



# Library Management System

Developed using Python & Streamlit

*Presented by*



## **Team Members:**

Khandakar Nafees Hossain (Project Lead & Developer)

Dhritiman Bera (Developer & Designer)

Parthib Mahapatra (Tester & Deployment)

**Guide:** Mr. Subhabrata Sengupta | Dr. Rupayan Das

# Why This Project?

## Time-Consuming Manual Systems

Traditional library operations are inefficient, error-prone, and resource-intensive, leading to delays and inaccuracies.

## Lack of Real-time Tracking

Absence of immediate insights into book availability and circulation, hindering efficient resource management.

## No Personalized Recommendations

Users miss out on tailored content suggestions, impacting engagement and discovery of relevant materials.

## Need for Centralized Access

A unified system with secure, role-based access is crucial for streamlined management and improved user experience.

# Project Objective

Our primary objective is to revolutionize library management through a secure, feature-rich digital platform.

## Digital Library System

To construct a robust digital platform for comprehensive library operations.

## Secure User Access

To implement secure sign-up and login functionalities for all users.

## Streamlined Book Management

To enable students to easily browse, issue, and return books.

## Admin Book Control

To empower administrators with tools for adding, removing, and managing library inventory.

## AI-Powered Recommendations

To integrate an AI module for personalized book suggestions based on user preferences.

# What Makes It Unique?



## OTP-based Authentication

Enhanced security and user verification for login.



## AI-Based Book Recommendation

Personalized suggestions to enhance user discovery.



## Digital Book Shelf

Interactive display with covers and detailed descriptions.



## Due Date Reminders

Automated alerts to ensure timely book returns.



## Analytics Dashboard (Upcoming)

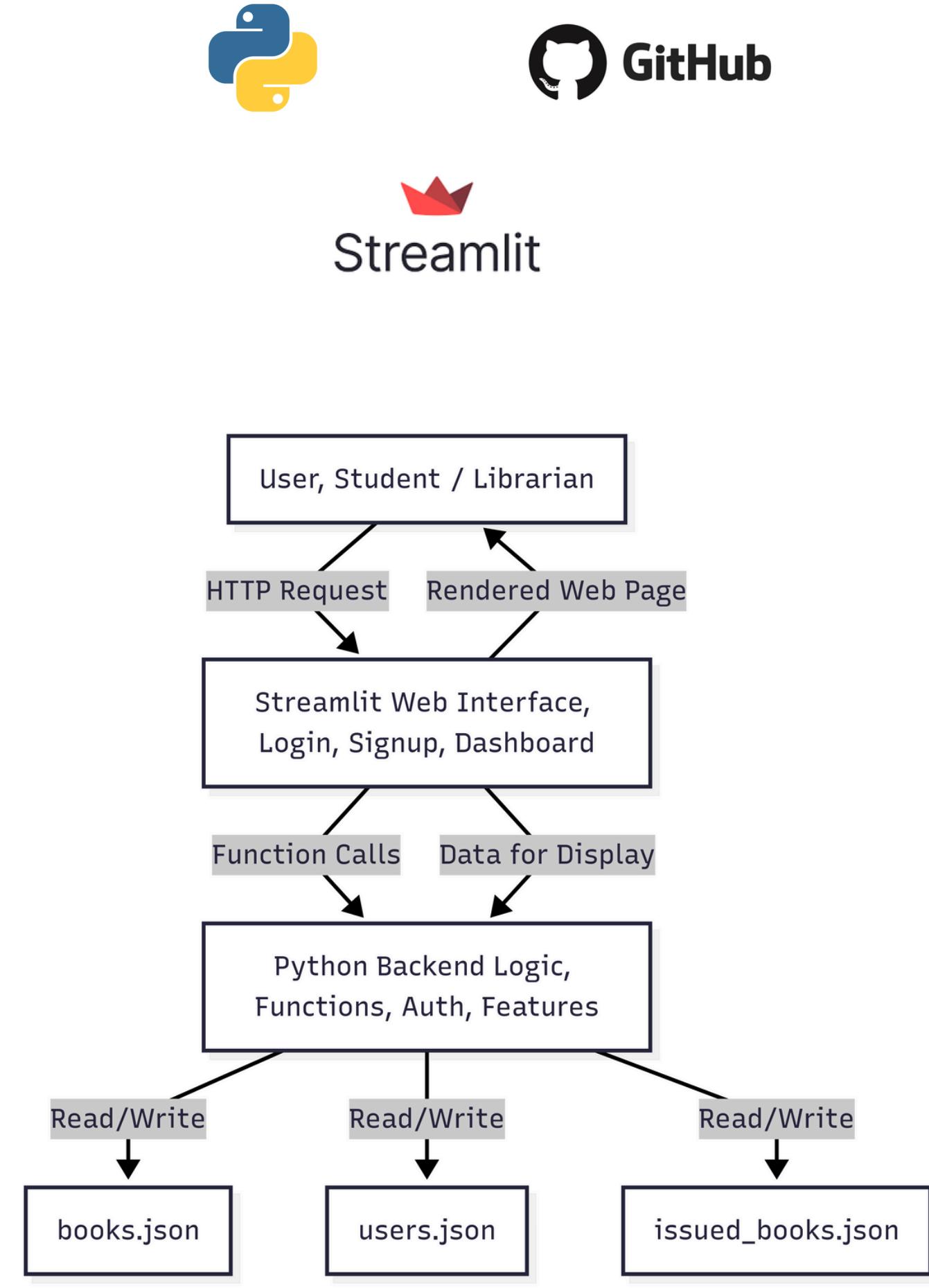
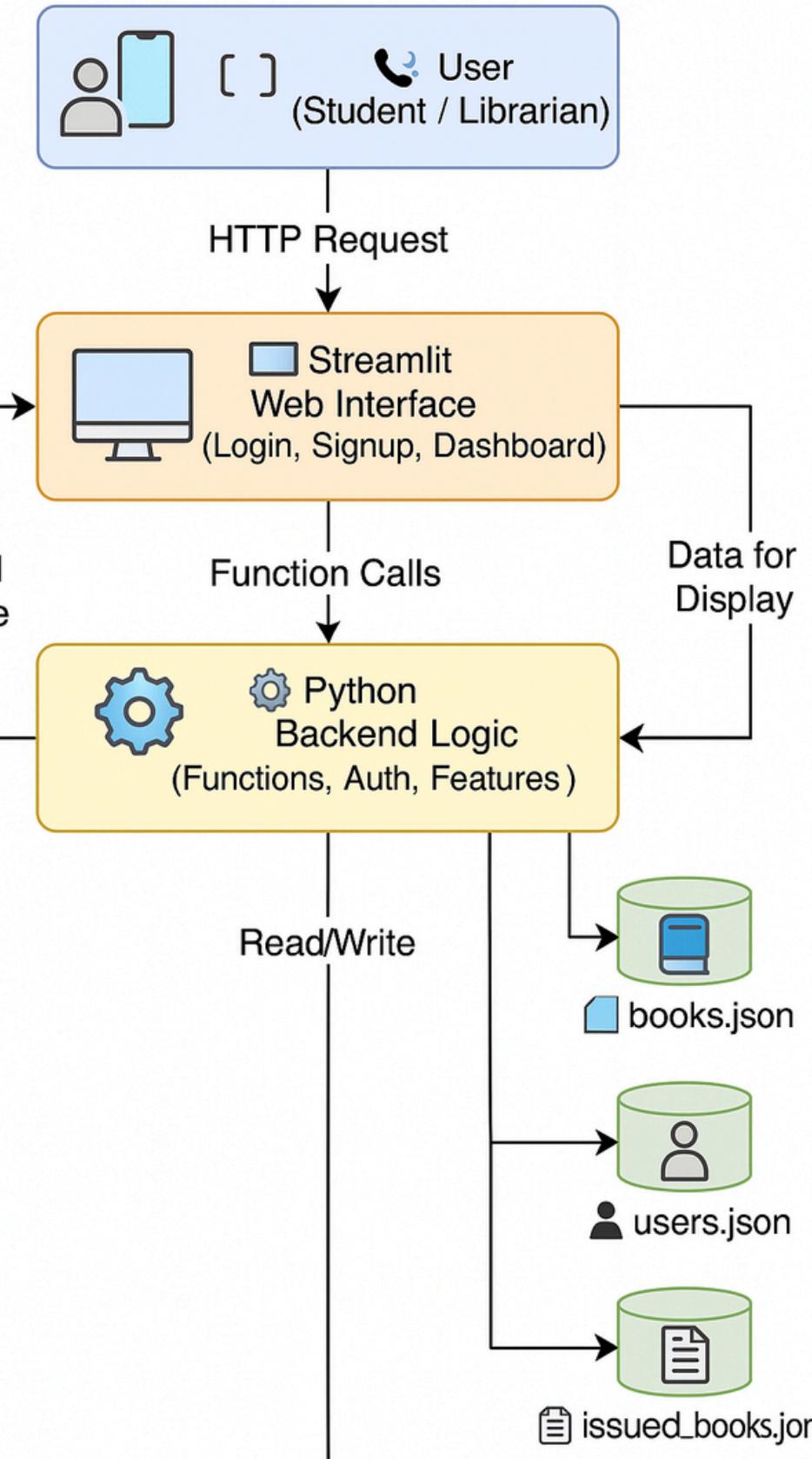
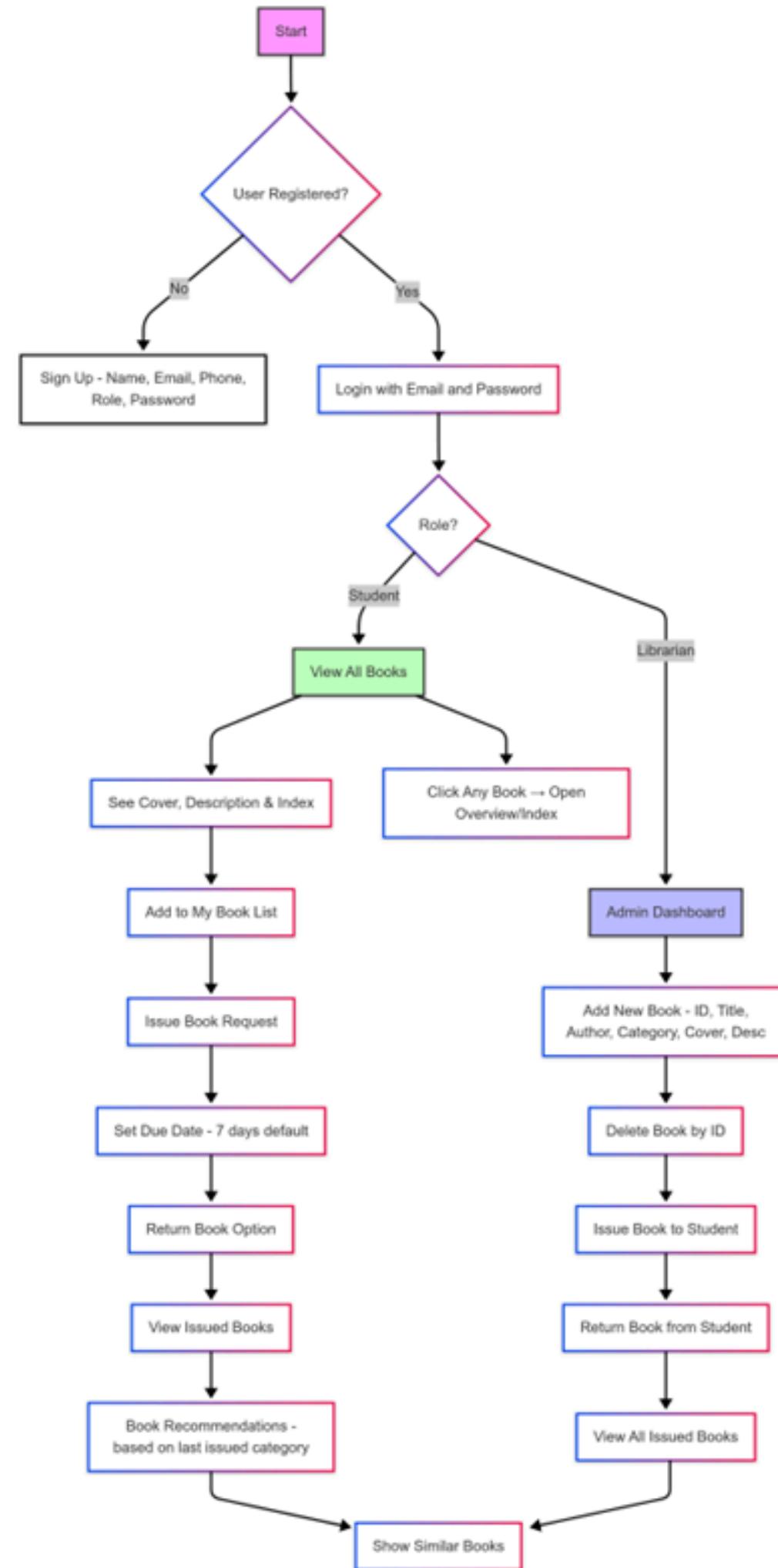
Future integration for insightful library metrics.



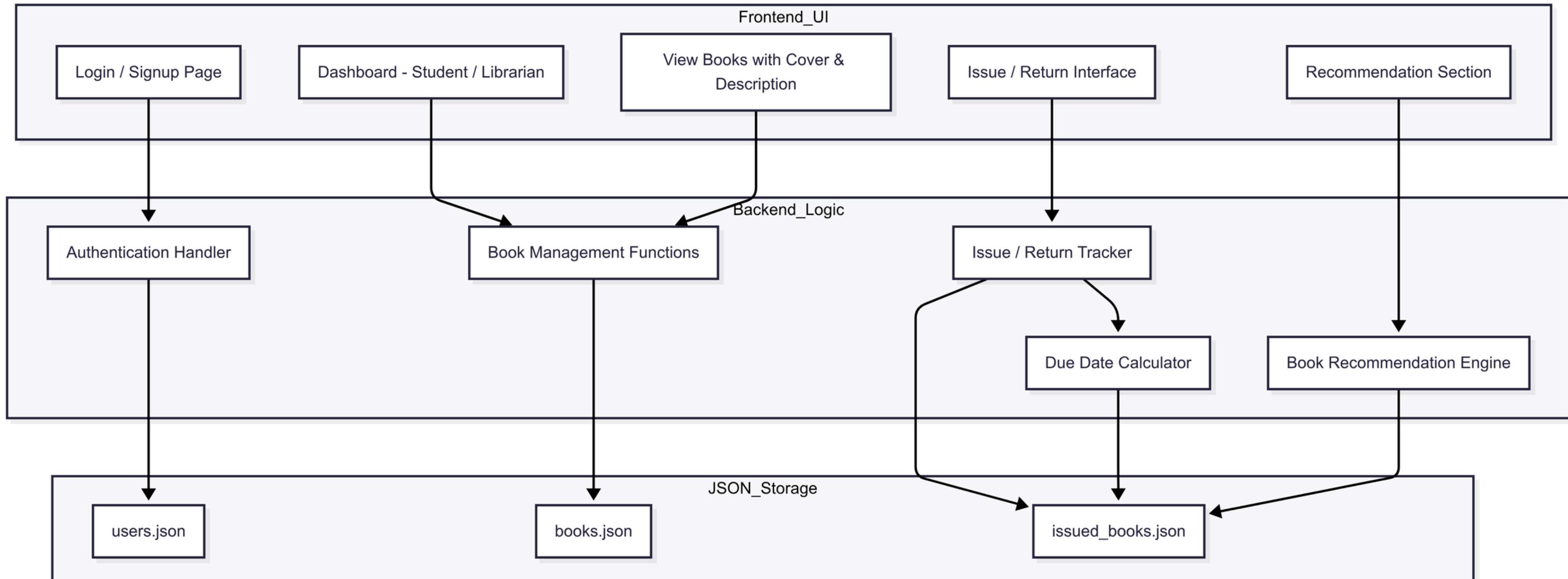
## Chatbot Assistant (Planned)

Interactive help for quick book searches and queries.

# Tech Stack



# Architecture Overview



# Role-Based Access Control

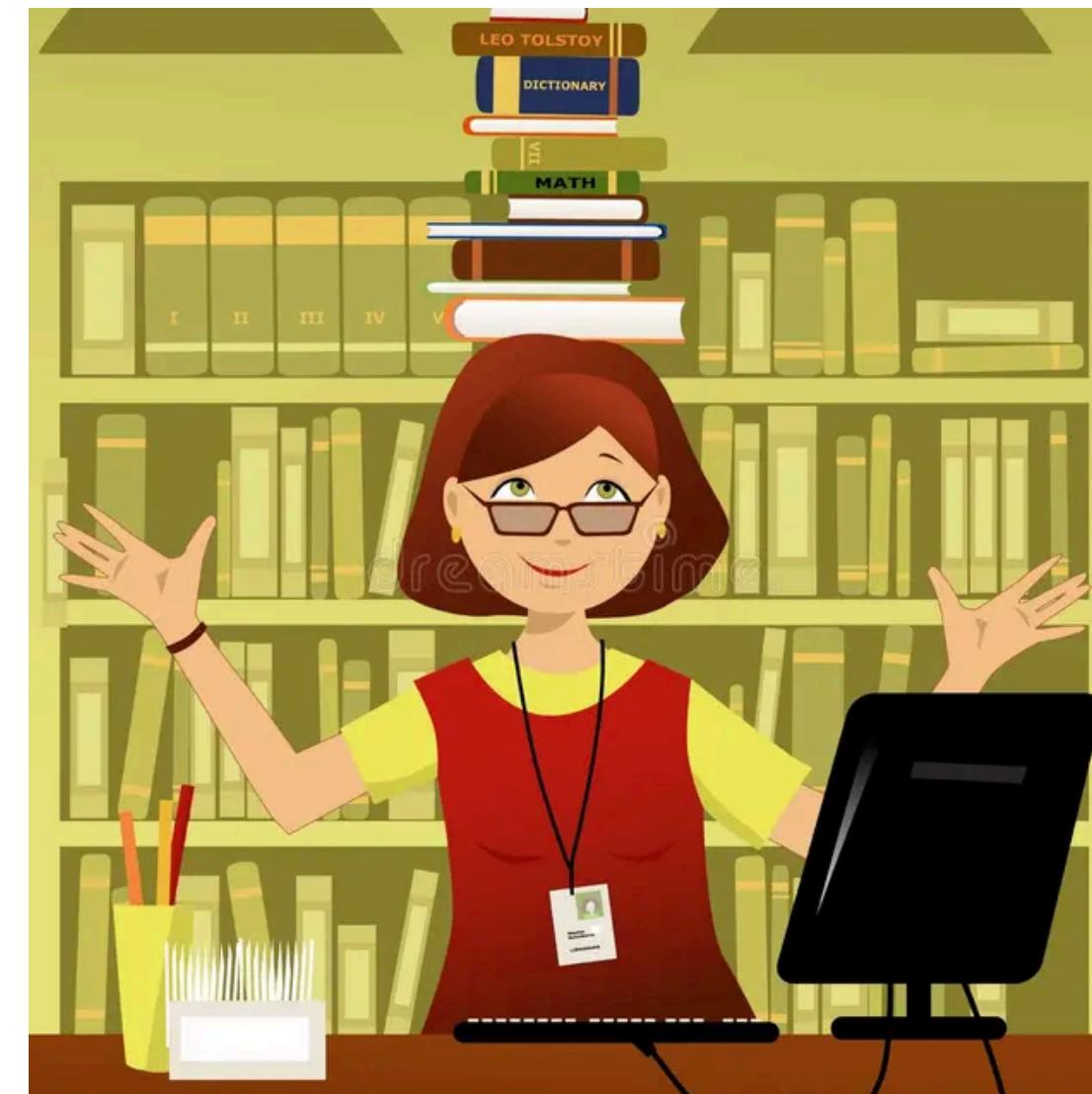
## Student Privileges

- Browse and view available books.
- Manage and view their personal booklist.
- Securely issue and return books.
- Receive personalized AI-based book recommendations.



## Librarian Functions

- Add new books to the library inventory.
- Delete existing books from the system.
- View all currently issued books.
- Manage and update book availability status.



# Data Storage

Our system leverages JSON files for efficient and structured data storage, ensuring data integrity and accessibility.

## **books.json**

Contains comprehensive data for all books in the library, including titles, authors, genres, and availability status.

## **users.json**

Stores essential user information such as names, assigned roles (student/librarian), email addresses, and encrypted passwords.

## **issued\_books.json**

Tracks all book issuance records, linking users to books, along with the issue date and the critical return deadline.

# What We Faced

Developing the system presented several technical and design challenges, which we successfully navigated.

## 1 JSON File Locking

Overcoming race conditions and ensuring data integrity during concurrent read/write operations on JSON files.

## 2 Streamlit UI Complexity

Designing an intuitive yet feature-rich user interface within Streamlit's framework limitations.

## 3 Multi-Role UX Design

Crafting distinct and user-friendly experiences for both student and librarian roles.

## 4 Recommendation Logic

Fine-tuning the AI-based recommendation engine for accuracy and relevance to user preferences.

# Future Scope

Our roadmap includes exciting enhancements to further improve functionality and user experience.



## Chatbot Assistant

Integrating an intelligent chatbot for instant book search and query resolution.



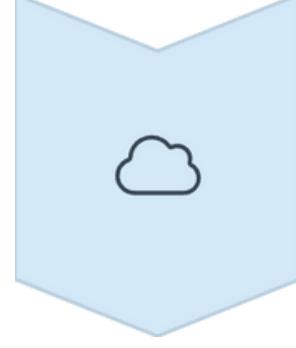
## Email Notifications

Implementing automated email reminders for upcoming due dates.



## Admin Dashboard

Developing a comprehensive dashboard with analytics for librarians.



## Cloud Database Migration

Transitioning from JSON files to a robust cloud database like Firebase or MongoDB for scalability.

**Thank You**