

Software Architecture

2025-2026

Project 1

Context

In a previous project, the Library Management REST-oriented backend service was developed.

This application provides REST endpoints for managing:

- Books
- Genres
- Authors
- Readers
- Lendings

Problem

The Library Management service does not support:

- Extensibility
- Configurability
- Reliability

Goals

The goals of this project (P1) are:

- Documenting
 - System-as-is (reverse engineering design)
 - Requirements, especially ASR
 - Classification
 - Adoption of ADD
 - Identification and classification of requirements
 - ADD process
 - Tactics
 - Reference architectures
 - Patterns
 - Architectural design alternatives and rational (visual models)
- Make the developments required so that the project supports:
 - Persisting data in different data models (e.g. relational, document) and SGBD: (i) SQL + Redis, (ii) MongoDB+Redis and (iii) Elastic Search
 - Retrieve a book's ISBN by title using different external systems: (i) ISBNdb, (ii) Google Books API, and (iii) Open Library Search API, or (iv) two of the previous together
 - Generate IDs for other entities in different formats based on varying specifications
- The previous alternatives must be defined during configuration (setup time), which directly impacts runtime behavior
- To improve automated functional testing:
 - Functional opaque-box with SUT = classes
 - Functional transparent-box with SUT = domain classes

- Mutation tests with SUT = classes
- Functional opaque-box with SUT = controller+service+{domain, repository, gateways}
- Functional opaque-box with SUT = system
- NB: Tests provide the key evidence for evaluating development

Conditions

- Number of students per group:
 - 2
 - exceptionally 3 or 1, if accepted by faculty, and implies differences in goals
- First evaluation:
 - Mandatory
 - Submission deadline: 2025-11-02
 - Mode: Individual, synchronous, face-to-face
 - Weight: 100% (or 70% if second evaluation takes places)
- Second evaluation:
 - Optional
 - Submission deadline: (as P2 submission deadline)
 - Mode: Individual, synchronous, face-to-face
 - Weight: 30% (or 0% if it does not take place)

Project 2

TBD