Project Report

On

Library Management System

Submitted By:

Aditya Pratap Singh
Jai kumar
Mohd. Amaan
Manthan kumar

CERTIFICATE

Certified that this is a bonafide record of the project work titled.

LIBRARY MANAGEMENT SYSTEM

Done By:
Aditya Pratap singh
Jai kumar
Mohd. Amaan
Manthan kumar

of VI semester B.tech in the year 2024 in partial fulfillment of the requirements for the project of web development classes.

ACKNOWLEDGEMENT

We take this occasion to thank God, almighty for blessing us with his grace and taking our endeavor to a successful culmination. We extend our sincere and heartfelt thanks to our esteemed guide, Satya Prakash sir , for providing us with the right guidance and advice at the crucial junctures and for showing me the right way. We would like to thank our friends and family for the support and encouragement they have given us during the course of our work.

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Abstract:

Library Management System is a system which maintains the information about the books present in the library, their authors, the members of library to whom books are issued, library staff and all. This is very difficult to organize manually. Maintenance of all this information manually is a very complex task. Owing to the advancement of technology, organization of an Online Library becomes much simple. The Online Library Management has been designed to computerize and automate the operations performed over the information about the members, book issues and returns and all other operations. This computerization of library helps in many instances of its maintenances. It reduces the workload of management as most of the manual work done is reduced

CHAPTER 1

INTRODUCTION

This chapter gives an overview about the aim , objectives ,background and operation environment of the system.

1.1 PROJECT AIMS AND OBJECTIVES

The project aims and objectives that will be achieved after completion of this project are discussed in this subchapter. The aims and objectives are as follows:

- Online book reading.
- A search column to search availability of books.
- Facility to download required book.
- Video tutorial for students.
- An Admin login page where admin can add books, videos or page sources
- Open link for Learning Websites

1.2 BACKGROUND OF PROJECT

Library Management System is an application which refers to library systems which are generally small or medium in size. It is used by librarian to manage the library using a computerized system where he/she can add new books, videos and Page sources.

Books and student maintenance modules are also included in this system which would keep track of the students using the library and also a detailed description about the books a library contains. With this computerized system there will be no loss of book record or member record which generally happens when a non computerized system is used.

All these modules are able to help librarian to manage the library with more convenience and in a more efficient way as compared to library systems which are not computerized.

PROCESSOR	INTEL CORE PROCESSOR OR BETTER PERFORMANCE
OPERATING SYSTEM	WINDOWS VISTA ,WINDOWS7 or above, UBUNTU
MEMORY	1GB RAM OR MORE
HARD DISK SPACE	MINIMUM 3 GB FOR DATABASE USAGE FOR FUTURE
DATABASE	MY SQL

CHAPTER 2

SYSTEM ANALYSIS

In this chapter, we will discuss and analyze about the developing process of Library Management System including software requirement specification (SRS) and comparison between existing and proposed system . The functional and non functional requirements are included in SRS part to provide complete description and overview of system requirement before the developing process is carried out. Besides that, existing vs proposed provides a view of how the proposed system will be more efficient than the existing one.

2.1 SRS (Library Management System) |

2.1.1 Purpose:

The main objective of this document is to illustrate the requirements of the project Library Management system. The document gives the detailed description of the both functional and non-functional requirements proposed by the client.

The purpose of this project is to provide a friendly environment to maintain the details of books and library members also this project maintains easy circulation system using computers and to provide different reports. It describes the hardware and software interface requirements using ER Models and UML diagrams.

2.1.2 Scope of the Project:

Library Management System Project is basically updating the manual library system into an internet-based web application so that the users can know the details of their accounts, availability of books and maximum limit for borrowing and many more features.

The project is specifically designed for the use of librarians and library users. The product will work as a complete user interface for library management process and library usage from ordinary users. Library Management System can be used by any existing or new library to manage its books and book borrowing, insertion and monitoring. It is especially useful for any educational institute where modifications in the content can be done easily according to requirements.

The project can be easily implemented under various situations. We can add new features as and when we require, making reusability possible as there is flexibility in all the modules. The language used for developing the project is Html, Bootstrap and php and mysql for backend. In terms of performance, tools available, cross platform compatibility, libraries, cost (freely available), and development process these languages are pretty compatible.

2.1.3 References:

Books:

- Software Requirements (Microsoft) Second Edition By Karl E. Wiegers
- Fundamentals of Database System By Elmasri
- Software Requirements and Specifications: A Lexicon of Practice, Principles and Prejudices (ACM Press) by Michael Jackson

- Fundamentals of Software Engineering By Rajib Mall
- Software Engineering: A Practitioner's Approach Fifth Edition By Roger S. Pressman

2.2 SRS (Library Management System) |

Overall Description:

2.2.1 Product Perspective:

LMS is a replacement for the ordinary library management systems which depend on paper work for recording book and users' information. LMS will provide an advanced book search mechanism and will make it easy to borrow, insert and index a book in the library.

2.2.2 Product Functions:

The proposed Library Management System (LMS) is designed to simplify the day-to-day activities of a library, providing features for both users and administrators.

Authentication and Authorization System:

- The system implements a secure login mechanism for users, and administrators. The admin has the authority to manage user access and ensure data integrity.

For Users:

We will have following features for a User:

1. New User Registration:
   - This feature allows new users (students, teachers, etc.) to sign up for the system by providing the necessary details.
2. Student Login:
   - This feature Provides authenticated access for registered users to use the system.
3. Search Book:
   - This feature allow users to search for books based on criteria such as book ID, book name, or author name, enhancing the ease of locating desired materials.
4. Issue Book:
   - This feature allow users in borrowing books from the library by recording the transaction and updating the availability status.
5. Return Book:
   - This feature allows users to return books either before the due date or after the specified time with a late fine, ensuring proper management of borrowed materials.

For Admin:

1. Record Library Activities:
   - This feature allows librarians to enter various records into the system, such as book issuances, returns, and non-availability of books.
2. Manage Books:
   - This feature allow librarians to keep track of the library's books by adding new books or removing them.
3. Manage Student:
   - This feature allow librarians to keep track of number of students and their details.
4. View Issued Books:
   - This feature allows librarians to view all Issued books with their status.
5. Defaulter List:
   - This feature allows librarians to show the details of the student who did not return the books before the deadline.
6. Issue Book:
   - This feature allow users in borrowing books from the library by recording the transaction and updating the availability status.

2.2.3 Class Diagram and Characteristics:

Class Diagram for Library Management System simply describes structure of Library Management System class, attributes, methods or operations, relationship among objects.

Class Diagram for Library Management System Project

Aggregation and Multiplicity are two important points that need to take into consideration while designing a Class Diagram. Let us understand in detail.

Aggregation:

- Aggregation simply shows a relationship where one thing can exist independently of other thing. It means to create or compose different abstractions together in defining a class.
- Aggregation is represented as a part of relationship in class diagram. In diagram given below, we can see that aggregation is represented by an edge with a diamond end pointing towards superclass.
- The "Library Management System" is superclass that consists of various classes. These classes are User, Book, and Librarian as shown in diagram. Further, for "Account" class, "User" is a superclass. All of these, share a relationship and these relationships are known as aggregate relationships.

Multiplicity:

- Multiplicity means that number of elements of a class is associated with another class. These relations can be one-to-one, many-to-many, and many-to-one or one-to-many. For denoting one element we use 1, for zero elements we use 0, and for many elements we use *.
- We can see in diagram; many users are associated with many books denoted by * and this represents a many-to-many type of relationship. One user has only one account that is denoted by 1 and this represents a one-to-one type of relationship.
- Many books are associated with one librarian and this represents many-to-one or one-to-many type of relationship. All these relationships are shown in diagram.

2.2.4 General Constraints:

- The information of all users, books and libraries must be stored in a database that is accessible by the website.
- MS SQL Server will be used as SQL engine and database.
- The Online Library System is running 24 hours a day.
- Users may access LMS from any computer that has Internet browsing capabilities and an Internet connection.
- Users must have their correct usernames and passwords to enter into their online accounts and do actions.

2.2.5 Assumptions and Dependencies:

The assumptions are:-

- The Coding should be error free.
- The system should be user-friendly so that it is easy to use for the users .
- The information of all users, books and libraries must be stored in a database that is accessible by the website .
- The system should have more storage capacity and provide fast access to the database.
- The system should provide search facility and support quick transactions.
- The Library System is running 24 hours a day .
- Users must have their correct usernames and passwords to enter into their online accounts and do actions .

The Dependencies are:-

- The specific hardware and software due to which the product will be run.
- On the basis of listing requirements and specification the project will be developed and run.
- The end users (admin) should have proper understanding of the product.
- The system should have the general report stored.
- The information of all the users must be stored in a database that is accessible by the Library System.
- Any update regarding the book from the library is to be recorded to the database and the data entered should be correct.

2.3 SRS (Library Mangement System) | Designing Library Management System Project:
Use case Diagram for Library Management System Project:

Use Case Diagram of Library Management System Project
This is a broad level diagram of the project showing a basic overview. The users can be either staff or student. This System will provide a search functionality to facilitate the search of resources. This search will be based on various categories . Further the library staff personal can add/update the resources and the resource users from the system. The users of the system can request issue/renew/return of books for which they would have to follow certain criteria.
ER Model of Library Management System Project:
ER Diagram is known as Entity-Relationship Diagram, it is used to analyze the structure of the Database. It shows relationships between entities and their attributes. An ER Model provides a means of communication.
The Library Management System project database keeps track of readers with the following considerations –

- The system keeps track of the staff with a single point authentication system comprising login Id and password.
- Staff maintains the book catalogue with its ISBN, Book title, price(in INR), category(novel, general, story), edition, author Number and details.
- A publisher has publisher Id, Year when the book was published, and name of the book.
- Readers are registered with their user_id, email, name (first name, last name), Phone no (multiple entries allowed), communication address. The staff keeps track of readers.
- Readers can return/reserve books that stamps with issue date and return date. If not returned within the prescribed time period, it may have a due date too.
- Staff also generate reports that has readers id, registration no of report, book no and return/issue info.

Let’s draw an ER Model of Library Management System :

ER Model of Library Management System Project
Entities and their Attributes –

- Book Entity : It has authno, isbn number, title, edition, category, price. ISBN is the Primary Key for Book Entity.
- Reader Entity : It has UserId, Email, address, phone no, name. Name is composite attribute of firstname and lastname. Phone no is multi valued attribute. UserId is the Primary Key for Readers entity.
- Publisher Entity : It has PublisherId, Year of publication, name. PublisherID is the Primary Key.
- Authentication System Entity : It has LoginId and password with LoginID as Primary Key.
- Reports Entity : It has UserId, Reg_no, Book_no, Issue/Return date. Reg_no is the Primary Key of reports entity.
- Staff Entity : It has name and staff_id with staff_id as Primary Key.
- Reserve/Return Relationship Set : It has three attributes: Reserve date, Due date, Return date.

Relationships between Entities –

- A reader can reserve N books but one book can be reserved by only one reader. The relationship 1:N.
- A publisher can publish many books but a book is published by only one publisher. The relationship 1:N.
- Staff keeps track of readers. The relationship is M:N.
- Staff maintains multiple reports. The relationship 1:N.
- Staff maintains multiple Books. The relationship 1:N.

- Authentication system provides login to multiple staffs. The relation is 1:N.

Data Flow Diagram of Library Management System Project:

Data Flow Diagram (DFD) serves as a visual representation of the flow of information within the system. This diagram illustrates how data, such as book information, user details, and transaction records, moves between various components of the LMS.

- Processes, represented by circles or ovals, Depict activities such as book issuance, returns, and cataloguing.
- Data stores, depicted by rectangles, represent where information is stored, including databases housing book records.
- Data flows, indicated by arrows, showcase how data moves between processes, data stores, and external entities like library patrons.
- Let's draw an Data Flow Diagram of Library Management System Project:

Data Flow Diagram of Library Management System Project

The DFD provides a concise yet comprehensive overview of the LMS's data flow and interactions, aiding in the analysis, design, and communication of the system's functional aspects.

2.4 Functional Requirements | SRS (Library Management System)

The LMS must have the following functional requirements:

- The LMS should store all information about librarian and other users (student students and faculty members) like their login info , books issued etc.
- The LMS should store all information about the books and users in two separated databases.
- The LMS should allow searching books / journals by author, title , keywords or availability.
- The LMS should generate request's reports for librarian , upon which he/she could make decisions about accepting / rejecting the requests.
- The LMS should provide the module to Issue or return the books.
- The LMS should provide modules to search request and renew books .
- The Admin must be able to add/remove/manage books or users.

2.4.1 Software Requirements:

This software package is developed using html , bootstrap for front end . Php and MY SQL Server as the back end to store the database for backend we are using Xampp server.

- Operating System: Windows 7, 8, 9, 10 .
- Language: Html , Css , Javascript , Php , sql
- Database: MS SQL Server (back end)

2.4.2 Hardware Requirements:

- Processor: Intel core i3 or above for a stable experience and fast retrieval of data.
- Hard Disk: 40GB and above
- RAM: 256 MB or more, recommended 2 GB for fast reading and writing capabilities which will result in better performance time.

2.5 Non Functional Requirements | SRS (Library Mangement System)

2.5.1 Usability Requirements:

- Our user interface should be interactive simple and easy to understand . The system should prompt for the user and administrator to login to the application for proper input criteria.
- Library management system shall handle expected and non – expected errors in ways that prevent loss in information and long downtime period.

2.5.2 Security Requirements:

- System should use secured Database.
- Normal users can just read information but they cannot edit or modify anything except their personal and some other information.
- System will have different types of users and every user has access constraints.
- Proper user authentication should be provided.

- No one should be able to hack users password .
- There should be separate accounts for admin and members such that no member can access the database and only admin has the rights to update the database.

2.5.3 Performance Requirements:

- The system shall accommodate high number of books and users without any fault.
- Responses to view information shall take no longer than 5 seconds to appear on the screen.

2.5.4 Error Requirements:

LMS product shall handle expected and non-expected errors in ways that prevent loss in information and long downtime period.

2.6 SRS (Library Management System) | Appendices:

Appendix A:

- A: Admin, Abbreviation, Acronym, Assumptions.
- B: Books, Business rules.
- C: Class, Client, Conventions.
- D: Data requirement, Dependencies.
- G: GUI.
- K: Key. L: Library, Librarian.
- N: Non-functional Requirement.
- O: Operating environment;
- P: Performance, Perspective, Purpose;
- R: Requirement, Requirement attributes;
- S: Safety, Scope, Security, System features;
- U: User, User class and characteristics, User requirement;

Glossary:

The following are the list of conventions and acronyms used in this document and the project as well:

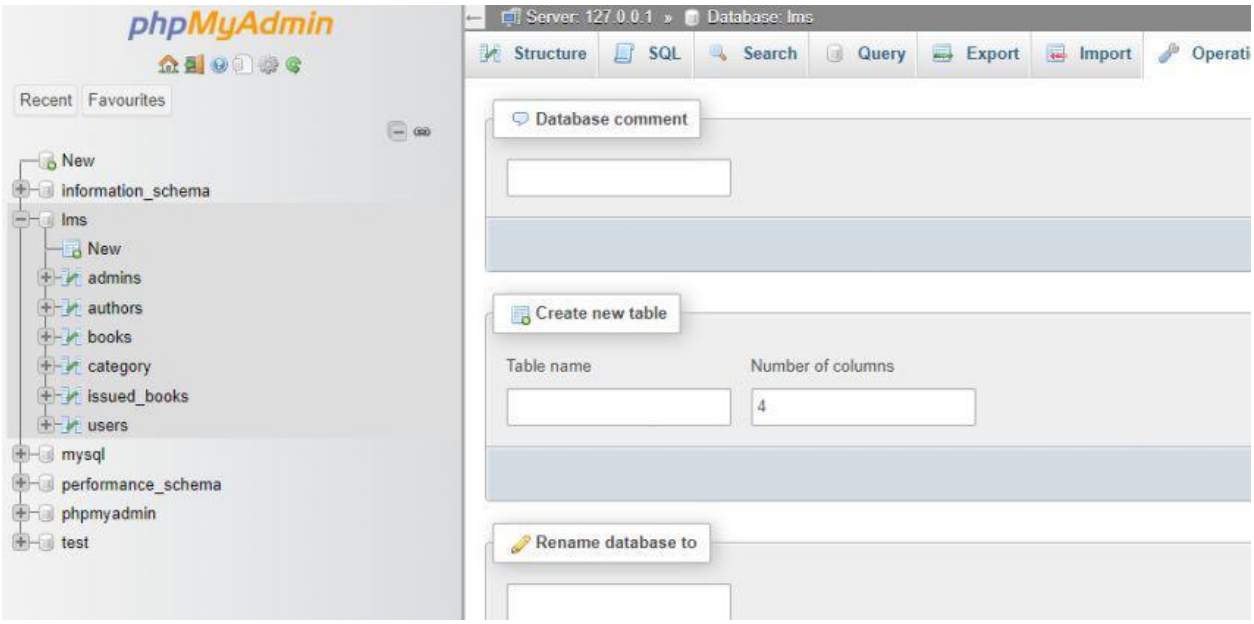
- Administrator: A login id representing a user with user administration privileges to the software.
- User: A general login id assigned to most users.
- Client: Intended users for the software.
- User Interface Layer: The section of the assignment referring to what the user interacts with directly.
- Interface: Something used to communicate across different mediums.

CHAPTER 3

SYSTEM DESIGN

VARIOUS TABELS TO MAINTAIN INFORMATION

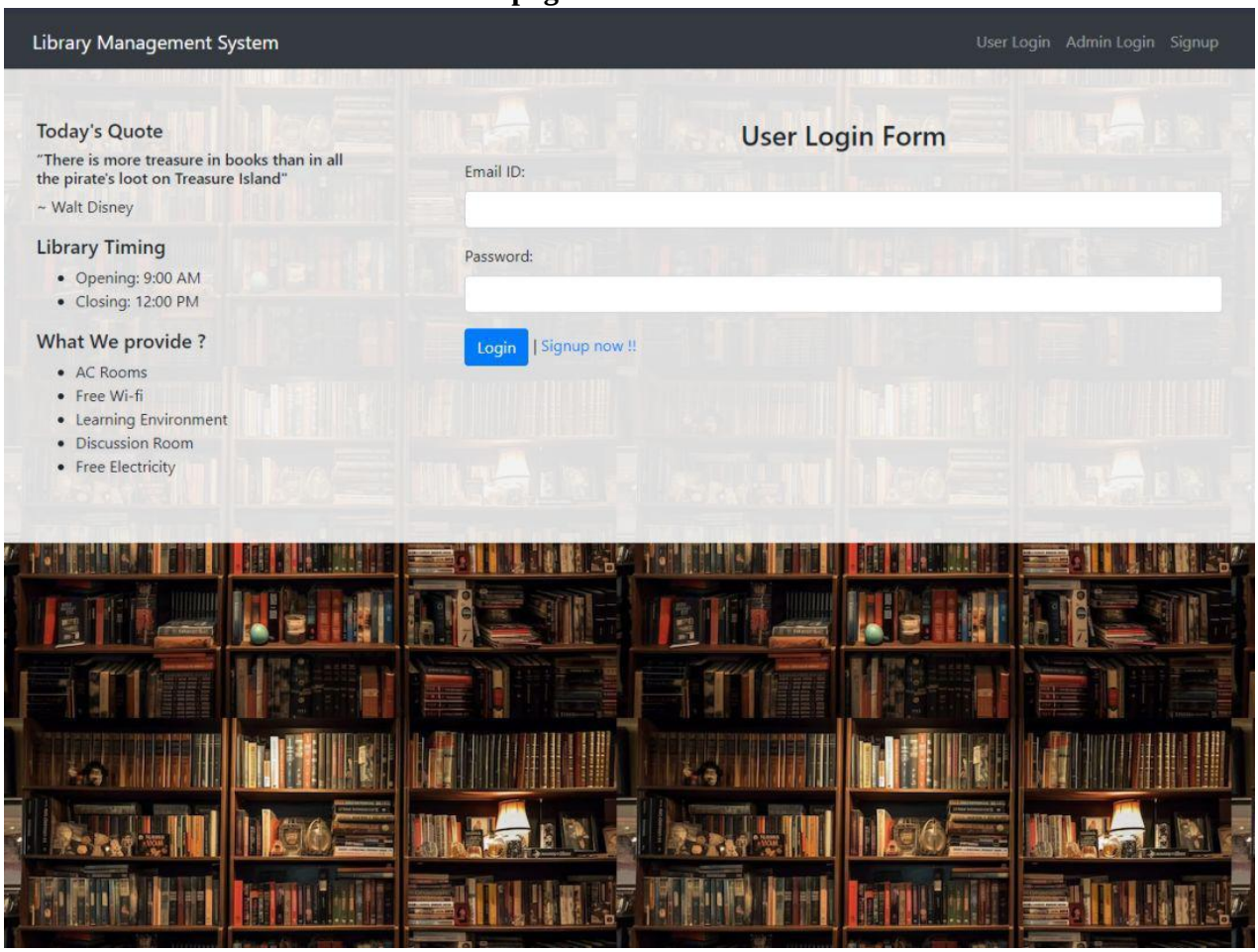
- **Library Table from Database**



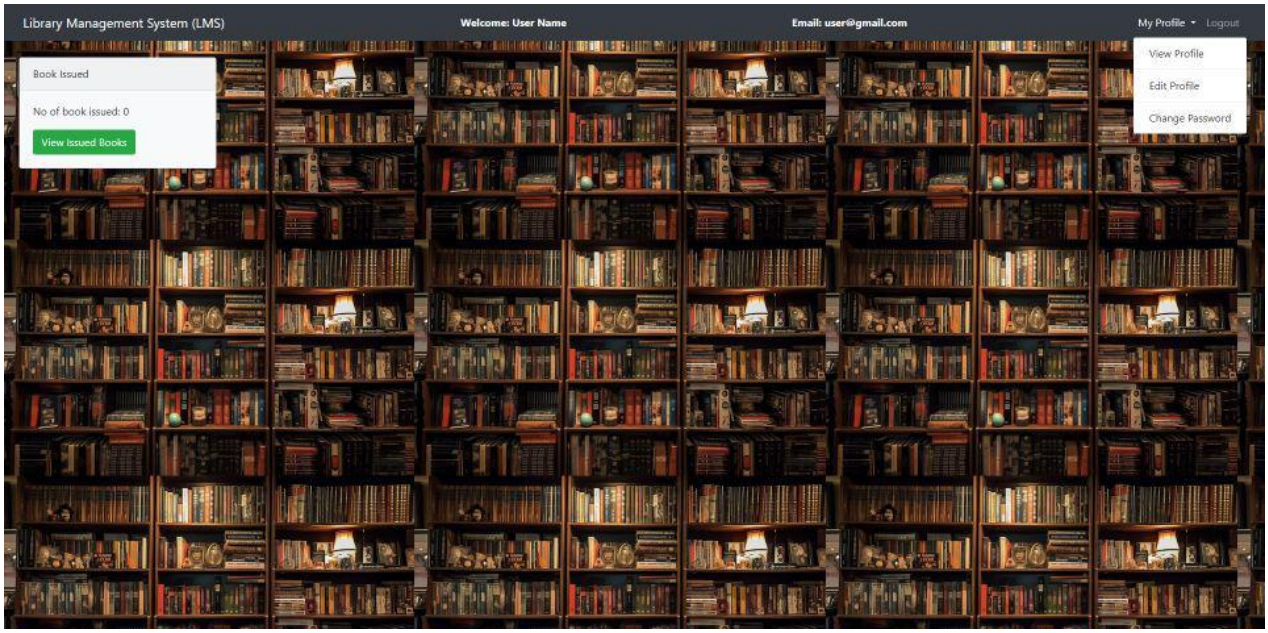
CHAPTER 4

SYSTEM IMPLEMENTATION

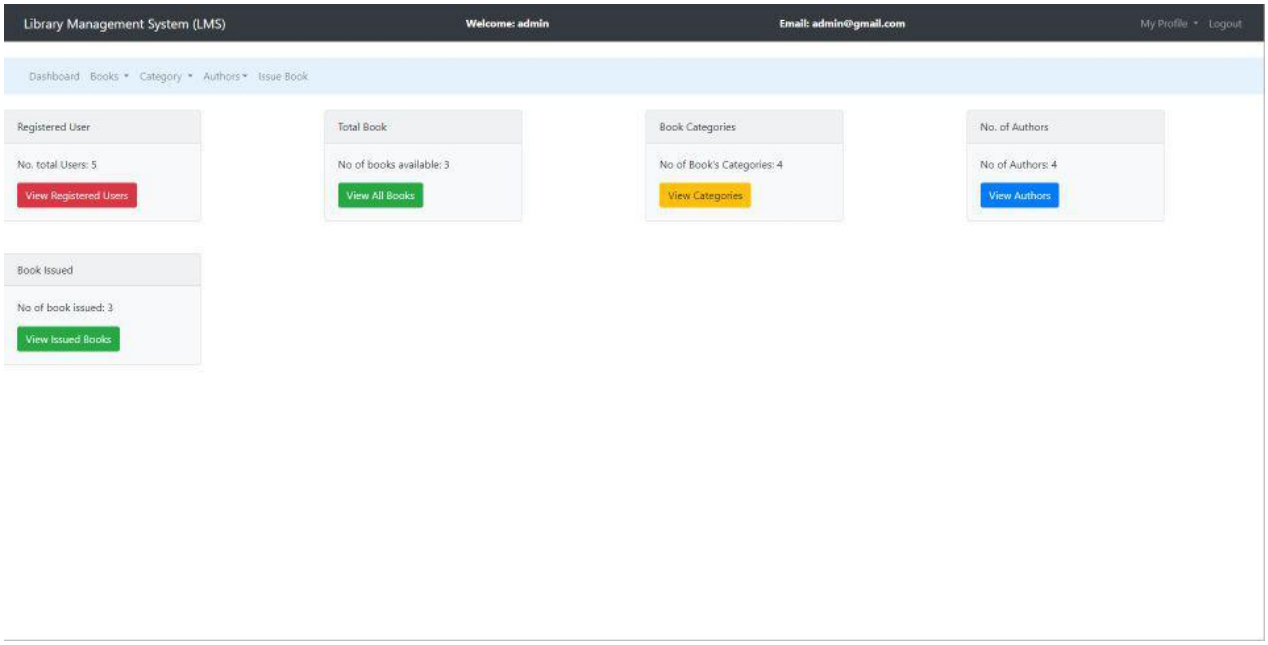
4.1 Screenshot for homepage



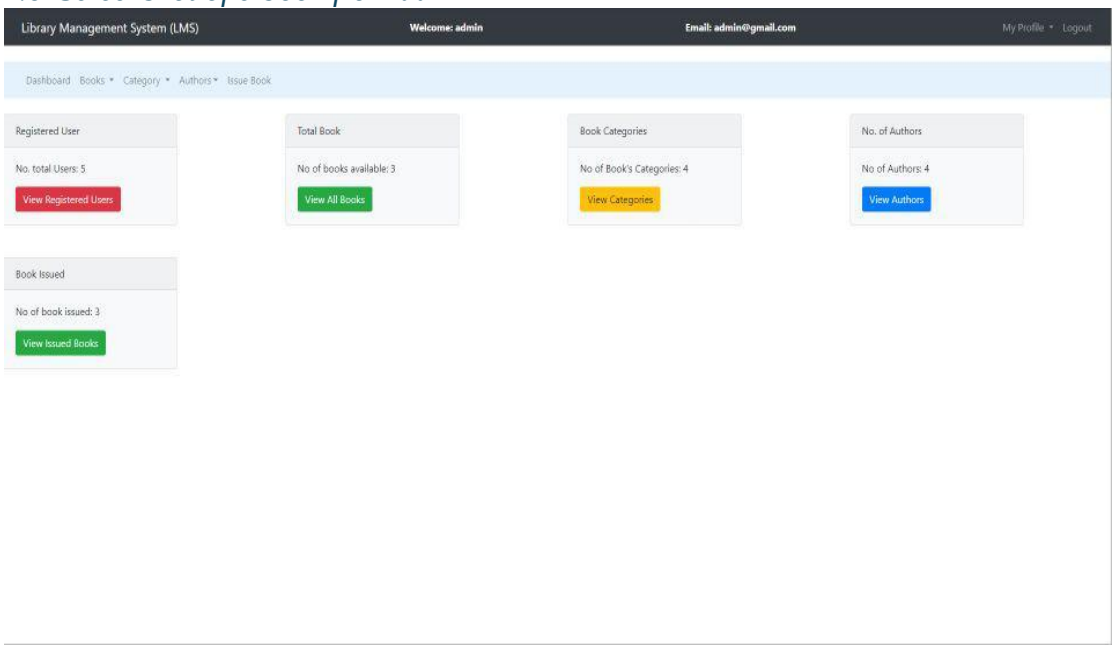
4.2 Screenshot of dashboard from user.



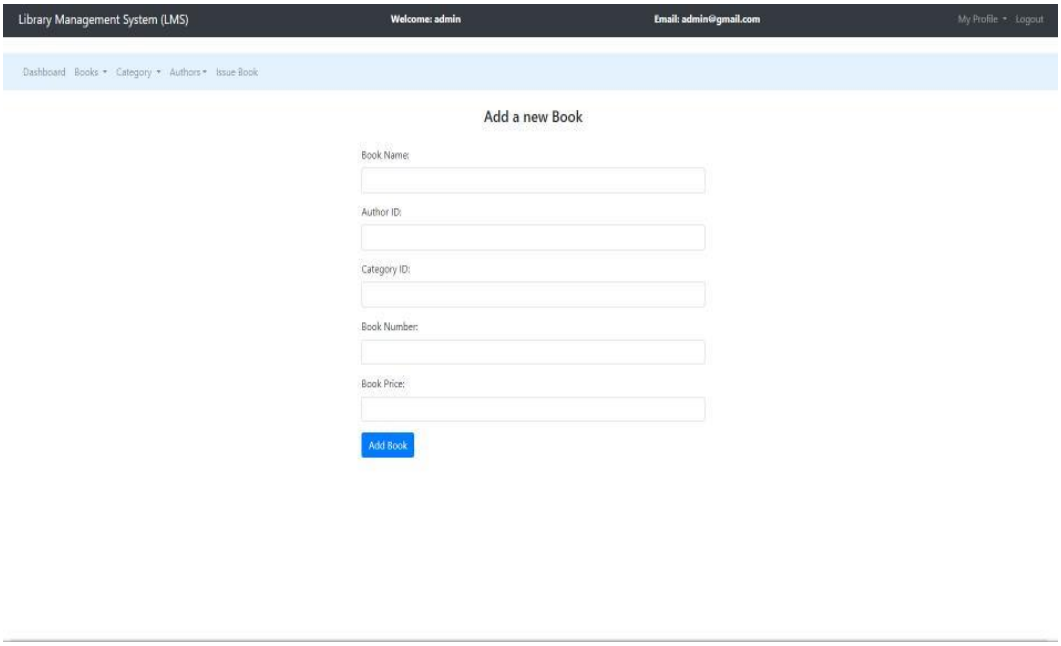
4.5 Screenshot of login for admin



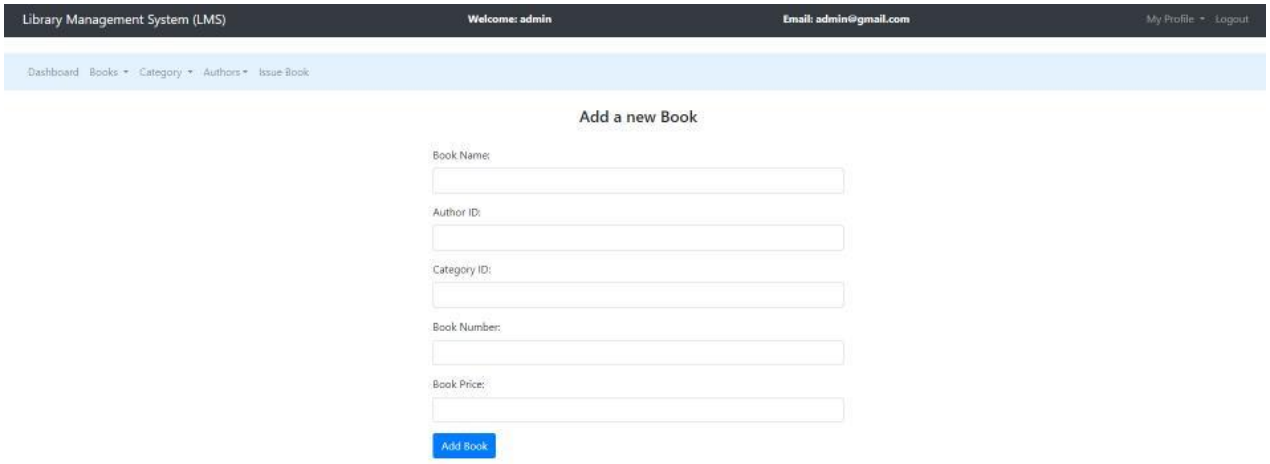
4.6 Screenshot of e-book from admin



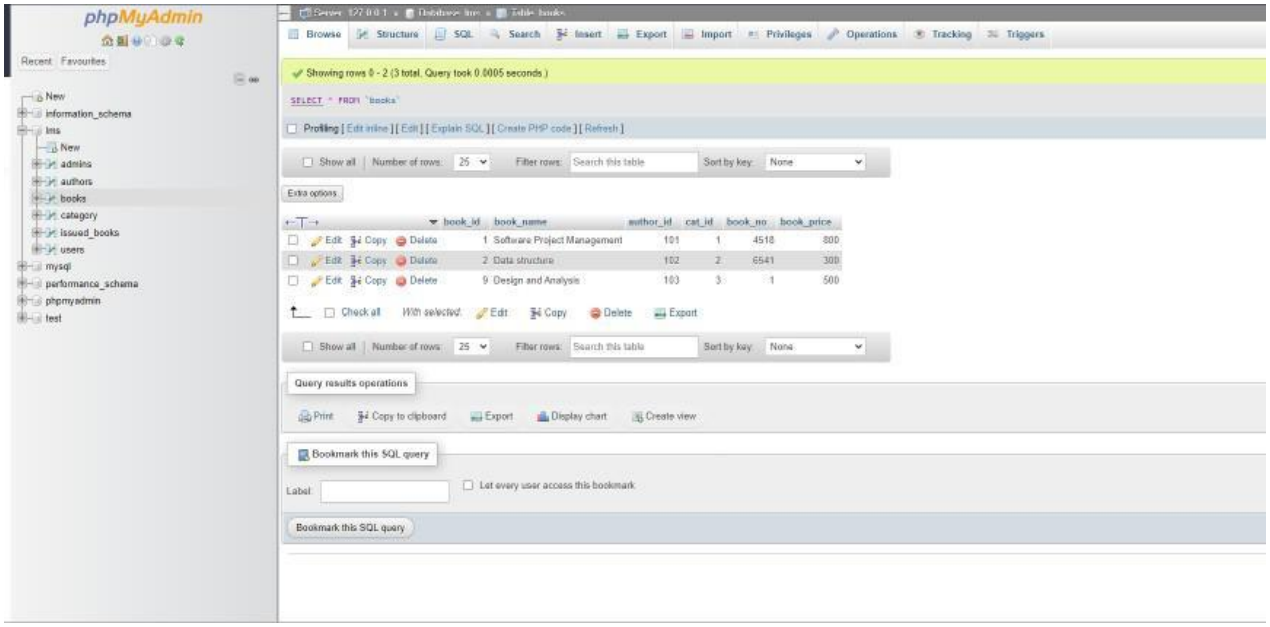
4.7 Screenshot of add new e-book from admin



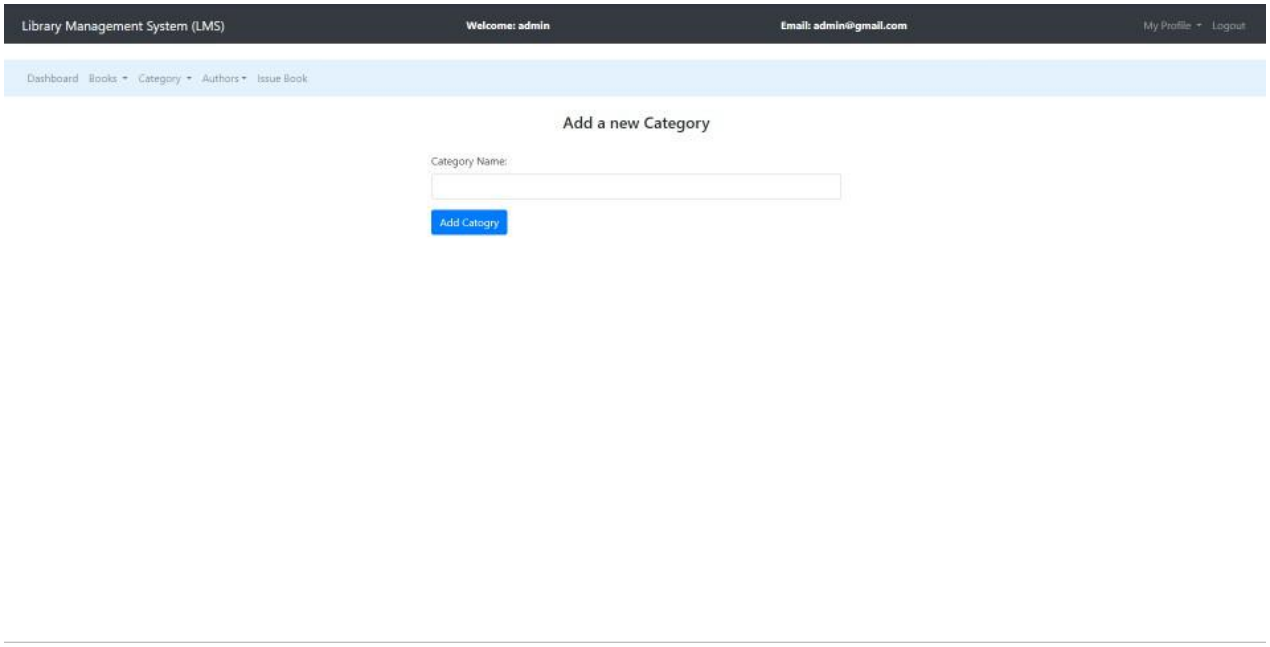
4.8 Screenshot of issue a new e-book from admin

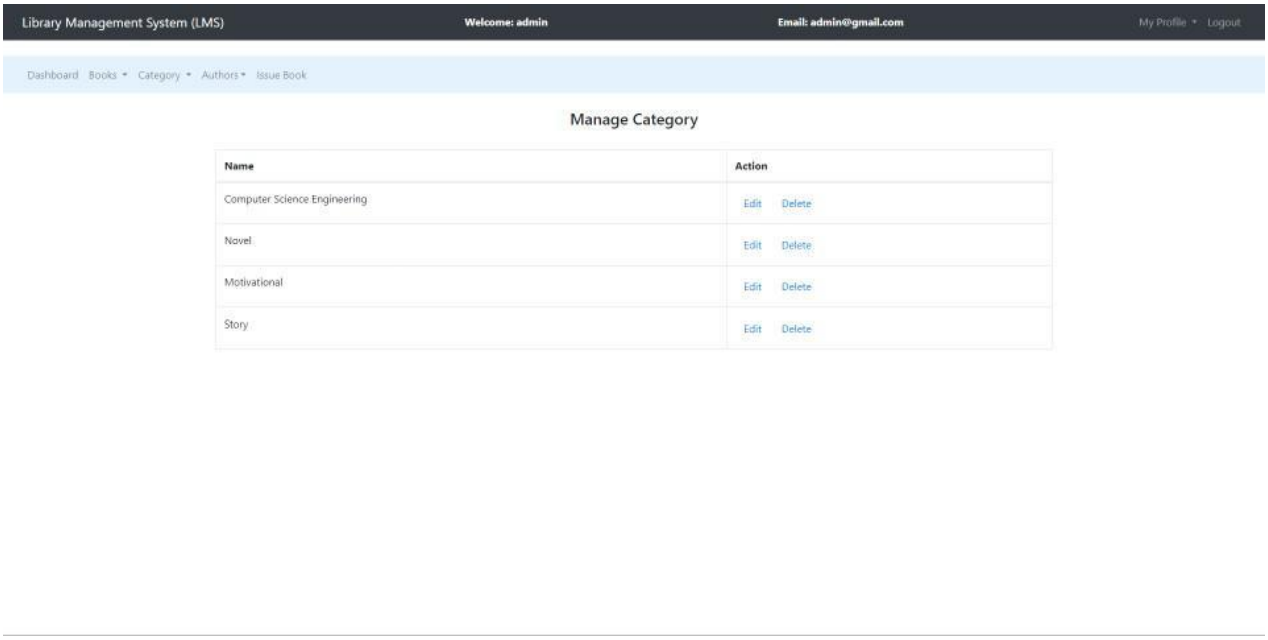


4.9 Screenshot of database from admin



4.10 Screenshot of Add a new category and manage category.


Library Management System (LMS)
Welcome: admin
Email: admin@gmail.com
My Profile
Logout
Dashboard
Books
Category
Authors
Issue Book
Add a new Category
Category Name:
Add Catogry


Library Management System (LMS)
Welcome: admin
Email: admin@gmail.com
My Profile
Logout
Dashboard
Books
Category
Authors
Issue Book
Manage Category
Name
Action
Computer Science Engineering
Edit
Delete
Novel
Edit
Delete
Motivational
Edit
Delete
Story
Edit
Delete

CHAPTER 5 SYSTEM TESTING

The aim of the system testing process was to determine all defects in our project .The program was subjected to a set of test inputs and various observations were made and based on these observations it will be decided whether the program behaves as expected or not. Our

Project went through two levels of testing

1.Unit testing

2.integration testing

UNIT TESTING

Unit testing is undertaken when a module has been created and successfully reviewed .In order to test a single module we need to provide a complete environment i.e. besides the module we would require

- The procedures belonging to other modules that the module under test calls.
- Non local data structures that module accesses.
- A procedure to call the functions of the module under test with appropriate parameters.

Unit testing was done on each and every module that is described under module description of chapter 4

1. Test For the admin module

- Testing admin login form-This form is used for log in of administrator of the system.In this we enter the username and password if both are correct administration page will open other wise if any of data is wrong it will get

redirected back to the login page and again ask for username and password

- Student account addition- In this section the admin can verify student details from student academinc info and then only add student details to main library database it contains add and delete buttons if user click add button data will be added to student database and if he clicks delete button the student data will be deleted.

- Book Addition- Admin can enter details of book and can add the details to the main book table also he can view the books requests .

2. Test for Student login module

   - Test for Student login Form-This form is used for log in of Student .In this we enter thelibraryid, username and password if all these are correct student login page will open other wise if any of data is wrong it will get redirected back to the login page and again ask for libraryid, username and password.

   - Test for account creation- This form is used for new account creation when student does not fill the form completely it asks again to fill the whole form when he fill the form fully it gets redirected to page which show waiting for conformation message as his data will be only added by administrator after verification.

3. Test for teacher login module-

Test for teacher login form- This form is used for logg in of teacher .In this we enter the username and password if all these are correct teacher login page will open other wise if any of data is wrong it will get redirected back to the login page and again ask for username and password.

INTEGRATION TESTING

In this type of testing we test various integration of the project module by providing the input

.The primary objective is to test the module interfaces in order to ensure that no errors are occurring when one module invokes the other module.

CHAPTER 6 CONCLUSION & FUTURE SCOPE

This website provides a computerized version of library management system which will benefit the students as well as the staff of the library.

It makes entire process online where student can search books, staff can generate reports and do book transactions. It also has a facility for student login where student can login and can see status of books issued as well request for book or give some suggestions. It has a facility of teacher's login where teachers can add lectures notes and also give necessary suggestion to library and also add info about workshops or events happening in our college or nearby college in the online notice board.

There is a future scope of this facility that many more features such as online lectures video tutorials can be added by teachers as well as online assignments submission facility , a feature Of group chat where students can discuss various issues of engineering can be added to this project thus making it more interactive more user friendly and project which fulfills each users need in the best way possible.

CHAPTER 7

REFERENCES

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