Library Management System

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Introduction

- A library is a collection of books, newspapers, magazines, videos, recordings, audio tapes and many other rich resources from which one can learn and understand concepts. It contains books related to different fields like academic books, economics, medical science, finance, mathematics, politics and many other different fields.
- ➤ In old time, mostly academic libraries are maintained by a particular staff of an institute but now everywhere there is a computerized system present so in my project I made this system more efficient and also add some more functionalities.

- ➤ In present time, most of the institute have a computerized system but still there are 30% schools and institute which do not have a computerized system. Out of those schools/institute which have a computerized system 90% of them do not have user access system.
- In my project, I made a web application which admin (librarian) and user (students) both can access and interact with each other. In this web application user can access the website, see which books are present in the library and can send issue/return request. On other side, admin can accept the request. And also, there is message facility present in my system through which they can admin can send reminder request before the return date of books. There are many other functionalities which I added in my project.

Motivation

The problem occurred before having computerized system includes:

• Difficult to search books

Academic libraries consist of large number of books. If there is no computerized system for users to see which books are present then this is a very tedious task.

• File lost

There is always a problem of file lost when there is no computerized system present. In the computerized system there is no such problem.

• Space consuming

Academic libraries contain large number of records therefore it needs a very large space to store each and every record. If the computerized system is present then we can easily store records in computer.

• File damaged

Files which contain records may lost due to some reasons like paper quality, spelling of water or due to some other natural disaster etc. But if we have computerized issue then there is no such issue.

• Cost consuming

As to store large number of records we also need huge amount of paper which can also effect our environment and also costly.

• Not user friendly

Some of the colleges have computerized library system but they are not allowed to access the website.

❖ I choose this problem because most of students in every college face this. No student wants to run from their hostel to check which books are available or not. To see the details of the books and also the details of all students is present on the website. So, they can visit the website to see all details.

Objective

Efficiency

This system is made to increase efficiency by implanting more facilities like making it user friendly, issue/return request.

Save time

User(students/faculty) can access the website to search books and records easily whether the required books are present in the library or not.

Message facility

Message facility is given to students and admins to interact with each other. Students can get reminder through message on user chat before returned date of every book.

User friendly

Students can visit website to see their details – all the books they issued, returned date and fine. Users can also view which books are available in library on website.

Book Recommendation

If the students find any book useful which can benefit others also then they can recommend that book for others.

No Need of library Card

Students can directly send requests issue/renew/request from the website only. There is no need to carry library card to issue them.

Literature Review

Before making this project, I read three recent important journals on Library management—system. All three journals help a lot me in understanding the design and structure of the library management system.

[1] Implementation of Automated Library Management System in the School of Chemistry Bharathidasan University using Koha Open Source Software

Objectives of this study: -

- To develop and updated database of Books and other Resources of the school of Chemistry Library, Bharathidasan University.
- To implement automated system using Koha Library Integrated Open Source Software.
- To carryout the charging and discharging functions of the circulation section more effectively.to provide various search options to know the availability of books in Library.
- To generate the list of books due by a particular member and also the overdue charges

[2] Ashutosh Tripathi & Ashish Srivastava / IOSR Journal of Engineering

- The purpose of the application is automation of library, it provide facilities to student required books and it allows the administrator or librarian to Issue & return books to students and can create & delete membership of students. The software Library Management System has four main modules.
- Insertion to Database Module User friendly input screen
- Extracting from Database module Attractive Output Screen
- Report Generation module borrowed book list & Available book list
- Search Facility system search for books and members

[3] International Journal of Creative Research Thoughts (IJCRT) ENHANCED LIBRARY MANAGEMENT SYSTEM.

The ELMS project is developing a computerized system in library management. As the modern organizations are computerized, This ELMS helps become essential for human being, commodity and computers in modern organization. An ELMS is an application which refers to library systems are generally small/medium in size. It helps the librarian to manage the library with the computerized system, by use of this system he can record various transaction like issue of books, return of books, adding of new student and adding of new student and more. Books and student maintenance modules are included in the system which keep track of the student using library and also describe about the books in library. Use of these ELMS there is no loss of book record/ member record, which generally happens when a noncomputerized system is used.

Methodology Used

System Architecture

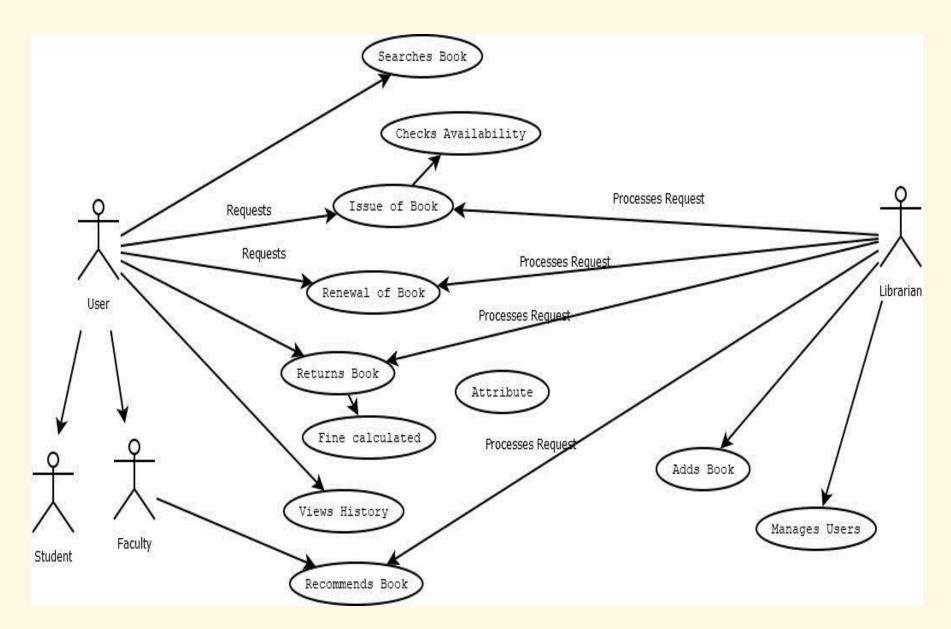
Mainly there are two main actors in my system – User and librarian. User can be students and faculty both.

Actor1 User (Student/Faculty):

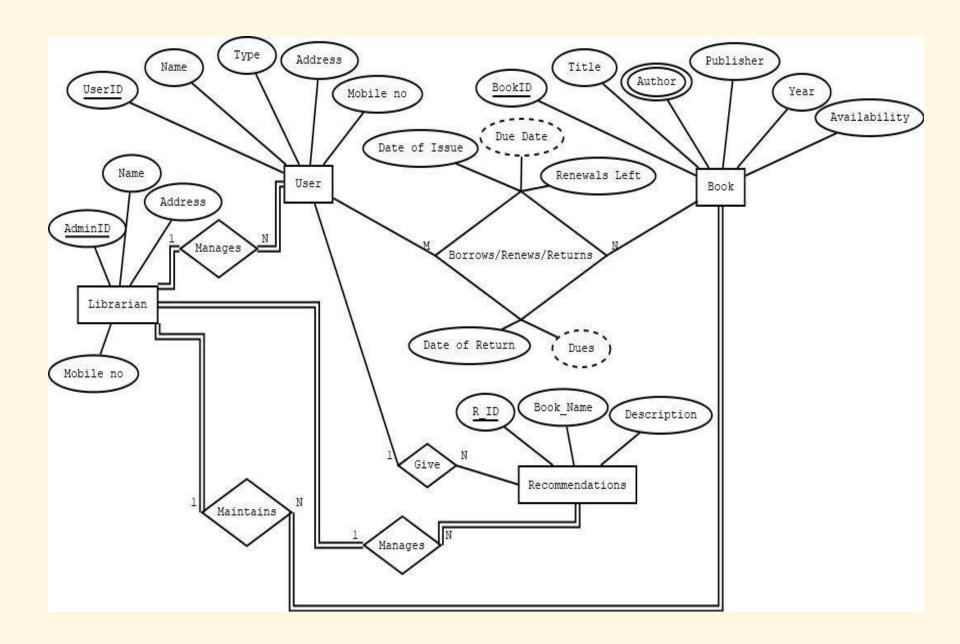
- User can search books in the library.
- Send issue/renew/return request of books.
- Issue also include check availability functionality.
- After returning book fine is calculated.
- User can see the history of the books he issued previously.
- If the user finds any book interesting /useful, he can recommend that book for other students.

Actor2 Admin (Librarian):

- Librarian processes issue, renew, and return requests that comes from the user.
- He can also process the requests for book recommendation.
- Librarian can add new books to the library.
- He can also manage all the users.

