Analysis and Design of a Library Management System

LITSHELF

Introduction

Definition

Library Management is the systematic method of managing the whole library through a simple and interactive interface

Functionality

Library Management Software keeps a track on all the books that are issued, returned and added to the library.

Objective

LMS Software is important for an efficient, user-friendly, fast and secure library management be it a small size school library having limited users and books or a large size public library.

01

Book acquisition

That is purchasing, cataloging, and processing books.

02

Cataloging and classification

Organizing books by title, author, subjects, ISBN, etc.

03

Book circulation and borrowing

04

Shelving and maintenance.

05

Book Management

06

Reports & Analytics

Part 1: Requirements Gathering

Stakeholders Identification

- **Librarians** (manage books and users)
- **Patrons(Students/Members)** (borrow/return books)
- **Administrators** (system maintenance and reporting)

Functional Requirements

- User authentication & roles
- Book search & cataloguing
- Borrowing & returning books
- Fine calculation for overdue books
- Reports generation

Non-Functional Requirements

- Performance
- Security
- Usability
- Scalability

Requirement Gathering Techniques

- Interviews with librarians and students
- Observation of library workflows

- Questionnaires for feedback
- Existing system analysis

Part 2: Design

Design Thinking

The design thinking process for a library management system focuses on understanding the needs and pain points of the librarians, patrons and other stake holders, providing an efficient, effective and user-friendly experience.

Design Thinking Focus

Empathize

- User Research
- Pain Points
- User Personas

Define

- Problem Statement
- Design Principle
- System requirements

Ideate

- Brainstorming
- Concept Development
- Prototyping

Prototype

- Pilot Testing
- User feedback
- Evaluation Metrics

System Design

Use Case Diagram

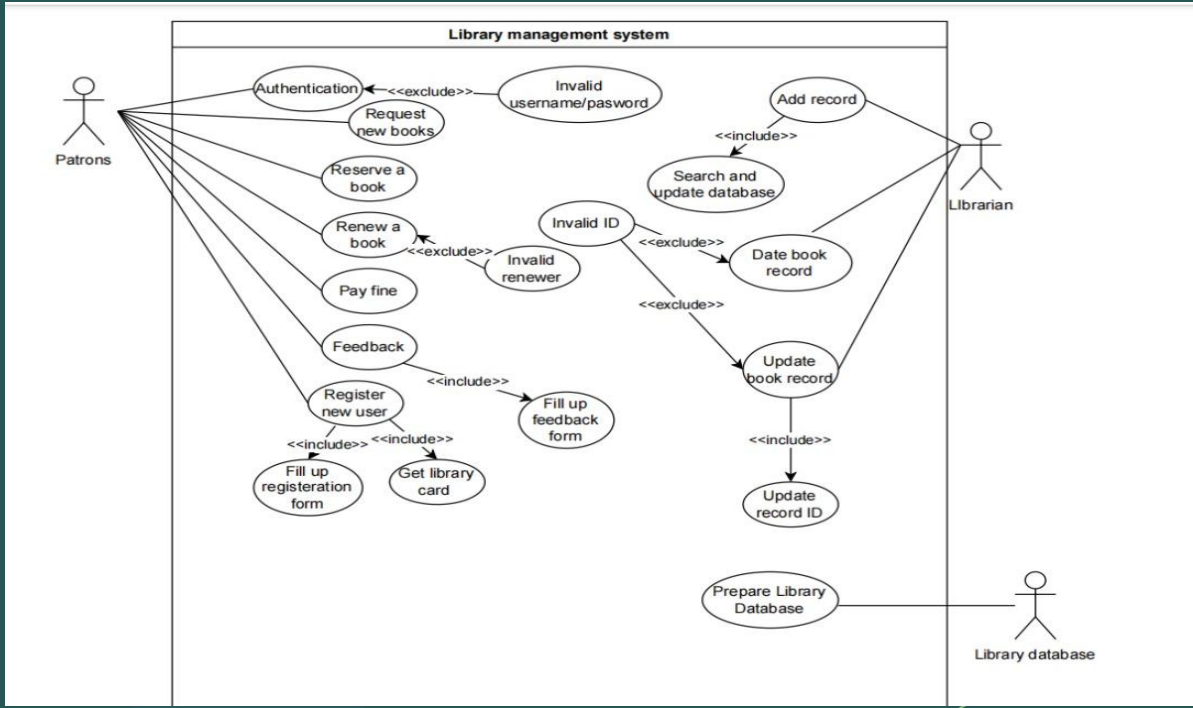
Actors

- Librarian
- Patron (student/other member)
- Library Admin

Use Cases

- Users borrowing/returning books
- Admin adding books
- Librarian managing users

Use Case Diagram



Entity-Relationship Diagram (ERD)

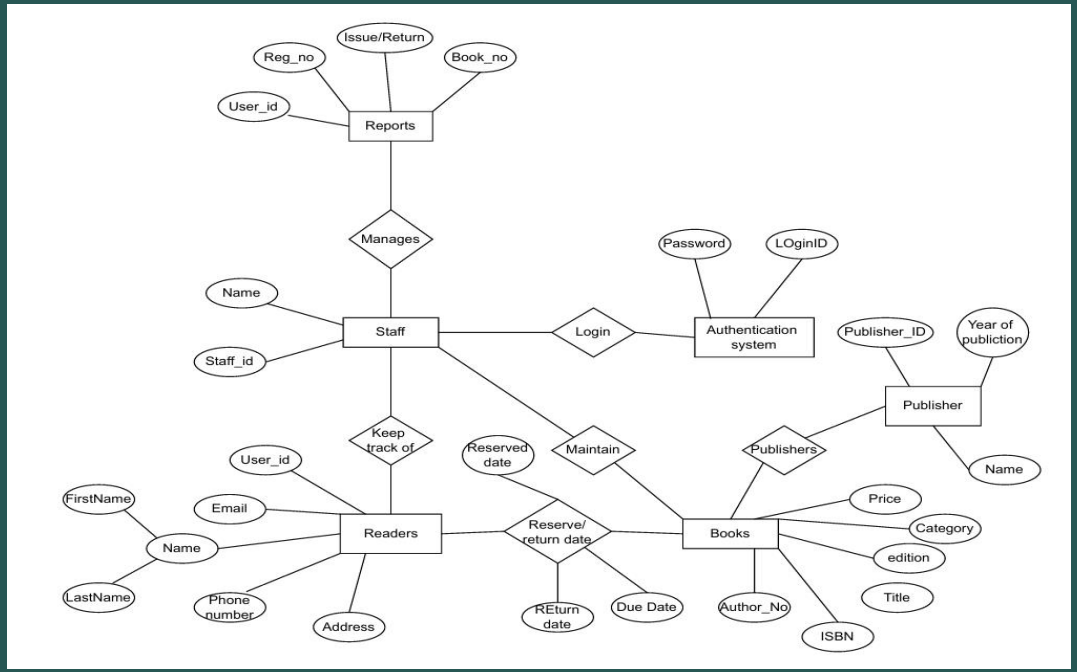
Entities

- Reports
- Staff
- Books
- Publisher
- Readers
- Authentication System

Relationship

- Keep track of readers
- Manage staff
- Publish books
- Login
- Reserve/return date
- Maintain books

Entity-Relationship Diagram (ERD)

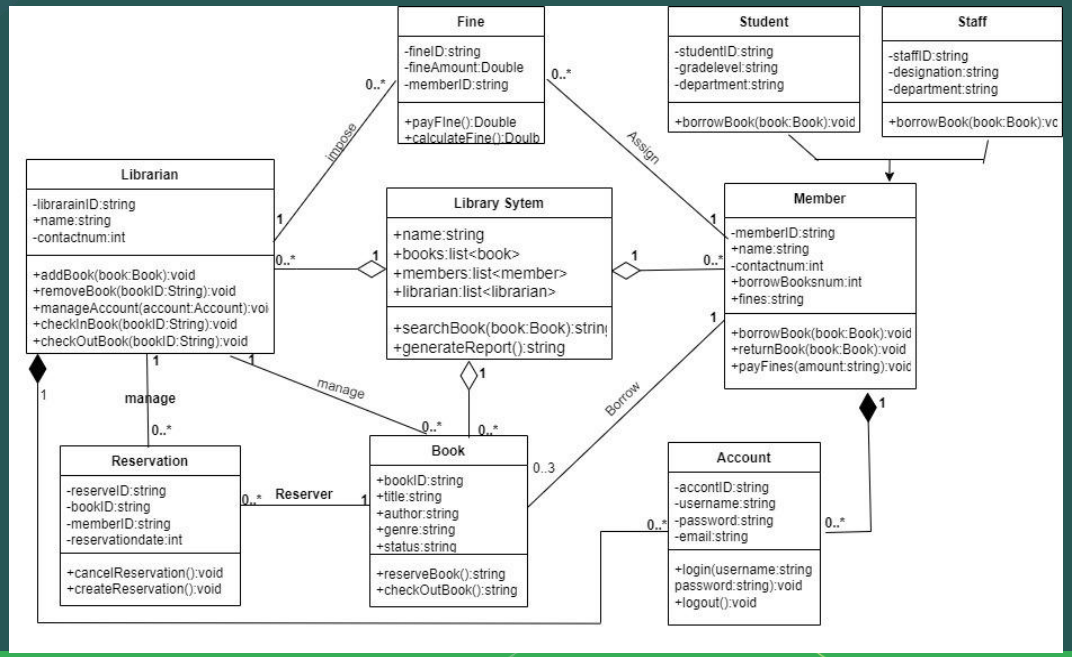


Class Diagram

Classes

- Librarian
- Book
- Account
- Reservation
- Member
- Library System

Class Diagram



Sequence Diagram

The sequence diagram of the library management system outlines the interactions between the different components of the system over time.

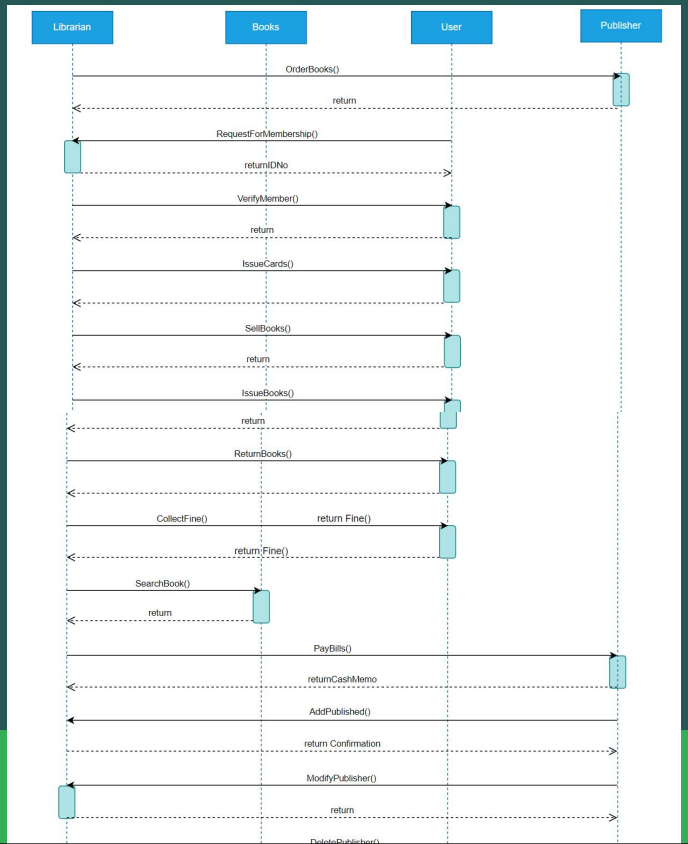
Actors and Components

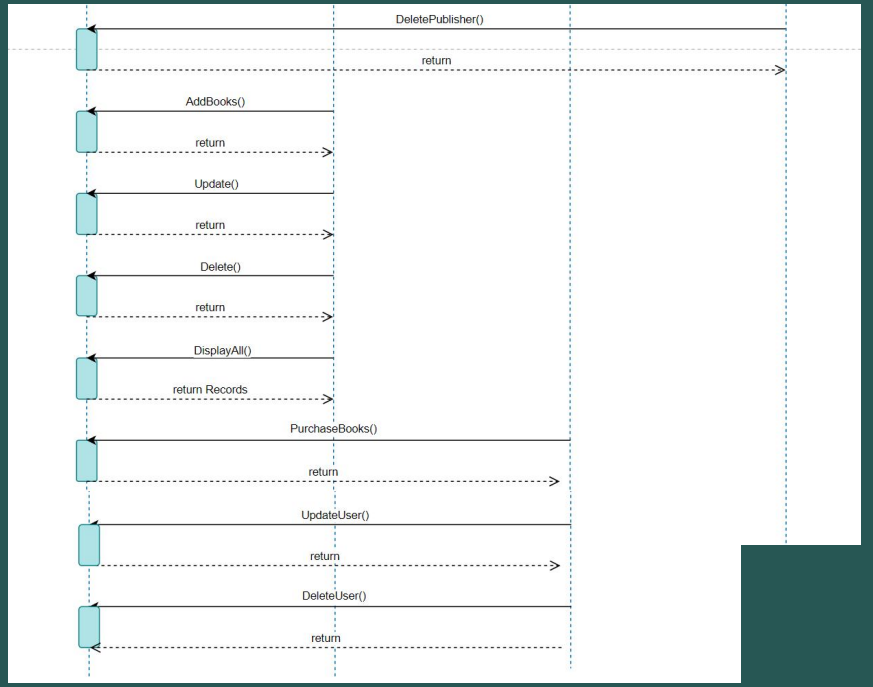
- Librarian
- Patron
- Librarian Management System
- Database

