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"Jnana Sangama", Belagavi-590018

WEB TECHNOLOGY MINI PROJECT

REPORT ON

"COLLEGE LIBRARY MANAGEMENT"

Submitted in partial fulfillment of the requirements for the award of the degree of

BACHELOR OF ENGINEERING

IN

COMPUTER SCIENCE AND ENGINEERING

Submitted by

JYOTHEESH A (1KG16CS041)

Under the Guidance

SANTHOSH KUMAR S
Assistant Professor.

SANDEEP H
Associate Professor

Department of CSE
K.S.S.E.M

Department of Computer Science &Engineering
K. S. SCHOOL OF ENGINEERING AND MANAGEMENT
#15, Mallasandra, off. Kanakapura Road, Bengaluru – 560109

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K. S. SCHOOL OF ENGINEERING AND MANAGEMENT
BENGALURU - 560109

Department of Computer Science &Engineering

CERTIFICATE

This is to certify that the **WEB TECHNOLOGY MINI PROJECT** entitled **"COLLEGE LIBRARY MANAGEMENT"** presented by **Mr. Jyotheesh A, USN: 1KG16CS041** of **VII semester** in partial fulfillment of the award of Bachelor of Engineering in **Computer Science & Engineering** in Visvesvaraya Technological University, Belagavi during the academic year **2019-2020**. The **WEB TECHNOLOGY MINI PROJECT** has been approved as it satisfies the academic requirements in respect of **Web Technology Laboratory with Mini Project** (15CSL77) prescribed for the Bachelor of Engineering degree.

Mr.SANTHOSH KUMAR.S	**Mr. SANDEEP.H**	**Prof. VEENA R.S**	**Dr. K. RAMA NARASIMHA**
Assistant Professor,CSE	**Associate Prof,CSE**	**Associate Prof.&Head, CSE**	**Principal / Director**
K.S.S.E.M., Bengaluru	**K.S.S.E.M,Bengaluru**	**K.S.S.E.M,Bengalore**	**K.S.S.E.M., Bengaluru**

Name of the Student: **JYOTHEESH A**

USN: **1KG16CS041**

Signature of the Student:

Name of the examiners **Signature with date**

1. _____ _____

2. _____ _____

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JYOTHEESH A (1KG16CS041)

ABSTRACT

Library is a collection of sources of information and similar resources, made accessible to a defined community for reference or borrowing. Thus, the process of handling a library manually is very troublesome and clumsy. As regards to this point of view, we plan to develop a computerized system for handling the activities of library management in a comprehensive way to lessen physical labor and reduce complexity of the manual system.

In this project, we plan on adding many features which are generally not available in a library management system. It will have features like user login, faculty login and admin login. It will also have a facility where student after logging in their accounts can see list of books issued and its issue date and return date and the students can request the librarian to add new books through a request link.

Overall this project is being developed to help the students as well as staff of library to maintain the library in the best way possible and reduce the human efforts.

TABLE OF CONTENTS

	Acknowledgement	i
	Abstract	ii
	Table of Contents	iii
	List of Figures	iv
Chapter 1	**INTRODUCTION**	01-02
1.1	Motivation	01
1.2	Problem Statement	01
1.3	Existing System	01
1.4	Proposed System	02
Chapter 2	**LITERATURE SURVEY**	03-05
2.1	Digital Library	03
2.2	Review of Literature	03
Chapter 3	**SYSTEM REQUIREMENT SPECIFICATION**	06-07
3.1	Overall Description	06
3.2	Specific requirements	06
Chapter 4	**DESIGN**	08-15
4.1	Input Design	08
4.2	Output Design	08
4.3	System Architecture	09
4.4	Sequence Diagram	09

4.5	Data Flow Diagrams	10
4.6	Use Case Diagram	14
Chapter 5	**IMPLEMENTATION AND TESTING**	16-22
Chapter 6	**SCREEN SHOTS**	23-32
Chapter 7	**CONCLUSION**	33
Chapter 8	**FUTURE ENHANCEMENTS**	34
	REFERENCES	35

LIST OF FIGURES

4.1	System Architecture	9
4.2	Sequence Diagram	10
4.3	Zero Level DFD	11
4.4	First Level DFD	12
4.5	Second Level DFD	13
4.6	Use Case Diagram	15
6.1	Login Page	23
6.2	Student Dashboard	24
6.3	Messages page	24
6.4	View Books	25
6.5	Borrowed History	25
6.6	Recommend a Book	26
6.7	Currently Issued Books	26
6.8	Student's Profile Update	27
6.9	Admin Dashboard	27
6.10	View Student Details	28
6.11	Send Message	28
6.12	View and Update Book Details	29
6.13	Add Books	29
6.14	View Requests	30
6.15	View Recommendations	30
6.16	Currently Issued Books	31
6.17	Admin's Profile Update	31
6.18	Member Registration	32

CHAPTER 1

INTRODUCTION

The purpose of this project is to provide a friendly environment to maintain the details of books and library members. The main purpose of this project is to maintain easy circulation system using computers and to provide different reports. The College Library Management is a package to be used by Libraries to improve the efficiency of Librarians, Library employees and Users. The system provides books catalogue and information to members and helps them decide on the books to borrow from the library. The Librarian can keep the books catalogue updated all the time so that the members (students and the professors) get the updated information all the time.

1.1 Motivation

To Develop a website for college which will give information about library within a click and which is much faster, easier at the same time avoiding conflicts. To make the task of librarian, student and teacher easier which is also complicated as they maintain and view all the books details, issue, return and renewal.

1.2 Problem Statement

Students have no profile of their own to see their details related to library. Details such as books related to them existing in the library. Keeping track of the issued books and the return date with the dues. Book recommendations and contribution to the library and librarian communication with the students. Registration of new students or professors as the members of library.

1.3 Existing System

In the existing system all the members should get into the library and manually search through all the books in the library. Then stand in the queue in order to borrow the book. Forgetting the due date and delay in returning or renewal of the borrowed book resulting in high dues. Can't reserve the book in prior so that that book will be reserved for him to borrow. Standing in a queue to fill a form to get registered as a member of the library.

1.4 Proposed System

The purpose of the College Library Management is to digitalise the existing library by creating a web application. By providing a profile for every book in the library with all the information required about the book with a preview of the index pages and the e-book copy of the book.

A profile for each member which will be registered and maintained by the librarian. This application will enable the librarian to accept the requests sent by the members, add or remove the member. Librarian can also make a profile for the books in the library and maintain them by adding or deleting the books. Accepting the book recommendation and sending personal message to the members.

A member being a student, or a professor can search for the required and check in the book details and can respond with an issue request or if the book doesn't exist, they can recommend the book to be added into the library. The member can also download the e-book copy of the book. Can read to message sent by the librarian and respond accordingly. Can easily keep track of the borrowed books, due dates and the dues for it.

CHAPTER 2

LITERATURE SURVEY

Significant changes seen by society through the transmission of information around the globe and it is accountable to the evolution of information technology. Now it is possible to archiving and accessing knowledge in the digitized form besides preservation of traditional knowledge due to use of information technology. Demand for electronic information increasing day by day and at the same time traditional format of library becoming more and more expensive and complex to maintain. Now it is time for libraries to capitalize these challenges and meet demands and expectations of digital users. Libraries must redesign their services to create value addition to satisfy the user's community.

2.1 Digital Library

Digital Library is a source that rebuild the knowledge and supports of conventional library in digital form. Digital Library is organized assortment of information, with its supported services and a place where the information is kept in digital format and can be retrieved over a network. It comprises of digital contents which interconnected by establishing link, metadata or simply query based relationship and software which may use basic pages in HTML or based on database management system. It can be interpreted based on above definition that a single web page or huge collection mass digital information is not a digital library. Here, it is important to note that digital libraries are not going to replace conventional libraries, but rather digital libraries are the future of conventional libraries (Seadle, 2007). Basically, digital library is required technological support to link the resources of many services that are disseminated to user. Collection of information is not restricted to document storage, but it is extended to digital artefacts than can only be distributed in digital formats.

2.2 Review of Literature

This section of the article discusses about the research related to user's experience with digital library. This may be helpful to understand user's opinion, attitude, satisfaction and service experiences with digital library which can be further considered for enhancing user's satisfaction towards the use of digital library.

Ekere et al (2016) study the perception of users towards digital library facilities, resources and services and found that users are highly satisfied with it. Users are highly aware and satisfied

about the digital library resources such and WWW, WIFI and search engines compare to online databases, portals, online abstract, video CDs, CD-ROMs, and online indexes and abstract.

Asad Khan (2016) investigated the factors that influence the adoption of Digital Library among research students. The findings revealed that Interface characteristics influence cognitive response which predict student's intention of using digital library. Whereas navigation, individual differences and system characteristics significantly affected the ease of use. Usefulness is directly affected by system characteristics and system quality. Finally, it is found that usefulness has highest effects on digital library usage intention.

Xianjin et al (2015) worked on Flow experience with respect to Mobile Library and try to compare perception of user's with mobile libraries and web digital libraries with respect to flow experience. Where flow experience defined as best experience about an activity that can be done by comparing perceived skills and perceived challenges. Study reveals that more users experienced flow in using web digital libraries than mobile libraries.

Yuangen and Zeng (2014) worked with customer churn rate and it is the rate of customer discontinuation with digital library service. Study found that customer churn rate of the given library is very high and same with churn hazard in initial three months after customer's registration on the web site of the library.

Xianjin et al (2014) investigated the effects of user's perception towards print and digital resources in terms of usage, usefulness and ease of use. There is a significant effect of the characteristics of users such as gender, age field and experience on perception of users with respect to usefulness, usage and ease of use.

Yalan et al (2014) examined quality of digital library which define as the quality of information quality of system and overall service quality of digital library. The compression of user's perceptions towards virtual communities and digital libraries have been done understand the actual nature of e quality perceived by the users. Based on the user's perception study found that digital libraries provide better information, system and service quality than virtual communities.

Ahmed (2013) study the usage pattern of digital information resources and satisfaction with university resources by the faculty members. It is found that faculty members are dissatisfied with current e-resources by the university. Service related issues are the main reason for dissatisfaction such as limited title and access to past issues, They identified limited number of

titles, limited access to back issues, difficulty in finding information, inability to access from home, limited access to computers and slow download speed as major constraints. However, poor infrastructure and limited access to these resources is the main reason for dissatisfaction.

Chang (2013) study user's behaviour intention towards using mobile library application by applying unified theory of acceptance and usage of technology (UTAUT) with task technology fit model. Effort expectancy, social influence, facilitating conditions and performance expectancy influence the behavioural intention towards mobile library application. Task technology model have moderating effect on behavioural intention.

Ming-der et al (2012) research scholar are frequent users of digital resources of library in this regard this study investigated usage pattern, search behaviour of graduate students and perception towards digital resources. Study reveals that students are using digital resources during thesis writing and science and technology student consider it as the most important for their research compare to other disciplines. Less number of students are using metasearch and alter services to collect update information.

Lorraine Paterson and Boon Low, (2011) found that students has higher acceptance of mobile library services.

Enrique (2005) reveals that the satisfaction with respect to digital library is still the area in which improvement required. A deeper study shows that from a Cognitive style perspective, Intermediate users are satisfied with the interface, but in Filed Dependency and Field Independency, users expects some improvements, especially help to operate the system. This is also true from a gender approach, where females are more dissatisfied than males, mainly because of the lack of help. Finally, it is found that as level of expertise increases the user's satisfaction is decreases.

It is high time for libraries in India to shift from traditional model to digital model. This study provides the highlights about the key areas in which researcher are doing research with respect to Digital Library and user experience to provide future scope for further research in this area. Majority of studies, which included in this paper, are related to Adoption, Perception, Attitude and Satisfaction of user towards Digital Library services. Whereas, Flow Experience and Equality aspect of Digital Library has also been studied out by the researchers. Mobile library is emerging as a new concept and showing high rate of acceptance among users where libraries provide content browsing through mobile application.

CHAPTER 3

SYSTEM REQUIREMENT SPECIFICATION

3.1 Overall Description

College Library Management is meant to be a common platform where management of everyday library activities can be carried out conveniently. Our goal is to develop a more friendly way to communicate and interact with the library instead of using the traditional way of making a queue for all the quarries and getting the things done. And provide e-books to reduce the problems caused of borrowing and returning od paper books.

3.2 Specific requirements

3.2.1 Functional requirements

The College Library Management must have the following functional requirements:

1. The College Library Management should store all information about librarian and its members (students and professors) – their login info, books issued, etc.
2. The College Library Management should store all information about the books and users in two separated databases.
3. The College Library Management should allow searching books/journals by author, title, keywords or availability.
4. The College Library Management should generate request's reports for librarian, upon which he/she could make decisions about accepting/ rejecting the requests.
5. The College Library Management should allow users to view their personal information and status (numbers of books issued, days left, etc.)
6. The College Library Management should provide modules to search, request and renew books.
7. The users should be able to view their recent check-ins/checkouts, calculate and clear dues, request/recommend more books, etc.
8. The librarian must be able to add/remove books, manage users, process dues, view recommendations from users, etc.

3.2.2 Non-Functional Requirements

Usability Requirements

The 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.

Error Handling

College Library Management shall handle expected and non-expected errors in ways that prevent loss in information and long downtime period.

Security Requirements

The LMS should provide databases' modification only for the librarian after proper authorization. The system shall accommodate high number of books and users without any fault.

Hardware Requirements

1. Dual Core (Processor).
2. 256 MB Ram
3. 512 KB Cache Memory
4. Hard disk 10 GB
5. Microsoft Compatible 101 or more Keyboard

Software Requirements

Technology Implemented	: Apache Server
Language Used	: PHP 5.62
Database	: My SQL
User Interface Design	: HTML, JAVASCRIPT, CSS
Web Browser	: Mozilla, Google Chrome, OPERA
Software	: XAMPP Server

CHAPTER 4

DESIGN

4.1 Input Design

Input design is the link that ties the information system into the world of its users. The input design involves determining the inputs, validating the data, minimizing the data entry and provides a multi-user facility. Inaccurate inputs are the most common cause of errors in data processing. Errors entered by the data entry operators can be controlled by input design. The user-originated inputs are converted to a computer-based format in the input design. Input data are collected and organized into groups of similar data.

Once identified, the appropriate input media are selected for processing. All the input data are validated and if any data violates any conditions, the user is warned by a message. If the data satisfies all the conditions, it is transferred to the appropriate tables in the database. In this project the Author details are to be entered at the time of registration. A page is designed for this purpose which is user friendly and easy to use. The design is done such that users get appropriate messages when exceptions occur.

4.2 Output Design

Computer output is the most important and direct source of information to the user. Output design is a very important phase since the output needs to be in an efficient manner. Efficient and intelligible output design improves the system relationship with the user and helps in decision making. Allowing the user to view the sample screen is important because the user is the ultimate judge of the quality of output. The output module of this system is the selected notifications.

4.3 System Architecture

Figure 4.1 shows the system architecture of the college library management.

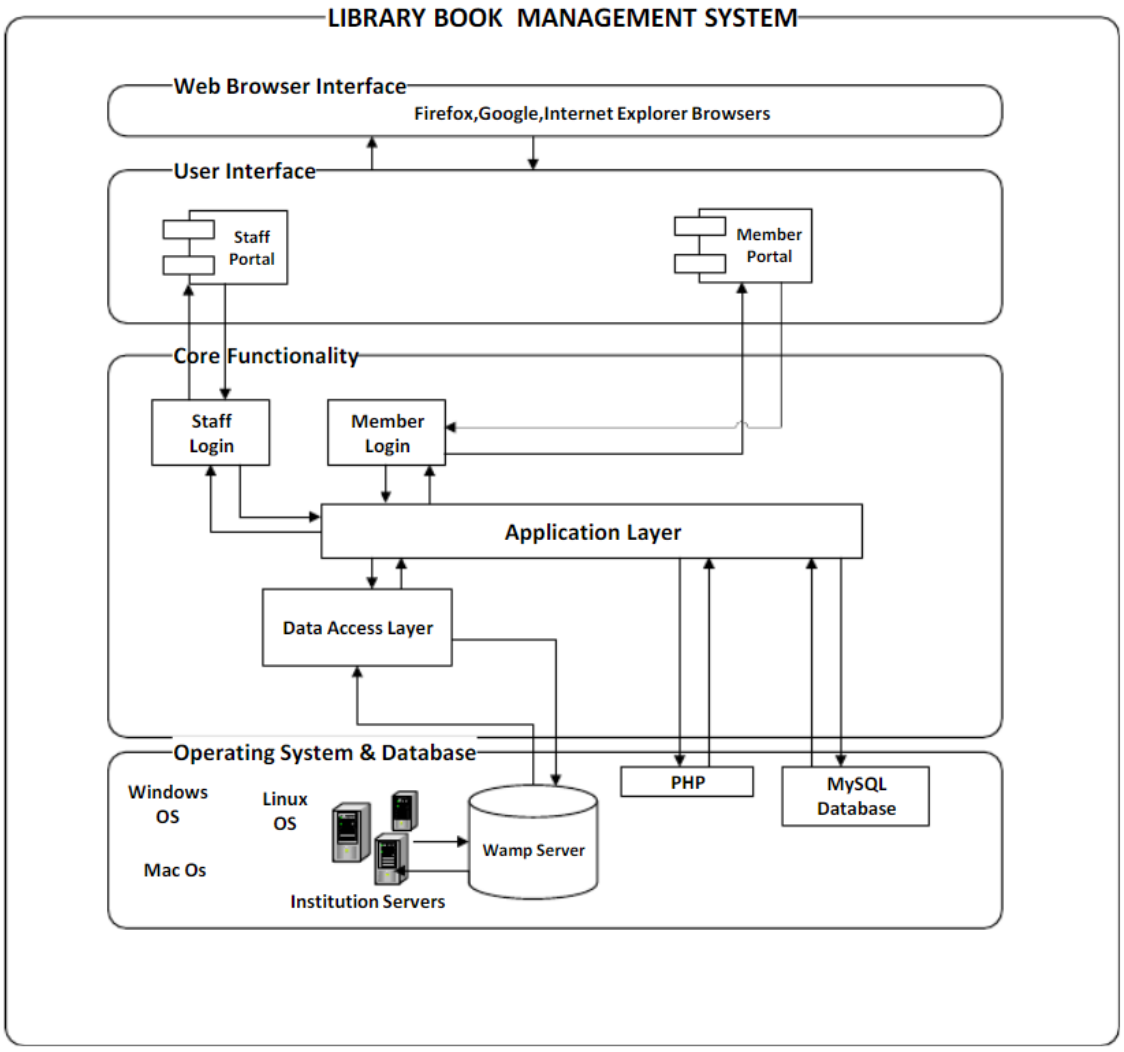

Fig: 4.1 System Architecture

4.4 Sequence Diagram

Sequence diagram and collaboration diagram are called INTERACTION DIAGRAMS. An interaction diagram shows an interaction, consisting of set of objects and their relationship including the messages that may be dispatched among them.

A sequence diagram is an introduction that empathizes the time ordering of messages. Graphically a sequence diagram is a table that shows objects arranged along the X-axis and messages ordered in increasing time along the Y-axis as shown in the figure 4.2.

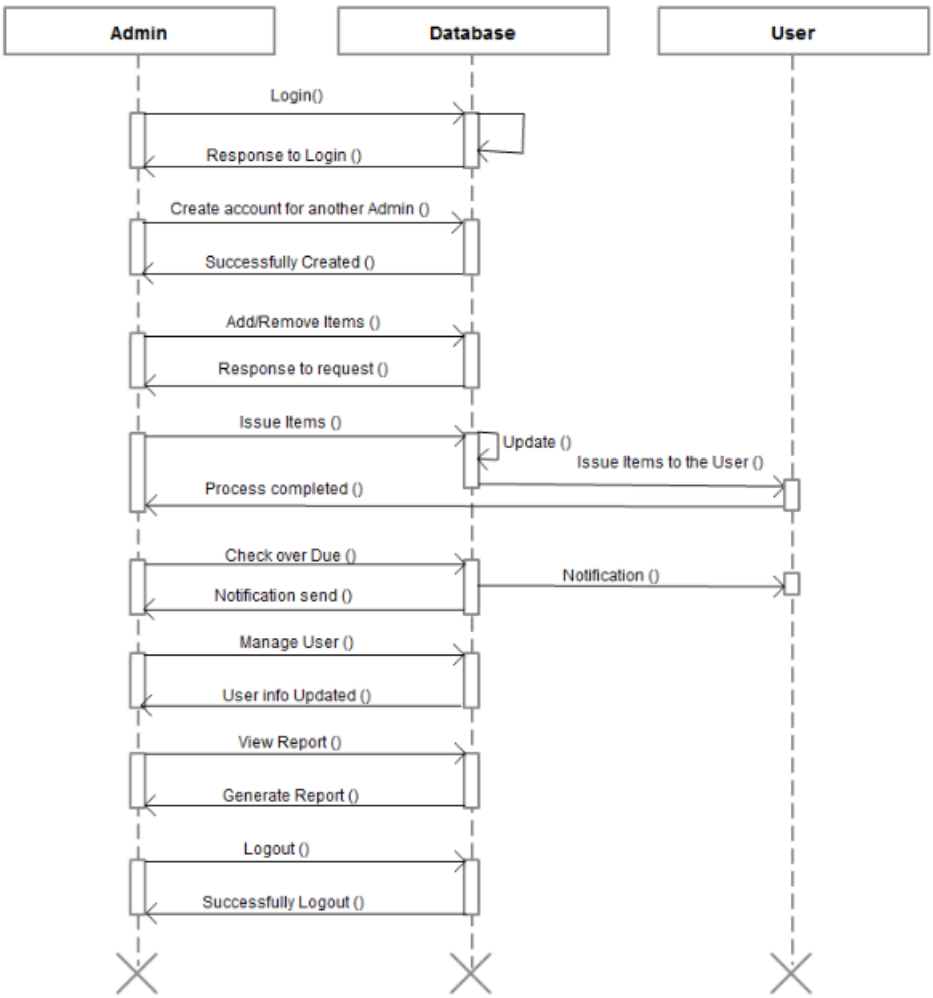

Fig: 4.2 Sequence Diagram

4.5 Data Flow Diagrams

College Library Management Data flow diagram is often used as a preliminary step to create an overview of the Library Management without going into detail, which can later be elaborated.it normally consists of overall application dataflow and processes of the Library Management process. It contains all the user flow and their entities such all the flow of Library, Book, Issue Book, Authors, Publisher, Employee, Student. All the below diagrams have been used for the visualization of data processing and structured design of the Library Management process and working flow.

4.5.1 Zero Level Data Flow Diagram (0 Level DFD) of Library Management System:

First Level DFD (1st Level) of College Library Management (bellow in figure 4.3) shows how the system is divided into sub-systems (processes), each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality

of the College Library Management as a whole. It also identifies internal data stores of Student, Employee, Publisher, Authors, Issue Book that must be present in order for the College Library Management to do its job, and shows the flow of data between the various parts of Library, Issue Book, Employee, Student, Publisher of the system. DFD Level 1 provides a more detailed breakout of pieces of the 1st level DFD. You will highlight the main functionalities of Library Management.

Main entities and output of First Level DFD (1st Level DFD):

- Processing Library records and generate report of all Library.
- Processing Book records and generate report of all Book.
- Processing Issue Book records and generate report of all Issue Book.
- Processing Authors records and generate report of all Authors.
- Processing Publisher records and generate report of all Publisher.
- Processing Employee records and generate report of all Employee.
- Processing Student records and generate report of all Student.

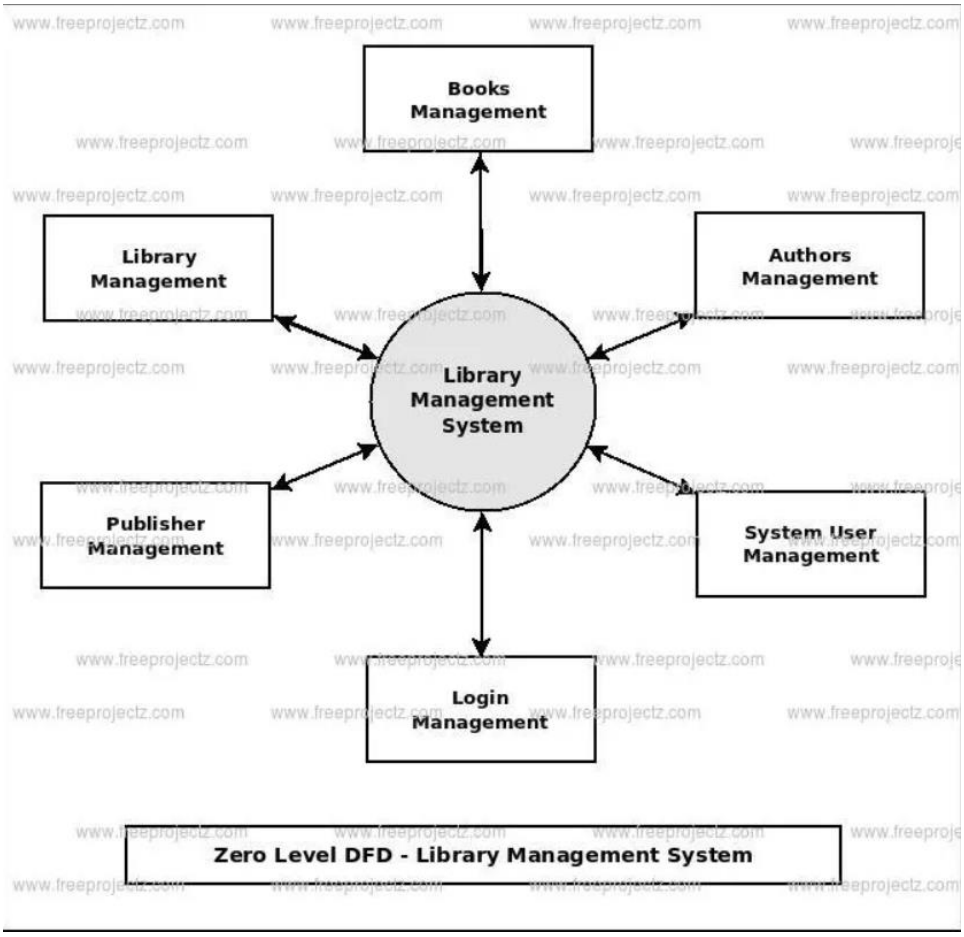

Fig:4.3 Zero Level DFD

4.5.2 First Level Data Flow Diagram (1st Level DFD) of Library Management System:

First Level DFD (1st Level) of College Library Management (bellow in figure 4.4) shows how the system is divided into sub-systems (processes), each of which deals with one or more of the data flows to or from an external agent, and which together provide all of the functionality of the College Library Management as a whole. It also identifies internal data stores of Student, Employee, Publisher, Authors, Issue Book that must be present in order for the College Library Management to do its job, and shows the flow of data between the various parts of Library, Issue Book, Employee, Student, Publisher of the system. DFD Level 1 provides a more detailed breakout of pieces of the 1st level DFD. You will highlight the main functionalities of Library Management.

