QCNF2Z3

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Z3 is a multipurpose SMT solver whose sources have been made publicly available recently[1]. QCNF2Z3 is a set of scripts that enable invoking Z3 on QDIMACS instances.

The scripts translate a given QBF into the theory of quantified bit-vectors; in Z3 this theory is invoked by the command `(set-logic UFBV)`. The decision procedure used for this theory was developed by Wintersteiger et al. [WHdM10]. Each Boolean variable is represented by a bit-vector of size 1; this is realized by defining the sort `Bit` by the command `define-sort Bit () (_ BitVec 1))`.

Z3 tends to perform better on existentially quantified formulas than universally quantified ones. Hence, if the given formula starts with a universal quantifier, the script inputs to Z3 its negation. Consequently, the first level variables do not need to be quantified over and are declared as functions by the command `(declare-fun x() Bit)`.

AVAILABILITY

QCNF2Z3[2] is free software: you can redistribute it and/or modify without any restrictions.

QCNF2Z3 is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

DISCLAIMER

The set of scripts constituting QCNF2Z3 were prepared by Mikoláš Janota and Nuno Lopes who are not part of the Z3 development team.

References

[WHdM10] Christoph M. Wintersteiger, Youssef Hamadi, and Leonardo de Moura. Efficiently solving quantified bit-vector formulas. In *Proceedings of Formal Methods in Computer Aided Design FMCAD*, October 2010.

[1] http://z3.codeplex.com/

[2] available from http://sat.inesc-id.pt/~mikolas/sw/qcnf2smt/