

Software Development Organization

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 has some limitations related to:

- Variability
- Configurability
- Reliability
- CI/CD
- Testing

Goals

The goals of this project (P1) are:

- Documenting
 - System-as-is
 - Reverse engineering design, including implementation and deployment
 - Test health metrics: quantity, and quality
 - System-to-be (deployment only)
 - Critical analysis on pipeline performance, with evidence of improvement over time
- To adopt a CI/CD automation process using Jenkins
 - Deployment of Jenkins in two of:
 - Local
 - DEI's remote servers (e.g. <https://vs-ctl.dei.isep.ipp.pt>)
 - Containers (e.g. Docker)
 - Other, e.g. Azure, GCP, AWS (no support is provided)
 - Build
 - Compile/Package (compilation, resolve dependency)
 - Artifact Creation (packaging)
 - Static Code Analysis (e.g. ES Lint, SonarQube)
 - Unit Testing (i.e. SUT = classes)
 - Run (different tests levels separately)
 - Test coverage
 - Mutation tests

- Reporting results
- Integration Testing (i.e. SUT = controller+service+{domain, repository, gateways})
 - Service testing
 - Data base testing
 - Reporting results
- Deployment to 2 hosting environments
 - Local
 - DEI's remote servers (e.g. <https://vs-ctl.dei.isep.ipp.pt>)
 - Containers (e.g. Docker)
- In 3 environments: dev, staging, and production, other, e.g. Azure, GCP, AWS
- To improve automated functional testing:
 - Functional opaque-box with SUT= classes
 - Functional transparent-box with SUT = domain class
 - Mutation tests with SUT= classes
 - Functional opaque-box with SUT = controller+service+{domain, repository, gateways}
 - Functional opaque-box with SUT = system
 - Test health metrics of the improved tests: quantity, and quality

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 30% 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