LIBRARY MANAGEMENT SYSTEM

A MINI-PROJECT REPORT

Submitted by

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BONAFIDE CERTIFICATE

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ABSTRACT

The Library Management System is a web-based application designed to efficiently manage library operations and improve user experience. This system automates and simplifies key functions such as book management, member registration, book issuance, and returns. It provides an intuitive interface for librarians and users to interact seamlessly while ensuring data accuracy and real-time updates.The system integrates robust features such as a centralized database to store information about books, members, and transactions, along with a secure login mechanism to protect data access. Key functionalities include managing book inventory, tracking borrowing trends, viewing borrowing history, and generating reports for informed decision-making.Additionally, the system includes a Check-In/Check-Out Module, enabling librarians to record user visits and manage attendance, ensuring better accountability. Advanced data visualization tools, like borrowing trends and popular genres displayed through graphs, provide insights into user preferences, supporting library resource optimization.Built using modern technologies like PHP, MySQL, JavaScript, and Bootstrap, the Library Management System ensures scalability, user-friendliness, and enhanced productivity. It serves as a vital tool for educational institutions and public libraries, streamlining library operations and fostering a better reading culture..

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CHAPTER 1

1.1 INTRODUCTION

The **Library Management System** is an advanced tool designed to streamline the operations of a library. It serves as a platform to manage library resources, including books, members, and transactions, efficiently. By replacing manual processes with a computerized system, this application ensures improved accuracy, accessibility, and speed in handling routine tasks such as issuing, returning, and tracking books. With its user-friendly interface and robust database integration, the system caters to both librarians and library members, fostering better organization and resource management.

1.2 SCOPE OF THE WORK

The Library Management System aims to address the challenges faced in traditional library management by providing the following functionalities:

- **Book Management:** Adding, updating, deleting, and tracking books in the library.
- **Member Management**: Maintaining a record of registered members and their borrowing history.
- **Transaction Management**: Facilitating seamless check-in and check-out of books and managing fines for overdue returns.
- **Data Visualization**: Displaying borrowing trends and popular genres using interactive graphs to optimize resource allocation.
- **Attendance Tracking:** Recording user attendance through a check-in/check-out system for better accountability.
- **Reporting:** Generating reports for inventory management, member activity, and book popularity trends..

1.3 PROBLEM STATEMENT

Libraries play a crucial role in providing access to knowledge, but their effectiveness is often hindered by outdated management practices. Traditional methods of maintaining library records—using ledgers or spreadsheets—are prone to errors, inefficiency, and loss of data. Some common challenges include:

- Difficulty in tracking book availability and user borrowing history.
- Inefficient resource allocation due to lack of insights into borrowing patterns.
- Time-consuming manual processes for issuing and returning books.
- Inadequate mechanisms for recording user attendance.

1.4 AIM AND OBJECTIVES OF THE PROJECT

Aim:

To develop a comprehensive and user-friendly Library Management System that automates and optimizes library operations, ensuring enhanced efficiency, accuracy, and user satisfaction.

Objectives:

- **Streamline Library Operations:** Develop modules for book inventory management, member registration, and transaction tracking.
- **Automate Attendance Tracking:** Implement a check-in/check-out feature to record user attendance and manage activity logs.
- **Provide Insights Through Data Visualization**: Use graphs and charts to display borrowing trends and popular genres for better decision-making.
- **Ensure Secure Data Handling**: Protect library data using authentication and role-based access.
- **Enhance User Experience**: Create an intuitive interface for both library staff and members to interact with the system seamlessly.
- **Facilitate Reporting**: Enable generation of comprehensive reports for library administration to monitor and optimize operations.

SYSTEM SPECIFICATIONS

2.1 HARDWARE SPECIFICATIONS

- **Processor**: Intel Core i5 or higher
- **RAM**: 8 GB or higher
- **Storage**: 500 GB HDD or 256 GB SSD (minimum)
- **Display**: 15-inch monitor with a resolution of 1366x768 or higher
- **Input Devices**: Keyboard and mouse
- **Network Connectivity**: Ethernet or Wi-Fi for database connectivity

2.2 SOFTWARE SPECIFICATIONS

- **Operating System**:Windows 10/11, Linux (Ubuntu, Fedora),or macOS
- **Database:MySQL** (used for storing and managing data)
- **Programming Languages**:JavaScript for client-side scripting Java for server-side logic using Servlets and JDBC
- **Frameworks:**Apache Tomcat as the web server XAMPP for local database and server management
- **Development Environment**:Eclipse IDE (Integrated Development Environment) for coding and debugging
- **Web Technologies**:HTML, CSS, and JavaScript for the front-end

