

# **Project assignment**

## **Object Oriented Programming**

Welcome ! This project for your Object-Oriented Programming (OOP) course is your chance to showcase your mastery of OOP concepts and translate theoretical knowledge into practical software development.

### **Objective of the project**

The primary objective of this final project is to provide you with a hands-on experience in developing real-world applications using object-oriented principles. By undertaking this project, you will deepen your understanding of encapsulation, inheritance, polymorphism, and abstraction, the core concepts that form the backbone of object-oriented design.

Furthermore, the project aims to enhance your proficiency in creating sophisticated software with a graphical user interface (GUI) using JavaFX, Swing, or other relevant libraries. This hands-on experience in designing and implementing a user-friendly interface will contribute to your skillset as a developer.

Additionally, the objective includes the practical application of database management, where you will create a local database using SQLite or work with semi-structured data formats such as JSON and XML. This aspect of the project is designed to provide insight into data storage and retrieval strategies, offering you a holistic understanding of software development beyond pure code implementation.

In addition to the technical implementation, you will be required to produce a detailed report documenting your project's design and implementation. This report will outline your chosen project concept, design decisions, and application structure, demonstrating your understanding and application of object-oriented principles by providing a description of the classes and objects used in your project, explaining their roles and relationships.

In summary, the overarching goal is not only to reinforce your understanding of object-oriented principles but also to equip you with the practical skills needed to develop robust and user-friendly software applications, incorporating graphical user interfaces and efficient data management using Java and relevant technologies.

### **Project options**

This project presents you with three diverse options :

- **Student Management System:**

Develop a Student Management System that facilitates the efficient management of student-related information within the university. This system should be capable of adding new students, calculating their grades, creating schedules for students if possible, and incorporating other features to aid in their academic journey.

- **Hospital Management System:**

Develop a Hospital Management System designed to streamline the effective management of patient-related information within the healthcare institution. This system should have the capability to admit new patients, manage their medical records, schedule appointments, and include other features to enhance the overall hospital management process.

- **Travel Booking System:**

Develop a Travel Agency System designed to efficiently manage various aspects of travel services. This comprehensive system should empower the agency to handle tasks such as booking new travel packages, managing customer details, facilitating reservations, and incorporating additional features to optimize the overall operations of the travel agency.

Each option offers a unique set of functionalities and challenges, providing opportunities to test your understanding of OOP concepts in different contexts. You can choose the option that aligns best with your interests or delve into an entirely different project idea, subject to teacher approval.

## Requirements

- Not more than three students per group.
- You can choose any topic of your own (preferably a real-world idea).
- Include all the concepts covered in the programming workshop (classes, objects, inheritance, abstraction, interfaces, etc.).
- Your Java application should include a graphical user interface (using Java Swing or JavaFX).
- Each project, should be connected to a database.
- A report is required for each project.

## Project Deliverables

- **Project Proposal:**

The project proposal serves as an initial document that outlines the overall plan and objectives of the project. In the project proposal, you should outline:

- the division of tasks by defining team roles and responsibilities.
- you should define key milestones throughout the project, specifying deliverables or achievements associated with each milestone and assigning target completion dates.
- The object of the project.
- The title of the project and team members.
- The functionalities of the software.

This encourages you to plan your work effectively, collaborate efficiently, and track progress towards the project's overall objectives ( a template of the project proposal will be shared with you).

- **Report about the project:**

The report about the project is a comprehensive document that provides an in-depth analysis of the project, its development process, and outcomes. The report should include :

- the construction steps using Unified Modeling Language (UML) diagrams, such as use case, class, sequence, and activity diagrams.
- database design is presented through visual representations like Entity-Relationship Diagrams (ERD).
- a comprehensive list of tools, frameworks, and technologies used in the development process, highlighting their role and impact.
- etc.

- **Source Code / Software**

The source code for the project strictly adheres to Object-Oriented Principles, emphasizing modularity and maintainability through encapsulation, inheritance, polymorphism, and abstraction. To kick off, a project concept aligned with personal interests is chosen, ensuring it involves multiple classes and objects. The application is then designed and implemented, employing Java Swing/JavaFX to create an accessible Graphical User Interface (GUI). Seamless integration with a database management system, such as SQLite, enhances data storage and retrieval efficiency. Rigorous testing, covering unit tests and user acceptance tests, is carried out to validate the application's reliability, followed by a meticulous debugging process. Inline comments within the source code.