

Model Checking Contest 2025

15th edition, Paris, France, June 24, 2025

Complete Results for the 2025 Edition of the Model Checking Contest

Last Updated
June 24, 2025

1. Introduction

This page summarizes the results for the 2025 edition of the Model Checking Contest (MCC'2025). This page is divided in three sections:

- First, we **list the qualified tools** for the MCC'2025,
- Then, we provide some informations about **the experimental conditions of the MCC'2025**,
- Then, we present an access **to details about results**,
- Then, we provide the **list of winners of the MCC'2025**,
- Finally, we provide an attempt to evaluate **tool reliability** based on the comparison of the results provided in the contest.

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2. List of Qualified Tools in 2025

5 tools where submitted this year. They all successfully went through a qualification process requiring about 1625 runs (each tool had to answer each examination for the first instance of each «known» model).

Data about these tools are summarized in the table below. For any tool, you can download the disk image that was provided with all its data. You may use these to reproduce measures locally and perform comparison with your own tool on the same benchmark. Please note that one tool (with two variants) was out of competition this year: this was agreed between the tool developer and the organizers and is part of an experiment with precomputed deep-learning.







IMPORTANT: all tool developers agreed to provide the original image disk embedding the tool they submitted his year (see links in the table below). You may operate these tools on your own. To do so, you need the second **disk image (mounted by the other one) that contains all models for 2025 together with the produced formulas**. This image is mounted with the default configuration, as well as in he default disk image provided in the tool submission kit ([see here](#)).

IMPORTANT: You also have access to the **archive containing all models and the corresponding formulas for 2025 here**.

IMPORTANT: Note that 2024-gold is an hybrid artificial tool made with the tools that won categories in 2024. It correspond usually to several virtual machines, so the corresponding archive is a bit larger. For the MCC'2025, 2024-gold is composed as follows:

- TINA.tedd** for the StateSpace Category
- ITS-Tools** for the UpperBounds category
- GreatSPN+red** for the GlobalProperties categories
- Tapaal** for Reachability Formulas, CTL Formulas and LTL Formulas categories

The table below presents all participating tools for 2025.

Summary of the Participating Tools					
Tool name	Supported Petri nets	Representative Author	Origin	Type of execution	Link to the submitted disk image
2024-gold	P/T and colored	Fabrice Kordon	Aalborg/Paris/Toulouse	Collateral Processing	
enPAC	P/T and colored	Cong He & Shuo Li	Tongji University, Shanghai (China)	Sequential Processing	
ITS-Tools	P/T and colored	Yann Thierry-Mieg	Sorbonne Université (France)	Collateral Processing	
smpt	P/T and colored	Nicolas Amat	LAAS-CNRS (France) & IMDEA (Spain)	Collateral Processing	
Tapaal	P/T and colored	Jiri Srba	Aalborg University (Denmark)	Collateral Processing	
TINA.tedd	P/T and colored	Bernard Berthomieu	LAAS-CNRS (France)	Collateral Processing	

The table below lists the techniques reported per examination (and for all the tool variants when applicable).

Techniques Reported by the Participating Tools (per examination)							
Tool name	StateSpace	GlobalProperties	UpperBounds	Reachability	CTL	LTL	All together
2024-gold	COLLATERAL_PROCESSING DECISION_DIAGRAMS EXPLICIT LATTICE_POINTS_COUNTING STRUCTURAL_REDUCTION TOPOLOGICAL UNFOLDING_TO_PT USE_NUPN	BESTFIRST_WALK CONSTANT_TEST CPN_APPROX_DEADLOCK_TEST DECISION_DIAGRAMS EXHAUSTIVE_WALK_INITIAL_STATE INVARIANTS_MARKED_SUFFIX_TEST PARALLEL_PROCESSING PARIKH_WALK PROBABILISTIC_WALK QUASI_LIVE_REVERSIBLE QUASILIVENESS_TEST RANDOM_WALK_SAT_SMT SCC_TEST_SIPHON_TEST SKELETON_TEST_SMT_REFINEMENT STRUCTURAL STRUCTURAL_REDUCTION TOPOLOGICAL TRIVIAL_UNMARKED_SCC_TEST UNFOLDING_TO_PT_USE_NUPN	BESTFIRST_WALK_COVER_WALK CPN_APPROX_DECISION_DIAGRAMS INITIAL_STATE_PARIKH_WALK RANDOM_WALK REACHABILITY_MAX REACHABILITY_MIN_SAT_SMT TOPOLOGICAL_USE_NUPN	COLLATERAL_PROCESSING CPN_APPROX_EXPLICIT_LP_APPROX QUERY_REDUCTION_SAT_SMT STATE_COMPRESSION STRUCTURAL_REDUCTION STUBBORN_SETS TRACE_ABSTRACTION_REFINEMENT UNFOLDING_TO_PT	COLLATERAL_PROCESSING CPN_APPROX_CTL_CZERO_EXPLICIT LP_APPROX_QUERY_REDUCTION SAT_SMT_STATE_COMPRESSION STRUCTURAL_REDUCTION STUBBORN_SETS TRACE_ABSTRACTION_REFINEMENT UNFOLDING_TO_PT	LOGFIRECOUNT_HEUR(5000) LP_APPROX_NDFS QUERY_REDUCTION RANDOM_HEUR_SAT_SMT STATE_COMPRESSION STRUCTURAL_REDUCTION STUBBORN STUBBORN_SETS_TARJAN UNFOLDING_TO_PT WEAK_SKIP	AUT_STUB_AUTOMATON_HEUR BESTFIRST_WALK COLLATERAL_PROCESSING CONSTANT_TEST_COVER_WALK CPN_APPROX_CTL_CZERO DEADLOCK_TEST DECISION_DIAGRAMS_DIST_HEUR EXHAUSTIVE_WALK_EXPLICIT HEURISTIC_INITIAL_STATE INVARIANTS LATTICE_POINTS_COUNTING LINEAR_EQUATIONS LOGFIRECOUNT_HEUR(5000) LP_APPROX_MARKED_SUFFIX_TEST NDFS_OPTIM-1 PARALLEL_PROCESSING PARIKH_WALK PROBABILISTIC_WALK QUASI_LIVE_REVERSIBLE QUASILIVENESS_TEST QUERY_REDUCTION RANDOM_HEUR_RANDOM_WALK REACHABILITY_MAX REACHABILITY_MIN_SAT_SMT SCC_TEST_SIPHON_TEST SKELETON_TEST_SMT_REFINEMENT STATE_COMPRESSION_STRUCTURAL STRUCTURAL_REDUCTION STUBBORN_STUBBORN_SETS TARJAN_TOPOLOGICAL TRACE_ABSTRACTION_REFINEMENT TRIVIAL_UNMARKED_SCC_TEST UNFOLDING_TO_PT_USE_NUPN WEAK_SKIP
enPAC	—	—	—	—	—	COLLATERAL_PROCESSING STATE_COMPRESSION USE_NUPN	COLLATERAL_PROCESSING STATE_COMPRESSION_USE_NUPN
ITS-Tools	DECISION_DIAGRAMS TOPOLOGICAL_USE_NUPN	BESTFIRST_WALK COLLATERAL_PROCESSING CONSTANT_TEST_CPN_APPROX DEADLOCK_TEST DECISION_DIAGRAMS EXHAUSTIVE_WALK_EXPLICIT INITIAL_STATE_INVARIANTS_LTSMIN MARKED_SUFFIX_TEST PARIKH_WALK_PARTIAL_ORDER PROBABILISTIC_WALK QUASI_LIVE_REVERSIBLE QUASILIVENESS_TEST RANDOM_WALK_SAT_SMT SCC_TEST_SIPHON_TEST SKELETON_TEST_SMT_REFINEMENT STRUCTURAL STRUCTURAL_REDUCTION	BESTFIRST_WALK_COVER_WALK CPN_APPROX_DECISION_DIAGRAMS INITIAL_STATE_PARIKH_WALK RANDOM_WALK REACHABILITY_MAX REACHABILITY_MIN_SAT_SMT TOPOLOGICAL_USE_NUPN	BESTFIRST_WALK COLLATERAL_PROCESSING CPN_APPROX_DECISION_DIAGRAMS EXHAUSTIVE_WALK_EXPLICIT INITIAL_STATE_LTSMIN OVER_APPROXIMATION PARIKH_WALK_PARTIAL_ORDER PROBABILISTIC_WALK RANDOM_WALK_SAT_SMT SMT_REFINEMENT STRUCTURAL_REDUCTION TOPOLOGICAL_USE_NUPN	BESTFIRST_WALK COLLATERAL_PROCESSING DECISION_DIAGRAMS EXHAUSTIVE_WALK_INITIAL_STATE OVER_APPROXIMATION PARIKH_WALK PROBABILISTIC_WALK RANDOM_WALK_SMT_REFINEMENT TOPOLOGICAL_USE_NUPN	DECISION_DIAGRAMS EXPLICIT_HOA_INITIAL_STATE KNOWLEDGE LENGTHENING_INSENSITIVE LTSMIN_PARTIAL_ORDER REACHABILITY_KNOWLEDGE SAT_SMT SHORTENING_INSENSITIVE STACK_TEST_STUTTER_TEST TOPOLOGICAL_USE_NUPN	BESTFIRST_WALK COLLATERAL_PROCESSING CONSTANT_TEST_COVER_WALK CPN_APPROX_DEADLOCK_TEST DECISION_DIAGRAMS EXHAUSTIVE_WALK_EXPLICIT_HOA INITIAL_STATE_INVARIANTS KNOWLEDGE LENGTHENING_INSENSITIVE_LTSMIN MARKED_SUFFIX_TEST OVER_APPROXIMATION PARIKH_WALK_PARTIAL_ORDER PROBABILISTIC_WALK QUASI_LIVE_REVERSIBLE QUASILIVENESS_TEST RANDOM_WALK REACHABILITY_KNOWLEDGE

