HW2 - Fall 2015

HW2: Categorization of Z3/SMT-Solver-Related Papers and Open Source Tools in a Research Sub-Area

Deadline: September 9 Weds  September 11 Friday (6:59:59am, Champaign time)

Submit this assignment through SVN (svn co https://subversion.ews.illinois.edu/svn/fa15-cs527/$NetID , replace '$NetID' with your respective NetId). You should include a single file, named "hw2.html". The file should be in HTML.

List and categorize at least 10 papers (no upper bound on #papers!) on a specific research sub-area related to Z3 and SMT solvers in general, and at least one open source tool (in the same research sub-area) that uses Z3 or another SMT solver directly or indirectly. Example pages of categorizing papers in a research sub-area can be found on Tao Xie's group web. Such HW is to help you get familiar with a research sub-area (along with available related open source tools), which may be your term project's focus.

Note that if you don't find sufficient papers or open source tools related to Z3, you shall expand your focus scope to papers or open source tools related to other SMT solvers as listed in the table here.

Later in your term project, if you would like to modify and develop new features upon an open source tool using another SMT solver (not Z3), you shall refactor the tool to use Z3; such refactoring shall not be difficult to do.

Here you can find a list of research open source tools related to software testing and analysis collected by Tao Xie’s group (in case you may want to browse to find out some open source tools that may fit in your research sub-area of your interest).

Below are a list of survey papers that may help you get a quick overview of the automated deduction area to allow you to figure out a research sub-area to start with. There is no need to read into details of these survey papers (or the papers that you will list and categorize) though.

- **Z3 Quick Overview**
  - Watch video on the Z3 Constraint Solver.
  - Read Z3 online tutorial and try Z3 in the online browser editor as guided in the tutorial.

- **Automated Deduction**
  - Nikolaj Bjorner and Leonardo de Moura. Applications of SMT solvers to Program Verification. Rough notes for SSFT 2014

Please discuss in Piazza for your new tips on finding related research papers and open source tools! The tips below will be expanded based on students' discussion.

**Tips on Finding Related Research Papers**

- See Tao Xie's old blog post on "Tips on collecting research papers related to your research topic".
- Browse proceedings of recent years' major venues in SE/PL/Compiler/Verification to find out related papers. See example major venues in these areas here (near the bottom).
- Find references (especially discussed in the related work section) of a paper, using Citeseer.
- Find papers citing a paper, using Google Scholar.
- Keep eyes on related researchers' publications in Google Scholar by following their new papers and papers citing their papers.
- Install and run WebMon daily or weekly to keep track of updates on a related researcher’s publication webpage.
- Find a classic paper in Google Scholar and find similar articles there (under the "Related articles" for a paper entry shown in the search results).
- You can type in keywords related to your research sub-area of focus to narrow down the search results.

**Tips on Finding Related Open Source Tools**

- Search with a keyword as a line typically included in the top of source code files using a library in code search engines such as Ohloh: https://code.openhub.net/ (where you can additionally specify the programming languages of the code that you search). You can try adding " and " around the keyword to find a narrower set of results and without adding them to find a broader set of results.
  - For C# code using Z3, use "using Microsoft.Z3;". For other languages, see example code using Z3 here.
For code using another SMT solver as listed in the table here, visit the SMT solver's website to figure out characteristics of the code using such SMT solver.

Some other code search engines (which may not be as good as Ohloh: https://code.openhub.net/) are SearchCode, Search Open Source Code, Krugle, NerdyData, Symbol Hunt, Merobase, and see more details here.

**Tips on Using Google**

- 13 Google Search Tricks That Make Life A Whole Lot Easier