Supervisor's statement of a final thesis

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

Student:	Bc. Ondřej Volf
Supervisor:	Ing. Miloš Fenyk
Thesis title:	IO-Link Device for testing of IO-Link Masters
Branch of the study:	Design and Programming of Embedded Systems

Date: 29. 5. 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:
The master's thesis presented by Ondrej Volf deals with development life cycle except the validation and verification phase of embedded device which is IO-Link device for testing purposes - so that the phases requested by the thesis assignment.

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 thesis describes requested part of development life cycle of embedded device which is the IO-Link Device for testing purposes in this case. The author's part of the development was collecting and interpretation of stakeholder's requirements, making a design decision with cooperation with supporting senior developers and hardware colleagues and finally preparing of embedded software structure and its implementation. This was completely achieved. Part of the implementation was testing the hardware for hardware colleagues which results in usable embedded device and a platform for future development.

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 thesis consists of 63 pages and one attachment. It is very well structured with clear set of the objectives the author wants to elaborate.

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 thesis consists of 63 pages and one attachment. It is very well structured with clear set of the objectives the author wants to elaborate. After a short introduction in the first chapter, the author proved very deep theoretical knowledge of the IO-Link technology in the second chapter.

The third chapter describes results of collecting of requirements as well functional ones as quality attributes. All stakeholders necessary in that time were asked and the requirements were categorized and ranked. It is necessary for setting of priorities in further development. The second part of the third chapter is describing design decision including of options which the author had at this time. This is important for future if there will be second round of hardware possibilities evaluation because of a change on the market with microcontrollers as well as IO-Link technology circuit. In this case these options can be excluded.

The fourth chapter contains embedded software related design decisions and basic overview of components as well as the class diagrams drawn in requested program Enterprise Architect. Main goal was to introduce some kind of abstraction for hardware which was fulfilled by strategy design pattern. Advantage of such design is possibility to exchange used microcontroller without minimal impact to upper software layers. Another goal was to minimize chaining of function calls from time critical events and to minimize coupling of components. This was achieved by request queuing followed by Publisher-Subscriber pattern. Beside this, the author describes IO-Link configuration, generating of IO-Link events, File System design and used third party software components.

Conclusion contains short summary of the thesis.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
5. Formal level of the thesis	*95 (A)*

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 pictures have bad quality.

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

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:
Correct.

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:
The result is easy portable FW for IO-Link devices. It was proved on another IO-Link Device hardware with different microcontroller architecture.

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 result is applicable in daily work in embedded development department and helps during development and maintenance of IO-Link master products.

Evaluation criterion:	*The evaluation scale: 1 to 5.*
9. Activity and self-reliance of the student	*9a:* ***1 = excellent activity,*** *2 = very good activity,* *3 = average activity,* *4 = weaker, but still sufficient activity,* *5 = insufficient activity* *9b:* ***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:
Review student's activity while working on this final thesis, student's punctuality when meeting the deadlines and consulting continuously and also, student's preparedness for these consultations. Furthermore, review student's independency.

Comments:
Student worked himself with excellent activity. A changes requested by senior developers were fully applied without any effort from their side.

Evaluation criterion:	*The evaluation scale: 0 to 100 points (grade A to F).*
10. The overall evaluation	*100 (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:
This diploma thesis achieved set goals. The result is easy portable FW for IO-Link devices, which works on hardware developed by another student and is perfectly applicable in daily work in embedded development department. Student worked himself with excellent activity.

Signature of the supervisor: