System Description: Yices 0.1

Leonardo de Moura

Computer Science Laboratory
SRI International
333 Ravenswood Avenue
Menlo Park, CA 94025 - USA
demoura@csl.sri.com

1   Introduction

Yices is a decision procedure developed at SRI International that decides formulas in a combination of useful theories. Yices decides the satisfiability of formulas in a quantifier-free, first-order theory containing both uninterpreted function symbols and interpreted symbols from a rich combination including: real and integer arithmetic, recursive datatypes, tuples/records, extensional arrays, and lambda expressions. Yices supports a richer input language similar to the SAL language. Dependent types are also supported, since we found them to be useful for specifying properties of uninterpreted function symbols. Yices is still a prototype, we plan to release the system in the end of 2005.

Yices is implemented in C++, it uses the Nelson-Oppen method for combining decision procedures. Yices is based on a generalized search engine which supports different kinds of case splits and constraint propagation rules. Yices tracks which atoms are relevant/irrelevant for the satisfiability of the whole formula, this feature is specially useful for handling expensive theories (e.g., arrays), and to control the instantiation of quantified formulas.

Every deduction step in Yices is associated with a proof object. The proofs of unsatisfiability produced by Yices are composed by a sequence of lemmas and a main theorem. Model generation is not completely functional in the current version of Yices.

2   Problem Divisions

The theories supported by Yices are a superset of the theories used in the competition. Therefore, Yices is in all problem divisions for STM-COMP.

3   Expected Performance

Yices is still a prototype and it was not yet tuned for performance. For instance, its search engine is not competitive with state-of-the-art SAT solvers.