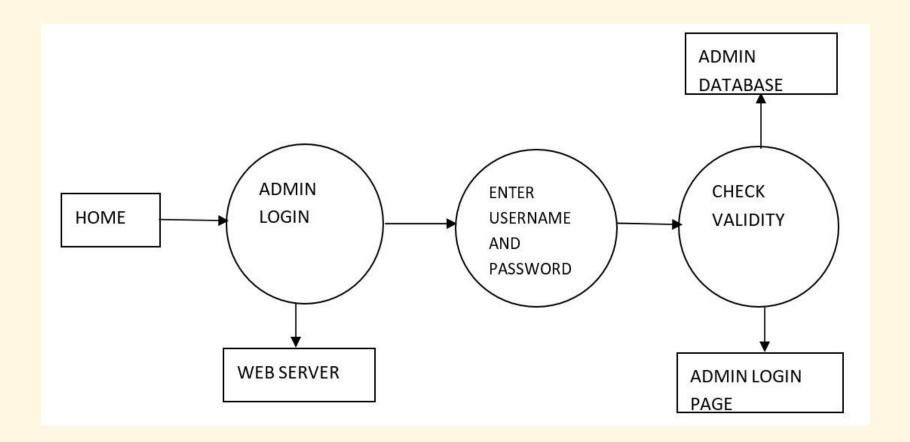


Context flow Diagram for LMS

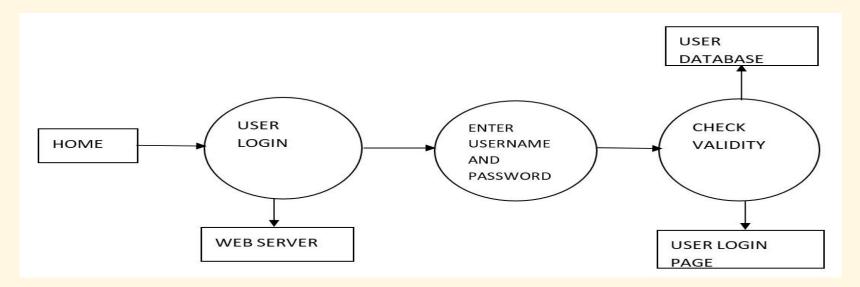


Entity Relationship Model

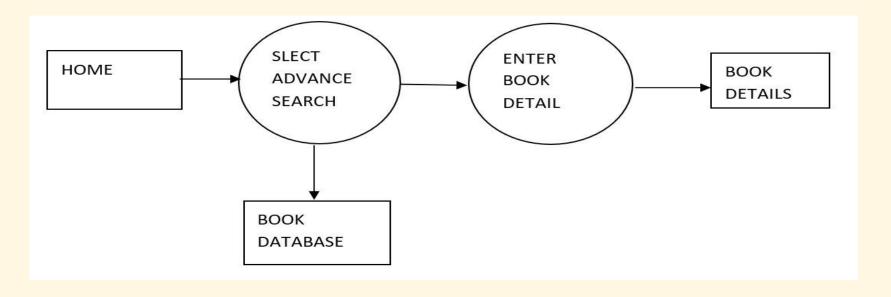
Block Diagrams



Dataflow Diagram for admin login



Dataflow Diagram for User login



Dataflow Diagram for book search

Methodology

The whole project is divided into three sections: Home page, User dashboard, Admin Dashboard.

≻ Home page:

First, I create the home page. This home page consists of sign-up/sign-in sections. First time the user has to sign-up by filling all the details (Name, Email, Password, Phone no., Roll number, category)

Then the admin and user next time can login with Roll no. and Password. If any of them entered is wrong then dialogue box appears with Incorrect Roll no. and password.

> Admin Dashboard

<u>Home:</u> After login using admin roll no. and password Admin home page appears where admin details is visible, he/she can update details using button Edit details.

<u>Message:</u> Admin can send message to user for reminding before the return date of book or for any other information.

Mange Students: Admin can see the details of all its users in mange student section.

<u>All Books:</u> This section contain all books present in the library. There is also an option for admin to update details.

Add Books: Student can add new books to library by filling book title, author, Publisher, Publication year and a number of copies.

<u>Issue/Return request:</u> It contain three sections issue requests, renew requests and return requests. Issue request contains all the requests made by the user to issue the book. Renew requests contain all the requests made by the user to renew books which they already issued. Return request contain all the requests made by the students to return the books.

<u>Book Recommendation:</u> This section contains all the books recommend by different students and its description and students Roll no.

<u>Currently issued book</u>: It contains all the books issued by students (Roll no., Book ID, Book name, Issue date, Due date, Dues).

Logout: From here admin can return to the Home page.

User Dashboard

Home: After login using user roll no. and password user home page appears where user details is visible, he/she can update details using button Edit details.

Message: User will get the message if his issue/renew/return request get accepted. User can also get reminder for before return date of every book.

<u>All books</u>: User can see all books present in the library and their details. If he wants to issue, he/she can issue books by clicking on issue button.

Previously Borrowed books: It contains the history of all the books that the user issued previously.

Recommend Books: Students can recommend books to other students if they find useful using book title and description.

Currently issued book: It contains all the books currently issued by that user.

Logout: From here user can return to the home page.

Implementation Details – setup & tools

OPERATING SYSTEM: Window 10

NOTEPAD: Need for writing codes (HTML, CSS, JavaScript, PHP, MySQL)

PhpMyAdmin: Control panel from where we can manage the database that we have created.

XAMPP: XAMPP uses folders in htdocs to execute and run PHP sites. Xampp is used for php-database connectivity.

Front-end is designed using HTML, CSS, PHP, JavaScript.

Back-end is designed using MySQL which is used to design the Database.

Testing

Software Testing is done at the module level or at the phase level of SDLC (Software development Life cycle). Software Testing is the result of the software against requirement made by the user.

The testing is done manually by the developer himself. We have not opted for the automated testing tools as our software is not prepared at the industrial level.

The developer prepared the test cases for different sections and level of code. It took a bit of time for executing the test cases and find errors in the code. After the error was find its solution is prepared and implemented by the developer.

Unit Testing

Developer perform while coding performs some task on the individual unit of the system to check whether it is error free or not.

Integration Testing

If the units of software are working fine individually (error free), there is a need to check if the units if integrated together would also work working fine without errors.

System Testing

After integration testing, the software is compiled as product and then it is tested as a whole to check whether it is satisfying all the requirements or not. System Testing can be done by functionality testing (testing all functionalities as per the requirements) and its performance that is how efficiently the software is working.

After going through tests, it was proved that the system was free from errors, faults and failures. And it is ready to go live and help the schools/institutes in need.

Result and Discussion

LMS Database Tables

User

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra	Action			
1	RollNo 🔑	varchar(50)	latin1_swedish_ci		No	None			Change	Drop	Y	More
2	Name	varchar(50)	latin1_swedish_ci		Yes	NULL			Change	Drop	~	More
3	Туре	varchar(50)	latin1_swedish_ci		Yes	NULL			Change	Drop	~	More
4	Category	varchar(50)	latin1_swedish_ci		Yes	NULL			Change	Drop	v	More
5	Emailld 🔑	varchar(50)	latin1_swedish_ci		Yes	NULL			Change	Drop	·	More
6	MobNo	bigint(11)			Yes	NULL			Change	Drop	V	More
7	Password	varchar(50)	latin1_swedish_ci		Yes	NULL			Change	Drop	¥	More

Book

#	Name	Туре	Collation	Attributes	Null	Default 0	Comments	Extra	Action			
1	Bookld 🔑	int(10)			No	None		AUTO_INCREMENT	Change	Drop	~	More
2	Title	varchar(50)	latin1_swedish_ci		Yes	NULL			Change	Drop	~	More
3	Publisher	varchar(50)	latin1_swedish_ci		Yes	NULL			Change	Drop	~	More
4	Year	varchar(50)	latin1_swedish_ci		Yes	NULL			Change	Drop	~	More
5	Availability	int(5)			Yes	NULL			Change	Drop	~	More

Message

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra	Action		
1	M_ld 🤌	int(10)			No	None		AUTO_INCREMENT	🥜 Change 🥞	Drop	■ More
2	RollNo 🔑	varchar(50)	latin1_swedish_ci		Yes	NULL			🧷 Change 🥞	Drop	
3	Msg	varchar(255)	latin1_swedish_ci		Yes	NULL			Change @	Drop	✓ More
4	Date	date			Yes	NULL			Change @	Drop	♥ More
5	Time	time			Yes	NULL			Change @	Drop	₩ More

Author

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra	Action		
1	Bookld 🄑	int(10)			No	None			Change	Drop	▼ More
2	Author 🔑	varchar(50)	latin1_swedish_ci		No	None			Change	Drop	▼ More

Record

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra	Action			
1	RollNo 🔑	varchar(50)	latin1_swedish_ci		No	None			Change	Drop	Y	More
2	Bookld 🔑 🔑	int(10)			No	None			Change	Drop	~	More
3	Date_of_Issue	date			Yes	NULL			Change	Drop	~	More
4	Due_Date	date			Yes	NULL			Change	Drop	v	Моге
5	Date_of_Return	date			Yes	NULL			Change	Drop	₹	More
6	Dues	int(10)			Yes	NULL			Change	Drop	~	More
7	Renewals_left	int(10)			Yes	NULL			Change	Drop	Ψ	More
8	Time	time			Yes	NULL			Change	Drop	~	More

Recommend

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra	Action	
1	R_ID 🤌	int(10)			No	None		AUTO_INCREMENT	Change	Drop More
2	Book_Name	varchar(50)	latin1_swedish_ci		Yes	NULL			Change	⊜ Drop
3	Description	varchar(255)	latin1_swedish_ci		Yes	NULL			<i>₯</i> Change	⊜ Drop ▼ More
4	RollNo 🔑	varchar(50)	latin1_swedish_ci		Yes	NULL			Change	Drop - More

Renew

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra	Action		
1	RollNo 🔑	varchar(50)	latin1_swedish_ci		No	None			Change	Drop	▼ More
2	Bookld 🔑 🔑	int(10)			No	None			Change	Drop	▼ More

Return

#	Name	Туре	Collation	Attributes	Null	Default	Comments	Extra	Action			
1	RollNo 🔑	varchar(50)	latin1_swedish_ci		No	None			Change	Drop	V	More
2	Bookid 🔑 🔑	int(10)			No	None			Change	Drop	₹	More

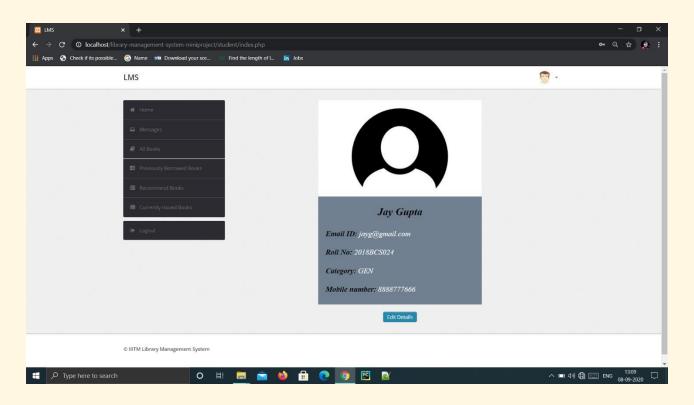
Outputs/Results

SIGNIN And SIGNUP PAGE: First New user (student) can sign-up by filling all their details name, email, password, phone no, roll no and category. Next time they can easily sign-in through their roll no and password.



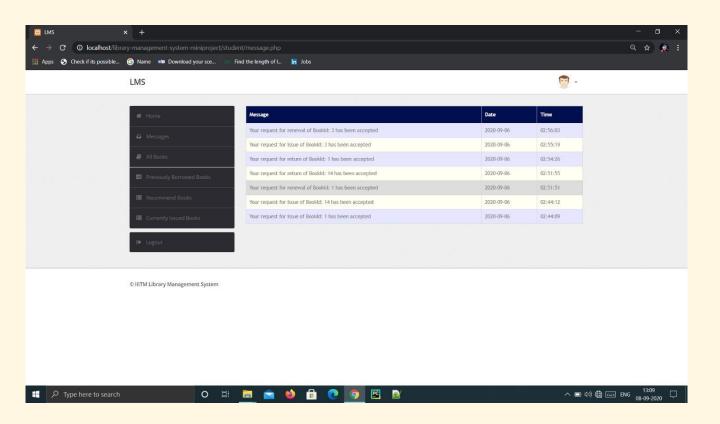
STUDENT SECTION

➤ Home: User(student) Home page contains all their details (Email-id, Roll-no, Category, Mobile no.) and they can also update their details by clicking on Edit details.

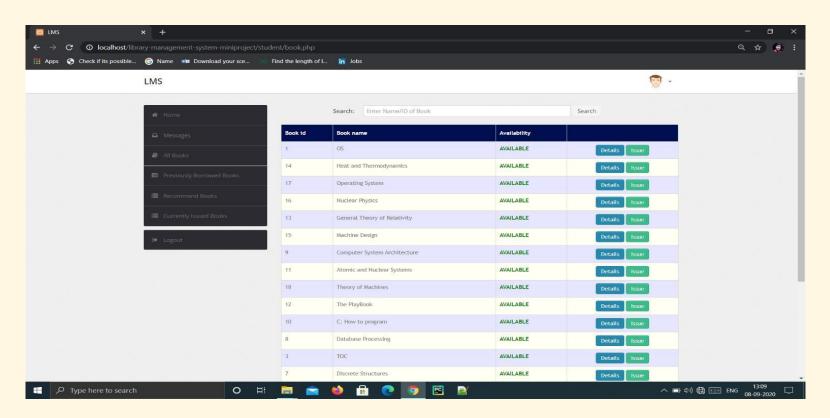


> Messages:

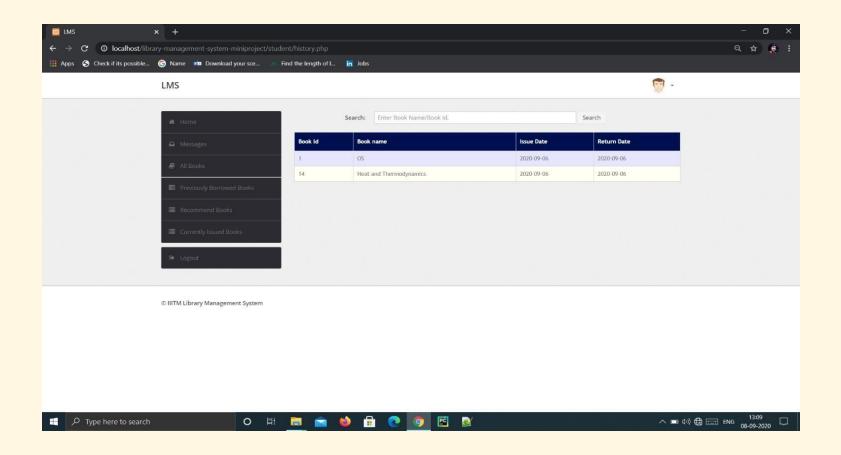
User can see message send by the admin in the message section. Students will also get reminder for each book before return date through message.



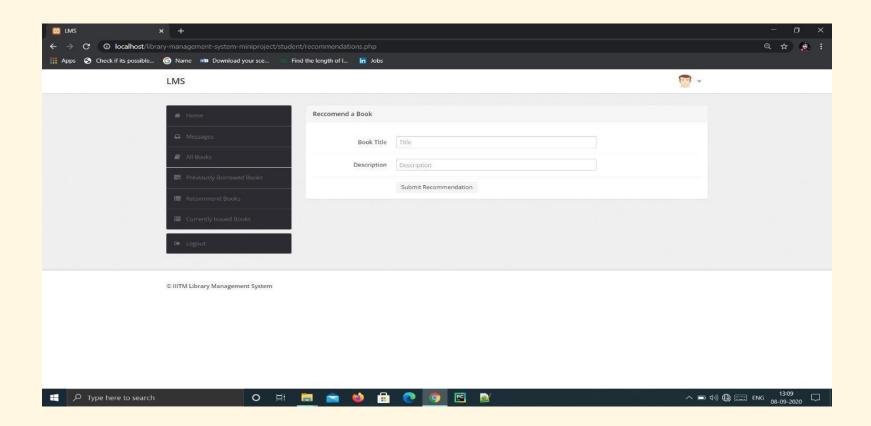
➤ <u>All Books:</u> User can see all the books present in library in the 'All BOOKS' section. They can see books details by clicking on details and can send issue request to admins.



➤ <u>Previously Borrowed Books</u>:. Users can see their previously issued books history in 'previously borrowed books' section.

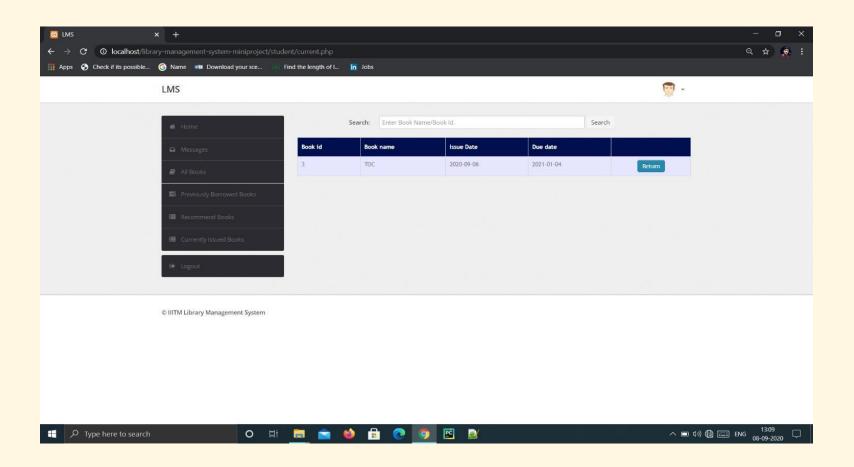


➤ **Recommend Books**: If the user finds any book useful they can recommend a book to admin by sending book title and its description.



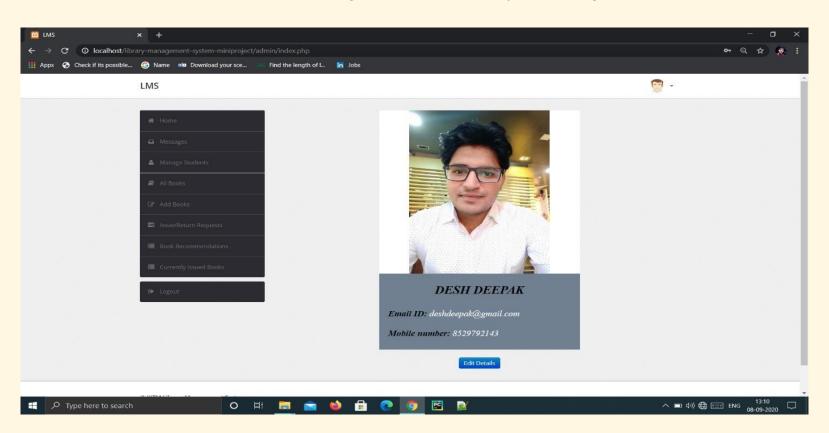
> Currently issued book:

User can view their currently issued books the 'currently issued book' section. They can also renew or return that book by clicking on renew and return button.



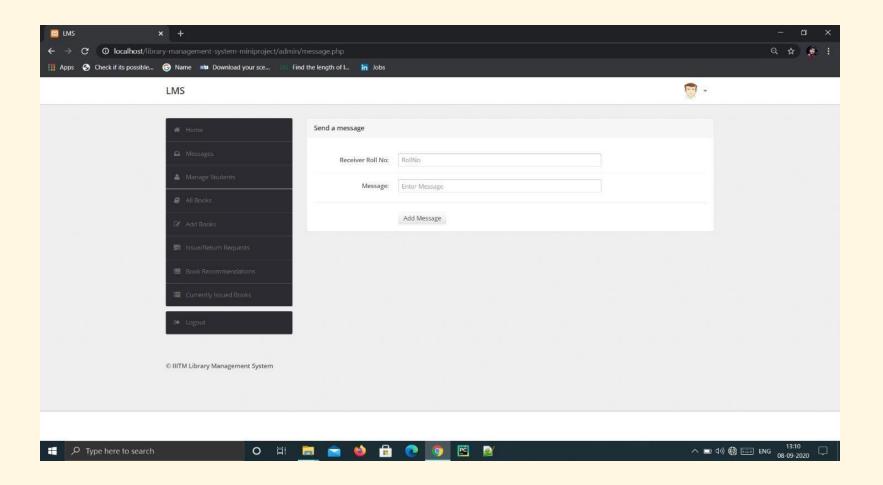
ADMIN SECTION

➤ Home Page: Admin can see all their details (email-id, mobile number) in the Home section and can also change their details by clicking on 'Edit details'.

