Library Management System

Serah Michaels

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Library Management System Project

Serah Michaels

Problem Statement:

A library that uses an outdated manual record-keeping system. Because they are keeping track of their inventory manually, they are struggling with tracking overdue books, managing and tracking their inventory, and being able to locate available copies to their patrons in the most efficient manner. The current manual system is also prone to error and more time-consuming than a system that can provide real-time updates.

Glossary of Terms:

Library Management System (LMS): A system that automates and streamlines everyday library operations including cataloging and cardholder account management.
ISBN (International Standard Book Number): A unique identifier assigned to each book to organize them in the catalog.
Catalog: A comprehensive database of all books that are available in the library.
CH (Cardholder): A customer of the library who holds a current library card status.

Functional Requirements

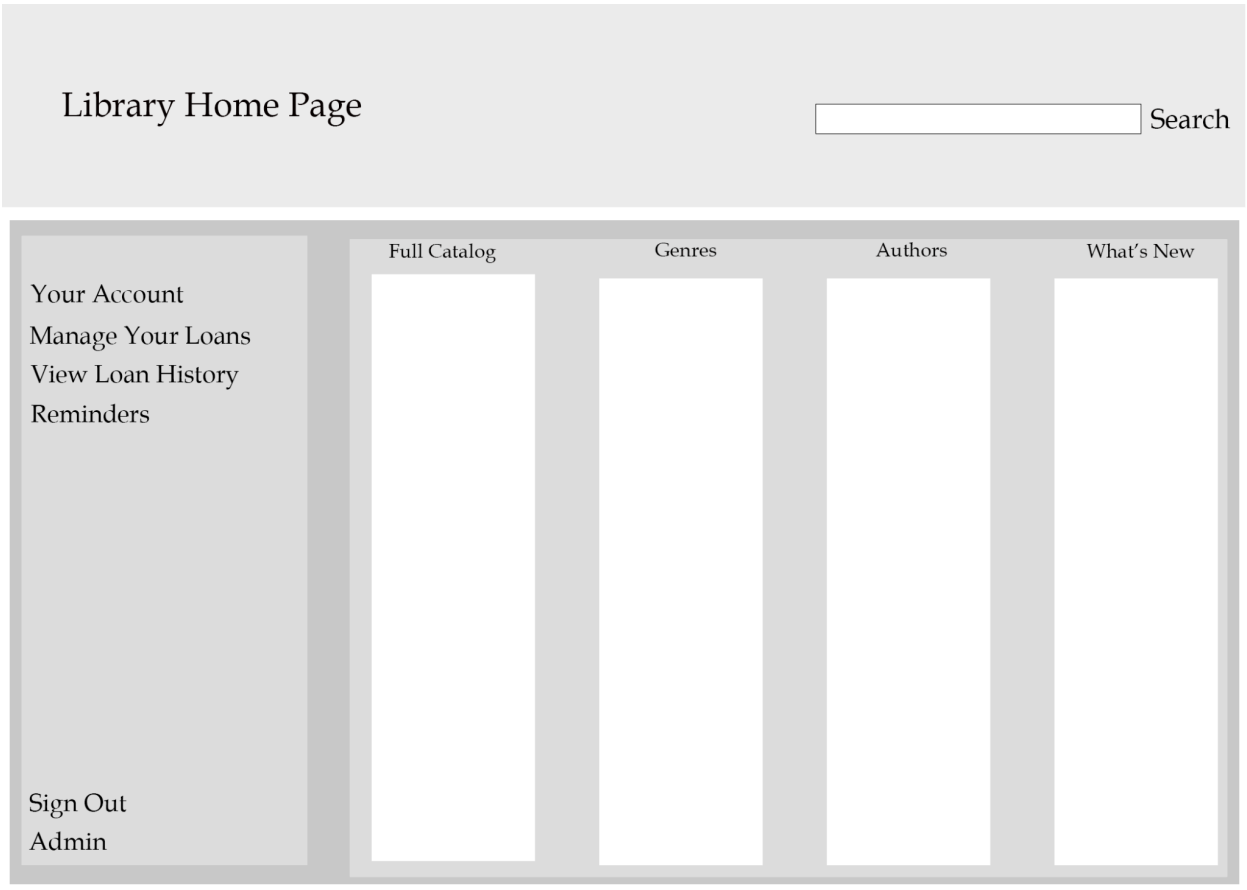
No.	Priority	Description
REQ-1	High	The catalog is able to be searched by genre, author, and title
REQ-2	Medium	The system supports automated checkout and return processing
REQ-3	High	Books can be added/removed in the library management system
REQ-4	Medium	Library staff and cardholders can track real-time book availability
REQ-5	High	Cardholders can manage their account details
REQ-6	Medium	Cardholders can view their loan history
REQ-7	High	Patrons can reserve and renew books online
REQ-8	Medium	Notifications are sent to cardholder's accounts if a book is overdue or the return deadline is approaching
REQ-9	High	The system must generate reports on the inventory status

Nonfunctional Requirements

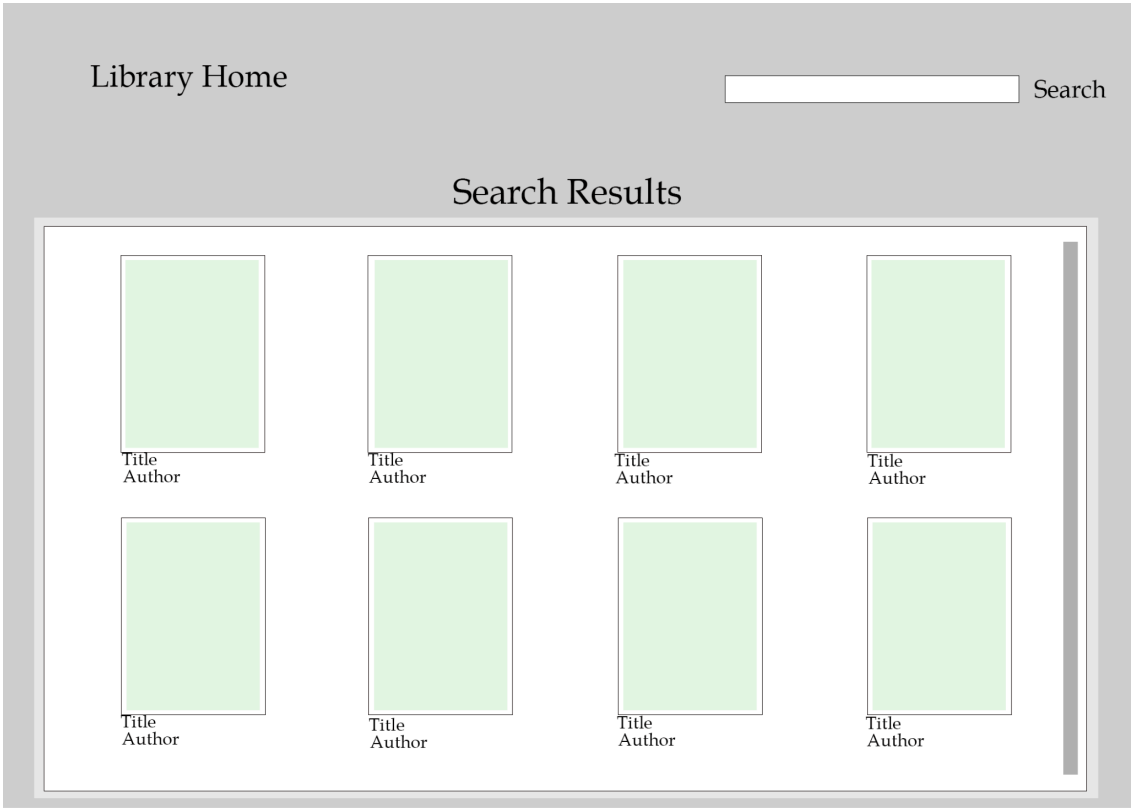
No.	Priority	Description
Functionality	High	The system can provide all library management features.
Usability	High	Cardholders must be able to reserve books online and library staff must be able to accurately track library's inventory.
Reliability	High	The system can accurately determine fines for overdue books and maintain accuracy on the library's inventory.
Performance	High	The system will be able to load queries and refresh without lags or bug interruptions.
Supportability	Medium	The system is maintainable and scalable based on a growing customer base and library catalog.

User Interface Requirements:

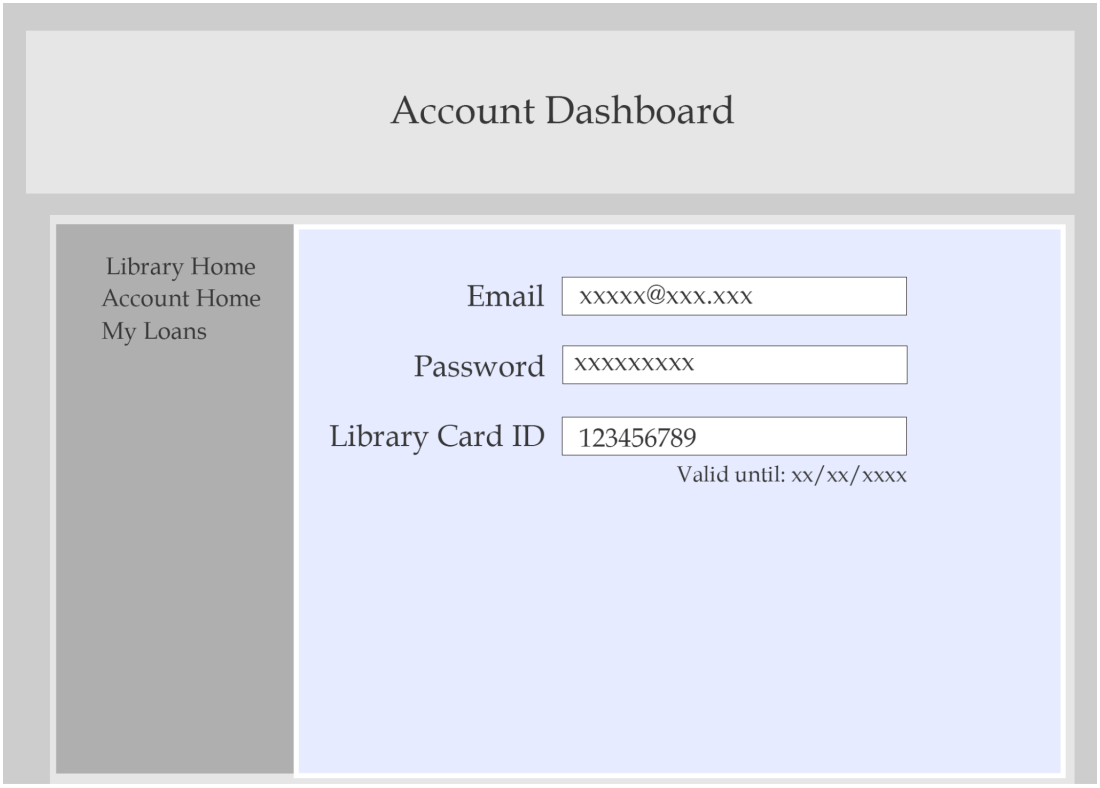
User-Friendly Navigation



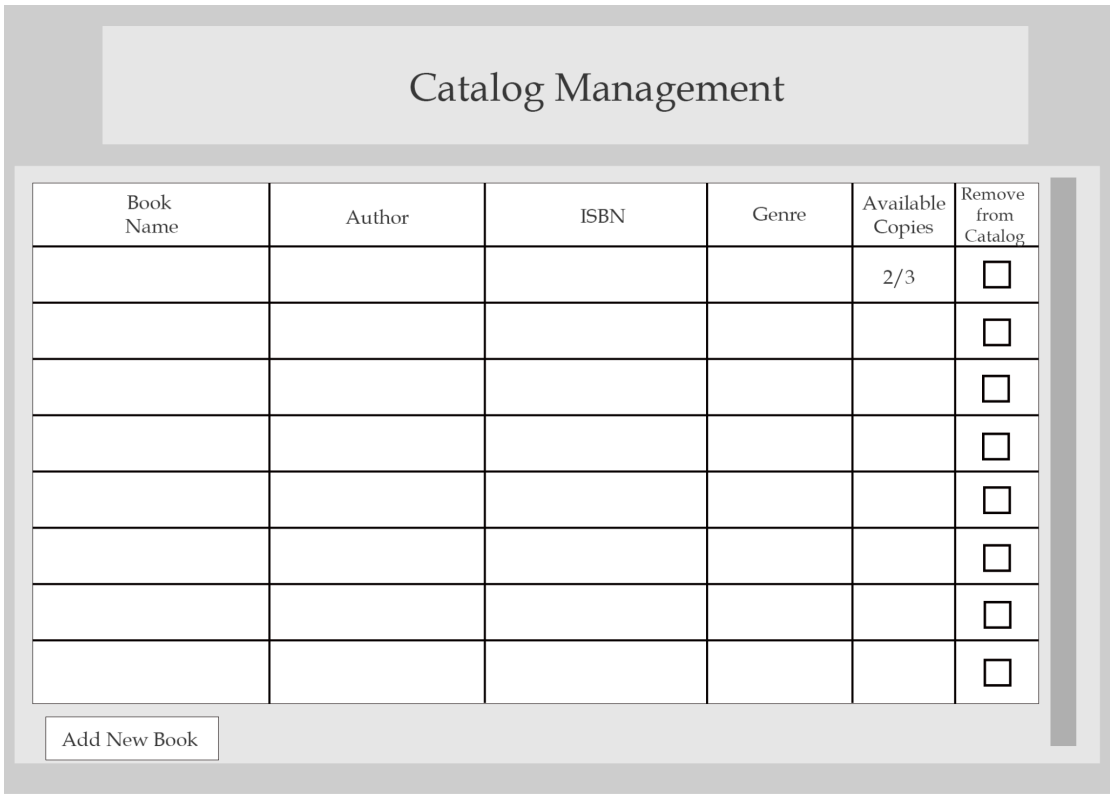
Search Functionality



Account Dashboard



Book Management



Report Generation

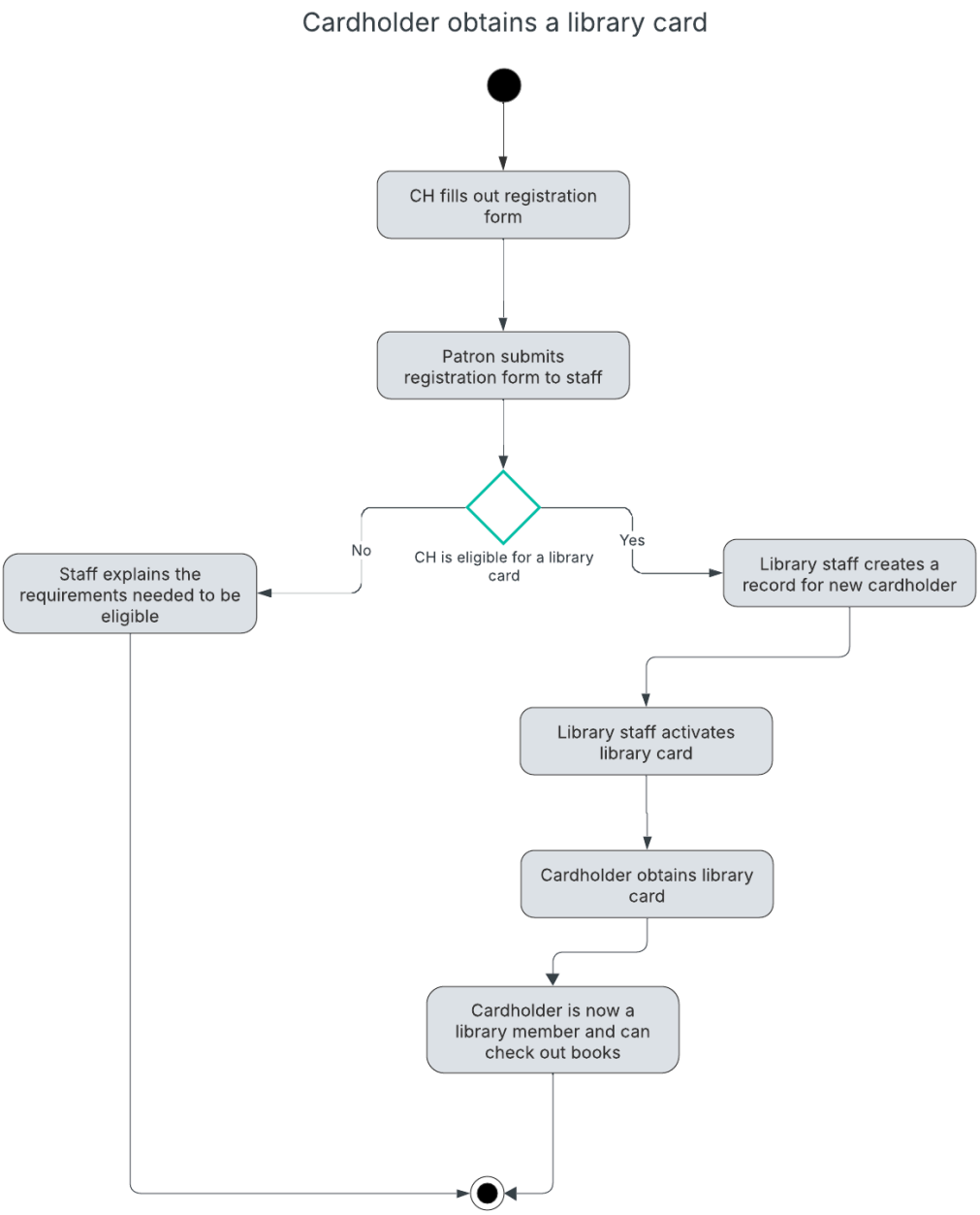
Plan of Work:

Weeks 1-2: setup the project, set up the development environment

I have set up my development environment so far. I will be using IntelliJ to write the code and Postgres to configure a database. I am currently trying to figure out how I want the interface to look using mockups.

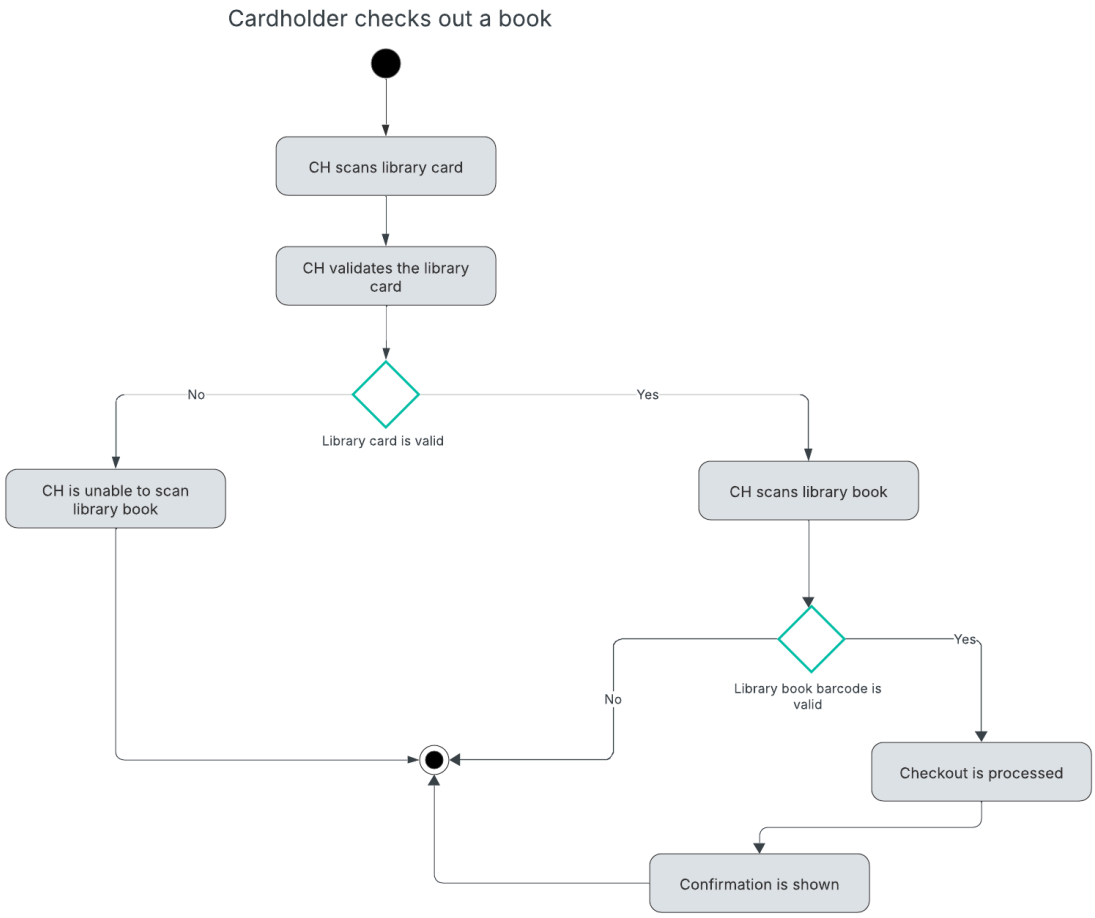
Weeks 3-4: build login for users and staff, build book entry interface, build book catalog and book search features
Weeks 5-7: build online loan and return function, build user profile and loan history features
Week 8: initial testing of the system
Weeks 9-11: add notification capabilities, refine book search and management features
Weeks 12-14: testing of program, bug fixes, optimize performance
Week 15: final demo

Module 5 - System Sequence Diagram and Activity Diagram
Serah Michaels

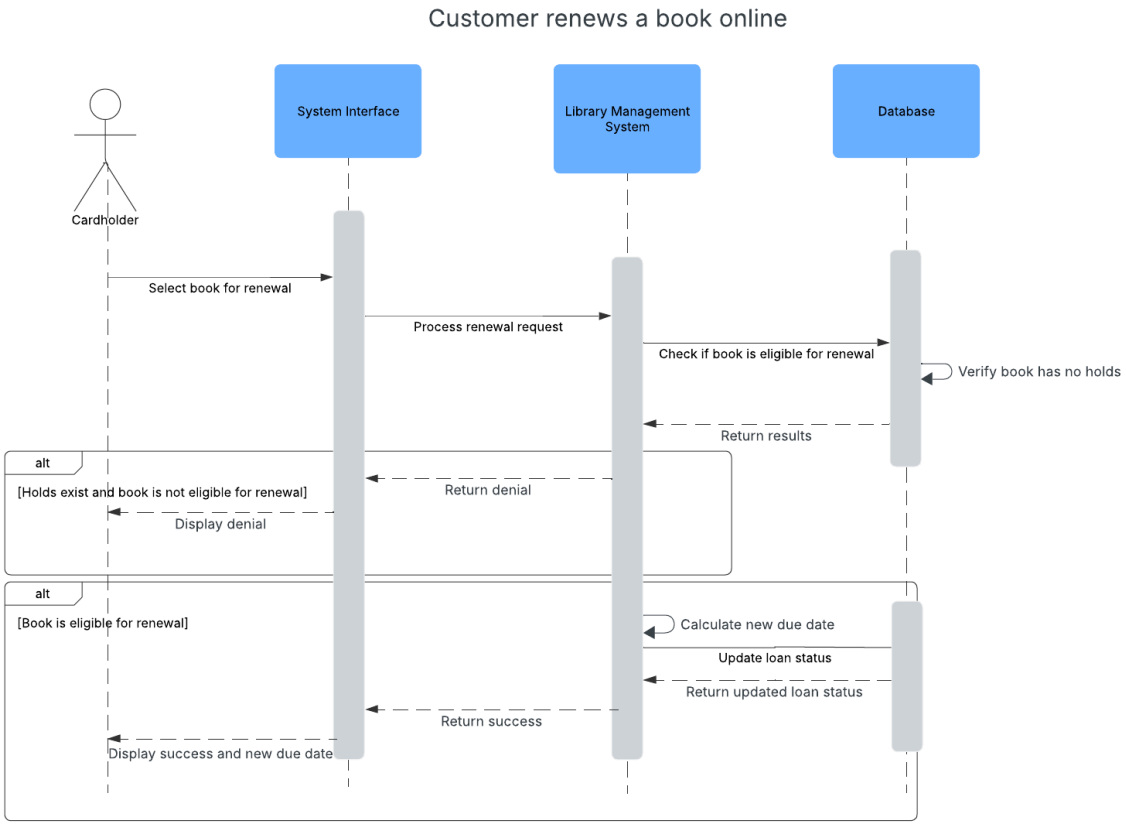


Actions:
The patron fills out a registration form to apply for a library card. The patron submits the form to the staff. If the patron is not eligible for a library card, the staff explains to the patron the eligibility requirements and the patron will need to come back at a later date if they can not meet the requirements. If the patron is eligible for a library card, the staff creates a record in the system for the new cardholder. A library card number is assigned and activated. The cardholder

obtains the library card, and they are now a library member and can use their card to check out books.

