functionalrequirements

Users must be able to sign up and specify their role (admin, user, librarian).

Users must be able to log in using credentials.

The system must allow admins to manage user accounts.

Users must be able to search for books by name or genre.

The system must allow users to borrow books.

The system must allow users to return books.

Users should be able to request book extensions.

Admins must be able to add/remove books from the storage.

Users must be able to rate and review books.

The system must calculate fines for overdue books.

Users must receive notifications for available books.

Users must receive notifications for overdue books.

The system must allow users to update their profile.

Admins must be able to ban/unban users or librarians.

The system should store all data in text files

Non functional requirements

7The system should be able to handle a minimum of 100 concurrent users.

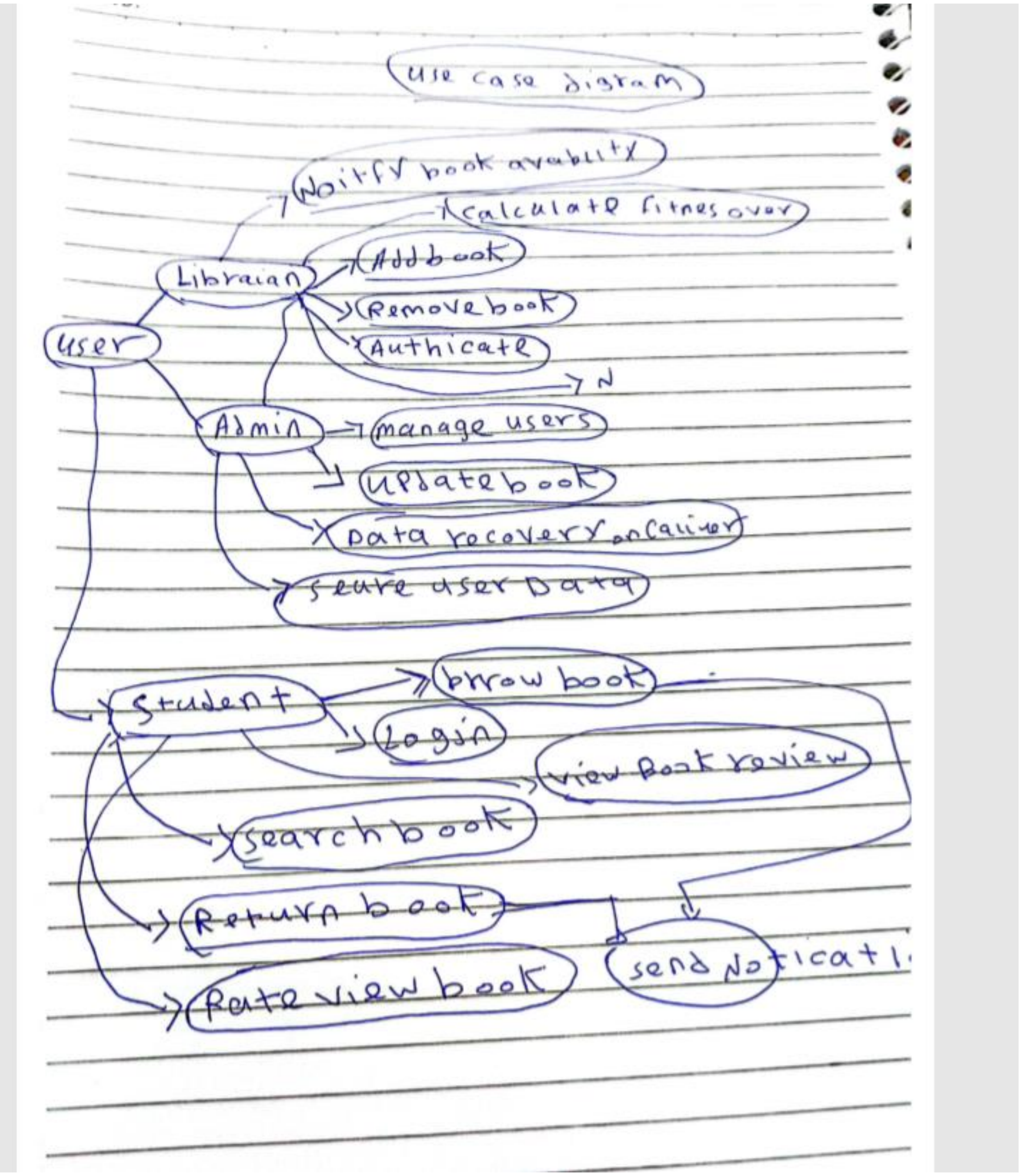
The application should respond to user input within 2 seconds.

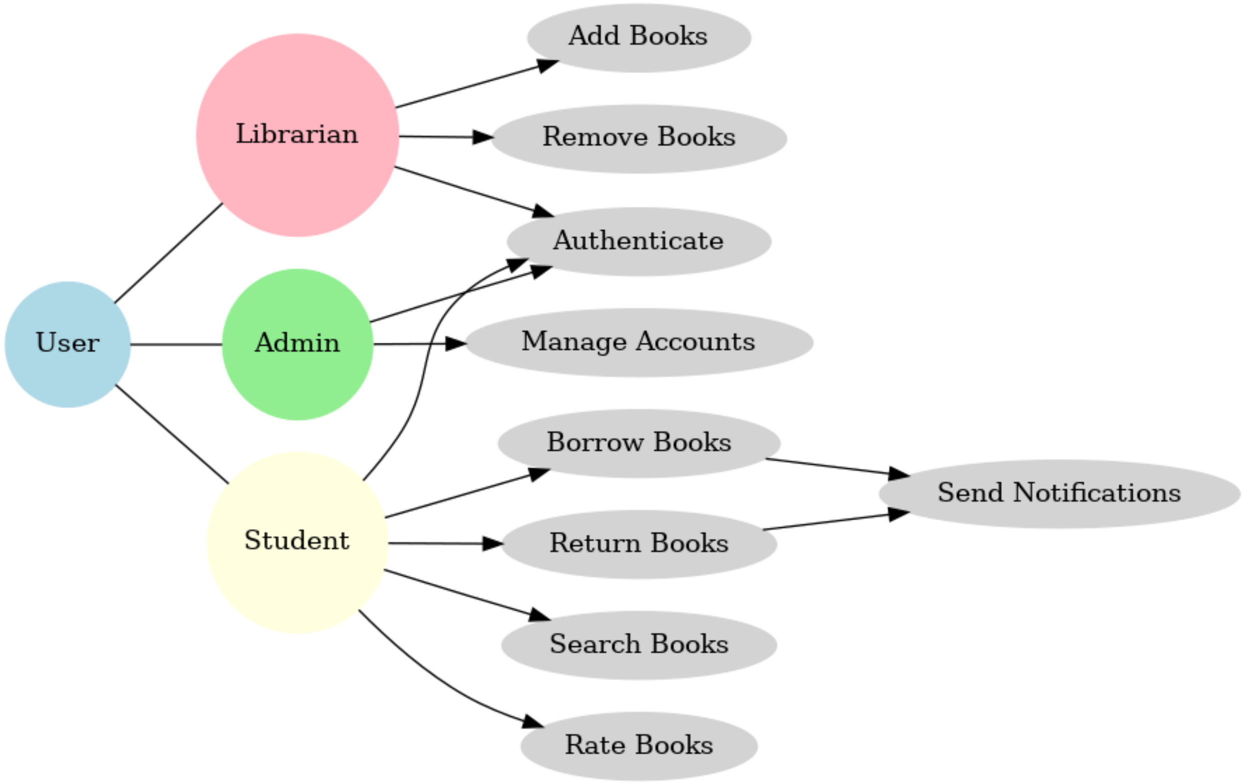
The system should store data persistently across sessions.

The system should be available 24/7 with minimal downtime.

The system should be secure and protect user data

<u>Use case digram</u>




Add Books
Librarian
Remove Books
Authenticate
User
Admin
Manage Accounts
Borrow Books
Send Notifications
Student
Return Books
Search Books
Rate Books

Use Case Name	Borrow a Book
Actor(s)	Student, Librarian
Description	Allows a student to borrow a book if it is available.
Preconditions	1. The student must be registered and logged into the system. 2. The book must be available in the library.
Main Flow	1. The student searches for a book in the catalog. 2. The system displays the search results. 3. The student selects a book and clicks "Borrow". 4. The system checks the availability of the book. 5. If available, the book is marked as borrowed, and the borrowing record is updated. 6. The system confirms the borrowing to the student.
Alternate Flows	1. If the book is not available, the system shows "Book unavailable" and offers to add it to the waiting list

Use Case Name	Manage Users
Actor(s)	Admin
Description	Allows the admin to manage user accounts (create, delete, ban, or unban)
Preconditions	1. The admin must be logged into the system.
Main Flow	1. The admin selects "Manage Users" from the menu. 2. The system displays a list of user accounts. 3. The admin selects a user and performs one of the following actions: - Edit user details. - Delete the user. - Ban or unban the user. 4. The system updates the user records accordingly.
Alternate Flows **Postconditions** . **Exceptions** .	1. If the admin attempts to delete their own account, an error message is shown 1. User records are updated 1. System failure during user management

Use Case Name	Return a Book
Actor(s)	Student, Librarian, Library System
Description	Allows a student to return a borrowed book.
Preconditions	1. The student must have a book borrowed 2. The book must not be damaged or lost.
Main Flow	1. The student selects "Return Book" from their account. 2. The system retrieves the borrowing record. 3. The system updates the book’s status to "Available". 4. If the return is overdue, the system calculates a fine. 5. The student pays the fine (if applicable)
Alternate Flows	1. If the book is damaged, the librarian calculates a replacement fee.
Postconditions	1. The book is marked as available. 2. The student’s borrowing history is updated.
Exceptions .	1. The student attempts to return a book that was not borrowed

Use Case Name	Notify Users
Actor(s)	Librarian
Description	Sends notifications to users about book availability or overdue books.
Preconditions	1. The system must have valid contact information for the users. 2. A book must either be available or overdue.
Main Flow	1. The system identifies users who have reserved a newly available book. 2. Notifications are sent to these users. 3. For overdue books, the system identifies affected users. 4. Notifications are sent about overdue books and fines.
Alternate Flows	1. If a user's contact information is invalid, the system skips the notification. 2. If the book becomes unavailable again before notification is sent, the process is canceled
Postconditions	1. Users are notified of book availability or overdue status.
Exceptions .	1. Failure to send notifications due to connectivity issues.