Par4
System Description

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Multi-core hardware is ubiquitous. The SMT Competition has been running on quad-core processors since 2014. Competing solvers are ranked with respect to both sequential and parallel performance (based on CPU time and wall time, respectively). Developing an SMT solver that takes advantage of multiple cores is a challenging problem. Although some of the solvers that participated in SMT-COMP 2018 were multi-threaded, their parallel score was often identical (or nearly identical) to their sequential score [1].

We observe that leading SMT solvers are often complementary: they perform well on different sets of benchmarks. Par4 is a portfolio solver that leverages this observation. It consists of a relatively simple wrapper that runs multiple other (wrapped) SMT solvers in parallel, reporting the answer—sat or unsat—that is first returned by any one of them. Par4 thereby aims to minimize wall time at the cost of increased CPU time.

The wrapped solvers were selected from those participating in the Main Track of SMT-COMP 2018. Specifically, the wrapped solvers are:

- AProVE (AProVE NIA 2014)
  https://www.starexec.org/starexec/secure/details/solver.jsp?id=19770

- Boolector (Boolector 3.0.0-pre)
  https://www.starexec.org/starexec/secure/details/solver.jsp?id=19771

- COLIBRI (COLIBRI 10_06_18 v2038)
  https://www.starexec.org/starexec/secure/details/solver.jsp?id=19772

- CVC4 (master-2018-06-10-b19c840-competition-default)
  https://www.starexec.org/starexec/secure/details/solver.jsp?id=19775

- SMTInterpol (SMTInterpol-2.5-19-g0d39cdee)
  https://www.starexec.org/starexec/secure/details/solver.jsp?id=19781

- SMTRAT (SMTRAT-Rat-final 2.1.0)
  https://www.starexec.org/starexec/secure/details/solver.jsp?id=19783

- SPASS-SATT (SPASS-SATT version 1.0)
  https://www.starexec.org/starexec/secure/details/solver.jsp?id=19784

- veriT (veriT list-146-gfae8ca36)
  https://www.starexec.org/starexec/secure/details/solver.jsp?id=19789

- Yices 2 (Yices 2.6.0)
  https://www.starexec.org/starexec/secure/details/solver.jsp?id=19791

- Z3 (z3-4.7.1)
  https://www.starexec.org/starexec/secure/details/solver.jsp?id=19792

For each benchmark, Par4 selects and runs at least two of these solvers, depending on the logic (division) to which the benchmark belongs.

Par4 has not been submitted to divisions in which a single solver performed better (on every benchmark) than any other solver in SMT-COMP 2018.

References

[1] Tjark Weber, Sylvain Conchon, David Déharbe, Matthias Heizmann, Aina Niemetz, Giles Reger, *The SMT Competition 2015–2018*. Draft, submitted for publication.