

Book Bank

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Problem Statement:

The Book Bank Management System aims to address inefficiencies in managing book lending and borrowing processes within educational institutions and libraries. Currently, these processes are often carried out manually, leading to human errors, difficulty in tracking overdue books, and time-consuming tasks like calculating fines. Inventory management is inefficient as real-time book availability is not easily accessible, making it hard for users to know which books are available. Additionally, managing member records, borrowing histories, and ensuring adherence to borrowing rules is cumbersome, with no automated system to send notifications or reminders. Searching for books manually also slows down the process, and there is a lack of automation in generating reports or analytics that can help administrators understand borrowing trends.

To solve these issues, the Book Bank Management System will automate book loans, returns, member management, and fine calculations. It will provide real-time updates on book availability, automate overdue reminders, and generate detailed reports. This digital solution will feature a user-friendly interface for both administrators and members, offering enhanced searchability and accessibility. By implementing such a system, institutions will eliminate manual errors, streamline operations, and significantly improve the efficiency of their book lending services.

Software Requirements Specification

For

Book Bank

Version3.0

Prepared by:

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19-10-2024

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Revision History

Name	Date	Reason for changes	Version
Week-1	11-09-2024	SRS creation (Introduction)	1.0
Week-2	18-09-2024	SRS documentation – Use Case, Class Diagram	2.0
Week-3	24-09-2024	Sequence Diagram, component Diagram	3.0

1.Introduction

The Book Bank Management System is a comprehensive software application designed to streamline the processes involved in managing a community book bank. This system aims to facilitate the donation, borrowing, and tracking of books while ensuring an efficient management process for both users and librarians.

1.1 Purpose

The primary purpose of the Book Bank Management System is to provide a user-friendly platform where users can easily search for, borrow, and return books, as well as manage their borrowing history and fines. For librarians, the system offers tools to efficiently manage book inventory, track donations, and generate reports, thereby improving the overall functionality of the book bank.

1.2 Document Conventions:

Heading:

Font-Size: 16, Font-Style: Bold, Font: Times New Roman

Subheading:

Font-Size: 14, Font-Style: Bold, Font: Times New Roman

Content:

Font-Size: 12, Font: Times New Roman.

1.3 Intended Audience and Reading Suggestions:

This document serves as a prototype for the Recruitment System, and it offers valuable insights to a diverse range of stakeholders. Developers can utilize it as a blueprint to create and implement the system effectively. Companies can utilize this system to sort applicants based on their qualifications and company requirements, speeding the process and efficiency while maintaining a structured approach to workforce planning.

1.4 Product Scope:

The Book Bank Management System is designed to provide an efficient platform for managing community book bank operations. The system will include user management features such as registration and profile management for members and librarians, with role-based access control. It will offer comprehensive book management capabilities, allowing users to search for books, while librarians can add or remove books and track availability. The borrowing and returning processes will enable members to check out and return books, view their borrowing history, and calculate fines for overdue items. Additionally, the system will support reservation and waitlist management, notifying users when books become available. Reporting features will allow librarians to generate statistics on borrowing and fine collections, and notifications will keep both members and librarians informed of important updates. However, the initial project scope excludes external integrations with third-party systems, the development of a mobile application, specific payment gateway integrations, advanced analytics, and offline access. Future enhancements may include mobile access, improved reporting capabilities, and broader community engagement features, ensuring the system remains adaptable to user needs and technological advancements.

1.5 References:

- <https://www.scribd.com/document/453754323/2-Book-Bank-Management-System-pdf>
- <https://www.studocu.com/in/document/anna-university/software-engineering/book-bank-management-system/45422332?origin=organic-success-document-viewer-cta>

2 Overall Description:

2.1 Product Perspective:

The Book Bank Management System is an innovative web-based application designed to streamline the management of a community book bank, enhancing both member and librarian experiences. It features user management capabilities that allow seamless registration and profile management, ensuring appropriate access for different roles. The system enables librarians to efficiently manage the book inventory by adding new titles, removing outdated ones, and tracking total and available copies, while also supporting donations from users. Members can easily borrow and return books, with automatic fine calculations for overdue items, and can view their borrowing history for better transparency. The reservation and waitlist management functionalities allow members to reserve books currently checked out and receive notifications when they become available. Fine management features facilitate easy payment options, allowing users to track and settle their fines directly through the system. Additionally, librarians can generate reports to analyze borrowing patterns and fine collections, aiding in informed decision-making. The Book Bank Management System fosters community engagement and operational efficiency, providing a centralized platform for managing book-related activities and ensuring a smooth experience in accessing and sharing knowledge through books.

2.2 Product Functions:

2.2.1 User Management:

Role-based Access Control: Ensures secure access for members and librarians, allowing them to perform specific functions based on their roles.

2.2.2 Book Inventory Management:

Search Functionality: Enables users to easily search for books by title, author, or ISBN, facilitating quick access to information.

2.2.3 Borrowing and Returning Books:

Borrow and Return Process: Simplifies the borrowing and returning of books while automatically calculating any overdue fines, enhancing user experience.

2.3 Operating Environment:

The Book Bank Management System is designed as a web-based application, ensuring compatibility with various operating systems. Users can access the system seamlessly through standard web browsers on Windows, macOS, and Linux platforms. This approach allows for flexibility and accessibility, enabling members and librarians to manage book-related activities from any device with an internet connection.

By leveraging web technologies, the application eliminates the need for specific operating system requirements, providing a user-friendly experience across multiple environments.

2.4 User Characteristics:

- Members: Individuals who borrow, return, and reserve books from the book bank.
- Librarians: Staff members responsible for managing book inventory, processing donations, and assisting members.

2.5 Design and Implementation Considerations:

- Architecture: The system utilizes a modular architecture to promote separation of concerns, allowing for easier maintenance and scalability. This design enables new features to be integrated without disrupting existing functionality.
- User Interface (UI): A responsive and intuitive user interface is essential for enhancing user experience across devices. The design focuses on user-centric principles, ensuring that both members and librarians can navigate the system easily.
- Security Measures: Implementing robust security protocols, including secure authentication, data encryption, and regular security audits, is critical to protect user data and ensure compliance with data protection regulations.
- Database Design: A relational database management system (RDBMS) is employed for efficient data storage and management. Careful attention to data normalization

ensures data integrity and reduces redundancy while allowing for efficient query processing.

2.6 Assumptions and Dependencies:

- **Stable Internet Access:** Users will need stable internet connectivity and compatible devices to use the Book Bank Management System effectively.
- **User Familiarity:** It is assumed that users (both members and librarians) have a basic understanding of how to navigate web-based applications.
- **Data Integrity:** The system assumes that users will enter accurate information during transactions, and that the database will be regularly maintained to ensure data integrity.
- **Backend Systems:** The system will rely on a secure backend database to store user data, book records, and transaction information.
- **Web Server:** The application depends on a web server (such as Apache or Nginx) to host the application and manage requests from users.
- **High Traffic Handling:** The platform will need to handle high volumes of traffic during peak usage times, ensuring fast load times and responsiveness.
- **Third-Party Libraries:** The application may depend on third-party libraries or frameworks to enhance functionality and support development.

3 External Interface Requirements:

3.1 User Interfaces the Book Bank Management System will provide:

- A web-based user interface for members to search for books, borrow and return copies, view borrowing history, and manage fines.
- A librarian interface for managing book inventory, adding new books and copies, generating reports, and notifying waitlisted members.
- Responsive design to ensure accessibility on various devices, including desktops, tablets, and smartphones.

3.2 Hardware Interfaces:

- The system will interface with:
- Standard computer hardware, including desktops and laptops with internet connectivity.
- Optional barcode scanners for librarians to quickly check in and check out books.
- Printers for generating reports and notification letters to members.

3.3 Software Interfaces:

- The Book Bank Management System will integrate with:
- A relational database management system (RDBMS) for data storage and management (e.g., MySQL, PostgreSQL).
- Third-party libraries or frameworks for enhanced user interface components and functionalities (e.g., Bootstrap, jQuery).
- Payment gateway services (if applicable) for processing online fine payments.

3.4 Communications Interfaces:

- The system will communicate through:
- HTTP/HTTPS protocols for secure communication between the client and server.

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- Email services for sending notifications and updates to members regarding their borrowed books, fines, and waitlist status.
- APIs for potential integration with external systems or services related to library management and user authentication.

4 System Features:

4.1 Librarian/Management Staff:

Requirement ID	: RI.01.01
Title	: Database Management
Description	: Control the entire database containing records of books member information, transaction history, and fine details. Any issues regarding accessing or updating the database must be resolved promptly to ensure smooth operation.
Priority	: 2
Requirement ID	: RI.01.02
Title	: Manage Book Inventory
Description	: The librarian should be able to add, update, and remove books and their copies from the system, ensuring that the inventory is always accurate and up to date.
Priority	: 1
Requirement ID	: RI.01.03
Title	: View All Transactions
Description	: Librarians must be able to view details of all members' transactions, including borrowed books, return dates, and fines, to maintain oversight of the system.
Priority	: 2
Requirement ID	: RI.01.04
Title	: Generate Reports
Description	: The system should allow librarians to generate reports on book usage, member activity, and financial transactions, providing insights into system performance.
Priority	: 2

4.2 Member:

Requirement ID	: R1.02.01
Title	: Member Registration
Description	: New members must sign up by creating login credentials to access the Book Bank Management System.
Priority	: 1
Requirement ID	: R1.02.02

Title	: Member Login
Description	: Members must use valid credentials (registered during the registration process) to log into the system and access their account.
Priority	: 1
Requirement ID	: R1.02.03
Title	: View and Edit Personal Details
Description	: Members must be able to view and edit their personal details, including contact information and borrowing history , to keep their records up to date.
Priority	: 2

5 Other Non-Functional Requirements for Book Bank Management System:

5.1 Performance Requirements:

- **Response Time:** User interactions, such as searching for books, borrowing, and returning copies, must complete within 2-3 seconds. Application details should load within 1 second under normal load conditions.
- **Concurrent Users:** The system must support up to 1000 concurrent users without significant degradation in performance. It should scale to accommodate peak usage times, particularly during school sessions and exam periods.
- **Database Transactions:** Each transaction (borrowing, returning, or reserving a book) should commit to the database within 1 second, ensuring data consistency and adherence to ACID compliance to avoid transactional errors.
- **Backup Speed:** Automated backups of the database must occur during off-peak hours, ensuring that system availability is not impacted. The system must be able to recover from failures within 10 minutes.

5.2 Safety Requirements:

- **Data Loss Prevention:** In the event of a system crash or unexpected shutdown, all pending transactions must either roll back or be securely stored to prevent any loss. The system should log discrepancies and notify administrators immediately.
- **Physical Safety:** Physical access to critical server components must be restricted to authorized personnel only, ensuring that sensitive operations are performed by users with the correct access levels.
- **Transaction Safety:** To prevent incorrect transactions, the system must conduct thorough checks, including verification of book availability and approval workflows for high-demand books. Failed transactions should trigger rollback mechanisms and notify users.
- **Fraud Detection:** The system should incorporate a fraud detection mechanism to alert and block suspicious or unauthorized activities based on user behavior and borrowing patterns.

5.3 Security Requirements:

- **User Authentication:** All users, including members and librarians, must authenticate through a secure two-factor authentication (2FA) system before accessing the platform. Passwords should meet current encryption standards and be stored using cryptographic hashing (e.g., SHA-256).
- **Data Encryption:** Sensitive data such as member information, transaction details, and loan history must be encrypted both in transit and at rest using at least 256-bit AES encryption.
- **Access Control:** Different levels of access must be enforced:
- **Member:** Can access personal details, view borrowing history, and manage their loans.
- **Librarian:** Can manage book inventory, view all transactions, and generate reports.
- **Admin:** Can modify system-wide configurations, grant permissions, and access logs.

