



***UE21CS352B - Object Oriented Analysis & Design using Java***

**Mini Project Report**

**“Library Management System”**

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# **Problem Statement**

**Introduction:** A library management system is a software application used to manage the catalog of a library. It helps to keep track of books available in the library, books borrowed, and books returned. The system also facilitates the librarian to manage library members and issue books.

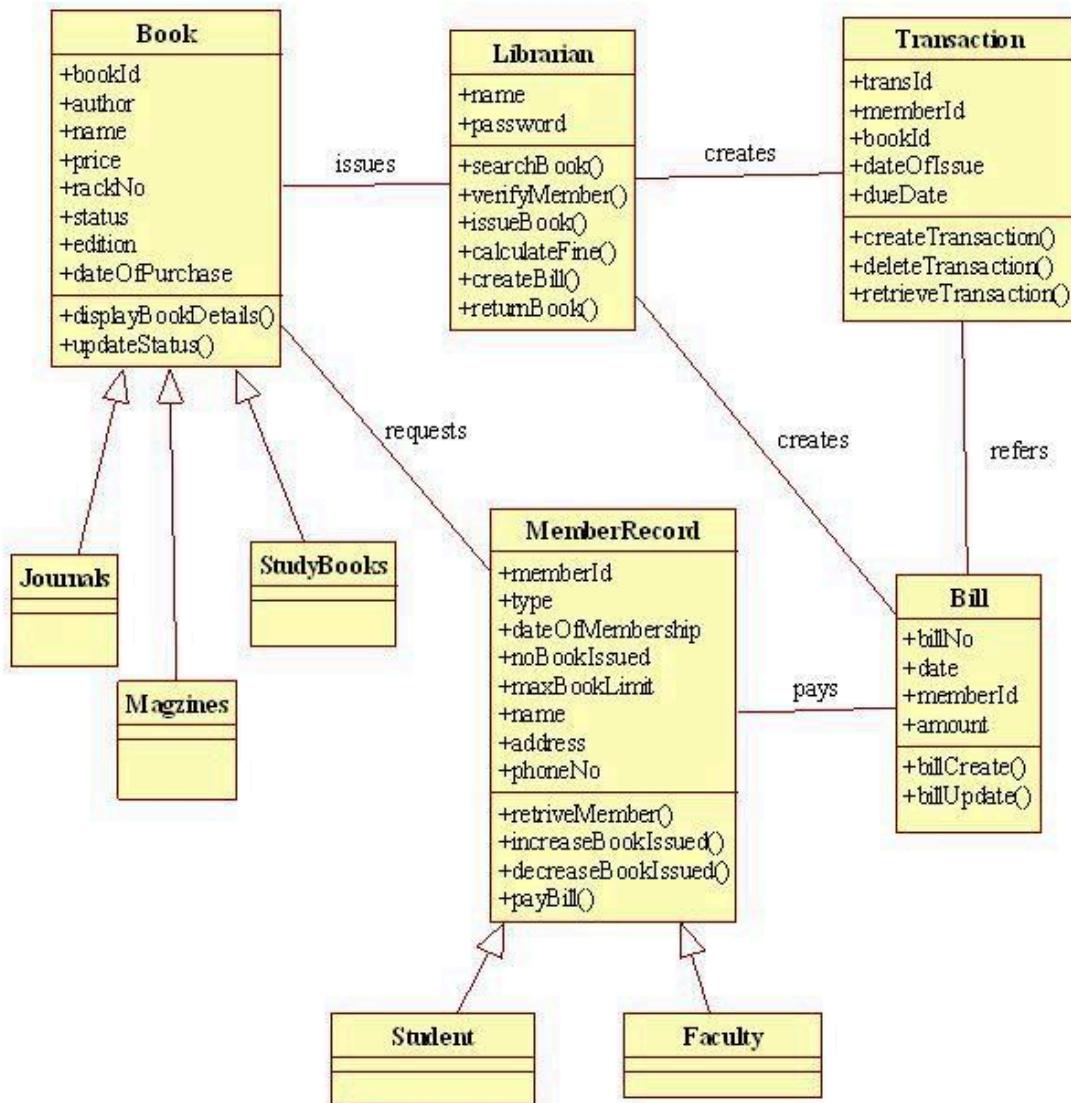
**Problem Description:** Design a library management system that allows librarians to manage the library's books and members efficiently. The system should provide functionalities to add new books, remove books, update book details, register new members, issue books to members and return books.

## **Key Features:**

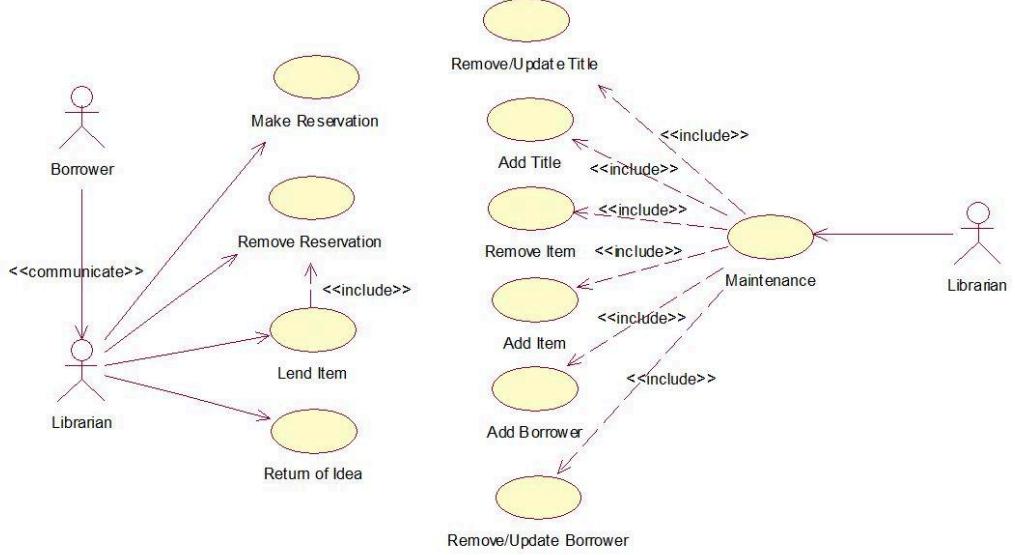
- **Student Registration:** This feature typically includes updating essential details like personal information, pursuing courses, and contact information to facilitate administrative processes.
- **Adding a Book:** It is a fundamental feature in library management systems that enables librarians to input new books into the library's catalog. This feature involves entering details such as title, author, publisher, genre, and quantity, which updates the library's inventory and makes the book available for borrowing by patrons.

- **Borrow and return of a book:** It enables the librarian to keep a track of the library's inventory.

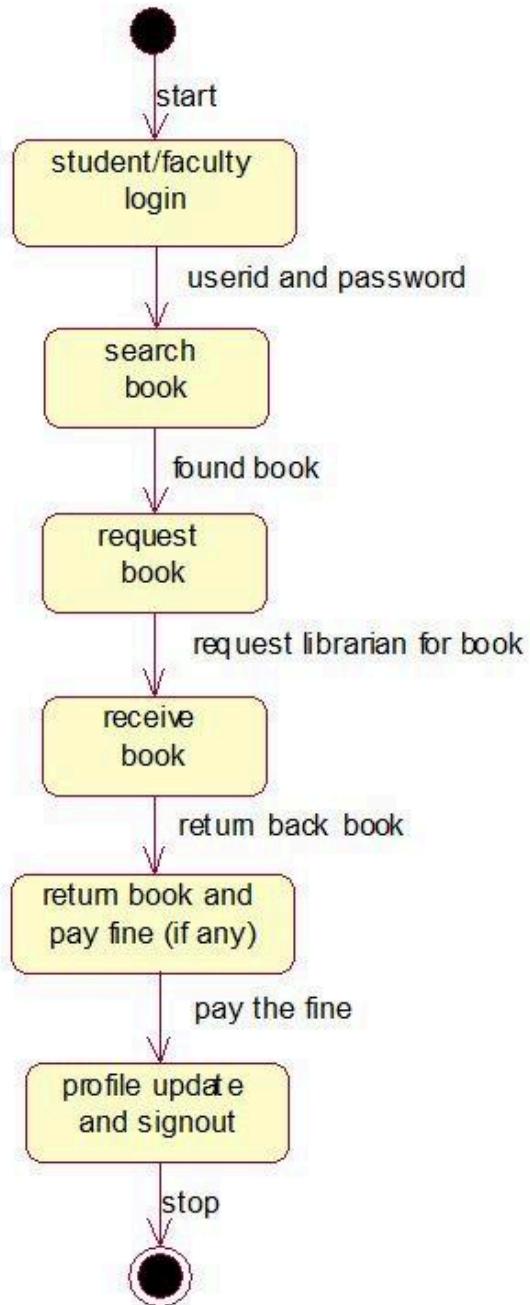
## Class Diagram



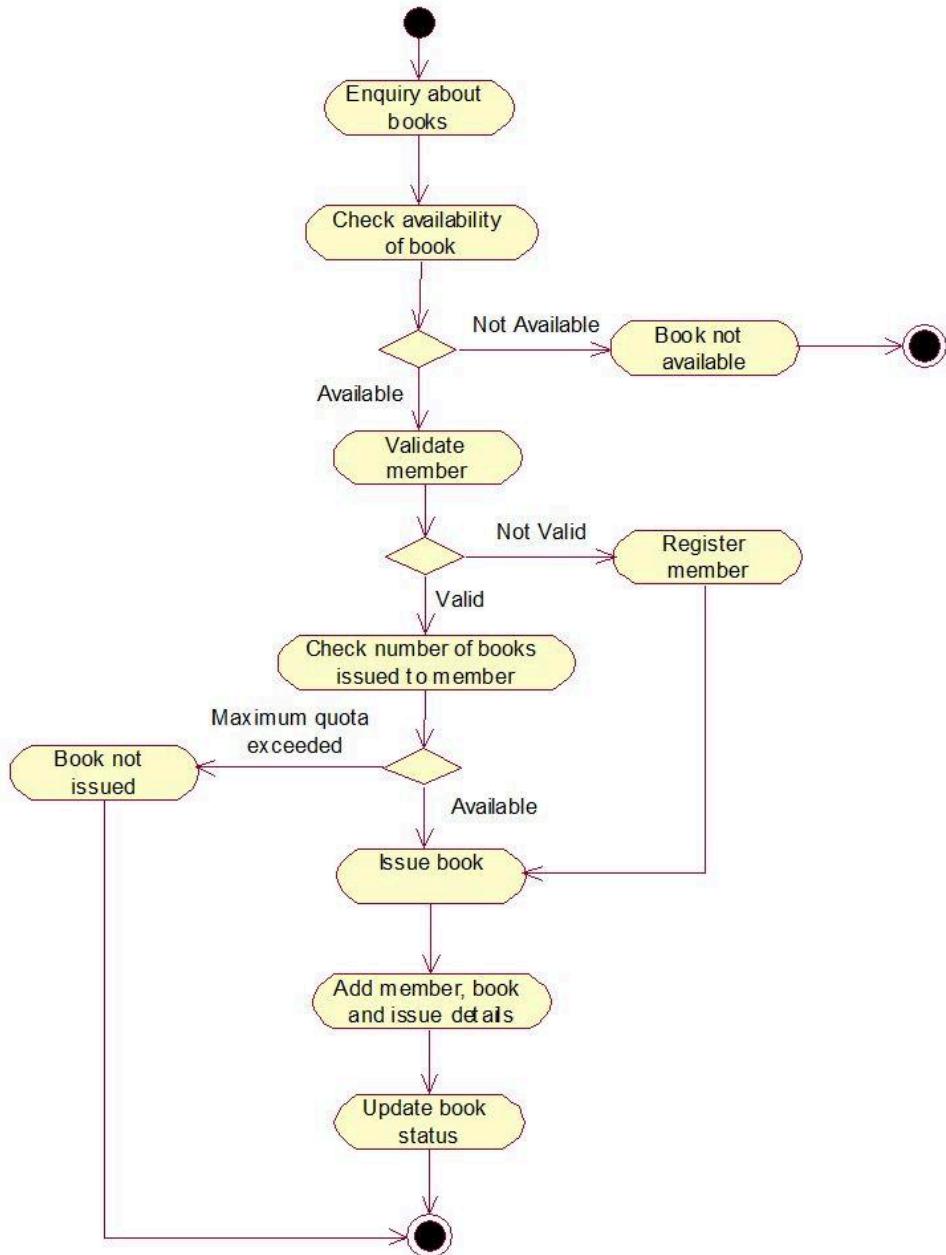
## Use Case Diagram



## **State Diagram**



## Activity Diagram



## **Architecture Pattern**

The application utilizes the Model-View-Controller (MVC) architecture to ensure a clear separation of responsibilities. The Model component encapsulates both data and logic, defining their attributes and functionalities. The Controller is responsible for managing user interactions and operations such as creating, removing, undoing/redrawing actions, and object manipulations. The View component is in charge of presenting visual elements on the screen, handling the display of user interface elements and other visual components.

## Design Principle & Pattern

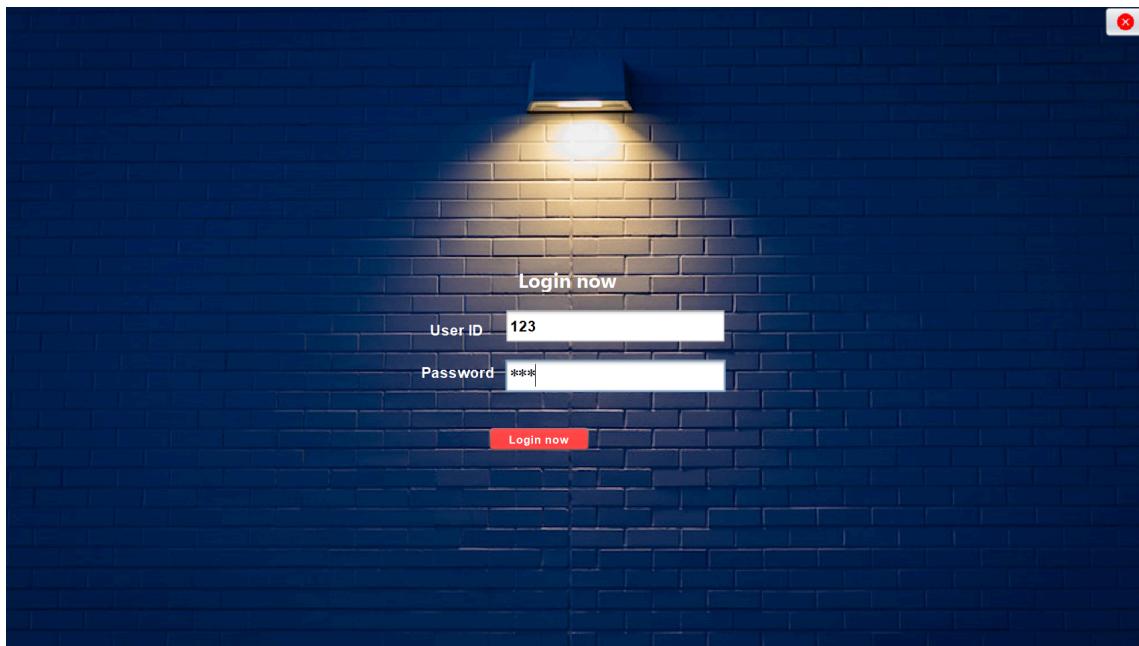
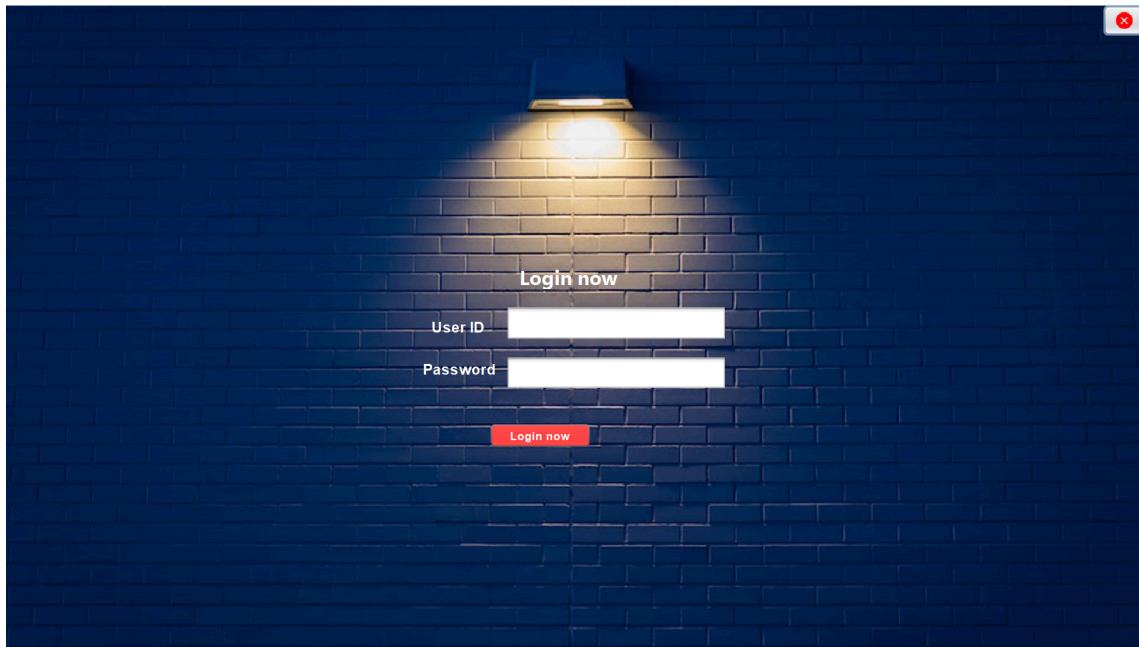
- **Single Responsibility Principle:** This principle ensures each class within the Model, View, and Controller sections has a single, well-defined purpose. For example, a class in the Model might be solely responsible for representing a Book object, while a Controller class might focus on handling user interactions like creating or moving Books. This promotes clean, focused code that's easier to understand and modify.
- **Liskov Principle:** It is crucial for establishing a strong and organized hierarchy within our Model classes. When a class inherits from another, it becomes a subtype that seamlessly integrates into any context where the parent class is utilized. This ensures that code designed for the parent class will function properly with its subclasses, minimizing the risk of errors or unforeseen behaviors. By adhering to this principle, we enhance code reliability and simplify future development efforts, allowing for the addition of new Books while preserving compatibility within the established structure.

## **Github Link:**

<https://github.com/mohnishgowda/Library-Management-System>

## **ScreenShots:**







The background of the interface features a photograph of a library's wooden bookshelf, densely packed with books of various sizes and colors.



**Student Registration**

Student ID:

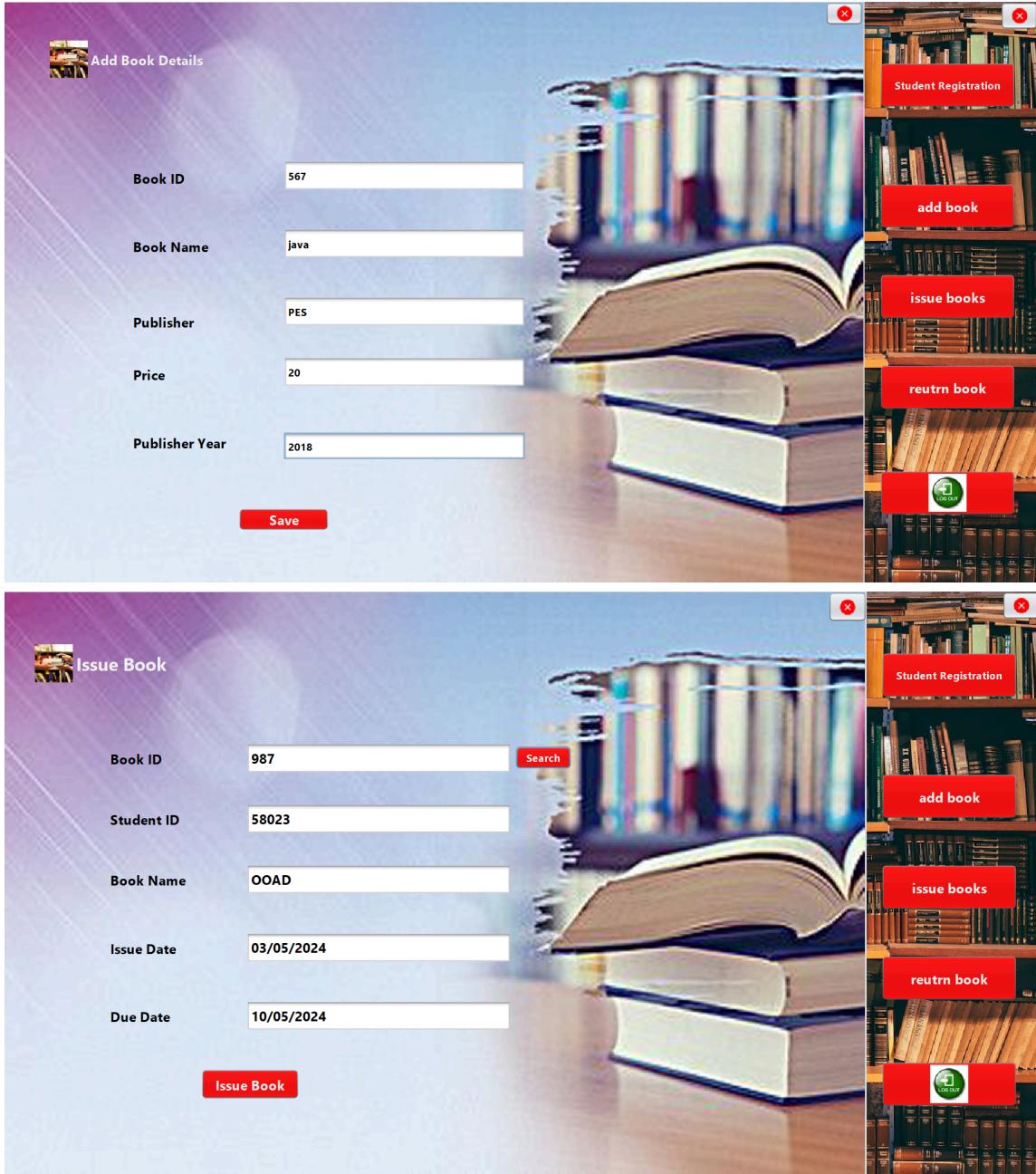
Student Name:

Course Name:

Branch Name:

Semester:

**Save**



 Add Book Details

**Book ID**

**Book Name**

**Publisher**

**Price**

**Publisher Year**

**Save**

 Issue Book

**Book ID**  **Search**

**Student ID**

**Book Name**

**Issue Date**

**Due Date**

**Issue Book**

**Student Registration**

**add book**

**issue books**

**reutrn book**



