SoSy-Lab
Software Systems

13th Competition on Software Verification

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Participants

Table 1: Competition candidates with tool references and representing jury members; ^{new} for first-time participants, ∅ for hors-concours participation

Participant	Jury member	Affiliation
2ls	V. Malík	BUT, Czechia
Aise [new]	Z. Chen	NUDT, China
BRICK	L. Bu	Nanjing U., China
Bubaak	M. Chalupa	ISTA, Austria
Bubaak-SpLit [new]	M. Chalupa	ISTA, Austria
CBMC [∅]	(h. c.)	–
Coastal [∅]	(h. c.)	–
CoVeriTeam-AlgSel [∅]	(h. c.)	–
CoVeriTeam-ParPort [∅]	(h. c.)	–
CPAchecker	D. Baier	LMU Munich, Germany
CPALockator [∅]	(h. c.)	–
CPA-BAM-BnB [∅]	(h. c.)	–
CPA-BAM-SMG [∅]	(h. c.)	–
CPV [new]	P.-C. Chien	LMU Munich, Germany
Crux [∅]	(h. c.)	–
CSeq [∅]	(h. c.)	–
Dartagnan	H. Ponce de León	Huawei Dresden, Germany
Deagle	F. He	Tsinghua U., China
DIVINE [∅]	(h. c.)	–
EBF	F. Aljaafari	U. of Manchester, UK
EmergenTheta [new]	L. Bajczi	BME Budapest, Hungary
ESBMC-incr [∅]	(h. c.)	–
ESBMC-kind	F. Brauße	U. Manchester, UK
Frama-C-SV	M. Spiessl	LMU Munich, Germany
Gazer-Theta [∅]	(h. c.)	–
GDart	F. Howar	TU Dortmund, Germany
GDart-LLVM [∅]	(h. c.)	–
Goblint	S. Saan	U. Tartu, Estonia
Graves-CPA [∅]	(h. c.)	–
Graves-Par [∅]	(h. c.)	–
Infer [∅]	(h. c.)	–
Java-Ranger [∅]	(h. c.)	–
JayHorn	H. Mousavi	U. Tehran, TIAS, Iran
JBMC	P. Schrammel	U. Sussex / Diffblue, UK
JDart [∅]	(h. c.)	–
Korn	G. Ernst	LMU Munich, Germany
Lazy-CSeq [∅]	(h. c.)	–
LF-checker [∅]	(h. c.)	–
Locksmith [∅]	(h. c.)	–
MLB	L. Bu	Nanjing U., China
Mopsa	R. Monat	Inria and U. Lille, France
PeSCo-CPA [∅]	(h. c.)	–
PIChecker [∅]	(h. c.)	–
Pinaka [∅]	(h. c.)	–
PredatorHP	V. Šoková	BUT, Czechia
Proton [new]	R. Metta	TCS, India
SPF [∅]	(h. c.)	–
sv-sanitizers [new]	S. Saan	U. of Tartu, Estonia
SWAT [new]	N. Loose	U. of Luebeck, Germany
Symbiotic	M. Jonáš	Masaryk U., Czechia
Theta	L. Bajczi	BME Budapest, Hungary
UAutomizer	M. Heizmann	U. Freiburg, Germany
UGemCutter	D. Klumpp	U. Freiburg, Germany
UKojak	F. Schüssele	U. Freiburg, Germany
UTaipan	D. Dietsch	U. Freiburg, Germany
VeriAbs	P. Darke	TCS, India
VeriAbsL	P. Darke	TCS, India
VeriOover [∅]	(h. c.)	–

Features

Table 2: Algorithms and techniques that the participating verification systems used; ^{new} for first-time participants, ∅ for hors-concours participation

