

The 11th QBF Solvers Evaluation (QBFEVAL'18)

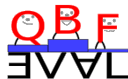
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²Johannes Kepler University, Linz (Austria)



21st International Conference on Theory and Applications of
Satisfiability Testing
Oxford, July 12, 2018



QBFEVAL'18 – Keynotes

- **Judges:** Olaf Beyersdorff and Christoph Wintersteiger.
- **5 tracks**
- **36 systems** submitted by **14 teams**
- **202 formulas** in QCIR format
- **Two stages**



Outline

- 1 The setup: Tracks, solvers and formulas
- 2 Awards & Results
- 3 Conclusions



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Tracks

- 1 Prenex CNF (PCNF)
 - ▶ 10 solvers (19 configuration)
- 2 Prenex non-CNF (PNCNF)
 - ▶ 6 solvers (13 configuration)
- 3 2QBF
 - ▶ **2 solvers** (4 configuration)+ PCNF solvers
- 4 DQBF Solvers
 - ▶ 4 solvers (5 configuration)
- 5 Hard Instances Track (HIT)
 - ▶ 3 solvers



Submitted Solvers (1/2)

Solver	Track	Author(s)
aspq (aspq2v3, aspq3alt, default)	2QBF, HIT	G. Amendola, C. Dodaro, F. Ricca
cqesto, qfun	PNCNF	M. Janota
cadet	2QBF	M. N. Rabe and L. Tentrup
caqe (bloqqr, bloqqr-qdo, hqspre)	PCNF, HIT	L. Tentrup, M. N. Rabe
cued (v2, v3)	PCNF	L. Chen, J. R. Jiang
dcaqe	DQBF	L. Tentrup, M. N. Rabe
depqbf (pre_QxQBH, prefix_opt_qdo)	PCNF, HIT	F. Lonsing
ghostQ (cegar, plain)	PCNF, PNCNF	W. Klieber
heretiQ (cube, simple), ijtihad	PCNF	V. Hadzic
hqspre	DQBF	R. Wimmer, K. Reimer, C. Scholl, B. Becker



Submitted Solvers (2/2)

Solver	Track	Author(s)
idq	DQBF	G. Kovasznai
iprover (hqspre-bloqger)	PCNF	K. Korovin
iprover (default, hqspre))	DQBF	K. Korovin
Pre-DynDep	PCNF	G. Charwat, U. Egly, F. Lonsing, S. Woltran
qbf portfolio	PCNF, PNCNF	H. Hoos, T. Peitl, F. Slivovsky S. Szeider
quabs	PNCNF	L. Tentrup
qute (default, opt500, random)	PCNF	F. Slivovsky
qute (hybrid, opt617, opt993)	PNCNF	F. Slivovsky
rareqs	PCNF	M. Janota



Submitted Formulas

- Chess Solving and Composing
 - ▶ 185 instances in QCIR format submitted by Tomas Peitl.
- Memory model encodings
 - ▶ 17 instances in QCIR format submitted by Simon Cooksey, Mark Batty, Radu Grigore and Mikolas Janota.



The Dataset

- Prenex CNF Track: **463** instances
- Prenex non-CNF Track: **333** instances
- 2QBF Track: **402** instances
- DQBF Track: **334** instances
- Hard Instances Track: **471** instances

Available at:

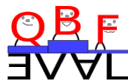
http://qbflib.org/QBFEVAL_18_DATASET.zip (Dataset 1–4)

http://qbflib.org/HARD_QDIMACS_QBFEVAL17.zip (HIT)



Scores, Resources and Infrastructure

- **Score** Total amount of solved formulas
- **Resources**
 - ▶ PCNF, PNCNF, 2QBF, DQBF: The CPU time granted to each system for each formula is **900 seconds**, while the memory limit is set to **32GB**.
 - ▶ HIT: **3600 seconds** of CPU time, **40GB** of memory.
- **Infrastructure** StarExec cluster (PCNF, PNCNF, 2QBF) and cluster provided by JKU (DQBF, HIT)



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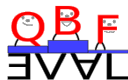
Prenex CNF Track – Winners

Place	Solver	# Solved	Time
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Prenex CNF Track – Winners

Place	Solver	# Solved	Time
	QBF Portfolio	275	22244.96






Prenex CNF Track – Winners

Place	Solver	# Solved	Time
	depqbf	280	23416.98
	QBF Portfolio	275	22244.96

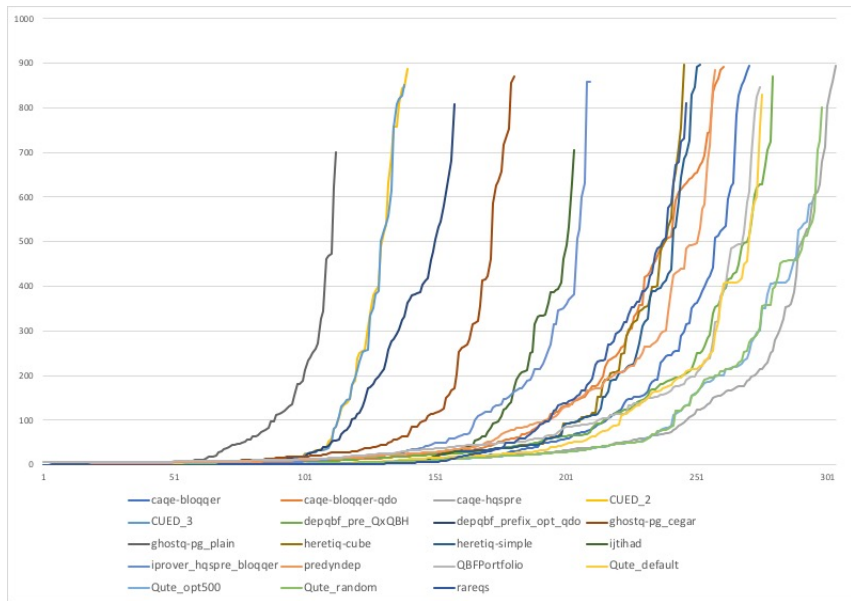


Prenex CNF Track – Winners

Place	Solver	# Solved	Time
	cage	304	22434.69
	depqbf	280	23416.98
	QBF Portfolio	275	22244.96



Prenex CNF Track – Results



Prenex non-CNF Track – Winners

Place	Solver	# Solved	Time
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Prenex non-CNF Track – Winners

Place	Solver	# Solved	Time
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ghostq

157

15399.40









Prenex non-CNF Track – Winners

Place	Solver	# Solved	Time
	cqesto	160	14999.72
	ghostq	157	15399.40

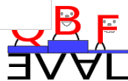
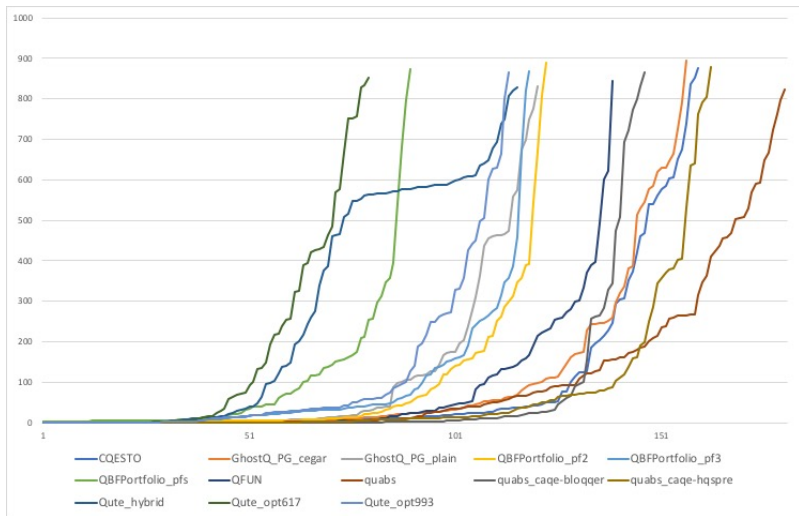


Prenex non-CNF Track – Winners

Place	Solver	# Solved	Time
 	quabs	181	19768.92
 	cqesto	160	14999.72
 	ghostq	157	15399.40



Prenex non-CNF Track – Results




2QBF Track – Winners

Place	Solver	# Solved	Time
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2QBF Track – Winners

