

[entity__diagram](#), [uses__diagram](#), [xref__diagram](#)

object

1.16.21 `inheritance__diagram`(Format)

- Format - Graph language file format.

Predicates for generating entity diagrams in the specified format with inheritance relation edges but no cross-referencing relation edges.

Availability:

`logtalk__load(diagrams(loader))`

Author: Paulo Moura

Version: 2:20:0

Date: 2024-03-20

Compilation flags:

`static, context__switching__calls`

Extends:

`public entity__diagram(Format)`

Uses:

[logtalk](#)

Remarks:

(none)

Inherited public predicates:

`all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 file/1 file/2 files/1 files/2 files/3
format_object/1 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3
rdirectory/1 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`entity_diagram(Format)`, `uses_diagram(Format)`, `xref_diagram(Format)`

object

1.16.22 library__dependency__diagram

Predicates for generating library dependency diagrams in DOT format.

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 2:1:0

Date: 2019-06-13

Compilation flags:

`static`, `context__switching__calls`

Extends:

`public library_dependency_diagram(dot)`

Remarks:

(none)

Inherited public predicates:

`all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`library_load_diagram, file_load_diagram, entity_diagram`

object

1.16.23 library_dependency_diagram(Format)

- Format - Graph language file format.

Predicates for generating library dependency diagrams. A dependency exists when an entity in one library makes a reference to an entity in another library.

Availability:

```
logtalk_load(diagrams(loader))
```

Author: Paulo Moura

Version: 2:34:0

Date: 2025-12-03

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public library_diagram(Format)
```

Uses:

```
entity_diagram(Format)
list
logtalk
modules_diagram_support
```

Remarks:

```
(none)
```

Inherited public predicates:

```
all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1
```

- Public predicates
- Protected predicates
- Private predicates
 - sub_diagram_/1
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`sub_diagram_/1`

Table of library sub-diagrams to support their generation.

Compilation flags:

`dynamic`

Template:

`sub_diagram_(Library)`

Mode and number of proofs:

`sub_diagram_(?atom) - zero_or_more`

Operators

(none)

See also

`library_load_diagram(Format)`, `directory_load_diagram(Format)`, `file_load_diagram(Format)`, `entity_diagram(Format)`

`category`

1.16.24 `library__diagram(Format)`

- `Format` - Graph language file format.

Common predicates for generating library diagrams.

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 2:17:0

Date: 2024-12-04

Compilation flags:

static

Extends:

public diagram(Format)

Uses:

list

user

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
 - add_library_documentation_url/4
 - remember_included_library/2
 - remember_referenced_logtalk_library/2
 - remember_referenced_prolog_library/2
- Private predicates
 - included_library_/2
 - referenced_logtalk_library_/2
 - referenced_prolog_library_/2
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

`add_library_documentation_url/4`

Adds a documentation URL when using the option `url_prefixes/2`.

Compilation flags:

`static`

Template:

`add_library_documentation_url(Kind,Options,Library,NodeOptions)`

Mode and number of proofs:

`add_library_documentation_url(+atom,+list(compound),+atom,-list(compound)) - one`

`remember_included_library/2`

Remember included Logtalk library in the diagram.

Compilation flags:

`static`

Template:

`remember_included_library(Library,Path)`

Mode and number of proofs:

`remember_included_library(+atom,+atom) - one`

`remember_referenced_logtalk_library/2`

Remember referenced Logtalk library in the diagram.

Compilation flags:

`static`

Template:

remember_referenced_logtalk_library(Library,Path)

Mode and number of proofs:

remember_referenced_logtalk_library(+atom,+atom) - one

remember_referenced_prolog_library/2

Remember referenced Prolog library in the diagram.

Compilation flags:

static

Template:

remember_referenced_prolog_library(Library,Path)

Mode and number of proofs:

remember_referenced_prolog_library(+atom,+atom) - one

Private predicates

included_library_/2

Table of Logtalk libraries already included in the diagram.

Compilation flags:

dynamic

Template:

included_library_(Library,Path)

Mode and number of proofs:

included_library_(?atom,?atom) - zero_or_more

`referenced_logtalk_library_/2`

Table of referenced Logtalk libraries in the diagram.

Compilation flags:

`dynamic`

Template:

`referenced_logtalk_library_(Library,Path)`

Mode and number of proofs:

`referenced_logtalk_library_(?atom,?atom) - zero_or_more`

`referenced_prolog_library_/2`

Table of referenced Prolog libraries in the diagram.

Compilation flags:

`dynamic`

Template:

`referenced_prolog_library_(Library,Path)`

Mode and number of proofs:

`referenced_prolog_library_(?atom,?atom) - zero_or_more`

Operators

(none)

 See also

`inheritance_diagram(Format), uses_diagram(Format), xref_diagram(Format), entity_diagram(Format)`

object

1.16.25 library_load_diagram

Predicates for generating library loading dependency diagrams in DOT format.

Availability:

```
logtalk_load(diagrams(loader))
```

Author: Paulo Moura

Version: 2:1:0

Date: 2019-06-13

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public library_load_diagram(dot)
```

Remarks:

```
(none)
```

Inherited public predicates:

```
all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`library__dependency__diagram`, `file__dependency__diagram`, `entity__diagram`

object

1.16.26 `library__load__diagram(Format)`

- Format - Graph language file format.

Predicates for generating library loading dependency diagrams.

Availability:

`logtalk__load(diagrams(loader))`

Author: Paulo Moura

Version: 2:33:1

Date: 2024-04-01

Compilation flags:

`static`, `context__switching__calls`

Imports:

`public library__diagram(Format)`

Uses:

`entity__diagram(Format)`

`list`

`logtalk`

`modules__diagram__support`

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
 default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
 directories/3 directory/1 directory/2 directory/3 files/1 files/2 files/3 format_object/1
 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3 rdirectory/1
 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
 - sub_diagram_/1
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

sub_diagram_/1

Table of library sub-diagrams to support their generation.

Compilation flags:

dynamic

Template:

sub_diagram_(Library)

Mode and number of proofs:

sub_diagram_(?atom) - zero_or_more

Operators

(none)

See also

```
library_dependency_diagram(Format),          directory_dependency_diagram(Format),  
file_dependency_diagram(Format), entity_diagram(Format)
```

object

1.16.27 mermaid_graph_language

Predicates for generating graph files using Mermaid.

Availability:

```
logtalk_load(diagrams(loader))
```

Author: Paulo Moura

Version: 0:3:1

Date: 2025-11-11

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public graph_language_protocol
```

Imports:

```
public options
```

Provides:

```
graph_language_registry::language_object/2
```

Uses:

```
list
```

```
os
```

```
term_io
```

```
user
```

Remarks:

(none)

Inherited public predicates:

```

check_option/1 check_options/1 default_option/1 default_options/1 edge/6 file_footer/3
file_header/3 graph_footer/5 graph_header/5 node/7 option/2 option/3 output_file_name/2
valid_option/1 valid_options/1

```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.16.28 modules_diagram_support

Utility predicates for supporting Prolog modules in diagrams.

Availability:

```
logtalk_load(diagrams(loader))
```

Author: Paulo Moura

Version: 0:19:5

Date: 2022-07-08

Compilation flags:

```
static, context_switching_calls
```

Dependencies:

(none)

Remarks:

- Supported backend Prolog systems: ECLiPSe, SICStus Prolog, SWI-Prolog, and YAP.

Inherited public predicates:

(none)

- Public predicates
 - `module_property/2`
 - `loaded_file_property/2`
 - `source_file_extension/1`
- Protected predicates
- Private predicates
- Operators

Public predicates

`module_property/2`

Access to module properties, at least `exports/1`, `file/1`, and `file/2` but also `declares/2`, `defines/2`, `calls/2`, and `provides/3` when possible.

Compilation flags:

`static`

Template:

`module_property(Module,Property)`

Mode and number of proofs:

`module_property(?atom,?callable) - zero_or_more`

loaded_file_property/2

Access to loaded source file properties, at least basename/1, directory/1 but also parent/1 when possible.

Compilation flags:

static

Template:

loaded_file_property(File,Property)

Mode and number of proofs:

loaded_file_property(?atom,?callable) - zero_or_more

source_file_extension/1

Valid source file extension for Prolog source files.

Compilation flags:

static

Template:

source_file_extension(Extension)

Mode and number of proofs:

source_file_extension(?atom) - one_or_more

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

object

1.16.29 uses__diagram

Predicates for generating entity diagrams in DOT format with only uses/2 and use__module/2 relation edges.

Availability:

logtalk_load(diagrams(loader))

Author: Paulo Moura

Version: 2:0:1

Date: 2020-03-27

Compilation flags:

static, context_switching_calls

Extends:

public uses__diagram(dot)

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 file/1 file/2 files/1 files/2 files/3
format_object/1 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3
rdirectory/1 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

[entity__diagram](#), [inheritance__diagram](#), [xref__diagram](#)

object

1.16.30 `uses__diagram(Format)`

- Format - Graph language file format.

Predicates for generating entity diagrams with only `uses/2` and `use__module/2` relation edges.

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 2:21:0

Date: 2024-03-20

Compilation flags:

`static`, `context__switching__calls`

Extends:

`public entity__diagram(Format)`

Uses:

[logtalk](#)

Remarks:

(none)

Inherited public predicates:

`all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 file/1 file/2 files/1 files/2 files/3
format_object/1 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3
rdirectory/1 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`entity_diagram(Format), inheritance_diagram(Format), xref_diagram(Format)`

object

1.16.31 xref_diagram

Predicates for generating predicate call cross-referencing diagrams in DOT format.

Availability:

```
logtalk_load(diagrams(loader))
```

Author: Paulo Moura

Version: 2:0:0

Date: 2014-01-01

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public xref_diagram(dot)
```

Remarks:

```
(none)
```

Inherited public predicates:

```
all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 entity/1 entity/2 file/1 file/2 files/1 files/2
files/3 format_object/1 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3
rdirectory/1 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`entity__diagram`, `inheritance__diagram`, `uses__diagram`

object

1.16.32 `xref__diagram`(Format)

- Format - Graph language file format.

Predicates for generating predicate call cross-referencing diagrams.

Availability:

`logtalk_load(diagrams(loader))`

Author: Paulo Moura

Version: 2:85:1

Date: 2025-10-27

Compilation flags:

`static`, `context_switching_calls`

Extends:

`public entity__diagram`(Format)

Uses:

`atom`

`list`

`logtalk`

`modules__diagram__support`

os
user

Remarks:

(none)

Inherited public predicates:

all_files/0 all_files/1 all_libraries/0 all_libraries/1 check_option/1 check_options/1
default_option/1 default_options/1 diagram_description/1 diagram_name_suffix/1 directories/2
directories/3 directory/1 directory/2 directory/3 file/1 file/2 files/1 files/2 files/3
format_object/1 libraries/1 libraries/2 libraries/3 library/1 library/2 option/2 option/3
rdirectory/1 rdirectory/2 rdirectory/3 rlibrary/1 rlibrary/2 valid_option/1 valid_options/1

- Public predicates
 - entity/2
 - entity/1
- Protected predicates
- Private predicates
 - included_predicate_/1
 - referenced_predicate_/1
 - external_predicate_/1
- Operators

Public predicates

entity/2

Creates a diagram for a single entity using the specified options.

Compilation flags:

static

Template:

entity(Entity,Options)

Mode and number of proofs:

entity(+entity_identifier,+list(compound)) - one

entity/1

Creates a diagram for a single entity using default options.

Compilation flags:

static

Template:

entity(Entity)

Mode and number of proofs:

entity(+entity_identifier) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

included_predicate_/1

Table of predicates already included in the diagram for the entity under processing.

Compilation flags:

dynamic

Template:

included_predicate_(Predicate)

Mode and number of proofs:

included_predicate_(?predicate_indicator) - zero_or_more

referenced_predicate_/1

Table of referenced predicates for the entity under processing.

Compilation flags:

dynamic

Template:

referenced_predicate_(Predicate)

Mode and number of proofs:

referenced_predicate_(?predicate_indicator) - zero_or_more

external_predicate_/1

Table of external predicate references for all the entities under processing.

Compilation flags:

dynamic

Template:

external_predicate_(Reference)

Mode and number of proofs:

external_predicate_(?compound) - zero_or_more

Operators

(none)

 See also

entity_diagram(Format), inheritance_diagram(Format), uses_diagram(Format)

1.17 dictionaries

object

1.17.1 avltree

AVL tree implementation of the dictionary protocol. Uses standard order to compare keys.

Availability:

logtalk_load(dictionaries(loader))

Author: R.A.O’Keefe, L.Damas, V.S.Costa, Glenn Burgess, Jiri Spitz, and Jan Wielemaker; Logtalk port and additional predicates by Paulo Moura

Version: 1:4:1

Date: 2025-05-28

Compilation flags:

static, context_switching_calls

Implements:

public dictionaryp

Extends:

public term

Uses:

list

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 apply/4 as_curly_bracketed/2
as_dictionary/2 as_list/2 check/1 clone/3 clone/4 delete/4 delete_max/4 delete_min/4
depth/2 empty/1 ground/1 insert/4 intersection/2 intersection/3 keys/2 lookup/2 lookup/3
map/2 map/3 max/3 min/3 new/1 next/4 numbervars/1 numbervars/3 occurs/2 previous/4
singletons/2 size/2 subsumes/2 subterm/2 update/3 update/4 update/5 valid/1 values/2
variables/2 variant/2 varnumbers/2 varnumbers/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

[bintree](#), [rbtree](#)

object

1.17.2 [bintree](#)

Simple binary tree implementation of the dictionary protocol. Uses standard order to compare keys.

Availability:

`logtalk_load(dictionaries(loader))`

Author: Paulo Moura and Paul Fodor

Version: 2:11:1

Date: 2022-05-05

Compilation flags:

`static, context_switching_calls`

Implements:

`public dictionaryp`

Extends:

`public term`

Uses:

`list`

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 apply/4 as_curly_bracketed/2
as_dictionary/2 as_list/2 check/1 clone/3 clone/4 delete/4 delete_max/4 delete_min/4
depth/2 empty/1 ground/1 insert/4 intersection/2 intersection/3 keys/2 lookup/2 lookup/3
map/2 map/3 max/3 min/3 new/1 next/4 numbervars/1 numbervars/3 occurs/2 previous/4
singletons/2 size/2 subsumes/2 subterm/2 update/3 update/4 update/5 valid/1 values/2
variables/2 variant/2 varnumbers/2 varnumbers/3

- Public predicates
 - preorder/2
 - inorder/2
 - postorder/2
- Protected predicates
- Private predicates
- Operators

Public predicates

preorder/2

Preorder tree traversal.

Compilation flags:

static

Template:

preorder(Tree,List)

Mode and number of proofs:

preorder(@tree,-list) - one

inorder/2

Inorder tree traversal.

Compilation flags:

static

Template:

```
inorder(Tree,List)
```

Mode and number of proofs:

```
inorder(@tree,-list) - one
```

```
postorder/2
```

Postorder tree traversal.

Compilation flags:

```
static
```

Template:

```
postorder(Tree,List)
```

Mode and number of proofs:

```
postorder(@tree,-list) - one
```

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

[avltree](#), [rbtree](#)

protocol

1.17.3 dictionaryp

Dictionary protocol.

Availability:

`logtalk_load(dictionaries(loader))`

Author: Paulo Moura

Version: 2:4:0

Date: 2024-10-02

Compilation flags:

`static`

Dependencies:

`(none)`

Remarks:

`(none)`

Inherited public predicates:

`(none)`

- Public predicates
 - `as_dictionary/2`
 - `as_list/2`
 - `as_curly_bracketed/2`
 - `clone/3`
 - `clone/4`
 - `insert/4`
 - `delete/4`
 - `update/4`
 - `update/5`
 - `update/3`
 - `empty/1`
 - `lookup/3`
 - `lookup/2`

- intersection/2
- intersection/3
- previous/4
- next/4
- min/3
- max/3
- delete_min/4
- delete_max/4
- keys/2
- values/2
- map/2
- map/3
- apply/4
- size/2
- Protected predicates
- Private predicates
- Operators

Public predicates

as_dictionary/2

Converts a list of key-value pairs to a dictionary.

Compilation flags:

static

Template:

as_dictionary(Pairs,Dictionary)

Mode and number of proofs:

as_dictionary(@list(pairs),-dictionary) - one

`as_list/2`

Converts a dictionary to an ordered list (as per standard order) of key-value pairs.

Compilation flags:

`static`

Template:

`as_list(Dictionary,Pairs)`

Mode and number of proofs:

`as_list(@dictionary,-list(pairs)) - one`

`as_curly_bracketed/2`

Creates a curly-bracketed term representation of a dictionary.

Compilation flags:

`static`

Template:

`as_curly_bracketed(Dictionary,Term)`

Mode and number of proofs:

`as_curly_bracketed(+dictionary,--term) - one`

`clone/3`

Clones a dictionary using the same keys but with all values unbound and returning a list of all the pairs in the new clone.

Compilation flags:

`static`

Template:

`clone(Dictionary,Clone,ClonePairs)`

Mode and number of proofs:

`clone(+dictionary,-dictionary,-list(pairs)) - one`

clone/4

Clones a dictionary using the same keys but with all values unbound and returning the list of all pairs in the dictionary and in the clone.

Compilation flags:

static

Template:

clone(Dictionary,Pairs,Clone,ClonePairs)

Mode and number of proofs:

clone(+dictionary,-list(pairs),-dictionary,-list(pairs)) - one

insert/4

Inserts a key-value pair into a dictionary, returning the updated dictionary. When the key already exists, the associated value is updated.

Compilation flags:

static

Template:

insert(OldDictionary,Key,Value,NewDictionary)

Mode and number of proofs:

insert(+dictionary,+ground,@term,-dictionary) - one

delete/4

Deletes a matching key-value pair from a dictionary, returning the updated dictionary. Fails if it cannot find the key or if the key exists but the value does not unify.

Compilation flags:

static

Template:

`delete(OldDictionary,Key,Value,NewDictionary)`

Mode and number of proofs:

`delete(+dictionary,@ground,?term,-dictionary) - zero_or_one`

`update/4`

Updates the value associated with Key in a dictionary, returning the updated dictionary. Fails if it cannot find the key.

Compilation flags:

`static`

Template:

`update(OldDictionary,Key,NewValue,NewDictionary)`

Mode and number of proofs:

`update(+dictionary,@ground,+term,-dictionary) - zero_or_one`

`update/5`

Updates the value associated with a key in a dictionary, returning the updated dictionary. Fails if it cannot find the key or if the existing value does not unify.

Compilation flags:

`static`

Template:

`update(OldDictionary,Key,OldValue,NewValue,NewDictionary)`

Mode and number of proofs:

`update(+dictionary,@ground,?term,+term,-dictionary) - zero_or_one`

update/3

Updates the key-value pairs in a dictionary, returning the updated dictionary. Fails if it cannot find one of the keys.

Compilation flags:

static

Template:

update(OldDictionary,Pairs,NewDictionary)

Mode and number of proofs:

update(+dictionary,@list(pair),-dictionary) - zero_or_one

empty/1

True iff the dictionary is empty.

Compilation flags:

static

Template:

empty(Dictionary)

Mode and number of proofs:

empty(@dictionary) - zero_or_one

lookup/3

Lookups a matching key-value pair from a dictionary. Fails if no match is found.

Compilation flags:

static

Template:

lookup(Key,Value,Dictionary)

Mode and number of proofs:

lookup(+ground,?term,@dictionary) - zero_or_one

lookup(-ground,?term,@dictionary) - zero_or_more

lookup/2

Lookups all matching key-value pairs from a dictionary. Fails if it cannot find one of the keys or if a value for a key does not unify.

Compilation flags:

static

Template:

lookup(Pairs,Dictionary)

Mode and number of proofs:

lookup(+list(pair),@dictionary) - zero_or_one

intersection/2

True iff the values of the dictionaries common keys unify. Trivially true when there are no common keys.

Compilation flags:

static

Template:

intersection(Dictionary1,Dictionary2)

Mode and number of proofs:

intersection(+dictionary,+dictionary) - zero_or_one

intersection/3

Returns the (possibly empty) intersection between two dictionaries when the values of their common keys unify.

Compilation flags:

static

Template:

```
intersection(Dictionary1,Dictionary2,Intersection)
```

Mode and number of proofs:

```
intersection(+dictionary,+dictionary,-dictionary) - zero_or_one
```

[previous/4](#)

Returns the previous pair in a dictionary given a key. Fails if there is no previous pair.

Compilation flags:

```
static
```

Template:

```
previous(Dictionary,Key,Previous,Value)
```

Mode and number of proofs:

```
previous(+dictionary,+key,-key,-value) - zero_or_one
```

[next/4](#)

Returns the next pair in a dictionary given a key. Fails if there is no next pair.

Compilation flags:

```
static
```

Template:

```
next(Dictionary,Key,Next,Value)
```

Mode and number of proofs:

```
next(+dictionary,+key,-key,-value) - zero_or_one
```

min/3

Returns the pair with the minimum key (as per standard order) in a dictionary. Fails if the dictionary is empty.

Compilation flags:

static

Template:

min(Dictionary,Key,Value)

Mode and number of proofs:

min(+dictionary,-key,-value) - zero_or_one

max/3

Returns the pair with the maximum key (as per standard order) in a dictionary. Fails if the dictionary is empty.

Compilation flags:

static

Template:

max(Dictionary,Key,Value)

Mode and number of proofs:

max(+dictionary,-key,-value) - zero_or_one

delete_min/4

Deletes the pair with the minimum key (as per standard order) from a dictionary, returning the deleted pair and the updated dictionary. Fails if the dictionary is empty.

Compilation flags:

static

Template:

delete_min(OldDictionary,Key,Value,NewDictionary)

Mode and number of proofs:

`delete_min(+dictionary,-key,-value,-dictionary) - zero_or_one`

`delete_max/4`

Deletes the pair with the maximum key (as per standard order) from a dictionary, returning the deleted pair and the updated dictionary. Fails if the dictionary is empty.

Compilation flags:

`static`

Template:

`delete_max(OldDictionary,Key,Value,NewDictionary)`

Mode and number of proofs:

`delete_max(+dictionary,-key,-value,-dictionary) - zero_or_one`

`keys/2`

Returns a list with all the dictionary keys in ascending order (as per standard order).

Compilation flags:

`static`

Template:

`keys(Dictionary,Keys)`

Mode and number of proofs:

`keys(@dictionary,-list) - one`

`values/2`

Returns a list with all the dictionary values in ascending order of the keys (as per standard order).

Compilation flags:

`static`

Template:

values(Dictionary,Values)

Mode and number of proofs:

values(@dictionary,-list) - one

map/2

Maps a closure over each dictionary key-value pair. Fails if the mapped closure attempts to modify the keys.

Compilation flags:

static

Template:

map(Closure,Dictionary)

Meta-predicate template:

map(1,*)

Mode and number of proofs:

map(@callable,+dictionary) - zero_or_more

map/3

Maps a closure over each dictionary key-value pair, returning the new dictionary. Fails if the mapped closure attempts to modify the keys.

Compilation flags:

static

Template:

map(Closure,OldDictionary,NewDictionary)

Meta-predicate template:

map(2,*,*)

Mode and number of proofs:

map(@callable,+dictionary,-dictionary) - zero_or_more

`apply/4`

Applies a closure to a specific key-value pair, returning the new dictionary. Fails if the key cannot be found or if the mapped closure attempts to modify the key.

Compilation flags:

`static`

Template:

`apply(Closure,OldDictionary,Key,NewDictionary)`

Meta-predicate template:

`apply(2,*,*,*)`

Mode and number of proofs:

`apply(+callable,+dictionary,+key,-dictionary) - zero_or_one`

`size/2`

Number of dictionary entries.

Compilation flags:

`static`

Template:

`size(Dictionary,Size)`

Mode and number of proofs:

`size(@dictionary,?integer) - one`

Protected predicates


(none)

Private predicates

(none)

Operators

(none)

 See also

[avltree](#), [bintree](#), [rbtree](#)

object

1.17.4 rbtree

Red-Black tree implementation of the dictionary protocol. Uses standard order to compare keys.

Availability:

`logtalk_load(dictionaries(loader))`

Author: Vitor Santos Costa; Logtalk port and additional predicates by Paulo Moura.

Version: 1:9:0

Date: 2021-04-12

Compilation flags:

`static, context_switching_calls`

Implements:

public [dictionaryp](#)

Extends:

public [term](#)

Remarks:

(none)

Inherited public predicates:

[\(<\)/2](#) [\(=:\)/2](#) [\(<=\)/2](#) [\(>=\)/2](#) [\(>\)/2](#) [\(>=\)/2](#) [apply/4](#) [as_curly_bracketed/2](#)
[as_dictionary/2](#) [as_list/2](#) [check/1](#) [clone/3](#) [clone/4](#) [delete/4](#) [delete_max/4](#) [delete_min/4](#)
[depth/2](#) [empty/1](#) [ground/1](#) [insert/4](#) [intersection/2](#) [intersection/3](#) [keys/2](#) [lookup/2](#) [lookup/3](#)
[map/2](#) [map/3](#) [max/3](#) [min/3](#) [new/1](#) [next/4](#) [numbervars/1](#) [numbervars/3](#) [occurs/2](#) [previous/4](#)
[singletons/2](#) [size/2](#) [subsumes/2](#) [subterm/2](#) [update/3](#) [update/4](#) [update/5](#) [valid/1](#) [values/2](#)
[variables/2](#) [variant/2](#) [varnumbers/2](#) [varnumbers/3](#)

- Public predicates
 - `partial_map/4`
- Protected predicates
- Private predicates
- Operators

Public predicates

`partial_map/4`

Applies a closure to the tree pairs identified by a set of keys.

Compilation flags:

`static`

Template:

`partial_map(Tree,Keys,Closure,NewTree)`

Meta-predicate template:

`partial_map(*,*,2,*)`

Mode and number of proofs:

`partial_map(+tree,+list,@closure,-tree) - zero_or_one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

`avltree`, `bintree`

1.18 dif

object

1.18.1 dif

Provides dif/2 and derived predicates.

Availability:

`logtalk_load(dif(loader))`

Author: Paulo Moura

Version: 1:3:0

Date: 2023-10-02

Compilation flags:

`static, context_switching_calls`

Dependencies:

`(none)`

Remarks:

- Supported backend Prolog systems: B-Prolog, ECLiPSe, SICStus Prolog, SWI-Prolog, Trealla Prolog, and YAP.

Inherited public predicates:

`(none)`

- Public predicates
 - `dif/2`
 - `dif/1`
- Protected predicates
- Private predicates
- Operators

Public predicates

dif/2

Sets a constraint that is true iff the two terms are different.

Compilation flags:

static

Template:

dif(Term1,Term2)

Mode and number of proofs:

dif(+term,+term) - zero_or_one

dif/1

Sets a set of constraints that are true iff all terms in a list are different.

Compilation flags:

static

Template:

dif(Terms)

Mode and number of proofs:

dif(+list(term)) - zero_or_one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.19 doclet

object

1.19.1 doclet

Utility object to help automate (re)generating documentation for a project.

Availability:

`logtalk_load(doclet(loader))`

Author: Paulo Moura

Version: 0:5:0

Date: 2017-01-05

Compilation flags:

`static, context_switching_calls`

Provides:

`logtalk::message_tokens//2`

Uses:

`logtalk`

`os`

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - `update/0`
 - `doc_goal/1`
 - `shell_command/1`

- Protected predicates
- Private predicates
- Operators

Public predicates

update/0

Updates the project documentation, first by calling a sequence of goals and second by executing a sequence of shell commands. Fails if any goal or shell command fails.

Compilation flags:

static

Mode and number of proofs:

update - zero_or_one

doc_goal/1

Table of goals, typically using the diagrams and the lgtdoc tools, used to generate the documentation. Goals are called in the order they are defined and in the context of the user pseudo-object.

Compilation flags:

static

Template:

doc_goal(Goal)

Mode and number of proofs:

doc_goal(?callable) - one_or_more

shell_command/1

Table of shell commands to convert intermediate documentation files into user-friendly documentation. Commands are executed in the order they are defined.

Compilation flags:

static

Template:

shell_command(Command)

Mode and number of proofs:

shell_command(?atom) - one_or_more

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

lgtdocp, diagram(Format)

1.20 edcg

object

1.20.1 edcg

Multiple hidden parameters: an extension to Prolog's DCG notation. Ported to Logtalk as a hook object.

Availability:

```
logtalk_load(edcg(loader))
```

Author: Peter Van Roy; adapted to Logtalk by Paulo Moura.

Version: 1:4:2

Date: 2020-04-08

Copyright: Copyright (C) 1992 Peter Van Roy

License: MIT

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public expanding
```

Provides:

```
logtalk::message_tokens//2
```

Uses:

```
list
```

```
logtalk
```

Remarks:

- Usage: Compile source files with objects (or categories) defining EDCGs using the compiler option `hook(edcg)`.

Inherited public predicates:

```
goal_expansion/2 term_expansion/2
```

- Public predicates
- Protected predicates
- Private predicates
 - `pred_info/3`
 - `acc_info/7`
 - `acc_info/5`

- pass_info/2
 - pass_info/1
- Operators
 - op(1200,xfx,-->>)

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

pred_info/3

Declares predicates that have the listed hidden parameters.

Compilation flags:

dynamic

Template:

pred_info(Name,Arity,HiddenParameters)

Mode and number of proofs:

pred_info(?atom,?integer,?list(atom)) - zero_or_more

acc_info/7

Long form for declaring accumulators.

Compilation flags:

dynamic

Template:

acc_info(Accumulator,Term,Left,Right,Joiner,LStart,RStart)

Mode and number of proofs:

acc_info(?atom,?term,?term,?term,?callable,?term,?term) - zero_or_more

`acc_info/5`

Short form for declaring accumulators.

Compilation flags:
dynamic

Template:

`acc_info(Accumulator,Term,Left,Right,Joiner)`

Mode and number of proofs:

`acc_info(?atom,?term,?term,?term,?callable) - zero_or_more`

`pass_info/2`

Long form for declaring passed arguments. Passed arguments are conceptually the same as accumulators with `=/2` as the joiner function.

Compilation flags:
dynamic

Template:

`pass_info(Argument,PStart)`

Mode and number of proofs:

`pass_info(?atom,?term) - zero_or_more`

`pass_info/1`

Short form for declaring passed arguments. Passed arguments are conceptually the same as accumulators with `=/2` as the joiner function.

Compilation flags:
dynamic

Template:

```
pass_info(Argument)
Mode and number of proofs:
pass_info(?atom) - zero_or_more
```

Operators

```
op(1200,xfx,-->>)
```

Scope:

```
public
```

1.21 events

object

1.21.1 after_event_registry

After events registry predicates.

Availability:

```
logtalk_load(events(loader))
```

Author: Paulo Moura

Version: 1:1:0

Date: 2009-10-08

Compilation flags:

```
static, context_switching_calls, events
```

Implements:

```
public event_registryp
```

Remarks:

```
(none)
```

Inherited public predicates:

```
del_monitors/0 del_monitors/4 monitor/1 monitor/4 monitored/1 monitors/1 set_monitor/4
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

`before_event_registry`, `monitorp`

object

1.21.2 `before_event_registry`

Before events registry predicates.

Availability:

`logtalk_load(events(loader))`

Author: Paulo Moura

Version: 1:1:0

Date: 2009-10-08

Compilation flags:

`static`, `context_switching_calls`, `events`

Implements:

public event_registryp

Remarks:

(none)

Inherited public predicates:

del_monitors/0 del_monitors/4 monitor/1 monitor/4 monitored/1 monitors/1 set_monitor/4

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

after_event_registry, monitorp

object

1.21.3 event_registry

Before and after events registry predicates.

Availability:

`logtalk_load(events(loader))`

Author: Paulo Moura

Version: 1:1:0

Date: 2009-10-08

Compilation flags:

`static, context__switching_calls, events`

Implements:

`public event_registry`

Remarks:

(none)

Inherited public predicates:

`del_monitors/0 del_monitors/4 monitor/1 monitor/4 monitored/1 monitors/1 set_monitor/4`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.21.4 event_registryp

Event registry protocol.

Availability:

logtalk_load(events(loader))

Author: Paulo Moura

Version: 1:1:0

Date: 2009-10-08

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - monitors/1
 - monitor/1

- monitored/1
- monitor/4
- set_monitor/4
- del_monitors/4
- del_monitors/0
- Protected predicates
- Private predicates
- Operators

Public predicates

monitors/1

Returns a list of all current monitors.

Compilation flags:

static

Template:

monitors(Monitors)

Mode and number of proofs:

monitors(-list(object_identifier)) - one

monitor/1

Monitor is an object playing the role of a monitor.

Compilation flags:

static

Template:

monitor(Monitor)

Mode and number of proofs:

monitor(-object_identifier) - zero_or_more

monitor(+object_identifier) - zero_or_one

monitored/1

Returns a list of all currently monitored objects.

Compilation flags:

static

Template:

monitored(Objects)

Mode and number of proofs:

monitored(-list(object_identifier)) - one

monitor/4

True if the arguments describe a currently defined monitored event.

Compilation flags:

static

Template:

monitor(Object,Message,Sender,Monitor)

Mode and number of proofs:

monitor(?object_identifier,?nonvar,?object_identifier,?object_identifier) - zero_or_more

set_monitor/4

Sets a monitor for the set of matching events.

Compilation flags:

static

Template:

set_monitor(Object,Message,Sender,Monitor)

Mode and number of proofs:

set_monitor(?object_identifier,?nonvar,?object_identifier,+object_identifier) - zero_or_one

`del_monitors/4`

Deletes all matching monitored events.

Compilation flags:

`static`

Template:

`del_monitors(Object,Message,Sender,Monitor)`

Mode and number of proofs:

`del_monitors(?object_identifier,?nonvar,?object_identifier,?object_identifier) - one`

`del_monitors/0`

Deletes all monitored events.

Compilation flags:

`static`

Mode and number of proofs:

`del_monitors - one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

`event_registry`, `monitorp`

category

1.21.5 monitor

Monitor predicates.

Availability:

`logtalk_load(events(loader))`

Author: Paulo Moura

Version: 1:3:0

Date: 2019-03-08

Compilation flags:

`static, events`

Implements:

`public monitorp`

Remarks:

`(none)`

Inherited public predicates:

`activate_monitor/0 del_spy_points/4 monitor_activated/0 reset_monitor/0 set_spy_point/4
spy_point/4 suspend_monitor/0`

- Public predicates
- Protected predicates
- Private predicates
 - `spy_point_/4`
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

spy__point_/4

Stores current spy points.

Compilation flags:

dynamic

Template:

spy__point__(Event,Object,Message,Sender)

Mode and number of proofs:

spy__point__(?event,?object,?callable,?object) - zero__or__more

Operators

(none)

protocol

1.21.6 monitorp

Monitor protocol.

Availability:

logtalk__load(events(loader))

Author: Paulo Moura

Version: 1:0:0

Date: 2000-07-24

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - monitor_activated/0
 - activate_monitor/0
 - suspend_monitor/0
 - reset_monitor/0
 - spy_point/4
 - set_spy_point/4
 - del_spy_points/4
- Protected predicates
- Private predicates
- Operators

Public predicates

monitor_activated/0

True if monitor is currently active.

Compilation flags:

static

Mode and number of proofs:

monitor_activated - zero_or_one

`activate_monitor/0`

Activates all spy points and start monitoring.

Compilation flags:

`static`

Mode and number of proofs:

`activate_monitor - one`

`suspend_monitor/0`

Suspends monitoring, deactivating all spy points.

Compilation flags:

`static`

Mode and number of proofs:

`suspend_monitor - one`

`reset_monitor/0`

Resets monitor, deactivating and deleting all spy points.

Compilation flags:

`static`

Mode and number of proofs:

`reset_monitor - one`

`spy_point/4`

Current spy point.

Compilation flags:

`static`

Template:

`spy_point(Event, Object, Message, Sender)`

Mode and number of proofs:

`spy_point(?event, ?object, ?callable, ?object) - zero_or_more`

`set_spy_point/4`

Sets a spy point.

Compilation flags:

`static`

Template:

`set_spy_point(Event, Object, Message, Sender)`

Mode and number of proofs:

`set_spy_point(?event, ?object, ?callable, ?object) - one`

`del_spy_points/4`

Deletes all matching spy points.

Compilation flags:

`static`

Template:

`del_spy_points(Event, Object, Message, Sender)`

Mode and number of proofs:

`del_spy_points(@event, @object, @callable, @object) - one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

➡ See also

[monitor](#), [event_registry](#)

1.22 expand_library_alias_paths

object

1.22.1 expand_library_alias_paths

Hook object for expanding library alias paths in `logtalk_library_path/2` facts when compiling a source file.

Availability:

`logtalk_load(expand_library_alias_paths(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2018-04-12

Compilation flags:

`static`, `context_switching_calls`

Implements:

`public` `expanding`

Uses:

`logtalk`

`os`

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.23 expecteds

object

1.23.1 either

Types and predicates for extended type-checking and handling of expected terms.

Availability:

`logtalk_load(expecteds(loader))`

Author: Paulo Moura

Version: 0:7:0

Date: 2021-01-03

Compilation flags:

static, context_switching_calls

Provides:

type::type/1
 type::check/2
 arbitrary::arbitrary/1
 arbitrary::arbitrary/2

Uses:

expected
 expected(Expected)
 random
 type

Remarks:

- Type-checking support: Defines a `either(ValueType, ErrorType)` type for checking expected terms where the value and error terms must be of the given types.
- QuickCheck support: Defines clauses for the `type::arbitrary/1-2` predicates to allow generating random values for the `either(ValueType, ErrorType)` type.

Inherited public predicates:

(none)

- Public predicates
 - `expecteds/2`
 - `unexpecteds/2`
 - `partition/3`
- Protected predicates
- Private predicates
- Operators

Public predicates

`expecteds/2`

Returns the values stored in the expected terms that hold a value.

Compilation flags:

static

Template:

 expecteds(Expecteds,Values)

Mode and number of proofs:

 expecteds(+list(expected),-list) - one

unexpecteds/2

Returns the errors stored in the expected terms that hold an error.

Compilation flags:

 static

Template:

 unexpecteds(Expecteds,Errors)

Mode and number of proofs:

 unexpecteds(+list(expected),-list) - one

partition/3

Retrieves and partitions the values and errors hold by the expected terms.

Compilation flags:

 static

Template:

 partition(Expecteds,Values,Errors)

Mode and number of proofs:

 partition(+list(expected),-list,-list) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

`expected`, `expected(Expected)`, `type`, `arbitrary`

object

1.23.2 `expected`

Constructors for `expected` terms. An `expected` term contains either a value or an error. Expected terms should be regarded as opaque terms and always used with the `expected/1` object by passing the `expected` term as a parameter.

Availability:

```
logtalk_load(expecteds(loader))
```

Author: Paulo Moura

Version: 2:1:0

Date: 2021-01-03

Compilation flags:

```
static, context_switching_calls
```

Provides:

```
type::type/1
type::check/2
```

Remarks:

- Type-checking support: This object also defines a type `expected` for use with the type library object.

Inherited public predicates:

(none)

- Public predicates
 - of__unexpected/2
 - of__expected/2
 - from__goal/4
 - from__goal/3
 - from__goal/2
 - from__generator/4
 - from__generator/3
 - from__generator/2
- Protected predicates
- Private predicates
- Operators

Public predicates

of__unexpected/2

Constructs an expected term from an error that represent that the expected value is missing.

Compilation flags:

static

Template:

of__unexpected(Error,Expected)

Mode and number of proofs:

of__unexpected(@term,--nonvar) - one

`of_expected/2`

Constructs an expected term from an expected value.

Compilation flags:

static

Template:

`of_expected(Value,Expected)`

Mode and number of proofs:

`of_expected(@term,--nonvar) - one`

`from_goal/4`

Constructs an expected term holding a value bound by calling the given goal. Otherwise returns an expected term with the unexpected goal error or failure represented by the Error argument.

Compilation flags:

static

Template:

`from_goal(Goal,Value,Error,Expected)`

Meta-predicate template:

`from_goal(0,*,*,*)`

Mode and number of proofs:

`from_goal(+callable,--term,@term,--nonvar) - one`

`from_goal/3`

Constructs an expected term holding a value bound by calling the given goal. Otherwise returns an expected term with the unexpected goal error or the atom fail representing the unexpected failure.

Compilation flags:

static

Template:

`from_goal(Goal,Value,Expected)`

Meta-predicate template:

from_goal(0,*,*)

Mode and number of proofs:

from_goal(+callable,--term,--nonvar) - one

from_goal/2

Constructs an expected term holding a value bound by calling the given closure. Otherwise returns an expected term holding the unexpected closure error or the atom fail representing the unexpected failure.

Compilation flags:

static

Template:

from_goal(Closure,Expected)

Meta-predicate template:

from_goal(1,*)

Mode and number of proofs:

from_goal(+callable,--nonvar) - one

from_generator/4

Constructs expected terms with the values generated by calling the given goal. On goal error or failure, returns an expected term with the unexpected goal error or failure represented by the Error argument.

Compilation flags:

static

Template:

from_generator(Goal,Value,Error,Expected)

Meta-predicate template:

from_generator(0,*,*,*)

Mode and number of proofs:

from_generator(+callable,--term,@term,--nonvar) - one_or_more

from_generator/3

Constructs expected terms with the values generated by calling the given goal. On goal error or failure, returns an expected term with, respectively, the unexpected goal error or the atom fail representing the unexpected goal failure.

Compilation flags:

static

Template:

from_generator(Goal,Value,Expected)

Meta-predicate template:

from_generator(0,*,*)

Mode and number of proofs:

from_generator(+callable,--term,--nonvar) - one_or_more

from_generator/2

Constructs expected terms with the values generated by calling the given closure. On closure error or failure, returns an expected term with, respectively, the unexpected closure error or the atom fail representing the unexpected closure failure.

Compilation flags:

static

Template:

from_generator(Closure,Expected)

Meta-predicate template:

from_generator(1,*)

Mode and number of proofs:

from_generator(+callable,--nonvar) - one_or_more

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`expected(Expected), type`

object

1.23.3 `expected(Expected)`

Expected term predicates. Requires passing an expected term (constructed using the expected object predicates) as a parameter.

Availability:

`logtalk_load(expecteds(loader))`

Author: Paulo Moura

Version: 1:5:0

Date: 2020-01-06

Compilation flags:

`static, context_switching_calls`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - is_expected/0
 - is_unexpected/0
 - if_expected/1
 - if_unexpected/1
 - if_expected_or_else/2
 - unexpected/1
 - expected/1
 - map/2
 - flat_map/2
 - either/3
 - or_else/2
 - or_else_get/2
 - or_else_call/2
 - or_else_throw/1
 - or_else_fail/1
- Protected predicates
- Private predicates
- Operators

Public predicates

is_expected/0

True if the expected term holds a value. See also the if_expected/1 predicate.

Compilation flags:

static

Mode and number of proofs:

is_expected - zero_or_one

`is_unexpected/0`

True if the expected term holds an error. See also the `if_unexpected/1` predicate.

Compilation flags:

`static`

Mode and number of proofs:

`is_unexpected - zero_or_one`

`if_expected/1`

Applies a closure when the expected term holds a value using the value as argument. Succeeds otherwise.

Compilation flags:

`static`

Template:

`if_expected(Closure)`

Meta-predicate template:

`if_expected(1)`

Mode and number of proofs:

`if_expected(+callable) - zero_or_more`

`if_unexpected/1`

Applies a closure when the expected term holds an error using the error as argument. Succeeds otherwise. Can be used to throw the exception hold by the expected term by calling it the `atom throw`.

Compilation flags:

`static`

Template:

`if_unexpected(Closure)`

Meta-predicate template:

`if_unexpected(1)`

Mode and number of proofs:

`if_unexpected(+callable) - zero_or_more`

`if_expected_or_else/2`

Applies either ExpectedClosure or UnexpectedClosure depending on the expected term holding a value or an error.

Compilation flags:

`static`

Template:

`if_expected_or_else(ExpectedClosure,UnexpectedClosure)`

Meta-predicate template:

`if_expected_or_else(1,1)`

Mode and number of proofs:

`if_expected_or_else(+callable,+callable) - zero_or_more`

`unexpected/1`

Returns the error hold by the expected term. Throws an error otherwise.

Compilation flags:

`static`

Template:

`unexpected(Error)`

Mode and number of proofs:

`unexpected(--term) - one_or_error`

Exceptions:

Expected term holds a value:

`existence_error(unexpected_error,Expected)`

`expected/1`

Returns the value hold by the expected term. Throws an error otherwise.

Compilation flags:

`static`

Template:

`expected(Value)`

Mode and number of proofs:

`expected(--term) - one_or_error`

Exceptions:

Expected term holds an error:

`existence_error(expected_value,Expected)`

`map/2`

When the expected term does not hold an error and mapping a closure with the expected value and the new value as additional arguments is successful, returns an expected term with the new value. Otherwise returns the same expected term.

Compilation flags:

`static`

Template:

`map(Closure,NewExpected)`

Meta-predicate template:

`map(2,*)`

Mode and number of proofs:

`map(+callable,--nonvar) - one`

`flat_map/2`

When the expected term does not hold an error and mapping a closure with the expected value and the new expected term as additional arguments is successful, returns the new expected term. Otherwise returns the same expected term.

Compilation flags:

`static`

Template:

`flat_map(Closure,NewExpected)`

Meta-predicate template:

`flat_map(2,*)`

Mode and number of proofs:

`flat_map(+callable,--nonvar) - one`

`either/3`

Applies either `ExpectedClosure` if the expected term holds a value or `UnexpectedClosure` if the expected term holds an error. Returns a new expected term if the applied closure is successful. Otherwise returns the same expected term.

Compilation flags:

`static`

Template:

`either(ExpectedClosure,UnexpectedClosure,NewExpected)`

Meta-predicate template:

`either(2,2,*)`

Mode and number of proofs:

`either(+callable,+callable,--nonvar) - one`

`or_else/2`

Returns the value hold by the expected term if it does not hold an error or the given default term if the expected term holds an error.

Compilation flags:

`static`

Template:

`or_else(Value,Default)`

Mode and number of proofs:

`or_else(--term,@term) - one`

`or_else_get/2`

Returns the value hold by the expected term if it does not hold an error. Otherwise applies a closure to compute the expected value. Throws an error when the expected term holds an error and a value cannot be computed.

Compilation flags:

`static`

Template:

`or_else_get(Value,Closure)`

Meta-predicate template:

`or_else_get(*,1)`

Mode and number of proofs:

`or_else_get(--term,+callable) - one_or_error`

Exceptions:

Expected term holds an unexpected error and an expected value cannot be computed:

`existence_error(expected_value,Expected)`

`or_else_call/2`

Returns the value hold by the expected term if it does not hold an error. Calls a goal deterministically otherwise.

Compilation flags:

`static`

Template:

`or_else_call(Value,Goal)`

Meta-predicate template:

`or_else_call(*,0)`

Mode and number of proofs:

`or_else_call(--term,+callable) - zero_or_one`

`or_else_throw/1`

Returns the value hold by the expected term if present. Throws the error hold by the expected term as an exception otherwise.

Compilation flags:

`static`

Template:

`or_else_throw(Value)`

Mode and number of proofs:

`or_else_throw(--term) - one_or_error`

`or_else_fail/1`

Returns the value hold by the expected term if it does not hold an error. Fails otherwise. Usually called to skip over expected terms holding errors.

Compilation flags:

`static`

Template:

```
    or_else_fail(Value)
Mode and number of proofs:
    or_else_fail(--term) - zero_or_one
```

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

[expected](#)

1.24 fcube

object

1.24.1 fcube

FCube: An Efficient Prover for Intuitionistic Propositional Logic.

Availability:

```
logtalk_load(fcube(loader))
```

Author: Mauro Ferrari, Camillo Fiorentini, Guido Fiorino; ported to Logtalk by Paulo Moura.

Version: 5:0:1

Date: 2024-03-14

Copyright: Copyright 2012 Mauro Ferrari, Camillo Fiorentini, Guido Fiorino; Copyright 2020-2024 Paulo Moura

License: GPL-2.0-or-later

Compilation flags:

static, context_switching_calls

Uses:

integer
list
os
set
user

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - gnu/0
 - fcube/0
 - decide/1
 - decide/2
- Protected predicates
- Private predicates
- Operators
 - op(1200,xfy,<=>)
 - op(1110,xfy,=>)
 - op(1000,xfy,&&)
 - op(500,fy,~)
 - op(1100,xfy,v)

Public predicates

gnu/0

Prints banner with copyright and license information.

Compilation flags:

static

Mode and number of proofs:

gnu - one

fcube/0

Reads a formula and applies the prover to it, printing its counter-model.

Compilation flags:

static

Mode and number of proofs:

fcube - one

decide/1

Applies the prover to the given formula and prints its counter-model.

Compilation flags:

static

Template:

decide(Formula)

Mode and number of proofs:

decide(++compound) - one

decide/2

Applies the prover to the given formula and returns its counter-model.

Compilation flags:

static

Template:

decide(Formula,CounterModel)

Mode and number of proofs:

decide(++compound,--compound) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

op(1200,xfy,<=>)

Scope:

public

op(1110,xfy,=>)

Scope:

public

op(1000,xfy,&&)

Scope:

public

op(500,fy,~)

Scope:

public

`op(1100,xfy,v)`

Scope:
 public

1.25 flags

category

1.25.1 flags

Implementation of persistent object flags.

Availability:
 `logtalk_load(flags(loader))`

Author: Theofrastos Mantadelis
Version: 1:0:0
Date: 2010-11-27

Compilation flags:
 static

Dependencies:
 (none)

Remarks:
 (none)

Inherited public predicates:
 (none)

- Public predicates
 - `get_flag_value/2`
 - `set_flag_value/2`
 - `set_flag_value/3`
 - `reset_flags/0`
 - `reset_flags/1`

- flag_groups/1
- flag_group_chk/1
- print_flags/0
- print_flags/1
- defined_flag/6
- built_in_flag/2
- Protected predicates
 - unsafe_set_flag_value/2
 - define_flag/1
 - define_flag/2
- Private predicates
 - defined_flag_/6
 - flag_value_/2
 - validate/3
 - validate_type/1
 - is_validator/1
- Operators

Public predicates

get_flag_value/2

Gets or tests the value of a flag.

Compilation flags:

static

Template:

get_flag_value(Flag,Value)

Mode and number of proofs:

get_flag_value(+atom,?nonvar) - zero_or_one

`set_flag_value/2`

Sets the value of a flag.

Compilation flags:

`static`

Template:

`set_flag_value(Flag,NewValue)`

Mode and number of proofs:

`set_flag_value(+atom,@nonvar) - one`

`set_flag_value/3`

Sets the value of a flag, returning the old value.

Compilation flags:

`static`

Template:

`set_flag_value(Flag,OldValue,NewValue)`

Mode and number of proofs:

`set_flag_value(+atom,?nonvar,@nonvar) - one`

`reset_flags/0`

Resets all flags to their default values.

Compilation flags:

`static`

Mode and number of proofs:

`reset_flags - one`

`reset_flags/1`

Resets all flags in a group to their default values.

Compilation flags:

`static`

Template:

`reset_flags(Group)`

Mode and number of proofs:

`reset_flags(+atom) - one`

`flag_groups/1`

Returns a list of all flag groups.

Compilation flags:

`static`

Template:

`flag_groups(Groups)`

Mode and number of proofs:

`flag_groups(-list(atom)) - one`

`flag_group_chk/1`

Checks if a given atom is a flag group.

Compilation flags:

`static`

Template:

`flag_group_chk(Group)`

Mode and number of proofs:

`flag_group_chk(+atom) - zero_or_one`

`print_flags/0`

Prints a listing of all flags.

Compilation flags:

`static`

Mode and number of proofs:

`print_flags - one`

`print_flags/1`

Prints a listing of all flags in a group.

Compilation flags:

`static`

Template:

`print_flags(Group)`

Mode and number of proofs:

`print_flags(+atom) - one`

`defined_flag/6`

Gets or test the existing (visible) flag definitions.

Compilation flags:

`static`

Template:

`defined_flag(Flag,Group,Type,DefaultValue,Description,Access)`

Mode and number of proofs:

`defined_flag(?atom,?atom,?nonvar,?nonvar,?atom,?atom) - zero_or_more`

`built_in_flag/2`

True if the argument is a built-in flag type with the specified default value.

Compilation flags:

`static`

Template:

`built_in_flag(Type,DefaultValue)`

Mode and number of proofs:

`built_in_flag(?atom,?nonvar) - zero_or_more`

Protected predicates

`unsafe_set_flag_value/2`

Sets the value of a flag without performing any validation checks.

Compilation flags:

`static`

Template:

`unsafe_set_flag_value(Flag,NewValue)`

Mode and number of proofs:

`unsafe_set_flag_value(+atom,@nonvar) - one`

`define_flag/1`

Defines a new flag using default options.

Compilation flags:

`static`

Template:

`define_flag(Flag)`

Mode and number of proofs:

`define_flag(+atom) - one`

`define_flag/2`

Defines a new flag using a given set of options (for example, `[group(general), type(nonvar), default(true), description(Flag), access(read_write)]`).

Compilation flags:

`static`

Template:

`define_flag(Flag,Options)`

Mode and number of proofs:

`define_flag(+atom,@list) - one`

Private predicates

`defined_flag_/6`

Gets or test the existing flag definitions.

Compilation flags:

`dynamic`

Template:

`defined_flag_(Flag,Group,Type,DefaultValue,Description,Access)`

Mode and number of proofs:

`defined_flag_(?atom,?atom,?nonvar,?nonvar,?atom,?atom) - zero_or_more`

`flag_value_/2`

Table of flag values.

Compilation flags:

`dynamic`

Template:

 flag_value_(Flag,Value)

Mode and number of proofs:

 flag_value_(?atom,?nonvar) - zero_or_more

validate/3

Compilation flags:

 static

validate_type/1

Compilation flags:

 static

is_validator/1

Compilation flags:

 static

Operators

(none)

protocol

1.25.2 flags_validator

Flag validation protocol. Must be implemented by validator objects.

Availability:

 logtalk_load(flags(loader))

Author: Theofrastos Mantadelis

Version: 1:0:0

Date: 2010-11-27

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - print_flags/0
 - validate/1
- Protected predicates
- Private predicates
- Operators

Public predicates

print_flags/0

Validates the validator object itself.

Compilation flags:

static

Mode and number of proofs:

print_flags - zero_or_one

validate/1

Validates a flag value.

Compilation flags:

static

Template:

validate(Value)

Mode and number of proofs:

validate(@term) - zero_or_one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.26 format

object

1.26.1 format

Formatted output predicates.

Availability:

logtalk_load(format(loader))

Author: Paulo Moura

Version: 1:3:0

Date: 2025-11-18

Compilation flags:

static, context_switching_calls

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - format/3
 - format/2
- Protected predicates
- Private predicates
- Operators

Public predicates

format/3

Writes a list of arguments after a format specification to the specified output stream.

Compilation flags:

static

Template:

format(Stream,Format,Arguments)

Mode and number of proofs:

format(@stream_or_alias,+atom,@list) - zero_or_one

format(@stream_or_alias,+list(character_code),@list) - zero_or_one

format(@stream_or_alias,+list(character),@list) - zero_or_one

`format/2`

Writes a list of arguments after a format specification to the current output stream.

Compilation flags:

`static`

Template:

`format(Format,Arguments)`

Mode and number of proofs:

`format(+atom,@list) - zero_or_one`

`format(+list(character_code),@list) - zero_or_one`

`format(+list(character),@list) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.27 genint

object

1.27.1 genint

Global object for generating increasing non-negative integers for named counters. The predicates are declared as synchronized when the library is compiled using a backend supporting threads.

Availability:

`logtalk_load(genint(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2022-07-21

Compilation flags:

static, context_switching_calls

Imports:

public `genint_core`

Remarks:

(none)

Inherited public predicates:

`genint/2` `reset_genint/0` `reset_genint/1`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.27.2 genint_core

Predicates for generating increasing non-negative integers. The predicates are declared as synchronized when the library is compiled using a backend supporting threads.

Availability:

```
logtalk_load(genint(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2022-07-26

Compilation flags:

```
static
```

Dependencies:

```
(none)
```

Remarks:

```
(none)
```

Inherited public predicates:

```
(none)
```

- Public predicates
 - reset_genint/0
 - reset_genint/1
 - genint/2
- Protected predicates
- Private predicates
 - counter_/2
- Operators

Public predicates

`reset_genint/0`

Resets all counters.

Compilation flags:

static, synchronized

Mode and number of proofs:

`reset_genint` - one

`reset_genint/1`

Resets the given counter.

Compilation flags:

static, synchronized

Template:

`reset_genint(Counter)`

Mode and number of proofs:

`reset_genint(+atom)` - one

`genint/2`

Returns the next integer for a given counter.

Compilation flags:

static, synchronized

Template:

`genint(Counter,Integer)`

Mode and number of proofs:

`genint(+atom,-non_negative_integer)` - one

Protected predicates

(none)

Private predicates

counter_/2

Table of current state of counters.

Compilation flags:

dynamic

Template:

counter_(Counter,Latest)

Mode and number of proofs:

counter_(?atom,?non_negative_integer) - zero_or_more

Operators

(none)

1.28 gensym

object

1.28.1 gensym

Global object for generating unique atoms. The predicates are declared as synchronized when the library is compiled using a backend supporting threads.

Availability:

logtalk_load(gensym(loader))

Author: Paulo Moura

Version: 2:0:0

Date: 2022-07-21

Compilation flags:

static, context_switching_calls

Imports:

public gensym_core

Remarks:

(none)

Inherited public predicates:

gensym/2 reset_gensym/0 reset_gensym/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.28.2 gensym_core

Predicates for generating unique atoms. Protocol based on the gensym module of SWI-Prolog. The predicates are declared as synchronized when the library is compiled using a backend supporting threads.

Availability:

logtalk_load(gensym(loader))

Author: Paulo Moura

Version: 2:1:0
Date: 2022-07-26

Compilation flags:
static

Dependencies:
(none)

Remarks:
(none)

Inherited public predicates:
(none)

- Public predicates
 - reset_gensym/0
 - reset_gensym/1
 - gensym/2
- Protected predicates
- Private predicates
 - base_/2
- Operators

Public predicates

reset_gensym/0

Resets the generator counter for all bases.

Compilation flags:
static, synchronized

Mode and number of proofs:
reset_gensym - one

`reset_gensym/1`

Resets the generator counter for a given base.

Compilation flags:

static, synchronized

Template:

`reset_gensym(Base)`

Mode and number of proofs:

`reset_gensym(+atom) - one`

`gensym/2`

Returns a new unique atom with a given base (prefix).

Compilation flags:

static, synchronized

Template:

`gensym(Base,Unique)`

Mode and number of proofs:

`gensym(+atom,-atom) - one`

Protected predicates

(none)

Private predicates

`base_/2`

Table of generator bases and respective counters.

Compilation flags:

dynamic

Template:

`base_(Base,Counter)`

Mode and number of proofs:

`base_(?atom,?integer) - zero_or_more`

Operators

(none)

1.29 git

object

1.29.1 git

Predicates for accessing a git project current branch and latest commit data.

Availability:

`logtalk_load(git(loader))`

Author: Paulo Moura

Version: 2:1:2

Date: 2024-03-11

Compilation flags:

`static, context_switching_calls`

Implements:

`public git_protocol`

Uses:

`os`

`user`

Remarks:

(none)

Inherited public predicates:

`branch/2 commit_author/2 commit_date/2 commit_hash/2 commit_hash_abbreviated/2
commit_log/3 commit_message/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.29.2 git_protocol

Predicates for accessing a git project current branch and latest commit data.

Availability:

`logtalk_load(git(loader))`

Author: Paulo Moura

Version: 1:1:0

Date: 2022-01-21

Compilation flags:

`static`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - branch/2
 - commit_author/2
 - commit_date/2
 - commit_hash/2
 - commit_hash_abbreviated/2
 - commit_message/2
 - commit_log/3
- Protected predicates
- Private predicates
- Operators

Public predicates

branch/2

Returns the name of the current git branch. Fails if the directory is not a git repo or a sub-directory of a git repo directory.

Compilation flags:

static

Template:

branch(Directory,Branch)

Mode and number of proofs:

branch(+atom,?atom) - zero_or_one

`commit_author/2`

Returns the latest commit author. Fails if the directory is not a git repo or a sub-directory of a git repo directory.

Compilation flags:

`static`

Template:

`commit_author(Directory,Author)`

Mode and number of proofs:

`commit_author(+atom,-atom) - zero_or_one`

`commit_date/2`

Returns the latest commit date (strict ISO 8601 format). Fails if the directory is not a git repo or a sub-directory of a git repo directory.

Compilation flags:

`static`

Template:

`commit_date(Directory,Date)`

Mode and number of proofs:

`commit_date(+atom,-atom) - zero_or_one`

`commit_hash/2`

Returns the latest commit hash. Fails if the directory is not a git repo or a sub-directory of a git repo directory.

Compilation flags:

`static`

Template:

`commit_hash(Directory,Hash)`

Mode and number of proofs:

`commit_hash(+atom,-atom) - zero_or_one`

`commit_hash_abbreviated/2`

Returns the latest commit abbreviated hash. Fails if the directory is not a git repo or a sub-directory of a git repo directory.

Compilation flags:

`static`

Template:

`commit_hash_abbreviated(Directory,Hash)`

Mode and number of proofs:

`commit_hash_abbreviated(+atom,-atom) - zero_or_one`

`commit_message/2`

Returns the latest commit message. Fails if the directory is not a git repo or a sub-directory of a git repo directory.

Compilation flags:

`static`

Template:

`commit_message(Directory,Message)`

Mode and number of proofs:

`commit_message(+atom,-atom) - zero_or_one`

`commit_log/3`

Returns the git latest commit log output for the given format (see e.g. <https://git-scm.com/docs/pretty-formats>). Fails if the directory is not a git repo or a sub-directory of a git repo directory.

Compilation flags:

`static`

Template:

`commit_log(Directory,Format,Output)`

Mode and number of proofs:

`commit_log(+atom,+atom,-atom) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.30 grammars

object

1.30.1 `blank_grammars(Format)`

Blank grammars.

Availability:

`logtalk_load(grammars(loader))`

Author: Paulo Moura

Version: 0:4:0

Date: 2025-10-06

Compilation flags:

static, context_switching_calls

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - white_space//0
 - white_spaces//0
 - space//0
 - spaces//0
 - tab//0
 - tabs//0
 - new_line//0
 - new_lines//0
 - blank//0
 - blanks//0
 - non_blank//1
 - non_blanks//1
 - control//0
 - controls//0
- Protected predicates
- Private predicates
- Operators

Public predicates

`white_space//0`

Consumes a single space or tab.

Compilation flags:

`static`

Mode and number of proofs:

`white_space - zero_or_one`

`white_spaces//0`

Consumes zero or more spaces and tabs.

Compilation flags:

`static`

Mode and number of proofs:

`white_spaces - one`

`space//0`

Consumes a single space.

Compilation flags:

`static`

Mode and number of proofs:

`space - zero_or_one`

spaces//0

Consumes zero or more spaces.

Compilation flags:

static

Mode and number of proofs:

spaces - one

tab//0

Consumes a single tab.

Compilation flags:

static

Mode and number of proofs:

tab - zero_or_one

tabs//0

Consumes zero or more tabs.

Compilation flags:

static

Mode and number of proofs:

tabs - one

`new_line//0`

Consumes a single new line.

Compilation flags:

`static`

Mode and number of proofs:

`new_line - zero_or_one`

`new_lines//0`

Consumes zero or more new lines.

Compilation flags:

`static`

Mode and number of proofs:

`new_lines - one`

`blank//0`

Consumes a single space, tab, vertical tab, line feed, or new line.

Compilation flags:

`static`

Mode and number of proofs:

`blank - zero_or_one`

`blanks//0`

Consumes zero or more spaces, tabs, vertical tabs, line feeds, or new lines.

Compilation flags:

`static`

Mode and number of proofs:

`blanks - one`

`non_blank//1`

Returns a single non-blank character or character code.

Compilation flags:

`static`

Template:

`non_blank(NonBlank)`

Mode and number of proofs:

`non_blank(-atomic) - zero_or_one`

`non_blanks//1`

Returns a (possibly empty) list of non-blank characters or character codes.

Compilation flags:

`static`

Template:

`non_blanks(NonBlanks)`

Mode and number of proofs:

`non_blanks(-list(atomic)) - one`

`control//0`

Consumes a single control character or character code. Support for the null control character depends on the Prolog backend.

Compilation flags:

`static`

Mode and number of proofs:

`control - zero_or_one`

`controls//0`

Consumes zero or more control characters or character codes. Support for the null control character depends on the Prolog backend.

Compilation flags:

`static`

Mode and number of proofs:

`controls - one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

`object`

1.30.2 ip_grammars(Format)

IP address grammars.

Availability:

logtalk_load(grammars(loader))

Author: Paulo Moura

Version: 0:2:0

Date: 2025-10-06

Compilation flags:

static, context_switching_calls

Uses:

number_grammars(Format)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - ipv4//1
 - ipv6//1
- Protected predicates
- Private predicates
- Operators

Public predicates

ipv4//1

Parses an IPv4 network address in the format XXX.XXX.XXX.XXX where each XXX is an octet (i.e., an integer between 0 and 255).

Compilation flags:

static

Template:

ipv4(Octets)

Mode and number of proofs:

ipv4(?list(integer)) - zero_or_one

ipv6//1

Parses an IPv6 network address in the format XXXX.XXXX.XXXX.XXXX.XXXX.XXXX.XXXX.XXXX where each X is a hexadecimal digit.

Compilation flags:

static

Template:

ipv6(HexDigits)

Mode and number of proofs:

ipv6(?list(integer)) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.30.3 number_grammars(Format)

Number grammars.

Availability:

logtalk_load(grammars(loader))

Author: Paulo Moura

Version: 0:3:0

Date: 2025-10-06

Compilation flags:

static, context_switching_calls

Uses:

list

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - bit//1
 - bits//1
 - digit//1
 - digits//1
 - hex_digit//1
 - hex_digits//1
 - natural//1
 - integer//1
 - float//1
 - number//1
 - sign//1
 - dot//1
- Protected predicates
- Private predicates
- Operators

Public predicates

`bit//1`

Parses a single bit.

Compilation flags:
static

Template:
bit(Bit)
Mode and number of proofs:
bit(?integer) - zero_or_one

`bits//1`

Parses a sequence of one or more bits.

Compilation flags:
static

Template:
bits(Bits)
Mode and number of proofs:
bits(?list(integer)) - zero_or_one

`digit//1`

Parses a single decimal digit.

Compilation flags:
static

Template:
digit(Digit)
Mode and number of proofs:
digit(?atomic) - zero_or_one

`digits//1`

Parses a sequence of zero or more digits.

Compilation flags:
 `static`

Template:
 `digits(Digits)`
Mode and number of proofs:
 `digits(?list(atomic)) - one`

`hex_digit//1`

Parses a single hexa-decimal digit.

Compilation flags:
 `static`

Template:
 `hex_digit(HexDigit)`
Mode and number of proofs:
 `hex_digit(?atomic) - zero_or_one`

`hex_digits//1`

Parses a sequence of zero or more hexa-decimal digits.

Compilation flags:
 `static`

Template:
 `hex_digits(HexDigits)`
Mode and number of proofs:

`hex_digits(?list(atomic)) - one`

`natural//1`

Parses a natural number (a non signed integer).

Compilation flags:

`static`

Template:

`natural(Natural)`

Mode and number of proofs:

`natural(?non_negative_integer) - zero_or_one`

`integer//1`

Parses an integer.

Compilation flags:

`static`

Template:

`integer(Integer)`

Mode and number of proofs:

`integer(?integer) - zero_or_one`

`float//1`

Parses a float.

Compilation flags:

`static`

Template:

float(Float)

Mode and number of proofs:

float(?float) - zero_or_one

number//1

Parses a number (an integer or a float).

Compilation flags:

static

Template:

number(Number)

Mode and number of proofs:

number(?number) - zero_or_one

sign//1

Parses a number sign (plus or minus).

Compilation flags:

static

Template:

sign(Sign)

Mode and number of proofs:

sign(?atomic) - zero_or_one

`dot//1`

Parses a decimal dot.

Compilation flags:

`static`

Template:

`dot(Dot)`

Mode and number of proofs:

`dot(?atomic) - zero_or_one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.30.4 `sequence_grammars`

Sequence grammars.

Availability:

`logtalk_load(grammars(loader))`

Author: Paulo Moura

Version: 0:4:0

Date: 2025-10-06

Compilation flags:

`static, context_switching_calls`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - zero_or_more//2
 - one_or_more//2
 - zero_or_more//1
 - one_or_more//1
 - zero_or_more//0
 - one_or_more//0
 - without//2
- Protected predicates
- Private predicates
- Operators

Public predicates

zero_or_more//2

Eagerly collect zero or more terminals that satisfy the given closure.

Compilation flags:

static

Template:

zero_or_more(Closure,Terminals)

Meta-predicate template:

zero_or_more(1,*)

Mode and number of proofs:

zero_or_more(+callable,-list(atomic)) - one

`one_or_more//2`

Eagerly collect one or more terminals that satisfy the given closure.

Compilation flags:

`static`

Template:

`one_or_more(Closure,Terminals)`

Meta-predicate template:

`one_or_more(1,*)`

Mode and number of proofs:

`one_or_more(+callable,-list(atomic)) - zero_or_one`

`zero_or_more//1`

Eagerly collect zero or more terminals.

Compilation flags:

`static`

Template:

`zero_or_more(Terminals)`

Mode and number of proofs:

`zero_or_more(-list(atomic)) - one`

`one_or_more//1`

Eagerly collect one or more terminals.

Compilation flags:

`static`

Template:

`one_or_more(Terminals)`

Mode and number of proofs:

`one_or_more(-list(atomic)) - zero_or_one`

`zero_or_more//0`

Eagerly parse zero or more terminals.

Compilation flags:

`static`

Mode and number of proofs:

`zero_or_more - one`

`one_or_more//0`

Eagerly parse one or more terminals.

Compilation flags:

`static`

Mode and number of proofs:

`one_or_more - zero_or_one`

`without//2`

Collects input terminals until one of the stop terminals is found. The stop terminals are excluded from the collected terminals.

Compilation flags:

`static`

Template:

`without(StopTerminals,Terminals)`

Mode and number of proofs:

`without(+list(atomic),-list(atomic)) - one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.31 heaps

object

1.31.1 heap(Order)

Heap implementation, parameterized by the order to be used to compare keys (< or >).

Availability:

`logtalk__load(heaps(loader))`

Author: Richard O’Keefe; adapted to Logtalk by Paulo Moura and Victor Lagerkvist.

Version: 1:1:0

Date: 2019-05-18

Compilation flags:

`static, context_switching_calls`

Implements:

`public heapp`

Extends:

`public compound`

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 as_heap/2 as_list/2 check/1 delete/4
 depth/2 empty/1 ground/1 insert/4 insert_all/3 merge/3 new/1 numbervars/1 numbervars/3
 occurs/2 singletons/2 size/2 subsumes/2 subterm/2 top/3 top_next/5 valid/1 variables/2
 variant/2 varnumbers/2 varnumbers/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

minheap, maxheap

protocol

1.31.2 heapp

Heap protocol. Key-value pairs are represented as Key-Value.

Availability:

logtalk_load(heaps(loader))

Author: Richard O'Keefe; adapted to Logtalk by Paulo Moura and Victor Lagerkvist.

Version: 1:0:1

Date: 2010-11-13

Compilation flags:
static

Dependencies:
(none)

Remarks:
(none)

Inherited public predicates:
(none)

- Public predicates
 - insert/4
 - insert_all/3
 - delete/4
 - merge/3
 - empty/1
 - size/2
 - as_list/2
 - as_heap/2
 - top/3
 - top_next/5
- Protected predicates
- Private predicates
- Operators

Public predicates

`insert/4`

Inserts the new pair into a heap, returning the updated heap.

Compilation flags:

`static`

Template:

`insert(Key, Value, Heap, NewHeap)`

Mode and number of proofs:

`insert(+key, +value, +heap, -heap) - one`

`insert_all/3`

Inserts a list of pairs into a heap, returning the updated heap.

Compilation flags:

`static`

Template:

`insert_all(List, Heap, NewHeap)`

Mode and number of proofs:

`insert_all(@list(pairs), +heap, -heap) - one`

`delete/4`

Deletes and returns the top pair in a heap returning the updated heap.

Compilation flags:

`static`

Template:

`delete(Heap, TopKey, TopValue, NewHeap)`

Mode and number of proofs:

`delete(+heap, ?key, ?value, -heap) - zero_or_one`

`merge/3`

Merges two heaps.

Compilation flags:
static

Template:
merge(Heap1,Heap2,NewHeap)
Mode and number of proofs:
merge(+heap,+heap,-heap) - one

`empty/1`

True if the heap is empty.

Compilation flags:
static

Template:
empty(Heap)
Mode and number of proofs:
empty(@heap) - zero_or_one

`size/2`

Returns the number of heap elements.

Compilation flags:
static

Template:
size(Heap,Size)
Mode and number of proofs:

`size(+heap,?integer) - zero_or_one`

`as_list/2`

Returns the current set of pairs in the heap as a list, sorted into ascending order of the keys.

Compilation flags:

`static`

Template:

`as_list(Heap,List)`

Mode and number of proofs:

`as_list(+heap,-list) - one`

`as_heap/2`

Constructs a heap from a list of pairs.

Compilation flags:

`static`

Template:

`as_heap(List,Heap)`

Mode and number of proofs:

`as_heap(+list,-heap) - one`

`top/3`

Returns the top pair in the heap. Fails if the heap is empty.

Compilation flags:

`static`

Template:

`top(Heap,TopKey,TopValue)`

Mode and number of proofs:

`top(+heap,?key,?value) - zero_or_one`

`top_next/5`

Returns the top pair and the next pair in the heap. Fails if the heap does not have at least two elements.

Compilation flags:

`static`

Template:

`top_next(Heap,TopKey,TopValue,NextKey,NextValue)`

Mode and number of proofs:

`top_next(+heap,?key,?value,?key,?value) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

[heap\(Order\)](#)

object

1.31.3 maxheap

Max-heap implementation. Uses standard order to compare keys.

Availability:

`logtalk_load(heaps(loader))`

Author: Paulo Moura.

Version: 1:0:0

Date: 2010-02-19

Compilation flags:

`static, context__switching__calls`

Extends:

`public heap(>)`

Remarks:

`(none)`

Inherited public predicates:

`(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 as_heap/2 as_list/2 check/1 delete/4
depth/2 empty/1 ground/1 insert/4 insert_all/3 merge/3 new/1 numbervars/1 numbervars/3
occurs/2 singletons/2 size/2 subsumes/2 subterm/2 top/3 top_next/5 valid/1 variables/2
variant/2 varnumbers/2 varnumbers/3`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.31.4 minheap

Min-heap implementation. Uses standard order to compare keys.

Availability:

logtalk_load(heaps(loader))

Author: Paulo Moura.

Version: 1:0:0

Date: 2010-02-19

Compilation flags:

static, context_switching_calls

Extends:

public heap(<)

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 as_heap/2 as_list/2 check/1 delete/4
depth/2 empty/1 ground/1 insert/4 insert_all/3 merge/3 new/1 numbervars/1 numbervars/3
occurs/2 singletons/2 size/2 subsumes/2 subterm/2 top/3 top_next/5 valid/1 variables/2
variant/2 varnumbers/2 varnumbers/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.32 help

object

1.32.1 help

Command-line help for Logtalk tools, libraries, entities, predicates, and non-terminals.

Availability:

```
logtalk_load(help(loader))
```

Author: Paulo Moura

Version: 0:42:0

Date: 2025-12-21

Compilation flags:

```
static, context_switching_calls, complements(allow)
```

Implements:

public forwarding

Uses:

atom
integer
list
os
user

Remarks:

(none)

Inherited public predicates:

forward/1

- Public predicates
 - help/0
 - handbook/0
 - apis/0
 - apis/1
 - tools/0
 - tool/1
 - libraries/0
 - library/1
 - entity/1
 - (/)/2
 - (//)/2
 - completion/2
 - completions/2
 - built_in_directive/4
 - built_in_predicate/4
 - built_in_method/4
 - control_construct/4
 - built_in_non_terminal/4
- Protected predicates
- Private predicates
- Operators

Public predicates

[help/0](#)

Provides instructions on how to use the help tool.

Compilation flags:

static

Mode and number of proofs:

help - one

[handbook/0](#)

Provides access to the Handbook.

Compilation flags:

static

Mode and number of proofs:

handbook - one

[apis/0](#)

Provides access to the APIs documentation.

Compilation flags:

static

Mode and number of proofs:

apis - one

apis/1

Provides help on the given predicate or non-terminal.

Compilation flags:

static

Template:

apis(Indicator)

Mode and number of proofs:

apis(+predicate_indicator) - one

apis(+non_terminal_indicator) - one

tools/0

Provides access to the developer tools documentation.

Compilation flags:

static

Mode and number of proofs:

tools - one

tool/1

Provides help on the given developer tool.

Compilation flags:

static

Template:

tool(Tool)

Mode and number of proofs:

tool(+atom) - zero_or_one

libraries/0

Provides access to the standard libraries documentation.

Compilation flags:

static

Mode and number of proofs:

libraries - one

library/1

Provides help on the given standard library.

Compilation flags:

static

Template:

library(Library)

Mode and number of proofs:

library(+atom) - zero_or_one

entity/1

Provides help on the given built-in, tool, and library entity (object, protocol, or category).

Compilation flags:

static

Template:

entity(Entity)

Mode and number of proofs:

entity(+entity_identifier) - zero_or_one

`(/)/2`

Provides help on the Name/Arity built-in control construct, directive, predicate, or method.

Compilation flags:

`static`

Template:

`Name/Arity`

Mode and number of proofs:

`+atom/ +integer - zero_or_one`

`(//)/2`

Provides help on the Name//Arity built-in non-terminal.

Compilation flags:

`static`

Template:

`Name//Arity`

Mode and number of proofs:

`+atom// +integer - zero_or_one`

`completion/2`

Provides a completion pair, Completion-Page, for a given prefix.

Compilation flags:

`static`

Template:

`completion(Prefix,Completion)`

Mode and number of proofs:

`completion(+atom,-pair) - zero_or_more`

completions/2

Provides a list of completions pairs, Completion-Page, for a given prefix.

Compilation flags:

static

Template:

completions(Prefix, Completions)

Mode and number of proofs:

completions(+atom, -lists(pair)) - zero_or_more

built_in_directive/4

Provides access to the HTML documenting files describing built-in directives.

Compilation flags:

static

Template:

built_in_directive(Name, Arity, Directory, Basename)

Mode and number of proofs:

built_in_directive(?atom, ?integer, -atom, -atom) - zero_or_more

built_in_predicate/4

Provides access to the HTML documenting files describing built-in predicates.

Compilation flags:

static

Template:

built_in_predicate(Name, Arity, Directory, Basename)

Mode and number of proofs:

built_in_predicate(?atom, ?integer, -atom, -atom) - zero_or_more

`built_in_method/4`

Provides access to the HTML documenting files describing built-in methods.

Compilation flags:

`static`

Template:

`built_in_method(Name,Arity,Directory,Basename)`

Mode and number of proofs:

`built_in_method(?atom,?integer,-atom,-atom) - zero_or_more`

`control_construct/4`

Provides access to the HTML documenting files describing built-in control constructs.

Compilation flags:

`static`

Template:

`control_construct(Name,Arity,Directory,Basename)`

Mode and number of proofs:

`control_construct(?atom,?integer,-atom,-atom) - zero_or_more`

`built_in_non_terminal/4`

Provides access to the HTML documenting files describing built-in DCG non-terminals.

Compilation flags:

`static`

Template:

`built_in_non_terminal(Name,Arity,Directory,Basename)`

Mode and number of proofs:

`built_in_non_terminal(?atom,?integer,-atom,-atom) - zero_or_more`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.33 hierarchies

category

1.33.1 class_hierarchy

Class hierarchy predicates.

Availability:

`logtalk_load(hierarchies(loader))`

Author: Paulo Moura

Version: 1:1:0

Date: 2006-02-20

Compilation flags:

`static`

Implements:

`public class_hierarchy`

Remarks:

(none)

Inherited public predicates:

`ancestor/1 ancestor/1 class/1 classes/1 descendant/1 descendant_class/1 descendant_classes/1
descendant_instance/1 descendant_instances/1 descendants/1 instance/1 instances/1 leaf/1
leaf_class/1 leaf_classes/1 leaf_instance/1 leaf_instances/1 leaves/1 subclass/1 subclasses/1
superclass/1 superclasses/1`

- [Public predicates](#)
- [Protected predicates](#)
- [Private predicates](#)
- [Operators](#)

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.33.2 [class_hierarchy](#)

Class hierarchy protocol.

Availability:

`logtalk_load(hierarchies(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2000-07-24

Compilation flags:

`static`

Extends:

`public hierarchy`

Remarks:

(none)

Inherited public predicates:

ancestor/1 ancestors/1 descendant/1 descendants/1 leaf/1 leaves/1

- Public predicates
 - class/1
 - classes/1
 - instance/1
 - instances/1
 - subclass/1
 - subclasses/1
 - superclass/1
 - superclasses/1
 - leaf_instance/1
 - leaf_instances/1
 - leaf_class/1
 - leaf_classes/1
 - descendant_instance/1
 - descendant_instances/1
 - descendant_class/1
 - descendant_classes/1
- Protected predicates
- Private predicates
- Operators

Public predicates

class/1

Returns, by backtracking, all object classes.

Compilation flags:

static

Template:

class(Class)

Mode and number of proofs:

class(?object) - zero_or_more

classes/1

List of all object classes.

Compilation flags:

static

Template:

classes(Classess)

Mode and number of proofs:

classes(-list) - one

instance/1

Returns, by backtracking, all class instances.

Compilation flags:

static

Template:

instance(Instance)

Mode and number of proofs:

instance(?object) - zero_or_more

instances/1

List of all class instances.

Compilation flags:

static

Template:

instances(Instances)

Mode and number of proofs:

instances(-list) - one

subclass/1

Returns, by backtracking, all class subclasses.

Compilation flags:

static

Template:

subclass(Subclass)

Mode and number of proofs:

subclass(?object) - zero_or_more

subclasses/1

List of all class subclasses.

Compilation flags:

static

Template:

subclasses(Subclasses)

Mode and number of proofs:

subclasses(-list) - one

`superclass/1`

Returns, by backtracking, all class superclasses.

Compilation flags:

`static`

Template:

`superclass(Superclass)`

Mode and number of proofs:

`superclass(?object) - zero_or_more`

`superclasses/1`

List of all class superclasses.

Compilation flags:

`static`

Template:

`superclasses(Superclasses)`

Mode and number of proofs:

`superclasses(-list) - one`

`leaf_instance/1`

Returns, by backtracking, all class leaf instances.

Compilation flags:

`static`

Template:

`leaf_instance(Leaf)`

Mode and number of proofs:

`leaf_instance(?object) - zero_or_more`

`leaf_instances/1`

List of all class leaf instances.

Compilation flags:

`static`

Template:

`leaf_instances(Leaves)`

Mode and number of proofs:

`leaf_instances(-list) - one`

`leaf_class/1`

Returns, by backtracking, all class leaf subclasses.

Compilation flags:

`static`

Template:

`leaf_class(Leaf)`

Mode and number of proofs:

`leaf_class(?object) - zero_or_more`

`leaf_classes/1`

List of all class leaf leaf subclasses.

Compilation flags:

`static`

Template:

`leaf_classes(Leaves)`

Mode and number of proofs:

`leaf_classes(-list) - one`

`descendant_instance/1`

Returns, by backtracking, all class descendant instances.

Compilation flags:

`static`

Template:

`descendant_instance(Descendant)`

Mode and number of proofs:

`descendant_instance(?object) - zero_or_more`

`descendant_instances/1`

List of all class descendant instances.

Compilation flags:

`static`

Template:

`descendant_instances(Descendants)`

Mode and number of proofs:

`descendant_instances(-list) - one`

`descendant_class/1`

Returns, by backtracking, all class descendant subclasses.

Compilation flags:

`static`

Template:

`descendant_class(Descendant)`

Mode and number of proofs:

`descendant_class(?object) - zero_or_more`

descendant_classes/1

List of all class descendant subclasses.

Compilation flags:

static

Template:

descendant_classes(Descendants)

Mode and number of proofs:

descendant_classes(-list) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

[class_hierarchy](#)

protocol

1.33.3 hierarchyp

Common hierarchy protocol for prototype and class hierarchies.

Availability:

logtalk_load(hierarchies(loader))

Author: Paulo Moura

Version: 1:0:0

Date: 2000-07-24

Compilation flags:
static

Dependencies:
(none)

Remarks:
(none)

Inherited public predicates:
(none)

- Public predicates
 - ancestor/1
 - ancestors/1
 - leaf/1
 - leaves/1
 - descendant/1
 - descendants/1
- Protected predicates
- Private predicates
- Operators

Public predicates

ancestor/1

Returns, by backtracking, all object ancestors.

Compilation flags:
static

Template:
ancestor(Ancestor)
Mode and number of proofs:
ancestor(?object) - zero_or_more

ancestors/1

List of all object ancestors.

Compilation flags:

static

Template:

ancestors(Ancestors)

Mode and number of proofs:

ancestors(-list) - one

leaf/1

Returns, by backtracking, all object leaves.

Compilation flags:

static

Template:

leaf(Leaf)

Mode and number of proofs:

leaf(?object) - zero_or_more

leaves/1

List of all object leaves.

Compilation flags:

static

Template:

leaves(Leaves)

Mode and number of proofs:

leaves(-list) - one

descendant/1

Returns, by backtracking, all object descendants.

Compilation flags:

static

Template:

descendant(Descendant)

Mode and number of proofs:

descendant(?object) - zero_or_more

descendants/1

List of all object descendants.

Compilation flags:

static

Template:

descendants(Descendants)

Mode and number of proofs:

descendants(-list) - one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

category

1.33.4 proto_hierarchy

Prototype hierarchy predicates.

Availability:

```
logtalk_load(hierarchies(loader))
```

Author: Paulo Moura

Version: 1:1:0

Date: 2006-02-20

Compilation flags:

```
static
```

Implements:

```
public proto_hierarchyp
```

Remarks:

(none)

Inherited public predicates:

```
ancestor/1 ancestors/1 descendant/1 descendants/1 extension/1 extensions/1 leaf/1 leaves/1  
parent/1 parents/1
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.33.5 proto_hierarchy

Prototype hierarchy protocol.

