



Supervisor's statement of a final thesis

Student: Bc. Richard Stanko
Supervisor: Ing. Jiří Hušák
Thesis title: GPS assisted implementation of way-back function on ultra low power MCU
Branch of the study: Design and Programming of Embedded Systems

Date: 14. 8. 2020

<i>Evaluation criterion:</i>	<i>The evaluation scale: 1 to 4.</i>
1. Fulfilment of the assignment	<i>1 = assignment fulfilled, 2 = assignment fulfilled with minor objections, 3 = assignment fulfilled with major objections, 4 = assignment not fulfilled</i>
<i>Criteria description:</i> 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.	
<i>Comments:</i> The thesis assignment has been fulfilled. Richard has done all the job required defined before the thesis work started. The work has been composed of pretty diverse topics: some theoretical research of GNSS basics and BLE fundamentals, the specific GPS IC implementation, Android application development and overall integration into an existing IoT (watch) application. Regarding the testing, this part is quite short and does not show all the potential aspects of every day usage of the application. On the other side, there is a part of power consumption analysis.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>
2. Main written part	<i>80 (B)</i>
<i>Criteria description:</i> 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.	
<i>Comments:</i> The written part gives a good insight into used technologies (GNSS, BLE). It shows well correct level of details of the implemented parts. The code snippets and block diagrams shows well the main implementation issues and the principal solution. However the overall system description (including integration of already done watch system and the work done in scope of this thesis) could have been improved. In addition, the obstacles and problems solved during the development could have been discussed and at least a proposition for a solution could have been presented.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>
3. Non-written part, attachments	<i>85 (B)</i>
<i>Criteria description:</i> 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.	
<i>Comments:</i> There is the watch code and android app code as attachment. The watch code was written in C and was created keeping in mind the future integration in real consumer electronics product, a watch. The code was written properly keeping in mind very limited HW resources of used MCU. The Android app attached was written only as a helper code, which will not be used in real life application.	
<i>Evaluation criterion:</i>	<i>The evaluation scale: 0 to 100 points (grade A to F).</i>

4. Evaluation of results, publication outputs and awards

80 (B)

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:

All the results of this thesis will be used in real industry application. Maybe not in the exact code implementation, but at least the results of feasibility. The Android app was developed only as example and helper for future use, but gives an estimation of future efforts to develop the real phone application. The watch C code developed can be reused as is. The watch code can certainly be re-used in case of need in end-user application. The measurement of current consumption gives a very good overview on use case (take me home) real end user experience (in real environment the battery life is extremely important). In addition, the obstacles and problems findings will help in future implementation. Some changes and improvements in the final product specification were identified during the implementation (shortcut and loops navigation, waypoint compression). Those were not fully implemented in the scope of this thesis.

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:

Richard showed a great ability to work independently, especially during the Covid times, when any personal contact and guidance was difficult. He was able work on two different platforms (embedded C in resource limited environment and Android app development). As the code was developed for future industry usage in real consumer electronics, Richard had to learn and use the internal company coding standards and code integration process. In general he was able to implement and test all the thesis assignment, however I'd expect more active approach in problem solving and solution finding. The cooperation with Richard was always smooth and he reacted promptly on any specific request.

Evaluation criterion:

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

6. The overall evaluation

85 (B)

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:

The overall thesis work and practical implementation fulfilled the given assignment. Richard has made a good theoretical introduction; he studied the existing HW / SW given as a base by the company and then he developed a watch and phone application code which was tested in real life conditions.

Signature of the supervisor: