

**ONLINE LIBRARY MANAGEMENT SYSTEM  
A COURSE PROJECT REPORT**

**18CSC303J - DATABASE MANAGEMENT SYSTEMS**

*Submitted by*

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**FACULTY OF ENGINEERING AND TECHNOLOGY**



S.R.M. Nagar, Kattankulathur, Chengalpattu District

**MAY 2024**

## **BONAFIDE CERTIFICATE**

Certified that this project report titled ONLINE LIBRARY MANAGEMENT SYSTEM is the bonafide work done by ATHARV MUGALE (RA21110031010051) who carried out the project under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other work.

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## **ABSTRACT**

In today's digital era, libraries are transitioning towards online platforms to enhance accessibility and efficiency. This paper presents the development and implementation of an innovative Online Library Management System (OLMS) that leverages HTML, CSS, JavaScript, PHP, and MySQL to revolutionize library operations. The front-end interface, crafted with HTML, CSS, and JavaScript, prioritizes user experience by offering a responsive and intuitive platform for patrons to explore library resources seamlessly across various devices. Through dynamic interactions and visually appealing design, the OLMS empowers users to conduct searches, manage accounts, and access information effortlessly.

Behind the user interface, the OLMS relies on a robust back-end infrastructure driven by PHP and MySQL to orchestrate complex library processes with precision and reliability. PHP serves as the backbone for server-side scripting, facilitating seamless communication between the front-end interface and the underlying database powered by MySQL. This integration enables comprehensive book management functionalities, including cataloging, indexing, and categorization, while ensuring data integrity and security. By embracing modular architecture and scalable design principles, the OLMS lays the foundation for future enhancements and adaptability, ensuring longevity in the rapidly evolving landscape of library technology.

Furthermore, the OLMS prioritizes security and administrative efficiency, implementing advanced encryption techniques and access control mechanisms to safeguard sensitive information and streamline administrative tasks. Librarians are equipped with powerful tools to monitor library resources, track transactions, and manage user accounts effectively. Through rigorous testing and iterative refinement, the OLMS exemplifies a best-in-class solution for modern libraries seeking to optimize operations, improve user satisfaction, and embrace the digital transformation.

## **Acknowledgement**

I would like to express our gratitude to our Assistant Professor, Mr. J. Prabakaran who gave us the golden opportunity to do this wonderful project on the topic **"ONLINE LIBRARY MANAGEMENT SYSTEM"** which also helped me in doing a lot of research and I came to know about so many new things I am really thankful to him.

I are also thankful to all the other faculty, teaching and non-teaching staff members of our department for their kind cooperation and help.

Lastly, I would also like to thank my friends who helped us a lot in finishing this project within the limited time. I am making this project not only for marks but to also increase our knowledge.

ATHARV MUGALE (RA2111031010038)

# INDEX

CONTENTS		
S.no	Particulars	Page no.
1.	Introduction	1
2.	Project Features and Objectives	3
3.	Project Design	5
4.	Output	8
5.	Modules	14
6.	Applications	16
7.	Conclusion	17
8.	Bibliography	18

# **CHAPTER-1**

## **INTRODUCTION**

At its core, the OLMS embodies a multi-layered architecture that seamlessly integrates front-end and back-end technologies to deliver a cohesive and user-centric library experience. Drawing upon the versatility of HTML, CSS, and JavaScript, the front-end interface is meticulously designed to prioritize usability, responsiveness, and visual appeal. Patrons are greeted with an intuitive platform that facilitates effortless navigation, efficient resource discovery, and seamless account management across a myriad of devices and screen sizes.

Complementing the user-facing interface, the OLMS harnesses the power of PHP and MySQL to drive the backend infrastructure, underpinning a robust ecosystem of administrative tools, database management functionalities, and security protocols. PHP serves as the linchpin for server-side scripting, enabling dynamic interactions between the front-end interface and the MySQL database, which houses a wealth of bibliographic data, user records, transaction logs, and administrative metadata.

Moreover, the OLMS places a premium on security and data integrity, implementing state-of-the-art encryption techniques and access control mechanisms to safeguard sensitive information and mitigate potential risks. Librarians are empowered with comprehensive administrative tools that facilitate resource monitoring, transaction tracking, and user management, thereby enhancing operational efficiency and ensuring compliance with regulatory standards.

Through a rigorous process of design iteration, prototyping, and user testing, the OLMS emerges as a testament to the project team's commitment to excellence and innovation in library technology. By embracing a modular architecture and scalable design principles, the OLMS lays the groundwork for future enhancements, extensions, and integrations, thereby ensuring its relevance and adaptability in the ever-evolving landscape of library science and n technology.

The back-end database used in this project is MySQL

It is a language used to interrogate and process data in a relational database. Originally developed by IBM for its mainframes, SQL commands can be used to interactively work with a database or can be embedded within a script or programming language as an interface to a database. Programming extensions to SQL have turned it into a full-blown database programming language, and all major database management systems (DBMSs) support it.

ANSI standardized SQL.

But most DBMSs have some proprietary enhancement, which if used, makes SQL non-standard. Moving an application from one SQL database to another sometimes requires tweaking, the age-old problem in this business!

### **1.1 Advantages of MySQL:**

1. SQL Queries can be used to retrieve large amounts of records from a database quickly.
2. SQL is used to view the data without storing the data into the object
3. SQL joins two or more tables and show it as one object to user
4. SQL databases use a long-established standard, which is being adopted by ANSI & ISO. Non-SQL databases do not adhere to any clear standard.
5. Using standard SQL, it is easier to manage database systems without having to write a substantial amount of code.

## **CHAPTER-2**

### **PROJECT FEATURES AND OBJECTIVES**

**Dashboard Overview:** The OLMS includes a comprehensive dashboard providing librarians with a snapshot of key metrics such as total books available, total students registered, and the number of books returned and borrowed today. This feature aims to offer quick access to vital information, facilitating informed decision-making and efficient resource allocation.

**Quick Shortcuts:** The dashboard incorporates quick shortcuts for librarians to access commonly used functionalities such as adding new book entries, registering new students, recording books returned today, and logging books borrowed today. These shortcuts enhance usability and streamline administrative workflows, minimizing the time required for routine tasks.

**Book Management:** The OLMS enables librarians to add new book entries, update existing book records, and manage inventory effectively. Librarians can input detailed bibliographic information, including title, author, publication date, ISBN, genre, and availability status. This feature ensures accurate cataloging and indexing of library resources, enhancing accessibility for patrons.

**Student Registration:** Librarians can register new students into the system, capturing essential information such as name, student ID, contact details, and enrollment status. This feature facilitates user authentication and enables personalized services such as book reservations, recommendations, and notifications.

**Record Keeping:** The OLMS facilitates the recording of books returned and borrowed on a daily basis, allowing librarians to maintain accurate transaction logs and track resource utilization trends over time. This feature promotes accountability, transparency, and compliance with library policies and regulations.

**Reporting and Analytics:** The OLMS offers reporting and analytics functionalities, allowing librarians to generate custom reports on library activities, circulation statistics, overdue books, and student demographics. These insights enable librarians to identify trends, assess performance, and optimize library services to better meet the needs of patrons.

**Security and Access Control:** The OLMS implements robust security measures to safeguard sensitive information and prevent unauthorized access. Role-based access control mechanisms ensure that only authorized personnel can perform administrative tasks such as adding new entries and accessing sensitive data, thereby preserving data integrity and confidentiality.



**Objective:**

The primary objective of the OLMS is to modernize library operations and enhance user experiences through the seamless integration of web technologies and comprehensive library management functionalities.

**Key objectives include:**

Streamlining administrative workflows: By providing librarians with intuitive tools and quick shortcuts, the OLMS aims to streamline administrative tasks such as book management, student registration, and transaction recording, thereby improving operational efficiency and reducing administrative overhead.

Enhancing user satisfaction: Through a user-centric design approach and responsive interface, the OLMS seeks to enhance user satisfaction by offering patrons intuitive access to library resources, personalized services, and real-time information updates.

Promoting data-driven decision-making: By offering reporting and analytics functionalities, the OLMS empowers librarians to make data-driven decisions regarding resource allocation, collection development, and service enhancements, thereby optimizing library operations and maximizing the impact of library services.

