



FINOLEX ACADEMY OF MANAGEMENT AND TECHNOLOGY, RATNAGIRI

This is to certify that the project report titled:

Library Management System

Carried out by student of MCA

Submitted By:

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Ms. Sanika Chandrashekhar Joshi

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In partial fulfilment of the award for degree of

MASTER OF COMPUTER APPLICATION

From Mumbai University

**And are the bonafide records of the work done by
them during the Semester I of A.Y 2023-2024**

Internal Guide
(Prof. Supriya S. Surve)

HOD
(Prof. Tejas V. Joshi)



A PROJECT REPORT ON

Library Management System

Submitted in partial fulfilment for Degree of

MASTER OF COMPUTER APPLICATION

By

Mr. Tanmay Shrikant Jogalekar

Ms. Sanika Chandrashekhar Joshi

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Introduction

In the digital age, the effective management of libraries demands a sophisticated and streamlined approach. The Library Management System project is a comprehensive solution designed to revolutionize the way libraries operate, ensuring efficiency, accuracy, and user satisfaction. This system leverages modern technology to automate various library processes, making it easier for librarians and patrons to access and manage resources seamlessly.

The Library Management System project aims to automate the cataloging process, allowing librarians to efficiently organize and categorize books, journals, and multimedia resources. This feature enhances accessibility and simplifies the search process for library users.

Our system is designed with a user-friendly interface, facilitating easy navigation for both librarians and patrons. Intuitive features make it simple to borrow, return, and renew items, providing a seamless experience for library users.

The Library Management System project includes robust inventory management capabilities, enabling librarians to keep track of the library's collection in real-time. Automated alerts for low-stock items and overdue returns contribute to better resource management.

In the spirit of embracing technological advancements, the LMS project supports online access to the library catalog. Patrons can search for resources, check availability, and place requests from the convenience of their own devices.

This Library Management System project is not just a technological upgrade; it represents a commitment to modernizing library operations, enhancing user experiences, and embracing the digital transformation of information management. Through this initiative, we aim to create a more dynamic and efficient library environment that meets the evolving needs of both librarians and patrons.

Problem Definition

Libraries, as fundamental repositories of knowledge and information, play a vital role in education and research. However, traditional library management processes often encounter significant challenges that impede efficiency, user satisfaction, and overall effectiveness.

The problems that necessitate the development of a Library Management System include :

- Manual Cataloging and Organization
- Limited Accessibility
- Resource Tracking Challenges
- Inefficient Borrowing and Returning Processes
- Lack of Data-Driven Decision-Making
- Security and Privacy Concerns
- Adaptation to Technological Advances

The Library Management System project seeks to address these challenges by introducing a comprehensive, automated, and user-friendly system that streamlines operations, enhances accessibility, and embraces technology to meet the evolving needs of both librarians and library users.

Objective :

The objectives of a Library Management System project outline the specific goals and outcomes that the project aims to achieve. Implement a system for the automated cataloging of library resources, including books, journals, multimedia, and other materials, to improve the accuracy and efficiency of record-keeping. Develop a user-friendly interface that facilitates easy and convenient access to the library's resources, enabling patrons to search, browse, and locate materials efficiently. Design the system to be scalable, allowing for future growth in the library's collection and user base without compromising performance or functionality.

Scope of Project :

The scope of a Library Management System project outlines the boundaries and extent of the project, defining what functionalities and features will be included. Here's a sample scope for an Library Management System project:

1. User Modules:

- **Librarian Module:** Includes features for registering a member , manage book data like add , update and delete book , managing stock of books.

2. Borrowing and Returning:

- **Issuing System:** Issuing books to members.
- **Returning System:** Members returned the issued books.

3. Scalability:

- **Scalable Architecture:** Design the system architecture to accommodate future growth in terms of the library's collection and user base.
- **Upgrades:** Plan for future upgrades and enhancements to keep the system current and relevant.

System Study

- **Existing System**

The existing system of a Library Management System typically refers to the manual or outdated methods currently in place for managing library resources and operations. Here's an overview of the common aspects of an existing library management system:

- 1. Manual Cataloging:**

Libraries often rely on manual cataloging methods, where librarians create and update records for each resource using paper-based systems.

- 2. Limited Accessibility:**

Access to the library's catalog and services is primarily limited to physical visits, hindering remote access for users.

- 3. Manual Inventory Management:**

Inventory management involves manual tracking of the library's collection, making it prone to inaccuracies, misplacements, and difficulties in maintaining real-time data.

- 4. No Integration with Modern Technologies:**

The library may not be integrated with modern technologies, making it challenging to adapt to the evolving needs and expectations of users.

- 5. Limited User Education:**

Librarians and staff may not receive extensive training on library management systems, potentially leading to suboptimal utilization of available tools.

- **Proposed System :**

The proposed system of a Library Management System project outlines the improvements and enhancements that will be implemented to address the shortcomings of the existing system. Here's an overview of the features and functionalities of the proposed Library Management System:

- 1. Automated Cataloging:**

Implement an automated cataloging system that allows librarians to efficiently organize and categorize various resources using a digital platform.

- 2. Enhanced Accessibility:**

Develop a user-friendly interface accessible through the web, enabling patrons to search for resources, check availability, and manage their accounts from anywhere.

- 3. Scalability:**

Design the system to be scalable, accommodating future growth in the library's collection and user base without compromising performance.

- 4. Compliance with Regulations:**

Ensure that the new system complies with relevant data protection and privacy regulations, building trust among users.

- 5. Improved User Experience:**

Prioritize the user experience by creating an intuitive and user-friendly interface, reducing waiting times, and enhancing overall satisfaction for both librarians.

Analysis and Design

- **Software and Hardware Requirement Specification:**

1. Hardware Requirement : **Operating System:**

Processor: Multi-core processor (e.g., Intel Core i3 or higher)
RAM: 4 GB or higher

Storage : Sufficient storage space for the database and application files (SSD recommended for better performance)

2. Software Requirement :

Operating System: Windows
Database Management System (DBMS):

MySQL Database Server: Required for storing and managing the library's data.

Version: MySQL 8.0 or higher

Development Environment:

Integrated Development Environment (IDE): NetBeans IDE for Java development.

Version: NetBeans 8.2 or higher

Download: NetBeans Downloads

Programming Language:

Java: The programming language used for developing the Library Management System.

Version: JDK 8 or higher

Java Libraries and Frameworks:

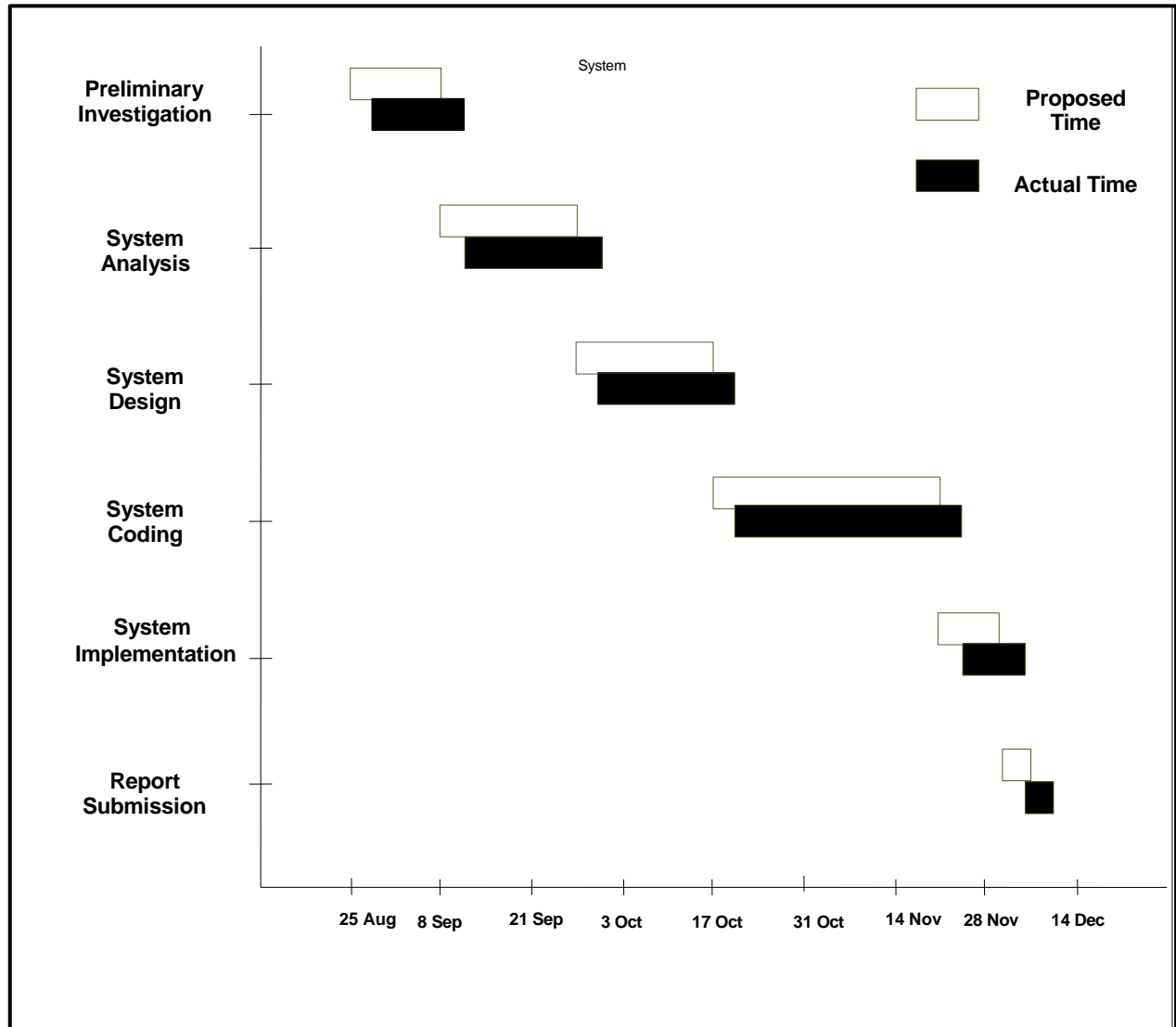
JavaFX: For building the graphical user interface (GUI) of the application. Included with NetBeans IDE.

Additional Libraries (JAR files):

MySQL Connector/J: JDBC driver for connecting Java applications to MySQL databases.

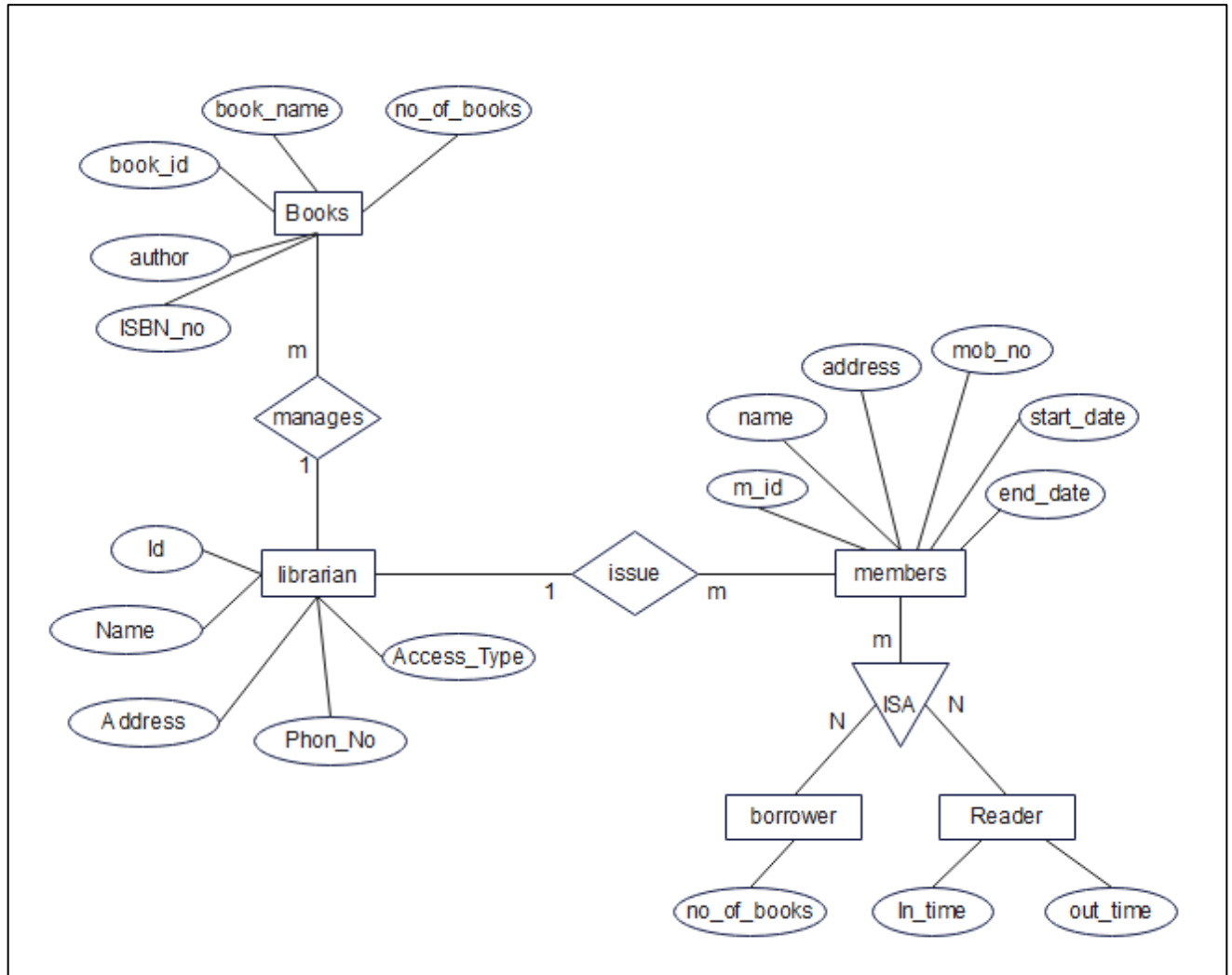
Download: MySQL Connector/J

Gantt Chart

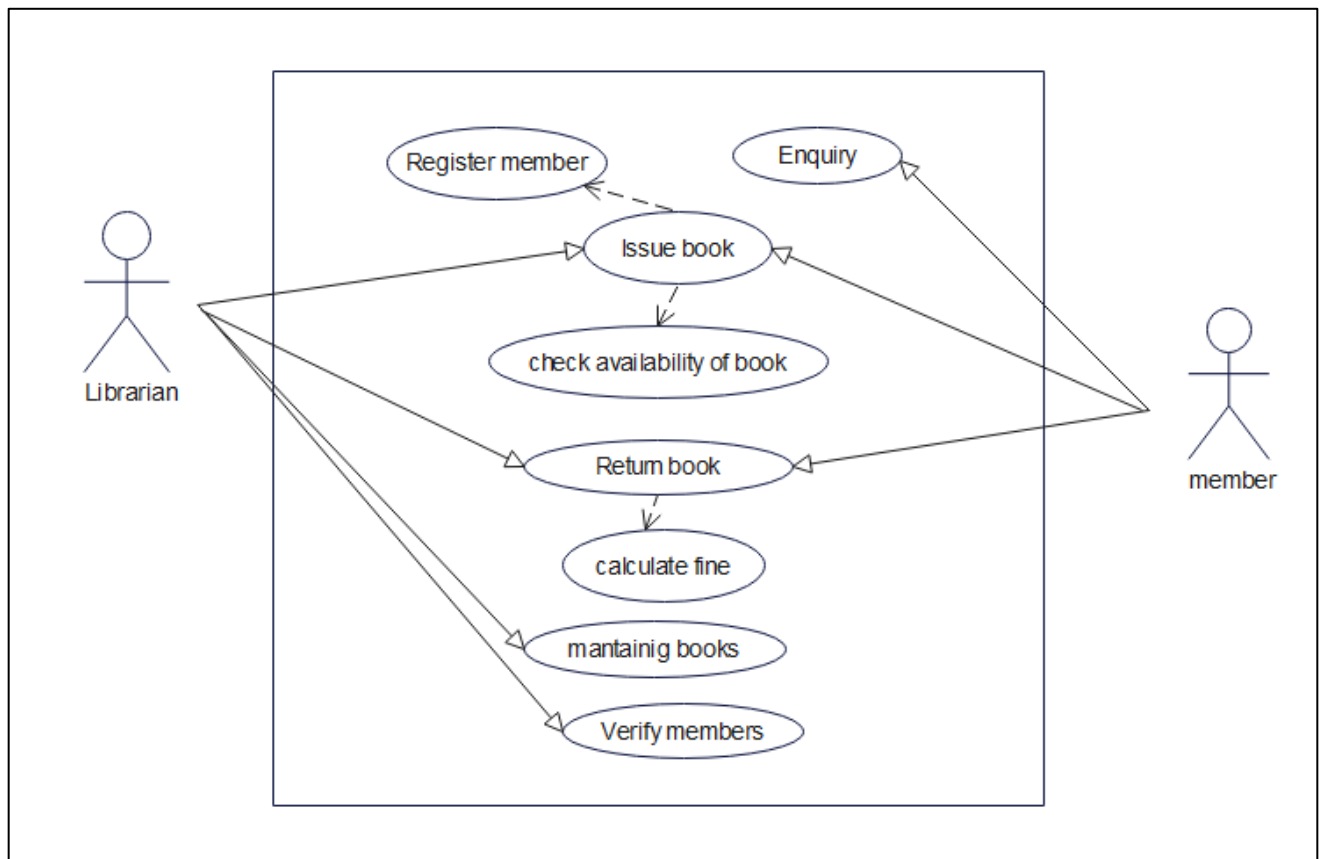


Signature of Guide

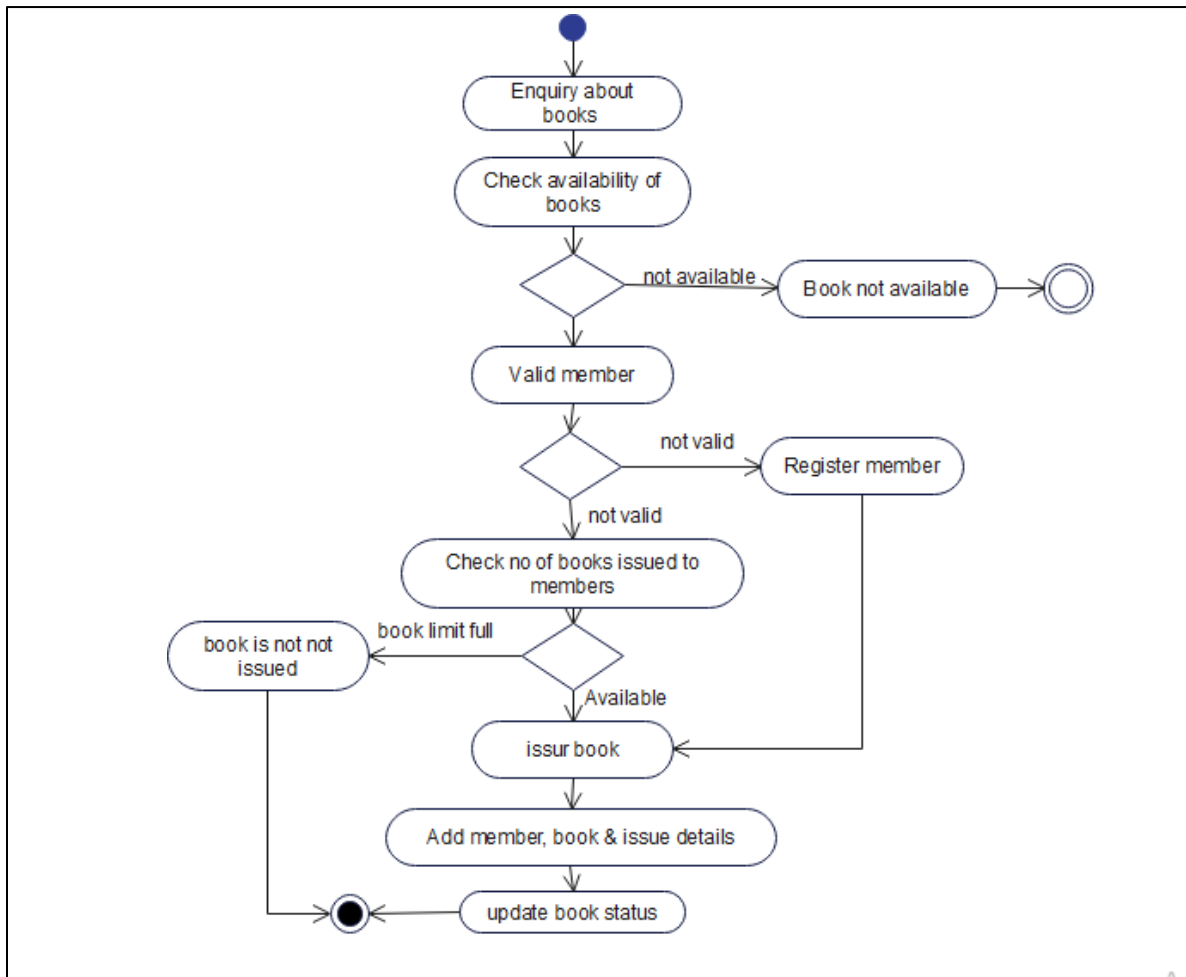
- **ER Diagram**



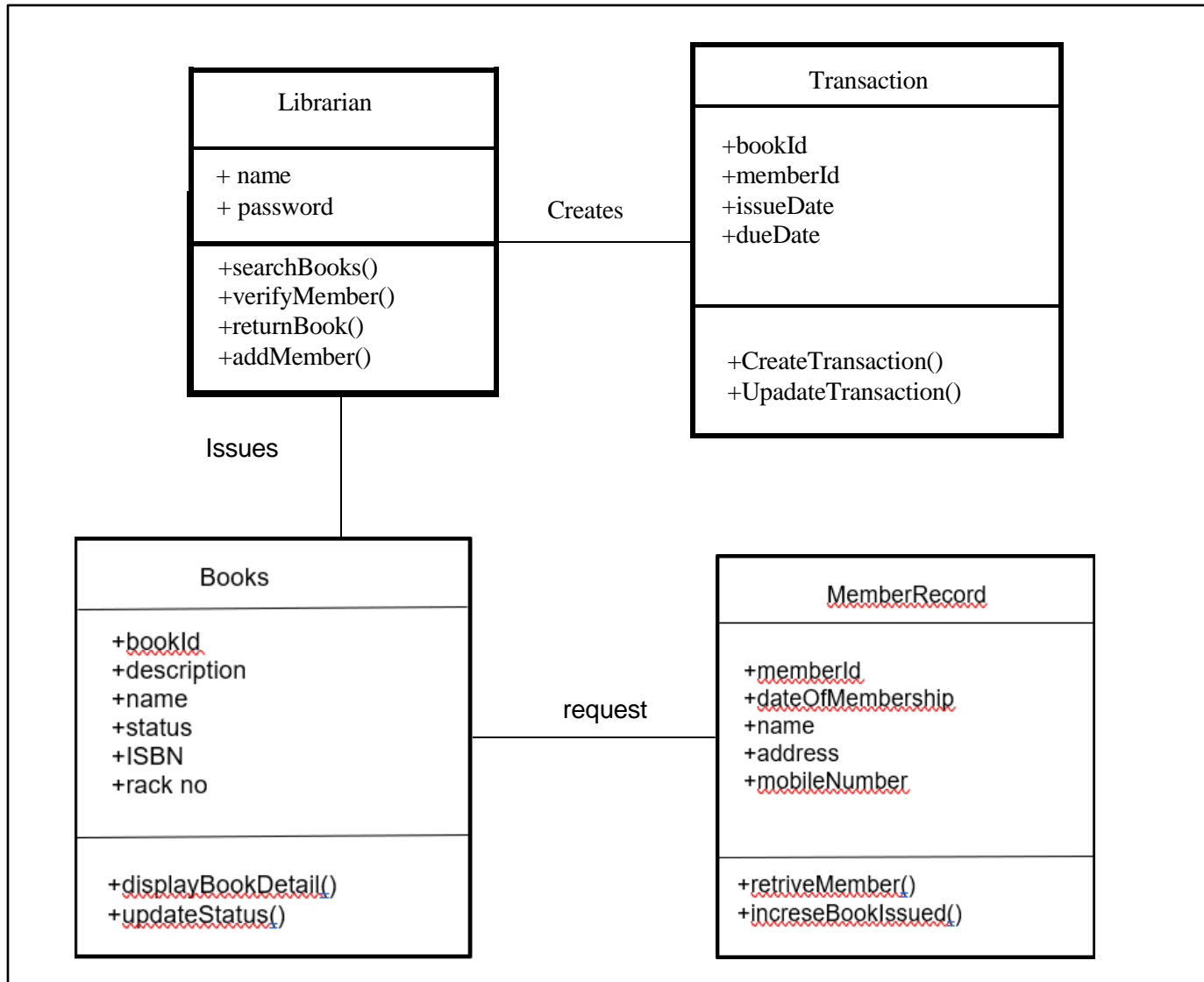
- **Use Case**



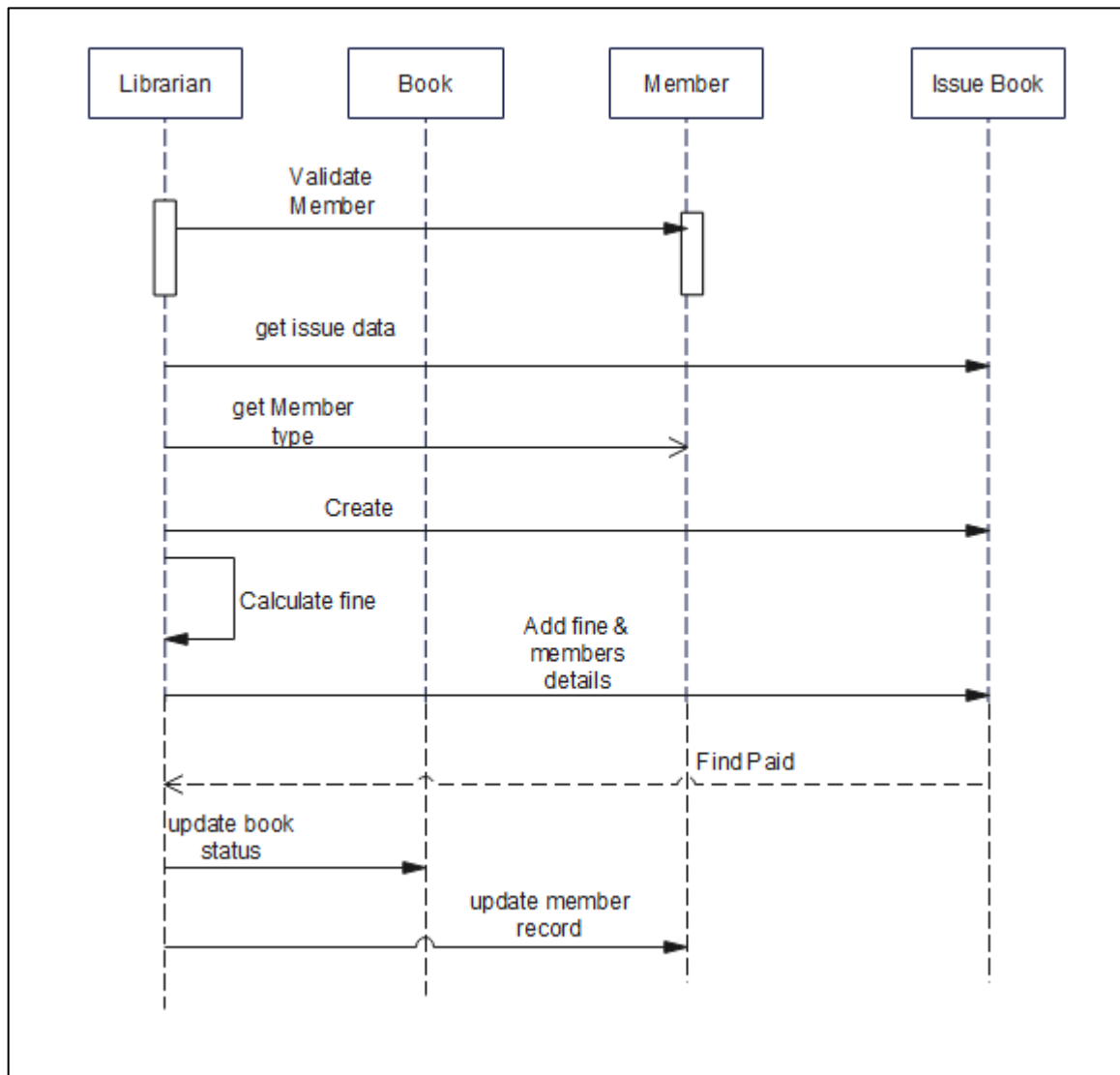
- **Activity Diagram**



- **Class Diagram:**



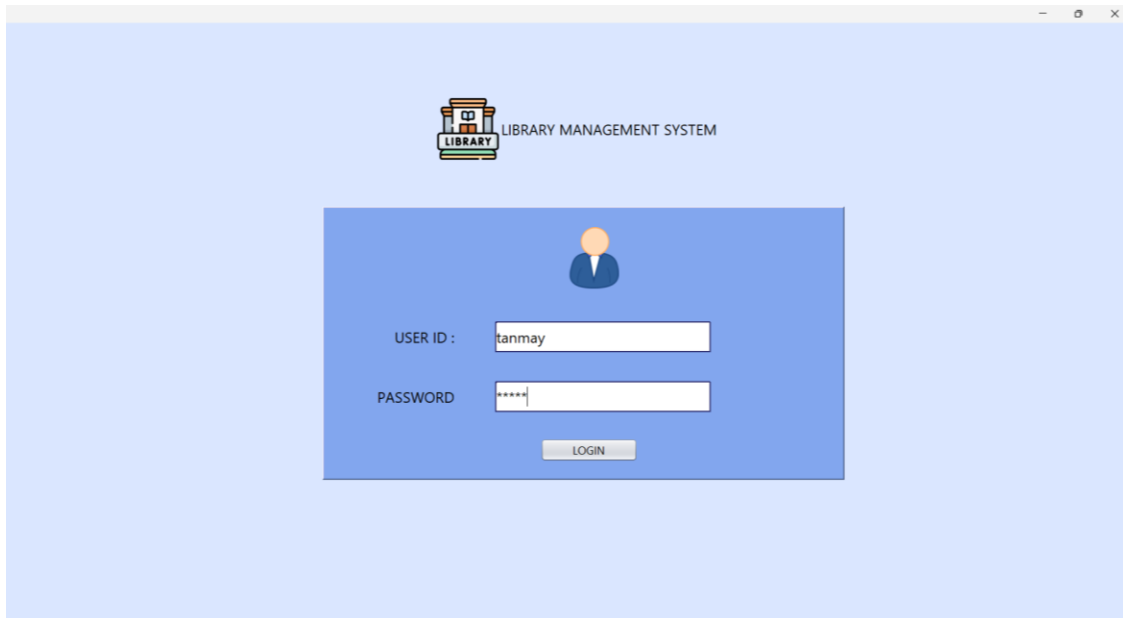
- **Sequence Diagram:**



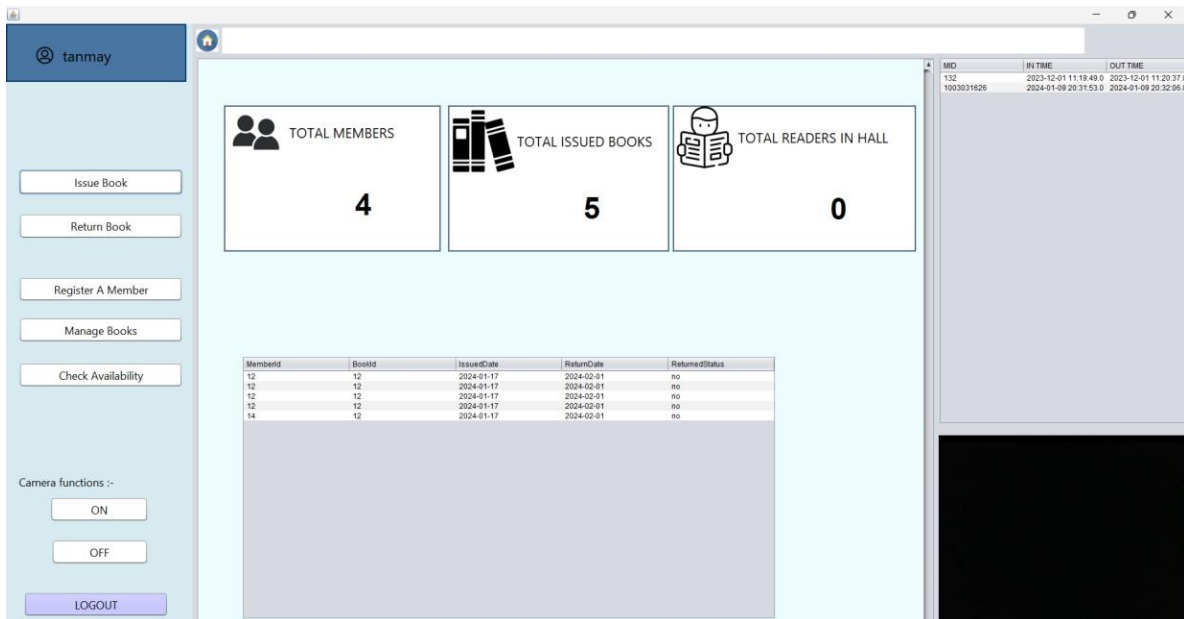
System Design

User Interface Design

➤ Login page



➤ Home page



➤ Issue book page

Member ID	Name
2	aditya kumar
12	shikhar yadav

Book ID	Book Name
1	agnipariksha

MO	IN TIME	OUT TIME
132	2023-12-01 11:19:49.0	2023-12-01 11:20:37.0
1003031626	2024-01-09 20:31:53.0	2024-01-09 20:32:06.0

➤ Member Registration

Full Name :

First Name Middle Name Last Name

Email id : Mobile Number : Alternate Mobile Number

Address :

Address line:

City State/Province

Zip/Postal Code

Membership plan : 1 Month Gender : Male

Select document for ID & Address proof : Adhaar Card

Select document file : CHOOSE FILE Upload Photo : CHOOSE FILE

Selected document file : Selected Photo File

REGISTER

MO	IN TIME	OUT TIME
132	2023-12-01 11:19:49.0	2023-12-01 11:20:37.0
1003031626	2024-01-09 20:31:53.0	2024-01-09 20:32:06.0

➤ Manage Book page

tanmay

Issue Book

Return Book

Register A Member

Manage Books

Check Availability

Camera functions :-

ON

OFF

LOGOUT

Book ID: 1

Book Name: agripantha

Description: 99

Quantity: 2

ISBN Number: abc123

Rack NO: 12

Add Update Delete

Title 1	Title 2	Title 3	Title 4	Title 5	Title 6
1	agripantha	99	2	abc123	12

MID	IN TIME	OUT TIME
132	2023-12-01 11:19:49.0	2023-12-01 11:20:37.0
1003031626	2024-01-09 20:31:53.0	2024-01-09 20:32:06.0

➤ Check Book availability panel

tanmay

Issue Book

Return Book

Register A Member

Manage Books

Check Availability

Camera functions :-

ON

TOTAL MEMBERS: 4

TOTAL ISSUED BOOKS: 0

TOTAL READERS IN HALL: 0

Memberid	Bookid
12	12
12	12
12	12
12	12
14	12

Database Table Example with Search

BookID	BookName	Quantity
1	agripantha	2

Search: Search

MID	IN TIME	OUT TIME
132	2023-12-01 11:19:49.0	2023-12-01 11:20:37.0
1003031626	2024-01-09 20:31:53.0	2024-01-09 20:32:06.0

➤ Database

Containing the word:

Table	Action	Rows	Type	Collation	Size	Overhead
<input type="checkbox"/> books		1	InnoDB	utf8mb4_general_ci	16.0 KiB	-
<input type="checkbox"/> inoutmember		2	InnoDB	utf8mb4_general_ci	16.0 KiB	-
<input type="checkbox"/> issuedbook		5	InnoDB	utf8mb4_general_ci	16.0 KiB	-
<input type="checkbox"/> members		2	InnoDB	utf8mb4_general_ci	1.5 MiB	-
<input type="checkbox"/> registration		2	InnoDB	utf8mb4_general_ci	240.0 KiB	-
<input type="checkbox"/> users		2	InnoDB	utf8mb4_general_ci	16.0 KiB	-
6 tables	Sum	14	InnoDB	utf8mb4_general_ci	1.8 MiB	0 B

