



Review report of a final thesis

Reviewer: Sebastián Krynski, MSc.
Student: Petr Šťastný
Thesis title: Symbolic execution for R
Branch / specialization: Computer Science
Created on: 4 June 2024

Evaluation criteria

1. Fulfillment of the assignment

- ▶ [1] assignment fulfilled
- [2] assignment fulfilled with minor objections
- [3] assignment fulfilled with major objections
- [4] assignment not fulfilled

It has exceeded my expectations.

2. Main written part 95 /100 (A)

The text is clear and well-written. All the parts are there and the text walks the reader into the topic of symbolic execution without any prior knowledge. The decisions made in the thesis are explained and justified.

3. Non-written part, attachments 100 /100 (A)

It is a remarkable effort just for the entry point: Researching how the tools used in the thesis work +porting Chef to work on newer versions of S2E + understanding the R interpreter codebase enough to instrument it. The artifact is nicely split into cohesive repositories.

4. Evaluation of results, publication outputs and awards 100 /100 (A)

I think this work shows potential and should be further researched and developed. For example, type inference for library code and builtins could be translated into type annotations in the R code. These could, in turn, be leveraged by just-in-time compiler to produce more efficient code.

The overall evaluation

100 /100 (A)

It is a well-fulfilled assignment. It shows that valuable information about R programs can be extracted from symbolically executing the interpreter and without writing a tailored execution for the target language (which would take substantially more effort).

Questions for the defense

How would you further develop the type inference and what are the current limitations? Explain the difference in inferring types for R code vs builtins.

Instructions

Fulfillment of the assignment

Assess whether the submitted FT defines the objectives sufficiently and in line with the assignment; whether the objectives are formulated correctly and fulfilled sufficiently. In the comment, specify the points of the assignment that have not been met, assess the severity, impact, and, if appropriate, also the cause of the deficiencies. If the assignment differs substantially from the standards for the FT or if the student has developed the FT beyond the assignment, describe the way it got reflected on the quality of the assignment's fulfilment and the way it affected your final evaluation.

Main written part

Evaluate whether the extent of the FT is adequate to its content and scope: are all the parts of the FT contentful and necessary? Next, consider whether the submitted FT is actually correct – are there factual errors or inaccuracies?

Evaluate the logical structure of the FT, the thematic flow between chapters and whether the text is comprehensible to the reader. Assess whether the formal notations in the FT are used correctly. Assess the typographic and language aspects of the FT, follow the Dean's Directive No. 52/2021, Art. 3.

Evaluate whether the relevant sources are properly used, quoted and cited. Verify that all quotes are properly distinguished from the results achieved in the FT, thus, that the citation ethics has not been violated and that the citations are complete and in accordance with citation practices and standards. Finally, evaluate whether the software and other copyrighted works have been used in accordance with their license terms.

Non-written part, attachments

Depending on the nature of the FT, comment on the non-written part of the thesis. For example: SW work – the overall quality of the program. Is the technology used (from the development to deployment) suitable and adequate? HW – functional sample. Evaluate the technology and tools used. Research and experimental work – repeatability of the experiment.

Evaluation of results, publication outputs and awards

Depending on the nature of the thesis, estimate whether the thesis results could be deployed in practice; alternatively, evaluate whether the results of the FT extend the already published/known results or whether they bring in completely new findings.

The overall evaluation

Summarize which of the aspects of the FT affected your grading process the most. The overall grade does not need to be an arithmetic mean (or other value) calculated from the evaluation in the previous criteria. Generally, a well-fulfilled assignment is assessed by grade A.