In-company or Research Internship MSc Computing Science – Starting form

To be filled in and signed by the student and the supervisor(s) at the beginning of the internship.

Course code: INMSTAG-08
Credits (EC): 15 points (420 hours)

1. General information

Student name and Signature: Filipe Alexandre Rosa Capela

Student number: S4040112

Project title: Exploring architectural design decisions in issue tracking systems

Date: 14/04/2020

Starting meeting: 14/04/2020

Start Date: 20/04/2020

Final assessment: 29/06/2020

First supervisor (name + signature): Paris Avgeriou

Second supervisor (name + signature): Mohamed Soliman

Daily supervisor (if applicable):

External supervisor (if applicable):

2. Project description:

Software architectural design decisions (ADDs) play a crucial role when developing a software system [1]. However, making the right ADDs is a challenging task, which requires knowledge and expertise. Sharing and re-using architectural knowledge from existing systems could support software engineers to learn from previous design experiences. This would be useful for software engineers to re-use successful ADDs from other existing software systems.

Recent research effort shows that software engineers share their architectural knowledge in several places (e.g. issue tracking systems [2]). Issue tracking systems (e.g. Jira) provide an interesting source of knowledge, because they are directly associated with an existing source code base. This makes them a useful source to capture and re-use architectural knowledge.

The main goal of this research effort is to explore how software engineers discuss architectural design decisions in issue tracking systems. During the internship, we make the following steps:

1. Capture changes in architectural decisions from a source code repository to determine architecture relevant source code commits.
2. Based on the above architecture relevant source code commits (from Step 1), determine architectural relevant issues in an issue tracking system (e.g. Jira).
3. Based on the captured architectural relevant issues (from Step 2), qualitatively and/or quantitatively analyse issues for the rationale of ADDs.

[1] L. Bass, P. Clements, and R. Kazman, Software Architecture in Practice, 2nd ed. Boston, MA, USA: Addison-Wesley Longman Publishing Co., Inc., 2003.

[2] A. Shahbazian, Y. Kyu Lee, D. Le, Y. Brun and N. Medvidovic, "Recovering Architectural Design Decisions," 2018 IEEE International Conference on Software Architecture (ICSA), Seattle, WA, 2018, pp. 95-9509.

3. Methodology and timeline:

To capture architectural design decisions, the student is going to capture one or more types of architectural design decisions:

- Decide on patterns and tactics in the selected projects.
- Creating components and dependencies in the analysed projects.
- Technology design decisions.

The student will follow the following time line:

1st week: Select project from a range of Apache products and analyse literature on the topic.

2nd – 6th week: Perform analysis to capture ADDs. This step involves experimenting with existing tools, and integrating them in a software to detect architecture relevant commits (ARCs), which trigger ADDs.

7th – 9th week: Determine issues based on ARCs, and analyse issues either qualitatively or quantitatively.

10th week: Finalize report and project.

4. Division of tasks

Non-applicable since student will be working alone.

5. Deliverables:

1. Software and source code responsible on capturing ARCs and analysing issues.
2. Generated data, such as the captured design patterns and tactics, commits, and issues.
3. A report containing the output of the research, and a documentation for the created software.

6. Grading

For the grading, the schema will be as follows:

Scientific quality of Research and technical contribution: 45%
Project management and interpersonal skills: 20%
Final Presentation: 10%
Report/Thesis: 25%