Library Management System

Java Object-Oriented Programming Assignment

1. Project Overview

The purpose of this project is to develop a simple Library Management System using Java and Object-Oriented Programming (OOP) principles. The system allows users to view available books, borrow books, and return books using a console-based interface. The project demonstrates key software development concepts such as encapsulation, separation of concerns, and modular design.

2. Project Objectives

- Implement a menu-driven library system using Java.
- Apply Object-Oriented Programming principles.
- Allow users to borrow and return books.
- Design a scalable and maintainable code structure.

3. System Design and Structure

The system is divided into multiple classes, each responsible for a specific function. This modular approach improves readability, maintainability, and future extensibility of the application.

4. Object-Oriented Principles Applied

- Encapsulation – Data is protected using private fields and public methods.
- Separation of Concerns – Each class has a single responsibility.
- Object Interaction – Classes communicate through method calls.

5. UML Class Diagram

The UML class diagram illustrates the relationships between the main classes in the system. The Library class aggregates Book objects, while the Main class serves as the entry point. FileManager is responsible for file operations, and Borrower represents future system expansion.

6. Conclusion

This project successfully implemented a functional Library Management System using Java. The application meets the stated objectives and demonstrates a clear understanding of Object-Oriented Programming principles. The structured class design ensures that the system is easy to maintain and extend in future versions.

7. Reflection

Through this assignment, I developed a deeper understanding of Java programming and OOP concepts. Challenges such as class separation and debugging reinforced the importance of proper software design. This project improved my problem-solving skills and provided practical experience in building structured, real-world applications.