



Supervisor's statement of a final thesis

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Thesis title: Development of vulnerable car ECU
Branch / specialization: Computer Security
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Evaluation criteria

1. Fulfillment of the assignment

- ▶ [1] assignment fulfilled
- [2] assignment fulfilled with minor objections
- [3] assignment fulfilled with major objections
- [4] assignment not fulfilled

Student has fulfilled the assignment completely. Outcome of the practical part of the thesis is intentionally vulnerable ECU that can be used to teach automotive cyber security concepts. Incorporated vulnerabilities were agreed with thesis supervisor and implemented correctly.

2. Main written part 55 /100 (E)

Thesis is not very well written. Although high-level structure of the thesis is good, individual subsections are sometimes poorly written or chosen. Written part of the thesis was obviously completed under significant time pressure with limited space for proofreading and error correction. Example of poorly chosen structure is for instance subsection 1.3.1 Software updates that is quite out of context under 1.3 Electronic control unit section. Example of poor writing style is occasional occurrence of sentences that do not make sense like: "This is engineering in a way how to implement the software update itself or logistics problem how to deliver the update to each car."

3. Non-written part, attachments 95 /100 (A)

Developed vulnerable ECU is of a very good quality. Device is stable, all vulnerabilities are stable and repeatedly exploitable by accompanied exploit script. Student also prepared a presentation slides describing all ECU vulnerabilities and how to exploit them, which may be used for teaching purposes. The only reason for 95 points instead of 100 are some minor omissions in the presentation slides.

4. Evaluation of results, publication outputs and awards

75 /100 (C)

Practical part of the thesis could and certainly would be deployed in practice. Written part of the thesis would need to be improved for publishing.

5. Activity of the student

- [1] excellent activity
- [2] very good activity
- ▶ [3] **average activity**
- [4] weaker, but still sufficient activity
- [5] insufficient activity

Student demonstrated great independence while resolving individual technical challenges, but he often struggled to meet individual deadlines and to adequately distribute the workload over longer period of time.

6. Self-reliance of the student

- [1] excellent self-reliance
- [2] very good self-reliance
- ▶ [3] **average self-reliance**
- [4] weaker, but still sufficient self-reliance
- [5] insufficient self-reliance

Student certainly has a good self-reliance when it comes to resolving technical challenges, but he needs to improve his project management skills.

The overall evaluation

75 /100 (C)

Practical part of the thesis is very good. Developed device is stable, all vulnerabilities are stable and repeatedly exploitable by accompanied exploit script. Practical part could be evaluated as excellent. Unfortunately, the thesis is not very well written. It was obviously completed under significant time pressure with limited space for proofreading and error correction. Overall, taking into account both practical and written part, I suggest the final grade C.

Instructions

Fulfillment of the assignment

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.

Main written part

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. 52/2021, 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.

Non-written part, attachments

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.

Evaluation of results, publication outputs and awards

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.

Activity of the student

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.

Self-reliance of the student

From your experience with the course of the work on the thesis and its outcome, assess the student's ability to develop independent creative work.

The overall evaluation

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.