CHAPTER 3

ARCHITECTURE DIAGRAM
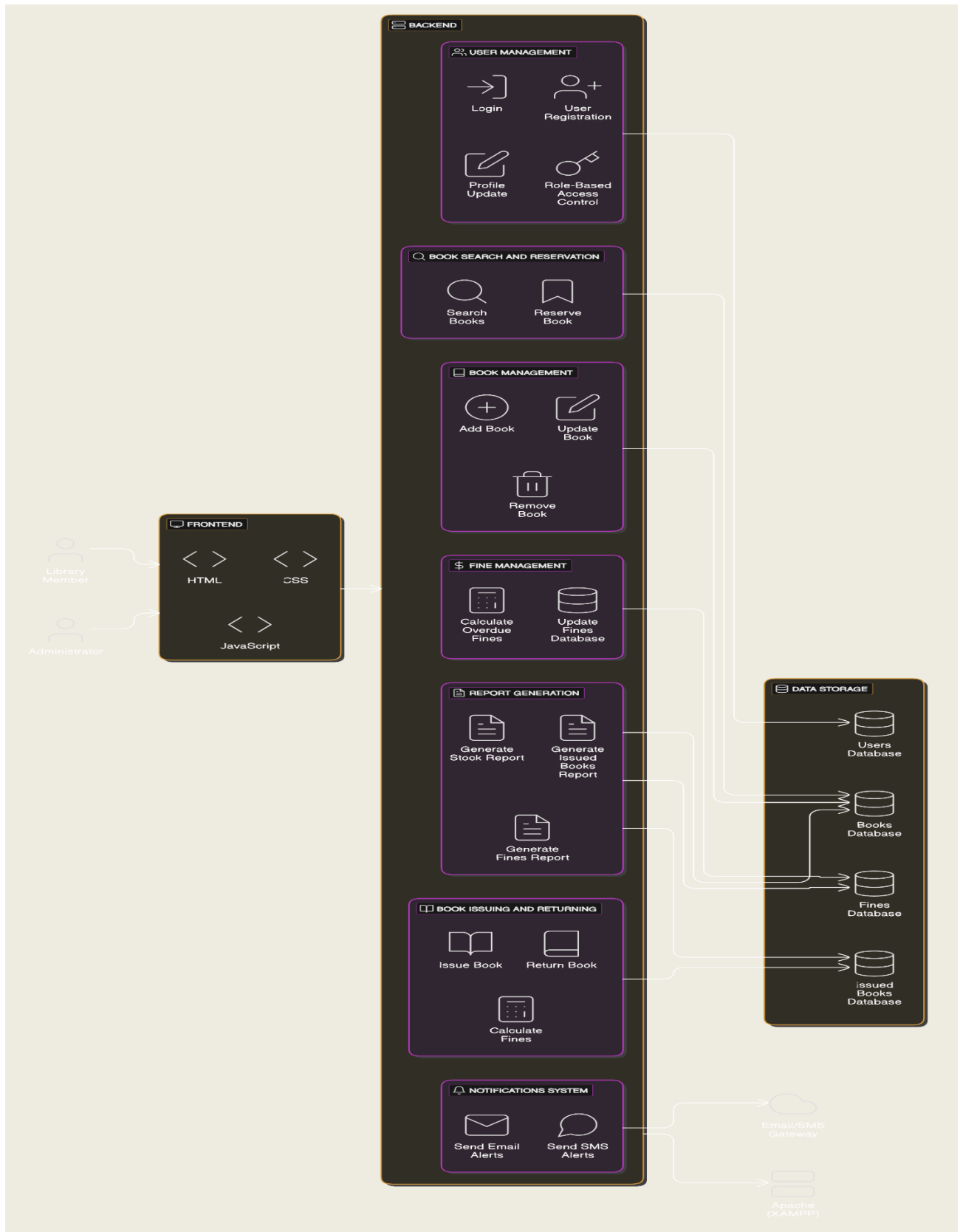
CHAPTER 4

MODULE DESCRIPTION

4.1. User Management Module

- **Purpose**: To manage user-related operations.
- **Features**:
  - User registration and login with secure credentials.
  - Role-based access (e.g., Admin, Librarian, Member).
  - Profile management for members and staff.
- **Database Tables**:
  - users (fields: id, name, email, password, role).

4.2. Book Management Module

- **Purpose**: To manage books and their related information.
- **Features**:
  - Add, update, delete, and view books.
  - Store book details such as title, author, publisher, edition, and price.
  - Categorization by genre and availability status.
- **Database Tables**:
  - books (fields: accno, title, author, publisher, edition, price, status).

4.3. Attendance Management Module

- **Purpose**: To manage member check-in and check-out activities.
- **Features**:
  - Record check-in/check-out timestamps.
  - Maintain attendance history.
  - Display active users currently checked in.
- **Database Tables**:
  - attendance (fields: id, username, checkin_time, checkout_time).

4.4. Borrowing and Returning Module

- **Purpose**: To facilitate book lending and returning operations.
- **Features**:
  - Issue books to members based on borrowing limits.
  - Accept returns and update book availability.
  - Calculate and record fines for late returns.

- **Database Tables**:
  - transactions (fields: transaction_id, member_id, book_id, issue_date, return_date, fine).

4.5. Reports and Analytics Module

- **Purpose**: To provide insights and generate reports.
- **Features**:
  - Generate reports on borrowing trends and popular genres.
  - Monitor member activity and borrowing statistics.
  - Summarize overdue books and pending fines.
- **Database Tables**:
  - Utilizes existing transactions and attendance tables for reporting.

4.6. Search and Filtering Module

- **Purpose**: To enable efficient data retrieval.
- **Features**:
  - Search books by title, author, or genre.
  - Filter users and books based on specific criteria (e.g., overdue, availability).
  - Dynamic suggestions for search queries.
- **Database Tables**:
  - Works with books and users tables.

 - notifications (fields: id, recipient_id, message, status, created_at).

4.7. Admin Dashboard Module

- **Purpose**: To provide administrators with a comprehensive view of system operations.
- **Features**:
  - Manage users, books, and system settings.
  - View real-time statistics such as active users and books issued.
  - Perform bulk operations (e.g., book imports).
- **Database Tables**:
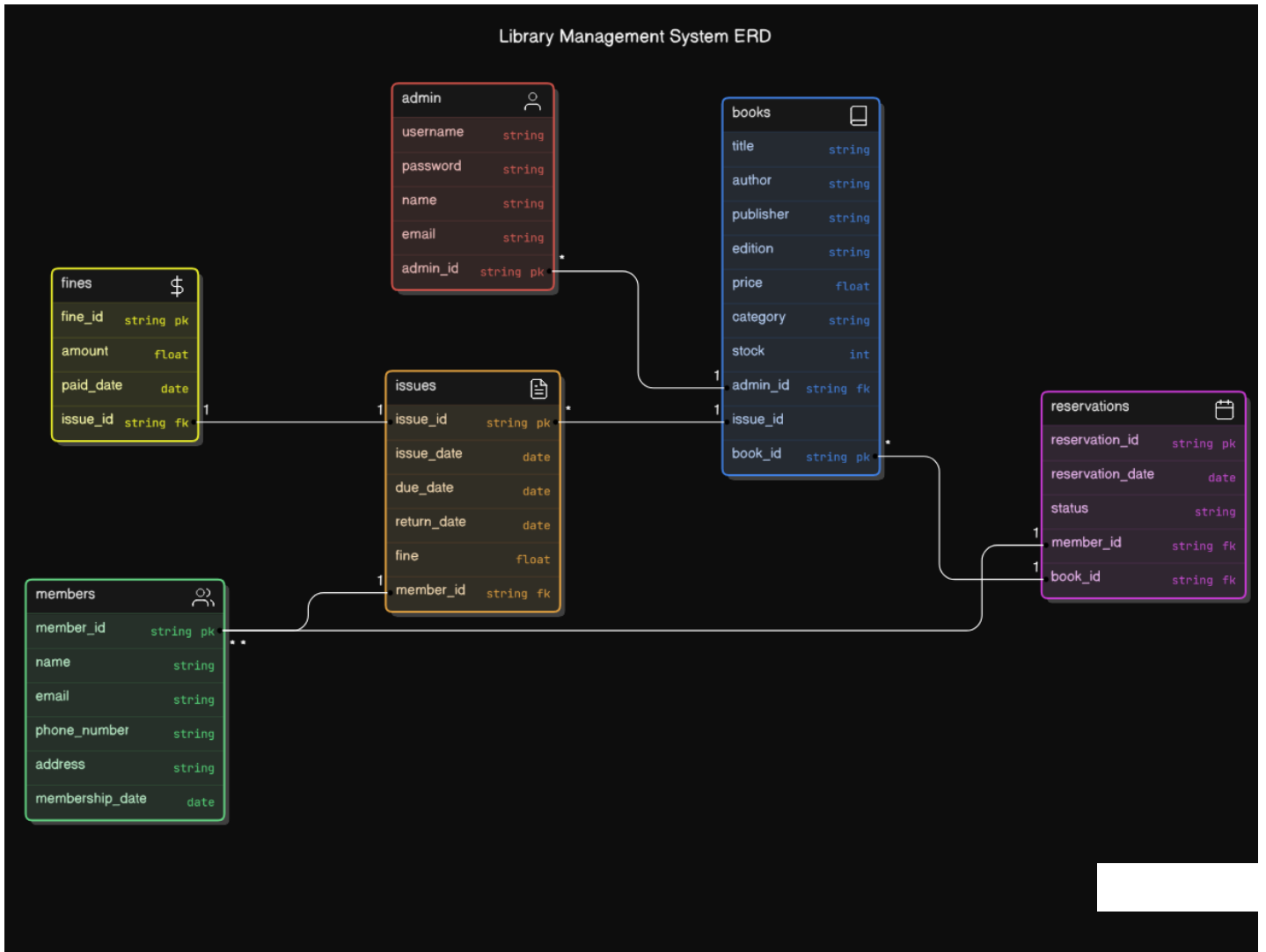 - Uses data from all major tables for dashboard insights.

CHAPTER 5

SYSTEM DESIGN

5.1 USE CASE DIAGRAM
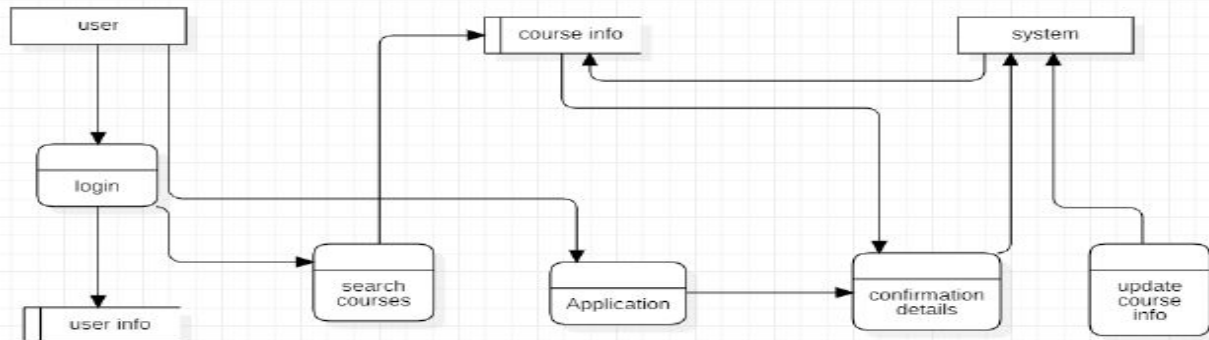
5.2 ER DIAGRAM

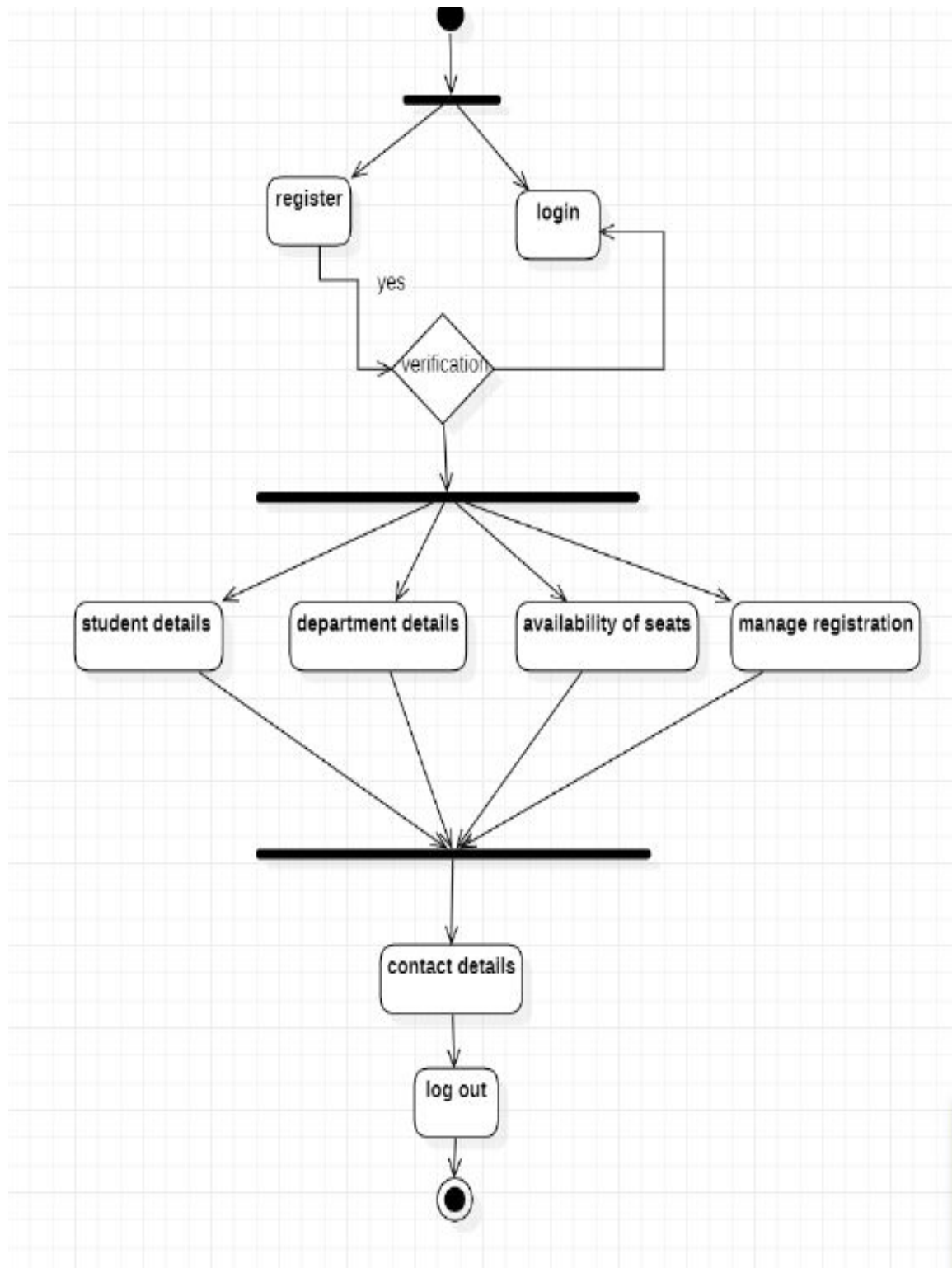Library Management System ERD
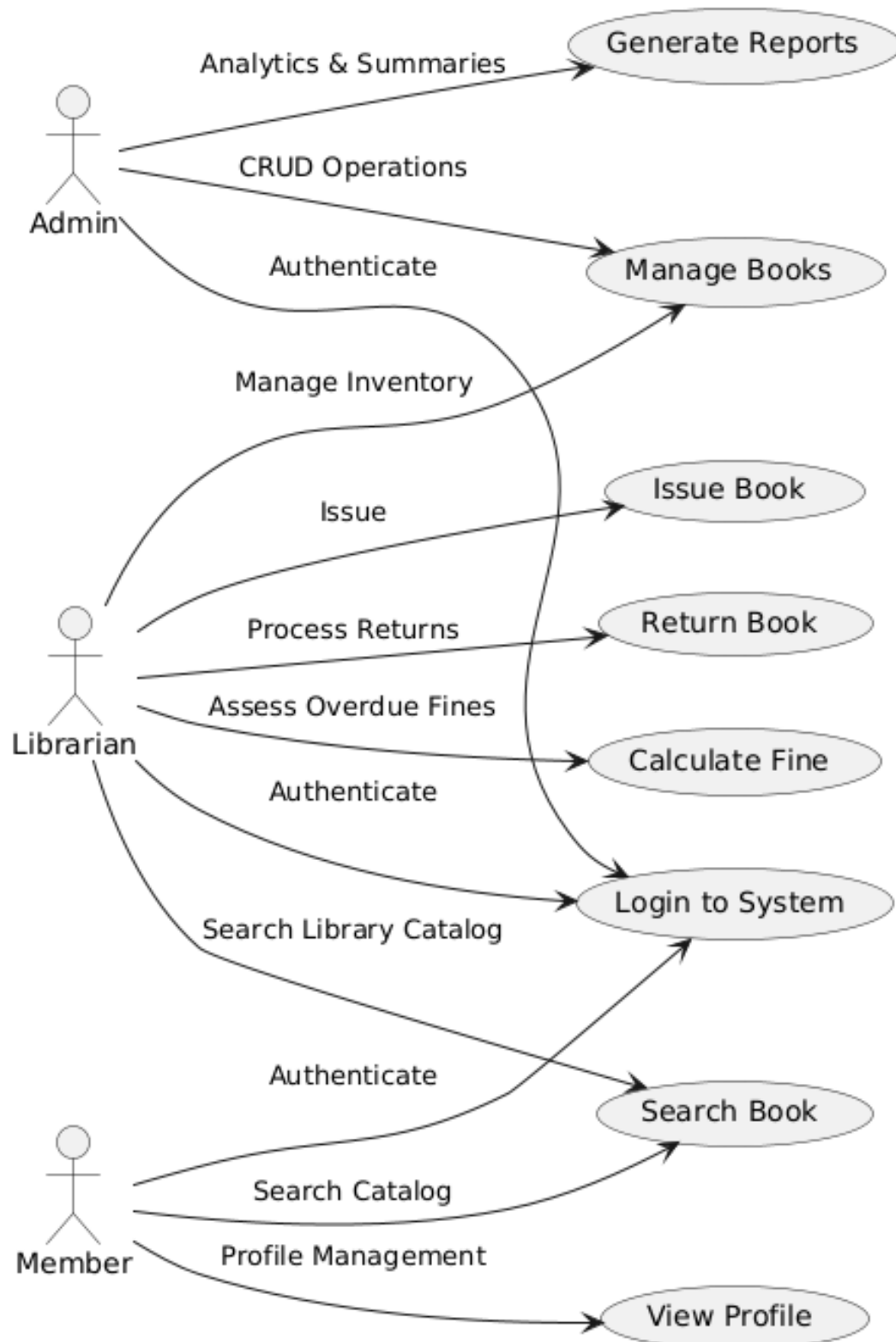
5.3 DFD DIAGRAM

DFD Level-0 Diagram

DFD Level-1 Diagram

5.4 ACTIVITY DIAGRAM

CHAPTER 6

SAMPLE CODING

Dashboard.php
```php
<?php
session_start();

// Redirect if not logged in
if (!isset($_SESSION['username'])) {
   header('Location: login.php');
   exit();
}

// Include the database connection
include('access.php');

// Simulated data (replace with DB queries)
$usersCount = 120;
$booksIssued = 45;
$booksRemaining = 105;
$borrowingTrends = [10, 20, 30, 25, 15]; // Example data
$popularGenres = ['Fiction', 'Non-Fiction', 'Science', 'History', 'Fantasy'];
$popularGenresCounts = [15, 10, 20, 8, 5];

$checkInMessage = '';
$checkOutMessage = '';

// Check-in logic
if (isset($_POST['checkin'])) {
   $name = $_POST['username'];
   $stmt = $conn->prepare("SELECT * FROM members WHERE name LIKE ?");
   $stmt->bind_param('s', $name);
   $stmt->execute();
   $result = $stmt->get_result();

   if ($result->num_rows > 0) {
      $user = $result->fetch_assoc();
      $username = $user['name'];

      $checkin_stmt = $conn->prepare("INSERT INTO attendance (username, checkin_time) VALUES (?,
NOW())");
      $checkin_stmt->bind_param('s', $username);
      $checkin_stmt->execute();
      $checkInMessage = "User $username checked in successfully!";
   } else {
      $checkInMessage = "User not found!";
   }
}

// Check-out logic
if (isset($_POST['checkout'])) {
   $name = $_POST['username'];
```

```php
    $stmt = $conn->prepare("SELECT * FROM members WHERE name LIKE ?");
    $stmt->bind_param('s', $name);
    $stmt->execute();
    $result = $stmt->get_result();

    if ($result->num_rows > 0) {
        $user = $result->fetch_assoc();
        $username = $user['name'];

        $checkout_stmt = $conn->prepare("UPDATE attendance SET checkout_time = NOW() WHERE
username = ? AND checkout_time IS NULL ORDER BY id DESC LIMIT 1");
        $checkout_stmt->bind_param('s', $username);
        $checkout_stmt->execute();
        $checkOutMessage = "User $username checked out successfully!";
    } else {
        $checkOutMessage = "User not found!";
    }
}

// Fetch checked-in users
$checkedInUsers = [];
$checkedIn_stmt = $conn->prepare("SELECT username FROM attendance WHERE checkout_time IS NULL
ORDER BY checkin_time DESC");
$checkedIn_stmt->execute();
$result = $checkedIn_stmt->get_result();
while ($row = $result->fetch_assoc()) {
    $checkedInUsers[] = $row['username'];
}
?>

<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Library Management Dashboard</title>

    <!-- Bootstrap CSS -->
    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/css/bootstrap.min.css" rel="stylesheet">
    <link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-awesome/6.0.0/css/all.min.css">

    <style>
        body {
            background-image: url('assets/dashboard.jpg');
            background-size: cover;
            background-attachment: fixed;
            color: white;
            background-size: cover;
            background-attachment: fixed;
            backdrop-filter: blur(3px);

        }
```

```css
    .navbar {
        background-color: rgba(0, 0, 0, 0.8);
    }

    .sidebar {
        background-color: rgba(0, 0, 0, 0.8);
        height: 100vh;
        padding: 20px;
    }

    .card-sidebar {
        margin-bottom: 15px;
        color: black;
    }

    .footer {
        background-color: black;
        padding: 20px;
        text-align: center;
    }

    .jumbotron {
        background-color: rgba(0, 0, 0, 0.7);
        border-radius: 10px;
        padding: 20px;
    }

    /* Custom Colors for Sidebar Cards */
    .card-white{ background-color: #007bff; }
    .card-white { background-color: #28a745; }
    .card-white { background-color: #fd7e14; }
    .card-purple { background-color: #6f42c1; }
    .card-teal { background-color: #20c997; }

    /* Remove hover animation */
    .card-sidebar:hover {
        transform: none;
        box-shadow: none;
    }
  </style>
</head>
<body>

<!-- Navbar -->
<nav class="navbar navbar-expand-lg navbar-dark">
  <div class="container-fluid">
    <a class="navbar-brand" href="#">Library Management</a>
    <div class="collapse navbar-collapse">
      <ul class="navbar-nav ms-auto">
        <li class="nav-item"><a class="nav-link" href="dashboard.php">Dashboard</a></li>
        <li class="nav-item"><a class="nav-link btn btn-primary" href="add_book.php">Add
Book</a></li>
        <li class="nav-item"><a class="nav-link btn btn-success" href="add_member.php">Add
Member</a></li>
```

```html
        <li class="nav-item"><a class="nav-link btn btn-warning" href="reports.php">Reports</a></li>
        <li class="nav-item"><a class="nav-link btn btn-danger" href="logout.php">Logout</a></li>
      </ul>
      <!-- Search Bar -->
      <form class="d-flex ms-3" method="GET" action="search_results.php">
        <input class="form-control me-2" type="search" placeholder="Search..." aria-label="Search"
name="query" required>
        <button class="btn btn-outline-light" type="submit">Search</button>
      </form>
    </div>
  </div>
</nav>

<div class="container-fluid">
  <div class="row">
    <!-- Sidebar -->
    <div class="col-md-3 sidebar">
      <div class="card card-sidebar card-blue">
        <div class="card-body">
          <h5 class="card-title" >Library Sections</h5>
          <a href="view_books.php" class="btn btn-light w-100">View Books</a>
          <a href="view_members.php" class="btn btn-light w-100">View Members</a>
          <a href="issue_book.php" class="btn btn-light w-100">Issue Book</a>
          <a href="return_book.php" class="btn btn-light w-100">Return Book</a>
        </div>
      </div>
      <div class="card card-sidebar card-green">
        <div class="card-body">
          <h5 class="card-title">New Sections</h5>
          <a href="membership.php" class="btn btn-light w-100">Membership Section</a>
          <a href="magazines.php" class="btn btn-light w-100">Magazine Section</a>
        </div>
      </div>
      <div class="card card-sidebar card-orange">
        <div class="card-body">
          <h5 class="card-title">Book Habits</h5>
          <p>Track reading habits and preferences.</p>
        </div>
      </div>
      <div class="card card-sidebar card-purple">
        <div class="card-body">
          <h5 class="card-title">Quotes</h5>
          <p>Inspire your reading with great quotes.</p>
        </div>
      </div>
    </div>

    <!-- Main Content -->
    <div class="col-md-9">
      <div class="text-center">
        <h1>Welcome, <?php echo htmlspecialchars($_SESSION['username']); ?>!</h1>
        <p>Manage the library below:</p>
      </div>
```

```html
<div class="row mt-5">
   <div class="col-md-4">
      <div class="card bg-info text-center">
         <div class="card-body">
            <h5 class="card-title">Total Users</h5>
            <p><?php echo $usersCount; ?></p>
         </div>
      </div>
   </div>
   <div class="col-md-4">
      <div class="card bg-warning text-center">
         <div class="card-body">
            <h5 class="card-title">Books Issued</h5>
            <p><?php echo $booksIssued; ?></p>
         </div>
      </div>
   </div>
   <div class="col-md-4">
      <div class="card bg-success text-center">
         <div class="card-body">
