

## Review of Master's Thesis

**Student:** Liščinský Matúš, Bc.  
**Title:** Performance Analysis Based on Noise Injection (id 24144)  
**Reviewer:** Malík Viktor, Ing., DITS FIT BUT

1. **Assignment complexity** **average assignment**
2. **Completeness of assignment requirements** **assignment fulfilled**  
The assignment has been fully accomplished.
3. **Length of technical report** **in usual extent**  
The thesis has ~60 pages, which is a standard scope. The contained text is mostly relevant and does not contain unnecessary parts (except for the fuzzing part which is needlessly long, considering the fact that fuzzing is not used in the work).
4. **Presentation level of technical report** **75 p. (C)**  
Overall, the text is well-structured and the chapters link well together. However, some parts of the thesis are difficult to understand and they could be further improved. My particular concerns are:
  - some chapters (especially 2 and 3) contain long code listings with examples which are not much relevant for the thesis,
  - Chapter 4 defines a lot of requirements for the work, but almost none of them is referenced to later in the text,
  - Section 6.2 contains a lot of equations which are not easy to understand and they could use a better motivation and/or examples. There are some examples later in the following sections, but some should definitely be here.
5. **Formal aspects of technical report** **70 p. (C)**  
The thesis is written in English which is of average quality. The text is easy to understand, however it contains a lot of linguistic mistakes (bad usage of articles and commas, not respecting "s" in the third person singular, etc.). Moreover, there is a number of typos.  
  
The typography of the work is mostly good, although there are some problems, too (e.g. Figure 3.2 on page 24). One thing that I do not like is that large parts of the explanations are located in table and figure captions which is sometimes confusing.
6. **Literature usage** **85 p. (B)**  
The thesis contains 46 references, mostly academic papers, which are used in a correct and sufficient way. I appreciate a good overview of state-of-the art approaches to performance analysis, however, I would like to see a comparison of the proposed work with existing methods or tools.
7. **Implementation results** **95 p. (A)**  
The work is implemented as an extension of the Perun framework and its benefits are demonstrated on 2 case studies. The experiments show that the extension is able to automatically analyse large real-world software and to locate possible bottlenecks and candidates for optimisation. The overall quality of the implementation is high and although it has not been merged to the mainline of Perun yet, this should happen soon (to the best of my knowledge). I particularly appreciate very detailed and informative outputs of the tool - a table with the most important functions and nice interactive charts.
8. **Utilizability of results**  
The implemented extension improves the ability of the Perun framework to analyse performance issues of programs. I believe that especially a combination of the proposed approach with methods already present in Perun (e.g. fuzzing) could help to discover non-trivial performance bugs in real-world software. In addition, the student extended Perun with a support for the Pin framework, which could open even more interesting extension opportunities.
9. **Questions for defence**
  1. I did not understand the intuition behind the selection of the next candidate function in the perfblooming loop. Could you please explain this in more detail (perhaps using an example)?
  2. How did you determine the configurations for the experiments? Was it empirical or did you perform some measurements?
10. **Total assessment** **85 p. very good (B)**  
Overall, the thesis proposes a good-quality and complex solution to a non-trivial practical problem. The solution

has been experimentally evaluated on real use cases. Unfortunately, the text part feels a little unfinished and spoils the overall impression of the work. With respect to this, I suggest to rate the thesis by the **grade B**.

In Brno 8 June 2021

Malík Viktor, Ing.  
reviewer