

# 1 Lecture 7

## 1.1 Exercise 7: Experimentation for Quality Attributes Verification

### Objective:

This exercise aims to design, set up, and execute an experiment to validate the two most important quality attributes of your system. Through this exercise, you will get an understanding of the practical implications of architectural decisions and their impact on desired system qualities.

### Tasks:

- *Select One Quality Attributes:* From the list of quality attributes defined for your system, select the most critical quantitative attribute.
- *Design the Experiment:*
  - Determine the goal of the experiment and use the template from the literature to state it.
  - Define specific metrics to quantitatively measure the selected quality attribute. Consideration one of these QAs: Interoperability, availability, deployability.
  - Design test scenarios that will be used to evaluate the system against these metrics.
  - Decide on the tools, environments, and configurations necessary for the experiment.
- *Execute the Experiment:*
  - Set up the required tools and environments.
  - Execute the designed test scenarios and collect data from the experiment in a structured manner (suitable for analysis).
  - Document the outcomes and any unexpected behaviors observed during the experiment.
- *Analyze and Document Findings:*
  - Analyze the collected data, e.g. using descriptive statistics.
  - Evaluate the results against the metrics defined for the quality attribute, e.g. testing your hypothesis.
  - Identify the successes and shortcomings of the current architecture in meeting the chosen quality attribute.
  - Provide recommendations for architecture refinement, if necessary, based on the experimental findings.

**Deliverables:**

- A document that includes:
  - The experiment design details including examples of the data collected.
  - Documented outcomes of the experiment, e.g. using tables, figures, and graphs.
  - Analysis of the results with respect to the defined metrics.
  - Recommendations and conclusion based on the outcome(s) of the experiment.

**Assessment Criteria:**

The students' submissions will be assessed based on the comprehensiveness of the experiment design, the accuracy and depth of the analysis, and the feasibility and justifiability of any architectural recommendations provided.