Sequence of Events

- Book Cataloging
- Patron Registration
- Book Borrowing
- Book Returning

Sequence Diagram





UI/UX Design

User Interface

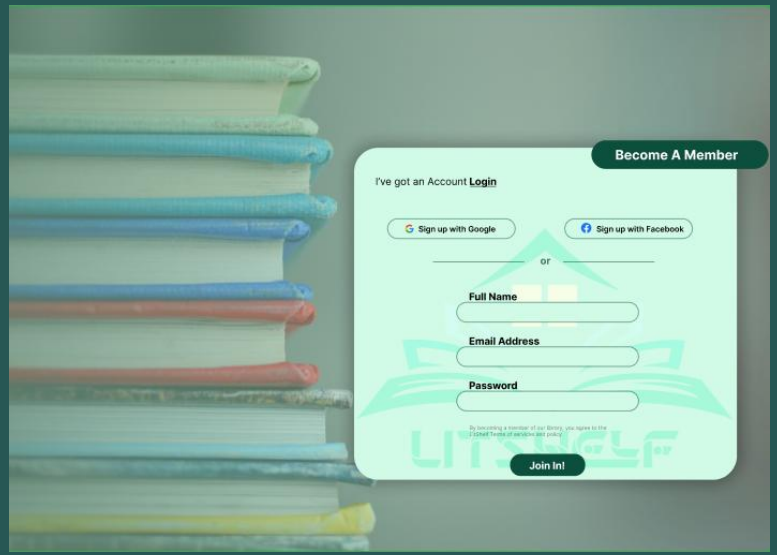
The library management system's UI design features a clean and intuitive layout.

User Experience

Availability of features such as scroll bars and navigation panels enhance user experience through out the web application

UI/UX Design

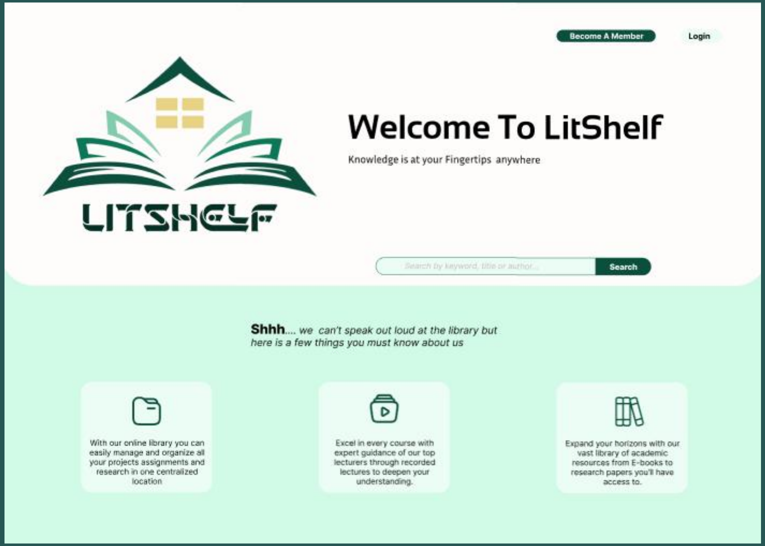
User Sign Up Page



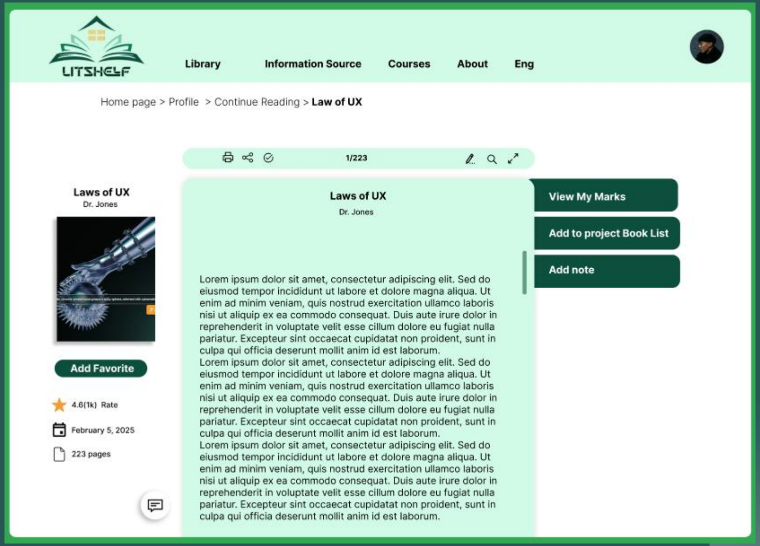
User Login Page

UI/UX Design

User Home/Landing Page



User Reading Page



Conclusion

By implementing the propose library management system and continuous evaluating and refining it, the library can improve its serves, enhance the user experience, and better support the needs of the patrons