LIBRARY MANAGEMENT SYSTEM

Details

The Library Management System offers five functions:

1. Viewing available books
2. Borrowing a book
3. Returning a book
4. Adding a book
5. Removing a book

Program

```
import java.sql.*;
import java.util.Scanner;
public class LibraryManagementSystem {
    private static final String DB_URL = "jdbc:mysql://localhost:3306/library_mgmt";
    private static final String DB_USER = "root";
    private static final String DB_PASSWORD = "";
    public static void main(String[] args) {
        try {
            Connection connection = DriverManager.getConnection(DB_URL, DB_USER,
DB_PASSWORD);
```

```
System.out.println("Connected to database.");
Scanner scanner = new Scanner(System.in);
while (true) {
    System.out.println("\n1. Display available books");
    System.out.println("2. Borrow a book");
    System.out.println("3. Return a book");
    System.out.println("4. Add a book");
    System.out.println("5. Remove a book");
    System.out.println("6. Exit");
    System.out.print("Enter your choice: ");
    int choice = scanner.nextInt();
    switch (choice) {
        case 1:
            displayAvailableBooks(connection);
            break;
        case 2:
            borrowBook(connection, scanner);
            break;
        case 3:
            returnBook(connection, scanner);
            break;
        case 4:
            addBook(connection, scanner);
            break;
```

```
                case 5:
                    removeBook(connection, scanner);
                    break;
                case 6:
                    System.out.println("Exiting...");
                    connection.close();
                    System.exit(0);
                    break;
                default:
                    System.out.println("Invalid choice. Please try again.");
            }
        }
    } catch (SQLException e) {
        System.out.println("Database connection error: " + e.getMessage());
    }
}
private static void displayAvailableBooks(Connection connection) throws
SQLException {
    PreparedStatement preparedStatement = connection.prepareStatement(
        "SELECT * FROM books WHERE book_id NOT IN (SELECT book_id FROM
borrowed_books WHERE return_date IS NULL)"
    );
    ResultSet resultSet = preparedStatement.executeQuery();
    System.out.println("\nAvailable books:");
    while (resultSet.next()) {
```

```
            System.out.println(
                    resultSet.getInt("book_id") + " | " +
                            resultSet.getString("book_name") + " | " +
                            resultSet.getString("book_author") + " | " +
                            resultSet.getDouble("price") + " | " +
                            resultSet.getDate("published_date")
            );
        }
        resultSet.close();
        preparedStatement.close();
    }
    private static void borrowBook(Connection connection, Scanner scanner) throws
SQLException {
        System.out.print("Enter the ID of the book you want to borrow: ");
        int bookId = scanner.nextInt();
        scanner.nextLine(); // Consume newline
        // Check if the book is available
        PreparedStatement preparedStatement = connection.prepareStatement(
            "SELECT * FROM borrowed_books WHERE book_id = ? AND return_date IS
NULL"
        );
        preparedStatement.setInt(1, bookId);
        ResultSet resultSet = preparedStatement.executeQuery();
        if (resultSet.next()) {
            System.out.println("This book is already borrowed.");
```

```
            return;
        }
        resultSet.close();
        preparedStatement.close();

        System.out.print("Enter your name: ");
        String borrowerName = scanner.nextLine();
        // Get current date
        Date borrowedDate = new Date(System.currentTimeMillis());

        preparedStatement = connection.prepareStatement(
            "INSERT INTO borrowed_books (book_id, book_name, borrowed_date,
borrowed_person) VALUES (?, ?, ?, ?)"
        );
        preparedStatement.setInt(1, bookId);
        // Get book details for the borrowed book
        PreparedStatement bookDetailsStatement = connection.prepareStatement(
            "SELECT book_name FROM books WHERE book_id = ?"
        );
        bookDetailsStatement.setInt(1, bookId);
        ResultSet bookDetailsResultSet = bookDetailsStatement.executeQuery();
        if (bookDetailsResultSet.next()) {
            preparedStatement.setString(2, bookDetailsResultSet.getString("book_name"));
        }
```

```
else {
            System.out.println("Book not found.");
            return;
        }
        bookDetailsResultSet.close();
        bookDetailsStatement.close();
        preparedStatement.setDate(3, borrowedDate);
        preparedStatement.setString(4, borrowerName);
        int rowsAffected = preparedStatement.executeUpdate();
        if (rowsAffected > 0) {
            System.out.println("Book borrowed successfully.");
        }
else {
            System.out.println("Failed to borrow book.");
        }
        preparedStatement.close();
    }
    private static void returnBook(Connection connection, Scanner scanner) throws
SQLException {
        System.out.print("Enter the ID of the book you want to return: ");
        int bookId = scanner.nextInt();
        // Get current date
        Date returnDate = new Date(System.currentTimeMillis());
        PreparedStatement preparedStatement = connection.prepareStatement(
```

```
            "UPDATE borrowed_books SET return_date = ? WHERE book_id = ? AND
return_date IS NULL"
        );
        preparedStatement.setDate(1, returnDate);
        preparedStatement.setInt(2, bookId);
        int rowsAffected = preparedStatement.executeUpdate();
        if (rowsAffected > 0) {
            System.out.println("Book returned successfully.");
        }
 else {
            System.out.println("Failed to return book. Either the book was not borrowed or
the ID is incorrect.");
        }
        preparedStatement.close();
    }
    private static void addBook(Connection connection, Scanner scanner) throws
SQLException {
        scanner.nextLine(); // Consume newline
        System.out.print("Enter book name: ");
        String bookName = scanner.nextLine();
        System.out.print("Enter author name: ");
        String authorName = scanner.nextLine();
        System.out.print("Enter price: ");
        double price = scanner.nextDouble();
        System.out.print("Enter published date (YYYY-MM-DD): ");
```

```
        String publishedDateStr = scanner.next();
        try {
            Date publishedDate = Date.valueOf(publishedDateStr);
            PreparedStatement preparedStatement = connection.prepareStatement(
                "INSERT INTO books (book_name, book_author, price, published_date)
VALUES (?, ?, ?, ?)"
            );
            preparedStatement.setString(1, bookName);
            preparedStatement.setString(2, authorName);
            preparedStatement.setDouble(3, price);
            preparedStatement.setDate(4, publishedDate);
            int rowsAffected = preparedStatement.executeUpdate();
            if (rowsAffected > 0) {
                System.out.println("Book added successfully.");
            }
else {
                System.out.println("Failed to add book.");
            }
            preparedStatement.close();
        } catch (IllegalArgumentException e) {
            System.out.println("Invalid date format. Please use the format YYYY-MM-
DD.");
        }
    }
```

```
    private static void removeBook(Connection connection, Scanner scanner) throws
SQLException {
        System.out.print("Enter the ID of the book you want to remove: ");
        int bookId = scanner.nextInt()
        PreparedStatement preparedStatement = connection.prepareStatement(
            "DELETE FROM books WHERE book_id = ? AND book_id NOT IN (SELECT
book_id FROM borrowed_books WHERE return_date IS NULL)"
        );
        preparedStatement.setInt(1, bookId);
        int rowsAffected = preparedStatement.executeUpdate();
        if (rowsAffected > 0) {
            System.out.println("Book removed successfully.");
        }
else {
            System.out.println("Failed to remove book. Either the book ID is incorrect or the
book is borrowed.");
        }
        preparedStatement.close();
    }
}
```