            <h5 class="card-title">Books Remaining</h5>
            <p><?php echo $booksRemaining; ?></p>
         </div>
      </div>
   </div>
</div>

<div class="mt-5">
   <h2>Check In / Check Out</h2>
   <form method="post">
      <input type="text" name="username" placeholder="Enter Username" required><br>
      <button type="submit" name="checkin" class="btn btn-success">Check In</button>
      <button type="submit" name="checkout" class="btn btn-danger">Check Out</button>
   </form>
   <?php if ($checkInMessage): ?>
      <div class="alert alert-success mt-3"><?php echo $checkInMessage; ?></div>
   <?php endif; ?>
   <?php if ($checkOutMessage): ?>
      <div class="alert alert-warning mt-3"><?php echo $checkOutMessage; ?></div>
   <?php endif; ?>
   <h4 class="mt-4">Checked In Users:</h4>
   <ul class="list-group">
      <?php foreach ($checkedInUsers as $user): ?>
         <li class="list-group-item bg-dark text-light"><?php echo htmlspecialchars($user); ?></li>
      <?php endforeach; ?>
   </ul>
</div>

<div class="row mt-5">
   <div class="col-md-6">
      <div class="jumbotron">
         <h2>Borrowing Trends</h2>
         <canvas id="borrowingTrendsChart"></canvas>
      </div>
```

```html
          </div>
          <div class="col-md-6">
             <div class="jumbotron">
                <h2>Popular Genres</h2>
                <canvas id="popularGenresChart"></canvas>
             </div>
          </div>
       </div>
    </div>
</div>

<div class="footer">
   <p>&copy; 2024 Library Management System. All rights reserved.</p>
</div>

<script src="https://cdn.jsdelivr.net/npm/bootstrap@5.3.0/dist/js/bootstrap.bundle.min.js"></script>
<script src="https://cdn.jsdelivr.net/npm/chart.js"></script>
<script>
   const ctx1 = document.getElementById('borrowingTrendsChart').getContext('2d');
   const borrowingTrendsChart = new Chart(ctx1, {
      type: 'line',
      data: {
         labels: ['Week 1', 'Week 2', 'Week 3', 'Week 4', 'Week 5'],
         datasets: [{
            label: 'Books Borrowed',
            data: <?php echo json_encode($borrowingTrends); ?>,
            backgroundColor: 'rgba(255, 99, 132, 0.2)',
            borderColor: 'rgba(255, 99, 132, 1)',
            borderWidth: 2,
            fill: true,
         }]
      },
      options: {
         scales: {
            y: {
               beginAtZero: true
            }
         }
      }
   });

   const ctx2 = document.getElementById('popularGenresChart').getContext('2d');
   const popularGenresChart = new Chart(ctx2, {
      type: 'bar',
      data: {
         labels: <?php echo json_encode($popularGenres); ?>,
         datasets: [{
            label: 'Popular Genres',
            data: <?php echo json_encode($popularGenresCounts); ?>,
            backgroundColor: [
               'rgba(54, 162, 235, 0.6)',
               'rgba(255, 206, 86, 0.6)',
               'rgba(75, 192, 192, 0.6)',
```
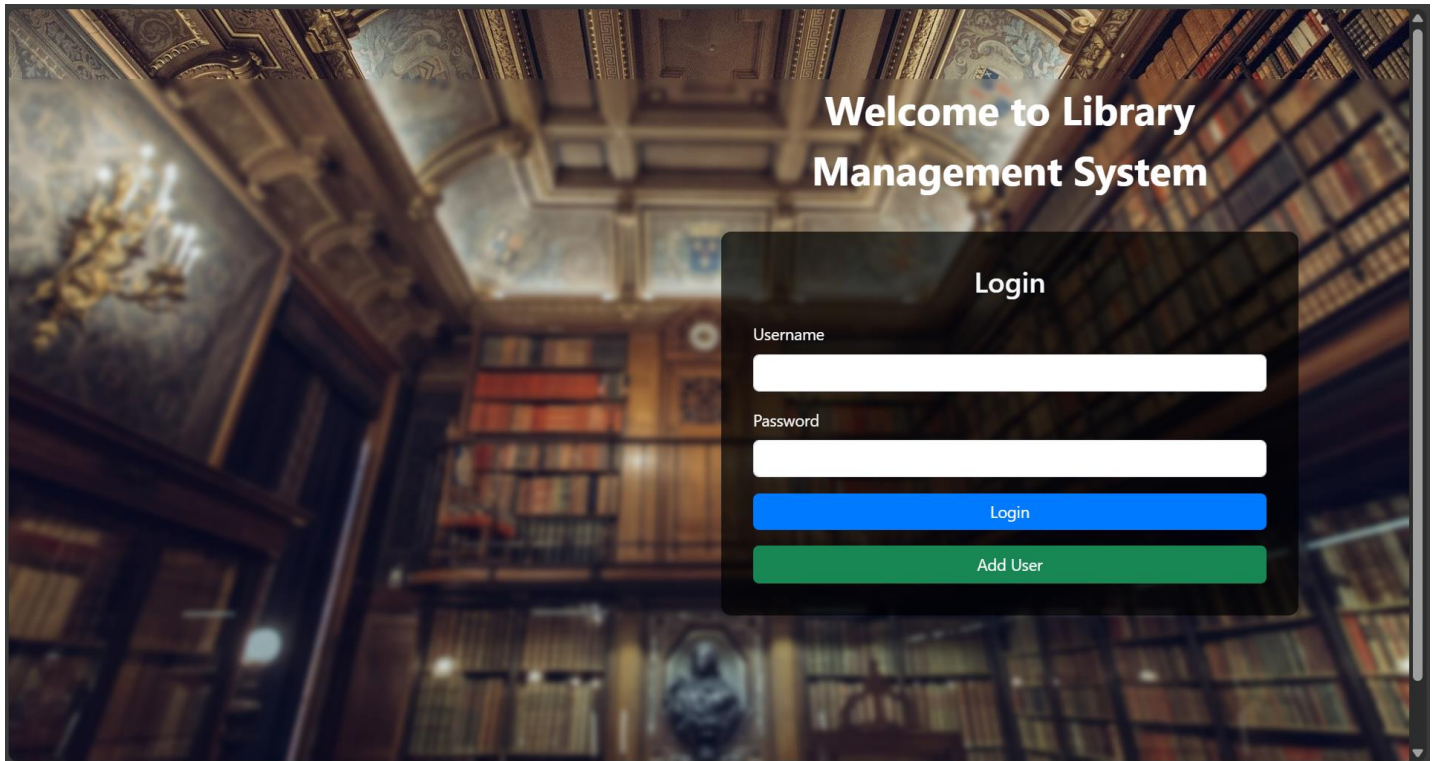
```
                    'rgba(153, 102, 255, 0.6)',
                    'rgba(255, 159, 64, 0.6)',
                ],
                borderColor: [
                    'rgba(54, 162, 235, 1)',
                    'rgba(255, 206, 86, 1)',
                    'rgba(75, 192, 192, 1)',
                    'rgba(153, 102, 255, 1)',
                    'rgba(255, 159, 64, 1)',
                ],
                borderWidth: 1
            }]
        },
        options: {
            scales: {
                y: {
                    beginAtZero: true
                }
            }
        }
    });
</script>
</body>
</html>
```
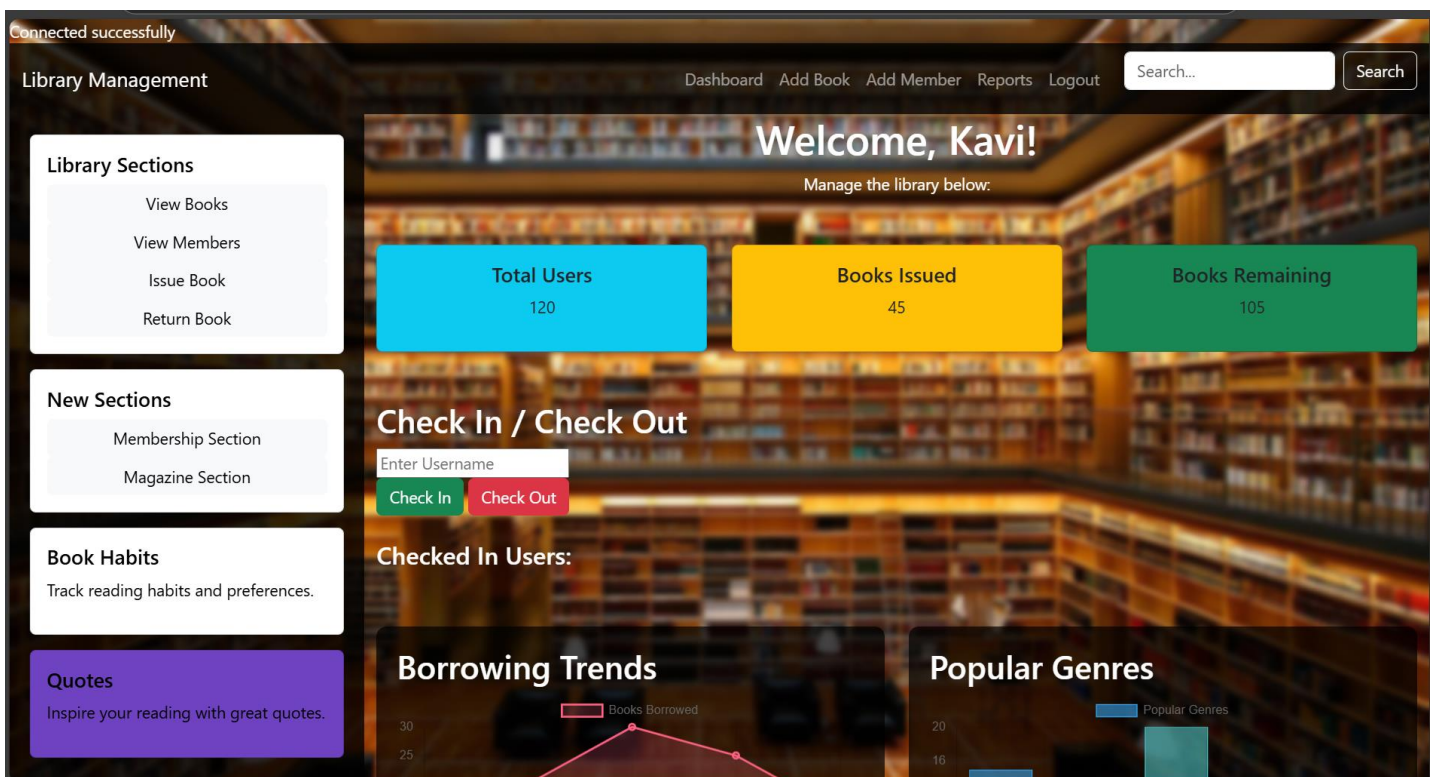
CHAPTER 7

