Software Analysis Workbench: function equivalence across languages

Description Illustrate how SAW is used to show equivalence between two functions written in C, Java, or Cryptol that are designed with different algorithms for the same problem.

Purpose Elementary use of SAW to prove or disprove equivalence of functions.

Audience This module is intended for:

1 The general public
2 K-12 and college classes on Cyber Defense and Math Logic
3 preparation for proficiency in the use of tools and a computing environment suitable for the study of cyber defense

Objectives After completing the module:

1 You will know how to run clang, the C language compiler to llvm
2 You will know how to create and-inverter-graphs that are equivalent to functions in C or Java
3 You will know how to use SAW to prove or disprove equivalence using a variety of methods

Keywords Math Logic, SMT Solver, SAT solver, ITP Solver, ATP solver, Propositional Logic, First Order Logic, Cryptol, Yices, ABC, Z3, CVC4, Boolector

Category cybersecurity > education

Delivery java applets and written documentation in pdf format

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Assessment The applets provide the means for experimentation. Questions are asked in the documentation that help with the set up of experiments. The ideas that learners come up with is evidence that the module was successful.

Workflow No particular schedule was established

Environment All materials are contained in a single jar file. The jar file can be run on any computer where java version 14 or higher and some pdf reader such as acroread or evince are available. The jar file may be executed in the cyber range or learners may download the jar file (which is considered to be an executable file) and run it on their personal computers.