

LIBRARY MANAGEMENT SYSTEM

Problem Statement:

Develop a comprehensive Library Management System to streamline operations and improve user experience. The system should encompass the following functionalities:

- **Book Management:** Maintain a comprehensive book catalog, track loans and returns and manage book acquisitions and damage.
- **User Management:** Register and manage library members, issue cards, and control user access privileges.
- **Search and Cataloguing:** Provide a user-friendly search interface, generate a library catalog, and support cataloging standards.
- **Circulation Management:** Process loans and returns efficiently, manage reservations, and handle overdue notices and fines.
- **Reporting and Analytics:** Generate reports on book usage, circulation statistics, and track library inventory trends.

SOFTWARE REQUIREMENTS SPECIFICATION

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Library Management System

1. Introduction

1.01 Purpose of this document

The SRS document outlines the detailed requirement for Library Management system. It serves as a blue print for the development team, ensuring final product meets the specified specification.

1.02 Scope of the Document

This document aims to include book details, video lectures, magazine, previous year question papers. It will be used by students, staffs, faculty, indirect stakeholders like technician.

1.03 Overview

The Library Management System will provide solution for managing operations like issuing books, catalogues, fine management, member management, transaction tracking. This will enable staff and other users to efficiently use and offer userfriendly interface.

2. General Description

The LMS will provide a platform for managing library resources efficiently. This system will provide registering students, cataloguing books, issuing/returning books.

3. Functional Requirements

Registration Management - Users should be able to register to the system.

List

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Users should be able to search for available ~~books~~ overdues.

System should be able to store registration details like contact information, etc.

Book Management:

The system will allow for addition, modification of book details.

Search facility: users should be able to search for books based on title, ISBN.

Interface Requirements:

The system should be able to graphical user interface accessible through web browser. The system will integrate existing database to store book and user information.

Performance Requirements:

The system must be able to handle 1,00,000 books and 10,000 users.

Book search result should be available within 3 sec.

Design Constraints

- The database should support MySQL for large database.
- Must be compatible with modern web browsers (Google chrome).

Non-functional.

Uptime should be atleast 99.99%.

The system must protect user data from unauthorised access.

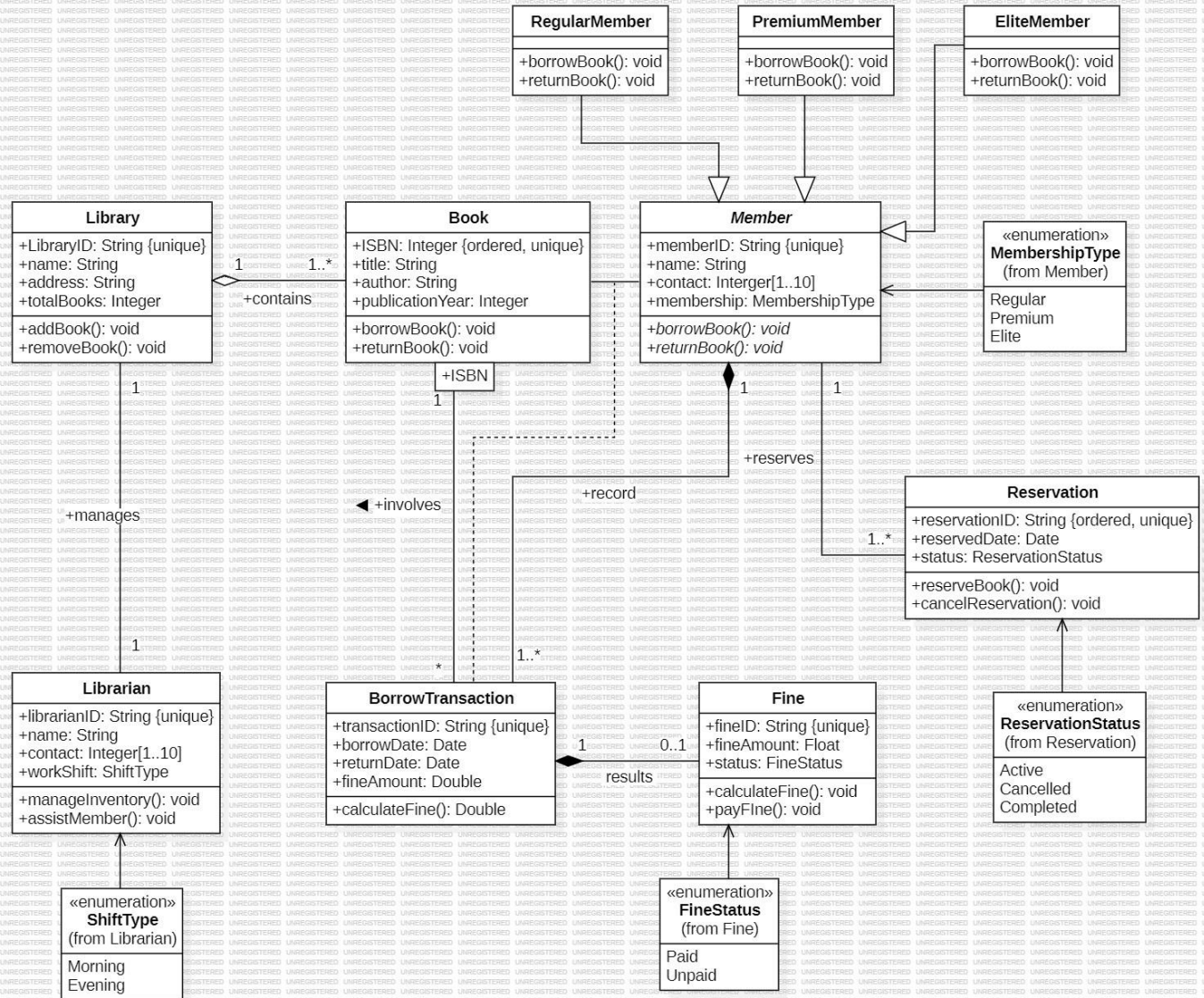
Preliminary Schedule & Budget:

The project is expected to take four months with development - 35,000, software license - 10,000; budget of 1.00 lacs.

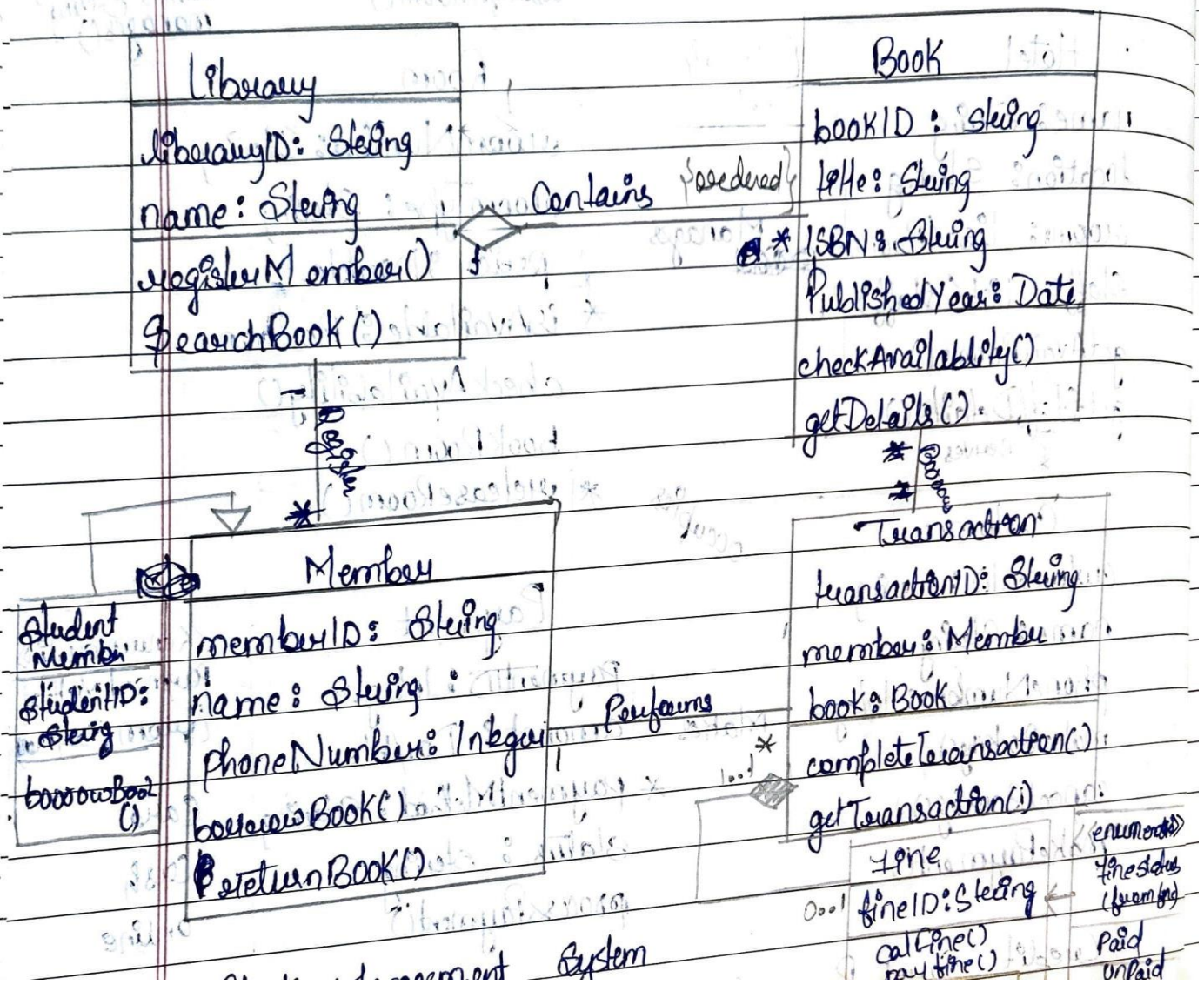
UML DIAGRAMS

CLASS DIAGRAM

LIBRARY MANAGEMENT SYSTEM - CLASS DIAGRAM



Library Management System



Brief description:

1. Library

- Represents the library entity.
- Manages book inventory, adds and removes books, and tracks total books.

2. Book

- Represents a book in the library.
- Has attributes like ISBN, title, author, publication year, and is involved in borrow transactions.

3. Member

- Represents a library member (Regular, Premium, or Elite).
- Has attributes like member ID, name, contact information, and membership type.

4. Librarian

- Represents a library staff member.
- Manages inventory, assists members, and works in shifts (Morning/Evening).

5. BorrowTransaction

- Represents a record of a book being borrowed by a member.
- Includes transaction ID, borrow date, return date, and calculates fines.

6. Fine

- Represents a fine imposed on a member.
- Has attributes like fine ID, amount, and status (Paid/Unpaid).

7. Reservation

- Represents a reservation made by a member for a book.
- Has attributes like reservation ID, reserved date, and status (Active/Cancelled/Completed).

8. MembershipType

- Enumeration representing different membership types (Regular, Premium, Elite).

9. ReservationStatus

- Enumeration representing the status of a reservation (Active, Cancelled, Completed).

10. ShiftType

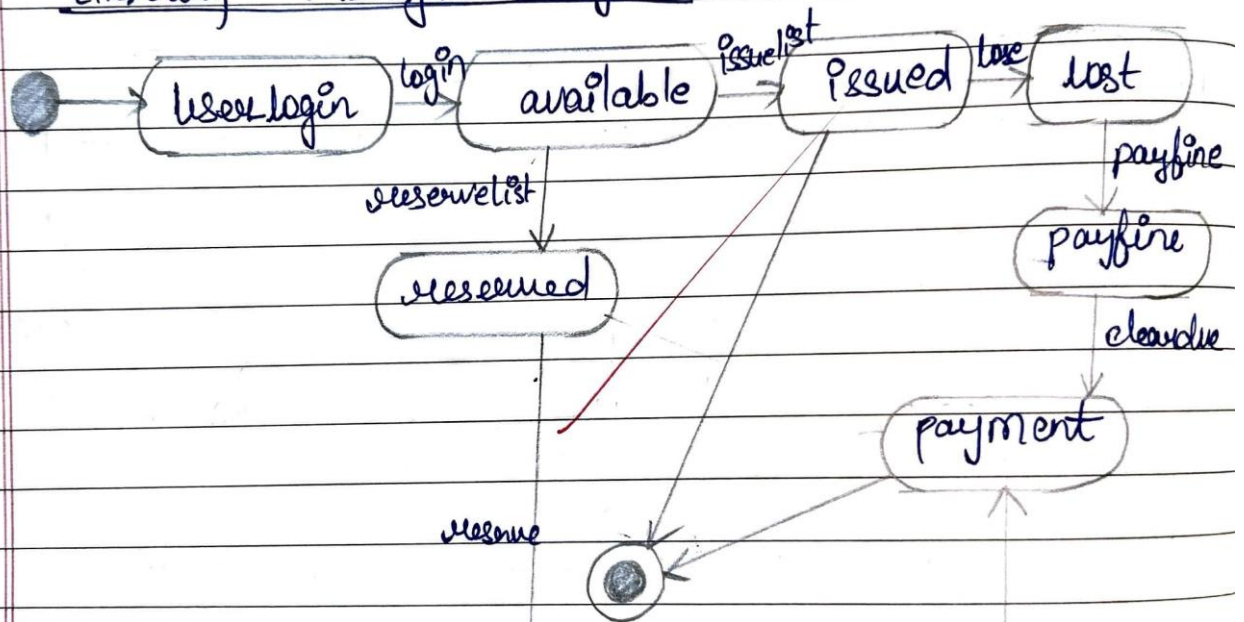
- Enumeration representing librarian shift types (Morning, Evening).

11. FineStatus

- Enumeration representing the status of a fine (Paid, Unpaid).

SIMPLE STATE DIAGRAM

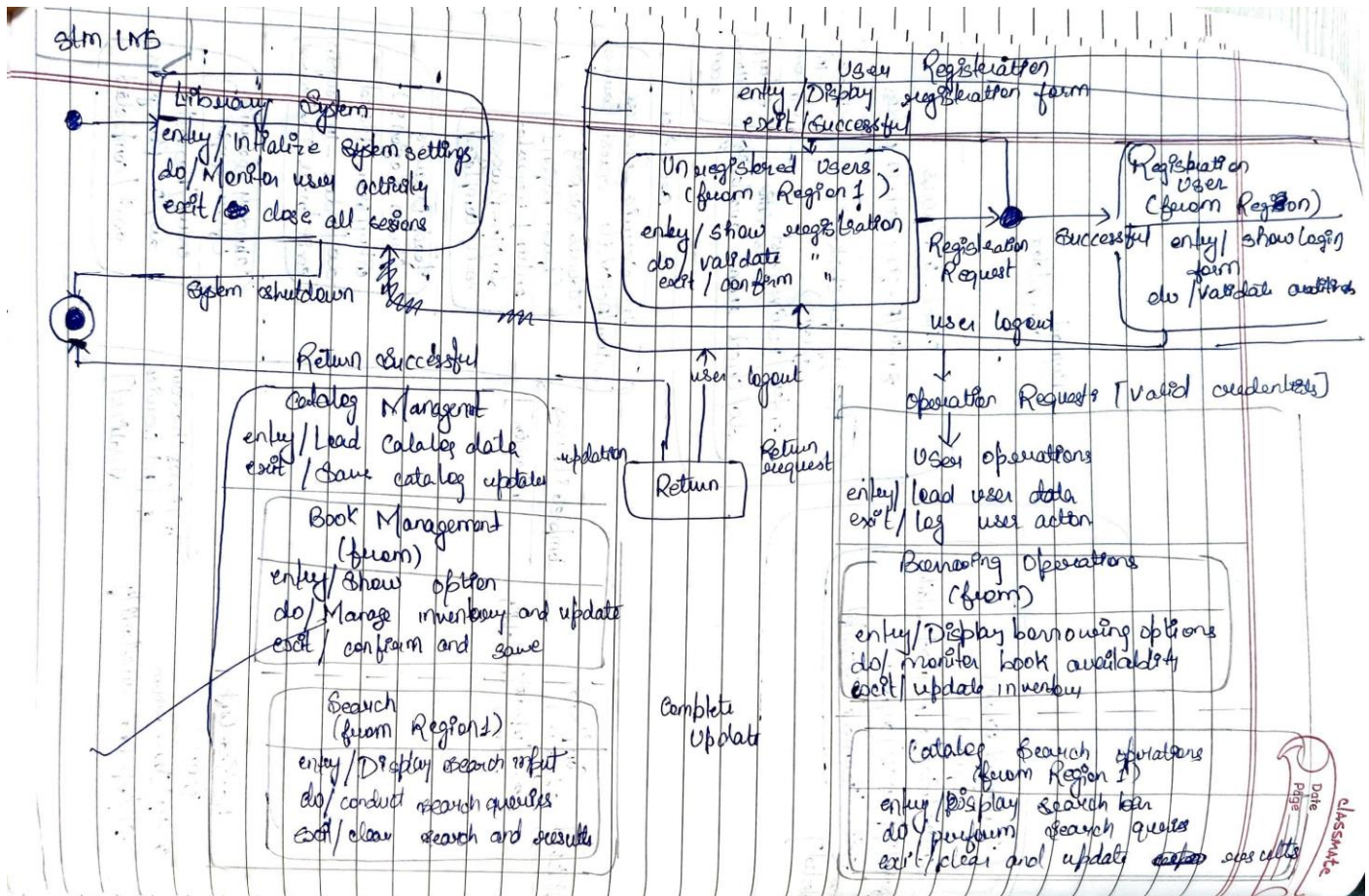
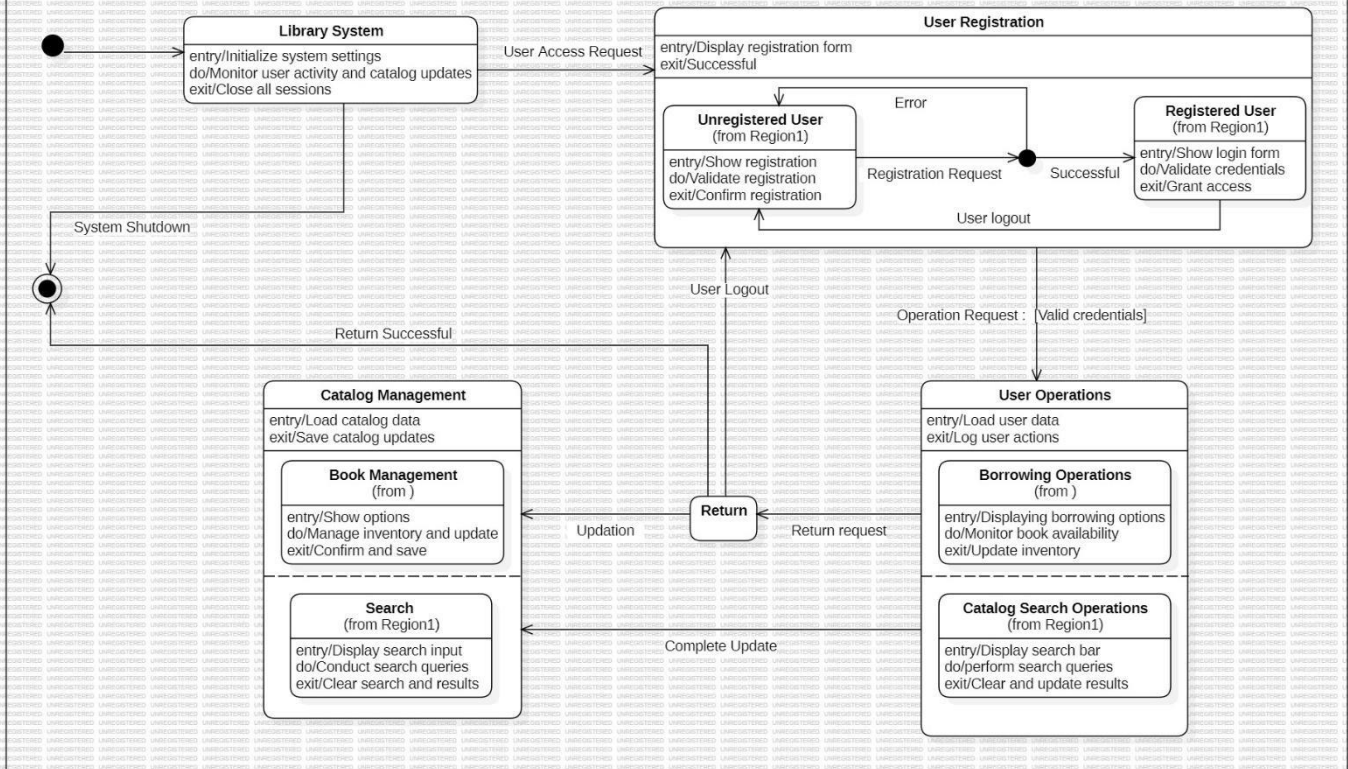
2. Library Management System



ADVANCE STATE DIAGRAM

stm LMS

LIBRARY MANAGEMENT SYSTEM - STATE DIAGRAM



Brief description:

1. Library System

- The initial state of the system, where system settings are initialized and user activity/catalog updates are monitored.

2. User Registration and Unregistered User

- The state where new users can register for library membership.
- The state of a user before they have registered for library membership.

3. Registered User

- The state of a user after they have successfully registered and logged in.

4. Catalog Management

- The state where the library's catalog data is managed and updated.

5. Book Management

- The state where book inventory is managed, including adding, removing, and updating book information.

6. Search

- The state where users can search the library catalog for books.

7. Borrowing Operations

- The state where users can borrow books, renew loans, and return books.

8. Catalog Search Operations

- The state where users can search the library catalog for specific books or information.

9. Return

- The state where a user returns a borrowed book.

10. Operation Request

- The state where a user requests to perform an operation, such as borrowing a book or searching the catalog.

11. Return Successful

- The state indicating that a book has been successfully returned.

12. Update

- The state where data is being updated, such as book information or user records.

13. User Access Request and Logout

- The state where a user requests access to the library system.
- The state where a user logs out of the library system.

14. System Shutdown

- The final state of the system, where all sessions are closed and the system is shut down.

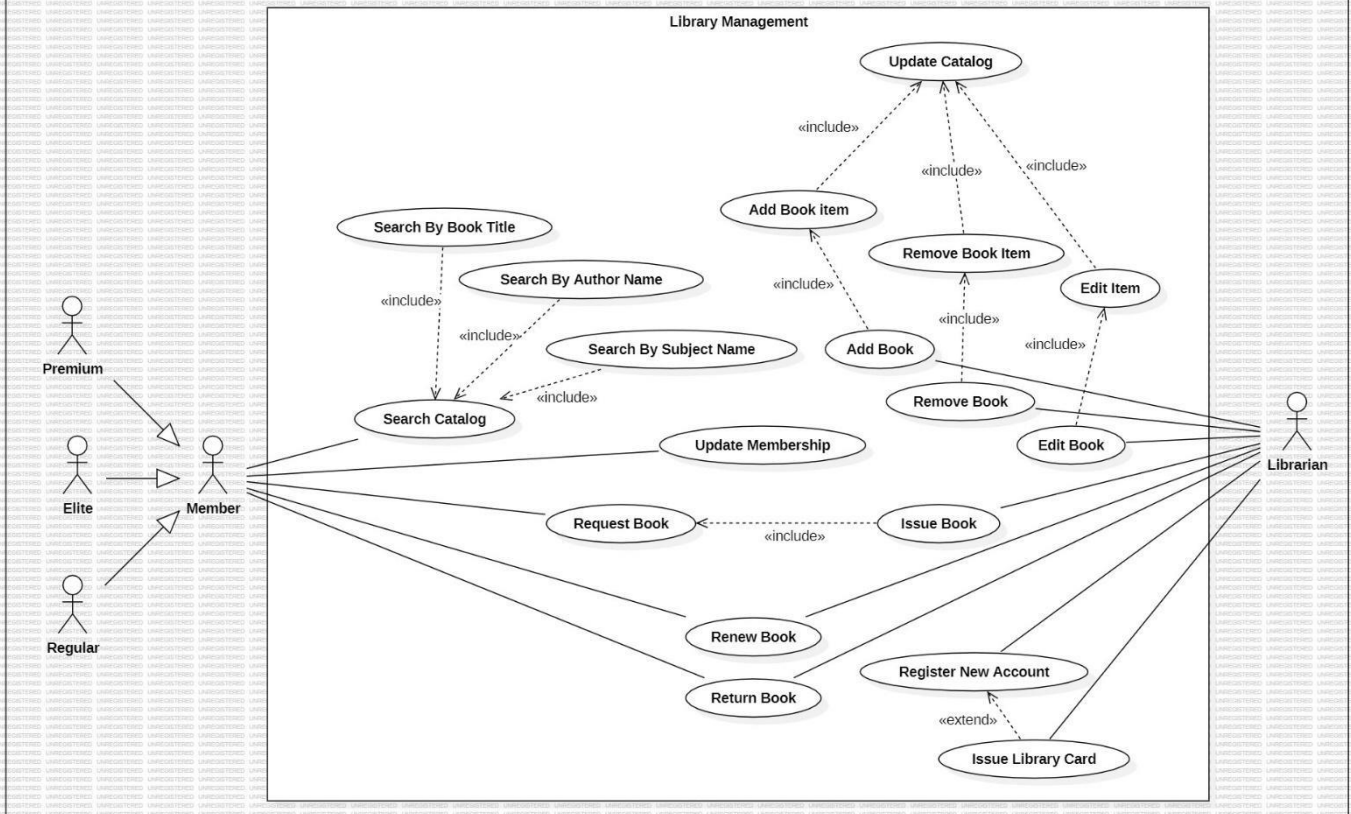
15. Error

- The state where an error occurs during a process, such as an invalid login attempt.

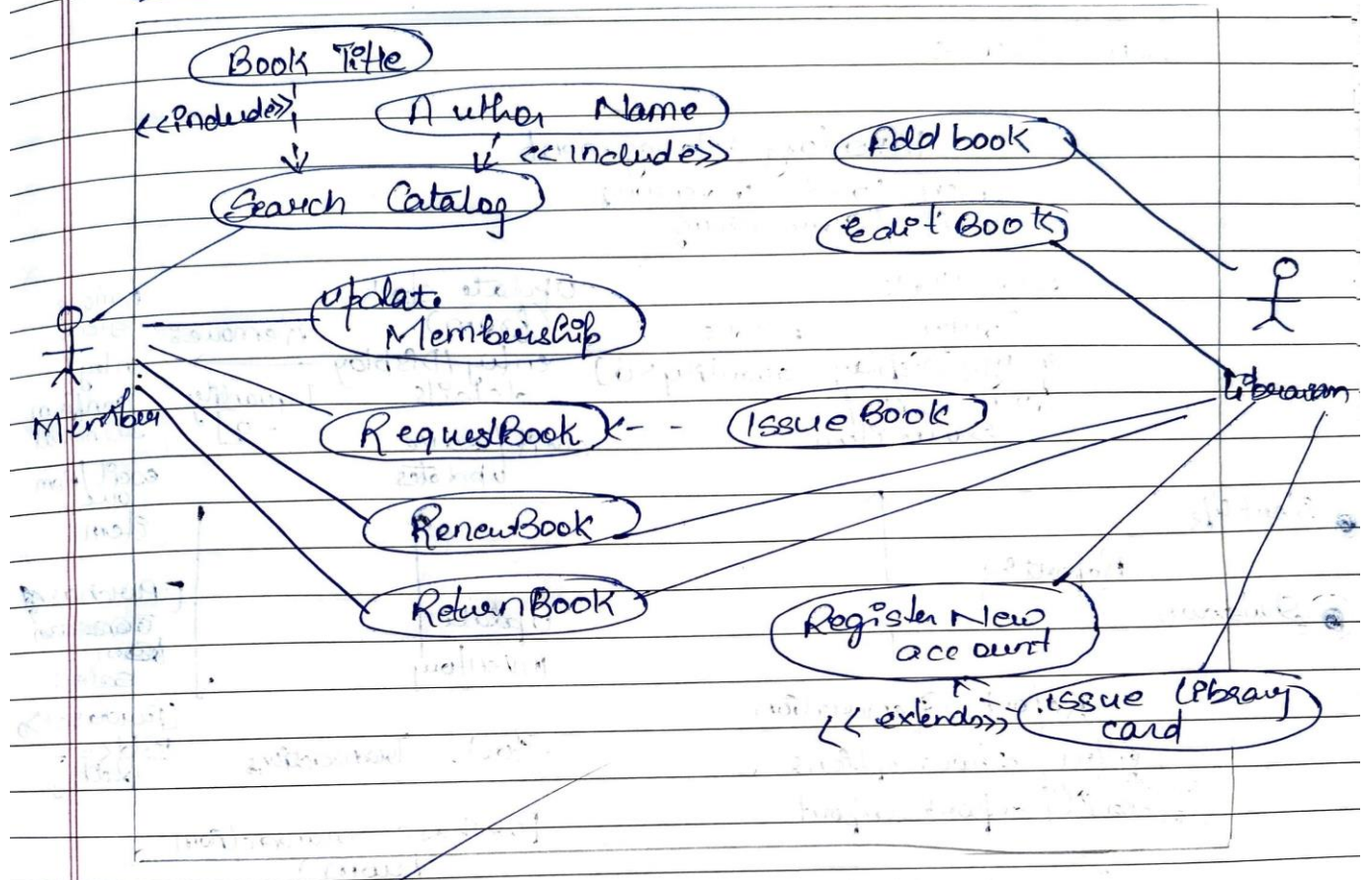
USE CASE DIAGRAM

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LIBRARY MANAGEMENT SYSTEM USE CASE DIAGRAM



Use case for LMS:



Brief description:

1. Library Management

- This is the overarching use case, encompassing all other functionalities within the library system.