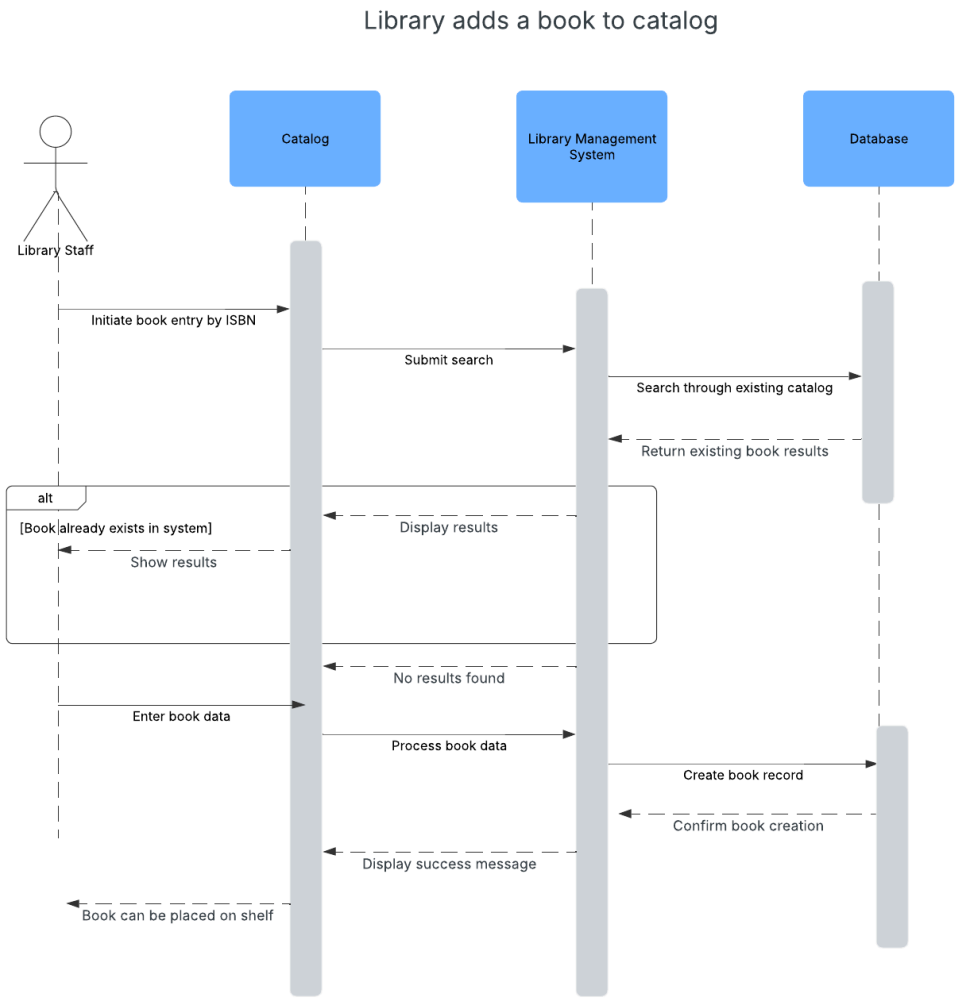


Actions:
To check out a book, the cardholder scans their library card. If their library card is not active, the cardholder is unable to continue to scan a library book. If their library card is active, the cardholder continues to scan a library book. If the book barcode is not valid, the cardholder can not check out the book. If the book barcode is valid, the checkout process is completed and confirmation is shown to the cardholder.



To renew a book online:

1. The cardholder selects the book they would like to renew.
2. The LMS processes the renewal request
3. The system searches the database to check if the book is eligible for renewal
4. The database verifies that the book has no existing holds
5. If holds exist and the book is not eligible for renewal:
    - The LMS returns the denial and displays it to the customer
6. If the book is eligible for renewal:
    - The LMS creates a new due date and updates the loan status in the database
7. The renewal is successfully placed and the success and new due date is displayed to the cardholder

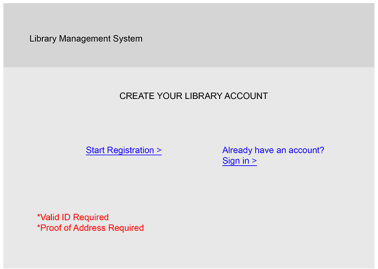


Steps for library staff to add a book to the catalog:

1. Staff inputs ISBN to begin book entry
2. The search is submitted to the LMS
3. The system searches the database for an existing record
4. If the book already exists in the system:
    - The result is displayed to the library staff and no record is input
5. If the book is not in the system:
    - The library staff continues to input book data
    - The book data is processed by the LMS
    - The book is added to the database
    - The confirmation for the book creation is sent to library staff
6. The book is ready to be placed on the shelf and checked out.

Use Case #1: A patron creates a new account

Screen 1: Account Creation



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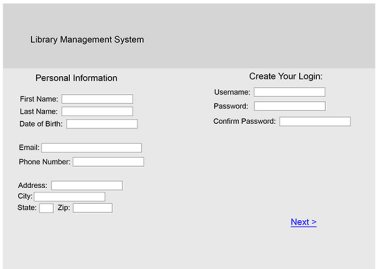
Screen 2: Personal Info



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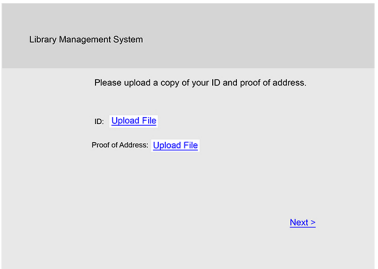
Screen 3: Upload Documents



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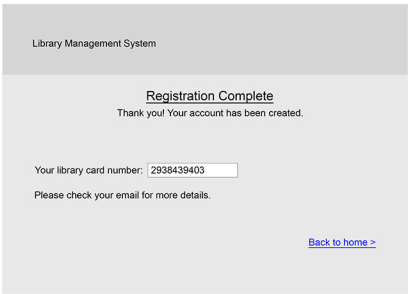
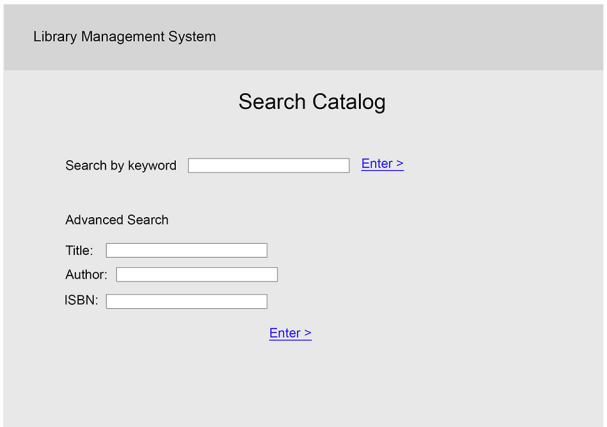
Screen 4: Confirmation

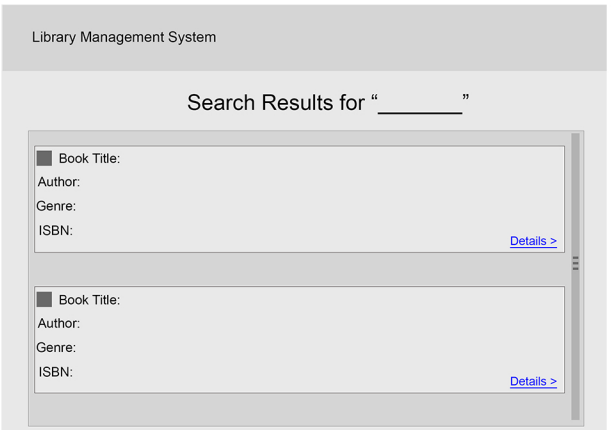


Use Case #2: Search for a title

Screen 1: Search Interface

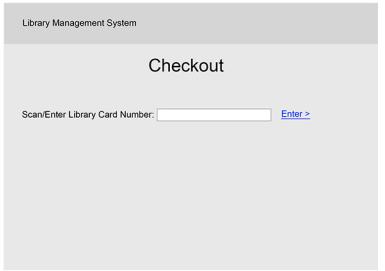


Screen 2: Search Results



Use Case #3: Checkout Process

Screen 1: Enter Library Card



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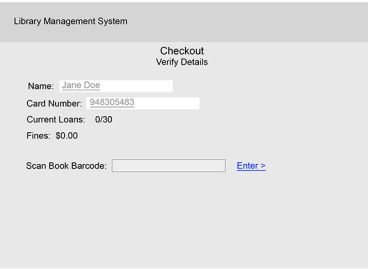
Screen 2: Verify Information



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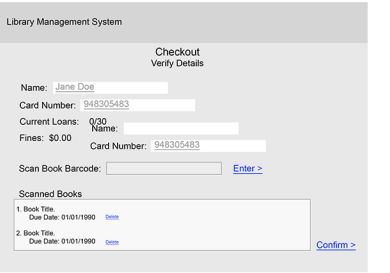
Screen 3: Books Scanned



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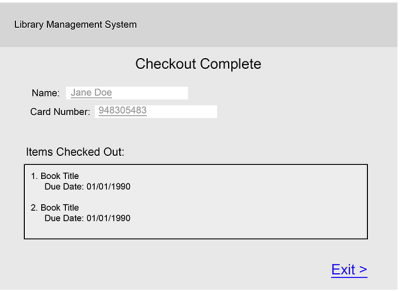
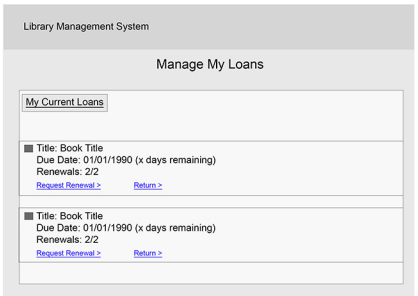
Screen 4: Checkout Complete



Use Case #4: Renewing a Title

Screen 1: Loan Home



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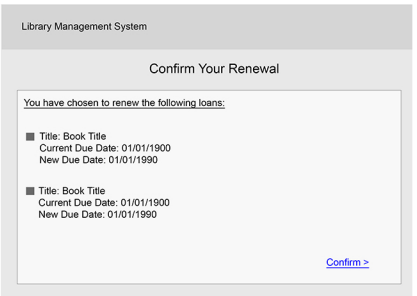
Screen 2: Renewal Confirmation



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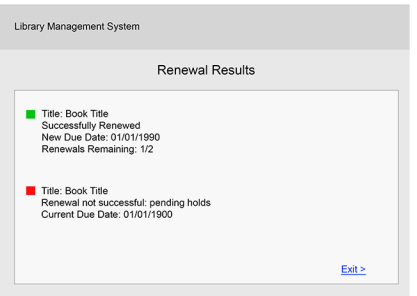
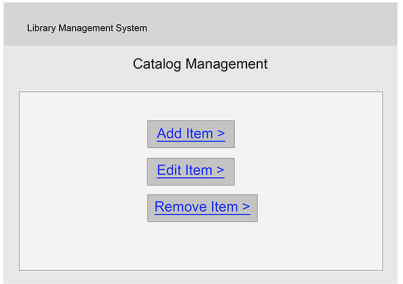
Screen 3: Renewal Results