Verifier	CEGAR	Predicate Abstraction	Symbolic Execution	Bounded Model Checking	k-Induction	Property-Directed Reach.	Explicit-Value Analysis	Numeric. Interval Analysis	Shape Analysis	Separation Logic	Bit-Precise Analysis	ARG-Based Analysis	Lazy Abstraction	Interpolation	Automata-Based Analysis	Concurrency Support	Ranking Functions	Evolutionary Algorithms	Algorithm Selection	Portfolio
2ls				✓	✓		✓													
Aise [new]	✓	✓	✓																	
BRICK							✓				✓	✓					✓		✓	✓
Bubaak			✓								✓									
Bubaak-SpLit [new]			✓								✓									
CBMC [∅]				✓																
Coastal [∅]			✓																	
CVT-AlgoSel [∅]	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓
CVT-ParPort [∅]	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	✓
CPAchecker	✓	✓		✓	✓		✓				✓	✓	✓	✓	✓		✓		✓	✓
CPALockator [∅]	✓	✓										✓	✓	✓	✓	✓				
CPA-BAM-BnB [∅]	✓	✓									✓	✓								
CPA-BAM-SMG [∅]									✓											
CPV [new]				✓	✓	✓														
Crux [∅]			✓																	
CSeq [∅]				✓							✓					✓				
Dartagnan				✓												✓				
Deagle				✓							✓					✓				
DIVINE [∅]			✓								✓					✓				
EBF				✓												✓				
EmergenTheta [new]				✓							✓	✓			✓	✓				
ESBMC-incr [∅]				✓							✓					✓				
ESBMC-kind				✓	✓						✓					✓				
Frama-C-SV				✓							✓									
Gazer-Theta [∅]	✓	✓		✓								✓		✓						
GDart			✓																	
GDart-LLVM [∅]			✓																	
Goblint								✓								✓				
Graves-CPA [∅]	✓	✓		✓	✓		✓				✓	✓	✓	✓	✓		✓		✓	✓
Graves-Par [∅]																				
Infer [∅]										✓										
Java-Ranger [∅]			✓			✓	✓													
JayHorn																				
JBMC				✓												✓				
JDart [∅]			✓																	
Korn	✓	✓																		
Lazy-CSeq [∅]				✓												✓				
LF-checker [∅]																✓				
Locksmith [∅]																✓				
MLB			✓													✓				
Mopsa								✓												
PeSCo-CPA [∅]	✓	✓		✓	✓		✓				✓	✓	✓	✓	✓		✓		✓	✓
PIChecker [∅]	✓	✓		✓	✓		✓				✓	✓		✓	✓	✓				
Pinaka [∅]			✓	✓							✓									
PredatorHP									✓											
Proton [new]			✓								✓									
SPF [∅]			✓											✓						
sv-sanitizers [new]			✓																	
SWAT [new]			✓													✓				
Symbiotic			✓								✓									
Theta	✓	✓		✓							✓	✓		✓	✓	✓	✓			
UAutomizer	✓	✓									✓		✓	✓	✓	✓	✓		✓	✓
UGemCutter	✓	✓									✓		✓	✓	✓	✓	✓			
UKojak	✓	✓									✓		✓	✓	✓	✓	✓			
UTaipan	✓	✓									✓		✓	✓	✓	✓	✓			
VeriAbs	✓		✓	✓	✓		✓	✓				✓			✓			✓	✓	✓
VeriAbsL	✓		✓	✓	✓		✓	✓				✓			✓			✓	✓	✓
VeriOover [∅]								✓												

Frameworks

Table 3: Solver libraries and frameworks that are used as components in the participating verification systems; ^{new} for first-time participants, ∅ for hors-concours participation

Verifier	CPAchecker	CProver	Esbmc	Jpf	Ultimate	JavaSMT	MathSAT	Cvc4	SMTInterpol	z3	MiniSAT	Apron
2ls		✓										
Aise [new]										✓	✓	
BRICK												
Bubaak												
Bubaak-SpLit [new]												
CBMC [∅]		✓								✓		
Coastal [∅]												
CVT-AlgoSel [∅]	✓	✓	✓		✓	✓	✓			✓		
CVT-ParPort [∅]	✓	✓	✓		✓	✓	✓			✓		
CPAchecker	✓					✓	✓			✓		✓
CPALockator [∅]	✓											
CPA-BAM-BnB [∅]	✓											
CPA-BAM-SMG [∅]	✓											
Crux [∅]										✓		
CSeq [∅]	✓									✓		
Dartagnan							✓					
Deagle										✓		
DIVINE [∅]												
EBF		✓	✓									
EmergenTheta [new]						✓				✓		
ESBMC-incr [∅]			✓							✓		
ESBMC-kind			✓							✓		
Frama-C-SV												
GDart								✓		✓		
GDart-LLVM [∅]										✓		
Goblint												✓
Graves-CPA [∅]	✓					✓	✓			✓		
Graves-Par [∅]												
Infer [∅]												
Java-Ranger [∅]				✓								
JayHorn												
JBMC										✓	✓	
JDart [∅]				✓						✓	✓	
Korn										✓	✓	
Lazy-CSeq [∅]	✓									✓		
LF-checker [∅]												
Locksmith [∅]												
MLB												
Mopsa												✓
PeSCo-CPA [∅]	✓					✓	✓		✓			
PIChecker [∅]	✓					✓	✓	✓				
Pinaka [∅]												
PredatorHP												
Proton [new]												
SPF [∅]				✓						✓		
sv-sanitizers [new]												
SWAT [new]												
Symbiotic										✓		
Theta							✓			✓		
UAutomizer					✓		✓	✓	✓	✓		
UGemCutter					✓		✓	✓	✓	✓		
UKojak					✓		✓	✓	✓	✓		
UTaipan					✓		✓	✓	✓	✓		
VeriAbs	✓	✓								✓	✓	
VeriAbsL	✓	✓								✓	✓	
VeriOover [∅]												