2. Update Catalog

- This use case includes several sub-use cases related to managing the library catalog:
 - **Add Book Item:** Adding a new book item to the catalog.
 - **Remove Book Item:** Removing a book item from the catalog.
 - **Edit Item:** Modifying the details of a book item in the catalog.

3. Search Catalog

- This use case also includes several sub-use cases for searching the catalog:
 - **Search By Book Title:** Searching the catalog by the title of the book.
 - **Search By Author Name:** Searching the catalog by the author of the book.
 - **Search By Subject Name:** Searching the catalog by the subject of the book.

4. Update Membership

- This use case allows for updating the membership information of library members.

5. Request Book

- This use case allows members to request a book that is currently unavailable or checked out.

6. Issue Book

- This use case handles the process of issuing a book to a member.

7. Renew Book

- This use case allows members to renew their book loans.

8. Return Book

- This use case handles the process of returning a borrowed book.

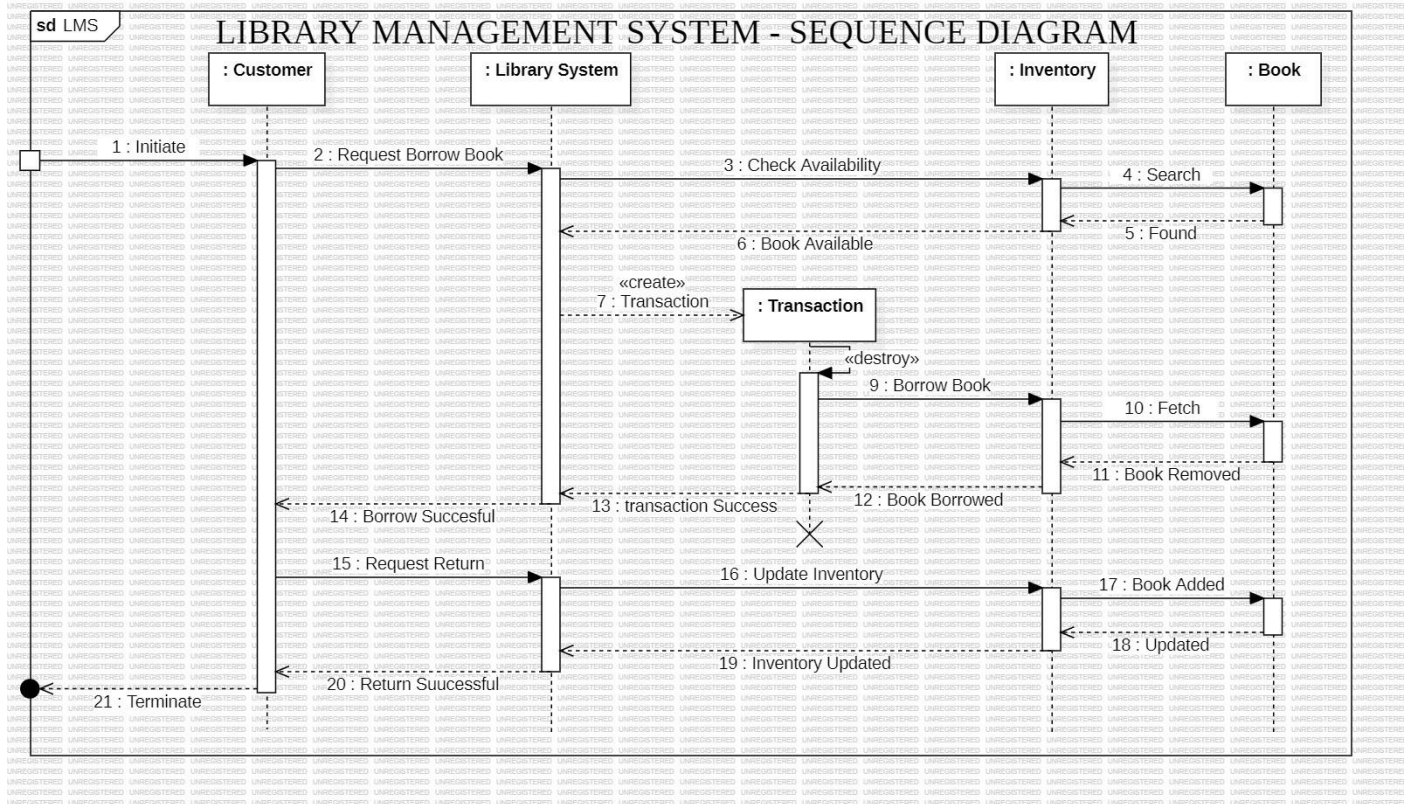
9. Register New Account

- This use case handles the process of registering new members in the library system.

10. Issue Library Card

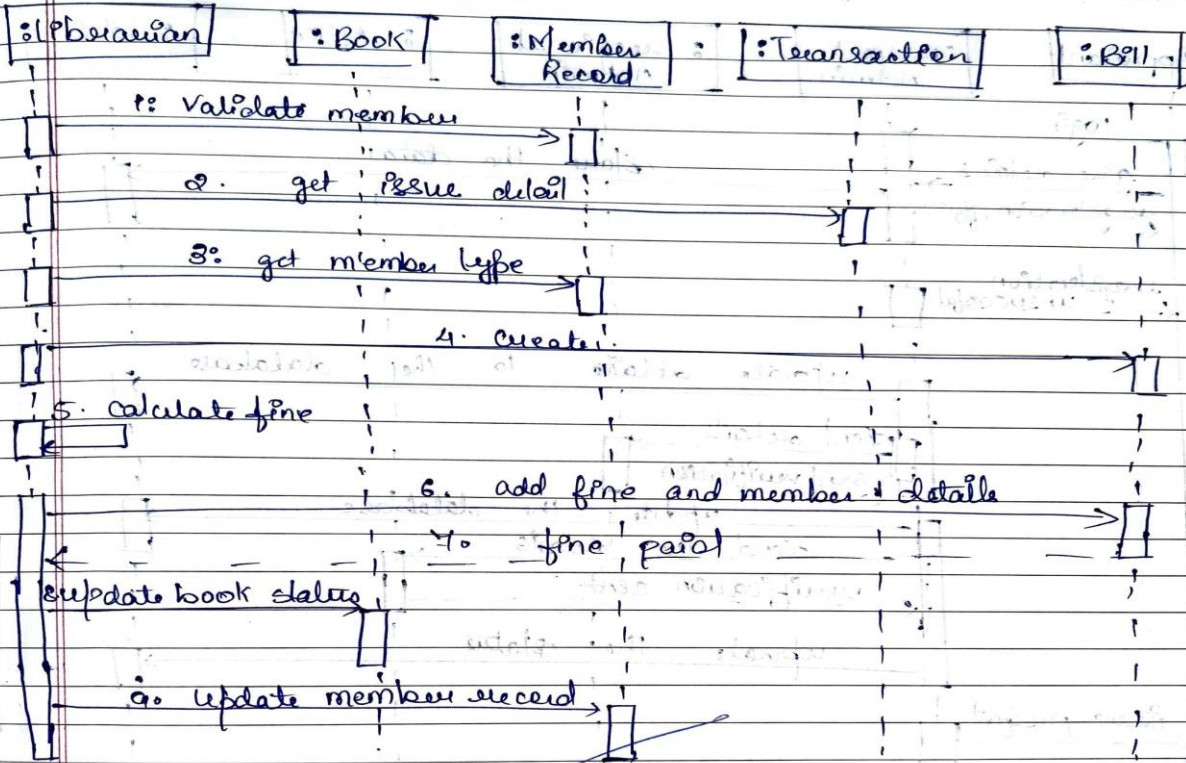
- This use case is a sub-use case of "Register New Account" and specifically handles the issuance of library cards to new members.

SEQUENCE DIAGRAM



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Library Management System



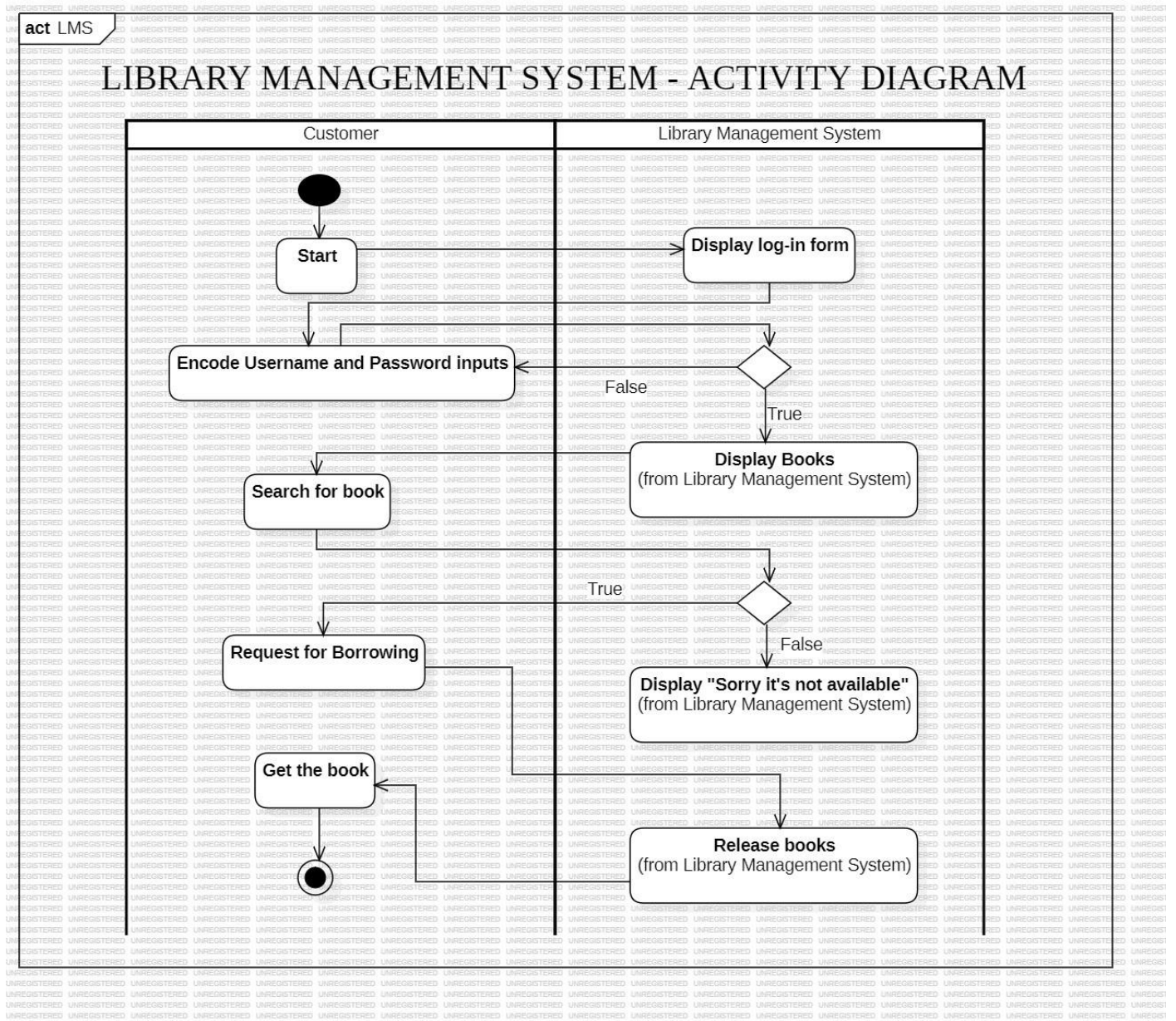
Brief description:

Interactions

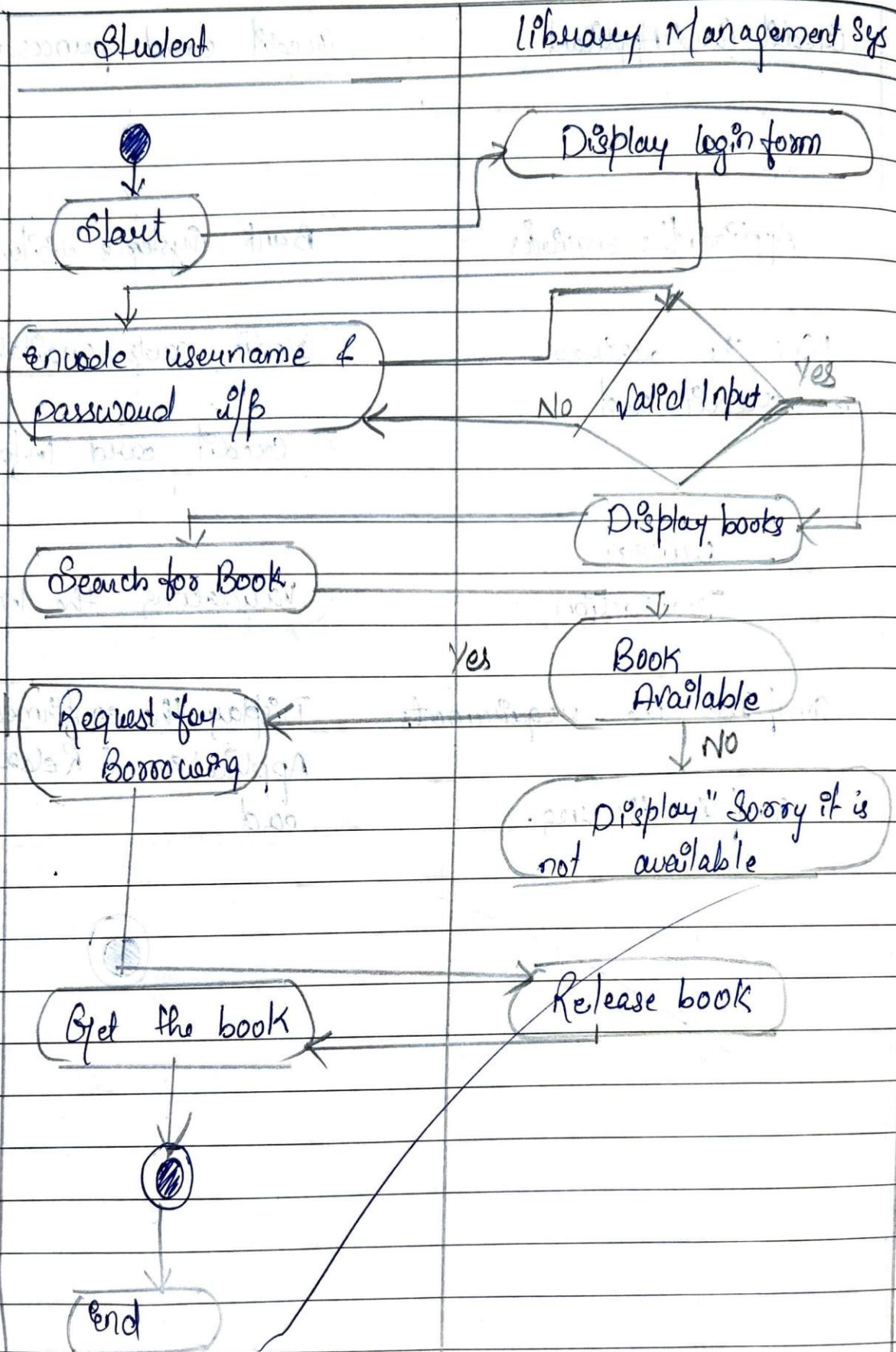
1. **Initiate:** The customer initiates a request to borrow a book.
2. **Request Borrow Book:** The customer sends a request to the library system to borrow a specific book.
3. **Check Availability:** The library system checks the availability of the requested book in the inventory.
4. **Search:** The library system searches the inventory for the requested book.
5. **Found:** The inventory confirms that the book has been found.
6. **Book Available:** The inventory indicates that the book is available for borrowing.
7. **Transaction:** A new transaction object is created to record the borrowing process.
8. **Borrow Book:** The library system records the borrowing of the book.
9. **Fetch:** The book object is fetched from the inventory.
10. **Book Borrowed:** The book is marked as borrowed in the inventory.
11. **Book Removed:** The book is removed from the available inventory.
12. **Borrow Successful:** The library system confirms that the book has been successfully borrowed.
13. **Transaction Success:** The transaction is marked as successful.
14. **Request Return:** The customer requests to return the borrowed book.
15. **Update Inventory:** The library system updates the inventory to reflect the return of the book.
16. **Book Added:** The book is added back to the available inventory.
17. **Updated:** The inventory is updated to reflect the returned book.
18. **Inventory Updated:** The inventory is confirmed as updated.
19. **Return Successful:** The library system confirms that the book has been successfully returned.
20. **Terminate:** The transaction process is terminated.

ACTIVITY DIAGRAM

LIBRARY MANAGEMENT SYSTEM - ACTIVITY DIAGRAM



3. Library Management System



Brief description:**Activities**

1. **Start:** The process begins with the customer starting the interaction with the system.
2. **Display Log-in Form:** The library management system displays a login form to the customer.
3. **Encode Username and Password Inputs:** The customer enters their username and password.
4. **Display Books:** If the login credentials are correct, the system displays a list of available books to the customer.
5. **Search for Book:** The customer searches for the book they want to borrow.
6. **Request for Borrowing:** The customer requests to borrow the selected book.
7. **Get the Book:** If the book is available, the system allows the customer to borrow the book.
8. **Release Books:** The customer returns the borrowed book to the library.