OpenSMT 0.1 System Description

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1 Overview

OpenSMT is a small and open-source SMT-Solver\footnote{The code, as well as tutorials, will be available soon at [4]. We are finishing cleaning the code of the solver submitted to SMTCOMP.}, providing a basic infrastructure for helping non-experts to develop theory-solvers without having to start from scratch. OpenSMT includes a parser for SMT-LIB language, a state-of-the-art SAT-Solver, and a core solver for QF\_UF logic. A template (empty) theory-solver is provided, to facilitate the development of solvers for other logics.

2 Implementation Details

OpenSMT is written in C++. It is based on MiniSAT 2.0 \cite{MiniSAT}. We tried to avoid modifications of its code as much as possible. Any added or modified line in the code is explicitly indicated.

The congruence closure algorithm implemented is the same as the one used in Simplify \cite{Simplify}, however we rely on the algorithm of \cite{Conflict} for retrieving explanations: this can be done by storing the necessary information for retrieving the conflict inside the data-structures for term-representation described in \cite{Simplify}.

We support theory propagation. We do not permanently learn clauses (except for unit clauses). As a result, OpenSMT is very stable in memory (it uses from 3 to 10 MB of main memory for most of the instances in SMT-LIB/QF\_UF).

As for the conversion into CNF we use a rather naive Tseitin conversion, but we also exploit de Morgan laws when possible (for many benchmarks this is sufficient).

3 Expected Performance

OpenSMT is still in a preliminary stage, as the version number suggests. We use basic STL classes. The tool has not been thoroughly tuned for performance (we finished writing the code in June).
References