More Information

https://sv-comp.sosy-lab.org/2024/

Ranking

Table 5: Overview of the top-three verifiers for each category; ^{new} for first-time participants, measurements for CPU time and energy rounded to two significant digits.

Rank	Verifier	Score	CPU Time (in h)	CPU Energy (in kWh)	Solved Tasks	Unconf. Tasks	False Alarms	Wrong Proofs
ReachSafety								
1	VeriAbsL	**10735**	190	7075	1138			2
2	VeriAbs	10541	190	6720	1032			1
3	CPAchecker	10084	200	6468	286	2		
MemSafety								
1	PredatorHP	**2321**	1.2	1823	3	3		
2	Symbiotic	2156	0.77	1855	0			5
3	UAutomizer	2110	62	1637	4			
ConcurrencySafety								
1	Dartagnan	**3547**	14	2086	0			5
2	UGemCutter	3189	32	1851	4			
3	UAutomizer	3079	28	1791	3			1
NoOverflows								
1	UAutomizer	**9497**	62	4532	2			
2	UTaipan	9231	66	4420	11			1
3	CPAchecker	8603	18	5596	192			
Termination								
1	Proton [new]	**3526**	19	1888	126	1		
2	UAutomizer	3248	18	1631	11			
3	2ls	1584	4.2	1167	201			
SoftwareSystems								
1	Mopsa	**2197**	15	2030	0			
2	Bubaak-SpLit [new]	872	0.42	480	163	8		
3	CPAchecker	784	43	1756	71			
FalsificationOverall								
1	CPAchecker	**4812**	91	4920	218	10		
2	Symbiotic	4050	27	4281	191	11		
3	UTaipan	3157	33	1602	34	1		
Overall								
1	UAutomizer	**26396**	290	13617	114	3		7
2	CPAchecker	21568	320	17968	698	16		1
3	UTaipan	18042	240	11524	71			13
JavaOverall								
1	MLB	**676**	0.93	484	34			
2	JBMC	618	0.44	424	80			
3	GDart	616	2.6	453	9			

Score Schema

Table 6: Scoring schema for SV-COMP 2024 (unchanged from 2021)

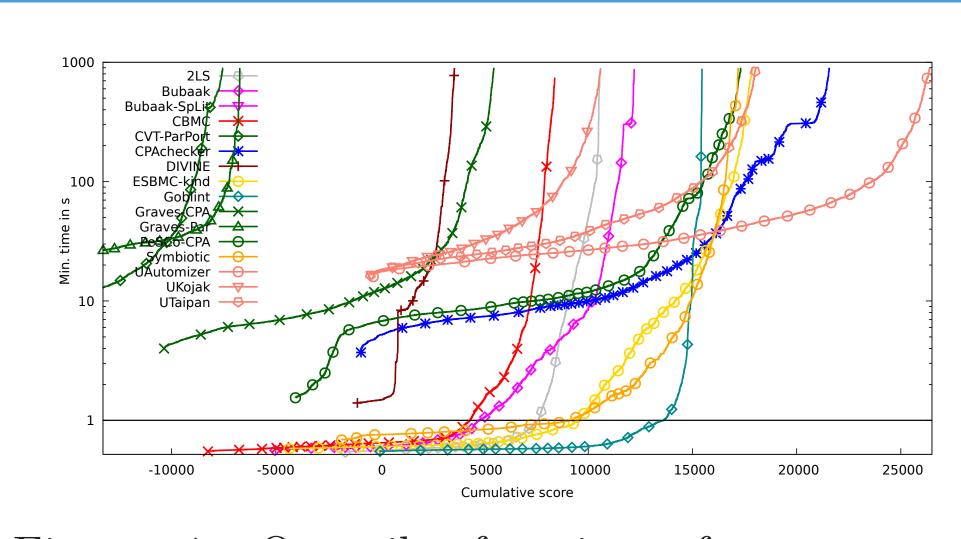| Reported result	Points	Description
Unknown	0	Failure to compute verification result
False correct	+1	Violation of property in program was correctly found and a validator confirmed the result based on a witness
False incorrect	−16	Violation reported but property holds (false alarm)
True correct	+2	Program correctly reported to satisfy property and a validator confirmed the result based on a witness
True incorrect	−32	Incorrect program reported as correct (wrong proof)

Cummulative Score

Figure 1: Quantile functions for category *C-Overall*.

Results

Table 4: Quantitative overview over all regular results; empty cells are used for opt-outs, ^{new} for first-time participants, ∅ for hors-concours participation

Participant	ReachSafety 11746 points 11305 tasks	MemSafety 3216 points 3416 tasks	ConcurrencySafety 5672 points 3259 tasks	NoOverflows 13844 points 8188 tasks	Termination 4000 points 2354 tasks	SoftwareSystems 5851 points 8813 tasks	FalsificationOverall 8817 points 28701 tasks	Overall 49097 points 31054 tasks	JavaOverall 825 points 587 tasks
2ls	6000	224	0	5976	1584	10	1311	10564	
aise [new]									
BRICK									
Bubaak	3788	1890	11	6465	1481	−1082	−617	12206	
Bubaak-SpLit [new]	4692	1312	7	−41374	661	872	1959	−18177	
CPAchecker	10084	1897	2029	8603	1195	784	4812	21568	
CPV [new]	6330								
Dartagnan			3547						
Deagle									
EBF	1178		636						
EmergenTheta [new]		636							
ESBMC-kind	8364	2077	1853	8272	1048	−1063	2394	17896	
Frama-C-SV				1098					
GDart									616
Goblint	2289	1304	2583	7059	890	536		15458	
JayHorn									325
JBMC									618
Korn									
MLB									676
Mopsa	2241	1516		8063		2197			
PredatorHP		2321							
Proton [new]					3526				
sv-sanitizers [new]		290							
SWAT [new]									566
Symbiotic	7052	2156	238	7370	1258	687	4050	17192	
Theta	2119		2354						
UAutomizer	6320	2110	3079	9497	3248	261	3139	26396	
UGemCutter			3189						
UKojak	4869	1400		7363	0	233	2291	10593	
UTaipan	5751	2014	2655	9231	0	351	3157	18042	
VeriAbs	10541								
VeriAbsL	10735								
CBMC [∅]	1269	1330	1229	5771	1125	−2569	−3764	8391	
COASTAL [∅]									−2752
CVT-AlgoSel [∅]	2635		41						
CVT-ParPort [∅]	−6152	1655	911	−17812	1289	−1297	−9118	−7545	
CPA-BAM-BnB [∅]							−2439		
CPA-BAM-SMG [∅]		2039					−2804		
CPALockator [∅]			−4924						
Crux [∅]	2066			490					
CSeq [∅]			−12478						
DIVINE [∅]	4655	298	390	0		0	76	256	3576
ESBMC-incr [∅]			542						
Gazer-Theta [∅]									
GDart-LLVM [∅]									
Graves-CPA [∅]	3831						−322	−1538	5470
Graves-Par [∅]	876	1627		−17650	1256	−2037	−9024	−6731	
Infer [∅]	−99128		−8289	−73312		−24917			
Java-Ranger [∅]									398
JDart [∅]									382
Lazy-CSeq [∅]			−15024						
LF-checker [∅]			772						
Locksmith [∅]									
PeSCo-CPA [∅]	5814						−76	3247	17315
PIChecker [∅]									
Pinaka [∅]	2418		521	1337	855				
SPF [∅]									182
VeriOover [∅]									