5.4 Software Quality Attributes:

- **Availability:** The system must be available 99.99% of the time, minimizing downtime, especially during critical operations like book borrowing and returns.
- **Reliability:** Transactions must be processed reliably, with no duplication or data loss. Fail-safe mechanisms should prevent incomplete transactions.
- **Scalability:** The system must scale horizontally, supporting additional users and books without performance degradation as the number of members grows.
- **Maintainability:** The codebase should be modular and easy to maintain, allowing for quick fixes and updates. Routine maintenance must not affect system availability.
- **Portability:** The system should support deployment across various platforms and cloud services to enable distributed operations and disaster recovery.
- **Interoperability:** The system must integrate with third-party services for notifications (e.g., email, SMS) and potential payment systems for fines.
- **Usability:** The user interface must be intuitive and easy to use, ensuring a smooth experience for all user demographics.
- **Testability:** All features must be easily testable with automated scripts, especially for performance benchmarks, security vulnerabilities, and functional testing.

5.5 Business Rules:

- **Member Permissions:** Members can only access their account details, manage their borrowing, and reserve books. No member can access another member's account details.

- **Librarian Permissions:** Librarians can manage book inventory, view all transactions, and generate reports. Permissions are role-specific.
- **Administrator Permissions:** Admins can override any system settings, including enabling or disabling features, modifying book details, and managing user permissions.
- **Alerts & Notifications:** Members must receive alerts when they successfully borrow a book, when their returns are due, and when their account status changes.

6 Other Requirements:

This section will focus on additional system constraints, policies, operational needs, and legal considerations that are necessary for the proper functioning and governance of the Book Bank Management System.

Appendix A: Glossary

Book Bank: The process by which a member borrows a book from the system for a specified period. This involves recording the issuance and due date.

Fine: The penalty charged to a member for not returning a borrowed book on or before the due date.

Inventory Management: A system module that tracks the availability of books in real-time, including their status (available, issued, reserved).

Librarian: A staff member responsible for managing the book inventory, overseeing member activities, and generating reports.

Member: A registered user of the system who can borrow, reserve, and return books, and is subject to fines for overdue returns.

Overdue Book: A book that has not been returned by the specified due date, resulting in fines.

Reservation: A feature allowing members to reserve books that are currently checked out by others. The system will notify the member when the reserved book becomes available.

Borrowing History: A record of all books borrowed and returned by a member, including due dates and any fines incurred.

Notification: Automated messages sent to members (via email/SMS) regarding overdue books, upcoming return dates, fines, and reserved book availability.

Report Generation: The system's feature that allows librarians to create detailed reports on borrowing patterns, fines, and inventory status.

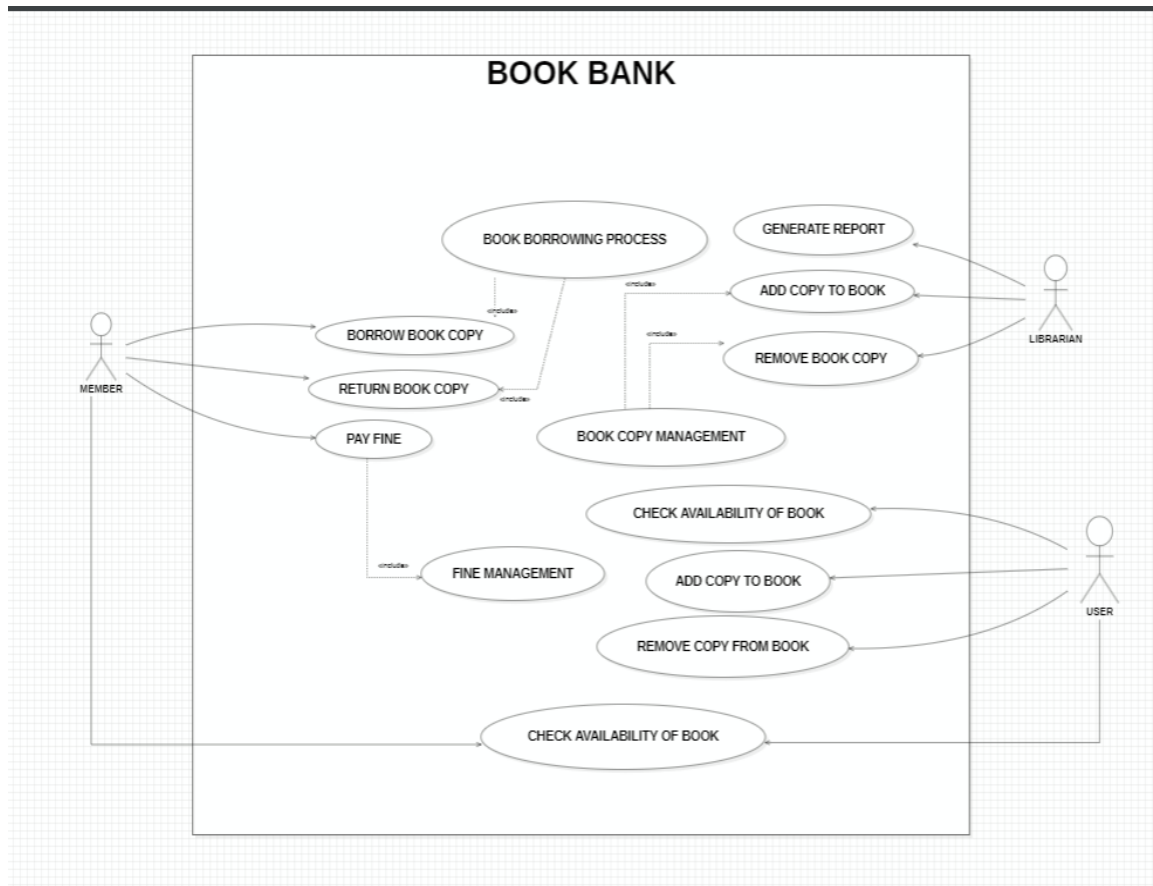
Search Functionality: A tool that allows users to search the system's inventory for books by title, author, ISBN, or category.

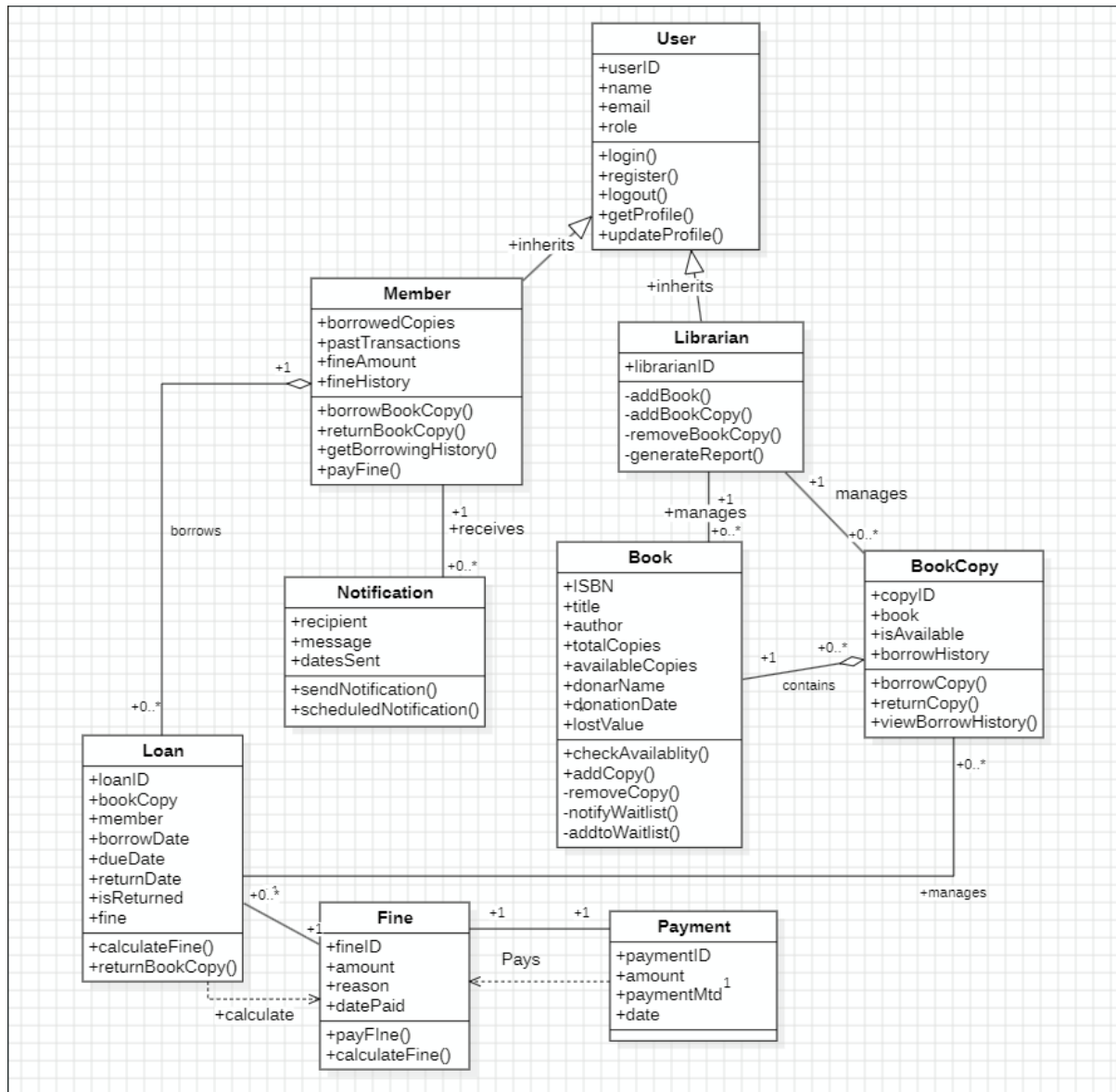
Appendix B: Analysis Models:**Use Case Template:**

Use Case ID:		11202739	
Use Case Name:		Book Bank	
End Objective:		streamline the management of a community book bank	
Created By:	1. CH Vaishnavi	On (date):	October 18,2024
	2. G Hemanth Kumar		
	3. K Sharvani		
	4. N Akshay		
User/Actor:		Librarian and Member	
Trigger:		User searching, borrowing, reserving books and administrator adding books	
Basic/Normal Flows:			
User Actions		System Actions	

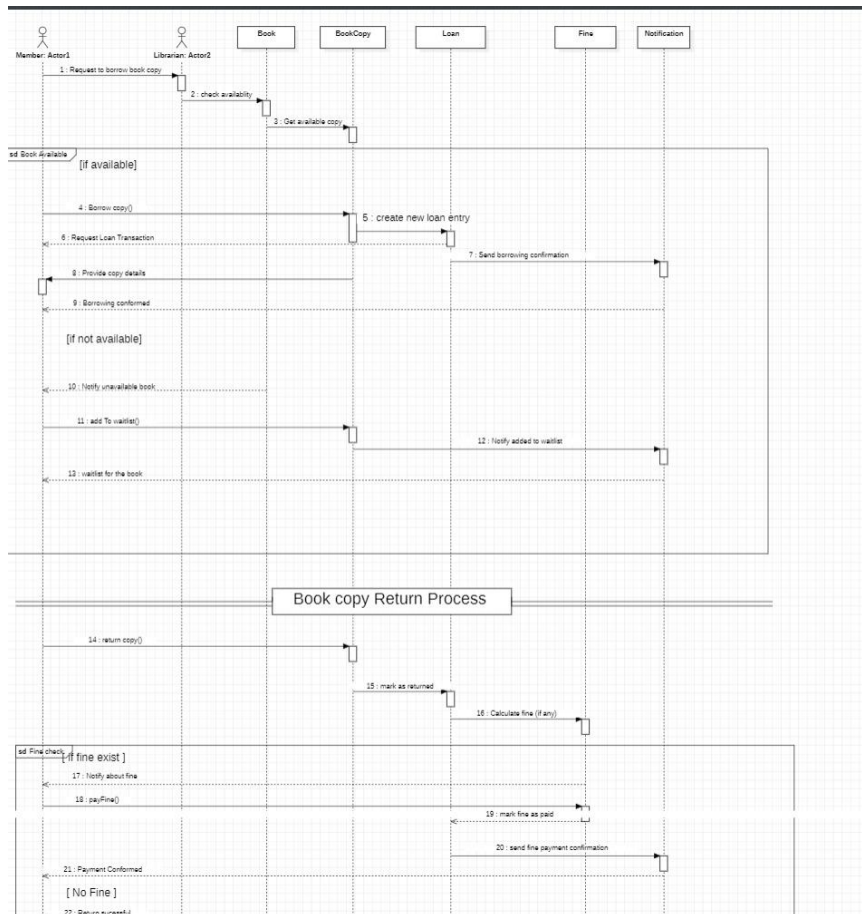
The user logs into the recruitment system by entering valid credentials.	The login page prompts the user for a valid username and password.
The user views account information, according to their status (Recruiter or Applicant).	The system retrieves and displays the user's account details as per their status.
The applicant applies for a job and the recruiter views applications.	The system provides a recruiter to access and validate applications and the applicant receives an alert.
The applicant views and edits their personal details, such as address and application preferences.	The system allows the applicant to view and update personal information. Any changes made are updated in the database.
The user completes the application process (e.g., getting the interview details).	The system processes the request, updates the interview status, and provides a confirmation message
Exception Flows	
User Actions	System Actions
The user attempts to log in but doesn't have an account.	The system prompts the user to register for an account through the registration page.
The user enters incorrect login credentials	The system displays an error message: "Please check the username or password entered" and prompts the user to re-enter the correct details.
The applicant tries to apply for a filled job which is not yet updated.	The system displays a message: "Job is already filled" and does not proceed with the application.
The recruiter tries to delete an upcoming interview.	The system displays an error message: "Interview still in process, alert the applicant to process".

Use-Case Diagram:

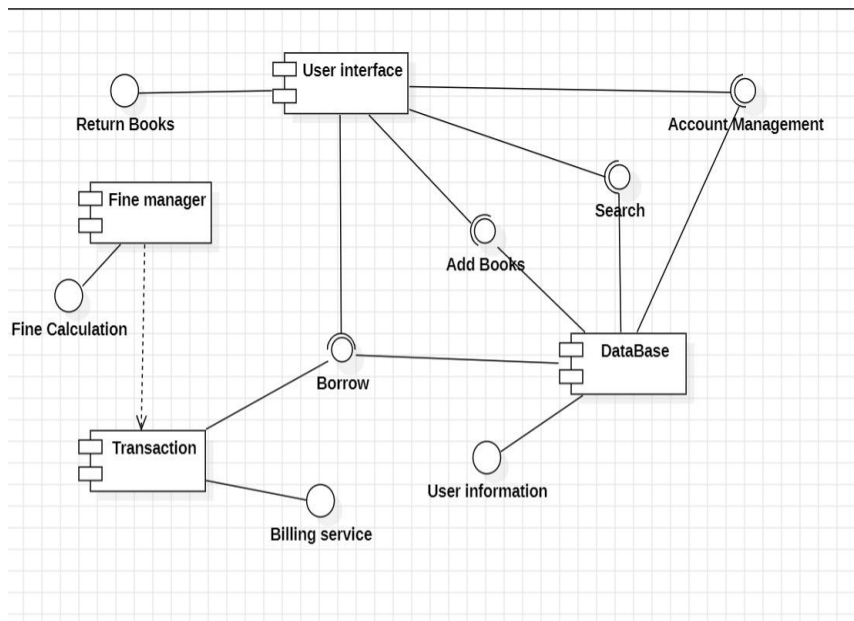


Class Diagram:

Sequence Diagram:



Component Diagram:



Appendix C : To be Determined List :

- Specific book genres to be prioritized for collection.
- User membership tiers and corresponding borrowing limits.
- Detailed service hours and resource allocation for peak periods.

This list helps keep track of important decisions that still need to be made as we work on the project.