☐ Check all With selected:

➤ Issue book table

Extra options

MemberId	BookId	IssuedDate	ReturnDate	ReturnedStatus
12	12	2024-01-17	2024-02-01	no
12	12	2024-01-17	2024-02-01	no
12	12	2024-01-17	2024-02-01	no
12	12	2024-01-17	2024-02-01	no
14	12	2024-01-17	2024-02-01	no

☐ Show all Number of rows: Filter rows:

Query results operations

Testing And Validation:

- Login**

Sr. No,	Possible Inputs	Expeced Result	Actual Result	Result
1	Valid Username and correct Password	Login Success Message and Redirect to dashboard	Login Success Message and Redirect to dashboard	pass
2	Valid Username and incorrect Password	Login Failure Message and Reload login Page	Login Failure Message and Reload login Page	pass
3	Invalid Username and correct Password	Login Failure Message and Reload login Page	Login Failure Message and Reload login Page	pass
4	Invalid Username and incorrect Password	Login Failure Message and Reload login Page	Login Failure Message and Reload login Page	Pass

- Add, Remove, Update Book**

Sr. No.	Operation Title	Possible Inputs	Expected Result	Result (pass/fail)
1	Add Book	Book entered Successfully	Book entered Successfully	pass
2	Add Book with empty textfields	Data can not inserted. Please fill all textfields.	Data can not inserted. Please fill all textfields	pass
3	Update Book	Book Updated Successfully	Book Updated Successfully	pass
4	Remove Book	Book remove Successfully	Book remove Successfully	pass

- Register Member**

Sr. No.	Operation Title	Possible Inputs	Expected Result	Result (pass/fail)
1	Add Member	Add member Successfully	Add member Successfully	Pass
2	Add member with invalid textfield	Please entered valid data	Please entered valid data	pass
3	Add member with empty textfield	Data can not inserted. Please fill all textfields.	Data can not inserted. Please fill all textfields.	pass

- **Issue Book**

Sr. No.	Operation Title	Possible Inputs	Expected Result	Result (pass/fail)
1	Issue valid book to valid member id	Book issued Successfully	Book issued Successfully	pass
2	Issue invalid book to valid member id	Can not issue book. Enter valid book id	Can not issue book. Enter valid book id	Pass
3	Issue valid book to invalid member id	Can not issue book. Enter valid member id	Can not issue book. Enter valid member id	Pass
4	Issue invalid book to invalid member id	Can not issue book. Enter valid book id and valid member id	Can not issue book. Enter valid book id and valid member id	Pass

- **Return Book**

Sr. No.	Operation Title	Possible Inputs	Expected Result	Result (pass/fail)
1	Enter valid member id	Book return Successfully	Book return Successfully	Pass
2	Enter invalid member id	Can not return book	Can not return book	Pass

- **Future Enhancement:**

This desktop application involves almost all the basic features of the library management. The future implementation will be help for the members with website administrator.

- **Conclusion:**

The project entitled “Library Management System” is developed using Java as a frontend and MYSQL database in backend to computerize the process of online management of books, issued and returned books. This project covers only the basic features required.

- **Business Cases:**

1. **Efficient Resource Allocation:**

A library management system optimizes resource allocation by automating tasks such as cataloging, tracking inventory, and managing user accounts. This efficiency can lead to cost savings in terms of staff time and resources.

2. **Enhanced User Experience:**

Implementing a library management system improves the overall user experience by providing a user-friendly interface for searching, borrowing, and returning books. This can attract more patrons and improve customer satisfaction.

3. **Data Analysis for Decision-Making:**

The system generates valuable data on borrowing patterns, popular titles, and user preferences. Analyzing this data helps in making informed decisions regarding collection development, resource allocation, and service improvements.

4. **Security and Access Control:**

A library management system enhances security by providing access controls and tracking system activities. This ensures that only authorized personnel can manage sensitive information and helps prevent theft or loss of library materials.

5. **Automation of Repetitive Tasks:**

Routine tasks like book checkouts, returns, and overdue reminders can be automated, allowing library staff to focus on more complex and meaningful tasks. This increases overall productivity and reduces the likelihood of human errors.

6. **Inter-Library Cooperation:**

Library management systems facilitate collaboration between different libraries, allowing them to share resources, catalogs, and information. This inter-library cooperation expands the range of available

materials for users.

7. Integration with Learning Management Systems:

Integration with educational institutions' learning management systems enables seamless access to library resources, fostering a cohesive learning environment for students and educators.

8. Remote Access and Online Services:

A library management system supports remote access to resources, enabling users to search, reserve, and borrow materials online. This enhances accessibility and accommodates users who may not be able to visit the physical library.

9. Financial Management:

The system assists in financial management by tracking expenses, budgeting for acquisitions, and providing insights into cost-effective ways to expand the library collection.

10. Adaptation to Technological Trends:

Implementing a library management system ensures the library stays relevant in the digital age. It allows for easy adaptation to emerging technologies and trends, ensuring that the library remains a valuable resource for users.

- **Bibliography**

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