**FACULTY
OF INFORMATION
TECHNOLOGY
CTU IN PRAGUE**

Review report of a final thesis

Reviewer:	Ing. Jan Sliacký
Student:	Filip Říha
Thesis title:	Simple Object Machine implementation in functional programming language
Branch / specialization:	Computer Science
Created on:	12 June 2023

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

All objectives have been fulfilled. The set-out goal for the implementation is on a larger and more complex side, the resulting implementation itself is of an exceptional quality.

2. Main written part   90 / 100 (A)

The thesis reads really well. It is succinct, to the point and well-structured. It has a logical and straightforward flow. There is, however, still some room left for more detailed descriptions and explanations; it would make the text even better while preserving the appreciated brevity.

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

The implementation is clearly well-designed and thought-out. It takes significant advantage of advanced techniques from functional programming and type-level programming facilities of Haskell.
All of the above then demonstrably projects on a type-safety of the implementation. Especially worth noting is the use of GADTs that allows GHC to rule out occasional impossible cases—making the code more succinct but still exhaustive.

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

The implementation could be used as a teaching reference. It would be worth considering publishing a series of blog posts in a tutorial-like format.

If that were to happen, the text of the thesis could serve as a basis but would have to be significantly extended with examples and explanations of specific design decisions with maybe comparisons to other possible options.

The overall evaluation   100 /100 (A)

The thesis is overall an excellent piece of work. The written part is really well-written bested only by the implementation itself.

Questions for the defense

Q1: Are there some "low-hanging fruits" that would make the implementation noticeably faster?

Q2: Does the implementation leverage Haskell's laziness or does it rather get in the way of the speed?

Q3: What kind of performance optimisations would be possible because of Haskell's strong type system? (as mentioned at the end of the Conclusion)

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.