3. Experimental Conditions of the MCC'2025

IMPORTANT: due to a configuration problem on one of the submitted tool, information concerning time and memory could not be retrieved, thus making comparisons useless. This is why in 2025, some comparison data are missing.

- We are pleased to thanks those who helped in the execution of tools:

This table below presents detailed results about the MCC'2025.

- You can [download the full archive](#) (5.3 GB compressed and 24 GB uncompressed) of the 144 690 runs processed to compute the results of the MCC'2025. This archive contains execution traces, execution logs and sampling, as well as a large CSV files that summarizes all the executions. You may get separately the two mostly interesting CSV files:

5. The Winners for the MCC'2025

- This section presents the results for the main examinations that are:

To avoid a too large disparity between models with numerous instances and those with only one, a normalization was applied so that the score, for an examination and a model, varies between 102 and 221 points. Therefore, providing a correct value may brings a different number of points according to the considered model. A multiplier was applied depending to the model category:

- **x1** for «Known» models,
- **x13** for «Surprise» models (computed from rule E-4.4 that states «the total score for all “surprise” models instances weight approximatively half the score for all the instances of “known” models»).

Let us remind two «special» tools:

- **2024-gold** is an hybrid tool made of the gold-medal for the 2023 edition for each examination. It is a way to evaluate the progress of participants since the last edition of the MCC.
- **BVT-2025 (Best Virtual Tool)** computes the union of all the values computed by all other tools. It is very often the fastest and the tool having the smallest memory footprint, based on what the participating tool performed. It is a way to evaluate the complementarity between tools by comparing it to the gold medal

WRNING: due to a mistake in one submitted VM, no memory and CPU information this year (crashes our analysis tools + not relevant).

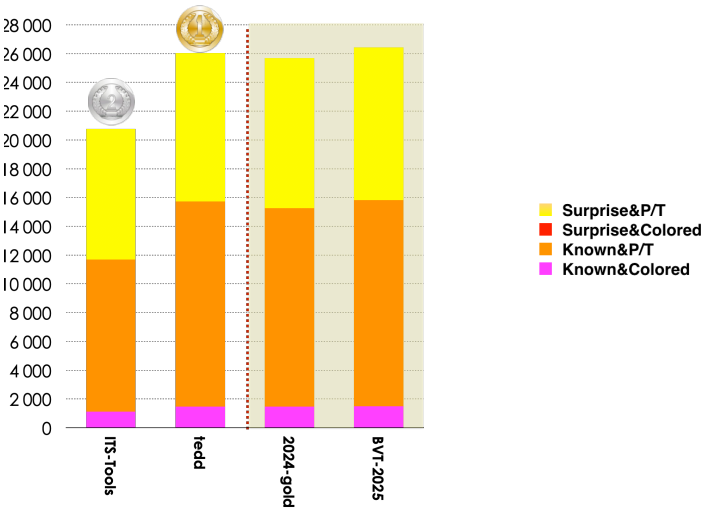
WRNING: due to a lack of time from the execution board, the computation rate (number of total values computed by each tool) could not be computed.

5.1. Winners in the StateSpace Category

5 tools out of 11 participated in this examination (plus 4 reference). Results based on the scoring shown below is:

- **tedd** ranked first (26 048 pts),
- **GreatSPN+red** ranked second (20 777 pts),

The the 2024-gold collected 25 697 pts. BVT-2025 (Best Virtual Tool) collected 26 430 pts.



Estimated Tool Confidence rate for StateSpace (based on the «significant values» computed by tools) see section 6. for details				
Tool name	Reliability	Correct Values	«significant values»	
Tools competing in 2025				
ITS-Tools	100.000%	3 253	3 253	
tedd	100.000%	3 253	3 253	
2024-gold and BVT-2025				
2024-gold	100.000%	3 253	3 253	
BVT-2025	100.000%	3 253	3 253	

Remarks about the StateSpace examination

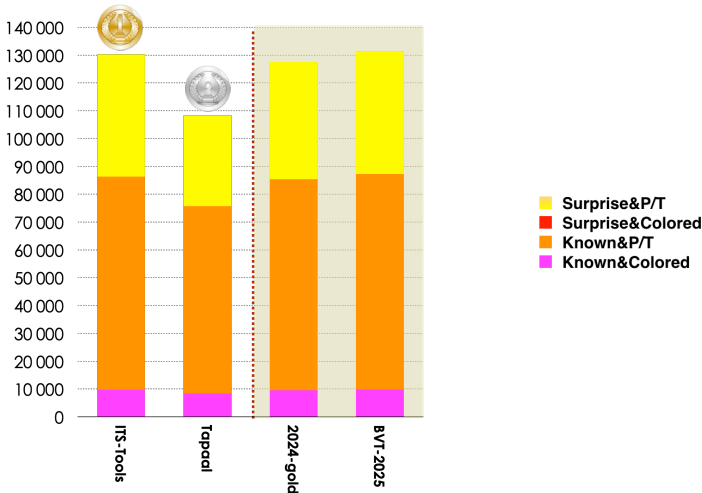
Some detailed results state that marking ins infinite (use of the value «+Inf*****»). There are some infinite models in our benchmark but our analysis tools have a constrains in the representation of very large state spaces which is the one of the Long_Long_Float Ada type (maximum value of 1.0E+4932). When watching the execution report of some tools, you can check weather «+Inf*****» really means infinite or not.

5.2. Winners in the GlobalProperties Category

6 tools out of 11 participated in these examinations (ReachabilityDeadlock , QuasiLiveness, StableMarking, Liveness, OneSafe). Results based on the scoring shown below is:

- **ITS-Tools** ranked first (130 285 pts),
- **Tapaal** ranked second (108 355 pts).

2024-gold collected 127 565 pts. BVT-2025 (Best Virtual Tool) collected 131 276 pts.



Estimated Tool Confidence rate for GlobalPropertiesScores (based on the «significant values» computed by tools) see section 6. for details				
Tool name	Reliability	Correct Values	«significant values»	

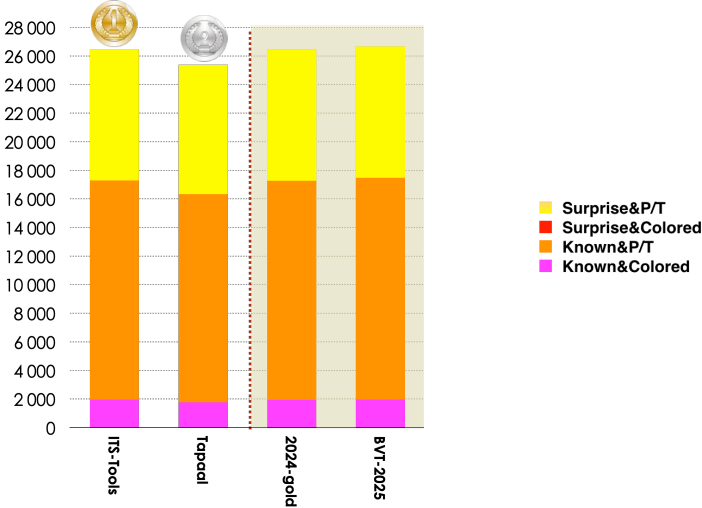
Tools competing in 2024			
ITS-Tools	100,000%	7 564	7 564
Tapaal	99,986%	7 564	7 564
2024-gold and BVT-2025			
2024-gold	100,000%	7 564	7 564
BVT-2025	100,000%	7 564	7 564

5.3. Winners in the UpperBounds Category

6 tools out of 11 participated in this examination. Results based on the scoring shown below is:

- **ITS-Tools** ranked first (26 479 pts),
- **Tapaal** ranked second (25 395 pts),

2024-gold collected 26 458 pts. BVT-2025 (Best Virtual Tool) collected 26 660 pts.



Estimated Tool Confidence rate for UpperBound (based on the «significant values» computed by tools) see section 6. for details			
Tool name	Reliability	Correct Values	«significant values»
Tools competing in 2024			
ITS-Tools	100.000%	26 567	26 567
Tapaal	100.000%	26 567	26 567
2024-gold and BVT-2025			
2024-gold	100.000%	26 567	26 567
BVT-2025	100.000%	26 567	26 567

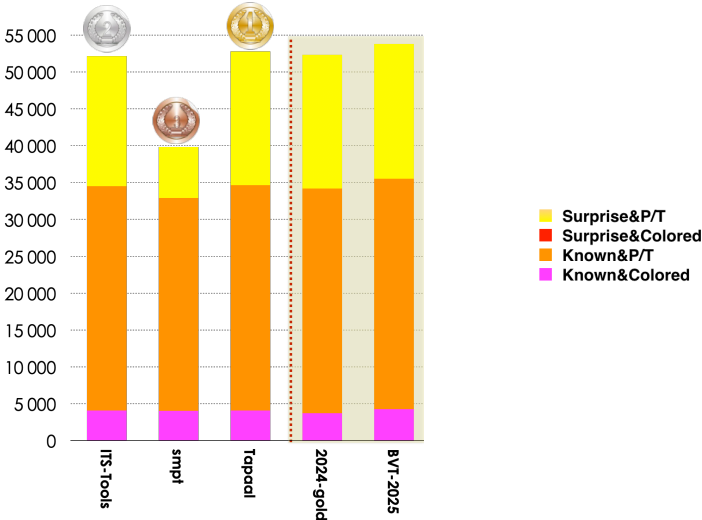
5.4. Winners in the Reachability Formulas Category

8 tools out of 11 participated in these examinations (ReachabilityCardinality and ReachabilityFireability). Results based on the scoring shown below is:

- **Tapaal** ranked first (52 819 pts),
- **ITS-Tools** ranked second (52 174 pts),
- **smtp** ranked third (39 841 pts).

2024-gold collected 52 345 pts. BVT-2025 (Best Virtual Tool) collected 53 796 pts.

Note that SVSKit only computes Fireability formulas.



Estimated Tool Confidence rate for Reachability (based on the «significant values» computed by tools) see section 6. for details			
Tools competing in 2024			
ITS-Tools	99,998%	54 760	54 761
smtp	100,000%	50 860	50 860
Tapaal	100,000%	55 241	55 241
2024-gold and BVT-2025			
2024-gold	99,989%	54 898	54 898
BVT-2025	100,000%	55 257	55 257

5.5. Winners in the CTL Formulas Category

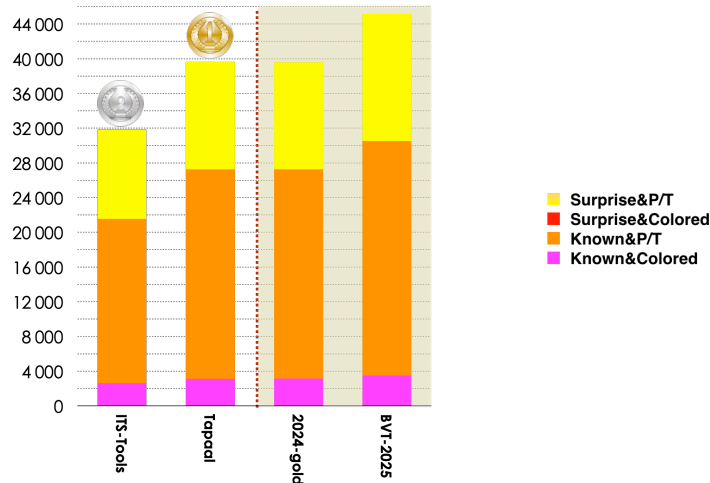
7 tools out of 11 participated in these examinations (CTLCardinality and CTLFireability). Results based on the scoring shown below is:

- **Tapaal** ranked first (39 644 pts),

- **ITS-Tools** ranked second (31 851 pts),

2024-gold collected 39 619 pts. BVT-2025 (Best Virtual Tool) collected 45 143 pts.

Note that SVSKit only computes Fireability formulas.



