

The Results of SAT Competition 2016

Tomáš Balyo, Marijn Heule, Matti Järvisalo

SAT 2016 Conference, Bordeaux

July 4, 2016

What is a SAT Competition?

- Competition of Boolean Satisfiability (SAT) solvers
- Purpose: "The purpose of the competition is to identify new challenging benchmarks and to promote new solvers for the propositional satisfiability problem (SAT) as well as to compare them with state-of-the-art solvers."
- Long tradition
 - First SAT Competition in 2002
 - 9 SAT Competitions
 - 4 SAT Races
 - 1 SAT Challenge

What is New This Year

- We have two new tracks
 - Agile Track – in favor of solvers with small overhead
large number (thousands) of easy benchmarks
small time limit (1 minute)
 - NoLimit Track – remove all limitations
solvers do not need to print model or produce proof,
authors do not have to provide source code, portfolios are allowed,
only brand new benchmarks are used
- Binary DRAT proof format introduced
 - proofs take up less space

Tracks part 1

- Main (Sequential) Track (29 solvers)
 - 300 “application” and 200 “crafted” benchmarks
 - 5,000 sec limit for solving and 20,000 sec for proof checking
 - Solvers run on a single core
 - UNSAT proof logging required

Tracks part 1

- Main (Sequential) Track (29 solvers)
 - 300 “application” and 200 “crafted” benchmarks
 - 5,000 sec limit for solving and 20,000 sec for proof checking
 - Solvers run on a single core
 - UNSAT proof logging required
- Parallel Track (13 solvers)
 - The same benchmark suite as the Main Track (application + crafted)
 - 5,000 sec limit for solving
 - 24 (48) CPU cores (hyper-threading), 64GB RAM

Tracks part 1

- Main (Sequential) Track (29 solvers)
 - 300 “application” and 200 “crafted” benchmarks
 - 5,000 sec limit for solving and 20,000 sec for proof checking
 - Solvers run on a single core
 - UNSAT proof logging required
- Parallel Track (13 solvers)
 - The same benchmark suite as the Main Track (application + crafted)
 - 5,000 sec limit for solving
 - 24 (48) CPU cores (hyper-threading), 64GB RAM
- Random Satisfiable Track (9 solvers)
 - 240 random satisfiable benchmarks
 - 5,000 sec limit for solving

Tracks part 2

- Incremental Library Track (8 solvers)
 - benchmarks are SAT based applications (PMaxSAT, Essentials, HWMCC), we used same applications but with different inputs
 - average rank for each application determines winner

Tracks part 2

- Incremental Library Track (8 solvers)
 - benchmarks are SAT based applications (PMaxSAT, Essentials, HWMCC), we used same applications but with different inputs
 - average rank for each application determines winner
- Introducing Agile Track (30 solvers)
 - 5,000 benchmarks, all coming from SMT solving
 - 60 sec limit for solving

Tracks part 2

- Incremental Library Track (8 solvers)
 - benchmarks are SAT based applications (PMaxSAT, Essentials, HWMCC), we used same applications but with different inputs
 - average rank for each application determines winner
- Introducing Agile Track (30 solvers)
 - 5,000 benchmarks, all coming from SMT solving
 - 60 sec limit for solving
- Introducing No-Limit Track (21 solvers)
 - 350 brand new benchmarks (subset of the Main Track benchmarks)
 - 5,000 sec limit for solving
 - Most of the solvers provided source codes and models, but not all

Random Track – Results

The Winners of the Random Track are:

Random Track – Results

The Winners of the Random Track are:

- 3rd Prize: **DCCAlm** (88 solved)
by Chuan Luo, Shaowei Cai, Kaile Su

Random Track – Results

The Winners of the Random Track are:

- 2nd Prize: **CSCCSat** (89 solved)
by Chuan Luo, Shaowei Cai, Wei Wu, Kaile Su
- 3rd Prize: **DCCAlm** (88 solved)
by Chuan Luo, Shaowei Cai, Kaile Su

Random Track – Results

The Winners of the Random Track are:

- 1st Prize: **Dimetheus** (95 solved)
by Oliver Gableske
- 2nd Prize: **CSCCSat** (89 solved)
by Chuan Luo, Shaowei Cai, Wei Wu, Kaile Su
- 3rd Prize: **DCCAlm** (88 solved)
by Chuan Luo, Shaowei Cai, Kaile Su

Incremental Track – Results

The Winners of the Incremental Track are:

Incremental Track – Results

The Winners of the Incremental Track are:

- 3rd Prize: **Riss** (avg. rank 3.0)
by Norbert Manthey, Aaron Stephan and Elias Werner

Incremental Track – Results

The Winners of the Incremental Track are:

- 2nd Prize: **Glucose** (avg. rank 2.3)
by Gilles Audemard and Laurent Simon
- 3rd Prize: **Riss** (avg. rank 3.0)
by Norbert Manthey, Aaron Stephan and Elias Werner

Incremental Track – Results

The Winners of the Incremental Track are:

- 1st Prize: **CryptoMiniSat** (avg. rank 2.0)
by Mate Soos
- 2nd Prize: **Glucose** (avg. rank 2.3)
by Gilles Audemard and Laurent Simon
- 3rd Prize: **Riss** (avg. rank 3.0)
by Norbert Manthey, Aaron Stephan and Elias Werner

Parallel Track – Results

The Winners of the Parallel Track are:

Parallel Track – Results

The Winners of the Parallel Track are:

- 3rd Prize: **CryptoMiniSat** (297 solved)
by Mate Soos

Parallel Track – Results

The Winners of the Parallel Track are:

- 2nd Prize: **Plingeling** (302 solved)
by Armin Biere
- 3rd Prize: **CryptoMiniSat** (297 solved)
by Mate Soos

Parallel Track – Results

The Winners of the Parallel Track are:

- 1st Prize: **Treengeling** (315 solved)
by Armin Biere
- 2nd Prize: **Plingeling** (302 solved)
by Armin Biere
- 3rd Prize: **CryptoMiniSat** (297 solved)
by Mate Soos

Agile Track – Results

The Winners of the Agile Track are:

Agile Track – Results

The Winners of the Agile Track are:

- 3rd Prize: **CHBR_Glucose** (3179 solved)
by Seongsoo Moon and Inaba Mary

Agile Track – Results

The Winners of the Agile Track are:

- 2nd Prize: **TB_Glucose** (3187 solved)
by Seongsoo Moon and Inaba Mary
- 3rd Prize: **CHBR_Glucose** (3179 solved)
by Seongsoo Moon and Inaba Mary

Agile Track – Results

The Winners of the Agile Track are:

- 1st Prize: **Riss** (3284 solved)
by Norbert Manthey, Aaron Stephan and Elias Werner
- 2nd Prize: **TB_Glucose** (3187 solved)
by Seongsoo Moon and Inaba Mary
- 3rd Prize: **CHBR_Glucose** (3179 solved)
by Seongsoo Moon and Inaba Mary

NoLimit Track – Results

The Winners of the NoLimit Track are:

NoLimit Track – Results

The Winners of the NoLimit Track are:

- 3rd Prize: **abcdSAT** (161 solved)
by Jingchao Chen

NoLimit Track – Results

The Winners of the NoLimit Track are:

- 2nd Prize: **Lingeling** (162 solved)
by Armin Biere
- 3rd Prize: **abcdSAT** (161 solved)
by Jingchao Chen

NoLimit Track – Results

The Winners of the NoLimit Track are:

- 1st Prize: **BreakIDCOMiniSatPS** (178 solved)
by Jo Devriendt and Bart Bogaerts
- 2nd Prize: **Lingeling** (162 solved)
by Armin Biere
- 3rd Prize: **abcdSAT** (161 solved)
by Jingchao Chen

Main Track – Special Prizes

The best Application/Crafted benchmark solvers and best Glucose Hack:

Main Track – Special Prizes

The best Application/Crafted benchmark solvers and best Glucose Hack:

- Best Application Benchmark Solver: **MapleCOMSPS** (154 solved) by Jia Hui Liang, Chanseok Oh, Vijay Ganesh, Krzysztof Czarnecki and Pascal Poupart

Main Track – Special Prizes

The best Application/Crafted benchmark solvers and best Glucose Hack:

- Best Application Benchmark Solver: **MapleCOMSPS** (154 solved) by Jia Hui Liang, Chanseok Oh, Vijay Ganesh, Krzysztof Czarnecki and Pascal Poupart
- Best Crafted Benchmark Solver: **TC_Glucose** (58 solved) by Seongsoo Moon and Inaba Mary

Main Track – Special Prizes

The best Application/Crafted benchmark solvers and best Glucose Hack:

- Best Application Benchmark Solver: **MapleCOMSPS** (154 solved) by Jia Hui Liang, Chanseok Oh, Vijay Ganesh, Krzysztof Czarnecki and Pascal Poupart
- Best Crafted Benchmark Solver: **TC_Glucose** (58 solved) by Seongsoo Moon and Inaba Mary
- Best Glucose Hack: **Kiel** (4th place overall) by Thorsten Ehlers and Dirk Nowotka

Main Track – Results

The Winners of the Main Track are:

Main Track – Results

The Winners of the Main Track are:

- 3rd Prize: **Lingeling** (201 solved)
by Armin Biere

Main Track – Results

The Winners of the Main Track are:

- 2nd Prize: **Riss** (202 solved)
by Norbert Manthey, Aaron Stephan and Elias Werner
- 3rd Prize: **Lingeling** (201 solved)
by Armin Biere

Main Track – Results

The Winners of the Main Track are:

- 1st Prize: **MapleCOMSPS** (203 solved)
by Jia Hui Liang, Chanseok Oh, Vijay Ganesh, Krzysztof Czarnecki and Pascal Poupart
- 2nd Prize: **Riss** (202 solved)
by Norbert Manthey, Aaron Stephan and Elias Werner
- 3rd Prize: **Lingeling** (201 solved)
by Armin Biere

More information and Acknowledgments

Additional Information

- The Competition Proceedings (solver and benchmark descriptions) can be found on the conference USB stick
- For the detailed competition results see the Sat Competition website

Acknowledgments

- Thanks to all the participants
- Thanks for all the benchmarks
- Thanks to Aaron Stump and StarExec
- Thanks to TACC for the Lonestar5 resources
- Thank You for Your attention