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
  - Generate IDs for other entities in different formats based on varying specifications
- The previous alternatives must be applied at run-time by configuration
- 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
- <u>NB: Tests provide the key evidence for evaluating development</u>

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