

Yices2 in SMT-COMP 2024

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1 Introduction

Yices 2 [2] is an open-source (GPLv3) SMT solver developed and distributed by SRI International. It can be download at <http://yices.csl.sri.com> and on our GitHub repository at <https://github.com/SRI-CSL/yices2>. The solver supports linear and non-linear arithmetic, bit-vectors, uninterpreted functions, and arrays.

Yices 2 uses the standard CDCL(T) [7] architecture and a variant of the Nelson-Oppen method for combining decision procedures. Details are presented in [2]. The solver also includes a Model-Construction Satisfiability Calculus (MCSat) [1, 6, 4] implementation. By default, MCSat is used for all theories that require non-linear arithmetic and CDCL(T) is used for everything else. Quantifier reasoning is supported for the UF theory, via E-graph matching and model-based instantiation. Yices 2 can use third-party backend SAT solvers for bitvector solving. Currently, it supports three SAT solvers: CaDiCaL [3], CryptoMiniSat [8], and Kissat [3].

What’s new? We have introduced a new theory-guided variable-selection heuristic in MCSat, in addition to its existing VSIDS variable-selection heuristic. This new feature allows theory plugins (i.e. theory solvers in the MCSat context) to request the main solver to decide on a particular variable. Specifically, we have implemented this feature for the nonlinear arithmetic (for Reals and Integers) plugin.

We have also improved the performance of arrays plugin in MCSat [5].

2 Competition Version

In the SMT competition 2023, we are participating with the most recent development version of Yices 2. This version is entering in all the logics and divisions it supports, including the incremental, model-validation, and unsat-core tracks.

We are utilizing Kissat as the backend SAT solver in the single-query and model-validation tracks of QF_BV. It is important to note that Kissat was originally intended to be used in the Yices2 SMTCOMP 2023 version; however, due to a bug, Kissat was never called. This issue has been addressed and fixed in this year’s submission.

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