SCREEN SHOTS

Fig. 7.1. Login Page

From this above figure this is the Login page where the student can login.

Fig. 7.2. Dashboard page Section

From this above figure user contain whole access of library.

Fig. 7.3. Add Book

From this above figure admin can add new book to the library.

Fig. 7.4. View Book page

From this above figure student can see the detailed information about the Book.

Fig. 7.5. Membership page

From this above figure Admin can add new members to the library.

Fig. 7.6. Search page section

From this above figure admin can search and generate the weekly report using this section

CHAPTER 8

CONCLUSION

The Library Management System (LMS) developed for this project serves as an efficient and automated solution for managing library resources, membership, transactions, and fines. It simplifies the processes of book issuance and return, ensures accurate tracking of borrowed books, and generates fines for overdue items.

The system provides a user-friendly interface for both library staff and members, with functionalities such as searching, issuing, and returning books, along with managing membership records and payments for fines. The implementation of a database ensures data consistency and integrity, while the system's scalability allows for future upgrades and expansions.

The project met the initial requirements, providing a robust platform to manage day-to-day library operations efficiently. The system's design and implementation, backed by comprehensive database management, will greatly benefit the library by reducing manual workloads and enhancing operational efficiency.

In conclusion, the Library Management System can serve as an effective tool for library administrators to maintain accurate records and enhance the user experience for library patrons, ensuring the smooth and hassle-free operation of library services.

REFERENCES

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- PHP Mailer: https://github.com/PHPMailer/PHPMailer

- SweetAlert2: https://sweetalert2.github.io/v10.html

- MySQL Database Management: www.mysql.com