Availability:

`logtalk_load(hierarchies(loader))`

Author: Paulo Moura

Version: 1:1:0

Date: 2006-02-20

Compilation flags:

`static`

Extends:

`public hierarchy`

Remarks:

(none)

Inherited public predicates:

`ancestor/1 ancestors/1 descendant/1 descendants/1 leaf/1 leaves/1`

- Public predicates
 - parent/1
 - parents/1
 - extension/1
 - extensions/1
- Protected predicates
- Private predicates
- Operators

Public predicates

parent/1

Returns, by backtracking, all object parents.

Compilation flags:

static

Template:

parent(Parent)

Mode and number of proofs:

parent(?object) - zero_or_more

parents/1

List of all object parents.

Compilation flags:

static

Template:

parents(Parents)

Mode and number of proofs:

parents(-list) - one

`extension/1`

Returns, by backtracking, all object direct descendants.

Compilation flags:

`static`

Template:

`extension(Extension)`

Mode and number of proofs:

`extension(?object) - zero_or_more`

`extensions/1`

List of all object direct descendants.

Compilation flags:

`static`

Template:

`extensions(Extensions)`

Mode and number of proofs:

`extensions(-list) - one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

[proto_hierarchy](#)

1.34 hook_flows

object

1.34.1 hook_pipeline(Pipeline)

- Pipeline - List of hook objects.

Use a pipeline (represented using a list) of hook objects to expand terms and goals. The expansion results from a hook object are passed to the next hook object in the pipeline.

Availability:

`logtalk_load(hook_flows(loader))`

Author: Paulo Moura

Version: 2:0:0

Date: 2024-09-27

Compilation flags:

`static, context_switching_calls`

Implements:

public [expanding](#)

Remarks:

- Usage: Compile source files that should be expanded using the pipeline of hook objects using the compiler option `hook(hook_pipeline(Pipeline))`.

Inherited public predicates:

`goal_expansion/2 term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`hook_set(Set)`

object

1.34.2 `hook_set(Set)`

- Set - Set (list) of hook objects.

Use a set (represented using a list) of hook objects to expand terms and goals. The hook objects are tried in sequence until one of them succeeds in expanding the current term (goal) into a different term (goal).

Availability:

`logtalk_load(hook_flows(loader))`

Author: Paulo Moura

Version: 2:0:0

Date: 2024-09-27

Compilation flags:

static, context_switching_calls

Implements:

public expanding

Remarks:

- Usage: Compile source files that should be expanded using the set of hook objects using the compiler option `hook(hook_set(Set))`.

Inherited public predicates:

goal_expansion/2 term_expansion/2

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

hook_pipeline(Pipeline)

1.35 hook_objects

object

1.35.1 backend_adapter_hook

This hook object applies the expansion rules defined in the Prolog backend adapter file.

Availability:

`logtalk_load(hook_objects(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2020-02-17

Compilation flags:

`static, context_switching_calls`

Implements:

public `expanding`

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

`default_workflow_hook`, `identity_hook`, `grammar_rules_hook`, `prolog_module_hook(Module)`, `object_wrapper_hook`, `write_to_stream_hook(Stream,Options)`, `write_to_stream_hook(Stream)`, `print_goal_hook`, `suppress_goal_hook`

object

1.35.2 `default_workflow_hook`

Use this object as the default hook object to restore the default expansion pipeline semantics used by the compiler.

Availability:

`logtalk_load(hook_objects(loader))`

Author: Paulo Moura

Version: 1:0:1

Date: 2020-03-24

Compilation flags:

`static`, `context_switching_calls`

Implements:

public `expanding`

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

`backend_adapter_hook`, `identity_hook`, `grammar_rules_hook`, `prolog_module_hook(Module)`, `object_wrapper_hook`, `write_to_stream_hook(Stream,Options)`, `write_to_stream_hook(Stream)`, `print_goal_hook`, `suppress_goal_hook`

object

1.35.3 `grammar_rules_hook`

This hook object expands grammar rules into clauses.

Availability:

`logtalk_load(hook_objects(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2020-02-14

Compilation flags:

static, context_switching_calls

Implements:

public expanding

Remarks:

(none)

Inherited public predicates:

goal_expansion/2 term_expansion/2

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

backend_adapter_hook, default_workflow_hook, identity_hook, prolog_module_hook(Module),
object_wrapper_hook, write_to_stream_hook(Stream,Options), write_to_stream_hook(Stream),
print_goal_hook, suppress_goal_hook

object

1.35.4 identity_hook

Use this object as a file specific hook object to prevent any (other) user-defined expansion rules to be applied when compiling the file.

Availability:

```
logtalk_load(hook_objects(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2020-02-15

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public expanding
```

Remarks:

```
(none)
```

Inherited public predicates:

```
goal_expansion/2 term_expansion/2
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

backend_adapter_hook, default_workflow_hook, grammar_rules_hook, pro-
log_module_hook(Module), object_wrapper_hook, write_to_stream_hook(Stream,Options),
write_to_stream_hook(Stream), print_goal_hook, suppress_goal_hook

object

1.35.5 object_wrapper_hook

Use this object to wrap the contents of a plain Prolog file in an object named after the file. The wrapper sets the context_switching_calls flag to allow, enabling calling of the wrapped predicates using the <</2 control construct.

Availability:

logtalk_load(hook_objects(loader))

Author: Paulo Moura

Version: 1:1:0

Date: 2020-10-30

Compilation flags:

static, context_switching_calls

Implements:

public [expanding](#)

Uses:

[os](#)

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

`object_wrapper_hook(Protocol)`, `object_wrapper_hook(Name,Relations)`, `back-end_adapter_hook`, `default_workflow_hook`, `grammar_rules_hook`, `prolog_module_hook(Module)`, `write_to_stream_hook(Stream,Options)`, `write_to_stream_hook(Stream)`, `print_goal_hook`, `suppress_goal_hook`

object

1.35.6 object_wrapper_hook(Protocol)

Use this object to wrap the contents of a plain Prolog file in an object named after the file that implements the given protocol.

Availability:

```
logtalk_load(hook_objects(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2021-11-24

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public expanding
```

Uses:

```
os
```

Remarks:

```
(none)
```

Inherited public predicates:

```
goal_expansion/2 term_expansion/2
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

```
object_wrapper_hook,          object_wrapper_hook(Name,Relations),          backend_adapter_hook,  
default_workflow_hook,       grammar_rules_hook,          prolog_module_hook(Module),  
write_to_stream_hook(Stream,Options), write_to_stream_hook(Stream), print_goal_hook, sup-  
press_goal_hook
```

object

1.35.7 object_wrapper_hook(Name,Relations)

Use this object to wrap the contents of a plain Prolog file in an object with the given name and object entity relations (a list).

Availability:

```
logtalk__load(hook__objects(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2022-02-03

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public expanding
```

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

`object_wrapper_hook`, `object_wrapper_hook(Protocol)`, `backend_adapter_hook`,
`default_workflow_hook`, `grammar_rules_hook`, `prolog_module_hook(Module)`,
`write_to_stream_hook(Stream,Options)`, `write_to_stream_hook(Stream)`, `print_goal_hook`, `suppress_goal_hook`

object

1.35.8 `print_goal_hook`

Use this object to easily print entity predicate goals before, after, or before and after calling them.

Availability:

```
logtalk_load(hook_objects(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2020-03-14

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public expanding
```

Remarks:

- Usage: Mark a goal to be printed by prefixing it with an operator. Printing uses a comment message.
- To print goal before calling it: - Goal.
- To print goal after calling it: + Goal.
- To print goal before and after calling it: * Goal.
- Operators: This hook object uses the standard - and + prefix operators and also defines a global * prefix operator with the same type and priority.

Inherited public predicates:

```
goal_expansion/2 term_expansion/2
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

`backend_adapter_hook`, `default_workflow_hook`, `grammar_rules_hook`, `identity_hook`, `prolog_module_hook(Module)`, `object_wrapper_hook`, `write_to_stream_hook(Stream,Options)`, `write_to_stream_hook(Stream)`, `suppress_goal_hook`

object

1.35.9 `prolog_module_hook(Module)`

This hook object applies the expansion rules defined in a Prolog module (e.g., `user`).

Availability:

`logtalk_load(hook_objects(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2020-02-17

Compilation flags:

`static`, `context_switching_calls`

Implements:

public `expanding`

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

`backend_adapter_hook`, `default_workflow_hook`, `identity_hook`, `grammar_rules_hook`, `object_wrapper_hook`, `write_to_stream_hook(Stream,Options)`, `write_to_stream_hook(Stream)`, `print_goal_hook`, `suppress_goal_hook`

object

1.35.10 `suppress_goal_hook`

Use this object to easily suppress a goal in a clause body.

Availability:

`logtalk_load(hook_objects(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2020-05-04

Compilation flags:

static, context_switching_calls

Implements:

public `expanding`

Remarks:

- Usage: Mark a goal to be suppressed by prefixing it with the -- operator.
- Operators: This hook object uses the -- prefix operator declared by Logtalk for use in mode/2 directives.

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

`backend_adapter_hook`, `default_workflow_hook`, `grammar_rules_hook`, `identity_hook`, `prolog_module_hook`(Module), `object_wrapper_hook`, `write_to_stream_hook`(Stream,Options), `write_to_stream_hook`(Stream), `print_goal_hook`

object

1.35.11 `write_to_file_hook`(File)

This hook object writes term-expansion results to a file in canonical format. The terms are terminated by a period and a new line.

Availability:

`logtalk_load(hook_objects(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2022-07-06

Compilation flags:

`static`, `context_switching_calls`

Extends:

`public write_to_file_hook(File,[quoted(true),ignore_ops(true)])`

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

backend_adapter_hook, default_workflow_hook, identity_hook, grammar_rules_hook,
prolog_module_hook(Module), object_wrapper_hook, write_to_file_hook(File,Options),
write_to_stream_hook(Stream,Options), write_to_stream_hook(Stream), print_goal_hook, sup-
press_goal_hook

object

1.35.12 write_to_file_hook(File,Options)

This hook object writes term-expansion results to a file using a list of write_term/3 options. The terms are terminated by a period and a new line.

Availability:

logtalk_load(hook_objects(loader))

Author: Paulo Moura

Version: 1:0:0

Date: 2022-07-06

Compilation flags:

static, context_switching_calls

Implements:

public [expanding](#)

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

`backend_adapter_hook`, `default_workflow_hook`, `identity_hook`, `grammar_rules_hook`,
`prolog_module_hook(Module)`, `object_wrapper_hook`, `write_to_file_hook(File)`,
`write_to_stream_hook(Stream,Options)`, `write_to_stream_hook(Stream)`, `print_goal_hook`, `sup-`
`press_goal_hook`

object

1.35.13 `write_to_stream_hook(Stream)`

This hook object writes term-expansion results to a stream in canonical format. The terms are terminated by a period and a new line.

Availability:

```
logtalk_load(hook_objects(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2020-02-16

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public write_to_stream_hook(Stream,[quoted(true),ignore_ops(true)])
```

Remarks:

```
(none)
```

Inherited public predicates:

```
goal_expansion/2 term_expansion/2
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

`backend_adapter_hook`, `default_workflow_hook`, `identity_hook`, `grammar_rules_hook`, `prolog_module_hook`(Module), `object_wrapper_hook`, `write_to_stream_hook`(Stream,Options), `write_to_file_hook`(File,Options), `write_to_file_hook`(File), `print_goal_hook`, `suppress_goal_hook`

object

1.35.14 `write_to_stream_hook`(Stream,Options)

This hook object writes term-expansion results to a stream using a list of `write_term/3` options. The terms are terminated by a period and a new line.

Availability:

`logtalk_load(hook_objects(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2020-02-16

Compilation flags:

`static`, `context_switching_calls`

Implements:

public `expanding`

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

See also

`backend_adapter_hook`, `default_workflow_hook`, `identity_hook`, `grammar_rules_hook`,
`prolog_module_hook(Module)`, `object_wrapper_hook`, `write_to_stream_hook(Stream)`,
`write_to_file_hook(File,Options)`, `write_to_file_hook(File)`, `print_goal_hook`, `suppress_goal_hook`

1.36 html

category

1.36.1 html

HTML generation.

Availability:

`logtalk_load(html(loader))`

Author: Paul Brown and Paulo Moura

Version: 0:3:0

Date: 2021-03-30

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - generate/2
 - void_element/1
 - normal_element/2
- Protected predicates
- Private predicates
 - doctype/1
- Operators

Public predicates

generate/2

Generates HTML content using the representation specified in the first argument (stream(Stream) or file(Path)) for the term in the second argument.

Compilation flags:

static

Template:

generate(Sink,Term)

Mode and number of proofs:

generate(+compound,++term) - one_or_error

`void_element/1`

Enumerates, by backtracking, all void elements.

Compilation flags:

`static`

Template:

`void_element(Element)`

Mode and number of proofs:

`void_element(?atom) - zero_or_more`

`normal_element/2`

Enumerates, by backtracking, all normal elements. The value of the `Display` argument is either `inline` or `block`.

Compilation flags:

`static`

Template:

`normal_element(Element,Display)`

Mode and number of proofs:

`normal_element(?atom,?atom) - zero_or_more`

Protected predicates

(none)

Private predicates

doctype/1

Doctype text.

Compilation flags:
static

Template:
doctype(DocType)
Mode and number of proofs:
doctype(?atom) - one

Operators

(none)
object

1.36.2 html5

HTML content generation using the HTML 5 doctype.

Availability:
logtalk_load(html(loader))

Author: Paul Brown and Paulo Moura
Version: 1:0:0
Date: 2021-03-29

Compilation flags:
static, context_switching_calls

Imports:
public [html](#)

Remarks:
(none)

Inherited public predicates:

`generate/2` `normal_element/2` `void_element/1`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.36.3 xhtml11

XHTML content generation using the XHTML 1.1 doctype.

Availability:

`logtalk_load(html(loader))`

Author: Paul Brown and Paulo Moura

Version: 1:0:0

Date: 2021-03-29

Compilation flags:

`static`, `context_switching_calls`

Imports:

public `html`

Remarks:

(none)

Inherited public predicates:

`generate/2` `normal_element/2` `void_element/1`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.37 ids

object

1.37.1 ids

Generator of random identifiers represented as atoms with 160 bits (20 bytes) of randomness.

Availability:

```
logtalk_load(ids(loader))
```

Author: Paulo Moura

Version: 1:1:0

Date: 2025-06-03

Compilation flags:

```
static, context__switching__calls
```

Extends:

```
public ids(atom,20)
```

Remarks:

```
(none)
```

Inherited public predicates:

```
generate/1
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

`ids(Representation,Bytes)`, `uuid`, `ulid`

object

1.37.2 `ids(Representation,Bytes)`

- Representation - Text representation for the identifier. Possible values are atom, chars, and codes.
- Bytes - Number of bytes of randomness.

Generator of random identifiers.

Availability:

```
logtalk_load(ids(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2022-11-23

Compilation flags:

```
static, context_switching_calls
```

Uses:

```
base64
fast_random
list
os
```

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - generate/1
- Protected predicates
- Private predicates
- Operators

Public predicates

generate/1

Generate a random identifier.

Compilation flags:

static

Template:

generate(Identifier)

Mode and number of proofs:

generate(--textids) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

[ids](#), [uuid](#), [ulid](#)

1.38 intervals

object

1.38.1 interval

Basic temporal interval relations. An interval is represented by a compound term, `i/2`, with two ground arguments, the start and end points.

Availability:

```
logtalk_load(intervals(loader))
```

Author: Paulo Moura

Version: 1:2:1

Date: 2022-01-15

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public intervalp
```

Aliases:

```
intervalp before/2 as b/2
intervalp after/2 as bi/2
intervalp meets/2 as m/2
intervalp met_by/2 as mi/2
intervalp overlaps/2 as o/2
intervalp overlapped_by/2 as oi/2
intervalp starts/2 as s/2
intervalp started_by/2 as si/2
intervalp during/2 as d/2
intervalp contains/2 as di/2
intervalp finishes/2 as f/2
intervalp finished_by/2 as fi/2
intervalp equal/2 as eq/2
```

Remarks:

(none)

Inherited public predicates:

after/2 before/2 contains/2 during/2 equal/2 finished_by/2 finishes/2 meets/2 met_by/2
new/3 overlapped_by/2 overlaps/2 started_by/2 starts/2 valid/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.38.2 intervalp

Basic temporal interval relations protocol (based on James F. Allen Interval Algebra work).

Availability:

logtalk_load(intervals(loader))

Author: Paulo Moura

Version: 1:1:0

Date: 2014-04-26

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - new/3
 - valid/1
 - before/2
 - after/2
 - meets/2
 - met_by/2
 - overlaps/2
 - overlapped_by/2
 - starts/2
 - started_by/2
 - during/2
 - contains/2
 - finishes/2
 - finished_by/2
 - equal/2
- Protected predicates
- Private predicates
- Operators

Public predicates

`new/3`

Constructs a new interval given start and end points. The start point must strictly precede the end point.

Compilation flags:

`static`

Template:

`new(Start,End,Interval)`

Mode and number of proofs:

`new(@ground,@ground,-interval) - zero_or_one`

`valid/1`

True if Interval is a valid interval.

Compilation flags:

`static`

Template:

`valid(Interval)`

Mode and number of proofs:

`valid(@interval) - zero_or_one`

`before/2`

True if Interval1 takes place before Interval2.

Compilation flags:

`static`

Template:

`before(Interval1,Interval2)`

Mode and number of proofs:

`before(@interval,@interval) - zero_or_one`

`after/2`

True if Interval1 takes place after Interval2.

Compilation flags:
static

Template:
after(Interval1,Interval2)
Mode and number of proofs:
after(@interval,@interval) - zero_or_one

`meets/2`

True if Interval1 meets Interval2.

Compilation flags:
static

Template:
meets(Interval1,Interval2)
Mode and number of proofs:
meets(@interval,@interval) - zero_or_one

`met_by/2`

True if Interval1 is met by Interval2.

Compilation flags:
static

Template:
met_by(Interval1,Interval2)
Mode and number of proofs:

`met_by(@interval,@interval) - zero_or_one`

`overlaps/2`

True if Interval1 overlaps with Interval2.

Compilation flags:

`static`

Template:

`overlaps(Interval1,Interval2)`

Mode and number of proofs:

`overlaps(@interval,@interval) - zero_or_one`

`overlapped_by/2`

True if Interval1 is overlapped by Interval2.

Compilation flags:

`static`

Template:

`overlapped_by(Interval1,Interval2)`

Mode and number of proofs:

`overlapped_by(@interval,@interval) - zero_or_one`

`starts/2`

True if Interval1 starts Interval2.

Compilation flags:

`static`

Template:

starts(Interval1,Interval2)

Mode and number of proofs:

starts(@interval,@interval) - zero_or_one

started_by/2

True if Interval1 is started by Interval2.

Compilation flags:

static

Template:

started_by(Interval1,Interval2)

Mode and number of proofs:

started_by(@interval,@interval) - zero_or_one

during/2

True if Interval1 occurs during Interval2.

Compilation flags:

static

Template:

during(Interval1,Interval2)

Mode and number of proofs:

during(@interval,@interval) - zero_or_one

`contains/2`

True if Interval1 contains Interval2.

Compilation flags:

`static`

Template:

`contains(Interval1,Interval2)`

Mode and number of proofs:

`contains(@interval,@interval) - zero_or_one`

`finishes/2`

True if Interval1 finishes Interval2.

Compilation flags:

`static`

Template:

`finishes(Interval1,Interval2)`

Mode and number of proofs:

`finishes(@interval,@interval) - zero_or_one`

`finished_by/2`

True if Interval1 is finished by Interval2.

Compilation flags:

`static`

Template:

`finished_by(Interval1,Interval2)`

Mode and number of proofs:

`finished_by(@interval,@interval) - zero_or_one`

`equal/2`

True if Interval1 is equal to Interval2.

Compilation flags:

`static`

Template:

`equal(Interval1,Interval2)`

Mode and number of proofs:

`equal(@interval,@interval) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

[interval](#)

1.39 iso8601

object

1.39.1 iso8601

ISO 8601 (and European civil calendar) compliant library of date predicates.

Availability:

`logtalk_load(iso8601(loader))`

Author: Daniel L. Dudley

Version: 1:0:3

Date: 2019-10-09

Compilation flags:

static, context_switching_calls

Uses:

os

Remarks:

- Scope: This object currently provides a powerful, versatile and efficient set of date-handling predicates, which—thanks to Logtalk—may be used as is on a wide range of Prolog compilers. Besides taking time to familiarize oneself with each predicate, the user should take note of the following information.
- Validation of dates: Date parts are not validated—that is the caller’s responsibility! However, not being quite heartless yet, we do provide a predicate for this purpose.
- Date arithmetic: Many of the examples illustrate a simplified method of doing date arithmetic. Note, however, that we do not generally recommend this practice—it is all too easy to make mistakes. The safest way of finding the day difference between two dates is to first convert the dates to their Julian day numbers and then subtract one from the other. Similarly, the safe way to add or subtract a day offset to a particular date is to first convert the date to its Julian day number, add or subtract the day offset, and then convert the result to its corresponding date.
- BC years: ISO 8601 specifies that the Gregorian calendar be used, yet requires that years prior to 1 AD be handled arithmetically, i.e., the year we know as 1 BC is year 0, 2 BC is year -1, 3 BC is year -2 and so on. We do not follow ISO 8601 with regard to the handling of BC years. Our date predicates will accept and interpret an input year 0 as 1 BC; however, a negative year, Year, should always be interpreted as $\text{abs}(\text{Year}) ::= \text{Year BC}$. We believe that the average person will find our handling of BC years more user-friendly than the ISO 8601 one, but we encourage feedback from users with a view to a possible change in future versions.
- Week numbers: It is possible for a day (date) to have a week number that belongs to another year. Up to three of the first days of a calendar year may belong to the last week (number) of the prior calendar year, and up to three days of the last days of a calendar year may belong to the first week (number) of the next calendar year. It for this reason that the Week parameter in date/6-7 is a compound term, namely week(WeekNo,ActualYear).
- Computation of Gregorian Easter Sunday: The algorithm is based upon the “Gaussian rule”. Proleptic use is limited to years > 1582 AD, that is, after the introduction of the Gregorian calendar.
- Some Christian feast day offsets from Easter Sunday: Carnival Monday: -48 days, Mardi Gras (Shrove Tuesday): -47 days, Ash Wednesday: -46 days, Palm Sunday: -7 days, Easter Friday: -2 days, Easter Saturday: -1 day, Easter Monday: +1 day, Ascension of Christ: +39 days, Whitsunday: +49 days, Whitmonday: +50 days, Feast of Corpus Christi: +60 days.

Inherited public predicates:

(none)

- Public predicates
 - date/4
 - date/5
 - date/6
 - date/7
 - date_string/3
 - valid_date/3
 - leap_year/1
 - calendar_month/3
 - easter_day/3
- Protected predicates
- Private predicates
- Operators

Public predicates

date/4

Get the system date and/or its Julian Day # or convert a Julian Day # to/from given date parts.

Compilation flags:

static

Template:

date(JD,Year,Month,Day)

JD - Julian day serial number.

Year - 0 or negative if converted BC year, positive otherwise.

Month - Normally an integer between 1 and 12 inclusive.

Day - Normally an integer between 1 and 31 inclusive depending upon month.

Mode and number of proofs:

date(?integer,?integer,?integer,?integer) - zero_or_one

Examples:

Current date (i.e., today)

date(JD,Year,Month,Day)

JD=2453471,Year=2005,Month=4,Day=10

Convert a date to its Julian day number

date(JD,2000,2,29)

JD=2451604

Convert a Julian day number to its date
 date(2451604,Year,Month,Day)
 Year=2000,Month=2,Day=29
 What is the date of day # 60 in year 2000?
 date(JD,2000,1,60)
 JD=2451604
 What is the Julian of the 1st day prior to 2000-1-1?
 date(JD,2000,1,0)
 JD=2451544
 What is the Julian of the 60th day prior to 2000-1-1?
 date(JD,2000,1,-59)
 JD=2451485
 Illegal date is auto-adjusted (see also next query)
 date(JD,1900,2,29)
 JD=2415080
 This is the correct date!
 date(2415080,Year,Month,Day)
 Year=1900,Month=3,Day=1

date/5

Ditto date/4 + get/check its day-of-week #.

Compilation flags:

static

Template:

date(JD,Year,Month,Day,DoW)
 JD - Julian day serial number.
 Year - 0 or negative if converted BC year, positive otherwise.
 Month - Normally an integer between 1 and 12 inclusive.
 Day - Normally an integer between 1 and 31 inclusive depending upon month.
 DoW - Day of week, where Monday=1, Tuesday=2, ..., Sunday=7.

Mode and number of proofs:

date(?integer,?integer,?integer,?integer,?integer) - zero_or_one

Examples:

Get the Julian and the day-of-week # of a date
 date(JD,2000,2,29,DoW)
 JD=2451604,DoW=2
 Check the validity of a given date (day-of-week is 2, not 4)
 date(_,2002,3,5,4)

```
no
Get the Julian day of a given date if it is a Sunday
date(JD,2004,2,29,7)
JD=2453065
Get the date and day-of-week # of a Julian
date(2451545,Year,Month,Day,DoW)
Year=2000,Month=1,Day=1,DoW=6
```

date/6

Ditto date/5 + get/check its week #.

Compilation flags:

```
static
```

Template:

```
date(JD,Year,Month,Day,DoW,Week)
JD - Julian day serial number.
Year - 0 or negative if converted BC year, positive otherwise.
Month - Normally an integer between 1 and 12 inclusive.
Day - Normally an integer between 1 and 31 inclusive depending upon month.
DoW - Day of week, where Monday=1, Tuesday=2, ..., Sunday=7.
Week - Compound term, week(WeekNo,ActualYear), of a day.
```

Mode and number of proofs:

```
date(?integer,?integer,?integer,?integer,?integer,?compound) - zero_or_one
```

Examples:

```
Get the day-of-week and week number of a date
date(_,2000,1,1,DoW,Week)
DoW=6,Week=week(52,1999)
Get the week number and year of this week
date(_,_,_,_,Week)
Week=week(7,2004)
Get the Julian number and the week of a date if it is a Sunday
date(JD,2004,2,29,7,Week)
JD=2453065,Week=week(9,2004)
Get the day-of-week and week of a Julian day number
date(2453066,_,_,_,DoW,Week)
DoW=1,Week=week(10,2004)
Check that given date data matches
date(_,2004,3,1,1,week(10,2004))
yes
```

What is the date of a day of week (default is 1) in given week # and year?

```
date(__,Year,Month,Day,DoW,week(26,2004))
Year=2004,Month=6,Day=21,DoW=1
```

Ditto for Sunday

```
date(__,Year,Month,Day,7,week(1,2005))
Year=2005,Month=1,Day=9
```

Ditto for Tuesday in following week

```
date(__,Year,Month,Day,9,week(1,2005))
Year=2005,Month=1,Day=11
```

Ditto for Thursday in the prior week

```
date(__,Year,Month,Day,4,week(0,2005))
Year=2004,Month=12,Day=30
```

Ditto for Tuesday two weeks prior

```
date(__,Year,Month,Day,2,week(-1,2005))
Year=2004,Month=12,Day=21
```

Ditto for Saturday

```
date(__,Year,Month,Day,6,week(53,2004))
Year=2005,Month=1,Day=1
```

Ditto for Monday (note automatic compensation of nonexistent week number)

```
date(__,Year,Month,Day,1,week(60,2004))
Year=2005,Month=2,Day=14
```

date/7

Ditto date/6 + get/check its day-of-year #.

Compilation flags:

static

Template:

```
date(JD,Year,Month,Day,DoW,Week,DoY)
```

JD - Julian day serial number.
Year - 0 or negative if converted BC year, positive otherwise.
Month - Normally an integer between 1 and 12 inclusive.
Day - Normally an integer between 1 and 31 inclusive depending upon month.
DoW - Day of week, where Monday=1, Tuesday=2, ..., Sunday=7.
Week - Compound term, week(WeekNo,ActualYear), of a day.
DoY - Day of year (NB! calendar year, not week # year).

Mode and number of proofs:

```
date(?integer,?integer,?integer,?integer,?integer,?compound,?integer) - zero_or_one
```

Examples:

Get the date and day-of-year of a Julian number
date(2451649,Year,Month,Day,_,_,DoY)
Year=2000,Month=4,Day=14,DoY=105

Get the Julian number, week number and day-of-year of a date, confirming that it is a Sunday
date(JD,2004,2,29,7,Week,DoY)
JD=2453065,Week=week(9,2004),DoY=60

Confirm that a date is, in fact, a specific day-of-year
date(_,2004,3,1,_,_,61)
yes

Get the Julian number, week day and day-of-year of a date
date(JD,2004,10,18,DoW,_,DoY)
JD=2453297,DoW=1,DoY=292

Get today's day-of-year
date(_,_,_,_,_,_,DoY)
DoY=54

Get all missing date data (excl. Julian number) for the 60th calendar day of 2004
date(_,2004,Month,Day,DoW,Week,60)
Month=2,Day=29,DoW=7,Week=week(9,2004)

Match given date data and, if true, return the missing data (excl. Julian number)
date(_,2004,3,Day,DoW,Week,61)
Day=1,DoW=1,Week=week(10,2004)

Ditto (the 61st day-of-year cannot be both day 1 and 2 of the month)
date(_,2004,_,2,_,_,61)
no

date_string/3

Conversion between an ISO 8601 compliant date string and its components (truncated and expanded date representations are currently unsupported). Note that date components are not validated; that is the caller's responsibility!

Compilation flags:

static

Template:

date_string(Format,Components,String)

Format - ISO 8601 format.

Components - When bound and String is free, either a [Year,Month,Day] term; it binds to the system day/date if free When free and String is bound, it binds to an integer list representing the numeric elements of String.

String - ISO 8601 formatted string correspondent to Components.

Mode and number of proofs:

date_string(+atom,+integer,?atom) - zero_or_one

`date_string(+atom,?list,?atom) - zero_or_one`

Examples:

```
Date, complete, basic (section 5.2.1.1)
date_string('YYYYMMDD',[2004,2,29],String)
String='20040229'

Date, complete, basic (section 5.2.1.1)
date_string('YYYYMMDD',Components,'20040229')
Components=[2004,2,29]

Date, complete, extended (section 5.2.1.1)
date_string('YYYY-MM-DD',[2003,12,16],String)
String='2003-12-16'

Date, complete, extended (section 5.2.1.1)
date_string('YYYY-MM-DD',Components,'2003-12-16')
Components=[2003,12,16]

Date, complete, extended (section 5.2.1.1)
date_string('YYYY-MM-DD',_,String)
String='2004-02-17'

Date, complete, extended (section 5.2.1.1)
date_string('YYYY-MM-DD',Components,'2004-02-17')
Components=[2004,2,17]

Date, reduced, month (section 5.2.1.2 a)
date_string('YYYY-MM',[2004,9,18],String)
String='2004-09'

Date, reduced, month (section 5.2.1.2 a)
date_string('YYYY-MM',Components,'2004-09')
Components=[2004,9]

Date, reduced, year (section 5.2.1.2 b)
date_string('YYYY',[1900,7,24],String)
String='1900'

Date, reduced, year (section 5.2.1.2 b)
date_string('YYYY',Components,'1900')
Components=[1900]

Date, reduced, century (section 5.2.1.2 c)
date_string('YY',2456557,String)
String='20'

Date, reduced, century (section 5.2.1.2 c)
date_string('YY',Components,'20')
Components=[20]

Date, ordinal, complete (section 5.2.2.1)
date_string('YYYYDDD',[2005,3,25],String)
String='2005084'

Date, ordinal, complete (section 5.2.2.1)
date_string('YYYYDDD',Components,'2005084')
Components=[2005,84]

Date, ordinal, extended (section 5.2.2.1)
```

```
date_string('YYYY-DDD',[1854,12,4],String)
String='1854-338'
Date, ordinal, extended (section 5.2.2.1)
date_string('YYYY-DDD',Components,'1854-338')
Components=[1854,338]
Week, complete, basic (section 5.2.3.1)
date_string('YYYYWwwD',[2000,1,2],String)
String='1999W527'
Week, complete, basic (section 5.2.3.1)
date_string('YYYYWwwD',Components,'1999W527')
Components=[1999,52,7]
Week, complete, extended (section 5.2.3.1)
date_string('YYYY-Www-D',[2003,12,29],String)
String='2004-W01-1'
Week, complete, extended (section 5.2.3.1)
date_string('YYYY-Www-D',Components,'2004-W01-1')
Components=[2004,1,1]
Week, complete, extended (section 5.2.3.1)
date_string('YYYY-Www-D',2453167,String)
String='2004-W24-4'
Week, complete, extended (section 5.2.3.1)
date_string('YYYY-Www-D',Components,'2004-W24-4')
Components=[2004,24,4]
Week, reduced, basic (section 5.2.3.2)
date_string('YYYYWww',[2004,2,29],String)
String='2004W09'
Week, reduced, basic (section 5.2.3.2)
date_string('YYYYWww',Components,'2004W09')
Components=[2004,9]
Week, reduced, extended (section 5.2.3.2)
date_string('YYYY-Www',[2004,2,29],String)
String='2004-W09'
Week, reduced, extended (section 5.2.3.2)
date_string('YYYY-Www',Components,'2004-W09')
Components=[2004,9]
```

`valid_date/3`

Validate a given date in the Gregorian calendar.

Compilation flags:

`static`

Template:

`valid_date(Year,Month,Day)`

Mode and number of proofs:

`valid_date(+integer,+integer,+integer) - zero_or_one`

Examples:

Yes, the recent millennium was a leap year

`valid_date(2000,2,29)`

`yes`

2004 was also a leap year

`valid_date(2004,2,29)`

`yes`

Only 30 days in April

`valid_date(2004,4,31)`

`no`

1 BC was a leap year

`valid_date(-1,2,29)`

`yes`

`leap_year/1`

Succeed if given year is a leap year in the Gregorian calendar.

Compilation flags:

`static`

Template:

`leap_year(Year)`

Year - The Gregorian calendar year to investigate. If free, it binds to the system year.

Mode and number of proofs:

`leap_year(?integer) - zero_or_one`

Examples:

No, the prior centenary was not a leap year

```
leap_year(1900)
```

no

The recent millennium

```
leap_year(2000)
```

yes

This year

```
leap_year(Year)
```

Year=2004

This year (equivalent to prior query)

```
leap_year(_)
```

yes

Next centennial

```
leap_year(2100)
```

no

Year 0, equivalent to 1 BC

```
leap_year(0)
```

yes

1 BC

```
leap_year(-1)
```

yes

4 BC

```
leap_year(-4)
```

no

5 BC

```
leap_year(-5)
```

yes

`calendar_month/3`

Compute a calendar month.

Compilation flags:

static

Template:

```
calendar_month(Year,Month,Calendar)
```

Year - The calendar year.

Month - The calendar month.

Calendar - A compound term, `m/3`, composed of three main arguments specifying year, month, and a list of week and week day numbers (calendar body).

Mode and number of proofs:

```
calendar_month(?integer,?integer,-compound) - zero_or_one
```


Examples:

Compute the calendar of March, 2005

```
calendar_month(2005,3,Calendar)
```

```
Calendar=m(2005,3,[w(9,[0,1,2,3,4,5,6]),w(10,[7,8,9,10,11,12,13]),w(11,[14,15,16,17,18,19,20]),  
w(12,[21,22,23,24,25,26,27]),w(13,[28,29,30,31,0,0,0]),w(0,[0,0,0,0,0,0,0])))
```

`easter_day/3`

Compute a Gregorian Easter Sunday.

Compilation flags:

static

Template:

```
easter_day(Year,Month,Day)
```

Year - Integer specifying the year to be investigated.

Month - Month in which Easter Sunday falls for given year.

Day - Day of month in which Easter Sunday falls for given year.

Mode and number of proofs:

```
easter_day(?integer,-integer,-integer) - zero_or_one
```

Examples:

Compute Easter Sunday for a particular year

```
easter_day(2006,Month,Day)
```

```
Month=4,Day=16
```

Compute Easter Sunday for the current year

```
easter_day(Year,Month,Day)
```

```
Year=2005,Month=3,Day=27
```

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.40 issue_creator

object

1.40.1 issue_creator

Support for automatically creating bug report issues for failed tests in GitHub or GitLab servers.

Availability:

```
logtalk_load(issue_creator(loader))
```

Author: Paulo Moura

Version: 0:12:1

Date: 2025-03-03

Compilation flags:

```
static, context_switching_calls
```

Provides:

```
logtalk::message_hook/4
```

Uses:

```
git  
os  
term_io  
user
```

Remarks:

- Usage: This tool is automatically loaded and used from the `logtalk_tester` automation script when using its `-b` option. See the script man page for details.

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.41 java

object

1.41.1 java

Abstract interface to JPL API utility predicates.

Availability:

`logtalk_load(java(loader))`

Author: Paulo Moura

Version: 1:8:0

Date: 2023-03-15

Compilation flags:

`static, context_switching_calls`

Implements:

public java_utils_protocol

Uses:

user

Remarks:

(none)

Inherited public predicates:

array_list/2 array_to_list/2 array_to_terms/2 array_to_terms/3 decode_exception/2
decode_exception/3 false/1 is_false/1 is_null/1 is_object/1 is_true/1 is_void/1
iterator_element/2 list_to_array/2 map_element/2 null/1 set_element/2 terms_to_array/2
true/1 value_reference/2 void/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

java(Reference,ReturnValue), java(Reference), java_hook

object

1.41.2 java(Reference)

- Reference - Either a class name or a Java reference to an object.

Minimal abstraction of the JPL API for calling Java from Logtalk using familiar message-sending syntax and a forward/1 handler to resolve methods.

Availability:

```
logtalk_load(java(loader))
```

Author: Paulo Moura and Sergio Castro

Version: 1:0:1

Date: 2019-06-13

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public java(Reference,_)
```

Remarks:

- Usage: Send to this object any valid message as listed in the JavaDocs for the given reference.

Inherited public predicates:

```
forward/1 get_field/2 invoke/1 invoke/2 new/1 new/2 set_field/2
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`java(Reference,ReturnValue)`, `java`, `java_hook`

object

1.41.3 `java(Reference,ReturnValue)`

- Reference - Either a class name or a Java reference to an object.
- ReturnValue - Value returned by a method call (possibly the Java value void).

Minimal abstraction of the JPL API for calling Java from Logtalk using familiar message-sending syntax and a forward/1 handler to resolve methods.

Availability:

`logtalk_load(java(loader))`

Author: Paulo Moura and Sergio Castro

Version: 1:4:0

Date: 2023-03-13

Compilation flags:

`static`, `context_switching_calls`

Implements:

`public forwarding`

`public java_access_protocol`

Remarks:

- Usage: Send to this object any valid message as listed in the JavaDocs for the given reference.

Inherited public predicates:

`forward/1` `get_field/2` `invoke/1` `invoke/2` `new/1` `new/2` `set_field/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`java(Reference)`, `java`, `java_hook`

protocol

1.41.4 java_access_protocol

Protocol for a minimal abstraction for calling Java from Logtalk using familiar message-sending syntax.

Availability:

logtalk_load(java(loader))

Author: Paulo Moura and Sergio Castro

Version: 1:2:1

Date: 2023-03-16

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - get_field/2
 - set_field/2
 - new/2
 - new/1
 - invoke/1
 - invoke/2
- Protected predicates
- Private predicates
- Operators

Public predicates

`get_field/2`

Gets the value of a class or object field.

Compilation flags:

`static`

Template:

`get_field(Field,Value)`

Mode and number of proofs:

`get_field(+atom,?nonvar) - zero_or_one`

`set_field/2`

Sets the value of a class or object field.

Compilation flags:

`static`

Template:

`set_field(Field,Value)`

Mode and number of proofs:

`set_field(+atom,+nonvar) - one`

`new/2`

Creates a new instance using the specified parameter values.

Compilation flags:

`static`

Template:

`new(Parameters,Instance)`

Mode and number of proofs:

`new(+list(nonvar),-reference) - one`

`new/1`

Creates a new instance using default parameter values.

Compilation flags:
static

Template:
new(Instance)
Mode and number of proofs:
new(-reference) - one

`invoke/1`

Invokes a method. This is a more efficient compared with relying on the forward/1 handler to resolve methods.

Compilation flags:
static

Template:
invoke(Method)
Mode and number of proofs:
invoke(@nonvar) - one

`invoke/2`

Invokes a method. This is a more efficient compared with relying on the forward/1 handler to resolve methods.

Compilation flags:
static

Template:

```
    invoke(Functor,Arguments)
Mode and number of proofs:
    invoke(@nonvar,@list) - one
```

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

object

1.41.5 java_hook

Hook object to optimize messages to the java/1-2 objects that otherwise would trigger the forward/1 handler.

Availability:

```
    logtalk_load(java(loader))
```

Author: Paulo Moura

Version: 1:0:1

Date: 2019-06-13

Compilation flags:

```
    static, context_switching_calls
```

Implements:

```
    public expanding
```

Remarks:

- Usage: Compile source files with messages to the java/1-2 objects using the compiler option `hook(java_hook)`.

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

`java(Reference,ReturnValue)`, `java(Reference)`

protocol

1.41.6 `java_utils_protocol`

Abstract interface to Java utility predicates.

Availability:

`logtalk_load(java(loader))`

Author: Paulo Moura

Version: 1:6:0

Date: 2023-03-13

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - value_reference/2
 - true/1
 - false/1
 - void/1
 - null/1
 - is_true/1
 - is_false/1
 - is_void/1
 - is_null/1
 - is_object/1
 - terms_to_array/2
 - array_to_terms/3
 - array_to_terms/2
 - array_to_list/2
 - list_to_array/2
 - array_list/2
 - iterator_element/2
 - map_element/2
 - set_element/2
 - decode_exception/2
 - decode_exception/3
- Protected predicates

- Private predicates
- Operators

Public predicates

`value_reference/2`

Returns an opaque term that represents the Java value with the given name.

Compilation flags:

`static`

Template:

`value_reference(Value,Reference)`

Mode and number of proofs:

`value_reference(?atom,--ground) - one_or_more`

`true/1`

Returns an opaque term that represents the Java value true.

Compilation flags:

`static`

Template:

`true(Reference)`

Mode and number of proofs:

`true(--ground) - one`

false/1

Returns an opaque term that represents the Java value false.

Compilation flags:

static

Template:

false(Reference)

Mode and number of proofs:

false(--ground) - one

void/1

Returns an opaque term that represents the Java value void.

Compilation flags:

static

Template:

void(Reference)

Mode and number of proofs:

void(--ground) - one

null/1

Returns an opaque term that represents the Java value null.

Compilation flags:

static

Template:

null(Reference)

Mode and number of proofs:

null(--ground) - one

`is_true/1`

True when the argument is the Java value true. Fails if the argument is not instantiated.

Compilation flags:

`static`

Template:

`is_true(Reference)`

Mode and number of proofs:

`is_true(@term) - zero_or_one`

`is_false/1`

True when the argument is the Java value false. Fails if the argument is not instantiated.

Compilation flags:

`static`

Template:

`is_false(Reference)`

Mode and number of proofs:

`is_false(@term) - zero_or_one`

`is_void/1`

True when the argument is the Java value void. Fails if the argument is not instantiated.

Compilation flags:

`static`

Template:

`is_void(Reference)`

Mode and number of proofs:

`is_void(@term) - zero_or_one`

`is_null/1`

True when the argument is the Java value null. Fails if the argument is not instantiated.

Compilation flags:

`static`

Template:

`is_null(Reference)`

Mode and number of proofs:

`is_null(@term) - zero_or_one`

`is_object/1`

True when the argument is a reference to a Java object. Fails if the argument is not instantiated.

Compilation flags:

`static`

Template:

`is_object(Reference)`

Mode and number of proofs:

`is_object(@term) - zero_or_one`

`terms_to_array/2`

Converts a list of ground Prolog terms to an array (a Java reference).

Compilation flags:

`static`

Template:

`terms_to_array(Terms,Array)`

Mode and number of proofs:

`terms_to_array(++list(ground),-array) - one`

`array__to__terms/3`

Converts an array (a Java reference) to a list of ground Prolog terms returning also its length. The array elements must be atoms, integers, floats, or compound terms. Fails otherwise.

Compilation flags:

`static`

Template:

`array__to__terms(Array, Terms, Length)`

Mode and number of proofs:

`array__to__terms(+array, -list(ground), -integer) - one`

`array__to__terms/2`

Converts an array (a Java reference) to a list of ground Prolog terms. The array elements must be atoms, integers, floats, or ground compound terms. Fails otherwise.

Compilation flags:

`static`

Template:

`array__to__terms(Array, Terms)`

Mode and number of proofs:

`array__to__terms(+array, -list(term)) - one`

`array__to__list/2`

Converts an array (a Java reference) to a list of Java references or their values.

Compilation flags:

`static`

Template:

`array__to__list(Array, List)`

Mode and number of proofs:

`array__to__list(+array, -list) - one`

`list_to_array/2`

Converts a list of Java references or values to an array (a Java reference).

Compilation flags:

`static`

Template:

`list_to_array(List,Array)`

Mode and number of proofs:

`list_to_array(+list,-array) - one`

`array_list/2`

Converts between an array (a Java reference) and a list of Java references or their values. Deprecated. Use the `array_to_list/2` and `list_to_array/2` predicates instead.

Compilation flags:

`static`

Template:

`array_list(Array,List)`

Mode and number of proofs:

`array_list(+array,-list) - one`

`array_list(-array,+list) - one`

`iterator_element/2`

Enumerates, by backtracking, all iterator elements.

Compilation flags:

`static`

Template:

`iterator_element(Iterator,Element)`

Mode and number of proofs:

`iterator_element(+iterator,-element) - zero_or_more`

`map_element/2`

Enumerates, by backtracking, all map elements.

Compilation flags:

`static`

Template:

`map_element(Map,Element)`

Mode and number of proofs:

`map_element(+iterator,-element) - zero_or_more`

`set_element/2`

Enumerates, by backtracking, all set elements.

Compilation flags:

`static`

Template:

`set_element(Set,Element)`

Mode and number of proofs:

`set_element(+iterator,-element) - zero_or_more`

`decode_exception/2`

Decodes an exception into its corresponding cause. Fails if the exception is not a Java exception.

Compilation flags:

`static`

Template:

`decode_exception(Exception,Cause)`

Mode and number of proofs:

`decode_exception(+callable,-atom) - zero_or_one`

`decode_exception/3`

Decodes an exception into its corresponding cause and a stack trace. Fails if the exception is not a Java exception.

Compilation flags:

`static`

Template:

`decode_exception(Exception,Cause,StackTrace)`

Mode and number of proofs:

`decode_exception(+callable,-atom,-list(atom)) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.42 json

object

1.42.1 json

JSON parser and generator. Uses curly terms for parsed JSON objects, dashes for parsed JSON pairs, and atoms for parsed JSON strings.

Availability:

`logtalk_load(json(loader))`

Author: Paulo Moura and Jacinto Dávila

Version: 1:1:0

Date: 2022-11-14

Compilation flags:

`static, context_switching_calls`

Extends:

`public json(curly,dash,atom)`

Remarks:

(none)

Inherited public predicates:

`generate/2 parse/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.42.2 json(StringRepresentation)

- StringRepresentation - Text representation to be used when decoding JSON strings. Possible values are atom (default), chars, and codes.

JSON parser and generator. Uses curly terms for parsed JSON objects and dashes for parsed JSON pairs.

Availability:

```
logtalk__load(json(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2022-11-14

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public json(curly,dash,StringRepresentation)
```

Remarks:

(none)

Inherited public predicates:

```
generate/2 parse/2
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.42.3 json(ObjectRepresentation,PairRepresentation,StringRepresentation)

- ObjectRepresentation - Object representation to be used when decoding JSON objects. Possible values are curly (default) and list.
- PairRepresentation - Pair representation to be used when decoding JSON objects. Possible values are dash (default), equal, and colon.
- StringRepresentation - Text representation to be used when decoding JSON strings. Possible values are atom (default), chars, and codes.

JSON parser and generator.

Availability:

```
logtalk_load(json(loader))
```

Author: Paulo Moura and Jacinto Dávila

Version: 0:13:0

Date: 2024-07-16

Compilation flags:

static, context_switching_calls

Implements:

public json_protocol

Uses:

reader

Remarks:

(none)

Inherited public predicates:

generate/2 parse/2

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.42.4 json_protocol

JSON parser and generator protocol.

Availability:

logtalk_load(json(loader))

Author: Paulo Moura and Jacinto Dávila

Version: 0:11:0

Date: 2022-11-09

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - parse/2
 - generate/2
- Protected predicates
- Private predicates
- Operators

Public predicates

parse/2

Parses the JSON contents read from the given source (codes(List), stream(Stream), line(Stream), file(Path), chars(List), or atom(Atom)) into a term. Fails if the JSON contents cannot be parsed.

Compilation flags:

static

Template:

parse(Source,Term)

Mode and number of proofs:

parse(++compound,--term) - one_or_error

generate/2

Generates the content using the representation specified in the first argument (codes(List), stream(Stream), file(Path), chars(List), or atom(Atom)) for the term in the second argument. Fails if this term cannot be processed.

Compilation flags:

static

Template:

generate(Sink,Term)

Mode and number of proofs:

generate(+compound,++term) - one_or_error

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.43 json_lines

object

1.43.1 json_lines

JSON Lines parser and generator. Uses curly terms for parsed JSON objects, dashes for parsed JSON pairs, and atoms for parsed JSON strings.

Availability:

```
logtalk_load(json_lines(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2025-05-27

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public json_lines(curly,dash,atom)
```

Remarks:

```
(none)
```

Inherited public predicates:

```
generate/2 parse/2
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.43.2 json_lines(StringRepresentation)

- StringRepresentation - Text representation to be used when decoding JSON strings. Possible values are atom (default), chars, and codes.

JSON Lines parser and generator. Uses curly terms for parsed JSON objects and dashes for parsed JSON pairs.

Availability:

`logtalk_load(json_lines(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2025-05-27

Compilation flags:

`static, context_switching_calls`

Extends:

`public json_lines(curly,dash,StringRepresentation)`

Remarks:

(none)

Inherited public predicates:

`generate/2 parse/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.43.3 `json_lines(ObjectRepresentation,PairRepresentation,StringRepresentation)`

- `ObjectRepresentation` - Object representation to be used when decoding JSON objects. Possible values are curly (default) and list.
- `PairRepresentation` - Pair representation to be used when decoding JSON objects. Possible values are dash (default), equal, and colon.
- `StringRepresentation` - Text representation to be used when decoding JSON strings. Possible values are atom (default), chars, and codes.

JSON Lines parser and generator.

Availability:

```
logtalk_load(json_lines(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2025-05-27

Compilation flags:

```
static, context_switching_calls
```

Implements:

`public json_lines_protocol`

Remarks:

(none)

Inherited public predicates:

`generate/2` `parse/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

`protocol`

1.43.4 json_lines_protocol

JSON Lines parser and generator protocol.

Availability:

`logtalk_load(json_lines(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2025-05-27

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - parse/2
 - generate/2
- Protected predicates
- Private predicates
- Operators

Public predicates

parse/2

Parses the JSON Lines contents read from the given source (`file(Path)`, `stream(Stream)`, `line(Stream)`, `codes(Codes)`, `chars(Chars)`, or `atom(Atom)`) into a list of ground terms.

Compilation flags:

static

Template:

parse(Source, Terms)

Mode and number of proofs:

parse(++compound, --list(ground)) - one_or_error

Exceptions:

Source is a variable:


```
instantiation_error
Source is neither a variable nor a valid source:
domain_error(json_lines_source,Source)
```

`generate/2`

Generates the content using the representation specified in the first argument (`file(Path)`, `stream(Stream)`, `codes(Codes)`, `chars(Chars)`, or `atom(Atom)`) for the list of ground terms in the second argument.

Compilation flags:
`static`

Template:

```
generate(Sink,Terms)
```

Mode and number of proofs:

```
generate(+compound,++list(ground)) - one_or_error
```

Exceptions:

Sink is a variable:

```
instantiation_error
```

Terms is a variable:

```
instantiation_error
```

Terms is neither a variable nor a list:

```
type_error(list,Terms)
```

Term is a non-ground element of the list Terms:

```
instantiation_error
```

Term is an element of the list Terms but not a valid JSON term:

```
domain_error(json_term,Term)
```

Sink cannot be generated:

```
domain_error(json_lines_sink,Sink)
```

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.44 lgtdoc

object

1.44.1 lgtdoc

Documenting tool. Generates XML documenting files for loaded entities and for library, directory, entity, and predicate indexes.

Availability:

`logtalk__load(lgtdoc(loader))`

Author: Paulo Moura

Version: 11:2:1

Date: 2025-10-07

Compilation flags:

`static, context_switching_calls`

Implements:

`public lgtdocp`

Imports:

`public options`

Uses:

`date`

`list`

`logtalk`

`os`

`type`

`user`

`varlist`

Remarks:

(none)

Inherited public predicates:

all/0 all/1 check_option/1 check_options/1 default_option/1 default_options/1 directories/1
directories/2 directory/1 directory/2 file/1 file/2 files/1 files/2 fix_option/2 fix_options/2
libraries/1 libraries/2 library/1 library/2 merge_options/2 option/2 option/3 rdirectories/1
rdirectories/2 rdirectory/1 rdirectory/2 rlibraries/1 rlibraries/2 rlibrary/1 rlibrary/2
valid_option/1 valid_options/1

- Public predicates
- Protected predicates
- Private predicates
 - library_entity_/4
 - directory_entity_/4
 - type_entity_/4
 - predicate_entity_/4
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

library_entity_/4

Table of documented entities per library.

Compilation flags:

dynamic

Template:

library_entity_(Library,PrimarySortKey,SecondarySortKey,Entity)

Mode and number of proofs:

library_entity_(?atom,?nonvar,?nonvar,?atom) - zero_or_more

`directory__entity__/4`

Table of documented entities per directory.

Compilation flags:

dynamic

Template:

`directory__entity__(Directory,PrimarySortKey,SecondarySortKey,Entity)`

Mode and number of proofs:

`directory__entity__(?atom,?nonvar,?nonvar,?atom) - zero_or_more`

`type__entity__/4`

Table of documented entities per type.

Compilation flags:

dynamic

Template:

`type__entity__(Type,PrimarySortKey,SecondarySortKey,Entity)`

Mode and number of proofs:

`type__entity__(?atom,?nonvar,?nonvar,?atom) - zero_or_more`

`predicate__entity__/4`

Table of public predicates for all documented entities.

Compilation flags:

dynamic

Template:

`predicate__entity__(Predicate,PrimarySortKey,SecondarySortKey,Entity)`

Mode and number of proofs:

`predicate_entity_(?predicate_indicator,?nonvar,?nonvar,?entity_identifier) - zero_or_more`

Operators

(none)

category

1.44.2 lgtdoc_messages

Logtalk documentation tool default message translations.

Availability:

`logtalk_load(lgtdoc(loader))`

Author: Paulo Moura

Version: 4:0:1

Date: 2024-12-02

Compilation flags:

`static`

Provides:

`logtalk::message_prefix_stream/4`

`logtalk::message_tokens//2`

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.44.3 lgtdocp

Documenting tool protocol.

Availability:

logtalk__load(lgtdoc(loader))

Author: Paulo Moura

Version: 6:0:0

Date: 2024-03-08

Compilation flags:

static

Dependencies:

(none)

Remarks:

- Compiling files for generating XML documentation: All source files must be compiled with the `source_data` flag turned on.
- `xml_spec(Specification)` option: XML documenting files specification format. Possible option values are `dtd` (DTD specification; default) and `xsd` (XML Schema specification).
- `xml_spec_reference(Reference)` option: Reference to the XML specification file in XML documenting files. Possible values are `local` (default; DTD/XSD file in same folder as XML files), `web` (logtalk.org website DTD/XSD file), and `standalone` (no reference to specification files).

- `entity_xsl_file(File)` option: XSLT file to use with generated XML documenting files. Default is `logtalk_entity_to_xml.xsl`, allowing the XML files to be viewed by opening them with a browser supporting XSLT (after running the `lgt2xml.sh` script on the output directory).
- `index_xsl_file(File)` option: XSLT file to use with generated XML documenting files. Default is `logtalk_index_to_xml.xsl`, allowing the XML files to be viewed by opening them with a browser supporting XSLT (after running the `lgt2xml.sh` script on the output directory).
- `xml_docs_directory(Directory)` option: Directory where the XML documenting files will be generated. The default value is `./xml_docs`, a sub-directory of the source files directory.
- `bom(Boolean)` option: Defines if a BOM should be added to the generated XML documenting files.
- `encoding(Encoding)` option: Encoding to be used for the generated XML documenting files.
- `omit_path_prefixes(Prefixes)` option: List of path prefixes (atoms) to omit when writing directory paths. The default value is to omit the home directory.
- `exclude_files(List)` option: List of files to exclude when generating the XML documenting files.
- `exclude_paths(List)` option: List of relative library paths to exclude when generating the XML documenting files (default is []). All sub-directories of the excluded directories are also excluded.
- `exclude_prefixes(List)` option: List of path prefixes to exclude when generating the XML documenting files (default is []).
- `exclude_entities(List)` option: List of entities to exclude when generating the XML documenting files (default is []).
- `sort_predicates(Boolean)` option: Sort entity predicates (default is false).
- Known issues: Some options may depend on the used XSL processor. Most XSL processors support DTDs but only some of them support XML Schemas. Some processors (e.g., `fop2`) reject reference to a DTD.

Inherited public predicates:

(none)

- Public predicates
 - `rlibraries/2`
 - `rlibraries/1`
 - `rlibrary/2`
 - `rlibrary/1`
 - `libraries/2`
 - `libraries/1`
 - `library/2`
 - `library/1`
 - `rdirectories/2`
 - `rdirectories/1`

- rdirectory/2
- rdirectory/1
- directories/2
- directories/1
- directory/2
- directory/1
- files/2
- files/1
- file/2
- file/1
- all/1
- all/0
- Protected predicates
- Private predicates
- Operators

Public predicates

rlibraries/2

Creates XML documenting files for all entities in all given libraries and their sub-libraries using the specified options.

Compilation flags:

static

Template:

rlibraries(Libraries,Options)

Mode and number of proofs:

rlibraries(+list(atom),+list) - one

`rlibraries/1`

Creates XML documenting files for all entities in all given libraries and their sub-libraries using default options.

Compilation flags:

`static`

Template:

`rlibraries(Libraries)`

Mode and number of proofs:

`rlibraries(+list(atom)) - one`

`rlibrary/2`

Creates XML documenting files for all entities in a library and its sub-libraries using the specified options.

Compilation flags:

`static`

Template:

`rlibrary(Library,Options)`

Mode and number of proofs:

`rlibrary(+atom,+list) - one`

Examples:

Generate XML documenting files for all tool entities for later conversion to Markdown files

`rlibrary(tools,[xslfile('lgtmd.xml')])`

`yes`

`rlibrary/1`

Creates XML documenting files for all entities in a library and its sub-libraries using default options.

Compilation flags:

`static`

Template:

`rlibrary(Library)`

Mode and number of proofs:

`rlibrary(+atom) - one`

Examples:

Generate XML documenting files for all tool entities for direct viewing in a browser (after indexing using the `lgt2xml` script)

`rlibrary(tools)`

`yes`

`libraries/2`

Creates XML documenting files for all entities in all given libraries using the specified options.

Compilation flags:

`static`

Template:

`libraries(Libraries,Options)`

Mode and number of proofs:

`libraries(+list(atom),+list) - one`

libraries/1

Creates XML documenting files for all entities in all given libraries using default options.

Compilation flags:

static

Template:

libraries(Libraries)

Mode and number of proofs:

libraries(+list(atom)) - one

library/2

Creates XML documenting files for all entities in a library using the specified options.

Compilation flags:

static

Template:

library(Library,Options)

Mode and number of proofs:

library(+atom,+list) - one

Examples:

Generate XML documenting files for all library entities for later conversion to PDF A4 files

library(library,[xslfile('logtalk_entity_to_pdf_a4.xml')])

yes

library/1

Creates XML documenting files for all entities in a library using default options.

Compilation flags:

static

Template:

library(Library)

Mode and number of proofs:

library(+atom) - one

rdirectories/2

Creates XML documenting files for all entities in all given directories and their sub-directories using the specified options.

Compilation flags:

static

Template:

rdirectories(Directories,Options)

Mode and number of proofs:

rdirectories(+list(atom),+list) - one

rdirectories/1

Creates XML documenting files for all entities in all given directories and their sub-directories using default options.

Compilation flags:

static

Template:

rdirectories(Directories)

Mode and number of proofs:

rdirectories(+list(atom)) - one

rdirectory/2

Creates XML documenting files for all entities in a directory and its sub-directories using the specified options.

Compilation flags:

static

Template:

rdirectory(Directory,Options)

Mode and number of proofs:

rdirectory(+atom,+list) - one

Examples:

Generate XML documenting files for all entities in the tools directory for later conversion to Markdown files

```
rdirectory('./tools',[xslfile('lgtmd.xml')])
```

yes

rdirectory/1

Creates XML documenting files for all entities in a directory and its sub-directories using default options.

Compilation flags:

static

Template:

rdirectory(Directory)

Mode and number of proofs:

rdirectory(+atom) - one

Examples:

Generate XML documenting files for all entities in the tools directory for direct viewing in a browser (after indexing using the lgt2xml script)

```
rdirectory('./tools')
```

yes

directories/2

Creates XML documenting files for all entities in all given directories using the specified options.

Compilation flags:

static

Template:

directories(Directories,Options)

Mode and number of proofs:

directories(+list(atom),+list) - one

directories/1

Creates XML documenting files for all entities in all given directories using default options.

Compilation flags:

static

Template:

directories(Directories)

Mode and number of proofs:

directories(+list(atom)) - one

directory/2

Creates XML documenting files for all entities in a directory using the specified options.

Compilation flags:

static

Template:

directory(Directory,Options)

Mode and number of proofs:

directory(+atom,+list) - one

Examples:

Generate XML documenting files for all the entities in the current directory for later conversion to PDF A4 files

```
directory('.',[xslfile('logtalk_entity_to_pdf_a4.xsl')])
yes
```

[directory/1](#)

Creates XML documenting files for all entities in a directory using default options.

Compilation flags:

static

Template:

directory(Directory)

Mode and number of proofs:

directory(+atom) - one

[files/2](#)

Creates XML documenting files for all entities in loaded source files using the specified options. The files can be given by name, basename, full path, or using library notation.

Compilation flags:

static

Template:

files(Files,Options)

Mode and number of proofs:

files(+list(atom),+list) - one

files/1

Creates XML documenting files for all entities in loaded source files using default options. The files can be given by name, basename, full path, or using library notation.

Compilation flags:

static

Template:

files(Files)

Mode and number of proofs:

files(+list(atom)) - one

file/2

Creates XML documenting files for all entities in a loaded source file using the specified options. The file can be given by name, basename, full path, or using library notation.

Compilation flags:

static

Template:

file(File,Options)

Mode and number of proofs:

file(+atom,+list) - one

file/1

Creates XML documenting files for all entities in a loaded source file using default options. The file can be given by name, basename, full path, or using library notation.

Compilation flags:

static

Template:

file(File)

Mode and number of proofs:

file(+atom) - one

all/1

Creates XML documenting files for all loaded entities using the specified options.

Compilation flags:

static

Template:

all(Options)

Mode and number of proofs:

all(+list) - one

all/0

Creates XML documenting files for all loaded entities using default options.

Compilation flags:

static

Mode and number of proofs:

all - one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

lgtdoc

1.45 lgtunit

object

1.45.1 automation_report

Intercepts unit test execution messages and generates a *.totals files for parsing by the logtalk_tester.sh automation shell script.

Availability:

logtalk_load(lgtunit(loader))

Author: Paulo Moura

Version: 6:0:0

Date: 2025-04-07

Compilation flags:

static, context_switching_calls

Provides:

logtalk::message_hook/4

Uses:

user

Remarks:

- Usage: Automatically loaded by the logtalk_tester.sh shell script.

Inherited public predicates:

(none)

- [Public predicates](#)
- [Protected predicates](#)
- [Private predicates](#)
- [Operators](#)

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.45.2 `coverage_report`

Intercepts unit test execution messages and generates a `coverage_report.xml` file with a test suite code coverage results.

Availability:

```
logtalk_load(lgtunit(loader))
```

Author: Paulo Moura

Version: 3:2:0

Date: 2023-04-11

Compilation flags:

```
static, context_switching_calls
```

Provides:

```
logtalk::message_hook/4
```

Uses:

logtalk
user

Remarks:

- Usage: Simply load this object before running your tests using the goal `logtalk_load(lgtunit(coverage_report))`.

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
 - `timestamp_/6`
 - `object_file_/2`
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`timestamp_/6`

Cache of the starting tests timestamp.

Compilation flags:

`dynamic`

Template:

`timestamp_(Year,Month,Day,Hours,Minutes,Seconds)`

Mode and number of proofs:

`timestamp_(-integer,-integer,-integer,-integer,-integer,-integer) - one`

`object_file_/2`

Cache of test object - file pairs.

Compilation flags:
 dynamic

Template:
 object_file__(Object,File)
Mode and number of proofs:
 object_file__(?object_identifier,?atom) - zero_or_more

Operators

(none)
object

1.45.3 lgtunit

A unit test framework supporting predicate clause coverage, determinism testing, input/output testing, property-based testing, and multiple test dialects.

Availability:
 logtalk_load(lgtunit(loader))

Author: Paulo Moura
Version: 22:3:1
Date: 2025-12-03

Compilation flags:
 static, context_switching_calls

Implements:
 public expanding
Imports:
 public lgtunit_messages
Provides:

logtalk::trace_event/2

Uses:

fast_random
list
logtalk
os
type
user

Remarks:

- Usage: Define test objects as extensions of the lgtunit object and compile their source files using the compiler option hook(lgtunit).
- Portability: Deterministic unit tests are currently not available when using Quintus Prolog as the backend compiler.
- Known issues: Parameter variables cannot currently be used in the definition of test options.

Inherited public predicates:

failed_test_reason//1 goal_expansion/2 term_expansion/2

- Public predicates
 - cover/1
 - run/0
 - run/1
 - run/2
 - run_test_sets/1
 - test/1
 - number_of_tests/1
 - deterministic/1
 - deterministic/2
 - assertion/1
 - assertion/2
 - quick_check/3
 - quick_check/2
 - quick_check/1
 - benchmark/2
 - benchmark_reified/3

- benchmark/3
- benchmark/4
- variant/2
- approximately_equal/2
- approximately_equal/3
- essentially_equal/3
- tolerance_equal/4
- ==~ = / 2
- epsilon/1
- Protected predicates
 - run_tests/0
 - run_tests/1
 - run_test_set/0
 - run_quick_check_tests/5
 - condition/0
 - setup/0
 - cleanup/0
 - make/1
 - note/1
 - file_path/2
 - suppress_text_output/0
 - suppress_binary_output/0
 - set_text_input/3
 - set_text_input/2
 - set_text_input/1
 - check_text_input/2
 - check_text_input/1
 - text_input_assertion/3
 - text_input_assertion/2
 - clean_text_input/0
 - set_binary_input/3
 - set_binary_input/2
 - set_binary_input/1
 - check_binary_input/2
 - check_binary_input/1

- binary_input_assertion/3
- binary_input_assertion/2
- clean_binary_input/0
- set_text_output/3
- set_text_output/2
- set_text_output/1
- check_text_output/3
- check_text_output/2
- check_text_output/1
- text_output_assertion/4
- text_output_assertion/3
- text_output_assertion/2
- text_output_contents/3
- text_output_contents/2
- text_output_contents/1
- clean_text_output/0
- set_binary_output/3
- set_binary_output/2
- set_binary_output/1
- check_binary_output/2
- check_binary_output/1
- binary_output_assertion/3
- binary_output_assertion/2
- binary_output_contents/2
- binary_output_contents/1
- clean_binary_output/0
- create_text_file/3
- create_text_file/2
- create_binary_file/2
- check_text_file/3
- check_text_file/2
- text_file_assertion/4
- text_file_assertion/3
- check_binary_file/2
- binary_file_assertion/3

- clean_file/1
- clean_directory/1
- closed_input_stream/2
- closed_output_stream/2
- stream_position/1
- test/2
- Private predicates
 - running_test_sets_/0
 - test/3
 - auxiliary_predicate_counter_/1
 - test_/2
 - selected_test_/1
 - skipped_/1
 - passed_/3
 - failed_/3
 - flaky_/1
 - fired_/3
 - covered_/4
- Operators
 - op(700,xfx,==~)

Public predicates

cover/1

Declares entities being tested for which code coverage information should be collected.

Compilation flags:

static

Template:

cover(Entity)

Mode and number of proofs:

cover(?entity__identifier) - zero_or_more

run/0

Runs the unit tests, writing the results to the current output stream.

Compilation flags:

static

Mode and number of proofs:

run - one

run/1

Runs a unit test or a list of unit tests, writing the results to the current output stream. Runs the global setup and cleanup steps when defined. Fails when given a partial list of tests or when one of the test identifiers is not valid.

Compilation flags:

static

Template:

run(Tests)

Mode and number of proofs:

run(++callable) - zero_or_one

run(++list(callable)) - zero_or_one

run/2

Runs the unit tests, writing the results to the specified file. Mode can be either write (to create a new file) or append (to add results to an existing file).

Compilation flags:

static

Template:

run(File,Mode)

Mode and number of proofs:

run(+atom,+atom) - one

`run_test_sets/1`

Runs two or more test sets as a unified set generating a single code coverage report if one is requested. When there is a single test set, it is equivalent to sending the message `run/0` to the test set. Trivially succeeds when the argument is an empty list.

Compilation flags:

`static`

Template:

`run_test_sets(TestObjects)`

Mode and number of proofs:

`run_test_sets(+list(object)) - one`

Exceptions:

TestObjects is a partial list or a list with an element which is a variable:

`instantiation_error`

TestObjects is neither a partial list nor a list:

`type_error(list(object),TestObjects)`

An element TestObject of the TestObjects list is not an existing object:

`existence_error(object,TestObject)`

`test/1`

Enumerates, by backtracking, the identifiers of all defined unit tests.

Compilation flags:

`static`

Template:

`test(Identifier)`

Mode and number of proofs:

`test(?callable) - zero_or_more`

`number_of_tests/1`

Number of defined unit tests.

Compilation flags:

`static`

Template:

`number_of_tests(NumerOfTests)`

Mode and number of proofs:

`number_of_tests(?integer) - zero_or_one`

`deterministic/1`

True if the goal succeeds once without leaving choice-points.

Compilation flags:

`static`

Template:

`deterministic(Goal)`

Meta-predicate template:

`deterministic(0)`

Mode and number of proofs:

`deterministic(+callable) - zero_or_one`

`deterministic/2`

Reified version of the `deterministic/1` predicate. True if the goal succeeds. Returns a boolean value (true or false) indicating if the goal succeeded without leaving choice-points.

Compilation flags:

`static`

Template:

`deterministic(Goal,Deterministic)`

Meta-predicate template:

deterministic(0,*)

Mode and number of proofs:

deterministic(+callable,--atom) - zero_or_one

assertion/1

True if the assertion goal succeeds. Throws an error using the assertion goal as argument if the assertion goal throws an error or fails.

Compilation flags:

static

Template:

assertion(Assertion)

Meta-predicate template:

assertion(::)

Mode and number of proofs:

assertion(@callable) - one

Exceptions:

Assertion goal fails:

assertion_failure(Assertion)

Assertion goal throws Error:

assertion_error(Assertion,Error)

assertion/2

True if the assertion goal succeeds. Throws an error using the description as argument if the assertion goal throws an error or fails. The description argument helps to distinguish between different assertions in the same test body.

Compilation flags:

static

Template:

assertion(Description,Assertion)

Meta-predicate template:

assertion(*,0)

Mode and number of proofs:

`assertion(+nonvar,@callable) - one`

Exceptions:

Assertion goal fails:

`assertion_failure(Description)`

Assertion goal throws Error:

`assertion_error(Description,Error)`

`quick_check/3`

Reified version of the `quick_check/2` predicate. Reports `passed(SequenceSeed,Discarded,Labels)`, `failed(Goal,SequenceSeed,TestSeed)`, `error(Error,Goal,SequenceSeed,TestSeed)`, or `broken(Why,Culprit)`. Goal is the failed test.

Compilation flags:

`static`

Template:

`quick_check(Template,Result,Options)`

Meta-predicate template:

`quick_check(:,*,::)`

Mode and number of proofs:

`quick_check(@callable,-callable,++list(compound)) - one`

Remarks:

- `SequenceSeed` argument: Can be used to re-run the same exact sequence of pseudo-random tests by using the `rs/1` option after changes to the code being tested.
 - `TestSeed` argument: Can be used to re-run the test that failed by using the `rs/1` option after changes to the code being tested.
 - `Discarded` argument: Number of generated tests that were discarded for failing to comply a pre-condition specified using the `pc/1` option.
 - `Labels` argument: List of pairs `Label-N` where `N` is the number of generated tests that are classified as `Label` by a closure specified using the `l/1` option.
 - `broken(Why,Culprit)` result: This result signals a broken setup. For example, an invalid template, a broken pre-condition or label goal, or broken test generation.
-

`quick_check/2`

Generates and runs random tests for a predicate given its mode template and a set of options. Fails when a generated test fails printing the test. Also fails on an invalid option, printing the option.

Compilation flags:

`static`

Template:

`quick_check(Template,Options)`

Meta-predicate template:

`quick_check(:,::,::)`

Mode and number of proofs:

`quick_check(@callable,++list(compound)) - zero_or_one`

Remarks:

- Number of tests: Use the `n(NumberOfTests)` option to specify the number of random tests. Default is 100.
 - Maximum number of shrink operations: Use the `s(MaxShrinks)` option to specify the number of shrink operations when a counter example is found. Default is 64.
 - Type edge cases: Use the `ec(Boolean)` option to specify if type edge cases are tested (before generating random tests). Default is true.
 - Starting seed: Use the `rs(Seed)` option to specify the random generator starting seed to be used when generating tests. No default. Seeds should be regarded as opaque terms.
 - Test generation filtering: Use the `pc/1` option to specify a pre-condition closure for filtering generated tests (extended with the test arguments; no default).
 - Generated tests classification: Use the `l/1` option to specify a label closure for classifying the generated tests (extended with the test arguments plus the labels argument; no default). The labelling predicate can return a single test label or a list of test labels.
 - Verbose test generation: Use the `v(Boolean)` option to specify verbose reporting of generated random tests. Default is false.
 - Progress bar: Use the `pb(Boolean,Tick)` option to print a progress bar for the executed tests, advancing at every Tick tests. Default is false. Only applies when the verbose option is false.
-

`quick_check/1`

Generates and runs random tests using default options for a predicate given its mode template. Fails when a generated test fails printing the test.

Compilation flags:

`static`

Template:

`quick_check(Template)`

Mode and number of proofs:

`quick_check(@callable) - zero_or_one`

`benchmark/2`

Benchmarks a goal and returns the total execution time in seconds. Uses CPU clock. Goals that may throw an exception should be wrapped by the `catch/3` control construct.

Compilation flags:

`static`

Template:

`benchmark(Goal,Time)`

Meta-predicate template:

`benchmark(0,*)`

Mode and number of proofs:

`benchmark(+callable,-float) - one`

`benchmark_reified/3`

Benchmarks a goal and returns the total execution time in seconds plus its result (success, failure, or `error(Error)`). Uses CPU clock.

Compilation flags:

`static`

Template:


```
benchmark_reified(Goal,Time,Result)
```

Meta-predicate template:

```
benchmark_reified(0,*,*)
```

Mode and number of proofs:

```
benchmark_reified(+callable,-float,-callable) - one
```

[benchmark/3](#)

Benchmarks a goal by repeating it the specified number of times and returning the total execution time in seconds. Uses CPU clock. Goals that may throw an exception should be wrapped by the catch/3 control construct.

Compilation flags:

```
static
```

Template:

```
benchmark(Goal,Repetitions,Time)
```

Meta-predicate template:

```
benchmark(0,*,*)
```

Mode and number of proofs:

```
benchmark(@callable,+positive_integer,-float) - one
```

[benchmark/4](#)

Benchmarks a goal by repeating it the specified number of times and returning the total execution time in seconds using the given clock (cpu or wall). Goals that may throw an exception should be wrapped by the catch/3 control construct.

Compilation flags:

```
static
```

Template:

```
benchmark(Goal,Repetitions,Clock,Time)
```

Meta-predicate template:

```
benchmark(0,*,*,*)
```

Mode and number of proofs:

```
benchmark(@callable,+positive_integer,+atom,-float) - one
```

variant/2

True when the two arguments are a variant of each other. I.e. if is possible to rename the term variables to make them identical. Useful for checking expected test results that contain variables.

Compilation flags:

static

Template:

variant(Term1,Term2)

Mode and number of proofs:

variant(@term,@term) - zero_or_one

approximately_equal/2

Compares two numbers for approximate equality given the epsilon arithmetic constant value using the de facto standard formula $\text{abs}(\text{Number1} - \text{Number2}) \leq \max(\text{abs}(\text{Number1}), \text{abs}(\text{Number2})) * \text{epsilon}$. Type-checked.

Compilation flags:

static

Template:

approximately_equal(Number1,Number2)

Mode and number of proofs:

approximately_equal(+number,+number) - zero_or_one

approximately_equal/3

Compares two numbers for approximate equality given a user-defined epsilon value using the de facto standard formula $\text{abs}(\text{Number1} - \text{Number2}) \leq \max(\text{abs}(\text{Number1}), \text{abs}(\text{Number2})) * \text{Epsilon}$. Type-checked.

Compilation flags:

static

Template:

approximately_equal(Number1,Number2,Epsilon)

Mode and number of proofs:

`approximately_equal(+number,+number,+number) - zero_or_one`

Remarks:

- Epsilon range: Epsilon should be the epsilon arithmetic constant value or a small multiple of it. Only use a larger value if a greater error is expected.
- Comparison with essential equality: For the same epsilon value, approximate equality is weaker requirement than essential equality.

`essentially_equal/3`

Compares two numbers for essential equality given an epsilon value using the de facto standard formula $\text{abs}(\text{Number1} - \text{Number2}) \leq \min(\text{abs}(\text{Number1}), \text{abs}(\text{Number2})) * \text{Epsilon}$. Type-checked.

Compilation flags:

`static`

Template:

`essentially_equal(Number1,Number2,Epsilon)`

Mode and number of proofs:

`essentially_equal(+number,+number,+number) - zero_or_one`

Remarks:

- Comparison with approximate equality: For the same epsilon value, essential equality is a stronger requirement than approximate equality.

`tolerance_equal/4`

Compares two numbers for close equality given relative and absolute tolerances using the de facto standard formula $\text{abs}(\text{Number1} - \text{Number2}) \leq \max(\text{RelativeTolerance} * \max(\text{abs}(\text{Number1}), \text{abs}(\text{Number2})), \text{AbsoluteTolerance})$. Type-checked.

Compilation flags:

`static`

Template:

`tolerance_equal(Number1,Number2,RelativeTolerance,AbsoluteTolerance)`

Mode and number of proofs:

tolerance_equal(+number,+number,+number,+number) - zero_or_one

`=~= / 2`

Compares two numbers (or lists of numbers) for approximate equality using 100*epsilon for the absolute error and, if that fails, 99.999% accuracy for the relative error. But these precision values may not be adequate for all cases. Type-checked.

Compilation flags:

static

Template:

`=~=(Number1,Number2)`

Mode and number of proofs:

`=~=(+number,+number) - zero_or_one`

`=~=(+list(number),+list(number)) - zero_or_one`

`epsilon/1`

Returns the value of epsilon used in the definition of the `(=~=)/2` predicate.

Compilation flags:

static

Template:

`epsilon(Epsilon)`

Mode and number of proofs:

`epsilon(-float) - one`

Protected predicates

`run_tests/0`

Runs all defined unit tests.

Compilation flags:

`static`

Mode and number of proofs:

`run_tests - one`

`run_tests/1`

Runs all the tests defined in the given file.

Compilation flags:

`static`

Template:

`run_tests(File)`

Mode and number of proofs:

`run_tests(+atom) - one`

`run_test_set/0`

Runs a test set as part of running two or more test sets as a unified set.

Compilation flags:

`static`

Mode and number of proofs:

`run_test_set - one`

`run_quick_check_tests/5`

Runs a QuickCheck test using the given options. Returns the starting seed used to generate the random tests, the number of discarded tests, and the test label statistics.

Compilation flags:

`static`

Template:

`run_quick_check_tests(Template,Options,Seed,Discarded,Labels)`

Meta-predicate template:

`run_quick_check_tests(:,::,*,*,*)`

Mode and number of proofs:

`run_quick_check_tests(@callable,+list,--nonvar,--number,--list(pair)) - one_or_error`

`condition/0`

Verifies conditions for running the tests. Defaults to the goal true.

Compilation flags:

`static`

Mode and number of proofs:

`condition - zero_or_one`

`setup/0`

Setup environment before running the test set. Defaults to the goal true.

Compilation flags:

`static`

Mode and number of proofs:

`setup - zero_or_one`

cleanup/0

Cleanup environment after running the test set. Defaults to the goal true.

Compilation flags:

static

Mode and number of proofs:

cleanup - zero_or_one

make/1

Make target for automatically running the test set when calling the logtalk_make/1 built-in predicate. No default. Possible values are all and check.

Compilation flags:

static

Template:

make(Target)

Mode and number of proofs:

make(?atom) - zero_or_one

note/1

Note to be printed after the test results. Defaults to the empty atom.

Compilation flags:

static

Template:

note(Note)

Mode and number of proofs:

note(?atom) - zero_or_one

`file_path/2`

Returns the absolute path for a file path that is relative to the tests object path. When the file path is already an absolute path, it is expanded to resolve any remaining relative file path parts.

Compilation flags:

`static`

Template:

`file_path(File,Path)`

Mode and number of proofs:

`file_path(+atom,-atom) - one`

See also:

`clean_file/1`

`clean_directory/1`

`suppress_text_output/0`

Suppresses text output. Useful to avoid irrelevant text output from predicates being tested to clutter the test logs.

Compilation flags:

`static`

Mode and number of proofs:

`suppress_text_output - one`

`suppress_binary_output/0`

Suppresses binary output. Useful to avoid irrelevant binary output from predicates being tested to clutter the test logs.

Compilation flags:

`static`

Mode and number of proofs:

`suppress_binary_output` - one

`set_text_input/3`

Creates a temporary file, in the same directory as the tests object, with the given text contents, and opens it for reading referenced by the given alias and using the additional options. If no `eof_action/1` option is specified, its value will be the default used by the backend compiler.

Compilation flags:

`static`

Template:

`set_text_input(Alias,Contents,Options)`

Mode and number of proofs:

`set_text_input(+atom,+atom,+list(stream_option))` - one

`set_text_input(+atom,+list(atom),+list(stream_option))` - one

See also:

`text_input_assertion/3`

`check_text_input/2`

`clean_text_input/0`

`set_text_input/2`

Creates a temporary file, in the same directory as the tests object, with the given text contents, and opens it for reading referenced by the given alias and using the default end-of-file action for the used backend compiler.

Compilation flags:

`static`

Template:

`set_text_input(Alias,Contents)`

Mode and number of proofs:

`set_text_input(+atom,+atom)` - one

`set_text_input(+atom,+list(atom))` - one

See also:

```
text_input_assertion/3  
check_text_input/2  
clean_text_input/0
```

```
set_text_input/1
```

Creates a temporary file, in the same directory as the tests object, with the given text contents, opens it for reading using the default end-of-file action for the used backend compiler, and sets the current input stream to the file.

Compilation flags:

```
static
```

Template:

```
set_text_input(Contents)
```

Mode and number of proofs:

```
set_text_input(+atom) - one
```

```
set_text_input(+list(atom)) - one
```

See also:

```
text_input_assertion/2  
check_text_input/1  
clean_text_input/0
```

```
check_text_input/2
```

Checks that the temporary file (referenced by the given alias) being read have the expected text contents.

Compilation flags:

```
static
```

Template:

```
check_text_input(Alias,Contents)
```

Mode and number of proofs:

```
check_text_input(+atom,+atom) - zero_or_one
```

See also:

```
set_text_input/2  
set_text_input/2  
text_input_assertion/3  
clean_text_input/0
```

check_text_input/1

Checks that the temporary file being read have the expected text contents.

Compilation flags:

static

Template:

check_text_input(Contents)

Mode and number of proofs:

check_text_input(+atom) - zero_or_one

See also:

```
set_text_input/1  
text_input_assertion/2  
clean_text_input/0
```

text_input_assertion/3

Returns an assertion for checking that the temporary file (referenced by the given alias) being read have the expected text contents.

Compilation flags:

static

Template:

text_input_assertion(Alias,Contents,Assertion)

Mode and number of proofs:

text_input_assertion(+atom,+atom,--callable) - one

See also:

```
set_text_input/3
```

[check_text_input/2](#)
[clean_text_input/0](#)

[text_input_assertion/2](#)

Returns an assertion for checking that the temporary file being read have the expected text contents.

Compilation flags:

static

Template:

`text_input_assertion(Contents,Assertion)`

Mode and number of proofs:

`text_input_assertion(+atom,--callable) - one`

See also:

[set_text_input/1](#)
[check_text_input/1](#)
[clean_text_input/0](#)

[clean_text_input/0](#)

Cleans the temporary file used when testing text input.

Compilation flags:

static

Mode and number of proofs:

`clean_text_input - one`

See also:

[set_text_input/3](#)
[set_text_input/2](#)
[set_text_input/1](#)

[set_binary_input/3](#)

Creates a temporary file, in the same directory as the tests object, with the given binary contents, and opens it for reading referenced by the given alias and using the additional options. If no eof_action/1 option is specified, its value will be the default used by the backend compiler.

Compilation flags:

static

Template:

set_binary_input(Alias,Bytes,Options)

Mode and number of proofs:

set_binary_input(+atom,+list(byte),+list(stream_option)) - one

See also:

[binary_input_assertion/3](#)

[check_binary_input/2](#)

[clean_binary_input/0](#)

[set_binary_input/2](#)

Creates a temporary file, in the same directory as the tests object, with the given binary contents, and opens it for reading referenced by the given alias and using the default end-of-file action for the used backend compiler.

Compilation flags:

static

Template:

set_binary_input(Alias,Bytes)

Mode and number of proofs:

set_binary_input(+atom,+list(byte)) - one

See also:

[binary_input_assertion/3](#)

[check_binary_input/2](#)

[clean_binary_input/0](#)

[set_binary_input/1](#)

Creates a temporary file, in the same directory as the tests object, with the given binary contents, and opens it for reading using the default end-of-file action for the used backend compiler, and sets the current input stream to the file.

Compilation flags:

static

Template:

`set_binary_input(Bytes)`

Mode and number of proofs:

`set_binary_input(+list(byte)) - one`

See also:

[binary_input_assertion/2](#)

[check_binary_input/1](#)

[clean_binary_input/0](#)

[check_binary_input/2](#)

Checks that the temporary file (referenced by the given alias) being read have the expected binary contents.

Compilation flags:

static

Template:

`check_binary_input(Alias,Bytes)`

Mode and number of proofs:

`check_binary_input(+atom,+list(byte)) - zero_or_one`

See also:

[set_binary_input/3](#)

[set_binary_input/2](#)

[binary_input_assertion/3](#)

[clean_binary_input/0](#)

[check_binary_input/1](#)

Checks that the temporary file being read have the expected binary contents.

Compilation flags:

static

Template:

`check_binary_input(Bytes)`

Mode and number of proofs:

`check_binary_input(+list(byte)) - zero_or_one`

See also:

[binary_input_assertion/2](#)

[set_binary_input/1](#)

[clean_binary_input/0](#)

[binary_input_assertion/3](#)

Returns an assertion for checking that the temporary file (referenced by the given alias) being read have the expected binary contents.

Compilation flags:

static

Template:

`binary_input_assertion(Alias,Bytes,Assertion)`

Mode and number of proofs:

`binary_input_assertion(+atom,+list(byte),--callable) - one`

See also:

[check_binary_input/2](#)

[set_binary_input/3](#)

[set_binary_input/2](#)

[clean_binary_input/0](#)

[binary_input_assertion/2](#)

Returns an assertion for checking that the temporary file being read have the expected binary contents.

Compilation flags:

static

Template:

`binary_input_assertion(Bytes,Assertion)`

Mode and number of proofs:

`binary_input_assertion(+list(byte),--callable) - one`

See also:

[check_binary_input/1](#)

[set_binary_input/1](#)

[clean_binary_input/0](#)

[clean_binary_input/0](#)

Cleans the temporary file used when testing binary input.

Compilation flags:

static

Mode and number of proofs:

`clean_binary_input - one`

See also:

[set_binary_input/3](#)

[set_binary_input/2](#)

[set_binary_input/1](#)

`set_text_output/3`

Creates a temporary file, in the same directory as the tests object, with the given text contents, and opens it for writing referenced by the given alias and using the additional options.

Compilation flags:

`static`

Template:

`set_text_output(Alias,Contents,Options)`

Mode and number of proofs:

`set_text_output(+atom,+atom,+list(stream_option)) - one`

`set_text_output(+atom,+list(atom),+list(stream_option)) - one`

See also:

`text_output_assertion/4`

`check_text_output/3`

`clean_text_output/0`

`set_text_output/2`

Creates a temporary file, in the same directory as the tests object, with the given text contents, and referenced by the given alias.

Compilation flags:

`static`

Template:

`set_text_output(Alias,Contents)`

Mode and number of proofs:

`set_text_output(+atom,+atom) - one`

`set_text_output(+atom,+list(atom)) - one`

See also:

`text_output_assertion/3`

`check_text_output/2`

`clean_text_output/0`

`set_text_output/1`

Creates a temporary file, in the same directory as the tests object, with the given text contents, and sets the current output stream to the file.

Compilation flags:

`static`

Template:

`set_text_output(Contents)`

Mode and number of proofs:

`set_text_output(+atom) - one`

`set_text_output(+list(atom)) - one`

See also:

`text_output_assertion/2`

`check_text_output/1`

`clean_text_output/0`

`check_text_output/3`

Checks that the temporary file (open with the given options and alias in the same directory as the tests object) being written have the expected text contents.

Compilation flags:

`static`

Template:

`check_text_output(Alias,Contents,Options)`

Mode and number of proofs:

`check_text_output(+atom,+atom,+list(stream_option)) - zero_or_one`

See also:

`set_text_output/3`

`text_output_assertion/4`

`clean_text_output/0`

`check_text_output/2`

Checks that the temporary file (open with default options and alias in the same directory as the tests object) being written have the expected text contents.

Compilation flags:

`static`

Template:

`check_text_output(Alias,Contents)`

Mode and number of proofs:

`check_text_output(+atom,+atom) - zero_or_one`

See also:

`set_text_output/2`

`text_output_assertion/3`

`clean_text_output/0`

`check_text_output/1`

Checks that the temporary file being written have the expected text contents.

Compilation flags:

`static`

Template:

`check_text_output(Contents)`

Mode and number of proofs:

`check_text_output(+atom) - zero_or_one`

See also:

`set_text_output/1`

`text_output_assertion/2`

`clean_text_output/0`

`text_output_assertion/4`

Returns an assertion for checking that the temporary file (open with the given options and alias in the same directory as the tests object) being written have the expected text contents.

Compilation flags:

`static`

Template:

`text_output_assertion(Alias,Contents,Options,Assertion)`

Mode and number of proofs:

`text_output_assertion(+atom,+atom,+list(stream_option),--callable) - one`

See also:

`set_text_output/3`

`check_text_output/3`

`clean_text_output/0`

`text_output_assertion/3`

Returns an assertion for checking that the temporary file (open with default options and alias in the same directory as the tests object) being written have the expected text contents.

Compilation flags:

`static`

Template:

`text_output_assertion(Alias,Contents,Assertion)`

Mode and number of proofs:

`text_output_assertion(+atom,+atom,--callable) - one`

See also:

`set_text_output/2`

`check_text_output/2`

`clean_text_output/0`

`text_output_assertion/2`

Returns an assertion for checking that the temporary file (open with default options in the same directory as the tests object) being written have the expected text contents.

Compilation flags:

`static`

Template:

`text_output_assertion(Contents,Assertion)`

Mode and number of proofs:

`text_output_assertion(+atom,--callable) - one`

See also:

`set_text_output/1`

`check_text_output/1`

`clean_text_output/0`

`text_output_contents/3`

Returns the contents of the temporary file (open with the given options and alias in the same directory as the tests object) being written.

Compilation flags:

`static`

Template:

`text_output_contents(Alias,Contents,Options)`

Mode and number of proofs:

`text_output_contents(+atom,-list(character),+list(stream_option)) - one`

`text_output_contents/2`

Returns the contents of the temporary file (open with default options and alias in the same directory as the tests object) being written.

Compilation flags:

`static`

Template:

`text_output_contents(Alias,Contents)`

Mode and number of proofs:

`text_output_contents(+atom,-list(character)) - one`

`text_output_contents/1`

Returns the contents of the temporary file (open with default options in the same directory as the tests object) being written.

Compilation flags:

`static`

Template:

`text_output_contents(Contents)`

Mode and number of proofs:

`text_output_contents(-list(character)) - one`

`clean_text_output/0`

Cleans the temporary file used when testing text output.

Compilation flags:

`static`

Mode and number of proofs:

`clean_text_output - one`

See also:

```
set_text_output/3  
set_text_output/2  
set_text_output/1
```

`set_binary_output/3`

Creates a temporary file, in the same directory as the tests object, with the given binary contents, and opens it for writing referenced by the given alias and using the additional options.

Compilation flags:

`static`

Template:

`set_binary_output(Alias,Contents,Options)`

Mode and number of proofs:

`set_binary_output(+atom,+list(byte),+list(stream_option))` - one

See also:

```
binary_output_assertion/3  
check_binary_output/2  
clean_binary_output/0
```

`set_binary_output/2`

Creates a temporary file, in the same directory as the tests object, with the given binary contents, and opens it for writing referenced with the given alias.

Compilation flags:

`static`

Template:

`set_binary_output(Alias,Bytes)`

Mode and number of proofs:

`set_binary_output(+atom,+list(byte))` - one

See also:

```
binary_output_assertion/3
```

```
check_binary_output/2  
clean_binary_output/0
```

```
set_binary_output/1
```

Creates a temporary file, in the same directory as the tests object, with the given binary contents, and sets the current output stream to the file.

Compilation flags:

```
static
```

Template:

```
set_binary_output(Bytes)
```

Mode and number of proofs:

```
set_binary_output(+list(byte)) - one
```

See also:

```
binary_output_assertion/2  
check_binary_output/1  
clean_binary_output/0
```

```
check_binary_output/2
```

Checks that the temporary file (referenced by the given alias) have the expected binary contents.

Compilation flags:

```
static
```

Template:

```
check_binary_output(Alias,Bytes)
```

Mode and number of proofs:

```
check_binary_output(+atom,+list(byte)) - zero_or_one
```

See also:

```
set_binary_output/3  
set_binary_output/2  
binary_output_assertion/3
```


`clean_binary_output/0`

`check_binary_output/1`

Checks that the temporary file (open in the same directory as the tests object) have the expected binary contents.

Compilation flags:

`static`

Template:

`check_binary_output(Bytes)`

Mode and number of proofs:

`check_binary_output(+list(byte)) - zero_or_one`

See also:

`set_binary_output/1`

`binary_output_assertion/2`

`clean_binary_output/0`

`binary_output_assertion/3`

Returns an assertion for checking that the temporary file (referenced by the given alias) have the expected binary contents.

Compilation flags:

`static`

Template:

`binary_output_assertion(Alias,Bytes,Assertion)`

Mode and number of proofs:

`binary_output_assertion(+atom,+list(byte),--callable) - one`

See also:

`set_binary_output/2`

`check_binary_output/2`

`clean_binary_output/0`

`binary_output_assertion/2`

Returns an assertion for checking that the temporary file (open in the same directory as the tests object) have the expected binary contents.

Compilation flags:

`static`

Template:

`binary_output_assertion(Bytes,Assertion)`

Mode and number of proofs:

`binary_output_assertion(+list(byte),--callable) - one`

See also:

`set_binary_output/1`

`check_binary_output/1`

`clean_binary_output/0`

`binary_output_contents/2`

Returns the binary contents of the temporary file (referenced by the given alias) being written.

Compilation flags:

`static`

Template:

`binary_output_contents(Alias,Bytes)`

Mode and number of proofs:

`binary_output_contents(+atom,-list(byte)) - one`

`binary_output_contents/1`

Returns the binary contents of the temporary file being written.

Compilation flags:

`static`

Template:

`binary_output_contents(Bytes)`

Mode and number of proofs:

`binary_output_contents(-list(byte)) - one`

`clean_binary_output/0`

Cleans the temporary file used when testing binary output.

Compilation flags:

`static`

Mode and number of proofs:

`clean_binary_output - one`

See also:

`set_binary_output/3`

`set_binary_output/2`

`set_binary_output/1`

`create_text_file/3`

Creates a text file with the given contents. The file is open for writing using the given options. Relative file paths are interpreted as relative to the tests object path.

Compilation flags:

`static`

Template:

```
create_text_file(File,Contents,Options)
```

Mode and number of proofs:

```
create_text_file(+atom,+atom,+list(stream_option)) - one
```

```
create_text_file(+atom,+list(atom),+list(stream_option)) - one
```

`create_text_file/2`

Creates a text file with the given contents. The file is open for writing using default options. Relative file paths are interpreted as relative to the tests object path.

Compilation flags:

```
static
```

Template:

```
create_text_file(File,Contents)
```

Mode and number of proofs:

```
create_text_file(+atom,+atom) - one
```

```
create_text_file(+atom,+list(atom)) - one
```

`create_binary_file/2`

Creates a binary file with the given contents. Relative file paths are interpreted as relative to the tests object path.

Compilation flags:

```
static
```

Template:

```
create_binary_file(File,Bytes)
```

Mode and number of proofs:

```
create_binary_file(+atom,+list(byte)) - one
```

[check_text_file/3](#)

Checks that the contents of a text file match the expected contents. The file is open for reading using the given options. Relative file paths are interpreted as relative to the tests object path.

Compilation flags:

static

Template:

`check_text_file(File,Contents,Options)`

Mode and number of proofs:

`check_text_file(+atom,+atom,+list(stream_option)) - zero_or_one`

See also:

[text_file_assertion/4](#)

[check_text_file/2](#)

Checks that the contents of a text file (open for reading using default options) match the expected contents. Relative file paths are interpreted as relative to the tests object path.

Compilation flags:

static

Template:

`check_text_file(File,Contents)`

Mode and number of proofs:

`check_text_file(+atom,+atom) - zero_or_one`

See also:

[text_file_assertion/3](#)

[text_file_assertion/4](#)

Returns an assertion for checking that the given file have the expected text contents. The file is open for reading using the given options. Relative file paths are interpreted as relative to the tests object path.

Compilation flags:

static

Template:

`text_file_assertion(File,Contents,Options,Assertion)`

Mode and number of proofs:

`text_file_assertion(+atom,+atom,+list(stream_option),--callable) - one`

See also:

[check_text_file/3](#)

[text_file_assertion/3](#)

Returns an assertion for checking that the given file have the expected text contents. The file is open for reading using default options. Relative file paths are interpreted as relative to the tests object path.

Compilation flags:

static

Template:

`text_file_assertion(File,Contents,Assertion)`

Mode and number of proofs:

`text_file_assertion(+atom,+atom,--callable) - one`

See also:

[check_text_file/2](#)

[check_binary_file/2](#)

Checks the contents of a binary file match the expected contents. Relative file paths are interpreted as relative to the tests object path.

Compilation flags:

static

Template:

`check_binary_file(File,Bytes)`

Mode and number of proofs:

`check_binary_file(+atom,+list(byte)) - zero_or_one`

See also:

[binary_file_assertion/3](#)

[binary_file_assertion/3](#)

Returns an assertion for checking that the given file have the expected binary contents. Relative file paths are interpreted as relative to the tests object path.

Compilation flags:

static

Template:

`binary_file_assertion(File,Bytes,Assertion)`

Mode and number of proofs:

`binary_file_assertion(+atom,+list(byte),--callable) - one`

See also:

[check_binary_file/2](#)

[clean_file/1](#)

Closes any existing stream associated with the file and deletes the file if it exists. Relative file paths are interpreted as relative to the tests object path.

Compilation flags:

static

Template:

`clean_file(File)`

Mode and number of proofs:

`clean_file(+atom) - one`

See also:

[clean_directory/1](#)

[file_path/2](#)

[clean_directory/1](#)

Deletes an empty directory if it exists. Relative directory paths are interpreted as relative to the tests object path.

Compilation flags:

static

Template:

`clean_directory(Directory)`

Mode and number of proofs:

`clean_directory(+atom) - one`

See also:

[clean_file/1](#)

[file_path/2](#)

`closed_input_stream/2`

Opens a temporary file in the same directory as the tests object with the given options for reading, closes it, and returns its stream handle.

Compilation flags:

`static`

Template:

`closed_input_stream(Stream,Options)`

Mode and number of proofs:

`closed_input_stream(-stream,+list(stream_option)) - one`

`closed_output_stream/2`

Opens a temporary file in the same directory as the tests object with the given options for writing, closes it, and returns its stream handle.

Compilation flags:

`static`

Template:

`closed_output_stream(Stream,Options)`

Mode and number of proofs:

`closed_output_stream(-stream,+list(stream_option)) - zero_or_one`

`stream_position/1`

Returns a syntactically valid stream position by opening a temporary file in the same directory as the tests object.

Compilation flags:

`static`

Template:

`stream_position(Position)`

Mode and number of proofs:

`stream_position(-stream_position) - one`

`test/2`

Table of defined tests.

Compilation flags:

`static`

Template:

`test(Identifier,Test)`

Mode and number of proofs:

`test(?callable,?compound) - zero_or_more`

Private predicates

`running_test_sets_/0`

Internal flag used when running two or more test sets as a unified set.

Compilation flags:

`dynamic`

Mode and number of proofs:

`running_test_sets_ - zero_or_one`

`test/3`

Compiled unit tests. The list of variables is used to ensure variable sharing between a test with its test options.

Compilation flags:

`static`

Template:

test(Identifier,Variables,Outcome)

Mode and number of proofs:

test(?callable,?list(variable),?nonvar) - zero_or_more

auxiliary_predicate_counter_/1

Counter for generating unique auxiliary predicate names.

Compilation flags:

dynamic

Template:

auxiliary_predicate_counter_(Counter)

Mode and number of proofs:

auxiliary_predicate_counter_(?integer) - one_or_more

test_/2

Table of compiled tests.

Compilation flags:

dynamic

Template:

test_(Identifier,Test)

Mode and number of proofs:

test_(?callable,?compound) - zero_or_more

selected_test_/1

Table of selected tests for execution.

Compilation flags:

dynamic

Template:

selected_test_(Identifier)

Mode and number of proofs:

selected_test_(?callable) - zero_or_more

skipped_/1

Counter for skipped tests.

Compilation flags:

dynamic

Template:

skipped_(Counter)

Mode and number of proofs:

skipped_(?integer) - zero_or_one

passed_/3

Counter and total time for passed tests.

Compilation flags:

dynamic

Template:

passed_(Counter,CPUTime,WallTime)

Mode and number of proofs:

passed_(?integer,-float,-float) - zero_or_one

failed_/3

Counter and total time for failed tests.

Compilation flags:

dynamic

Template:

failed__(Counter,CPUTime,WallTime)

Mode and number of proofs:

failed__(?integer,-float,-float) - zero_or_one

flaky_/1

Counter for failed tests that are marked as flaky.

Compilation flags:

dynamic

Template:

flaky__(Counter)

Mode and number of proofs:

flaky__(?integer) - zero_or_one

fired_/3

Fired clauses when running the unit tests.

Compilation flags:

dynamic

Template:

fired__(Entity,Predicate,Clause)

Mode and number of proofs:

fired__(?entity__identifier,?predicate__indicator,?integer) - zero_or_more

`covered_/4`

Auxiliary predicate for collecting statistics on clause coverage.

Compilation flags:

`dynamic`

Template:

`covered_(Entity,Predicate,Covered,Total)`

Mode and number of proofs:

`covered_(?entity__identifier,?callable,?integer,?integer) - zero_or_more`

Operators

`op(700,xfx,==)`

Scope:

`public`

`category`

1.45.4 lgtunit_messages

Logtalk unit test framework default message translations.

Availability:

`logtalk_load(lgtunit(loader))`

Author: Paulo Moura

Version: 12:2:0

Date: 2025-10-20

Compilation flags:

`static`

Provides:

`logtalk::message_prefix_stream/4`

`logtalk::message_tokens//2`

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - failed_test_reason//1
- Protected predicates
- Private predicates
- Operators

Public predicates

failed_test_reason//1

Used to rewrite a term representing the reason why a term failed into a list of tokens.

Compilation flags:

static

Template:

failed_test_reason(Reason)

Mode and number of proofs:

failed_test_reason(@nonvar) - one_or_more

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.45.5 `minimal_output`

Intercepts unit test execution messages and outputs a minimal report.

Availability:

`logtalk_load(lgtunit(loader))`

Author: Paulo Moura

Version: 3:0:0

Date: 2021-05-27

Compilation flags:

`static, context_switching_calls`

Provides:

`logtalk::message_hook/4`

Remarks:

- Usage: Simply load this object before running your tests using the goal `logtalk_load(lgtunit(minimal_output))`.
- Limitations: Cannot be used when the test objects also intercept lgtunit messages.

Inherited public predicates:

(none)

- [Public predicates](#)
- [Protected predicates](#)
- [Private predicates](#)
- [Operators](#)

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.45.6 tap_output

Intercepts unit test execution messages and outputs a report using the TAP format to the current output stream.

Availability:

`logtalk_load(lgtunit(loader))`

Author: Paulo Moura

Version: 5:0:0

Date: 2025-04-07

Compilation flags:

`static, context_switching_calls`

Provides:

`logtalk::message_hook/4`

Remarks:

- Usage: Simply load this object before running your tests using the goal `logtalk_load(lgtunit(tap_output))`.

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
 - generating_/0
 - partial_/1
 - test_count_/1
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

generating_/0

Flag to detect report in progress when processing two or more test sets as a unified set.

Compilation flags:

dynamic

Mode and number of proofs:

generating_ - zero_or_one

partial_/1

Cache of total of tests per test set.

Compilation flags:

dynamic

Template:

partial__(Count)

Mode and number of proofs:

partial__(?integer) - zero_or_more

test_count_/1

Test counter.

Compilation flags:

dynamic

Template:

test_count__(Count)

Mode and number of proofs:

test_count__(?integer) - zero_or_one

Operators

(none)

object

1.45.7 tap_report

Intercepts unit test execution messages and generates a tap_report.txt file using the TAP output format in the same directory as the tests object file.

Availability:

logtalk_load(lgtunit(loader))

Author: Paulo Moura

Version: 6:0:0

Date: 2025-04-07

Compilation flags:

static, context_switching_calls

Provides:

logtalk::message_hook/4

Uses:

logtalk

Remarks:

- Usage: Simply load this object before running your tests using the goal `logtalk_load(lgtunit(tap_report))`.

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
 - partial_/1
 - test_count_/1
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

partial_/1

Cache of total of tests per test set.

Compilation flags:

dynamic

Template:

partial_(Count)

Mode and number of proofs:

partial_(?integer) - zero_or_more

`test_count_/1`

Test counter.

Compilation flags:
 dynamic

Template:
 test_count_(Count)
Mode and number of proofs:
 test_count_(?integer) - zero_or_one

Operators

(none)
object

1.45.8 `xunit_net_v2_output`

Intercepts unit test execution messages and outputs a report using the xUnit.net v2 XML format to the current output stream.

Availability:
 logtalk_load(lgtunit(loader))

Author: Paulo Moura
Version: 5:0:0
Date: 2025-04-07

Compilation flags:
 static, context_switching_calls

Provides:
 logtalk::message_hook/4
Uses:
 user

Remarks:

- Usage: Simply load this object before running your tests using the goal `logtalk_load(lgtunit(xunit_net_v2_output))`.

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
 - `message_cache_/1`
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`message_cache_/1`

Table of messages emitted by the `lgtunit` tool when running tests.

Compilation flags:

`dynamic`

Template:

`message_cache_(Message)`

Mode and number of proofs:

`message_cache_(?callable) - zero_or_more`

Operators

(none)

object

1.45.9 xunit_net_v2_report

Intercepts unit test execution messages and generates a xunit_report.xml file using the xUnit.net v2 XML format in the same directory as the tests object file.

Availability:

`logtalk_load(lgtunit(loader))`

Author: Paulo Moura

Version: 6:0:0

Date: 2025-04-07

Compilation flags:

`static, context_switching_calls`

Provides:

`logtalk::message_hook/4`

Uses:

`logtalk`

`user`

Remarks:

- Usage: Simply load this object before running your tests using the goal `logtalk_load(lgtunit(xunit_net_v2_report))`.

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
 - `message_cache_/1`
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`message_cache_/1`

Table of messages emitted by the lgtunit tool when running tests.

Compilation flags:

`dynamic`

Template:

`message_cache_(Message)`

Mode and number of proofs:

`message_cache_(?callable) - zero_or_more`

Operators

(none)

object

1.45.10 xunit_output

Intercepts unit test execution messages and outputs a report using the xUnit XML format to the current output stream.

Availability:

`logtalk_load(lgtunit(loader))`

Author: Paulo Moura

Version: 5:0:1

Date: 2025-04-11

Compilation flags:

static, context_switching_calls

Provides:

logtalk::message_hook/4

Uses:

logtalk

user

Remarks:

- Usage: Simply load this object before running your tests using the goal `logtalk_load(lgtunit(xunit_output))`.

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
 - message_cache_/1
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

message_cache_/1

Table of messages emitted by the lgtunit tool when running tests.

Compilation flags:

dynamic

Template:

```
message_cache_(Message)
```

Mode and number of proofs:

```
message_cache_(?callable) - zero_or_more
```

Operators

(none)

object

1.45.11 xunit_report

Intercepts unit test execution messages and generates a xunit_report.xml file using the xUnit XML format in the same directory as the tests object file.

Availability:

```
logtalk_load(lgtunit(loader))
```

Author: Paulo Moura

Version: 6:0:0

Date: 2025-04-07

Compilation flags:

```
static, context_switching_calls
```

Provides:

```
logtalk::message_hook/4
```

Uses:

```
logtalk
```

```
user
```

Remarks:

- Usage: Simply load this object before running your tests using the goal `logtalk_load(lgtunit(xunit_report))`.

Inherited public predicates:

```
(none)
```

- Public predicates
- Protected predicates
- Private predicates
 - message_cache_/1
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

message_cache_/1

Table of messages emitted by the lgtunit tool when running tests.

Compilation flags:

dynamic

Template:

message_cache_(Message)

Mode and number of proofs:

message_cache_(?callable) - zero_or_more

Operators

(none)

1.46 library

protocol

1.46.1 cloning

Object cloning protocol.

Availability:

`logtalk_load(library(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2010-09-14

Compilation flags:

`static`

Dependencies:

`(none)`

Remarks:

`(none)`

Inherited public predicates:

`(none)`

- Public predicates
 - `clone/1`
- Protected predicates
- Private predicates
- Operators

Public predicates

`clone/1`

Clones an object, returning the identifier of the new object if none is given.

Compilation flags:

`static`

Template:

`clone(Clone)`

Mode and number of proofs:

`clone(?object) - zero_or_one`

Protected predicates

`(none)`

Private predicates

`(none)`

Operators

`(none)`

`category`

1.46.2 counters

Named integer counters. Counter names can be any nonvar term.

Availability:

`logtalk_load(library(loader))`

Author: Paulo Moura

Version: 1:0:1

Date: 2022-02-11

Compilation flags:

`static`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - counter/2
 - increment_counter/1
 - decrement_counter/1
 - reset_counter/1
 - reset_counters/0
- Protected predicates
- Private predicates
 - counter_/2
- Operators

Public predicates

counter/2

True if Counter is a counter with value Value.

Compilation flags:

static

Template:

counter(Counter,Value)

Mode and number of proofs:

counter(?nonvar,?integer) - zero_or_more

`increment_counter/1`

Increments the named counter.

Compilation flags:

`static`

Template:

`increment_counter(Counter)`

Mode and number of proofs:

`increment_counter(+nonvar) - one`

`decrement_counter/1`

Decrements the named counter.

Compilation flags:

`static`

Template:

`decrement_counter(Counter)`

Mode and number of proofs:

`decrement_counter(+nonvar) - one`

`reset_counter/1`

Resets the named counter to zero. Creates the counter if it does not exist.

Compilation flags:

`static`

Template:

`reset_counter(Counter)`

Mode and number of proofs:

`reset_counter(+nonvar) - one`

`reset_counters/0`

Resets all existing named counters to zero.

Compilation flags:

`static`

Mode and number of proofs:

`reset_counters - one`

Protected predicates

(none)

Private predicates

`counter_/2`

Table of named counters.

Compilation flags:

`dynamic`

Template:

`counter_(Counter,Value)`

Mode and number of proofs:

`counter_(?nonvar,?integer) - zero_or_more`

Operators

(none)

object

1.46.3 streamvars

Stream variables (supporting logical, backtracable, adding and retrieving of terms).

Availability:

`logtalk_load(library(loader))`

Author: Nobukuni Kino and Paulo Moura

Version: 1:3:0

Date: 2019-06-15

Compilation flags:

`static, context_switching_calls`

Dependencies:

`(none)`

Remarks:

`(none)`

Inherited public predicates:

`(none)`

- Public predicates
 - `new/1`
 - `new/2`
 - `(<=)/2`
 - `(>=)/2`
- Protected predicates
- Private predicates
- Operators
 - `op(100,xfx,<=)`
 - `op(100,xfx,>=)`

Public predicates

new/1

Makes Variable a stream variable. Initial state will be empty.

Compilation flags:

static

Template:

new(Variable)

Mode and number of proofs:

new(--streamvar) - one

Exceptions:

Variable is not a variable:

type__error(variable,Variable)

new/2

Makes Variable a stream variable and sets its initial state to Value.

Compilation flags:

static

Template:

new(Variable,Value)

Mode and number of proofs:

new(--streamvar,@nonvar) - one

Exceptions:

Variable is not a variable:

type__error(variable,Variable)

$(\leq)/2$

Sets the state of the stream variable *Variable* to *Value* (initializing the variable if needed).

Compilation flags:

static

Template:

Variable \leq *Value*

Mode and number of proofs:

$(?streamvar)\leq(@nonvar) - one$

$(\Rightarrow)/2$

Unifies *Value* with the current state of the stream variable *Variable*.

Compilation flags:

static

Template:

Variable \Rightarrow *Value*

Mode and number of proofs:

$+streamvar\Rightarrow ?nonvar - zero_or_one$

Protected predicates

(none)

Private predicates

(none)

Operators

`op(100,xfx,<=)`

Scope:
public

`op(100,xfx,=>)`

Scope:
public

1.47 listing

category

1.47.1 listing

Listing predicates.

Availability:
logtalk__load(listing(loader))

Author: Paulo Moura
Version: 1:0:0
Date: 2024-01-26

Compilation flags:
static

Dependencies:
(none)

Remarks:
(none)

Inherited public predicates:
(none)

- Public predicates
 - listing/0
 - listing/1
 - portray_clause/1
- Protected predicates
- Private predicates
- Operators

Public predicates

listing/0

Lists all clauses of all visible dynamic predicates to the current output stream.

Compilation flags:

static

Mode and number of proofs:

listing - one

listing/1

Lists all clauses of a visible dynamic predicate or non-terminal to the current output stream. When the argument is a clause head, lists all matching clauses.

Compilation flags:

static

Template:

listing(Spec)

Mode and number of proofs:

listing(+predicate_indicator) - one_or_error

listing(+non_terminal_indicator) - one_or_error

listing(+callable) - one_or_error

Exceptions:

Spec is not ground:

instantiation_error
Spec is ground but not a valid predicate indicator:
type_error(predicate_indicator,Spec)
Spec is ground but not a valid non-terminal indicator:
type_error(non_terminal_indicator,Spec)
Spec is a predicate indicator but not a visible predicate:
existence_error(predicate,Spec)
Spec is a non-terminal indicator but not a visible non-terminal:
existence_error(non_terminal,Spec)
Spec is a callable term with a Functor/Arity indicator but not a visible predicate:
existence_error(predicate, Functor/Arity)
Spec is a predicate indicator of a visible predicate but not a dynamic predicate:
permission_error(access, predicate, Spec)
Spec is a non-terminal indicator of a visible non-terminal but not a dynamic non-terminal:
permission_error(access, non_terminal, Spec)
Spec is a callable term for a visible predicate with a Functor/Arity indicator but not a dynamic predicate:
permission_error(access, predicate, Functor/Arity)

portray_clause/1

Pretty prints a clause to the current output stream.

Compilation flags:

static

Template:

portray_clause(Clause)

Mode and number of proofs:

portray_clause(+clause) - one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.48 logging

object

1.48.1 logger

Global logger object for logging events to files.

Availability:

`logtalk_load(logging(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2011-01-06

Compilation flags:

`static, context_switching_calls`

Implements:

`public loggingp`

Remarks:

(none)

Inherited public predicates:

`define_log_file/2 disable_logging/1 enable_logging/1 init_log_file/2 log_event/2 log_file/2 logging/1`

- Public predicates
- Protected predicates
- Private predicates

- log_file_/2
- logging_to_file_/2
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

log_file_/2

Table of log files.

Compilation flags:

dynamic

Template:

log_file_(Alias,File)

Mode and number of proofs:

log_file_(?atom,?nonvar) - zero_or_more

logging_to_file_/2

Table of logging file status for log files.

Compilation flags:

dynamic

Template:

logging_to_file_(Alias,Status)

Mode and number of proofs:

logging_to_file_(?atom,?atom) - zero_or_more

Operators

(none)

category

1.48.2 logging

Logging events to files category.

Availability:

logtalk_load(logging(loader))

Author: Paulo Moura

Version: 1:0:0

Date: 2011-01-06

Compilation flags:

static

Implements:

public loggingp

Remarks:

(none)

Inherited public predicates:

define_log_file/2 disable_logging/1 enable_logging/1 init_log_file/2 log_event/2 log_file/2
logging/1

- Public predicates
- Protected predicates
- Private predicates
 - log_file_/2
 - logging_to_file_/2
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`log_file_/2`

Table of log files.

Compilation flags:
dynamic

Template:

`log_file_(Alias,File)`

Mode and number of proofs:

`log_file_(?atom,?nonvar) - zero_or_more`

`logging_to_file_/2`

Table of logging file status for log files.

Compilation flags:
dynamic

Template:

`logging_to_file_(Alias,Status)`

Mode and number of proofs:

`logging_to_file_(?atom,?atom) - zero_or_more`

Operators

(none)

protocol

1.48.3 loggingp

Logging events to files protocol.

Availability:

logtalk_load(logging(loader))

Author: Paulo Moura

Version: 1:0:0

Date: 2011-01-06

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - log_file/2
 - define_log_file/2
 - init_log_file/2
 - log_event/2
 - logging/1
 - enable_logging/1
 - disable_logging/1
- Protected predicates
- Private predicates

- Operators

Public predicates

`log_file/2`

Access to the table of log files.

Compilation flags:

`static`

Template:

`log_file(Alias,File)`

Mode and number of proofs:

`log_file(?atom,?atom) - zero_or_more`

`define_log_file/2`

Defines a log file with alias `Alias` and file name `File`. If the log file already exists, its contents are kept. Logging is enabled by default.

Compilation flags:

`static`

Template:

`define_log_file(Alias,File)`

Mode and number of proofs:

`define_log_file(+atom,+atom) - one`

`init_log_file/2`

Initializes a new log file with alias `Alias` and file name `File`. If the log file already exists, its contents are erased. Logging is enabled by default.

Compilation flags:

`static`

Template:

`init_log_file(Alias,File)`

Mode and number of proofs:

`init_log_file(+atom,+atom) - one`

`log_event/2`

Logs an event `Event` to a log file with alias `Alias`. Fails if a log file with alias `Alias` is not defined.

Compilation flags:

`static`

Template:

`log_event(Alias,Event)`

Mode and number of proofs:

`log_event(+atom,+nonvar) - zero_or_one`

`logging/1`

True if logging to file with alias `Alias` is enabled.

Compilation flags:

`static`

Template:

`logging(Alias)`

Mode and number of proofs:

`logging(+atom) - zero_or_one`

`enable_logging/1`

Enables logging to file with alias Alias. Fails if a log file with alias Alias is not defined.

Compilation flags:

`static`

Template:

`enable_logging(Alias)`

Mode and number of proofs:

`enable_logging(+atom) - zero_or_one`

`disable_logging/1`

Disables logging to file with alias Alias. Fails if a log file with alias Alias is not defined.

Compilation flags:

`static`

Template:

`disable_logging(Alias)`

Mode and number of proofs:

`disable_logging(+atom) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

logging

1.49 loops

object

1.49.1 loop

Loop control structures predicates.

Availability:

logtalk_load(loops(loader))

Author: Paulo Moura

Version: 1:4:1

Date: 2020-12-20

Compilation flags:

static, context_switching_calls

Implements:

public `loopp`

Remarks:

(none)

Inherited public predicates:

`dowhile/2` `fordownto/3` `fordownto/4` `fordownto/5` `foreach/3` `foreach/4` `forto/3` `forto/4` `forto/5`
`whiledo/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.49.2 loopp

Loop control constructs protocol.

Availability:

`logtalk_load(loops(loader))`

Author: Paulo Moura

Version: 1:3:0

Date: 2017-03-20

Compilation flags:

`static`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - whiledo/2
 - dowhile/2
 - foreach/3
 - foreach/4
 - forto/3
 - forto/4
 - forto/5
 - fordownto/3
 - fordownto/4
 - fordownto/5
- Protected predicates
- Private predicates
- Operators

Public predicates

whiledo/2

While Condition is true do Action.

Compilation flags:

static

Template:

whiledo(Condition,Action)

Meta-predicate template:

whiledo(0,0)

Mode and number of proofs:

whiledo(+callable,@callable) - zero_or_one

dowhile/2

Do Action while Condition is true.

Compilation flags:

static

Template:

dowhile(Action,Condition)

Meta-predicate template:

dowhile(0,0)

Mode and number of proofs:

dowhile(@callable,+callable) - zero_or_one

foreach/3

For each Element in List call Goal.

Compilation flags:

static

Template:

foreach(Element,List,Goal)

Meta-predicate template:

foreach(*,*,0)

Mode and number of proofs:

foreach(@var,+list(term),@callable) - zero_or_one

foreach/4

For each Element in List at position Index call Goal. Index starts at 1.

Compilation flags:

static

Template:

foreach(Element,Index,List,Goal)

Meta-predicate template:

```
foreach(*,*,*,0)
```

Mode and number of proofs:

```
foreach(@var,@var,+list(term),@callable) - zero_or_one
```

forto/3

Calls Goal counting up from First to Last. Increment is 1. For convenience, First and Last can be arithmetic expressions. Fails iff Goal fails.

Compilation flags:

```
static
```

Template:

```
forto(First,Last,Goal)
```

Meta-predicate template:

```
forto(*,*,0)
```

Mode and number of proofs:

```
forto(+number,+number,@callable) - zero_or_one
```

forto/4

Calls Goal counting up from First to Last and binding Count to each successive value. Increment is 1. For convenience, First and Last can be arithmetic expressions. Fails iff Goal fails.

Compilation flags:

```
static
```

Template:

```
forto(Count,First,Last,Goal)
```

Meta-predicate template:

```
forto(*,*,*,0)
```

Mode and number of proofs:

```
forto(@var,+number,+number,@callable) - zero_or_one
```

forto/5

Calls Goal counting up from First to Last and binding Count to each successive value. For convenience, First, Last, and Increment can be arithmetic expressions (uses Increment absolute value). Fails iff Goal fails.

Compilation flags:

static

Template:

forto(Count,First,Last,Increment,Goal)

Meta-predicate template:

forto(*,*,*,*,0)

Mode and number of proofs:

forto(@var,+number,+number,+number,@callable) - zero_or_one

fordownto/3

Calls Goal counting down from First to Last. Decrement is 1. For convenience, First and Last can be arithmetic expressions. Fails iff Goal fails.

Compilation flags:

static

Template:

fordownto(First,Last,Goal)

Meta-predicate template:

fordownto(*,*,0)

Mode and number of proofs:

fordownto(+number,+number,@callable) - zero_or_one

fordownto/4

Calls Goal counting down from First to Last and binding Count to each successive value. Decrement is 1. For convenience, First and Last can be arithmetic expressions. Fails iff Goal fails.

Compilation flags:

static

Template:

```
fordownto(Count,First,Last,Goal)
```

Meta-predicate template:

```
fordownto(*,*,*,0)
```

Mode and number of proofs:

```
fordownto(@var,+number,+number,@callable) - zero_or_one
```

`fordownto/5`

Calls Goal counting down from First to Last and binding Count to each successive value. For convenience, First, Last, and Decrement can be arithmetic expressions (uses Decrement absolute value). Fails iff Goal fails.

Compilation flags:

```
static
```

Template:

```
fordownto(Count,First,Last,Decrement,Goal)
```

Meta-predicate template:

```
fordownto(*,*,*,*,0)
```

Mode and number of proofs:

```
fordownto(@var,+number,+number,+number,@callable) - zero_or_one
```

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

loop

1.50 meta

object

1.50.1 meta

Some useful meta-predicates.

Availability:

```
logtalk_load(meta(loader))
```

Author: Paulo Moura

Version: 5:2:0

Date: 2016-10-06

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public metap
```

Aliases:

```
metap map/2 as succeeds/2
metap map/2 as maplist/2
metap map/3 as maplist/3
metap map/4 as maplist/4
metap map/5 as maplist/5
metap map/6 as maplist/6
metap map/7 as maplist/7
metap map/8 as maplist/8
metap include/3 as filter/3
metap fold_left/4 as foldl/4
metap fold_left_1/3 as foldl1/3
metap fold_right/4 as foldr/4
metap fold_right_1/3 as foldr1/3
metap scan_left/4 as scanl/4
metap scan_left_1/3 as scanl1/3
metap scan_right/4 as scanr/4
metap scan_right_1/3 as scanr1/3
```

Remarks:

```
(none)
```

Inherited public predicates:

exclude/3 findall_member/4 findall_member/5 fold_left/4 fold_left_1/3 fold_right/4
 fold_right_1/3 include/3 map/2 map/3 map/4 map/5 map/6 map/7 map/8 map_reduce/5
 partition/4 partition/6 scan_left/4 scan_left_1/3 scan_right/4 scan_right_1/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

[meta_compiler](#)

protocol

1.50.2 metap

Useful meta-predicates protocol.

Availability:

logtalk_load(meta(loader))

Author: Paulo Moura

Version: 6:1:0

Date: 2015-12-23

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - include/3
 - exclude/3
 - findall__member/4
 - findall__member/5
 - partition/4
 - partition/6
 - fold__left/4
 - fold__left__1/3
 - scan__left/4
 - scan__left__1/3
 - fold__right/4
 - fold__right__1/3
 - scan__right/4
 - scan__right__1/3
 - map/2
 - map/3
 - map/4
 - map/5
 - map/6
 - map/7
 - map/8
 - map_reduce/5

- Protected predicates
- Private predicates
- Operators

Public predicates

`include/3`

Returns a list of all list elements that satisfy a predicate.

Compilation flags:

`static`

Template:

`include(Closure,List,Included)`

Meta-predicate template:

`include(1,*,*)`

Mode and number of proofs:

`include(+callable,+list,-list) - one`

`exclude/3`

Returns a list of all list elements that fail to satisfy a predicate.

Compilation flags:

`static`

Template:

`exclude(Closure,List,Excluded)`

Meta-predicate template:

`exclude(1,*,*)`

Mode and number of proofs:

`exclude(+callable,+list,-list) - one`

[findall_member/4](#)

Finds all members of a list that satisfy a given test.

Compilation flags:

static

Template:

findall_member(Member,List,Test,Result)

Meta-predicate template:

findall_member(*,*,0,*)

Mode and number of proofs:

findall_member(@term,+list,@callable,-list) - one

[findall_member/5](#)

Finds all members of a list that satisfy a given test appending the given tail to the result.

Compilation flags:

static

Template:

findall_member(Member,List,Test,Result,Tail)

Meta-predicate template:

findall_member(*,*,0,*,*)

Mode and number of proofs:

findall_member(@term,+list,@callable,-list,+list) - one

[partition/4](#)

Partition a list of elements in two lists using a predicate.

Compilation flags:

static

Template:

partition(Closure,List,Included,Excluded)

Meta-predicate template:

```
partition(1,*,*,*)
```

Mode and number of proofs:

```
partition(+callable,+list,-list,-list) - one
```

`partition/6`

Partitions a list in lists with values less, equal, and greater than a given value using a comparison predicate with the same argument order as `compare/3`.

Compilation flags:

```
static
```

Template:

```
partition(Closure,List,Value,Less,Equal,Greater)
```

Meta-predicate template:

```
partition(3,*,*,*,*,*)
```

Mode and number of proofs:

```
partition(+callable,+list,@term,-list,-list,-list) - one
```

`fold_left/4`

List folding (left associative). Closure is extended with three arguments: accumulator, list element, and updated accumulator.

Compilation flags:

```
static
```

Template:

```
fold_left(Closure,Accumulator,List,Result)
```

Meta-predicate template:

```
fold_left(3,*,*,*)
```

Mode and number of proofs:

```
fold_left(+callable,?term,+list,?term) - zero_or_more
```

fold_left_1/3

List folding (left associative). Closure is extended with three arguments: accumulator, list element, and updated accumulator. The initial value of the accumulator is the list first element. Fails for empty lists.

Compilation flags:

static

Template:

fold_left_1(Closure,List,Result)

Meta-predicate template:

fold_left_1(3,*,*)

Mode and number of proofs:

fold_left_1(+callable,+list,?term) - zero_or_more

scan_left/4

List scanning (left associative). Closure is extended with three arguments: accumulator, list element, and updated accumulator.

Compilation flags:

static

Template:

scan_left(Closure,Accumulator,List,Results)

Meta-predicate template:

scan_left(3,*,*,*)

Mode and number of proofs:

scan_left(+callable,?term,+list,?list) - zero_or_more

scan_left_1/3

List scanning (left associative). Closure is extended with three arguments: accumulator, list element, and updated accumulator. The accumulator is initialized with the list first element. Fails for empty lists.

Compilation flags:

static

Template:

```
scan_left_1(Closure,List,Results)
```

Meta-predicate template:

```
scan_left_1(3,*,*)
```

Mode and number of proofs:

```
scan_left_1(+callable,+list,?list) - zero_or_more
```

`fold_right/4`

List folding (right associative). Closure is extended with three arguments: list element, accumulator, and updated accumulator.

Compilation flags:

```
static
```

Template:

```
fold_right(Closure,Accumulator,List,Result)
```

Meta-predicate template:

```
fold_right(3,*,*,*)
```

Mode and number of proofs:

```
fold_right(+callable,?term,+list,?term) - zero_or_more
```

`fold_right_1/3`

List folding (right associative). Closure is extended with three arguments: list element, accumulator, and updated accumulator. The initial value of the accumulator is the list first element. Fails for empty lists.

Compilation flags:

```
static
```

Template:

```
fold_right_1(Closure,List,Result)
```

Meta-predicate template:

```
fold_right_1(3,*,*)
```

Mode and number of proofs:

```
fold_right_1(+callable,+list,?term) - zero_or_more
```

`scan_right/4`

List scanning (right associative). Closure is extended with three arguments: list element, accumulator, and updated accumulator.

Compilation flags:

`static`

Template:

`scan_right(Closure,Accumulator,List,Results)`

Meta-predicate template:

`scan_right(3,*,*,*)`

Mode and number of proofs:

`scan_right(+callable,?term,+list,?list) - zero_or_more`

`scan_right_1/3`

List scanning (right associative). Closure is extended with three arguments: list element, accumulator, and updated accumulator. The accumulator is initialized with the list first element. Fails for empty lists.

Compilation flags:

`static`

Template:

`scan_right_1(Closure,List,Results)`

Meta-predicate template:

`scan_right_1(3,*,*)`

Mode and number of proofs:

`scan_right_1(+callable,+list,?list) - zero_or_more`

`map/2`

True if the predicate succeeds for each list element.

Compilation flags:

`static`

Template:

`map(Closure,List)`

Meta-predicate template:

`map(1,*)`

Mode and number of proofs:

`map(+callable,?list) - zero_or_more`

`map/3`

List mapping predicate taken arguments from two lists of elements.

Compilation flags:

`static`

Template:

`map(Closure,List1,List2)`

Meta-predicate template:

`map(2,*,*)`

Mode and number of proofs:

`map(+callable,?list,?list) - zero_or_more`

`map/4`

List mapping predicate taken arguments from three lists of elements.

Compilation flags:

`static`

Template:

`map(Closure,List1,List2,List3)`

Meta-predicate template:

`map(3,*,*,*)`

Mode and number of proofs:

`map(+callable,?list,?list,?list) - zero_or_more`

map/5

List mapping predicate taken arguments from four lists of elements.

Compilation flags:

static

Template:

map(Closure,List1,List2,List3,List4)

Meta-predicate template:

map(4,*,*,*,*)

Mode and number of proofs:

map(+callable,?list,?list,?list,?list) - zero_or_more

map/6

List mapping predicate taken arguments from five lists of elements.

Compilation flags:

static

Template:

map(Closure,List1,List2,List3,List4,List5)

Meta-predicate template:

map(5,*,*,*,*,*)

Mode and number of proofs:

map(+callable,?list,?list,?list,?list,?list) - zero_or_more

map/7

List mapping predicate taken arguments from six lists of elements.

Compilation flags:

static

Template:

map(Closure,List1,List2,List3,List4,List5,List6)

Meta-predicate template:

```
map(6,*,*,*,*,*,*)
```

Mode and number of proofs:

```
map(+callable,?list,?list,?list,?list,?list,?list) - zero_or_more
```

map/8

List mapping predicate taken arguments from seven lists of elements.

Compilation flags:

```
static
```

Template:

```
map(Closure,List1,List2,List3,List4,List5,List6,List7)
```

Meta-predicate template:

```
map(7,*,*,*,*,*,*,*)
```

Mode and number of proofs:

```
map(+callable,?list,?list,?list,?list,?list,?list,?list) - zero_or_more
```

map_reduce/5

Map a list and apply a fold left (reduce) to the resulting list.

Compilation flags:

```
static
```

Template:

```
map_reduce(Map,Reduce,Accumulator,List,Result)
```

Meta-predicate template:

```
map_reduce(2,3,*,*,*)
```

Mode and number of proofs:

```
map_reduce(+callable,+callable,+term,?list,?term) - zero_or_more
```

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

[meta](#)

1.51 meta_compiler

object

1.51.1 meta_compiler

Compiler for the meta object meta-predicates. Generates auxiliary predicates in order to avoid meta-call overheads.

Availability:

`logtalk_load(meta_compiler(loader))`

Author: Paulo Moura

Version: 0:16:0

Date: 2024-10-24

Compilation flags:

`static, context_switching_calls`

Implements:

`public expanding`

Uses:

`gensym`

`list`

`logtalk`

`user`

Remarks:

- Usage: Compile source files with calls to the meta object meta-predicates using the compiler option `hook(meta_compiler)`.

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
 - `generated_predicate_/1`
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`generated_predicate_/1`

Table of generated auxiliary predicates.

Compilation flags:

`dynamic`

Template:

`generated_predicate_(Predicate)`

Mode and number of proofs:

`generated_predicate_(?predicate_indicator) - zero_or_more`

Operators

(none)

 See also

[meta](#)

1.52 metagol

object

1.52.1 metagol

Inductive logic programming (ILP) system based on meta-interpretive learning.

Availability:

```
logtalk_load(metagol(loader))
```

Author: Metagol authors; adapted to Logtalk by Paulo Moura.

Version: 0:24:4

Date: 2024-03-15

Copyright: Copyright 2016 Metagol authors; Copyright 2018-2024 Paulo Moura

License: BSD-3-Clause

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public expanding
```

Provides:

```
logtalk::message\_tokens/2
```

```
logtalk::message\_prefix\_stream/4
```

Uses:

```
coroutining
```

```
integer
```

```
list
```

```
logtalk
```

```
meta
```

```
timeout
```

Remarks:

(none)

Inherited public predicates:

goal_expansion/2 term_expansion/2

- Public predicates
 - learn/3
 - learn/2
 - learn_seq/2
 - learn_with_timeout/4
 - program_to_clauses/2
 - pprint/1
 - metarule/6
 - head_pred/1
 - body_pred/1
 - ibk/3
 - func_test/3
 - functional/0
 - min_clauses/1
 - max_clauses/1
 - max_inv_preds/1
 - metarule_next_id/1
 - timeout/1
- Protected predicates
 - pprint_clause/1
 - pprint_clauses/1
 - compiled_pred_call/2
 - body_pred_call/2
 - type/3
- Private predicates
- Operators

Public predicates

`learn/3`

Learns from a set of positive examples and a set of negative examples and returns the learned program.

Compilation flags:

`static`

Template:

`learn(PositiveExamples,NegativeExamples,Program)`

Mode and number of proofs:

`learn(@list(example),@list(example),-list(term)) - zero_or_more`

`learn/2`

Learns from a set of positive examples and a set of negative examples and pretty prints the learned program.

Compilation flags:

`static`

Template:

`learn(PositiveExamples,NegativeExamples)`

Mode and number of proofs:

`learn(@list(example),@list(example)) - zero_or_more`

`learn_seq/2`

Learns from a sequence of examples represented as a list of PositiveExamples/NegativeExamples elements and returns the learned program.

Compilation flags:

`static`

Template:

`learn_seq(Examples,Program)`

Mode and number of proofs:

```
learn_seq(@list(example),-list(clause)) - zero_or_one
```

`learn_with_timeout/4`

Learns from a set of positive examples and a set of negative examples and returns the learned program constrained by the given timeout or its default value.

Compilation flags:

`static`

Template:

```
learn_with_timeout(PositiveExamples,NegativeExamples,Program,Timeout)
```

Mode and number of proofs:

```
learn_with_timeout(@list(example),@list(example),-list(term),+number) - zero_or_one_or_error
```

```
learn_with_timeout(@list(example),@list(example),-list(term),-number) - zero_or_one_or_error
```

Exceptions:

Learning does not complete in the allowed time:

```
timeout(learn(PositiveExamples,NegativeExamples,Program))
```

`program_to_clauses/2`

Converts a learned program into a list of clauses.

Compilation flags:

`static`

Template:

```
program_to_clauses(Program,Clauses)
```

Mode and number of proofs:

```
program_to_clauses(@list(term),-list(clause)) - one
```

`pprint/1`

Pretty prints a learned program.

Compilation flags:

`static`

Template:

`pprint(Program)`

Mode and number of proofs:

`pprint(@list(term)) - one`

`metarule/6`

Compilation flags:

`static`

`head_pred/1`

Compilation flags:

`static`

`body_pred/1`

Compilation flags:

`dynamic`

ibk/3

Compilation flags:
static

func_test/3

Compilation flags:
static

functional/0

Compilation flags:
dynamic

min_clauses/1

Compilation flags:
dynamic

max_clauses/1

Compilation flags:
dynamic

max_inv_preds/1

Compilation flags:
dynamic

metarule_next_id/1

Compilation flags:
dynamic

timeout/1

Compilation flags:
dynamic

Protected predicates

pprint_clause/1

Compilation flags:
static

pprint_clauses/1

Compilation flags:
static

compiled_pred_call/2

Compilation flags:
dynamic

body_pred_call/2

Compilation flags:
dynamic

type/3

Compilation flags:
dynamic

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)
protocol

1.52.2 metagol_example_protocol

Convenient learning predicates for use in examples and unit tests.

Availability:
logtalk_load(metagol(loader))

Author: Paulo Moura.
Version: 0:1:1
Date: 2024-03-15

License: BSD-3-Clause

Compilation flags:
static

Dependencies:
(none)

Remarks:
(none)

Inherited public predicates:
(none)

- Public predicates
 - learn/1
 - learn/0
- Protected predicates
- Private predicates
- Operators

Public predicates

learn/1

Learns and returns set of clauses.

Compilation flags:
static

Template:
learn(Clauses)

Mode and number of proofs:
learn(-list(clause)) - zero_or_more

learn/0

Learns and prints a set of clauses.

Compilation flags:

static

Mode and number of proofs:

learn - zero_or_more

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.53 mutations

object

1.53.1 default_atom_mutations

Default atom mutations.

Availability:

logtalk_load(mutations(loader))

Author: Paulo Moura

Version: 0:1:0

Date: 2023-11-24

Compilation flags:

static, context_switching_calls

Provides:

`mutations_store::mutation/4`

Uses:

`fast_random`

`list`

`type`

Remarks:

(none)

Inherited public predicates:

(none)

- `Public predicates`
- `Protected predicates`
- `Private predicates`
- `Operators`

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`type`

object

1.53.2 default_compound_mutations

Default compound mutations.

Availability:

`logtalk_load(mutations(loader))`

Author: Paulo Moura

Version: 0:1:0

Date: 2023-11-23

Compilation flags:

`static, context_switching_calls`

Provides:

`mutations_store::mutation/4`

Uses:

`mutations_store`

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

type

object

1.53.3 `default_float_mutations`

Default float mutations.

Availability:

`logtalk_load(mutations(loader))`

Author: Paulo Moura

Version: 0:1:0

Date: 2023-11-23

Compilation flags:

`static, context_switching_calls`

Provides:

`mutations_store::mutation/4`

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

type

object

1.53.4 default_integer_mutations

Default integer mutations.

Availability:

`logtalk_load(mutations(loader))`

Author: Paulo Moura

Version: 0:1:0

Date: 2023-11-24

Compilation flags:

`static, context_switching_calls`

Provides:

`mutations_store::mutation/4`

Uses:

`fast_random`

`list`

Remarks:

(none)

Inherited public predicates:

(none)

- `Public predicates`
- `Protected predicates`
- `Private predicates`
- `Operators`

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`type`

`object`

1.53.5 default_list_mutations

Default list mutations.

Availability:

```
logtalk_load(mutations(loader))
```

Author: Paulo Moura

Version: 0:1:0

Date: 2023-11-24

Compilation flags:

```
static, context_switching_calls
```

Provides:

```
mutations_store::mutation/4
```

Uses:

```
fast_random
```

```
list
```

```
mutations_store
```

Remarks:

```
(none)
```

Inherited public predicates:

```
(none)
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

[type](#)

category

1.53.6 mutations

Adds mutations support to the library type object.

Availability:

`logtalk_load(mutations(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2023-11-23

Compilation flags:

`static`

Complements:

[type](#)

Uses:

[mutations__store](#)

Remarks:

(none)

Inherited public predicates:
(none)

- Public predicates
 - mutation/3
- Protected predicates
- Private predicates
- Operators

Public predicates

mutation/3

Returns a random mutation of a term into another term of the same type. The input Term is assume to be valid for the given Type.

Compilation flags:
static

Template:
mutation(Type,Term,Mutation)
Mode and number of proofs:
mutation(@callable,@term,-term) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.53.7 mutations_store

Stores mutation definitions for selected types. User extensible by defining objects or categories defining clauses for the mutation/3 predicate and using this object as a hook object for their compilation.

Availability:

`logtalk_load(mutations(loader))`

Author: Paulo Moura

Version: 0:1:0

Date: 2023-11-23

Compilation flags:

`static, context_switching_calls`

Implements:

`public expanding`

Uses:

`fast_random`

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2 term_expansion/2`

- Public predicates
 - `mutation/3`
 - `counter/2`
- Protected predicates
- Private predicates
 - `mutation/4`
 - `counter_/2`

- Operators

Public predicates

`mutation/3`

Returns a random mutation of a term into another term of the same type. The input Term is assumed to be valid for the given Type.

Compilation flags:

`static`

Template:

`mutation(Type,Term,Mutation)`

Mode and number of proofs:

`mutation(@callable,@term,-term) - one`

`counter/2`

Table of the number of mutations available per type.

Compilation flags:

`static`

Template:

`counter(Type,N)`

Mode and number of proofs:

`counter(?callable,?positive_integer) - zero_or_more`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`mutation/4`

Returns a random mutation of a term into another term of the same type using mutator N. The input Term is assume to be valid for the given Type.

Compilation flags:
static, multifile

Template:
mutation(Type,N,Term,Mutation)

Mode and number of proofs:
mutation(?callable,?positive_integer,@term,-term) - zero_or_more

`counter_/2`

Internal counter for the number of mutations available for a given type.

Compilation flags:
dynamic

Template:
counter_(Type,N)

Mode and number of proofs:
counter_(?callable,?positive_integer) - zero_or_more

Operators

(none)

➡ See also

type

1.54 nested_dictionaries

object

1.54.1 navltree

Nested dictionary implementation based on the AVL tree implementation. Uses standard order to compare keys.

Availability:

```
logtalk_load(nested_dictionaries(loader))
```

Author: Paul Brown and Paulo Moura.

Version: 0:1:0

Date: 2021-04-09

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public nested_dictionary_protocol
```

Extends:

```
private avltree
```

Remarks:

(none)

Inherited public predicates:

```
as_curly_bracketed/2 as_nested_dictionary/2 delete_in/4 empty/1 insert_in/4 lookup_in/3
new/1 update_in/4 update_in/5
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates


(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

nrbtree, nbintree

object

1.54.2 nbintree

Nested dictionary implementation based on the simple binary tree implementation. Uses standard order to compare keys.

Availability:

`logtalk_load(nested_dictionaries(loader))`

Author: Paul Brown and Paulo Moura.

Version: 0:1:0

Date: 2021-04-09

Compilation flags:

`static, context_switching_calls`

Implements:

public nested_dictionary_protocol

Extends:

private bintree

Remarks:

(none)

Inherited public predicates:

as_curly_bracketed/2 as_nested_dictionary/2 delete_in/4 empty/1 insert_in/4 lookup_in/3
new/1 update_in/4 update_in/5

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

nrbtree, navltree

protocol

1.54.3 nested_dictionary_protocol

Nested dictionary protocol.

Availability:

`logtalk_load(nested_dictionaries(loader))`

Author: Paul Brown and Paulo Moura

Version: 0:1:0

Date: 2021-04-07

Compilation flags:

`static`

Dependencies:

`(none)`

Remarks:

`(none)`

Inherited public predicates:

`(none)`

- Public predicates
 - `new/1`
 - `empty/1`
 - `as_nested_dictionary/2`
 - `as_curly_bracketed/2`
 - `lookup_in/3`
 - `update_in/4`
 - `update_in/5`
 - `insert_in/4`
 - `delete_in/4`
- Protected predicates
- Private predicates
- Operators

Public predicates

`new/1`

Create an empty (nested) dictionary.

Compilation flags:

`static`

Template:

`new(Dictionary)`

Mode and number of proofs:

`new(--dictionary) - one`

`empty/1`

True iff the dictionary is empty.

Compilation flags:

`static`

Template:

`empty(Dictionary)`

Mode and number of proofs:

`empty(@dictionary) - zero_or_one`

`as_nested_dictionary/2`

Creates a (nested) dictionary term from a curly-bracketed term representation.

Compilation flags:

`static`

Template:

`as_nested_dictionary(Term,Dictionary)`

Mode and number of proofs:

`as_nested_dictionary(++term,--dictionary) - one_or_error`

`as_curly_bracketed/2`

Creates a a curly-brackted term representation from a (nested) dictionary.

Compilation flags:

`static`

Template:

`as_curly_bracketed(Dictionary,Term)`

Mode and number of proofs:

`as_curly_bracketed(+dictionary,--term) - one_or_error`

`lookup_in/3`

Lookup a chain of keys in a nested dictionary. Unifies Value with Dictionary when Keys is the empty list.

Compilation flags:

`static`

Template:

`lookup_in(Keys,Value,Dictionary)`

Mode and number of proofs:

`lookup_in(++list(ground),?term,+dictionary) - zero_or_more`

`update_in/4`

Updates the value found by traversing through the nested keys.

Compilation flags:

`static`

Template:

`update_in(OldDictionary,Keys,Value,NewDictionary)`

Mode and number of proofs:

```
update_in(+dictionary,++list(ground),++term,--dictionary) - zero_or_one
```

update_in/5

Updates the value found by traversing through the nested keys, only succeeding if the value found after traversal matches the old value.

Compilation flags:

static

Template:

```
update_in(OldDictionary,Keys,OldValue,NewValue,NewDictionary)
```

Mode and number of proofs:

```
update_in(+dictionary,++list(ground),?term,++term,--dictionary) - zero_or_one
```

insert_in/4

Inserts a key-value pair into a dictionary by traversing through the nested keys. When the key already exists, the associated value is updated.

Compilation flags:

static

Template:

```
insert_in(OldDictionary,Keys,Value,NewDictionary)
```

Mode and number of proofs:

```
insert_in(+dictionary,++list(ground),++term,--dictionary) - zero_or_one
```

`delete_in/4`

Deletes a matching key-value pair from a dictionary by traversing through the nested keys, returning the updated dictionary.

Compilation flags:

`static`

Template:

`delete_in(OldDictionary,Keys,Value,NewDictionary)`

Mode and number of proofs:

`delete_in(+dictionary,++list(ground),?term,--dictionary) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

`navltree`, `nbintree`, `nrbtree`

object

1.54.4 `nrbtree`

Nested dictionary implementation based on the red-black tree implementation. Uses standard order to compare keys.

Availability:

`logtalk_load(nested_dictionaries(loader))`

Author: Paul Brown and Paulo Moura.

Version: 0:1:0

Date: 2021-04-09

Compilation flags:

static, context_switching_calls

Implements:

public nested_dictionary_protocol

Extends:

private rbtree

Remarks:

(none)

Inherited public predicates:

as_curly_bracketed/2 as_nested_dictionary/2 delete_in/4 empty/1 insert_in/4 lookup_in/3
new/1 update_in/4 update_in/5

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

[navltree](#), [nbintree](#)

1.55 optionals

object

1.55.1 maybe

Types and predicates for type-checking and handling optional terms. Inspired by Haskell.

Availability:

`logtalk_load(optionals(loader))`

Author: Paulo Moura

Version: 0:7:0

Date: 2021-01-03

Compilation flags:

`static, context_switching_calls`

Provides:

`type::type/1`

`type::check/2`

`arbitrary::arbitrary/1`

`arbitrary::arbitrary/2`

Uses:

`optional`

`optional(Optional)`

`random`

`type`

Remarks:

- Type-checking support: Defines type `maybe(Type)` for checking optional terms where the value hold by the optional term must be of the given type.

- QuickCheck support: Defines clauses for the `arbitrary::arbitrary/1-2` predicates to allow generating random values for the `maybe(Type)` type.

Inherited public predicates:

(none)

- Public predicates
 - `cat/2`
- Protected predicates
- Private predicates
- Operators

Public predicates

`cat/2`

Returns the values stored in the non-empty optional terms.

Compilation flags:

`static`

Template:

`cat(Optionals,Values)`

Mode and number of proofs:

`cat(+list(optional),-list) - one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`optional`, `optional(Optional)`, `type`, `arbitrary`

object

1.55.2 optional

Constructors for optional terms. An optional term is either empty or holds a value. Optional terms should be regarded as opaque terms and always used with the `optional/1` object by passing the optional term as a parameter.

Availability:

`logtalk_load(optionals(loader))`

Author: Paulo Moura

Version: 2:1:0

Date: 2021-01-03

Compilation flags:

`static`, `context_switching_calls`

Provides:

`type::type/1`

`type::check/2`

Remarks:

- Type-checking support: This object also defines a type optional for use with the type library object.

Inherited public predicates:

(none)

- Public predicates
 - empty/1
 - of/2
 - from_goal/3
 - from_goal/2
 - from_generator/3
 - from_generator/2
- Protected predicates
- Private predicates
- Operators

Public predicates

empty/1

Constructs an empty optional term.

Compilation flags:

static

Template:

empty(Optional)

Mode and number of proofs:

empty(--nonvar) - one

of/2

Constructs an optional term holding the given value.

Compilation flags:

static

Template:

of(Value,Optional)

Mode and number of proofs:

of(@term,--nonvar) - one

`from_goal/3`

Constructs an optional term holding a value bound by calling the given goal. Returns an empty optional term if the goal fails or throws an error.

Compilation flags:

`static`

Template:

`from_goal(Goal,Value,Optional)`

Meta-predicate template:

`from_goal(0,*,*)`

Mode and number of proofs:

`from_goal(+callable,--term,--nonvar) - one`

`from_goal/2`

Constructs an optional term holding a value bound by calling the given closure. Returns an empty optional term if the closure fails or throws an error.

Compilation flags:

`static`

Template:

`from_goal(Closure,Optional)`

Meta-predicate template:

`from_goal(1,*)`

Mode and number of proofs:

`from_goal(+callable,--nonvar) - one`

`from_generator/3`

Constructs optional terms with the values generated by calling the given goal. On goal error or failure, returns an empty optional.

Compilation flags:

`static`

Template:

`from_generator(Goal, Value, Optional)`

Meta-predicate template:

`from_generator(0, *, *)`

Mode and number of proofs:

`from_generator(+callable, --term, --nonvar) - one_or_more`

`from_generator/2`

Constructs optional terms with the values generated by calling the given closure. On closure error or failure, returns an empty optional.

Compilation flags:

`static`

Template:

`from_generator(Closure, Optional)`

Meta-predicate template:

`from_generator(1, *)`

Mode and number of proofs:

`from_generator(+from_generator, --nonvar) - one_or_more`

Protected predicates


(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`optional(Optional), type`

object

1.55.3 `optional(Optional)`

Optional term handling predicates. Requires passing an optional term (constructed using the optional object predicates) as a parameter.

Availability:

`logtalk_load(optionals(loader))`

Author: Paulo Moura

Version: 1:7:0

Date: 2019-11-26

Compilation flags:

`static, context_switching_calls`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - `is_empty/0`

- is_present/0
- if_empty/1
- if_present/1
- if_present_or_else/2
- filter/2
- map/2
- flat_map/2
- or/2
- get/1
- or_else/2
- or_else_get/2
- or_else_call/2
- or_else_fail/1
- or_else_throw/2
- Protected predicates
- Private predicates
- Operators

Public predicates

is_empty/0

True if the optional term is empty. See also the if_empty/1 predicate.

Compilation flags:

static

Mode and number of proofs:

is_empty - zero_or_one

`is_present/0`

True if the optional term holds a value. See also the `if_present/1` predicate.

Compilation flags:

`static`

Mode and number of proofs:

`is_present - zero_or_one`

`if_empty/1`

Calls a goal if the optional term is empty. Succeeds otherwise.

Compilation flags:

`static`

Template:

`if_empty(Goal)`

Meta-predicate template:

`if_empty(0)`

Mode and number of proofs:

`if_empty(+callable) - zero_or_more`

`if_present/1`

Applies a closure to the value hold by the optional term if not empty. Succeeds otherwise.

Compilation flags:

`static`

Template:

`if_present(Closure)`

Meta-predicate template:

`if_present(1)`

Mode and number of proofs:

`if_present(+callable) - zero_or_more`

`if_present_or_else/2`

Applies a closure to the value hold by the optional term if not empty. Otherwise calls the given goal.

Compilation flags:

`static`

Template:

`if_present_or_else(Closure,Goal)`

Meta-predicate template:

`if_present_or_else(1,0)`

Mode and number of proofs:

`if_present_or_else(+callable,+callable) - zero_or_more`

`filter/2`

Returns the optional term when it is not empty and the value it holds satisfies a closure. Otherwise returns an empty optional term.

Compilation flags:

`static`

Template:

`filter(Closure,NewOptional)`

Meta-predicate template:

`filter(1,*)`

Mode and number of proofs:

`filter(+callable,--nonvar) - one`

`map/2`

When the optional term is not empty and mapping a closure with the value it holds and the new value as additional arguments is successful, returns an optional term with the new value. Otherwise returns an empty optional term.

Compilation flags:

`static`

Template:

`map(Closure,NewOptional)`

Meta-predicate template:

`map(2,*)`

Mode and number of proofs:

`map(+callable,--nonvar) - one`

`flat_map/2`

When the optional term is not empty and mapping a closure with the value it holds and the new optional term as additional arguments is successful, returns the new optional term. Otherwise returns an empty optional term.

Compilation flags:

`static`

Template:

`flat_map(Closure,NewOptional)`

Meta-predicate template:

`flat_map(2,*)`

Mode and number of proofs:

`flat_map(+callable,--nonvar) - one`

or/2

Returns the same optional term if not empty. Otherwise calls closure to generate a new optional term. Fails if optional term is empty and calling the closure fails or throws an error.

Compilation flags:

static

Template:

or(NewOptional,Closure)

Meta-predicate template:

or(*,1)

Mode and number of proofs:

or(--term,@callable) - zero_or_one

get/1

Returns the value hold by the optional term if not empty. Throws an error otherwise.

Compilation flags:

static

Template:

get(Value)

Mode and number of proofs:

get(--term) - one_or_error

Exceptions:

Optional is empty:

existence_error(optional_term,Optional)

`or_else/2`

Returns the value hold by the optional term if not empty or the given default value if the optional term is empty.

Compilation flags:

`static`

Template:

`or_else(Value,Default)`

Mode and number of proofs:

`or_else(--term,@term) - one`

`or_else_get/2`

Returns the value hold by the optional term if not empty. Applies a closure to compute the value otherwise. Throws an error when the optional term is empty and the value cannot be computed.

Compilation flags:

`static`

Template:

`or_else_get(Value,Closure)`

Meta-predicate template:

`or_else_get(*,1)`

Mode and number of proofs:

`or_else_get(--term,+callable) - one_or_error`

Exceptions:

Optional is empty and the term cannot be computed:

`existence_error(optional_term,Optional)`

`or_else_call/2`

Returns the value hold by the optional term if not empty or calls a goal deterministically if the optional term is empty.

Compilation flags:

`static`

Template:

`or_else_call(Value,Goal)`

Meta-predicate template:

`or_else_call(*,0)`

Mode and number of proofs:

`or_else_call(--term,+callable) - zero_or_one`

`or_else_fail/1`

Returns the value hold by the optional term if not empty. Fails otherwise. Usually called to skip over empty optional terms.

Compilation flags:

`static`

Template:

`or_else_fail(Value)`

Mode and number of proofs:

`or_else_fail(--term) - zero_or_one`

`or_else_throw/2`

Returns the value hold by the optional term if not empty. Throws the given error otherwise.

Compilation flags:

`static`

Template:

`or_else_throw(Value,Error)`

Mode and number of proofs:

```
or_else_throw(--term,@nonvar) - one_or_error
```

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

[optional](#)

1.56 options

category

1.56.1 options

Options processing predicates. Options are represented by compound terms where the functor is the option name.

Availability:

```
logtalk_load(options(loader))
```

Author: Paulo Moura

Version: 1:2:0

Date: 2022-01-03

Compilation flags:

```
static
```

Implements:

```
public options_protocol
```


Uses:

`list`

Remarks:

(none)

Inherited public predicates:

`check_option/1` `check_options/1` `default_option/1` `default_options/1` `option/2` `option/3`
`valid_option/1` `valid_options/1`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

`protocol`

1.56.2 options_protocol

Options protocol.

Availability:

`logtalk_load(options(loader))`

Author: Paulo Moura

Version: 1:2:0

Date: 2022-01-03

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - check_option/1
 - check_options/1
 - valid_option/1
 - valid_options/1
 - default_option/1
 - default_options/1
 - option/2
 - option/3
- Protected predicates
 - merge_options/2
 - fix_options/2
 - fix_option/2
- Private predicates
- Operators

Public predicates

`check_option/1`

Succeeds if the option is valid. Throws an error otherwise.

Compilation flags:

`static`

Template:

`check_option(Option)`

Mode and number of proofs:

`check_option(@term) - one_or_error`

Exceptions:

Option is a variable:

`instantiation_error`

Option is neither a variable nor a compound term:

`type_error(compound,Option)`

Option is a compound term but not a valid option:

`domain_error(option,Option)`

`check_options/1`

Succeeds if all the options in a list are valid. Throws an error otherwise.

Compilation flags:

`static`

Template:

`check_options(Options)`

Mode and number of proofs:

`check_options(@term) - one_or_error`

Exceptions:

Options is a variable:

`instantiation_error`

Options is neither a variable nor a list:

`type_error(list,Options)`

An element Option of the list Options is a variable:

`instantiation_error`

An element Option of the list Options is neither a variable nor a compound term:

`type_error(compound,Option)`

An element Option of the list Options is a compound term but not a valid option:

`domain_error(option,Option)`

`valid_option/1`

Succeeds if the option is valid.

Compilation flags:

`static`

Template:

`valid_option(Option)`

Mode and number of proofs:

`valid_option(@term) - zero_or_one`

`valid_options/1`

Succeeds if all the options in a list are valid.

Compilation flags:

`static`

Template:

`valid_options(Options)`

Mode and number of proofs:

`valid_options(@term) - one`

`default_option/1`

Enumerates, by backtracking, the default options.

Compilation flags:

`static`

Template:

`default_option(Option)`

Mode and number of proofs:

`default_option(?compound) - zero_or_more`

`default_options/1`

Returns a list of the default options.

Compilation flags:

`static`

Template:

`default_options(Options)`

Mode and number of proofs:

`default_options(-list(compound)) - one`

`option/2`

True iff Option unifies with the first occurrence of the same option in the Options list.

Compilation flags:

`static`

Template:

`option(Option,Options)`

Mode and number of proofs:

`option(+compound,+list(compound)) - zero_or_one`

`option/3`

True iff `Option` unifies with the first occurrence of the same option in the `Options` list or, when that is not the case, if `Option` unifies with `Default`.

Compilation flags:

`static`

Template:

`option(Option,Options,Default)`

Mode and number of proofs:

`option(+compound,+list(compound),+compound) - zero_or_one`

Protected predicates

`merge_options/2`

Merges the user options with the default options, returning the final list of options. Calls the `fix_options/2` predicate to preprocess the options after merging. Callers must ensure, if required, that the user options are valid.

Compilation flags:

`static`

Template:

`merge_options(UserOptions,Options)`

Mode and number of proofs:

`merge_options(+list(compound),-list(compound)) - one`

`fix_options/2`

Fixes a list of options, returning the list of options.

Compilation flags:

`static`

Template:

```
fix_options(Options,FixedOptions)
```

Mode and number of proofs:

```
fix_options(+list(compound),-list(compound)) - one
```

`fix_option/2`

Fixes an option.

Compilation flags:

```
static
```

Template:

```
fix_option(Option,FixedOption)
```

Mode and number of proofs:

```
fix_option(+compound,-compound) - zero_or_one
```

Private predicates

(none)

Operators

(none)

 See also

[options](#)

1.57 os

object

1.57.1 `os`

Portable operating-system access predicates.

Availability:

```
logtalk_load(os(loader))
```

Author: Paulo Moura

Version: 1:102:0

Date: 2025-11-15

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public osp
```

Uses:

```
list
```

Aliases:

```
osp absolute_file_name/2 as expand_path/2
```

Remarks:

- File path expansion: To ensure portability, all file paths are expanded before being handed to the backend Prolog system.
- Exception terms: Currently, there is no standardization of the exception terms thrown by the different backend Prolog systems.
- B-Prolog portability: The `wall_time/1` predicate is not supported.
- CxProlog portability: The `date_time/7` predicate returns zeros for all arguments.
- JIProlog portability: The `file_permission/2` and `command_line_arguments/1` predicates are not supported.
- Quintus Prolog: The `pid/1` and `shell/2` predicates are not supported.
- XSB portability: The `command_line_arguments/1` predicate is not supported.

Inherited public predicates:

```
absolute_file_name/2 change_directory/1 command_line_arguments/1 copy_file/2 cpu_time/1  
date_time/7 decompose_file_name/3 decompose_file_name/4 delete_directory/1  
delete_directory_and_contents/1 delete_directory_contents/1 delete_file/1 directory_exists/1  
directory_files/2 directory_files/3 ensure_directory/1 ensure_file/1 environment_variable/2  
file_exists/1 file_modification_time/2 file_permission/2 file_size/2 full_device_path/1  
internal_os_path/2 is_absolute_file_name/1 make_directory/1 make_directory_path/1  
null_device_path/1 operating_system_machine/1 operating_system_name/1  
operating_system_release/1 operating_system_type/1 path_concat/3 pid/1
```


read_only_device_path/1 rename_file/2 shell/1 shell/2 sleep/1 temporary_directory/1
time_stamp/1 wall_time/1 working_directory/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

[os_types](#)

category

1.57.2 os_types

A set of operating-system related types.

Availability:

logtalk_load(os(loader))

Author: Paulo Moura

Version: 1:4:0

Date: 2021-02-12

Compilation flags:

static

Provides:

type::type/1
type::check/2

Uses:

list
os

Remarks:

- Provided types: This category adds file, file(Extensions), file(Extensions,Permissions), directory, directory(Permissions), and environment_variable types for type-checking when using the type library object.
- Type file: For checking if a term is an atom and an existing file.
- Type file(Extensions): For checking if a term is an atom and an existing file with one of the listed extensions (specified as '.ext').
- Type file(Extensions,Permissions): For checking if a term is an atom and an existing file with one of the listed extensions (specified as '.ext') and listed permissions ({read, write, execute}).
- Type directory: For checking if a term is an atom and an existing directory.
- Type directory(Permissions): For checking if a term is an atom and an existing directory with the listed permissions ({read, write, execute}).
- Type environment_variable: For checking if a term is an atom and an existing environment variable.

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

osp, os, type

protocol

1.57.3 osp

Portable operating-system access protocol.

Availability:

`logtalk_load(os(loader))`

Author: Paulo Moura

Version: 1:41:0

Date: 2025-05-19

Compilation flags:

`static`

Dependencies:

(none)

Remarks:

- Error handling: Predicates that require a file or directory to exist throw an error when that is not the case. But the exact exception term is currently backend Prolog compiler dependent.

- CPU and wall time accuracy: Depends on the backend and can be different between CPU and wall time (e.g. CPU time can have nanosecond accuracy with wall time only having millisecond accuracy).

Inherited public predicates:

(none)

- Public predicates
 - pid/1
 - shell/2
 - shell/1
 - is_absolute_file_name/1
 - absolute_file_name/2
 - decompose_file_name/3
 - decompose_file_name/4
 - path_concat/3
 - internal_os_path/2
 - make_directory/1
 - make_directory_path/1
 - delete_directory/1
 - delete_directory_contents/1
 - delete_directory_and_contents/1
 - change_directory/1
 - working_directory/1
 - temporary_directory/1
 - null_device_path/1
 - full_device_path/1
 - read_only_device_path/1
 - directory_files/2
 - directory_files/3
 - directory_exists/1
 - ensure_directory/1
 - file_exists/1
 - file_modification_time/2
 - file_size/2
 - file_permission/2

- copy_file/2
- rename_file/2
- delete_file/1
- ensure_file/1
- environment_variable/2
- time_stamp/1
- date_time/7
- cpu_time/1
- wall_time/1
- operating_system_type/1
- operating_system_name/1
- operating_system_machine/1
- operating_system_release/1
- command_line_arguments/1
- sleep/1
- Protected predicates
- Private predicates
- Operators

Public predicates

pid/1

Returns the process identifier of the running process.

Compilation flags:

static

Template:

pid(PID)

Mode and number of proofs:

pid(-integer) - one

shell/2

Runs an operating-system shell command and returns its exit status.

Compilation flags:

static

Template:

shell(Command,Status)

Mode and number of proofs:

shell(+atom,-integer) - one

shell/1

Runs an operating-system shell command.

Compilation flags:

static

Template:

shell(Command)

Mode and number of proofs:

shell(+atom) - zero_or_one

is_absolute_file_name/1

True iff the argument is an absolute file path. On POSIX systems, this predicate is true if File starts with a /. On Windows systems, this predicate is true if File starts with a drive letter. No attempt is made to expand File as a path.

Compilation flags:

static

Template:

is_absolute_file_name(File)

Mode and number of proofs:

is_absolute_file_name(+atom) - zero_or_one

`absolute_file_name/2`

Expands a file name to an absolute file path. An environment variable at the beginning of the file name is also expanded.

Compilation flags:

static

Template:

`absolute_file_name(File,Path)`

Mode and number of proofs:

`absolute_file_name(+atom,-atom) - one`

`decompose_file_name/3`

Decomposes a file name into its directory (which always ends with a slash; `./` is returned if absent) and its basename (which can be the empty atom).

Compilation flags:

static

Template:

`decompose_file_name(File,Directory,Basename)`

Mode and number of proofs:

`decompose_file_name(+atom,?atom,?atom) - one`

`decompose_file_name/4`

Decomposes a file name into its directory (which always ends with a slash; `./` is returned if absent), name (that can be the empty atom), and extension (which starts with a `.` when defined; the empty atom otherwise).

Compilation flags:

static

Template:

```
decompose_file_name(File,Directory,Name,Extension)
```

Mode and number of proofs:

```
decompose_file_name(+atom,?atom,?atom,?atom) - one
```

`path_concat/3`

Concatenates a path prefix and a path suffix, adding a / separator if required. Returns Suffix when it is an absolute path. Returns Prefix with a trailing / appended if missing when Suffix is the empty atom.

Compilation flags:

```
static
```

Template:

```
path_concat(Prefix,Suffix,Path)
```

Mode and number of proofs:

```
path_concat(+atom,+atom,--atom) - one
```

`internal_os_path/2`

Converts between the internal path representation (which is backend dependent) and the operating-system native path representation.

Compilation flags:

```
static
```

Template:

```
internal_os_path(InternalPath,OSPath)
```

Mode and number of proofs:

```
internal_os_path(+atom,-atom) - one
```

```
internal_os_path(-atom,+atom) - one
```

`make_directory/1`

Makes a new directory. Succeeds if the directory already exists.

Compilation flags:

`static`

Template:

`make_directory(Directory)`

Mode and number of proofs:

`make_directory(+atom) - one`

`make_directory_path/1`

Makes a new directory creating all the intermediate directories if necessary. Succeeds if the directory already exists.

Compilation flags:

`static`

Template:

`make_directory_path(Directory)`

Mode and number of proofs:

`make_directory_path(+atom) - one`

`delete_directory/1`

Deletes an empty directory. Throws an error if the directory does not exist.

Compilation flags:

`static`

Template:

`delete_directory(Directory)`

Mode and number of proofs:

`delete_directory(+atom) - one_or_error`

`delete_directory_contents/1`

Deletes directory contents. Throws an error if the directory does not exist.

Compilation flags:

`static`

Template:

`delete_directory_contents(Directory)`

Mode and number of proofs:

`delete_directory_contents(+atom) - one_or_error`

`delete_directory_and_contents/1`

Deletes directory and its contents. Throws an error if the directory does not exist.

Compilation flags:

`static`

Template:

`delete_directory_and_contents(Directory)`

Mode and number of proofs:

`delete_directory_and_contents(+atom) - one_or_error`

`change_directory/1`

Changes current working directory. Throws an error if the directory does not exist.

Compilation flags:

`static`

Template:

`change_directory(Directory)`

Mode and number of proofs:

`change_directory(+atom) - one_or_error`

`working_directory/1`

Current working directory.

Compilation flags:

`static`

Template:

`working_directory(Directory)`

Mode and number of proofs:

`working_directory(?atom) - zero_or_one`

`temporary_directory/1`

Temporary directory. Tries first environment variables: TEMP and TMP on Windows systems; TMPDIR, TMP, TEMP, and TEMPDIR on POSIX systems. When not defined, tries default locations. Returns the working directory as last resort.

Compilation flags:

`static`

Template:

`temporary_directory(Directory)`

Mode and number of proofs:

`temporary_directory(?atom) - one`

`null_device_path/1`

Null device path: nul on Windows systems and /dev/null on POSIX systems.

Compilation flags:

static

Template:

`null_device_path(Path)`

Mode and number of proofs:

`null_device_path(?atom) - one`

`full_device_path/1`

Full device path: /dev/full on Linux and BSD systems. Fails on other systems. Experimental.

Compilation flags:

static

Template:

`full_device_path(Path)`

Mode and number of proofs:

`full_device_path(?atom) - zero_or_one`

`read_only_device_path/1`

Read-only device path: /dev/urandom on macOS. Fails on other systems. Experimental.

Compilation flags:

static

Template:

`read_only_device_path(Path)`

Mode and number of proofs:

`read_only_device_path(?atom) - zero_or_one`

`directory_files/2`

Returns a list of all files (including directories, regular files, and hidden directories and files) in a directory. File paths are relative to the directory. Throws an error if the directory does not exist.

Compilation flags:

`static`

Template:

`directory_files(Directory,Files)`

Mode and number of proofs:

`directory_files(+atom,-list(atom)) - one_or_error`

`directory_files/3`

Returns a list of files filtered using the given list of options. Invalid options are ignored. Default option values are equivalent to `directory_files/2`. Throws an error if the directory does not exist.

Compilation flags:

`static`

Template:

`directory_files(Directory,Files,Options)`

Mode and number of proofs:

`directory_files(+atom,-list(atom),+list(compound)) - one_or_error`

Remarks:

- Option `paths/1`: Possible values are relative and absolute. Default is relative.
 - Option `type/1`: Possible values are all, regular, directory. Default is all.
 - Option `extensions/1`: Argument is a list of required extensions (using the format `'.ext'`). Default is the empty list.
 - Option `prefixes/1`: Argument is a list of required file prefixes (atoms). Default is the empty list.
 - Option `suffixes/1`: Argument is a list of required file suffixes (atoms). Default is the empty list.
 - Option `dot_files/1`: Possible values are true and false. Default is true.
-

`directory_exists/1`

True if the specified directory exists (irrespective of directory permissions).

Compilation flags:

`static`

Template:

`directory_exists(Directory)`

Mode and number of proofs:

`directory_exists(+atom) - zero_or_one`

`ensure_directory/1`

Ensures that a directory exists, creating it if necessary.

Compilation flags:

`static`

Template:

`ensure_directory(Directory)`

Mode and number of proofs:

`ensure_directory(+atom) - one`

`file_exists/1`

True if the specified file exists and is a regular file (irrespective of file permissions).

Compilation flags:

`static`

Template:

`file_exists(File)`

Mode and number of proofs:

`file_exists(+atom) - zero_or_one`

`file_modification_time/2`

File modification time (which can be used for comparison). Throws an error if the file does not exist.

Compilation flags:

`static`

Template:

`file_modification_time(File,Time)`

Mode and number of proofs:

`file_modification_time(+atom,-integer) - one_or_error`

`file_size/2`

File size (in bytes). Throws an error if the file does not exist.

Compilation flags:

`static`

Template:

`file_size(File,Size)`

Mode and number of proofs:

`file_size(+atom,-integer) - one_or_error`

`file_permission/2`

True iff the specified file has the specified permission (read, write, or execute). Throws an error if the file does not exist.

Compilation flags:

`static`

Template:

`file_permission(File,Permission)`

Mode and number of proofs:

`file_permission(+atom,+atom) - zero_or_one_or_error`

`copy_file/2`

Copies a file. Throws an error if the original file does not exist or if the copy cannot be created.

Compilation flags:

`static`

Template:

`copy_file(File,Copy)`

Mode and number of proofs:

`copy_file(+atom,+atom) - one_or_error`

`rename_file/2`

Renames a file or a directory. Throws an error if the file or directory does not exist.

Compilation flags:

`static`

Template:

`rename_file(Old,New)`

Mode and number of proofs:

`rename_file(+atom,+atom) - one_or_error`

`delete_file/1`

Deletes a file. Throws an error if the file does not exist.

Compilation flags:

`static`

Template:

`delete_file(File)`

Mode and number of proofs:

`delete_file(+atom) - one_or_error`

`ensure_file/1`

Ensures that a file exists, creating it if necessary.

Compilation flags:

`static`

Template:

`ensure_file(File)`

Mode and number of proofs:

`ensure_file(+atom) - one`

`environment_variable/2`

Returns an environment variable value. Fails if the variable does not exists.

Compilation flags:

`static`

Template:

`environment_variable(Variable,Value)`

Mode and number of proofs:

`environment_variable(+atom,?atom) - zero_or_one`

`time_stamp/1`

Returns a system-dependent time stamp, which can be used for sorting, but should be regarded otherwise as an opaque term.

Compilation flags:

`static`

Template:

time_stamp(Time)

Mode and number of proofs:

time_stamp(-ground) - one

date_time/7

Returns the current date and time. Note that most backends do not provide sub-second accuracy and in those cases the value of the Milliseconds argument is always zero.

Compilation flags:

static

Template:

date_time(Year,Month,Day,Hours,Minutes,Seconds,Milliseconds)

Mode and number of proofs:

date_time(-integer,-integer,-integer,-integer,-integer,-integer,-integer) - one

cpu_time/1

System cpu time in seconds. Accuracy depends on the backend.

Compilation flags:

static

Template:

cpu_time(Seconds)

Mode and number of proofs:

cpu_time(-number) - one

wall_time/1

Wall time in seconds. Accuracy depends on the backend.

Compilation flags:

static

Template:

wall_time(Seconds)

Mode and number of proofs:

wall_time(-number) - one

operating_system_type/1

Operating system type. Possible values are unix, windows, and unknown.

Compilation flags:

static

Template:

operating_system_type(Type)

Mode and number of proofs:

operating_system_type(?atom) - zero_or_one

operating_system_name/1

Operating system name. On POSIX systems, it returns the value of uname -s. On macOS systems, it returns 'Darwin'. On Windows systems, it returns 'Windows'.

Compilation flags:

static

Template:

operating_system_name(Name)

Mode and number of proofs:

operating_system_name(?atom) - zero_or_one

`operating_system_machine/1`

Operating system hardware platform. On POSIX systems, it returns the value of `uname -m`. On Windows systems, it returns the value of the `PROCESSOR_ARCHITECTURE` environment variable.

Compilation flags:

`static`

Template:

`operating_system_machine(Machine)`

Mode and number of proofs:

`operating_system_machine(?atom) - zero_or_one`

`operating_system_release/1`

Operating system release. On POSIX systems, it returns the value of `uname -r`. On Windows systems, it uses WMI code.

Compilation flags:

`static`

Template:

`operating_system_release(Release)`

Mode and number of proofs:

`operating_system_release(?atom) - zero_or_one`

`command_line_arguments/1`

Returns a list with the command line arguments that occur after `--`.

Compilation flags:

`static`

Template:

```
command_line_arguments(Arguments)
```

Mode and number of proofs:

```
command_line_arguments(-list(atom)) - one
```

`sleep/1`

Suspends execution the given number of seconds.

Compilation flags:

```
static
```

Template:

```
sleep(Seconds)
```

Mode and number of proofs:

```
sleep(+number) - one
```

Protected predicates


(none)

Private predicates

(none)

Operators

(none)

 See also

`os`, `os_types`

1.58 packs

protocol

1.58.1 pack_protocol

Pack specification protocol. Objects implementing this protocol should be named after the pack with a `_pack` suffix and saved in a file with the same name as the object.

Availability:

`logtalk_load(packs(loader))`

Author: Paulo Moura

Version: 0:18:0

Date: 2025-05-21

Compilation flags:

`static`

Dependencies:

`(none)`

Remarks:

`(none)`

Inherited public predicates:

`(none)`

- Public predicates
 - `name/1`
 - `description/1`
 - `license/1`
 - `home/1`
 - `version/6`
 - `note/3`
- Protected predicates
- Private predicates

- Operators

Public predicates

name/1

Pack name.

Compilation flags:
static

Template:
name(Name)
Mode and number of proofs:
name(?atom) - zero_or_one

description/1

Pack one line description.

Compilation flags:
static

Template:
description(Description)
Mode and number of proofs:
description(?atom) - zero_or_one

license/1

Pack license. Specified using the identifier from the SPDX License List (<https://spdx.org/licenses/>) when possible.

Compilation flags:
static

Template:

license(License)

Mode and number of proofs:

license(?atom) - zero_or_one

home/1

Pack home HTTPS or file URL.

Compilation flags:

static

Template:

home(Home)

Mode and number of proofs:

home(?atom) - zero_or_one

version/6

Table of available versions.

Compilation flags:

static

Template:

version(Version,Status,URL,Checksum,Dependencies,Portability)

Mode and number of proofs:

version(?compound,?atom,-atom,-pair(atom,atom),-list(pair(atom,callable)),?atom) - zero_or_more
version(?compound,?atom,-atom,-pair(atom,atom),-list(pair(atom,callable)),-list(atom)) -
zero_or_more

Remarks:

- Version: This argument uses the same format as entity versions: Major:Minor:Patch. Semantic versioning should be used.
- Status: Version development status: stable, rc, beta, alpha, experimental, or deprecated.

- URL: File URL for a local directory, file URL for a local archive, download HTTPS URL for the pack archive, or download git archive URL for the pack archive.
 - Checksum: A pair where the key is the hash algorithm and the value is the checksum. Currently, the hash algorithm must be sha256. For file:// URLs of local directories, use none instead of a pair.
 - Dependencies: Pack dependencies list. Each dependency is a Dependency Operator Version term. Operator is a term comparison operator. Valid Dependency values are Registry::Pack, os(Name,Machine), logtalk, and a backend identifier atom.
 - Portability: Either the atom all or a list of the supported backend Prolog compilers (using the identifier atoms used by the prolog_dialect flag).
 - Clause order: Versions must be listed ordered from newest to oldest.
-

note/3

Table of notes per action and version.

Compilation flags:

static

Template:

note(Action,Version,Note)

Mode and number of proofs:

note(?atom,?term,-atom) - zero_or_more

Remarks:

- Action: Possible values are install, update, and uninstall. When unbound, the note apply to all actions.
 - Version: Version being installed, updated, or uninstalled. When unbound, the note apply to all versions.
 - Note: Note to print when performing an action on a pack version.
-

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

object

1.58.2 packs

Pack handling predicates.

Availability:

logtalk__load(packs(loader))

Author: Paulo Moura

Version: 0:87:1

Date: 2025-08-20

Compilation flags:

static, context_switching_calls

Imports:

public packs__common

public options

Uses:

list

logtalk

os

registries

type

user

Remarks:

(none)

Inherited public predicates:

check_option/1 check_options/1 default_option/1 default_options/1 directory/1 directory/2
help/0 logtalk_packs/0 logtalk_packs/1 option/2 option/3 pin/0 pin/1 pinned/1 prefix/0
prefix/1 readme/1 readme/2 reset/0 setup/0 unpin/0 unpin/1 valid_option/1 valid_options/1
verify_commands_availability/0

- Public predicates

- available/2
- available/1
- available/0
- installed/4
- installed/3
- installed/1
- installed/0
- outdated/5
- outdated/4
- outdated/2
- outdated/1
- outdated/0
- orphaned/2
- orphaned/0
- versions/3
- describe/2
- describe/1
- search/1
- install/4
- install/3
- install/2
- install/1
- update/3
- update/2
- update/1
- update/0
- uninstall/2
- uninstall/1
- uninstall/0
- clean/2
- clean/1
- clean/0
- save/2

- save/1
- restore/2
- restore/1
- dependents/3
- dependents/2
- dependents/1
- lint/2
- lint/1
- lint/0
- Protected predicates
- Private predicates
- Operators

Public predicates

available/2

Enumerates, by backtracking, all available packs.

Compilation flags:

static

Template:

available(Registry,Pack)

Mode and number of proofs:

available(?atom,?atom) - zero_or_more

Exceptions:

Registry is neither a variable nor an atom:

type_error(atom,Registry)

Pack is neither a variable nor an atom:

type_error(atom,Pack)

available/1

Lists all the packs that are available for installation from the given registry.

Compilation flags:

static

Template:

available(Registry)

Mode and number of proofs:

available(+atom) - one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

available/0

Lists all the packs that are available for installation from all defined registries.

Compilation flags:

static

Mode and number of proofs:

available - one

installed/4

Enumerates by backtracking all installed packs.

Compilation flags:

static

Template:

installed(Registry,Pack,Version,Pinned)

Mode and number of proofs:

installed(?atom,?atom,?compound,?boolean) - zero_or_more

Exceptions:

Registry is neither a variable nor an atom:

type__error(atom,Registry)

Pack is neither a variable nor an atom:

type__error(atom,Pack)

Version is neither a variable nor a compound term:

type__error(compound,Version)

Pinned is neither a variable nor a boolean:

type__error(boolean,Pinned)

installed/3

Enumerates by backtracking all installed packs.

Compilation flags:

static

Template:

installed(Registry,Pack,Version)

Mode and number of proofs:

installed(?atom,?atom,?compound) - zero_or_more

Exceptions:

Registry is neither a variable nor an atom:

type__error(atom,Registry)

Pack is neither a variable nor an atom:

type__error(atom,Pack)

Version is neither a variable nor a compound term:

type__error(compound,Version)

installed/1

Lists all the packs that are installed from the given registry. Fails if the registry is unknown.

Compilation flags:

static

Template:

installed(Registry)

Mode and number of proofs:

installed(+atom) - zero_or_one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

installed/0

Lists all the packs that are installed.

Compilation flags:

static

Mode and number of proofs:

installed - one

outdated/5

Enumerates by backtracking all installed but outdated packs (together with the current version installed and the latest version available) using the given options.

Compilation flags:

static

Template:

outdated(Registry,Pack,Version,LatestVersion,Options)

Mode and number of proofs:

outdated(?atom,?atom,?compound,?compound,++list(compound)) - zero_or_more

Exceptions:

Registry is neither a variable nor an atom:

type__error(atom,Registry)

Pack is neither a variable nor an atom:

type__error(atom,Pack)

Version is neither a variable nor a compound term:

type__error(compound,Version)

LatestVersion is neither a variable nor a compound term:

type__error(compound,LatestVersion)

Options is a variable:

instantiation__error

Options is neither a variable nor a list:

type__error(list,Options)

An element Option of the list Options is a variable:

instantiation__error

An element Option of the list Options is neither a variable nor a compound term:

type__error(compound,Option)

An element Option of the list Options is a compound term but not a valid option:

domain__error(option,Option)

Remarks:

- compatible(Boolean) option: Restrict listing to compatible packs. Default is true.
 - status(Status) option: Restrict listing to updates with the given status. Default is [stable,rc,beta,alpha]. Set to all to also list experimental and deprecated updates.
-

outdated/4

Enumerates by backtracking all installed but outdated packs (together with the current version installed and the latest version available) using default options.

Compilation flags:

static

Template:

outdated(Registry,Pack,Version,LatestVersion)

Mode and number of proofs:

outdated(?atom,?atom,?compound,?compound) - zero_or_more

Exceptions:

Registry is neither a variable nor an atom:

`type__error(atom,Registry)`

Pack is neither a variable nor an atom:

`type__error(atom,Pack)`

Version is neither a variable nor a compound term:

`type__error(compound,Version)`

LatestVersion is neither a variable nor a compound term:

`type__error(compound,LatestVersion)`

See also:

[outdated/5](#)

[outdated/2](#)

Lists all the packs from the given registry that are installed but outdated using the given options.

Compilation flags:

`static`

Template:

`outdated(Registry,Options)`

Mode and number of proofs:

`outdated(+atom,++list(compound)) - one`

Exceptions:

Registry is neither a variable nor an atom:

`type__error(atom,Registry)`

Options is a variable:

`instantiation__error`

Options is neither a variable nor a list:

`type__error(list,Options)`

An element Option of the list Options is a variable:

`instantiation__error`

An element Option of the list Options is neither a variable nor a compound term:

`type__error(compound,Option)`

An element Option of the list Options is a compound term but not a valid option:

`domain__error(option,Option)`

Remarks:

- `compatible(Boolean)` option: Restrict installation to compatible packs. Default is true.
 - `status(Status)` option: Restrict listing to updates with the given status. Default is `[stable,rc,beta,alpha]`. Set to `all` to also list experimental and deprecated updates.
-

[outdated/1](#)

Lists all the packs from the given registry that are installed but outdated using default options.

Compilation flags:

`static`

Template:

`outdated(Registry)`

Mode and number of proofs:

`outdated(+atom) - one`

Exceptions:

Registry is neither a variable nor an atom:

`type_error(atom,Registry)`

See also:

[outdated/2](#)

[outdated/0](#)

Lists all the packs that are installed but outdated using default options.

Compilation flags:

`static`

Mode and number of proofs:

`outdated - one`

See also:

[outdated/1](#)

orphaned/2

Lists all the packs that are installed but whose registry is no longer defined.

Compilation flags:

static

Template:

orphaned(Registry,Pack)

Mode and number of proofs:

orphaned(?atom,?atom) - zero_or_more

Exceptions:

Registry is neither a variable nor an atom:

type_error(atom,Registry)

Pack is neither a variable nor an atom:

type_error(atom,Pack)

orphaned/0

Lists all the packs that are installed but whose registry is no longer defined.

Compilation flags:

static

Mode and number of proofs:

orphaned - one

versions/3

Returns a list of all available pack versions. Fails if the pack is unknown.

Compilation flags:

static

Template:

versions(Registry,Pack,Versions)

Mode and number of proofs:

versions(+atom,+atom,-list) - zero_or_one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

Pack is a variable:

instantiation_error

Pack is neither a variable nor an atom:

type_error(atom,Pack)

describe/2

Describes a registered pack, including installed version if applicable. Fails if the pack is unknown.

Compilation flags:

static

Template:

describe(Registry,Pack)

Mode and number of proofs:

describe(+atom,+atom) - zero_or_one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

Pack is a variable:

instantiation_error

Pack is neither a variable nor an atom:

type_error(atom,Pack)

describe/1

Describes a registered pack, including installed version if applicable. Fails if the pack is unknown.

Compilation flags:

static

Template:

describe(Pack)

Mode and number of proofs:

describe(+atom) - zero_or_one

Exceptions:

Pack is a variable:

instantiation_error

Pack is neither a variable nor an atom:

type_error(atom,Pack)

search/1

Searches packs whose name or description includes the search term (case sensitive).

Compilation flags:

static

Template:

search(Term)

Mode and number of proofs:

search(+atom) - one

Exceptions:

Term is a variable:

instantiation_error

Term is neither a variable nor an atom:

type_error(atom,Term)

install/4

Installs a new pack using the specified options. Fails if the pack is unknown or already installed but not using `update(true)` or `force(true)` options. Fails also if the pack version is unknown.

Compilation flags:

static

Template:

install(Registry,Pack,Version,Options)

Mode and number of proofs:

install(+atom,+atom,++compound,++list(compound)) - zero_or_one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

Pack is a variable:

instantiation_error

Pack is neither a variable nor an atom:

type_error(atom,Pack)

Version is a variable:

instantiation_error

Version is neither a variable nor a valid version:

type_error(pack_version,Version)

Options is a variable:

instantiation_error

Options is neither a variable nor a list:

type_error(list,Options)

An element Option of the list Options is a variable:

instantiation_error

An element Option of the list Options is neither a variable nor a compound term:

type_error(compound,Option)

An element Option of the list Options is a compound term but not a valid option:

domain_error(option,Option)

Remarks:

- `update(Boolean)` option: Update pack if already installed. Default is false. Overrides the `force/1` option.
- `force(Boolean)` option: Force pack re-installation if already installed. Default is false.
- `compatible(Boolean)` option: Restrict installation to compatible packs. Default is true.
- `clean(Boolean)` option: Clean pack archive after installation. Default is false.

- `verbose(Boolean)` option: Verbose installing steps. Default is false.
- `checksum(Boolean)` option: Verify pack archive checksum. Default is true.
- `checksig(Boolean)` option: Verify pack archive signature. Default is false.
- `git(Atom)` option: Extra command-line options. Default is ''.
- `downloader(Atom)` option: Downloader utility. Either curl or wget. Default is curl.
- `curl(Atom)` option: Extra command-line options. Default is ''.
- `wget(Atom)` option: Extra command-line options. Default is ''.
- `gpg(Atom)` option: Extra command-line options. Default is ''.
- `tar(Atom)` option: Extra command-line options. Default is ''.

[install/3](#)

Installs the specified version of a pack from the given registry using default options. Fails if the pack is already installed or unknown. Fails also if the pack version is unknown.

Compilation flags:

`static`

Template:

`install(Registry,Pack,Version)`

Mode and number of proofs:

`install(+atom,+atom,?compound) - zero_or_one`

Exceptions:

Registry is a variable:

`instantiation_error`

Registry is neither a variable nor an atom:

`type_error(atom,Registry)`

Pack is a variable:

`instantiation_error`

Pack is neither a variable nor an atom:

`type_error(atom,Pack)`

Version is a variable:

`instantiation_error`

Version is neither a variable nor a valid version:

`type_error(pack_version,Version)`

See also:

[install/4](#)

[install/2](#)

Installs the latest version of a pack from the given registry using default options. Fails if the pack is already installed or unknown.

Compilation flags:

static

Template:

install(Registry,Pack)

Mode and number of proofs:

install(+atom,+atom) - zero_or_one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

Pack is a variable:

instantiation_error

Pack is neither a variable nor an atom:

type_error(atom,Pack)

See also:

[install/3](#)

[install/1](#)

Installs a pack (if its name is unique among all registries) using default options. Fails if the pack is already installed or unknown. Fails also if the pack is available from multiple registries.

Compilation flags:

static

Template:

install(Pack)

Mode and number of proofs:

`install(+atom) - zero_or_one`

Exceptions:

Pack is a variable:

`instantiation_error`

Pack is not an atom:

`type_error(atom,Pack)`

See also:

[install/2](#)

[update/3](#)

Updates an outdated pack to the specified version using the specified options. Fails if the pack or the pack version is unknown or if the pack is not installed. Fails also if the pack is orphaned or pinned and not using a `force(true)` option.

Compilation flags:

`static`

Template:

`update(Pack,Version,Options)`

Mode and number of proofs:

`update(+atom,++callable,++list(callable)) - zero_or_one`

Exceptions:

Pack is a variable:

`instantiation_error`

Pack is neither a variable nor an atom:

`type_error(atom,Pack)`

Version is a variable:

`instantiation_error`

Version is neither a variable nor a valid version:

`type_error(pack_version,Version)`

Options is a variable:

`instantiation_error`

Options is neither a variable nor a list:

`type_error(list,Options)`

An element Option of the list Options is a variable:

`instantiation_error`

An element Option of the list Options is neither a variable nor a compound term:

```
type_error(compound,Option)
An element Option of the list Options is a compound term but not a valid option:
domain_error(option,Option)
```

Remarks:

- `install(Boolean)` option: Install pack latest version if not already installed. Default is false.
 - `force(Boolean)` option: Force update if the pack is pinned or breaks installed packs. Default is false.
 - `compatible(Boolean)` option: Restrict updating to compatible packs. Default is true.
 - `status(Status)` option: Specify allowed pack status. Default is `[stable,rc,beta,alpha]`. Set to `all` to also allow experimental and deprecated.
 - `clean(Boolean)` option: Clean pack archive after updating. Default is false.
 - `verbose(Boolean)` option: Verbose updating steps. Default is false.
 - `checksum(Boolean)` option: Verify pack archive checksum. Default is true.
 - `checksig(Boolean)` option: Verify pack archive signature. Default is false.
 - `git(Atom)` option: Extra command-line options. Default is `''`.
 - `downloader(Atom)` option: Downloader utility. Either `curl` or `wget`. Default is `curl`.
 - `curl(Atom)` option: Extra command-line options. Default is `''`.
 - `wget(Atom)` option: Extra command-line options. Default is `''`.
 - `gpg(Atom)` option: Extra command-line options. Default is `''`.
 - `tar(Atom)` option: Extra command-line options. Default is `''`.
-

update/2

Updates an outdated pack to its latest version using the specified options. Fails if the pack is orphaned, unknown, or not installed. Fails also if the pack is pinned and not using a `force(true)` option.

Compilation flags:

```
static
```

Template:

```
update(Pack,Options)
```

Mode and number of proofs:

```
update(+atom,++list(callable)) - zero_or_one
```

Exceptions:

Pack is a variable:

```
instantiation_error
```

Pack is neither a variable nor an atom:

```

    type_error(atom,Pack)
Options is a variable:
    instantiation_error
Options is neither a variable nor a list:
    type_error(list,Options)
An element Option of the list Options is a variable:
    instantiation_error
An element Option of the list Options is neither a variable nor a compound term:
    type_error(compound,Option)
An element Option of the list Options is a compound term but not a valid option:
    domain_error(option,Option)

```

Remarks:

- `install(Boolean)` option: Install pack latest version if not already installed. Default is false.
- `force(Boolean)` option: Force update if the pack is pinned or breaks installed packs. Default is false.
- `compatible(Boolean)` option: Restrict updating to compatible packs. Default is true.
- `status(Status)` option: Specify allowed pack update status. Default is `[stable,rc,beta,alpha]`. Set to all to also allow experimental and deprecated.
- `clean(Boolean)` option: Clean pack archive after updating. Default is false.
- `verbose(Boolean)` option: Verbose updating steps. Default is false.
- `checksum(Boolean)` option: Verify pack archive checksum. Default is true.
- `checksig(Boolean)` option: Verify pack archive signature. Default is false.
- `git(Atom)` option: Extra command-line options. Default is `''`.
- `downloader(Atom)` option: Downloader utility. Either `curl` or `wget`. Default is `curl`.
- `curl(Atom)` option: Extra command-line options. Default is `''`.
- `wget(Atom)` option: Extra command-line options. Default is `''`.
- `gpg(Atom)` option: Extra command-line options. Default is `''`.
- `tar(Atom)` option: Extra command-line options. Default is `''`.

`update/1`

Updates an outdated pack to its latest version using default options. Fails if the pack is pinned, orphaned, not installed, unknown, or breaks installed packs.

Compilation flags:

```
static
```

Template:

```
update(Pack)
```

Mode and number of proofs:

```
update(+atom) - zero_or_one
```

Exceptions:

Pack is a variable:

```
instantiation_error
```

Pack is neither a variable nor an atom:

```
type_error(atom,Pack)
```

See also:

[update/2](#)

[update/3](#)

[update/0](#)

Updates all outdated packs (that are not pinned) using default options.

Compilation flags:

```
static
```

Mode and number of proofs:

```
update - zero_or_one
```

[uninstall/2](#)

Uninstalls a pack using the specified options. Fails if the pack is unknown or not installed. Fails also if the pack is pinned or have dependents and not using a `force(true)` option.

Compilation flags:

```
static
```

Template:

```
uninstall(Pack,Options)
```

Mode and number of proofs:

```
uninstall(+atom,++list(compound)) - zero_or_one
```

Exceptions:

Pack is a variable:

`instantiation_error`

Pack is neither a variable nor an atom:

`type_error(atom,Pack)`

Options is a variable:

`instantiation_error`

Options is neither a variable nor a list:

`type_error(list,Options)`

An element Option of the list Options is a variable:

`instantiation_error`

An element Option of the list Options is neither a variable nor a compound term:

`type_error(compound,Option)`

An element Option of the list Options is a compound term but not a valid option:

`domain_error(option,Option)`

Remarks:

- `force(Boolean)` option: Force deletion if the pack is pinned. Default is false.
 - `clean(Boolean)` option: Clean pack archive after deleting. Default is false.
 - `verbose(Boolean)` option: Verbose uninstalling steps. Default is false.
-

`uninstall/1`

Uninstalls a pack using default options. Fails if the pack is pinned, have dependents, not installed, or unknown.

Compilation flags:

`static`

Template:

`uninstall(Pack)`

Mode and number of proofs:

`uninstall(+atom) - zero_or_one`

Exceptions:

Pack is a variable:

`instantiation_error`

Pack is neither a variable nor an atom:

`type_error(atom,Pack)`

See also:

`uninstall/2`

`uninstall/0`

Uninstalls all packs using the `force(true)` option.

Compilation flags:

`static`

Mode and number of proofs:

`uninstall - zero_or_one`

`clean/2`

Cleans all pack archives. Fails if the the pack is unknown.

Compilation flags:

`static`

Template:

`clean(Registry,Pack)`

Mode and number of proofs:

`clean(+atom,+atom) - zero_or_one`

Exceptions:

Registry is a variable:

`instantiation_error`

Registry is neither a variable nor an atom:

`type_error(atom,Registry)`

Pack is a variable:

`instantiation_error`

Pack is neither a variable nor an atom:

`type_error(atom,Pack)`

[clean/1](#)

Cleans all pack archives. Fails if the pack is unknown.

Compilation flags:

static

Template:

clean(Pack)

Mode and number of proofs:

clean(+atom) - zero_or_one

Exceptions:

Pack is a variable:

instantiation_error

Pack is neither a variable nor an atom:

type_error(atom,Pack)

See also:

[clean/2](#)

[clean/0](#)

Cleans all archives for all packs.

Compilation flags:

static

Mode and number of proofs:

clean - one

save/2

Saves a list of all installed packs and registries plus pinning status to a file using the given options. Registries without installed packs are saved when using the option `save(all)` and skipped when using the option `save(installed)` (default).

Compilation flags:

static

Template:

save(File,Options)

Mode and number of proofs:

save(+atom,++list(compound)) - one_or_error

Exceptions:

File is a variable:

instantiation_error

File is neither a variable nor an atom:

type_error(atom,File)

File is an existing file but cannot be written:

permission_error(open,source_sink,File)

Options is a variable:

instantiation_error

Options is neither a variable nor a list:

type_error(list,Options)

An element Option of the list Options is a variable:

instantiation_error

An element Option of the list Options is neither a variable nor a compound term:

type_error(compound,Option)

An element Option of the list Options is a compound term but not a valid option:

domain_error(option,Option)

save/1

Saves a list of all installed packs and their registries plus pinning status to a file using default options.

Compilation flags:

static

Template:

save(File)

Mode and number of proofs:

`save(+atom) - one_or_error`

Exceptions:

File is a variable:

`instantiation_error`

File is neither a variable nor an atom:

`type_error(atom,File)`

File is an existing file but cannot be written:

`permission_error(open,source_sink,File)`

See also:

[save/2](#)

[restore/2](#)

Restores a list of registries and packs plus their pinning status from a file using the given options. Fails if restoring is not possible.

Compilation flags:

`static`

Template:

`restore(File,Options)`

Mode and number of proofs:

`restore(+atom,++list(compound)) - zero_or_one_or_error`

Exceptions:

File is a variable:

`instantiation_error`

File is neither a variable nor an atom:

`type_error(atom,File)`

File is an atom but not an existing file:

`existence_error(file,File)`

File is an existing file but cannot be read:

`permission_error(open,source_sink,File)`

Options is a variable:

`instantiation_error`

Options is neither a variable nor a list:

`type_error(list,Options)`

An element Option of the list Options is a variable:

instantiation_error

An element Option of the list Options is neither a variable nor a compound term:

type_error(compound,Option)

An element Option of the list Options is a compound term but not a valid option:

domain_error(option,Option)

Remarks:

- force(Boolean) option: Force restoring if a registry is already defined or a pack is already installed. Default is true.
 - compatible(Boolean) option: Restrict installation to compatible packs. Default is true.
 - clean(Boolean) option: Clean registry and pack archives after restoring. Default is false.
 - verbose(Boolean) option: Verbose restoring steps. Default is false.
 - checksum(Boolean) option: Verify pack archive checksums. Default is true.
 - checksig(Boolean) option: Verify pack archive signatures. Default is false.
 - git(Atom) option: Extra command-line options. Default is ''.
 - downloader(Atom) option: Downloader utility. Either curl or wget. Default is curl.
 - curl(Atom) option: Extra command-line options. Default is ''.
 - wget(Atom) option: Extra command-line options. Default is ''.
 - gpg(Atom) option: Extra command-line options. Default is ''.
 - tar(Atom) option: Extra command-line options. Default is ''.
-

restore/1

Restores a list of registries and packs plus their pinning status from a file using default options. Fails if restoring is not possible.

Compilation flags:

static

Template:

restore(File)

Mode and number of proofs:

restore(+atom) - zero_or_one_or_error

Exceptions:

File is a variable:

instantiation_error

File is neither a variable nor an atom:

```
type_error(atom,File)
File is an atom but not an existing file:
existence_error(file,File)
File is an existing file but cannot be read:
permission_error(open,source_sink,File)
```

See also:

[restore/2](#)

[dependents/3](#)

Returns a list of all installed packs that depend on the given pack from the given registry. Fails if the pack is unknown.

Compilation flags:

static

Template:

```
dependents(Registry,Pack,Dependents)
```

Mode and number of proofs:

```
dependents(+atom,+atom,-list(atom)) - zero_or_one
```

Exceptions:

Registry is a variable:

```
instantiation_error
```

Registry is neither a variable nor an atom:

```
type_error(atom,Registry)
```

Pack is a variable:

```
instantiation_error
```

Pack is neither a variable nor an atom:

```
type_error(atom,Pack)
```

dependents/2

Prints a list of all installed packs that depend on the given pack from the given registry. Fails if the pack is unknown.

Compilation flags:

static

Template:

dependents(Registry,Pack)

Mode and number of proofs:

dependents(+atom,+atom) - zero_or_one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

Pack is a variable:

instantiation_error

Pack is neither a variable nor an atom:

type_error(atom,Pack)

dependents/1

Prints a list of all installed packs that depend on the given pack if unique from all defined registries. Fails if the pack is unknown or available from multiple registries.

Compilation flags:

static

Template:

dependents(Pack)

Mode and number of proofs:

dependents(+atom) - zero_or_one

Exceptions:

Pack is a variable:

instantiation_error

Pack is neither a variable nor an atom:

```
type__error(atom,Pack)
```

lint/2

Checks the pack specification. Fails if the pack is unknown or if linting detects errors.

Compilation flags:

```
static
```

Template:

```
lint(Registry,Pack)
```

Mode and number of proofs:

```
lint(+atom,+atom) - zero_or_one
```

Exceptions:

Registry is a variable:

```
instantiation_error
```

Registry is neither a variable nor an atom:

```
type__error(atom,Registry)
```

Pack is a variable:

```
instantiation_error
```

Pack is neither a variable nor an atom:

```
type__error(atom,Pack)
```

lint/1

Checks the pack specification. Fails if the pack is unknown, or available from multiple registries, or if linting detects errors.

Compilation flags:

```
static
```

Template:

```
lint(Pack)
```

Mode and number of proofs:

```
lint(+atom) - zero_or_one
```

Exceptions:

Pack is a variable:

instantiation_error

Pack is neither a variable nor an atom:

type_error(atom,Pack)

lint/0

Checks all pack specifications.

Compilation flags:

static

Mode and number of proofs:

lint - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.58.3 packs_common

Common predicates for the packs tool objects.

Availability:

logtalk_load(packs(loader))

Author: Paulo Moura

Version: 0:33:0
Date: 2025-01-23

Compilation flags:
static

Provides:
type::type/1
type::check/2

Uses:
list
logtalk
os
type
user

Remarks:
(none)

Inherited public predicates:
(none)

- Public predicates
 - setup/0
 - reset/0
 - verify_commands_availability/0
 - help/0
 - pin/1
 - pin/0
 - unpin/1
 - unpin/0
 - pinned/1
 - directory/2
 - directory/1
 - readme/2
 - readme/1
 - logtalk_packs/1

- logtalk_packs/0
 - prefix/1
 - prefix/0
- Protected predicates
 - readme_file_path/2
 - print_readme_file_path/1
 - command/2
 - load_registry/1
 - sha256sum_command/1
 - tar_command/1
 - supported_archive/1
 - supported_url_archive/1
 - decode_url_spaces/2
- Private predicates
- Operators

Public predicates

setup/0

Ensures that registries and packs directory structure exists. Preserves any defined registries and installed packs.

Compilation flags:

static

Mode and number of proofs:

setup - one

reset/0

Resets registries and packs directory structure. Deletes any defined registries and installed packs.

Compilation flags:

static

Mode and number of proofs:

reset - one

verify_commands_availability/0

Verifies required shell commands availability. Fails printing an error message if a command is missing.

Compilation flags:

static

Mode and number of proofs:

verify_commands_availability - zero_or_one

help/0

Provides help about the main predicates.

Compilation flags:

static

Mode and number of proofs:

help - one

pin/1

Pins a resource (pack or registry) preventing it from being updated, uninstalled, or deleted. Fails if the resource is not found.

Compilation flags:

static

Template:

pin(Resource)

Mode and number of proofs:

pin(+atom) - zero_or_one

Exceptions:

Resource is a variable:

instantiation_error

Resource is neither a variable nor an atom:

type_error(atom,Resource)

pin/0

Pins all resource (packs or registries) preventing them from being updated, uninstalled, or deleted. Note that resources added after calling this predicate will not be pinned.

Compilation flags:

static

Mode and number of proofs:

pin - one

unpin/1

Unpins a resource (pack or registry), allowing it to be updated, uninstalled, or deleted. Fails if the resource is not found.

Compilation flags:

static

Template:

unpin(Resource)

Mode and number of proofs:

unpin(+atom) - zero_or_one

Exceptions:

Resource is a variable:

instantiation_error

Resource is neither a variable nor an atom:

type_error(atom,Resource)

unpin/0

Unpins all resources (packs or registries), allowing them to be updated, uninstalled, or deleted.

Compilation flags:

static

Mode and number of proofs:

unpin - one

pinned/1

True iff the resource (pack or registry) is defined or installed and if it is pinned.

Compilation flags:

static

Template:

pinned(Resource)

Mode and number of proofs:

pinned(+atom) - zero_or_one

Exceptions:

Resource is a variable:

instantiation_error

Resource is neither a variable nor an atom:

type_error(atom,Resource)

directory/2

Enumerates by backtracking all packs or registries and respective installation or definition directories (using the internal backend format).

Compilation flags:

static

Template:

directory(Resource,Directory)

Mode and number of proofs:

directory(?atom,?atom) - zero_or_more

Exceptions:

Resource is neither a variable nor an atom:

type_error(atom,Resource)

Directory is neither a variable nor an atom:

type_error(atom,Directory)

directory/1

Prints the directory where the registry or the pack is installed (using the native operating-system format).

Compilation flags:

static

Template:

directory(Resource)

Mode and number of proofs:

directory(+atom) - zero_or_one

Exceptions:

Resource is a variable:

instantiation_error

Resource is neither a variable nor an atom:

type_error(atom,Resource)

readme/2

Returns the path to the resource (pack or registry) readme file (using the internal backend format). Fails if the resource is not defined or installed or if no readme file is found for it.

Compilation flags:

static

Template:

readme(Resource,ReadMeFile)

Mode and number of proofs:

readme(+atom,-atom) - zero_or_one

Exceptions:

Resource is a variable:

instantiation_error

Resource is neither a variable nor an atom:

type_error(atom,Resource)

ReadMeFile is neither a variable nor an atom:

type_error(atom,ReadMeFile)

readme/1

Prints the path to the resource (pack or registry) readme file (using the native operating-system format). Fails if the resource is not defined or installed or if no readme file is found for it.

Compilation flags:

static

Template:

readme(Resource)

Mode and number of proofs:

readme(+atom) - zero_or_one

Exceptions:

Resource is a variable:

instantiation_error

Resource is neither a variable nor an atom:

type_error(atom,Resource)

logtalk_packs/1

Returns the directory prefix (using the internal backend format) where the registries, packs, and archives are installed.

Compilation flags:

static

Template:

logtalk_packs(LogtalkPacks)

Mode and number of proofs:

logtalk_packs(-atom) - one

Exceptions:

LogtalkPacks is neither a variable nor an atom:

type_error(atom,LogtalkPacks)

logtalk_packs/0

Prints the directory prefix (using the native operating-system format) where the registries, packs, and archives are installed.

Compilation flags:

static

Mode and number of proofs:

logtalk_packs - one

prefix/1

Returns the directory prefix (using the internal backend format) where the registries or packs are installed.

Compilation flags:

static

Template:

prefix(Prefix)

Mode and number of proofs:

prefix(-atom) - one

Exceptions:

Prefix is neither a variable nor an atom:

type_error(atom,Prefix)

prefix/0

Prints the directory prefix (using the native operating-system format) where the registries or packs are installed.

Compilation flags:

static

Mode and number of proofs:

prefix - one

Protected predicates

readme_file_path/2

Returns the absolute path for the given directory readme file if it exists.

Compilation flags:

static

Template:

readme_file_path(Directory,ReadMeFile)

Mode and number of proofs:

readme_file_path(+atom,-atom) - zero_or_one

Remarks:

- Valid file names: Case variations of README and NOTES with or without a .md or .txt extension. The recommended file name is README.md.
-

print_readme_file_path/1

Prints the absolute path for the given directory readme file if it exists. Succeeds otherwise.

Compilation flags:

static

Template:

print_readme_file_path(Directory)

Mode and number of proofs:

print_readme_file_path(+atom) - one

`command/2`

Executes a shell command. Prints an error message and fails if the command fails.

Compilation flags:

`static`

Template:

`command(Command,FailureMessage)`

Mode and number of proofs:

`command(+atom,@nonvar) - zero_or_one`

`load_registry/1`

Loads all registry files from the given directory.

Compilation flags:

`static`

Template:

`load_registry(Directory)`

Mode and number of proofs:

`load_registry(+atom) - zero_or_one`

`sha256sum_command/1`

Returns the name of the sha256sum command to be used on POSIX systems. Fails if neither gsha256sum or sha256sum commands are found.

Compilation flags:

`static`

Template:

`sha256sum_command(Command)`

Mode and number of proofs:

`sha256sum_command(-atom) - zero_or_one`

`tar_command/1`

Returns the name of the tar command to be used depending on the operating-system.

Compilation flags:

`static`

Template:

`tar_command(Command)`

Mode and number of proofs:

`tar_command(-atom) - one`

`supported_archive/1`

True iff the archive format is supported.

Compilation flags:

`static`

Template:

`supported_archive(Extension)`

Mode and number of proofs:

`supported_archive(+atom) - zero_or_one`

`supported_url_archive/1`

True iff the URL archive is supported.

Compilation flags:

`static`

Template:

`supported_url_archive(URL)`

Mode and number of proofs:

supported_url_archive(+atom) - zero_or_one

decode_url_spaces/2

Decodes encoded spaces (%20) in URLs to spaces.

Compilation flags:

static

Template:

decode_url_spaces(URL,Decoded)

Mode and number of proofs:

decode_url_spaces(+atom,-atom) - one

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.58.4 packs_messages

Packs default message translations.

Availability:

logtalk_load(packs(loader))

Author: Paulo Moura

Version: 0:41:0

Date: 2025-05-23

Compilation flags:

static

Provides:

logtalk::message_prefix_stream/4
logtalk::message_tokens//2

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.58.5 packs_specs_hook

Hook object for filtering registry and pack specification file contents.

Availability:

logtalk_load(packs(loader))

Author: Paulo Moura

Version: 0:13:0
Date: 2022-06-28

Compilation flags:
static, context_switching_calls

Implements:
public [expanding](#)

Uses:
[character](#)
[logtalk](#)

Remarks:
(none)

Inherited public predicates:
[goal_expansion/2](#) [term_expansion/2](#)

- [Public predicates](#)
- [Protected predicates](#)
- [Private predicates](#)
- [Operators](#)

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.58.6 registries

Registry handling predicates.

Availability:

`logtalk_load(packs(loader))`

Author: Paulo Moura

Version: 0:62:0

Date: 2025-08-20

Compilation flags:

`static, context_switching_calls`

Imports:

`public packs_common`

`public options`

Uses:

`list`

`logtalk`

`os`

`type`

`user`

Remarks:

(none)

Inherited public predicates:

`check_option/1 check_options/1 default_option/1 default_options/1 directory/1 directory/2
help/0 logtalk_packs/0 logtalk_packs/1 option/2 option/3 pin/0 pin/1 pinned/1 prefix/0
prefix/1 readme/1 readme/2 reset/0 setup/0 unpin/0 unpin/1 valid_option/1 valid_options/1
verify_commands_availability/0`

- Public predicates
 - `list/0`

- describe/1
- defined/4
- add/3
- add/2
- add/1
- update/2
- update/1
- update/0
- delete/2
- delete/1
- delete/0
- clean/1
- clean/0
- provides/2
- lint/1
- lint/0
- Protected predicates
- Private predicates
- Operators

Public predicates

list/0

Prints a list of all defined registries, including how defined (git, archive, or directory) and if they are pinned.

Compilation flags:
static

Mode and number of proofs:
list - one

describe/1

Prints all registry entries.

Compilation flags:

static

Template:

describe(Registry)

Mode and number of proofs:

describe(+atom) - one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

defined/4

Enumerates by backtracking all defined registries, their definition URL, how they are defined (git, archive, or directory), and if they are pinned.

Compilation flags:

static

Template:

defined(Registry,URL,HowDefined,Pinned)

Mode and number of proofs:

defined(?atom,?atom,?atom,?boolean) - zero_or_more

Exceptions:

Registry is neither a variable nor an atom:

type_error(atom,Registry)

URL is neither a variable nor an atom:

type_error(atom,URL)

HowDefined is neither a variable nor an atom:

type_error(atom,HowDefined)

Pinned is neither a variable nor a boolean:

type_error(boolean,Pinned)

add/3

Adds a new registry using the given options. Fails if the registry cannot be added or if it is already defined but not using update(true) or force(true) options. A file:// URL can be used for a local directory or archive.

Compilation flags:

static

Template:

add(Registry,URL,Options)

Mode and number of proofs:

add(+atom,+atom,++list(compound)) - zero_or_one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

URL is a variable:

instantiation_error

URL is neither a variable nor an atom:

type_error(atom,URL)

Options is a variable:

instantiation_error

Options is neither a variable nor a list:

type_error(list,Options)

An element Option of the list Options is a variable:

instantiation_error

An element Option of the list Options is neither a variable nor a compound term:

type_error(compound,Option)

An element Option of the list Options is a compound term but not a valid option:

domain_error(option,Option)

Remarks:

- Registry name: Must be the URL basename when using a git URL or a local directory URL. Must also be the declared registry name in the registry specification object.
- HTTPS URLs: Must end with either a .git extension or an archive extension.
- update(Boolean) option: Update registry if already defined. Default is false. Overrides the force/1 option.

- `force(Boolean)` option: Force registry re-installation if already defined by first deleting the previous installation. Default is `false`.
 - `clean(Boolean)` option: Clean registry archive after updating. Default is `false`.
 - `verbose(Boolean)` option: Verbose adding steps. Default is `false`.
 - `downloader(Atom)` option: Downloader utility. Either `curl` or `wget`. Default is `curl`.
 - `curl(Atom)` option: Extra command-line options. Default is `''`.
 - `wget(Atom)` option: Extra command-line options. Default is `''`.
 - `gpg(Atom)` option: Extra command-line options. Default is `''`.
 - `tar(Atom)` option: Extra command-line options. Default is `''`.
-

`add/2`

Adds a new registry using default options. Fails if the registry cannot be added or if it is already defined. HTTPS URLs must end with either a `.git` extension or an archive extension. A `file://` URL can be used for a local directory or archive.

Compilation flags:

`static`

Template:

`add(Registry,URL)`

Mode and number of proofs:

`add(+atom,+atom) - zero_or_one`

Exceptions:

Registry is a variable:

`instantiation_error`

Registry is neither a variable nor an atom:

`type_error(atom,Registry)`

URL is a variable:

`instantiation_error`

URL is neither a variable nor an atom:

`type_error(atom,URL)`

Remarks:

- Registry name: Must be the URL basename when using a git URL or a local directory URL. Must also be the declared registry name in the registry specification object.

See also:

[add/3](#)

[add/1](#)

Adds a new registry using default options. Fails if the registry cannot be added or if it is already defined. HTTPS URLs must end with a .git extension or an archive extension. A file:// URL can be used for a local directory or archive.

Compilation flags:

static

Template:

add(URL)

Mode and number of proofs:

add(+atom) - zero_or_one

Exceptions:

URL is a variable:

instantiation_error

URL is neither a variable nor an atom:

type_error(atom,URL)

Remarks:

- Registry name: Taken from the URL basename.

See also:

[add/2](#)

[update/2](#)

Updates a defined registry using the specified options. Fails if the registry is not defined.

Compilation flags:

static

Template:

```
update(Registry,Options)
```

Mode and number of proofs:

```
update(+atom,++list(compound)) - zero_or_one
```

Exceptions:

Registry is a variable:

```
instantiation_error
```

Registry is neither a variable nor an atom:

```
type_error(atom,Registry)
```

Options is a variable:

```
instantiation_error
```

Options is neither a variable nor a list:

```
type_error(list,Options)
```

An element Option of the list Options is a variable:

```
instantiation_error
```

An element Option of the list Options is neither a variable nor a compound term:

```
type_error(compound,Option)
```

An element Option of the list Options is a compound term but not a valid option:

```
domain_error(option,Option)
```

Remarks:

- force(Boolean) option: Force update if the registry is pinned. Default is false.
 - clean(Boolean) option: Clean registry archive after updating. Default is false.
 - verbose(Boolean) option: Verbose updating steps. Default is false.
 - downloader(Atom) option: Downloader utility. Either curl or wget. Default is curl.
 - curl(Atom) option: Extra command-line options. Default is ''.
 - wget(Atom) option: Extra command-line options. Default is ''.
 - gpg(Atom) option: Extra command-line options. Default is ''.
 - tar(Atom) option: Extra command-line options. Default is ''.
-

[update/1](#)

Updates a defined registry using default options. Fails if the registry is not defined.

Compilation flags:

```
static
```

Template:

```
update(Registry)
```

Mode and number of proofs:

`update(+atom) - zero_or_one`

Exceptions:

Registry is a variable:

`instantiation_error`

Registry is neither a variable nor an atom:

`type_error(atom,Registry)`

See also:

[update/2](#)

[update/0](#)

Updates all defined registries using default options.

Compilation flags:

`static`

Mode and number of proofs:

`update - zero_or_one`

[delete/2](#)

Deletes a registry using the specified options (if not pinned).

Compilation flags:

`static`

Template:

`delete(Registry,Options)`

Mode and number of proofs:

`delete(+atom,++list(compound)) - zero_or_one`

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

Options is a variable:

instantiation_error

Options is neither a variable nor a list:

type_error(list,Options)

An element Option of the list Options is a variable:

instantiation_error

An element Option of the list Options is neither a variable nor a compound term:

type_error(compound,Option)

An element Option of the list Options is a compound term but not a valid option:

domain_error(option,Option)

Remarks:

- force(Boolean) option: Force deletion if the registry is pinned or there are installed registry packs. Default is false.
 - clean(Boolean) option: Clean registry archive after deleting. Default is false.
 - verbose(Boolean) option: Verbose deleting steps. Default is false.
 - downloader(Atom) option: Downloader utility. Either curl or wget. Default is curl.
 - curl(Atom) option: Extra command-line options. Default is ''.
 - wget(Atom) option: Extra command-line options. Default is ''.
 - gpg(Atom) option: Extra command-line options. Default is ''.
 - tar(Atom) option: Extra command-line options. Default is ''.
-

[delete/1](#)

Deletes a registry using default options.

Compilation flags:

static

Template:

delete(Registry)

Mode and number of proofs:

delete(+atom) - zero_or_one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

See also:

[delete/2](#)

[delete/0](#)

Deletes all registries using the force(true) option.

Compilation flags:

static

Mode and number of proofs:

delete - zero_or_one

[clean/1](#)

Cleans all registry archives. Fails if the registry is not defined.

Compilation flags:

static

Template:

clean(Registry)

Mode and number of proofs:

clean(+atom) - zero_or_one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

`clean/0`

Cleans all archives for all registries.

Compilation flags:

`static`

Mode and number of proofs:

`clean - one`

`provides/2`

Enumerates by backtracking all packs provided by a registry.

Compilation flags:

`static`

Template:

`provides(Registry,Pack)`

Mode and number of proofs:

`provides(?atom,?atom) - zero_or_more`

Exceptions:

Registry is neither a variable nor an atom:

`type_error(atom,Registry)`

Pack is neither a variable nor an atom:

`type_error(atom,Pack)`

`lint/1`

Checks the registry specification. Fails if the registry is not defined or if linting detects errors.

Compilation flags:

`static`

Template:

lint(Registry)

Mode and number of proofs:

lint(+atom) - zero_or_one

Exceptions:

Registry is a variable:

instantiation_error

Registry is neither a variable nor an atom:

type_error(atom,Registry)

lint/0

Checks all registry specifications.

Compilation flags:

static

Mode and number of proofs:

lint - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.58.7 registry_loader_hook

Hook object for filtering registry loader file contents.

Availability:

`logtalk_load(packs(loader))`

Author: Paulo Moura

Version: 0:13:0

Date: 2022-11-20

Compilation flags:

`static, context_switching_calls`

Implements:

`public expanding`

Uses:

`character`

`logtalk`

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2 term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.58.8 registry__protocol

Registry specification protocol. Objects implementing this protocol should be named after the pack with a __registry suffix and saved in a file with the same name as the object.

Availability:

logtalk__load(packs(loader))

Author: Paulo Moura

Version: 0:12:0

Date: 2022-06-28

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - name/1
 - description/1
 - home/1
 - clone/1
 - archive/1
 - note/2
- Protected predicates
- Private predicates
- Operators

Public predicates

name/1

Registry name. Preferably a valid unquoted atom.

Compilation flags:

static

Template:

name(Name)

Mode and number of proofs:

name(?atom) - zero_or_one

description/1

Registry one line description.

Compilation flags:

static

Template:

description(Description)

Mode and number of proofs:

description(?atom) - zero_or_one

home/1

Registry home HTTPS or file URL.

Compilation flags:
static

Template:
home(Home)

Mode and number of proofs:
home(?atom) - zero_or_one

clone/1

Registry git clone HTTPS URL (must end with the .git extension). Git repos should have the same name as the registry.

Compilation flags:
static

Template:
clone(URL)

Mode and number of proofs:
clone(?atom) - zero_or_one

archive/1

Registry archive download HTTPS URL.

Compilation flags:
static

Template:
archive(URL)

Mode and number of proofs:

archive(?atom) - zero_or_one

note/2

Table of notes per action.

Compilation flags:

static

Template:

note(Action,Note)

Mode and number of proofs:

note(?atom,-atom) - zero_or_more

Remarks:

- Action: Possible values are add, update, and delete. When unbound, the note apply to all actions.
 - Note: Note to print when performing an action on a registry.
-

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.59 pddl_parser

object

1.59.1 pddl

Simple parser of PDDL 3.0 files.

Availability:

```
logtalk_load(pddl_parser(loader))
```

Author: Robert Sasak, Charles University in Prague. Adapted to Logtalk by Paulo Moura.

Version: 1:2:2

Date: 2024-03-14

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public read_file
```

Uses:

```
user
```

Remarks:

```
(none)
```

Inherited public predicates:

```
read_file/2
```

- Public predicates
 - parse_domain/3
 - parse_domain/2
 - parse_problem/2
 - parse_problem/3
- Protected predicates
- Private predicates
- Operators

Public predicates

`parse_domain/3`

Parses a PDDL 3.0 domain file, returning a compound term representing its contents and rest of the file. Useful when domain and problem are in one file.

Compilation flags:

`static`

Template:

`parse_domain(File,Output,RestOfFile)`

Mode and number of proofs:

`parse_domain(+atom,-compound,-list(atom)) - one`

`parse_domain/2`

Parses a PDDL 3.0 domain file, returning a compound term representing its contents.

Compilation flags:

`static`

Template:

`parse_domain(File,Output)`

Mode and number of proofs:

`parse_domain(+atom,-compound) - one`

`parse_problem/2`

Parses a PDDL 3.0 problem file, returning a compound term representing its contents.

Compilation flags:

`static`

Template:

`parse_problem(File,Output)`

Mode and number of proofs:

`parse_problem(+atom,-compound) - one`

`parse_problem/3`

Parses a PDDL 3.0 problem file, returning a compound term representing its contents and rest of the file. Useful when domain and problem are in one file.

Compilation flags:

`static`

Template:

`parse_problem(File,Output,RestOfFile)`

Mode and number of proofs:

`parse_problem(+atom,-compound,-list(atom)) - one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.59.2 read_file

Utility predicates for parsing a file as a list of atoms.

Availability:

`logtalk_load(pddl_parser(loader))`

Author: Robert Sasak, Charles University in Prague. Adapted to Logtalk by Paulo Moura.

Version: 1:0:0

Date: 2011-08-04

Compilation flags:
static

Dependencies:
(none)

Remarks:
(none)

Inherited public predicates:
(none)

- Public predicates
 - read_file/2
- Protected predicates
- Private predicates
- Operators

Public predicates

read_file/2

Reads a file character by character, parsing it into a list of atoms.

Compilation flags:
static

Template:
read_file(File,List)
Mode and number of proofs:
read_file(+atom,-list(atom)) - one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.60 ports_profiler

object

1.60.1 ports_profiler

Predicate execution box model port profiler.

Availability:

logtalk_load(ports_profiler(loader))

Author: Paulo Moura

Version: 2:0:0

Date: 2024-05-18

Compilation flags:

static, context_switching_calls

Provides:

logtalk::debug_handler/1

logtalk::debug_handler/3

Uses:

logtalk

user

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - start/0
 - stop/0
 - data/0
 - data/1
 - data/2
 - reset/0
 - reset/1
 - port/5
 - clause_location/6
 - clause/5
- Protected predicates
- Private predicates
 - clause_location_/6
 - port_/5
 - clause_/5
 - entity_defines_/2
- Operators

Public predicates

start/0

Activates the ports profiler for followup goals.

Compilation flags:

static

Mode and number of proofs:

start - one

stop/0

Deactivates the ports profiler.

Compilation flags:

static

Mode and number of proofs:

stop - one

data/0

Prints a table with all port profiling data.

Compilation flags:

static

Mode and number of proofs:

data - one

data/1

Prints a table with all port profiling data for the specified entity.

Compilation flags:

static

Template:

data(Entity)

Mode and number of proofs:

data(+entity__identifier) - one

data/2

Prints a table with all port profiling data for the specified entity predicate (or non-terminal).

Compilation flags:

static

Template:

data(Entity,Predicate)

Mode and number of proofs:

data(+entity__identifier,+predicate__indicator) - one

data(+entity__identifier,+non__terminal__indicator) - one

reset/0

Resets all port profiling data.

Compilation flags:

static

Mode and number of proofs:

reset - one

reset/1

Resets all port profiling data for the specified entity.

Compilation flags:

static

Template:

reset(Entity)

Mode and number of proofs:

reset(+entity__identifier) - one

port/5

Enumerates, by backtracking, all collected port profiling data.

Compilation flags:

static

Template:

port(Port,Entity,Functor,Arity,Count)

Mode and number of proofs:

port(?atom,?entity__identifier,?atom,?integer,?integer) - zero_or_more

clause_location/6

Enumerates, by backtracking, all collected profiled clause location data.

Compilation flags:

static

Template:

clause_location(Entity,Functor,Arity,ClauseNumber,File,BeginLine)

Mode and number of proofs:

clause_location(?entity__identifier,?atom,?integer,?integer,?atom,?integer) - zero_or_more

clause/5

Enumerates, by backtracking, all collected clause profiling data.

Compilation flags:

dynamic

Template:

clause(Entity,Functor,Arity,ClauseNumber,Count)

Mode and number of proofs:

clause(?entity__identifier,?atom,?integer,?integer,?integer) - zero_or_more

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`clause_location_/6`

Internal table of collected profiled clause location data.

Compilation flags:

dynamic

Template:

`clause_location_(Entity, Functor, Arity, ClauseNumber, File, BeginLine)`

Mode and number of proofs:

`clause_location_(?entity_identifier, ?atom, ?integer, ?integer, ?atom, ?integer) - zero_or_more`

`port_/5`

Internal table of collected port profiling data.

Compilation flags:

dynamic

Template:

`port_(Port, Entity, Functor, Arity, Count)`

Mode and number of proofs:

`port_(?atom, ?entity_identifier, ?atom, ?integer, ?integer) - zero_or_more`

`clause_/5`

Internal table of collected clause profiling data.

Compilation flags:

dynamic

Template:

clause_(Entity, Functor, Arity, ClauseNumber, Count)

Mode and number of proofs:

clause_(?entity_identifier, ?atom, ?integer, ?integer, ?integer) - zero_or_more

entity_defines_/2

Internal cache for profiled predicates.

Compilation flags:

dynamic

Template:

entity_defines_(Entity, Predicate)

Mode and number of proofs:

entity_defines_(?entity_identifier, ?predicate_indicator) - zero_or_more

Operators

(none)

1.61 queues

object

1.61.1 queue

Queue predicates implemented using difference lists.

Availability:

logtalk_load(queues(loader))

Author: Paulo Moura

Version: 1:3:0

Date: 2020-12-09

Compilation flags:

static, context_switching_calls

Implements:

public queuep

Extends:

public compound

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (= <)/2 (= \=)/2 (>)/2 (>=)/2 append/3 as_list/2 check/1 depth/2
empty/1 ground/1 head/2 join/3 join_all/3 jump/3 jump_all/3 jump_all_block/3 length/2
map/2 map/3 new/1 numbervars/1 numbervars/3 occurs/2 serve/3 singletons/2 subsumes/2
subterm/2 valid/1 variables/2 variant/2 varnumbers/2 varnumbers/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.61.2 queuep

Queue protocol.

Availability:

logtalk_load(queues(loader))

Author: Paulo Moura

Version: 1:3:0

Date: 2020-12-09

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - empty/1
 - head/2
 - join/3
 - join_all/3
 - jump/3
 - jump_all/3
 - jump_all_block/3
 - append/3
 - length/2

- serve/3
- as_list/2
- map/2
- map/3
- Protected predicates
- Private predicates
- Operators

Public predicates

empty/1

True if the queue is empty.

Compilation flags:

static

Template:

empty(Queue)

Mode and number of proofs:

empty(@queue) - zero_or_one

head/2

Unifies Head with the first element of the queue.

Compilation flags:

static

Template:

head(Queue,Head)

Mode and number of proofs:

head(+queue,?term) - zero_or_one

`join/3`

Adds the new element at the end of the queue.

Compilation flags:

`static`

Template:

`join(Element,Queue,NewQueue)`

Mode and number of proofs:

`join(@term,+queue,-queue) - zero_or_one`

`join_all/3`

Adds the new elements at the end of the queue. The elements are added in the same order that they appear in the list.

Compilation flags:

`static`

Template:

`join_all(List,Queue,NewQueue)`

Mode and number of proofs:

`join_all(+list,+queue,-queue) - zero_or_one`

`jump/3`

Adds the new element at the front of the queue.

Compilation flags:

`static`

Template:

`jump(Element,Queue,NewQueue)`

Mode and number of proofs:

`jump(@term,+queue,-queue) - zero_or_one`

`jump_all/3`

Adds the new elements at the front of the queue. The last element in the list will be at the front of the queue.

Compilation flags:

`static`

Template:

`jump_all(Elements,Queue,NewQueue)`

Mode and number of proofs:

`jump_all(+list,+queue,-queue) - zero_or_one`

`jump_all_block/3`

Adds the new elements as a block at the front of the queue. The first element in the list will be at the front of the queue.

Compilation flags:

`static`

Template:

`jump_all_block(Elements,Queue,NewQueue)`

Mode and number of proofs:

`jump_all_block(+list,+queue,-queue) - zero_or_one`

`append/3`

Appends two queues. The new queue will have the elements of the first queue followed by the elements of the second queue.

Compilation flags:

`static`

Template:

```
append(Queue1,Queue2,NewQueue)
```

Mode and number of proofs:

```
append(+queue,+queue,-queue) - one
```

`length/2`

Queue length.

Compilation flags:

```
static
```

Template:

```
length(Queue,Length)
```

Mode and number of proofs:

```
length(+heap,?integer) - zero_or_one
```

`serve/3`

Removes the first element of the queue for service.

Compilation flags:

```
static
```

Template:

```
serve(Queue,Head,NewQueue)
```

Mode and number of proofs:

```
serve(+queue,?term,-queue) - zero_or_one
```

`as_list/2`

Converts a queue to a list.

Compilation flags:

`static`

Template:

`as_list(Queue,List)`

Mode and number of proofs:

`as_list(+queue,-list) - one`

`map/2`

Applies a closure to all elements of a queue.

Compilation flags:

`static`

Template:

`map(Closure,Queue)`

Meta-predicate template:

`map(1,*)`

Mode and number of proofs:

`map(+callable,+queue) - zero_or_one`

`map/3`

Applies a closure to all elements of a queue constructing a new queue.

Compilation flags:

`static`

Template:

`map(Closure,Queue,NewQueue)`

Meta-predicate template:

`map(2,*,*)`

Mode and number of proofs:

`map(+callable,+queue,?queue) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

[queue](#)

1.62 random

object

1.62.1 backend_random

Random number generator predicates using the backend Prolog compiler built-in random generator.

Availability:

`logtalk_load(random(loader))`

Author: Paulo Moura

Version: 1:21:1

Date: 2025-04-07

Compilation flags:

`static, context_switching_calls`

Implements:

`public pseudo_random_protocol`

`public sampling_protocol`

Uses:

`list`

Remarks:

- Implementation: The backend Prolog compiler built-in random generator is only used for the basic `random/1`, `get_seed/1`, and `set_seed/1` predicates.
- Portability: B-Prolog, CxProlog, ECLiPSe, JIProlog, Qu-Prolog, and Quintus Prolog do not provide implementations for the `get_seed/1` and `set_seed/1` predicates and calling these predicates simply succeed without performing any action.

Inherited public predicates:

`bernoulli/2` `beta/3` `between/3` `binomial/3` `chi_squared/2` `circular_uniform_cartesian/3`
`circular_uniform_polar/3` `dirichlet/2` `enumerate/2` `exponential/2` `fisher/3` `gamma/3` `geometric/2`
`get_seed/1` `gumbel/3` `hypergeometric/4` `logistic/3` `lognormal/3` `logseries/2` `maybe/0` `maybe/1`
`maybe/2` `maybe_call/1` `maybe_call/2` `member/2` `normal/3` `permutation/2` `poisson/2` `power/2`
`random/1` `random/3` `randseq/4` `randset/4` `select/3` `select/4` `sequence/4` `set/4` `set_seed/1`
`standard_cauchy/3` `standard_exponential/1` `standard_gamma/2` `standard_normal/1`
`standard_t/2` `swap/2` `swap_consecutive/2` `triangular/4` `uniform/1` `uniform/3` `von_mises/3`
`wald/3` `weibull/3`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

[random](#), [fast_random](#)

object

1.62.2 [fast_random](#)

Fast portable random number generator predicates. Core predicates originally written by Richard O’Keefe. Based on algorithm AS 183 from Applied Statistics.

Availability:

`logtalk_load(random(loader))`

Author: Paulo Moura

Version: 2:12:1

Date: 2025-04-07

Compilation flags:

`static, context_switching_calls`

Implements:

`public pseudo_random_protocol`

`public sampling_protocol`

Uses:

`list`

Remarks:

- Single random number generator: This object provides a faster version of the random library object but does not support being extended to define multiple random number generators.
- Randomness: Loading this object always initializes the random generator seed to the same value, thus providing a pseudo random number generator. The `randomize/1` predicate can be used to initialize the seed with a random value.

Inherited public predicates:

bernoulli/2 beta/3 between/3 binomial/3 chi_squared/2 circular_uniform_cartesian/3
circular_uniform_polar/3 dirichlet/2 enumerate/2 exponential/2 fisher/3 gamma/3 geometric/2
get_seed/1 gumbel/3 hypergeometric/4 logistic/3 lognormal/3 logseries/2 maybe/0 maybe/1
maybe/2 maybe_call/1 maybe_call/2 member/2 normal/3 permutation/2 poisson/2 power/2
random/1 random/3 randseq/4 randset/4 select/3 select/4 sequence/4 set/4 set_seed/1
standard_cauchy/3 standard_exponential/1 standard_gamma/2 standard_normal/1
standard_t/2 swap/2 swap_consecutive/2 triangular/4 uniform/1 uniform/3 von_mises/3
wald/3 weibull/3

- Public predicates
 - reset_seed/0
 - randomize/1
- Protected predicates
- Private predicates
 - seed_/3
- Operators

Public predicates

reset_seed/0

Resets the random generator seed to its default value. Use get_seed/1 and set_seed/1 instead if you need reproducibility.

Compilation flags:

static, synchronized

Mode and number of proofs:

reset_seed - one

randomize/1

Randomizes the random generator using a positive integer to compute a new seed. Use of a large integer is recommended. In alternative, when using a small integer argument, discard the first dozen random values.

Compilation flags:

static, synchronized

Template:

randomize(Seed)

Mode and number of proofs:

randomize(+positive_integer) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

seed_/3

Stores the current random generator seed values.

Compilation flags:

dynamic

Template:

seed__(S0,S1,S2)

Mode and number of proofs:

seed__(-integer,-integer,-integer) - one

Operators

(none)

➡ See also

[random](#), [backend_random](#)

protocol

1.62.3 pseudo_random_protocol

Pseudo-random number generator protocol for seed handling predicates. These predicates are declared as synchronized when the library is compiled using a backend supporting threads.

Availability:

`logtalk_load(random(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2021-02-21

Compilation flags:

`static`

Extends:

`public random_protocol`

Remarks:

(none)

Inherited public predicates:

`between/3` `enumerate/2` `maybe/0` `maybe/1` `maybe/2` `maybe_call/1` `maybe_call/2` `member/2`
`permutation/2` `random/1` `random/3` `randseq/4` `randset/4` `select/3` `select/4` `sequence/4` `set/4`
`swap/2` `swap_consecutive/2`

- Public predicates
 - `get_seed/1`
 - `set_seed/1`
- Protected predicates

- Private predicates
- Operators

Public predicates

`get_seed/1`

Gets the current random generator seed. Seed should be regarded as an opaque ground term.

Compilation flags:

static, synchronized

Template:

`get_seed(Seed)`

Mode and number of proofs:

`get_seed(-ground) - one`

`set_seed/1`

Sets the random generator seed to a given value returned by calling the `get_seed/1` predicate.

Compilation flags:

static, synchronized

Template:

`set_seed(Seed)`

Mode and number of proofs:

`set_seed(+ground) - one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

`random`, `backend_random`, `fast_random`

object

1.62.4 `random`

Portable random number generator predicates. Core predicates originally written by Richard O’Keefe. Based on algorithm AS 183 from Applied Statistics.

Availability:

`logtalk_load(random(loader))`

Author: Paulo Moura

Version: 2:12:1

Date: 2025-04-07

Compilation flags:

`static`, `context_switching_calls`

Implements:

`public pseudo_random_protocol`

`public sampling_protocol`

Uses:

`list`

Remarks:

- Multiple random number generators: To define multiple random number generators, simply extend this object. The derived objects must send to self the `reset_seed/0` message.

- Randomness: Loading this object always initializes the random generator seed to the same value, thus providing a pseudo random number generator. The `randomize/1` predicate can be used to initialize the seed with a random value.

Inherited public predicates:

```
bernoulli/2 beta/3 between/3 binomial/3 chi_squared/2 circular_uniform_cartesian/3
circular_uniform_polar/3 dirichlet/2 enumerate/2 exponential/2 fisher/3 gamma/3 geometric/2
get_seed/1 gumbel/3 hypergeometric/4 logistic/3 lognormal/3 logseries/2 maybe/0 maybe/1
maybe/2 maybe_call/1 maybe_call/2 member/2 normal/3 permutation/2 poisson/2 power/2
random/1 random/3 randseq/4 randset/4 select/3 select/4 sequence/4 set/4 set_seed/1
standard_cauchy/3 standard_exponential/1 standard_gamma/2 standard_normal/1
standard_t/2 swap/2 swap_consecutive/2 triangular/4 uniform/1 uniform/3 von_mises/3
wald/3 weibull/3
```

- Public predicates
 - `reset_seed/0`
 - `randomize/1`
- Protected predicates
- Private predicates
 - `seed_/3`
- Operators

Public predicates

`reset_seed/0`

Resets the random generator seed to its default value. Use `get_seed/1` and `set_seed/1` instead if you need reproducibility.

Compilation flags:

`static, synchronized`

Mode and number of proofs:

`reset_seed - one`

randomize/1

Randomizes the random generator using a positive integer to compute a new seed. Use of a large integer is recommended. In alternative, when using a small integer argument, discard the first dozen random values.

Compilation flags:

static, synchronized

Template:

randomize(Seed)

Mode and number of proofs:

randomize(+positive_integer) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

seed_/3

Stores the current random generator seed values.

Compilation flags:

dynamic

Template:

seed__(S0,S1,S2)

Mode and number of proofs:

seed__(-integer,-integer,-integer) - one

Operators

(none)

➡ See also

`fast_random`, `backend_random`

protocol

1.62.5 `random_protocol`

Random number generator protocol. The predicates are declared as synchronized when the library is compiled using a backend supporting threads.

Availability:

`logtalk_load(random(loader))`

Author: Paulo Moura

Version: 3:3:0

Date: 2023-11-24

Compilation flags:

`static`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - `random/1`
 - `between/3`
 - `member/2`
 - `select/3`

- select/4
- swap/2
- swap_consecutive/2
- enumerate/2
- permutation/2
- sequence/4
- set/4
- random/3
- randseq/4
- randset/4
- maybe/0
- maybe/1
- maybe/2
- maybe_call/1
- maybe_call/2
- Protected predicates
- Private predicates
- Operators

Public predicates

random/1

Returns a new random float value in the interval [0.0, 1.0[.

Compilation flags:

static, synchronized

Template:

random(Random)

Mode and number of proofs:

random(-float) - one

between/3

Returns a new random integer in the interval [Lower, Upper]. Fails if Lower or Upper are not integers or if Lower > Upper.

Compilation flags:

static

Template:

between(Lower,Upper,Random)

Mode and number of proofs:

between(+integer,+integer,-integer) - zero_or_one

member/2

Returns a random member of a list. Fails if the list is empty.

Compilation flags:

static

Template:

member(Random,List)

Mode and number of proofs:

member(-term,+list(term)) - zero_or_one

select/3

Returns a random member of a list and the rest of the list. Fails if the list is empty.

Compilation flags:

static

Template:

select(Random,List,Rest)

Mode and number of proofs:

select(-term,+list(term),-list(term)) - zero_or_one

`select/4`

Returns a random member of a list, replacing it with a new element and returning the resulting list.

Compilation flags:

`static`

Template:

`select(Random,OldList,New,NewList)`

Mode and number of proofs:

`select(-term,+list(term),@term,-list(term)) - zero_or_one`

`swap/2`

Swaps two randomly selected elements of a list. Fails if the list is empty or contains a single element.

Compilation flags:

`static`

Template:

`swap(OldList,NewList)`

Mode and number of proofs:

`swap(-term,+list(term)) - zero_or_one`

`swap_consecutive/2`

Swaps two randomly selected consecutive elements of a list. Fails if the list is empty or contains a single element.

Compilation flags:

`static`

Template:

`swap_consecutive(OldList,NewList)`

Mode and number of proofs:

swap_consecutive(-term,+list(term)) - zero_or_one

enumerate/2

Enumerates the elements of a list in random order. Fails if the list is empty.

Compilation flags:

static

Template:

enumerate(List,Random)

Mode and number of proofs:

enumerate(+list(term),--term) - zero_or_more

permutation/2

Returns a random permutation of a list.

Compilation flags:

static, synchronized

Template:

permutation(List,Permutation)

Mode and number of proofs:

permutation(+list,-list) - one

sequence/4

Returns list of random integers of given length in random order in interval [Lower, Upper]. Fails if Length, Lower, or Upper are not integers or if Lower > Upper.

Compilation flags:

static, synchronized

Template:

sequence(Length,Lower,Upper,List)

Mode and number of proofs:

sequence(+integer,+integer,+integer,-list(integer)) - zero_or_one

set/4

Returns ordered set of random integers of given size in interval [Lower, Upper]. Fails if Length, Lower, or Upper are not integers, if Lower > Upper, or if Length > Upper - Lower + 1.

Compilation flags:

static, synchronized

Template:

set(Length,Lower,Upper,Set)

Mode and number of proofs:

set(+integer,+integer,+integer,-list(integer)) - zero_or_one

random/3

Returns a new random value in the interval [Lower, Upper[. Fails if Lower > Upper. Deprecated. Use between/3 for integers.

Compilation flags:

static, synchronized

Template:

random(Lower,Upper,Random)

Mode and number of proofs:

random(+integer,+integer,-integer) - zero_or_one

random(+float,+float,-float) - zero_or_one

randseq/4

Returns list of random values of given length in random order in interval [Lower, Upper[. Fails if Lower > Upper or if the arguments are neither integers or floats. Deprecated. Use sequence/4 for integers.

Compilation flags:

static, synchronized

Template:

randseq(Length,Lower,Upper,List)

Mode and number of proofs:

randseq(+integer,+integer,+integer,-list(integer)) - zero_or_one

randseq(+integer,+float,+float,-list(float)) - zero_or_one

randset/4

Returns ordered set of random values of given size in interval [Lower, Upper[. Fails if the arguments are neither integers or floats, Lower > Upper, or Length > Upper - Lower when arguments are integers. Deprecated. Use set/4 for integers.

Compilation flags:

static, synchronized

Template:

randset(Length,Lower,Upper,Set)

Mode and number of proofs:

randset(+integer,+integer,+integer,-list(integer)) - zero_or_one

randset(+integer,+float,+float,-list(float)) - zero_or_one

maybe/0

Succeeds or fails with equal probability.

Compilation flags:

static

Mode and number of proofs:

maybe - zero_or_one

maybe/1

Succeeds with probability Probability or fails with probability 1 - Probability. Fails if Probability is not a float or is outside the interval [0.0, 1.0].

Compilation flags:

static

Template:

maybe(Probability)

Mode and number of proofs:

maybe(+probability) - zero_or_one

maybe/2

Succeeds with probability K/N where K and N are integers satisfying the equation $0 \leq K \leq N$. Fails otherwise.

Compilation flags:

static

Template:

maybe(K,N)

Mode and number of proofs:

maybe(+non_negative_integer,+non_negative_integer) - zero_or_one

`maybe_call/1`

Calls a goal or fails without calling it with equal probability. When the goal is called, it determines if this predicate succeeds once or fails.

Compilation flags:

`static`

Template:

`maybe_call(Goal)`

Meta-predicate template:

`maybe_call(0)`

Mode and number of proofs:

`maybe_call(+callable) - zero_or_one`

`maybe_call/2`

Calls a goal or fails without calling it with probability `Probability`. When the goal is called, it determines if this predicate succeeds once or fails.

Compilation flags:

`static`

Template:

`maybe_call(Probability,Goal)`

Meta-predicate template:

`maybe_call(*,0)`

Mode and number of proofs:

`maybe_call(+probability,+callable) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

random, backend_random, fast_random

protocol

1.62.6 sampling_protocol

Predicates for sampling probability distributions.

Availability:

logtalk_load(random(loader))

Author: Paulo Moura

Version: 1:0:0

Date: 2025-02-25

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - normal/3
 - lognormal/3

- wald/3
- chi_squared/2
- fisher/3
- logseries/2
- geometric/2
- hypergeometric/4
- exponential/2
- binomial/3
- bernoulli/2
- beta/3
- gamma/3
- logistic/3
- poisson/2
- power/2
- weibull/3
- uniform/3
- uniform/1
- triangular/4
- von_mises/3
- gumbel/3
- dirichlet/2
- circular_uniform_polar/3
- circular_uniform_cartesian/3
- standard_t/2
- standard_cauchy/3
- standard_exponential/1
- standard_gamma/2
- standard_normal/1
- Protected predicates
- Private predicates
- Operators

Public predicates

normal/3

Returns a scaled normally (Gaussian) distributed random value with the given mean and standard deviation.

Compilation flags:

static

Template:

normal(Mean,Deviation,Value)

Mode and number of proofs:

normal(+float,+non_negative_float,-float) - one

lognormal/3

Returns a scaled log normally distributed random value with the given mean and standard deviation for the normal distribution.

Compilation flags:

static

Template:

lognormal(Mean,Deviation,Value)

Mode and number of proofs:

lognormal(+float,+non_negative_float,-float) - one

wald/3

Returns a scaled Wald (inverse Gaussian) distributed random value with the given mean.

Compilation flags:

static

Template:

wald(Mean,Scale,Value)

Mode and number of proofs:

wald(+positive_float,+positive_float,-float) - one

chi_squared/2

Returns a chi-squared distributed random value given the degrees of freedom.

Compilation flags:

static

Template:

chi_squared(DegreesOfFreedom,Value)

Mode and number of proofs:

chi_squared(+positive_integer,-float) - one

fisher/3

Returns a Fisher distributed random value given the degrees of freedom in the numerator and in the denominator.

Compilation flags:

static

Template:

fisher(DegreesOfFreedomNumerator,DegreesOfFreedomDenominator,Value)

Mode and number of proofs:

fisher(+positive_integer,+positive_integer,-float) - one

logseries/2

Returns a logseries distributed random value. Requires $0.0 < \text{Shape} < 1$ and fails otherwise.

Compilation flags:

static

Template:

logseries(Shape,Value)

Mode and number of proofs:

logseries(+non_negative_integer,-positive_integer) - zero_or_one

geometric/2

Returns a geometric distributed random value (trials until the first success).

Compilation flags:

static

Template:

geometric(Probability,Value)

Mode and number of proofs:

geometric(+probability,-positive_integer) - one

hypergeometric/4

Returns a hypergeometric distributed random value.

Compilation flags:

static

Template:

hypergeometric(Population,Successes,Draws,Value)

Mode and number of proofs:

hypergeometric(+non_negative_integer,+non_negative_integer,+non_negative_integer,
-non_negative_integer) - one

exponential/2

Returns a scaled exponentially distributed random value.

Compilation flags:

static

Template:

exponential(Scale,Value)

Mode and number of proofs:

exponential(+positive_float,-float) - one

binomial/3

Returns a binomial distributed random value.

Compilation flags:

static

Template:

binomial(Trials,Probability,Value)

Mode and number of proofs:

binomial(+positive_integer,+positive_float,-float) - one

bernoulli/2

Returns a Bernoulli distributed random value.

Compilation flags:

static

Template:

bernoulli(Probability,Value)

Mode and number of proofs:

bernoulli(+positive_integer,-float) - one

beta/3

Returns a beta distributed random value.

Compilation flags:

static

Template:

beta(Alpha,Beta,Value)

Mode and number of proofs:

beta(+positive_float,+positive_float,-float) - one

gamma/3

Returns a scaled gamma distributed random value.

Compilation flags:

static

Template:

gamma(Shape,Scale,Value)

Mode and number of proofs:

gamma(+positive_float,+positive_float,-float) - one

logistic/3

Returns a scaled logistic distributed random value.

Compilation flags:

static

Template:

logistic(Location,Scale,Value)

Mode and number of proofs:

logistic(+float,+positive_float,-float) - one

`poisson/2`

Returns a Poisson distributed random value given the expected number of events.

Compilation flags:

`static`

Template:

`poisson(Mean, Value)`

Mode and number of proofs:

`poisson(+non_negative_float, -non_negative_integer) - one`

`power/2`

Returns a power distributed random value.

Compilation flags:

`static`

Template:

`power(Exponent, Value)`

Mode and number of proofs:

`power(+positive_float, -float) - one`

`weibull/3`

Returns a scaled Weibull distributed random value.

Compilation flags:

`static`

Template:

`weibull(Shape, Scale, Value)`

Mode and number of proofs:

`weibull(+float, +positive_float, -float) - one`

uniform/3

Returns a uniform distributed random value in the interval “[Lower, Upper[. Fails if ``Lower or Upper are not integers or if Lower > Upper. Same as random/3.

Compilation flags:

static

Template:

uniform(Lower,Upper,Value)

Mode and number of proofs:

uniform(+float,+float,-float) - zero_or_one

uniform/1

Returns a uniform distributed random value in the interval “[0.0, 1.0[. Same as ``random/1.

Compilation flags:

static

Template:

uniform(Value)

Mode and number of proofs:

uniform(-float) - one

triangular/4

Returns a triangular distributed random value. Fails if the Left =< Mode =< Right condition does not hold.

Compilation flags:

static

Template:

triangular(Left,Mode,Right,Value)

Mode and number of proofs:

triangular(+float,+float,+float,-float) - zero_or_one

`von_mises/3`

Returns a von Mises distributed random value.

Compilation flags:
static

Template:
von_mises(Mode,Concentration,Value)

Mode and number of proofs:
von_mises(+float,+non_negative_float,-float) - zero_or_one

`gumbel/3`

Returns a Gumbel distributed random value.

Compilation flags:
static

Template:
gumbel(Location,Scale,Value)

Mode and number of proofs:
gumbel(+float,+non_negative_float,-float) - zero_or_one

`dirichlet/2`

Returns a Dirichlet distributed list of random values.

Compilation flags:
static

Template:
dirichlet(Alphas,Thetas)

Mode and number of proofs:

`dirichlet(+list(positive_float),-list(positive_float)) - one`

`circular_uniform_polar/3`

Returns a circular uniform distributed random point in polar coordinates given the circle radius.

Compilation flags:

`static`

Template:

`circular_uniform_polar(Radius,Rho,Theta)`

Mode and number of proofs:

`circular_uniform_polar(+float,+float,-float) - one`

`circular_uniform_cartesian/3`

Returns a circular uniform distributed random point in cartesian coordinates given the circle radius.

Compilation flags:

`static`

Template:

`circular_uniform_cartesian(Radius,X,Y)`

Mode and number of proofs:

`circular_uniform_cartesian(+float,+float,-float) - one`

`standard_t/2`

Returns a standard Student's t distributed random value given the degrees of freedom.

Compilation flags:

`static`

Template:

```
standard_t(DegreesOfFreedom,Value)
```

Mode and number of proofs:

```
standard_t(+positive_integer,-float) - one
```

```
standard_cauchy/3
```

Returns a standard Cauchy distributed random value.

Compilation flags:

```
static
```

Template:

```
standard_cauchy(Location,Scale,Value)
```

Mode and number of proofs:

```
standard_cauchy(+float,+float,-float) - one
```

```
standard_exponential/1
```

Returns a standard exponential distributed random value.

Compilation flags:

```
static
```

Template:

```
standard_exponential(Value)
```

Mode and number of proofs:

```
standard_exponential(-float) - one
```

`standard_gamma/2`

Returns a standard gamma distributed random value.

Compilation flags:

`static`

Template:

`standard_gamma(Shape, Value)`

Mode and number of proofs:

`standard_gamma(+positive_float, -float) - one`

`standard_normal/1`

Returns a standard normally (Gaussian) distributed random value (using a default mean of 0.0 and a default deviation of 1.0).

Compilation flags:

`static`

Template:

`standard_normal(Value)`

Mode and number of proofs:

`standard_normal(-float) - one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

➡ See also

`random_protocol`, `pseudo_random_protocol`

1.63 reader

object

1.63.1 reader

Predicates for reading text file and text stream contents to lists of terms, characters, or character codes and for reading binary file and binary stream contents to lists of bytes.

Availability:

`logtalk_load(reader(loader))`

Author: Paulo Moura

Version: 2:2:0

Date: 2023-11-14

Compilation flags:

`static`, `context_switching_calls`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - `file_to_codes/2`
 - `file_to_codes/3`

- file_to_chars/2
 - file_to_chars/3
 - file_to_terms/2
 - file_to_terms/3
 - file_to_bytes/2
 - file_to_bytes/3
 - stream_to_codes/2
 - stream_to_codes/3
 - stream_to_chars/2
 - stream_to_chars/3
 - stream_to_terms/2
 - stream_to_terms/3
 - stream_to_bytes/2
 - stream_to_bytes/3
 - line_to_chars/2
 - line_to_chars/3
 - line_to_codes/2
 - line_to_codes/3
- Protected predicates
 - Private predicates
 - Operators

Public predicates

file_to_codes/2

Reads a text file into a list of character codes.

Compilation flags:

static

Template:

file_to_codes(File,Codes)

Mode and number of proofs:

file_to_codes(+atom,-list(character_code)) - one

`file_to_codes/3`

Reads a text file into a list of character codes. The list is terminated by the given tail.

Compilation flags:

`static`

Template:

`file_to_codes(File,Codes,Tail)`

Mode and number of proofs:

`file_to_codes(+atom,-list(character_code),@term) - one`

`file_to_chars/2`

Reads a text file into a list of characters.

Compilation flags:

`static`

Template:

`file_to_chars(File,Chars)`

Mode and number of proofs:

`file_to_chars(+atom,-list(character)) - one`

`file_to_chars/3`

Reads a text file into a list of characters. The list is terminated by the given tail.

Compilation flags:

`static`

Template:

`file_to_chars(File,Chars,Tail)`

Mode and number of proofs:

`file_to_chars(+atom,-list(character),@term) - one`

`file_to_terms/2`

Reads a text file into a list of terms.

Compilation flags:

`static`

Template:

`file_to_terms(File,Terms)`

Mode and number of proofs:

`file_to_terms(+atom,-list(term)) - one`

`file_to_terms/3`

Reads a text file into a list of terms. The list is terminated by the given tail.

Compilation flags:

`static`

Template:

`file_to_terms(File,Terms,Tail)`

Mode and number of proofs:

`file_to_terms(+atom,-list(term),@term) - one`

`file_to_bytes/2`

Reads a binary file into a list of bytes.

Compilation flags:

`static`

Template:

`file_to_bytes(File,Bytes)`

Mode and number of proofs:

`file_to_bytes(+atom,-list(byte)) - one`

`file_to_bytes/3`

Reads a binary file into a list of bytes. The list is terminated by the given tail.

Compilation flags:

`static`

Template:

`file_to_bytes(File,Bytes,Tail)`

Mode and number of proofs:

`file_to_bytes(+atom,-list(byte),@term) - one`

`stream_to_codes/2`

Reads a text stream into a list of character codes. Does not close the stream.

Compilation flags:

`static`

Template:

`stream_to_codes(Stream,Codes)`

Mode and number of proofs:

`stream_to_codes(+stream_or_alias,-list(character_code)) - one`

`stream_to_codes/3`

Reads a text stream into a list of character codes. Does not close the stream. The list is terminated by the given tail.

Compilation flags:

`static`

Template:

`stream_to_codes(Stream,Codes,Tail)`

Mode and number of proofs:

`stream_to_codes(+stream_or_alias,-list(character_code),@term) - one`

`stream__to__chars/2`

Reads a text stream into a list of characters. Does not close the stream.

Compilation flags:

`static`

Template:

`stream__to__chars(Stream,Chars)`

Mode and number of proofs:

`stream__to__chars(+stream_or_alias,-list(char)) - one`

`stream__to__chars/3`

Reads a text stream into a list of characters. Does not close the stream. The list is terminated by the given tail.

Compilation flags:

`static`

Template:

`stream__to__chars(Stream,Chars,Tail)`

Mode and number of proofs:

`stream__to__chars(+stream_or_alias,-list(char),@term) - one`

`stream__to__terms/2`

Reads a text stream into a list of terms. Does not close the stream.

Compilation flags:

`static`

Template:

`stream__to__terms(Stream,Terms)`

Mode and number of proofs:

`stream_to_terms(+stream_or_alias,-list(term))` - one

`stream_to_terms/3`

Reads a text stream into a list of terms. Does not close the stream. The list is terminated by the given tail.

Compilation flags:

`static`

Template:

`stream_to_terms(Stream,Terms,Tail)`

Mode and number of proofs:

`stream_to_terms(+stream_or_alias,-list(term),@term)` - one

`stream_to_bytes/2`

Reads a binary stream into a list of bytes. Does not close the stream.

Compilation flags:

`static`

Template:

`stream_to_bytes(Stream,Bytes)`

Mode and number of proofs:

`stream_to_bytes(+stream_or_alias,-list(byte))` - one

`stream_to_bytes/3`

Reads a binary stream into a list of bytes. Does not close the stream. The list is terminated by the given tail.

Compilation flags:

`static`

Template:

stream_to_bytes(Stream,Bytes,Tail)

Mode and number of proofs:

stream_to_bytes(+stream_or_alias,-list(byte),@term) - one

line_to_chars/2

Reads a line from a text stream into a list of characters. Discards the end-of-line characters. Unifies Chars with end_of_file at the end of the file.

Compilation flags:

static

Template:

line_to_chars(Stream,Chars)

Mode and number of proofs:

line_to_chars(+stream_or_alias,-types([atom,list(character)])) - one

line_to_chars/3

Reads a line from a text stream into a list of characters. Keeps the end-of-line marker normalized to the line feed control character. The list is terminated by the given tail, which is unified with the empty list at the end of the file.

Compilation flags:

static

Template:

line_to_chars(Stream,Chars,Tail)

Mode and number of proofs:

line_to_chars(+stream_or_alias,-list(character),?term) - one

`line_to_codes/2`

Reads a line from a text stream into a list of character codes. Discards the end-of-line character codes. Unifies Codes with `end_of_file` at the end of the file.

Compilation flags:

`static`

Template:

`line_to_codes(Stream,Codes)`

Mode and number of proofs:

`line_to_codes(+stream_or_alias,-types([atom,list(character_code)])) - one`

`line_to_codes/3`

Reads a line from a text stream into a list of character codes. Keeps the end-of-line marker normalized to the line feed control character code. The list is terminated by the given tail, which is unified with the empty list at the end of the file.

Compilation flags:

`static`

Template:

`line_to_codes(Stream,Codes,Tail)`

Mode and number of proofs:

`line_to_codes(+stream_or_alias,-list(character_code),?term) - one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.64 recorded_database

object

1.64.1 recorded_database

Legacy recorded database predicates. Provides an application global database.

Availability:

```
logtalk_load(recorded_database(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2023-12-17

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public recorded_database_core
```

Remarks:

(none)

Inherited public predicates:

```
erase/1 instance/2 recorda/2 recorda/3 recorded/2 recorded/3 recordz/2 recordz/3
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.64.2 recorded_database_core

Legacy recorded database predicates. Can be imported into an object to provide a local database.

Availability:

```
logtalk_load(recorded_database(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2023-12-17

Compilation flags:

```
static
```

Dependencies:

(none)

Remarks:

- References: Opaque ground terms.

Inherited public predicates:

(none)

- Public predicates
 - recorda/3
 - recorda/2
 - recordz/3
 - recordz/2
 - recorded/3
 - recorded/2
 - erase/1
 - instance/2
- Protected predicates
- Private predicates
 - record_/3
 - reference_/1
- Operators

Public predicates

recorda/3

Adds a term as the first term for the given key, returning its reference.

Compilation flags:

static

Template:

recorda(Key,Term,Reference)

Mode and number of proofs:

recorda(+recorded_database_key,+term,--recorded_database_reference) - one_or_error

Exceptions:

Key is a variable:

instantiation_error

Key is neither a variable nor an atomic term or compound term:

type_error(recorded_database_key,Key)

Reference is a not a variable:

uninstantiation_error(Reference)

recorda/2

Adds a term as the first term for the given key.

Compilation flags:

static

Template:

recorda(Key,Term)

Mode and number of proofs:

recorda(+recorded_database_key,+term) - one_or_error

Exceptions:

Key is a variable:

instantiation_error

Key is neither a variable nor an atomic term or compound term:

type_error(recorded_database_key,Key)

recordz/3

Adds a term as the last term for the given key, returning its reference.

Compilation flags:

static

Template:

recordz(Key,Term,Reference)

Mode and number of proofs:

recordz(+recorded_database_key,+term,--recorded_database_reference) - one_or_error

Exceptions:

Key is a variable:

instantiation_error

Key is neither a variable nor an atomic term or compound term:

type_error(recorded_database_key,Key)

Reference is a not a variable:

uninstantiation_error(Reference)

`recordz/2`

Adds a term as the last term for the given key.

Compilation flags:

`static`

Template:

`recordz(Key,Term)`

Mode and number of proofs:

`recordz(+recorded__database__key,+term) - one_or_error`

Exceptions:

Key is a variable:

`instantiation_error`

Key is neither a variable nor an atomic term or compound term:

`type_error(recorded__database__key,Key)`

`recorded/3`

Enumerates, by backtracking, all record key-term pairs and their references.

Compilation flags:

`static`

Template:

`recorded(Key,Term,Reference)`

Mode and number of proofs:

`recorded(?recorded__database__key,?term,-recorded__database__reference) - zero_or_more`

`recorded(?recorded__database__key,?term,+recorded__database__reference) - zero_or_one`

recorded/2

Enumerates, by backtracking, all record key-term pairs.

Compilation flags:

static

Template:

recorded(Key,Term)

Mode and number of proofs:

recorded(?recorded_database_key,?term) - zero_or_more

erase/1

Erases the record indexed by the given reference. Fails if there is no record with the given reference.

Compilation flags:

static

Template:

erase(Reference)

Mode and number of proofs:

erase(@recorded_database_reference) - zero_or_one_or_error

Exceptions:

Reference is a variable:

instantiation_error

instance/2

.

Compilation flags:

static

Template:

instance(Reference,Term)

Mode and number of proofs:

instance(@recorded_database_reference,?term) - zero_or_one_or_error

Exceptions:

Reference is a variable:

instantiation_error

Protected predicates

(none)

Private predicates

record_/3

Records table.

Compilation flags:

dynamic

Template:

record_(Key,Term,Reference)

Mode and number of proofs:

record_(?recorded_database_key,?term,?recorded_database_reference) - zero_or_more

reference_/1

Reference count.

Compilation flags:

dynamic

Template:

reference_(Reference)

Mode and number of proofs:

reference_(?non_negative_integer) - zero_or_one

Operators

(none)

1.65 redis

object

1.65.1 redis

Redis client. Inspired by Sean Charles GNU Prolog Redis client.

Availability:

```
logtalk_load(redis(loader))
```

Author: Paulo Moura

Version: 0:5:1

Date: 2021-12-06

Compilation flags:

```
static, context_switching_calls
```

Provides:

```
logtalk::message_tokens//2
```

Uses:

```
list
```

```
logtalk
```

Remarks:

- Command representation: Use the Redis command name as the functor of a compound term where the arguments are the command arguments.
- Valid arguments: Atoms, integers, and floats. Always use atoms instead of double-quoted “strings”. This helps portability by not depending on the value of the double_quotes flag.

Inherited public predicates:

(none)

- Public predicates
 - connect/1
 - connect/3
 - disconnect/1
 - send/3
 - console/1
- Protected predicates
- Private predicates
- Operators

Public predicates

connect/1

Connect to a Redis server running on localhost using the default 6379 port.

Compilation flags:

static

Template:

connect(Connection)

Mode and number of proofs:

connect(--ground) - one

connect/3

Connect to a Redis server running on the given host and port.

Compilation flags:

static

Template:

connect(Host,Port,Connection)

Mode and number of proofs:

connect(+atom,+integer,--ground) - one

`disconnect/1`

Disconnect from a Redis server.

Compilation flags:

`static`

Template:

`disconnect(Connection)`

Mode and number of proofs:

`disconnect(++ground) - one`

`send/3`

Sends a request to the a Redis server and returns its reply.

Compilation flags:

`static`

Template:

`send(Connection,Request,Reply)`

Mode and number of proofs:

`send(++ground,++callable,--callable) - one`

`console/1`

Sends a request to a Redis server running on localhost at the default 6379 port and prints the reply.

Compilation flags:

`static`

Template:

`console(Request)`

Mode and number of proofs:

console(++callable) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.66 sets

object

1.66.1 set

Set predicates implemented using ordered lists. Uses `==/2` for element comparison and standard term ordering.

Availability:

`logtalk_load(sets(loader))`

Author: Richard O’Keefe (main predicates); adapted to Logtalk by Paulo Moura.

Version: 2:0:0

Date: 2025-07-08

Compilation flags:

`static, context_switching_calls`

Implements:

`public setp`

Extends:

`public compound`

Aliases:

`setp size/2 as length/2`

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (= <)/2 (= \=)/2 (>)/2 (>=)/2 as_list/2 as_set/2 check/1 delete/3 depth/2 disjoint/2 empty/1 equal/2 ground/1 insert/3 insert_all/3 intersect/2 intersection/3 intersection/4 member/2 memberchk/2 new/1 numbervars/1 numbervars/3 occurs/2 powerset/2 product/3 select/3 selectchk/3 singletons/2 size/2 subset/2 subsumes/2 subterm/2 subtract/3 symdiff/3 union/3 union/4 valid/1 variables/2 variant/2 varnumbers/2 varnumbers/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

set(Type)

object

1.66.2 set(Type)

Set predicates with elements constrained to a single type and custom comparing rules.

Availability:

`logtalk_load(sets(loader))`

Author: Paulo Moura and Adrian Arroyo

Version: 1:24:0

Date: 2022-02-03

Compilation flags:

`static, context_switching_calls`

Extends:

`public set`

Uses:

`list`

Remarks:

(none)

Inherited public predicates:

`(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 as_list/2 as_set/2 check/1 delete/3 depth/2 disjoint/2 empty/1 equal/2 ground/1 insert/3 insert_all/3 intersect/2 intersection/3 intersection/4 member/2 memberchk/2 new/1 numbervars/1 numbervars/3 occurs/2 powerset/2 product/3 select/3 selectchk/3 singletons/2 size/2 subset/2 subsumes/2 subterm/2 subtract/3 symdiff/3 union/3 union/4 valid/1 variables/2 variant/2 varnumbers/2 varnumbers/3`

- Public predicates
- Protected predicates
- Private predicates
 - `sort/2`
 - `partition/4`
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

sort/2

Sorts a list in ascending order.

Compilation flags:

static

Template:

sort(List,Sorted)

Mode and number of proofs:

sort(+list,-list) - one

partition/4

List partition in two sub-lists using a pivot.

Compilation flags:

static

Template:

partition(List,Pivot,Lowes,Biggers)

Mode and number of proofs:

partition(+list,+nonvar,-list,-list) - one

Operators

(none)

protocol

1.66.3 setp

Set protocol.

Availability:

logtalk_load(sets(loader))

Author: Paulo Moura

Version: 2:0:0

Date: 2025-07-08

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates

- as_set/2
- as_list/2
- delete/3
- disjoint/2
- equal/2
- empty/1
- insert/3
- insert_all/3
- intersect/2

- intersection/3
- intersection/4
- size/2
- member/2
- memberchk/2
- powerset/2
- product/3
- select/3
- selectchk/3
- subset/2
- subtract/3
- symdiff/3
- union/3
- union/4
- Protected predicates
- Private predicates
- Operators

Public predicates

`as_set/2`

Returns a set with all unique elements from the given list.

Compilation flags:

`static`

Template:

`as_set(List,Set)`

Mode and number of proofs:

`as_set(@list,-set) - one`

`as_list/2`

Returns a list with all elements of the given set.

Compilation flags:

`static`

Template:

`as_list(Set,List)`

Mode and number of proofs:

`as_list(@set,-list) - one`

`delete/3`

Deletes an element from a set returning the set of the remaining elements.

Compilation flags:

`static`

Template:

`delete(Set,Element,Remaining)`

Mode and number of proofs:

`delete(@set,@term,-set) - one`

`disjoint/2`

True when the two sets have no element in common.

Compilation flags:

`static`

Template:

`disjoint(Set1,Set2)`

Mode and number of proofs:

`disjoint(@set,@set) - zero_or_one`

`equal/2`

True when the two sets are equal.

Compilation flags:

`static`

Template:

`equal(Set1,Set2)`

Mode and number of proofs:

`equal(@set,@set) - zero_or_one`

`empty/1`

True when the set is empty.

Compilation flags:

`static`

Template:

`empty(Set)`

Mode and number of proofs:

`empty(@set) - zero_or_one`

`insert/3`

Inserts an element in a set, returning the resulting set.

Compilation flags:

`static`

Template:

`insert(In,Element,Out)`

Mode and number of proofs:

`insert(@set,@term,-set) - one`

`insert_all/3`

Inserts all the elements of the list into a set, returning the resulting set.

Compilation flags:

`static`

Template:

`insert_all(List,In,Out)`

Mode and number of proofs:

`insert_all(@list,@set,-set) - one`

`intersect/2`

True if the two sets have at least one element in common.

Compilation flags:

`static`

Template:

`intersect(Set1,Set2)`

Mode and number of proofs:

`intersect(@set,@set) - zero_or_one`

`intersection/3`

Computes the intersection of Set1 and Set2.

Compilation flags:

`static`

Template:

`intersection(Set1,Set2,Intersection)`

Mode and number of proofs:

`intersection(@set,@set,-set) - one`

intersection/4

Computes the intersection and the difference between Set2 and Set1.

Compilation flags:

static

Template:

intersection(Set1,Set2,Intersection,Difference)

Mode and number of proofs:

intersection(@set,@set,-set,-set) - one

size/2

Number of set elements.

Compilation flags:

static

Template:

size(Set,Size)

Mode and number of proofs:

size(@set,?integer) - zero_or_one

member/2

Element is a member of set Set.

Compilation flags:

static

Template:

member(Element,Set)

Mode and number of proofs:

member(?term,+set) - zero_or_more

memberchk/2

True when a term is a member of a set.

Compilation flags:

static

Template:

memberchk(Element,Set)

Mode and number of proofs:

memberchk(@term,@set) - zero_or_one

powerset/2

Returns the power set of a set, represented as a list of sets.

Compilation flags:

static

Template:

powerset(Set,Powerset)

Mode and number of proofs:

powerset(@set,-list(set)) - one

product/3

Returns the cartesian product of two sets.

Compilation flags:

static

Template:

product(Set1,Set2,Product)

Mode and number of proofs:

product(@set,@set,-set) - one

`select/3`

Selects an element from a set, returning the set of remaining elements.

Compilation flags:

`static`

Template:

`select(Element,Set,Remaining)`

Mode and number of proofs:

`select(?term,?set,?set) - zero_or_more`

`selectchk/3`

True if an element can be selected from a set, returning the set of remaining elements.

Compilation flags:

`static`

Template:

`selectchk(Element,Set,Remaining)`

Mode and number of proofs:

`selectchk(@term,@set,-set) - zero_or_one`

`subset/2`

True if Subset is a subset of Set.

Compilation flags:

`static`

Template:

`subset(Subset,Set)`

Mode and number of proofs:

`subset(@set,@set) - zero_or_one`

subtract/3

Computes the set of all the elements of Set1 which are not also in Set2.

Compilation flags:

static

Template:

subtract(Set1,Set2,Difference)

Mode and number of proofs:

subtract(@set,@set,-set) - one

symdiff/3

Computes the symmetric difference of Set1 and Set2, containing all elements that are not in the sets intersection.

Compilation flags:

static

Template:

symdiff(Set1,Set2,Difference)

Mode and number of proofs:

symdiff(@set,@set,-set) - one

union/3

Computes the union of Set1 and Set2.

Compilation flags:

static

Template:

union(Set1,Set2,Union)

Mode and number of proofs:

union(@set,@set,-set) - one

`union/4`

Computes the union of Set1 and Set2 and the difference between Set2 and Set1.

Compilation flags:

`static`

Template:

`union(Set1,Set2,Union,Difference)`

Mode and number of proofs:

`union(@set,@set,-set,-set) - one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

`set, set(Type)`

1.67 statistics

object

1.67.1 population

Statistical population represented as a list of numbers.

Availability:

```
logtalk_load(statistics(loader))
```

Author: Paulo Moura

Version: 1:3:0

Date: 2020-02-02

Compilation flags:

```
static, context__switching__calls
```

Imports:

```
public statistics
```

Remarks:

```
(none)
```

Inherited public predicates:

```
arithmetic_mean/2 average_deviation/3 coefficient_of_variation/2 fractile/3 geometric_mean/2  
harmonic_mean/2 kurtosis/2 max/2 mean_deviation/2 median/2 median_deviation/2 min/2  
min_max/3 modes/2 product/2 range/2 relative_standard_deviation/2 skewness/2  
standard_deviation/2 sum/2 valid/1 variance/2 weighted_mean/3 z_normalization/2
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

sample

object

1.67.2 sample

Statistical sample represented as a list of numbers.

Availability:

`logtalk_load(statistics(loader))`

Author: Paulo Moura

Version: 1:4:0

Date: 2020-02-02

Compilation flags:

`static, context_switching_calls`

Imports:

`public statistics`

Remarks:

(none)

Inherited public predicates:

`arithmetic_mean/2 average_deviation/3 coefficient_of_variation/2 fractile/3 geometric_mean/2
harmonic_mean/2 kurtosis/2 max/2 mean_deviation/2 median/2 median_deviation/2 min/2
min_max/3 modes/2 product/2 range/2 relative_standard_deviation/2 skewness/2
standard_deviation/2 sum/2 valid/1 variance/2 weighted_mean/3 z_normalization/2`

- [Public predicates](#)
- [Protected predicates](#)
- [Private predicates](#)
- [Operators](#)

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

[population](#)

[category](#)

1.67.3 statistics

Statistical calculations over a list of numbers.

Availability:

```
logtalk_load(statistics(loader))
```

Author: Paulo Moura

Version: 1:7:1

Date: 2023-05-29

Compilation flags:

```
static
```

Implements:

public statisticsp

Uses:

list

numberlist

Remarks:

(none)

Inherited public predicates:

arithmetic_mean/2 average_deviation/3 coefficient_of_variation/2 fractile/3 geometric_mean/2
 harmonic_mean/2 kurtosis/2 max/2 mean_deviation/2 median/2 median_deviation/2 min/2
 min_max/3 modes/2 product/2 range/2 relative_standard_deviation/2 skewness/2
 standard_deviation/2 sum/2 valid/1 variance/2 weighted_mean/3 z_normalization/2

- Public predicates
- Protected predicates
- Private predicates
 - arithmetic_mean/5
 - squares_and_cubes/6
 - squares_and_hypers/6
 - variance/6
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`arithmetic_mean/5`

Auxiliary predicate for computing the arithmetic mean.

Compilation flags:

`static`

Template:

`arithmetic_mean(List,Length0,Length,Sum,Mean)`

Mode and number of proofs:

`arithmetic_mean(+list(number),+integer,-integer,+number,-float) - one`

`squares_and_cubes/6`

Auxiliary predicate for computing the skewness.

Compilation flags:

`static`

Template:

`squares_and_cubes(List,Mean,Squares0,Squares,Cubes0,Cubes)`

Mode and number of proofs:

`squares_and_cubes(+list(number),+float,+float,-float,+float,-float) - one`

`squares_and_hypers/6`

Auxiliary predicate for computing the kurtosis.

Compilation flags:

`static`

Template:

```
squares_and_hypers(List,Mean,Squares0,Squares,Hypers0,Hypers)
```

Mode and number of proofs:

```
squares_and_hypers(+list(number),+float,+float,-float,+float,-float) - one
```

variance/6

Auxiliary predicate for computing the variance.

Compilation flags:

```
static
```

Template:

```
variance(List,Length0,Length,Mean,M20,M2)
```

Mode and number of proofs:

```
variance(+list(number),+integer,-integer,+float,+float,-float) - one
```

Operators

(none)

protocol

1.67.4 statisticsp

Statistical calculations over a list of numbers protocol.

Availability:

```
logtalk_load(statistics(loader))
```

Author: Paulo Moura

Version: 1:3:0

Date: 2022-06-20

Compilation flags:

```
static
```

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - product/2
 - sum/2
 - min/2
 - max/2
 - min__max/3
 - range/2
 - arithmetic__mean/2
 - geometric__mean/2
 - harmonic__mean/2
 - weighted__mean/3
 - median/2
 - modes/2
 - average__deviation/3
 - mean__deviation/2
 - median__deviation/2
 - standard__deviation/2
 - coefficient__of__variation/2
 - relative__standard__deviation/2
 - skewness/2
 - kurtosis/2
 - variance/2
 - z__normalization/2
 - fractile/3
 - valid/1
- Protected predicates
- Private predicates

- Operators

Public predicates

`product/2`

Calculates the product of all list numbers. Fails if the list is empty.

Compilation flags:

`static`

Template:

`product(List,Product)`

Mode and number of proofs:

`product(+list(number),-number) - zero_or_one`

`sum/2`

Calculates the sum of all list numbers. Fails if the list is empty.

Compilation flags:

`static`

Template:

`sum(List,Sum)`

Mode and number of proofs:

`sum(+list(number),-number) - zero_or_one`

`min/2`

Determines the minimum value in a list of numbers. Fails if the list is empty.

Compilation flags:

`static`

Template:

`min(List,Minimum)`

Mode and number of proofs:

`min(+list,-number) - zero_or_one`

`max/2`

Determines the list maximum value in a list of numbers. Fails if the list is empty.

Compilation flags:

`static`

Template:

`max(List,Maximum)`

Mode and number of proofs:

`max(+list,-number) - zero_or_one`

`min_max/3`

Determines the minimum and maximum values in a list of numbers. Fails if the list is empty.

Compilation flags:

`static`

Template:

`min_max(List,Minimum,Maximum)`

Mode and number of proofs:

`min_max(+list(number),-number,-number) - zero_or_one`

range/2

Range is the length of the smallest interval which contains all the numbers in List. Fails if the list is empty.

Compilation flags:

static

Template:

range(List,Range)

Mode and number of proofs:

range(+list,-number) - zero_or_one

arithmetic_mean/2

Calculates the arithmetic mean of a list of numbers. Fails if the list is empty.

Compilation flags:

static

Template:

arithmetic_mean(List,Mean)

Mode and number of proofs:

arithmetic_mean(+list(number),-float) - zero_or_one

geometric_mean/2

Calculates the geometric mean of a list of numbers. Fails if the list is empty.

Compilation flags:

static

Template:

geometric_mean(List,Mean)

Mode and number of proofs:

geometric_mean(+list(number),-float) - zero_or_one

harmonic_mean/2

Calculates the harmonic mean of a list of numbers. Fails if the list is empty.

Compilation flags:

static

Template:

harmonic_mean(List,Mean)

Mode and number of proofs:

harmonic_mean(+list(number),-float) - zero_or_one

weighted_mean/3

Calculates the weighted mean of a list of numbers. Fails if the list is empty or if the two lists have different lengths. Wights are assume to be non-negative.

Compilation flags:

static

Template:

weighted_mean(Weights,List,Mean)

Mode and number of proofs:

weighted_mean(+list(number),+list(number),-float) - zero_or_one

median/2

Calculates the median of a list of numbers. Fails if the list is empty.

Compilation flags:

static

Template:

median(List,Median)

Mode and number of proofs:

median(+list(number),-float) - zero_or_one

`modes/2`

Returns the list of modes of a list of numbers in ascending order. Fails if the list is empty.

Compilation flags:

`static`

Template:

`modes(List,Modes)`

Mode and number of proofs:

`modes(+list(number),-list(number)) - zero_or_one`

`average_deviation/3`

Calculates the average absolute deviation of a list of numbers given a central tendency (e.g., mean, median, or mode). Fails if the list is empty.

Compilation flags:

`static`

Template:

`average_deviation(List,CentralTendency,Deviation)`

Mode and number of proofs:

`average_deviation(+list(number),+float,-float) - zero_or_one`

`mean_deviation/2`

Calculates the mean absolute deviation of a list of numbers. Fails if the list is empty.

Compilation flags:

`static`

Template:

`mean_deviation(List,Deviation)`

Mode and number of proofs:

```
mean_deviation(+list(number),-float) - zero_or_one
```

`median_deviation/2`

Calculates the median absolute deviation of a list of numbers. Fails if the list is empty.

Compilation flags:

```
static
```

Template:

```
median_deviation(List,Deviation)
```

Mode and number of proofs:

```
median_deviation(+list(number),-float) - zero_or_one
```

`standard_deviation/2`

Calculates the standard deviation of a list of numbers. Fails if the list is empty.

Compilation flags:

```
static
```

Template:

```
standard_deviation(List,Deviation)
```

Mode and number of proofs:

```
standard_deviation(+list(number),-float) - zero_or_one
```

`coefficient_of_variation/2`

Calculates the coefficient of variation of a list of numbers. Fails if the list is empty.

Compilation flags:

```
static
```

Template:

coefficient_of_variation(List,Coefficient)

Mode and number of proofs:

coefficient_of_variation(+list(number),-float) - zero_or_one

relative_standard_deviation/2

Calculates the relative standard deviation of a list of numbers. Fails if the list is empty.

Compilation flags:

static

Template:

relative_standard_deviation(List,Percentage)

Mode and number of proofs:

relative_standard_deviation(+list(number),-float) - zero_or_one

skewness/2

Calculates the (moment) skewness of a list of numbers. Fails if the list is empty.

Compilation flags:

static

Template:

skewness(List,Skewness)

Mode and number of proofs:

skewness(+list(number),-float) - zero_or_one

kurtosis/2

Calculates the (excess) kurtosis of a list of numbers. Fails if the list is empty.

Compilation flags:

static

Template:

kurtosis(List,Kurtosis)

Mode and number of proofs:

kurtosis(+list(number),-float) - zero_or_one

variance/2

Calculates the unbiased variance of a list of numbers. Fails if the list is empty.

Compilation flags:

static

Template:

variance(List,Variance)

Mode and number of proofs:

variance(+list(number),-float) - zero_or_one

z_normalization/2

Normalizes a list of number such that for the resulting list the mean of is close to zero and the standard deviation is close to 1. Fails if the list is empty.

Compilation flags:

static

Template:

z_normalization(List,NormalizedList)

Mode and number of proofs:

z_normalization(+list(number),-list(float)) - zero_or_one

fractile/3

Calculates the smallest value in a list of numbers such that the list elements in its fraction P are less or equal to that value (with P in the open interval (0.0, 1.0)). Fails if the list is empty.

Compilation flags:

static

Template:

fractile(P,List,Fractile)

Mode and number of proofs:

fractile(+float,+list(integer),-integer) - zero_or_one

fractile(+float,+list(float),-float) - zero_or_one

valid/1

Term is a closed list of numbers.

Compilation flags:

static

Template:

valid(Term)

Mode and number of proofs:

valid(@nonvar) - zero_or_one

Protected predicates


(none)

Private predicates

(none)

Operators

(none)

 See also

statistics, sample, population

1.68 term_io

object

1.68.1 term_io

Term input/output from/to atom, chars, and codes.

Availability:

`logtalk_load(term_io(loader))`

Author: Paulo Moura

Version: 1:3:0

Date: 2023-11-14

Compilation flags:

`static, context_switching_calls`

Implements:

`public term_io_protocol`

Uses:

`os`

Remarks:

(none)

Inherited public predicates:

```

format_to_atom/3 format_to_chars/3 format_to_chars/4 format_to_codes/3
format_to_codes/4 read_from_atom/2 read_from_chars/2 read_from_codes/2
read_term_from_atom/3 read_term_from_chars/3 read_term_from_chars/4
read_term_from_codes/3 read_term_from_codes/4 with_output_to/2 write_term_to_atom/3
write_term_to_chars/3 write_term_to_chars/4 write_term_to_codes/3
write_term_to_codes/4 write_to_atom/2 write_to_chars/2 write_to_codes/2

```

- Public predicates
- Protected predicates
- Private predicates
 - temporary_file_/1
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

temporary_file_/1

Logtalk session and term_io specific temporary file path.

Compilation flags:

dynamic

Template:

temporary_file_(Path)

Mode and number of proofs:

temporary_file_(-atom) - one

Operators

(none)

protocol

1.68.2 term_io_protocol

Predicates for term input/output from/to atom, chars, and codes. The predicates are declared as synchronized when the library is compiled using a backend supporting threads.

Availability:

logtalk_load(term_io(loader))

Author: Paulo Moura

Version: 1:3:0

Date: 2021-10-04

Compilation flags:

static

Dependencies:

(none)

Remarks:

- Portability notes: To keep calls to these library predicates portable, use only standard read/write options and specify output formats using atoms.

Inherited public predicates:

(none)

- Public predicates
 - read_term_from_atom/3
 - read_from_atom/2
 - read_term_from_chars/3
 - read_term_from_chars/4
 - read_from_chars/2
 - read_term_from_codes/3

- read_term_from_codes/4
- read_from_codes/2
- write_term_to_atom/3
- write_to_atom/2
- write_term_to_chars/3
- write_term_to_chars/4
- write_to_chars/2
- write_term_to_codes/3
- write_term_to_codes/4
- write_to_codes/2
- format_to_atom/3
- format_to_chars/3
- format_to_chars/4
- format_to_codes/3
- format_to_codes/4
- with_output_to/2
- Protected predicates
- Private predicates
- Operators

Public predicates

read_term_from_atom/3

Reads a term from an atom using the given read options. A period at the end of the atom is optional. Valid options are those supported by the standard read_term/3 predicate.

Compilation flags:

static, synchronized

Template:

read_term_from_atom(Atom,Term,Options)

Mode and number of proofs:

read_term_from_atom(+atom,-term,+list(read_option)) - one_or_error

`read_from_atom/2`

Reads a term from an atom using default read options. Shorthand for `read_term_from_atom(Atom,Term,[])`. A period at the end of the atom is optional.

Compilation flags:

`static`

Template:

`read_from_atom(Atom,Term)`

Mode and number of proofs:

`read_from_atom(+atom,-term) - one_or_error`

`read_term_from_chars/3`

Reads a term from a list of characters using the given read options. A period at the end of the list is optional. Valid options are those supported by the standard `read_term/3` predicate.

Compilation flags:

`static, synchronized`

Template:

`read_term_from_chars(Chars,Term,Options)`

Mode and number of proofs:

`read_term_from_chars(+list(character),-term,+list(read_option)) - one_or_error`

`read_term_from_chars/4`

Reads a term from a list of characters using the given read options, also returning the remaining characters. A period at the end of the term is required. Valid options are those supported by the standard `read_term/3` predicate.

Compilation flags:

`static`

Template:

`read_term_from_chars(Chars,Term,Tail,Options)`

Mode and number of proofs:

```
read_term_from_chars(+list(character),-term,-list(character),+list(read_option)) - one_or_error
```

`read_from_chars/2`

Reads a term from a list of characters using default read options. Shorthand for `read_term_from_chars(Chars,Term,[])`. A period at the end of the list is optional.

Compilation flags:

```
static
```

Template:

```
read_from_chars(Chars,Term)
```

Mode and number of proofs:

```
read_from_chars(+list(character),-term) - one_or_error
```

`read_term_from_codes/3`

Reads a term from a list of character codes using the given read options. A period at the end of the list is optional. Valid options are those supported by the standard `read_term/3` predicate.

Compilation flags:

```
static, synchronized
```

Template:

```
read_term_from_codes(Codes,Term,Options)
```

Mode and number of proofs:

```
read_term_from_codes(+list(character_code),-term,+list(read_option)) - one_or_error
```

`read_term_from_codes/4`

Reads a term from a list of character codes using the given read options, also returning the remaining character codes. A period at the end of the term is required. Valid options are those supported by the standard `read_term/3` predicate.

Compilation flags:

`static`

Template:

`read_term_from_codes(Codes,Term,Tail,Options)`

Mode and number of proofs:

`read_term_from_codes(+list(character_code),-term,-list(character_code),+list(read_option)) - one_or_error`

`read_from_codes/2`

Reads a term from a list of character codes using default read options. Shorthand for `read_term_from_codes(Codes,Term,[])`. A period at the end of the list is optional.

Compilation flags:

`static`

Template:

`read_from_codes(Codes,Term)`

Mode and number of proofs:

`read_from_codes(+list(character_code),-term) - one_or_error`

`write_term_to_atom/3`

Writes a term to an atom using the given write options. Valid options are those supported by the standard `write_term/3` predicate.

Compilation flags:

`static, synchronized`

Template:


```
write_term_to_atom(Term,Atom,Options)
```

Mode and number of proofs:

```
write_term_to_atom(@term,-atom,+list(write_option)) - one
```

`write_to_atom/2`

Writes a term to an atom using default write options. Shorthand for `write_term_to_atom(Term,Atom,[])`.

Compilation flags:

```
static
```

Template:

```
write_to_atom(Term,Atom)
```

Mode and number of proofs:

```
write_to_atom(@term,-atom) - one
```

`write_term_to_chars/3`

Writes a term to a list of characters using the given write options. Shorthand for `write_term_to_chars(Term,Chars,[],Options)`. Valid options are those supported by the standard `write_term/3` predicate.

Compilation flags:

```
static
```

Template:

```
write_term_to_chars(Term,Chars,Options)
```

Mode and number of proofs:

```
write_term_to_chars(@term,-list(character),+list(write_option)) - one
```

`write_term_to_chars/4`

Writes a term to a list of characters with the given tail using the given write options. Valid options are those supported by the standard `write_term/3` predicate.

Compilation flags:

static, synchronized

Template:

`write_term_to_chars(Term,Chars,Tail,Options)`

Mode and number of proofs:

`write_term_to_chars(@term,-list(character),@term,+list(write_option))` - one

`write_to_chars/2`

Writes a term to a list of characters using default write options. Shorthand for `write_term_to_chars(Term,Chars,[],[])`.

Compilation flags:

static

Template:

`write_to_chars(Term,Chars)`

Mode and number of proofs:

`write_to_chars(@term,-list(character))` - one

`write_term_to_codes/3`

Writes a term to a list of character codes using the given write options. Shorthand for `write_term_to_codes(Term,Codes,[],Options)`. Valid options are those supported by the standard `write_term/3` predicate.

Compilation flags:

static

Template:

`write_term_to_codes(Term,Codes,Options)`

Mode and number of proofs:

```
write_term_to_codes(@term,-list(character_code),+list(write_option)) - one
```

`write_term_to_codes/4`

Writes a term to a list of character codes with the given tail using the given write options. Valid options are those supported by the standard `write_term/3` predicate.

Compilation flags:

```
static, synchronized
```

Template:

```
write_term_to_codes(Term,Codes,Tail,Options)
```

Mode and number of proofs:

```
write_term_to_codes(@term,-list(character_code),@term,+list(write_option)) - one
```

`write_to_codes/2`

Writes a term to a list of character codes using default write options. Shorthand for `write_term_to_chars(Term,Codes,[],[])`.

Compilation flags:

```
static
```

Template:

```
write_to_codes(Term,Codes)
```

Mode and number of proofs:

```
write_to_codes(@term,-list(character_code)) - one
```

`format__to__atom/3`

Writes a list of arguments to an atom using the given format (specified as in the de facto standard `format/2` predicate).

Compilation flags:

static, synchronized

Template:

`format__to__atom(Format,Arguments,Atom)`

Mode and number of proofs:

`format__to__atom(@atom,+list(term),-atom)` - one

`format__to__chars/3`

Writes a list of arguments to a list of characters using the given format (specified as in the de facto standard `format/2` predicate). Shorthand for `format__to__chars(Format,Arguments,Chars,[])`.

Compilation flags:

static

Template:

`format__to__chars(Format,Arguments,Chars)`

Mode and number of proofs:

`format__to__chars(@term,+list(term),-list(character))` - one

`format__to__chars/4`

Writes a term to a list of characters with the given tail using the given format (specified as in the de facto standard `format/2` predicate).

Compilation flags:

static, synchronized

Template:

`format__to__chars(Format,Arguments,Chars,Tail)`

Mode and number of proofs:

`format__to__chars(@term,+list(term),-list(character),@term) - one`

`format__to__codes/3`

Writes a list of arguments to a list of character codes using the given format (specified as in the de facto standard `format/2` predicate). Shorthand for `format__to__codes(Format,Arguments,Codes,[])`.

Compilation flags:

`static`

Template:

`format__to__codes(Format,Arguments,Codes)`

Mode and number of proofs:

`format__to__codes(@term,+list(term),-list(character_code)) - one`

`format__to__codes/4`

Writes a list of arguments to a list of character codes with the given tail using the given format (specified as in the de facto standard `format/2` predicate).

Compilation flags:

`static, synchronized`

Template:

`format__to__codes(Format,Arguments,Codes,Tail)`

Mode and number of proofs:

`format__to__codes(@term,+list(term),-list(character_code),@term) - one`

`with_output_to/2`

Calls a goal deterministically with output to the given format: `atom(Atom)`, `chars(Chars)`, `chars(Chars,Tail)`, `codes(Codes)`, or `codes(Codes,Tail)`.

Compilation flags:

`static`, `synchronized`

Template:

`with_output_to(Output,Goal)`

Meta-predicate template:

`with_output_to(*,0)`

Mode and number of proofs:

`with_output_to(+compound,+callable) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.69 timeout

object

1.69.1 timeout

Predicates for calling goal with a time limit.

Availability:

`logtalk_load(timeout(loader))`

Author: Paulo Moura

Version: 0:10:0

Date: 2022-06-15

Compilation flags:

static, context_switching_calls

Dependencies:

(none)

Remarks:

- Supported backend Prolog systems: B-Prolog, ECLiPSe, SICStus Prolog, SWI-Prolog, Trealla Prolog, XSB, XVM, and YAP.

Inherited public predicates:

(none)

- Public predicates
 - call_with_timeout/2
 - call_with_timeout/3
- Protected predicates
- Private predicates
- Operators

Public predicates

call_with_timeout/2

Calls a goal deterministically with the given time limit (expressed in seconds). Note that the goal may fail or throw an error before exhausting the time limit.

Compilation flags:

static

Template:

call_with_timeout(Goal,Timeout)

Meta-predicate template:

call_with_timeout(0,*)

Mode and number of proofs:

call_with_timeout(+callable,+positive_number) - zero_or_one

Exceptions:

Goal does not complete in the allowed time:
 `timeout(Goal)`

`call_with_timeout/3`

Calls a goal deterministically with the given time limit (expressed in seconds) returning a reified result: `true`, `fail`, `timeout`, or `error(Error)`.

Compilation flags:

`static`

Template:

`call_with_timeout(Goal,Timeout,Result)`

Meta-predicate template:

`call_with_timeout(0,*,*)`

Mode and number of proofs:

`call_with_timeout(+callable,+positive_number,--atom) - one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.70 toon

object

1.70.1 toon

TOON parser and generator. Uses curly terms for parsed TOON objects, dashes for parsed TOON pairs, and atoms for parsed TOON strings.

Availability:

```
logtalk_load(toon(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2025-12-07

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public toon(curly,dash,atom)
```

Remarks:

```
(none)
```

Inherited public predicates:

```
generate/2 parse/2
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.70.2 toon(StringRepresentation)

- StringRepresentation - Text representation to be used when decoding TOON strings. Possible values are atom (default), chars, and codes.

TOON parser and generator. Uses curly terms for parsed TOON objects and dashes for parsed TOON pairs.

Availability:

`logtalk__load(toon(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2025-12-07

Compilation flags:

`static, context__switching__calls`

Extends:

`public toon(curly,dash,StringRepresentation)`

Remarks:

(none)

Inherited public predicates:

`generate/2 parse/2`

- Public predicates
- Protected predicates

- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.70.3 toon(ObjectRepresentation,PairRepresentation,StringRepresentation)

- ObjectRepresentation - Object representation to be used when decoding TOON objects. Possible values are curly (default) and list.
- PairRepresentation - Pair representation to be used when decoding TOON objects. Possible values are dash (default), equal, and colon.
- StringRepresentation - Text representation to be used when decoding TOON strings. Possible values are atom (default), chars, and codes.

TOON (Token-Oriented Object Notation) parser and generator. TOON is a compact, human-readable, line-oriented format that encodes the JSON data model.

Availability:

```
logtalk_load(toon(loader))
```

Author: Paulo Moura

Version: 0:1:0

Date: 2025-12-07

Compilation flags:

```
static, context_switching_calls
```

Implements:

public toon_protocol

Uses:

list

meta

reader

Remarks:

(none)

Inherited public predicates:

generate/2 parse/2

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.70.4 toon_protocol

TOON (Token-Oriented Object Notation) parser and generator protocol.

Availability:

logtalk_load(toon(loader))

Author: Paulo Moura

Version: 0:1:0

Date: 2025-12-15

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - parse/2
 - generate/2
- Protected predicates
- Private predicates
- Operators

Public predicates

parse/2

Parses the TOON contents read from the given source (codes(List), stream(Stream), file(Path), chars(List), or atom(Atom)) into a term. Throws an error if the TOON contents cannot be parsed.

Compilation flags:

static

Template:

 parse(Source,Term)

Mode and number of proofs:

 parse(++compound,--term) - one_or_error

Exceptions:

 Source is a variable:

 instantiation_error

 Source is neither a variable nor a valid source:

 domain_error(toon_source,Source)

generate/2

Generates the content using the representation specified in the first argument (codes(List), stream(Stream), file(Path), chars(List), or atom(Atom)) for the term in the second argument. Throws an error if this term cannot be processed.

Compilation flags:

 static

Template:

 generate(Sink,Term)

Mode and number of proofs:

 generate(+compound,++term) - one_or_error

Exceptions:

 Sink is a variable:

 instantiation_error

 Sink is neither a variable nor a valid sink:

 domain_error(toon_sink,Sink)

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.71 toychr

object

1.71.1 toychrdb

Simple CHR interpreter/debugger based on the refined operational semantics of CHRs.

Availability:

`logtalk__load(toychr(loader))`

Author: Gregory J. Duck; adapted to Logtalk by Paulo Moura.

Version: 0:7:1

Date: 2024-03-15

Copyright: Copright 2004 Gregory J. Duck; Copyright 2019-2024 Paulo Moura

License: GPL-2.0-or-later

Compilation flags:

`static, context__switching__calls`

Implements:

`public expanding`

Uses:

`list`

`user`

Remarks:

(none)

Inherited public predicates:

goal_expansion/2 term_expansion/2

- Public predicates
 - chr_is/2
 - chr_trace/0
 - chr_notrace/0
 - chr_spy/1
 - chr_nospy/0
 - chr_no_spy/1
 - chr_option/2
- Protected predicates
 - current_prog/1
 - chr_option_print_trace/0
 - chr_option_trace_interactive/0
 - chr_option_optimization_level/1
 - chr_option_show_stack/0
 - chr_option_show_store/0
 - chr_option_show_history/0
 - chr_option_show_id/0
 - chr_option_allow_deep_guards/0
 - chr_next_state/1
 - chr_spy_point/1
- Private predicates
 - chr_rule_/1
- Operators

Public predicates

chr_is/2

Compilation flags:

static

chr_trace/0

Compilation flags:
static

chr_notrace/0

Compilation flags:
static

chr_spy/1

Compilation flags:
static

chr_nospy/0

Compilation flags:
static

chr_no_spy/1

Compilation flags:
static

chr_option/2

Compilation flags:
static

Protected predicates

`current_prog/1`

Compilation flags:
static

`chr_option_print_trace/0`

Compilation flags:
dynamic

`chr_option_trace_interactive/0`

Compilation flags:
dynamic

`chr_option_optimization_level/1`

Compilation flags:
dynamic

`chr_option_show_stack/0`

Compilation flags:
dynamic

chr_option_show_store/0

Compilation flags:
dynamic

chr_option_show_history/0

Compilation flags:
dynamic

chr_option_show_id/0

Compilation flags:
dynamic

chr_option_allow_deep_guards/0

Compilation flags:
dynamic

chr_next_state/1

Compilation flags:
dynamic

`chr_spy_point/1`

Compilation flags:
dynamic

Private predicates

`chr_rule_/1`

Compilation flags:
dynamic

Operators

(none)

1.72 tsv

object

1.72.1 tsv

TSV files reading and writing predicates using the option Header-keep.

Availability:
logtalk_load(tsv(loader))

Author: Paulo Moura
Version: 1:0:0
Date: 2023-11-15

Compilation flags:
static, context_switching_calls

Extends:
public tsv(keep)

Remarks:

(none)

Inherited public predicates:

`read_file/2` `read_file/3` `read_file_by_line/2` `read_file_by_line/3` `read_stream/2`
`read_stream/3` `read_stream_by_line/2` `read_stream_by_line/3` `write_file/3` `write_stream/3`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.72.2 tsv(Header)

- Header - Header handling option with possible values skip and keep (default).

TSV file and stream reading and writing predicates.

Availability:

`logtalk_load(tsv(loader))`

Author: Paulo Moura

Version: 1:0:1

Date: 2024-03-11

Compilation flags:

static, context_switching_calls

Implements:

public tsv_protocol

Uses:

list

logtalk

reader

type

Remarks:

(none)

Inherited public predicates:

read_file/2 read_file/3 read_file_by_line/2 read_file_by_line/3 read_stream/2

read_stream/3 read_stream_by_line/2 read_stream_by_line/3 write_file/3 write_stream/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.72.3 tsv_protocol

TSV file and stream reading and writing protocol.

Availability:

logtalk_load(tsv(loader))

Author: Paulo Moura

Version: 1:0:1

Date: 2025-05-07

Compilation flags:

static

Dependencies:

(none)

Remarks:

- Type-checking: Some of the predicate file and stream argument type-checking exceptions depend on the Prolog backend compliance with standards.

Inherited public predicates:

(none)

- Public predicates
 - read_file/3
 - read_stream/3
 - read_file/2
 - read_stream/2
 - read_file_by_line/3
 - read_stream_by_line/3
 - read_file_by_line/2

- read_stream_by_line/2
- write_file/3
- write_stream/3
- Protected predicates
- Private predicates
- Operators

Public predicates

read_file/3

Reads a TSV file saving the data as clauses for the specified object predicate. Fails if the file cannot be parsed.

Compilation flags:

static

Template:

read_file(File,Object,Predicate)

Mode and number of proofs:

read_file(+atom,+object_identifier,+predicate_indicator) - zero_or_one

Exceptions:

File is a variable:

instantiation_error

File is neither a variable nor an atom:

type_error(atom,File)

File is an atom but not an existing file:

existence_error(file,File)

File is an existing file but cannot be opened for reading:

permission_error(open,source_sink,File)

Object is a variable:

instantiation_error

Object is neither a variable nor an object identifier:

type_error(object_identifier,Object)

Object is a valid object identifier but not an existing object:

existence_error(object,Object)

Predicate is a variable:

instantiation_error

Predicate is neither a variable nor a predicate indicator:

type_error(predicate_indicator,Predicate)

Predicate is a valid predicate indicator but not an existing public predicate:

existence_error(predicate,Predicate)

read_stream/3

Reads a TSV stream saving the data as clauses for the specified object predicate. Fails if the stream cannot be parsed.

Compilation flags:

static

Template:

read_stream(Stream,Object,Predicate)

Mode and number of proofs:

read_stream(+stream_or_alias,+object_identifier,+predicate_indicator) - zero_or_one

Exceptions:

Stream is a variable:

instantiation_error

Stream is neither a variable nor a stream-term or alias:

domain_error(stream_or_alias,Stream)

Stream is not an open stream:

existence_error(stream,Stream)

Stream is an output stream:

permission_error(input,stream,Stream)

Stream is a binary stream:

permission_error(input,binary_stream,Stream)

Object is a variable:

instantiation_error

Object is neither a variable nor an object identifier:

type_error(object_identifier,Object)

Object is a valid object identifier but not an existing object:

existence_error(object,Object)

Predicate is a variable:

instantiation_error

Predicate is neither a variable nor a predicate indicator:

type_error(predicate_indicator,Predicate)

Predicate is a valid predicate indicator but not an existing public predicate:

existence_error(predicate,Predicate)

`read_file/2`

Reads a TSV file returning the data as a list of rows, each row a list of fields. Fails if the file cannot be parsed.

Compilation flags:

`static`

Template:

`read_file(File,Rows)`

Mode and number of proofs:

`read_file(+atom,-list(list)) - zero_or_one`

Exceptions:

File is a variable:

`instantiation_error`

File is neither a variable nor an atom:

`type_error(atom,File)`

File is an atom but not an existing file:

`existence_error(file,File)`

File is an existing file but cannot be opened for reading:

`permission_error(open,source_sink,File)`

`read_stream/2`

Reads a TSV stream returning the data as a list of rows, each row a list of fields. Fails if the stream cannot be parsed.

Compilation flags:

`static`

Template:

`read_stream(Stream,Rows)`

Mode and number of proofs:

`read_stream(+stream_or_alias,-list(list)) - zero_or_one`

Exceptions:

Stream is a variable:

`instantiation_error`

Stream is neither a variable nor a stream-term or alias:

```

    domain_error(stream_or_alias,Stream)
Stream is not an open stream:
    existence_error(stream,Stream)
Stream is an output stream:
    permission_error(input,stream,Stream)
Stream is a binary stream:
    permission_error(input,binary_stream,Stream)

```

`read_file_by_line/3`

Reads a TSV file saving the data as clauses for the specified object predicate. The file is read line by line. Fails if the file cannot be parsed.

Compilation flags:
static

Template:

```
read_file_by_line(File,Object,Predicate)
```

Mode and number of proofs:

```
read_file_by_line(+atom,+object_identifier,+predicate_indicator) - zero_or_one
```

Exceptions:

File is a variable:

```
instantiation_error
```

File is neither a variable nor an atom:

```
type_error(atom,File)
```

File is an atom but not an existing file:

```
existence_error(file,File)
```

File is an existing file but cannot be opened for reading:

```
permission_error(open,source_sink,File)
```

Object is a variable:

```
instantiation_error
```

Object is neither a variable nor an object identifier:

```
type_error(object_identifier,Object)
```

Object is a valid object identifier but not an existing object:

```
existence_error(object,Object)
```

Predicate is a variable:

```
instantiation_error
```

Predicate is neither a variable nor a predicate indicator:

```
type_error(predicate_indicator,Predicate)
```

Predicate is a valid predicate indicator but not an existing public predicate:

```
existence_error(predicate,Predicate)
```

`read_stream_by_line/3`

Reads a TSV stream saving the data as clauses for the specified object predicate. The stream is read line by line. Fails if the stream cannot be parsed.

Compilation flags:

`static`

Template:

`read_stream_by_line(Stream,Object,Predicate)`

Mode and number of proofs:

`read_stream_by_line(+stream_or_alias,+object_identifier,+predicate_indicator) - zero_or_one`

Exceptions:

Stream is a variable:

`instantiation_error`

Stream is neither a variable nor a stream-term or alias:

`domain_error(stream_or_alias,Stream)`

Stream is not an open stream:

`existence_error(stream,Stream)`

Stream is an output stream:

`permission_error(input,stream,Stream)`

Stream is a binary stream:

`permission_error(input,binary_stream,Stream)`

Object is a variable:

`instantiation_error`

Object is neither a variable nor an object identifier:

`type_error(object_identifier,Object)`

Object is a valid object identifier but not an existing object:

`existence_error(object,Object)`

Predicate is a variable:

`instantiation_error`

Predicate is neither a variable nor a predicate indicator:

`type_error(predicate_indicator,Predicate)`

Predicate is a valid predicate indicator but not an existing public predicate:

`existence_error(predicate,Predicate)`

`read_file_by_line/2`

Reads a TSV file returning the data as a list of rows, each row a list of fields. The file is read line by line. Fails if the file cannot be parsed.

Compilation flags:

`static`

Template:

`read_file_by_line(File,Rows)`

Mode and number of proofs:

`read_file_by_line(+atom,-list(list)) - zero_or_one`

Exceptions:

File is a variable:

`instantiation_error`

File is neither a variable nor an atom:

`type_error(atom,File)`

File is an atom but not an existing file:

`existence_error(file,File)`

File is an existing file but cannot be opened for reading:

`permission_error(open,source_sink,File)`

`read_stream_by_line/2`

Reads a TSV stream returning the data as a list of rows, each row a list of fields. The stream is read line by line. Fails if the stream cannot be parsed.

Compilation flags:

`static`

Template:

`read_stream_by_line(Stream,Rows)`

Mode and number of proofs:

`read_stream_by_line(+stream_or_alias,-list(list)) - zero_or_one`

Exceptions:

Stream is a variable:

`instantiation_error`

Stream is neither a variable nor a stream-term or alias:

```
domain_error(stream_or_alias,Stream)
Stream is not an open stream:
existence_error(stream,Stream)
Stream is an output stream:
permission_error(input,stream,Stream)
Stream is a binary stream:
permission_error(input,binary_stream,Stream)
```

`write_file/3`

Writes a TSV file with the data represented by the solutions to the specified object predicate.

Compilation flags:

```
static
```

Template:

```
write_file(File,Object,Predicate)
```

Mode and number of proofs:

```
write_file(+atom,+object_identifier,+predicate_indicator) - one
```

Exceptions:

File is a variable:

```
instantiation_error
```

File is neither a variable nor an atom:

```
type_error(atom,File)
```

File is an atom but cannot be opened for writing:

```
permission_error(open,source_sink,File)
```

Object is a variable:

```
instantiation_error
```

Object is neither a variable nor an object identifier:

```
type_error(object_identifier,Object)
```

Object is a valid object identifier but not an existing object:

```
existence_error(object,Object)
```

Predicate is a variable:

```
instantiation_error
```

Predicate is neither a variable nor a predicate indicator:

```
type_error(predicate_indicator,Predicate)
```

Predicate is a valid predicate indicator but not an existing public predicate:

```
existence_error(predicate,Predicate)
```

`write_stream/3`

Writes a TSV stream with the data represented by the solutions to the specified object predicate.

Compilation flags:

`static`

Template:

`write_stream(Stream,Object,Predicate)`

Mode and number of proofs:

`write_stream(+stream_or_alias,+object_identifier,+predicate_indicator) - one`

Exceptions:

Stream is a variable:

`instantiation_error`

Stream is neither a variable nor a stream-term or alias:

`domain_error(stream_or_alias,Stream)`

Stream is not an open stream:

`existence_error(stream,Stream)`

Stream is an input stream:

`permission_error(output,stream,Stream)`

Stream is a binary stream:

`permission_error(output,binary_stream,Stream)`

Object is a variable:

`instantiation_error`

Object is neither a variable nor an object identifier:

`type_error(object_identifier,Object)`

Object is a valid object identifier but not an existing object:

`existence_error(object,Object)`

Predicate is a variable:

`instantiation_error`

Predicate is neither a variable nor a predicate indicator:

`type_error(predicate_indicator,Predicate)`

Predicate is a valid predicate indicator but not an existing public predicate:

`existence_error(predicate,Predicate)`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.73 tutor

object

1.73.1 tutor

This object adds explanations and suggestions to selected compiler warning and error messages.

Availability:

`logtalk__load(tutor(loader))`

Author: Paulo Moura

Version: 0:84:0

Date: 2025-10-20

Compilation flags:

`static, context_switching_calls`

Provides:

`logtalk::message_hook/4`

Uses:

`list`

`logtalk`

Remarks:

- Usage: Simply load this object at startup using the goal `logtalk__load(tutor(loader))`.

Inherited public predicates:

(none)

- Public predicates
 - explain//1
- Protected predicates
- Private predicates
- Operators

Public predicates

explain//1

Generates an explanation for a message.

Compilation flags:

static

Template:

explain(Message)

Mode and number of proofs:

explain(@callable) - zero_or_one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.74 types

object

1.74.1 atom

Atom data type predicates.

Availability:

```
logtalk_load(types(loader))
```

Author: Paulo Moura

Version: 1:9:0

Date: 2023-04-12

Compilation flags:

```
static, context_switching_calls
```

Extends:

```
public atomic
```

Uses:

```
user
```

Remarks:

```
(none)
```

Inherited public predicates:

```
(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 check/1 depth/2 ground/1 new/1  
numbervars/1 numbervars/3 occurs/2 singletons/2 subsumes/2 subterm/2 valid/1 variables/2  
variant/2 varnumbers/2 varnumbers/3
```

- Public predicates
 - replace_sub_atom/4
 - split/3
- Protected predicates
- Private predicates
- Operators

Public predicates

`replace_sub_atom/4`

Replaces all occurrences of Old by New in Input returning Output. Returns Input if Old is the empty atom. Fails when Output does not unify with the resulting atom.

Compilation flags:

`static`

Template:

`replace_sub_atom(Old,New,Input,Output)`

Mode and number of proofs:

`replace_sub_atom(+atom,+atom,+atom,?atom) - zero_or_one`

`split/3`

Splits an atom at a given delimiter into a list of sub-atoms.

Compilation flags:

`static`

Template:

`split(Atom,Delimiter,SubAtoms)`

Mode and number of proofs:

`split(+atom,+atom,-list(atom)) - one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.74.2 atomic

Atomic data type predicates.

Availability:

`logtalk__load(types(loader))`

Author: Paulo Moura

Version: 1:3:0

Date: 2018-07-11

Compilation flags:

`static, context_switching_calls`

Extends:

`public term`

Remarks:

(none)

Inherited public predicates:

`(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 check/1 depth/2 ground/1 new/1
numbervars/1 numbervars/3 occurs/2 singletons/2 subsumes/2 subterm/2 valid/1 variables/2
variant/2 varnumbers/2 varnumbers/3`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.74.3 callable

Callable term type predicates.

Availability:

`logtalk__load(types(loader))`

Author: Paulo Moura

Version: 1:4:0

Date: 2018-07-11

Compilation flags:

`static, context_switching_calls`

Extends:

public `term`

Remarks:

(none)

Inherited public predicates:

`(<)/2 (=:=)/2 (= <)/2 (= \=)/2 (>)/2 (>=)/2 check/1 depth/2 ground/1 new/1
numbervars/1 numbervars/3 occurs/2 singletons/2 subsumes/2 subterm/2 valid/1 variables/2
variant/2 varnumbers/2 varnumbers/3`

- [Public predicates](#)
- [Protected predicates](#)
- [Private predicates](#)
- [Operators](#)

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.74.4 [character](#)

Character predicates (most of them assume an ASCII representation).

Availability:

`logtalk_load(types(loader))`

Author: Paulo Moura

Version: 1:9:0

Date: 2019-06-29

Compilation flags:

`static, context_switching_calls`

Implements:

`public characterp`

Extends:

`public atom`

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 check/1 depth/2 ground/1 is_alpha/1
is_alphanumeric/1 is_ascii/1 is_bin_digit/1 is_control/1 is_dec_digit/1 is_end_of_line/1
is_hex_digit/1 is_layout/1 is_letter/1 is_lower_case/1 is_newline/1 is_octal_digit/1
is_period/1 is_punctuation/1 is_quote/1 is_upper_case/1 is_vowel/1 is_white_space/1
lower_upper/2 new/1 numbervars/1 numbervars/3 occurs/2 parenthesis/2 replace_sub_atom/4
singletons/2 split/3 subsumes/2 subterm/2 valid/1 variables/2 variant/2 varnumbers/2
varnumbers/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.74.5 characterp

Character protocol.

Availability:

`logtalk_load(types(loader))`

Author: Paulo Moura

Version: 1:3:0

Date: 2019-06-29

Compilation flags:

`static`

Dependencies:

`(none)`

Remarks:

`(none)`

Inherited public predicates:

`(none)`

- Public predicates
 - `is_ascii/1`
 - `is_alphanumeric/1`
 - `is_alpha/1`
 - `is_letter/1`
 - `is_bin_digit/1`
 - `is_octal_digit/1`
 - `is_dec_digit/1`
 - `is_hex_digit/1`
 - `is_lower_case/1`
 - `is_upper_case/1`
 - `is_vowel/1`
 - `is_white_space/1`
 - `is_layout/1`

- is_quote/1
- is_punctuation/1
- is_period/1
- is_control/1
- is_newline/1
- is_end_of_line/1
- parenthesis/2
- lower_upper/2
- Protected predicates
- Private predicates
- Operators

Public predicates

is_ascii/1

True if the argument is an ASCII character.

Compilation flags:

static

Template:

is_ascii(Char)

Mode and number of proofs:

is_ascii(+char) - zero_or_one

is_alphanumeric/1

True if the argument is an alphanumeric character.

Compilation flags:

static

Template:

is_alphanumeric(Char)

Mode and number of proofs:

`is_alphanumeric(+char) - zero_or_one`

`is_alpha/1`

True if the argument is a letter or an underscore.

Compilation flags:

`static`

Template:

`is_alpha(Char)`

Mode and number of proofs:

`is_alpha(+char) - zero_or_one`

`is_letter/1`

True if the argument is a letter.

Compilation flags:

`static`

Template:

`is_letter(Char)`

Mode and number of proofs:

`is_letter(+char) - zero_or_one`

`is_bin_digit/1`

True if the argument is a binary digit.

Compilation flags:

`static`

Template:

`is_bin_digit(Char)`

Mode and number of proofs:

`is_bin_digit(+char) - zero_or_one`

`is_octal_digit/1`

True if the argument is an octal digit.

Compilation flags:

`static`

Template:

`is_octal_digit(Char)`

Mode and number of proofs:

`is_octal_digit(+char) - zero_or_one`

`is_dec_digit/1`

True if the argument is a decimal digit.

Compilation flags:

`static`

Template:

`is_dec_digit(Char)`

Mode and number of proofs:

`is_dec_digit(+char) - zero_or_one`

`is_hex_digit/1`

True if the argument is an hexadecimal digit.

Compilation flags:

`static`

Template:

`is_hex_digit(Char)`

Mode and number of proofs:

`is_hex_digit(+char) - zero_or_one`

`is_lower_case/1`

True if the argument is a lower case letter.

Compilation flags:

`static`

Template:

`is_lower_case(Char)`

Mode and number of proofs:

`is_lower_case(+char) - zero_or_one`

`is_upper_case/1`

True if the argument is a upper case letter.

Compilation flags:

`static`

Template:

`is_upper_case(Char)`

Mode and number of proofs:

`is_upper_case(+char) - zero_or_one`

`is_vowel/1`

True if the argument is a vowel.

Compilation flags:

`static`

Template:

`is_vowel(Char)`

Mode and number of proofs:

`is_vowel(+char) - zero_or_one`

`is_white_space/1`

True if the argument is a white space character (a space or a tab) inside a line of characters.

Compilation flags:

`static`

Template:

`is_white_space(Char)`

Mode and number of proofs:

`is_white_space(+char) - zero_or_one`

`is_layout/1`

True if the argument is a layout character.

Compilation flags:

`static`

Template:

`is_layout(Char)`

Mode and number of proofs:

`is_layout(+char) - zero_or_one`

is_quote/1

True if the argument is a quote character.

Compilation flags:

static

Template:

is_quote(Char)

Mode and number of proofs:

is_quote(+char) - zero_or_one

is_punctuation/1

True if the argument is a sentence punctuation character.

Compilation flags:

static

Template:

is_punctuation(Char)

Mode and number of proofs:

is_punctuation(+char) - zero_or_one

is_period/1

True if the argument is a character that ends a sentence.

Compilation flags:

static

Template:

is_period(Char)

Mode and number of proofs:

is_period(+char) - zero_or_one

`is_control/1`

True if the argument is an ASCII control character.

Compilation flags:

`static`

Template:

`is_control(Char)`

Mode and number of proofs:

`is_control(+char) - zero_or_one`

`is_newline/1`

True if the argument is the ASCII newline character.

Compilation flags:

`static`

Template:

`is_newline(Char)`

Mode and number of proofs:

`is_newline(+char) - zero_or_one`

`is_end_of_line/1`

True if the argument is the ASCII end-of-line character (either a carriage return or a line feed).

Compilation flags:

`static`

Template:

`is_end_of_line(Char)`

Mode and number of proofs:

`is_end_of_line(+char) - zero_or_one`

parenthesis/2

Recognizes and converts between open and close parenthesis.

Compilation flags:

static

Template:

parenthesis(Char1,Char2)

Mode and number of proofs:

parenthesis(?char,?char) - zero_or_more

parenthesis(+char,?char) - zero_or_one

parenthesis(?char,+char) - zero_or_one

lower_upper/2

Recognizes and converts between lower and upper case letters.

Compilation flags:

static

Template:

lower_upper(Char1,Char2)

Mode and number of proofs:

lower_upper(?char,?char) - zero_or_more

lower_upper(+char,?char) - zero_or_one

lower_upper(?char,+char) - zero_or_one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

[character](#)

protocol

1.74.6 comparingp

Comparing protocol using overloading of standard operators.

Availability:

`logtalk_load(types(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2000-07-24

Compilation flags:

`static`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- [Public predicates](#)
 - [\(<\)/2](#)
 - [\(<=\)/2](#)

- ($>$)/2
- ($>=$)/2
- ($=:=$)/2
- ($=\backslash=$)/2
- Protected predicates
- Private predicates
- Operators

Public predicates

($<$)/2

True if Term1 is less than Term2.

Compilation flags:

static

Template:

Term1<Term2

Mode and number of proofs:

+term< +term - zero_or_one

($=<$)/2

True if Term1 is less or equal than Term2.

Compilation flags:

static

Template:

Term1= $<$ Term2

Mode and number of proofs:

+term= $<$ +term - zero_or_one

(>)/2

True if Term1 is greater than Term2.

Compilation flags:

static

Template:

Term1>Term2

Mode and number of proofs:

+term> +term - zero_or_one

(>=)/2

True if Term1 is equal or grater than Term2.

Compilation flags:

static

Template:

Term1>=Term2

Mode and number of proofs:

+term>= +term - zero_or_one

(=:=)/2

True if Term1 is equal to Term2.

Compilation flags:

static

Template:

Term1=:=Term2

Mode and number of proofs:

+term=:= +term - zero_or_one

$(=\backslash=)/2$

True if Term1 is not equal to Term2.

Compilation flags:

static

Template:

Term1= \backslash =Term2

Mode and number of proofs:

+term= \backslash = +term - zero_or_one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

object

1.74.7 compound

Compound data type.

Availability:

logtalk_load(types(loader))

Author: Paulo Moura

Version: 1:3:0

Date: 2018-07-11

Compilation flags:

static, context_switching_calls

Extends:

public term

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (= <)/2 (= \=)/2 (>)/2 (>=)/2 check/1 depth/2 ground/1 new/1
 numbervars/1 numbervars/3 occurs/2 singletons/2 subsumes/2 subterm/2 valid/1 variables/2
 variant/2 varnumbers/2 varnumbers/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.74.8 difflist

Difference list predicates.

Availability:

logtalk_load(types(loader))

Author: Paulo Moura

Version: 2:0:0

Date: 2020-05-11

Compilation flags:

static, context_switching_calls

Implements:

public [listp](#)

Extends:

public [compound](#)

Uses:

[list](#)

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 append/2 append/3 check/1 delete/3
delete_matches/3 depth/2 drop/3 empty/1 flatten/2 ground/1 hamming_distance/3 keysort/2
last/2 length/2 max/2 member/2 memberchk/2 min/2 msort/2 msort/3 new/1 nextto/3
nth0/3 nth0/4 nth1/3 nth1/4 numbervars/1 numbervars/3 occurrences/2 occurrences/3
occurs/2 partition/5 permutation/2 prefix/2 prefix/3 proper_prefix/2 proper_prefix/3
proper_suffix/2 proper_suffix/3 remove_duplicates/2 reverse/2 same_length/2 same_length/3
select/3 select/4 selectchk/3 selectchk/4 sequential_occurrences/2 sequential_occurrences/3
singletons/2 sort/2 sort/3 sort/4 split/4 sublist/2 subsequence/3 subsequence/4 substitute/4
subsumes/2 subterm/2 subtract/3 suffix/2 suffix/3 take/3 valid/1 variables/2 variant/2
varnumbers/2 varnumbers/3

- Public predicates
 - [add](#)/3
 - [as_list](#)/2
- Protected predicates
- Private predicates
- Operators

Public predicates

`add/3`

Adds a term to the end of a difference list.

Compilation flags:

`static`

Template:

`add(Term,DiffList,NewDiffList)`

Mode and number of proofs:

`add(@term,+difference_list,-difference_list) - one`

`as_list/2`

Returns a list with the elements of the difference list.

Compilation flags:

`static`

Template:

`as_list(DiffList,List)`

Mode and number of proofs:

`as_list(@difference_list,-list) - one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

list, list(Type), numberlist, varlist

object

1.74.9 float

Floating point numbers data type predicates.

Availability:

logtalk_load(types(loader))

Author: Paulo Moura

Version: 1:7:0

Date: 2025-02-25

Compilation flags:

static, context_switching_calls

Extends:

public number

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 =~= / 2 (>)/2 (>=)/2 approximately_equal/2
approximately_equal/3 check/1 depth/2 essentially_equal/3 ground/1 new/1 numbervars/1
numbervars/3 occurs/2 singletons/2 subsumes/2 subterm/2 tolerance_equal/4 valid/1
variables/2 variant/2 varnumbers/2 varnumbers/3

- Public predicates
 - between/4
 - sequence/4
 - sequence/5

- Protected predicates
- Private predicates
- Operators

Public predicates

`between/4`

Enumerates by backtracking a sequence of N equally spaced floats in the interval [Lower,Upper]. Assumes $N > 0$ and $\text{Lower} \leq \text{Upper}$; fails otherwise.

Compilation flags:

`static`

Template:

`between(Lower,Upper,N,Float)`

Mode and number of proofs:

`between(+float,+float,+positive_integer,-float) - zero_or_more`

`sequence/4`

Generates a list with the sequence of N equally spaced floats in the interval [Lower,Upper]. Assumes $N > 0$ and $\text{Lower} \leq \text{Upper}$; fails otherwise.

Compilation flags:

`static`

Template:

`sequence(Lower,Upper,N,List)`

Mode and number of proofs:

`sequence(+float,+float,+positive_integer,-list(float)) - zero_or_one`

`sequence/5`

Generates a list with the sequence of Step spaced floats in the interval [Lower,Upper]. Also returns the length of the list. Assumes Lower =< Upper; fails otherwise.

Compilation flags:

`static`

Template:

`sequence(Lower,Upper,Step,List,Length)`

Mode and number of proofs:

`sequence(+float,+float,+float,-list(float),-positive__integer) - zero__or__one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.74.10 integer

Integer data type predicates.

Availability:

`logtalk_load(types(loader))`

Author: Paulo Moura

Version: 1:56:0

Date: 2025-05-26

Compilation flags:

`static, context_switching_calls`

Extends:

public number

Remarks:

- Portability notes: This object will use the backend Prolog system between/3, plus/3, and succ/2 built-in predicates when available.

Inherited public predicates:

(<)/2 (=:=)/2 (= <)/2 (= \=)/2 =~/2 (>)/2 (>=)/2 approximately_equal/2
 approximately_equal/3 check/1 depth/2 essentially_equal/3 ground/1 new/1 numbervars/1
 numbervars/3 occurs/2 singletons/2 subsumes/2 subterm/2 tolerance_equal/4 valid/1
 variables/2 variant/2 varnumbers/2 varnumbers/3

- Public predicates
 - between/3
 - plus/3
 - succ/2
 - sequence/3
 - sequence/4
 - power_sequence/4
- Protected predicates
- Private predicates
- Operators

Public predicates

between/3

Returns integers in the interval defined by the two first arguments.

Compilation flags:

static

Template:

between(Lower,Upper,Integer)

Mode and number of proofs:

between(+integer,+integer,+integer) - zero_or_one

between(+integer,+integer,-integer) - zero_or_more

plus/3

Reversible integer sum. At least two of the arguments must be instantiated to integers.

Compilation flags:

static

Template:

plus(I,J,Sum)

Mode and number of proofs:

plus(+integer,+integer,?integer) - zero_or_one

plus(+integer,?integer,+integer) - zero_or_one

plus(?integer,+integer,+integer) - zero_or_one

succ/2

Successor of a natural number. At least one of the arguments must be instantiated to a natural number.

Compilation flags:

static

Template:

succ(I,J)

Mode and number of proofs:

succ(+integer,?integer) - zero_or_one

succ(?integer,+integer) - zero_or_one

sequence/3

Generates a list with the sequence of all integers in the interval [Lower,Upper]. Assumes Lower =< Upper and fails otherwise.

Compilation flags:

static

Template:

sequence(Lower,Upper,List)

Mode and number of proofs:

sequence(+integer,+integer,-list(integer)) - zero_or_one

sequence/4

Generates a list with the sequence of integers in the interval [Lower,Upper] by Step. Assumes Lower =< Upper, Step >= 1 and fails otherwise.

Compilation flags:

static

Template:

sequence(Lower,Upper,Step,List)

Mode and number of proofs:

sequence(+integer,+integer,+integer,-list(integer)) - zero_or_one

power_sequence/4

Generates a list of exponentiation results given [Lower,Upper] sequence of exponents and Base. Assumes Lower =< Upper and Base > 1 and fails otherwise.

Compilation flags:

static

Template:

power_sequence(Lower,Upper,Base,List)

Mode and number of proofs:

power_sequence(+integer,+integer,+integer,-list(integer)) - zero_or_one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.74.11 list

List predicates.

Availability:

logtalk_load(types(loader))

Author: Paulo Moura

Version: 4:3:0

Date: 2024-05-24

Compilation flags:

static, context_switching_calls

Implements:

public `listp`

Extends:

public `compound`

Remarks:

- Portability notes: This object will use the backend Prolog system `msort/2` and `sort/4` built-in predicates when available.

Inherited public predicates:

`(<)/2` `(=:)/2` `(=<)/2` `(=\=)/2` `(>)/2` `(>=)/2` `append/2` `append/3` `check/1` `delete/3`
`delete_matches/3` `depth/2` `drop/3` `empty/1` `flatten/2` `ground/1` `hamming_distance/3` `keysort/2`
`last/2` `length/2` `max/2` `member/2` `memberchk/2` `min/2` `msort/2` `msort/3` `new/1` `nextto/3`
`nth0/3` `nth0/4` `nth1/3` `nth1/4` `numbervars/1` `numbervars/3` `occurrences/2` `occurrences/3`
`occurs/2` `partition/5` `permutation/2` `prefix/2` `prefix/3` `proper_prefix/2` `proper_prefix/3`

proper_suffix/2 proper_suffix/3 remove_duplicates/2 reverse/2 same_length/2 same_length/3
 select/3 select/4 selectchk/3 selectchk/4 sequential_occurrences/2 sequential_occurrences/3
 singletons/2 sort/2 sort/3 sort/4 split/4 sublist/2 subsequence/3 subsequence/4 substitute/4
 subsumes/2 subterm/2 subtract/3 suffix/2 suffix/3 take/3 valid/1 variables/2 variant/2
 varnumbers/2 varnumbers/3

- Public predicates
 - as_difflist/2
- Protected predicates
- Private predicates
- Operators

Public predicates

as_difflist/2

Converts a list to a difference list.

Compilation flags:

static

Template:

as_difflist(List,Diffist)

Mode and number of proofs:

as_difflist(+list,-difference_list) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

`list(Type)`, `numberlist`, `varlist`, `difflist`

object

1.74.12 `list(Type)`

List predicates with elements constrained to a single type.

Availability:

`logtalk_load(types(loader))`

Author: Paulo Moura

Version: 1:22:0

Date: 2018-07-11

Compilation flags:

`static`, `context_switching_calls`

Extends:

public `list`

Remarks:

(none)

Inherited public predicates:

`(<)/2` `(=:)/2` `(=<)/2` `(=)/2` `(>)/2` `(>=)/2` `append/2` `append/3` `as_difflist/2` `check/1`
`delete/3` `delete_matches/3` `depth/2` `drop/3` `empty/1` `flatten/2` `ground/1` `hamming_distance/3`
`keysort/2` `last/2` `length/2` `max/2` `member/2` `memberchk/2` `min/2` `msort/2` `msort/3` `new/1`
`nextto/3` `nth0/3` `nth0/4` `nth1/3` `nth1/4` `numbervars/1` `numbervars/3` `occurrences/2`
`occurrences/3` `occurs/2` `partition/5` `permutation/2` `prefix/2` `prefix/3` `proper_prefix/2`
`proper_prefix/3` `proper_suffix/2` `proper_suffix/3` `remove_duplicates/2` `reverse/2` `same_length/2`
`same_length/3` `select/3` `select/4` `selectchk/3` `selectchk/4` `sequential_occurrences/2`
`sequential_occurrences/3` `singletons/2` `sort/2` `sort/3` `sort/4` `split/4` `sublist/2` `subsequence/3`
`subsequence/4` `substitute/4` `subsumes/2` `subterm/2` `subtract/3` `suffix/2` `suffix/3` `take/3` `valid/1`
`variables/2` `variant/2` `varnumbers/2` `varnumbers/3`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

list, numberlist, varlist, difflist

protocol

1.74.13 listp

List protocol.

Availability:

logtalk_load(types(loader))

Author: Paulo Moura

Version: 1:18:0

Date: 2024-05-24

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - append/2
 - append/3
 - delete/3
 - delete_matches/3
 - empty/1
 - flatten/2
 - hamming_distance/3
 - keysort/2
 - last/2
 - length/2
 - max/2
 - member/2
 - memberchk/2
 - min/2
 - msort/2
 - msort/3
 - nextto/3
 - nth0/3
 - nth0/4
 - nth1/3
 - nth1/4
 - sequential_occurrences/2
 - sequential_occurrences/3
 - occurrences/2
 - occurrences/3

- partition/5
 - permutation/2
 - prefix/2
 - prefix/3
 - proper_prefix/2
 - proper_prefix/3
 - remove_duplicates/2
 - reverse/2
 - same_length/2
 - same_length/3
 - select/3
 - selectchk/3
 - select/4
 - selectchk/4
 - sort/2
 - sort/3
 - sort/4
 - split/4
 - sublist/2
 - subsequence/3
 - subsequence/4
 - substitute/4
 - subtract/3
 - suffix/2
 - suffix/3
 - proper_suffix/2
 - proper_suffix/3
 - take/3
 - drop/3
- Protected predicates
 - Private predicates
 - Operators

Public predicates

append/2

Appends all lists in a list of lists.

Compilation flags:

static

Template:

append(Lists,Concatenation)

Mode and number of proofs:

append(+list(list),?list) - zero_or_one

append/3

Appends two lists.

Compilation flags:

static

Template:

append(List1,List2,List)

Mode and number of proofs:

append(?list,?list,?list) - zero_or_more

delete/3

Deletes from a list all occurrences of an element returning the list of remaining elements. Uses ==/2 for element comparison.

Compilation flags:

static

Template:

delete(List,Element,Remaining)

Mode and number of proofs:

`delete(@list,@term,?list) - one`

`delete_matches/3`

Deletes all matching elements from a list, returning the list of remaining elements. Uses `=/2` for element comparison.

Compilation flags:

`static`

Template:

`delete_matches(List,Element,Remaining)`

Mode and number of proofs:

`delete_matches(@list,@term,?list) - one`

`empty/1`

True if the argument is an empty list.

Compilation flags:

`static`

Template:

`empty(List)`

Mode and number of proofs:

`empty(@list) - zero_or_one`

`flatten/2`

Flattens a list of lists into a list.

Compilation flags:

`static`

Template:

 flatten(List,Flatted)

Mode and number of proofs:

 flatten(+list,-list) - one

hamming_distance/3

Calculates the Hamming distance between two lists (using equality to compare list elements). Fails if the two lists are not of the same length.

Compilation flags:

 static

Template:

 hamming_distance(List1,List2,Distance)

Mode and number of proofs:

 hamming_distance(+list,+list,-integer) - zero_or_one

keysort/2

Sorts a list of key-value pairs in ascending order.

Compilation flags:

 static

Template:

 keysort(List,Sorted)

Mode and number of proofs:

 keysort(+list(pair),-list(pair)) - one

last/2

List last element (if it exists).

Compilation flags:

static

Template:

last(List,Last)

Mode and number of proofs:

last(?list,?term) - zero_or_more

length/2

List length.

Compilation flags:

static

Template:

length(List,Length)

Mode and number of proofs:

length(?list,?integer) - zero_or_more

max/2

Determines the list maximum value using standard order. Fails if the list is empty.

Compilation flags:

static

Template:

max(List,Maximum)

Mode and number of proofs:

max(+list,-term) - zero_or_one

member/2

Element is a list member.

Compilation flags:

static

Template:

member(Element,List)

Mode and number of proofs:

member(?term,?list) - zero_or_more

memberchk/2

Checks if a term is a member of a list.

Compilation flags:

static

Template:

memberchk(Element,List)

Mode and number of proofs:

memberchk(?term,?list) - zero_or_one

min/2

Determines the minimum value in a list using standard order. Fails if the list is empty.

Compilation flags:

static

Template:

min(List,Minimum)

Mode and number of proofs:

min(+list,-term) - zero_or_one

`msort/2`

Sorts a list in ascending order (duplicated elements are not removed).

Compilation flags:

`static`

Template:

`msort(List,Sorted)`

Mode and number of proofs:

`msort(+list,-list) - one`

`msort/3`

Sorts a list using a user-specified comparison predicate modeled on the standard `compare/3` predicate (duplicated elements are not removed).

Compilation flags:

`static`

Template:

`msort(Closure,List,Sorted)`

Meta-predicate template:

`msort(3,*,*)`

Mode and number of proofs:

`msort(+callable,+list,-list) - one`

`nextto/3`

X and Y are consecutive elements in List.

Compilation flags:

`static`

Template:

`nextto(X,Y,List)`

Mode and number of proofs:

`nextto(?term,?term,?list) - zero_or_more`

`nth0/3`

Nth element of a list (counting from zero).

Compilation flags:

`static`

Template:

`nth0(Nth,List,Element)`

Mode and number of proofs:

`nth0(?integer,?list,?term) - zero_or_more`

`nth0/4`

Nth element of a list (counting from zero). Rest is a list of all the other elements. Can be used to either select the nth element of List or to insert an element before the nth element in Rest.

Compilation flags:

`static`

Template:

`nth0(Nth,List,Element,Rest)`

Mode and number of proofs:

`nth0(?integer,?list,?term,?list) - zero_or_more`

`nth1/3`

Nth element of a list (counting from one).

Compilation flags:

`static`

Template:

`nth1(Nth,List,Element)`

Mode and number of proofs:

`nth1(?integer,?list,?term) - zero_or_more`

`nth1/4`

Nth element of a list (counting from one). Rest is a list of all the other elements. Can be used to either select the nth element of List or to insert an element before the nth element in Rest.

Compilation flags:

`static`

Template:

`nth1(Nth,List,Element,Rest)`

Mode and number of proofs:

`nth1(?integer,?list,?term,?list) - zero_or_more`

`sequential_occurrences/2`

Counts the number of sequential occurrences of each List element, unifying Occurrences with a list of Element-Count pairs. Uses term equality for element comparison.

Compilation flags:

`static`

Template:

`sequential_occurrences(List,Occurrences)`

Mode and number of proofs:

`sequential_occurrences(@list,-list(pair(term,positive_integer))) - one`

`sequential_occurrences/3`

Counts the number of sequential occurrences of each List element, unifying Occurrences with a list of Element-Count pairs. Uses Closure for element comparison.

Compilation flags:

static

Template:

`sequential_occurrences(List,Closure,Occurrences)`

Mode and number of proofs:

`sequential_occurrences(@list,@callable,-list(pair(term,positive_integer))) - one`

`occurrences/2`

Counts the number of occurrences of each List element, unifying Occurrences with a sorted list of Element-Count pairs. Uses term equality for element comparison.

Compilation flags:

static

Template:

`occurrences(List,Occurrences)`

Mode and number of proofs:

`occurrences(@list,-list(pair(term,positive_integer))) - one`

`occurrences/3`

Counts the number of occurrences of each List element, unifying Occurrences with a sorted list of Element-Count pairs. Uses Closure for element comparison.

Compilation flags:

static

Template:

`occurrences(List,Closure,Occurrences)`

Meta-predicate template:

```
occurrences(*,2,*)
```

Mode and number of proofs:

```
occurrences(@list,@callable,-list(pair(term,positive_integer))) - one
```

[partition/5](#)

Partitions a list in lists with values less, equal, and greater than a given value (using standard order).

Compilation flags:

```
static
```

Template:

```
partition(List,Value,Less,Equal,Greater)
```

Mode and number of proofs:

```
partition(+list,+number,-list,-list,-list) - one
```

[permutation/2](#)

The two lists are a permutation of the same list.

Compilation flags:

```
static
```

Template:

```
permutation(List,Permutation)
```

Mode and number of proofs:

```
permutation(?list,?list) - zero_or_more
```

prefix/2

Prefix is a prefix of List.

Compilation flags:

static

Template:

prefix(Prefix,List)

Mode and number of proofs:

prefix(?list,+list) - zero_or_more

prefix/3

Prefix is a prefix of length Length of List.

Compilation flags:

static

Template:

prefix(Prefix,Length,List)

Mode and number of proofs:

prefix(?list,+integer,+list) - zero_or_one

prefix(?list,-integer,+list) - zero_or_more

proper_prefix/2

Prefix is a proper prefix of List.

Compilation flags:

static

Template:

proper_prefix(Prefix,List)

Mode and number of proofs:

proper_prefix(?list,+list) - zero_or_more

`proper_prefix/3`

Prefix is a proper prefix of length Length of List.

Compilation flags:

`static`

Template:

`proper_prefix(Prefix,Length,List)`

Mode and number of proofs:

`proper_prefix(?list,+integer,+list) - zero_or_one`

`proper_prefix(?list,-integer,+list) - zero_or_more`

`remove_duplicates/2`

Removes duplicated list elements using equality (`==/2`) for comparison and keeping the left-most element when repeated.

Compilation flags:

`static`

Template:

`remove_duplicates(List,Set)`

Mode and number of proofs:

`remove_duplicates(+list,-list) - one`

`reverse/2`

Reverses a list.

Compilation flags:

`static`

Template:

```
reverse(List,Reversed)
```

Mode and number of proofs:

```
reverse(+list,?list) - zero_or_one
```

```
reverse(?list,+list) - zero_or_one
```

```
reverse(-list,-list) - one_or_more
```

same_length/2

The two lists have the same length.

Compilation flags:

```
static
```

Template:

```
same_length(List1,List2)
```

Mode and number of proofs:

```
same_length(+list,?list) - zero_or_one
```

```
same_length(?list,+list) - zero_or_one
```

```
same_length(-list,-list) - one_or_more
```

same_length/3

The two lists have the same length.

Compilation flags:

```
static
```

Template:

```
same_length(List1,List2,Length)
```

Mode and number of proofs:

```
same_length(+list,?list,?integer) - zero_or_one
```

```
same_length(?list,+list,?integer) - zero_or_one
```

```
same_length(-list,-list,-integer) - one_or_more
```

`select/3`

Selects an element from a list, returning the list of remaining elements.

Compilation flags:

`static`

Template:

`select(Element,List,Remaining)`

Mode and number of proofs:

`select(?term,?list,?list) - zero_or_more`

`selectchk/3`

Checks that an element can be selected from a list, returning the list of remaining elements.

Compilation flags:

`static`

Template:

`selectchk(Element,List,Remaining)`

Mode and number of proofs:

`selectchk(?term,?list,?list) - zero_or_one`

`select/4`

Selects an element from a list, replacing it by a new element and returning the resulting list.

Compilation flags:

`static`

Template:

`select(Old,OldList,New,NewList)`

Mode and number of proofs:

`select(?term,?list,?term,?list) - zero_or_more`

selectchk/4

Checks that an element from a list can be replaced by a new element, returning the resulting list.

Compilation flags:

static

Template:

selectchk(Old,OldList,New,NewList)

Mode and number of proofs:

selectchk(?term,?list,?term,?list) - zero_or_one

sort/2

Sorts a list in ascending order (duplicated elements are removed).

Compilation flags:

static

Template:

sort(List,Sorted)

Mode and number of proofs:

sort(+list,-list) - one

sort/3

Sorts a list using a user-specified comparison predicate modeled on the standard compare/3 predicate (duplicated elements are removed).

Compilation flags:

static

Template:

sort(Closure,List,Sorted)

Meta-predicate template:

sort(3,*,*)

Mode and number of proofs:

```
sort(+callable,+list,-list) - one
```

```
sort/4
```

Sorts a list using the given key and order. Uses the standard term comparison operators for the order. The key selects the argument in each element in the list to use for comparisons. A key value of zero uses the whole element for comparisons.

Compilation flags:

```
static
```

Template:

```
sort(Key,Order,List,Sorted)
```

Mode and number of proofs:

```
sort(+non_negative_integer,+atom,+list,-list) - one
```

Remarks:

- Removing duplicates: Use one of the @< or @> orders.
 - Keeping duplicates: Use one of the @=< or @>= orders.
 - Sorting in ascending order: Use one of the @< or @=< orders.
 - Sorting in descending order: Use one of the @> or @>= orders.
-

```
split/4
```

Splits a list into sublists of a given length. Also returns a list with the remaining elements. Fails if the length is zero or negative.

Compilation flags:

```
static
```

Template:

```
split(List,Length,Sublists,Remaining)
```

Mode and number of proofs:

```
split(+list,+integer,-list(list),-list) - zero_or_one
```

sublist/2

The first list is a sublist of the second.

Compilation flags:

static

Template:

sublist(Sublist,List)

Mode and number of proofs:

sublist(?list,+list) - zero_or_more

subsequence/3

List is an interleaving of Subsequence and Remaining. Element order is preserved.

Compilation flags:

static

Template:

subsequence(List,Subsequence,Remaining)

Mode and number of proofs:

subsequence(?list,?list,?list) - zero_or_more

subsequence/4

Generates subsequences of a given length from a list. Also returns the remaining elements. Element order is preserved.

Compilation flags:

static

Template:

subsequence(List,Length,Subsequence,Remaining)

Mode and number of proofs:

subsequence(+list,+integer,?list,?list) - zero_or_more

substitute/4

Substitutes all occurrences of Old in List by New, returning NewList. Uses term equality for element comparison.

Compilation flags:

static

Template:

substitute(Old,List,New,NewList)

Mode and number of proofs:

substitute(@term,@list,@term,-list) - one

subtract/3

Removes all elements in the second list from the first list, returning the list of remaining elements.

Compilation flags:

static

Template:

subtract(List,Elements,Remaining)

Mode and number of proofs:

subtract(+list,+list,-list) - one

suffix/2

Suffix is a suffix of List.

Compilation flags:

static

Template:

suffix(Suffix,List)

Mode and number of proofs:

suffix(?list,+list) - zero_or_more

suffix/3

Suffix is a suffix of length Length of List.

Compilation flags:

static

Template:

suffix(Suffix,Length,List)

Mode and number of proofs:

suffix(?list,+integer,+list) - zero_or_one

suffix(?list,-integer,+list) - zero_or_more

proper_suffix/2

Suffix is a proper suffix of List.

Compilation flags:

static

Template:

proper_suffix(Suffix,List)

Mode and number of proofs:

proper_suffix(?list,+list) - zero_or_more

`proper_suffix/3`

Suffix is a proper suffix of length Length of List.

Compilation flags:

`static`

Template:

`proper_suffix(Suffix,Length,List)`

Mode and number of proofs:

`proper_suffix(?list,+integer,+list) - zero_or_one`

`proper_suffix(?list,-integer,+list) - zero_or_more`

`take/3`

Takes the first N elements of a list. Fails if the list have fewer than N elements.

Compilation flags:

`static`

Template:

`take(N,List,Elements)`

Mode and number of proofs:

`take(+integer,+list,-list) - zero_or_one`

`drop/3`

Drops the first N elements of a list. Fails if the list have fewer than N elements.

Compilation flags:

`static`

Template:

`drop(N,List,Remaining)`

Mode and number of proofs:

`drop(+integer,+list,-list) - zero_or_one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

➡ See also

`list`, `list(Type)`, `numberlistp`, `varlistp`

object

1.74.14 `natural`

Natural numbers data type predicates.

Availability:

`logtalk_load(types(loader))`

Author: Paulo Moura

Version: 2:0:0

Date: 2025-01-16

Compilation flags:

`static`, `context_switching_calls`

Extends:

`public integer`

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 =~= / 2 (>)/2 (>=)/2 approximately_equal/2
 approximately_equal/3 between/3 check/1 depth/2 essentially_equal/3 ground/1 new/1
 numbervars/1 numbervars/3 occurs/2 plus/3 power_sequence/4 sequence/3 sequence/4
 singletons/2 subsumes/2 subterm/2 succ/2 tolerance_equal/4 valid/1 variables/2 variant/2
 varnumbers/2 varnumbers/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.74.15 number

Number data type predicates.

Availability:

logtalk_load(types(loader))

Author: Paulo Moura

Version: 1:14:0

Date: 2023-12-07

Compilation flags:

static, context_switching_calls

Extends:

public atomic

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 check/1 depth/2 ground/1 new/1
numbervars/1 numbervars/3 occurs/2 singletons/2 subsumes/2 subterm/2 valid/1 variables/2
variant/2 varnumbers/2 varnumbers/3

- Public predicates
 - approximately_equal/2
 - approximately_equal/3
 - essentially_equal/3
 - tolerance_equal/4
 - ==~ / 2
- Protected predicates
- Private predicates
- Operators
 - op(700,xfx,==~)

Public predicates

approximately_equal/2

Compares two numbers for approximate equality given the epsilon arithmetic constant value using the de facto standard formula $\text{abs}(\text{Number1} - \text{Number2}) \leq \max(\text{abs}(\text{Number1}), \text{abs}(\text{Number2})) * \text{epsilon}$. No type-checking.

Compilation flags:

static

Template:

approximately_equal(Number1,Number2)

Mode and number of proofs:

approximately_equal(+number,+number) - zero_or_one

`approximately_equal/3`

Compares two numbers for approximate equality given a user-defined epsilon value using the de facto standard formula $\text{abs}(\text{Number1} - \text{Number2}) \leq \max(\text{abs}(\text{Number1}), \text{abs}(\text{Number2})) * \text{Epsilon}$. No type-checking.

Compilation flags:

`static`

Template:

`approximately_equal(Number1,Number2,Epsilon)`

Mode and number of proofs:

`approximately_equal(+number,+number,+number) - zero_or_one`

Remarks:

- Epsilon range: Epsilon should be the epsilon arithmetic constant value or a small multiple of it. Only use a larger value if a greater error is expected.
 - Comparison with essential equality: For the same epsilon value, approximate equality is weaker requirement than essential equality.
-

`essentially_equal/3`

Compares two numbers for essential equality given an epsilon value using the de facto standard formula $\text{abs}(\text{Number1} - \text{Number2}) \leq \min(\text{abs}(\text{Number1}), \text{abs}(\text{Number2})) * \text{Epsilon}$. No type-checking.

Compilation flags:

`static`

Template:

`essentially_equal(Number1,Number2,Epsilon)`

Mode and number of proofs:

`essentially_equal(+number,+number,+number) - zero_or_one`

Remarks:

- Comparison with approximate equality: For the same epsilon value, essential equality is a stronger requirement than approximate equality.
-

tolerance_equal/4

Compares two numbers for close equality given relative and absolute tolerances using the de facto standard formula $\text{abs}(\text{Number1} - \text{Number2}) \leq \max(\text{RelativeTolerance} * \max(\text{abs}(\text{Number1}), \text{abs}(\text{Number2})), \text{AbsoluteTolerance})$. No type-checking.

Compilation flags:

static

Template:

tolerance_equal(Number1,Number2,RelativeTolerance,AbsoluteTolerance)

Mode and number of proofs:

tolerance_equal(+number,+number,+number,+number) - zero_or_one

=~/ 2

Compares two floats (or lists of floats) for approximate equality using 100*epsilon for the absolute error and, if that fails, 99.999% accuracy for the relative error. Note that these precision values may not be adequate for all cases. No type-checking.

Compilation flags:

static

Template:

=~/ (Float1,Float2)

Mode and number of proofs:

=~/ (+number,+number) - zero_or_one

=~/ (+list(number),+list(number)) - zero_or_one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

op(700,xfx,=~=)

Scope:

public

object

1.74.16 numberlist

List of numbers predicates.

Availability:

logtalk_load(types(loader))

Author: Paulo Moura

Version: 1:16:0

Date: 2025-03-13

Compilation flags:

static, context_switching_calls

Implements:

public numberlistp

Extends:

public list

Uses:

list

Remarks:

(none)

Inherited public predicates:

(<)/2 (=:=)/2 (=<)/2 (=\\=)/2 (>)/2 (>=)/2 append/2 append/3 as_difflist/2 average/2
chebyshev_distance/3 chebyshev_norm/2 check/1 delete/3 delete_matches/3 depth/2 drop/3
empty/1 euclidean_distance/3 euclidean_norm/2 flatten/2 ground/1 hamming_distance/3
keysort/2 last/2 least_common_multiple/2 length/2 manhattan_distance/3 manhattan_norm/2
max/2 median/2 member/2 memberchk/2 min/2 min_max/3 modes/2 msort/2 msort/3

new/1 nextto/3 normalize_range/2 normalize_range/4 normalize_scalar/2 normalize_unit/2
nth0/3 nth0/4 nth1/3 nth1/4 numbervars/1 numbervars/3 occurrences/2 occurrences/3
occurs/2 partition/5 permutation/2 prefix/2 prefix/3 product/2 proper_prefix/2
proper_prefix/3 proper_suffix/2 proper_suffix/3 remove_duplicates/2 rescale/3 reverse/2
same_length/2 same_length/3 scalar_product/3 select/3 select/4 selectchk/3 selectchk/4
sequential_occurrences/2 sequential_occurrences/3 singletons/2 softmax/2 softmax/3 sort/2
sort/3 sort/4 split/4 sublist/2 subsequence/3 subsequence/4 substitute/4 subsumes/2
subterm/2 subtract/3 suffix/2 suffix/3 sum/2 take/3 valid/1 variables/2 variant/2
varnumbers/2 varnumbers/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

list, list(Type), varlist, difflist

protocol

1.74.17 numberlistp

List of numbers protocol.

Availability:

`logtalk_load(types(loader))`

Author: Paulo Moura

Version: 1:10:0

Date: 2025-03-13

Compilation flags:

`static`

Dependencies:

`(none)`

Remarks:

`(none)`

Inherited public predicates:

`(none)`

- Public predicates
 - `min/2`
 - `max/2`
 - `min_max/3`
 - `product/2`
 - `sum/2`
 - `average/2`
 - `median/2`
 - `modes/2`
 - `euclidean_norm/2`
 - `chebyshev_norm/2`
 - `manhattan_norm/2`
 - `euclidean_distance/3`
 - `chebyshev_distance/3`

- manhattan_distance/3
- scalar_product/3
- normalize_range/2
- normalize_range/4
- normalize_unit/2
- normalize_scalar/2
- rescale/3
- least_common_multiple/2
- softmax/2
- softmax/3
- Protected predicates
- Private predicates
- Operators

Public predicates

`min/2`

Determines the minimum value in a list using arithmetic order. Fails if the list is empty.

Compilation flags:

`static`

Template:

`min(List,Minimum)`

Mode and number of proofs:

`min(+list(number),-number) - zero_or_one`

`max/2`

Determines the list maximum value using arithmetic order. Fails if the list is empty.

Compilation flags:

`static`

Template:

max(List,Maximum)

Mode and number of proofs:

max(+list(number),-number) - zero_or_one

min_max/3

Determines the minimum and maximum values in a list using arithmetic order. Fails if the list is empty.

Compilation flags:

static

Template:

min_max(List,Minimum,Maximum)

Mode and number of proofs:

min_max(+list(number),-number,-number) - zero_or_one

product/2

Calculates the product of all list numbers. Fails if the list is empty.

Compilation flags:

static

Template:

product(List,Product)

Mode and number of proofs:

product(+list(number),-number) - zero_or_one

`sum/2`

Calculates the sum of all list numbers. Returns the integer zero if the list is empty.

Compilation flags:

`static`

Template:

`sum(List,Sum)`

Mode and number of proofs:

`sum(+list(number),-number) - one`

`average/2`

Calculates the average (i.e., arithmetic mean) of a list of numbers. Fails if the list is empty.

Compilation flags:

`static`

Template:

`average(List,Average)`

Mode and number of proofs:

`average(+list(number),-float) - zero_or_one`

`median/2`

Calculates the median of a list of numbers. Fails if the list is empty.

Compilation flags:

`static`

Template:

`median(List,Median)`

Mode and number of proofs:

`median(+list(number),-float) - zero_or_one`

modes/2

Returns the list of modes of a list of numbers in ascending order. Fails if the list is empty.

Compilation flags:

static

Template:

modes(List,Modes)

Mode and number of proofs:

modes(+list(number),-list(number)) - zero_or_one

euclidean_norm/2

Calculates the Euclidean norm of a list of numbers. Fails if the list is empty.

Compilation flags:

static

Template:

euclidean_norm(List,Norm)

Mode and number of proofs:

euclidean_norm(+list(number),-float) - zero_or_one

chebyshev_norm/2

Calculates the Chebyshev norm of a list of numbers. Fails if the list is empty.

Compilation flags:

static

Template:

chebyshev_norm(List,Norm)

Mode and number of proofs:

chebyshev_norm(+list(integer),-integer) - zero_or_one

chebyshev_norm(+list(float),-float) - zero_or_one

`manhattan_norm/2`

Calculates the Manhattan norm of a list of numbers. Fails if the list is empty.

Compilation flags:

`static`

Template:

`manhattan_norm(List, Norm)`

Mode and number of proofs:

`manhattan_norm(+list(integer), -integer) - zero_or_one`

`manhattan_norm(+list(float), -float) - zero_or_one`

`euclidean_distance/3`

Calculates the Euclidean distance between two lists of numbers. Fails if the two lists are empty or not of the same length.

Compilation flags:

`static`

Template:

`euclidean_distance(List1, List2, Distance)`

Mode and number of proofs:

`euclidean_distance(+list(number), +list(number), -float) - zero_or_one`

`chebyshev_distance/3`

Calculates the Chebyshev distance between two lists of numbers. Fails if the two lists are empty or not of the same length.

Compilation flags:

`static`

Template:

```
chebyshev_distance(List1,List2,Distance)
```

Mode and number of proofs:

```
chebyshev_distance(+list(integer),+list(integer),-integer) - zero_or_one
```

```
chebyshev_distance(+list(float),+list(float),-float) - zero_or_one
```

`manhattan_distance/3`

Calculates the Manhattan distance between two lists of numbers. Fails if the two lists are empty or not of the same length.

Compilation flags:

```
static
```

Template:

```
manhattan_distance(List1,List2,Distance)
```

Mode and number of proofs:

```
manhattan_distance(+list(integer),+list(integer),-integer) - zero_or_one
```

```
manhattan_distance(+list(float),+list(float),-float) - zero_or_one
```

`scalar_product/3`

Calculates the scalar product of two lists of numbers. Fails if the two lists are empty or not of the same length.

Compilation flags:

```
static
```

Template:

```
scalar_product(List1,List2,Product)
```

Mode and number of proofs:

```
scalar_product(+list(integer),+list(integer),-integer) - zero_or_one
```

```
scalar_product(+list(float),+list(float),-float) - zero_or_one
```

`normalize_range/2`

Normalizes a list of numbers into the $[0.0,1.0]$ range. Caller must handle arithmetic exceptions if the input list is not normalizable.

Compilation flags:

`static`

Template:

`normalize_range(List,NormalizedList)`

Mode and number of proofs:

`normalize_range(+list(number),-list(float)) - one`

`normalize_range/4`

Normalizes a list of numbers into the given range. Caller must handle arithmetic exceptions if the input list is not normalizable.

Compilation flags:

`static`

Template:

`normalize_range(List,Minimum,Maximum,NormalizedList)`

Mode and number of proofs:

`normalize_range(+list(number),+number,+number,-list(float)) - one`

`normalize_unit/2`

Normalizes a list of numbers returning its unit vector (i.e., a list with Euclidean norm equal to one). Caller must handle arithmetic exceptions if the input list is not normalizable.

Compilation flags:

`static`

Template:

`normalize_unit(List,NormalizedList)`

Mode and number of proofs:

```
normalize_unit(+list(number),-list(float)) - one
```

```
normalize_scalar/2
```

Normalizes a list of numbers such that the sum of all numbers is equal to one. Caller must handle arithmetic exceptions if the input list is not normalizable.

Compilation flags:

```
static
```

Template:

```
normalize_scalar(List,NormalizedList)
```

Mode and number of proofs:

```
normalize_scalar(+list(number),-list(float)) - one
```

```
rescale/3
```

Rescales all numbers in a list by the given factor.

Compilation flags:

```
static
```

Template:

```
rescale(List,Factor,RescaledList)
```

Mode and number of proofs:

```
rescale(+list(integer),+integer,-list(integer)) - one
```

```
rescale(+list(number),+float,-list(float)) - one
```

`least_common_multiple/2`

Computes the least common multiple of a list of two or more positive integers. Fails if the list is empty or contains a single element. Fails also if any of the elements is zero. May require backend support for unbound integer arithmetic.

Compilation flags:

`static`

Template:

`least_common_multiple(Integers,LeastCommonMultiple)`

Mode and number of proofs:

`least_common_multiple(+list(positive_integer),-positive_integer) - zero_or_one`

`softmax/2`

Computes the softmax of a list of floats, returning a probability distribution.

Compilation flags:

`static`

Template:

`softmax(Floats,Softmax)`

Mode and number of proofs:

`softmax(+list(float),-list(float)) - one`

`softmax/3`

Computes the softmax of a list of floats with the given temperature, returning a probability distribution.

Compilation flags:

`static`

Template:

`softmax(Floats,Temperature,Softmax)`

Mode and number of proofs:

`softmax(+list(float),+positive_float,-list(float)) - one`

Remarks:

- Temperature > 1.0: Makes the distribution more uniform.
- Temperature < 1.0: Makes the distribution more concentrated on the largest values.
- Temperature = 1.0: Standard softmax behavior.

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

numberlist, listp, varlistp

object

1.74.18 pairs

Useful predicates over lists of pairs (key-value terms).

Availability:

logtalk_load(types(loader))

Author: Paulo Moura

Version: 2:1:1

Date: 2023-11-21

Compilation flags:

static, context_switching_calls

Dependencies:

(none)

Remarks:

- Usage: This object can be loaded independently of other entities in the types library by using the goal `logtalk_load(types(pairs))`.

Inherited public predicates:

(none)

- Public predicates
 - `keys_values/3`
 - `keys/2`
 - `key/2`
 - `values/2`
 - `value/3`
 - `transpose/2`
 - `group_sorted_by_key/2`
 - `group_consecutive_by_key/2`
 - `group_by_key/2`
 - `map/3`
- Protected predicates
- Private predicates
- Operators

Public predicates

`keys_values/3`

Converts between a list of pairs and lists of keys and values. When converting to pairs, this predicate fails if the list of keys and the list of values have different lengths.

Compilation flags:

`static`

Template:

`keys_values(Pairs,Keys,Values)`

Mode and number of proofs:

`keys_values(+list(pair),-list,-list)` - one

`keys_values(-list(pair),+list,+list)` - zero_or_one

[keys/2](#)

Returns a list of keys from a list of pairs.

Compilation flags:

static

Template:

keys(Pairs,Keys)

Mode and number of proofs:

keys(+list(pair),-list) - one

[key/2](#)

Enumerates by backtracking all keys from a list of pairs.

Compilation flags:

static

Template:

key(Pairs,Key)

Mode and number of proofs:

key(+list(pair),-term) - zero_or_more

[values/2](#)

Returns a list of values from a list of pairs.

Compilation flags:

static

Template:

values(Pairs,Values)

Mode and number of proofs:

values(+list(pair),-list) - one

value/3

Returns a value addressed by the given path (a key or a list of keys in the case of nested list of pairs). Fails if path does not exist.

Compilation flags:

static

Template:

value(Pairs,Path,Value)

Mode and number of proofs:

value(+list(pair),+term,-term) - zero_or_one

value(+list(pair),+list,-term) - zero_or_one

transpose/2

Transposes a list of pairs by swapping each pair key and value. The relative order of the list elements is kept.

Compilation flags:

static

Template:

transpose(Pairs,TransposedPairs)

Mode and number of proofs:

transpose(+list(pair),-list(pair)) - one

`group_sorted_by_key/2`

Groups pairs by key by sorting them and then constructing new pairs by grouping all values for a given key in a list. Keys are compared using equality. Relative order of values per key is kept. Resulting list of pairs is sorted by key.

Compilation flags:

`static`

Template:

`group_sorted_by_key(Pairs,Groups)`

Mode and number of proofs:

`group_sorted_by_key(+list(pair),-list(pair)) - one`

`group_consecutive_by_key/2`

Groups pairs by constructing new pairs by grouping all values for consecutive key in a list. Keys are compared using equality. The relative order of the values for the same key is kept.

Compilation flags:

`static`

Template:

`group_consecutive_by_key(Pairs,Groups)`

Mode and number of proofs:

`group_consecutive_by_key(+list(pair),-list(pair)) - one`

`group_by_key/2`

Same as the `group_sorted_by_key/2` predicate. Deprecated.

Compilation flags:

`static`

Template:

`group_by_key(Pairs,Groups)`

Mode and number of proofs:

```
group_by_key(+list(pair),-list(pair)) - one
```

map/3

Maps a list into pairs using a closure that applies to each list element to compute its key.

Compilation flags:

```
static
```

Template:

```
map(Closure,List,Pairs)
```

Meta-predicate template:

```
map(2,*,*)
```

Mode and number of proofs:

```
map(@callable,+list,-list(pair)) - one
```

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

object

1.74.19 term

Term utility predicates.

Availability:

```
logtalk_load(types(loader))
```

Author: Paulo Moura

Version: 1:11:0
Date: 2022-05-13

Compilation flags:
static, context_switching_calls

Implements:
public `term`

Aliases:
term variables/2 as vars/2

Remarks:
(none)

Inherited public predicates:
(<)/2 (=:=)/2 (= <)/2 (= \=)/2 (>)/2 (>=)/2 check/1 depth/2 ground/1 new/1
numbervars/1 numbervars/3 occurs/2 singletons/2 subsumes/2 subterm/2 valid/1 variables/2
variant/2 varnumbers/2 varnumbers/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.74.20 term_p

Term utility predicates protocol.

Availability:

`logtalk__load(types(loader))`

Author: Paulo Moura

Version: 1:35:0

Date: 2022-05-13

Compilation flags:

`static`

Extends:

`public comparingp`

Remarks:

(none)

Inherited public predicates:

`(<)/2` `(=:=)/2` `(=<)/2` `(=\=)/2` `(>)/2` `(>=)/2`

- Public predicates
 - `depth/2`
 - `ground/1`
 - `new/1`
 - `occurs/2`
 - `subsumes/2`

- subterm/2
- valid/1
- check/1
- variant/2
- variables/2
- singletons/2
- numbervars/3
- numbervars/1
- varnumbers/3
- varnumbers/2
- Protected predicates
- Private predicates
- Operators

Public predicates

depth/2

True if the depth of Term is Depth. The depth of atomic terms is zero; the depth of a compound term is one plus the maximum depth of its sub-terms.

Compilation flags:

static

Template:

depth(Term,Depth)

Mode and number of proofs:

depth(@term,?integer) - zero_or_one

ground/1

True if the argument is ground. Deprecated. Use the ground/1 standard predicate instead.

Compilation flags:

static

Template:

ground(Term)

Mode and number of proofs:

ground(@term) - zero_or_one

new/1

Creates a new term instance (if meaningful).

Compilation flags:

static

Template:

new(Term)

Mode and number of proofs:

new(-nonvar) - zero_or_one

occurs/2

True if the variable occurs in the term.

Compilation flags:

static

Template:

occurs(Variable,Term)

Mode and number of proofs:

occurs(@var,@term) - zero_or_one

subsumes/2

The first term subsumes the second term. Deprecated. Use the subsumes_term/2 standard predicate instead.

Compilation flags:

static

Template:

subsumes(General,Specific)

Mode and number of proofs:

subsumes(@term,@term) - zero_or_one

subterm/2

The first term is a subterm of the second term.

Compilation flags:

static

Template:

subterm(Subterm,Term)

Mode and number of proofs:

subterm(?term,+term) - zero_or_more

valid/1

Term is valid.

Compilation flags:

static

Template:

valid(Term)

Mode and number of proofs:

valid(@nonvar) - zero_or_one

check/1

Checks if a term is valid. Throws an exception if the term is not valid.

Compilation flags:

static

Template:

check(Term)

Mode and number of proofs:

check(@nonvar) - one

variant/2

Each term is a variant of the other (i.e., they are structurally equivalent).

Compilation flags:

static

Template:

variant(Term1,Term2)

Mode and number of proofs:

variant(@term,@term) - zero_or_one

variables/2

Returns a list of all term variables (ordered as found when doing a depth-first, left-to-right traversal of Term). Deprecated. Use the standard term_variables/2 predicate instead.

Compilation flags:

static

Template:

variables(Term,List)

Mode and number of proofs:

variables(@term,-list) - one

singletons/2

Returns a list of all term singleton variables (ordered as found when doing a depth-first, left-to-right traversal of Term).

Compilation flags:

static

Template:

singletons(Term,Singletons)

Mode and number of proofs:

singletons(@term,-list) - one

numbervars/3

Grounds a term by replacing all variables with '\$VAR'(N) terms with N starting at From. The Next argument is unified with the next value for N after binding all variables.

Compilation flags:

static

Template:

numbervars(Term,From,Next)

Mode and number of proofs:

numbervars(?term,+integer,?integer) - zero_or_one

numbervars/1

Grounds a term by replacing all variables with '\$VAR'(N) terms with N starting at 0.

Compilation flags:

static

Template:

numbervars(Term)

Mode and number of proofs:

numbervars(?term) - zero_or_one

varnumbers/3

Replaces all '\$VAR'(N) sub-terms in a term with fresh variables for all values of N grater or equal to From. Variables in Term are shared with Copy.

Compilation flags:

static

Template:

varnumbers(Term,From,Copy)

Mode and number of proofs:

varnumbers(@term,+integer,?term) - zero_or_one

varnumbers/2

Replaces all '\$VAR'(N) sub-terms in a term with fresh variables for all values of N grater or equal to 0. Variables in Term are shared with Copy.

Compilation flags:

static

Template:

varnumbers(Term,Copy)

Mode and number of proofs:

varnumbers(@term,?term) - zero_or_one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

[term](#)

object

1.74.21 type

Type checking predicates. User extensible. New types can be defined by adding clauses for the type/1 and check/2 multifile predicates.

Availability:

`logtalk_load(types(loader))`

Author: Paulo Moura

Version: 2:5:1

Date: 2024-09-26

Compilation flags:

`static, context_switching_calls, complements(restrict)`

Uses:

[list](#)

Remarks:

- Logtalk specific types: `entity`, `object`, `protocol`, `category`, `entity__identifier`, `object__identifier`, `protocol__identifier`, `category__identifier`, `event`, `predicate`.
- Prolog module related types (when the backend compiler supports modules): `module`, `module__identifier`, `qualified_callable`.
- Prolog base types: `term`, `var`, `nonvar`, `atomic`, `atom`, `number`, `integer`, `float`, `compound`, `callable`, `ground`.

- Atom derived types: `non_quoted_atom`, `non_empty_atom`, `boolean`, `character`, `in_character`, `char`, `operator_specifier`, `hex_char`.
- Atom derived parametric types: `atom(CharSet)`, `atom(CharSet,Length)`, `non_empty_atom(CharSet)`, `character(CharSet)`, `in_character(CharSet)`, `char(CharSet)`.
- Number derived types: `positive_number`, `negative_number`, `non_positive_number`, `non_negative_number`.
- Float derived types: `positive_float`, `negative_float`, `non_positive_float`, `non_negative_float`, `probability`.
- Integer derived types: `positive_integer`, `negative_integer`, `non_positive_integer`, `non_negative_integer`, `byte`, `in_byte`, `character_code`, `in_character_code`, `code`, `operator_priority`, `hex_code`.
- Integer derived parametric types: `character_code(CharSet)`, `in_character_code(CharSet)`, `code(CharSet)`.
- List types (compound derived types): `list`, `non_empty_list`, `partial_list`, `list_or_partial_list`, `list(Type)`, `list(Type,Length)`, `list(Type,Min,Max)`, `list(Type,Length,Min,Max)`, `non_empty_list(Type)`, `codes`, `chars`.
- Difference list types (compound derived types): `difference_list`, `difference_list(Type)`.
- Other compound derived types: `compound(Name,Types)`, `predicate_indicator`, `non_terminal_indicator`, `predicate_or_non_terminal_indicator`, `clause`, `grammar_rule`, `pair`, `pair(KeyType,ValueType)`, `cyclic`, `acyclic`.
- Stream types: `stream`, `stream_or_alias`, `stream(Property)`, `stream_or_alias(Property)`.
- Other types: `Object::Closure`, `between(Type,Lower,Upper)`, `property(Type,LambdaExpression)`, `one_of(Type,Set)`, `var_or(Type)`, `ground(Type)`, `types(Types)`, `constrain(Type,Closure)`, `type`.
- Type predicate notes: This type is used to check for an object public predicate specified as `Object::Functor/Arity`.
- Type boolean notes: The two value of this type are the atoms `true` and `false`.
- Stream types notes: In the case of the `stream(Property)` and `stream_or_alias(Property)` types, `Property` must be a valid stream property.
- Type order notes: The three possible values of this type are the single character atoms `<`, `=`, and `>`.
- Type `character_code` notes: This type takes into account Unicode support by the backend compiler. When Unicode is supported, it distinguishes between BMP and full support. When Unicode is not supported, it assumes a byte representation for characters.
- Type `Object::Closure` notes: Allows calling a public object predicate for type-checking. The predicate should provide valid/2 predicate semantics and assume called with a bound argument. The Closure closure is extended with a single argument, the value to be checked.
- Type `compound(Name,Types)` notes: This type verifies that a compound term have the given `Name` and its arguments conform to `Types`.
- Type `between(Type, Lower, Upper)` notes: The type argument allows distinguishing between numbers and other types. It also allows choosing between mixed integer/float comparisons and strict float or integer comparisons. The term is type-checked before testing for interval membership.
- Type `property(Type, Lambda)` notes: Verifies that `Term` satisfies a property described using a lambda expression of the form `[Parameter]>>Goal`. The lambda expression is applied in the context of `user`. The term is type-checked before calling the goal.

- `one_of(Type, Set)` notes: For checking if a given term is an element of a set. The set is represented using a list. The term is type-checked before testing for set membership.
- `var_or(Type)` notes: Allows checking if a term is either a variable or a valid value of the given type.
- `ground(Type)` notes: Allows checking if a term is ground and a valid value of the given type.
- `types(Types)` notes: Allows checking if a term is a valid value for one of the types in a list of types.
- `constrain(Type, Closure)` notes: Allows checking if a term is a valid value for the given type and satisfies the given closure.
- `type` notes: Allows checking if a term is a valid type.
- `qualified_callable` notes: Allows checking if a term is a possibly module-qualified callable term. When the term is qualified, it also checks that the qualification modules are type correct. When the term is not qualified, its semantics are the same as the callable type.
- Design choices: The main predicates are `valid/2` and `check/3`. These are defined using the predicate `check/2`. Defining clauses for `check/2` instead of `valid/2` gives the user full control of exception terms without requiring an additional predicate.
- Error context: The built-in execution-context method `context/1` can be used to provide the calling context for errors when using the predicate `check/3`.
- Registering new types: New types can be registered by defining clauses for the `type/1` and `check/2` multifile predicates. Clauses for both predicates must have a bound first argument to avoid introducing spurious choice-points when type-checking terms.
- Meta-types: Meta-types are types that have one or more sub-type arguments. E.g. `var_or(Type)`. The sub-types of a meta-type can be enumerated by defining a clause for the `meta_type/3` multifile predicate.
- Character sets: When testing character or character code based terms (e.g., `atom`), it is possible to choose a character set (`ascii_identifier`, `ascii_printable`, `ascii_full`, `byte`, `unicode_bmp`, or `unicode_full`) using the parameterizable types.
- Caveats: The type argument (and any type parameterization) to the predicates is not type-checked (or checked for consistency) for performance reasons.
- Unicode limitations: Currently, correct character/code type-checking is only ensured for SWI-Prolog and XVM as other backends do not provide support for querying a Unicode code point category.

Inherited public predicates:

```
arbitrary/1 arbitrary/2 edge_case/2 get_seed/1 max_size/1 mutation/3 set_seed/1 shrink/3
shrink_sequence/3 shrinker/1
```

- Public predicates
 - `type/1`
 - `meta_type/3`
 - `valid/2`
 - `check/3`

- check/2
- Protected predicates
- Private predicates
- Operators

Public predicates

type/1

Table of defined types. A new type can be registered by defining a clause for this predicate and adding a clause for the check/2 multifile predicate.

Compilation flags:
static, multifile

Template:
type(Type)
Mode and number of proofs:
type(?callable) - zero_or_more

meta_type/3

Table of defined meta-types. A registered type that is a meta-type can be described by defining a clause for this predicate to enumerate its sub-types and optional values in case of a single sub-type.

Compilation flags:
static, multifile

Template:
meta_type(MetaType,SubTypes,Values)
Mode and number of proofs:
meta_type(?callable,-list,-list) - zero_or_more

`valid/2`

True if the given term is of the specified type. Fails otherwise.

Compilation flags:

`static`

Template:

`valid(Type,Term)`

Mode and number of proofs:

`valid(@callable,@term) - zero_or_one`

`check/3`

True if the given term is of the specified type. Throws an error otherwise using the format `error(Error, Context)`. For the possible values of `Error` see the `check/2` predicate.

Compilation flags:

`static`

Template:

`check(Type,Term,Context)`

Mode and number of proofs:

`check(@callable,@term,@term) - one_or_error`

`check/2`

True if the given term is of the specified type. Throws an error otherwise. A new type can be added by defining a clause for this predicate and registering it by adding a clause for the `type/1` multifile predicate.

Compilation flags:

`static, multifile`

Template:

`check(Type,Term)`

Meta-predicate template:

`check(:,*)`

Mode and number of proofs:

`check(@callable,@term) - one_or_error`

Exceptions:

Term is not bound as required:

`instantiation_error`

Term is bound but not of the specified type:

`type_error(Type,Term)`

Term is the of the correct type but not in the specified domain:

`domain_error(Domain,Term)`

Term is the of the correct type and domain but the resource it represents does not exist:

`existence_error(Type,Term)`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`arbitrary`, `os_types`, `either`, `maybe`

object

1.74.22 varlist

List of variables predicates.

Availability:

`logtalk_load(types(loader))`

Author: Paulo Moura

Version: 2:0:0

Date: 2020-05-11

Compilation flags:

static, context_switching_calls

Implements:

public varlistp

Remarks:

(none)

Inherited public predicates:

append/3 check/1 delete/3 empty/1 flatten/2 last/2 length/2 memberchk/2 nextto/3 nth0/3
nth0/4 nth1/3 nth1/4 permutation/2 prefix/2 remove_duplicates/2 reverse/2 same_length/2
select/3 sublist/2 subtract/3 suffix/2 valid/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

list, list(Type), numberlist, difflist

protocol

1.74.23 varlistp

List of variables protocol.

Availability:

`logtalk_load(types(loader))`

Author: Paulo Moura

Version: 1:3:0

Date: 2022-09-19

Compilation flags:

`static`

Dependencies:

`(none)`

Remarks:

`(none)`

Inherited public predicates:

`(none)`

- Public predicates
 - `append/3`
 - `delete/3`
 - `empty/1`
 - `flatten/2`
 - `last/2`
 - `length/2`
 - `memberchk/2`
 - `nextto/3`
 - `nth0/3`
 - `nth0/4`
 - `nth1/3`
 - `nth1/4`
 - `permutation/2`

- prefix/2
- remove_duplicates/2
- reverse/2
- same_length/2
- select/3
- sublist/2
- subtract/3
- suffix/2
- valid/1
- check/1
- Protected predicates
- Private predicates
- Operators

Public predicates

append/3

Appends two lists.

Compilation flags:

static

Template:

append(List1,List2,List)

Mode and number of proofs:

append(?list,?list,?list) - zero_or_more

delete/3

Deletes from a list all occurrences of an element returning the list of remaining elements.

Compilation flags:

static

Template:

`delete(List,Element,Remaining)`

Mode and number of proofs:

`delete(@list,@term,?list)` - one

`empty/1`

True if the argument is an empty list.

Compilation flags:

`static`

Template:

`empty(List)`

Mode and number of proofs:

`empty(@list)` - zero_or_one

`flatten/2`

Flattens a list of lists into a list.

Compilation flags:

`static`

Template:

`flatten(List,Flatted)`

Mode and number of proofs:

`flatten(@list,-list)` - one

`last/2`

List last element (if it exists).

Compilation flags:

`static`

Template:

`last(List,Last)`

Mode and number of proofs:

`last(@list,@var) - zero_or_one`

`length/2`

List length.

Compilation flags:

`static`

Template:

`length(List,Length)`

Mode and number of proofs:

`length(@list,?integer) - zero_or_one`

`memberchk/2`

Checks if a variable is a member of a list.

Compilation flags:

`static`

Template:

`memberchk(Element,List)`

Mode and number of proofs:

`memberchk(@var,@list) - zero_or_one`

`nextto/3`

X and Y are consecutive elements in List.

Compilation flags:

`static`

Template:

`nextto(X,Y,List)`

Mode and number of proofs:

`nextto(@var,@var,?list) - zero_or_more`

`nth0/3`

Nth element of a list (counting from zero).

Compilation flags:

`static`

Template:

`nth0(Nth,List,Element)`

Mode and number of proofs:

`nth0(?integer,+list,@var) - zero_or_more`

`nth0/4`

Nth element of a list (counting from zero). Rest is a list of all the other elements. Can be used to either select the nth element of List or to insert an element before the nth element in Rest.

Compilation flags:

`static`

Template:

`nth0(Nth,List,Element,Rest)`

Mode and number of proofs:

`nth0(?integer,+list,@var,?list) - zero_or_more`

`nth1/3`

Nth element of a list (counting from one).

Compilation flags:

`static`

Template:

`nth1(Nth,List,Element)`

Mode and number of proofs:

`nth1(?integer,+list,@var) - zero_or_more`

`nth1/4`

Nth element of a list (counting from zero). Rest is a list of all the other elements. Can be used to either select the nth element of List or to insert an element before the nth element in Rest.

Compilation flags:

`static`

Template:

`nth1(Nth,List,Element,Rest)`

Mode and number of proofs:

`nth1(?integer,+list,@var,?list) - zero_or_more`

`permutation/2`

The two lists are a permutation of the same list.

Compilation flags:

`static`

Template:

`permutation(List,Permutation)`

Mode and number of proofs:

permutation(@list,@list) - zero_or_one

prefix/2

Prefix is a prefix of List.

Compilation flags:

static

Template:

prefix(Prefix,List)

Mode and number of proofs:

prefix(?list,@list) - zero_or_more

remove_duplicates/2

Removes duplicated variables and keeping the left-most variable when repeated.

Compilation flags:

static

Template:

remove_duplicates(List,Set)

Mode and number of proofs:

remove_duplicates(+list,-list) - one

reverse/2

Reverses a list.

Compilation flags:

static

Template:

reverse(List,Reversed)

Mode and number of proofs:

reverse(@list,?list) - zero_or_one

reverse(?list,@list) - zero_or_one

reverse(-list,-list) - one_or_more

same_length/2

The two lists have the same length.

Compilation flags:

static

Template:

same_length(List1,List2)

Mode and number of proofs:

same_length(@list,?list) - zero_or_one

same_length(?list,@list) - zero_or_one

same_length(-list,-list) - one_or_more

select/3

Selects an element from a list, returning the list of remaining elements.

Compilation flags:

static

Template:

select(Element,List,Remaining)

Mode and number of proofs:

select(@var,?list,?list) - zero_or_more

sublist/2

The first list is a sublist of the second.

Compilation flags:

static

Template:

sublist(Sublist,List)

Mode and number of proofs:

sublist(?list,@list) - zero_or_more

subtract/3

Removes all elements in the second list from the first list, returning the list of remaining elements.

Compilation flags:

static

Template:

subtract(List,Elements,Remaining)

Mode and number of proofs:

subtract(@list,@list,-list) - one

suffix/2

Suffix is a suffix of List.

Compilation flags:

static

Template:

suffix(Suffix,List)

Mode and number of proofs:

suffix(?list,@list) - zero_or_more

valid/1

Term is a valid list of variables.

Compilation flags:

static

Template:

valid(Term)

Mode and number of proofs:

valid(@nonvar) - zero_or_one

check/1

Checks if a term is a valid list of variables. Throws an exception if the term is not valid.

Compilation flags:

static

Template:

check(Term)

Mode and number of proofs:

check(@nonvar) - one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

➞ See also

varlist, listp, numberlistp

1.75 ulid

object

1.75.1 ulid

Universally Unique Lexicographically Sortable Identifier (ULID) generator using an atom representation.

Availability:

`logtalk__load(ulid(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2023-05-19

Compilation flags:

`static, context_switching_calls`

Extends:

`public ulid(atom)`

Remarks:

(none)

Inherited public predicates:

`generate/1 generate/2 generate/8 timestamp/2 timestamp/8`

- Public predicates
- Protected predicates
- Private predicates

- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

`ulid(Representation)`, `ulid_types`, `uuid`, `uuid(Representation)`, `ids`, `ids(Representation,Bytes)`

object

1.75.2 `ulid(Representation)`

- Representation - Text representation for the ULID. Possible values are atom, chars, and codes.

Universally Unique Lexicographically Sortable Identifier (ULID) generator.

Availability:

```
logtalk_load(ulid(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2023-05-19

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public ulid_protocol
```

Uses:

`fast_random`
`iso8601`
`list`
`os`

Remarks:

(none)

Inherited public predicates:

`generate/1` `generate/2` `generate/8` `timestamp/2` `timestamp/8`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➞ See also

`ulid`, `ulid_types`, `uuid(Representation)`, `uuid`, `ids`, `ids(Representation,Bytes)`

protocol

1.75.3 ulid_protocol

Universally Unique Lexicographically Sortable Identifier (ULID) generator protocol.

Availability:

```
logtalk_load(ulid(loader))
```

Author: Paulo Moura

Version: 1:0:0

Date: 2023-05-17

Compilation flags:

```
static
```

Dependencies:

```
(none)
```

Remarks:

```
(none)
```

Inherited public predicates:

```
(none)
```

- Public predicates
 - generate/1
 - generate/2
 - generate/8
 - timestamp/2
 - timestamp/8
- Protected predicates
- Private predicates
- Operators

Public predicates

`generate/1`

Generates a new ULID.

Compilation flags:
static

Template:
generate(ULID)
Mode and number of proofs:
generate(--ulid) - one

`generate/2`

Generates a new ULID from a timestamp (number of milliseconds since the Unix epoch: 00:00:00 UTC on January 1, 1970).

Compilation flags:
static

Template:
generate(Milliseconds,ULID)
Mode and number of proofs:
generate(+integer,--ulid) - one

`generate/8`

Generates a new ULID from a timestamp discrete components.

Compilation flags:
static

Template:
generate(Year,Month,Day,Hours,Minutes,Seconds,Milliseconds,ULID)
Mode and number of proofs:

generate(+integer,+integer,+integer,+integer,+integer,+integer,+integer,--ulid) - one

timestamp/2

Returns the given ULID timestamp (number of milliseconds since the Unix epoch: 00:00:00 UTC on January 1, 1970).

Compilation flags:

static

Template:

timestamp(ULID,Milliseconds)

Mode and number of proofs:

timestamp(++ulid,-integer) - one

timestamp/8

Decodes a ULID into its timestamp discrete components.

Compilation flags:

static

Template:

timestamp(ULID,Year,Month,Day,Hours,Minutes,Seconds,Milliseconds)

Mode and number of proofs:

timestamp(++ulid,-integer,-integer,-integer,-integer,-integer,-integer,-integer) - one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

category

1.75.4 ulid__types

ULID type definition.

Availability:

`logtalk__load(ulid(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2023-05-19

Compilation flags:

`static`

Provides:

`type::type/1`

`type::check/2`

Uses:

`list`

`type`

Remarks:

- Provided types: This category adds a `ulid(Representation)` type for type-checking when using the `ulid` library object. Valid representation values are `atom`, `chars`, and `codes`.

Inherited public predicates:

(none)

- Public predicates
- Protected predicates

- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`ulid(Representation), ulid`

1.76 union_find

object

1.76.1 union_find

Union find data structure implementation.

Availability:

`logtalk_load(union_find(loader))`

Author: José Antonio Riaza Valverde; adapted to Logtalk by Paulo Moura

Version: 1:0:0

Date: 2022-02-18

Compilation flags:

`static, context_switching_calls`

Implements:

public `union_find_protocol`

Extends:

public `compound`

Uses:

`avltree`

Remarks:

(none)

Inherited public predicates:

`(<)/2` `(:=)/2` `(=<)/2` `(=\=)/2` `(>)/2` `(>=)/2` `check/1` `depth/2` `disjoint_sets/2` `find/4`
`find/5` `ground/1` `make_set/3` `new/1` `new/2` `numbervars/1` `numbervars/3` `occurs/2` `singletons/2`
`subsumes/2` `subterm/2` `union/4` `union_all/3` `valid/1` `variables/2` `variant/2` `varnumbers/2`
`varnumbers/3`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

`protocol`

1.76.2 union_find_protocol

Union-find data structure protocol.

Availability:

```
logtalk_load(union_find(loader))
```

Author: José Antonio Ríaza Valverde; adapted to Logtalk by Paulo Moura

Version: 1:0:0

Date: 2022-02-17

Compilation flags:

```
static
```

Dependencies:

```
(none)
```

Remarks:

```
(none)
```

Inherited public predicates:

```
(none)
```

- Public predicates
 - new/2
 - make_set/3
 - union/4
 - union_all/3
 - find/4
 - find/5
 - disjoint_sets/2
- Protected predicates
- Private predicates
- Operators

Public predicates

`new/2`

Creates a new union-find data structure with a list of elements as keys.

Compilation flags:

`static`

Template:

`new(Elements,UnionFind)`

Mode and number of proofs:

`new(+list(element),?union_find) - zero_or_one`

`make_set/3`

Makes a new set by creating a new element with a unique key `Element`, a rank of 0, and a parent pointer to itself. The parent pointer to itself indicates that the element is the representative member of its own set.

Compilation flags:

`static`

Template:

`make_set(UnionFind,Element,NewUnionFind)`

Mode and number of proofs:

`make_set(+union_find,+element,?union_find) - zero_or_one`

`union/4`

Merges the two trees, if distinct, that contain the given elements. The trees are joined by attaching the shorter tree (by rank) to the root of the taller tree. Fails if any of the elements is not found.

Compilation flags:

`static`

Template:

`union(UnionFind,Element1,Element2,NewUnionFind)`

Mode and number of proofs:

`union(+union_find,+element,+element,?union_find) - zero_or_one`

`union_all/3`

Merges the distinct trees for all the given elements returning the resulting union-find data structure. Fails if any of the elements is not found.

Compilation flags:

`static`

Template:

`union_all(UnionFind,Elements,NewUnionFind)`

Mode and number of proofs:

`union_all(+union_find,+list(element),?union_find) - zero_or_one`

`find/4`

Finds the root element of a set by following the chain of parent pointers from the given element. Root is the representative member of the set to which the element belongs, and may be element itself. Fails if the element is not found.

Compilation flags:

`static`

Template:

`find(UnionFind,Element,Root,NewUnionFind)`

Mode and number of proofs:

`find(+union_find,+element,?element,?union_find) - zero_or_one`

Remarks:

- Path compression: The structure of the tree containing the element is flattened by making every node point to the root whenever this predicate is used on it.
-

find/5

Same as the find/4 predicate, but returning also the rank of the root. Fails if the element is not found.

Compilation flags:

static

Template:

find(UnionFind,Element,Root,Rank,UnionFindOut)

Mode and number of proofs:

find(+union_find,+element,?element,?rank,?union_find) - zero_or_one

Remarks:

- Path compression: The structure of the tree containing the element is flattened by making every node point to the root whenever this predicate is used on it.

disjoint_sets/2

Returns the list of disjoint sets in the given union-find data structure.

Compilation flags:

static

Template:

disjoint_sets(UnionFind,Sets)

Mode and number of proofs:

disjoint_sets(+union_find,?sets) - zero_or_one

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

➡ See also

[union_find](#)

1.77 uuid

object

1.77.1 uuid

Universally unique identifier (UUID) generator using an atom representation.

Availability:

`logtalk_load(uuid(loader))`

Author: Paulo Moura

Version: 0:2:0

Date: 2022-11-23

Compilation flags:

`static, context_switching_calls`

Extends:

`public uuid(atom)`

Remarks:

(none)

Inherited public predicates:

`random_node/1 uuid_null/1 uuid_v1/2 uuid_v4/1`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

 See also

`uuid(Representation)`, `ulid`, `ulid(Representation)`, `ids`, `ids(Representation,Bytes)`

object

1.77.2 `uuid(Representation)`

- Representation - Text representation for the UUID. Possible values are atom, chars, and codes.

Universally unique identifier (UUID) generator.

Availability:

`logtalk_load(uuid(loader))`

Author: Paulo Moura

Version: 0:5:0

Date: 2022-11-23

Compilation flags:

`static`, `context_switching_calls`

Implements:

public uuid_protocol

Uses:

fast_random

iso8601

list

os

Remarks:

(none)

Inherited public predicates:

random_node/1 uuid_null/1 uuid_v1/2 uuid_v4/1

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

➡ See also

uuid, ulid, ulid(Representation), ids, ids(Representation,Bytes)

protocol

1.77.3 uuid_protocol

Universally unique identifier (UUID) generator protocol.

Availability:

`logtalk_load(uuid(loader))`

Author: Paulo Moura

Version: 0:3:0

Date: 2021-03-13

Compilation flags:

`static`

Dependencies:

`(none)`

Remarks:

`(none)`

Inherited public predicates:

`(none)`

- Public predicates
 - `uuid_v1/2`
 - `uuid_v4/1`
 - `uuid_null/1`
 - `random_node/1`
- Protected predicates
- Private predicates
- Operators

Public predicates

`uuid_v1/2`

Returns a version 1 UUID for the given MAC address (a list of six bytes). The MAC address can be replaced by a random 6 bytes node identifier as per RFC 4122 when the MAC address is not available or should not be disclosed.

Compilation flags:

`static`

Template:

`uuid_v1(MAC,UUID)`

Mode and number of proofs:

`uuid_v1(+list(byte),--ground) - one`

`uuid_v4/1`

Returns a version 4 UUID.

Compilation flags:

`static`

Template:

`uuid_v4(UUID)`

Mode and number of proofs:

`uuid_v4(--ground) - one`

`uuid_null/1`

Returns the null UUID.

Compilation flags:

`static`

Template:

`uuid_null(UUID)`

Mode and number of proofs:

`uuid_null(--ground) - one`

`random_node/1`

Generates a list with six random bytes that can be used in alternative to a MAC address when generating version 1 UUIDs.

Compilation flags:

`static`

Template:

`random_node(Node)`

Mode and number of proofs:

`random_node(--list(byte)) - one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

1.78 verdi_neruda

object

1.78.1 `a_star_interpreter(W)`

A* interpreter for general logic programs. The parameter `W` is used to fine tune the behavior. `W = 0` gives us a breadth-first search and `W = 1` gives us a greedy best-first search. The default value for `W` is 0.5.

Availability:

```
logtalk_load(verdi_neruda(loader))
```

Author: Victor Lagerkvist

Version: 1:0:0

Date: 2010-06-13

Compilation flags:

```
static, context_switching_calls
```

Imports:

```
public best_first
```

Remarks:

```
(none)
```

Inherited public predicates:

```
prove/2 prove/3
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.2 benchmark_generators

Generates random data structures for use in benchmarks.

Availability:

logtalk_load(verdi_neruda(loader))

Author: Victor Lagerkvist

Version: 1:0:0

Date: 2010-06-13

Compilation flags:

static, context_switching_calls

Uses:

random

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - random_tree/1
- Protected predicates

- Private predicates
- Operators

Public predicates

`random_tree/1`

Generates a random tree.

Compilation flags:

`static`

Template:

`random_tree(Tree)`

Mode and number of proofs:

`random_tree(-tree) - one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

`category`

1.78.3 `best_first`

Best-first framework for general logic programs.

Availability:

`logtalk_load(verdi_neruda(loader))`

Author: Victor Lagerkvist

Version: 1:1:0
Date: 2019-03-08

Compilation flags:
static

Implements:
public `interpreterp`

Uses:
`counter`
`minheap`

Remarks:
(none)

Inherited public predicates:
`prove/2` `prove/3`

- Public predicates
- Protected predicates
 - `f/4`
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

`f/4`

.

Compilation flags:
static

Template:
`f(Length1,Length2,Depth,Cost)`

Mode and number of proofs:

`f(+float,+float,+float,-float) - zero_or_more`

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.4 bfs_interpreter

Breadth-first interpreter for general logic programs.

Availability:

`logtalk_load(verdi_neruda(loader))`

Author: Victor Lagerkvist

Version: 1:0:0

Date: 2010-06-13

Compilation flags:

`static, context_switching_calls`

Implements:

`public interpreterp`

Uses:

`counter`

`queue`

Remarks:

(none)

Inherited public predicates:

`prove/2 prove/3`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.5 `bup_interpreter`

Semi-naive bottom-up interpreter for general (stratified) logic programs. Magic transformation is realized through an expansion hook.

Availability:

```
logtalk_load(verdi_neruda(loader))
```

Author: Ulf Nilsson. Ported to Logtalk and augmented with negation by Victor Lagerkvist.

Version: 1:1:3

Date: 2023-11-30

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public interpreterp
```

Uses:

```
counter
```


list
magic
term

Remarks:

(none)

Inherited public predicates:

prove/2 prove/3

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.6 counter

Counter implemented with asserta/retract.

Availability:

logtalk_load(verdi_neruda(loader))

Author: Victor Lagerkvist

Version: 1:0:1
Date: 2022-10-08

Compilation flags:
static, context_switching_calls

Dependencies:
(none)

Remarks:
(none)

Inherited public predicates:
(none)

- Public predicates
 - increment/0
 - increase/1
 - set/1
 - value/1
 - reset/0
- Protected predicates
- Private predicates
 - c/1
- Operators

Public predicates

increment/0

Increment the counter by 1.

Compilation flags:
static

Mode and number of proofs:
increment - one

increase/1

Increments the counter by the specified amount.

Compilation flags:
static

Template:
increase(I)

Mode and number of proofs:
increase(+number) - one

set/1

Sets the counter to the specified amount.

Compilation flags:
static

Template:
set(N)

Mode and number of proofs:
set(+number) - one

value/1

Gets the current value of the counter.

Compilation flags:
static

Template:
value(N)

Mode and number of proofs:

value(?number) - one

reset/0

Resets the counter to zero.

Compilation flags:

static

Mode and number of proofs:

reset - one

Protected predicates

(none)

Private predicates

c/1

Stores the current value of the counter.

Compilation flags:

dynamic

Template:

c(N)

Mode and number of proofs:

c(?number) - zero_or_one

Operators

(none)

protocol

1.78.7 databasep

Database protocol.

Availability:

logtalk_load(verdi_neruda(loader))

Author: Victor Lagerkvist

Version: 1:0:0

Date: 2010-06-13

Compilation flags:

static

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - rule/4
 - rule/3
 - rule/2
 - bench_goal/1
- Protected predicates
- Private predicates
- Operators

Public predicates

rule/4

Clauses for this predicate are automatically generated using term-expansion. The third argument contains the length of Body.

Compilation flags:

static

Template:

rule(Head,Body,Length,Tail)

Mode and number of proofs:

rule(?callable,?callable,-,-) - zero_or_more

rule/3

Clauses for this predicate are automatically generated using term-expansion. The third argument denotes the tail of the Body.

Compilation flags:

static

Template:

rule(Head,Body,Tail)

Mode and number of proofs:

rule(?callable,?callable,-) - zero_or_more

rule/2

Clauses for this predicate are automatically generated using term-expansion.

Compilation flags:

static

Template:

rule(Head,Body)

Mode and number of proofs:

`rule(?callable,-list(callable)) - zero_or_more`

`bench_goal/1`

Table of benchmark goals. They are used from `shell.lgt` to make benchmarking easier.

Compilation flags:

`static`

Template:

`bench_goal(Goal)`

Mode and number of proofs:

`bench_goal(?callable) - zero_or_more`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

object

1.78.8 `debug_expansion`(Mode)

Expands `debug/1` calls. The parameter `Mode` can be either the atom “debug” or “production”.

Availability:

`logtalk_load(verdi_neruda(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2010-04-15

Compilation flags:

static, context_switching_calls

Implements:

public `expanding`

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2` `term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.9 demodb

Availability:

`logtalk_load(verdi_neruda(loader))`

Compilation flags:

`static, context_switching_calls`

Implements:

public `databasep`

Remarks:

(none)

Inherited public predicates:

`bench_goal/1 rule/2 rule/3 rule/4`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.10 dfs_interpreter

Depth-first interpreter for general logic programs.

Availability:

`logtalk_load(verdi_neruda(loader))`

Author: Victor Lagerkvist

Version: 1:0:0

Date: 2010-06-13

Compilation flags:

`static, context_switching_calls`

Implements:

`public interpreterp`

Uses:

`counter`

Remarks:

(none)

Inherited public predicates:

`prove/2 prove/3`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

category

1.78.11 flattening

Flattens conjunction of goals with the form `f and g` into a list `[f,g]`.

Availability:

`logtalk__load(verdi__neruda(loader))`

Author: Victor Lagerkvist

Version: 1:1:0

Date: 2025-10-06

Compilation flags:

`static`

source: Based on source code from The Craft of Prolog, by Richard O’Keefe.

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
- Protected predicates
 - `flatten_goals//1`
- Private predicates
- Operators

Public predicates

(none)

Protected predicates

`flatten_goals//1`

Flattens a conjunction of goals.

Compilation flags:

`static`

Template:

`flatten_goals(Conjunction)`

Mode and number of proofs:

`flatten_goals(+callable) - one`

Private predicates

(none)

Operators

(none)

object

1.78.12 heuristic_expansion(*Mode*)

Expands rules of the form *p* if *f* and *g* to rule(*p*, [*f,g*|*Tail*], *Length*, *Tail*).

Availability:

```
logtalk_load(verdi_neruda(loader))
```

Author: Victor Lagerkvist

Version: 1:0:2

Date: 2022-10-08

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public expanding
```

Extends:

```
public rule_expansion(Mode)
```

Uses:

```
list
```

Remarks:

```
(none)
```

Inherited public predicates:

```
goal_expansion/2 term_expansion/2
```

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.13 iddfs_interpreter(Increment)

Iterative deepening depth-first interpreter for general logic programs. Based on source code from The Craft of Prolog, by Richard O’Keefe. The default value for the increment is 1.

Availability:

`logtalk_load(verdi_neruda(loader))`

Author: Victor Lagerkvist

Version: 1:0:0

Date: 2010-06-13

Compilation flags:

`static, context_switching_calls`

Implements:

`public interpreterp`

Uses:

`counter`

`dfs_interpreter`

Remarks:

(none)

Inherited public predicates:

`prove/2 prove/3`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

protocol

1.78.14 interpreterp

Protocol for an interpreter.

Availability:

`logtalk_load(verdi_neruda(loader))`

Author: Victor Lagerkvist

Version: 1:0:0

Date: 2010-06-13

Compilation flags:

`static`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - prove/2
 - prove/3
- Protected predicates
- Private predicates
- Operators

Public predicates

prove/2

True if goal is provable in the specified database.

Compilation flags:

static

Template:

prove(Goal,DB)

Mode and number of proofs:

prove(+goal,+database) - zero_or_more

prove/3

True if goal is provable within the given depth-limit in the specified database.

Compilation flags:

static

Template:

prove(Goal,Limit,DB)

Mode and number of proofs:

prove(+goal,+limit,+database) - zero_or_more

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

object

1.78.15 magic

Object encapsulating magic methods.

Availability:

logtalk_load(verdi_neruda(loader))

Author: Ulf Nilsson. Ported to Logtalk and augmented with stratified negation by Victor Lagerkvist.

Version: 1:0:0

Date: 2010-06-13

Compilation flags:

static, context_switching_calls

Uses:

[list](#)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - `magicise/4`
 - `magic/2`
- Protected predicates
- Private predicates
- Operators

Public predicates

`magicise/4`

Transform `(Head :- Body)` into a magic clause `(NewHead :- NewBody)`.

Compilation flags:

`static`

Template:

`magicise(Head,Body,NewHead,NewBody)`

Mode and number of proofs:

`magicise(+term,+list,-term,-list) - zero_or_one`

`magic/2`

Prefix the predicate symbol of `Old` with `magic`.

Compilation flags:

`static`

Template:

`magic(Old,New)`

Mode and number of proofs:

`magic(+callable,-callable) - zero_or_one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.16 `magic_expansion`(Mode)

Expands rules of the form `p if f and g` to the more manageable rule(`p`, `[f,g]`) and performs magic transformation of clauses.

Availability:

`logtalk_load(verdi_neruda(loader))`

Author: Victor Lagerkvist

Version: 1:0:2

Date: 2022-10-08

Compilation flags:

`static, context_switching_calls`

Implements:

`public expanding`

Imports:

`public flatting`

Extends:

`public debug_expansion(Mode)`

Uses:

`list`

`magic`

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2 term_expansion/2`

- [Public predicates](#)
- [Protected predicates](#)
- [Private predicates](#)
- [Operators](#)

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.17 `rule_expansion`(Mode)

Expands rules of the form `p if f and g` to the more manageable rule(`p`, [`f,g`]).

Availability:

`logtalk_load(verdi_neruda(loader))`

Author: Victor Lagerkvist

Version: 1:0:2

Date: 2022-10-08

Compilation flags:

`static, context_switching_calls`

Implements:

public `expanding`

Imports:

public `flattening`

Extends:

`public debug_expansion(Mode)`

Remarks:

(none)

Inherited public predicates:

`goal_expansion/2 term_expansion/2`

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.18 shell

User frontend to start the application.

Availability:

`logtalk_load(verdi_neruda(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2019-03-20

Compilation flags:

static, context_switching_calls

Uses:

shell(Interpreters)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - welcome/0
 - start/0
- Protected predicates
- Private predicates
- Operators

Public predicates

welcome/0

Compilation flags:

static

start/0

Compilation flags:

static

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.19 shell(Interpreters)

Prolog shell for the interpreters.

Availability:

logtalk_load(verdi_neruda(loader))

Author: Victor Lagerkvist and Paulo Moura

Version: 1:1:3

Date: 2024-03-15

Compilation flags:

static, context_switching_calls

Uses:

counter

list

meta

pairs

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - init/0
- Protected predicates
- Private predicates
- Operators

Public predicates

init/0

Compilation flags:
static

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

object

1.78.20 shell_expansion(Mode)

Expansion object for the shell.

Availability:
logtalk_load(verdi_neruda(loader))

Author: Victor Lagerkvist

Version: 1:0:1

Date: 2022-10-08

Compilation flags:

static, context_switching_calls

Implements:

public expanding

Extends:

public rule_expansion(Mode)

Remarks:

(none)

Inherited public predicates:

goal_expansion/2 term_expansion/2

- Public predicates
- Protected predicates
- Private predicates
- Operators

Public predicates

(no local declarations; see entity ancestors if any)

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

1.79 wrapper

object

1.79.1 wrapper

Adviser tool for porting and wrapping plain Prolog applications.

Availability:

```
logtalk_load(wrapper(loader))
```

Author: Paulo Moura

Version: 0:12:3

Date: 2025-10-28

Compilation flags:

```
static, context_switching_calls
```

Implements:

```
public expanding
```

Provides:

```
logtalk::message_hook/4
```

```
logtalk::message_prefix_stream/4
```

```
logtalk::message_tokens//2
```

Uses:

```
logtalk
```

```
os
```

Remarks:

- `prolog_extensions(Extensions)` option: List of file name extensions used to recognize Prolog source files (default is `['.pl', '.pro', '.prolog']`).
- `logtalk_extension(Extension)` option: Logtalk file name extension to be used for the generated wrapper files (default is `'.lgt'`).
- `exclude_files(Files)` option: List of Prolog source files names to exclude (default is `[]`).
- `exclude_directories(Files)` option: List of sub-directory names to exclude (default is `[]`).
- `include_wrapped_files(Boolean)`: Generate include/1 directives for the wrapped Prolog source files (default is `true`).

Inherited public predicates:

```
goal_expansion/2 term_expansion/2
```

- Public predicates
 - rdirectory/2
 - rdirectory/1
 - directory/2
 - directory/1
 - directories/2
 - directories/1
 - files/2
 - files/1
 - file/2
 - file/1
 - save/1
 - save/0
 - default_option/1
 - default_options/1
- Protected predicates
- Private predicates
 - merge_options/2
 - predicate_called_but_not_defined_/2
 - object_predicate_called_/3
 - module_predicate_called_/3
 - unknown_predicate_called_/2
 - missing_predicate_directive_/3
 - non_standard_predicate_call_/2
 - dynamic_directive_/3
 - multifile_directive_/3
 - add_directive_before_entity_/2
 - add_directive_/2
 - add_directive_/3
 - remove_directive_/2
 - file_being_advised_/4
- Operators

Public predicates

`rdirectory/2`

Advises the user on missing directives for converting all plain Prolog files in a directory and its sub-directories to Logtalk objects using the specified options.

Compilation flags:

`static`

Template:

`rdirectory(Directory,Options)`

Mode and number of proofs:

`rdirectory(+atom,+list(compound)) - one`

`rdirectory/1`

Advises the user on missing directives for converting all plain Prolog files in a directory and its sub-directories to Logtalk objects using default options.

Compilation flags:

`static`

Template:

`rdirectory(Directory)`

Mode and number of proofs:

`rdirectory(+atom) - one`

`directory/2`

Advises the user on missing directives for converting all plain Prolog files in a directory to Logtalk objects using the specified options.

Compilation flags:

`static`

Template:

directory(Directory,Options)

Mode and number of proofs:

directory(+atom,+list(compound)) - one

directory/1

Advises the user on missing directives for converting all plain Prolog files in a directory to Logtalk objects using default options.

Compilation flags:

static

Template:

directory(Directory)

Mode and number of proofs:

directory(+atom) - one

directories/2

Advises the user on missing directives for converting all Prolog files in a set of directories to Logtalk objects using the specified options.

Compilation flags:

static

Template:

directories(Directories,Options)

Mode and number of proofs:

directories(+list(atom),+list(compound)) - one

directories/1

Advises the user on missing directives for converting all Prolog files in a set of directories to Logtalk objects using default options.

Compilation flags:

static

Template:

directories(Directories)

Mode and number of proofs:

directories(+list(atom)) - one

files/2

Advises the user on missing directives for converting a list of plain Prolog files to Logtalk objects using the specified options.

Compilation flags:

static

Template:

files(Files,Options)

Mode and number of proofs:

files(+list(atom),+list(compound)) - one

files/1

Advises the user on missing directives for converting a list of plain Prolog files to Logtalk objects using default options.

Compilation flags:

static

Template:

files(Files)

Mode and number of proofs:

files(+list(atom)) - one

file/2

Advises the user on missing directives for converting a plain Prolog file to Logtalk objects using the specified options.

Compilation flags:

static

Template:

file(File,Options)

Mode and number of proofs:

file(+atom,+list(compound)) - one

file/1

Advises the user on missing directives for converting a plain Prolog file to Logtalk objects using default options.

Compilation flags:

static

Template:

file(File)

Mode and number of proofs:

file(+atom) - one

save/1

Saves the generated wrapper objects (plus a loader file per directory) for all advised files using the specified options. The wrapper objects are saved to the same directories that contain the wrapped Prolog files.

Compilation flags:

static

Template:

save(Options)

Mode and number of proofs:

save(+list(compound)) - one

save/0

Saves the generated wrapper objects (plus a loader file per directory) for all advised files using default options. The wrapper objects are saved to the same directories that contain the wrapped Prolog files.

Compilation flags:

static

Mode and number of proofs:

save - one

default_option/1

Enumerates by backtracking the default options used when generating the wrapper objects.

Compilation flags:

static

Template:

default_option(DefaultOption)

Mode and number of proofs:

default_option(?compound) - zero_or_more

default_options/1

Returns a list of the default options used when generating the wrapper objects.

Compilation flags:

static

Template:

default_options(DefaultOptions)

Mode and number of proofs:

default_options(-list(compound)) - one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

merge_options/2

Merges the user options with the default options, returning the list of options used when generating the wrapper objects.

Compilation flags:

static

Template:

merge_options(UserOptions,Options)

Mode and number of proofs:

merge_options(+list(compound),-list(compound)) - one

`predicate_called_but_not_defined_/2`

Table of called object predicates that are not locally defined.

Compilation flags:

`dynamic`

Template:

`predicate_called_but_not_defined_(Object,Predicate)`

Mode and number of proofs:

`predicate_called_but_not_defined_(?atom,?predicate_indicator) - zero_or_more`

`object_predicate_called_/3`

Table of called object predicates.

Compilation flags:

`dynamic`

Template:

`object_predicate_called_(Object,Other,Predicate)`

Mode and number of proofs:

`object_predicate_called_(?atom,?atom,?predicate_indicator) - zero_or_more`

`module_predicate_called_/3`

Table of called module predicates.

Compilation flags:

`dynamic`

Template:

`module_predicate_called_(Object,Module,Predicate)`

Mode and number of proofs:

`module_predicate_called_(?atom,?atom,?predicate_indicator) - zero_or_more`

unknown_predicate_called_/2

Table of predicates called but not defined.

Compilation flags:

dynamic

Template:

unknown_predicate_called_(Object,Predicate)

Mode and number of proofs:

unknown_predicate_called_(?atom,?predicate_indicator) - zero_or_more

missing_predicate_directive_/3

Table of missing predicate directives.

Compilation flags:

dynamic

Template:

missing_predicate_directive_(Object,Directive,Predicate)

Mode and number of proofs:

missing_predicate_directive_(?atom,?predicate_indicator,?predicate_indicator) - zero_or_more

non_standard_predicate_call_/2

Table of called non-standard predicates.

Compilation flags:

dynamic

Template:

non_standard_predicate_call_(Object,Predicate)

Mode and number of proofs:

non_standard_predicate_call_(?atom,?predicate_indicator) - zero_or_more

`dynamic_directive_/3`

Table of declared dynamic predicates.

Compilation flags:

`dynamic`

Template:

`dynamic_directive_(Object,Line,Predicate)`

Mode and number of proofs:

`dynamic_directive_(?atom,?integer,?predicate_indicator) - zero_or_more`

`multifile_directive_/3`

Table of declared multifile predicates.

Compilation flags:

`dynamic`

Template:

`multifile_directive_(Object,Line,Predicate)`

Mode and number of proofs:

`multifile_directive_(?atom,?integer,?predicate_indicator) - zero_or_more`

`add_directive_before_entity_/2`

Table of directives to be added before the entity opening directive.

Compilation flags:

`dynamic`

Template:

`add_directive_before_entity_(Object,Directive)`

Mode and number of proofs:

`add_directive_before_entity_(?atom,?predicate_indicator) - zero_or_more`

`add_directive_/2`

Table of directives to be added.

Compilation flags:

`dynamic`

Template:

`add_directive_(Object,Directive)`

Mode and number of proofs:

`add_directive_(?atom,?predicate_indicator) - zero_or_more`

`add_directive_/3`

Table of directives to be added to complement existing directives.

Compilation flags:

`dynamic`

Template:

`add_directive_(Object,Directive,NewDirective)`

Mode and number of proofs:

`add_directive_(?atom,?predicate_indicator,?predicate_indicator) - zero_or_more`

`remove_directive_/2`

Table of directives to be removed.

Compilation flags:

`dynamic`

Template:

`remove_directive_(Object,Directive)`

Mode and number of proofs:

`remove_directive_(?atom,?predicate_indicator) - zero_or_more`

file_being_advised_/4

Table of files being advised are respective directories and names (basename without extension).

Compilation flags:

dynamic

Template:

file_being_advised__(File,Path,Directory,Name)

Mode and number of proofs:

file_being_advised__((?atom,?atom,?atom,?atom) - zero_or_more

Operators

(none)

1.80 xml_parser

object

1.80.1 xml

Bi-directional XML parser.

Availability:

logtalk_load(xml_parser(loader))

Author: John Fletcher; adapted to Logtalk by Paulo Moura.

Version: 3:9:0

Date: 2025-10-06

Copyright: Copyright (C) 2001-2005 Binding Time Limited, Copyright (C) 2005-2013 John Fletcher

License: This program is offered free of charge, as unsupported source code. You may use it, copy it, distribute it, modify it or sell it without restriction, but entirely at your own risk.

Compilation flags:

static, context_switching_calls

Uses:

list
term

Remarks:

- On-line documentation: https://binding-time.co.uk/index.php/Parsing_XML_with_Prolog
- Compliance: This XML parser supports a subset of XML suitable for XML Data and Worldwide Web applications. It is neither as strict nor as comprehensive as the XML 1.0 Specification mandates.
- Compliance-strictness: It is not as strict, because, while the specification must eliminate ambiguities, not all errors need to be regarded as faults, and some reasonable examples of real XML usage would have to be rejected if they were.
- Compliance-comprehensive: It is not as comprehensive, because, where the XML specification makes provision for more or less complete DTDs to be provided as part of a document, xml.pl actions the local definition of ENTITIES only. Other DTD extensions are treated as commentary.
- Bi-directional conversions: Conversions are not fully symmetrical as weaker XML is accepted than can be generated. Notably, in-bound (Codes -> Document) parsing does not require strictly well-formed XML. If Codes does not represent well-formed XML, Document is instantiated to the term malformed(<attributes>,<content>).

Inherited public predicates:

(none)

- Public predicates
 - parse/2
 - parse/3
 - subterm/2
 - pp/1
- Protected predicates
- Private predicates
 - xml_to_document/3
 - empty_map/1
 - map_member/3
 - map_store/4
 - pp_string/1
 - fault/5
 - exception/4
 - document_generation//2
 - pcddata_7bit//1

- character_data_format/3
- cdata_generation//1
- Operators

Public predicates

parse/2

Parses a list of character codes to/from a data structure of the form `xml(<atts>,<content>)`.

Compilation flags:

static

Template:

parse(Codes,Document)

Mode and number of proofs:

parse(+list(character_code),?nonvar) - zero_or_one

parse(?list(character_code),+nonvar) - zero_or_one

parse/3

Parses a list of character codes to/from a data structure of the form `xml(<atts>,<content>)` using the given list of options.

Compilation flags:

static

Template:

parse(Options,Codes,Document)

Mode and number of proofs:

parse(++list(compound),+list(character_code),?nonvar) - zero_or_one

parse(++list(compound),?list(character_code),+nonvar) - zero_or_one

Remarks:

- extended_characters(Boolean) option: Use the extended character entities for XHTML (default true).
- format(Boolean) option: For parsing, strip layouts when no character data appears between elements (default true). For generating, indent the element content (default true).

- `remove_attribute_prefixes(Boolean)` option: Remove namespace prefixes from attributes when it's the same as the prefix of the parent element (default false).
 - `allow_ampersand(Boolean)` option: Allow unescaped ampersand characters (&) to occur in PCDATA (default false).
-

`subterm/2`

Unifies Subterm with a sub-term of XMLTerm. Note that XMLTerm is a sub-term of itself.

Compilation flags:

`static`

Template:

`subterm(XMLTerm,Subterm)`

Mode and number of proofs:

`subterm(+nonvar,?nonvar) - zero_or_one`

`pp/1`

Pretty prints a XML document on the current output stream.

Compilation flags:

`static`

Template:

`pp(XMLDocument)`

Mode and number of proofs:

`pp(+nonvar) - zero_or_one`

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

`xml_to_document/3`

Translates the list of character codes XML into the Prolog term Document. Options is a list of terms controlling the treatment of layout characters and character entities.

Compilation flags:

static

Template:

`xml_to_document(Options,XML,Document)`

Mode and number of proofs:

`xml_to_document(+nonvar,+nonvar,?nonvar) - zero_or_one`

`empty_map/1`

True if Map is a null map.

Compilation flags:

static

Template:

`empty_map(Map)`

Mode and number of proofs:

`empty_map(?nonvar) - zero_or_one`

map_member/3

True if Map is a ordered map structure which records the pair Key-Data. Key must be ground.

Compilation flags:

static

Template:

map_member(Key,Map,Data)

Mode and number of proofs:

map_member(+nonvar,+nonvar,?nonvar) - zero_or_one

map_store/4

True if Map0 is an ordered map structure, Key must be ground, and Map1 is identical to Map0 except that the pair Key-Data is recorded by Map1.

Compilation flags:

static

Template:

map_store(Map0,Key,Data,Map1)

Mode and number of proofs:

map_store(+nonvar,+nonvar,+nonvar,?nonvar) - zero_or_one

pp_string/1

Prints String onto the current output stream. If String contains only 7-bit chars it is printed in shorthand quoted format, otherwise it is written as a list.

Compilation flags:

static

Template:

pp_string(String)

Mode and number of proofs:

pp_string(+nonvar) - zero_or_one

fault/5

Identifies SubTerm as a sub-term of Term which cannot be serialized after Indentation. Message is an atom naming the type of error; Path is a string encoding a list of SubTerm's ancestor elements in the form <tag>{(id)}* where <tag> is the element tag and <id> is the value of any attribute __named__ id.

Compilation flags:

static

Template:

fault(Term,Indentation,SubTerm,Path,Message)

Mode and number of proofs:

fault(+nonvar,+nonvar,?nonvar,?nonvar,?nonvar) - zero_or_one

exception/4

Hook to raise an exception to be raised in respect of a fault in the XML Term Document.

Compilation flags:

static

Template:

exception(Message,Document,Culprit,Path)

Mode and number of proofs:

exception(+atom,+nonvar,+nonvar,+nonvar) - one

document_generation//2

DCG generating Document as a list of character codes. Format is true|false defining whether layouts, to provide indentation, should be added between the element content of the resultant "string". Note that formatting is disabled for elements that are interspersed with pcdatalog/1 terms, such as XHTML's 'inline' elements. Also, Format is over-ridden, for an individual element, by an explicit 'xml:space'="preserve" attribute.

Compilation flags:

static

Template:

document_generation(Format,Document)

Mode and number of proofs:

document_generation(+nonvar,+nonvar) - zero_or_one

pcdata_7bit//1

Represents the ASCII character set in its simplest format, using the character entities &, ", <, and > which are common to both XML and HTML. The numeric entity ' is used in place of ' because browsers don't recognize it in HTML.

Compilation flags:

static

Template:

pcdata_7bit(Code)

Mode and number of proofs:

pcdata_7bit(?nonvar) - zero_or_one

character_data_format/3

Holds when Format0 and Format1 are the statuses of XML formatting before and after Codes - which may be null.

Compilation flags:

static

Template:

character_data_format(Codes,Format0,Format1)

Mode and number of proofs:

character_data_format(+nonvar,+nonvar,?nonvar) - zero_or_one

`cdata_generation//1`

Holds when `Format0` and `Format1` are the statuses of XML formatting before and after `Codes` - which may be null.

Compilation flags:

`static`

Template:

`cdata_generation(Codes)`

Mode and number of proofs:

`cdata_generation(+list) - zero_or_one`

Operators

(none)

1.81 zippers

protocol

1.81.1 zipperp

Zipper protocol.

Availability:

`logtalk_load(zippers(loader))`

Author: Paulo Moura

Version: 1:0:0

Date: 2019-01-20

Compilation flags:

`static`

Dependencies:

(none)

Remarks:

(none)

Inherited public predicates:

(none)

- Public predicates
 - zip/2
 - zip/3
 - unzip/2
 - current/2
 - next/2
 - next/3
 - previous/2
 - previous/3
 - rewind/2
 - rewind/3
 - forward/2
 - forward/3
 - apply/2
 - insert_before/3
 - insert_after/3
 - replace/3
 - delete_and_previous/2
 - delete_and_next/2
 - delete_and_unzip/2
 - delete_all_before/2
 - delete_all_before_and_unzip/2
 - delete_all_after/2
 - delete_all_after_and_unzip/2
- Protected predicates
- Private predicates
- Operators

Public predicates

zip/2

Adds a zipper to a compound term holding a sequence of elements. Fails if the sequence is empty.

Compilation flags:

static

Template:

zip(Sequence,Zipper)

Mode and number of proofs:

zip(+sequence,--zipper) - zero_or_one

zip/3

Adds a zipper to a compound term holding a sequence of elements. Also returns the first element. Fails if the sequence is empty.

Compilation flags:

static

Template:

zip(Sequence,Zipper,First)

Mode and number of proofs:

zip(+sequence,--zipper,--term) - zero_or_one

unzip/2

Removes a zipper from a sequence.

Compilation flags:

static

Template:

unzip(Zipper,Sequence)

Mode and number of proofs:

`unzip(@zipper,--sequence) - one`

`current/2`

Current element.

Compilation flags:
static

Template:

`current(Zipper,Current)`

Mode and number of proofs:

`current(+zipper,?term) - zero_or_one`

`next/2`

Moves to the next element. Fails if already at the last elements.

Compilation flags:
static

Template:

`next(Zipper,NewZipper)`

Mode and number of proofs:

`next(+zipper,--zipper) - zero_or_one`

`next/3`

Moves to and returns the next element. Fails if already at the last elements.

Compilation flags:
static

Template:

```
next(Zipper,NewZipper,Next)
```

Mode and number of proofs:

```
next(+zipper,--zipper,-term) - zero_or_one
```

[previous/2](#)

Moves to the previous element. Fails if already at the first elements.

Compilation flags:

```
static
```

Template:

```
previous(Zipper,NewZipper)
```

Mode and number of proofs:

```
previous(+zipper,--zipper) - zero_or_one
```

[previous/3](#)

Moves to and returns the previous element. Fails if already at the first element.

Compilation flags:

```
static
```

Template:

```
previous(Zipper,NewZipper,Previous)
```

Mode and number of proofs:

```
previous(+zipper,--zipper,-term) - zero_or_one
```

rewind/2

Rewinds the zipper so that the first element becomes the current element.

Compilation flags:

static

Template:

rewind(Zipper,NewZipper)

Mode and number of proofs:

rewind(+zipper,--zipper) - one

rewind/3

Rewinds the zipper so that the first element becomes the current element. Also returns the first element.

Compilation flags:

static

Template:

rewind(Zipper,NewZipper,First)

Mode and number of proofs:

rewind(+zipper,--zipper,?term) - zero_or_one

forward/2

Forward the zipper so that the last element becomes the current element.

Compilation flags:

static

Template:

forward(Zipper,NewZipper)

Mode and number of proofs:

forward(+zipper,--zipper) - one

forward/3

Forward the zipper so that the last element becomes the current element. Also returns the last element.

Compilation flags:

static

Template:

forward(Zipper,NewZipper,Last)

Mode and number of proofs:

forward(+zipper,--zipper,?term) - zero_or_one

apply/2

Applies a closure to the current element.

Compilation flags:

static

Template:

apply(Closure,Zipper)

Meta-predicate template:

apply(1,*)

Mode and number of proofs:

apply(+callable,+zipper) - zero_or_more

insert_before/3

Inserts an element before the current one.

Compilation flags:

static

Template:

insert_before(Zipper,Element,NewZipper)

Mode and number of proofs:

insert_before(+zipper,?term,--zipper) - zero_or_one

`insert_after/3`

Inserts an element after the current one.

Compilation flags:

`static`

Template:

`insert_after(Zipper,Element,NewZipper)`

Mode and number of proofs:

`insert_after(+zipper,?term,--zipper) - zero_or_one`

`replace/3`

Replaces the current element with a new element.

Compilation flags:

`static`

Template:

`replace(Zipper,NewCurrent,NewZipper)`

Mode and number of proofs:

`replace(+zipper,?term,--zipper) - one`

`delete_and_previous/2`

Deletes the current element and moves to the previous element. Fails if no previous element exists.

Compilation flags:

`static`

Template:

`delete_and_previous(Zipper,NewZipper)`

Mode and number of proofs:

`delete_and_previous(+zipper,--zipper) - zero_or_one`

`delete_and_next/2`

Deletes the current element and moves to the next element. Fails if no next element exists.

Compilation flags:

`static`

Template:

`delete_and_next(Zipper,NewZipper)`

Mode and number of proofs:

`delete_and_next(+zipper,--zipper) - zero_or_one`

`delete_and_unzip/2`

Deletes the current element and removes the zipper returning the resulting sequence.

Compilation flags:

`static`

Template:

`delete_and_unzip(Zipper,Sequence)`

Mode and number of proofs:

`delete_and_unzip(+zipper,--sequence) - one`

`delete_all_before/2`

Deletes all elements before the current element.

Compilation flags:

`static`

Template:

```
delete_all_before(Zipper,NewZipper)
```

Mode and number of proofs:

```
delete_all_before(+zipper,--zipper) - one
```

```
delete_all_before_and_unzip/2
```

Deletes all elements before the current element and removes the zipper returning the resulting sequence.

Compilation flags:

```
static
```

Template:

```
delete_all_before_and_unzip(Zipper,NewZipper)
```

Mode and number of proofs:

```
delete_all_before_and_unzip(+zipper,--sequence) - one
```

```
delete_all_after/2
```

Deletes all elements after the current element.

Compilation flags:

```
static
```

Template:

```
delete_all_after(Zipper,NewZipper)
```

Mode and number of proofs:

```
delete_all_after(+zipper,--zipper) - one
```

`delete_all_after_and_unzip/2`

Deletes all elements after the current element and removes the zipper returning the resulting sequence.

Compilation flags:

`static`

Template:

`delete_all_after_and_unzip(Zipper,NewZipper)`

Mode and number of proofs:

`delete_all_after_and_unzip(+zipper,--sequence) - one`

Protected predicates

(none)

Private predicates

(none)

Operators

(none)

 See also

[zlist](#)

object

1.81.2 `zlist`

Zipper list predicates. Zippers should be regarded as opaque terms.

Availability:

`logtalk_load(zippers(loader))`

Author: Paulo Moura

Version: 1:0:1

Date: 2019-03-12

Compilation flags:

static, context_switching_calls

Implements:

public zipperp

Remarks:

(none)

Inherited public predicates:

apply/2 current/2 delete_all_after/2 delete_all_after_and_unzip/2 delete_all_before/2
 delete_all_before_and_unzip/2 delete_and_next/2 delete_and_previous/2 delete_and_unzip/2
 forward/2 forward/3 insert_after/3 insert_before/3 next/2 next/3 previous/2 previous/3
 replace/3 rewind/2 rewind/3 unzip/2 zip/2 zip/3

- Public predicates
 - zip_at_index/4
- Protected predicates
- Private predicates
- Operators

Public predicates

zip_at_index/4

Adds a zipper to a list opened at the given index and also returns the element at the index. Fails if the list is empty or the index (starting at 1) does not exist.

Compilation flags:

static

Template:

zip_at_index(Index,List,Zipper,Element)

Mode and number of proofs:

zip_at_index(+natural,+list,--zipper,--term) - zero_or_one

Protected predicates

(no local declarations; see entity ancestors if any)

Private predicates

(no local declarations; see entity ancestors if any)

Operators

(none)

DIRECTORIES

To load an entity, always load the library that includes it using the goal `logtalk__load(library__name(loader))` instead of using its path. The library loader file ensures that all the required dependencies are also loaded and that any required flags are used. The loading goal can be found in the entity documentation.

2.1 contributions/flags/

2.2 contributions/iso8601/

2.3 contributions/pddl_parser/

2.4 contributions/verdi_neruda/

2.5 contributions/xml_parser/

2.6 core/

2.7 library/

2.8 library/arbitrary/

2.9 library/assignvars/

2.10 library/base64/

2.11 library/cbor/

2.12 library/ccsds/

2.13 library/coroutining/

2.14 library/csv/

2.15 library/dates/

2.16 library/dependents/

2.17 library/dictionaries/

2.18 library/dif/

2.19 library/edcg/

2.20 library/events/

2.1. contributions/flags/

2.21 library/expand_library_alias_paths/

ENTITIES

To load an entity, always load the library that includes it using the goal `logtalk__load(library__name(loader))` instead of loading just the entity. The library loader file ensures that all the required dependencies are also loaded and that any required flags are used. The loading goal can be found in the entity documentation.

3.1 Categories

3.2 Objects

3.3 Protocols

PREDICATES

This index lists all entities declaring a given predicate. To load an entity providing the predicate that you want to call, always load the library that includes it using the goal `logtalk_load(library_name(loader))` instead of loading just the entity. The library loader file ensures that all the required dependencies are also loaded and that any required flags are used. The loading goal can be found in the entity documentation.

4.1 `(/)/2`

- `help`

4.2 `(//)/2`

- `help`

4.3 `(<)/2`

- `comparingp`

4.4 `(<=)/2`

- `assignvarsp`
- `streamvars`

4.5 `(:=)/2`

- `comparingp`

4.6 ($=<$)/2

- `comparingp`

4.7 ($=>$)/2

- `assignvarsp`
- `streamvars`

4.8 ($=\backslash=$)/2

- `comparingp`

4.9 $=\sim=$ / 2

- `lgtunit`
- `number`

4.10 ($>$)/2

- `comparingp`

4.11 ($>=$)/2

- `comparingp`

4.12 `absolute_file_name`/2

- `osp`

4.13 `activate_debug_handler`/1

- `logtalk`

4.14 activate_monitor/0

- monitorp

4.15 active_debug_handler/1

- logtalk

4.16 add/1

- registries

4.17 add/2

- registries

4.18 add/3

- difflist
- registries

4.19 addDependent/1

- subject

4.20 after/2

- intervalp

4.21 after/3

- monitoring

4.22 all/0

- `code_metric`
- `dead_code_scanner`
- `lgtdocp`

4.23 all/1

- `code_metric`
- `dead_code_scanner`
- `lgtdocp`

4.24 all_files/0

- `diagram(Format)`
- `diagrams(Format)`

4.25 all_files/1

- `diagram(Format)`
- `diagrams(Format)`

4.26 all_libraries/0

- `diagram(Format)`
- `diagrams(Format)`

4.27 all_libraries/1

- `diagram(Format)`
- `diagrams(Format)`

4.28 all_score/1

- code_metric

4.29 ancestor/1

- hierarchyp

4.30 ancestors/1

- hierarchyp

4.31 apid/2

- ccstds(SecondaryHeaderLength)

4.32 apis/0

- help

4.33 apis/1

- help

4.34 append/2

- listp

4.35 append/3

- listp
- queuep
- varlistp

4.36 apply/2

- zipperp

4.37 apply/4

- dictionaryp

4.38 approximately_equal/2

- lgtunit
- number

4.39 approximately_equal/3

- lgtunit
- number

4.40 arbitrary/1

- arbitrary

4.41 arbitrary/2

- arbitrary

4.42 archive/1

- registry_protocol

4.43 arithmetic_mean/2

- statisticsp

4.44 array_list/2

- java_utils_protocol

4.45 array_to_list/2

- java_utils_protocol

4.46 array_to_terms/2

- java_utils_protocol

4.47 array_to_terms/3

- java_utils_protocol

4.48 as_curly_bracketed/2

- dictionaryp
- nested_dictionary_protocol

4.49 as_dictionary/2

- dictionaryp

4.50 as_difflist/2

- list

4.51 as_heap/2

- heapp

4.52 as_list/2

- dictionaryp
- difflist
- heapp
- queuep
- setp

4.53 as_nested_dictionary/2

- nested_dictionary_protocol

4.54 as_set/2

- setp

4.55 ask_question/5

- logtalk

4.56 assertion/1

- assertions(Mode)
- lgtunit

4.57 assertion/2

- assertions(Mode)
- lgtunit

4.58 assignable/1

- assignvarsp

4.59 assignable/2

- assignvarsp

4.60 available/0

- packs

4.61 available/1

- packs

4.62 available/2

- packs

4.63 average/2

- numberlistp

4.64 average_deviation/3

- statisticsp

4.65 before/2

- intervalp

4.66 before/3

- monitoring

4.67 bench_goal/1

- databasep

4.68 benchmark/2

- lgtunit

4.69 benchmark/3

- lgtunit

4.70 benchmark/4

- lgtunit

4.71 benchmark_reified/3

- lgtunit

4.72 bernoulli/2

- sampling_protocol

4.73 beta/3

- sampling_protocol

4.74 between/3

- integer
- random_protocol

4.75 between/4

- float

4.76 binomial/3

- sampling_protocol

4.77 bit//1

- number_grammars(Format)

4.78 bits//1

- number_grammars(Format)

4.79 blank//0

- blank_grammars(Format)

4.80 blanks//0

- blank_grammars(Format)

4.81 body_pred/1

- metagol

4.82 branch/2

- git_protocol

4.83 built_in_directive/4

- help

4.84 built_in_flag/2

- flags

4.85 built_in_method/4

- help

4.86 built_in_non_terminal/4

- help

4.87 built_in_predicate/4

- help

4.88 calendar_month/3

- iso8601

4.89 call_with_timeout/2

- timeout

4.90 call_with_timeout/3

- timeout

4.91 cat/2

- maybe

4.92 change_directory/1

- osp

4.93 changed/0

- subject

4.94 changed/1

- subject

4.95 chebyshev_distance/3

- numberlistp

4.96 chebyshev_norm/2

- numberlistp

4.97 check/1

- term
- varlistp

4.98 check/2

- type

4.99 check/3

- type

4.100 check_option/1

- options_protocol

4.101 check_options/1

- options_protocol

4.102 chi_squared/2

- sampling_protocol

4.103 chr_is/2

- toychrdb

4.104 chr_no_spy/1

- toychrdb

4.105 chr_nospy/0

- toychrdb

4.106 chr_notrace/0

- toychrdb

4.107 chr_option/2

- toychrdb

4.108 chr_spy/1

- toychrdb

4.109 chr_trace/0

- toychrdb

4.110 circular_uniform_cartesian/3

- sampling_protocol

4.111 circular_uniform_polar/3

- sampling_protocol

4.112 class/1

- class_hierarchy

4.113 classes/1

- class_hierarchy

4.114 clause/5

- ports_profiler

4.115 clause_location/6

- ports_profiler

4.116 clean/0

- packs
- registries

4.117 clean/1

- packs
- registries

4.118 clean/2

- packs

4.119 clone/1

- cloning
- registry_protocol

4.120 clone/3

- dictionaryp

4.121 clone/4

- dictionaryp

4.122 coefficient_of_variation/2

- statisticsp

4.123 command_line_arguments/1

- osp

4.124 commit_author/2

- git_protocol

4.125 commit_date/2

- git_protocol

4.126 commit_hash/2

- git_protocol

4.127 commit_hash_abbreviated/2

- git_protocol

4.128 commit_log/3

- git_protocol

4.129 commit_message/2

- git_protocol

4.130 compile_aux_clauses/1

- logtalk

4.131 compile_predicate_heads/4

- logtalk

4.132 compile_predicate_indicators/3

- logtalk

4.133 completion/2

- help

4.134 completions/2

- help

4.135 connect/1

- redis

4.136 connect/3

- redis

4.137 console/1

- redis

4.138 contains/2

- intervalp

4.139 control//0

- blank_grammars(Format)

4.140 control_construct/4

- help

4.141 controls//0

- blank_grammars(Format)

4.142 copy_file/2

- osp

4.143 counter/2

- counters
- mutations_store

4.144 cover/1

- lgtunit

4.145 cpu_time/1

- osp
- timep

4.146 current/2

- zipperp

4.147 data/0

- ports__profiler

4.148 data/1

- ports__profiler

4.149 data/2

- ports__profiler

4.150 data_length/2

- ccstds(SecondaryHeaderLength)

4.151 date/4

- iso8601

4.152 date/5

- iso8601

4.153 date/6

- iso8601

4.154 date/7

- iso8601

4.155 date_string/3

- iso8601

4.156 date_time/7

- osp

4.157 days_in_month/3

- datep

4.158 deactivate_debug_handler/0

- logtalk

4.159 debug/0

- debuggerp

4.160 debug_handler/1

- logtalk

4.161 debug_handler/3

- logtalk

4.162 debugging/0

- debuggerp

4.163 debugging/1

- debuggerp

4.164 decide/1

- fcube

4.165 decide/2

- fcube

4.166 decode_exception/2

- java_utils_protocol

4.167 decode_exception/3

- java_utils_protocol

4.168 decompile_predicate_heads/4

- logtalk

4.169 decompile_predicate_indicators/4

- logtalk

4.170 `decompose__file__name/3`

- `osp`

4.171 `decompose__file__name/4`

- `osp`

4.172 `decrement__counter/1`

- `counters`

4.173 `default__option/1`

- `options__protocol`
- `wrapper`

4.174 `default__options/1`

- `options__protocol`
- `wrapper`

4.175 `define__log__file/2`

- `loggingp`

4.176 `defined/4`

- `registries`

4.177 `defined__flag/6`

- `flags`

4.178 del_monitors/0

- event_registry

4.179 del_monitors/4

- event_registry

4.180 del_spy_points/4

- monitor

4.181 delete/0

- registries

4.182 delete/1

- registries

4.183 delete/2

- registries

4.184 delete/3

- list
- set
- varlist

4.185 delete/4

- dictionary
- heap

4.186 delete__all__after/2

- zipperp

4.187 delete__all__after__and__unzip/2

- zipperp

4.188 delete__all__before/2

- zipperp

4.189 delete__all__before__and__unzip/2

- zipperp

4.190 delete__and__next/2

- zipperp

4.191 delete__and__previous/2

- zipperp

4.192 delete__and__unzip/2

- zipperp

4.193 delete__directory/1

- osp

4.194 delete_directory_and_contents/1

- osp

4.195 delete_directory_contents/1

- osp

4.196 delete_file/1

- osp

4.197 delete_in/4

- nested_dictionary_protocol

4.198 delete_matches/3

- listp

4.199 delete_max/4

- dictionaryp

4.200 delete_min/4

- dictionaryp

4.201 depends/1

- packs
- subject

4.202 dependents/2

- packs

4.203 dependents/3

- packs

4.204 depth/2

- term_p

4.205 descendant/1

- hierarchyp

4.206 descendant_class/1

- class_hierarchyp

4.207 descendant_classes/1

- class_hierarchyp

4.208 descendant_instance/1

- class_hierarchyp

4.209 descendant_instances/1

- class_hierarchyp

4.210 descendants/1

- `hierarchyp`

4.211 describe/1

- `packs`
- `registries`

4.212 describe/2

- `packs`

4.213 description/1

- `pack_protocol`
- `registry_protocol`

4.214 deterministic/1

- `lgtunit`

4.215 deterministic/2

- `lgtunit`

4.216 diagram_description/1

- `diagram(Format)`

4.217 diagram_name_suffix/1

- `diagram(Format)`

4.218 dif/1

- coroutining
- dif

4.219 dif/2

- coroutining
- dif

4.220 digit//1

- number_grammars(Format)

4.221 digits//1

- number_grammars(Format)

4.222 directories/1

- lgtdocp
- wrapper

4.223 directories/2

- diagram(Format)
- diagrams(Format)
- lgtdocp
- wrapper

4.224 directories/3

- diagram(Format)
- diagrams(Format)

4.225 directory/1

- `code__metric`
- `dead__code__scanner`
- `diagram(Format)`
- `diagrams(Format)`
- `lgtdocp`
- `packs__common`
- `wrapper`

4.226 directory/2

- `code__metric`
- `dead__code__scanner`
- `diagram(Format)`
- `diagrams(Format)`
- `lgtdocp`
- `packs__common`
- `wrapper`

4.227 directory/3

- `diagram(Format)`
- `diagrams(Format)`

4.228 directory__exists/1

- `osp`

4.229 directory__files/2

- `osp`

4.230 directory_files/3

- osp

4.231 directory_score/2

- code_metric

4.232 dirichlet/2

- sampling_protocol

4.233 disable/1

- debug_messages

4.234 disable/2

- debug_messages

4.235 disable_logging/1

- loggingp

4.236 disconnect/1

- redis

4.237 disjoint/2

- setp

4.238 disjoint_sets/2

- union_find_protocol

4.239 doc_goal/1

- doclet

4.240 dot//1

- number_grammars(Format)

4.241 dowhile/2

- loopp

4.242 drop/3

- listp

4.243 during/2

- intervalp

4.244 easter_day/3

- iso8601

4.245 edge/6

- graph_language_protocol

4.246 edge_case/2

- arbitrary

4.247 either/3

- expected(Expected)

4.248 empty/1

- dictionaryp
- heapp
- listp
- nested_dictionary_protocol
- optional
- queuep
- setp
- varlistp

4.249 enable/1

- debug_messages

4.250 enable/2

- debug_messages

4.251 enable_logging/1

- loggingp

4.252 enabled/1

- debug_messages

4.253 enabled/2

- debug_messages

4.254 ensure_directory/1

- osp

4.255 ensure_file/1

- osp

4.256 entity/1

- code_metric
- dead_code_scanner
- help
- xref_diagram(Format)

4.257 entity/2

- xref_diagram(Format)

4.258 entity_info_pair_score_hook/3

- doc_metric

4.259 entity_info_score_hook/2

- doc_metric

4.260 entity_predicates_weights_hook/2

- doc_metric

4.261 entity_prefix/2

- logtalk

4.262 entity_score/2

- code_metric

4.263 enumerate/2

- random_protocol

4.264 environment_variable/2

- osp

4.265 epsilon/1

- lgtunit

4.266 equal/2

- intervalp
- setp

4.267 erase/1

- recorded_database_core

4.268 essentially_equal/3

- lgtunit
- number

4.269 euclidean_distance/3

- numberlistp

4.270 euclidean_norm/2

- numberlistp

4.271 exclude/3

- metap

4.272 execution_context/7

- logtalk

4.273 expand_library_path/2

- logtalk

4.274 expected/1

- expected(Expected)

4.275 expecteds/2

- either

4.276 explain//1

- tutor

4.277 exponential/2

- sampling_protocol

4.278 extension/1

- proto_hierarchy

4.279 extensions/1

- proto_hierarchy

4.280 failed_test_reason//1

- lgtunit_messages

4.281 false/1

- java_utils_protocol

4.282 fcube/0

- fcube

4.283 file/1

- `code_metric`
- `dead_code_scanner`
- `entity_diagram(Format)`
- `lgtdocp`
- `wrapper`

4.284 file/2

- `code_metric`
- `dead_code_scanner`
- `entity_diagram(Format)`
- `lgtdocp`
- `wrapper`

4.285 file_exists/1

- `osp`

4.286 file_footer/3

- `graph_language_protocol`

4.287 file_header/3

- `graph_language_protocol`

4.288 file_modification_time/2

- `osp`

4.289 file__permission/2

- osp

4.290 file__score/2

- code__metric

4.291 file__size/2

- osp

4.292 file__to__bytes/2

- reader

4.293 file__to__bytes/3

- reader

4.294 file__to__chars/2

- reader

4.295 file__to__chars/3

- reader

4.296 file__to__codes/2

- reader

4.297 file_to_codes/3

- reader

4.298 file_to_terms/2

- reader

4.299 file_to_terms/3

- reader

4.300 file_type_extension/2

- logtalk

4.301 files/1

- diagram(Format)
- diagrams(Format)
- lgtdocp
- wrapper

4.302 files/2

- diagram(Format)
- diagrams(Format)
- lgtdocp
- wrapper

4.303 files/3

- diagram(Format)
- diagrams(Format)

4.304 filter/2

- optional(Optional)