OUTPUT

Created a Database : library_mgmt

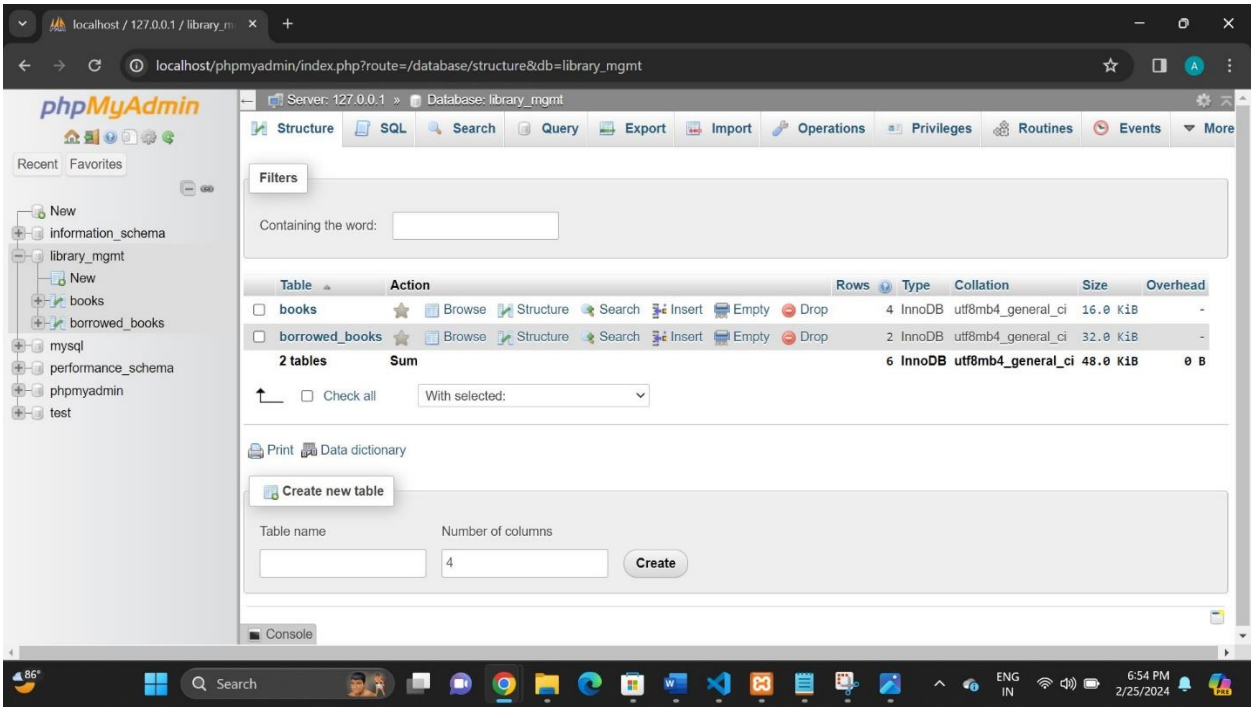
Table Creation

```
CREATE TABLE books (
    book_id INT AUTO_INCREMENT PRIMARY KEY,
    book_name VARCHAR(255) NOT NULL,
    book_author VARCHAR(255) NOT NULL,
    Price DECIMAL(10, 2) NOT NULL,
    Published_date DATE NOT NULL
);



CREATE TABLE borrowed_books (
    book_id INT,
    book_name VARCHAR(255),
    borrowed_date DATE NOT NULL,
    return_date DATE,
    borrowed_person VARCHAR(255) NOT NULL,
    FOREIGN KEY (book_id) REFERENCES books(book_id)
);
```

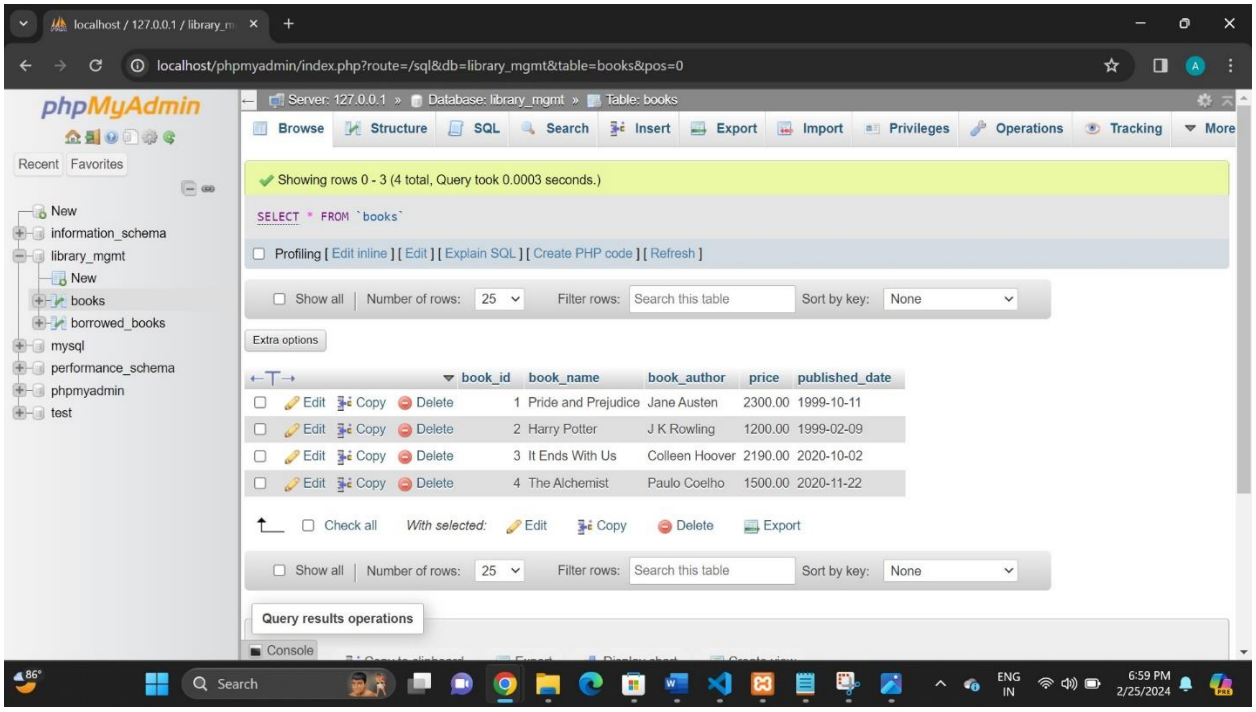
Database : library_mgmt and Tables : books and borrowed_books



1. To display available books

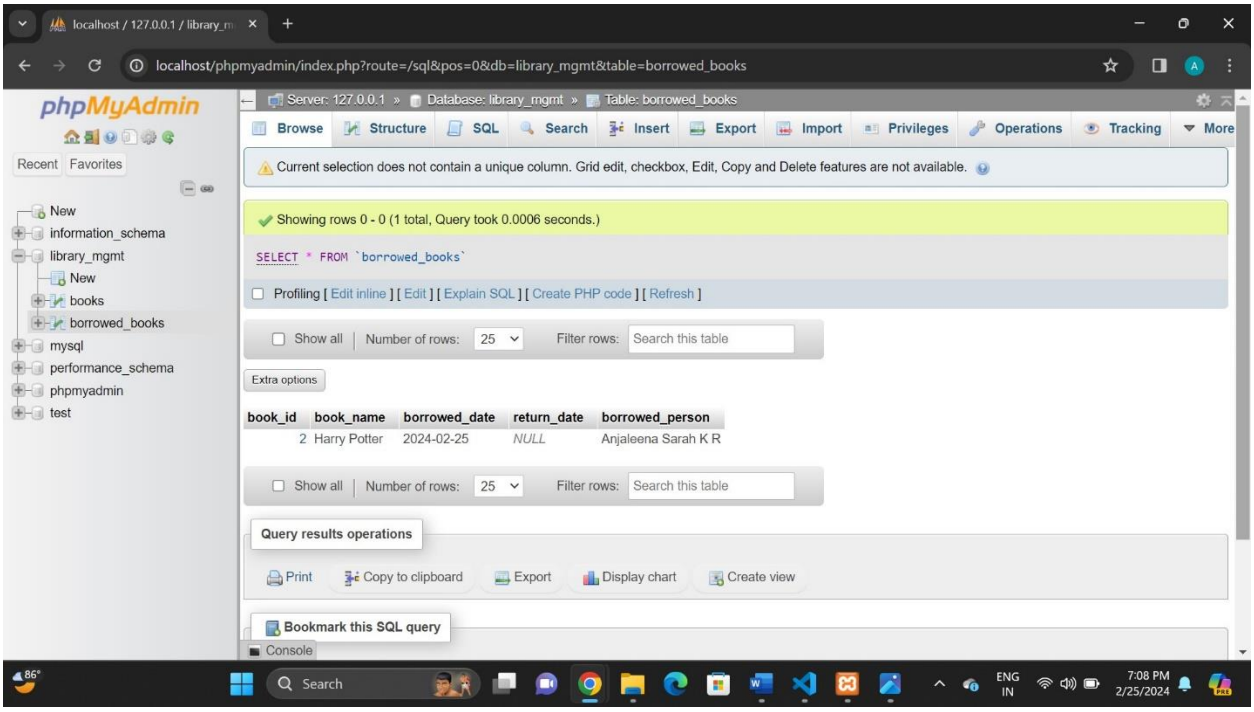
```
1. Display available books
2. Borrow a book
3. Return a book
4. Add a book
5. Remove a book
6. Exit
Enter your choice: 1

Available books:
1 | Pride and Prejudice | Jane Austen | 2300.0 | 1999-10-11
2 | Harry Potter | J K Rowling | 1200.0 | 1999-02-09
3 | It Ends With Us | Colleen Hoover | 2190.0 | 2020-10-02
4 | The Alchemist | Paulo Coelho | 1500.0 | 2020-11-22
```



2. To borrow a book

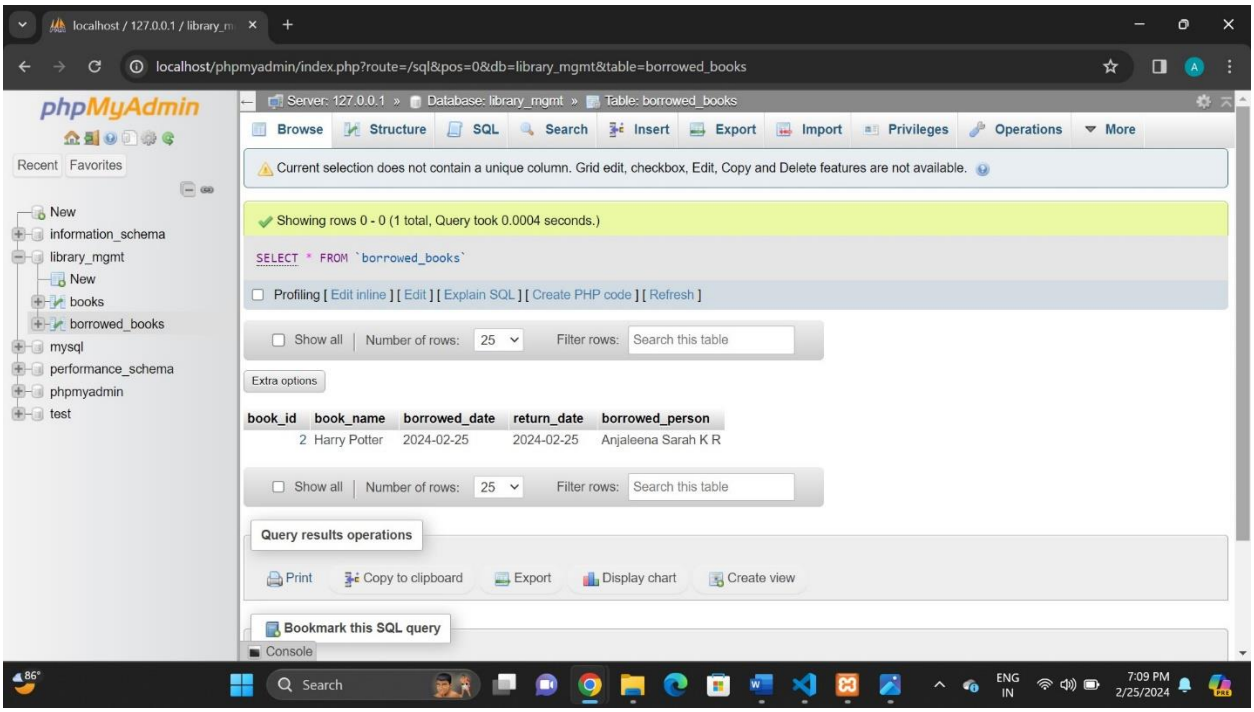
```
1. Display available books
2. Borrow a book
3. Return a book
4. Add a book
5. Remove a book
6. Exit
Enter your choice: 2
Enter the ID of the book you want to borrow: 2
Enter your name: Anjaleena Sarah K R
Book borrowed successfully.
```



3. To return a book

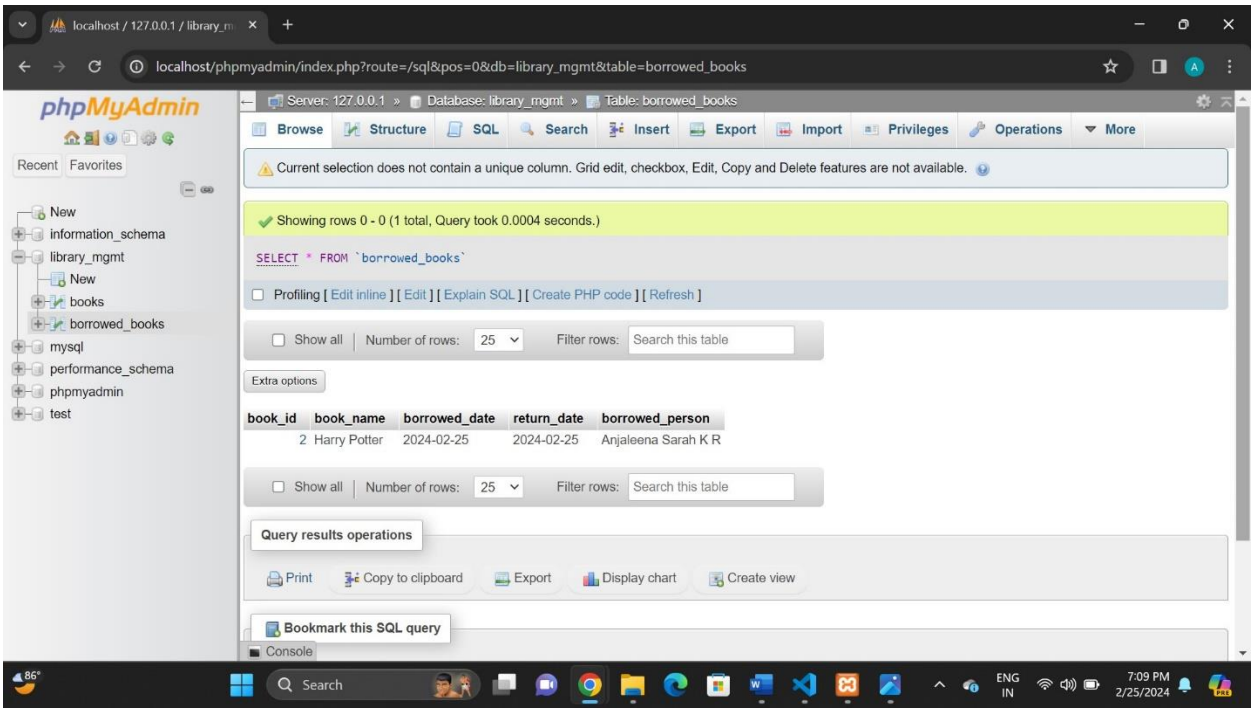
```
1. Display available books
2. Borrow a book
3. Return a book
4. Add a book
5. Remove a book
6. Exit
Enter your choice: 3
Enter the ID of the book you want to return: 2
Book returned successfully.
```

After returning the book – return_date is updated



4. To add a book

```
1. Display available books
2. Borrow a book
3. Return a book
4. Add a book
5. Remove a book
6. Exit
Enter your choice: 4
Enter book name: The Great Gatsby
Enter author name: F Scott
Enter price: 2500
Enter published date (YYYY-MM-DD): 2020-09-11
Book added successfully.
```

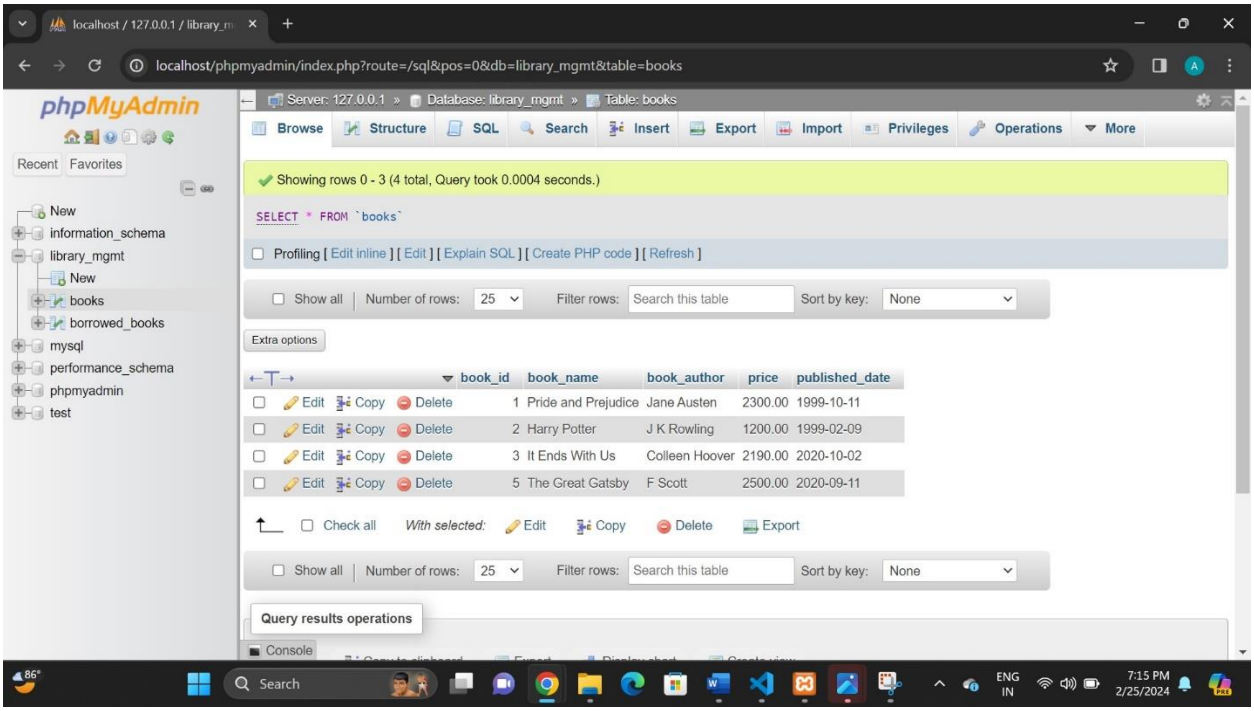


5. To remove a book

```
1. Display available books
2. Borrow a book
3. Return a book
4. Add a book
5. Remove a book
6. Exit
Enter your choice: 5
Enter the ID of the book you want to remove: 4
Book removed successfully.

1. Display available books
2. Borrow a book
3. Return a book
4. Add a book
5. Remove a book
6. Exit
Enter your choice: 1

Available books:
1 | Pride and Prejudice | Jane Austen | 2300.0 | 1999-10-11
2 | Harry Potter | J K Rowling | 1200.0 | 1999-02-09
3 | It Ends With Us | Colleen Hoover | 2190.0 | 2020-10-02
5 | The Great Gatsby | F Scott | 2500.0 | 2020-09-11
```



6. Exiting from the program