

FLoC Olympic Games 2014

Citius, Maius, Potentius – Faster, Bigger, More Powerful

Josep Argelich Chu Min Li Felip Manyà Jordi Planes
Ruben Martins

Universitat de Lleida Université de Picardie IIIA-CSIC
University of Oxford

Max-SAT Evaluation 2014



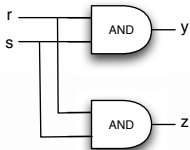


- ▶ Affiliated event of the SAT-2014
- ▶ Assessing the state of the art in the field of Max-SAT solvers
- ▶ Creating a collection of publicly available Max-SAT benchmark instances

The Max-SAT Evaluation: Example



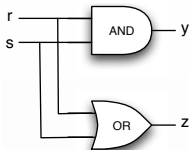
Correct circuit



Input stimuli: $\langle r, s \rangle = \langle 0, 1 \rangle$

Valid output: $\langle y, z \rangle = \langle 0, 0 \rangle$

Faulty circuit



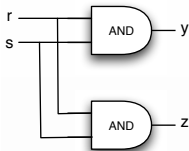
Input stimuli: $\langle r, s \rangle = \langle 0, 1 \rangle$

Invalid output: $\langle y, z \rangle = \langle 0, 0 \rangle$

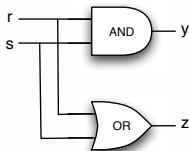
The Max-SAT Evaluation: Example



Correct circuit



Faulty circuit



Design Debugging

Partial MaxSAT formulation:

- ▶ Hard clauses: input and output values
- ▶ Soft clauses: representation of circuit

The problem Maximize number of circuit gates

The Max-SAT Evaluation: Interesting Facts



- ▶ 22 submitters

- ▶ 46 solvers. Two types:
 - ▶ Complete solvers: 33
 - ▶ Incomplete solvers: 13

- ▶ 5009 benchmark instances

- ▶ Computation time: 2 months

- ▶ Ranking:
 1. Number of solved instances
 2. Time to solve those instances



The Max-SAT Evaluation: Complete Solvers



Gold medals:

	MaxSAT	Partial	W. Partial



Gold medals:

	MaxSAT	Partial	W. Partial
Random	ahmaxsat-ls (branch&bound)	ahmaxsat (branch&bound)	CCLS2akms (branch&bound)



Gold medals:

	MaxSAT	Partial	W. Partial
Random	ahmaxsat-ls (branch&bound)	ahmaxsat (branch&bound)	CCLS2akms (branch&bound)
Crafted	ahmaxsat-ls (branch&bound)	ISAC+ (portfolio)	ISAC+ (portfolio)



Gold medals:

	MaxSAT	Partial	W. Partial
Random	ahmaxsat-ls (branch&bound)	ahmaxsat (branch&bound)	CCLS2akms (branch&bound)
Crafted	ahmaxsat-ls (branch&bound)	ISAC+ (portfolio)	ISAC+ (portfolio)
Industrial	Open-WBO-Inc (core-guided)	ISAC+ (portfolio)	Eva500a (core-guided)



The Max-SAT Evaluation: Incomplete Solvers



- ▶ Recent track
- ▶ Goal: find the best solution within 5 minutes
- ▶ Does not require to prove optimality

The Max-SAT Evaluation: Incomplete Solvers



- ▶ Recent track
- ▶ Goal: find the best solution within 5 minutes
- ▶ Does not require to prove optimality
- ▶ Distinguished solvers:
 - ▶ Random: **Dist** (Local Search)
 - ▶ Crafted: **Dist** (Local Search)
 - ▶ Industrial: **WPM-2014-in** (core-guided)

Max-SAT Evaluation: Thanks



More information at <http://maxsat.ia.udl.cat/>

Thanks to the people that contributed solvers and benchmarks, and to the Universitat de Lleida for allowing to use their clusters.

We encourage you to participate in the next Max-SAT Evaluation.



Universitat de Lleida

