Review report of a final thesis

Czech Technical University in Prague **Faculty of Information Technology**

Student:	Bc. Jan Ječmen
Reviewer:	Ing. Filip Křikava, Ph.D.
Thesis title:	Improvements of the RIR bytecode toolchain
Branch of the study:	System Programming

Date: 5. 6. 2017

Evaluation criterion:	*The evaluation scale: 1 to 5.*
1. Difficulty and other comments on the assignment	***1 = extremely challenging assignment,*** *2 = rather difficult assignment,* *3 = assignment of average difficulty,* *4 = easier, but still sufficient assignment,* *5 = insufficient assignment*

Criteria description:
Characterize this final thesis in detail and its relationships to previous or current projects. Comment what is difficult about this thesis (in case of a more difficult thesis, you may overlook some shortcomings that you would not in case of an easy assignment, and on the contrary, with an easy assignment those shortcomings should be evaluated more strictly.)

Comments:
This assignment was a challenging one. The student had to familiarize himself with a number of technologies including the R language with all its quirks as well as three different R interpreters (the GNU R AST and bytecode ones and the RIR one). Next to this, he had to understand the optimization techniques that are used in the existing implementations, propose improvements applicable to RIR and implement it all in a code that could be merged into the RIR project.

Evaluation criterion:	*The evaluation scale: 1 to 4.*
2. Fulfilment of the assignment	***1 = assignment fulfilled,*** *2 = assignment fulfilled with minor objections,* *3 = assignment fulfilled with major objections,* *4 = assignment not fulfilled*

Criteria description:
Assess whether the thesis meets the assignment statement. In Comments indicate parts of the assignment that have not been fulfilled, completely or partially, or extensions of the thesis beyond the original assignment. If the assignment was not completely fulfilled, try to assess the importance, impact, and possibly also the reason of the insufficiencies.

Comments:
The assignment was carried out very well and the proposed improvements are now part of the RIR codebase.

Evaluation criterion:	*The evaluation scale: 1 to 4.*
3. Size of the main written part	***1 = meets the criteria,*** *2 = meets the criteria with minor objections,* *3 = meets the criteria with major objections,* *4 = does not meet the criteria*

Criteria description:
Evaluate the adequacy of the extent of the final thesis, considering its content and the size of the written part, i.e. that all parts of the thesis are rich on information and the text does not contain unnecessary parts.

Comments:
The written part has the expected size.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
4. Factual and logical level of the thesis	*100 (A)*

Criteria description:
Assess whether the thesis is correct as to the facts or if there are factual errors and inaccuracies. Evaluate further the logical structure of the thesis, links among the chapters, and the comprehensibility of the text for a reader.

Comments:
The code is well implemented and has been merged into the RIR codebase thus passing code reviews and code quality standards.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
5. Formal level of the thesis	*80 (B)*

Criteria description:
Assess the correctness of formalisms used in the thesis, the typographical and linguistic aspect s, see Dean's Directive No. 14/2015, Article 3.

Comments:
The written part of the thesis could be improved a bit. What is missing is a more systematic presentation of the work. Some sections are unnecessary long and written in a plain text jumping from one topic to another without a clear structure. When a series of steps had to be performed it would be nice to format it using an enumerated list. This would overall improve the text readability. The evaluation chapter could have been extended a bit with a more detailed discussion about the results. The plots should be enlarged to make them easier to read.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*

6. Bibliography *80 (B)*

Criteria description:
Evaluate the student's activity in acquisition and use of studying materials in his thesis. Characterize the choice of the sources. Discuss whether the student used all relevant sources, or whether he tried to solve problems that were already solved. Verify that all elements taken from other sources are properly differentiated from his own results and contributions. Comment if there was a possible violation of the citation ethics and if the bibliographical references are complete and in compliance with citation standards.

Comments:
Some citations are missing the title of the publications in which they appeared. There could be a better management of what shall be in a footnote and what in a bibliography.

Evaluation criterion: *The evaluation scale: 0 to 100 points (grade A to F).*

7. Evaluation of results, publication outputs and awards *100 (A)*

Criteria description:
Comment on the achieved level of major results of the thesis and indicate whether the main results of the thesis extend published state-of-the-art results and/or bring completely new findings. Assess the quality and functionality of hardware or software solutions. Alternatively, evaluate whether the software or source code that was not created by the student himself was used in accordance with the license terms and copyright. Comment on possible publication output or awards related to the thesis.

Comments:
There is a potential for a publication.

Evaluation criterion: *No evaluation scale.*

8. Applicability of the results

Criteria description:
Indicate the potential of using the results of the thesis in practice.

Comments:
The work done in this thesis is part of the RIR code and already being used.

Evaluation criterion: *No evaluation scale.*

9. Questions for the defence

Criteria description:
Formulate any question(s) that the student should answer to the committee during the defence (use a bullet list).

Questions:
1. Next to the shootout benchmarks, have you considered any other ones? For example just simply running the code associated with R packages and observing whether there are any differences in speed?
2. What would be the next steps for optimizing RIR further? One thing is to get it to the level of GNU R, but ideally much further, right?

Evaluation criterion: *The evaluation scale: 0 to 100 points (grade A to F).*

10. The overall evaluation *95 (A)*

Criteria description:
Summarize the parts of the thesis that had major impact on your evaluation. The overall evaluation **does not** have to be the arithmetic mean or any other formula with the values from the previous evaluation criteria 1 to 9.

Comments:
Overall, I really enjoyed reviewing this thesis. Jan did a great job in learning all the technologies and figuring a way how to improve RIR.
He has shown that he can carry out research tasks, write a solid implementation, evaluate his work and do all that in a limited amount of time.

Signature of the reviewer: