Supervisor assessment of Bachelor's Thesis

Student: Beránek Tomáš
Title: Practical Application of Facebook Infer on Systems Code (id 24187)
Supervisor: Vojnar Tomáš, prof. Ing., Ph.D., DITS FIT BUT

1. **Assignment comments**
   The difficulty of the work is slightly above average due to the student had to study various techniques of static analysis (not taught at the bachelor level at FIT BUT), had to get acquainted with the way these approaches are implemented in Facebook Infer (with not so much documentation available), and had to apply the tool and optimize its functioning on a number of different software projects. Many of these projects had the form of quite low-level systems code while others were research prototypes with the common problems of such projects. To be able to propose the improvements of Facebook Infer that are presented in his thesis, the student had to spend many tens of hours studying advanced code written sometimes tens of years ago to see why the different analyses behave in practice as they behave.
   The student started to work on the subject during the project practice course. The work produced invaluable contributions to several research projects, especially the H2020 ECSEL projects Aquas and Arrowhead Tools. The results that the student arrived to, though seemingly simple and heuristic, quite significantly improve the results that one can get from Facebook Infer on various kinds of software projects. Moreover, they produced a lot of knowledge that can be used in future work where we are planning to try to achieve a similar effect as the student achieved manually by means of machine learning. Indeed, there has already happened an online meeting between the student, me, representatives of Red Hat, and researchers from IBM Watson whose outcome (based on the results of the student) was that we preliminarily agreed to try to go together in this direction.
   Last but not least, the student managed to find bugs in real-life software projects that are under development for many years and in common use all over the globe, such as zip or less. Some of these bugs have already been fixed by the developers.
2. **Literature usage**
   The way the student used the available literature is appropriate. The student was able to himself actively search for relevant literature and use it.
3. **Assignment activity, consultation, communication**
   The student was very active for the whole duration of the project practice, which preceded the work on his thesis, as well as during the work on the thesis (with may be one weaker period). The student was willing to work on the subject even during the summer break. He regularly participated at the meetings of our static analysis group and communicated also with researchers and developers from Facebook and Red Hat. During the meetings, he was able to clearly present the problems he hit and their suggested solutions. I very much appreciate that he was able to make a clear presentation for a group of researchers from IBM Watson and was able to answer their many questions.
4. **Assignment finalisation**
   The text of the thesis was prepared relatively in a hurry and could certainly be improved. However, I still managed to make one pass of the text. Here, I have to note that this situation was also influenced by my own pressure on the student to try to analyse more and more software projects, which was needed in the above-mentioned research projects.
5. **Publications, awards**
   The results were not published in the form of a paper, but they contributed to multiple deliverables of the mentioned research projects. Moreover, as already said, they led to discoveries of errors in various commonly used utilities whose corrections improve this software for many people that use it on everyday basis. Finally, I believe that the mentioned communication with IBM and Red Hat may be a beginning of very interesting research collaboration.
6. **Total assessment** **excellent (A)**
   Due to my lengthy comments above, I dare to be brief here: taking all the above-mentioned facts into account and reflecting the hard and intelligent work of the student, I suggest him to be graded A.

In Brno 2 June 2021

Vojnar Tomáš, prof. Ing., Ph.D.
supervisor