

Online Library Management System

Report

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***This code written in web development project done by me and it is mine.**

Acknowledgement

I would like to express the deepest gratitude to Mr. Ikram Ullah Khan, my teacher, for his help, guidance and encouragement in my work and far beyond. Without his numerous suggestions and immense knowledge, this would never have been completed. Without his open-mindedness, my hard work would not have been so rewarding.

It gives me great pleasure to have the opportunity to thank those fellows who helped me in developing the web application where I got stuck during this development period.

I acknowledge that code written for back-end is developed by me myself. But for front-end I use bootstrap templates.

Abstract

Library plays an important role in the education part of school, colleges and universities. I think no educational institution is complete without a library management software. It is a vital feature of any school and college library, and it assists the librarian in keeping track of both available and issued volumes. Library Management System software assists students in a variety of ways by allowing them to study, gather resources, enhance group learning, and develop their knowledge and abilities. The Online Library Management System is an Automated Library System that manages the library's many operations. It offers a full library administration software solution. In Online Library Management System, there can be multiple users but there is only one librarian that is admin of the software. Users can issue books from the library but admin can add another, update a book, can delete a book and view all the books which are currently available in the library with their copies. The technology which is used in this project is python with flask as back-end, html/CSS for front-end, Ajax for data requests and MYSQL for database.

Keywords: Online, Library, System, Admin, User, Books, python, Ajax, MYSQL.

1. Introduction

The project "Online Library Management System" is a library management tool that tracks and regulates library transactions. The Online Library System is a piece of software designed to increase the productivity of librarians, library employees, and users. The Online Library System that will be constructed will be extremely beneficial to the institute's members and librarians. Members can utilize the book catalogue and metadata in the system to assist them decide which books to borrow from the library. The Librarian is in charge of maintaining the books catalogue up to current at all times so that members (students and professors) may access the most up-to-date information.

1.1 Purpose of Document

The objective of this document is to define the Online Library System's exterior and internal behavior. It specifies and explains the Online Library System's operations, interfaces, and performance. Nonfunctional requirements, such as user interfaces, are also described in the paper. It also explains the design restrictions that must be addressed while designing the system, as well as other variables that are required to create a thorough and comprehensive definition of the software requirements.

1.2 Document Conventions

The following are the list of conventions and acronyms used in this document and the project as well:

- **Admin:** A login id representing a user with user admin privileges to the software
- **User:** A general login id assigned to most users
- **SQL:** Structured query language used to retrieve information from a database
- **MYSQL Server:** A server used to store data in an organized format
- **ASP:** Active Server Pages: A web Page formatted on the server and delivered to the browser.
- **Data flow Diagram:** It shows the dataflow between the entities.
- **Use Case:** A broad level diagram of the project showing a basic overview
- **Interface:** Something used to communicate across different mediums
- **Unique Key:** Used to differentiate entries in a database

2. Problem Statement:

Institutional Libraries can be managed by any librarian because these are not so much large but there are many public libraries which are run by government and there is no check and balance of books. Librarians in libraries keep track of the books that students borrow, check them personally, and keep track of the books that are delivered. All of these duties must be accomplished manually, and if the library is vast, proper record keeping will become a major problem, as manual record keeping has never been a reliable method owing to people's penchant for forgetting things. Their grievances with the existing system include the following:

- It is impossible to provide reports in a timely manner.
- It's difficult to locate a book.
- The data on book issue returns isn't updated on a regular basis.
- No central database can be built since information isn't available in databases.

3. Purpose Statement

It is planned to use an online Library Management System. Users may rapidly add members, books, update and change information, and borrow and return books. The following are the advantages of our proposed system.

- User friendly interface
- Fast access to database
- Less error
- More Storage Capacity
- Search facility
- Look and Feel Environment
- Quick transaction

All the manual difficulties in managing the Library have been rectified by implementing computerization.

4. Methodology:

4.1 VS code:

Before start of any project, we have to determine that which IDE is the best to develop a code and on which language we are going to work. For this web development application, I chose VS code as my development IDE which is the product of Microsoft and free to use. It has many built in extension to give user friendly interface. Instead of all this VS code provides us a very easy and light weighted directory structure for our development project.

4.2 Flask with Python:

For this specific development project, we have to use python as programming language to build back end of our web application. Python provides different frameworks for the web development. In this we were given choices to use one out of two frameworks; 1. Flask, 2. Django. But I used Flask framework for this specific project. Because I had a good hand on experience on framework and the most important thing that it was being taught to us in the whole previous semester. I had already worked on the flask framework.

4.3 MySQLAlchemy

For this web application, I have to maintain some records which have to be used in the web application. For example, maintaining the records of users, maintaining the records of books and maintaining the records of issued books. To keep all these records, I have used freesqlhosting database of MySQLAlchemy. SQLAlchemy is the way to connect our object relational model in python with MYSQL database. So, this database is free of cost and online but it will be expired after some days. To buy it permanent we have to pay online to get the storage and database.

4.4 Html/CSS

Web application is incomplete without the user interface. The more it will be friendly, the more it will be used by users. User interfaces are nothing just the front-end of web application. It means how users will be able to see and use your web application. For front-end, I used html with CSS. Html is used to create forms and write the text on the interfaces but CSS is cascading style sheet which is used for coloring and styling the web page.

4.5 Ajax

Before this project, we use the render templates method to send data to html page and receives data in the same way. But this time, I used Ajax which is not a programming language rather it is used to transfer data in the Jason form. It is a browser built-in XMLHttpRequest object which requests the data from web server.

4.6 ORM

ORM stands for object relational Mapping. It is a technology that uses an object-oriented paradigm to query and modify data from a database. An ORM library is a perfectly regular library built in your preferred language that wraps the code required to handle the data, so you no longer need SQL and instead interact directly with an object in the same language.

4.7 MVC

MVC stands for Model View Controller. The MVC design allows you to segregate the frontend and backend code. This makes it much easier to handle and alter one side without interfering with the other.

5. Functionality

5.1 Home Page

When we run the code, a server starts running on the local host which runs the web application. When we start the code it shows us an index page which is an html page. It has three buttons to redirect to sign up and login page respectively.

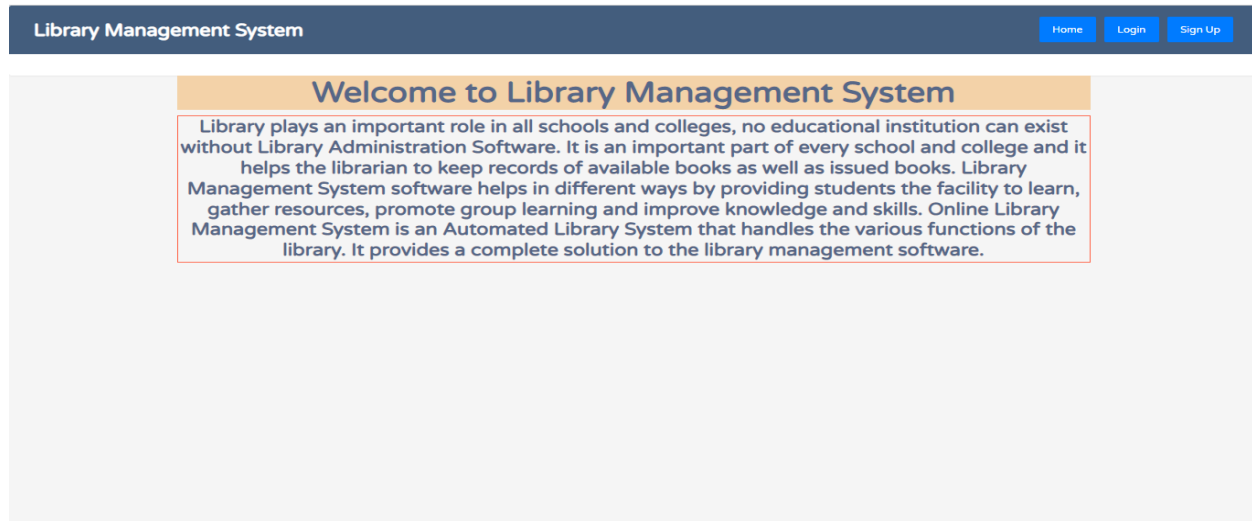


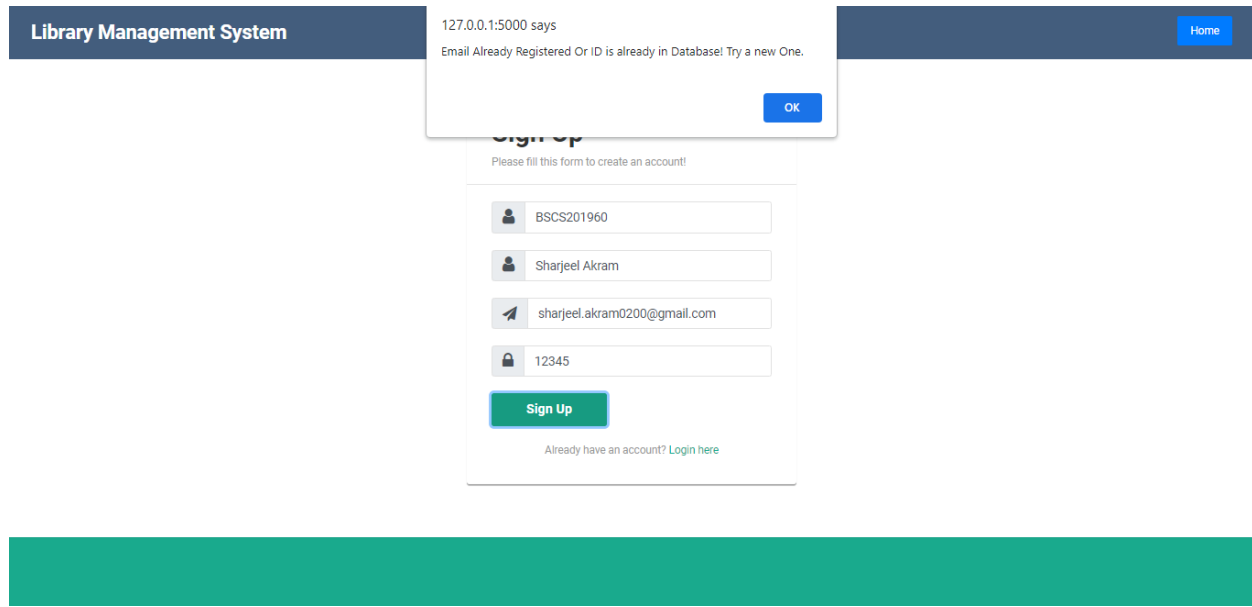
Figure 1: Home Page of Web Application.

5.2 Sign up Page or User Registration

Once you click the Sign up button, you are redirected to use registration form where you have to get yourself registered to use this library management system. Sign up forms demands you to input your university ID, your name, your email and your password. Once you click the signup, you got yourself registered in the users table of library. But you should keep this in mind that your email should be unique each time. And you have to remember password for login.

Figure 2: Sign up page of web application.

After signing up your account, you will be redirected to login page. But before this there is exceptional case that if you registered your account with already registered account, it will give an error.

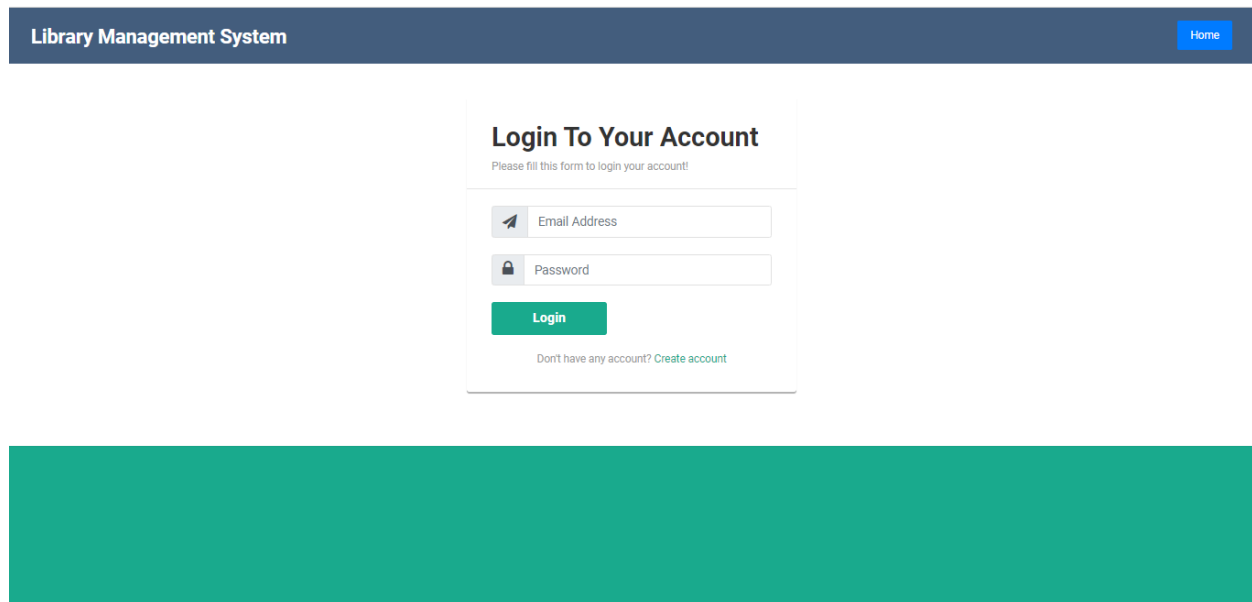


The screenshot shows the 'Library Management System' header. A modal window displays an error message: '127.0.0.1:5000 says Email Already Registered Or ID is already in Database! Try a new One.' Below the error is an 'OK' button. The sign-up form below the error contains the following fields: ID (BSCS201960), Name (Sharjeel Akram), Email (sharjeel.akram0200@gmail.com), and Password (12345). A 'Sign Up' button is at the bottom of the form, with a link 'Already have an account? Login here' below it.

Figure 3: Error on sign up Page of web Application

5.3 Login Page

On the login page, only registered user can login otherwise new users have to register first before login. Login form demands your email and password through which you got registered yourself. And if the credentials are wrong then you will get an error to ask you valid credentials.



The screenshot shows the 'Library Management System' header. The login form is titled 'Login To Your Account' and includes the instruction 'Please fill this form to login your account!'. It contains two input fields: 'Email Address' and 'Password'. A 'Login' button is positioned below these fields. At the bottom of the form, there is a link: 'Don't have any account? Create account'.

Figure 4: Login Page of web Application.

5.4 User Dashboard

If user logged in successfully, then user will be redirected to user Dashboard where user can see his ID, his name and his email on the Dashboard.

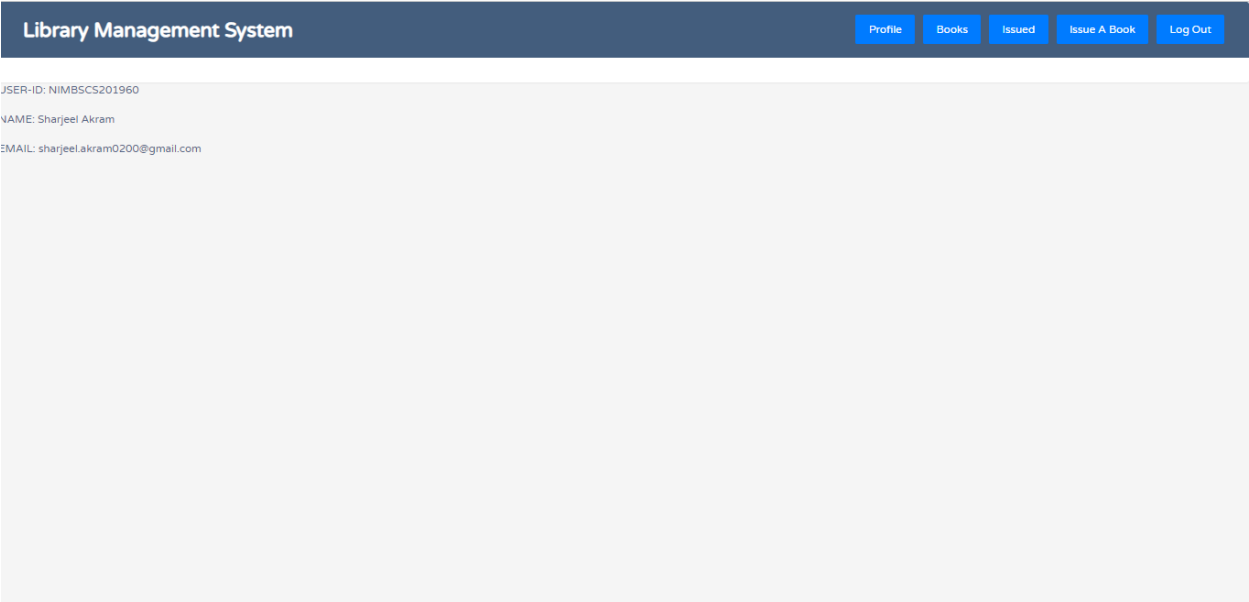


Figure 5: User profile on User Dashboard.

Dashboard has multiple buttons and through these button user has different type of privileges to use the Library Management System. User can view all the books in the Library.

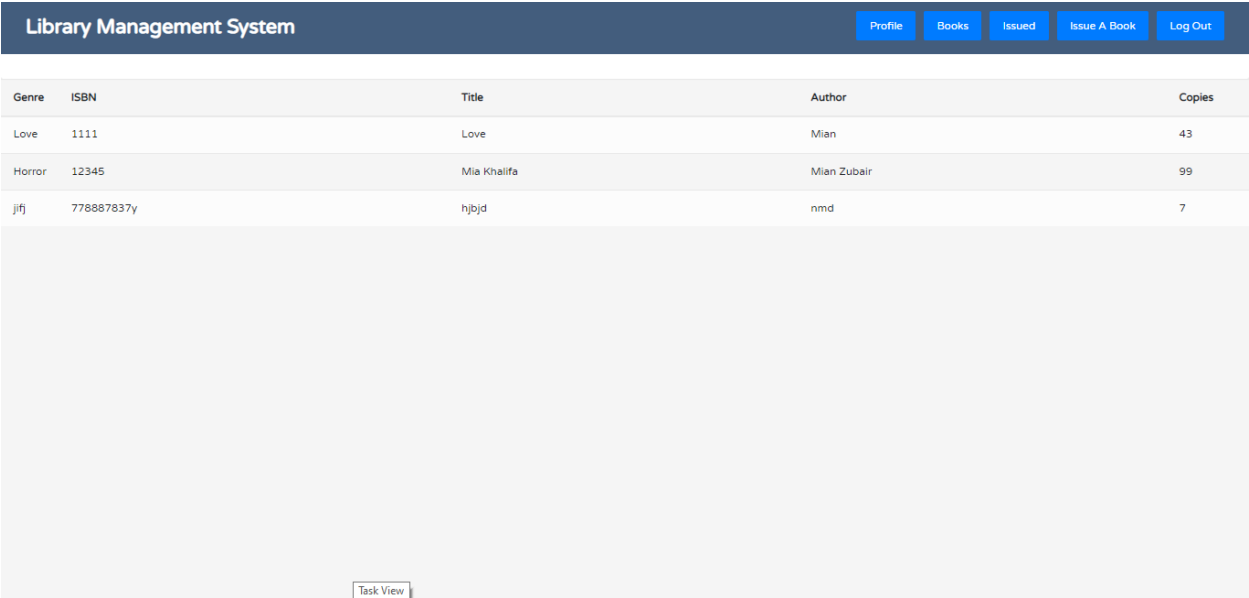


Figure 6: All available books on user dashboard.

5.5 Issue a book

Beside this, user can issue a book from the library and when the user issues a book from the library then the copy of book reduces one in the table of books. To issue a book user has to input book ISBN number and the book will be issued from the library.

Library Management System

[Profile](#)[Books](#)[Issued](#)[Issue A Book](#)[Log out](#)

Issue A Book

Save

Figure 7: User can issue a book from the Library.

After issuing the book, the user issued book will be visible in the issued page of user dashboard. That book will be shown which currently logged in user had got issued.

Library Management System

[Profile](#)[Books](#)[Issued](#)[Issue A Book](#)[Log Out](#)

Sr_No	ISBN	User Email	Status
10	1111	sharjeel.akram0200@gmail.com	Borrowed

Figure 8: Issued book by a user on his dashboard.

And at the end, if the user clicks on log out button then the user will be logged out and to gain access again he has to login again.

That was all the functionality of a user in the library.



5.6 Admin Dashboard

To access the admin dashboard, user has to be registered with admin email and admin email will always be admin123@gmail.com. By logging in through that Gmail, the admin will be redirected to admin Dashboard. Admin has some more privileges than user. Admin can also see his profile, his name, his id and his email. Admin can also view the books which are available in the library.

Library Management System

USER-ID: admin123
NAME: Admin
EMAIL: admin123@gmail.com

Main Profile Delete Book Add Book Log out

Figure 9: Admin Profile on admin dashboard.

5.7 Add a book

There is an additional functionality that admin can add the books in the library. By clicking on add a book on the page, admin will be redirected to add a book. Admin will fill the form like genre of book, ISBN of book, title, author and copies of book. By saving it the book will be added to the database and will be visible to the admin dashboard.

Library Management System

Main Profile Delete Book Add Book Log out

Add Book

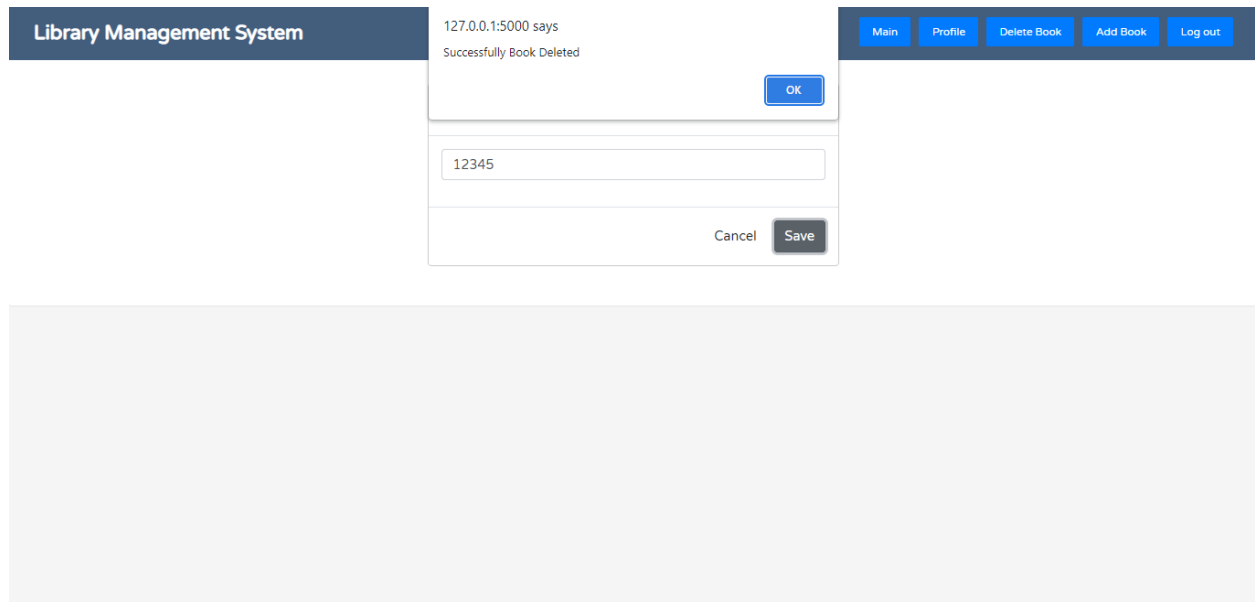
English
987654321
English Literature
Michael
45

Cancel Save

Figure 10: Add a book by the admin.

5.8 Delete a book

There is another functionality that admin can also delete a book from the library by ISBN number. The book will be deleted from the library and if the book is issued by any user it will also be deleted from the user.



The screenshot displays the 'Library Management System' interface. On the left, a dark blue header contains the text 'Library Management System'. On the right, a dark blue navigation bar includes buttons for 'Main', 'Profile', 'Delete Book', 'Add Book', and 'Log out'. The central area features a white modal dialog box. At the top of the dialog, it says '127.0.0.1:5000 says' and 'Successfully Book Deleted'. Below this is an 'OK' button. Underneath the message is a text input field containing the number '12345'. At the bottom of the dialog are 'Cancel' and 'Save' buttons.

Figure 11: Delete a book by admin.

And if the copies of book are out of stock, then by adding a book option you can add multiple copies of book and copies will be added to already added book in the library.

Admin can logout from the web and to gain access again, admin has to login again.

6. Conclusion

This report concludes all the description of a web application that is Library Management System. Online Library Management System is the basic need for all the libraries to maintain the record of all books which are issued by users. Librarian can add book and delete book depends on the availability of the books in the library. My developed web application has basics functionalities but fulfilling all the demands which were asked in the web development project.

The code is written in this web application is mine.