VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI

REPORT ON DBMS MINI PROJECT(21CSL55)

"LIBRARY MANAGEMENT SYSTEM"

Submitted in partial fulfillment for the award of Degree of,

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE &ENGINEERING

By

Student Name : Nikita Patil **USN:2BU21CS075**

Student Name : Pranjal B. **USN:2BU21CS086**

Under the Guidance of

Dr. S.F. RODD

Professor, CSE Dept

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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Shivabasava Nagar Belagavi, Karnataka, India – 590010

2023– 2024

S. G. BALEKUNDRI INSTITUTE OF TECHNOLOGY

Shivabasavanagar, Belagavi-10, Karnataka.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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CERTIFICATE

This is to certify that the DBMS mini project entitled **"Library Management System"** has been successfully completed by

STUDENT NAME : Nikita Patil USN:2BU21CS075

STUDENT NAME : Pranjal B USN:2BU21CS086

the bonafide students of **DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING, S.G. BALEKUNDRI INSTITUTE OF TECHNOLOGY** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2023–2024. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The Project Work (21CSL55) has been approved as it satisfies the academic requirements in respect of DBMS mini Project work prescribed for the Bachelor of Engineering Degree.

Dr. S.F. Rodd	**Dr. B. S. Halakarnimath**	**Dr.B. R. Patagundi**
Project Guide	**Head of the Department**	**Principal**

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ACKNOWLEDGEMENT

The satisfaction and euphoria that accompany a successful completion of any task would be incomplete without the mention of people who made it possible, success is the epitome of hard work and perseverance, but steadfast of all is encouraging guidance.

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STUDENT NAME: Nikita Patil USN: 2BU21CS075

STUDENT NAME: Pranjal B. USN: 2BU21CS086

ABSTRACT

The "Student Library Management System" is a comprehensive software solution designed to streamline and automate the management of library resources in educational institutions. This project aims to provide an efficient platform for librarians and students to manage library operations effectively. The system encompasses various modules to handle tasks such as book management, student registration, book issuance, returns, and administrative functions.

Key features of the system include:
Student Registration: Enables the registration of students into the library system, capturing essential details such as student ID, full name, contact information, and login credentials.
Book Management: Facilitates the management of books available in the library, including adding new books, updating existing book information, and categorizing books based on genres or subjects.
Book Search and Availability: Provides a search interface for students to find books based on title, author, category, or ISBN number. The system also displays real-time availability status to inform students about the availability of desired books.
Book Issuance and Returns: Allows students to borrow books from the library by scanning their student ID or entering their credentials. The system records issuance details such as book ID, student ID, issuance date, and expected return date. Additionally, it manages the return process and calculates fines for overdue books.
Admin Dashboard: Offers an administrative dashboard for librarians and administrators to monitor library activities, view statistics, generate reports, and perform configuration tasks.
Notifications and Reminders: Sends automated notifications and reminders to students regarding upcoming due dates, overdue books, and other relevant announcements.
Security and Access Control: Implements robust security measures to safeguard sensitive data and restrict unauthorized access to the system functionalities.

The "Student Library Management System" enhances the efficiency of library operations, improves access to educational resources for students, and provides valuable insights for administrators to optimize resource allocation and decision-making. This project report explores the system architecture, design methodologies, implementation details, user documentation, and future enhancements to support continuous improvement and scalability of the system.

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CHAPTER 1

INTRODUCTION

1.1 PROBLEM STATEMENT

In the physical library management system, manual processes, outdated technology, and disjointed systems lead to inefficiencies and errors. Our project aims to develop a modern library management system to automate processes, integrate systems, and enhance user experience. By automating cataloging and record-keeping, integrating systems, and implementing online access, we streamline operations, ensure data consistency, and improve accessibility. Real-time reporting and analytics capabilities empower administrators with insights for informed decision-making. Through this project, we address these challenges, transforming the library management system into a modern, efficient, and user-friendly platform.

1.2 OBJECTIVES:

- **Automate processes**: Develop automated cataloging and record-keeping systems to reduce manual errors and administrative workload.
- **Integrate systems**: Consolidate disparate systems into a unified platform to ensure data consistency and streamline administrative tasks.
- **Enhance user experience**: Implement online access and self-service functionalities to improve accessibility and convenience for users.
- **Enable real-time reporting**: Introduce reporting and analytics capabilities to provide administrators with insights for informed decision-making.
- **Modernize library management**: Transform the physical library management system into a modern, efficient, and user-centric platform to meet the evolving needs of librarians and users.
- **Ensure scalability and adaptability**: Design the system to be scalable and adaptable to accommodate future growth, technological advancements, and evolving user needs, ensuring its long-term effectiveness and relevance in the ever-changing library landscape.

1.3 SQL COMMANDS:

SQL Command	Use	Example
SELECT	Retrieve data from one or more tables	SELECT * FROM tblbooks; SELECT BookName, BookPrice FROM tblbooks WHERE CatId = 5;
INSERT	Insert new records into a table	INSERT INTO tblstudents (StudentId, FullName, EmailId) VALUES ('SID013', 'John Smith', 'john@example.com');
UPDATE	Update existing records in a table	UPDATE tblbooks SET BookPrice = 25.00 WHERE id = 1;
DELETE	Delete records from a table	DELETE FROM tblauthors WHERE id = 3;
JOIN	Combine rows from two or more tables based on a related column	SELECT b.BookName, s.FullName FROM tblissuedbookdetails ibd JOIN tblbooks b ON ibd.BookId = b.id JOIN tblstudents s ON ibd.StudentID = s.StudentId;
GROUP BY	Group rows that have the same values into summary rows	SELECT c.CategoryName, COUNT(*) AS TotalBooks FROM tblbooks b JOIN tblcategory c ON b.CatId = c.id GROUP BY c.CategoryName;
ORDER BY	Sort the result set in ascending or descending order	SELECT * FROM tblbooks ORDER BY BookName ASC;
WHERE	Filter records based on specified conditions	SELECT * FROM tblbooks WHERE CatId = 5;
LIMIT	Limit the number of records returned	SELECT * FROM tblbooks LIMIT 5;

Table 1.1 SQL commands

CHAPTER 2

METHODOLOGY

2.1 ABOUT BACKEND CONNECTION:

Database Layer: This layer consists of the database management system (DBMS) where all data related to the library management system is stored. In this project, the DBMS used is MySQL, indicated by the SQL commands and structure defined for tables such as `tblbooks`, `tblstudents`, etc.

Application Layer: The application layer contains the business logic and application code responsible for processing user requests, interacting with the database, and generating responses. This layer can be implemented using various programming languages and frameworks. We have used PHP for server-side scripting.

Connection Setup:

The connection setup involves configuring the backend to establish a connection with the database management system. This typically includes:

- Database Configuration**:** Setting up the database server, creating the necessary databases and tables, and configuring user permissions and access rights.
- Backend Configuration**:** Configuring the backend application to connect to the database. This involves specifying the database host, port, username, password, and other connection parameters. In PHP applications, this is often done using functions like `mysqli_connect()` or PDO (PHP Data Objects) to establish a connection to the MySQL database.

This is the configuration code used in our project for backend connection:

```php
<?php
// DB credentials.
define('DB_HOST','localhost');
define('DB_USER','root');
define('DB_PASS','');
define('DB_NAME','library');
// Establish database connection.
try
{
$dbh = new PDO("mysql:host=".DB_HOST.";dbname=".DB_NAME,DB_USER, DB_PASS,array(PDO::MYSQL_ATTR_INIT_COMMAND => "SET NAMES 'utf8'"));
}
catch (PDOException $e)
{
exit("Error: " . $e->getMessage());
}
?>
```

Figure 1.1 Configuration code snippet

- DB credentials: These constants (`DB_HOST`, `DB_USER`, `DB_PASS`, `DB_NAME`) store the database connection details, including the host (localhost), username (root), password (blank in this case), and database name (library).
- Establish database connection: The `try-catch` block attempts to establish a connection to the MySQL database using PDO. The `PDO()` constructor is used to create a new PDO object, passing the database DSN (Data Source Name) as the first argument, which includes the host, database name, username, and password.
- Error handling: If an exception (PDOException) occurs during the connection attempt, the `catch` block captures the exception, and an error message is displayed, providing details about the error.

This code snippet demonstrates the backend connection setup in a PHP application, where the application connects to the MySQL database using PDO. It's a common approach to establishing database connections in PHP applications, ensuring secure and reliable communication between the application and the database management system.

2.2 INTRODUCTION TO SERVER:

To host a library management system, you need a server configured with the following components:

- Operating System: Choose a stable and secure operating system like Linux (e.g., Ubuntu, CentOS) or Windows Server.
- Web Server: Install and configure a web server such as Apache or Nginx to handle HTTP requests.
- Database Server: Set up a database management system (e.g., MySQL, PostgreSQL) to store and manage library data.
- Server-Side Scripting: Use a server-side scripting language like PHP, Python, or Node.js to build the backend logic of the system.
- Backup and Monitoring: Set up regular backups of data and monitor server performance to ensure reliability and availability.

CHAPTER 3

SYSTEM REQUIREMENTS AND SPECIFICATIONS

3.1 SOFTWARE REQUIREMENTS:

1. Web Server:

   Apache HTTP Server: To serve web pages locally during development.

   XAMPP: Bundled package including Apache, MySQL, PHP, and phpMyAdmin for local development environment setup.

2. Database Management System:

   MySQL: Database system for storing and managing library data.

3. Development Tools:

   Visual Studio Code (VSCode): Integrated Development Environment (IDE) for writing and editing code.

   Browser: Google Chrome for testing and debugging web pages.

3.1 HARDWARE REQUIREMENTS:

Server Hardware (for Deployment):

Processor: Dual-core or higher for handling server operations efficiently.

RAM: At least 4GB, though 8GB or more would be beneficial for smoother performance.

Storage: 512 SSD storage for faster read/write operations.

Network: Stable internet connection for serving requests to client devices.

CHAPTER 4

SYSTEM DESIGN

4.1 ER DIAGRAM

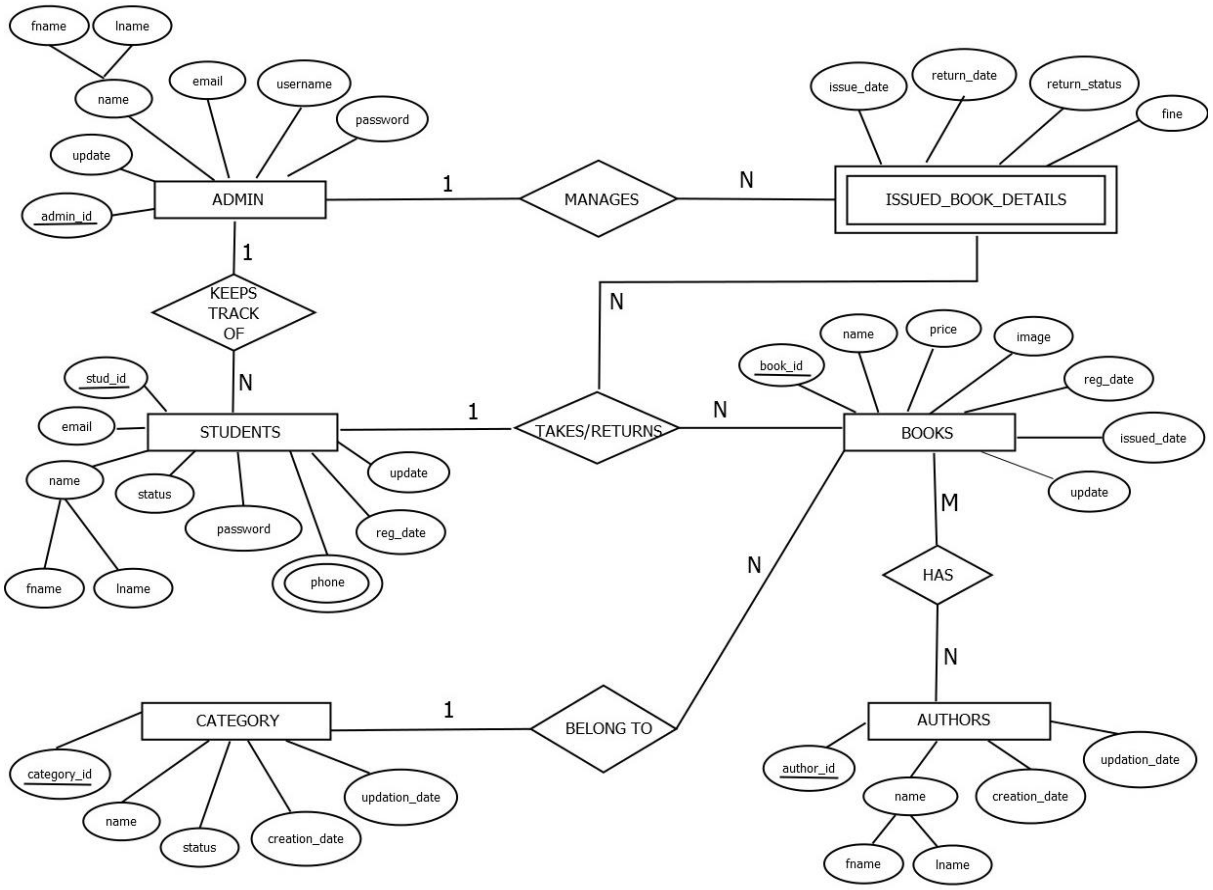

Figure 1.2 ER Diagram

Relationships and Cardinality ratios:

Entity 1	Relationship	Entity 2	Cardinality Ratio
Admin	Manages	Books	1: M
Admin	Manages	IssuedBookDetails	1: M
Admin	Keepstrackof	Students	1: M
Students	Take/Return	Books	1: M
Books	BelongsTo	Category	M :1
Books	Have	Authors	M: N

Table 1.2 ER Relationships

4.2 SCHEMA DIAGRAM:

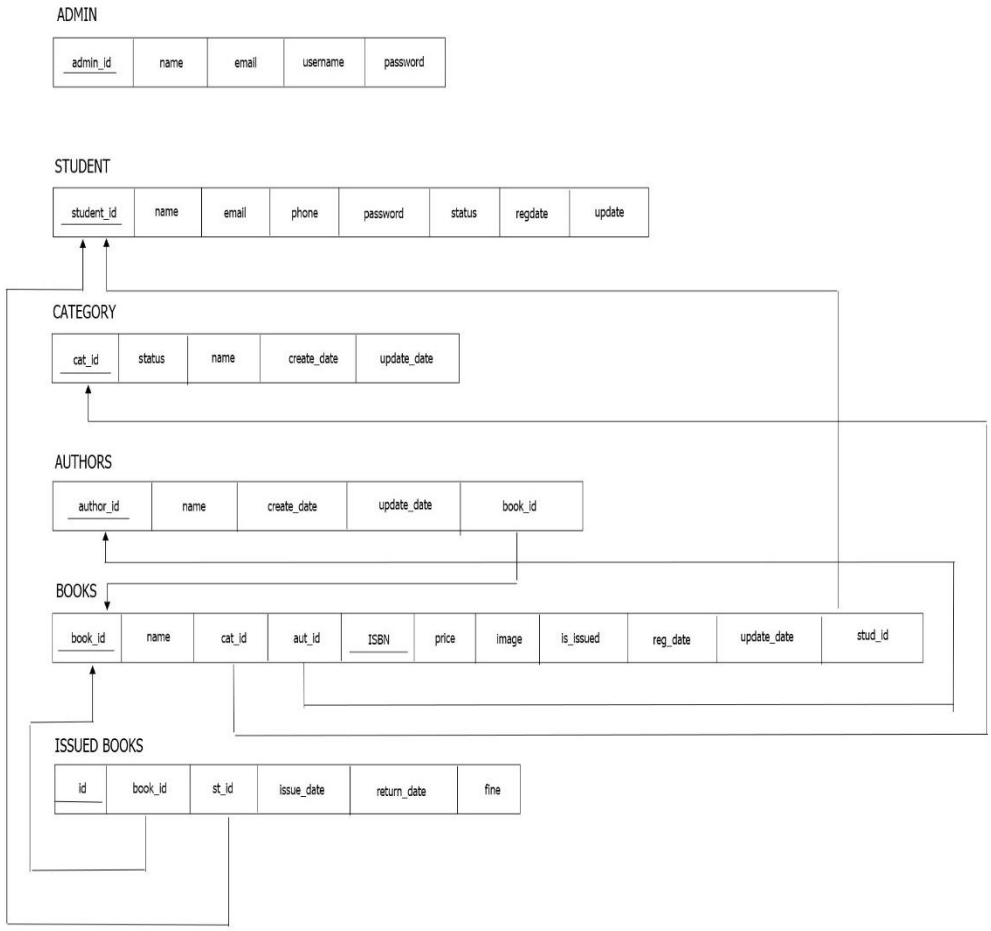

Figure 1.3 Schema Diagram

- **Admin:-** Primary Key: id
- **Books:-** Primary Key: id

  Foreign Key: Admin_id (refers to Admin's id)

  Foreign Key: Category_id (refers to Category's id)

- **IssuedBookDetails:-** Primary Key: id

  Foreign Key: BookId (refers to Books' id)

  Foreign Key: StudentID (refers to Students' id)

- **Students:-** Primary Key: id
- **Category:-** Primary Key: id
- **Authors:-** Primary Key: id

CHAPTER 5

IMPLEMENTATION

5.1 TECHNOLOGIES USED:

Development Environment

- The Library Management System was developed using a combination of software tools and technologies.
- The primary development environment consisted of:
    - Visual Studio Code (VSCode) as the Integrated Development Environment (IDE).
    - XAMPP for providing a local server environment including Apache, MySQL, and PHP.
    - MySQL Workbench for database design and management.

Database Design

- The database schema was designed to capture all relevant information for managing the library system effectively.
- Detailed discussions on the tables, columns, relationships, and constraints were carried out to ensure data integrity and efficiency.
- Normalization techniques were applied to reduce redundancy and improve data organization.

Backend Development

- Backend logic was implemented using PHP scripting language to handle database interactions and business logic.
- PHP scripts were responsible for querying the database, processing user requests, and generating dynamic content for the frontend.
- Object-oriented programming (OOP) principles were employed to modularize code and improve maintainability.

Frontend Development

- The user interface was developed using HTML, CSS, and JavaScript.
- Responsive design principles were applied to ensure compatibility across different devices and screen sizes.
- Bootstrap framework was utilized to streamline the frontend development process and enhance UI consistency.

5.2 DATABASE CREATION:

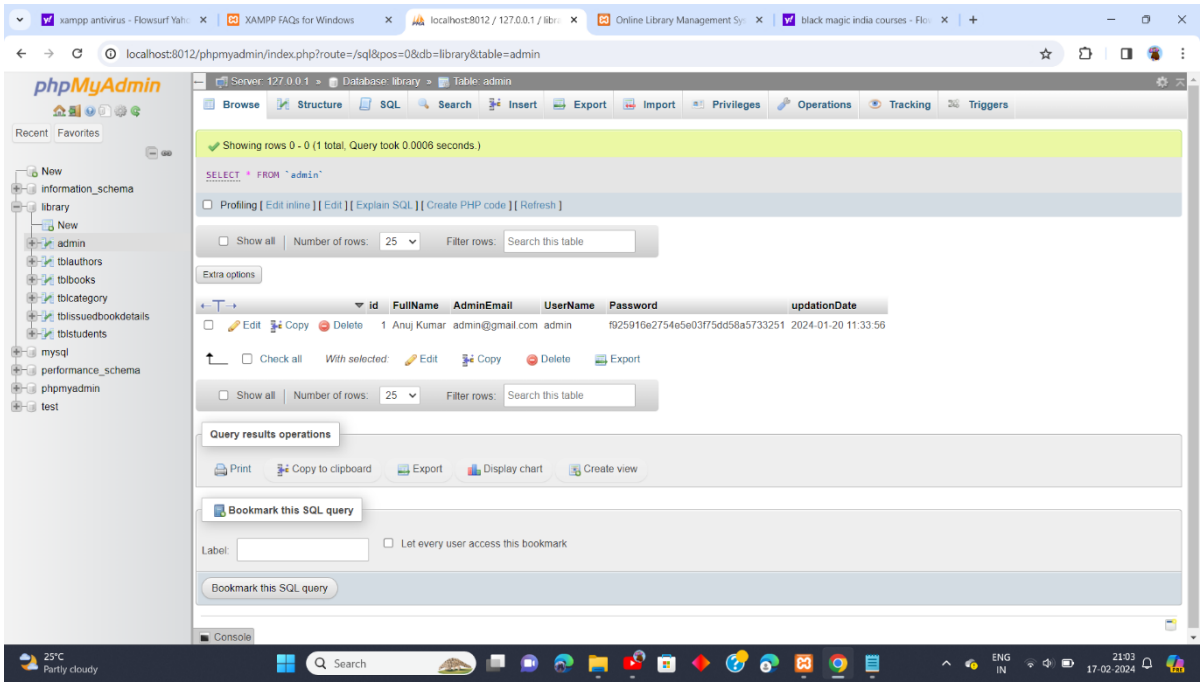

Figure 1.4 Table admin

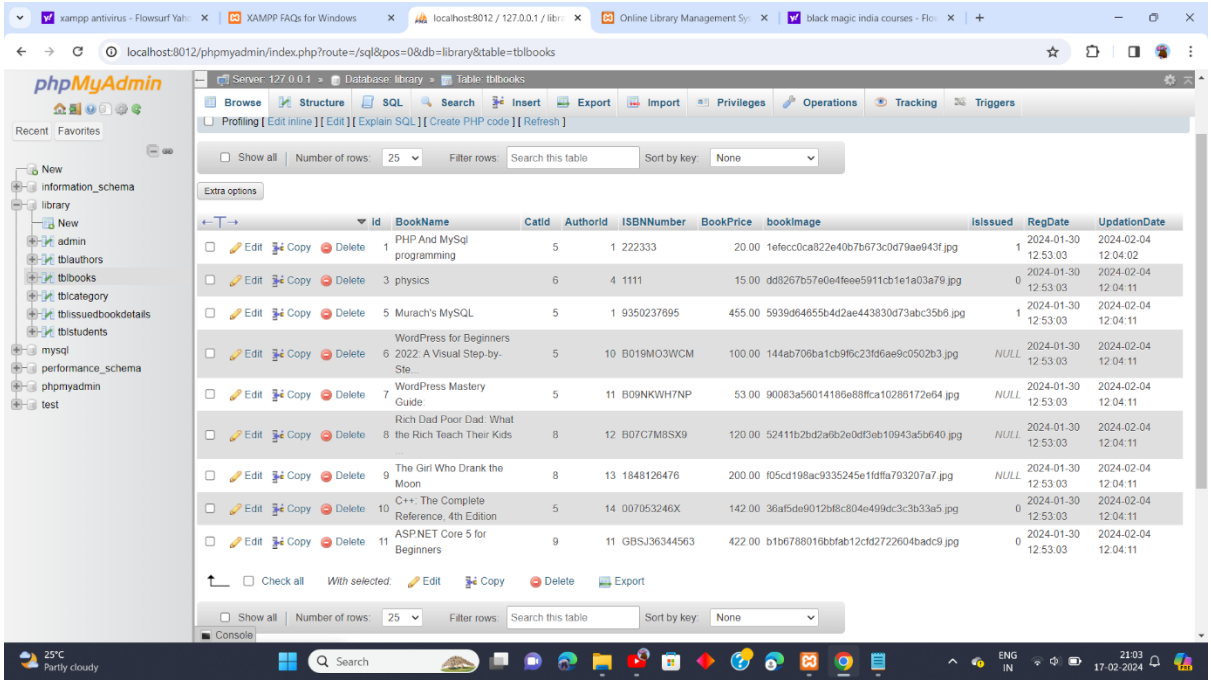

Figure 1.5 Table books

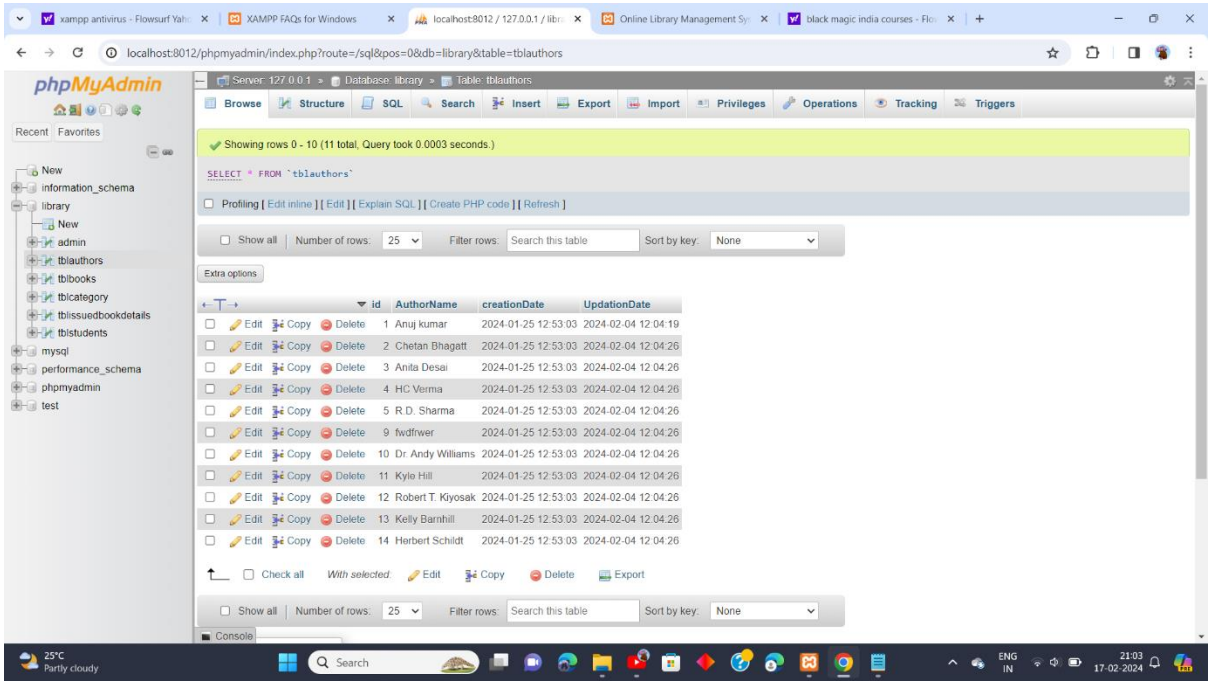

Figure 1.6 Table authors

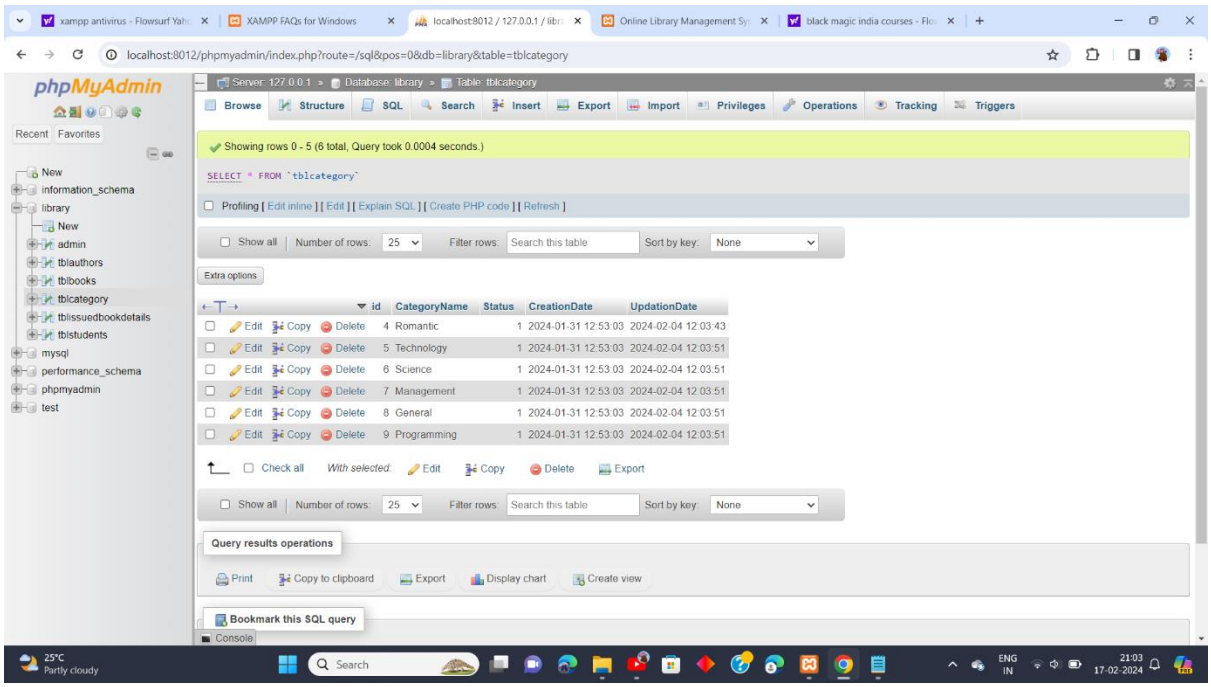

Figure 1.7 Table category

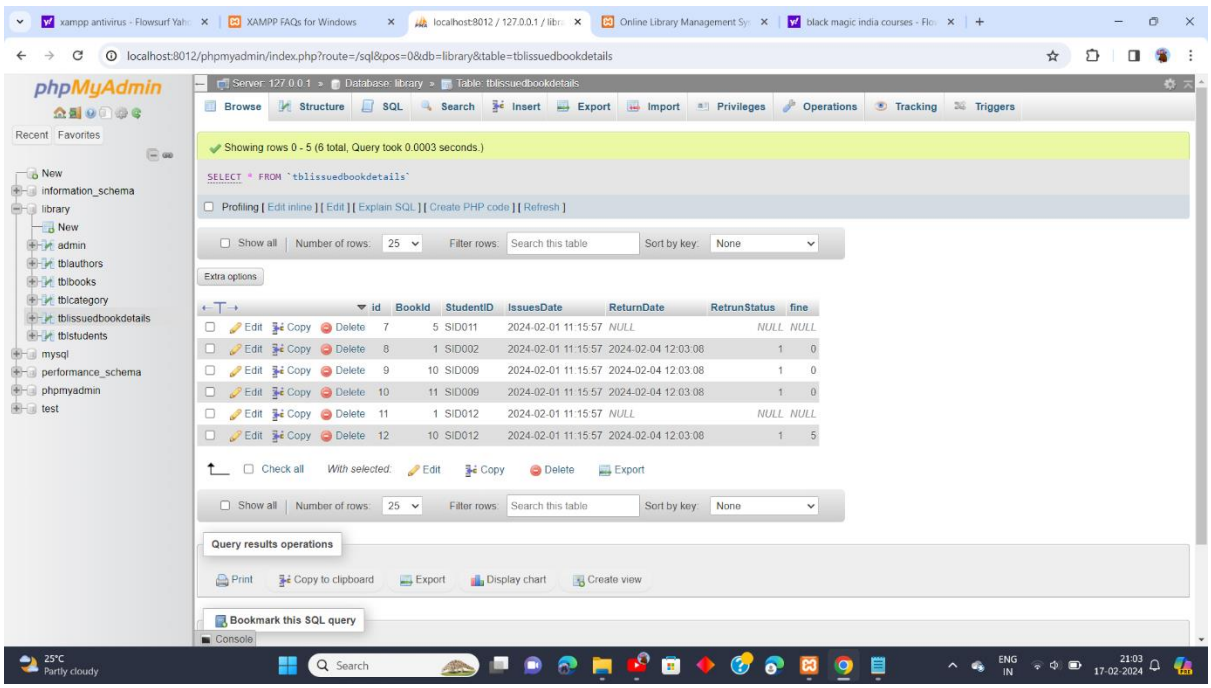

Figure 1.8 Table issued_book_details

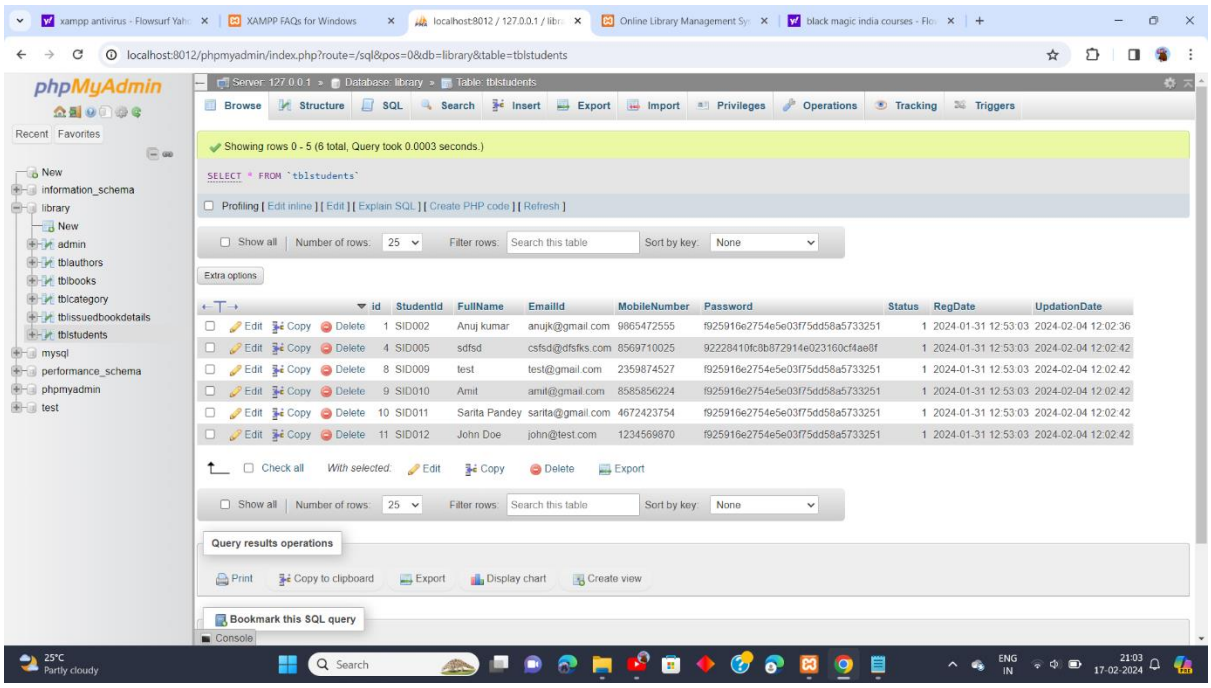

Figure1.9 Table students

5.3 IMPLEMENTATION CODE (INDEX.PHP)

```
<?php
session_start();
error_reporting(0);
include('includes/config.php');
if($_SESSION['login']!=''){
$_SESSION['login']='';
}
if(isset($_POST['login']))
{
$email=$_POST['emailid'];
$password=md5($_POST['password']);
$sql ="SELECT EmailId,Password,StudentId,Status FROM tblstudents WHERE
EmailId=:email and Password=:password";
$query= $dbh -> prepare($sql);
$query-> bindParam(':email', $email, PDO::PARAM_STR);
$query-> bindParam(':password', $password, PDO::PARAM_STR);
$query-> execute();
$results=$query->fetchAll(PDO::FETCH_OBJ);
if($query->rowCount() > 0)
{
 foreach ($results as $result) {
 $_SESSION['stdid']=$result->StudentId;
if($result->Status==1)
{
$_SESSION['login']=$_POST['emailid'];
echo "<script type='text/javascript'> document.location ='dashboard.php'; </script>";
} else {
echo "<script>alert('Your Account Has been blocked .Please contact admin');</script>";
}
}
}
else{
echo "<script>alert('Invalid Details');</script>";
}
}

?>
<!DOCTYPE html>
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <meta charset="utf-8" />
    <meta name="viewport" content="width=device-width, initial-scale=1, maximum-
scale=1" />
    <meta name="description" content="" />
    <meta name="author" content="" />
    <title>Online Library Management System | </title>
    <!-- BOOTSTRAP CORE STYLE  -->
    <link href="assets/css/bootstrap.css" rel="stylesheet" />
```

```
    <!-- FONT AWESOME STYLE  -->
    <link href="assets/css/font-awesome.css" rel="stylesheet" />
    <!-- CUSTOM STYLE  -->
    <link href="assets/css/style.css" rel="stylesheet" />
    <!-- GOOGLE FONT -->
    <link href='http://fonts.googleapis.com/css?family=Open+Sans' rel='stylesheet'
type='text/css' />
</head>
<body>
    <!------MENU SECTION START-->
<?php include('includes/header.php');?>
<!-- MENU SECTION END-->
<div class="content-wrapper">
<div class="container">
<!--Slider---->
     <div class="row">
            <div class="col-md-10 col-sm-8 col-xs-12 col-md-offset-1">
                <div id="carousel-example" class="carousel slide slide-bdr" data-
ride="carousel" >
                <div class="carousel-inner">
                   <div class="item active">
                      <img src="assets/img/1.jpg" alt="" />
                   </div>
                   <div class="item">
                      <img src="assets/img/2.jpg" alt="" />
                   </div>
                   <div class="item">
                      <img src="assets/img/3.jpg" alt="" />
                   </div>
                </div>

                <!--INDICATORS-->
                 <ol class="carousel-indicators">
                   <li data-target="#carousel-example" data-slide-to="0" class="active"></li>
                   <li data-target="#carousel-example" data-slide-to="1"></li>
                   <li data-target="#carousel-example" data-slide-to="2"></li>
                </ol>
                <!--PREVIUS-NEXT BUTTONS-->

                 <a class="left carousel-control" href="#carousel-example" data-slide="prev">
    <span class="glyphicon glyphicon-chevron-left"></span>
  </a>
  <a class="right carousel-control" href="#carousel-example" data-slide="next">
    <span class="glyphicon glyphicon-chevron-right"></span>
  </a>
              </div>
            </div>
           </div>
<hr />
<div class="row pad-botm">
```

```
<div class="col-md-12">
<h4 class="header-line">USER LOGIN FORM</h4>
</div>
</div>
 <a name="ulogin"></a>
<!--LOGIN PANEL START-->
<div class="row">
<div class="col-md-6 col-sm-6 col-xs-12 col-md-offset-3" >
<div class="panel panel-info">
<div class="panel-heading">

 LOGIN FORM
</div>
<div class="panel-body">
<form role="form" method="post">
<div class="form-group">
<label>Enter Email id</label>
<input class="form-control" type="text" name="emailid" required autocomplete="off" />
</div>
<div class="form-group">
<label>Password</label>
<input class="form-control" type="password" name="password" required
autocomplete="off"  />
<p class="help-block"><a href="user-forgot-password.php">Forgot Password</a></p>
</div>
 <button type="submit" name="login" class="btn btn-info">LOGIN </button> | <a
href="signup.php">Not Register Yet</a>

</form>

 </div>
</div>
</div>
</div>

<!---LOGIN PABNEL END-->
    </div>
   </div>
    <!-- CONTENT-WRAPPER SECTION END-->
 <?php include('includes/footer.php');?>
     <!-- FOOTER SECTION END-->
   <script src="assets/js/jquery-1.10.2.js"></script>
   <!-- BOOTSTRAP SCRIPTS  -->
   <script src="assets/js/bootstrap.js"></script>
     <!-- CUSTOM SCRIPTS  -->
   <script src="assets/js/custom.js"></script>
</body>
</html>
```

CHAPTER 6

RESULTS

6.1 HOME PAGE

Figure 1.10 Home page

6.2 USER LOGIN PAGE

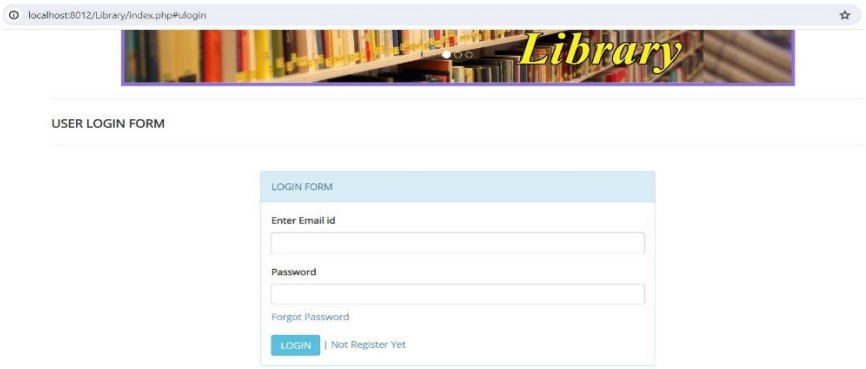

Figure 1.11 User login page

6.3 USER SIGNUP PAGE

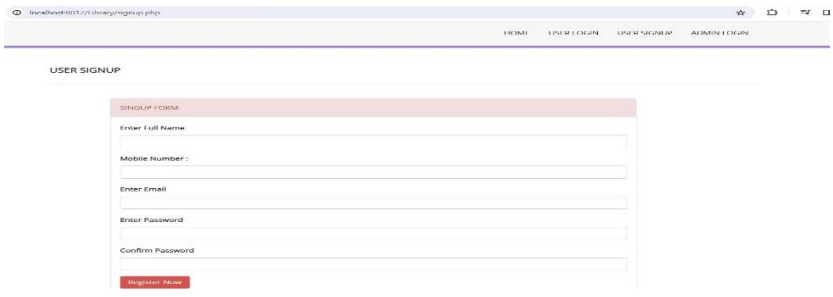

Figure 1.12 User signup page

6.4 ADMIN LOGIN PAGE

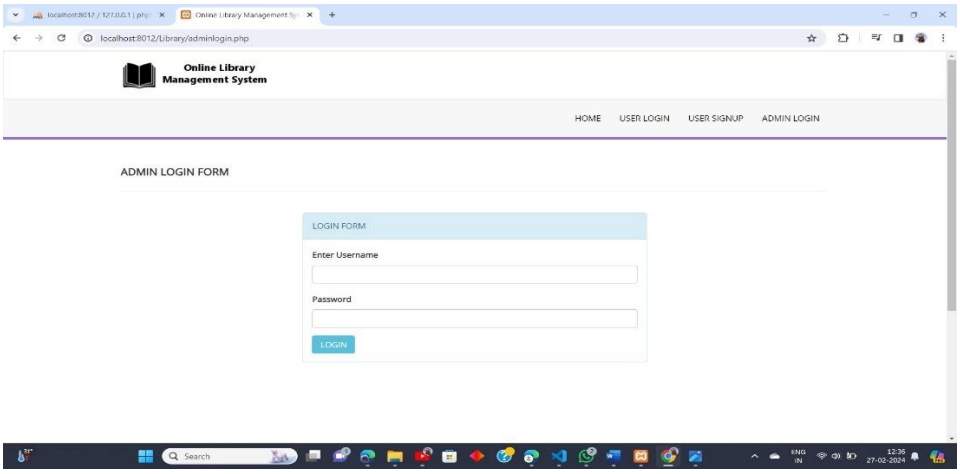

Figure 1.13 Admin Login page

6.5 USER DASHBOARD PAGE

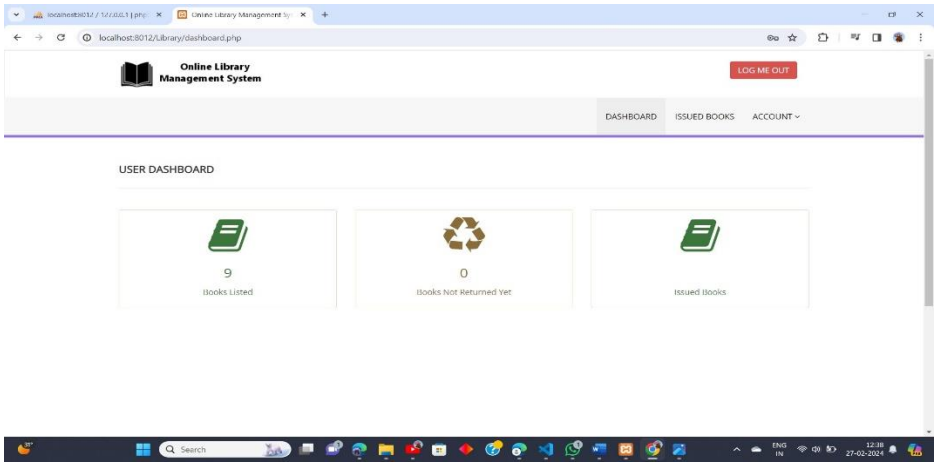

Figure 1.14 User Dashboard page

6.6 ISSUED BOOK PAGE

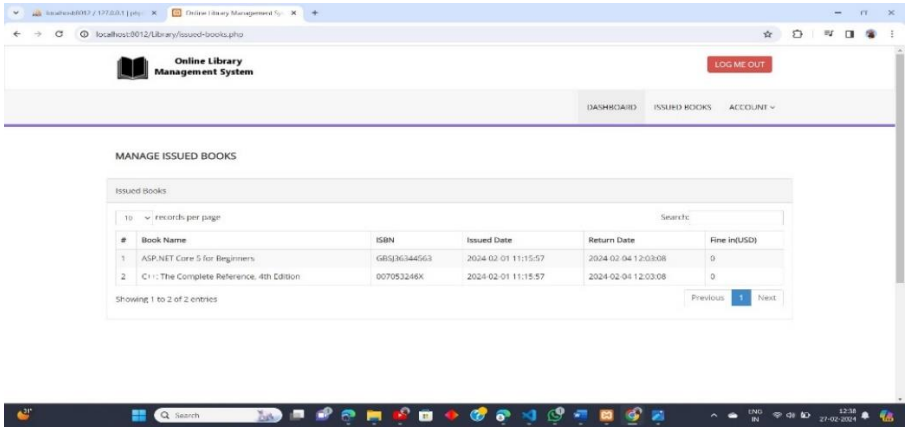

Figure 1.15 Issued Books page

6.7 USER CHANGE PASSWORD PAGE

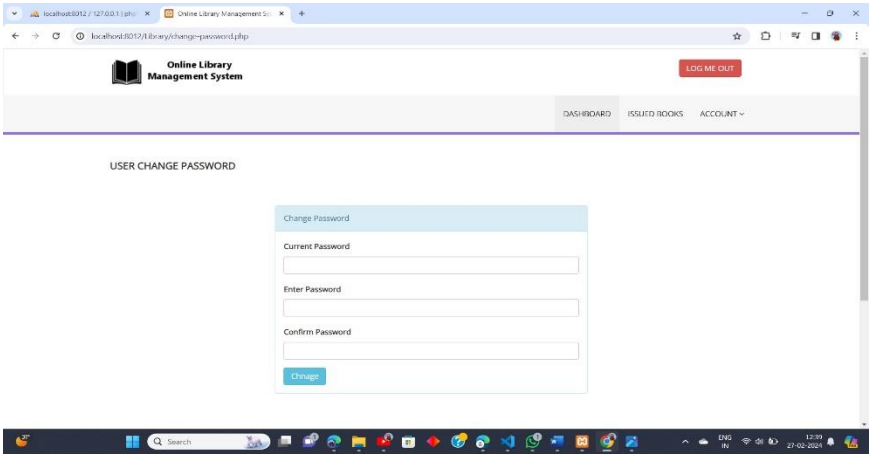

Figure 1.16 User Change password page

6.8 MY PROFILE PAGE

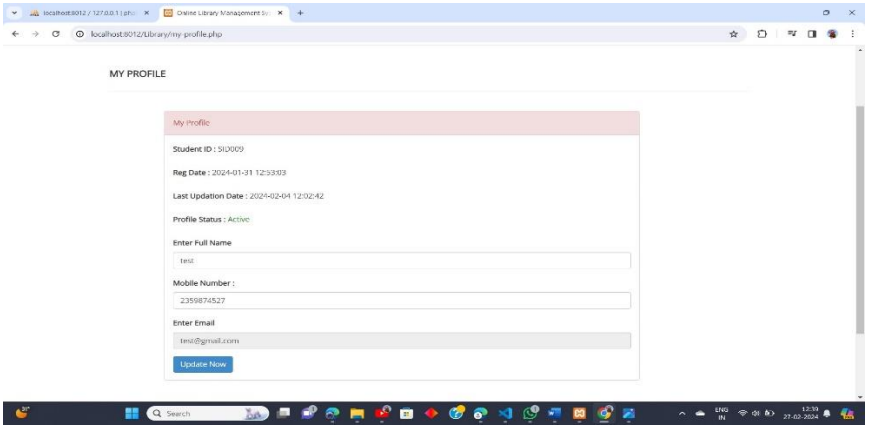

Figure 1.17 My Profile page

6.9 ADMIN DASHBOARD PAGE

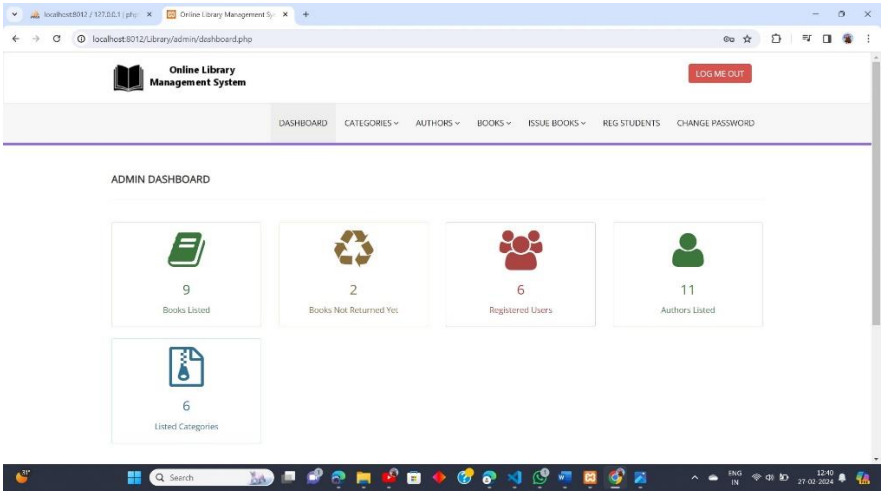

Figure 1.18 Admin Dashboard page

6.10 ADD CATEGORY PAGE

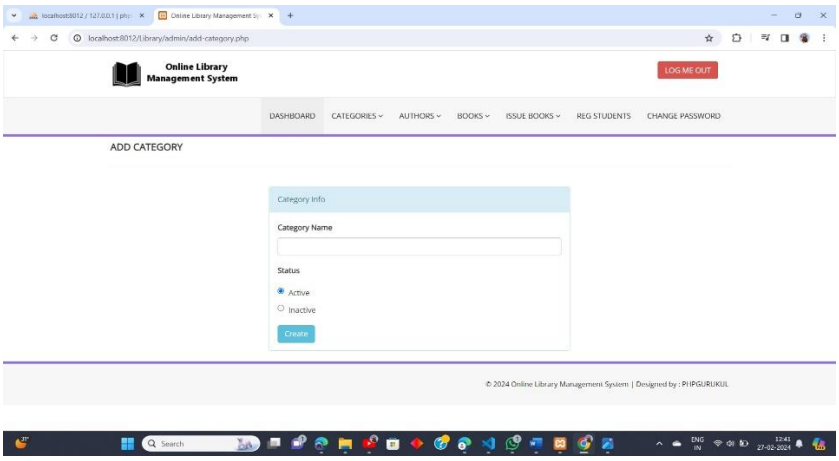

Figure 1.19 Add category page

6.11 MANAGE CATEGORIES PAGE

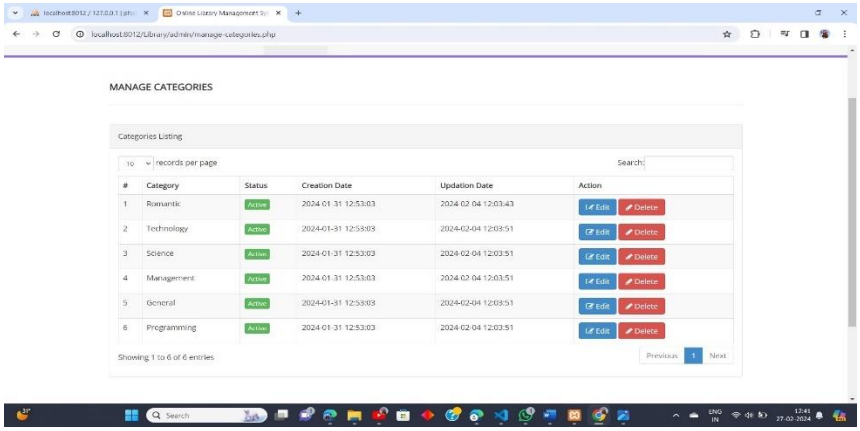

Figure 1.20 Manage category page

6.12 ADD AUTHOR PAGE

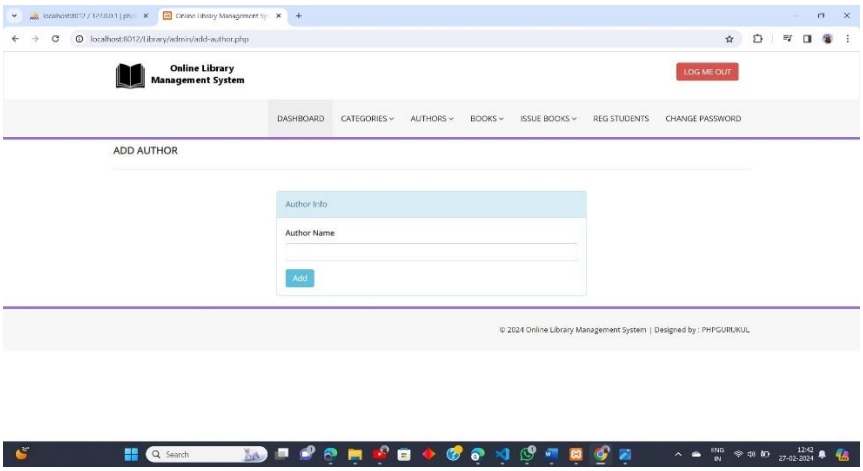

Figure 1.21 Add Author page

6.13 MANAGE AUTHOR PAGE

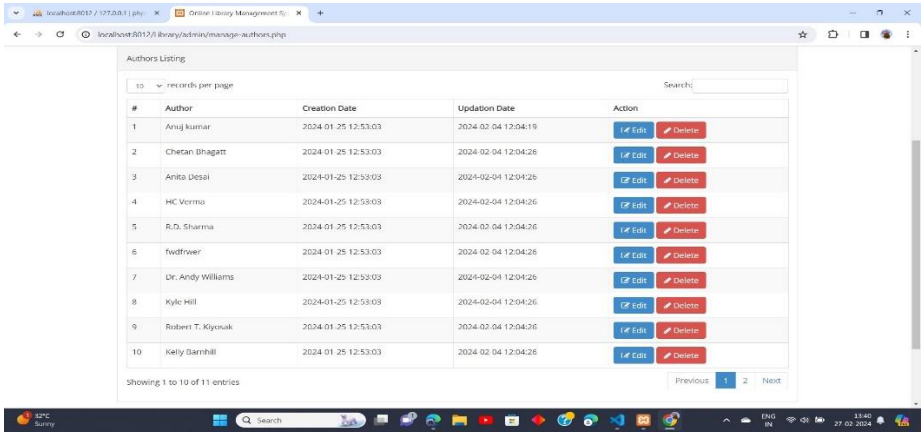

Figure 1.22 Manage Author page

6.14 ADD BOOK PAGE

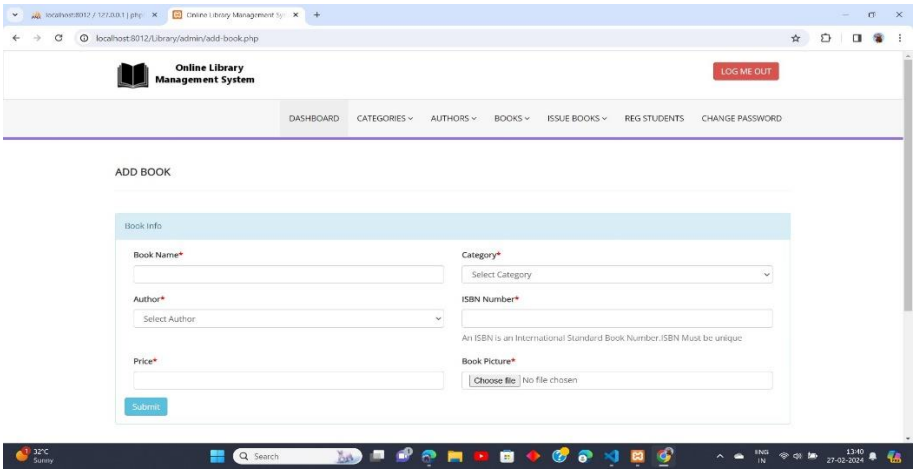

Figure 1.23 Add Book page

6.15 MANAGE BOOK PAGE

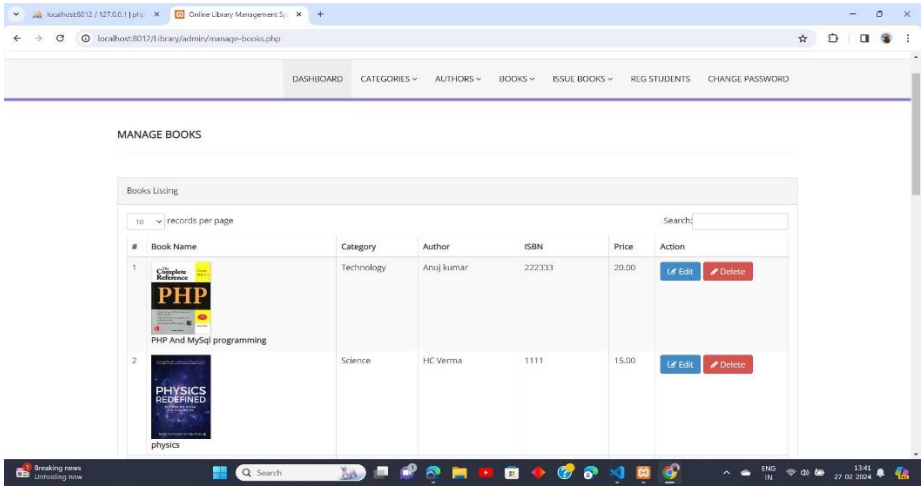

Figure 1.24 Manage Book page

6.16 ISSUE A NEW BOOK PAGE

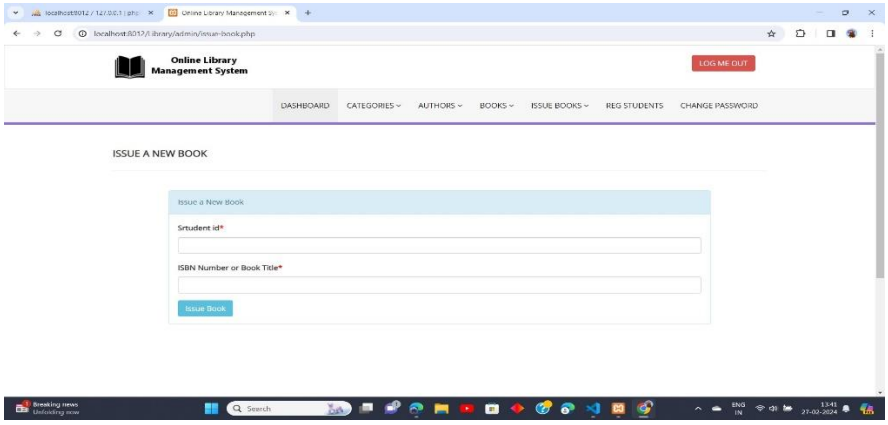

Figure 1.25 Issue a new Book page

6.17 MANAGE ISSUED BOOKS PAGE

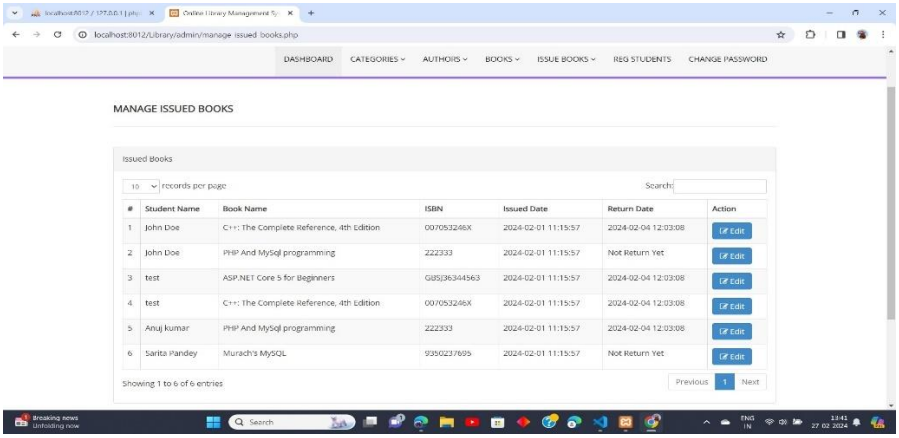

Figure 1.26 Manage Issued Book page

6.18 MANAGE REG STUDENTS PAGE

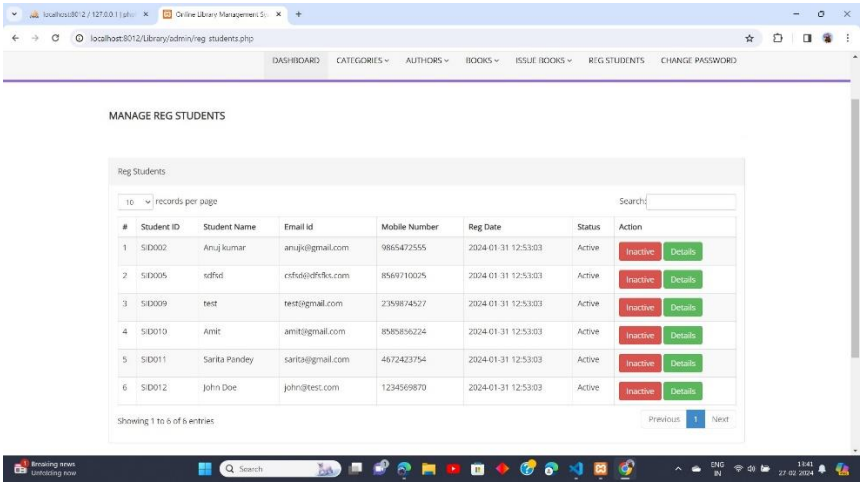

Figure 1.27 Manage reg student page

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