SAT Race 2015

Tomáš Balyo, Markus Iser, Carsten Sinz | September 22, 2015
What is a SAT Race?

- 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
  - 3 Sat Races
  - 1 Sat Challenge
Tracks

- **Main (Sequential) Track (28 solvers)**
  - 300 "application" benchmarks
    (133 from the 2014 SAT Competition, 167 new)
  - 1h time limit, 5 runs

- **Parallel Track (11 solvers)**
  - 100 benchmarks (the hardest 100 from the Main Track)
  - 1h time limit
  - 64 CPU cores, 512GB Ram

- **Introducing - Incremental Library Track (8+1 solvers)**
  - solvers implement a "C" language API (IPASIR)
  - benchmarks are SAT solving based applications
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Incremental Library Track – IPASIR

IPASIR = Re-entrant Incremental Satisfiability Application Program Interface (acronym reversed)

IPASIR has 6 methods for SAT solving:
- add clauses and assumptions (2 methods)
- set callback for abort
- solve
- get model and failed assumptions (2 methods)
Incremental Library Track – Benchmarks

- Partial MaxSat Solving (linear strengthening of a cardinality constraint on soft clauses), 568 pMaxSat problems (industrial track, MaxSat 2014)
- Trivial parallel portfolio SAT solver (clause order diversification), the 100 problems of the parallel track
- Finding all essential (has to be assigned in each satisfying assignment) variables, 50 easiest instances of the main track
- Incremental SAT file interpreter, 50 files generated from HWMCC 2014 instances, 3979 SAT calls in total
  - submitted by Florian Lonsing, Johannes Oetsch, and Uwe Egly
## Incremental Library Track – Results

<table>
<thead>
<tr>
<th>solver name</th>
<th>essent.</th>
<th>pmax</th>
<th>is-file</th>
<th>pfolio</th>
<th>total</th>
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</thead>
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<td>3979</td>
<td>100</td>
<td>4697</td>
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<td>266</td>
<td>1454</td>
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<td>1768</td>
</tr>
<tr>
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<td>47</td>
<td>271</td>
<td>1452</td>
<td>0</td>
<td>1770</td>
</tr>
<tr>
<td>CoMiniSatPs1 Earth</td>
<td>45</td>
<td>244</td>
<td>1406</td>
<td>12</td>
<td>1707</td>
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<tr>
<td>CoMiniSatPs1 Sun</td>
<td>45</td>
<td>250</td>
<td>1434</td>
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<tr>
<td>Glucose4</td>
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<td>259</td>
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<td>1</td>
<td>1715</td>
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<tr>
<td>Riss505</td>
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<td>SatUZK</td>
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<td>204</td>
<td>842</td>
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- **3rd Prize**: **Glucose4** by **Gilles Audemard** and **Laurent Simon**
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- 1st Prize: **CoMiniSatPs1** by Chanseok Oh
- 3rd Prize: **Glucose4** by Gilles Audemard and Laurent Simon
Parallel Track – Results

- 1st Prize:
- 2nd Prize:
- 3rd Prize:
1st Prize: 

2nd Prize: 

3rd Prize: Treengeling sr15bal by Armin Biere (73 solved)
Parallel Track – Results

- 1st Prize:
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Parallel Track – Results

- 1st Prize: Glucose Syrup Adapt 4 by Gilles Audemard and Laurent Simon (78 solved)
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Main Track – Results

- 1st Prize:
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Main Track – Results

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- 3rd Prize: **Riss v5.05** (blackbox) by Lucas Kahlert, Franziska Krüger, Norbert Manthey and Aaron Stephan (249.4 solved)
Main Track – Results

- 1st Prize:
- 2nd Prize: **MiniSatBCD** by **Jingchao Chen** (256.4 solved)
- 3rd Prize: **Riss v5.05** (blackbox) by **Lucas Kahlert, Franziska Krüger, Norbert Manthey and Aaron Stephan** (249.4 solved)
Main Track – Results

- 1st Prize: abcdSAT by Jingchao Chen (261 solved)
- 2nd Prize: MiniSatBCD by Jingchao Chen (256.4 solved)
- 3rd Prize: Riss v5.05 (blackbox) by Lucas Kahlert, Franziska Krüger, Norbert Manthey and Aaron Stephan (249.4 solved)
Main Track – Special Prize

- Special Prize – Most ”Innovative” Solver
  - Based on instances not solved by the 1st, 2nd, and 3rd solver
  - 4 points for each benchmark not solved by any of the winners
  - 2 points for each benchmark solved by only one of the winners
  - 1 point for each benchmark solved by only two of the winners

- Winner is:
Main Track – Special Prize

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- Winner is: Lingeling sr15bal by Armin Biere (38 points)
Acknowledgments

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