Review report of a final thesis

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

Student:	Bc. Oleg Gul
Reviewer:	Ing. Marcel Hlopko
Thesis title:	Garbage Collector for Multi-threaded Scheme using Native Threads
Branch of the study:	System Programming (Master)

Date: 1. 6. 2015

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:
Student had to design a multi-threaded garbage collector, which requires deep knowledge of C language, operating systems, and multi-threaded programming. He had to integrate this garbage collector into TinyScheme programming environment, which was very demanding and time consuming task. Student went on as far as he could trying to optimize the performance.

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:
Student fulfilled all the points of the assignment.

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 text size of the thesis is adequate, the detail, precisions and topics covered are adequate too. If anything, I would remove the API documentation from the text and leave it as an appendix.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
4. Factual and logical level of the thesis	*90 (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 text of the thesis is understandable, flows logically from simple description of the problem into deeper topics.

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. 12/2014, Article 3.

Comments:
The text of the thesis is typographically correct. The grammar is not always correct, but the student always manages to deliver ideas to the reader.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
6. Bibliography	*50 (E)*

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:

Student used many relevant information sources, but I am very unpleased with the section 1, which contains diagrams taken without attribution, and which contains entire paragraphs taken word by word from other sources. These paragraphs include citation in the Bibliography section, but the authorship of the paragraphs is neither stated nor visually separated from the authors own text. The level of abstraction in the section 1 varies greatly, when student describes JVM garbage collector in great depth, but completely skims over garbage collectors used in various Ruby implementations.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
7. Evaluation of results, publication outputs and awards	*90 (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:

The results of the thesis are of high quality and will be rewarding to the other virtual machines research done on the faculty.

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 results of this thesis are rewarding to the other virtual machines research done on the faculty.

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:

* In section 3.3, how was the compaction improved comparing to the first version?
* In section 4.2, one of the optimizations was marking all objects in
  a page as reachable after the SIGSEGV. How big was the performance
  improvement using this optimization only? Is it worth having more
  garbage objects floating around longer and less SIGSEGVs?
* Number of iterations and problem size of each iteration for
  performance testing seems small, did you try much larger numbers? Did
  you observe the same difference in performance?

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
10. The overall evaluation	*90 (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:

Student managed to fulfill the assignment of the thesis completely and with high quality. The topic was demanding, original, and the results will be important for other reasearch on the faculty. Even with formal flaws, I strongly advice the grade A.

Signature of the reviewer: