Online Library Management System (OLMS)

Software Requirements Specification (SRS) Document

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1 Introduction

1.1 Introduction

This exhaustive Software Requirements Specification (SRS) document serves as an intricate guide for the comprehensive development and deployment of the cutting-edge Online Library Management System (OLMS). The primary objective is to revolutionize traditional library operations, offering an advanced and streamlined experience for both library staff and patrons. Within this document, we delve into the minutiae of the system's features, capabilities, and constraints, establishing a robust foundation for OLMS's development journey.

1.2 Scope of this Document

Tailored explicitly for the OLMS project, this SRS document is a cornerstone for delivering a sophisticated digital solution that supersedes conventional, paper-based library management methodologies. With a laser focus on meeting the needs of library staff and patrons, this document is meticulously crafted by the dedicated project team. It intricately details the system requirements, design considerations, and the multifaceted functionalities inherent in OLMS.

1.3 Overview

The Online Library Management System (OLMS) is not merely a system but a paradigm shift in the management of library operations. It introduces an all-encompassing suite of tools, finely tuned for the seamless orchestration of library functions. Covering an extensive range of functionalities, including user registration, book cataloging, digital resource access, and efficient data management, OLMS aspires to be a catalyst for transformative change. Its overarching goal is to recalibrate existing practices, diminishing manual workloads, amplifying accessibility, and elevating the overall library experience for both staff and patrons.

1.4 Business Context

The transition to OLMS is a strategic response to the prevailing inefficiencies that libraries face in managing voluminous book collections and catering to diverse patron needs. Embracing a digital paradigm, libraries stand on the precipice of substantial improvements in service delivery, ensuring not only enhanced resource management but also heightened user satisfaction. Beyond mere library operations, OLMS is poised to act as a dynamic catalyst, lending support to a spectrum of activities – from fundraising events and book clubs to comprehensive educational programs. It thus aspires to cultivate a more dynamic, enriched, and interconnected library ecosystem, propelling libraries into the digital age with resilience and innovation.

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2 General Description

2.1 Product Functions

OLMS is designed to be a comprehensive digital solution for library management, encompassing a range of functions:

- **Catalog Management**: A central feature for maintaining an up-to-date catalog of all library resources, including books, journals, e-books, and multimedia materials. The system allows for easy addition, modification, and deletion of resource records.
- **User Account Management**: Enables library staff to manage patron accounts, including registration, profile updates, and tracking of borrowing history.
- **Resource Borrowing and Return**: Automates the process of checking out and returning library resources, including management of due dates and overdue notifications.
- **Reservation and Waitlist Management**: Patrons can reserve books that are currently checked out and join waitlists. The system notifies them when the resource becomes available.

- **Digital Resource Access**: Facilitates access to digital resources like e-books and online databases, directly through the system.
- **Reporting and Analytics**: Provides detailed reports and analytics on library operations, including resource usage statistics, patron demographics, and borrowing trends.
- **Event Management**: Supports the creation and management of library events such as workshops, author talks, and book clubs, including participant registration and reminders.

2.2 Similar System Information

OLMS is being developed in the context of existing digital library management solutions. While there are numerous systems in use for similar purposes, OLMS differentiates itself through:

- **Enhanced User Experience**: A focus on a user-friendly interface that simplifies interaction for both staff and patrons.
- **Integration Capabilities**: Ability to seamlessly integrate with existing systems and databases within the library ecosystem.
- **Customizable Features**: Offers customizable features to cater to the specific needs of different libraries.

2.3 User Characteristics

OLMS is intended for a diverse user base, characterized as follows:

- **Library Staff**: Individuals who manage the library operations, including cataloging resources, assisting patrons, and organizing events. They require a system that is efficient and reduces the manual workload.
- **Patrons**: This group includes students, researchers, and general library visitors who seek to borrow resources or use library services. They need a system that is easy to navigate and provides quick access to library resources.
- **Administrators**: Library administrators who oversee library operations and require tools for reporting, analytics, and system management to make informed decisions.

2.4 User Problem Statement

Current library systems often face challenges such as:

- Inefficient management of physical and digital resources.
- Slow and cumbersome checkout and return processes.
- Limited ability to analyze usage patterns and patron needs.
- Difficulty in managing user data and ensuring privacy.

2.5 User Objectives

Users aim to achieve:

- A streamlined process for managing library resources and accounts.
- Quick and easy access to both physical and digital library materials.
- Enhanced ability to discover and reserve resources.
- Improved data management and reporting capabilities for informed decision-making.

2.6 General Constraints

The development and implementation of OLMS are subject to:

- **Time Constraints**: The system must be developed and deployed within a predefined timeline.
- **Budget Constraints**: Development must adhere to the allocated budget, balancing cost with functionality.
- **Technological Constraints**: The system must be compatible with existing library infrastructure and accessible across various devices.
- **User Adoption**: The system should be intuitive and easy-to-use to ensure quick adoption by both library staff and patrons.

3 Functional Requirements

3.1 Data Storage and Management

The system will provide secure and organized storage for all types of library data, including a diverse collection of books, digital resources such as e-books and online journals, and comprehensive user information. Data encryption and secure data handling procedures will be implemented to ensure privacy and integrity.

3.2 User Management

Efficient processes for user registration, profile updates, and account management will be implemented. The system will support various user types with role-based access controls, enabling specific functionalities for patrons, librarians, and administrators accordingly.

3.3 Resource Management

The system will feature an all-encompassing suite for managing library resources. This includes intuitive interfaces for cataloging items, streamlined check-out and return workflows, and robust tracking of resource locations and availability.

3.4 Search and Reservation

An advanced search engine within the system will allow users to quickly find resources using various filters and keywords. A reservation system will enable users to reserve available items and join waitlists for borrowed items, with real-time updates on status changes.

3.5 Notifications and Alerts

The system will automate the dispatch of notifications concerning due dates, reservations, and general library updates. Users will have the flexibility to customize their notification preferences to select which alerts they receive and how they receive them (e.g., email, SMS).

3.6 Reporting and Analytics

A comprehensive set of reporting tools will be provided for library staff to generate detailed insights into library usage, resource popularity, and user activities. The analytics module will track key performance indicators and present data trends to support decision-making.

3.7 Accessibility Features

The system will adhere to best practices in accessibility design to ensure it is usable by individuals with a range of disabilities. Features will include screen reader compatibility, alternative text for images, and user interface options for users with limited dexterity.

3.8 Mobile Accessibility

A mobile application or responsive web design will ensure that the system's core functionalities are conveniently accessible on various mobile devices. The design will prioritize ease of navigation, quick access to essential services, and a seamless user experience across devices.

3.9 Integration with External Systems

The system will be designed to integrate smoothly with external databases, educational platforms, and other third-party systems. APIs and data exchange protocols will be established to enhance the library's resource network and service offerings.

3.10 User Role Management

Detailed access control mechanisms will be in place to allow for precise specification of permissions and capabilities for different user roles within the library ecosystem. This will include granular settings to enable or restrict actions such as resource editing, user management, and system configuration.

4 Interface Requirements

4.1 User Interfaces

- **GUI (Graphical User Interface)**: Intuitive and responsive design, accessible to users of varying technical skill levels. Includes dashboard views for both patrons and staff, with easy navigation to different modules such as catalog browsing, account management, and administration.
  - Landing Page : It features a navigation bar, a main content area with book statistics and issued/returned books, and a right side area with sorting options and a usage graph.

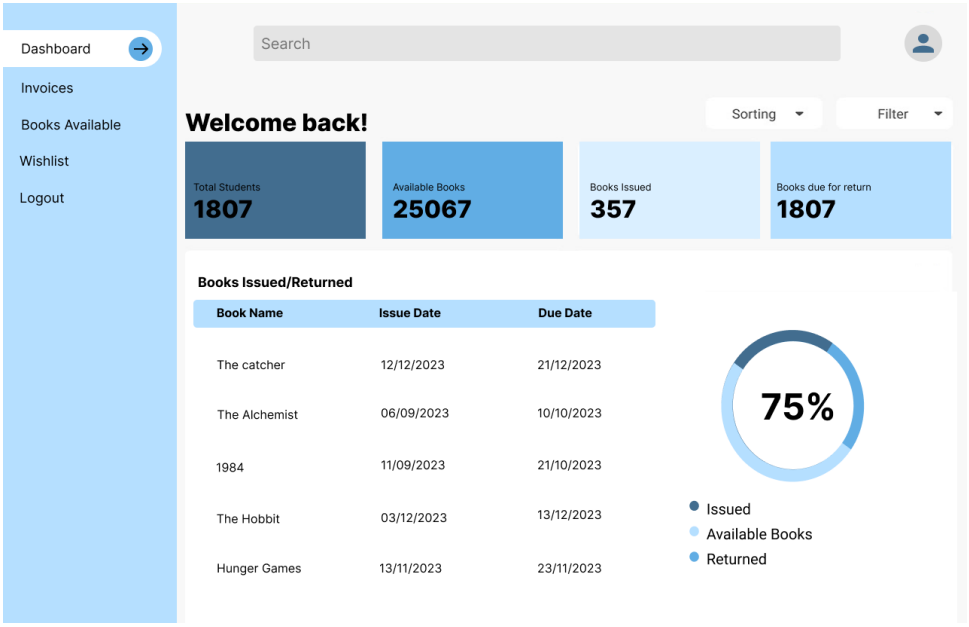

Figure 1: Landing Page

  - **Login Page** : It has fields for "Email or username" and "Password", a "Remember me" checkbox, and a "Log In" button. There's a "Forgot your password?" option for password recovery.

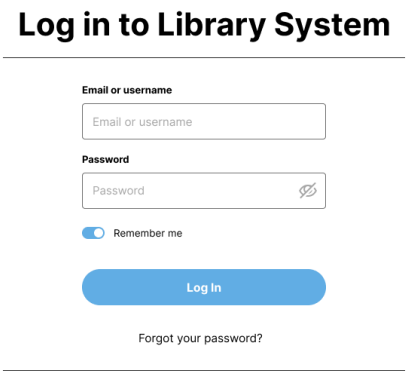

Figure 2: Login Page

– **Catalog Management Page** : Catalog management interface allowing librarians to efficiently add, edit, and delete records for physical and digital resources.

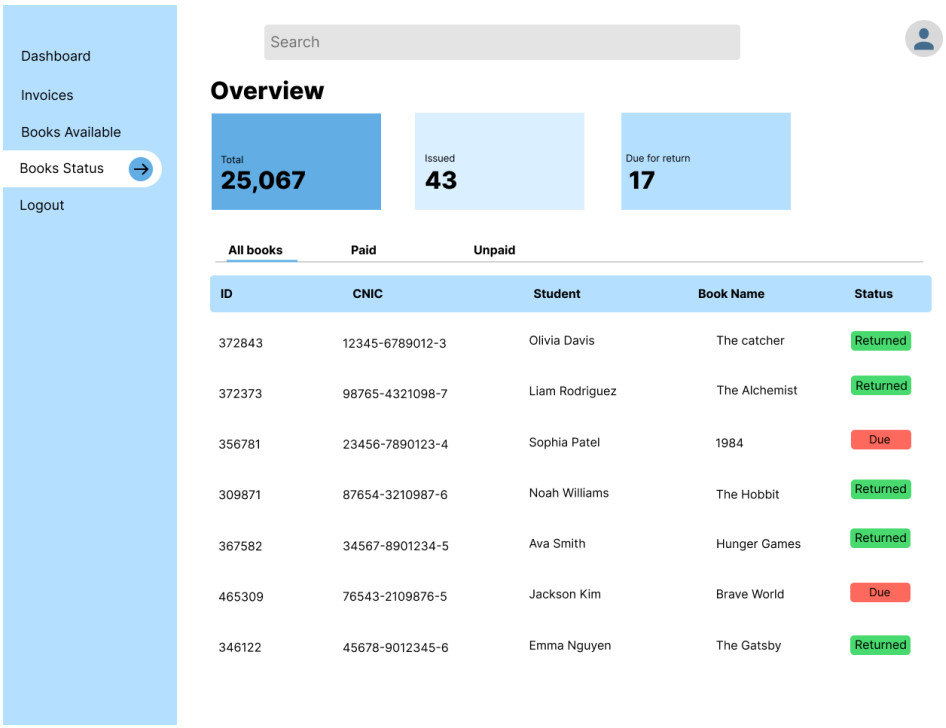

Figure 3: Catalog Management

– **Sign up Page** : Sign Up page has fields for “Email address”, “Username”, “CNIC/CMS ID”, and “Password”. There’s a “Sign Up” button for submitting the form. A link “Already have an account? Log in here” is provided for existing users.

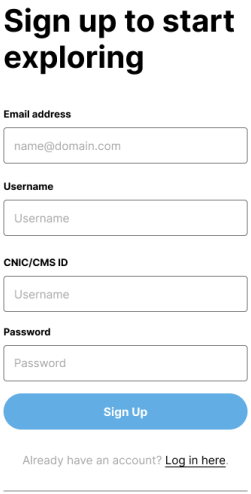

Figure 4: Sign UP

– **Fine Management Page** : Fine Management page displays an overview of total, paid, and unpaid invoices in PKR. There's a detailed list of individual invoices with ID, CNIC, student name, fine amount, and payment status. A navigation bar on the left includes options like "Dashboard", "Invoices", "Books Available", "Books Status", and "Logout"

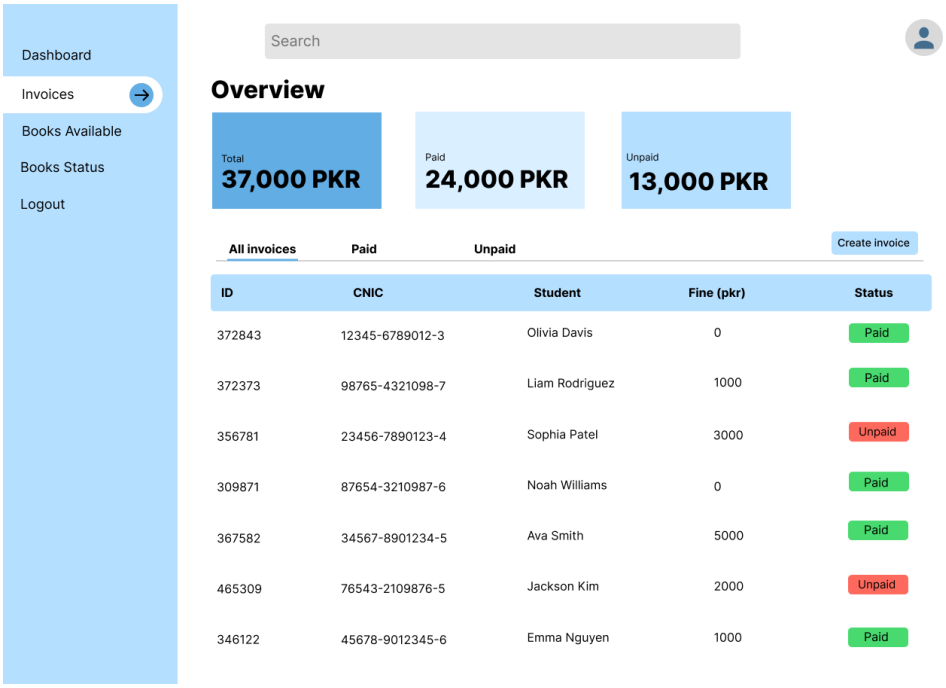

Figure 5: Fine Management

– **Ebooks Page** : Ebook page showcases popular novels under sections like "What's New" and "More of what you like". Each book has a star rating and a "Read Now" button. A navigation bar on the left includes options like "Trending Now", "Top Books", "Discover", "Categories", and "Reading".

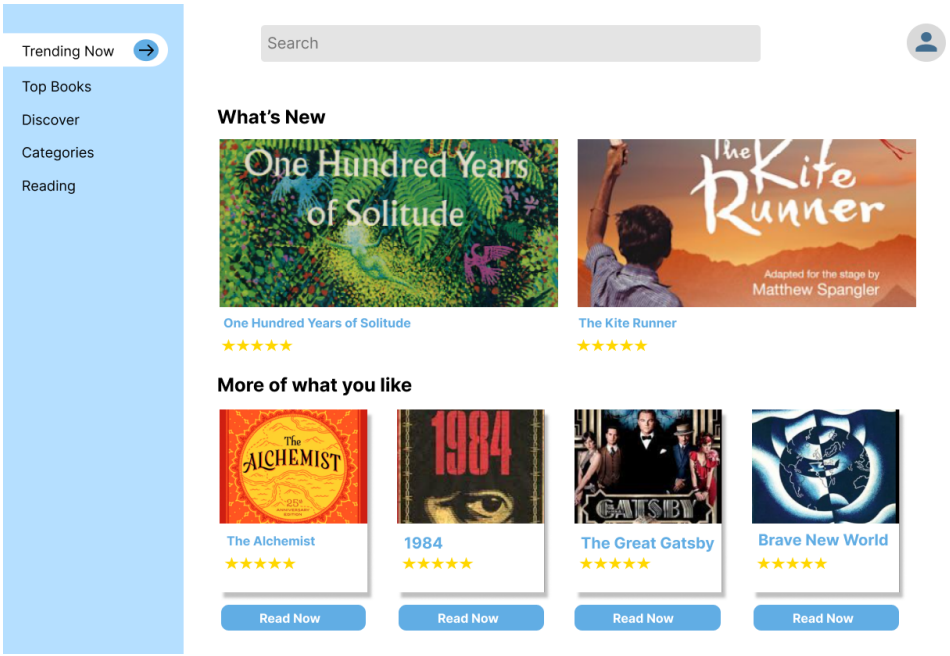

Figure 6: Ebooks

– **User Profile Page** : User Profile displays available books, issued books, and books due for return. There's a borrowing history table with book names, issue dates, and due dates. On the right side, there are notifications about fees due and book return reminders.

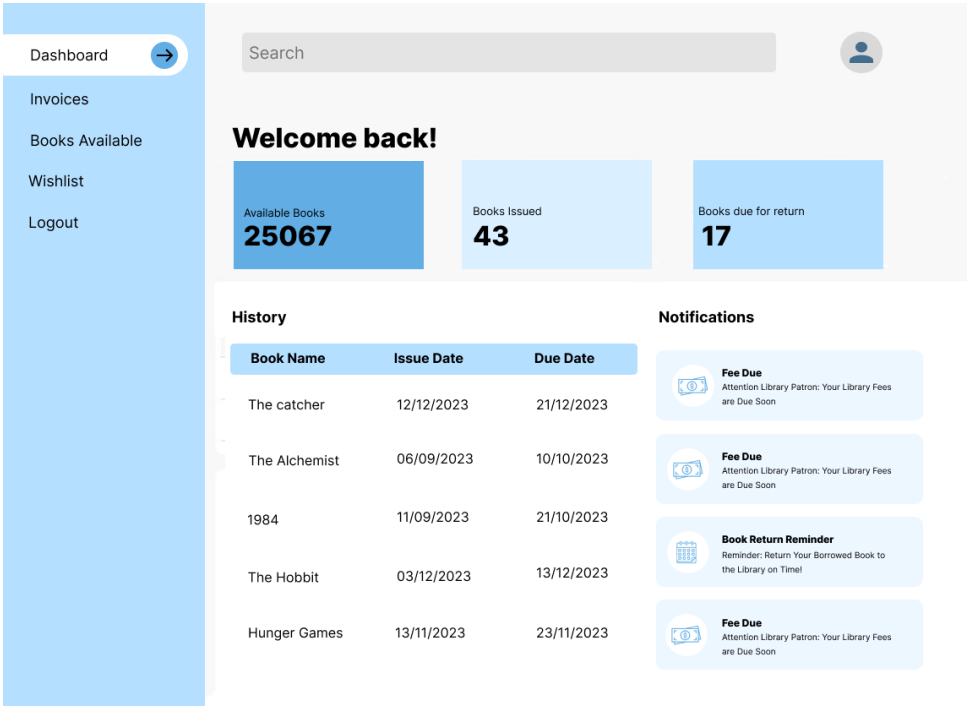

Figure 7: User Profile

– **User Logs Page** : User Logs Page displays student details, number of books borrowed, fines, and payment status. There are eight entries showing different students, their fines, and whether those fines have been paid or are unpaid.

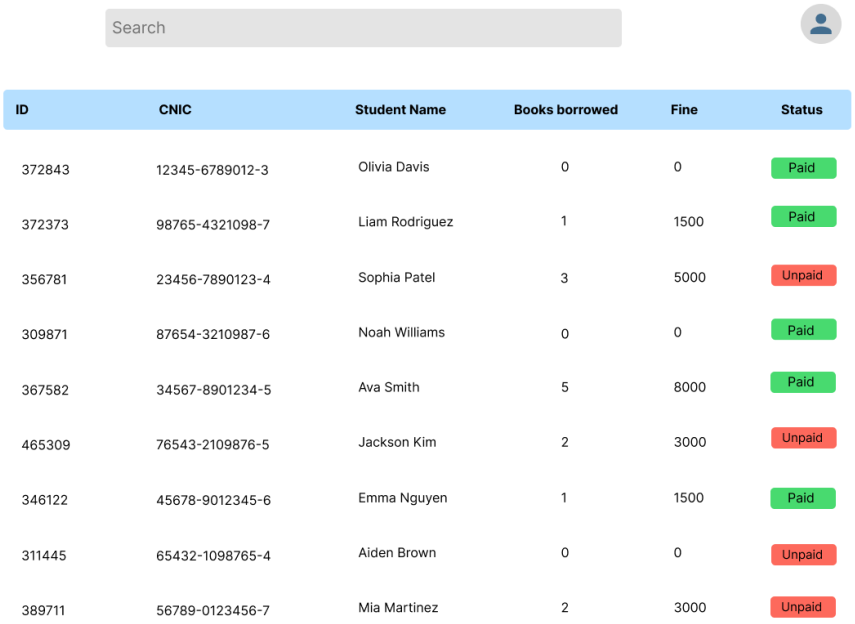

Figure 8: User Logs

- **CLI (Command Line Interface)**: Not applicable for OLMS.
- **API (Application Programming Interface)**: No external APIs in the initial release. Future releases may include APIs for integration with external systems like digital resource providers and other library networks.
- **Diagnostics and ROM**: Integration with Microsoft's troubleshooting and diagnostics tools for system maintenance and problem resolution.

4.2 Hardware Interfaces

- Standard PC and mobile device compatibility.
- Compatibility with standard library hardware like barcode scanners and printers.

4.3 Communications Interfaces

- Secure internet connection for accessing the OLMS online portal.
- Local network capabilities for in-library system access and resource sharing.

4.4 Software Interfaces

- Compatibility with Microsoft Access and Excel for data import/export functions.
- Interface with existing library databases for migration of data to OLMS.

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5 Performance Requirements

- OLMS should be optimized for fast response times, handling multiple simultaneous user requests without significant lag.
- The system should support a large number of concurrent users, scalable to accommodate growing user bases.

- Minimal downtime, with scheduled maintenance during off-peak hours to minimize impact on users.

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6 Non-Functional Requirements

6.1 Security

Our system's security will be its stronghold, establishing a fortress around sensitive user data and library records. By weaving in industry-standard encryption and robust authentication processes, we'll ensure that confidentiality and integrity are never compromised. Like a vigilant guardian, the system will routinely update its defenses with the latest patches, and an intrusion detection system will keep a watchful eye for any signs of digital trespassing.

6.2 Binary Compatibility

In a world where technology changes at breakneck speed, our system will stand compatible with the most widely used operating systems including the ever-popular Windows 10, Windows 11, and the various flavors of MacOS from Catalina to Monterey. We'll make it a priority to ensure that no user is left behind due to compatibility issues, and pledge to swiftly adapt to the new horizons of future OS releases.

6.3 Reliability

Like a reliable old friend, the system will be there when you need it, come rain or shine. Regularly scheduled backups will act as a safety net for data, and our database replication process will be the backbone of our data redundancy strategy. Our hosting services will be chosen for their reliability, with SLAs to back their promise of minimal downtime, ensuring that the system stands resilient even during the busiest hours.

6.4 Maintainability

The system will be designed with a future-proof architecture, modular and ripe for growth, allowing us to weave in new features with the ease of adding threads to a tapestry. Documentation won't just be an afterthought; it will be a comprehensive guidebook, a map detailing every nook and cranny of the system's architecture, and a handbook for the maintainers who will keep the system thriving. This living document will evolve with the system, providing clarity and direction for ongoing and future development efforts.

7 Operational Scenarios

7.1 Initial Item Definitions

- **Description**: Library staff enters new books and other resources into OLMS, including details like title, author, ISBN, and categorization tags.
- **Process**: Utilizing a dedicated form in OLMS, staff inputs the necessary information and assigns each item a unique identifier for tracking.

7.2 Customer Check-out

- **Description**: Patrons check out books either in the library or through an online reservation system.
- **Process**: Patrons select books, either physically or online, and their selections are processed by the system, updating the inventory and patron's borrowing history.

7.3 Database Maintenance

- **Description**: Routine database maintenance tasks are performed to ensure data integrity and system efficiency.
- **Process**: Regular backups, data validation checks, and updates to ensure all records are accurate and up-to-date.

7.4 Overdue Notifications

- **Description**: Automated notification system for overdue items.
- **Process**: OLMS tracks due dates for borrowed items and automatically sends reminders to patrons with overdue items.

7.5 User Registration and Profile Management

- **Description**: New users register for an account and existing users update their profiles.
- **Process**: Patrons fill out an online registration form to create an account or log in to update their profile information, such as contact details and preferences.

7.6 Digital Resource Access

- **Description**: Patrons access digital resources like e-books and online journals.
- **Process**: Patrons log into OLMS, browse the digital library, and access or download available digital resources.

7.7 Inventory Management

- **Description**: Library staff manage and update the library's inventory of resources.
- **Process**: Staff conduct physical inventory checks and update OLMS to reflect current resource statuses, including new acquisitions and retired items.

7.8 Reporting and Analytics

- **Description**: Generating reports for library usage statistics and resource popularity.
- **Process**: Library administrators use OLMS to generate and review reports on various metrics, such as most borrowed books, patron demographics, and peak usage times.

7.9 Event Management

- **Description**: Managing library events like author talks, book clubs, and educational workshops.
- **Process**: Library staff use OLMS to schedule events, manage registrations, send out notifications, and track attendance.

7.10 Feedback and Suggestions

- **Description**: Patrons provide feedback or suggest new titles for the library to acquire.
- **Process**: Patrons use a feedback form in OLMS to submit their suggestions or reviews, which are then reviewed by library staff for potential action.

8 Use Case Models and Diagrams

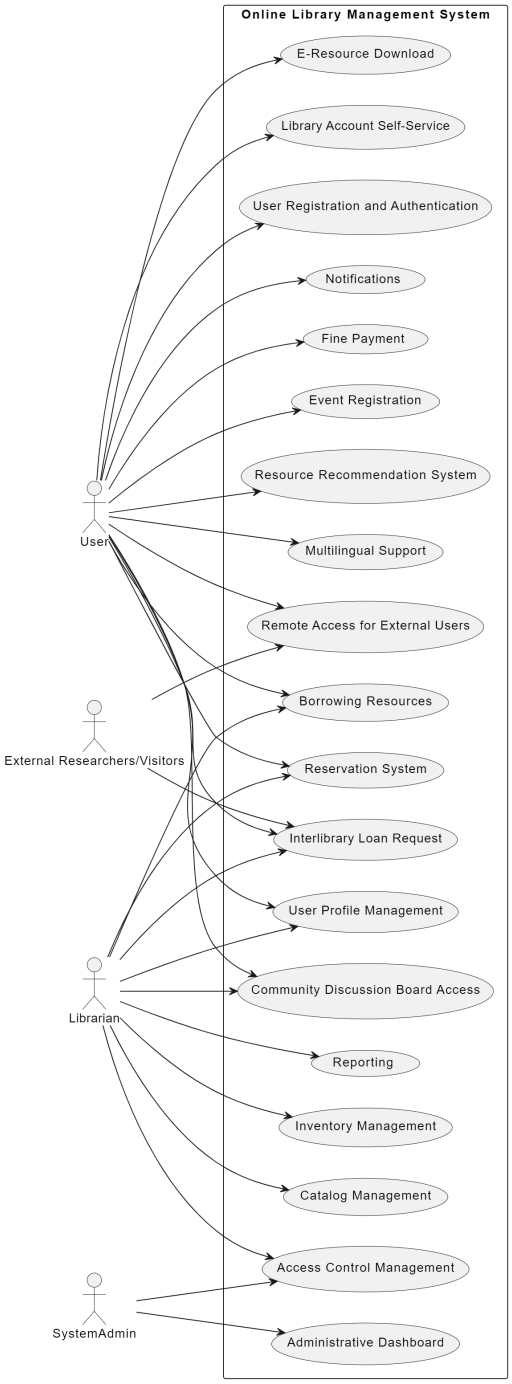


Figure 9: Use Case Diagram for OLMS

Use Case 01: User Registration and Authentication

Heading	Data
Use Case Name	User Registration and Authentication
Actor(s)	Users
Description	Users can create a new account and log in to access the system.
Preconditions	User is not already registered.
Postconditions	User account is created and user can log in.
Main Flow	1. User enters details.2. System validates data.3. System creates account.
Alternative Flows	If details are invalid, prompt user to correct them.
Data	User details, login credentials.
Stimulus	User chooses to register or log in.

Use Case 02: Catalog Management

Heading	Data
Use Case Name	Catalog Management
Actor(s)	Librarian
Description	Librarians can add, update, or delete resource records.
Preconditions	Librarian is authenticated.
Postconditions	Catalog is updated.
Main Flow	1. Librarian logs in.2. Accesses catalog.3. Modifies records.
Alternative Flows	None.
Data	Resource information, librarian credentials.
Stimulus	Librarian decides to modify the catalog.

Use Case 03: Borrowing Resources

Heading	Data
Use Case Name	Borrowing Resources
Actor(s)	Users
Description	Users can borrow physical resources. The system maintains due dates and manages renewals.
Preconditions	User is authenticated and account is in good standing.
Postconditions	Resource is marked as borrowed. User's account is updated with due date.
Main Flow	1. User selects resource.2. System checks availability.3. Process transaction.
Alternative Flows	If resource is not available, offer to reserve it.
Data	Resource details, user account information.
Stimulus	User selects a resource to borrow.

Use Case 04: Reservation System

Heading	Data
Use Case Name	Reservation System
Actor(s)	Users
Description	Users can reserve books that are currently checked out and be notified when they become available.
Preconditions	User is authenticated.
Postconditions	Book is reserved for the user.
Main Flow	1. User selects book.2. System reserves book.3. Notifies when available.
Alternative Flows	If book is available, proceed to borrowing flow.
Data	Book details, reservation information.
Stimulus	User chooses to reserve a checked-out book.

Use Case 05: User Profile Management

Heading	Data
Use Case Name	User Profile Management
Actor(s)	Users
Description	Users can view their borrowing history, update personal information, and manage account preferences.
Preconditions	User is authenticated.
Postconditions	User profile is updated.
Main Flow	1. User accesses profile.2. Updates information.3. Saves changes.
Alternative Flows	None.
Data	User personal information, borrowing history.
Stimulus	User opts to view or update their profile.

Use Case 06: Administrative Dashboard

Heading	Data
Use Case Name	Administrative Dashboard
Actor(s)	System Administrators
Description	Admins manage user accounts, monitor system performance, and maintain data security.
Preconditions	Admin is authenticated.
Postconditions	System is managed and monitored.
Main Flow	1. Admin logs in.2. Accesses dashboard.3. Performs administrative tasks.
Alternative Flows	None.
Data	User accounts, system status, security logs.
Stimulus	Admin logs in to perform maintenance.

Use Case 07: Notifications

Heading	Data
Use Case Name	Notifications
Actor(s)	System
Description	System sends automated notifications for due dates, reserved items, and system updates.
Preconditions	Appropriate trigger event occurs.
Postconditions	User receives notification.
Main Flow	1. Event occurs.2. System generates notification.3. User is notified.
Alternative Flows	None.
Data	Notification content, user contact details.
Stimulus	System event triggers a notification.

Use Case 08: Reporting

Heading	Data
Use Case Name	Reporting
Actor(s)	Librarian
Description	Generate reports on resource usage and user statistics.
Preconditions	Librarian is authenticated.
Postconditions	Reports are generated and can be reviewed.
Main Flow	1. Librarian requests report.2. System generates report.
Alternative Flows	None.
Data	Usage data, librarian credentials.
Stimulus	Librarian requests a report.

Use Case 09: Digital Resources Access

Heading	Data
Use Case Name	Digital Resources Access
Actor(s)	Users
Description	Users can access digital resources such as e-books, e-journals, and research papers.
Preconditions	User is authenticated.
Postconditions	User accesses digital resources.
Main Flow	1. User searches for digital resources.2. Accesses selected resources.
Alternative Flows	If access is denied, offer alternative resources or prompt for necessary permissions.
Data	Digital resource files, access rights.
Stimulus	User selects a digital resource to access.

Use Case 10: Fine Payment

Heading	Data
Use Case Name	Fine Payment
Actor(s)	Users
Description	Users can view and pay overdue fines through the system.
Preconditions	User is authenticated and has outstanding fines.
Postconditions	Fines are paid and user's account is updated.
Main Flow	1. User logs in.2. Views fines.3. Makes payment.4. Receives confirmation.
Alternative Flows	If payment fails, provide options to retry or choose a different payment method.
Data	Fine amount, payment details.
Stimulus	User chooses to view or pay fines.

Use Case 11: Interlibrary Loan Request

Heading	Data
Use Case Name	Interlibrary Loan Request
Actor(s)	Users
Description	Users can request resources from other libraries if they are not available in the local library.
Preconditions	User is authenticated.
Postconditions	Request is placed and user is notified upon resource arrival.
Main Flow	1. User requests resource.2. System places interlibrary loan request.3. User is notified on arrival.
Alternative Flows	If the resource is unavailable, suggest similar resources.
Data	Loan request details, user account information.
Stimulus	User chooses to request an interlibrary loan.

Use Case 12: Access Control Management

Heading	Data
Use Case Name	Access Control Management
Actor(s)	System Administrators
Description	Admins can manage access controls for different user roles within the system, including permissions for users, staff, and guests.
Preconditions	Admin is authenticated.
Postconditions	Access levels are appropriately assigned and updated.
Main Flow	1. Admin logs in.2. Modifies access controls.3. Updates system settings.
Alternative Flows	Audit changes and revert if necessary.
Data	User roles, access levels.
Stimulus	Admin needs to update access controls.

Use Case 13: Resource Recommendation System

Heading	Data
Use Case Name	Resource Recommendation System
Actor(s)	Users
Description	The system provides personalized resource recommendations based on user preferences and borrowing history.
Preconditions	User is authenticated and has borrowing history.
Postconditions	User receives personalized recommendations.
Main Flow	1. User logs in.2. System analyzes history.3. System displays recommendations.
Alternative Flows	Refine recommendations based on user feedback.
Data	Borrowing history, user preferences.
Stimulus	User seeks resource recommendations.

Use Case 14: Remote Access for External Users

Heading	Data
Use Case Name	Remote Access for External Users
Actor(s)	Visitors
Description	External users can access a subset of the library's digital resources remotely.
Preconditions	User has been granted remote access privileges.
Postconditions	External user accesses digital resources.
Main Flow	1. User requests remote access.2. System grants permission.3. User accesses resources.
Alternative Flows	If access is denied, explain requirements for remote access privileges.
Data	External user details, resource access permissions.
Stimulus	External user requests remote access.

Use Case 15: Inventory Management

Heading	Data
Use Case Name	Inventory Management
Actor(s)	Librarian
Description	Librarians can manage and update inventory records for all library resources, including tracking and audits.
Preconditions	Librarian is authenticated.
Postconditions	Inventory records are accurate and up to date.
Main Flow	1. Librarian logs in.2. Accesses inventory module.3. Updates records.
Alternative Flows	Conduct periodic audits and reconcile discrepancies.
Data	Inventory data, audit logs.
Stimulus	Librarian performs inventory management.

Use Case 16: Multilingual Support

Heading	Data
Use Case Name	Multilingual Support
Actor(s)	All Users
Description	Users can interact with the system in multiple languages.
Preconditions	User selects preferred language.
Postconditions	System interfaces in the selected language.
Main Flow	1. User chooses language.2. System translates interface.3. User navigates system.
Alternative Flows	Provide language assistance if automatic translation is not sufficient.
Data	Language preferences, system translation capabilities.
Stimulus	User chooses a different language setting.

Use Case 17: E-Resource Download

Heading	Data
Use Case Name	E-Resource Download
Actor(s)	Users
Description	Users can download e-books, papers, and other digital media for offline access.
Preconditions	User is authenticated and has appropriate permissions.
Postconditions	Digital resources are downloaded for offline use.
Main Flow	1. User selects e-resource.2. Chooses download option.3. Downloads resource.
Alternative Flows	Offer alternative formats if the primary download fails.
Data	E-resource files, user download permissions.
Stimulus	User wants to download digital resources.

Use Case 18: Library Account Self-Service

Heading	Data
Use Case Name	Library Account Self-Service
Actor(s)	Users
Description	Users can manage their library account details, including contact information and preferences, without librarian assistance.
Preconditions	User is authenticated.
Postconditions	User account details are updated.
Main Flow	1. User accesses account settings.2. Updates details.3. Saves changes.
Alternative Flows	Provide assistance if the user encounters issues updating their information.
Data	User account details.
Stimulus	User needs to update their account details.

9 Sequence Diagrams

- User authentication : The process involving a User, System, and Database. The User initiates the process by entering details and logging in. The System validates the data, creates an account, and verifies the credentials. The Database interacts with the System during these processes. The outcome of this sequence is an Authentication result. This flowchart provides a clear visual representation of the steps involved in a user authentication process

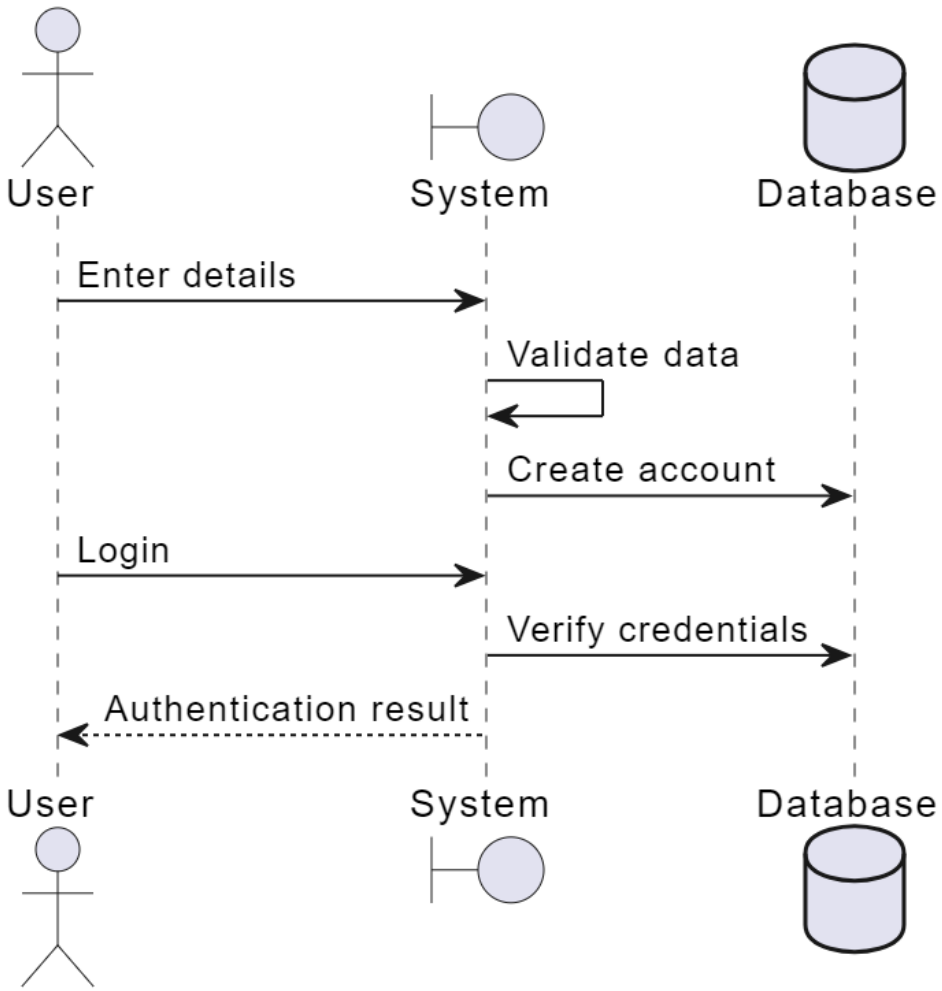


Figure 10: userAuthentication

- Resource Interaction : The process involves a librarian modifying the catalog, which includes accessing, viewing, and updating records. Further process involves a user borrowing or reserving a resource, which includes logging in, selecting a resource, checking its availability, and proceeding with the transaction or reserving the resource if it's not available.

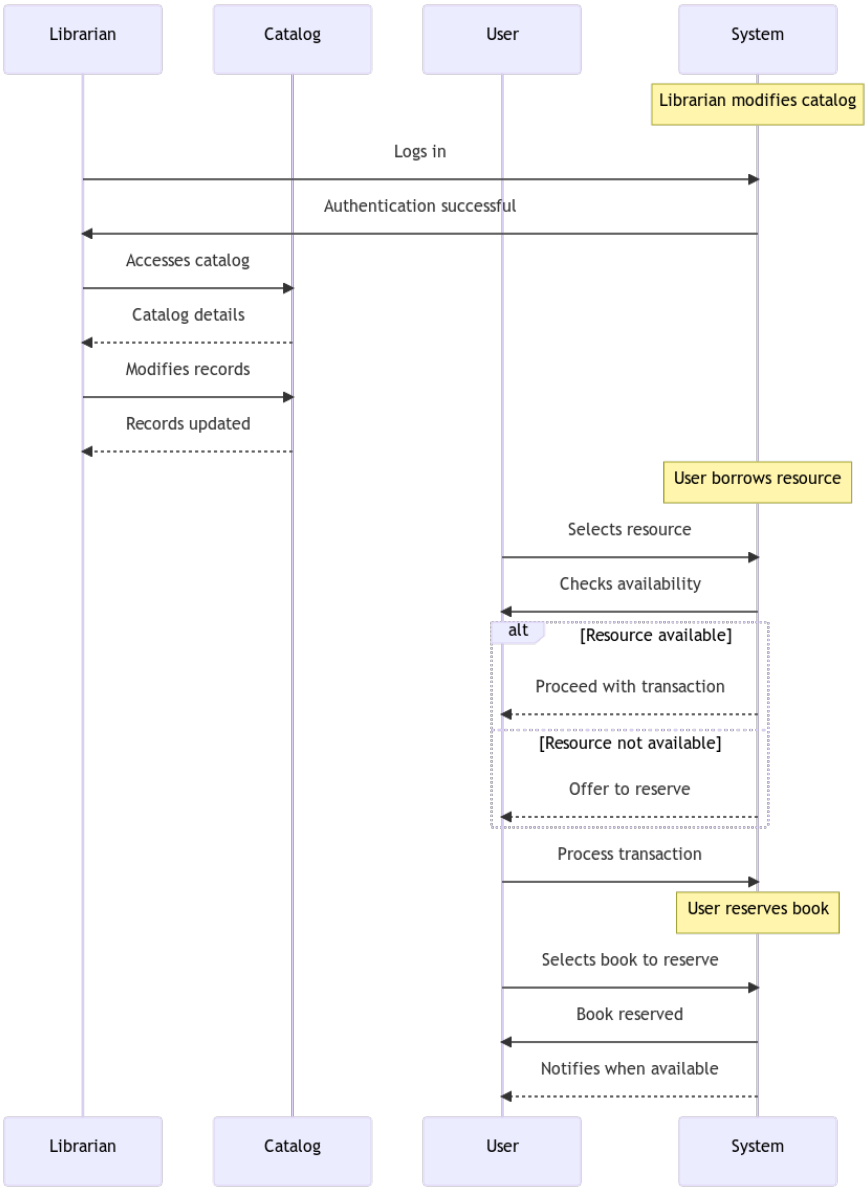


Figure 11: Resource Interaction

- Recommendation : The User logs in, and the system accesses the User's borrowing history. Based on this history, the system displays recommendations to the User. The User can provide feedback on these recommendations, which the system uses to refine future recommendations. This flowchart provides a clear visual representation of the steps involved in a resource recommendation process.

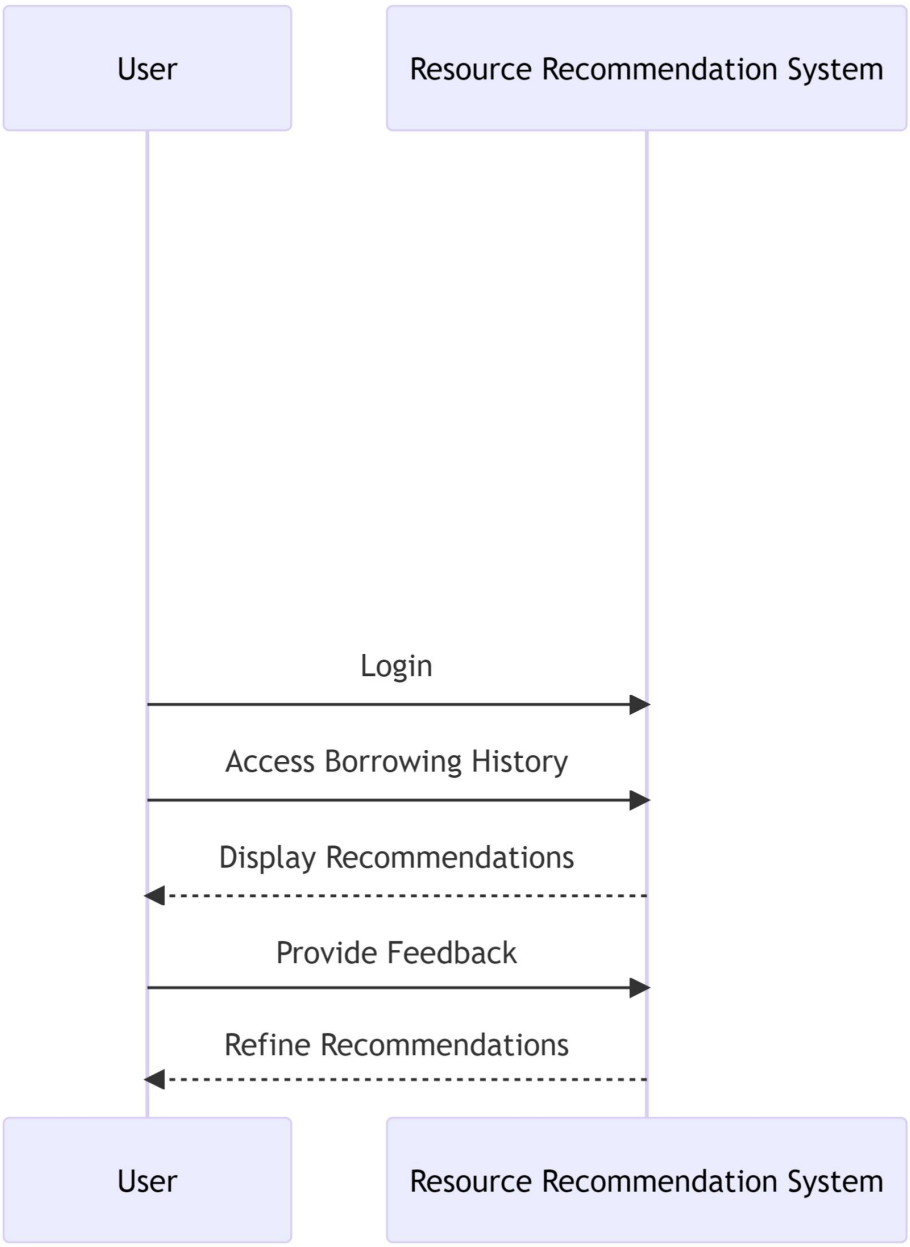


Figure 12: Recommendation

- Report generation : The Librarian logs into the Library System and requests a report. The Library System interacts with the Report Generator to generate the requested report. Once the report is generated and returned to the Library System, the Librarian is notified that the reports are available. This diagram provides a clear visual representation of the steps involved in a report generation process in a library system.

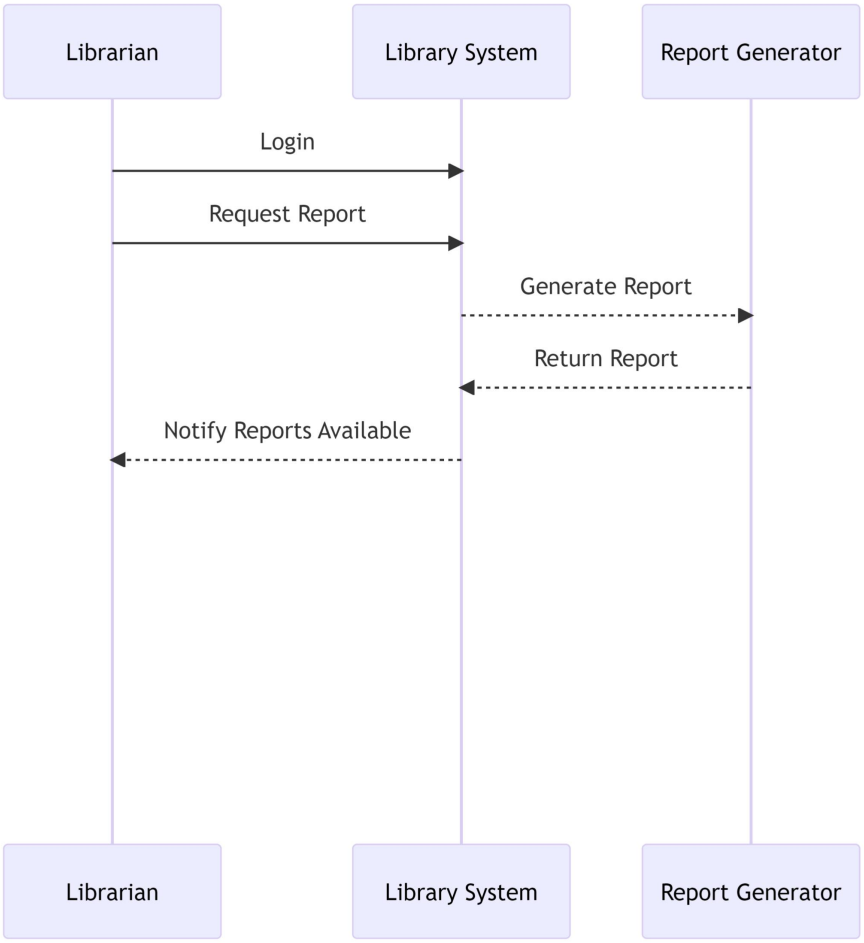


Figure 13: reporting

- Library Operations : The User logs into the Library System, searches for a resource, and requests it. The Library System notifies the Librarian of an interlibrary loan request. The Librarian logs in, accesses the inventory module, updates inventory records, and confirms that the records are updated. This sequence represents a specific order of operations among these entities.

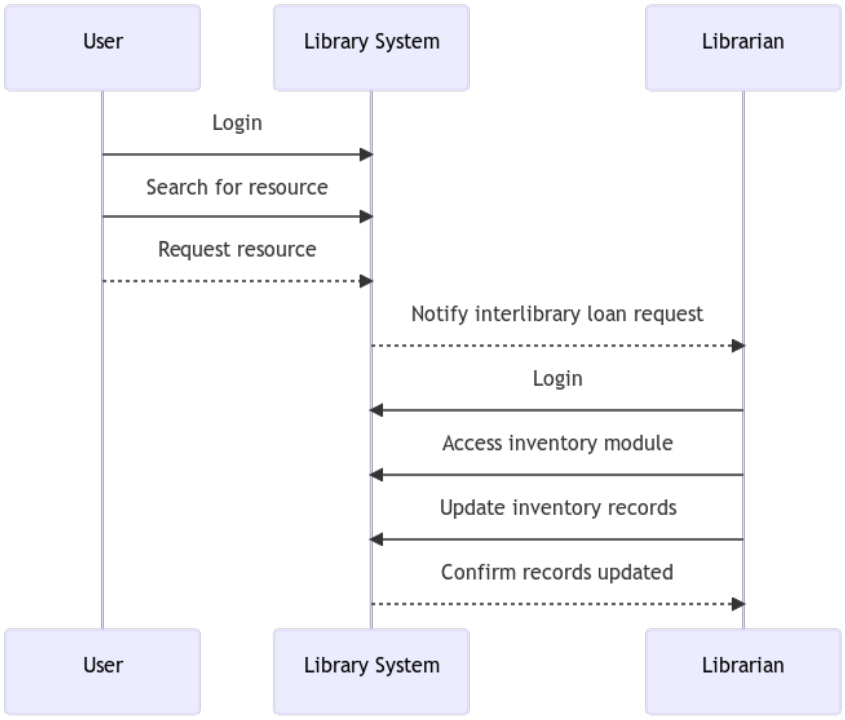


Figure 14: Library Operations

- Admin and Monitoring : TThe Admin logs into the system, accesses the dashboard, and performs administrative tasks including providing system status, security logs, and user accounts. The System accesses data from the Database as part of its operations. A loop indicates repeated actions involving the Monitoring System where system performance is viewed and user accounts are reviewed. This flowchart provides a clear visual representation of the steps involved in system administration and monitoring.

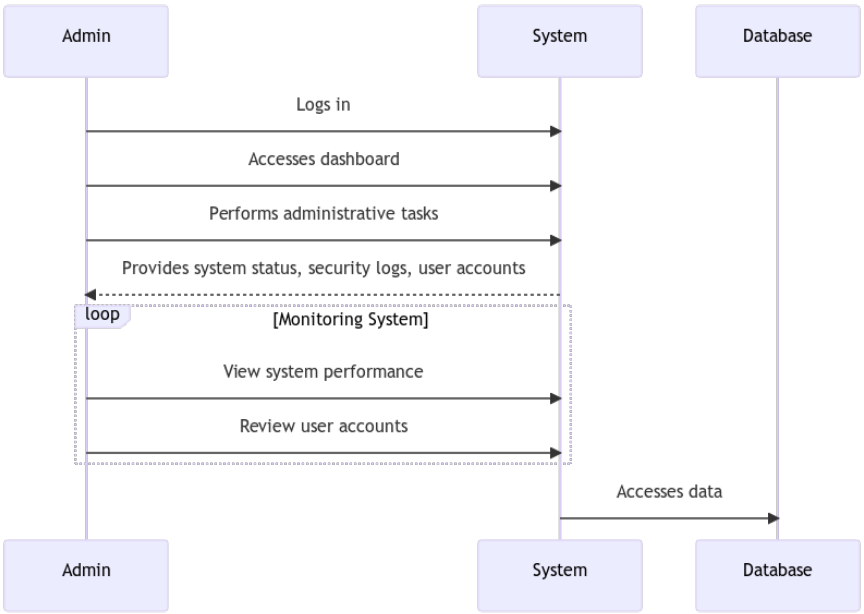


Figure 15: Admin and Monitoring

10 Updated Budget

Expense Category	Estimated Cost (PKR)
Development Team Salaries	500,000
Software Licensing	100,000
Hardware Procurement	200,000
Testing and Quality Assurance	150,000
Maintenance and Support	80,000
Miscellaneous Expenses	20,000
Total Estimated Budget	1,050,000

Table 1: Budget Plan for OLMS

11 Class Diagram

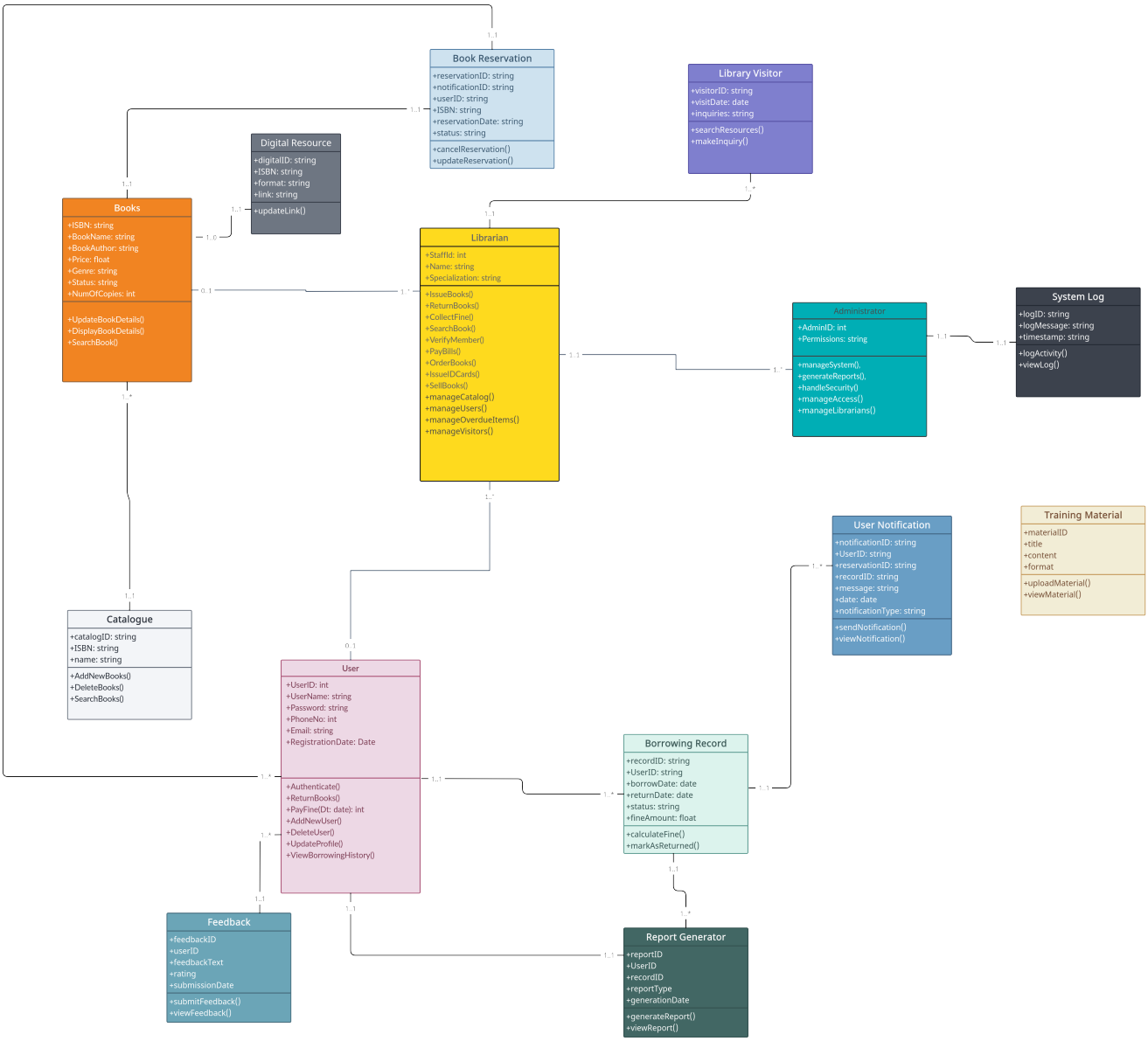
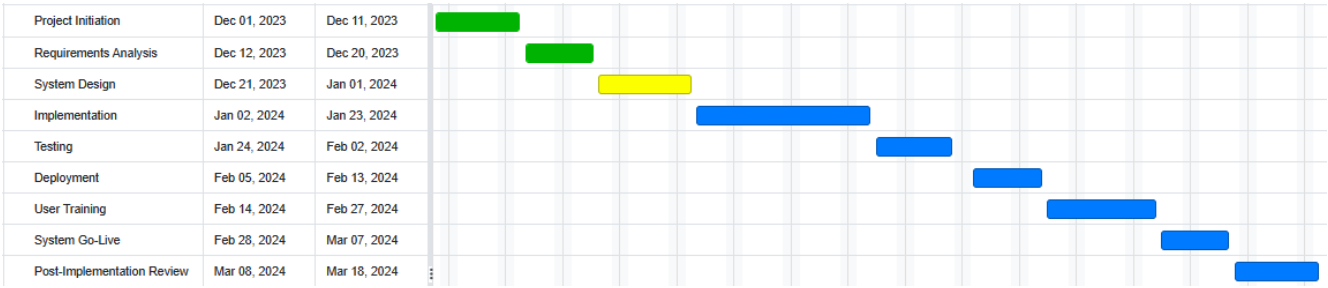


Figure 16: Class daigram

- **Book Reservation**: Represents reservations with attributes like reservationID and status. It's associated with the Library Visitor class.
- **Digital Resource**: Seems to be a subclass of Books, indicating that digital resources are a special type of book.
- **Librarian**: A class with various operations to manage books, catalogs, and users, linked to the Catalogue class.
- **User**: Likely represents a registered user of the library system with operations to check out books and update profile information.
- **Feedback** and **Report Generator**: Classes that likely handle user feedback and system reports, respectively.
- **Borrowing Record**: Tracks information about borrowings, with operations to calculate fines and mark as returned.
- **User Notification**: Manages sending notifications to users.
- **Administrator**: A special user with extensive system management capabilities.
- **Training Material**: Appears to be related to materials for training purposes, possibly for new users or staff.
- **Catalogue**: Represents the collection of books and is associated with Books and Librarian classes.
- **System Log**: A class for logging system events, which an Administrator can manage.

  Each class is designed to encapsulate data and operations pertaining to one aspect of the library system, and the relationships indicate how these aspects interact with each other. For instance, a Librarian can manage Catalogues, and Users can have Borrowing Records.

12 Updated Schedule



Project Initiation	Dec 01, 2023	Dec 11, 2023
Requirements Analysis	Dec 12, 2023	Dec 20, 2023
System Design	Dec 21, 2023	Jan 01, 2024
Implementation	Jan 02, 2024	Jan 23, 2024
Testing	Jan 24, 2024	Feb 02, 2024
Deployment	Feb 05, 2024	Feb 13, 2024
User Training	Feb 14, 2024	Feb 27, 2024
System Go-Live	Feb 28, 2024	Mar 07, 2024
Post-Implementation Review	Mar 08, 2024	Mar 18, 2024

Figure 17: Gantt Chart

- **Color Scheme**
  1. Green: Completed
  2. Yellow: Current
  3. Blue: Remaining

13 Appendices

13.1 Librarian Interview Summary 1

- **How many years of experience do you have in library management?**

  Malik Tanveer has been running the Punjab Library for 8 years.

- **Can you describe the current library management system and rate its efficiency on a scale of 1 to 10?**

  The library uses a manual system for keeping track of books, members, and transactions, which Malik rates as 4 out of 10 for efficiency.

- **What major challenges or difficulties do you face in managing the library, and are there specific time-consuming or error-prone tasks?**

  It's hard to find books quickly, renewing memberships takes time, and it's easy to make errors with overdue fines. Record-keeping is a heavy task and mistakes are common when it's busy.

- **How do library users currently search for and borrow books, and what issues or concerns do they commonly raise?**

  People find books by looking through the shelves or asking the staff, which can be slow. They often worry about not remembering when to return books.

- **How is the record-keeping process managed in terms of book loans, returns, and overdue fines, and are there difficulties in maintaining accurate records?**

  Everything is written down by hand, which can lead to mistakes, especially when the library is busy.

- **How accessible is the current library system to users, and are there any restrictions on user access?**

  You have to be at the library to get books because there's no online catalog, which means you can only access books when the library is open.

- **Is formal training provided to library staff regarding the current system, and how is user support handled?**

  The staff learn as they go, by doing the job. They help users in person and solve problems as they come up.

- **What improvements or features would you like to see in an ideal, automated library management system?**

  Malik wants a system that manages the catalog automatically, keeps track of when books are due, and lets users access it online. He wants something that will make things more efficient and reduce the need for manual work.

- **How do you feel about transitioning from a manual to an automated library management system, and are there specific concerns or expectations?**

  He's excited about using an automated system to be more efficient but worries about how the staff will adapt and if there will be any problems during the change.

- **In your opinion, how would an automated system impact the overall efficiency of library operations?**

  He's not very happy with the current system, giving it a 2 out of 5. But he believes automation will help and would like a cloud-based system.

- **How do you currently track the utilization and condition of library resources?**

  They check the books and their condition by looking at the shelves, which isn't always accurate because books can be misplaced.

- **How do you collect feedback from library users about their experience with the current system?**

  Users give feedback through suggestion boxes and surveys. They're unhappy with how long it takes to find books and want an online catalog.

- **How is sensitive user data handled in the current system, considering privacy and data security?**

  They keep sensitive information locked up and only certain staff can see it. There's a worry that the physical records could be lost or damaged.

- **How does the current manual system impact the library's budget, and do you believe transitioning to an automated system would lead to cost savings?**

  They spend money on paper, ink, and labor. Malik thinks an automated system could save money in the long run.

- **How is data backup and recovery currently handled, and do you see the need for robust features in a new system?**

  They make photocopies for backups, but it's hard to recover anything if it's lost or damaged. A new system should have a good way to back up and recover data.

- **How is the current administration of overdue items, fines, and fees managed, and are there challenges in ensuring timely resource returns?**

  They track late returns by hand and collect fines, which can lead to disagreements and delays.

- **How do you currently assess and maintain the physical condition of resources, and are there concerns about wear and tear that an automated system could address?**

  They check the books by looking at them and fix them when needed. A new system could keep a better record of their condition.

- **How valuable do you find detailed reports on resource use and user statistics for library decision-making, and are there specific types of reports you believe would significantly benefit operations?**

  Malik values detailed reports on how the library is used to make better decisions. Reports on what types of books are popular and who uses the library would be very helpful.

- **How do you envision the transition from the current manual system to a new, automated system, and are there specific steps or considerations that should be prioritized?**

  Malik imagines starting with training staff and putting the catalog online. He wants to make sure users are supported during the change.

- **How important is mobile accessibility for library users in accessing catalog information and services, and would the development of a mobile application be beneficial?**

  It's important for users to be able to look up the catalog on their phones. A mobile app would make access better.

- **How would a recommendation system based on user preferences impact resource discovery in the library, and can you foresee any challenges or benefits associated with its implementation?**

  A system that suggests books based on what users like could be good, but it needs to work well.

- **Summary** Malik doesn't think this system handle things very fast, rating it 2 out of 5. But he believes a reservation system and reports on what books are popular and how people borrow would help. Malik gives the current reservation system a 3 out of 5. He thinks automated reminders would be useful and prefers to make changes gradually.

13.2 Librarian Interview Summary 2

- **How many years of experience do you have in library management?**

  Mian Muhammad Shahbaz has been in an assistant librarian of NUST Central City Library for 5 years.

- **Can you describe the current library management system and rate its efficiency on a scale of 1 to 10?**

  They use a mix of computer and manual work, with Shahbaz giving it a 6 out of 10 for how well it works.

- **What major challenges or difficulties do you face in managing the library, and are there specific time-consuming or error-prone tasks?**

  Problems include not reminding users when books are overdue, which could lead to books being taken, and no way to check who's using an account, which is a security worry.

- **How do library users currently search for and borrow books, and what issues or concerns do they commonly raise?**

  People can look up books online but have to go to the library to actually borrow or return them. There's no app, which makes things less convenient.

- **How is the record-keeping process managed in terms of returns, and overdue fines, and are there difficulties in maintaining accurate records?**

  They do use a computer to keep track, but they still have to make sure things are up to date by hand, especially when books are overdue.

- **What improvements or features would you like to see in an ideal, automated library management system?**

  Shahbaz wants to start sending out reminders for overdue books and set up a system to check user accounts. She also hopes to make an easy-to-use app for the library.

- **How do you feel about transitioning from a semi-automatic to an automated library management system, and are there specific concerns or expectations?**

  He's looking forward to using a more computerized system to fix current problems but knows they'll need good training and to make sure the change is smooth for users.

- **How do you currently track the utilization and condition of library resources?**

  They keep an eye on books and their condition using the computer, with occasional shelf checks. Sometimes what the computer says doesn't match what's actually there.

- **How do you collect feedback from library users about their experience with the current system?**

  People drop suggestions in a box or fill out surveys sometimes. They're not happy about not getting reminders for overdue books and want more user-friendly options.

- **How is sensitive user data handled in the current system, considering privacy and data security?**

  Important information about users is kept in the computer with limited access, but they need to make it safer.

- **How does the current manual system impact the library's budget, and do you believe transitioning to an automated system would lead to cost savings?**

  The manual part of their system costs money for still extra labour and things like papers etc. . They hope a more computerized system will save money over time.

- **How does the user account system in this current semi-automated library system works**

  They keep user information in the computer, but you can't really change how it works to suit different people. Only an account can be made and user can update his/her account information by visiting librarian. User itself has no option or app to edit details. Shahbaz thinks having more options for users would make things better.

- **Are there specific challenges in terms of accessibility for users with disabilities, and how could an automated system address these concerns?**

  It's hard for people with disabilities to use the library. They hope a computer system could help by including special features.

- **How is data backup and recovery currently handled, and do you see the need for robust features in a new system?**

  They save copies of the computer records sometimes, but getting them back after a problem is hard work. They think a new system should be better at saving and restoring information.

- **How is the current administration of overdue items, fines, and fees managed, and are there challenges in ensuring timely resource returns?**

  Although book issuing and return date are adding on computer in user record, librarians still have to manually keep track of when books are due and fines. This can lead to arguments and delays in getting fines paid.

- **How do you currently assess and maintain the physical condition of resources, and are there concerns about wear and tear that an automated system could address?**

  They just look at the books to see what condition they're in and fix them when needed. A computer could help keep better track of how the books are doing especially when searching every book is efficient.

- **How valuable do you find detailed reports on resource use and user statistics for library decision-making, and are there specific types of reports you believe would significantly benefit operations?**

  Shahbaz says they do not have this feature in currently computerized system. They think it's really helpful to have detailed reports (graphs and charts) on how the library is used. They'd like to know what types of books are popular and who's using the library.

- **How do you envision the transition from the current manual system to a new, automated system, and are there specific steps or considerations that should be prioritized?**

  They want to start by teaching the staff using good and proper training material and making the computer system better. They want to make sure they teach users too.

- **Do you think adding E-books features in app is a good idea and is beneficial?**

  They think adding digital books would give people more choices and will reduce load on library for books. Also, it is difficult for some people to visit libraries so they will still have access to books in the form of pdf.

- **How important is mobile accessibility for library users in accessing catalog information and services, and would the development of a mobile application be beneficial?**

  They know it's important for people to be able to look up the library on their phones with other data like borrowed history and profile management also. They think an app would make things better.

- **How would a recommendation system based on user preferences impact resource discovery in the library, and can you foresee any challenges or benefits associated with its implementation?**

  They think a system that suggests books to people, according to their taste and courses, will be good and will be beneficial for librarians as most of their work is done when the user knows which book he/she wants.

- **Do you think that the new system must be integrated with any of the current systems present?**

  They don't work with any learning systems right now; they're on their own. They think connecting with NUST LMS and Qalam could make things better for students and teachers.

- **Summary**

  Shahbaz is kind of okay with how things are, rating it 3 out of 5. She does think a more computerized system will help and likes the idea of a system that's based on the internet. Shahbaz thinks they're just okay at dealing with things quickly, giving it a 2 out of 5. She believes a better borrowing system and reminders would be good, which will also help in a good book recovery rate and better tracking of users.

13.3 Definitions, Acronyms, Abbreviations

Term	Definition
OLMS	Online Library Management System
GUI	Graphical User Interface
API	Application Programming Interface
ISBN	International Standard Book Number