1. INTRODUCTION

1.1 INTRODUCTION

The purpose of a library management system is to operate a library with efficiency and at reduced costs. The system being entirely automated streamlines all the tasks involved in operations of the library. The activities of book purchasing, cataloging, indexing, circulation recording and stock checking are done by the software. Such software eliminates the need for repetitive manual work and minimizes the chances of errors.

The library management system software makes the library a smart one by organizing the books systematically by author, title and subject. This enables users to search for books quickly and effortlessly.

Online Library Management System is an Automated Library System that handles the various functions of the library. It provides a complete solution to the library management software.

Library plays an important role in all schools and colleges, no educational institution can exist without Library Administration Software. It is an important part of every school and college and it helps the librarian to keep records of available books as well as issued books. Library Management System software helps in different ways by providing students the facility to learn, gather resources, promote group learning and improve knowledge and skills.

Features of Online Library Management System

- Integration of all records of students
- Manage the records systematically
- It can track any information online
- Manage all information online
- Easy to maintain records
- It leads to fast book entry

1.2 NECESSITY

There are many reasons why a Library Management system or project may be necessary. For example, a student wants to issue a particular book, so the traditional method is that student go to library of college/school is search for the book in the racks and issue it. It takes lot of time but now the e-library management system makes it all easier. Now, student can issue the book online and check the availability also. And admin can control the database of the system like how many books are available and check the student details many more. It saves lots of time of student as well as teachers also.

Maintaining daily statistics on the total number of volumes issued, reissued, unreturned, and available can be a time-consuming task for a librarian. A library management system improves the efficiency of a library's whole life cycle by allowing all tasks to be completed with a single click, making a librarian's job easier.

Data is an essential component of any educational institution, and library books are a valuable asset. Manual data management entails hazards such as data misplacement, data entry errors, and so on. We must properly document all library data to be easily accessible. They can save the whole catalogue, details of books issued, reissued, unreturned, and available in a single system, and retrieve it anytime needed with a few simple clicks by employing a library management system. They lower the chance of data loss while simultaneously ensuring security.

How it is useful?

It is the digital age of connectedness, and practically all processes in school management, from online applications to student results, have gone online. We must technologically connect college libraries to students' academic lives in the digital age. Students no longer need to physically visit the college library to check the availability of reference materials. Integrating college library software with student portals, whether via the college website or mobile apps.

This management systems allow system administrators to monitor the operation of the library department while also allowing librarians and users to maximize time and efficiency. Management would comprehend the task outline and fineness of several librarians using this type of technology. They also learn how well-maintained the record of issued books and fee collecting is, and management can track the money from penalties due to late book submissions.

The librarian and management will also receive reports, including a variety of useful data. We can create borrowing and lending reports in a variety of forms. Reports like these can help in decision-making. It also keeps track of all of the vendors and bookbinders.

A well-organized computerized library management system will increase the library's efficiency. This high-quality system should allow the librarian to oversee library resources, saving time and effort more effectively. After installation, such software requires relatively minimum maintenance because it is quick to implement and simple to set up.

1.3. SYSTEM REQUIREMNETS

1.3.1 HARDWARE REQUIREMENTS

A. SERVER SIDE

Operating System	Linux/Windows
Processor	Dual Core
Database	MYSQL

B. CLIENT SIDE

Operating System	Linux/Windows
Processor	1 Gigahertz
Ram	2 Gigabyte
Hard Drive	32 GB Or Above
Internet Connection	1 MB Or More

1.3.2 SOFTWARE REQUIREMENTS

A. SERVER-SIDE

Operating System	Linux/Windows
Web Server	Linux Server
Database	MYSQL
Programming Language	Html, CSS, JavaScript, PHP

B. CLIENT-SIDE

Operating System	Linux/Windows
Web Browser	Internet explorer-6, Mozilla Firefox, Chrome

1.4 PROBLEM STATEMENT

- To enhance the accessibility
- To enhance accuracy
- To enhance the management of data of the books store in database
- To enhance the management of time

1.5 OBJECTIVE

1. The objective of this project was to develop a library database system in which a user can supply books to the server, organize books by location, retrieve books from the server and query the server for books which contain specific keywords.

2. A library query will return a list of books and will show a list of locations where a keyword is found within each book. Returned results will be filtered to books that contain the specified context. By indexing the books, user queries can return results, in context, without having to search every row in the database.

3. The system should be able to handle large amounts of data efficiently.

4. Librarian is able to search record by using few clicks of mouse and few search keywords thus saving his valuable time.

1.6 MOTIVATION

The goal is to create a system that can provide Books to the student and teachers as well based on their individual needs. There are a number of motivations for developing such a system. First, it is very easy to find the books in the e-library management system. With the vast number of books that is available library room, it is becoming increasingly difficult for students and teacher to find the specific book that they are interested in. A e-library management system can help to solve this problem by providing users with user friendly interface. Second, a library management system can be used to increase student's satisfaction and retention. If a user is able to find books easily through the system, they are more likely to continue using the service. This can lead to increase the traffic to the college providing the library management system.

Library management systems help users find and select books (e.g., books, movies, restaurants) from the huge number of books available in the library. Given a large set of books of the user's needs, they present to the user a similar set of the books that are well suited to the title.

2. LITERATURE SURVEY

Sr. No.	PAPER NAME	AUTHOR NAME	YEAR	ALGORITHM / TECHNIQUES	RESULTS / ACCURACY	ADVANTAGES	DISADVANTAGES
1	Enactment of Smart Library Management System Exercising Ubiquitous Computing	C. Saranya , Veeramuthu Venkatesh	2014	RFID technology and Rule-based decision technique		library stood clearly as the first place to “begin” research and offered a number of options within its physical locations including “librarian, journal indexes or perhaps the more modern CD ROM”	limitation is that the system does not know the actual location of the book only the position where it is supposed to be located.
2	The Centrality of the Integrated Library Management System: a Strategic View of Information Management in an E-Service Environment	Laura Maquignaz, Jane Miller	2015	Divide and conquer	92%	New technologies and developments have altered the perceived link between information and libraries. For students of previous generations the library stood clearly as the first place to “begin” research and offered a number of options within its physical locations including “librarian, journal indexes or perhaps the more modern CD ROM”	Lifelong learning is the major educational movement discussed in relation to learners of this generation. Education as a continuing process throughout life in order to “maintain employment” coupled with the quest for “self improvement” and enhanced ability to solve

3	An Introduction to a Library material management and security control system - Radio Frequency ldentification (RFID) technology	Thanuja C. Ranawella	2016	automatic identification method		RFlD has the added advantage that it can also provide security for the range of different media on offer in libraries.	The major drawbacks of RFlD technology is its cost. While the readers and gate sensors used to read the information typically cost around Rs. 1 million each, the tag costs around Rs. 50.00 each
4	Global Research in Library Management from 2010 to 2020: A Bibliometric Investigation based on Scopus	Ankit Biswas, Dhruba Jyoti Borgohain	2021			it provides many opportunities and venues to manage the library and information services sustainably.	Libraries are basically paternalistic, service-oriented and not-for-profit organizations.
5	Implementing BRICKS, a Digital Library Management System	Nicola Aloia, Cesare Concordia, Carlo Meghini	2017	source selection algorithm		. Typical digital library tools, are the core applications that can have benefit in using BRICKS, especially those dealing with multimedia documents.	the query optimizer to limit the data transfer

6	Context-aware Library Management System using Augmented Reality	Nishant Malhotra , Aayushi Singh , J. DivyaKrishna , Kanika Saini , Neeraj Gupta	2018	detection algorithm		The major benefit of mobile devices for AR is that the technology is ubiquitous and easily accessible to consumers.	the application itself stores the entire model of the library so it may not be scalable to larger, real-world libraries. Another limitation is that the system does not know the actual location of the book only the position where it is supposed to be located.
7	A Security Mechanism for library management system using low cost RFID tags	Derek Hall , & Timothy SandsV.NagaLakshmi , I.Rameshbabu , D.Lalitha Bhaskari	2020	decryption algorithm.		RFID tags have several major advantages over optical barcode systems. Tag data may be read automatically, without line of sight, through non conducting materials such as paper or cardboard, at a rate of several hundred tags per second and from a range of several meters	problem readers have is reading a lot of chips in the same field. Tag clash occurs when more than one chip reflects back a signal at the same time, confusing the reader.
8	Research on Human-Computer Interaction Intention Recognition Based on EEG and Eye Movement	MINRUI ZHAO 1 , HONGNI GAO1 , WEI WANG1 , AND JUE QU	2020	Intention Recognition	93.54%	the identification of multiple physiological information intentions.	

9	Library Management System	Shanmugam A.P, Ramalakshmi, Sasthri, Baalachandran	2020			In the Library Management system, the librarian can add/update/remove the student and book details into the database. The students have a Unique ID for accessing any book from the library	They mainly concentrate on library lending for designing the construction of the model library.
10	ONLINE LIBRARY MANAGEMENT SYSTEM	NAMBURI SAI NAGA LAKSHMI PRASANNA, B.N.SRINIVASA GUPTA	2020			The proposed system is automated that is faster book, search for a book, renew a book, return a book and can send mails to the admin regarding any issue related to the books.	Maintaining the data in excel sheets and files is very hard to remember the file names in which the required data is feed. No easy access to the required queries. Data redundancy, inconsistency, lot of human work need to be done in order analyze the details present in the excel sheets.

11	Designing Web-based Library Management System	Tsega Weldu Araya, Ass. Pro. Adhana Mengsteab	2020			The advantage of using proper management in the information system and the sustainability of library systems. .	A database creates to store different kinds of files to the system. Although the database is designed to edit, delete, and to add documents at any interval of time
12	e-commerce logistics distribution path planning based on Improved Genetic Algorithm	Lan Lan	2022	hybrid search algorithm	high accuracy, low error and good convergence	Optimize the analysis of e-commerce logistics distribution nodes, establish a modern logistics distribution system, and optimize the total transportation time and transportation cost under the location model of the logistics distribution center.	The main disadvantage of this distribution method is that gradually strengthened.

3. SYSTEM DEVELOPMENT

3.1 Technologies Used

3.1.1 HTML

HTML is stands for **Hyper Text Markup Language** which is used for creating web pages and web applications. Let's see what is meant by Hypertext Markup Language, and Web page.

Hyper Text: HyperText simply means "Text within Text." A text has a link within it, is a hypertext. Whenever you click on a link which brings you to a new webpage, you have clicked on a hypertext. HyperText is a way to link two or more web pages (HTML documents) with each other.

Markup language: A markup language is a computer language that is used to apply layout and formatting conventions to a text document. Markup language makes text more interactive and dynamic. It can turn text into images, tables, links, etc.

Hence, HTML is a markup language which is used for creating attractive web pages with the help of styling, and which looks in a nice format on a web browser. An HTML document is made of many HTML tags and each HTML tag contains different content.

3.1.2 CSS

CSS stands for **Cascading Style Sheets**. It is a style sheet language which is used to describe the look and formatting of a document written in markup language. It provides an additional feature to HTML. It is generally used with HTML to change the style of web pages and user interfaces. It can also be used with any kind of XML documents including plain XML, SVG and XUL.

CSS is used along with HTML and JavaScript in most websites to create user interfaces for web applications and user interfaces for many mobile applications.

3.1.3 BOOTSTRAP

Bootstrap is the most popular HTML, CSS and JavaScript framework for developing a responsive and mobile friendly website. It is absolutely free to download and use. It is a front-end framework used for easier and faster web development. It includes HTML and CSS based design templates for typography, forms, buttons, tables, navigation, modals, image carousels and many others. It can also use JavaScript plug-ins. It facilitates you to create responsive designs.

3.1.4 JavaScript

JavaScript (js) is a light-weight object-oriented programming language which is used by several websites for scripting the webpages. It is an interpreted, full-fledged programming language that enables dynamic interactivity on websites when applied to an HTML document. With JavaScript, users can build modern web applications to interact directly without reloading the page every time. The traditional website uses js to provide several forms of interactivity and simplicity.

Features of JavaScript

- All popular web browsers support JavaScript as they provide built-in execution environments.
- JavaScript follows the syntax and structure of the C programming language. Thus, it is a structured programming language.
- JavaScript is a weakly typed language, where certain types are implicitly cast
- It is a light-weighted and interpreted language.
- It is a case-sensitive language.

3.1.5 php

PHP is stand for "PHP: Hypertext Pre-processor". A PHP file consists of texts, HTML tags and scripts with a file extension of .php, .php3, or .phtml. You can create a login page, design a form, create forums, dynamic and static websites and many more with PHP. PHP is an HTML-embedded, server-side scripting language designed for web development. It is also used as a general-purpose programming language.

PHP codes are simply mixed with HTML codes and can be used in combination with various web frameworks. Its scripts are executed on the server. PHP code is processed by a PHP interpreter. The main goal of PHP is to allow web developer to create dynamically generated pages quickly.

Key Features of php

- PHP stands for Hypertext Pre-processor.
- PHP is a server-side scripting language like ASP.
- PHP supports various databases like MySQL, Oracle, Sybase, Solid, PostgreSQL, Informix etc.
- PHP is an open-source software and it is free to download and use.

3.1.6 MySQL

MySQL is an open-source relational database management system. As with other relational databases, MySQL stores data in tables made up of rows and columns. Users can define, manipulate, control, and query data using Structured Query Language, more commonly known as SQL.

The “SQL” part of “MySQL” stands for “Structured Query Language.” SQL is the most common standardized language used to access databases. Depending on your programming environment, you might enter SQL directly (for example, to generate reports), embed SQL statements into code written in another language, or use a language-specific API that hides the SQL syntax.

3.1.7 XAMPP

XAMPP is an abbreviation where *X* stands for Cross-Platform, A stands for Apache, M stands for MYSQL, and the Ps stand for PHP and Perl, respectively. It is an open-source package of web solutions that includes Apache distribution for many servers and command-line executables along with modules such as Apache server, MariaDB, PHP, and Perl.

XAMPP helps a local host or server to test its website and clients via computers and laptops before releasing it to the main server. It is a platform that furnishes a suitable environment to test and verify the working of projects based on Apache, Perl, MySQL database, and PHP through the system of the host itself. Among these technologies, Perl is a programming language used for web development, PHP is a backend scripting language, and MariaDB is the most vividly used database developed by MySQL.

3.1.8 Visual Studio Code

Visual Studio Code, also commonly referred to as VS Code, is a source- code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Users can change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality.

3.2 SYSTEM OVERVIEW

Our Project Name is Library Management System. The domain is Web Development. In this project, we used Supervised learning. Here we use supervised machine learning algorithms to implement our logic. Here we use Divide and Conquer Algorithm. To use this algorithm, we use JavaScript and Php. We developed this project using different Technologies like HTML, CSS, Bootstrap, JavaScript, php and MySQL.

The system deployment Front view is implemented using HTML, CSS, BOOTSTRAP, JAVASCRIPT, the back end uses JavaScript and Php, the database uses MySQL for storage. The system is object-oriented to guarantee a system of high cohesion and improve development efficiency.

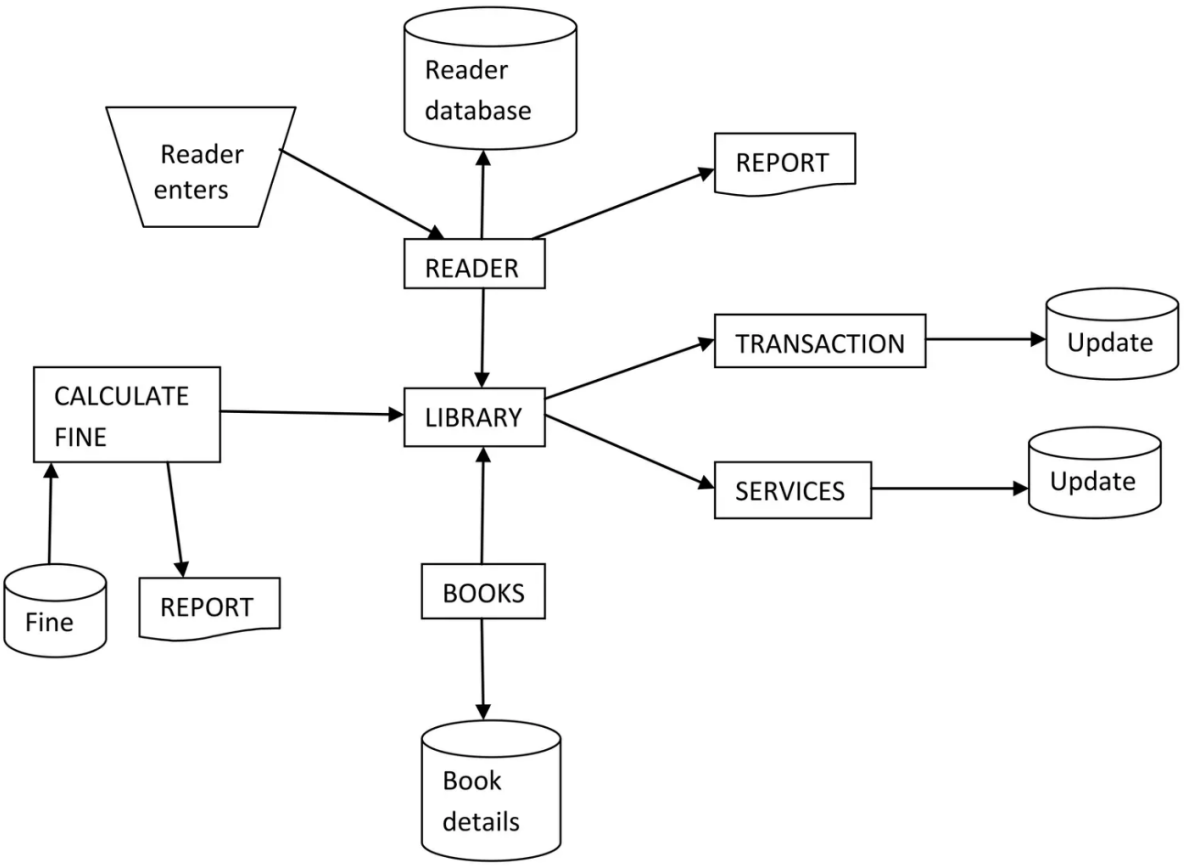
A library management system is software that is designed to manage all the functions of a library. It helps librarian to maintain the database of new books and the books that are borrowed by members along with their due dates.

This system completely automates all your library's activities. The best way to maintain, organize, and handle countless books systematically is to implement a library management system software.

A library management system is used to maintain library records. It tracks the records of the number of books in the library, how many books are issued, or how many books have been returned or renewed or late fine charges, etc.

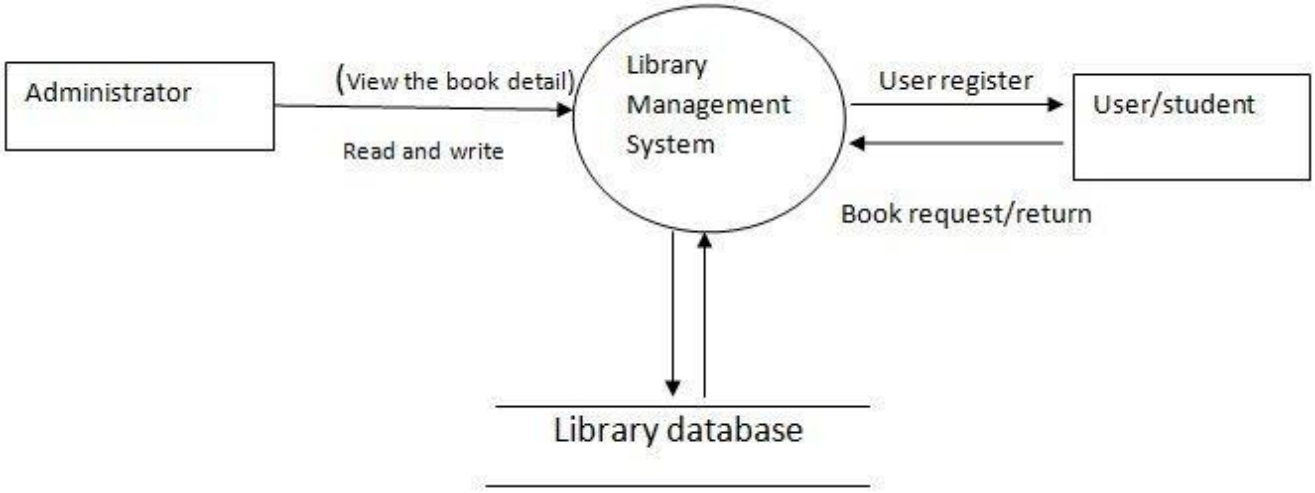
3.3 BLOCK DIAGRAMS

A. Overall System Architecture

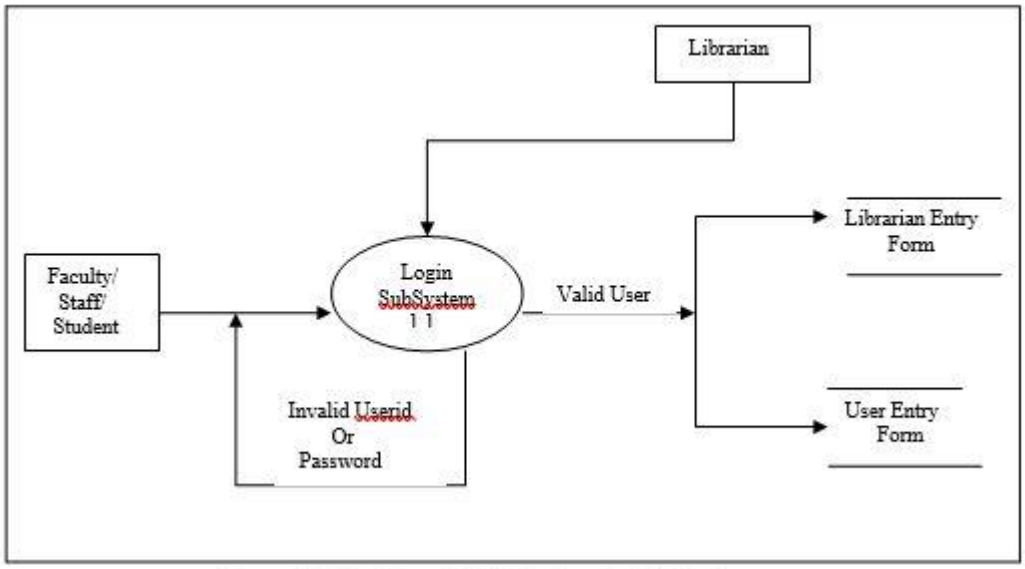


3.3 FLOWCHARTS

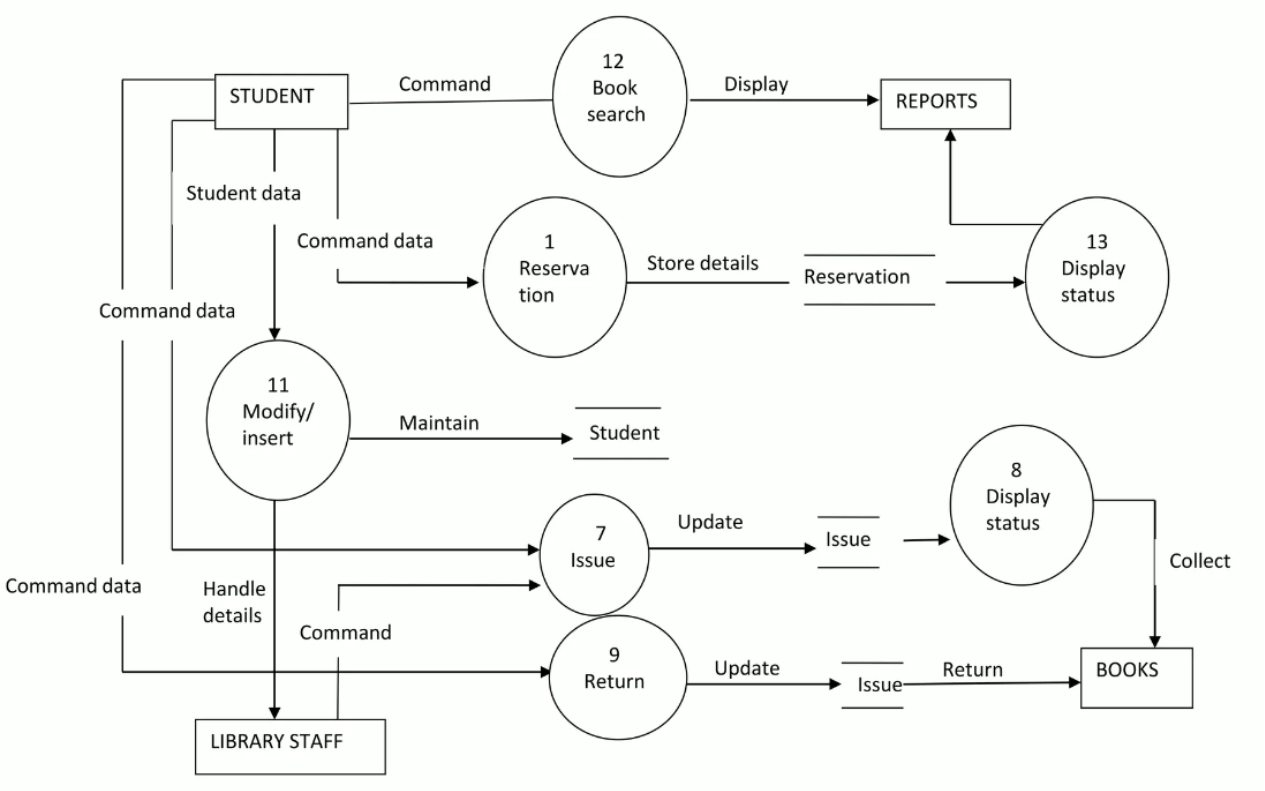
A. DFD-0



B. DFD-1



C. DFD-2


STUDENT
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12
Book
search
Display
REPORTS
Student data
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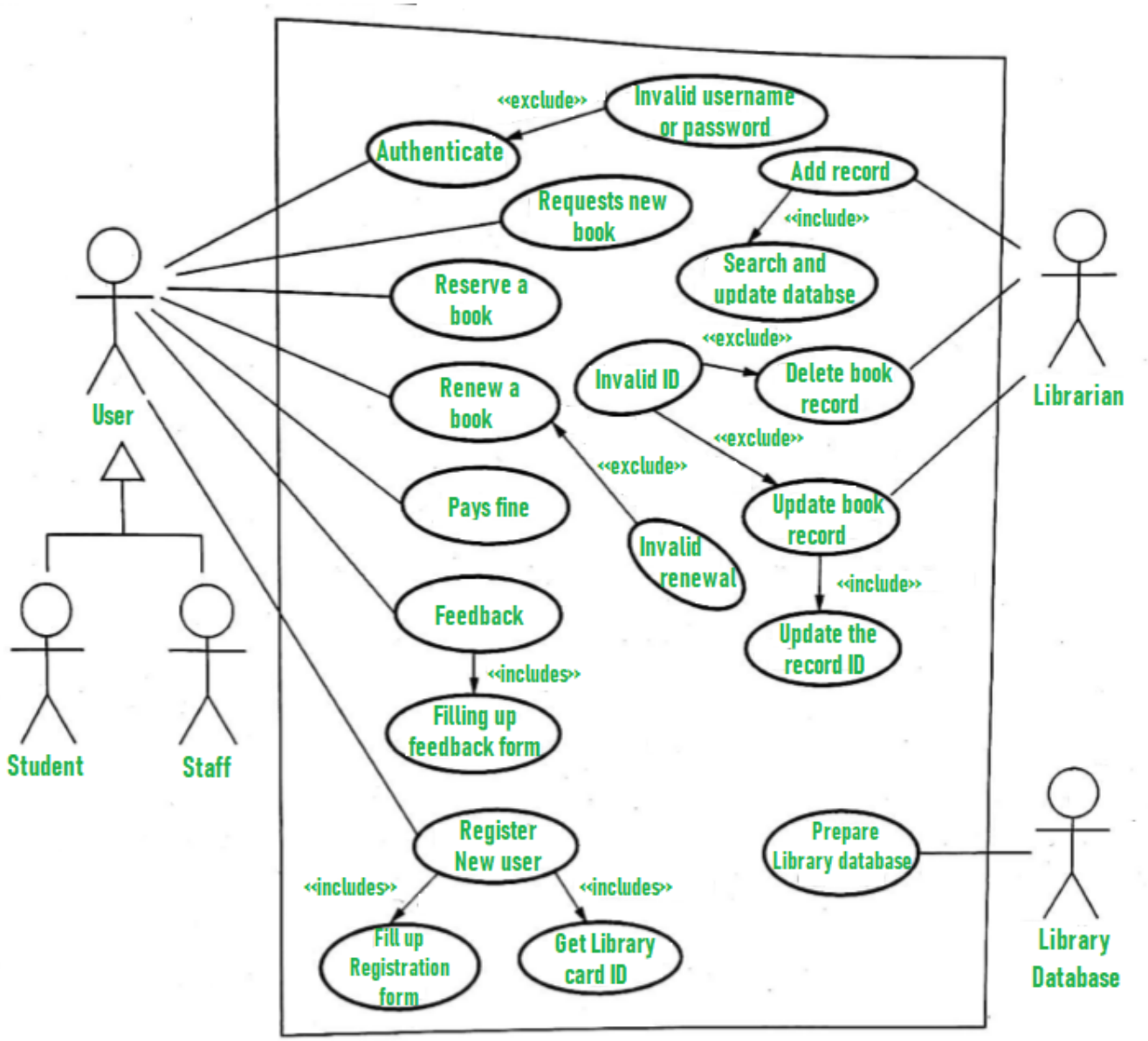
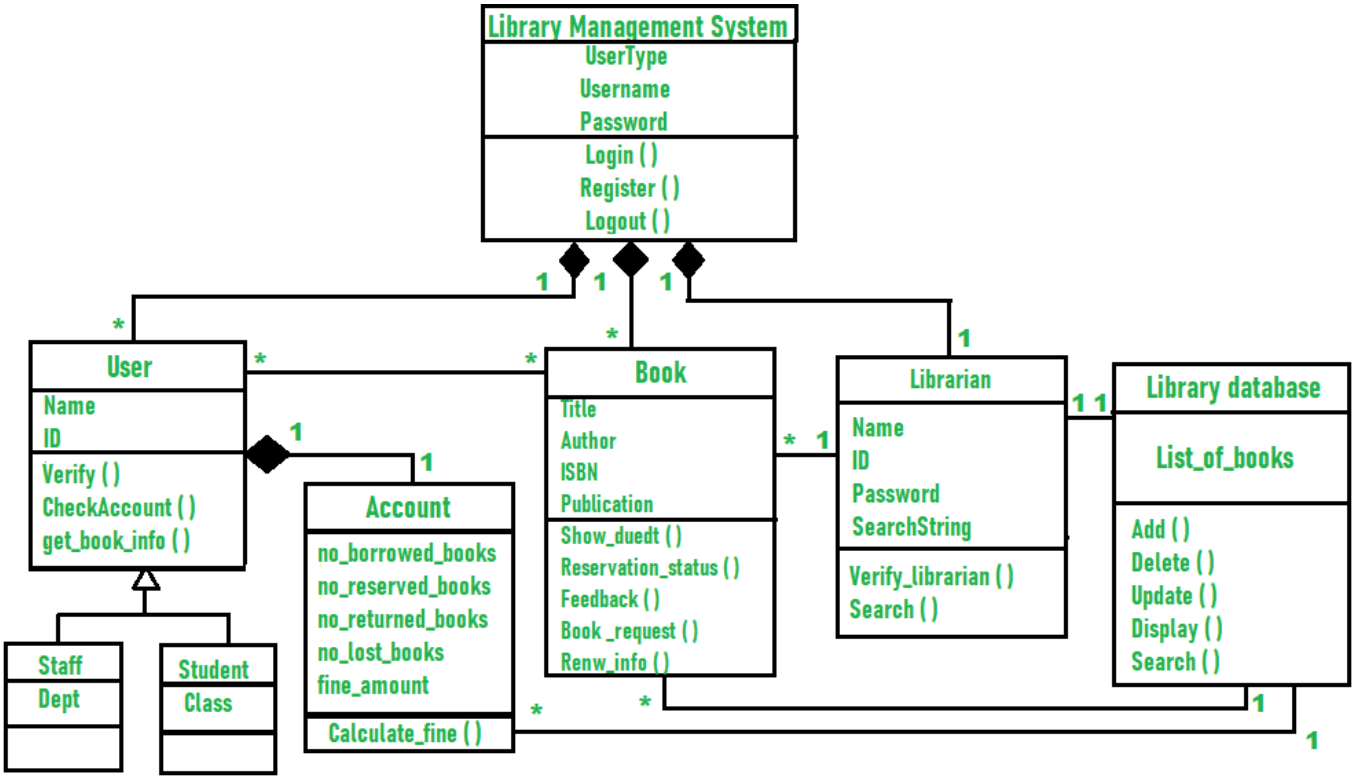
1
Reserva
tion
Store details
Reservation
13
Display
status
Command data
11
Modify/
insert
Maintain
Student
8
Display
status
7
Issue
Update
Issue
Collect
Command data
Handle
details
Command
9
Return
Update
Issue
Return
BOOKS
LIBRARY STAFF

D. Use Case Diagram



E. Class Diagram



3.4 ALGORITHMS

1. Login User/Admin

Step1: Enter the valid e-mail and password.

Step2: Fetching the details of the registered admin or user from the database.

Step3: If the e-mail and password is correct then the user or admin logged in or if the details are wrong then user must fill the valid details.

Step4: User or admin is logged in.

2. Register User

Step1: Enter the Required fields in the form.

Step2: The details filled in the form should be correct.

Step3: The required field data is going to store in the database.

Step4: The user can login with email and password that user enter in the form.

3. Issue Book

Step 1: Click on the issue book button in the user page

Step 2: Fill all the details in the form.

Step 3: Select the user, student or teacher.

Step 4: If book is available then book is issued.

Step 5: The data of the issue book form is going to store in the Database of the system so that admin the view the user's details.

4. PERFORMANCE ANALYSIS

4.1 TESTING

A. WEBSITE TESTING

We perform all the testing related website following tables shows all the testing measures.

Test id	Module name/page	Description	Action	Results	Status
LMS_01	Parameter Inputs	Section to input the parameters	Provides input box with Login Admin, Register user, login user.	Test Case: pass	Pass
LMS_02	Inputting numerical parameters	Rejection of numerical data	Doesn't accept numerical data	Test Case: pass	Pass
LMS_03	Login Admin and User and Register user	Means submitting the inputted values	Provides login, register button to submit the entered values	Test Case: pass	Pass
LMS_04	Parameter Inputs	Section to input the parameters	Provides input box with issue book	Test Case: pass	Pass
LMS_05	Inputting numerical parameters	Rejection of numerical data	Doesn't accept numerical data	Test Case: pass	Pass
LMS_06	Issue book	Means submitting the inputted values	Provides issue book to submit the entered values	Test Case: pass	Pass

B. System Testing

I performed all the testing related to proposed System functionality and I got the following results for all testing measures shown in below table.

Measures	Expected Output	Actual Output	Status
Logging in To admin and User Page	Logged in	Logged in	Pass
Register User	User is Registered	User is Register	Pass
Issue Book for Student/Teacher	Book issued	Book issued	Pass

4.2 JUSTIFICATION

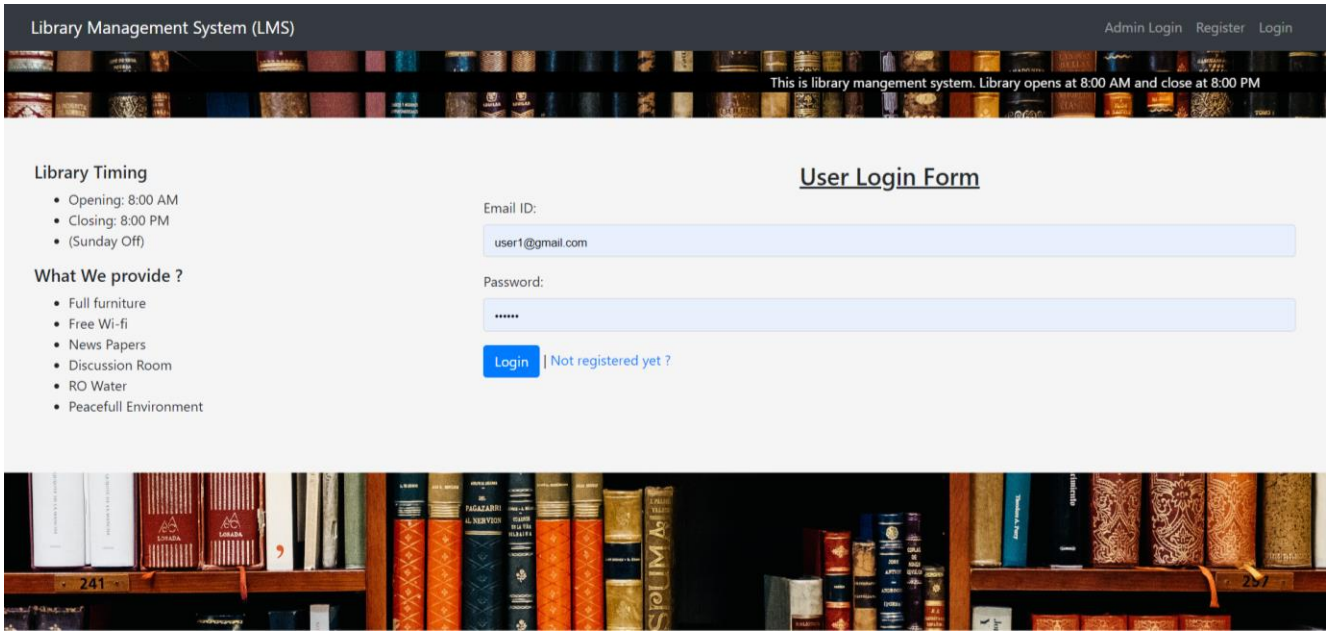
The result shows that all the elements of web development work as it should be. The results also show that the buttons are able to accurately works as they should be, even with some flexibility of customisation.

The input field in the form for the book issuing should be correct so that admin can check which user issue which book.

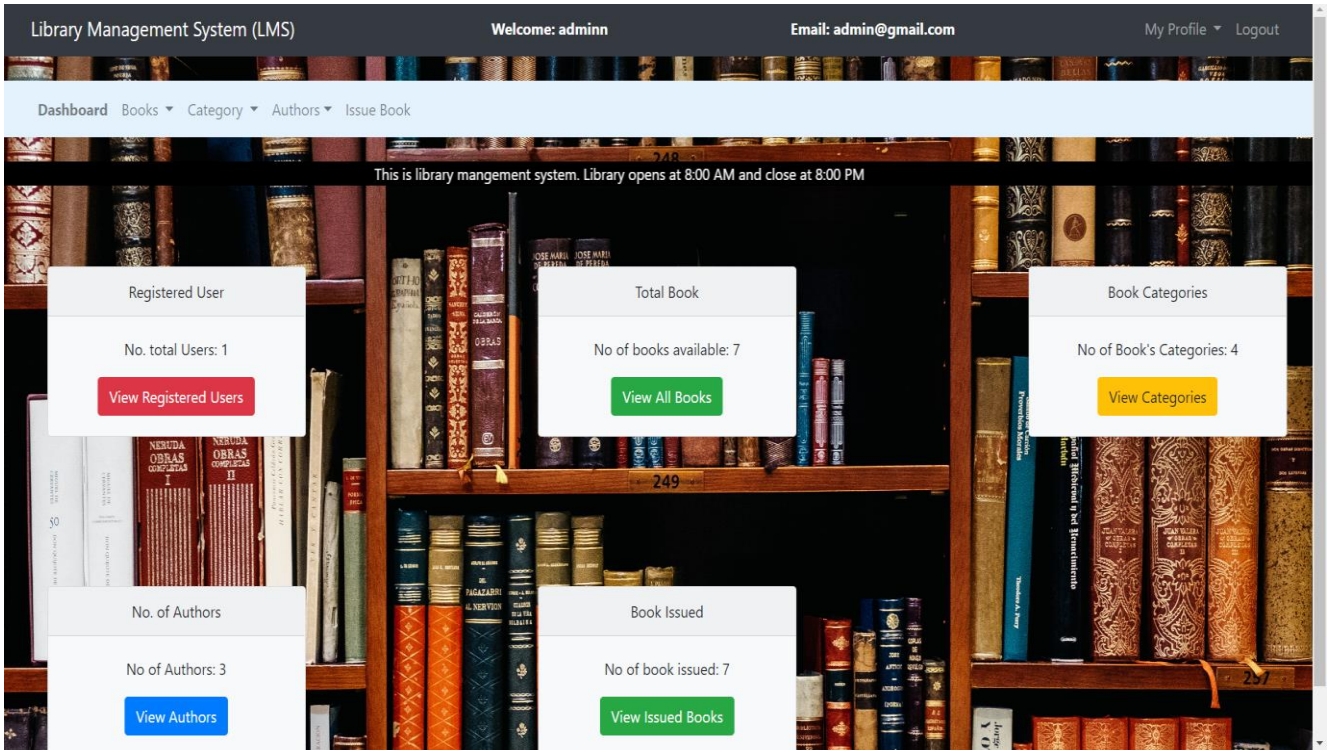
Since teachers also want to issue the book, they can also fill the form by selecting teacher in the field so that admin can understand that the teacher wants to issue the book not the student.

5. RESULTS

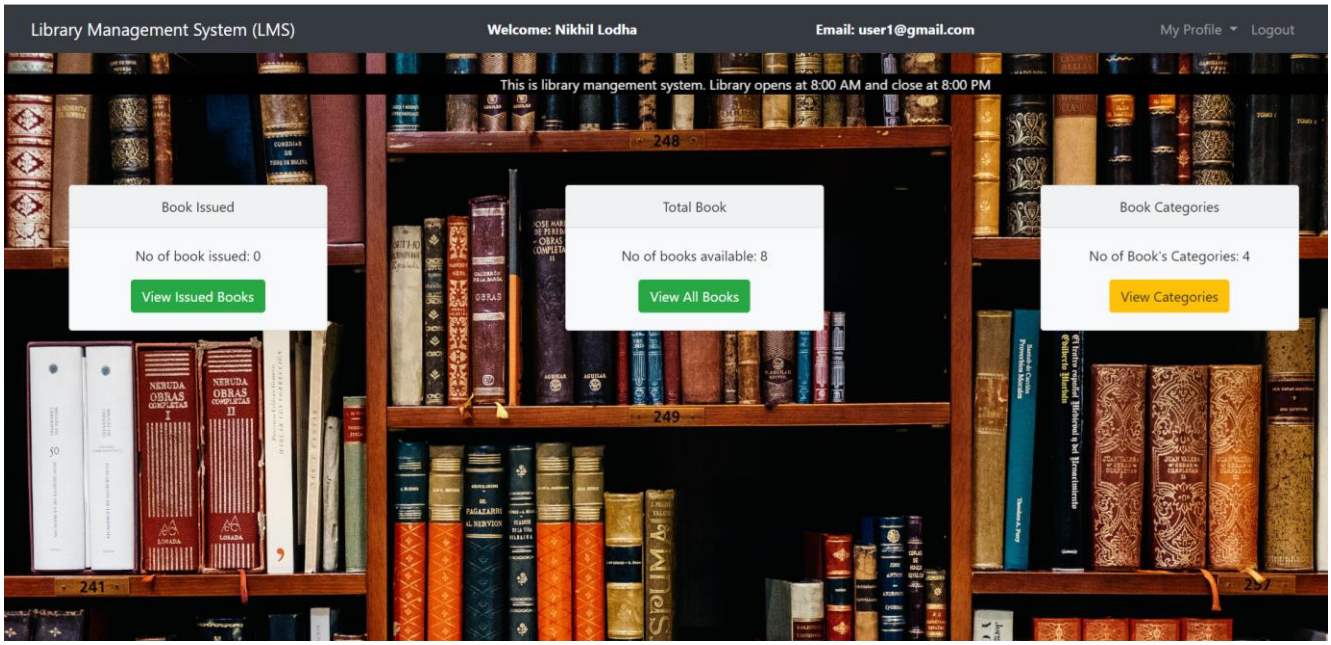
A. HOME PAGE OF SYSTEM



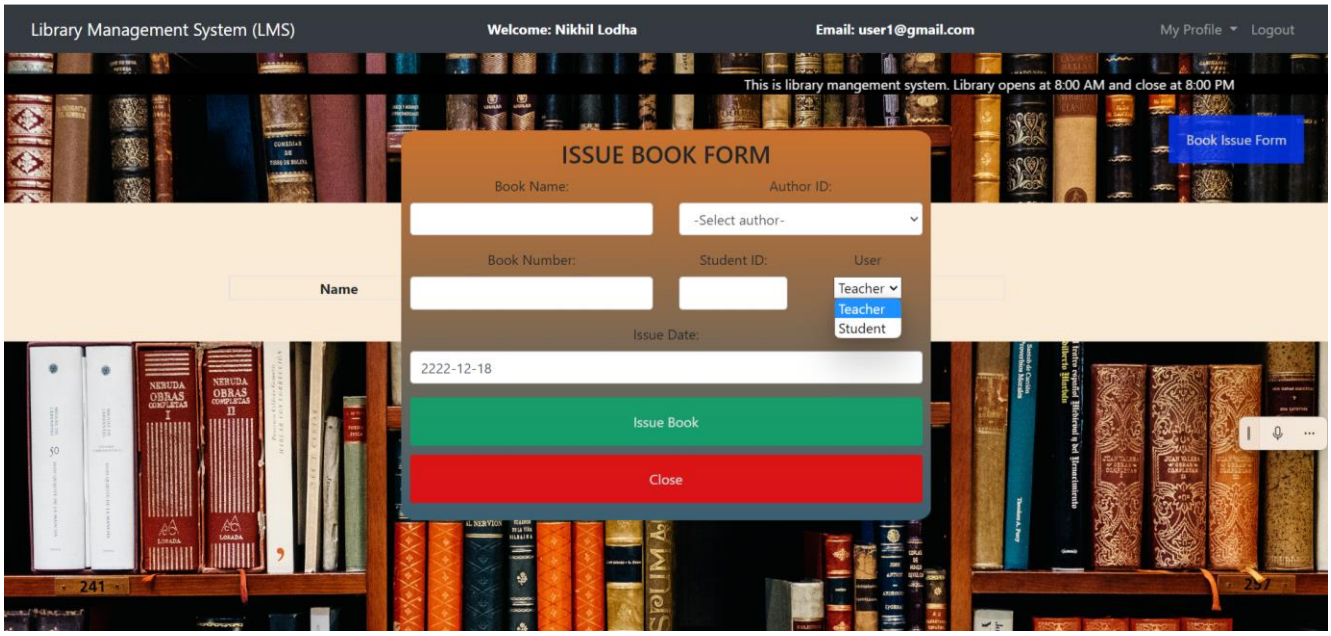
B. ADMIN PAGE OF SYSTEM



C. USERS PAGE OF THE SYSTEM



D. BOOK ISSUE FORM OF THE SYSTEM



6. CONCLUSIONS

6.1 CONCLUSIONS

In this project, we have implemented a book issue engine using simple form where student as well as teacher can also issue the books. In addition, a library management engine has been developed using different methods. This model is implemented in the JavaScript with php programming language.

The purpose of a library management system is to operate a library with efficiency and at reduced costs. The system being entirely automated streamlines all the tasks involved in operations of the library. The activities of book purchasing, cataloging, indexing, circulation recording and stock checking are done by the software. Such software eliminates the need for repetitive manual work and minimizes the chances of errors.

The library management system software makes the library a smart one by organizing the books systematically by author, title and subject. This enables users to search for books quickly and effortlessly.

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.

6.2 APPLICATIONS

- **Simple and easy to use**

  The Library Management Software is easy to use, simple, and adaptable to your current system. Its low-code no-code setup doesn’t require an IT head’s support.

- **Boost Learner’s Engagement**

  By giving students 24/7 access to library materials from any location at any time using smartphones and tablets, you can avoid frustration and tediousness. The librarian can manage all kinds of books, eBooks, journals, photos, videos, and events with the aid of library management software. The system allows sending triggers and notifications to users about the book due, fine, dues, etc.

- **Creates Smart Library**

  A well-organized library will succeed over one that isn't, as opposed to one that isn't neat, orderly, or systematic. You can organize and make your library smarter with the aid of library automation software. Through the use of effective search tools, the library management software enables you or your users to quickly locate a book in your library

- **Highly Secure, Scalable, and Reliable**

  The library management system benefits provide online and offline storage, automated backups, and easy upgrades to simplify and enhance the learning process with its efficient cloud data management. College libraries benefit from scalable infrastructure, role-based secure access, high performance, and reliability to ensure seamless access to library databases.

- **Student Become Better reader**

  Today have access to a wealth of information, but it is questionable how much of it is reliable. Giving children false or unreliable information ensures a less-than-favorable future. Therefore, it is essential that students have access to a library that is "organized" and "advanced" so they can find reliable information. The digital era necessitates digital strategies for integrating libraries into the academic lives of all students.

- **Customizability**

  The biggest advantage of library software is it's easy to configure. Institutions can work with their vendors in designing workflows that best fit their needs, with no fear of coding or programming knowledge.

6.3 FUTURE SCOPE

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 fulfils each users need in the best way possible.

In the future, we are going to test the system using more data and improve the accuracy of the system.

In addition, we will try to increase the accuracy of the Book search engine.

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7.1 REFERENCES

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