FACULTY OF INFORMATION TECHNOLOGY CTU IN PRAGUE

Supervisor's statement of a final thesis

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Thesis title:	Swift for Embedded Systems
Branch of the study:	System Programming

Date: 31. 5. 2019

Evaluation criterion:	*The evaluation scale: 1 to 4.*
1. 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 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.

Comments:
The goal of porting the Swift language to embedded systems, specifically the Cortex-M architecture was fulfilled. From my past experience this topic is one of the harder one as the student was required to understand and work with very complex systems (such as the Swift Language Runtime, or the LLVM compiler). And while there is room for improvement in the future, the scope of the work done by the student has exceeded by expectations.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
2. Main written part	*90 (A)*

Criteria description:
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. 26/2017, 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.

Comments:
The thesis is very well written, reading it is a pleasant experience thanks to both fairly high level of student's proficiency in the English language as well as logical and naturally flowing structure of the text. It walks the reader through the many steps required to make the porting work, elaborating on details where appropriate.

My only issue is with data visualization where my feeling is that often form is preferred over substance. Canonical example is Figure 23, which albeit being visually appealing conveys no valuable information at all. I understand where the student was heading with some of the figures presented, but often it feels that more time should have been spent thinking how to present the information the author had in mind.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
3. Non-written part, attachments	*100 (A)*

Criteria description:
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.

Comments:
I can't think of any problems with the non-thesis part of the work. I am convinced the technologies used are quite appropriate. I am particularly impressed by the diligence the student showed in reducing the final binary size. For smallish embedded systems (such as the Cortex M mentioned above), this binary size is indeed a hard limit and language features of high level languages such as swift make the program size quite hard to keep minimal. Within the timeframe of the work, the student did a really good and thorough work especially in this area.

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

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

Criteria description:
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.

Comments:

The work represents a substantial first step in developing a practical port of the Swift language to Core-M architectures. Although there is always room for improvement, the work is substantial and tackles even practical issues such as the Package Manager for simple & fast deployment. The documentation, including the thesis is written in English, promoting further use of the results obtained.

Evaluation criterion:	*The evaluation scale: 1 to 5.*
5. Activity and self-reliance of the student	*5a:* ***1 = excellent activity,*** *2 = very good activity,* *3 = average activity,* *4 = weaker, but still sufficient activity,* *5 = insufficient activity* *5b:* ***1 = excellent self-reliance,*** *2 = very good self-reliance,* *3 = average self-reliance,* *4 = weaker, but still sufficient self-reliance,* *5 = insufficient self-reliance.*

Criteria description:
From your experience with the course of the work on the thesis and its outcome, review the student's activity while working on the thesis, his/her punctuality when meeting the deadlines and whether he/she consulted you as he/she went along and also, whether he/she was well prepared for these consultations (5a). Assess the student's ability to develop independent creative work (5b).

Comments:

Throughout the work, the student exceptionally motivated and organized, well above the average of Msc theses I have supervised in the past. While being independent enough, all important and interesting decisions were discussed in due time and acted upon swiftly:)

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

Criteria description:
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.

Comments:

Overall, I am very impressed with the thesis. It presents a quite substantial and very hard & involved piece of work. In light of this complexity the very few issues raised above are of very minor consequences and should serve as hints for the student's future academic or professional work rather than as substantial criticisms of the current work. The student accomplished porting a real-world programming language into a real-world architecture in a way that can, if promoted enough, form a basis of future development.

Signature of the supervisor: