Practical Course: SMT Solving

Introduction

Erika Ábrahám, Rebecca Haehn, Gereon Kremer, Stefan Schupp

Winter term 2018/19

Goals of this Practical Course

- Understanding of SMT solving
- Understanding of the theory `QF_UF`
- Understanding of different decision procedures for equality logic and uninterpreted functions

Goals of this Practical Course

- Understanding of SMT solving
- Understanding of the theory `QF_UF`
- Understanding of different decision procedures for equality logic and uninterpreted functions

- Implementation of these procedures as theory modules in SMT-RAT
- Implementation in clean and modern C++
- Debugging, evaluation and documentation of theory modules
- Presentation of results

Approximate Schedule

- Design an algorithm for equality logic and uninterpreted functions
- Design data structures supporting this algorithm

Presentation of design: October/November

Approximate Schedule

- Design an algorithm for equality logic and uninterpreted functions
- Design data structures supporting this algorithm

Presentation of design: October/November

- Implement these as a theory module
- Compare different heuristics and optimizations
- Test on standard benchmarks

Presentation of results: February

Requirements

You need Linux or MacOS with the following software:

- git
- cmake, ccmake
- g++ (≥ 5) or clang (≥ 3.8)
- boost
- eigen3, gmp
- doxygen

Setup

You will form multiple teams $X \in \{a, b, ...\}$, each team will get

- a group chat in *Slack*
- read access to CArL and SMT-RAT repositories
- a git repository containing a clone of SMT-RAT:
  `https://srv-i2.informatik.rwth-aachen.de/scm/git/thsws18/smt-X.git`

Setup

You will form multiple teams $X \in \{a, b, ...\}$, each team will get

- a group chat in *Slack*
- read access to CArL and SMT-RAT repositories
- a git repository containing a clone of SMT-RAT:
  `https://srv-i2.informatik.rwth-aachen.de/scm/git/thsws18/smt-X.git`

Changes to CArL or the core of SMT-RAT will be committed by us and are available to all teams.

Grades

- Document your progress and commit also ideas, ToDo-lists etc..
- For the final grade we will take the content of each team members commits into account!

Grades

- Document your progress and commit also ideas, ToDo-lists etc..
- For the final grade we will take the content of each team members commits into account!
- We will compare your solvers amongst each other, the best team gets a grade bonus of 0.3.

Building Groups

Building Groups

Send us the names of your group members in Slack.

Meetings

Mandatory! To discuss results and present new tasks. On

- October 2nd
- October 16th
- October 23rd
- October 30th
- November 20th
- December 11th
- January 8th
- January 22nd
- February 5th

at 16:15 am.

URLs

- Homepage:
  `http://ths.rwth-aachen.de/teaching/ws-18/praktikum-smt-solving/`
- **Supervisors:** `smt-admin@i2.informatik.rwth-aachen.de`
- CArL:
  `https://<user>@srv-i2.informatik.rwth-aachen.de/scm/git/carl.git`
- Documentation for CArL (includes introduction to our build process):
  `https://smtrat.github.io/carl/`
- SMT-RAT:
  `https://<user>@srv-i2.informatik.rwth-aachen.de/scm/git/smtrat.git`
- Your git:
  `https://<user>@srv-i2.informatik.rwth-aachen.de/scm/git/smt-X.git`

That's it...

Questions?