LIBRARY MANAGEMENT SYSTEM

By

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Project Submitted in Partial Fulfilment of the Requirements for the diploma of Diploma in Computer Forensics in the Faculty of Information Sciences and Engineering

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ABSTRACT

Abstract of project presented to the Senate of Management & Science University in partial fulfilment of the requirements for the diploma of Diploma in Computer Forensics.

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This thesis addresses the dire necessity to introduce a complete Library Management System in order to modernise school library operations. The research, which focuses on school libraries in Malaysia, reveals common issues such as the lack of online databases and manual book transactions.

The goals of the system include creating an online database, making registration easy, and creating effective book management systems. The research highlights the importance of the project by demonstrating how the suggested Library Management System improves productivity, accurate data keeping, time savings, and better reporting—all of which are in line with the larger objectives of using technology to promote education.

A comparative comparison of current library management systems is provided by the literature research, and methodical development is guided by the adoption of a Waterfall Methodology. The system's resilience is confirmed by results from unit and system testing, especially when it comes to user registration and book transactions.

The study concludes by highlighting the benefits of the Library Management System for school libraries and arguing for its broad implementation. Research on specific aspects of library management systems is encouraged by proposals for more studies, while recommendations emphasise larger applications in educational institutions.

An important step towards modernising school libraries, this project adds to the continuing discussions about how technology may advance educational support systems. The search for creative ways to enhance education continues to be a group effort as the digital world changes.

ABSTRAK

Abstrak tesis yang dikemukakan kepada Senat Management & Science University sebagai memenuhi sebahagian keperluan untuk diploma Diploma Forensik Komputer.

“LIBRARY MANAGEMENT SYSTEM”

Oleh

MUHAMAD AZRI MUHAMAD AZMIR

Disember 2023

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Tesis ini menangani keperluan untuk memperkenalkan Sistem Pengurusan Perpustakaan (Library Management System) yang lengkap bagi memodenkan operasi perpustakaan sekolah. Penyelidikan yang memfokuskan kepada perpustakaan sekolah di Malaysia, mendedahkan isu biasa seperti kekurangan pangkalan data dalam talian dan transaksi buku manual.

Matlamat sistem termasuk mewujudkan pangkalan data dalam talian, memudahkan pendaftaran, dan mewujudkan sistem pengurusan buku yang berkesan. Penyelidikan menyerlahkan kepentingan projek dengan menunjukkan cara Sistem Pengurusan Perpustakaan yang dicadangkan meningkatkan produktiviti, penyimpanan data yang tepat, penjimatan masa dan pelaporan yang lebih baik—semuanya selaras dengan objektif yang lebih besar untuk menggunakan teknologi untuk mempromosikan pendidikan.

Perbandingan sistem pengurusan perpustakaan semasa disediakan oleh penyelidikan literatur, dan pembangunan berkaedah dipandu oleh penggunaan Metodologi Air Terjun. Ketahanan sistem disahkan oleh hasil daripada ujian unit dan sistem, terutamanya apabila ia berkaitan dengan pendaftaran pengguna dan transaksi buku.

Kajian ini diakhiri dengan mengetengahkan faedah Sistem Pengurusan Perpustakaan untuk perpustakaan sekolah dan mempertikaikan pelaksanaannya secara meluas. Penyelidikan mengenai aspek khusus sistem pengurusan perpustakaan digalakkan oleh cadangan untuk lebih banyak kajian, manakala cadangan menekankan aplikasi yang lebih besar dalam institusi pendidikan.

Satu langkah penting ke arah memodenkan perpustakaan sekolah, projek ini menambah perbincangan berterusan tentang cara teknologi boleh memajukan sistem sokongan pendidikan. Pencarian cara kreatif untuk meningkatkan pendidikan terus menjadi usaha kumpulan apabila dunia digital berubah.

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CHAPTER I

INTRODUCTION

1.1 Project Background

A library is an organized collection of information sources which is made accessible to the people. The information is often physically or digitally available in the library. In the past, access was often made in the library room, but as technology advanced, access could also be made online. Libraries can be divided into categories by several types, which are: academic libraries, public libraries, and school libraries. For this particular project, the idea is to create a library management system specifically for schools.

In general, a library is comprised of the following sections, based on the services rendered:

i. Acquisition Section: The selection, acquisition, and purchase of new materials for the library's collection are within the purview of this section. They assess and identify pertinent books, periodicals, digital resources, and other items that are in line with the collection development policy of the library and satisfy the demands of its patrons.

ii. Technical Section: To make library resources available to users, this section organises and processes them. They organise the items for shelving by cataloguing and classifying them, giving them call numbers. They also make sure that bibliographic entries are accurate and manage the library's online catalogue.

iii. Circulation Section: The lending and returning of library resources are controlled under this section. They manage user registration, material check-out and check-in, keep track of circulation, and manage late fees and notifications. They also make sure that library resources are managed safely and securely.

1.1.1 Background of School Libraries in Malaysia

School libraries provide a wide range of information and knowledge resources, particularly for the development of literacy. These resources include encouraging students to read for pleasure and boosting their reading confidence. Additionally, school librarians are essential in introducing technology, information, education, and learning abilities to instructors and students. School libraries frequently address lessons in information literacy and educational technology that are integrated into the curricula of the schools. In helping students get ready for success in further education, the workplace, and even society, it supports educators, counsellors, and administrators. Most significantly, school libraries can help students develop leadership skills and the norms for ethical use of information and technology.

1.1.2 Current Situation

Currently, most school libraries have no online database and all of the book transactions in the library are done manually, which adds time to tasks like borrowing and returning books as well as looking for membership and books. This leads to a number of issues, which leads to ineffective library administration. Because the library does not use a computerized system, there may occasionally be record loss and damage due to human mistake.

1.1.3 Current Technology in the Field

i. Barcode System

In libraries, barcodes are used to label books, periodicals, CDs, and DVDs. Every book and other object are given a special 12-digit barcode. It includes all of the product's information. Every time a student returns or issues a book, the library management system retrieves the barcode number so that we may methodically enter the book's information into the computer. The administration of books is facilitated by a library management system.

ii. RFID System

In order to automatically recognize and track tags attached to books, radio frequency identification (RFID) uses electromagnetic fields. Although there are other ways to identify tags, storing a serial number is the most popular. An RFID tag is made up of an antenna and chip that are connected together. The RFID reader or scanner transforms the data from RFID tags into digital data that may then be seen on a computer and saved for later use.

1.2 Problem Statement

i. Unavailability of Online Library Database

The manual library has an issue with the difficulty in looking for books, which might be characterized as poor book management, leading to inefficiency and time-consuming in the library. If no computerized system is adopted, the issues of space consumption and expense also arise as the number of records grows and more room is needed for physical storage of files and information.

ii. Inconvenient System for Borrowing and Returning Books

Currently, the majority of book transactions in school libraries are done manually, which adds time to tasks like borrowing and returning books as well as looking for members and books. The system would need to be redesigned to make book transactions more seamless and user-friendly, with the help of technology.

iii. Manual Paper-Based Book Record and Library Management

A possibly out-of-date way of cataloguing books at the library is mentioned in this problem statement. Manual paper-based book recording includes writing down information on books on paper, which can be time-consuming, prone to inaccuracy, and ineffective. The library may need to switch to a digital record system that automates data entry to address this issue and improve the accuracy and efficiency of book management, including memberships and reports of the library.

1.3 Objectives of the Project

i. To develop an online database for the library.

ii. To provide a system for the students to register as library members, allowing them to borrow and return books.

iii. To implement a system for the library staff to manage book collections, library membership, and library reports.

1.4 Scope of the Project

System Scope

i. **Book Record and Inventory Management**

As a result of the system's digital book record and inventory management features, library resources such as books may be efficiently arranged and tracked.

ii. **User Authentication and Access Control**

To maintain data security, the system will provide strong user authentication and access control features. Depending on their positions, users will have different levels of access, such as staff and users.

iii. **Reporting and Analytics**

To provide insights into library usage, popular resources, overdue items, and other crucial indicators, the system will have reporting and analytics functions. Staff will be able to make decisions based on data.

User Scope

i. **User Registration and Profiles**

Users will be able create profiles that include personal information, borrowing history, and preferences, including students and class. This will make it possible to provide individualized services and advice.

ii. **Book Search**

Users will be able to perform a catalogue search, to find books by their author, title, category, and publisher.

iii. **Online Book Catalogue**

Users will have access to an online book catalogue that offers a thorough and searchable database of all the library's books, making it simpler to learn about and explore the collection.

Admin Scope

i. **User Management and Permissions**

The ability to manage user accounts, including their creation, modification, and deactivation, will belong to the library staff. Additionally, they can specify user roles and permissions, allowing or denying access, as necessary.

ii. **Content Acquisition and Curation**

Library staff will oversee the collection's resource acquisition and curation. They can choose which resources to include in the library's collection, edit records, and add new items.

iii. **Maintenance and Support**

In order to maintain the system's performance, security, and dependability, the library staff will be in charge. Additionally, they will deal with technical problems and offer user support.

1.5 Significance of the Project

i. **Enhanced Efficiency**

It can take a lot of effort for the staff to keep track of daily statistics on the total number of volumes issued, unreturned, reissued, and available. A school library management system increases a library's efficiency by allowing all functions to be completed with a single click, simplifying the staff's job. Students can access the catalogue, their book status, and other information by logging into individual accounts.

ii. **Keeping Track of Data**

Any educational setting needs information, and library books are an essential resource. Risks associated with manual data management include data loss and incorrect data entry. A library management system may be used to keep track of the whole catalogue as well as information on the library books that are available, reissued, and unreturned. The library staff can easily keep track of all the current materials thanks to this capability. For instance, the system may immediately supply the count if the library staff asks for the quantity of a particular category at the moment.

This application maintains a more accurate record of the available resources since it is computer-based. It lets the library staff arrange the volumes whichever best suits the library whether by title, author, category, and publisher.

iii. **Saves Time**

It may take some time to manage library activities in the traditional manner. Students have to wait much longer than normal during the test time due to an increase in the number of students utilizing the library. Currently, employing a library management software is beneficial. The library staff can provide books to students quickly and effectively. In order to determine whether the book they need is currently in stock, students can also look it up in the catalogue. This may save a lot of time for both the library staff and the students.

By automating time-consuming tasks, library management systems will reduce the stress of manual work in the future.

iv. **Improves Reporting and Monitoring**

In an automated library management system, self-updating records provide dynamic reporting and supervision. It allows for more effective scheduling, content delivery, and user tracking.

1.6 Limitations of the Project

i. **Dependency On an Internet Connection**

For online library management systems to work, there has to be a reliable internet connection. The system could not function properly in places with low internet access, causing delays or even system outages.

ii. **Cost**

The installation and upkeep of online library management systems may be costly. It could be difficult for smaller libraries or institutions with tighter funds to invest in such a system.

iii. **Limited Scope**

The management and cataloguing of books are the project's main area of focus. It might not completely encompass other library resources, such multimedia or digital content. It could be necessary to enhance the system further in order to make it capable of handling more resources.

CHAPTER II

LITERATURE REVIEW

2.1 Review of Current Situation

The school's library is regarded as its heart and soul. It serves as a centre for educational resources and supports the school's curriculum in every way possible.

(Sharma & Tripathi, 2022) did a study to explore the existing status of library management in school libraries of India and their study revealed that 34% school libraries affiliated to Central Board of Secondary Education in India are managed properly and they are termed as first-class library. Rest of the schools are not managed as per rules and regulations of school librarianship.

The presence of technology can be felt everywhere, the library is no exception. In fact, library has used technology such as barcode and RFID technology, as a tool to disseminate information and services. Now user need not to be present in the library and the information can reach to its desk remotely **(Sharma & Tripathi, 2022)**.

2.2 Review of Related Products

i. Koha Library Software

Figure 0.1 Koha Library Software Logo

The well-known and famous library management system is the KOHA library management system. It was known that the KOHA library management system is being used and implemented in 1999. Ever since then, the KOHA has been a demanding system by plenty of libraries worldwide. The improvement in functionality of KOHA, boosting the capability of the system. KOHA later release the newer version which is 3.0 in 2005. Zebra indexing engine integrated with KOHA and makes it a scalable solution and viable for libraries. Thereafter, the LibLime KOHA was introduced and it is built based on the previous foundation. The advanced feature set of the LibLime KOHA, make it to become the most functionally open source Integrated Library System in the market **(Renn & Mohd Nawi, 2022)**.

ii. NewGenLib

Figure 0.2 NewGenLib Logo

Verus Solution Pvt Ltd created the NewGenLib, which is an Integrated Library Management System. Kesavan Institute of Information and Knowledge Management

(KIIKM) provides the primary expertise. The location of the institute is Hyderabad, India. In March 2005, the initial version, NewGenLib version 1.0 was release. Verus Solutions declared NewGenLib as open source software under the GNU General Public License on 9th January 2008. NewGenLib 3.1 is the most recent version available on the market. NewGenLib is anticipated to be used as the major Integrated Library Management System by roughly 2500 libraries in 58 countries **(Renn & Mohd Nawi, 2022)**.

iii. Virginia Tech Library System (VTLS)

Figure 0.3 Virginia Tech Library System (VTLS) Logo

The Virginia Tech Library System (VTLS) is a global leader in library automation, serving more than 900 institutions in 37 countries. VTLS has a deep and extensive understanding of the current demands of libraries and information centres as a provider of library solutions for more than 30 years. At the same time, VTLS is a trailblazer in producing cutting-edge products for the future demands of libraries. Virtua was the first Unicode-compliant Integrated Library Management System, as well as the first to include functional requirements for bibliographic records (FRBR) functionality and resource description and access (RDA) implementation **(Renn & Mohd Nawi, 2022)**.

2.3 Summary by Comparison Between Existing Systems

Feature / System	Koha	NewGenLib	Virginia Tech Library System (VTLS)	Proposed Library Management System
Login Function	Yes	Yes	Yes	Yes
Registration Function	Yes	Yes	Yes	Yes
Book Status	No	No	No	Yes
Database Server	No	No	No	Yes

Table 2.1 Comparison between existing systems

Based on Table 2.1, it can be found that most of the existing system and proposed system share almost the same features which are having the login module and registration module. NewGenLib are normally customized, modified and will be expanded to meet the requirement of the library and the patrons. However, it is discovered that only the proposed system offers such capabilities when it comes to browser compatibility. This is because the proposed system is web-based, whereas the present system requires local installation of software. As a result, the proposed system works with all browsers, including Internet Explorer, Google Chrome, Microsoft Edge, and others. The flexibility cannot be seen in VTLS because the source code of VTLS is kept confidential. The programming language used to program KOHA will be PHP and Perl, whereas for NewGenLib and VTLS will be using Java. Meanwhile, the proposed system will be using HTML, PHP, and MySQL.

CHAPTER III

METHODOLOGY

The methodology chapter describes the approach and methodology used. This section consists of the introduction, the research approach, the workflow model, the algorithm, the research model (if any), the methods of data collection, the analysis of research data.

3.1 Project Methodology

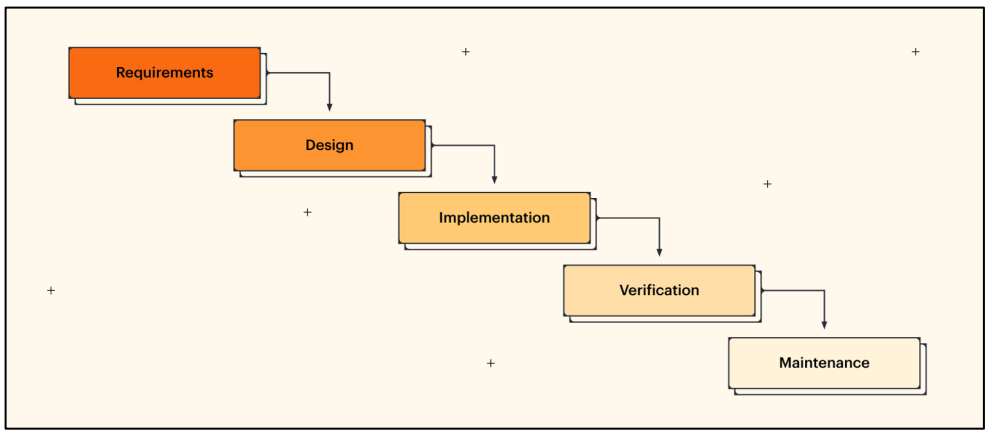

Figure 3.1 Waterfall Methodology

i. Requirements

Collecting and recording user and stakeholder needs for the library management system is part of the requirements phase. This involves identifying the features and functionalities that the system must possess in addition to the non-functional needs, such those related to usability, performance, and security.

ii. Design

Planning for the library management system is part of the design phase. This covers creating the database schema, user interface, and system architecture. The criteria that were acquired in the previous step should serve as the foundation for the design.

iii. Implementation

The developing of the library management system's code is done during the implementation phase. The Waterfall methodology's longest phase, it needs thorough planning and execution. The design that was produced in the previous step should be followed while writing the code.

iv. Verification

During the verification phase, the library management system is tested to make sure it satisfies all specifications and performs as intended.

v. Maintenance

During the maintenance phase, the library management system's bugs are fixed, and new features and functionality are added as needed. This stage will take time to complete as the library management system will need to be upgraded to prepare for evolving user needs and the state of technology.

3.2 Hardware and Software Requirements

This section will cover the details of software and hardware that will be used throughout the period of the research. The software can include software that will be used to create user interface, CGI scripting, database, web server, etc., while the hardware will be confined to the tangible equipment's used for the experiment, development, testing, etc.

HARDWARE	**SPECIFICATIONS**
Computer CPU	Intel Core i5-11400H Processor
RAM	16GB DDR4-3200
Graphics Card	Nvidia GeForce RTX 3050

Table 3.1 Hardware specifications

SOFTWARE	**SPECIFICATIONS**
Operating System	Windows 10
Front-end	HTML, CSS
Back-end	MySQL, JavaScript, PHP

Table 3.2 Software specifications

3.3 Project Schedule

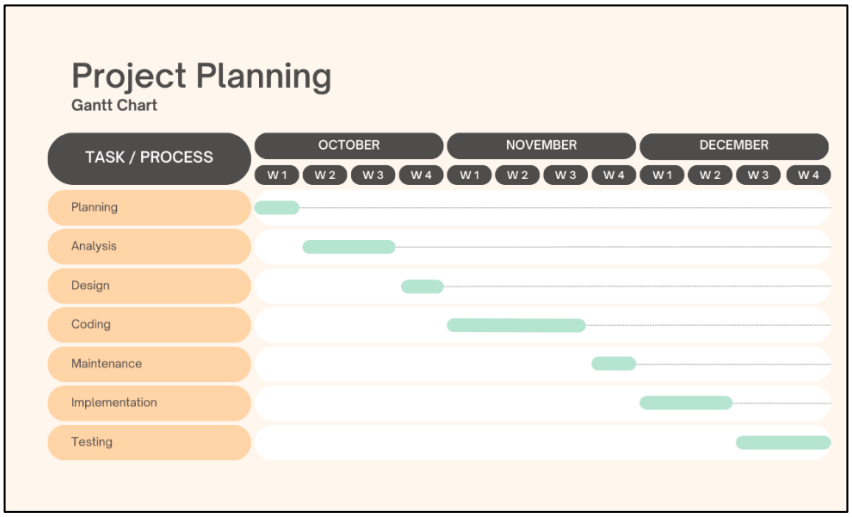

Figure 3.2 Project Schedule

CHAPTER IV

FINDINGS AND DISCUSSIONS

This chapter provides a detailed account of the results and analyses derived from the study on the Library Management System. The testing phase, including unit tests and system tests, is thoroughly documented to highlight the outcomes and their significance in the context of the project's objectives.

4.1 Testing Approach and Environment

User Test:

i. **User A: Member Registration**

Test ID: U1

- **Test Purpose:** To verify if the system correctly accepts valid member registration information.
- **Test Sequence and Inputs:** Call the member registration method with valid user details (e.g., name: "Erwin Smith," email: "erwin@example.com," password: "Basement123").
- **Correct Outputs:** Successful registration, with the member's information stored in the database. The system returns a confirmation message indicating a new member has been successfully registered.

Result: The system successfully registers the member, and the member's details are accurately stored in the database.

ii. **User B: Member Registration**

Test ID: U2

- **Test Purpose:** To confirm the system's ability to add a new book to the library inventory.
- **Test Sequence and Inputs:** Call the method to add a book with valid details (e.g., title: "Attack on Titan Volume 1" author: "Hajime Isayama" ISBN: "9781612620244").
- **Correct Outputs:** The book is successfully added to the catalog, and the database is updated with the new book information.

Result: The system accurately adds the book to the library inventory, and the catalog reflects the newly added book.

iii. User C: Borrowing Functionality

Test ID: U3

- **Test Purpose:** To validate the system's ability to process book borrowing transactions.
- **Test Sequence and Inputs:** Simulate a user borrowing a book, ensuring the member has a valid account and the book is available for borrowing.
- **Correct Outputs:** The borrowed book is reflected in the member's account, and the library inventory updates to indicate the book's status as "Borrowed."

Result: The system successfully processes the book borrowing transaction, updating both the member's account and the library inventory accurately.

System Test:

i. System A: Member Registration

Test ID: S1

- **Test Purpose:** To validate the end-to-end process of member registration in the Library Management System.
- **Test Sequence and Inputs:** Simulate a user navigating to the registration page, entering valid user details, and submitting the registration form.
- **Correct Outputs:** Successful registration, with the user redirected to a confirmation page, and the member's information stored in the database.

Result: The system successfully guides the user through the registration process, provides feedback on successful registration, and accurately stores the member's information.

ii. System B: Book Addition

Test ID: S2

- **Test Purpose:** To ensure the seamless addition of a new book to the library inventory through the system's interface.
- **Test Sequence and Inputs:** Simulate an administrator logging in, navigating to the book addition page, entering valid book details, and submitting the form.
- **Correct Outputs:** The newly added book is visible in the library catalog, and the database is updated with the book's information.

Result: The system allows administrators to effortlessly add books through the user interface, and the added book is accurately reflected in the library catalog.

iii. System Test C: Borrowing Functionality

Test ID: S3

- **Test Purpose:** To validate the end-to-end process of borrowing a book from the library using the system.
- **Test Sequence and Inputs:** Simulate a user logging in, searching for a book, initiating the borrowing process, and completing the transaction.
- **Correct Outputs:** The borrowed book is updated in the member's account, and the library inventory reflects the updated availability status.

Result: The system facilitates a smooth borrowing process for users, updating both the member's account and the library inventory accurately.

