



## **Bachelor Thesis**

In the Requirements Engineering Research Group

### **Context**

Traceability is a very active field of research. Different tools have been developed during the last years for generating traceability links automatically. But there is still no comparison of the effectiveness of these tools for generating links for different types of artifacts.

We propose to evaluate and compare publicly available traceability tools using a traceability benchmark that we developed for this purpose [2].

### **Aqualush Benchmark**

*Aqualush* is an irrigation system example that has been developed in [1]. The example includes various requirements and design documents as well as a java implementation of the system.

We completed the Aqualush project with a number of tests and defined traceability links among the Aqualush artifacts. Then we used it as a benchmark for traceability [2].

### **Thesis Goal**

The goal of the thesis is to use the Aqualush traceability benchmark to evaluate and compare various traceability tools.

### **Student Tasks**

- Do a literature review to identify existing tools for generating traceability links.
- Run the tool on the Aqualush benchmark and compare the obtained results. For this task, the student will have to adapt the data in the Aqualush benchmark to fit to the used tools.
- Eventually evaluating and improving the benchmark: the student will have to apply a number of changes to the benchmark that are meant to improve its quality and facilitate its use.

### **Deliverables**

- A review of existing traceability tools.
- A comparison of the effectiveness of these tools.
- Data and code used for performing the evaluations and comparisons

### **Benefits for the Student**

- Exploring the field of traceability
- Introduction to research and benchmarking
- Getting in touch with different artifacts produced during the development of a software system.



### Proposed Plan

- **W1-W4:** Reviewing traceability literature: by the end of the 4<sup>th</sup> week the student should deliver a document reviewing the main traceability links generation techniques and their characteristics.
- **W5-W6:** Exploring (and eventually improving) the Aqualush benchmark: by the end of this stage the student should propose a detailed plan (with the intend iterations and milestones) of the evaluation he will conduct.
- **W7- ...- W11:** Iterations: by the end of each iteration the student should return an evaluation of the considered traceability tool.
- **W12:** Merging results
- **W13-W16:** Finalizing the project and writing the thesis

|                 |                                       |
|-----------------|---------------------------------------|
| <b>Workload</b> | 4 months, 17 ECTS                     |
| <b>Advisors</b> | Eya Ben Charrada and Cédric Jeanneret |
| <b>Examiner</b> | Prof. Dr. Martin Glinz                |

### Note:

This work could be extended into a Master thesis. In such case the student will have to both a qualitative and quantitative evaluation of the traceability tools.

### References

- [1] C. Fox. Software Engineering Design: Processes, Principles, and Patterns with UML2. 2006.
- [2] E. Ben Charrada, D. Caspar, C. Jeanneret, M. Glinz. Towards a Benchmark for Traceability. In Proceedings of the Joint ERCIM Workshop on Software Evolution and the International Workshop on Principles of Software Evolution (IWPSE-EVOL), at ESEC-FSE 2011 (To appear).