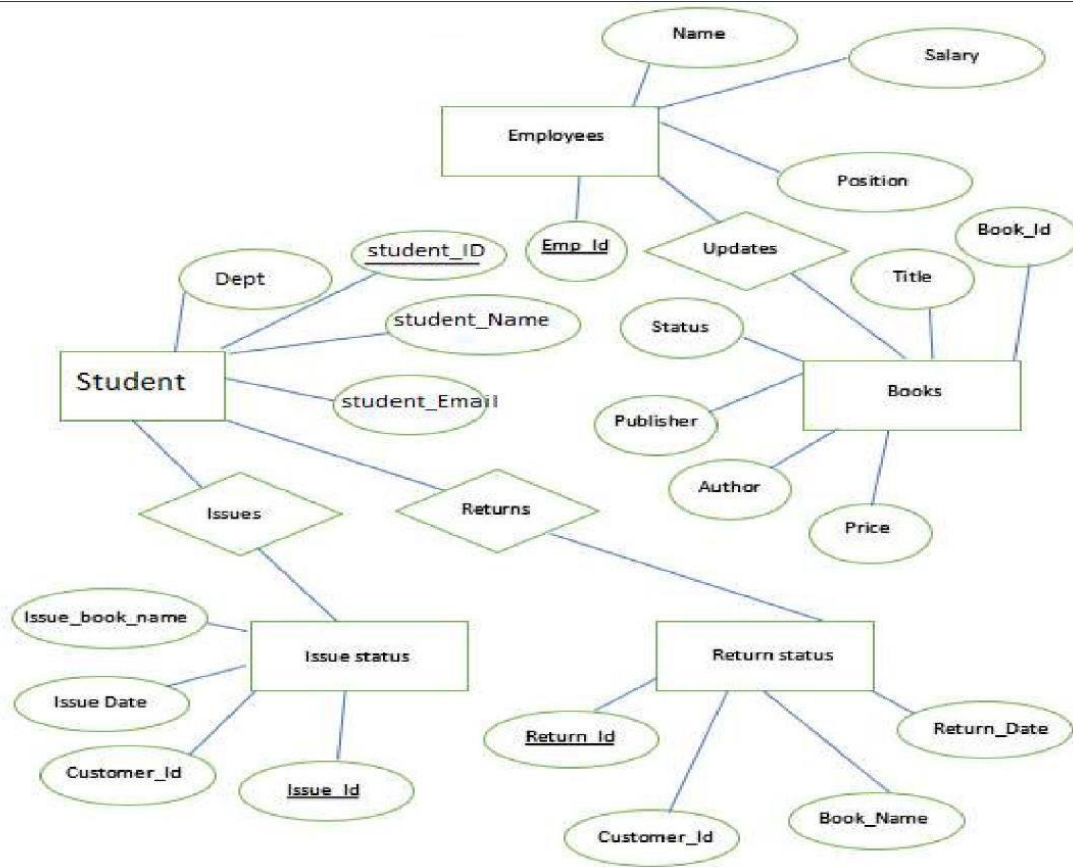
Ensuring compliance and security: The OLMS prioritizes data security and regulatory compliance by implementing robust security measures and access control mechanisms, thereby safeguarding sensitive information and preserving the confidentiality and integrity of library records

## CHAPTER-3

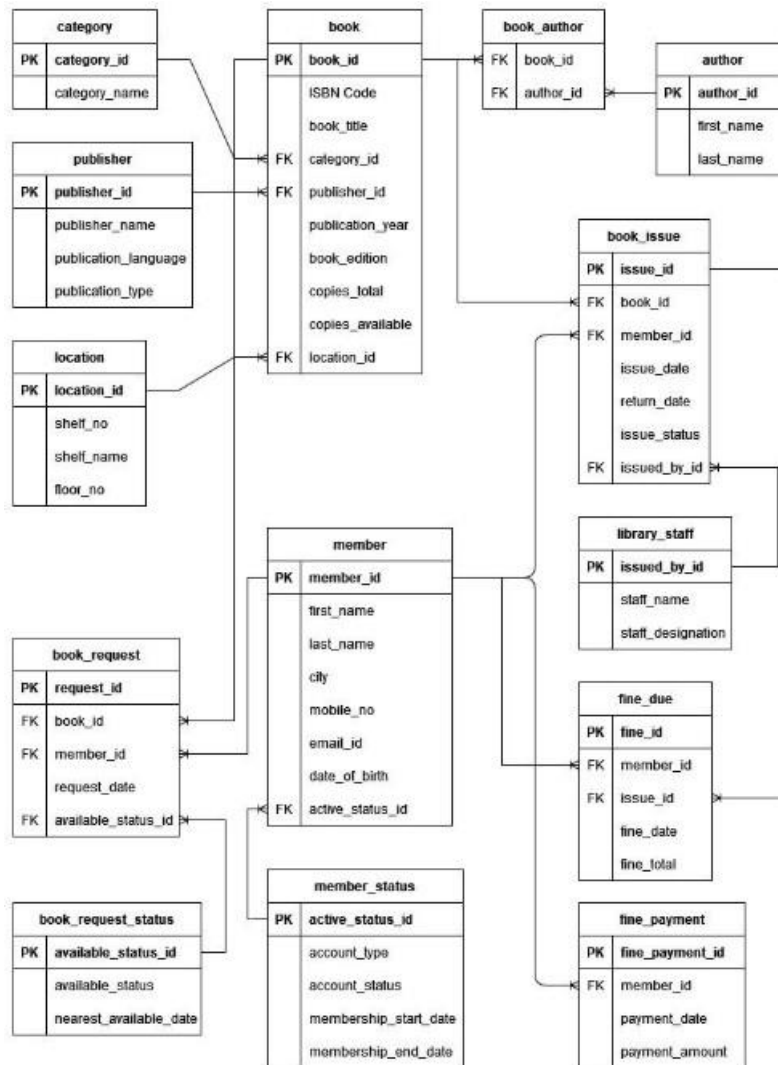
### PROJECT DESIGN

#### 3.1 BACKEND DESIGN

##### 3.1.1 Conceptual Database Design (ER-Diagram)



### 3.1.2 Logical Database Design(ER Mapping)



- The entities are represented as tables.
- The tables contain the attributes
- The attributes which are underlined are referred to as primary keys.

## **3.2 FRONT-END DESIGN**

### **3.2.1 Front-end web development details**

Front-end web development, which encompasses the structural and visual elements of websites, is primarily driven by Python, PHP, and MySQL technologies.

Python:

Python serves as the backbone for web development, handling tasks such as site structure and content creation. It provides a versatile and beginner-friendly platform for building robust web applications. With its simple syntax and extensive libraries, Python is an essential tool for any web professional, offering an accessible entry point for learners.

MySQL:

MySQL is utilized for database management, storing and retrieving data to support the functionality of web applications. As a widely-used relational database management system (RDBMS), MySQL seamlessly integrates with PHP to enable efficient data handling and manipulation. It plays a crucial role in managing user information, content, and other resources essential for web development.

Together, Python, PHP, and MySQL constitute a robust tech stack for front-end web development, offering a comprehensive solution for creating dynamic, interactive, and data-driven websites. From structuring web pages to processing server-side scripts and managing databases, these technologies provide the necessary tools and capabilities to meet the demands of modern web development projects.

## **3.3 CONNECTIVITY (from frontend to backend)**

**PHP is an amazing and popular language.**

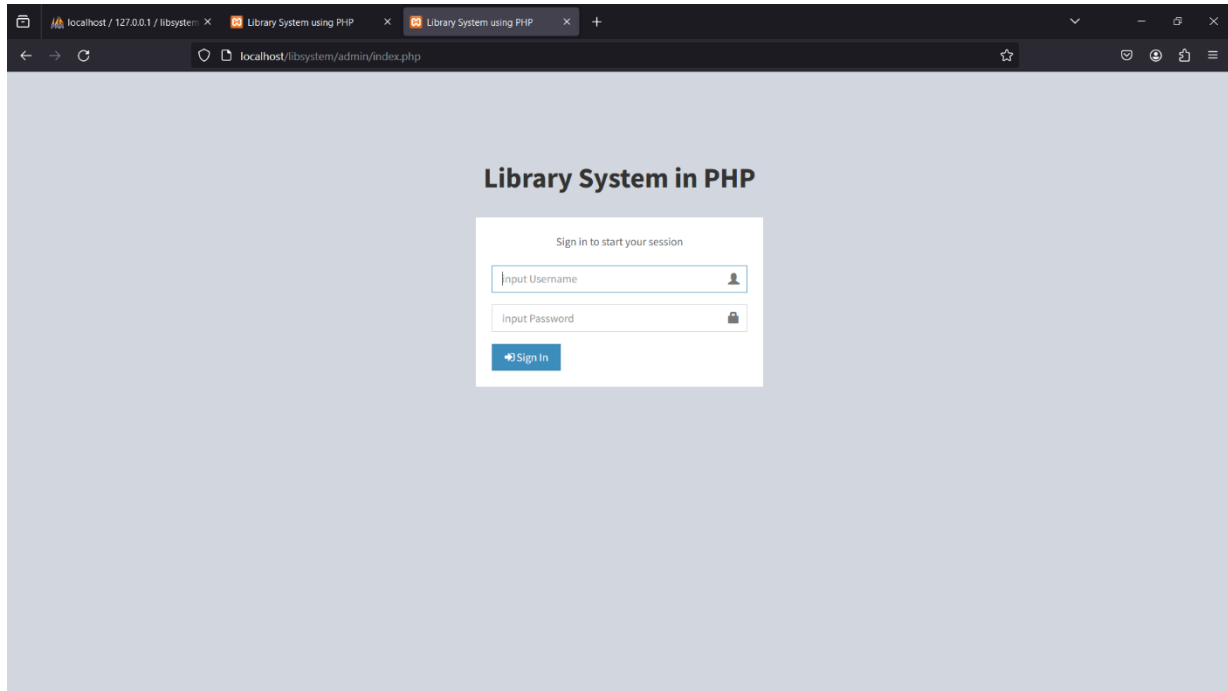
It is powerful enough to be at the core of the biggest blogging system on the web (WordPress). It is deep enough to run the largest social network (Facebook), It is also easy enough to be a beginner's first server side language.

- PHP is an acronym for "PHP: Hypertext Preprocessor"
- PHP is a widely-used, open-source scripting language
- PHP scripts are executed on the server
- PHP is free to download and use
- PHP files can contain text, HTML, CSS, JavaScript, and PHP code
- PHP code is executed on the server, and the result is returned to the browser as plain HTML
- With PHP you are not limited to output HTML. You can output images, PDF files, and even Flash movies. You can also output any text, such as XHTML and XML.

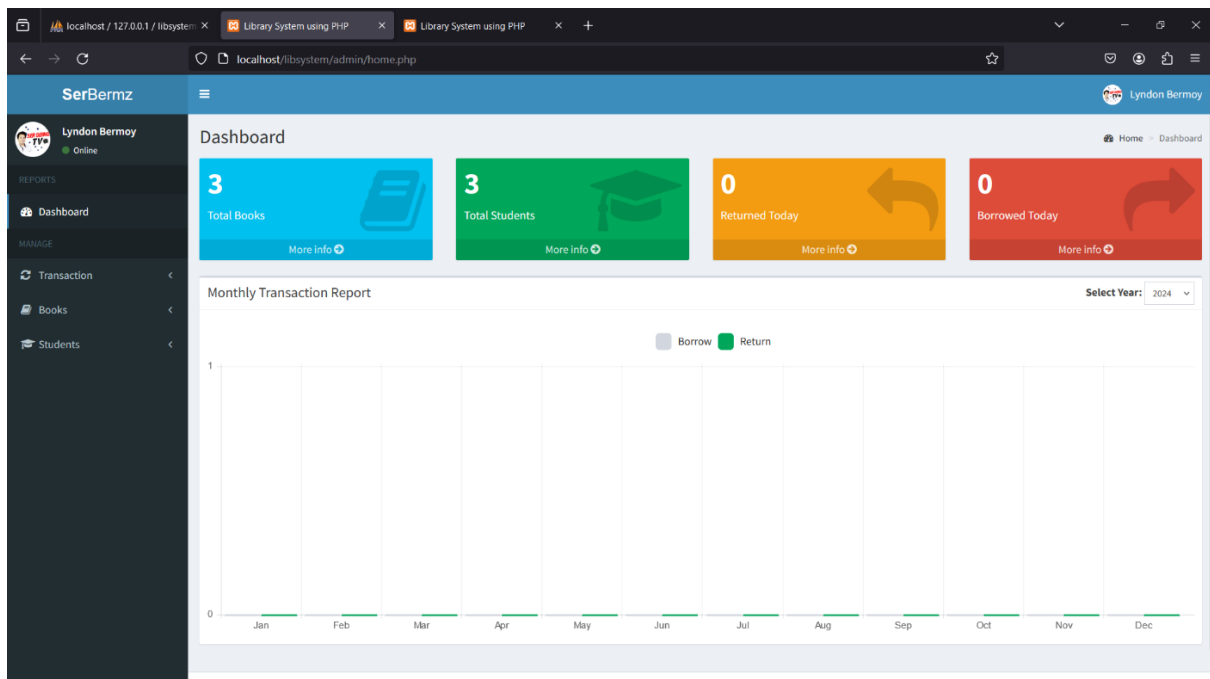
# CHAPTER-4

## OUTPUT

### Sign In Page



### Dashboard



# Borrow

localhost / 127.0.0.1 / libsystem

Library System using PHP

localhost/libsystem/admin/borrow.php

SerBermz

Lyndon Bermoy  
Online

REPORTS

Dashboard

MANAGE

Transaction

Borrow

Return

Books

Students

Borrow Books

Home > Transaction > Borrow

+ Borrow

Show 10 entries

Search:

Date	Student ID	Name	ISBN	Title	Status
No data available in table					

Showing 0 to 0 of 0 entries

PreviousNext

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# Book List

localhost / 127.0.0.1 / libsystem

Library System using PHP

localhost/libsystem/admin/book.php

SerBermz

Lyndon Bermoy  
Online

REPORTS

Dashboard

MANAGE

Transaction

Books

Book List

Category

Students

Book List

Home > Books > Book List

+ New

Category: ALL

Show 10 entries

Search:

Category	ISBN	Title	Author	Publisher	Status	Tools
History	123456789	Power	Atharv	Adobe	available	<div><div>✓ Edit</div><div>✗ Delete</div></div>
Mathematics	bookisbntest	Calculus Made Easy	Author Me	Self Publish Inc	available	<div><div>✓ Edit</div><div>✗ Delete</div></div>
Science and Technology	159420229X	Moonwalking with Einstein: The Art and Science of Remembering Everything	Joshua Foer	Penguin Press HC	available	<div><div>✓ Edit</div><div>✗ Delete</div></div>

Showing 1 to 3 of 3 entries

Previous1Next

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# Return

The screenshot shows the SerBermz Library System admin interface. The top navigation bar includes the SerBermz logo, a user profile for Lyndon Bermoy (Online), and a breadcrumb trail: Home > Transaction > Return. The left sidebar contains a 'MANAGE' section with options: Transaction, Borrow, Return, Books, and Students. The main content area is titled 'Return Books' and features a '+Returns' button, a 'Show 10 entries' dropdown, and a search bar. Below these is an empty table with headers: Date, Student ID, Name, ISBN, and Title. The table displays 'No data available in table' and 'Showing 0 to 0 of 0 entries'. Navigation buttons 'Previous' and 'Next' are at the bottom right of the table area. The footer contains 'Copyright © 2020 Bermz ISware Solutions' and 'All rights reserved'.

# Category

The screenshot shows the SerBermz Library System admin interface. The top navigation bar includes the SerBermz logo, a user profile for Lyndon Bermoy (Online), and a breadcrumb trail: Home > Books > Category. The left sidebar contains a 'MANAGE' section with options: Transaction, Books, Book List, Category, and Students. The main content area is titled 'Category' and features a '+New' button, a 'Show 10 entries' dropdown, and a search bar. Below these is a table with columns: Category and Tools. The table lists four categories: Engineering, History, Mathematics, and Science and Technology, each with 'Edit' and 'Delete' buttons. The table displays 'Showing 1 to 4 of 4 entries'. Navigation buttons 'Previous', '1', and 'Next' are at the bottom right of the table area. The footer contains 'Copyright © 2020 Bermz ISware Solutions' and 'All rights reserved'.

# Student List

SerBermz

Lyndon Bermoy

Online

REPORTS

Dashboard

MANAGE

Transaction

Books

Students

Student List

Course













Student List

Home Students Student List

+ New

Show 10 entries

Search:

Course	Photo	Student ID	Firstname	Lastname	Tools
BSCS		 NXW610527983	Atharv	Mugale	 Edit  Delete
BSIS		 DCW790358146	Ayush	Raj	 Edit  Delete
BSIS		 HWW421639750	Samarth	Bish	 Edit  Delete

Showing 1 to 3 of 3 entries

Previous 1 Next

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# Admin Php Table

phpMyAdmin

Recent Favorites

New

information\_schema

library

library\_system

libsystem

New

admin

books

borrow

category

course

returns

students

mybook\_db

mysql

online\_library

parking\_db

performance\_schema

phpmyadmin

test

localhost / 127.0.0.1 / libsystem

Library System using PHP

localhost/phpmyadmin/index.php?route=/sql&pos=0&db=libsystem&table=admin

Server: 127.0.0.1 Database: libsystem Table: admin

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Showing rows 0 - 0 (1 total, Query took 0.0016 seconds)

SELECT \* FROM `admin`

Profiling [ Edit inline ] [ Edit ] [ Explain SQL ] [ Create PHP code ] [ Refresh ]

Show all Number of rows: 25 Filter rows: Search this table

Extra options

	id	username	password	firstname	lastname	photo	created_on
<input type="checkbox"/>	1	serbermz	\$2y\$10\$1VmOehdw8E5iTn wRR2EOmRvX23G6G/8KbTRkAat...	Lyndon	Bermoy	profile_youtube.jpg	2018-05-03

Check all With selected: Edit Copy Delete Export

Show all Number of rows: 25 Filter rows: Search this table

Query results operations

Print Copy to clipboard Export Display chart Create view

Bookmark this SQL query

Label:  ☐ Let every user access this bookmark

Bookmark this SQL query

Console



## Books Php Table

The screenshot shows the phpMyAdmin interface for the 'libsystem' database. The 'books' table is selected, and the 'Table: books' view is active. The table structure is displayed with columns: id, isbn, category\_id, title, author, publisher, publish\_date, and status. The table contains 3 rows of data.

id	isbn	category_id	title	author	publisher	publish_date	status
2	booksbrntest	2	Calculus Made Easy	Author Me	Self Publish Inc	2018-05-02	0
13	159420229X	3	Moonwalking with Einstein: The Art and Science of ...	Joshua Foer	Penguin Press HC	2020-05-11	0
14	1234567889	4	Power	Atharv	Adobe	2023-11-19	0

## Category Table

The screenshot shows the phpMyAdmin interface for the 'libsystem' database. The 'category' table is selected, and the 'Table: category' view is active. The table structure is displayed with columns: id and name. The table contains 4 rows of data.

id	name
1	Engineering
2	Mathematics
3	Science and Technology
4	History

# Course Table

Showing rows 0 - 1 (2 total, Query took 0.0005 seconds)

```
SELECT * FROM `course`
```

Number of rows: 25 | Filter rows: Search this table | Sort by key: None

	id	title	code
<input type="checkbox"/>	1	Bachelor of Science in Information Systems BSIS	BSIS
<input type="checkbox"/>	2	Bachelor of Science in Computer Science BSCS	BSCS

Query results operations: Print, Copy to clipboard, Export, Display chart, Create view

Bookmark this SQL query

Label:  ☐ Let every user access this bookmark

Bookmark this SQL query

# Students Table

Showing rows 0 - 2 (3 total, Query took 0.0008 seconds)

```
SELECT * FROM `students`
```

Number of rows: 25 | Filter rows: Search this table | Sort by key: None

	id	student_id	firstname	lastname	photo	course_id	created_on
<input type="checkbox"/>	5	NXW610527983	Atharv	Mugale		2	2024-05-09
<input type="checkbox"/>	6	DCW790358146	Ayush	Raj		1	2024-05-09
<input type="checkbox"/>	7	HVV421639750	Samarth	Bish		1	2024-05-09

Query results operations: Print, Copy to clipboard, Export, Display chart, Create view

Bookmark this SQL query

Label:  ☐ Let every user access this bookmark

Bookmark this SQL query

## **CHAPTER-5**

### **MODULES**

#### **User Management Module:**

**User Registration:** Allows new users to register for library membership.

**User Authentication:** Facilitates login and authentication for registered users.

**User Profile Management:** Enables users to update their profile information and preferences.

#### **Book Management Module:**

**Book Cataloging:** Allows librarians to add new book entries, including details such as title, author, ISBN, genre, and availability status.

**Book Search:** Enables users to search for books based on various criteria such as title, author, genre, or ISBN.

**Book Details:** Provides detailed information about each book, including its availability status, location within the library, and related resources.

#### **Student Management Module:**

**Student Registration:** Enables librarians to register new students into the system, capturing essential information such as name, student ID, contact details, and enrollment status.

**Student Records:** Maintains a database of student records, including borrowing history, fines, and other relevant information.

**Student Search:** Allows librarians to search for students based on criteria such as name, student ID, or enrollment status.

#### **Transaction Management Module:**

**Borrowing:** Facilitates the borrowing of books by registered users, updating inventory records and issuing due dates.

**Returning:** Manages the return of books, updating inventory records, calculating fines (if applicable), and recording return dates.

**Transaction History:** Maintains a comprehensive log of all library transactions, including borrowings, returns, renewals, and fines.

#### **Dashboard Module:**

**Overview:** Provides librarians with a dashboard overview displaying key metrics such as total books available, total students registered, and recent transactions.

**Quick Shortcuts:** Offers quick shortcuts for common tasks such as adding new book entries, registering new students, and recording transactions.

#### Reporting and Analytics Module:

Circulation Reports: Generates reports on library circulation statistics, including trends in book borrowings, returns, and overdue items.

Student Demographics: Provides insights into student demographics, including enrollment trends, user preferences, and borrowing habits.

Fine Management: Tracks fines collected, outstanding fines, and overdue notices, enabling librarians to manage fines effectively.

#### Security Module:

Role-based Access Control: Implements role-based access control mechanisms to restrict access to sensitive functionalities and data based on user roles (e.g., librarian, administrator, patron).

Data Encryption: Ensures that sensitive data such as user credentials, transaction logs, and personal information are encrypted to prevent unauthorized access or tampering.

#### Settings Module:

System Configuration: Allows administrators to configure system settings such as library hours, borrowing policies, fine rates, and notification preferences.

Database Management: Provides tools for database administration, including backup, restore, and maintenance tasks.

## **CHAPTER-6**

### **APPLICATIONS**

**Academic Institutions:** OLMS can be deployed in academic institutions such as schools, colleges, and universities to manage their library resources efficiently. It facilitates seamless borrowing and returning of books by students and faculty members, maintains accurate records of library transactions, and provides insights into library usage patterns for informed decision-making by administrators.

**Public Libraries:** Public libraries can leverage OLMS to enhance user experiences and streamline library operations. Patrons can search for books, reserve titles, and manage their accounts online, while librarians can efficiently manage inventory, track circulation statistics, and administer library services such as interlibrary loans and community outreach programs.

**Corporate Libraries:** OLMS can be tailored to meet the needs of corporate libraries within organizations. It enables employees to access company resources, conduct research, and borrow materials relevant to their work, while library administrators can oversee resource allocation, track usage metrics, and optimize library services to support organizational objectives.

**Specialized Libraries:** OLMS can be customized for specialized libraries such as law libraries, medical libraries, and research institutions. It offers tailored functionalities to manage specialized collections, track citation metrics, and facilitate access to domain-specific resources, catering to the unique requirements of researchers, scholars, and professionals in various fields.

**Community Centers:** Community centers and local libraries can deploy OLMS to provide access to educational and recreational resources for residents. It enables community members to borrow books, participate in library events, and access digital resources such as e-books and online databases, fostering a culture of lifelong learning and community engagement.

**Mobile Libraries:** OLMS can be adapted for mobile library services, facilitating the management of mobile collections and outreach programs. It enables librarians to track inventory, schedule visits to different locations, and engage with patrons in underserved communities, ensuring equitable access to library resources regardless of geographical constraints.

**Consortiums and Networks:** OLMS can be integrated into library consortiums and networks to facilitate resource sharing and collaboration among member institutions. It enables patrons to access materials from partner libraries, participate in cooperative purchasing agreements, and benefit from shared cataloging and metadata standards, enhancing resource accessibility and cost-effectiveness.

## **CHAPTER-7**

### **CONCLUSION**

In conclusion, the Online Library Management System (OLMS) represents a pivotal advancement in the realm of library science and information technology, offering a comprehensive solution to modernize library operations, enhance user experiences, and foster knowledge dissemination in diverse settings. By harnessing the power of web technologies such as HTML, CSS, JavaScript, PHP, and MySQL, the OLMS provides a versatile platform that caters to the unique needs of academic institutions, public libraries, corporate libraries, specialized libraries, community centers, mobile libraries, consortiums, and online education platforms.

Through a modular architecture and scalable design, the OLMS lays the foundation for innovation and adaptability, enabling libraries to evolve alongside technological advancements and changing user preferences. Its robust functionalities, including user management, book management, student registration, transaction management, dashboard analytics, security mechanisms, and administrative tools, empower librarians to streamline workflows, optimize resource utilization, and make data-driven decisions to better serve their patrons.

Moreover, the applications of the OLMS extend beyond traditional library settings, encompassing diverse contexts such as education, research, corporate knowledge management, community development, and collaborative networks. Whether deployed in academic institutions to support student learning, public libraries to engage communities, or specialized libraries to serve niche audiences, the OLMS exemplifies a commitment to accessibility, inclusivity, and lifelong learning.

In an era characterized by rapid technological advancements and evolving information landscapes, the OLMS stands as a testament to the enduring relevance and transformative potential of libraries as dynamic hubs of knowledge, culture, and innovation. By embracing innovation, collaboration, and user-centric design principles, the OLMS paves the way for a future where libraries continue to thrive as vital pillars of society, enriching lives, empowering communities, and shaping the intellectual landscape of generations to come.

## **CHAPTER-8**

### **BIBLIOGRAPHY**

It has been a matter of immense pleasure, honor and challenge to have this opportunity to take up this project and complete it successfully.

I have obtained information from various resources to design and implement my project. I have acquired most of the knowledge from the Internet.