4.2 Flowchart

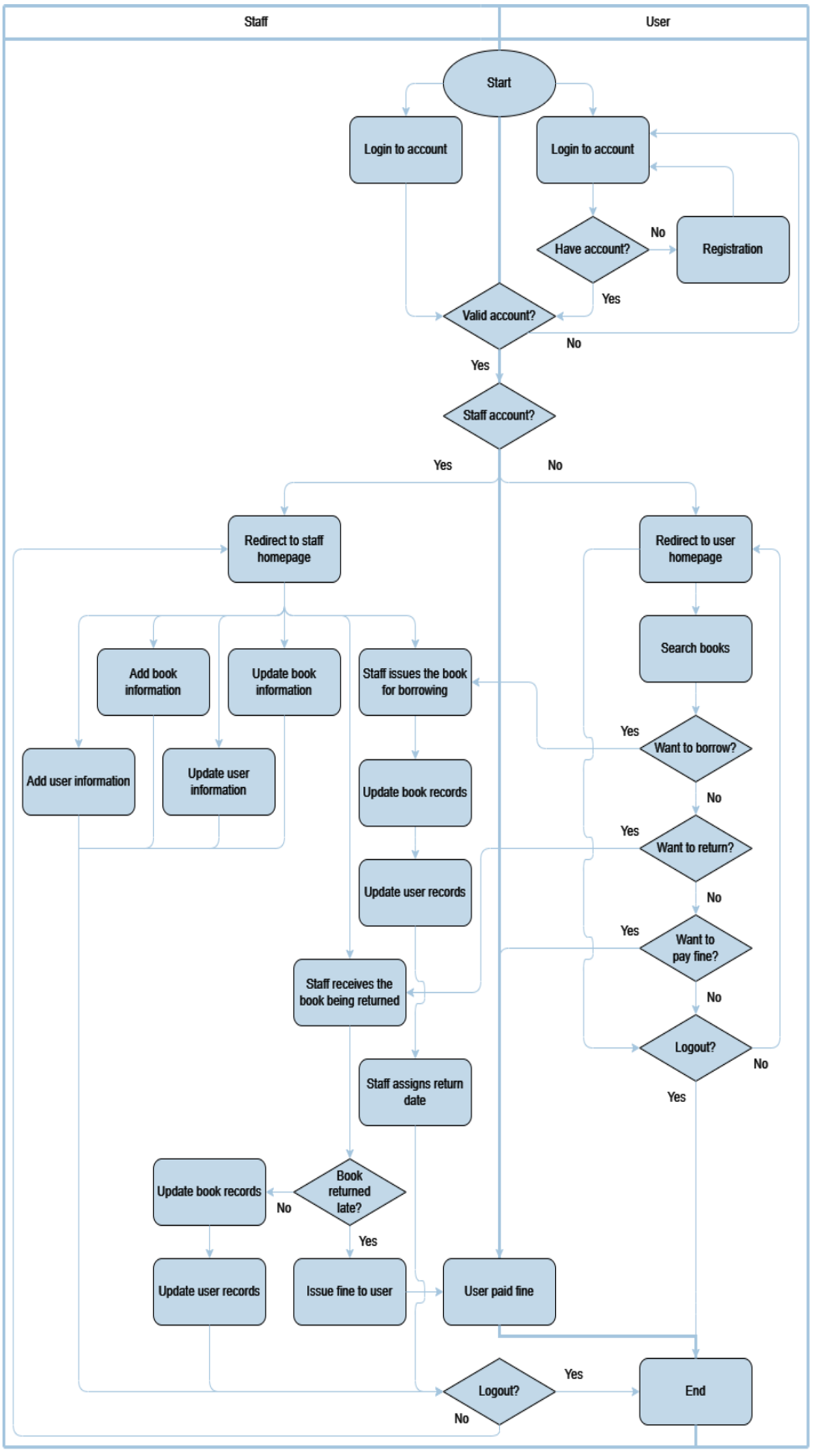

Figure 4.1 Flowchart

4.3 Entity Relationship Diagram (ERD)

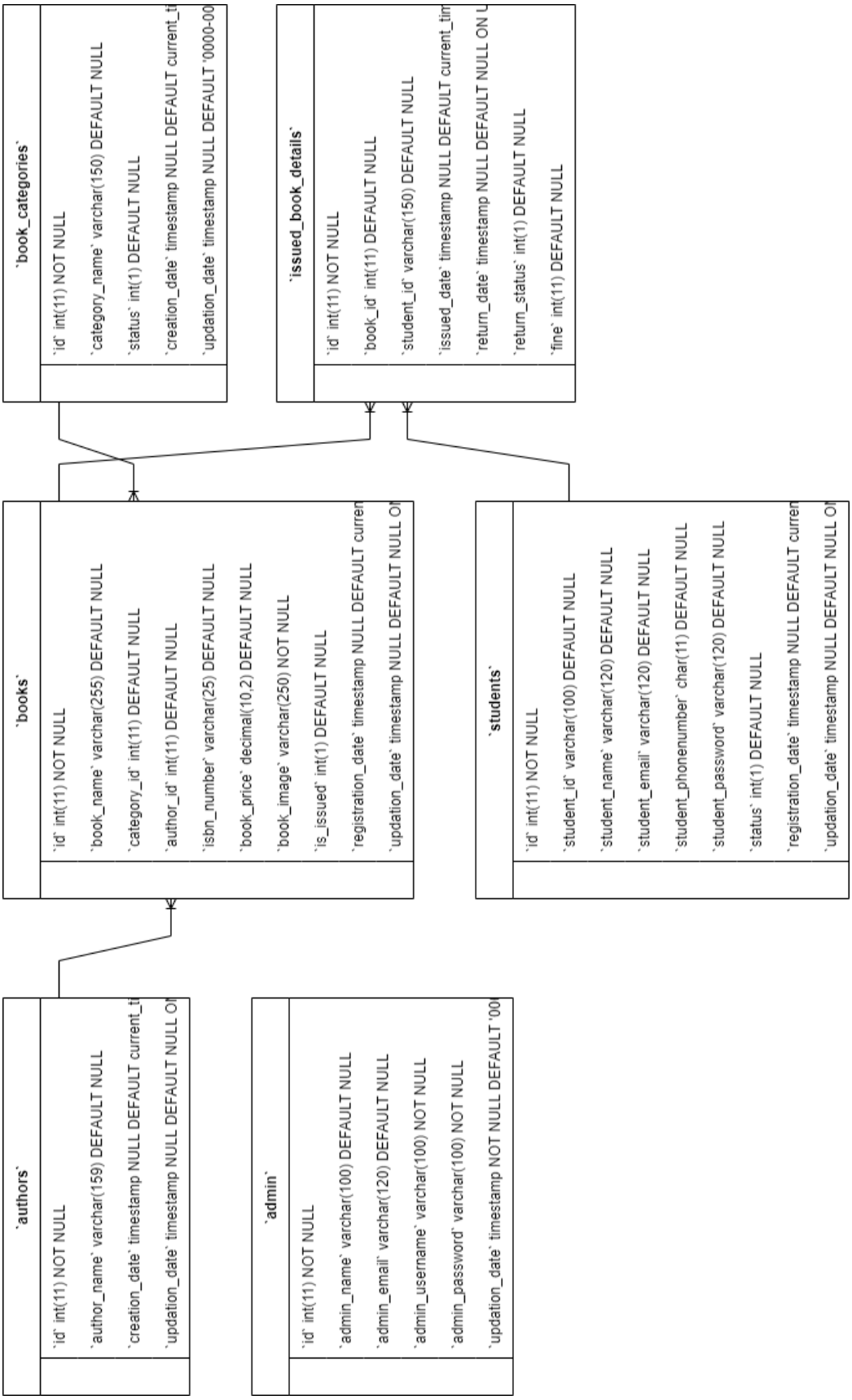

Figure 4.2 Entity Relationship Diagram

1. Table: `admin`

- `id`: Unique identifier for each admin.
- `admin_name`: Name of the admin.
- `admin_email`: Email address of the admin.
- `admin_username`: Username of the admin.
- `admin_password`: Password of the admin.
- `updation_date`: Timestamp indicating the last update.

2. Table: `authors`

- `id`: Unique identifier for each author.
- `author_name`: Name of the author.
- `creation_date`: Timestamp indicating when the author record was created.
- `updation_date`: Timestamp indicating the last update.

3. Table: `books`

- `id`: Unique identifier for each book.
- `book_name`: Name of the book.
- `category_id`: Foreign key referencing the `id` in the `book_categories` table, indicating the category of the book.
- `author_id`: Foreign key referencing the `id` in the `authors` table, indicating the author of the book.
- `isbn_number`: International Standard Book Number.
- `book_price`: Price of the book.
- `book_image`: Filename or path of the book's image.
- `is_issued`: Flag indicating whether the book is currently issued.

- `registration_date`: Timestamp indicating when the book record was created.
- `updation_date`: Timestamp indicating the last update.

4. Table: `book_categories`

- `id`: Unique identifier for each book category.
- `category_name`: Name of the book category.
- `status`: Status flag indicating the status of the category.
- `creation_date`: Timestamp indicating when the category record was created.
- `updation_date`: Timestamp indicating the last update.

5. Table: `issued_book_details`

- `id`: Unique identifier for each issued book record.
- `book_id`: Foreign key referencing the `id` in the `books` table, indicating the book that was issued.
- `student_id`: Identifier of the student who issued the book.
- `issued_date`: Timestamp indicating when the book was issued.
- `return_date`: Timestamp indicating when the book was returned.
- `return_status`: Flag indicating the return status of the book.
- `fine`: Fine amount associated with the issued book.

6. Table: `students`

- `id`: Unique identifier for each student.
- `student_id`: Identifier of the student.
- `student_name`: Name of the student.
- `student_email`: Email address of the student.

- `student_phonenumber`: Phone number of the student.

- `student_password`: Password of the student.

- `status`: Status flag indicating the status of the student.

- `registration_date`: Timestamp indicating when the student record was created.

- `updation_date`: Timestamp indicating the last update.

4.4 Proposed Interface Design

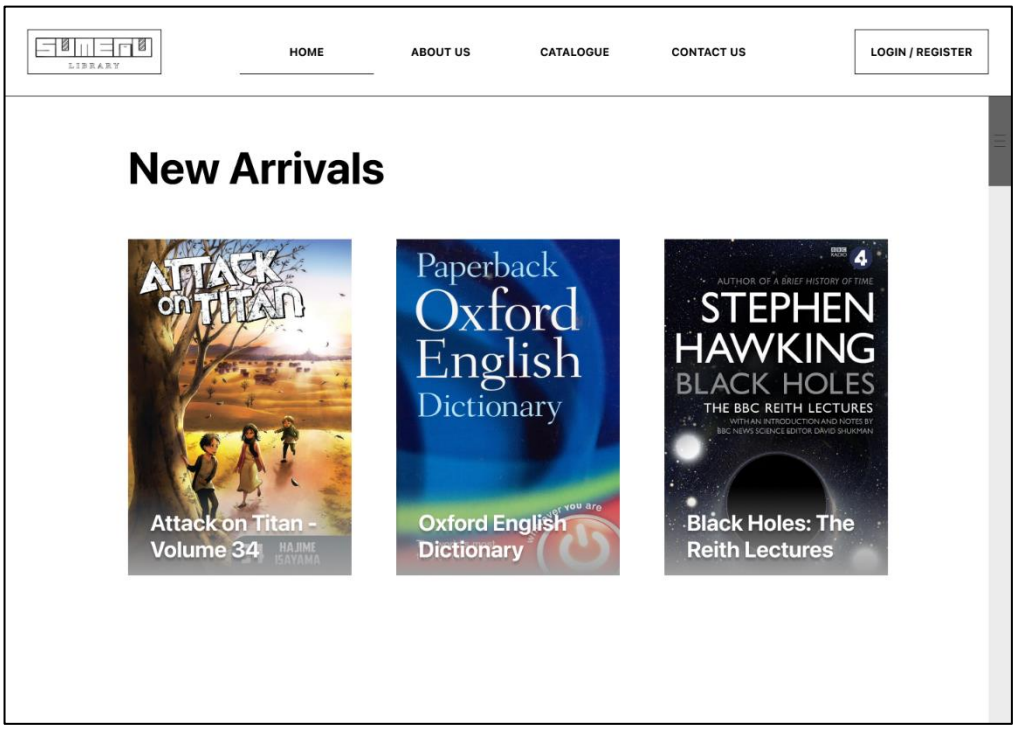

Figure 4.3 Proposed Main Page

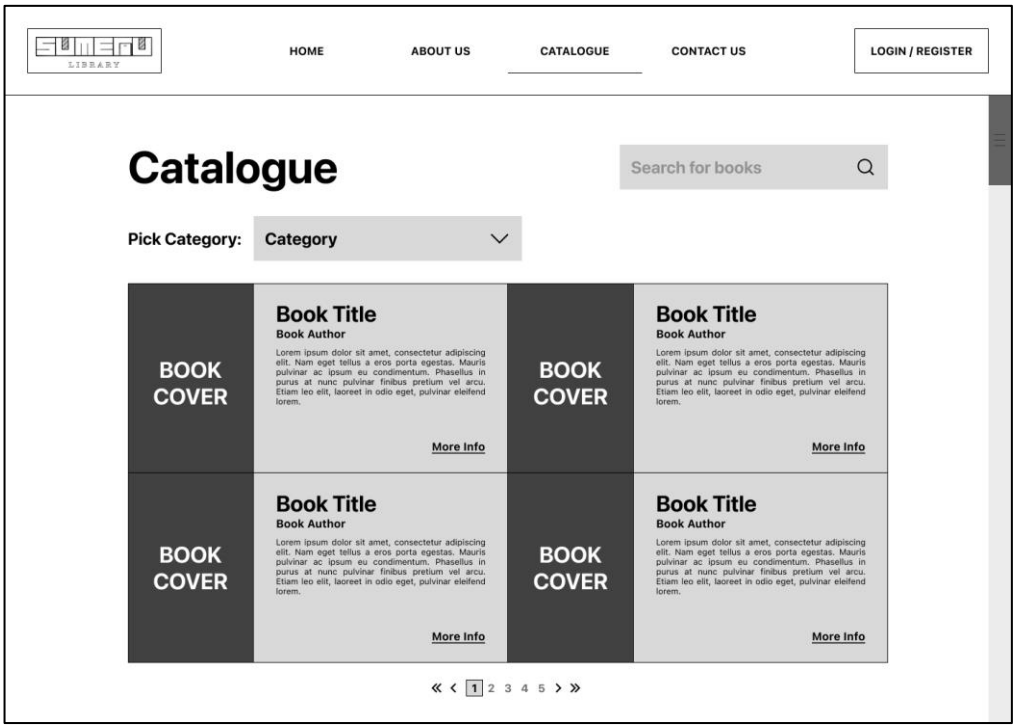

Figure 4.4 Proposed Catalogue

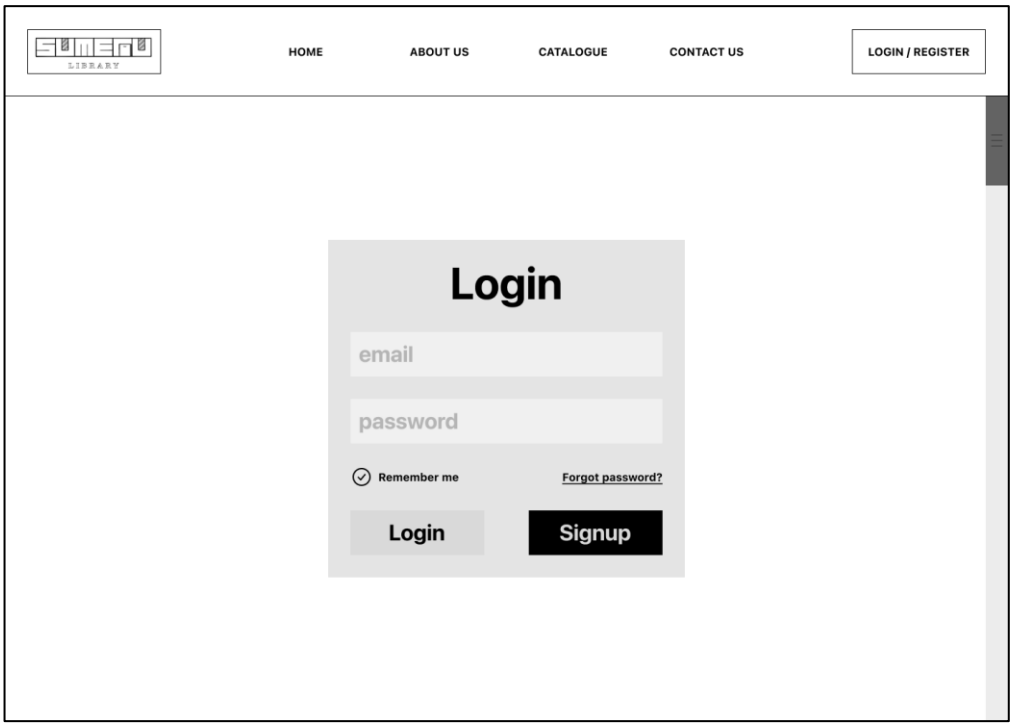

Figure 4.5 Proposed Login Page

4.5 Final Interface Design

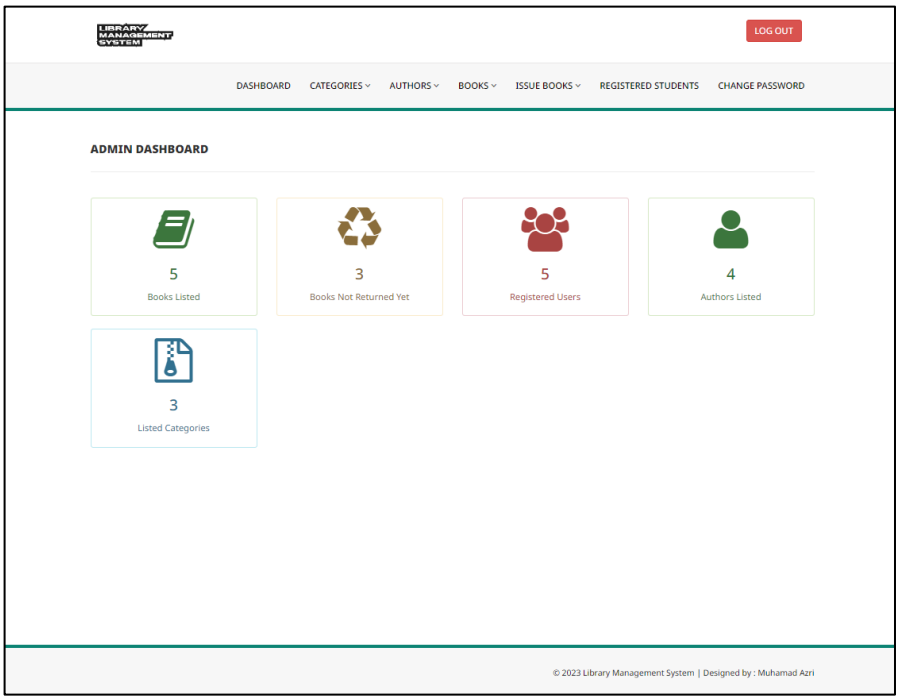

Figure 4.6 Final Admin Dashboard

The admin dashboard image provides a snapshot of key metrics and system status in the management interface. It offers a user-friendly overview, allowing administrators to access vital information and navigate system functionalities efficiently.

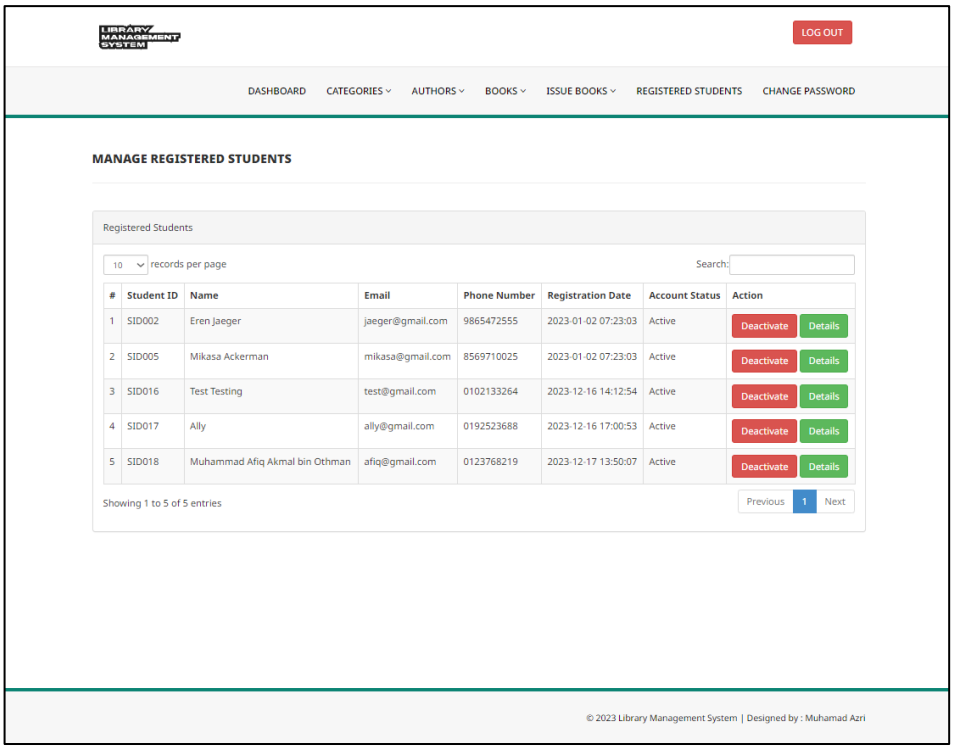

Figure 4.7 Final Manage Registered Students Page

The registered students page displays a comprehensive list of enrolled students in the system. This section offers administrators insights into student details, such as names, IDs, email addresses, and registration dates. It serves as a centralized hub for managing student information and ensuring accurate record-keeping within the academic environment.

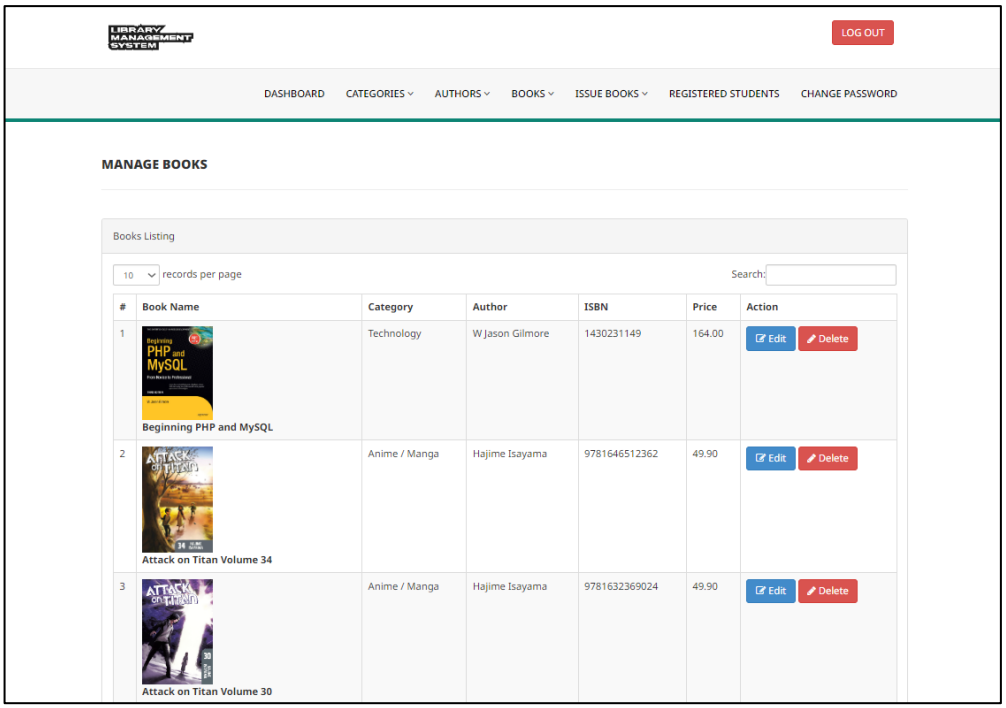

Figure 4.8 Final Manage Books Page

This page serves as a centralized control panel for overseeing the library's book inventory. Administrators can efficiently handle various book-related tasks, such as adding new books, updating existing information, and monitoring the availability of each book. This section typically includes features for inputting book details such as name, category, author, ISBN number, price, and status. The page provides an intuitive interface for administrators to maintain an organized and up-to-date library collection.

4.6 SQL Code

```
-- phpMyAdmin SQL Dump
-- version 5.2.1
-- https://www.phpmyadmin.net/
--
-- Host: 127.0.0.1
-- Generation Time: Dec 16, 2023 at 07:20 PM
-- Server version: 10.4.32-MariaDB
-- PHP Version: 8.2.12

SET SQL_MODE = "NO_AUTO_VALUE_ON_ZERO";
START TRANSACTION;
SET time_zone = "+00:00";


/*!40101 SET @OLD_CHARACTER_SET_CLIENT=@@CHARACTER_SET_CLIENT */;
/*!40101 SET @OLD_CHARACTER_SET_RESULTS=@@CHARACTER_SET_RESULTS */;
/*!40101 SET @OLD_COLLATION_CONNECTION=@@COLLATION_CONNECTION */;
/*!40101 SET NAMES utf8mb4 */;

--
-- Database: `library_v0`
--

-- --------------------------------------------------------

--
-- Table structure for table `admin`
--

CREATE TABLE `admin` (
  `id` int(11) NOT NULL,
  `admin_name` varchar(100) DEFAULT NULL,
  `admin_email` varchar(120) DEFAULT NULL,
  `admin_username` varchar(100) NOT NULL,
  `admin_password` varchar(100) NOT NULL,
  `updation_date` timestamp NOT NULL DEFAULT '0000-00-00 00:00:00' ON
UPDATE current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1 COLLATE=latin1_swedish_ci;

--
-- Dumping data for table `admin`
--

INSERT INTO `admin` (`id`, `admin_name`, `admin_email`,
`admin_username`, `admin_password`, `updation_date`) VALUES
(1, 'Muhamad Azri', 'admin@gmail.com', 'admin',
'f925916e2754e5e03f75dd58a5733251', '2023-12-16 08:13:08');
```

```
-- --------------------------------------------------------

--
-- Table structure for table `authors`
--

CREATE TABLE `authors` (
  `id` int(11) NOT NULL,
  `author_name` varchar(159) DEFAULT NULL,
  `creation_date` timestamp NULL DEFAULT current_timestamp(),
  `updation_date` timestamp NULL DEFAULT NULL ON UPDATE
current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1 COLLATE=latin1_swedish_ci;

--
-- Dumping data for table `authors`
--

INSERT INTO `authors` (`id`, `author_name`, `creation_date`,
`updation_date`) VALUES
(1, 'Hajime Isayama', '2023-01-21 23:23:03', '2023-01-21 23:23:03'),
(2, 'Afiq A.', '2023-01-21 23:23:03', '2023-01-21 23:23:03'),
(16, 'W Jason Gilmore', '2023-12-16 06:56:59', NULL),
(17, 'Gege Akutami', '2023-12-16 10:31:59', NULL);

-- --------------------------------------------------------

--
-- Table structure for table `books`
--

CREATE TABLE `books` (
  `id` int(11) NOT NULL,
  `book_name` varchar(255) DEFAULT NULL,
  `category_id` int(11) DEFAULT NULL,
  `author_id` int(11) DEFAULT NULL,
  `isbn_number` varchar(25) DEFAULT NULL,
  `book_price` decimal(10,2) DEFAULT NULL,
  `book_image` varchar(250) NOT NULL,
  `is_issued` int(1) DEFAULT NULL,
  `registration_date` timestamp NULL DEFAULT current_timestamp(),
  `updation_date` timestamp NULL DEFAULT NULL ON UPDATE
current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1 COLLATE=latin1_swedish_ci;

--
-- Dumping data for table `books`
--
```

```
INSERT INTO `books` (`id`, `book_name`, `category_id`, `author_id`,
`isbn_number`, `book_price`, `book_image`, `is_issued`,
`registration_date`, `updation_date`) VALUES
(1, 'Beginning PHP and MySQL', 5, 16, '1430231149', 164.00,
'cea87edb9497eead7b38eab19ecfbaa2.jpg', 1, '2023-01-21 23:23:03',
'2023-12-16 09:35:34'),
(12, 'Attack on Titan Volume 34', 10, 1, '9781646512362', 49.90,
'fb79e782abc4487ef5bf2a23be9f9027.jpg', 1, '2023-12-15 17:03:57',
'2023-12-16 09:34:47'),
(13, 'Attack on Titan Volume 30', 10, 1, '9781632369024', 49.90,
'ce1cc7870098a380d805a4c1d156669c.png', 1, '2023-12-16 07:10:09',
'2023-12-16 09:35:10'),
(14, 'Attack on Titan Volume 23', 10, 1, '9781632364630', 49.90,
'adb8a911f9dfe75d58789bcdf14d64f8.png', NULL, '2023-12-16 10:30:20',
NULL);

-- --------------------------------------------------------

--
-- Table structure for table `book_categories`
--

CREATE TABLE `book_categories` (
  `id` int(11) NOT NULL,
  `category_name` varchar(150) DEFAULT NULL,
  `status` int(1) DEFAULT NULL,
  `creation_date` timestamp NULL DEFAULT current_timestamp(),
  `updation_date` timestamp NULL DEFAULT '0000-00-00 00:00:00' ON
UPDATE current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1 COLLATE=latin1_swedish_ci;

--
-- Dumping data for table `book_categories`
--

INSERT INTO `book_categories` (`id`, `category_name`, `status`,
`creation_date`, `updation_date`) VALUES
(4, 'Romance', 1, '2023-01-21 23:23:03', '2023-01-21 23:23:03'),
(5, 'Technology', 1, '2023-01-21 23:23:03', '2023-01-21 23:23:03'),
(10, 'Anime / Manga', 1, '2023-12-15 16:54:11', '0000-00-00 00:00:00');

-- --------------------------------------------------------

--
-- Table structure for table `issued_book_details`
--

CREATE TABLE `issued_book_details` (
  `id` int(11) NOT NULL,
```

```
  `book_id` int(11) DEFAULT NULL,
  `student_id` varchar(150) DEFAULT NULL,
  `issued_date` timestamp NULL DEFAULT current_timestamp(),
  `return_date` timestamp NULL DEFAULT NULL ON UPDATE
current_timestamp(),
  `return_status` int(1) DEFAULT NULL,
  `fine` int(11) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=latin1 COLLATE=latin1_swedish_ci;

--
-- Dumping data for table `issued_book_details`
--

INSERT INTO `issued_book_details` (`id`, `book_id`, `student_id`,
`issued_date`, `return_date`, `return_status`, `fine`) VALUES
(17, 12, 'SID002', '2023-12-16 09:34:47', NULL, NULL, NULL),
(18, 13, 'SID005', '2023-12-16 09:35:10', NULL, NULL, NULL),
(19, 1, 'SID017', '2023-12-16 09:35:34', NULL, NULL, NULL);

-- --------------------------------------------------------

--
-- Table structure for table `students`
--

CREATE TABLE `students` (
  `id` int(11) NOT NULL,
  `student_id` varchar(100) DEFAULT NULL,
  `student_name` varchar(120) DEFAULT NULL,
  `student_email` varchar(120) DEFAULT NULL,
  `student_phonenumber` char(11) DEFAULT NULL,
  `student_password` varchar(120) DEFAULT NULL,
  `status` int(1) DEFAULT NULL,
  `registration_date` timestamp NULL DEFAULT current_timestamp(),
  `updation_date` timestamp NULL DEFAULT NULL ON UPDATE
current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1 COLLATE=latin1_swedish_ci;

--
-- Dumping data for table `students`
--

INSERT INTO `students` (`id`, `student_id`, `student_name`,
`student_email`, `student_phonenumber`, `student_password`, `status`,
`registration_date`, `updation_date`) VALUES
(1, 'SID002', 'Eren Jaeger', 'jaeger@gmail.com', '9865472555',
'a209541310cac0ba0f9d419d51061198', 1, '2023-01-01 23:23:03', '2023-12-
16 08:53:49'),
```

```
(4, 'SID005', 'Mikasa Ackerman', 'mikasa@gmail.com', '8569710025',
'92228410fc8b872914e023160cf4ae8f', 1, '2023-01-01 23:23:03', '2023-01-
22 08:25:53'),
(16, 'SID016', 'Test Testing', 'test@gmail.com', '0102133264',
'f925916e2754e5e03f75dd58a5733251', 1, '2023-12-16 06:12:54', '2023-12-
16 07:36:54'),
(17, 'SID017', 'Ally', 'ally@gmail.com', '0192523688',
'2ad733df56aaafa5650bafc9c98c6ffb', 1, '2023-12-16 09:00:53', '2023-12-
16 09:07:35');

--
-- Indexes for dumped tables
--

--
-- Indexes for table `admin`
--
ALTER TABLE `admin`
  ADD PRIMARY KEY (`id`);

--
-- Indexes for table `authors`
--
ALTER TABLE `authors`
  ADD PRIMARY KEY (`id`);

--
-- Indexes for table `books`
--
ALTER TABLE `books`
  ADD PRIMARY KEY (`id`);

--
-- Indexes for table `book_categories`
--
ALTER TABLE `book_categories`
  ADD PRIMARY KEY (`id`);

--
-- Indexes for table `issued_book_details`
--
ALTER TABLE `issued_book_details`
  ADD PRIMARY KEY (`id`);

--
-- Indexes for table `students`
--
ALTER TABLE `students`
  ADD PRIMARY KEY (`id`),
```

```
  ADD UNIQUE KEY `student_id` (`student_id`);

--
-- AUTO_INCREMENT for dumped tables
--

--
-- AUTO_INCREMENT for table `admin`
--
ALTER TABLE `admin`
  MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=2;

--
-- AUTO_INCREMENT for table `authors`
--
ALTER TABLE `authors`
  MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=18;

--
-- AUTO_INCREMENT for table `books`
--
ALTER TABLE `books`
  MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=15;

--
-- AUTO_INCREMENT for table `book_categories`
--
ALTER TABLE `book_categories`
  MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=11;

--
-- AUTO_INCREMENT for table `issued_book_details`
--
ALTER TABLE `issued_book_details`
  MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=20;

--
-- AUTO_INCREMENT for table `students`
--
ALTER TABLE `students`
  MODIFY `id` int(11) NOT NULL AUTO_INCREMENT, AUTO_INCREMENT=18;
COMMIT;

/*!40101 SET CHARACTER_SET_CLIENT=@OLD_CHARACTER_SET_CLIENT */;
/*!40101 SET CHARACTER_SET_RESULTS=@OLD_CHARACTER_SET_RESULTS */;
/*!40101 SET COLLATION_CONNECTION=@OLD_COLLATION_CONNECTION */;
```

4.7 Compilation of Other Codes

Code of index.php

```
<?php
session_start();
error_reporting(0);
include('includes/config.php');

if ($_SESSION['login'] != '') {
    $_SESSION['login'] = '';
}

if (isset($_POST['login'])) {
    $email = $_POST['student_email'];
    $student_password = md5($_POST['student_password']);

    $sql = "SELECT student_email, student_password, student_id, status
FROM students WHERE student_email=:email and
student_password=:student_password";
    $query = $dbh->prepare($sql);
    $query->bindParam(':email', $email, PDO::PARAM_STR);
    $query->bindParam(':student_password', $student_password,
PDO::PARAM_STR);
    $query->execute();
    $results = $query->fetchAll(PDO::FETCH_OBJ);

    if ($query->rowCount() > 0) {
        foreach ($results as $result) {
            $_SESSION['stdid'] = $result->student_id;

            if ($result->status == 1) {
                $_SESSION['login'] = $_POST['student_email'];
                echo "<script type='text/javascript'> document.location
='dashboard.php'; </script>";
            } else {
                echo "<script>alert('Your account is currently blocked.
Contact the admin to seek help.');</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>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' />
    <!-- FAVICON -->
    <link rel="icon" type="image/png" sizes="16x16"
href="assets/img/icons8-book-ios-16-filled-16.png">
    <link rel="icon" type="image/png" sizes="32x32"
href="assets/img/icons8-book-ios-16-filled-32.png">
    <link rel="icon" type="image/png" href="assets/img/icons8-book-ios-
16-filled-16.png">

</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>
                        <!--PREVIOUS-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>
            <div class="row pad-botm">
                <!---LOGIN PANEL END-->
            </div>
        </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>
```

Code of admin\dashboard.php

```
<?php
session_start();
error_reporting(0);
include('includes/config.php');

if(strlen($_SESSION['alogin']) == 0) {
    header('location:index.php');
} else {
?>
<!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="" />
    <!--[if IE]>
        <meta http-equiv="X-UA-Compatible" content="IE=edge,chrome=1">
        <![endif]-->
    <title>Library Management System | Admin Dashboard</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' />
    <!-- 16x16 favicon -->
    <link rel="icon" type="image/png" sizes="16x16"
href="assets\img\icons8-book-ios-16-filled-16.png">
    <!-- 32x32 favicon -->
    <link rel="icon" type="image/png" sizes="32x32"
href="assets\img\icons8-book-ios-16-filled-32.png">
    <!-- Generic favicon (for browsers that don't support sizes
attribute) -->
    <link rel="icon" type="image/png" href="assets\img\icons8-book-ios-
16-filled-16.png">
</head>
<body>
    <!------MENU SECTION START-->
    <?php include('includes/header.php');?>
    <!-- MENU SECTION END-->
    <div class="content-wrapper">
        <div class="container">
```

```
            <div class="row pad-botm">
                <div class="col-md-12">
                    <h4 class="header-line">ADMIN DASHBOARD</h4>
                </div>
            </div>

            <div class="row">
            <a href="manage-books.php">
    <div class="col-md-3 col-sm-3 col-xs-6">
        <div class="alert alert-success back-widget-set text-center">
            <i class="fa fa-book fa-5x"></i>
            <?php
                $sql = "SELECT id FROM books";
                $query = $dbh->prepare($sql);
                $query->execute();
                $listdbooks = $query->rowCount();
            ?>
            <h3><?php echo htmlentities($listdbooks);?></h3>
            Books Listed
        </div>
    </div>
</a>


                <a href="manage-issued-books.php">
                    <div class="col-md-3 col-sm-3 col-xs-6">
                        <div class="alert alert-warning back-widget-set
text-center">
                            <i class="fa fa-recycle fa-5x"></i>
                            <?php
                                $sql2 ="SELECT id FROM
issued_book_details WHERE (return_status='' || return_status IS NULL)";
                                $query2 = $dbh->prepare($sql2);
                                $query2->execute();
                                $results2 = $query2-
>fetchAll(PDO::FETCH_OBJ);
                                $returnedbooks = $query2->rowCount();
                            ?>
                            <h3><?php echo
htmlentities($returnedbooks);?></h3>
                            Books Not Returned Yet
                        </div>
                    </div>
                </a>

                <a href="reg-students.php">
                    <div class="col-md-3 col-sm-3 col-xs-6">
                        <div class="alert alert-danger back-widget-set
text-center">
```

```
                            <i class="fa fa-users fa-5x"></i>
                            <?php
                                $sql3 ="SELECT id FROM students";
                                $query3 = $dbh->prepare($sql3);
                                $query3->execute();
                                $results3 = $query3-
>fetchAll(PDO::FETCH_OBJ);
                                $regstds = $query3->rowCount();
                            ?>
                            <h3><?php echo
htmlentities($regstds);?></h3>
                            Registered Users
                        </div>
                    </div>
                </a>

                <a href="manage-authors.php">
                    <div class="col-md-3 col-sm-3 col-xs-6">
                        <div class="alert alert-success back-widget-set
text-center">
                            <i class="fa fa-user fa-5x"></i>
                            <?php
                                $sq4 ="SELECT id FROM authors";
                                $query4 = $dbh->prepare($sq4);
                                $query4->execute();
                                $results4 = $query4-
>fetchAll(PDO::FETCH_OBJ);
                                $listdathrs = $query4->rowCount();
                            ?>
                            <h3><?php echo
htmlentities($listdathrs);?></h3>
                            Authors Listed
                        </div>
                    </div>
                </a>
            </div>

            <div class="row">
                <a href="manage-categories.php">
                    <div class="col-md-3 col-sm-3 rscol-xs-6">
                        <div class="alert alert-info back-widget-set
text-center">
                            <i class="fa fa-file-archive-o fa-5x"></i>
                            <?php
                                $sql5 ="SELECT id FROM
book_categories";
                                $query5 = $dbh->prepare($sql5);
                                $query5->execute();
```

```
                                $results5 = $query5->fetchAll(PDO::FETCH_OBJ);
                                $listdcats = $query5->rowCount();
                            ?>
                            <h3><?php echo htmlentities($listdcats);?></h3>
                            Listed Categories
                        </div>
                    </div>
                </a>
            </div>
        </div>
    </div>
    <!-- CONTENT-WRAPPER SECTION END-->
    <?php include('includes/footer.php');?>
    <!-- FOOTER SECTION END-->
    <!-- JAVASCRIPT FILES PLACED AT THE BOTTOM TO REDUCE THE LOADING TIME  -->
    <!-- CORE JQUERY  -->
    <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>
<?php } ?>
```

Summary

The testing phase demonstrated an organised and efficient approach, covering a range of situations including boundary cases, unique conditions, and valid and wrong inputs. The unit tests provide a white-box view of crucial functionality by concentrating on particular parts and important classes.

If performed integration tests would show how different parts of the system interact with one another. System tests, which simulated user behaviours and ensured smooth functionality, addressed the application as a whole. These included peer tests and tests created by the author.

Conclusion

The adaptability of the Library Management System was validated by the extensive testing technique used throughout its development. Test findings showed that a variety of circumstances could be handled successfully, confirming the usefulness of the features that had been put in place.

Recommendations

Future updates of the Library Management System should continue to take a systematic and comprehensive approach to testing, given the significance of rigorous testing. The system's long-term success will be largely dependent on regular testing and continuing feedback loops with users and stakeholders.

CHAPTER V

CONCLUSION AND RECOMMENDATIONS

One important step towards the continuous goal of simplifying and modernising school library operations is the creation of this library management system. When we consider the primary findings and results of this research, it is clear that the project is in line with the overall objective of improving library efficiency and guaranteeing the best possible user experience for staff and students by putting in place a reliable digital library management system.

Summary of Main Findings

The primary conclusions highlight the crucial role that the digital library management system plays in modern school libraries by boosting output, streamlining data monitoring, saving a significant amount of time, and improving reporting capabilities. The successful results highlight the project's accomplishments in meeting the predetermined objectives and highlight the system's adaptability to the changing requirements of 21st-century learners.

Interpretation and Implications

The analysis of these results clarifies the need of utilising technology to satisfy the requirements of contemporary schooling. An online library management system that is successfully implemented anticipates and adjusts to the continually changing information management landscape in addition to addressing present difficulties. The fact that there were few, if any, unexpected results shows how well the system was designed and implemented.

Integration and Theorization

It is crucial to incorporate the results into current theories or develop new theoretical frameworks. Within this framework, the project is consistent with current theories about user-centered design, instructional technology, and information management. The system's smooth incorporation into school libraries advances our knowledge of how technology might improve educational support systems.

Recommendations and Applications

Beyond the findings, it is critical to offer useful suggestions that came from the research. More extensive uses inside educational institutions are made possible by the effective deployment of this library management system. The suggestions emphasise the potential advantages for other organisations looking to update their library operations and go beyond the immediate use of digital solutions in school libraries.

Suggestions for Further Research

Like each research dedication, this one offers possibilities for more investigation and improvement. Subsequent investigations might focus on certain facets of library management systems, such measurements related to user engagement, the effect of digital systems on resource accessibility, or comparisons between various technical approaches. For scholars looking to add to the corpus of existing knowledge, these recommendations provide helpful points of reference.

In summary, this initiative represents a significant advancement in school library modernization and adds to the larger conversation about the use of technology in educational support systems. The effective execution of the library management system establishes our libraries as vibrant, cutting-edge centres for knowledge exchange and academic progress. The quest to improve education through creative solutions is still a joint endeavour as we move forward with technological improvements.

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