Symbolic Execution(Working title)

Aarhus Universitet

Søren Baadsgaard

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Abstract

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Basic symbolic execution for the *SImPL* language

3.1 description

In this chapter we will describe the process of implementing symbolic execution for a simple imperative language called *SImPL* .

3.2 Introducing the *SImPL* language

SImPL **(Simple Imperative Programming Language)** is a small imperative programming language, designed to highlight the interesting use cases of symbolic execution. The language supports only one type, namely the set integers $\mathbb{N}$, where 0 and 1 doubles as the logic values *true* and *false* respectively. *SImPL* supports basic variables that can be assigned the value of any expression, as well as basic branching functionality through an **If** - **Then** - **Else** statement. Furthermore it allows for looping through a **While** - **Do** statement.

We will describe the language formally, by the following Context Free Grammar:

$\langle int \rangle$ ::= 0 | 1 | -1 | 2 | -2 | ...

$\langle var \rangle$ ::= a | b | c | ...

$\langle exp \rangle$ ::= $\langle int \rangle$
| $\langle var \rangle$
| $\langle exp \rangle + \langle exp \rangle \mid \langle exp \rangle - \langle exp \rangle \mid \langle exp \rangle * \langle exp \rangle \mid \langle exp \rangle \ / \ \langle exp \rangle$
| $\langle exp \rangle > \langle exp \rangle \mid \langle exp \rangle == \langle exp \rangle$
| ($\langle exp \rangle$)

$\langle stm \rangle$ ::= $\langle var \rangle = \langle exp \rangle$
| $\langle stm \rangle \ \langle stm \rangle$
| if $\langle exp \rangle$ then $\langle exp \rangle$ else $\langle exp \rangle$
| while $\langle exp \rangle$ do $\langle exp \rangle$
|

where $+, *, -, /$ denotes the usual arithmatic operators on integers, and $>, ==$ denotes the comparison-operators of *greater-than* and *equal-to* respectively.

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