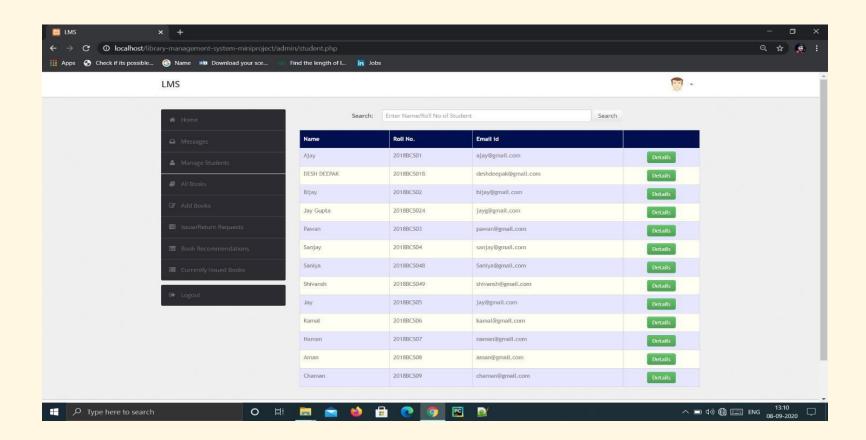


> Message:

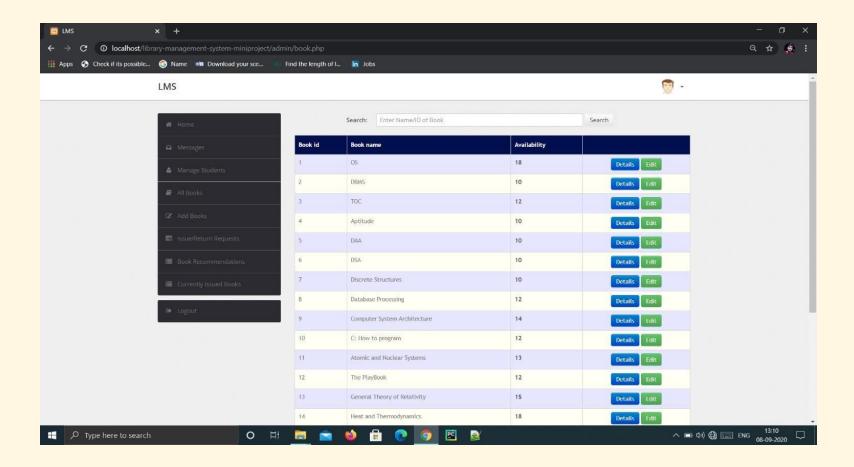
Admin can send reminder to students or interact with them by sending message.



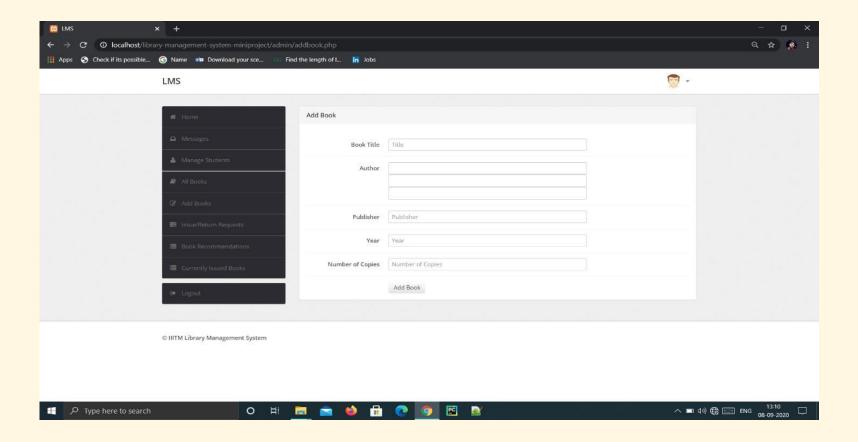
➤ <u>Manage students</u>: Admin can manage students, see all their details in the 'manage book' section.