Use Case #5: Adding a Title to Catalog

Screen 1: Catalog Management



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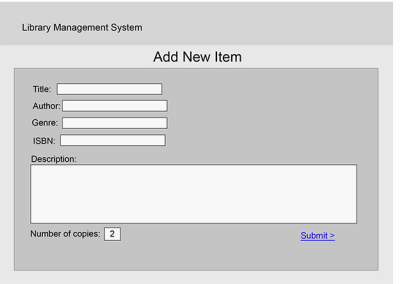
Screen 2: Add New Item



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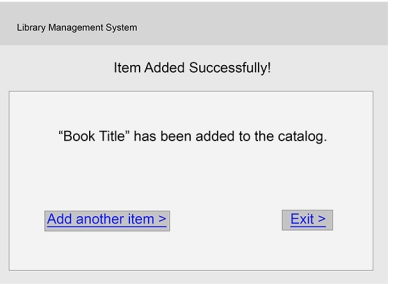
Screen 3: Confirmation



User Effor Estimation

Use Case #1: A Patron Creates a New Account

The patron will need to click start registration. They will be taken to the account creation page and will need to enter their personal information (first name, last name, date of birth, email, phone number, address, city, state, zip). Then, they will need to create their username and password, and confirm their password. Then they will be taken to the ID verification page where they will need to click to browse files, choose file and upload (3 click). They will need to do this for their proof of address (3 click). Then, they click next and are taken to the registration complete screen.

Total for Use Case #1:

- Mouse clicks: 10
- Keystrokes: 85-100

Use Case #2: Search for a Title

The patron will click and enter keywords. The cardholder can also search by title, author, or ISBN (1-3 clicks). Then, the patron will select submit (1 click). The cardholder is taken to the search results page and any titles matching the keywords will return in the search results. The cardholder can click on details for each result (1 click).

Total for Use Case #2:

- Mouse clicks: 5
- Keystrokes: 15-30

Use Case #3: Checkout Process

The patron will need to add or scan their library card and click the enter button (1 click). They will be taken to the next screen which displays their information including their name, card number, their current loans, and any fines on their. The cardholder will then need to scan the book barcode and click enter (1 click). The screen will refresh with the books that they have scanned. Then, they will click confirm (1 click) and they will be taken to the checkout confirmation screen that displays their information and how many books they have checked out. Then, the patron can click exit.

Total for Use Case #3:

- Mouse clicks: 6

- Keystrokes: 45-70

Use Case #4: Renewing a Title

The patron will access their loan management screen. Here, their current loans will be displayed. The patron can click on each title and then request renewal or return on their loans. If they click request renewal, they will be taken to the renewal confirmation screen. The screen will display their selections. The patron will select confirm (1 click). Then, they are taken to the renewal confirmation screen that displays the loans they have successfully renewed or loans that have not been renewed. If the loan is unable to be renewed, a reason will be displayed. The patron can now exit (1 click).

Total for Use Case #4:

- Mouse clicks: 5
- Keystrokes: 0

Use Case #5: Adding a Title to Catalog

From the catalog management screen, staff can select to add an item to the catalog, edit an existing item, or remove an item. If the staff selects add item (1 click), they are taken to the next screen where they can enter the details. The staff will enter title, author, genre, ISBN, description if applicable, and the number of copies (6 click). Then, the staff will select submit (1 click). The next screen is the confirmation screen that the title has been added to the catalog successfully. The staff can select add another item or exit. If add another item is selected, they are returned to the second screen.

Total for Use Case #5:

- Mouse clicks: 5
- Keystrokes: 110-200

Library Management System - Proposal

Serah Michaels

Problem Statement

For this project, I will be helping a library that uses an outdated manual record-keeping system. Because they are keeping track of their inventory manually, they are struggling with tracking overdue books, managing and tracking their inventory, and being able to locate available copies to their patrons in the most efficient manner. The current manual system is also prone to error and more time-consuming than a system that can provide real-time updates.

Objectives of the System

The library management system's objectives include providing a streamlined experience to track book inventory. Errors will become minimal since staff will be able to track inventory and overdue loans in real-time. Users will be able to loan books online without needing to visit the library. Users will also be able to determine if a book is available before visiting the library.

System Requirements

- Browse the library's book catalog
- Manage the library inventory
- Search for books by title, author, genre, or keywords
- Check book availability in real-time
- Reserve books online
- View loan history
- Renew book loans
- View due dates
- Track overdue books
- Manage book reservations

Typical Customers

The typical customers include library patrons, such as library card holders, students, and researchers. Other customers include the library staff, such as the librarians and library assistants.

Project Planning

For the software, the front-end and back-end will be developed using Java, and the database will be developed using SQL. The requirements for the hardware will include computers. The network will require a high-speed internet connection and SSL encryption to protect the user's data.

Development Approach

For this project, I will use the programming language Java and MySQL for the database. Java is flexible and versatile, and MySQL will be able to keep the book catalog well-organized. I will also use the Hibernate framework to interact Java with the database.

Development Plan

Weeks 1-2: setup the project, set up the development environment

Weeks 3-4: build login for users and staff, build book entry interface, build book catalog and book search features

Weeks 5-7: build online loan and return function, build user profile and loan history features

Week 8: initial testing of the system

Weeks 9-11: add notification capabilities, refine book search and management features

Weeks 12-14: testing of program, bug fixes, optimize performance

Week 15: final demo

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