Software Architecture Design and Recovery: Assignment Report

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Abstract

The primary goal of this assignment is to explore different types of design decisions in a project, focusing on the components and connectors of the respective project. We aim to answer two research questions:

1. What types of design decisions are discussed in the issue tracker of a project?

2. What are the differences between architectural components, connectors, and configurations in issue trackers versus source code?

1 Introduction

In software engineering, design decisions are often discussed in project issue trackers. However, understanding the implications of these decisions on architectural components and connectors requires a systematic exploration. This report focuses on the analysis conducted in the first week of the assignment, laying the groundwork for future analysis.

2 Study Design

2.1 Week 1 – Initial Exploration

2.1.1 Exploring Architecturally Significant Requirements

We began by skimming through the project documentation to identify functional requirements and quality attributes relevant to our project. The main features were listed, providing an overview of the architectural requirements.

2.1.2 Types of Design Decisions in Issue Trackers

We classified issues from the project's issue tracker based on qualitative content analysis. Each issue was assessed for:

- Its architectural significance (Yes/No)

- Types of design decisions present (Existence, Property, Executive)

- Description of components design (Yes/No)

- Quality attributes discussed in each issue

This step established a foundational understanding of the design decisions relevant to the project.

3 Results

The findings from our classification reveal the prevalence and types of architectural discussions occurring in the issue tracker.

3.1 Dataset Statistics

- **Total Issues Reviewed**: 109

- **Architectural Issues**:

- **Types of Decisions Identified**:

  - Existence:
  - Property:
  - Executive:

4 Challenges and Limitations

We faced several challenges during the initial exploration:

- Unable to access issues in the issue tracker using the JIRA API.

- Missing descriptions or added email links in some issues, which complicated our classification efforts.

5 Team Contributions and Hours Spent

Member	Hours Spent	Remarks
Adarsh Choudhary	6	Created script to download issue details from the issue tracker, created script to download commit details from GitHub repo, made codebook, classified 41 issues.
Mohit Jain	8	Assisted in writing scripts, classified 37 issues, made codebook.
Surabhi	11	Assisted in writing scripts, classified 37 issues, made codebook, listed functional requirements and quality attributes.

Table 1: Team Contributions and Hours Spent

6 Repository

The source code and additional materials for this project can be found in our GitHub
repository: `https://github.com/iamAdarshh/SADR-Types-of-design-decisions-and-components`

7 References

1 Project documentation and issue tracker: `https://axis.apache.org/axis2/java/core/`

2 Project source code: `https://github.com/apache/axis-axis2-java-core`

3 ChatGPT for classification of architecture design types and quality attributes.