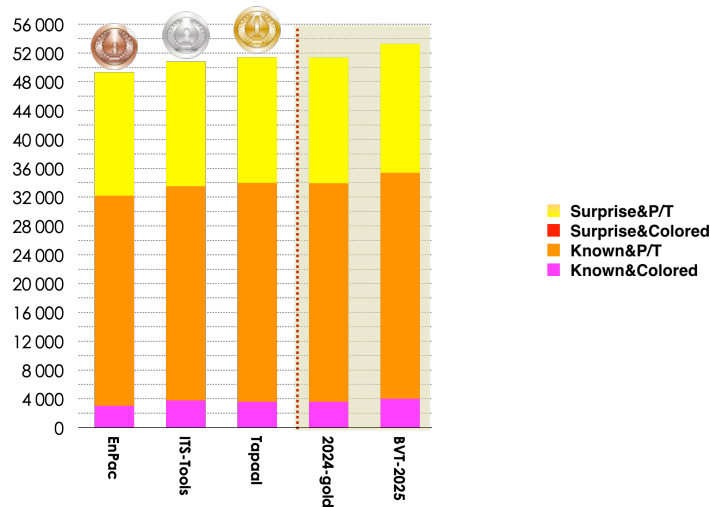
Estimated Tool Confidence rate for CTL (based on the «significant values» computed by tools) see section 6. for details			
Tool name	Reliability	Correct Values	«significant values»
Tools competing in 2024			
ITS-Tools	100,000%	29 026	29 026
Tapaal	100,000%	29 026	29 026
2024-gold and BVT-2025			
2024-gold	100,000%	29 026	29 026
BVT-2025	100,000%	29 026	29 026

5.6. Winners in the LTL Formulas Category

7 tools out of 11 participated in these examinations (LTLCardinality and LTLFireability). Results based on the scoring shown below is:

- **Tapaal** ranked first (51 422 pts),
- **ITS-Tools** ranked second (50 818 pts),
- **EnPac** ranked third (49 333 pts).

2024-gold collected 51 386 pts. BVT-2025 (Best Virtual Tool) collected 53 282.



Estimated Tool Confidence rate for LTL (based on the «significant values» computed by tools) see section 6. for details			
Tools competing in 2024			
EnPac	99,948%	51 733	51 760
ITS-Tools	99,996%	52 392	52 394
Tapaal	100,000%	54 198	54 198
2024-gold and BVT-2025			
2024-gold	100,000%	54 195	54 195
BVT-2025	100,000%	54 214	542 14

6. Estimation of the Global Tool Confidence

A confidence analysis enforces the computation of «right results» based on the answers of participating tools. To do so, we considered each value provided in the contest (a value is a partial result such as the result of a formula or a number provided for state space, bound computation, etc.). To do so, we processed as follows:

1. For each «line» (all tools for a given examination for a given instance), we selected all «significant values» where at least 3 tools do agree.
2. Based on this subset of values, we computed the ratio between the selected values for the tool and the number of good answers they provide for such values. This ratio gave us a tool confidence rate that is provided in the table below.
3. This tool confidence rate rate was then applied to compute the scores presented in the dedicated section.

The table below provides, in first column, the computed confidence rates (that are naturally lower for tools where a bug was detected). Then, the table provides the number of correct results (column 2) out of the number of «significant values» selected for the tool (column 3). The last column shows the number of examinations (and their type) the tool was involved in.

Estimated Tool Confidence rate (based on the «significant values» computed by tools)				
Tool name	Reliability	Correct Values	«significant values»	Involved Examinations
Tools competing in 2025				
EnPac	99.948%	51 733	51 760	2LTLCardinality, LTLFireability

ITS-Tools	99.998%	173 562	173 565	13 StateSpace, UpperBounds, CTLCardinality, CTLFireability, LTLCardinality, LTLFireability, ReachabilityCardinality, ReachabilityFireability, ReachabilityDeadlock, QuasiLiveness, StableMarking, Liveness, OneSafe
smpt	100.000%	50 860	50 860	2 ReachabilityCardinality, ReachabilityFireability
Tapaal	100.000%	172 596	172 596	12 UpperBounds, CTLCardinality, CTLFireability, LTLCardinality, LTLFireability, ReachabilityCardinality, ReachabilityFireability, ReachabilityDeadlock, QuasiLiveness, StableMarking, Liveness, OneSafe
tedd	100.000%	3 253	3 253	1 StateSpace
2024-gold	100.000%	175 503	175 503	2024-gold and BVT-2025
BVT-2025	100.000%	175 830	175 830	13 StateSpace, UpperBounds, CTLCardinality, CTLFireability, LTLCardinality, LTLFireability, ReachabilityCardinality, ReachabilityFireability, ReachabilityDeadlock, QuasiLiveness, StableMarking, Liveness, OneSafe