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# **Library Management System**

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## Abstract

The Library Management System (LMS) represents a complete web-based application which optimizes library operations through its advanced functionality. The system executes fundamental operations which include book circulation and catalog management and user data processing. The LMS features a responsive user-friendly interface built with PHP and MySQL and integrated with HTML, CSS, JavaScript and Bootstrap to enable smooth interactions for students and administrators. The system operates through two fundamental modules which include Student Access and Administrator Control. Students can perform registration and login functions while they can view available books and track their issued books and manage their profiles. Through the system administrators gain full control to handle book categories alongside author management and inventory tracking and they can also issue and return books and maintain student records. The system provides users with both overdue tracking and password recovery features to enhance their convenience and control capabilities. The LMS improves operational workflow and accessibility through its real-time information access and automated processes which reduce manual work. The integration of modern web technologies ensures security, scalability, and dynamic functionality, such as real-time search and responsive design. The LMS significantly improves resource management and user experience, establishing itself as an essential digital tool for libraries in academic institutions.

Keywords: Management system, PHP, MySQL, HTML, CSS, JavaScript, Bootstrap.

# 1. Introduction

People across the world have distributed knowledge through written texts since ancient times. A library serves as a repository for substantial documentation that users can access through its resources. The physical library cannot fulfill all user requirements because most printed documents suffer damage after a limited period of use. Library employees introduce Digital Library Management to eliminate paper records and decrease book-related expenses and resolve file disappearance issues. Digital libraries serve as essential educational and research institutions today because they organize information access for users in the digital age. Large manual management of books and journals alongside digital materials consumes excessive time while creating potential mistakes throughout the process. The Library Management System represents a software platform which automates library management tasks so administrators and users both can work more efficiently. The system enables users to track books alongside user administration while generating reports which leads to a contemporary library workflow.



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The LMS consists of two main operational modules named Admin and Student through which library management processes become more efficient. Through the Admin module librarians obtain complete authority to handle library management tasks which include book collections and categories and author recordkeeping and student book distribution functions. Through the admin module library staff members gain full control to monitor book borrows and change return statuses while they can access student information through unique identification systems. The system enables users to create and maintain password security protocols. Through its self-service portal the student module allows users to perform registration and view available books and their issued books and manage their profiles. Student registration creates a unique identification system which permits access to the catalog and due date monitoring. The password recovery feature allows users to have an easy-to-use system that upholds security standards. The implementation of this LMS enables libraries to shift from their conventional paper processes toward a digital platform that scales efficiently. The system handles manual tasks more efficiently and lowers human mistakes while enhancing student and research accessibility. Real-time book tracking in combination with automated notifications and secure authentication allows the system to boost operational structure while creating an environment that centers around users. The research examines the key elements and operational aspects and advantages of the proposed Library Management System which drives contemporary library advancements and user satisfaction improvements. Educational institutions need automation now, and this system supports their requirements by achieving resource management efficiency and better service delivery.

#### 2. Problem Statement

Libraries have maintained their status as fundamental establishments which serve to access knowledge while preserving it and distributing it to users. The traditional library operations rely on manual systems to handle book catalogs and borrower records and document maintenance. The use of ledgers and index cards and handwritten logs in these systems demands extensive time and labor for their maintenance. The expansion of both library users and book collections creates challenges for manual information management systems which become more difficult to handle and prone to errors.

#### 2.1 Problem

Keeping library operations manual creates extensive time consumption and operational inefficiency which results in multiple operational problems. Many educational institutions together with public libraries continue to keep their book records and user data and transaction logs on paper and basic spreadsheets. The outdated system provides limited access to real-time data while human mistakes become more frequent and book-related operations become complex for students and administrators. The volume growth of books and users makes manual systems harder to control while increasing the likelihood of data inconsistencies. Students encounter challenges in monitoring their library materials and administrators experience difficulties in maintaining accurate records and effective library activity oversight. The current manual systems demonstrate an immediate requirement for automated library management solutions which enhance both system complexity handling and user experience alongside precision.



## 2.2 Need for a system

The expansion of libraries alongside rising user numbers creates challenges for manual systems which become less effective and more error-prone and harder to control. Students face delays when trying to locate books and monitor due dates but librarians must cope with keeping precise records. The implementation of a digital Library Management System helps organizations achieve operational efficiency by minimizing manual labor while providing improved user service. Modern academic and institutional environments need real-time data access along with better resource management and operational transparency which the system provides.

## 3. Proposed System

## 3.1 Introduction

The proposed Library Management System (LMS) is a web-based application designed to digitize and simplify the process of managing a library's books, users, and operations. This system facilitates efficient management by offering different access levels and dashboards for students and administrators. The system aims to eliminate manual record keeping, reduce human error, and provide quick access to information related to books and users.

#### 3.2 System Overview

The LMS is divided into two main modules: Admin and Student. Each module is designed with distinct features to streamline user-specific tasks. The Admin module handles core management functionalities, whereas the Student module allows users to interact with the library services.

#### 3.2.1 Admin Module of Library Management System

The LMS features the Admin Module as its central component which manages all library operational tasks. The admin dashboard enables users to perform book category management alongside author and book management through addition and modification and deletion features. Through the system administrators can both issue books to students and update records upon return and search student details by their unique IDs. The module enables effective resource and user data organization within the library system.

#### 3.2.2 Student Module of Library Management System

Students can access the Student Module to perform different library-related operations through the system. The system enables student registration to generate unique IDs which allow students to see available books and update their profile information and modify their passwords. The module provides students with easy access to self-service features which reduces administrative tasks.

#### 3.2.3 Functionalities of the Admin Dashboard

- Add, update, and delete categories for better organization.
- Manage author information to maintain records of book contributors
- Maintain a book inventory by adding, updating, and deleting book entries.
- Issue books to students and update records upon return.



- Search student details and retrieve information using unique IDs. These functionalities collectively enhance the efficiency of library resource management.
- 3.2.4 Student Dashboard and Its Features
  - Viewing available books to check for availability before borrowing.
  - Viewing issued books to track borrowed materials.
  - Checking return deadlines to avoid late submission penalties.
  - Updating profile details for maintaining accurate student records.
  - Changing or recovering passwords to ensure security and accessibility. The student dashboard simplifies access to library resources, ensuring a user-friendly experience.

3.3 Objectives of the Proposed System

- To create a secure, user-friendly interface for library management.
- To automate the library process and minimize manual errors.
- To reduce the workload of librarians and improve information accuracy.
- To allow students easy and quick access to library resources.
- To maintain transparent and accessible records of book transactions.
- 3.4 Advantages and Disadvantages for Library Management System

#### 3.4.1 Advantages

- Eliminates manual record-keeping, reducing human errors in book tracking, issuing, and returns.
- Admins can quickly search, issue, and manage books using digital records.
- Role-based access control ensures only authorized users can perform specific actions.
- Reduces operational costs by minimizing manual labor and paper usage.

#### 3.4.2 Disadvantages

- Software bugs, system crashes, or server failures can disrupt operations.
- Dependency on internet connectivity (for web-based LMS) may cause access issues.
- 3.5 Scope for Future Enhancement
  - Integration of barcode/RFID scanning for faster book management.
  - Addition of digital book downloads and e-book management.
  - Implementation of notification system for due/return alerts via email or SMS.
  - Advanced analytics and reporting dashboard for admins.



# 4. System Architecture (Overview)

#### 4.1 Architecture Model

The proposed Library Management System follows a three-tier architecture consisting of the Presentation Layer, Application Layer, and Database Layer. This model separates the user interface, business logic, and data storage, enhancing scalability, maintainability, and security.

Presentation Layer (Frontend):

This is the user interface where both admins and students interact with the system. It includes dashboards, forms, tables, and navigation elements. Technologies used may include HTML, CSS, JavaScript, or modern frontend frameworks.

Application Layer (Backend):

This layer processes user requests, applies business rules, and handles operations such as login, registration, book issuing, and updates. It connects the frontend with the database using server-side technologies such as PHP, Python, Java, or Node.js.

Database Layer:

This layer stores all persistent data including student records, book details, issued/return logs, admin credentials, and category/author information. A relational database like MySQL or PostgreSQL is typically used, with well-structured tables and relationships.

#### 5. Methodology/ Result

The Library Management System development implements the Waterfall Model as its structured framework to finish each phase before advancing to the next one. The defined requirements make the Waterfall Model an appropriate design for this project.

5.1 Implementation

The system was developed using a standard tech stack: Frontend: HTML, CSS, JavaScript (Bootstrap) Backend: JavaScript, PHP, SQL (through Xampp) Database: MySQL or PostgreSQL for relational data management.





BACKEND

MuSOI

Fig. 5.2: Cloud architecture of Proposed System (LMS)

Fig 5.2 Shows the proposed system of LMS where the front end is responsible for user interface and user experience while the backend ensures the functionality and performance of the application.



Fig 5.3: Flow chart of LMS

In fig 5.3 the flowchart illustrates the structure and functionality of a Library Management System (LMS), divided into Admin Module and Student Module. The Student Module includes features like registration, receiving a unique student ID, viewing available books, updating profile details, and checking issued books along with return deadlines and can also change or recover their passwords. The Admin Module allows authorized users to manage library operations, including adding, updating, and deleting book categories, authors, and book details. The admin can also issue books, update return records, and search student details.



#### 5.4 Result

Upon logging in, the system loads and directs them to the Home page, where they must enter their credentials. This process is illustrated in fig 5.5

Online Library Management System				
		ADMIN LOO	GIN USER SIGNUP	USER LOGIN
USER LOGIN FORM				
	LOGIN FORM			
	Enter Email id			
	Password			
	Forgot Password			

Fig 5.5: User Login Page

After logging into the system, they can assess the library in accordance with their input account credentials. But before logging in to the account if the user is new to the system, they must first make a user account for the system to be accessed.



Fig 5.6: Student Signup for LMS



While signing up for the LMS, student details such as name, mobile number, E-mail is enrolled. Similarly, to add a new book, we enroll the book name, book id, total copies, categories etc... In the proposed system, only the admin possesses the authority to add, update, and manage book records. Furthermore, the Admin is solely responsible for verifying and accessing detailed information related to the books. This functionality is demonstrated in fig 5.7

		DASHBOARD	CATEGORIES ~	PUBLIC	ATIONS 🗸	BOOKS 🗸	ISSUE BOOKS V	REQUESTED BOOKS	REPOR	T RE	G STUDENTS	CHANGE PASS
	.ge books				ADD BO	юк						
					MANAG	E BOOKS						
Books	s Listing				UPDATE	FINE						
10	✓ records per	page									Search:	
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Fig 5.7: Admin Interface for Book Management in the LMS

The Library Management System (LMS) streamlines library operations by integrating admin and student modules. Administrators manage book inventory, issue books, and track student records, while students access available books, update profiles, and check return deadlines. The system enhances efficiency, security, and accessibility, reducing manual workload and improving resource management in libraries.

# 6. Summary and conclusion

The Library Management System solves traditional manual system problems through its digital solution which improves operational efficiency and data accuracy and user experience. The system delivers efficient library service access to administrators and students through separately designed modules. The system enables secure handling of data as well as clear record storage and efficient resource management.

A systematic approach during implementation enables the system to scale up as well as adapt to new requirements while remaining easy to maintain. The practical aspects of the system in educational and institutional libraries become evident through its role-based access control features and real-time dashboards with intuitive user interfaces.

The proposed LMS represents a vital advancement for library modernization which provides groundwork for building more sophisticated digital library systems of the future.



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