Book Bank

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Problem Statement:

A book bank is an initiative aimed at providing students with access to academic resources by creating a system where they can borrow, donate, or exchange books. The goal of the book bank is to reduce the financial burden on students by facilitating the redistribution of used books in good condition. The book bank system will allow students to browse available books, request books, and keep track of borrowed or donated items through a user-friendly interface. This system should also include a database to manage inventory, record transactions, and ensure that book loans are tracked efficiently.

The system needs to include user authentication, allowing students to create accounts, log in, and track their borrowing history. Additionally, the system should provide features like book search based on title, author, or subject, and include an option to filter books by availability. An automated notification system will remind users of upcoming return deadlines, and penalties will be tracked for overdue books. The main goal is to promote a cost-effective solution for acquiring academic resources while encouraging the sharing and recycling of books within the community.

Software Requirement Specification for Book Bank

Version 1.0 approved

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Revision History

Name	Date	Reasons for Changes	Version
Week-1	25-09-2024	SRS Template Creation (Introduction)	1.0
Week-2	18-10-2024	SRS Documentation – Use Case and Class Diagram	2.0
Week-3	25-10-2024	SRS Final Document	3.0

1.Introduction

1.1 purpose

The purpose of this Book Bank system is to connect students, educational institutions, and donors in one integrated platform, enabling seamless exchange and lending of academic resources. This application is designed to maintain a centralized repository of books, allowing students to easily access available resources and donors to contribute to the community. The system aims to provide educational institutions with an organized method to manage their book inventories, ensuring efficient circulation of materials and contributing to the overall advancement of education

1.2 Document Convention

Heading:

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Subheading:

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Content:

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1.3 Intended Audience and Reading Suggestions

This document is intended for various stakeholders involved in the development and use of the Book Bank system, each with a unique perspective. Developers should focus on the sections covering functional and non-functional requirements, as well as system architecture, to design and implement the system efficiently. These sections offer critical insights into how the system is expected to function and the performance benchmarks it must achieve. Project managers are encouraged to review sections on timelines, resource planning, risks, and costs to ensure the system is delivered on time and within budget, while addressing potential risks. Educational institutions and administrators will find value in understanding how the Book Bank simplifies the management of book inventories, improves access to educational resources, and supports a more organized, streamlined system for resource sharing. Advertisers/marketers should pay attention to the system's key benefits, such as improving the availability of academic materials, promoting sustainability through resource sharing, and fostering community engagement, which can be highlighted to position the system as a valuable solution for educational institutions. Testers can use the document to identify the functional and non-functional testing criteria to verify that the system performs as expected and meets all quality standards.

1.4 Product Scope

The Scope of the Book Bank Application is as follows:

The Book Bank will offer a centralized platform for managing and sharing educational resources, connecting students, educational institutions, and donors. The system will maintain a global repository of available books and materials, providing users with access to this database to borrow, donate, or manage books. Key features include a login interface for users to view available resources, request books, or donate materials, and admin access for maintaining and updating the repository. This integrated solution will streamline book circulation, inventory management, and reporting while ensuring secure access to sensitive data, ultimately enhancing the accessibility of educational resources for all users.

1.5 References

• Library Management System standards and guidelines, including the Dewey Decimal Classification (DDC) and Library of Congress Classification (LCC).
• MySQL/PostgreSQL documentation, API guides for third-party integration, and software framework manuals (React, Spring Boot).
• Existing system design documents and market research on book lending platforms and resource-sharing systems.
• Copyright laws, data privacy regulations such as GDPR, and policies related to the sharing and distribution of educational materials.

2.Overall Description

2.1 Product Perspective

The Book Bank Management System (BBMS) is a centralized, integrated solution designed to automate and streamline the operations of a book bank or library. It addresses the inefficiencies and communication gaps that arise from standalone processes, such as manual record-keeping, delayed book requests, and poor tracking of inventory. The BBMS interconnects various functionalities like book registration, member management, book lending and returns, and inventory tracking into a unified system. This integration facilitates better coordination, improves accessibility to books, and ensures accurate record-keeping, all while improving administrative efficiency and optimizing member satisfaction.

2.2 Product Functions

- Book Registration: Adds and updates records of books available in the book bank, including details like title, author, edition, and genre.
- Member Management: Registers members, maintains records of their personal information, borrowing history, and active lending status.
- Book Lending and Returns: Automates the process of issuing and returning books, ensuring proper tracking of due dates and availability status.
- Inventory Management: Tracks the stock of books in real-time, notifying administrators when certain titles are in demand or need restocking.
- Member Portal: Allows members to search available books, request new loans, and view their borrowing history and fines.
- Reporting and Analytics: Provides reports on book lending activity, overdue books, member engagement, and stock levels for inventory control.

2.3 Operating Environment

The Book Bank Management System (BBMS) will operate on a variety of devices, including desktop computers, tablets, and smartphones. It will support access through standard web browsers like Chrome and Firefox, and offer mobile-friendly interfaces for members to interact with the system. A reliable internet connection is essential for real-time transactions between members and the book bank staff. Data will be stored securely in a cloud-based environment, ensuring that the system is scalable, reliable, and able to handle the sensitive data of books and members.

2.4 User Characteristics

- Librarians/Administrators: Manage book inventory, register and update member information, issue and return books, and monitor the system's overall performance.
- Members: Access the system to search for books, request loans, view borrowing history, and update personal details via the member portal.
- Book Bank Management: Oversee system usage, generate reports on inventory, lending trends, and ensure smooth operations.

2.5 Design and Implementation Constraints

The Book Bank Management System (BBMS) must meet several important constraints. It should comply with any applicable data privacy laws to protect the personal information of

members. The system must be able to scale as the book bank grows, handling an increasing number of books, members, and loans. Real-time updates on book availability, member records, and loan status are essential for efficient daily operations. Additionally, the system must support multiple user roles with varying access levels to ensure that only authorized personnel can make critical changes to the system.

2.6 User Documentation

The user documentation for the Book Bank Management System (BBMS) will include comprehensive user manuals for librarians, administrators, and book bank managers. These manuals will explain how to use system functionalities like inventory management, member registration, and book lending. Training guides will also be provided to assist librarians and staff in learning how to perform day-to-day tasks efficiently. Furthermore, a user guide for members will be available to help them understand how to access the system, search for books, request loans, and check their borrowing history.

2.7 Assumptions and Dependencies

The development and successful operation of the Book Bank Management System (BBMS) depend on several assumptions. It is assumed that all users, including librarians and members, will receive adequate training to effectively use the system. It is also assumed that stable internet connectivity will be available for real-time operations. The system will be compliant with applicable data protection regulations and will be hosted on reliable cloud infrastructure to ensure system uptime, scalability, and data backup for disaster recovery.

3. External Interface Requirements

3.1 User Interfaces

The Book Bank system will provide a login screen, a main dashboard with "Borrow," "Donate," and "Return" options, and separate interfaces for users and administrators. Users will see book categories, availability, and due dates in a tabulated format. Admins will access additional screens for inventory management and reporting.

3.2 Hardware Interfaces

Compatible with Windows, macOS, and Linux systems requiring a 1.7 GHz processor and 2 GB RAM. Supports standard peripherals like a keyboard, mouse, and touchscreen input. Mobile versions will be compatible with Android and iOS devices.

3.3 Software Interfaces

Developed with Node.js (backend) and React or Vue.js (frontend). Database options include MySQL or PostgreSQL for secure data storage. Integrates with email services (e.g., SendGrid) for automated notifications. Provides API access for third-party library tool integration.

3.4 Communication Interfaces

Operates over HTTP and HTTPS protocols for secure data transfer. Real-time data synchronization between user and admin interfaces. Compatible with major browsers (Chrome, Firefox, Safari, Edge).

4. System Features

4.1 Book Borrowing and Returning

4.1.1. Description and Priority

This feature allows users to borrow and return books. It ensures that users can easily access and manage their borrowed books, fostering an efficient borrowing process. This is a High Priority feature, as it forms the core functionality of the Book Bank system.

4.1.2. Stimulus/Response Sequences

Stimulus: A user requests to borrow or return a book.

Response: The system checks book availability, updates the borrowing or return status, and notifies the user.

4.1.3. Functional Requirements

REQ-1: The system must display the current availability status of all books.

REQ-2: The system should allow users to borrow or return books with a single action.

REQ-3: The system must send notifications to users for due dates, overdue books, and returns.

4.2 Book Donation Management

4.2.1. Description and Priority

This feature enables users to donate books to the Book Bank. Donations help maintain and expand the system's inventory, ensuring the continuous availability of resources. It is a Medium Priority feature to ensure sustainability and community participation.

4.2.2. Stimulus/Response Sequences

Stimulus: A user initiates a book donation process.

Response: The system adds the donated book to the inventory, updating availability, and notifies the admin for review.

4.2.3. Functional Requirements

REQ-4: The system must allow users to submit book donation requests.

REQ-5: The system should update the inventory after each donation is approved.

REQ-6: The system must notify the admin of new donations for approval or rejection.

4.3 User Account Management

4.3.1. Description and Priority

This feature manages user profiles, borrowing history, and notifications. It ensures that users can view their activity and receive reminders. High Priority for maintaining user engagement and system personalization.

4.3.2. Stimulus/Response Sequences

Stimulus: A user views or updates their account information or borrowing history.

Response: The system retrieves the user's data and displays it for review or modification.

4.3.3. Functional Requirements

REQ-7: The system must allow users to view and edit their profile details.

REQ-8: The system should track borrowing history and display it in the user's profile.

REQ-9: The system must notify users about important updates such as due dates and donation approvals.

4.4 Inventory Management

4.4.1. Description and Priority

This feature helps administrators manage the Book Bank's inventory, ensuring that book details, availability, and conditions are updated regularly. High Priority for ensuring a smooth borrowing experience.

4.4.2. Stimulus/Response Sequences

Stimulus: An admin updates the status of a book or adds new books to the inventory.

Response: The system updates the book inventory and notifies users if the book is available for borrowing.

4.4.3. Functional Requirements

REQ-10: The system must allow admins to add, remove, or update book details in the inventory.

REQ-11: The system should track the condition and availability of all books.

REQ-12: The system must generate reports on inventory status for the admin.

4.5 Notifications and Reminders

4.5.1. Description and Priority

This feature sends automatic notifications and reminders to users regarding borrowing, returning, and donation activities. High Priority to ensure timely communication and user compliance with borrowing rules.

4.5.2. Stimulus/Response Sequences

Stimulus: A book is borrowed, returned, or a donation is processed.

Response: The system sends a notification or reminder to the user.

4.5.3. Functional Requirements

REQ-13: The system must send notifications for due dates, overdue books, and return confirmations.

REQ-14: The system should notify users about successful donations and inventory updates.

REQ-15: The system must allow users to configure their notification preferences.

5. Nonfunctional Requirements

5.1 Performance Requirements

The Book Bank system should ensure efficient performance, allowing users to search for, borrow, and donate books swiftly. The system should handle up to multiple concurrent users without any noticeable delays. Book searches and retrieval of user borrowing history should occur within 2 seconds under normal conditions. Inventory updates, including book donations and returns, should be processed within 3 seconds to maintain real-time accuracy.

5.2 Safety Requirements

To maintain system safety, the Book Bank must ensure that book availability and borrowing data are consistently accessible. Daily automatic backups of all transactions and user interactions are necessary to prevent data loss. In case of system failures, a recovery mechanism should restore the most recent system state without losing transaction details.

5.3 Security Requirements

The Book Bank system must implement strong security measures, including encryption for user data and book transaction details. Role-based access control should be established to limit administrative privileges, ensuring that only authorized users can modify inventory or manage user accounts. An audit trail must log all book transactions, donations, and returns to maintain transparency and accountability.

5.4 Software Quality Attributes

Reliability: The system must achieve 99.8% uptime to ensure continuous availability for users.

Scalability: The system should be able to expand with increased demand, supporting larger inventories and user bases without compromising performance.

Maintainability: A modular design will be used to allow for easy updates and feature additions, with minimal disruption to the users.

Usability: The interface should be intuitive, requiring minimal training for users to navigate and utilize its key functions efficiently.

Compatibility: The system should integrate with other digital platforms and support standard data formats for importing and exporting book records.

5.5 Business Rules

The Book Bank should enforce a flexible borrowing policy, allowing users to borrow up to a predefined number of books per semester. Fines for overdue books must be automatically calculated based on the time period and notified to users. The system should also promote the donation of books by providing incentives, such as extended borrowing periods or waived fines

for users who donate frequently. All business rules should align with the goals of providing free or low-cost access to educational materials for students and other community members.

6.Other Requirements

6.1 User Registration and Authentication:

The system should allow users to register with their details and authenticate using secure methods (e.g., username and password, or integration with third-party authentication providers).

6.2 Search and Filter Functionality:

Users must be able to search for books using various filters, such as author, title, genre, and availability.

6.3 Borrowing and Returning:

The system should track books that are borrowed and set due dates for return. It should also send notifications for overdue books.

6.4 Book Donation Portal:

An option for users to donate books should be available, where donors can specify the condition, genre, and other relevant information about the book.

6.5 Book Reviews and Ratings:

Users should be able to review and rate books to provide feedback to other members of the book bank.

6.6 Late Fee Management:

A late fee policy should be implemented where users are charged for returning books after the due date. The system should calculate and track these fees.

6.7 Inventory Management:

Admins should have access to a tool that helps manage the inventory, including adding new books, removing old or damaged ones, and generating reports on book circulation.

6.8 Mobile Accessibility:

The book bank platform should be mobile-friendly, ensuring users can access it via smartphones or tablets.

6.9 Notifications and Alerts:

Users should receive email or SMS notifications for key actions such as book availability, due date reminders, and system updates.

6.10 Integration with External Libraries:

The system should have the potential to integrate with other libraries or book banks to extend access to a larger variety of books.

Appendix A: Book Bank Glossary

- Book Donation: The process of giving books to the bank, where they are made available to other users in need.
- Library Management System: A digital tool to manage book records, users, and transactions within the book bank.
- Book Reservation: A feature allowing users to reserve books for future borrowing.

Appendix B:

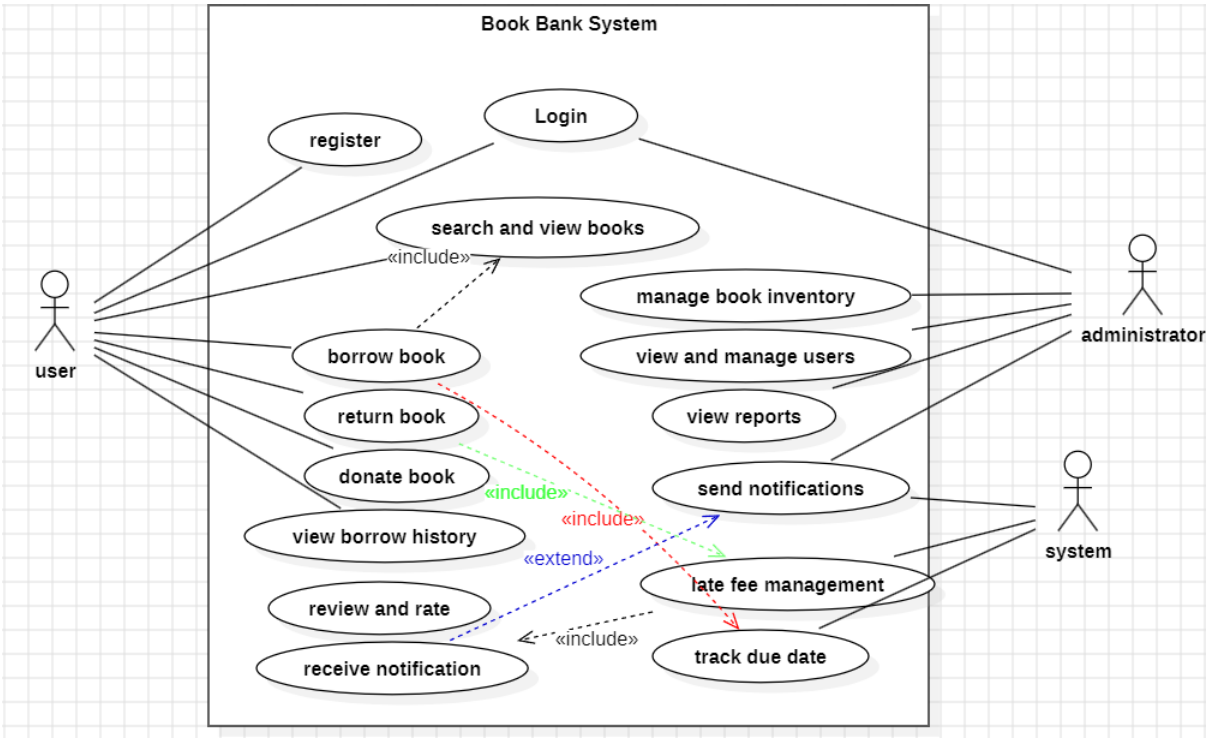
Use Case template:

Use Case ID	040816540237		
Use Case Name	Book Bank		
End Objective	To allow users and administrators to efficiently manage book transactions and information in the Book Bank System.		
Created by	1.Baba Gandhi Kandagatla 2.Chaitanya Gattu 3.Kummari Sai Teja 4.Surabhi Abhinav 5.Harihara Naga Hemanth	On (date):	October 18, 2024
User/Actor	Student (User), Administrator, System		

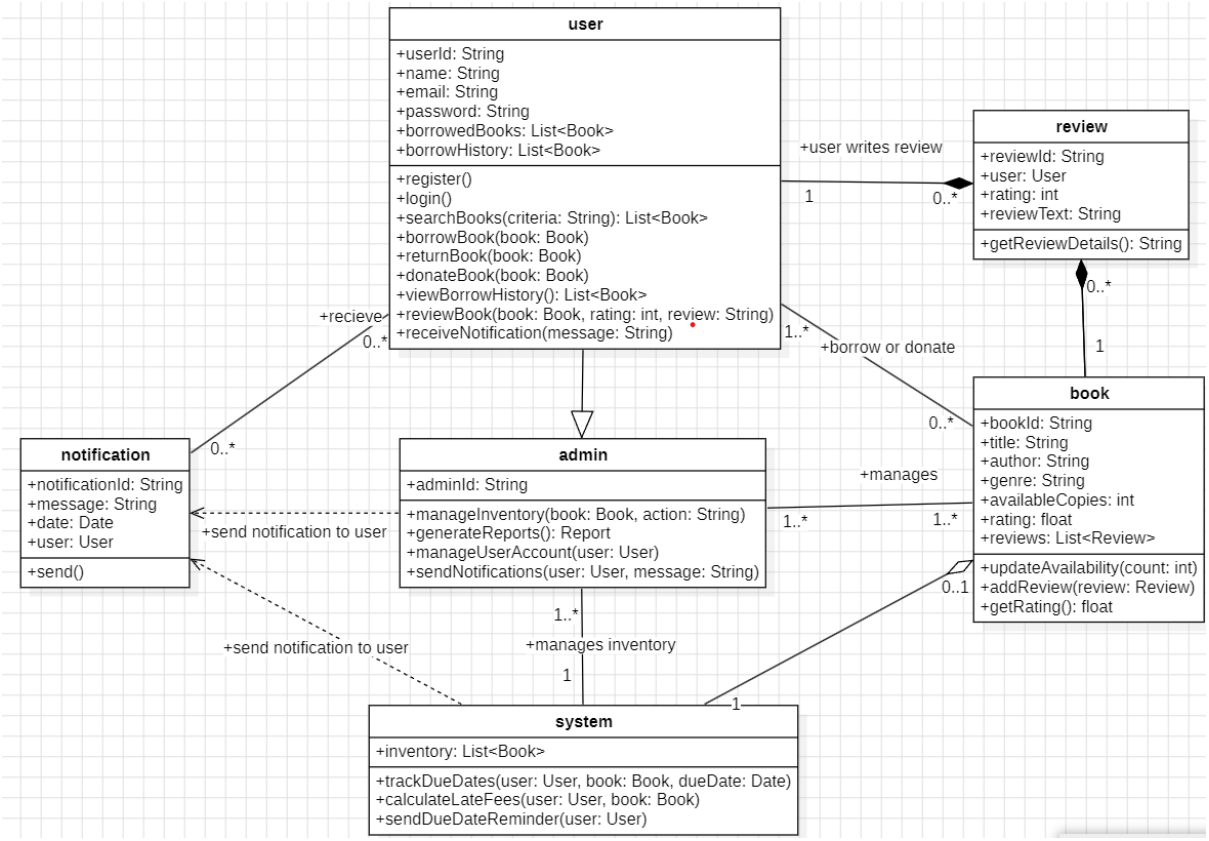
<table>
<tr><td>Trigger</td><td colspan="3">User or administrator initiates a system action, such as searching for books, borrowing books, or managing inventory.</td></tr>
<tr><td colspan="4">Basic/Normal Flows</td></tr>
<tr><td>User Actions</td><td colspan="2">Admin Actions</td><td>System Actions</td></tr>
<tr><td>The user logs into the system.
The user browses available books using search bars and filters (e.g., title, author, genre, or availability).
The user borrows a book by selecting the appropriate options and confirming the action.
The user donates a book by filling in the required details and submitting the book information.
The user views and updates their personal details through the profile section.
The user returns a borrowed book and receives a confirmation message of successful return.
The user reviews and rates a book they have borrowed.</td><td colspan="2">The admin logs into the system with elevated permissions.
The admin manages the inventory, adding new books, updating details of existing books, or removing old books.
The admin views reports on book circulation, borrowing trends, and overdue books.
The admin sends notifications or reminders to users about book due dates, late fees, or other announcements.
The admin manages user accounts, including resetting passwords and handling user permissions (e.g., blocking a user or granting admin rights).</td><td>The login page prompts the user to enter a valid username and password.
The homepage displays available books and allows the user to search for specific books using a search bar and filters.
The system offers an option to borrow books, including showing the borrowing history and tracking due dates.
The system allows the user to view and edit their personal details in the profile section.
Upon returning a book, the system processes the return, updates the inventory, and confirms the successful return to the user.
The system prompts the user to submit a review or rating for borrowed books.</td></tr>
<tr><td colspan="4">Exception Flows</td></tr>
</table>

User Actions	Admin Actions	System Actions
The user tries to log in but does not have an account on the system. The user attempts to log in by entering their credentials but enters incorrect details. The user tries to borrow a book, but the book is unavailable or already borrowed by someone else. The user attempts to donate a book but encounters an issue, such as incomplete information or invalid book details. The user tries to return a book after the due date has passed, and late fees apply.	The login page prompts the user or admin to enter valid credentials (username and password). The homepage displays available books and allows users to search for specific books using a search bar and filters. The system tracks borrowed books, automatically updates inventory upon borrowing/return, and monitors due dates. The system allows users and admins to view and edit personal details through the profile section. Upon returning a book, the system processes the return, updates the inventory, and confirms the successful return to the user. The system generates reports on book circulation, inventory status, and overdue books for admins. The system sends automated reminders for due dates, overdue books, or notifications about new books.	The system prompts the user to register on the signup page before attempting to log in. If the login credentials are incorrect, the system displays a message: "Please check the username or password entered" and asks the user to try again. If the user attempts to borrow a book that is unavailable, the system displays: "Book currently unavailable" and notifies the user of the next available date. If the book donation information is incomplete or invalid, the system prompts the user to fill in the missing details or correct the errors. If the user tries to return a book after the due date, the system calculates and displays any applicable late fees before processing the return.

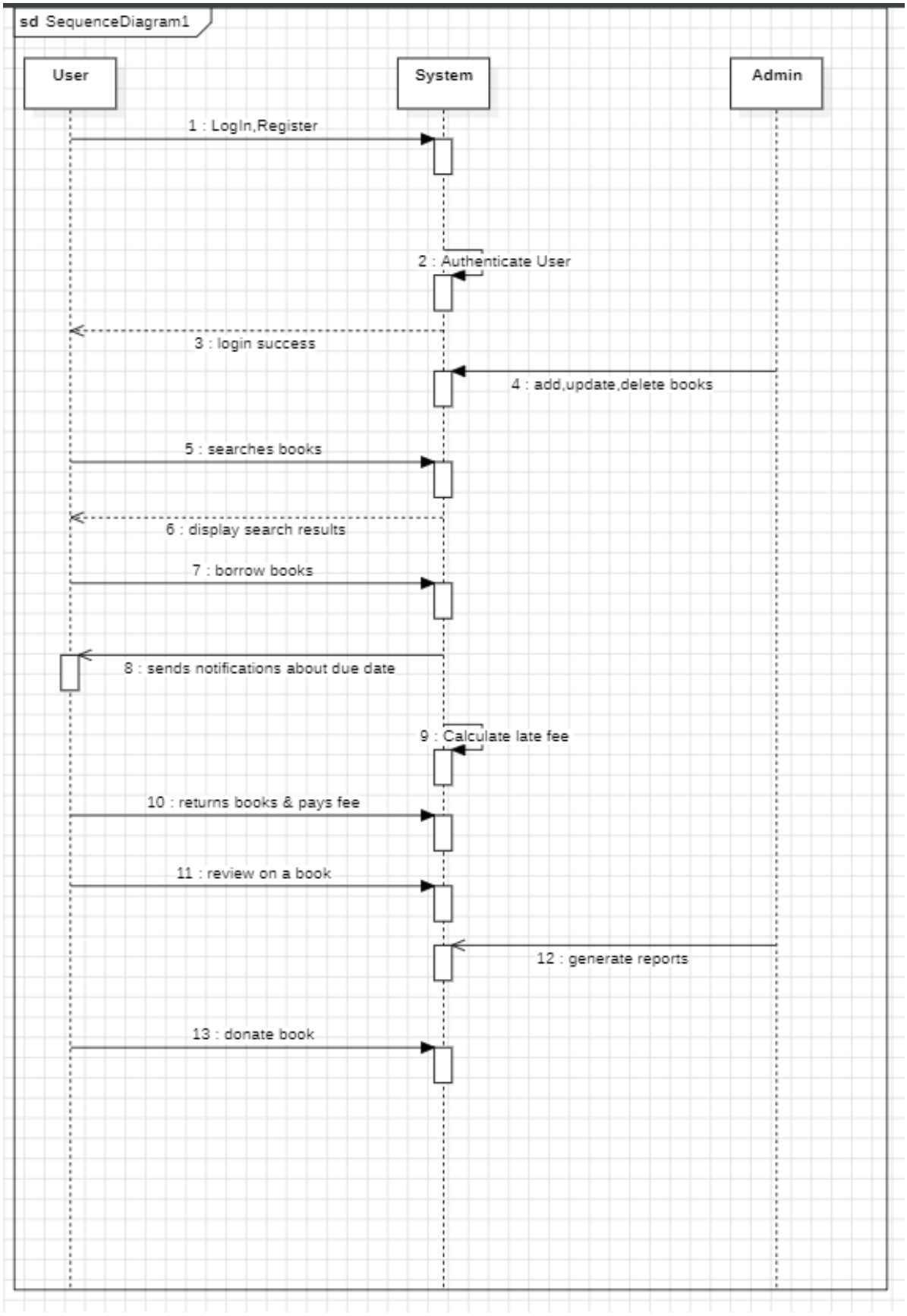
Use Case Diagram:



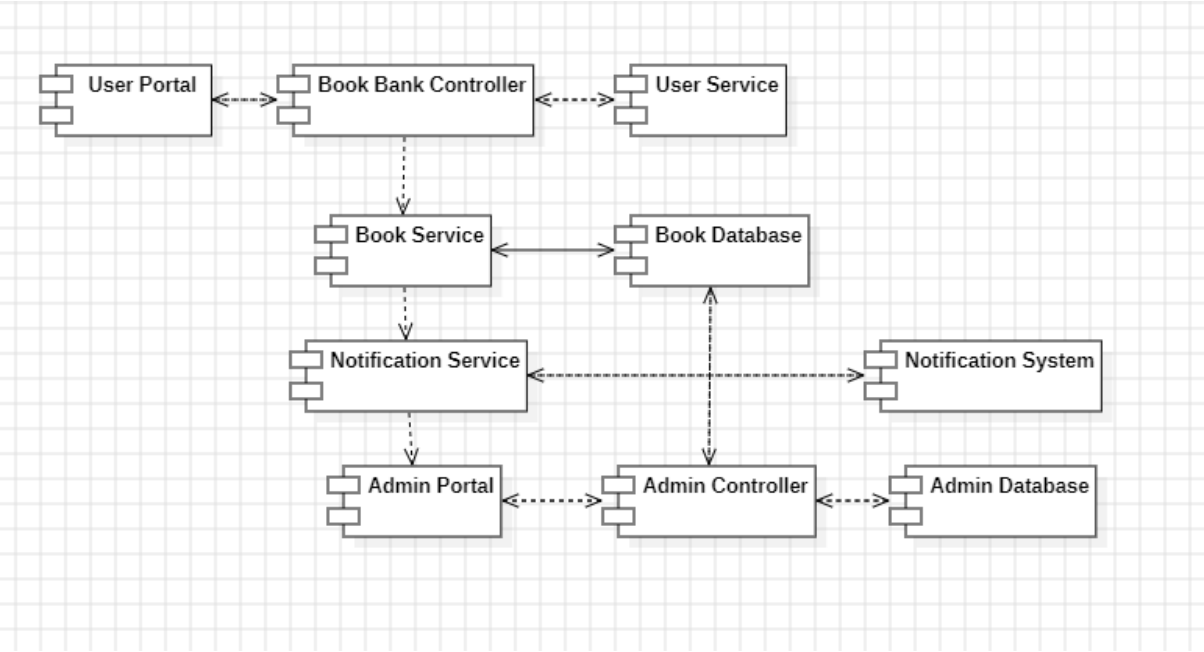
Class Diagram:



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.