



Supervisor's statement of a final thesis

Student: David Mokoš
Supervisor: MSc Felix Javier Acero Salazar
Thesis title: Automated Acceptance Testing on macOS – A survey study focused on Avast Passwords for mac
Branch of the study: Web and Software Engineering

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<p><i>Evaluation criterion:</i></p> <p>1. Difficulty and other comments on the assignment</p>	<p><i>The evaluation scale: 1 to 5.</i></p> <p>1 = extremely challenging assignment, 2 = rather difficult assignment, 3 = assignment of average difficulty, 4 = easier, but still sufficient assignment, 5 = insufficient assignment</p>
<p><i>Criteria description:</i> 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.)</p> <p><i>Comments:</i> David's task during the thesis was far from trivial. The amount of documentation, official or otherwise, that exists about acceptance testing in macOS is very scarce. Implementing an automated acceptance test suite for a macOS application, is therefore not an easy challenge. Furthermore, the company has little experience automating the GUI of macOS apps placing the contributions of David's thesis among the first serious attempts made inside the company towards understanding the available tools and formalising the acceptance test process.</p>	
<p><i>Evaluation criterion:</i></p> <p>2. Fulfilment of the assignment</p>	<p><i>The evaluation scale: 1 to 4.</i></p> <p>1 = assignment fulfilled, 2 = assignment fulfilled with minor objections, 3 = assignment fulfilled with major objections, 4 = assignment not fulfilled</p>
<p><i>Criteria description:</i> 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.</p> <p><i>Comments:</i> The thesis achieved the aims defined at the outset:</p> <ul style="list-style-type: none">- The first part of the thesis covers with some detail the available tools for implementing the different parts of an acceptance test suite in macOS, giving special emphasis to GUI driving technologies, which turned out to be the biggest challenge in the project.- The second part describes the implementation of the automated acceptance test suite for "Avast Passwords for Mac". The final test suite covers the most important use cases of "Avast Passwords for Mac", and defines an architecture that enables the implementation of the missing test cases without too much effort. <p>Yet another goal that was achieved during this work was to contribute as much as possible to the test community mainly in the form of Pull Requests (PRs) to the Open Source projects used in the practical part of the thesis. At least 3 PRs were submitted to "Appium for Mac", which is part of the GUI driving solution used by David for implementing the automated acceptance test suite of "Avast Passwords for Mac"</p>	
<p><i>Evaluation criterion:</i></p> <p>3. Size of the main written part</p>	<p><i>The evaluation scale: 1 to 4.</i></p> <p>1 = meets the criteria, 2 = meets the criteria with minor objections, 3 = meets the criteria with major objections, 4 = does not meet the criteria</p>
<p><i>Criteria description:</i> 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.</p>	

Comments:

The document covers with enough detail the available technologies and tools for developing acceptance test suites for macOS applications. Similarly, the second part of the document provides a detailed account of the implementation of the test suite, including a discussion about the architecture, the chosen tools and providing code listings with the code used for implementing each of the layers of the test suite.

Evaluation criterion:

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

4. Factual and logical level of the thesis

90 (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 document is well written. The structure of the thesis is logic and very hierarchical. It starts by providing the reader with an overview of the different types of testing, focusing mostly on the topic of Acceptance Testing. Then it transitions towards a discussion of the macOS platform describing in special detail the available tools and technologies for driving the GUI of the application.

The second part of the document starts off by introducing the reader to "Avast Passwords for Mac", discussing the high-level architecture of the application as well as enumerating the most important functionalities. At this point, the text becomes much more technical providing detailed information about the implementation of the test suite, including several class diagrams as well as several code snippets.

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 aspects, see Dean's Directive No. 26/2017, Article 3.

Comments:

In addition to be completely written in English, the language used in the thesis complies with the standard language and typographic conventions used in these type of works.

Evaluation criterion:

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

6. Bibliography

90 (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:

Although detailed, in-depth documentation for certain aspects of the thesis is not easy to come by, David managed to put together a compelling set of references ranging from official technical documents published by Apple to books and academic papers on the subject of software testing and acceptance testing in general.

As expected, the first part of the document ("State of the Art") is loaded with bibliographic references, each of which is indicated inside of the text and properly referenced in the "Bibliography" section. Further sections in the document also contain bibliographic references, though in a lesser quantity since these chapters discuss the application of the theoretical concepts to a specific problem

Evaluation criterion:

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

7. Evaluation of results, publication outputs and awards

90 (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 main outputs of the thesis were:

- A clear discussion and evaluation of the available tools for building acceptance test suites in macOS (with special emphasis to the GUI driving technologies)
- An automated acceptance test suite for "Avast Passwords for Mac"

In both cases, the resulted output is of good quality and of clear practical value for Avast and the testing community in general. The survey and comparison of the tools is particularly useful since the discussion of these tools in the academic and practitioners community is very scarce (specially in the niche of native macOS applications). The automated acceptance test suite delivered, is not only functional but also implemented with special attention to readability and extensibility.

In addition to these work products, David managed to submit 3 Pull Requests to "Appium for Mac" aimed at improving the overall functionality of the tool.

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 automated acceptance test suite implemented by David is currently used as part of the release process of "Avast Passwords for Mac". The delivered code is in a very good shape and is prepared to be extended to support additional test cases.

Since this is among the first efforts done in the company for formalising the implementation of automated acceptance test suites for macOS applications in Avast, is very likely that David's work will become the reference model used by other QA engineers to implement test suites for the other macOS applications developed by Avast.

Evaluation criterion:

9. Activity and self-reliance of the student

The evaluation scale: 1 to 5.

- 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:

From the beginning of the project, we defined a weekly update meeting in which we would discuss David's progress during the previous week, define the goals for the following week and resolve any outstanding doubts and questions. David attended each meeting, presenting in each occasion the work he had achieved and bringing forth new ideas that had occurred to him while working on the thesis.

David took ownership of the project from the very beginning and was very receptive to my advice and suggestions. He provided me with timely updates, as well as with ideas of how to approach each of the challenges in the thesis.

Evaluation criterion:

10. The overall evaluation

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

95 (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:

Overall I am very satisfied with David's work during the thesis. The produced outcomes have been immediately useful for Avast and have percolated to the overall testing community (in the form of several Pull Requests). The delivered document is very compelling and describes with enough detail the state-of-the-art as well as the implementation of the solution. Finally, David's work ethic, and commitment to the project was impeccable.

After working with him during the last months, I am convinced that he will be a great asset for any institution that will have the privilege to count him as part of his members.

Signature of the supervisor: