

Library Management System

Department of Information and Communication Engineering

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1. Problem Statement

Libraries are an essential resource for educational institutions, but managing the library's collection of books and resources can be a challenging task. Inefficient management can lead to disorganized books, inefficient book borrowing and return system, and frustrated users. Currently, our seminar library management process is manual, and librarians use paper-based systems to keep track of books and users. This process is not only time-consuming but also prone to errors, leading to inaccurate record-keeping and frustration among users.

To overcome these challenges, there is a need for a digital solution that automates the library management process. The proposed solution is a library management website that offers functionalities like user management, book management, borrowing management, reservation system, reporting, and search functionality. This solution will streamline the library management process, making it more efficient and user-friendly. However, the website should be developed within the available skills of the students who are tasked with its development.

2. Requirement Analysis

Functional Requirements:

- **User Management:** The website should enable academics, students, and librarians to create and manage user accounts.
- **Book Management:** The website should permit librarians to add, edit, and delete books from the library catalog.
- **Search Functionality:** The website should offer users to look up books by title, author, or subject.
- **Borrowing Management:** The website should allow visitors to borrow and return books from the library.
- **Reservation System:** The website should allow users to show books that they currently have on loan on the website and can see the requested book.

Nonfunctional Requirements:

- **Usability:** Simple, user-friendly and easy to navigate should be the basic property of the website
- **Performance:** The website needs to be quick to handle a large number of concurrent users and provide a fast response time.
- **Security:** The website needs to be safe and guard user information.
- **Accessibility:** People with disabilities should be able to use the website.
- **Compatibility:** The website should work with a variety of browsers and devices.

Constraints:

- **Budget:** A set budget should be followed in developing the project.
- **Time:** The project needs to be designed and launched within the allotted amount of time.

- **Technology:** Specific technologies that are compatible with the current IT infrastructure should be used to construct the project.
- **Legal and Regulatory Compliance:** In terms of data privacy, intellectual property rights, and accessibility, the website should adhere to all applicable legal and governmental standards.
- **Skill:** The library management website should be developed within the limits of the expertise of the students who are tasked with its development.

3. Use Case Diagram

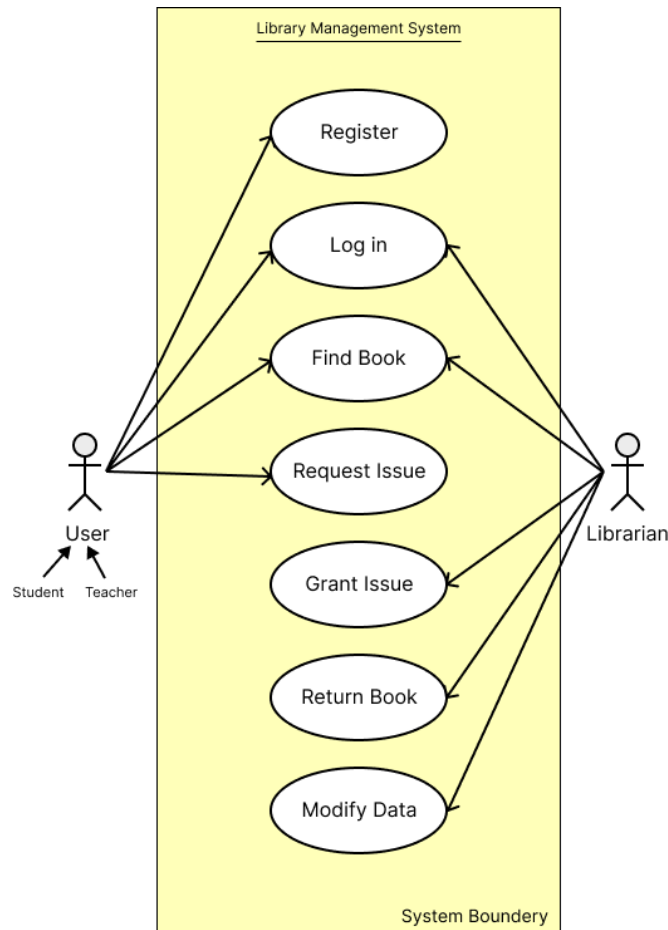


Figure: Use Case Diagram of the Library Management System

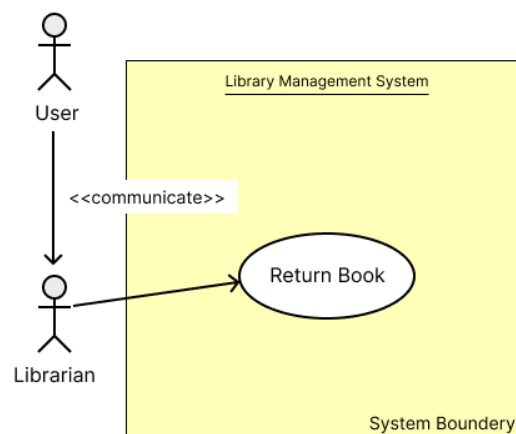
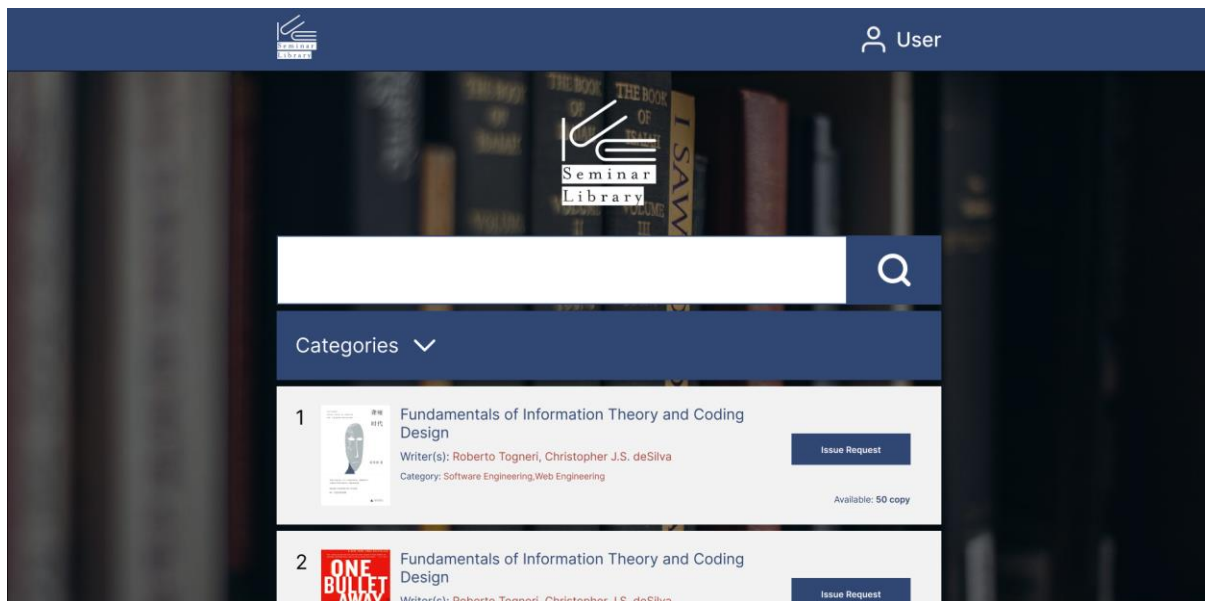


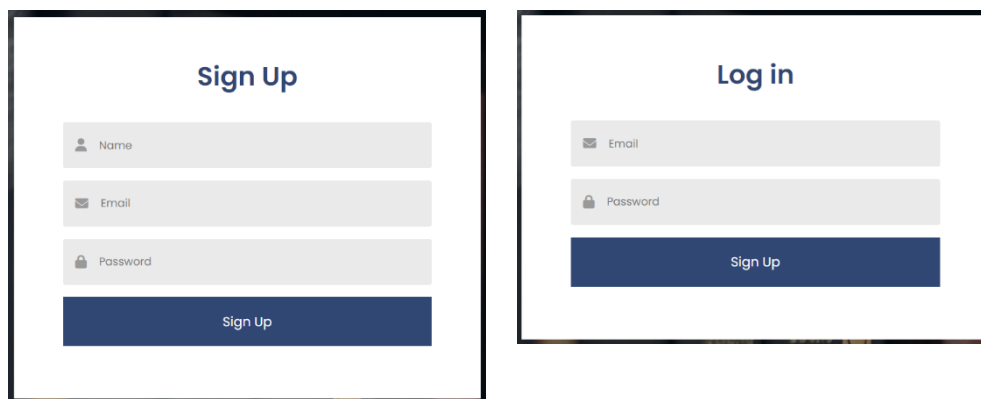
Figure: Use Case Diagram of the Library Management System (Return Book)

4. UI Design

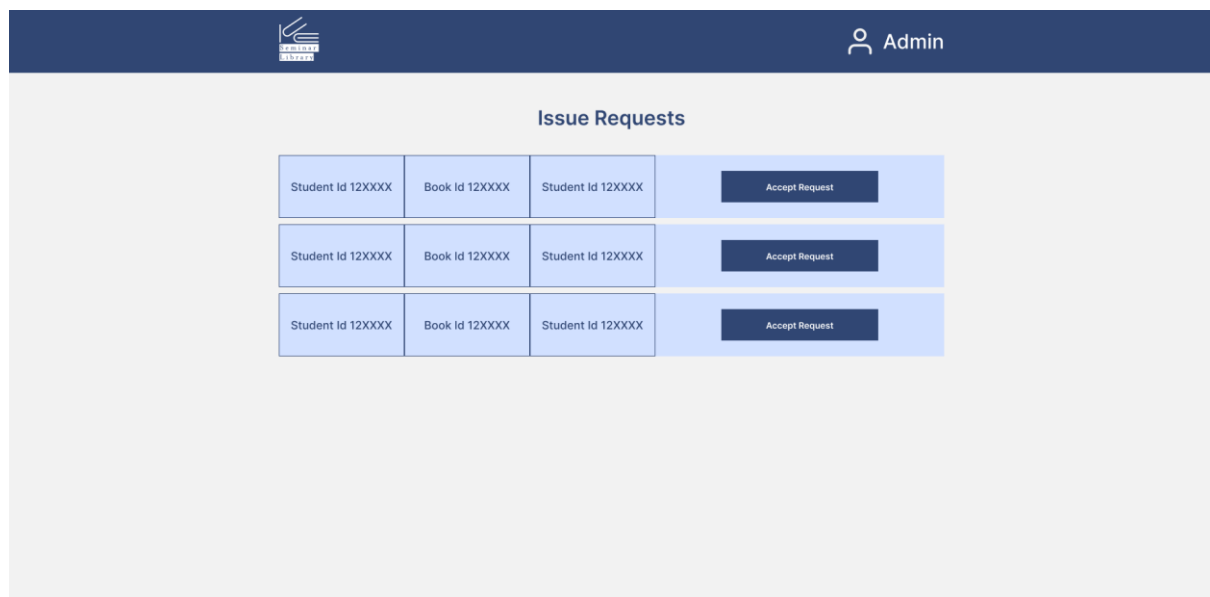
1. Home Page



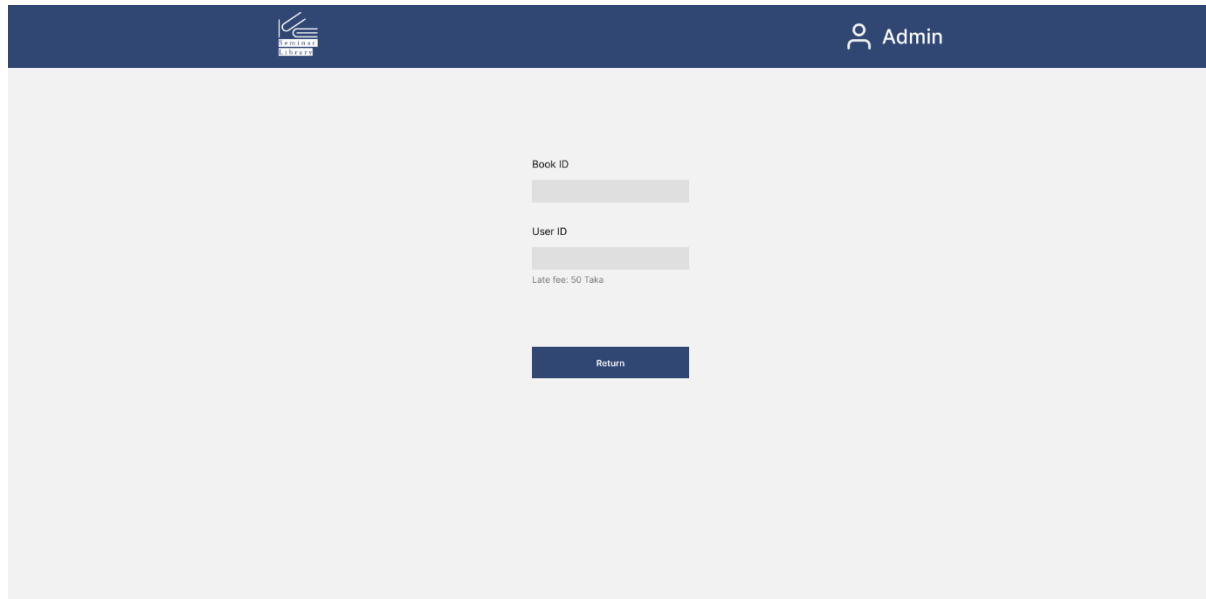
2. Sign Up & Log in page



3. Grant Request Page



4. Return Page



Book ID

User ID

Late fee: 50 Taka

Return

5. Project Team & Participation

Lead and Organising:

Project lead: Tanshen Mahamud Saimu: 1810677105

Writing and documentation Team:

Requirement Engineering: Shehjad Mobin: 1810677110, Nayem Hosen Mollah: 1811177147, Md Hasib: 1810277142, Bipul Islam: 1810677126

Use case Diagram: Shehjad Mobin: 1810677110, Bipul Islam: 1810677126, Nayem Hosen Mollah: 1811177147

UI design: Shehjad Mobin: 1810677110

Documentation: Shehjad Mobin: 1810677110, Tanshen Mahamud Saimu: 1810677105

Front-end Development Team:

Homepage: Tanshen Mahamud Saimu: 1810677105

Login & Sign Up Page: Shehjad Mobin: 1810677110, S.M. Shuzatul Hoque: 1811077101

Book Card: S.M. Shuzatul Hoque: 1811077101

Issue Book Page: Md Jahidul Islam: 1810277130

Return Book Page: Tanshen Mahamud Saimu: 1810677105

Database & User Interaction with JavaScript: Tanshen Mahamud Saimu: 1810677105, Al Riyad Karim: 1810477148

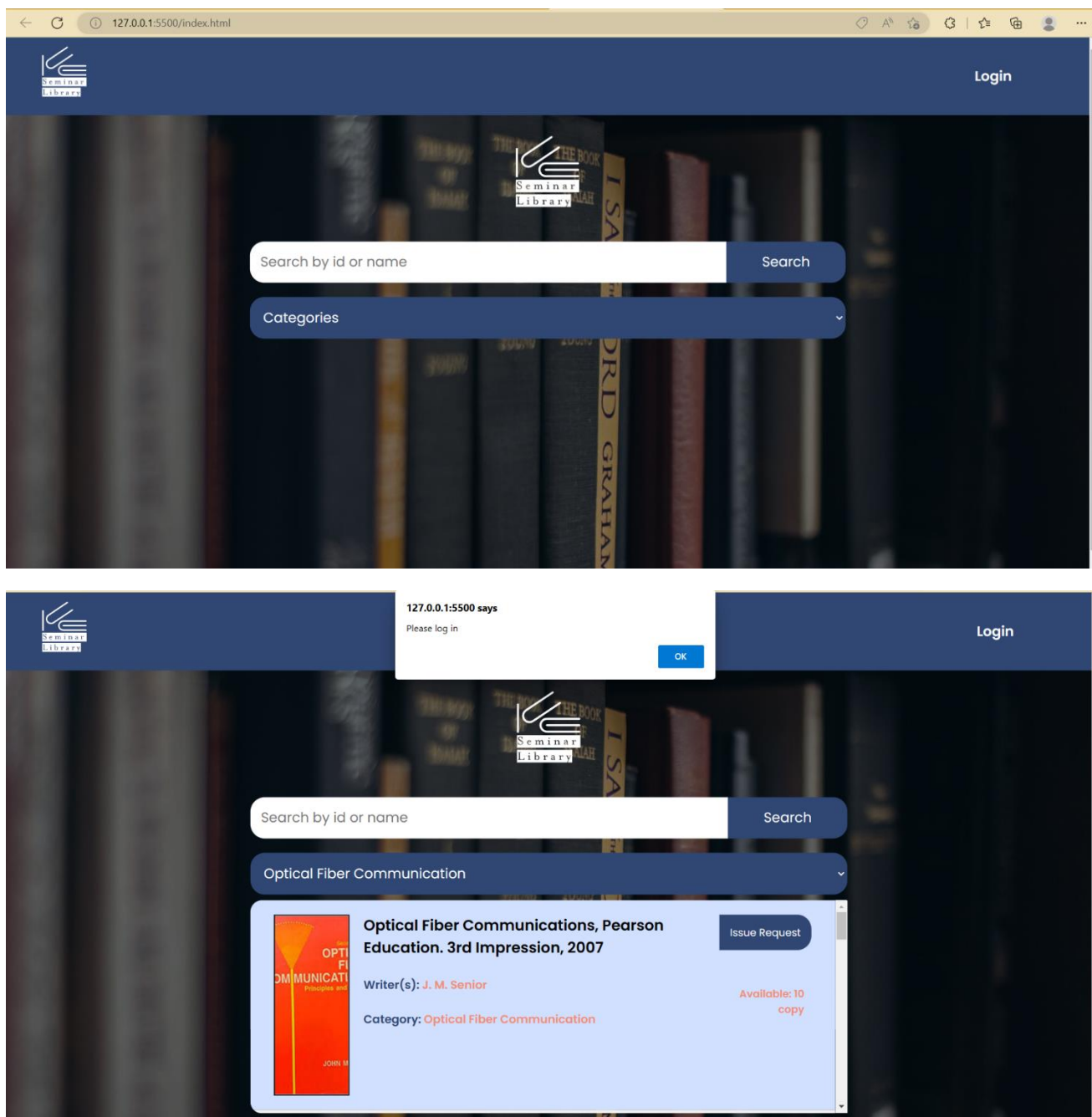
Data Organization Team:

User Data: Shohel Rana: 1810677137, Milon Kumar Mahato: 1810677150, Asifuzzaman: 1710277102

Book Data: Jihad Molla: 1810177129, Asif-Bin-Nur: 1811177136, Azharul Islam: 1810677121, Tasrif Ahmed Ocean: 1810477138, Moniruzzaman: 1810877123

Image & resource: Asif-Bin-Nur: 1811177136, Azharul Islam: 1810677121, Tasrif Ahmed Ocean: 1810477138

6. Developed Website





Login

[Log in](#)

riaz_uddin_mondal@ru.ac.bd

.....

Log in



Dr. Riaz Uddin Mondal Logout

Logout



Search by id or name

Search

Categories



Dr. Riaz Uddin Mondal Logout



Name: Dr. Riaz Uddin Mondal
Email: riaz_uddin_mondal@ru.ac.bd
Role: Teacher
Issued Book: 4111.1,4131.1

Search by id or name

Search

Categories



127.0.0.1:5500 says
Your request has been granted

Dr. Riaz Uddin Mondal
Email: riaz_uddin_mondal@ru.ac.bd
Role: Teacher
Issued Book: 4111.1,4131.1

Search by id or name

Search

Database Management System



Database Systems Concept, Fifth Edition

Issue Request

Writer(s): A. Silberschatz, H. F. Korth and S.Sudarshan

Category: Database Management System

Available: 10
copy



Search

Categories



Return

Admin

Issue Requests

Student Id	Book Id	Book Name	Action
102	4141.1	Database Systems Concept, Fifth Edition	Accept Request

Issue Requests

Student Id	Book Id	Book Name	Action
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Return

User Id

Book Id

Return

Return

102

414LI

Return

5. Implementation

Modern online technologies, including HTML5, CSS3, and JavaScript, as well as the lightweight JSON (JavaScript Object Notation) data transfer format, are used in the development of the library management website. Both desktop and mobile devices can visit the website.

The methods for implementing the library administration website are as follows because of the students' limited technological abilities:

UI Design: All users, especially those with little technical experience, are intended to find the website interface to be easy to use. Any user may quickly and simply find and order books thanks to the interface's streamlined navigation. Additionally, the design has been developed to enable accessibility for people who are blind to color, for example. The library management website hopes to deliver a smooth user experience that meets the demands of all users by including these elements.

Front-End Development: The front-end development team will utilize HTML5, CSS3, and JavaScript to create the user interface after the design is complete. They will make sure that the user interface is simple to use and navigate and that the website's design is appropriately applied. We used the JSON data interchange standard, which is popular in online applications, to exchange data between the server and the client instead of a backend database management system like MySQL. JSON data works in frontend by enabling web developers to share data in a compact, effective, and standardized format between the server and the client-side JavaScript code.

Functionalities: The user and book data are initially retrieved from the corresponding files `users.json` and `books.json`. If the data hasn't already been put in local storage, the block of code makes sure to do so using the `'setItem()'` method.

On the homepage, visitors can explore book categories and do a name- or ID-based book search. Using the JavaScript `'find()'` function, this program extracts all the categories from the `'books.json'` file and associates them with the corresponding books. A user cannot issue a book unless they are logged in.

The user profile is displayed, which includes their name, email, role, and issued book. This information is retrieved from the local storage and then displayed on the webpage by clicking their name.

Users can look for books by category or ID after logging in, which is authenticated using the `Find` function, and request a book. Users can log out and go back to the login page by clicking the logout button.

The next block of code also includes functionalities such as logging in, logging out, searching for books, issuing books, and returning books. The `"searchFromCategory"` function allows users to search for books based on their category, while the `"searchBook"` function enables them to search for books by name or ID. The `"issueBook"` function allows users to issue a book if it is available, and the `"request"` function grants their request and updates the local storage.

The admin panel allows admins to view requests made by users for a particular book. The requests are collected from local storage using the `'getItem()'` function, and the admin can approve the request after verifying the user and book IDs using the `'find()'` function. If the book is issued, the quantity is updated in local storage using the `'setItem()'` function. The admin panel also has the option to return books,

which is handled by a JavaScript function that verifies the user and book IDs using the *'find()'* function and updates the quantity of the book in local storage using the *'setItem()'* function.

Testing: The team will thoroughly test the website when it is created to make sure it is error-free, secure, and user-friendly. To verify the website's usability, performance, and functioning, manual testing will be used.

Documentation: The website development process is formally documented in this report. This article presents a clear and thorough overview of the website's development, from the initial problem definition to the final technical specifics, by documenting every stage of the development process. This documentation serves as a reference for future developers and stakeholders, ensuring that they have a clear understanding of the website's development process and technical details. Additionally, this documentation can be used to inform future updates and improvements to the website, ensuring that it remains an efficient and effective tool for the library.

6. Limitations

Only frontend technologies, without any backend programming or database integration, were used in the development of our website. As a result, neither a database language like MySQL or MongoDB, nor a backend development language like PHP or Node.js, are necessary. As a result, since the website functions with predefined user data, we lack a working signup page.

One major drawback of this website using json is book quantity, borrowed or requested book, user or any other variable or data is changed only on the localhost not in the json file. If we have to edit anything on json file we have to cut all the data saved on the localhost and start the website anew. Thus, we can lose all the previous data.

Again, we have many other academic activities we cannot ensure the full focus and time on this project.

Additionally, we are working on showing the table which books user have requested and which book user has borrowed from the website. Also, the books user has borrowed will show to admin panel return web page and within one click the book will return.

7. Conclusion

On the user and admin sides of the interface, our website does not display an issued book table. On their individual profile pages, individuals can examine the presently issued books that are part of their library, and administrators can use the admin panel to view all current issue requests submitted by users. We were unable to add some functionality to our website due to time restrictions and gaps in our technical skills. Although we acknowledge that some features may have been ideal, we had to decide what was practical given the project's scale and timetable. Nevertheless, we welcome criticism and ideas for future enhancements. We anticipate acquiring the requisite technical know-how and abilities to put those stages into effect in the near future.