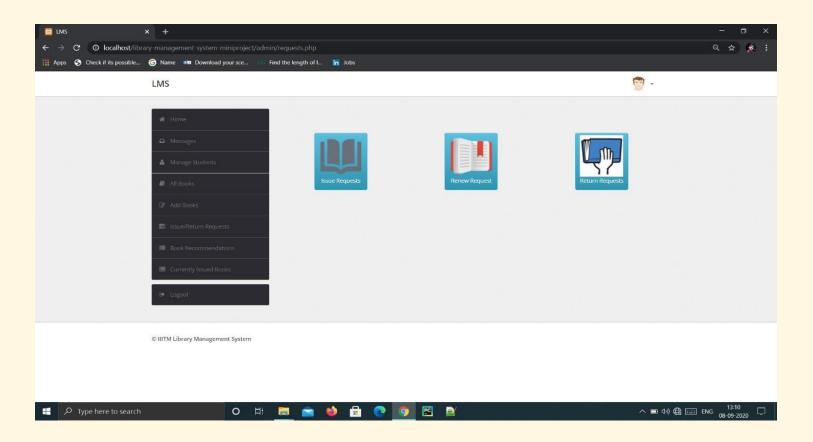
All Book: Admin can see all books and the no of copies available, all their details present in the library and can also update details by clicking on update details.



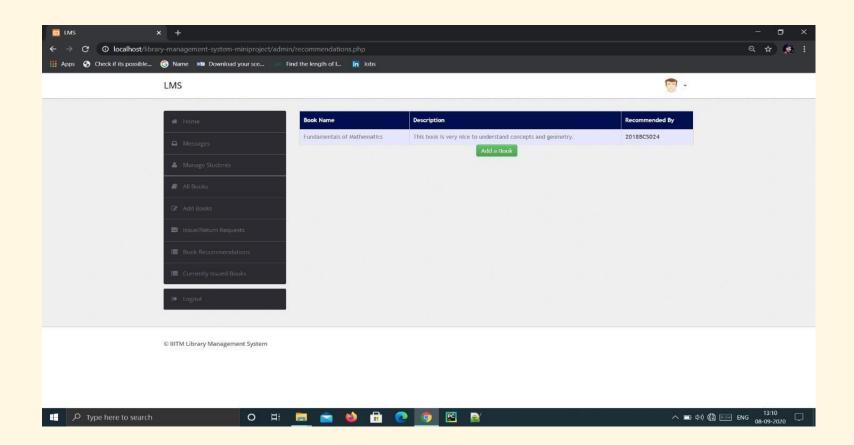
Add books: Admin can add new books by entering its details (book title, author, publisher, year, no of copies).



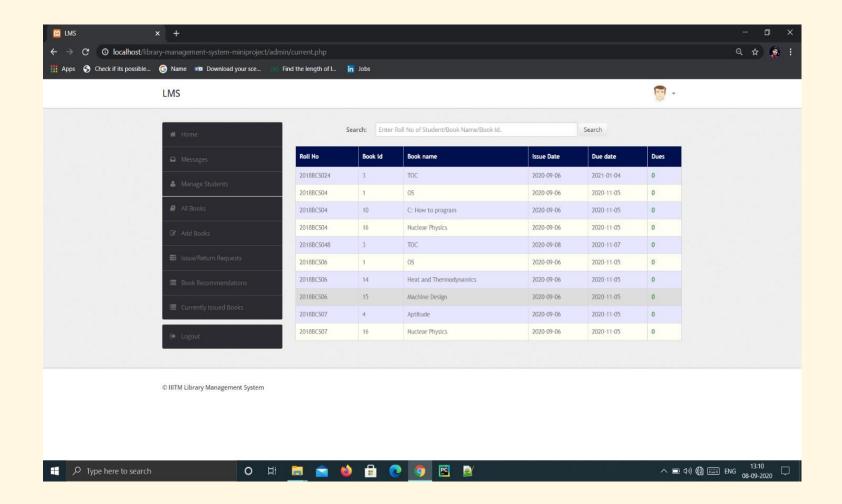
➤ <u>Issue/Return Requests:</u> Admin can see Issue ,renew, return requests in 'Issue/return request' from students and grant access to students by accepting their requests.



Book Recommendations: Admin can see all the book recommendation the book Recommendation section and also the student roll no who recommend that book.



Currently Issued Books: In currently issued book section admin can see all details of books issued by different students.



Future Activities

For further research work to be carried out. I hereby suggest the following: -

- University library should be developed to support audio, video and a diagrammatic aid to learning.
- ❖ One of the major future scope is connecting libraries to a common data centre will provide globalization to the libraries, and then the user will able to search books all over the city and nearby areas.
- ❖ Diagrammatic representation as a lecturing aid should be included in a University Library.
- *Facility of an online notice board where teachers and students can put up information about workshops and seminars can be added.

References

[1]Implementation of Automated Library Management System in the School of Chemistry Bharathidasan University using Koha Open Source Software Neelakandan.B, Duraisekar. S, Balasubramani.R, Srinivasa Ragavan.S

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[6]MySQL AB. "What is MySQL?, MySQL 5.1 Reference Manual". [wwwdocument] available at: http://dev.mysql.com/doc/refman/5.1/en/Retrieved 19.03.2010

[7]PHP learning(https://www.w3schools.com/php/DEFAULT.asp)

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THANK YOU