University of Tabuk

College of Computers & Information Technology

Department of Computer Science

Advanced Web Technology (CIT1303)

University Library Management System

Final PHP Project

Group Members

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Project Description

We created a web application called the "University Library Management System". This system handles the core operations of a library, including inventory management, user authentication, and book lending. It allows an Admin to manage the entire book catalog, track current loans, and manage all user accounts (students and staff). Students can log in to view their active loans and check due dates. Non-logged-in Guests can search and view the public catalog for book availability. The application is built using a secure PHP backend and a responsive front-end design.

Database Structure

We used MySQL to store all system data. There are three essential tables that link together using Foreign Keys to maintain data integrity:

- **users Table:** Stores student and admin information, including ID, username, password (hashed), and user_type.
- **books Table:** Holds the library inventory, including book titles, authors, ISBN, total_copies, and available_copies.
- **loans Table:** Tracks all lending transactions, linking a specific user_id to a book_id, along with loan_date, due_date, and return_date.

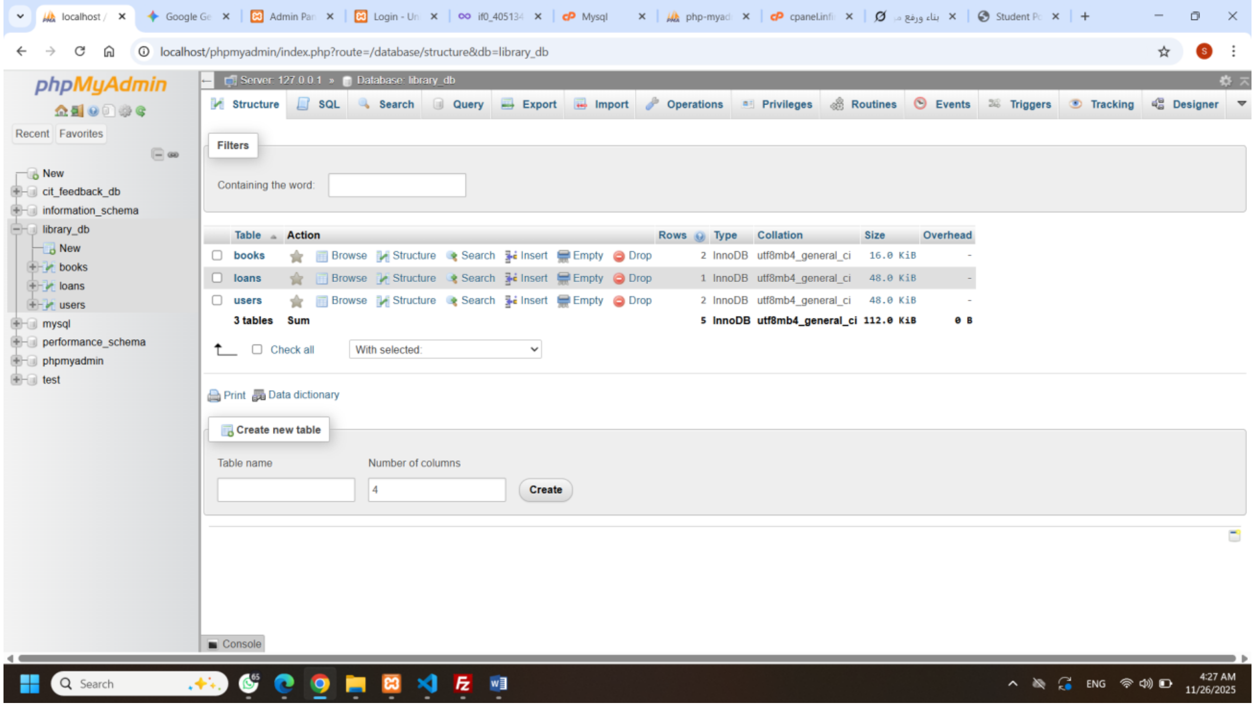
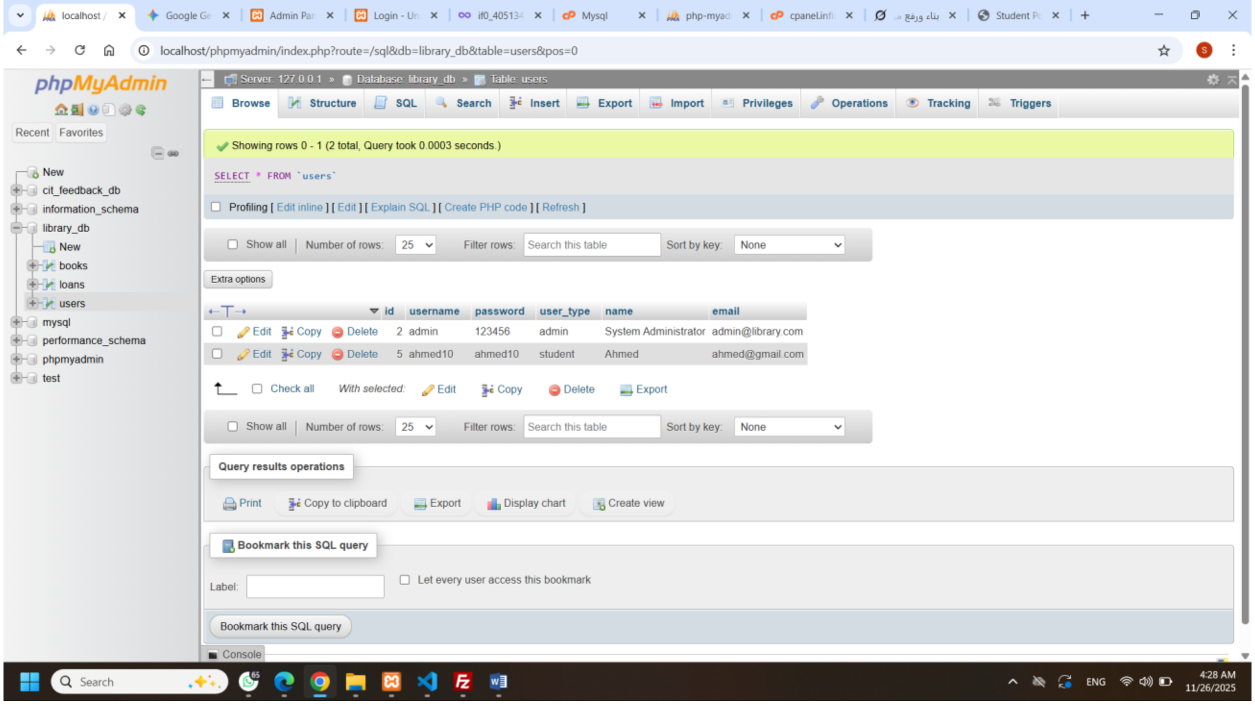


Table	Action	Rows	Type	Collation	Size	Overhead
books	Browse Structure Search Insert Empty Drop	2	InnoDB	utf8mb4_general_ci	16.0 KiB	-
loans	Browse Structure Search Insert Empty Drop	1	InnoDB	utf8mb4_general_ci	48.0 KiB	-
users	Browse Structure Search Insert Empty Drop	2	InnoDB	utf8mb4_general_ci	48.0 KiB	-
3 tables	Sum	5	InnoDB	utf8mb4_general_ci	112.0 KiB	0 B

Figure 1: Database structure showing all tables and relationships.



localhost/phpmyadmin/index.php?route=/sql&db=library_db&table=users&pos=0

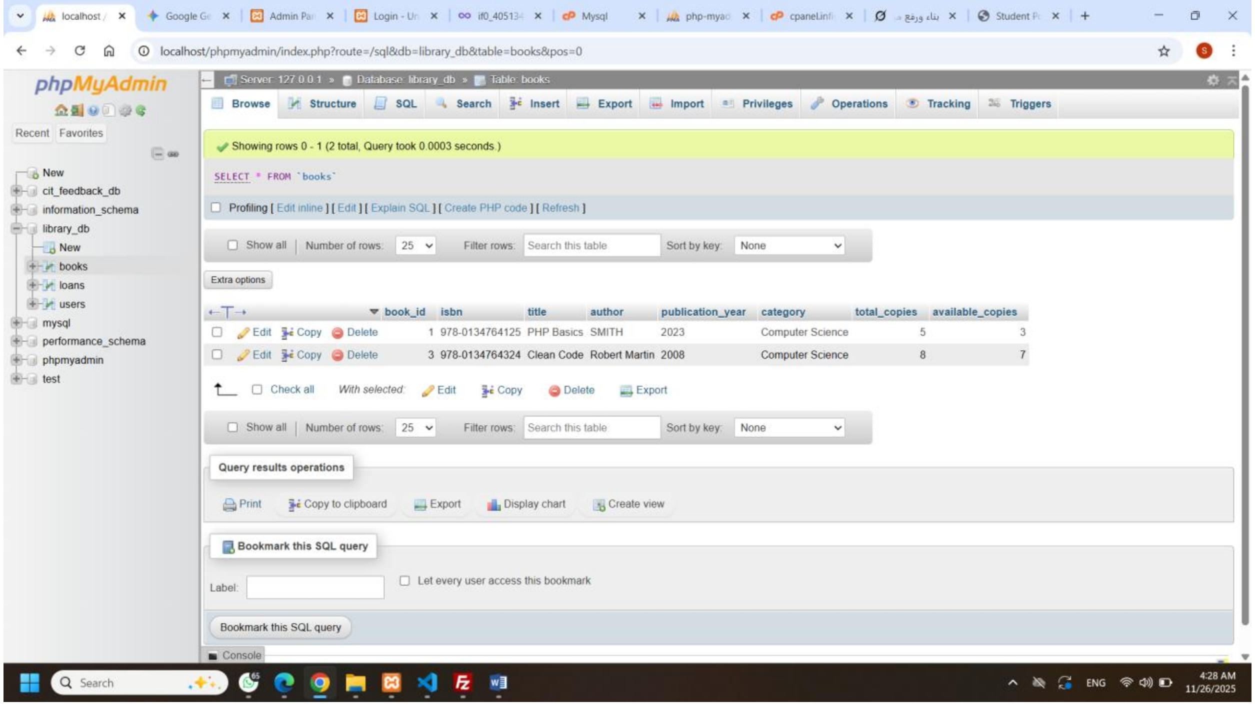
Server: 127.0.0.1 » Database: library_db » Table: users

✓ Showing rows 0 - 1 (2 total, Query took 0.0003 seconds.)

```
SELECT * FROM `users`
```

	id	username	password	user_type	name	email
□ Edit Copy Delete	2	admin	123456	admin	System Administrator	admin@library.com
□ Edit Copy Delete	5	ahmed10	ahmed10	student	Ahmed	ahmed@gmail.com

Figure 2: Structure view of the users table.



localhost/phpmyadmin/index.php?route=/sql&db=library_db&table=books&pos=0

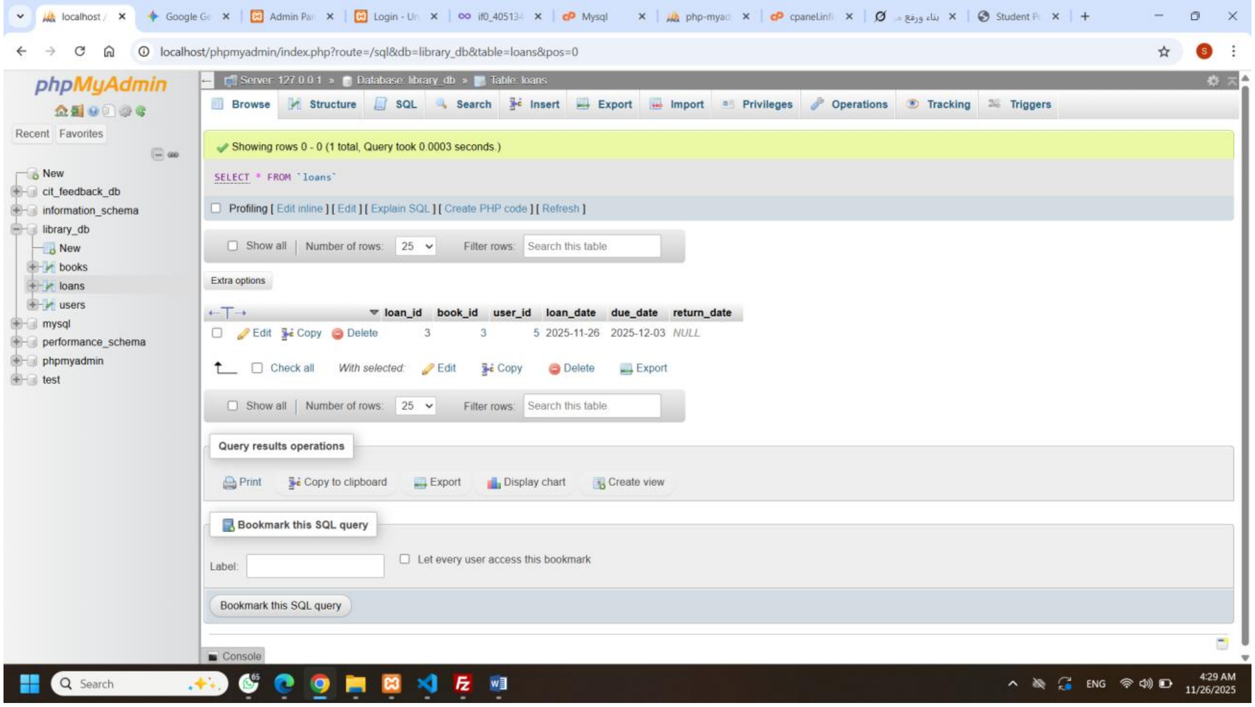
Server: 127.0.0.1 » Database: library_db » Table: books

✓ Showing rows 0 - 1 (2 total, Query took 0.0003 seconds.)

```
SELECT * FROM `books`
```

	book_id	isbn	title	author	publication_year	category	total_copies	available_copies
□ Edit Copy Delete	1	978-0134764125	PHP Basics	SMITH	2023	Computer Science	5	3
□ Edit Copy Delete	3	978-0134764324	Clean Code	Robert Martin	2008	Computer Science	8	7

Figure 3: Structure view of the books table.



Showing rows 0 - 0 (1 total, Query took 0.0003 seconds.)

```
SELECT * FROM `loans`
```

	loan_id	book_id	user_id	loan_date	due_date	return_date
Edit Copy Delete	3	3	5	2025-11-26	2025-12-03	NULL

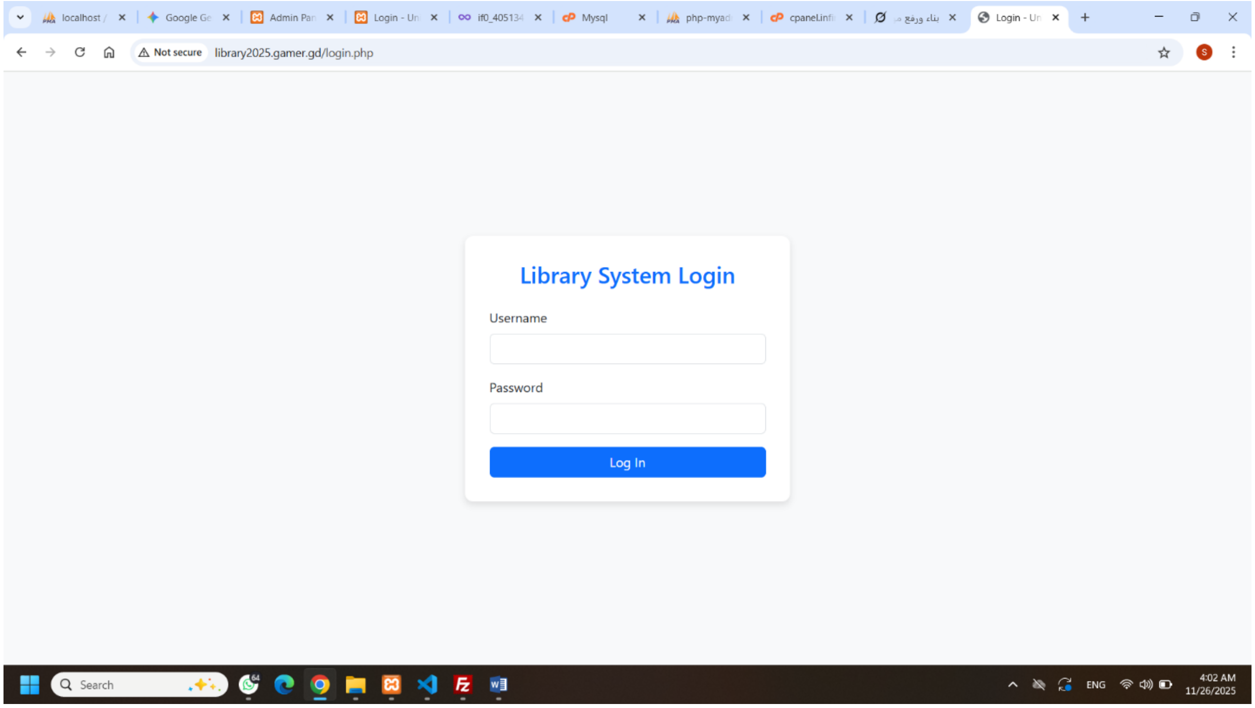
Figure 4: Structure view of the loans table.

System Pages and Features

The system is split into protected portals and public access areas.

Public Access

The system uses the Login Page to authenticate users and the Public Catalog Page (catalog.php) to allow guests to view the entire inventory.

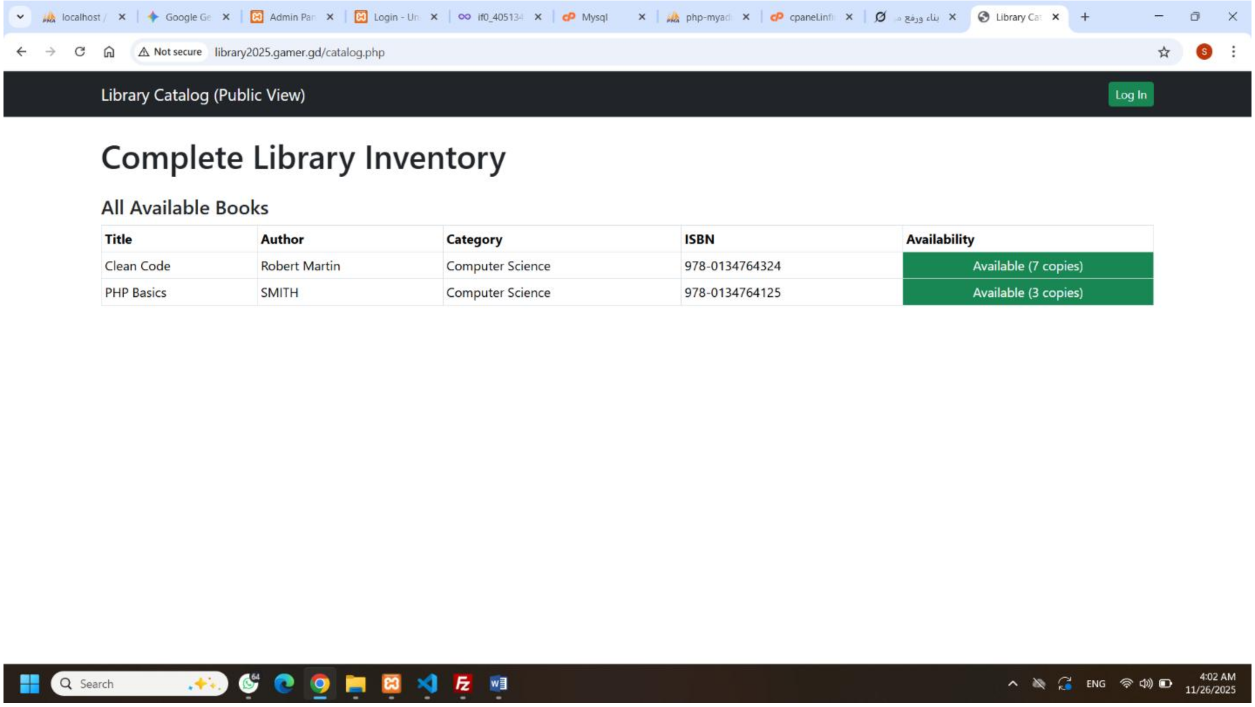


Library System Login

Username

Password

Figure 5: Login page for students and admin.



Complete Library Inventory

All Available Books

Title	Author	Category	ISBN	Availability
Clean Code	Robert Martin	Computer Science	978-0134764324	Available (7 copies)
PHP Basics	SMITH	Computer Science	978-0134764125	Available (3 copies)

Figure 6: Public Catalog page showing all books and their availability (Guest View).

Admin Portal

The Admin controls all CRUD operations:

- Admin Dashboard: Shows key statistics (Total Books, Current Loans, Total Users).
- Manage Books: Allows the admin to Add (C), View (R), Edit (U), and Delete (D) book records.
- Manage Loans: Allows the admin to perform Check Out (C) and Check In (U) transactions.
- Manage Users: Allows the admin to Add (C), View (R), Edit (U), and Delete (D) user accounts.

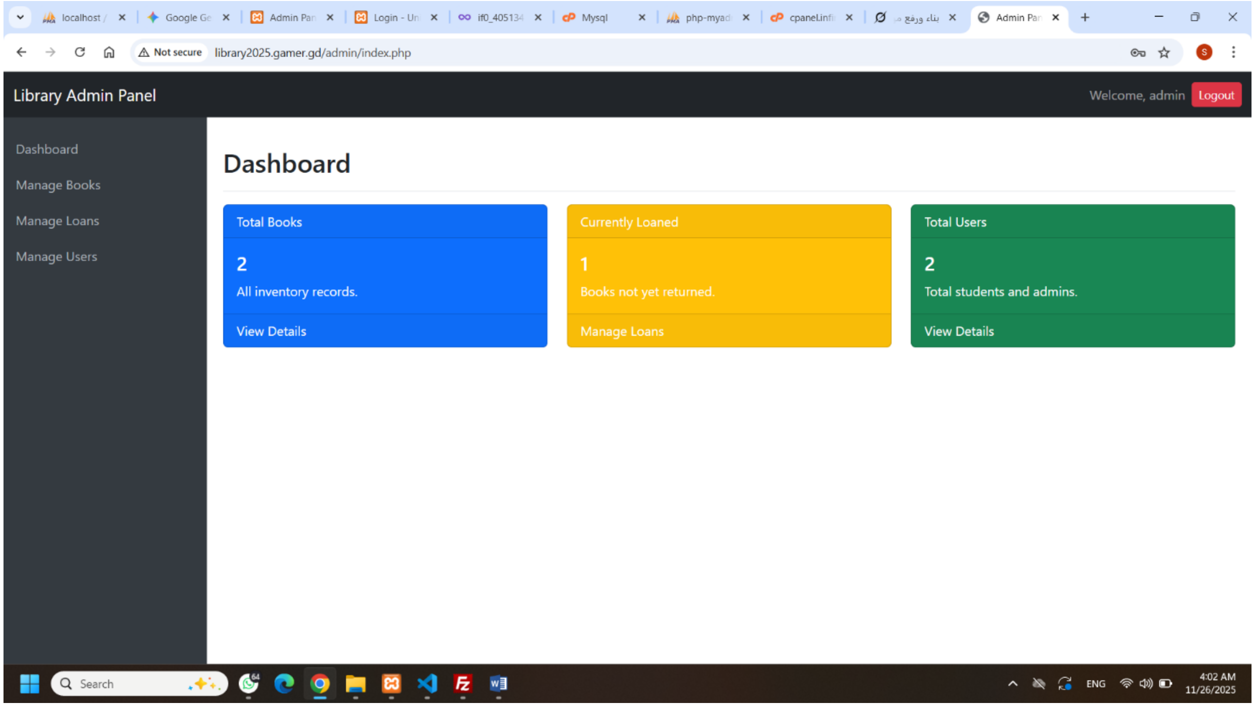
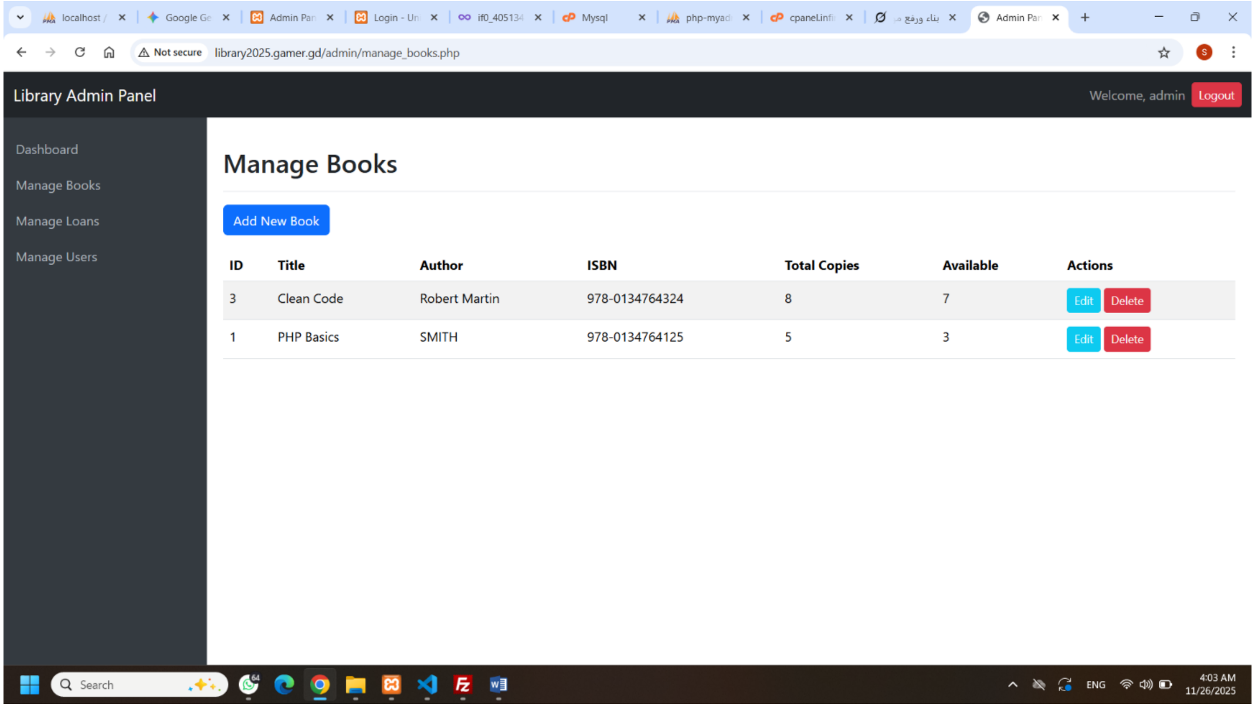


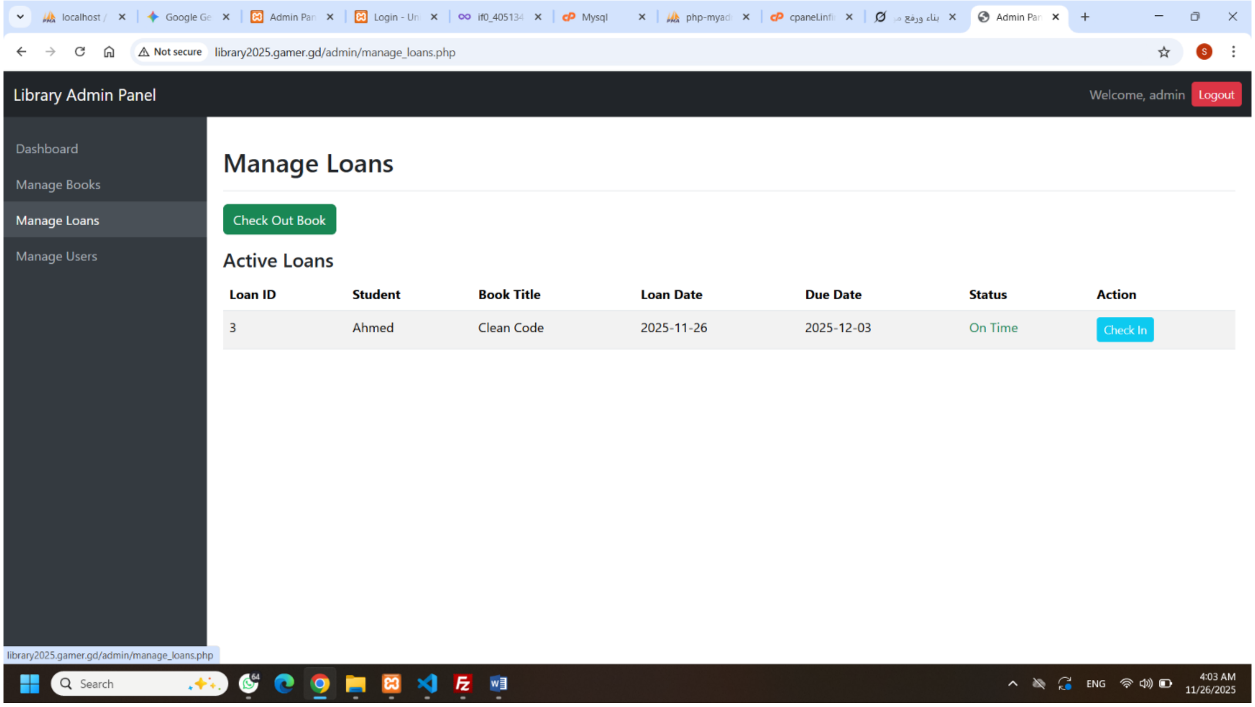
Figure 7: Admin Dashboard with summary statistics.



Manage Books

ID	Title	Author	ISBN	Total Copies	Available	Actions
3	Clean Code	Robert Martin	978-0134764324	8	7	Edit Delete
1	PHP Basics	SMITH	978-0134764125	5	3	Edit Delete

Figure 8: Manage Books page showing CRUD functionality.

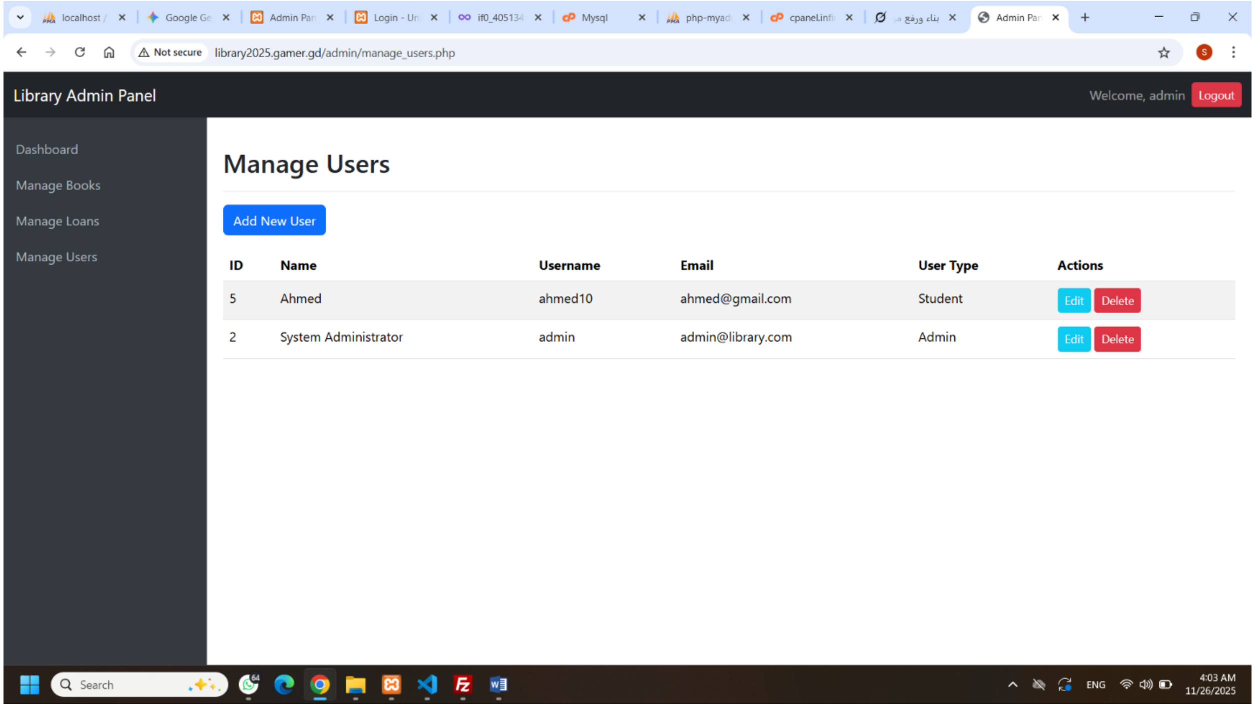


Manage Loans

Active Loans

Loan ID	Student	Book Title	Loan Date	Due Date	Status	Action
3	Ahmed	Clean Code	2025-11-26	2025-12-03	On Time	Check In

Figure 9: Manage Loans page showing active transactions and Check In option.



Manage Users

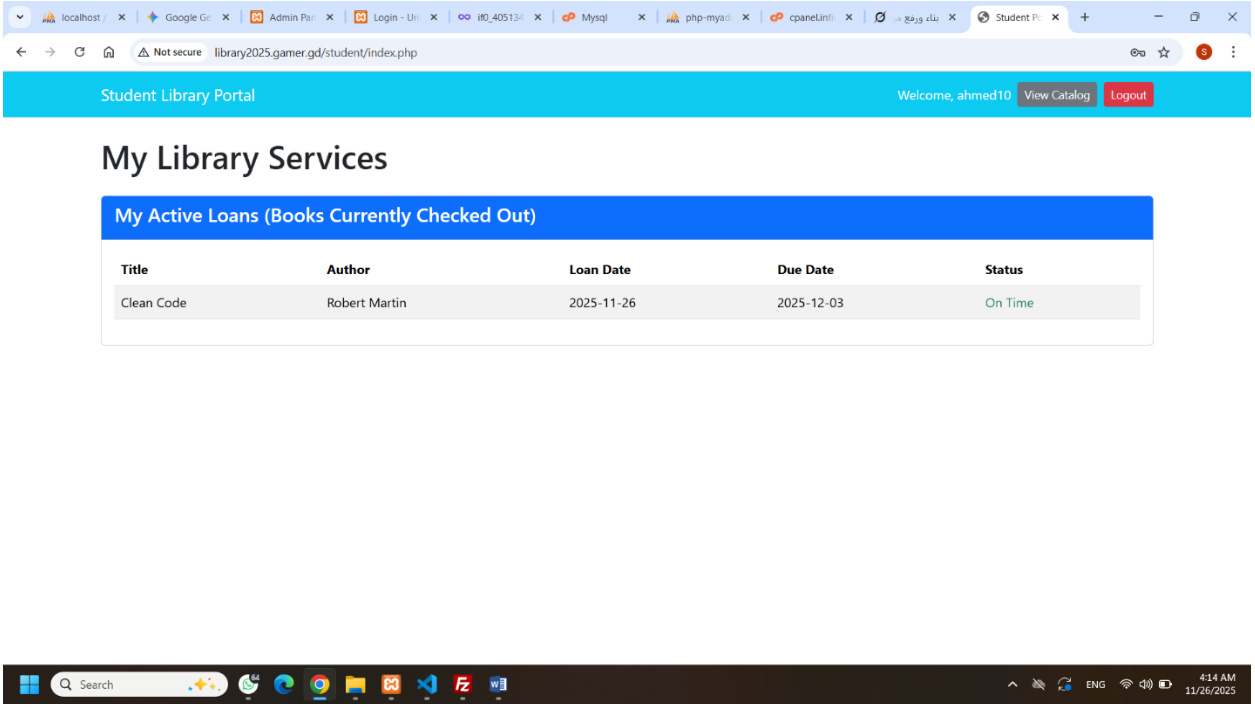
Add New User

ID	Name	Username	Email	User Type	Actions
5	Ahmed	ahmed10	ahmed@gmail.com	Student	Edit Delete
2	System Administrator	admin	admin@library.com	Admin	Edit Delete

Figure 10: Manage Users page showing user accounts and management tools.

Student Portal

- **Student Portal:** Allows the student to View (R) their active loans, check due dates, and see if any books are overdue.



My Library Services

My Active Loans (Books Currently Checked Out)

Title	Author	Loan Date	Due Date	Status
Clean Code	Robert Martin	2025-11-26	2025-12-03	On Time

Figure 11: Student Portal showing the list of active loans.

CRUD Operations Summary

The system implements complete Create, Read, Update, and Delete operations:

- **Create (C):** Adding new books and users (manage_books.php, manage_users.php), and creating a new loan transaction (Check Out in manage_loans.php).
- **Read (R):** Displaying all data in lists and reports (manage_books.php, manage_loans.php), and showing user-specific data (My Active Loans).
- **Update (U):** Editing book and user details, and performing a Check In transaction (manage_loans.php) which updates the loan status and the book's availability count.
- **Delete (D):** Removing book records and user accounts (manage_books.php, manage_users.php).

Challenges and Solutions

During development, we successfully overcame critical challenges related to security and database integrity:

1. **Authorization:** We ensured that only users with admin status could access the /admin/ folder by checking the PHP Session ($_SESSION['user_type']) on every management page.
2. **Referential Integrity (Foreign Keys):** Deleting a user who had active loans, or deleting a book that was currently checked out, would cause a foreign key error. We solved this by implementing checks in the Delete logic to prevent the action if there is an active dependency (i.e., the user must return the book first).
3. **Cross-Page Design:** We ensured a consistent design across the Admin portal by using layout_admin_top.php and layout_admin_bottom.php as template files.

Conclusion

The result is a professional and fully operational Library Management System. We applied core concepts learned in the Advanced Web Technology course, including secure database interaction (PDO), authorization control (PHP Sessions), robust data validation, and responsive design (Bootstrap). The project demonstrates a strong understanding of web application development principles and is ready for institutional use.