Library Management System

Project Documenta on

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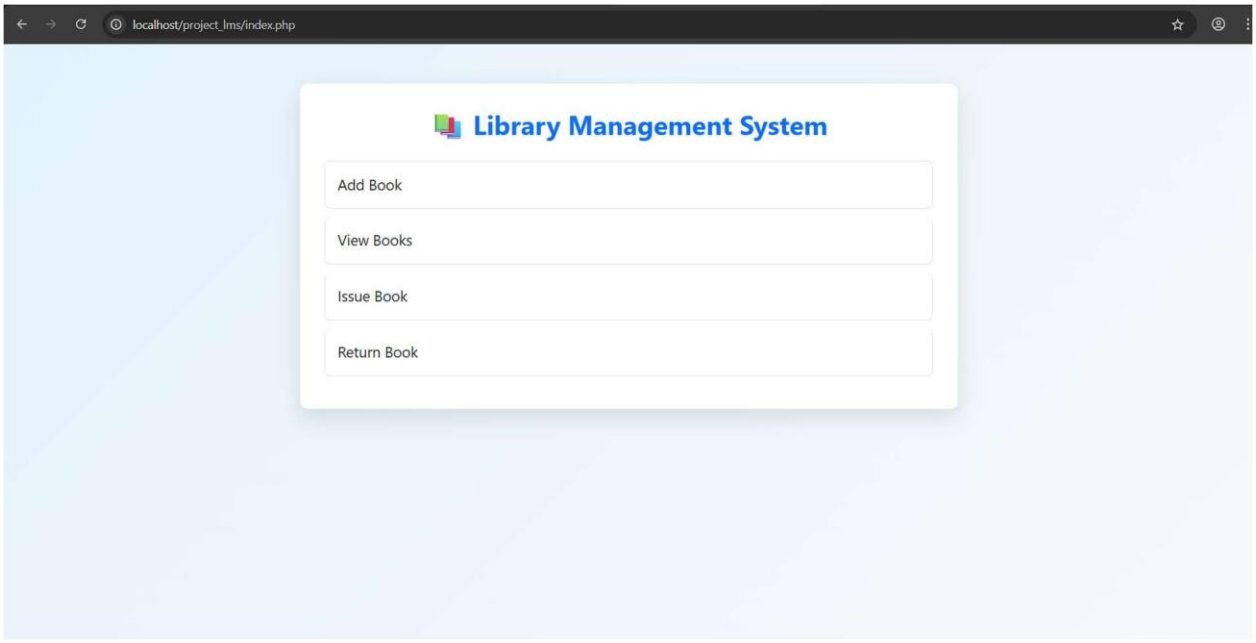
1. Introduc on

The Library Management System (LMS) is a comprehensive web-based applica on developed to manage and automate the daily ac vi es of a library. In tradi onal library systems, most opera ons such as maintaining book records, issuing books, and tracking returns are handled manually. This manual process is me-consuming, error-prone, and inefficient, especially when the number of books and users increases. The Library Management System aims to overcome these limita ons by providing a computerized solu on.

This project is developed using HTML and CSS for structure and styling, Bootstrap for responsive and professional user interface design, PHP for server-side scrip ng, and MySQL for database management. The system provides an easy-to-use interface that allows the librarian or administrator to manage books efficiently.

The project also serves as an academic implementa on to demonstrate how frontend and backend technologies can be integrated to create a complete database-driven web applica on. It focuses on simplicity, clarity, and func onality while maintaining professional design standards.



2. Problem Statement

In many educa onal ins tu ons, libraries s ll rely on manual systems such as registers or spreadsheets to manage book records. These systems suffer from several problems including data redundancy, loss of records, difficulty in searching books, and lack of proper tracking of issued and returned books. As the size of the library grows, managing records manually becomes increasingly difficult.

The problem addressed by this project is the lack of an efficient, reliable, and user-friendly system to manage library opera ons. The Library Management System is designed to provide a centralized pla orm where all library-related data can be stored, managed, and retrieved easily.

3. Objec ves of the Project

The primary objec ves of the Library Management System are:

- To automate the process of managing library records To provide accurate informa on about available books
- To simplify the process of issuing and returning books
- To reduce manual workload and paperwork
- To minimize errors in record keeping
- To provide a user-friendly and professional interface
- To demonstrate prac cal implementa on of web technologies

4. Scope of the Project

The scope of this project is limited to basic library management func onali es suitable for small to medium-sized libraries such as schools, colleges, or departments. The system allows administrators to add books, view available books, issue books to students, and record book returns.

Although the current version does not include advanced features such as authen ca on, fine calcula on, or repor ng, the system is designed in a modular way so that addi onal features can be added in the future without major changes to the exis ng codebase.

5. Feasibility Study

5.1 Technical Feasibility

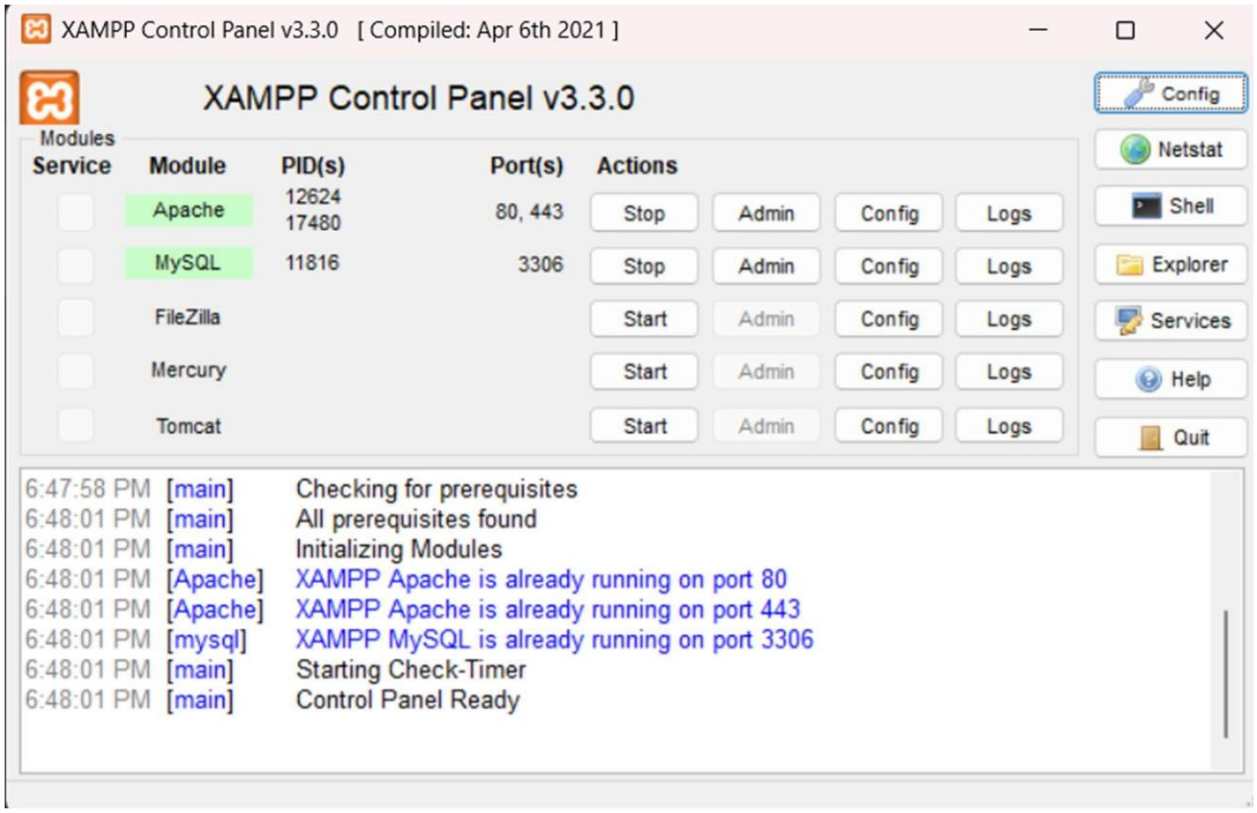
The project is technically feasible as it uses widely available and open-source technologies such as PHP, MySQL, HTML, CSS, and Bootstrap. These technologies are well-documented and supported, making development and maintenance easy.

5.2 Economic Feasibility

The system is economically feasible because it does not require any licensed so ware. All tools used in the project, such as XAMPP and VS Code, are free of cost.

5.3 Opera onal Feasibility

The system is easy to operate and requires minimal training. Any user with basic computer knowledge can use the system effec vely.



6. So ware and Hardware Requirements

6.1 So ware Requirements

- Opera ng System: Windows 10 or above
- Web Server: Apache (XAMPP)
- Database Server: MySQL
- Programming Language: PHP
- Frontend Technologies: HTML, CSS, Bootstrap
- Web Browser: Google Chrome or any modern browser

6.2 Hardware Requirements

- Processor: Intel Core i3 or above
- RAM: Minimum 4 GB
- Storage: At least 10 GB free disk space

7. Technologies Used

7.1 HTML

HTML is used to create the structure of web pages. It defines elements such as forms, tables, headings, and links used in the project.

7.2 CSS

CSS is used to style the web pages and improve visual appearance. Custom CSS is used along with Bootstrap to provide a professional look.

7.3 Bootstrap

Bootstrap is a frontend framework used to design responsive and mobile-friendly web pages. It provides pre-built components such as bu ons, tables, and forms.

7.4 PHP

PHP is a server-side scrip ng language used to handle backend logic such as database opera ons and form handling.

7.5 MySQL

MySQL is a rela onal database management system used to store and manage data related to books and issued records.

8. System Architecture

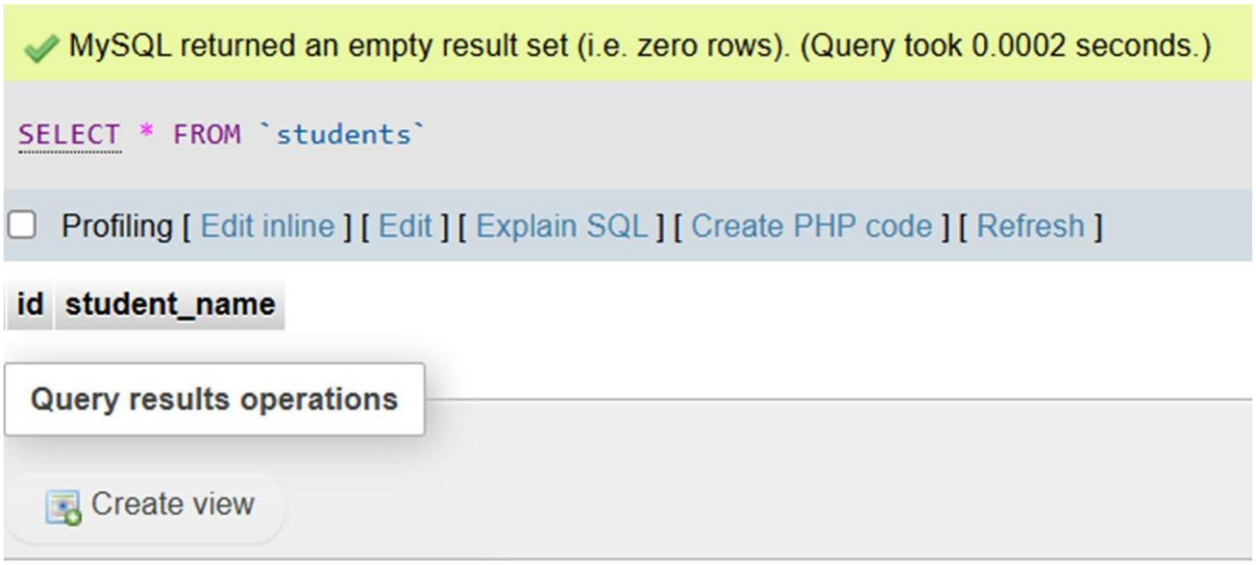
The Library Management System follows a client-server architecture. The client side consists of HTML, CSS, and Bootstrap which handle user interac on. The server side consists of PHP scripts that process requests and communicate with the MySQL database.

When a user performs an ac on, such as adding a book, the data is sent to the server where PHP processes it and stores it in the database. The response is then sent back to the client.

9. Database Design

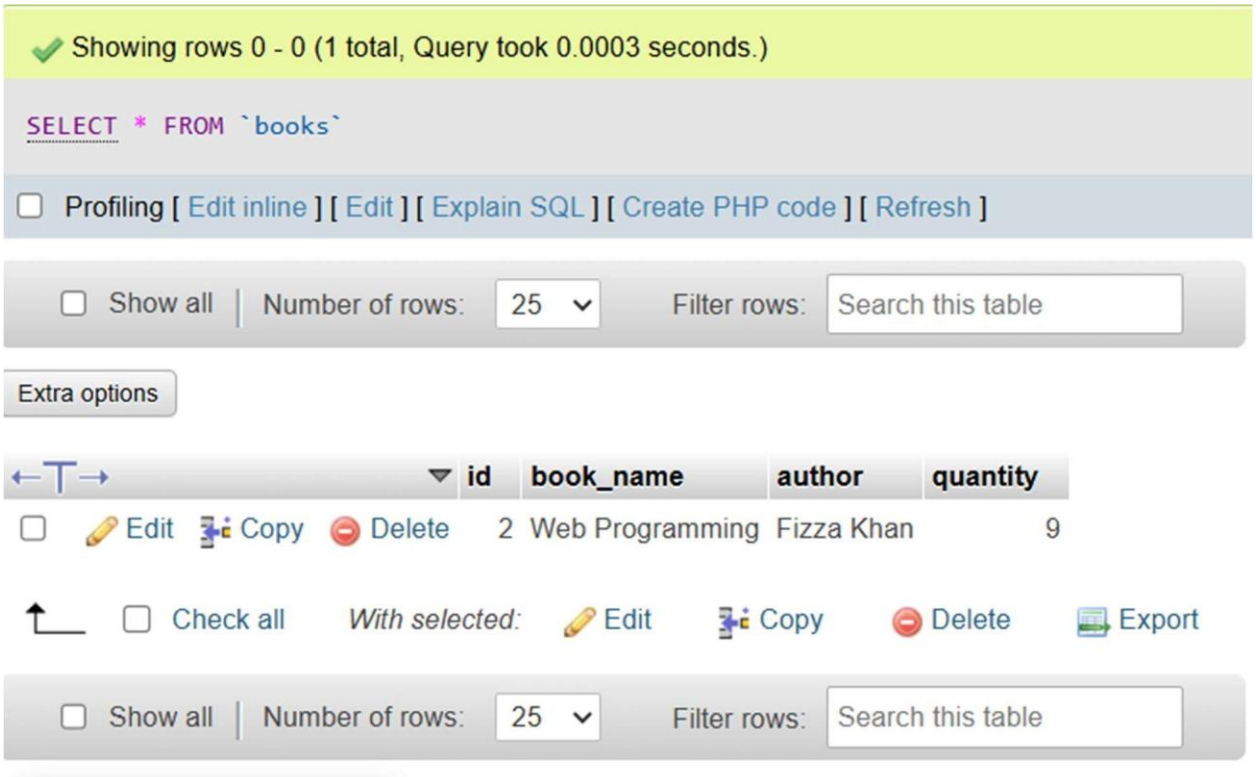
9.1 Database Overview

The database used in this project is named library_db. It contains mul ple tables that store informa on about books and issued records.



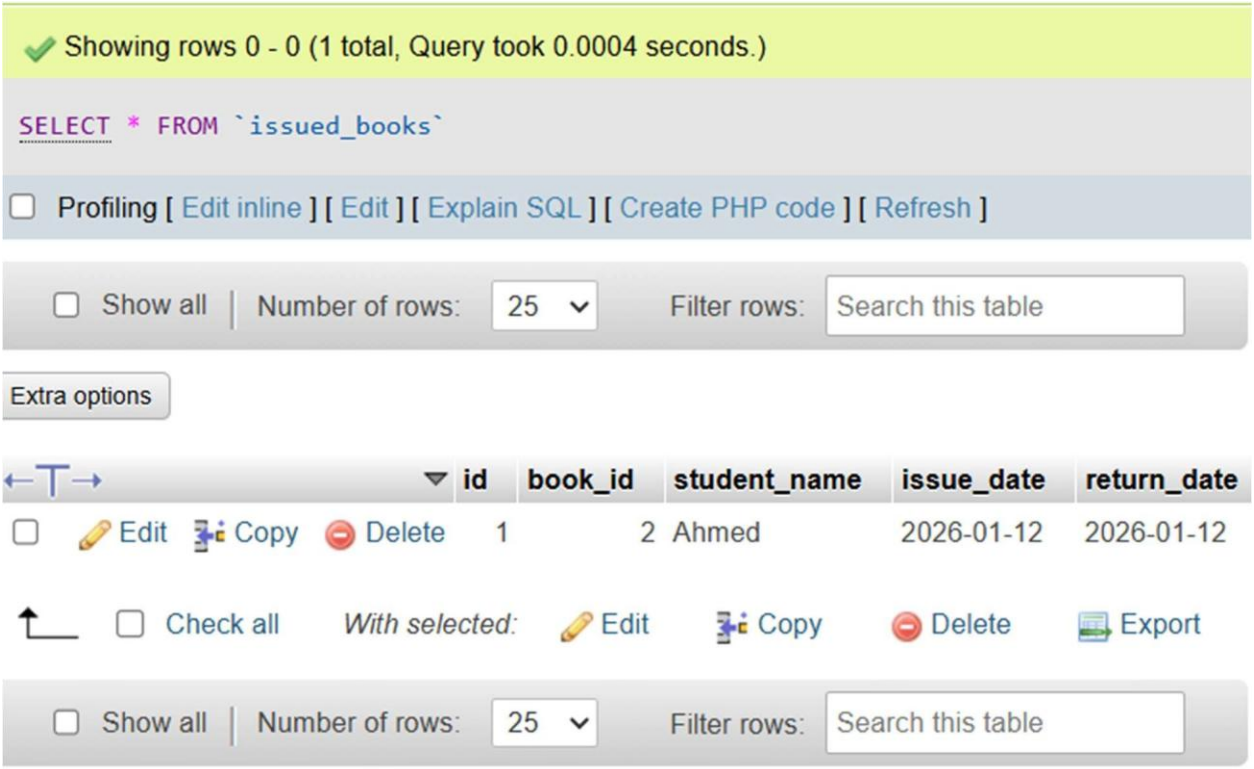
9.2 Books Table

The Books table stores informa on about all books available in the library. Each record includes book name, author name, and quan ty.



9.3 Issued Books Table

The Issued Books table stores records of books issued to students along with issue and return dates.



10. Module Descrip on

10.1 Home Page Module

The home page acts as the central naviga on point of the system. It provides links to all major func onali es.

10.2 Add Book Module

This module allows the administrator to add new books into the system by entering required details.

10.3 View Books Module

This module displays all available books in a structured table format.

10.4 Issue Book Module

This module handles the issuing of books to students and updates the database accordingly.

10.5 Return Book Module

This module records the return of books and updates return dates in the database.

11. User Interface Design

The user interface is designed using Bootstrap and custom CSS. It follows a card-based layout with proper spacing, colors, and typography to ensure a professional appearance.

12. Tes ng Strategy

Tes ng was performed on each module to ensure correct func onality. Input valida on and database opera ons were tested thoroughly.

13. Security Considera ons

Basic security measures such as input valida on are implemented. Future versions can include authen ca on and prepared statements.

14. Limita ons of the System

The current system has limited features and does not include advanced func onali es such as login systems or fine calcula on.

15. Future Enhancements

The system can be enhanced by adding user authen ca on, search func onality, repor ng features, and fine management.

16. Advantages of the System

The system is user-friendly, efficient, me-saving, and reduces manual errors.

17. Disadvantages of the System

The system is basic and suitable only for small-scale use.

18. Conclusion

The Library Management System successfully demonstrates the use of web technologies to build a func onal applica on. It provides a strong founda on for future improvements.

19. References

- PHP Official Documenta on
- MySQL Documenta on
- Bootstrap Official Website

20. Appendix

The appendix contains source code and database scripts used in the project.

21. Screenshots and Output Explana on

21.1 Home Page Screenshot

Figure 1: Home Page of Library Management System

index.php

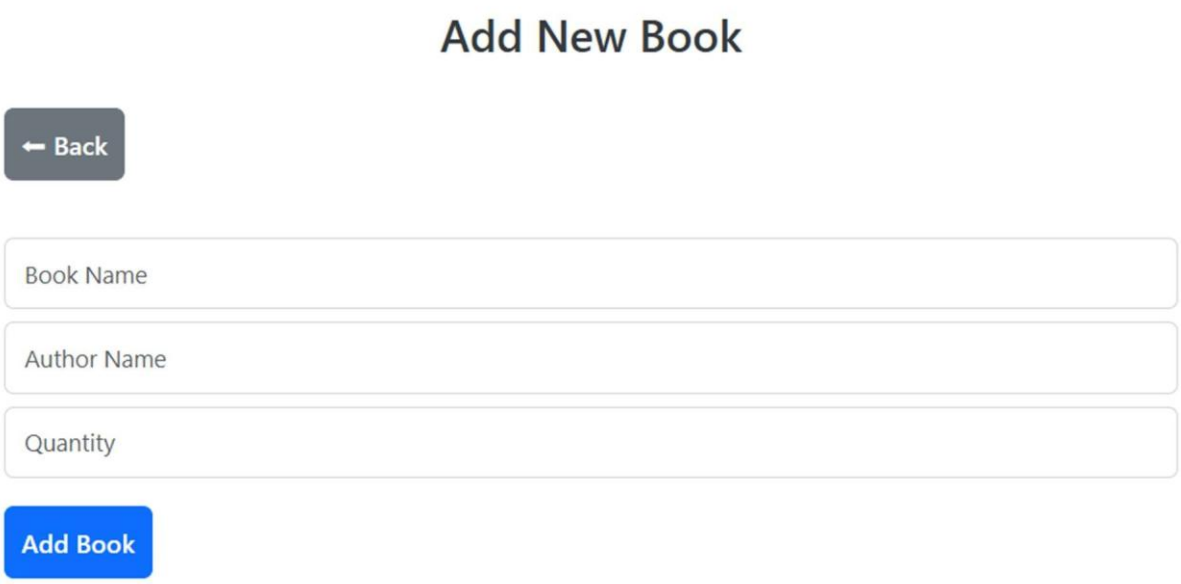
```php
<!DOCTYPE html>
<html>
<head>
    <title>Library Management System</title>
    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css" rel="stylesheet">
    <link rel="stylesheet" href="style.css">

</head>
<body class="bg-light">

<div class="container mt-5">
    <h2 class="text-center">📚 Library Management System</h2>
    <div class="list-group mt-4">
        <a href="add_book.php" class="list-group-item list-group-item-action">Add Book</a>
        <a href="view_books.php" class="list-group-item list-group-item-action">View Books</a>
        <a href="issue_book.php" class="list-group-item list-group-item-action">Issue Book</a>
        <a href="return_book.php" class="list-group-item list-group-item-action">Return Book</a>
    </div>
</div>

</body>
</html>

```

Descrip on:

The home page serves as the main dashboard of the Library Management System. It provides clear naviga on links to all modules. Bootstrap list groups and custom CSS are used to give a clean and professional look.

21.2 Add Book Page Screenshot

Figure 2: Add Book Module



Descrip on:

This page allows the administrator to add new books to the library. Data entered in the form is sent to the database using PHP and MySQL.

21.3 View Books Page Screenshot

Figure 3: View Books Module

Descrip on:

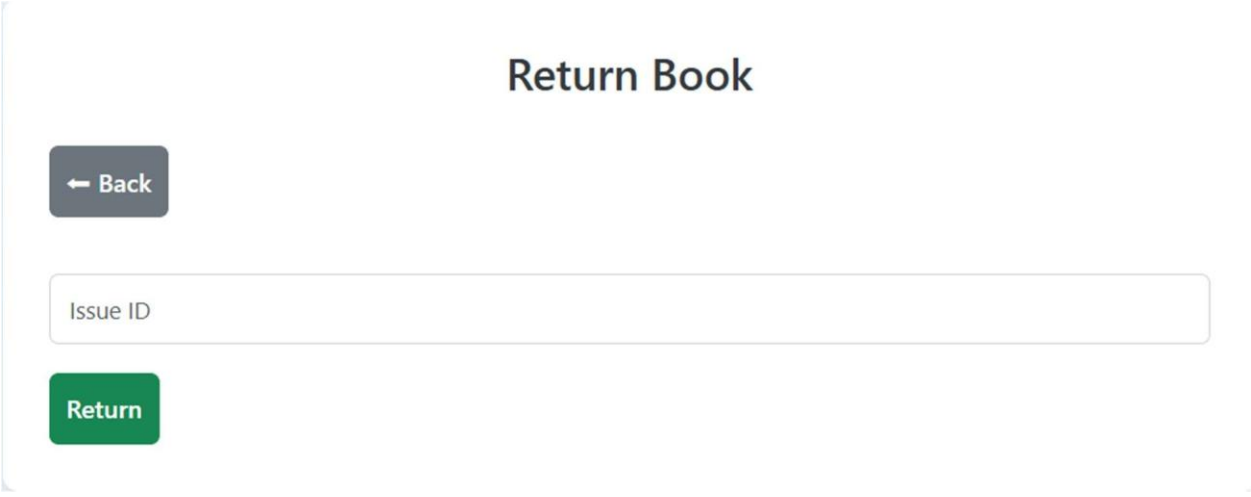
This module displays all books stored in the database in a tabular format. Bootstrap tables are used for proper alignment and readability.

Figure 4: Issue Book Module

Descrip on:

This page records the issuing of books to students. When a book is issued, its quan ty is reduced in the database.

Figure 5: Return Book Module



Descrip on:

This module updates the return date of issued books and completes the transac on process.

22. Source Code Documenta on

22.1 Database Connec on Code (db.php)

```
<?php
$conn = mysqli_connect("localhost", "root", "", "library_db");
if (!$conn) {
    die("Database connec on failed");
}
?>
```

Explana on:

This file is used to establish a connec on between the PHP applica on and the MySQL database.

It is included in all backend files.

22.2 Home Page Code (index.php)

```
<!DOCTYPE html>
<html>
<head>
```

```
    < tle>Library Management System</ tle>
    <link href="h ps://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css"
rel="stylesheet">
    <link rel="stylesheet" href="style.css">
</head>
<body>
<div class="container">
    <h2>Library Management System</h2>
    <div class="list-group">
        <a href="add_book.php" class="list-group-item">Add Book</a>
        <a href="view_books.php" class="list-group-item">View Books</a>
        <a href="issue_book.php" class="list-group-item">Issue Book</a>
        <a href="return_book.php" class="list-group-item">Return Book</a>
    </div>
</div>
</body>
</html>
```

Explana on:

This page provides naviga on to all system modules and acts as the main entry point.

22.3 Add Book Code (add_book.php)

```
<?php include 'db.php'; ?>

<form method="post">

    <input type="text" name="book_name" placeholder="Book Name">

    <input type="text" name="author" placeholder="Author">

    <input type="number" name="quan ty" placeholder="Quan ty">

    <bu on name="add">Add Book</bu on>

</form>
```

Explana on:

This code inserts new book records into the database using SQL INSERT queries.

22.4 Issue Book Code (issue_book.php)

```
mysqli_query($conn, "INSERT INTO issued_books VALUES(", '$book_id', '$student', '$date',
")");

mysqli_query($conn, "UPDATE books SET quan ty = quan ty - 1 WHERE id='$book_id'");
```

Explana on:

This code records issued books and updates book quan ty in the database.

23. Sample SQL Queries

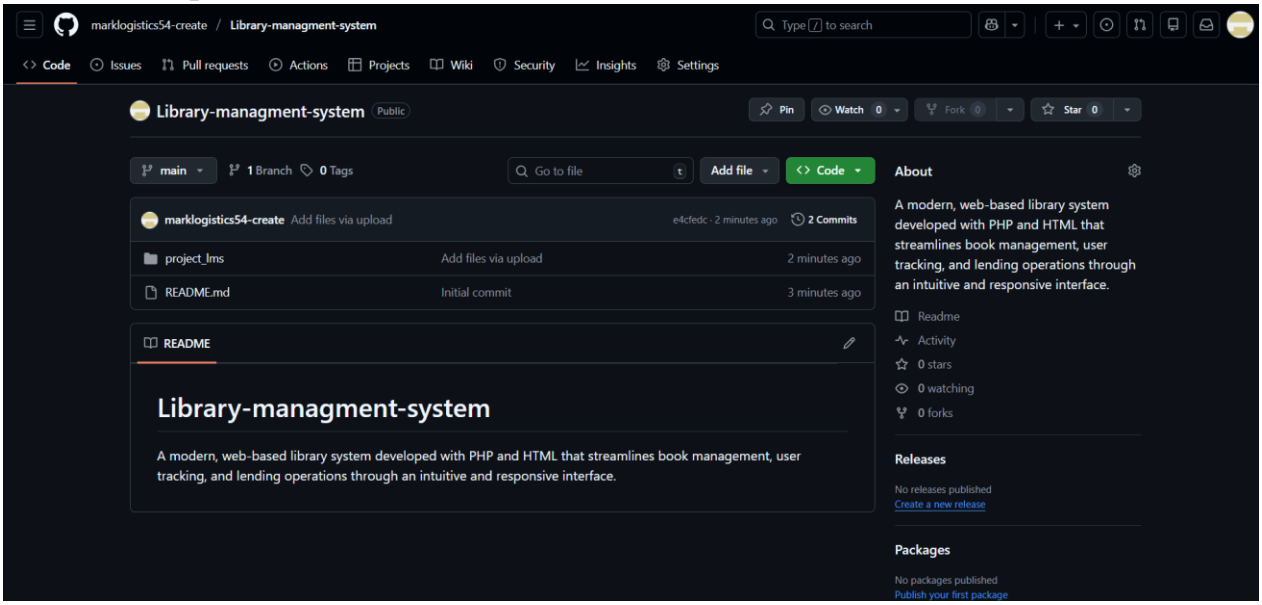
INSERT INTO books (book_name, author, quan ty) VALUES ('DBMS', 'Navathe', 5);

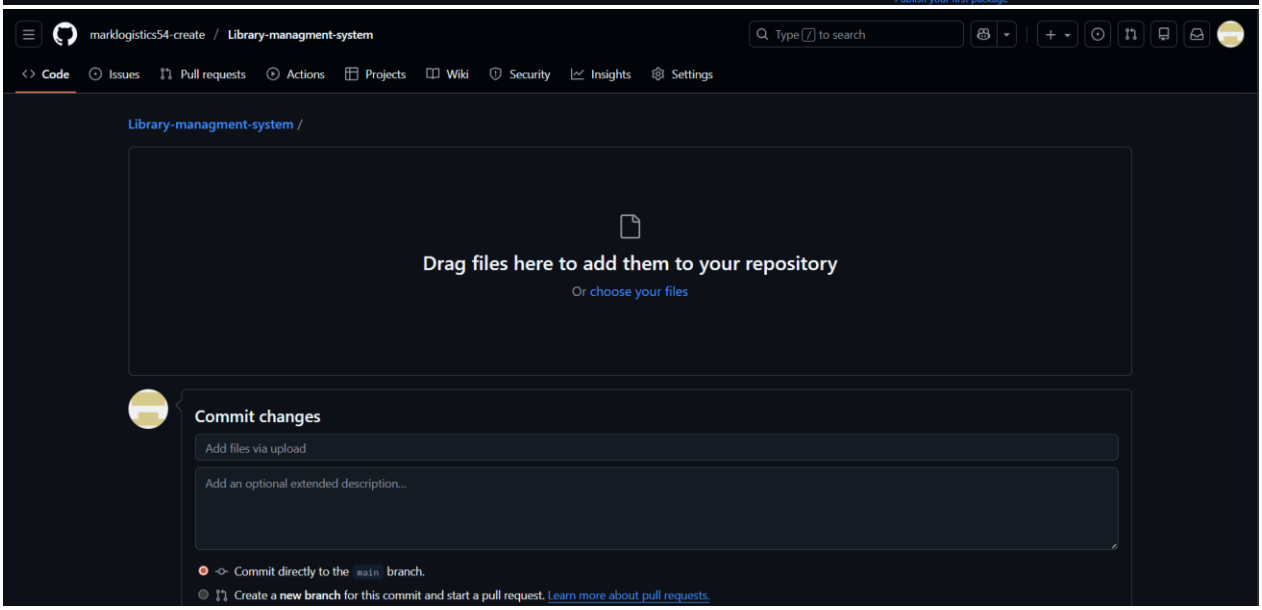
SELECT * FROM books;

Explana on:

These queries are used to insert and retrieve data from the database.

24.Github Upload





25. Final Conclusion

The Library Management System is a complete web-based applica on that fulfills basic library requirements. By integra ng frontend design with backend logic and database connec vity, the project demonstrates prac cal applica on of web development concepts. This project is suitable for academic submission and can be further extended into a full-scale system.