4.305 find/4

- union_find_protocol

4.306 find/5

- union_find_protocol

4.307 findall_member/4

- metap

4.308 findall_member/5

- metap

4.309 finished_by/2

- intervalp

4.310 finishes/2

- intervalp

4.311 fisher/3

- sampling_protocol

4.312 `flag_group_chk/1`

- `flags`

4.313 `flag_groups/1`

- `flags`

4.314 `flat_map/2`

- `expected(Expected)`
- `optional(Optional)`

4.315 `flatten/2`

- `listp`
- `varlistp`

4.316 `float//1`

- `number_grammars(Format)`

4.317 `fold_left/4`

- `metap`

4.318 `fold_left_1/3`

- `metap`

4.319 `fold_right/4`

- `metap`

4.320 fold_right_1/3

- metap

4.321 fordownto/3

- looppp

4.322 fordownto/4

- looppp

4.323 fordownto/5

- looppp

4.324 foreach/3

- looppp

4.325 foreach/4

- looppp

4.326 format/2

- format

4.327 format/3

- format

4.328 `format_entity_score//2`

- `code_metric`

4.329 `format_object/1`

- `diagram(Format)`

4.330 `format_to_atom/3`

- `term_io_protocol`

4.331 `format_to_chars/3`

- `term_io_protocol`

4.332 `format_to_chars/4`

- `term_io_protocol`

4.333 `format_to_codes/3`

- `term_io_protocol`

4.334 `format_to_codes/4`

- `term_io_protocol`

4.335 `forto/3`

- `loopp`

4.336 forto/4

- loopp

4.337 forto/5

- loopp

4.338 forward/1

- forwarding

4.339 forward/2

- zipperp

4.340 forward/3

- zipperp

4.341 fractile/3

- statisticsp

4.342 freeze/2

- coroutining

4.343 from_generator/2

- expected
- optional

4.344 from_generator/3

- expected
- optional

4.345 from_generator/4

- expected

4.346 from_goal/2

- expected
- optional

4.347 from_goal/3

- expected
- optional

4.348 from_goal/4

- expected

4.349 frozen/2

- coroutining

4.350 full_device_path/1

- osp

4.351 func_test/3

- metagol

4.352 functional/0

- metagol

4.353 gamma/3

- sampling_protocol

4.354 generate/1

- ids(Representation,Bytes)
- ulid_protocol

4.355 generate/2

- base64
- base64url
- cbor(StringRepresentation)
- ccstds(SecondaryHeaderLength)
- html
- json_lines_protocol
- json_protocol
- toon_protocol
- ulid_protocol

4.356 generate/3

- ccstds(SecondaryHeaderLength)

4.357 generate/8

- `ulid_protocol`

4.358 genint/2

- `genint_core`

4.359 gensym/2

- `gensym_core`

4.360 geometric/2

- `sampling_protocol`

4.361 geometric_mean/2

- `statisticsp`

4.362 get/1

- `optional(Optional)`

4.363 get_field/2

- `java_access_protocol`

4.364 get_flag_value/2

- `flags`

4.365 get_seed/1

- arbitrary
- pseudo_random_protocol

4.366 gnu/0

- fcube

4.367 goal_expansion/2

- expanding

4.368 graph_footer/5

- graph_language_protocol

4.369 graph_header/5

- graph_language_protocol

4.370 ground/1

- term

4.371 group_by_key/2

- pairs

4.372 group_consecutive_by_key/2

- pairs

4.373 group_sorted_by_key/2

- pairs

4.374 guess_arity/2

- csv_protocol

4.375 guess_separator/2

- csv_protocol

4.376 gumbel/3

- sampling_protocol

4.377 hamming_distance/3

- listp

4.378 handbook/0

- help

4.379 harmonic_mean/2

- statisticsp

4.380 head/2

- queuep

4.381 head_pred/1

- metagol

4.382 help/0

- help
- packs_common

4.383 hex_digit//1

- number_grammars(Format)

4.384 hex_digits//1

- number_grammars(Format)

4.385 home/1

- pack_protocol
- registry_protocol

4.386 hypergeometric/4

- sampling_protocol

4.387 ibk/3

- metagol

4.388 if_empty/1

- optional(Optional)

4.389 if_expected/1

- expected(Expected)

4.390 if_expected_or_else/2

- expected(Expected)

4.391 if_present/1

- optional(Optional)

4.392 if_present_or_else/2

- optional(Optional)

4.393 if_unexpected/1

- expected(Expected)

4.394 include/3

- metap

4.395 increase/1

- counter

4.396 increment/0

- counter

4.397 increment_counter/1

- counters

4.398 init/0

- shell(Interpreters)

4.399 init_log_file/2

- loggingp

4.400 inorder/2

- bintree

4.401 insert/3

- setp

4.402 insert/4

- dictionaryp
- heapp

4.403 insert_after/3

- zipperp

4.404 insert_all/3

- heapp
- setp

4.405 insert_before/3

- zipperp

4.406 insert_in/4

- nested_dictionary_protocol

4.407 install/1

- packs

4.408 install/2

- packs

4.409 install/3

- packs

4.410 install/4

- packs

4.411 installed/0

- packs

4.412 installed/1

- packs

4.413 installed/3

- packs

4.414 installed/4

- packs

4.415 instance/1

- class_hierarchyp

4.416 instance/2

- recorded_database_core

4.417 instances/1

- class_hierarchyp

4.418 integer//1

- number_grammars(Format)

4.419 internal_os_path/2

- osp

4.420 intersect/2

- setp

4.421 intersection/2

- dictionaryp

4.422 intersection/3

- dictionaryp
- setp

4.423 intersection/4

- setp

4.424 invoke/1

- java__access__protocol

4.425 invoke/2

- java__access__protocol

4.426 ipv4//1

- ip_grammars(Format)

4.427 ipv6//1

- ip_grammars(Format)

4.428 is_absolute_file_name/1

- osp

4.429 is_alpha/1

- characterp

4.430 is_alphanumeric/1

- characterp

4.431 is_ascii/1

- characterp

4.432 is_bin_digit/1

- characterp

4.433 is_control/1

- characterp

4.434 is_dec_digit/1

- characterp

4.435 is_empty/0

- optional(Optional)

4.436 is_end_of_line/1

- characterp

4.437 `is_expected/0`

- `expected(Expected)`

4.438 `is_false/1`

- `java_utils_protocol`

4.439 `is_hex_digit/1`

- `characterp`

4.440 `is_layout/1`

- `characterp`

4.441 `is_letter/1`

- `characterp`

4.442 `is_lower_case/1`

- `characterp`

4.443 `is_newline/1`

- `characterp`

4.444 `is_null/1`

- `java_utils_protocol`

4.445 is__object/1

- java_utils_protocol

4.446 is__octal_digit/1

- characterp

4.447 is__period/1

- characterp

4.448 is__present/0

- optional(Optional)

4.449 is__punctuation/1

- characterp

4.450 is__quote/1

- characterp

4.451 is__true/1

- java_utils_protocol

4.452 is__unexpected/0

- expected(Expected)

4.453 is_upper_case/1

- characterp

4.454 is_void/1

- java_utils_protocol

4.455 is_vowel/1

- characterp

4.456 is_white_space/1

- characterp

4.457 iterator_element/2

- java_utils_protocol

4.458 join/3

- queuep

4.459 join_all/3

- queuep

4.460 jump/3

- queuep

4.461 jump_all/3

- queuep

4.462 jump_all_block/3

- queuep

4.463 key/2

- pairs

4.464 keys/2

- dictionaryp
- pairs

4.465 keys_values/3

- pairs

4.466 keysort/2

- listp

4.467 kurtosis/2

- statisticsp

4.468 language_object/2

- graph_language_registry

4.469 last/2

- listp
- varlistp

4.470 leaf/1

- hierarchyp

4.471 leaf_class/1

- class_hierarchyp

4.472 leaf_classes/1

- class_hierarchyp

4.473 leaf_instance/1

- class_hierarchyp

4.474 leaf_instances/1

- class_hierarchyp

4.475 leap_year/1

- datep
- iso8601

4.476 learn/0

- metagol_example_protocol

4.477 learn/1

- metagol_example_protocol

4.478 learn/2

- metagol

4.479 learn/3

- metagol

4.480 learn_seq/2

- metagol

4.481 learn_with_timeout/4

- metagol

4.482 leash/1

- debuggerp

4.483 leashing/1

- debuggerp

4.484 least_common_multiple/2

- numberlistp

4.485 leaves/1

- `hierarchyp`

4.486 length/2

- `listp`
- `queuep`
- `varlistp`

4.487 libraries/0

- `help`

4.488 libraries/1

- `diagram(Format)`
- `diagrams(Format)`
- `lgtdocp`

4.489 libraries/2

- `diagram(Format)`
- `diagrams(Format)`
- `lgtdocp`

4.490 libraries/3

- `diagram(Format)`
- `diagrams(Format)`

4.491 library/1

- `code__metric`
- `dead__code__scanner`
- `diagram(Format)`
- `diagrams(Format)`
- `help`
- `lgtdocp`

4.492 library/2

- `code__metric`
- `dead__code__scanner`
- `diagram(Format)`
- `diagrams(Format)`
- `lgtdocp`

4.493 library__score/2

- `code__metric`

4.494 license/1

- `pack__protocol`

4.495 line__to__chars/2

- `reader`

4.496 line__to__chars/3

- `reader`

4.497 line_to_codes/2

- reader

4.498 line_to_codes/3

- reader

4.499 lint/0

- packs
- registries

4.500 lint/1

- packs
- registries

4.501 lint/2

- packs

4.502 list/0

- registries

4.503 list_to_array/2

- java_utils_protocol

4.504 listing/0

- listing

4.505 listing/1

- listing

4.506 loaded_file/1

- logtalk

4.507 loaded_file_property/2

- logtalk
- modules_diagram_support

4.508 loaded_files_topological_sort/1

- logtalk

4.509 loaded_files_topological_sort/2

- logtalk

4.510 log/3

- debuggerp

4.511 log_event/2

- loggingp

4.512 log_file/2

- loggingp

4.513 logging/1

- loggingp

4.514 logging/3

- debuggerp

4.515 logistic/3

- sampling_protocol

4.516 lognormal/3

- sampling_protocol

4.517 logseries/2

- sampling_protocol

4.518 logtalk_packs/0

- packs_common

4.519 logtalk_packs/1

- packs_common

4.520 lookup/2

- dictionaryp

4.521 lookup/3

- dictionaryp

4.522 lookup_in/3

- nested_dictionary_protocol

4.523 lower_upper/2

- characterp

4.524 magic/2

- magic

4.525 magicise/4

- magic

4.526 make_directory/1

- osp

4.527 make_directory_path/1

- osp

4.528 make_set/3

- union_find_protocol

4.529 manhattan_distance/3

- numberlistp

4.530 manhattan_norm/2

- numberlistp

4.531 map/2

- dictionaryp
- expected(Expected)
- metap
- optional(Optional)
- queuep

4.532 map/3

- dictionaryp
- metap
- pairs
- queuep

4.533 map/4

- metap

4.534 map/5

- metap

4.535 map/6

- metap

4.536 map/7

- metap

4.537 map/8

- metap

4.538 map_element/2

- java_utils_protocol

4.539 map_reduce/5

- metap

4.540 max/2

- listp
- numberlistp
- statisticsp

4.541 max/3

- dictionaryp

4.542 max_clauses/1

- metagol

4.543 max_inv_preds/1

- metagol

4.544 max_size/1

- arbitrary

4.545 maybe/0

- random_protocol

4.546 maybe/1

- random_protocol

4.547 maybe/2

- random_protocol

4.548 maybe_call/1

- random_protocol

4.549 maybe_call/2

- random_protocol

4.550 mean_deviation/2

- statisticsp

4.551 median/2

- numberlistp
- statisticsp

4.552 median_deviation/2

- statisticsp

4.553 meets/2

- intervalp

4.554 member/2

- listp
- random_protocol
- setp

4.555 memberchk/2

- listp
- setp
- varlistp

4.556 merge/3

- heapp

4.557 message_hook/4

- logtalk

4.558 message_prefix_file/6

- logtalk

4.559 message_prefix_stream/4

- logtalk

4.560 message_tokens//2

- logtalk

4.561 met_by/2

- intervalp

4.562 meta_type/3

- type

4.563 metarule/6

- metagol

4.564 metarule_next_id/1

- metagol

4.565 min/2

- listp
- numberlistp
- statisticsp

4.566 min/3

- dictionaryp

4.567 min_clauses/1

- metagol

4.568 min_max/3

- numberlistp
- statisticsp

4.569 modes/2

- numberlistp
- statisticsp

4.570 module_property/2

- modules_diagram_support

4.571 monitor/1

- event_registryp

4.572 monitor/4

- event_registryp

4.573 monitor_activated/0

- monitorp

4.574 monitored/1

- `event_registryp`

4.575 monitors/1

- `event_registryp`

4.576 msort/2

- `listp`

4.577 msort/3

- `listp`

4.578 mutation/3

- `mutations`
- `mutations_store`

4.579 name/1

- `pack_protocol`
- `registry_protocol`

4.580 name_of_day/3

- `datep`

4.581 name_of_month/3

- `datep`

4.582 natural//1

- number_grammars(Format)

4.583 new/1

- java_access_protocol
- nested_dictionary_protocol
- streamvars
- term_p

4.584 new/2

- java_access_protocol
- streamvars
- union_find_protocol

4.585 new/3

- interval_p

4.586 new_line//0

- blank_grammars(Format)

4.587 new_lines//0

- blank_grammars(Format)

4.588 next/2

- zipper_p

4.589 next/3

- zipperp

4.590 next/4

- dictionaryp

4.591 nextto/3

- listp
- varlistp

4.592 node/7

- graph_language_protocol

4.593 nodebug/0

- debuggerp

4.594 nolog/3

- debuggerp

4.595 nologall/0

- debuggerp

4.596 non_blank//1

- blank_grammars(Format)

4.597 non_blanks//1

- blank_grammars(Format)

4.598 normal/3

- sampling_protocol

4.599 normal_element/2

- html

4.600 normalize_range/2

- numberlistp

4.601 normalize_range/4

- numberlistp

4.602 normalize_scalar/2

- numberlistp

4.603 normalize_unit/2

- numberlistp

4.604 nospy/1

- debuggerp

4.605 nospy/3

- debuggerp

4.606 nospy/4

- debuggerp

4.607 nospyall/0

- debuggerp

4.608 note/2

- registry_protocol

4.609 note/3

- pack_protocol

4.610 notrace/0

- debuggerp

4.611 now/3

- timep

4.612 nth0/3

- listp
- varlistp

4.613 nth0/4

- listp
- varlistp

4.614 nth1/3

- listp
- varlistp

4.615 nth1/4

- listp
- varlistp

4.616 null/1

- java_utils_protocol

4.617 null_device_path/1

- osp

4.618 number//1

- number_grammars(Format)

4.619 number_of_tests/1

- lgtunit

4.620 numbervars/1

- term

4.621 numbervars/3

- term

4.622 occurrences/2

- list

4.623 occurrences/3

- list

4.624 occurs/2

- term

4.625 of/2

- optional

4.626 of_expected/2

- expected

4.627 of_unexpected/2

- expected

4.628 one_or_more//0

- sequence_grammars

4.629 one_or_more//1

- sequence_grammars

4.630 one_or_more//2

- sequence_grammars

4.631 operating_system_machine/1

- osp

4.632 operating_system_name/1

- osp

4.633 operating_system_release/1

- osp

4.634 operating_system_type/1

- osp

4.635 option/2

- options_protocol

4.636 option/3

- options_protocol

4.637 or/2

- optional(Optional)

4.638 or_else/2

- expected(Expected)
- optional(Optional)

4.639 or_else_call/2

- expected(Expected)
- optional(Optional)

4.640 or_else_fail/1

- expected(Expected)
- optional(Optional)

4.641 or_else_get/2

- expected(Expected)
- optional(Optional)

4.642 or_else_throw/1

- expected(Expected)

4.643 or_else_throw/2

- optional(Optional)

4.644 orphaned/0

- packs

4.645 orphaned/2

- packs

4.646 outdated/0

- packs

4.647 outdated/1

- packs

4.648 outdated/2

- packs

4.649 outdated/4

- packs

4.650 outdated/5

- packs

4.651 output_file_name/2

- graph_language_protocol

4.652 overlapped_by/2

- intervalp

4.653 overlaps/2

- intervalp

4.654 parent/1

- proto_hierarchyp

4.655 parenthesis/2

- characterp

4.656 parents/1

- proto_hierarchyp

4.657 parse/2

- base64
- base64url
- cbor(StringRepresentation)
- cclds(SecondaryHeaderLength)
- json_lines_protocol
- json_protocol
- toon_protocol
- xml

4.658 parse/3

- xml

4.659 parse__domain/2

- pddl

4.660 parse__domain/3

- pddl

4.661 parse__problem/2

- pddl

4.662 parse__problem/3

- pddl

4.663 partial_map/4

- rbtrees

4.664 partition/3

- either

4.665 partition/4

- metap

4.666 partition/5

- listp

4.667 partition/6

- metap

4.668 path_concat/3

- osp

4.669 permutation/2

- listp
- random_protocol
- varlistp

4.670 pid/1

- osp

4.671 pin/0

- packs_common

4.672 pin/1

- packs_common

4.673 pinned/1

- packs_common

4.674 plus/3

- integer

4.675 poisson/2

- sampling_protocol

4.676 port/5

- ports_profiler

4.677 portray_clause/1

- listing

4.678 postorder/2

- bintree

4.679 power/2

- sampling_protocol

4.680 power_sequence/4

- integer

4.681 powerset/2

- setp

4.682 pp/1

- xml

4.683 pprint/1

- metagol

4.684 predicate/2

- dead_code_scanner

4.685 predicate_info_pair_score_hook/4

- doc_metric

4.686 predicate_info_score_hook/3

- doc_metric

4.687 predicate_mode_score_hook/3

- doc_metric

4.688 predicate_mode_score_hook/5

- doc_metric

4.689 predicates/2

- dead_code_scanner

4.690 prefix/0

- packs_common

4.691 prefix/1

- packs_common

4.692 prefix/2

- listp
- varlistp

4.693 prefix/3

- listp

4.694 preorder/2

- bintree

4.695 previous/2

- zipperp

4.696 previous/3

- zipperp

4.697 previous/4

- dictionaryp

4.698 print_flags/0

- flags
- flags_validator

4.699 print_flags/1

- flags

4.700 print_message/3

- logtalk

4.701 print_message_token/4

- logtalk

4.702 print_message_tokens/3

- logtalk

4.703 product/2

- numberlistp
- statisticsp

4.704 product/3

- setp

4.705 program_to_clauses/2

- metagol

4.706 proper_prefix/2

- listp

4.707 proper_prefix/3

- listp

4.708 proper_suffix/2

- listp

4.709 proper_suffix/3

- listp

4.710 prove/2

- interpreterp

4.711 prove/3

- interpreterp

4.712 provides/2

- registries

4.713 question_hook/6

- logtalk

4.714 question_prompt_stream/4

- logtalk

4.715 quick_check/1

- lgtunit

4.716 quick_check/2

- lgtunit

4.717 quick_check/3

- lgtunit

4.718 random/1

- random_protocol

4.719 random/3

- random_protocol

4.720 random_node/1

- uuid_protocol

4.721 random_tree/1

- benchmark_generators

4.722 randomize/1

- fast_random
- random

4.723 randseq/4

- random_protocol

4.724 randset/4

- random_protocol

4.725 range/2

- statisticsp

4.726 rdirectories/1

- lgtdocp

4.727 rdirectories/2

- lgtdocp

4.728 rdirectory/1

- code_metric
- dead_code_scanner
- diagram(Format)
- diagrams(Format)
- lgtdocp
- wrapper

4.729 rdirectory/2

- `code_metric`
- `dead_code_scanner`
- `diagram(Format)`
- `diagrams(Format)`
- `lgtdocp`
- `wrapper`

4.730 rdirectory/3

- `diagram(Format)`
- `diagrams(Format)`

4.731 rdirectory_score/2

- `code_metric`

4.732 read_file/2

- `csv_protocol`
- `read_file`
- `tsv_protocol`

4.733 read_file/3

- `csv_protocol`
- `tsv_protocol`

4.734 read_file_by_line/2

- `csv_protocol`
- `tsv_protocol`

4.735 read_file_by_line/3

- csv_protocol
- tsv_protocol

4.736 read_from_atom/2

- term_io_protocol

4.737 read_from_chars/2

- term_io_protocol

4.738 read_from_codes/2

- term_io_protocol

4.739 read_only_device_path/1

- osp

4.740 read_stream/2

- csv_protocol
- tsv_protocol

4.741 read_stream/3

- csv_protocol
- tsv_protocol

4.742 read_stream_by_line/2

- csv_protocol
- tsv_protocol

4.743 read_stream_by_line/3

- csv_protocol
- tsv_protocol

4.744 read_term_from_atom/3

- term_io_protocol

4.745 read_term_from_chars/3

- term_io_protocol

4.746 read_term_from_chars/4

- term_io_protocol

4.747 read_term_from_codes/3

- term_io_protocol

4.748 read_term_from_codes/4

- term_io_protocol

4.749 readme/1

- packs_common

4.750 readme/2

- packs_common

4.751 recorda/2

- recorded_database_core

4.752 recorda/3

- recorded_database_core

4.753 recorded/2

- recorded_database_core

4.754 recorded/3

- recorded_database_core

4.755 recordz/2

- recorded_database_core

4.756 recordz/3

- recorded_database_core

4.757 relative_standard_deviation/2

- statisticsp

4.758 removeDependent/1

- subject

4.759 remove_duplicates/2

- listp
- varlistp

4.760 rename_file/2

- osp

4.761 replace/3

- zipperp

4.762 replace_sub_atom/4

- atom

4.763 rescale/3

- numberlistp

4.764 reset/0

- counter
- debuggerp
- packs_common
- ports_profiler

4.765 reset/1

- ports_profiler

4.766 reset_counter/1

- counters

4.767 reset_counters/0

- counters

4.768 reset_flags/0

- flags

4.769 reset_flags/1

- flags

4.770 reset_genint/0

- genint_core

4.771 reset_genint/1

- genint_core

4.772 reset_gensym/0

- gensym_core

4.773 reset_gensym/1

- gensym_core

4.774 reset_monitor/0

- monitorp

4.775 reset_seed/0

- fast_random
- random

4.776 restore/1

- packs

4.777 restore/2

- packs

4.778 reverse/2

- listp
- varlistp

4.779 rewind/2

- zipperp

4.780 rewind/3

- zipperp

4.781 rlibraries/1

- lgtdocp

4.782 rlibraries/2

- lgtdocp

4.783 rlibrary/1

- code__metric
- dead__code__scanner
- diagram(Format)
- diagrams(Format)
- lgtdocp

4.784 rlibrary/2

- code__metric
- dead__code__scanner
- diagram(Format)
- diagrams(Format)
- lgtdocp

4.785 rlibrary__score/2

- code__metric

4.786 rule/2

- databasep

4.787 rule/3

- databasep

4.788 rule/4

- databasep

4.789 run/0

- lgtunit

4.790 run/1

- lgtunit

4.791 run/2

- lgtunit

4.792 run_test_sets/1

- lgtunit

4.793 same_length/2

- listp
- varlistp

4.794 same_length/3

- listp

4.795 save/0

- wrapper

4.796 save/1

- packs
- wrapper

4.797 save/2

- packs

4.798 scalar_product/3

- numberlistp

4.799 scan_left/4

- metap

4.800 scan_left_1/3

- metap

4.801 scan_right/4

- metap

4.802 scan_right_1/3

- metap

4.803 search/1

- packs

4.804 secondary_header/2

- cclds(SecondaryHeaderLength)

4.805 secondary_header_flag/2

- cclds(SecondaryHeaderLength)

4.806 secondary_header_time/2

- cclds(SecondaryHeaderLength)

4.807 select/3

- listp
- random_protocol
- setp
- varlistp

4.808 select/4

- listp
- random_protocol

4.809 selectchk/3

- listp
- setp

4.810 selectchk/4

- listp

4.811 send/3

- redis

4.812 sequence/3

- integer

4.813 sequence/4

- float
- integer
- random_protocol

4.814 sequence/5

- float

4.815 sequence_count/2

- ccstds(SecondaryHeaderLength)

4.816 sequence_flags/2

- ccstds(SecondaryHeaderLength)

4.817 sequential_occurrences/2

- listp

4.818 sequential_occurrences/3

- listp

4.819 serve/3

- queuep

4.820 set/1

- counter

4.821 set/4

- random_protocol

4.822 set_element/2

- java_utils_protocol

4.823 set_field/2

- java_access_protocol

4.824 set_flag_value/2

- flags

4.825 set_flag_value/3

- flags

4.826 set__monitor/4

- event_registry

4.827 set__seed/1

- arbitrary
- pseudo_random_protocol

4.828 set__spy__point/4

- monitorp

4.829 set__write__max__depth/1

- debuggerp

4.830 setup/0

- packs_common

4.831 shell/1

- osp

4.832 shell/2

- osp

4.833 shell__command/1

- doclet

4.834 shrink/3

- arbitrary

4.835 shrink_sequence/3

- arbitrary

4.836 shrinker/1

- arbitrary

4.837 sign//1

- number_grammars(Format)

4.838 singletons/2

- term

4.839 size/2

- dictionary
- heapp
- setp

4.840 skewness/2

- statisticsp

4.841 sleep/1

- osp

4.842 softmax/2

- numberlistp

4.843 softmax/3

- numberlistp

4.844 sort/2

- listp

4.845 sort/3

- listp

4.846 sort/4

- listp

4.847 source_file_extension/1

- modules_diagram_support

4.848 space//0

- blank_grammars(Format)

4.849 spaces//0

- blank_grammars(Format)

4.850 split/3

- atom

4.851 split/4

- listp

4.852 spy/1

- debuggerp

4.853 spy/3

- debuggerp

4.854 spy/4

- debuggerp

4.855 spy_point/4

- monitorp

4.856 spying/1

- debuggerp

4.857 spying/3

- debuggerp

4.858 spying/4

- debuggerp

4.859 standard_cauchy/3

- sampling_protocol

4.860 standard_deviation/2

- statisticsp

4.861 standard_exponential/1

- sampling_protocol

4.862 standard_gamma/2

- sampling_protocol

4.863 standard_normal/1

- sampling_protocol

4.864 standard_t/2

- sampling_protocol

4.865 start/0

- ports_profiler
- shell

4.866 start_redirect_to_file/2

- dump_trace

4.867 started_by/2

- intervalp

4.868 starts/2

- intervalp

4.869 stop/0

- ports_profiler

4.870 stop_redirect_to_file/0

- dump_trace

4.871 stream_to_bytes/2

- reader

4.872 stream_to_bytes/3

- reader

4.873 stream_to_chars/2

- reader

4.874 stream_to_chars/3

- reader

4.875 stream_to_codes/2

- reader

4.876 stream_to_codes/3

- reader

4.877 stream_to_terms/2

- reader

4.878 stream_to_terms/3

- reader

4.879 subclass/1

- class_hierarchy

4.880 subclasses/1

- class_hierarchy

4.881 sublist/2

- listp
- varlistp

4.882 subsequence/3

- listp

4.883 subsequence/4

- listp

4.884 subset/2

- setp

4.885 substitute/4

- listp

4.886 subsumes/2

- term_p

4.887 subterm/2

- term_p
- xml

4.888 subtract/3

- listp
- setp
- varlistp

4.889 succ/2

- integer

4.890 suffix/2

- listp
- varlistp

4.891 suffix/3

- listp

4.892 sum/2

- numberlistp
- statisticsp

4.893 superclass/1

- class_hierarchy

4.894 superclasses/1

- class_hierarchy

4.895 suspend_monitor/0

- monitorp

4.896 swap/2

- random_protocol

4.897 swap_consecutive/2

- random_protocol

4.898 symdiff/3

- setp

4.899 tab//0

- blank_grammars(Format)

4.900 tabs//0

- blank_grammars(Format)

4.901 take/3

- listp

4.902 temporary_directory/1

- osp

4.903 term_expansion/2

- expanding

4.904 terms_to_array/2

- java_utils_protocol

4.905 test/1

- lgtunit

4.906 time_stamp/1

- osp

4.907 timeout/1

- metagol

4.908 timestamp/2

- ulid_protocol

4.909 timestamp/8

- ulid_protocol

4.910 today/3

- datep

4.911 tolerance_equal/4

- lgtunit
- number

4.912 tool/1

- help

4.913 tools/0

- help

4.914 top/3

- heapp

4.915 top_next/5

- heapp

4.916 trace/0

- debuggerp

4.917 trace_event/2

- logtalk

4.918 transpose/2

- pairs

4.919 triangular/4

- sampling_protocol

4.920 true/1

- java_utils_protocol

4.921 type/1

- type

4.922 type/2

- cclds(SecondaryHeaderLength)

4.923 unexpected/1

- expected(Expected)

4.924 unexpecteds/2

- either

4.925 uniform/1

- sampling_protocol

4.926 uniform/3

- sampling_protocol

4.927 uninstall/0

- packs

4.928 uninstall/1

- packs

4.929 uninstall/2

- packs

4.930 union/3

- setp

4.931 union/4

- setp
- union_find_protocol

4.932 union_all/3

- union_find_protocol

4.933 unpin/0

- packs_common

4.934 unpin/1

- packs_common

4.935 unzip/2

- zipperp

4.936 update/0

- doclet
- packs
- registries

4.937 update/1

- observer
- packs
- registries

4.938 update/2

- packs
- registries

4.939 update/3

- dictionaryp
- packs

4.940 update/4

- dictionaryp

4.941 update/5

- dictionaryp

4.942 update_in/4

- nested_dictionary_protocol

4.943 update_in/5

- nested_dictionary_protocol

4.944 user_data/2

- cclds(SecondaryHeaderLength)

4.945 uuid_null/1

- uuid_protocol

4.946 uuid_v1/2

- uuid_protocol

4.947 uuid_v4/1

- uuid_protocol

4.948 valid/1

- intervalp
- statisticsp
- term p
- varlistp

4.949 valid/2

- type

4.950 valid/3

- datep
- timep

4.951 valid_date/3

- iso8601

4.952 valid_option/1

- options_protocol

4.953 valid_options/1

- options_protocol

4.954 validate/1

- flags_validator

4.955 value/1

- counter

4.956 value/3

- pairs

4.957 value_reference/2

- java_utils_protocol

4.958 values/2

- dictionaryp
- pairs

4.959 variables/2

- term

4.960 variance/2

- statisticsp

4.961 variant/2

- lgtunit
- term

4.962 varnumbers/2

- term

4.963 varnumbers/3

- term

4.964 verify_commands_availability/0

- packs_common

4.965 version/2

- ccscds(SecondaryHeaderLength)

4.966 version/6

- pack_protocol

4.967 versions/3

- packs

4.968 void/1

- java_utils_protocol

4.969 void_element/1

- html

4.970 von_mises/3

- sampling_protocol

4.971 wald/3

- sampling_protocol

4.972 wall_time/1

- osp

4.973 weibull/3

- sampling_protocol

4.974 weighted_mean/3

- statisticsp

4.975 welcome/0

- shell

4.976 when/2

- coroutining

4.977 whiledo/2

- looppp

4.978 white_space//0

- blank_grammars(Format)

4.979 white_spaces//0

- blank_grammars(Format)

4.980 with_output_to/2

- term_io_protocol

4.981 without//2

- sequence_grammars

4.982 working_directory/1

- osp

4.983 write__file/3

- csv_protocol
- tsv_protocol

4.984 write__max__depth/1

- debuggerp

4.985 write__stream/3

- csv_protocol
- tsv_protocol

4.986 write__term__to__atom/3

- term_io_protocol

4.987 write__term__to__chars/3

- term_io_protocol

4.988 write__term__to__chars/4

- term_io_protocol

4.989 write__term__to__codes/3

- term_io_protocol

4.990 write__term__to__codes/4

- term_io_protocol

4.991 write_to_atom/2

- term_io_protocol

4.992 write_to_chars/2

- term_io_protocol

4.993 write_to_codes/2

- term_io_protocol

4.994 z_normalization/2

- statisticsp

4.995 zero_or_more//0

- sequence_grammars

4.996 zero_or_more//1

- sequence_grammars

4.997 zero_or_more//2

- sequence_grammars

4.998 zip/2

- zipperp

4.999 zip/3

- zipperp

4.1000 zip_at_index/4

- zlist

INDICES AND TABLES

- `genindex`
- `search`

Generated on Tue Dec 30 15:30:10 WET 2025

Symbols

(/)/2, 373
 (//)/2, 374
 (<)/2, 892
 (<=)/2, 15, 564
 (:=)/2, 893
 (=<)/2, 892
 (=>)/2, 16, 565
 (=\\=)/2, 893
 (>)/2, 892
 (>=)/2, 893
 =~= / 2, 510, 934

A

a_star_interpreter(W), 996
 absolute_file_name/2, 657
 acc_info/5, 283
 acc_info/7, 282
 activate_debug_handler/1, 84
 activate_monitor/0, 294
 active_debug_handler/1, 83
 active_debug_handler_/1, 91
 add/1, 725
 add/2, 724
 add/3, 723, 897
 add_directive_/2, 1038
 add_directive_/3, 1039
 add_directive_before_entity_/2, 1038
 add_library_documentation_url/4, 240
 add_link_options/3, 186
 add_node_zoom_option/4, 187
 addDependent/1, 162
 after/2, 428
 after/3, 93
 after_event_registry, 284
 all/0, 41, 128, 491
 all/1, 40, 127, 491
 all_files/0, 176, 199
 all_files/1, 176, 199
 all_libraries/0, 170, 193
 all_libraries/1, 169, 193
 all_score/1, 43

ancestor/1, 386
 ancestor/4, 52
 ancestors/1, 386
 apid/2, 29
 apis/0, 371
 apis/1, 371
 append/2, 910
 append/3, 752, 910, 969
 apply/2, 1054
 apply/4, 272
 approximately_equal/2, 508, 932
 approximately_equal/3, 508, 932
 arbitrary, 1
 arbitrary/1, 4
 arbitrary/2, 4
 archive/1, 735
 arithmetic_mean/2, 829
 arithmetic_mean/5, 824
 array_list/2, 461
 array_to_list/2, 460
 array_to_terms/2, 460
 array_to_terms/3, 459
 as_curly_bracketed/2, 264, 624
 as_dictionary/2, 263
 as_difflist/2, 905
 as_heap/2, 365
 as_list/2, 263, 365, 753, 811, 897
 as_nested_dictionary/2, 623
 as_set/2, 811
 ask_question/5, 81
 assertion/1, 10, 503
 assertion/2, 10, 503
 assertions, 7
 assertions(Mode), 9
 assertions_messages, 11
 assignable/1, 14
 assignable/2, 15
 assignvars, 12
 assignvarsp, 13
 atom, 876
 atomic, 878
 automation_report, 492

auxiliary_predicate_counter_/1, 541
available/0, 679
available/1, 678
available/2, 678
average/2, 940
average_deviation/3, 831
avltree, 257

B

backend_adapter_hook, 396
backend_random, 755
base64, 17
base64url, 19
base_/2, 336
before/2, 427
before/3, 93
before_event_registry, 285
bench_goal/1, 1009
benchmark/2, 506
benchmark/3, 507
benchmark/4, 507
benchmark_generators, 998
benchmark_reified/3, 506
bernoulli/2, 779
best_first, 999
beta/3, 779
between/3, 766, 901
between/4, 899
bfs_interpreter, 1001
binary_file_assertion/3, 537
binary_input_assertion/2, 521
binary_input_assertion/3, 521
binary_output_assertion/2, 532
binary_output_assertion/3, 531
binary_output_contents/1, 532
binary_output_contents/2, 532
binomial/3, 779
bintree, 259
bit//1, 352
bits//1, 352
blank//0, 346
blank_grammars(Format), 342
blanks//0, 346
body_pred/1, 602
body_pred_call/2, 605
branch/2, 339
built_in_directive/4, 375
built_in_flag/2, 322
built_in_method/4, 375
built_in_non_terminal/4, 376
built_in_predicate/4, 375
bup_interpreter, 1002

C

c/1, 1006
calendar_month/3, 442
call_with_timeout/2, 849
call_with_timeout/3, 850
callable, 879
cat/2, 629
cbor, 21
cbor(StringRepresentation), 22
cc_metric, 33
ccsds, 24
ccsds(SecondaryHeaderLength), 25
ccsds_types, 32
cdata_generation//1, 1047
change_directory/1, 660
changed/0, 162
changed/1, 162
character, 880
character_data_format/3, 1047
characterp, 881
chebyshev_distance/3, 942
chebyshev_norm/2, 941
check/1, 957, 977
check/2, 965
check/3, 965
check_binary_file/2, 536
check_binary_input/1, 520
check_binary_input/2, 520
check_binary_output/1, 531
check_binary_output/2, 530
check_option/1, 645
check_options/1, 645
check_text_file/2, 535
check_text_file/3, 534
check_text_input/1, 517
check_text_input/2, 516
check_text_output/1, 525
check_text_output/2, 524
check_text_output/3, 524
chi_squared/2, 777
chr_is/2, 858
chr_next_state/1, 861
chr_no_spy/1, 859
chr_nospy/0, 859
chr_notrace/0, 859
chr_option/2, 859
chr_option_allow_deep_guards/0, 861
chr_option_optimization_level/1, 860
chr_option_print_trace/0, 860
chr_option_show_history/0, 861
chr_option_show_id/0, 861
chr_option_show_stack/0, 860
chr_option_show_store/0, 860
chr_option_trace_interactive/0, 860

chr_rule_/1, 862
 chr_spy/1, 859
 chr_spy_point/1, 861
 chr_trace/0, 858
 circular_uniform_cartesian/3, 784
 circular_uniform_polar/3, 784
 class/1, 379
 class_hierarchy, 377
 class_hierarchyp, 378
 classes/1, 380
 clause/5, 745
 clause_/5, 746
 clause_breakpoint_/2, 141
 clause_location/6, 745
 clause_location_/6, 746
 clean/0, 697, 729
 clean/1, 696, 729
 clean/2, 696
 clean_binary_input/0, 522
 clean_binary_output/0, 533
 clean_directory/1, 538
 clean_file/1, 537
 clean_text_input/0, 518
 clean_text_output/0, 528
 cleanup/0, 512
 clone/1, 559, 735
 clone/3, 264
 clone/4, 265
 cloning, 558
 closed_input_stream/2, 538
 closed_output_stream/2, 539
 code_metric, 35
 code_metrics, 48
 code_metrics_messages, 49
 code_metrics_utilities, 50
 coefficient_of_variation/2, 832
 command/2, 714
 command_line_arguments/1, 670
 commit_author/2, 339
 commit_date/2, 340
 commit_hash/2, 340
 commit_hash_abbreviated/2, 341
 commit_log/3, 341
 commit_message/2, 341
 comparingp, 891
 compile_aux_clauses/1, 88
 compile_predicate_heads/4, 89
 compile_predicate_indicators/3, 89
 compiled_pred_call/2, 604
 completion/2, 374
 completions/2, 374
 compound, 894
 condition/0, 512
 conditional_breakpoint_/3, 142

connect/1, 804
 connect/3, 804
 console/1, 805
 contains/2, 430
 context_breakpoint_/4, 142
 control//0, 347
 control_construct/4, 376
 controls//0, 348
 copy_file/2, 666
 core_messages, 72
 coroutining, 95
 counter, 1003
 counter/2, 560, 617
 counter_/2, 333, 562, 618
 counters, 559
 coupling_metric, 56
 cover/1, 499
 coverage_report, 493
 covered_/4, 543
 cpu_time/1, 120, 668
 create_binary_file/2, 534
 create_text_file/2, 534
 create_text_file/3, 533
 csv, 98
 csv(Header,Separator,IgnoreQuotes), 100
 csv_guess_questions, 101
 csv_protocol, 102
 current/2, 1051
 current_entity/1, 52
 current_prog/1, 860

D

d2_graph_language, 164
 data/0, 743
 data/1, 743
 data/2, 743
 data_length/2, 30
 databasep, 1007
 date, 113
 date/4, 434
 date/5, 435
 date/6, 436
 date/7, 437
 date_string/3, 438
 date_time/7, 668
 datep, 114
 days_in_month/3, 116
 deactivate_debug_handler/0, 84
 dead_code_scanner, 121
 dead_code_scanner_messages, 129
 debug/0, 148
 debug_expansion(Mode), 1009
 debug_handler/1, 83
 debug_handler/3, 85

[debug_messages](#), 130
[debugger](#), 135
[debugger_messages](#), 144
[debuggerp](#), 145
[debugging/0](#), 148
[debugging/1](#), 149
[debugging_/0](#), 137
[decide/1](#), 316
[decide/2](#), 316
[declares_predicate/2](#), 52
[decode_exception/2](#), 462
[decode_exception/3](#), 463
[decode_url_spaces/2](#), 717
[decompile_predicate_heads/4](#), 89
[decompile_predicate_indicators/4](#), 90
[decompose_file_name/3](#), 657
[decompose_file_name/4](#), 657
[decrement_counter/1](#), 561
[default_atom_mutations](#), 607
[default_compound_mutations](#), 608
[default_float_mutations](#), 610
[default_integer_mutations](#), 611
[default_list_mutations](#), 612
[default_option/1](#), 646, 1034
[default_options/1](#), 647, 1034
[default_workflow_hook](#), 397
[define_flag/1](#), 323
[define_flag/2](#), 324
[define_log_file/2](#), 574
[defined/4](#), 722
[defined_flag/6](#), 322
[defined_flag_/6](#), 324
[defines_predicate/2](#), 53
[defines_predicate/3](#), 53
[del_monitors/0](#), 291
[del_monitors/4](#), 290
[del_spy_points/4](#), 296
[delete/0](#), 729
[delete/1](#), 728
[delete/2](#), 727
[delete/3](#), 812, 910, 969
[delete/4](#), 265, 363
[delete_all_after/2](#), 1057
[delete_all_after_and_unzip/2](#), 1057
[delete_all_before/2](#), 1056
[delete_all_before_and_unzip/2](#), 1057
[delete_and_next/2](#), 1056
[delete_and_previous/2](#), 1055
[delete_and_unzip/2](#), 1056
[delete_directory/1](#), 659
[delete_directory_and_contents/1](#), 660
[delete_directory_contents/1](#), 660
[delete_file/1](#), 666
[delete_in/4](#), 625
[delete_matches/3](#), 911
[delete_max/4](#), 271
[delete_min/4](#), 270
[demodb](#), 1010
[dependent_/1](#), 163
[dependents/1](#), 162, 702
[dependents/2](#), 701
[dependents/3](#), 701
[depth/2](#), 955
[descendant/1](#), 387
[descendant_class/1](#), 384
[descendant_classes/1](#), 384
[descendant_instance/1](#), 383
[descendant_instances/1](#), 384
[descendants/1](#), 388
[describe/1](#), 686, 721
[describe/2](#), 686
[description/1](#), 673, 734
[deterministic/1](#), 502
[deterministic/2](#), 502
[dfs_interpreter](#), 1012
[diagram\(Format\)](#), 165
[diagram_caption/3](#), 178
[diagram_description/1](#), 177
[diagram_name_suffix/1](#), 177
[diagrams](#), 189
[diagrams\(Format\)](#), 190
[dictionaryp](#), 261
[dif](#), 276
[dif/1](#), 96, 277
[dif/2](#), 96, 277
[difflist](#), 895
[digit//1](#), 352
[digits//1](#), 353
[directories/1](#), 488, 1031
[directories/2](#), 172, 195, 487, 1031
[directories/3](#), 171, 195
[directory/1](#), 38, 125, 174, 197, 489, 710, 1031
[directory/2](#), 38, 124, 174, 197, 488, 710, 1030
[directory/3](#), 173, 197
[directory_dependency_diagram](#), 200
[directory_dependency_diagram\(Format\)](#), 201
[directory_diagram\(Format\)](#), 203
[directory_entity_/4](#), 478
[directory_exists/1](#), 663
[directory_files/2](#), 662
[directory_files/3](#), 663
[directory_load_diagram](#), 207
[directory_load_diagram\(Format\)](#), 208
[directory_score/2](#), 43
[dirichlet/2](#), 783
[disable/1](#), 132
[disable/2](#), 133
[disable_logging/1](#), 576

disconnect/1, 805
 disjoint/2, 812
 disjoint_sets/2, 990
 dit_metric, 57
 doc_goal/1, 279
 doc_metric, 59
 doclet, 278
 doctype/1, 418
 document_generation//2, 1046
 dot//1, 355
 dot_graph_language, 210
 dowhile/2, 579
 drop/3, 929
 dump_trace, 157
 during/2, 430
 dynamic_directive_/3, 1037

E

easter_day/3, 443
 edcg, 280
 edge/5, 181
 edge/6, 230
 edge_/5, 188
 edge_case/2, 5
 either, 298
 either/3, 311
 empty/1, 267, 364, 623, 631, 750, 813, 911, 970
 empty_map/1, 1044
 enable/1, 131
 enable/2, 132
 enable_logging/1, 576
 enabled/1, 132
 enabled/2, 133
 enabled_/1, 134
 enabled_/2, 134
 ensure_directory/1, 664
 ensure_file/1, 667
 entity/1, 37, 123, 255, 373
 entity/2, 255
 entity_calls/3, 54
 entity_defines_/2, 747
 entity_diagram, 212
 entity_diagram(Format), 213
 entity_info_pair_score_hook/3, 61
 entity_info_score_hook/2, 60
 entity_kind/2, 54
 entity_predicate_breakpoint_/4, 142
 entity_predicates_weights_hook/2, 60
 entity_prefix/2, 88
 entity_property/2, 54
 entity_score/2, 41
 entity_updates/3, 55
 enumerate/2, 769
 environment_variable/2, 667

epsilon/1, 510
 equal/2, 431, 812
 erase/1, 801
 essentially_equal/3, 509, 933
 euclidean_distance/3, 942
 euclidean_norm/2, 941
 event_registry, 286
 event_registry, 288
 exception/4, 1046
 exclude/3, 587
 execution_context/7, 90
 expand_library_alias_paths, 297
 expand_library_path/2, 85
 expanding, 73
 expected, 301
 expected(Expected), 306
 expected/1, 309
 expecteds/2, 299
 explain//1, 875
 explicit_tracing_/0, 137
 exponential/2, 778
 extension/1, 391
 extensions/1, 392
 external_predicate_/1, 257

F

f/4, 1000
 failed_/3, 542
 failed_test_reason//1, 545
 false/1, 456
 fast_random, 757
 fault/5, 1046
 fcube, 314
 fcube/0, 316
 file/1, 37, 124, 215, 490, 1033
 file/2, 37, 123, 214, 490, 1033
 file_being_advised_/4, 1039
 file_dependency_diagram, 217
 file_dependency_diagram(Format), 218
 file_diagram(Format), 220
 file_exists/1, 664
 file_footer/3, 229
 file_header/3, 229
 file_line_hit_count_/3, 144
 file_load_diagram, 224
 file_load_diagram(Format), 225
 file_modification_time/2, 664
 file_path/2, 513
 file_permission/2, 665
 file_score/2, 42
 file_size/2, 665
 file_to_bytes/2, 790
 file_to_bytes/3, 790
 file_to_chars/2, 789

- file_to_chars/3, 789
- file_to_codes/2, 788
- file_to_codes/3, 788
- file_to_terms/2, 789
- file_to_terms/3, 790
- file_type_extension/2, 87
- files/1, 175, 199, 489, 1032
- files/2, 175, 198, 489, 1032
- files/3, 175, 198
- filter/2, 637
- filter_external_file_extension/3, 185
- filter_file_extension/3, 185
- find/4, 989
- find/5, 989
- findall_member/4, 587
- findall_member/5, 588
- finished_by/2, 431
- finishes/2, 431
- fired_/3, 543
- fisher/3, 777
- fix_option/2, 649
- fix_options/2, 648
- flag_group_chk/1, 321
- flag_groups/1, 321
- flag_value_/2, 324
- flags, 318
- flags_validator, 325
- flaky_/1, 543
- flat_map/2, 310, 638
- flatten/2, 911, 970
- flatten_goals//1, 1014
- flatting, 1013
- float, 898
- float//1, 354
- fold_left/4, 589
- fold_left_1/3, 589
- fold_right/4, 591
- fold_right_1/3, 591
- fordownto/3, 582
- fordownto/4, 582
- fordownto/5, 583
- foreach/3, 580
- foreach/4, 580
- format, 327
- format/2, 328
- format/3, 328
- format_entity_score//2, 44
- format_object/1, 176
- format_to_atom/3, 845
- format_to_chars/3, 846
- format_to_chars/4, 846
- format_to_codes/3, 847
- format_to_codes/4, 847
- forto/3, 581

- forto/4, 581
- forto/5, 581
- forward/1, 76
- forward/2, 1053
- forward/3, 1053
- forwarding, 75
- fractile/3, 835
- freeze/2, 97
- from_generator/2, 305, 633
- from_generator/3, 304, 632
- from_generator/4, 304
- from_goal/2, 304, 632
- from_goal/3, 303, 632
- from_goal/4, 303
- frozen/2, 97
- full_device_path/1, 662
- func_test/3, 603
- functional/0, 603

G

- gamma/3, 780
- generate/1, 423, 982
- generate/2, 18, 20, 23, 27, 416, 469, 475, 856, 982
- generate/3, 28
- generate/8, 982
- generated_predicate_/1, 597
- generating_/0, 548
- genint, 329
- genint/2, 332
- genint_core, 330
- gensym, 333
- gensym/2, 336
- gensym_core, 334
- geometric/2, 778
- geometric_mean/2, 829
- get/1, 639
- get_field/2, 451
- get_flag_value/2, 319
- get_seed/1, 6, 761
- git, 337
- git_protocol, 338
- gnu/0, 315
- goal_expansion/2, 74
- grammar_rules_hook, 398
- graph_footer/5, 229
- graph_header/5, 229
- graph_language_protocol, 227
- graph_language_registry, 231
- ground/1, 955
- ground_entity_identifier/3, 185
- group_by_key/2, 951
- group_consecutive_by_key/2, 951
- group_sorted_by_key/2, 950
- guess_arity/2, 112

guess_separator/2, 111
gumbel/3, 783

H

halstead_metric, 63
halstead_metric(Stroud), 64
hamming_distance/3, 912
handbook/0, 371
harmonic_mean/2, 829
head/2, 750
head_pred/1, 602
heap(Order), 360
heapp, 361
help, 369
help/0, 371, 707
heuristic_expansion(Mode), 1014
hex_digit//1, 353
hex_digits//1, 353
hierarchyp, 385
home/1, 674, 735
hook_pipeline(Pipeline), 393
hook_set(Set), 394
html, 415
html5, 418
hypergeometric/4, 778

I

ibk/3, 602
iddfs_interpreter(Increment), 1016
identity_hook, 400
ids, 420
ids(Representation,Bytes), 422
if_empty/1, 636
if_expected/1, 308
if_expected_or_else/2, 309
if_present/1, 636
if_present_or_else/2, 637
if_unexpected/1, 308
include/3, 587
included_directory_/1, 206
included_entity_/1, 215
included_file_/1, 223
included_library_/2, 241
included_module_/1, 215
included_predicate_/1, 256
increase/1, 1005
increment/0, 1004
increment_counter/1, 560
inheritance_diagram, 232
inheritance_diagram(Format), 234
init/0, 1026
init_log_file/2, 574
inorder/2, 260
insert/3, 813

insert/4, 265, 363
insert_after/3, 1055
insert_all/3, 363, 813
insert_before/3, 1054
insert_in/4, 625
install/1, 690
install/2, 690
install/3, 689
install/4, 687
installed/0, 681
installed/1, 680
installed/3, 680
installed/4, 679
instance/1, 380
instance/2, 801
instances/1, 380
integer, 900
integer//1, 354
internal_os_path/2, 658
interpreterp, 1017
intersect/2, 814
intersection/2, 268
intersection/3, 268, 814
intersection/4, 814
interval, 424
intervalp, 425
invocation_number_/1, 139
invoke/1, 452
invoke/2, 452
ip_grammars(Format), 348
ipv4//1, 349
ipv6//1, 350
is_absolute_file_name/1, 656
is_alpha/1, 884
is_alphanumeric/1, 883
is_ascii/1, 883
is_bin_digit/1, 884
is_control/1, 888
is_dec_digit/1, 885
is_empty/0, 635
is_end_of_line/1, 889
is_expected/0, 307
is_false/1, 458
is_hex_digit/1, 885
is_layout/1, 887
is_letter/1, 884
is_lower_case/1, 886
is_newline/1, 889
is_null/1, 458
is_object/1, 459
is_octal_digit/1, 885
is_period/1, 888
is_present/0, 635
is_punctuation/1, 888

is_quote/1, 887
is_true/1, 457
is_unexpected/0, 307
is_upper_case/1, 886
is_validator/1, 325
is_void/1, 458
is_vowel/1, 886
is_white_space/1, 887
iso8601, 432
issue_creator, 444
iterator_element/2, 461

J

java, 445
java(Reference), 446
java(Reference,ReturnValue), 448
java_access_protocol, 449
java_hook, 453
java_utils_protocol, 454
join/3, 750
join_all/3, 751
json, 464
json(ObjectRepresentation,PairRepresentation,StringRepresentation), 466
json(StringRepresentation), 465
json_lines, 469
json_lines(ObjectRepresentation,PairRepresentation,StringRepresentation), 472
json_lines(StringRepresentation), 471
json_lines_protocol, 473
json_protocol, 467
jump/3, 751
jump_all/3, 752
jump_all_block/3, 752
jump_to_invocation_number_/1, 139

K

key/2, 949
keys/2, 271, 949
keys_values/3, 948
keysort/2, 912
kurtosis/2, 833

L

language_object/2, 232
last/2, 912, 970
leaf/1, 387
leaf_class/1, 383
leaf_classes/1, 383
leaf_instance/1, 382
leaf_instances/1, 382
leap_year/1, 115, 441
leaping_/1, 138

learn/0, 606
learn/1, 606
learn/2, 600
learn/3, 600
learn_seq/2, 600
learn_with_timeout/4, 601
leash/1, 150
leashing/1, 150
leashing_/1, 139
least_common_multiple/2, 945
leaves/1, 387
length/2, 753, 913, 971
lgtdoc, 476
lgtdoc_messages, 479
lgtdocp, 480
lgtunit, 495
lgtunit_messages, 544
libraries/0, 372
libraries/1, 169, 192, 484
libraries/2, 169, 192, 484
libraries/3, 168, 192
library/1, 39, 126, 171, 194, 373, 485
library/2, 39, 126, 171, 194, 485
library_dependency_diagram, 235
library_dependency_diagram(Format), 236
library_diagram(Format), 238
library_entity, 477
library_load_diagram, 242
library_load_diagram(Format), 244
library_score/2, 41
license/1, 673
line_to_chars/2, 794
line_to_chars/3, 794
line_to_codes/2, 794
line_to_codes/3, 795
lint/0, 704, 731
lint/1, 703, 730
lint/2, 703
list, 904
list(Type), 906
list/0, 721
list_to_array/2, 461
listing, 566
listing/0, 567
listing/1, 567
listp, 907
load_registry/1, 715
loaded_file/1, 85
loaded_file_property/2, 86, 248
loaded_files_topological_sort/1, 87
loaded_files_topological_sort/2, 87
locate_directory/2, 184
locate_file/5, 184
locate_library/2, 184

[log/3](#), 154
[log_event/2](#), 575
[log_file/2](#), 574
[log_file_/2](#), 570, 572
[log_point_/3](#), 140
[logger](#), 569
[logging](#), 571
[logging/1](#), 575
[logging/3](#), 155
[logging_to_file_/2](#), 570, 572
[loggingp](#), 573
[logistic/3](#), 780
[lognormal/3](#), 776
[logseries/2](#), 777
[logtalk](#), 77
[logtalk_packs/0](#), 712
[logtalk_packs/1](#), 712
[lookup/2](#), 268
[lookup/3](#), 267
[lookup_in/3](#), 624
[loop](#), 577
[loopp](#), 578
[lower_upper/2](#), 890

M

[magic](#), 1019
[magic/2](#), 1020
[magic_expansion\(Mode\)](#), 1021
[magicise/4](#), 1020
[make/1](#), 513
[make_directory/1](#), 658
[make_directory_path/1](#), 659
[make_set/3](#), 988
[manhattan_distance/3](#), 943
[manhattan_norm/2](#), 942
[map/2](#), 272, 310, 592, 637, 754
[map/3](#), 272, 593, 754, 952
[map/4](#), 593
[map/5](#), 593
[map/6](#), 594
[map/7](#), 594
[map/8](#), 595
[map_element/2](#), 462
[map_member/3](#), 1044
[map_reduce/5](#), 595
[map_store/4](#), 1045
[max/2](#), 828, 913, 938
[max/3](#), 270
[max_clauses/1](#), 603
[max_inv_preds/1](#), 603
[max_size/1](#), 7
[maxheap](#), 366
[maybe](#), 628
[maybe/0](#), 771
[maybe/1](#), 772
[maybe/2](#), 772
[maybe_call/1](#), 772
[maybe_call/2](#), 773
[mean_deviation/2](#), 831
[median/2](#), 830, 940
[median_deviation/2](#), 832
[meets/2](#), 428
[member/2](#), 767, 815, 913
[memberchk/2](#), 815, 914, 971
[merge/3](#), 364
[merge_options/2](#), 648, 1035
[mermaid_graph_language](#), 246
[message_cache_/1](#), 552, 554, 555, 557
[message_diagram_description/1](#), 187
[message_hook/4](#), 81
[message_prefix_file/6](#), 81
[message_prefix_stream/4](#), 80
[message_tokens//2](#), 80
[met_by/2](#), 428
[meta](#), 584
[meta_compiler](#), 596
[meta_type/3](#), 964
[metagol](#), 598
[metagol_example_protocol](#), 605
[metap](#), 585
[metarule/6](#), 602
[metarule_next_id/1](#), 604
[min/2](#), 827, 914, 938
[min/3](#), 269
[min_clauses/1](#), 603
[min_max/3](#), 828, 939
[minheap](#), 368
[minimal_output](#), 546
[missing_predicate_directive_/3](#), 1037
[modes/2](#), 831, 940
[module_predicate_called_/3](#), 1036
[module_property/2](#), 248
[modules_diagram_support](#), 247
[monitor](#), 291
[monitor/1](#), 289
[monitor/4](#), 290
[monitor_activated/0](#), 294
[monitored/1](#), 289
[monitoring](#), 92
[monitorp](#), 293
[monitors/1](#), 289
[msort/2](#), 914
[msort/3](#), 915
[multifile_directive_/3](#), 1038
[mutation/3](#), 615, 617
[mutation/4](#), 618
[mutations](#), 614
[mutations_store](#), 616

N

- name/1, 673, 734
- name_of_day/3, 116
- name_of_month/3, 116
- natural, 930
- natural//1, 354
- navltree, 619
- nbintree, 620
- nested_dictionary_protocol, 621
- new/1, 452, 564, 623, 956
- new/2, 451, 564, 988
- new/3, 427
- new_line//0, 345
- new_lines//0, 346
- next/2, 1051
- next/3, 1051
- next/4, 269
- nextto/3, 915, 971
- noc_metric, 66
- node/6, 181
- node/7, 230
- node_/6, 188
- node_path_/2, 188
- nodebug/0, 148
- nolog/3, 155
- nologall/0, 155
- non_blank//1, 347
- non_blanks//1, 347
- non_standard_predicate_call_/2, 1037
- nor_metric, 67
- normal/3, 776
- normal_element/2, 417
- normalize_range/2, 943
- normalize_range/4, 944
- normalize_scalar/2, 945
- normalize_unit/2, 944
- nospy/1, 151
- nospy/3, 152
- nospy/4, 153
- nospyall/0, 154
- not_excluded_file/3, 55
- not_excluded_file/4, 183
- note/1, 513
- note/2, 736
- note/3, 675
- notrace/0, 149
- now/3, 120
- nrbtree, 626
- nth0/3, 916, 972
- nth0/4, 916, 972
- nth1/3, 916, 973
- nth1/4, 917, 973
- null/1, 457
- null_device_path/1, 661

- number, 931
- number//1, 355
- number_grammars(Format), 350
- number_of_tests/1, 501
- numberlist, 935
- numberlistp, 936
- numbervars/1, 959
- numbervars/3, 959

O

- object_file_/2, 495
- object_predicate_called_/3, 1036
- object_wrapper_hook, 401
- object_wrapper_hook(Name,Relations), 404
- object_wrapper_hook(Protocol), 402
- observer, 159
- occurrences/2, 918
- occurrences/3, 918
- occurs/2, 956
- of/2, 631
- of_expected/2, 302
- of_unexpected/2, 302
- omit_path_prefix/3, 186
- one_or_more//0, 359
- one_or_more//1, 358
- one_or_more//2, 357
- operating_system_machine/1, 670
- operating_system_name/1, 669
- operating_system_release/1, 670
- operating_system_type/1, 669
- option/2, 647
- option/3, 647
- optional, 630
- optional(Optional), 634
- options, 642
- options_protocol, 643
- or/2, 638
- or_else/2, 311, 639
- or_else_call/2, 312, 640
- or_else_fail/1, 313, 641
- or_else_get/2, 312, 640
- or_else_throw/1, 313
- or_else_throw/2, 641
- orphaned/0, 685
- orphaned/2, 684
- os, 649
- os_types, 651
- osp, 653
- outdated/0, 684
- outdated/1, 684
- outdated/2, 683
- outdated/4, 682
- outdated/5, 681
- output_edges/1, 182

output_externals/1, 179
 output_file/4, 180
 output_file_name/2, 228
 output_file_path/4, 183
 output_files/2, 179
 output_library/3, 178
 output_missing_externals/1, 182
 output_node/6, 181
 output_rdirectory/3, 179
 output_rlibrary/3, 178
 output_sub_diagrams/1, 180
 overlapped_by/2, 429
 overlaps/2, 429

P

pack_protocol, 672
 packs, 676
 packs_common, 704
 packs_messages, 717
 packs_specs_hook, 718
 pairs, 947
 parent/1, 391
 parenthesis/2, 889
 parents/1, 391
 parse/2, 18, 20, 23, 27, 468, 474, 855, 1042
 parse/3, 1042
 parse_domain/2, 738
 parse_domain/3, 738
 parse_problem/2, 738
 parse_problem/3, 739
 partial_/1, 548, 550
 partial_map/4, 275
 partition/3, 300
 partition/4, 588, 809
 partition/5, 919
 partition/6, 589
 pass_info/1, 283
 pass_info/2, 283
 passed_/3, 542
 path_concat/3, 658
 pcd_data_7bit//1, 1047
 pddl, 737
 permutation/2, 769, 919, 973
 pid/1, 655
 pin/0, 708
 pin/1, 707
 pinned/1, 709
 plus/3, 902
 poisson/2, 780
 population, 819
 port/5, 744
 port_/5, 746
 portray_clause/1, 568
 ports_profiler, 741
 postorder/2, 261
 power/2, 781
 power_sequence/4, 903
 powerset/2, 816
 pp/1, 1043
 pp_string/1, 1045
 pprint/1, 601
 pprint_clause/1, 604
 pprint_clauses/1, 604
 pred_info/3, 282
 predicate/2, 128
 predicate_breakpoint_/3, 141
 predicate_called_but_not_defined_/2, 1035
 predicate_entity_/4, 478
 predicate_info_pair_score_hook/4, 62
 predicate_info_score_hook/3, 62
 predicate_mode_score_hook/3, 61
 predicate_mode_score_hook/5, 62
 predicates/2, 128
 prefix/0, 713
 prefix/1, 713
 prefix/2, 919, 974
 prefix/3, 920
 preorder/2, 260
 previous/2, 1052
 previous/3, 1052
 previous/4, 269
 print_flags/0, 321, 326
 print_flags/1, 322
 print_goal_hook, 405
 print_message/3, 79
 print_message_token/4, 80
 print_message_tokens/3, 79
 print_readme_file_path/1, 714
 process_all/1, 46
 process_directory/2, 45
 process_entity/2, 44
 process_file/2, 45
 process_library/2, 46
 process_rdirectory/2, 45
 process_rlibrary/2, 46
 product/2, 827, 939
 product/3, 816
 program_to_clauses/2, 601
 prolog_module_hook(Module), 407
 proper_prefix/2, 920
 proper_prefix/3, 921
 proper_suffix/2, 928
 proper_suffix/3, 928
 proto_hierarchy, 389
 proto_hierarchyp, 390
 prove/2, 1018
 prove/3, 1018
 provides/2, 730

pseudo_random_protocol, 760

Q

quasi_skipping_/0, 138

question_hook/6, 82

question_prompt_stream/4, 82

queue, 747

queup, 749

quick_check/1, 505

quick_check/2, 504

quick_check/3, 504

R

random, 762

random/1, 766

random/3, 770

random_node/1, 996

random_protocol, 765

random_tree/1, 999

randomize/1, 758, 763

randseq/4, 770

randset/4, 771

range/2, 828

rbtree, 274

rdirectories/1, 486

rdirectories/2, 486

rdirectory/1, 39, 125, 173, 196, 487, 1030

rdirectory/2, 38, 125, 173, 196, 486, 1030

rdirectory/3, 172, 196

rdirectory_score/2, 43

read_file, 739

read_file/2, 105, 740, 867

read_file/3, 104, 866

read_file_by_line/2, 108, 870

read_file_by_line/3, 107, 869

read_from_atom/2, 839

read_from_chars/2, 841

read_from_codes/2, 842

read_only_device_path/1, 662

read_stream/2, 106, 868

read_stream/3, 105, 867

read_stream_by_line/2, 109, 871

read_stream_by_line/3, 108, 870

read_term_from_atom/3, 839

read_term_from_chars/3, 840

read_term_from_chars/4, 840

read_term_from_codes/3, 841

read_term_from_codes/4, 841

reader, 787

readme/1, 711

readme/2, 711

readme_file_path/2, 714

record_/3, 802

recorda/2, 799

recorda/3, 798

recorded/2, 800

recorded/3, 800

recorded_database, 796

recorded_database_core, 797

recordz/2, 800

recordz/3, 799

redis, 803

reference_/1, 802

referenced_entity_/2, 216

referenced_logtalk_directory_/1, 206

referenced_logtalk_file_/1, 223

referenced_logtalk_library_/2, 241

referenced_module_/2, 216

referenced_predicate_/1, 256

referenced_prolog_directory_/1, 206

referenced_prolog_file_/1, 223

referenced_prolog_library_/2, 242

registries, 720

registry_loader_hook, 731

registry_protocol, 733

relative_standard_deviation/2, 833

remember_included_directory/1, 205

remember_included_file/1, 222

remember_included_library/2, 240

remember_referenced_logtalk_directory/1, 205

remember_referenced_logtalk_file/1, 222

remember_referenced_logtalk_library/2, 240

remember_referenced_prolog_directory/1, 205

remember_referenced_prolog_file/1, 222

remember_referenced_prolog_library/2, 241

remove_directive_/2, 1039

remove_duplicates/2, 921, 974

removeDependent/1, 163

rename_file/2, 666

replace/3, 1055

replace_sub_atom/4, 877

rescale/3, 945

reset/0, 147, 180, 706, 744, 1006

reset/1, 744

reset_counter/1, 561

reset_counters/0, 561

reset_flags/0, 320

reset_flags/1, 320

reset_genint/0, 332

reset_genint/1, 332

reset_gensym/0, 335

reset_gensym/1, 335

reset_monitor/0, 295

reset_seed/0, 758, 763

restore/1, 700

restore/2, 699

reverse/2, 921, 974

rewind/2, 1052

- rewind/3, 1053
- rlibraries/1, 482
- rlibraries/2, 482
- rlibrary/1, 40, 127, 170, 194, 483
- rlibrary/2, 40, 126, 170, 193, 483
- rlibrary_score/2, 42
- rule/2, 1008
- rule/3, 1008
- rule/4, 1008
- rule_expansion(Mode), 1022
- run/0, 499
- run/1, 500
- run/2, 500
- run_quick_check_tests/5, 511
- run_test_set/0, 511
- run_test_sets/1, 501
- run_tests/0, 511
- run_tests/1, 511
- running_test_sets_/0, 540

S

- same_length/2, 922, 975
- same_length/3, 922
- sample, 821
- sampling_protocol, 774
- save/0, 1034
- save/1, 698, 1033
- save/2, 697
- save_edge/5, 182
- scalar_product/3, 943
- scan_left/4, 590
- scan_left_1/3, 590
- scan_right/4, 591
- scan_right_1/3, 592
- search/1, 687
- secondary_header/2, 31
- secondary_header_flag/2, 29
- secondary_header_time/2, 31
- seed_/3, 759, 764
- select/3, 767, 816, 922, 975
- select/4, 768, 923
- selectchk/3, 817, 923
- selectchk/4, 923
- selected_test_/1, 541
- send/3, 805
- sequence/3, 902
- sequence/4, 769, 899, 903
- sequence/5, 899
- sequence_count/2, 30
- sequence_flags/2, 29
- sequence_grammars, 356
- sequential_occurrences/2, 917
- sequential_occurrences/3, 917
- serve/3, 753
- set, 806
- set(Type), 807
- set/1, 1005
- set/4, 770
- set_binary_input/1, 519
- set_binary_input/2, 519
- set_binary_input/3, 518
- set_binary_output/1, 530
- set_binary_output/2, 529
- set_binary_output/3, 529
- set_element/2, 462
- set_field/2, 451
- set_flag_value/2, 319
- set_flag_value/3, 320
- set_monitor/4, 290
- set_seed/1, 6, 761
- set_spy_point/4, 296
- set_text_input/1, 516
- set_text_input/2, 515
- set_text_input/3, 515
- set_text_output/1, 523
- set_text_output/2, 523
- set_text_output/3, 522
- set_write_max_depth/1, 156
- setp, 810
- setup/0, 512, 706
- sha256sum_command/1, 715
- shell, 1023
- shell(Interpreters), 1025
- shell/1, 656
- shell/2, 655
- shell_command/1, 279
- shell_expansion(Mode), 1026
- shrink/3, 5
- shrink_sequence/3, 5
- shriner/1, 4
- sign//1, 355
- singletons/2, 959
- size/2, 273, 364, 815
- size_metric, 69
- skewness/2, 833
- skipped_/1, 542
- skipping_/0, 137
- skipping_unleashed_/1, 138
- sleep/1, 671
- softmax/2, 946
- softmax/3, 946
- sort/2, 809, 924
- sort/3, 924
- sort/4, 925
- source_file_extension/1, 249
- space//0, 344
- spaces//0, 344
- split/3, 877

- split/4, 925
- spy/1, 150
- spy/3, 152
- spy/4, 153
- spy_point/4, 295
- spy_point_/4, 293
- spying/1, 151
- spying/3, 152
- spying/4, 153
- squares_and_cubes/6, 824
- squares_and_hypers/6, 824
- standard_cauchy/3, 785
- standard_deviation/2, 832
- standard_exponential/1, 785
- standard_gamma/2, 785
- standard_normal/1, 786
- standard_t/2, 784
- start/0, 742, 1024
- start_redirect_to_file/2, 158
- started_by/2, 430
- starts/2, 429
- statistics, 822
- statisticsp, 825
- stop/0, 742
- stop_redirect_to_file/0, 158
- stream_position/1, 539
- stream_to_bytes/2, 793
- stream_to_bytes/3, 793
- stream_to_chars/2, 792
- stream_to_chars/3, 792
- stream_to_codes/2, 791
- stream_to_codes/3, 791
- stream_to_terms/2, 792
- stream_to_terms/3, 793
- streamvars, 562
- sub_diagram_/1, 220, 227, 238, 245
- sub_diagram_/2, 203, 210
- sub_directory/2, 47
- sub_library/2, 47
- subclass/1, 381
- subclasses/1, 381
- subject, 160
- sublist/2, 925, 975
- subsequence/3, 926
- subsequence/4, 926
- subset/2, 817
- substitute/4, 927
- subsumes/2, 956
- subterm/2, 957, 1043
- subtract/3, 817, 927, 976
- succ/2, 902
- suffix/2, 927, 976
- suffix/3, 928
- sum/2, 827, 939

- superclass/1, 381
- superclasses/1, 382
- supported_archive/1, 716
- supported_editor_url_scheme_prefix/1, 186
- supported_url_archive/1, 716
- suppress_binary_output/0, 514
- suppress_goal_hook, 408
- suppress_text_output/0, 514
- suspend_monitor/0, 295
- swap/2, 768
- swap_consecutive/2, 768
- syndiff/3, 818

T

- tab//0, 345
- tabs//0, 345
- take/3, 929
- tap_output, 547
- tap_report, 549
- tar_command/1, 716
- temporary_directory/1, 661
- temporary_file_/1, 837
- term, 952
- term_expansion/2, 74
- term_io, 836
- term_io_protocol, 838
- termp, 954
- terms_to_array/2, 459
- test/1, 501
- test/2, 540
- test/3, 540
- test_/2, 541
- test_count_/1, 549, 551
- text_file_assertion/3, 536
- text_file_assertion/4, 535
- text_input_assertion/2, 518
- text_input_assertion/3, 517
- text_output_assertion/2, 526
- text_output_assertion/3, 526
- text_output_assertion/4, 525
- text_output_contents/1, 528
- text_output_contents/2, 527
- text_output_contents/3, 527
- time, 118
- time_stamp/1, 667
- timeout, 848
- timeout/1, 604
- timep, 119
- timestamp/2, 983
- timestamp/8, 983
- timestamp_/6, 494
- today/3, 115
- tolerance_equal/4, 509, 933
- tool/1, 372

tools/0, 372
 toon, 850
 toon(ObjectRepresentation,PairRepresentation,StringRepresentation), 853
 toon(StringRepresentation), 852
 toon_protocol, 854
 top/3, 365
 top_next/5, 366
 toychrdb, 857
 trace/0, 149
 trace_event/2, 83
 tracing_/0, 137
 transpose/2, 950
 triangular/4, 782
 triggered_breakpoint_/4, 143
 triggered_breakpoint_enabled_/2, 143
 true/1, 456
 tsv, 862
 tsv(Header), 863
 tsv_protocol, 865
 tutor, 874
 type, 961
 type/1, 964
 type/2, 28
 type/3, 605
 type_entity_/4, 478

U

ulid, 978
 ulid(Representation), 979
 ulid_protocol, 980
 ulid_types, 984
 unexpected/1, 309
 unexpected/2, 300
 uniform/1, 782
 uniform/3, 781
 uninstall/0, 696
 uninstall/1, 695
 uninstall/2, 694
 union/3, 818
 union/4, 819, 988
 union_all/3, 989
 union_find, 985
 union_find_protocol, 986
 unknown_predicate_called_/2, 1036
 unpin/0, 709
 unpin/1, 708
 unsafe_set_flag_value/2, 323
 unzip/2, 1050
 update/0, 279, 694, 727
 update/1, 160, 693, 726
 update/2, 692, 725
 update/3, 266, 691
 update/4, 266

update/5, 266
 update_in/4, 624
 update_in/5, 625
 upn_metric, 70
 user, 94
 user_data/2, 30
 uses_diagram, 250
 uses_diagram(Format), 251
 uuid, 991
 uuid(Representation), 992
 uuid_null/1, 995
 uuid_protocol, 993
 uuid_v1/2, 995
 uuid_v4/1, 995

V

valid/1, 427, 835, 957, 976
 valid/2, 964
 valid/3, 117, 121
 valid_date/3, 440
 valid_option/1, 646
 valid_options/1, 646
 validate/1, 326
 validate/3, 325
 validate_type/1, 325
 value/1, 1005
 value/3, 950
 value_reference/2, 456
 values/2, 271, 949
 variables/2, 958
 variance/2, 834
 variance/6, 825
 variant/2, 507, 958
 varlist, 966
 varlistp, 967
 varnumbers/2, 960
 varnumbers/3, 960
 verify_commands_availability/0, 707
 version/2, 28
 version/6, 674
 versions/3, 685
 void/1, 457
 void_element/1, 417
 von_mises/3, 783

W

wald/3, 776
 wall_time/1, 668
 weibull/3, 781
 weighted_mean/3, 830
 welcome/0, 1024
 when/2, 98
 whiledo/2, 579
 white_space//0, 344

`white_spaces//0`, 344
`with_output_to/2`, 847
`without//2`, 359
`working_directory/1`, 661
`wrapper`, 1028
`write_file/3`, 110, 872
`write_max_depth/1`, 156
`write_max_depth_/1`, 140
`write_stream/3`, 110, 872
`write_term_to_atom/3`, 842
`write_term_to_chars/3`, 843
`write_term_to_chars/4`, 843
`write_term_to_codes/3`, 844
`write_term_to_codes/4`, 845
`write_to_atom/2`, 843
`write_to_chars/2`, 844
`write_to_codes/2`, 845
`write_to_file_hook(File)`, 410
`write_to_file_hook(File,Options)`, 411
`write_to_stream_hook(Stream)`, 412
`write_to_stream_hook(Stream,Options)`, 414

X

`xhtml11`, 419
`xml`, 1040
`xml_to_document/3`, 1044
`xref_diagram`, 252
`xref_diagram(Format)`, 254
`xunit_net_v2_output`, 551
`xunit_net_v2_report`, 553
`xunit_output`, 554
`xunit_report`, 556

Z

`z_normalization/2`, 834
`zap_to_port_/1`, 140
`zero_or_more//0`, 359
`zero_or_more//1`, 358
`zero_or_more//2`, 357
`zip/2`, 1050
`zip/3`, 1050
`zip_at_index/4`, 1059
`zipperp`, 1048
`zlist`, 1058