Place	Solver	# Solved	Time
	predyndep	261	15003.02






2QBF Track – Winners

Place	Solver	# Solved	Time
	cadet	263	11001.63
	predyndep	261	15003.02

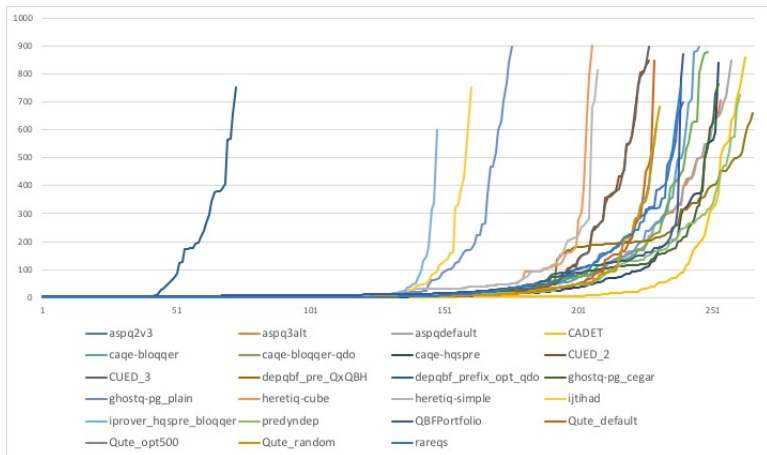


2QBF Track – Winners

Place	Solver	# Solved	Time
	depqbf	266	22239.51
	cadet	263	11001.63
	predyndep	261	15003.02



2QBF Track – Results



DQBF Track – Winners

Place	Solver	# Solved	Time
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DQBF Track – Winners

Place	Solver	# Solved	Time
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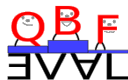
dcage

80 5595.38









DQBF Track – Winners

Place	Solver	# Solved	Time
	iprover	118	6256.28
	dcaqe	80	5595.38

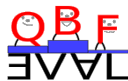
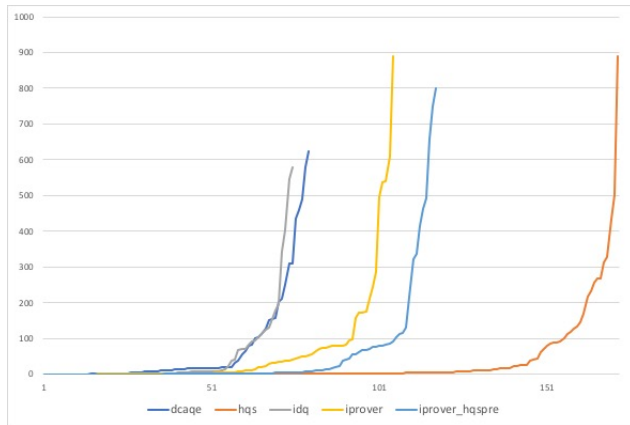


DQBF Track – Winners

Place	Solver	# Solved	Time
 	hqs	172	5856.54
 	iprover	118	6256.28
 	dcaqe	80	5595.38



DQBF Track – Results



Hard Instances Track – Winners

Place	Solver	# Solved	Time
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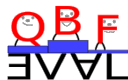
Hard Instances Track – Winners

Place	Solver	# Solved	Time
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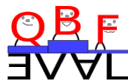
caqe

15






Hard Instances Track – Winners

Place	Solver	# Solved	Time
	depqbf	16	
	caqe	15	



Hard Instances Track – Winners

Place	Solver	# Solved	Time
	aspq3	36	
	depqbf	16	
	caqe	15	



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Conclusions

- Results **soon available** at `www.qbfeval.org`
 - ▶ Detailed description of solvers and instances
 - ▶ Further insights into setup & data
- Raw data available (in 10 minutes) at `www.qbflib.org/qbfeval18_data.zip`
- **See you tomorrow during lunch for discussing the next edition!**



Conclusions

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Forthcoming call for contribution!

Special issue on SAT-related competition in JSAT



Acknowledgments

Participants All solver and benchmark submitters!

Judges O. Beyersdorff, C. Wintersteiger.

StarExec A. Stump