Main entities and output of First Level DFD (1st Level DFD):

- Processing Library records and generate report of all Library.
- Processing Book records and generate report of all Book.
- Processing Issue Book records and generate report of all Issue Book.
- Processing Authors records and generate report of all Authors.
- Processing Publisher records and generate report of all Publisher.
- Processing Employee records and generate report of all Employee.
- Processing Student records and generate report of all Student.

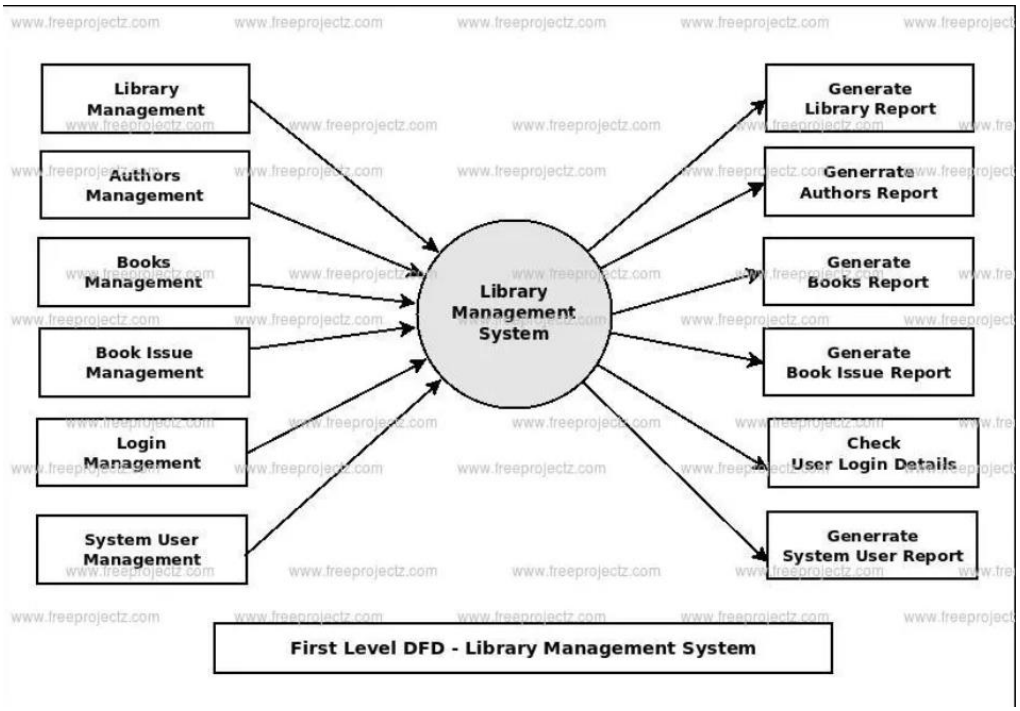

Fig: 4.4 First Level DFD

4.5.3 Second Level Data Flow Diagram (2nd Level DFD) of College Library Management:

DFD Level 2 then goes one step deeper into parts of Level 1 of Library Management as showed in figure 4.5. It may require more functionalities of Library Management to reach the necessary level of detail about the Library Management functioning. First Level DFD (1st Level) of College Library Management shows how the system is divided into sub-systems (processes). The 2nd Level DFD contains more details of Student, Employee, Publisher, Authors, Issue Book, Book, Library.

Low level functionalities of Library Management System:

- Admin logins to the system and manage all the functionalities of College Library Management.
- Admin can add, edit, delete and view the records of Library, Issue Book, Publisher, Student.
- Admin can manage all the details of Book, Authors, Employee.
- Admin can also generate reports of Library, Book, Issue Book, Authors, Publisher, Employee.
- Admin can search the details of Book, Publisher, Employee.
- Admin can apply different level of filters on report of Library, Authors, Publisher.
- Admin can track the detailed information of Book, Issue Book, Authors, Publisher.

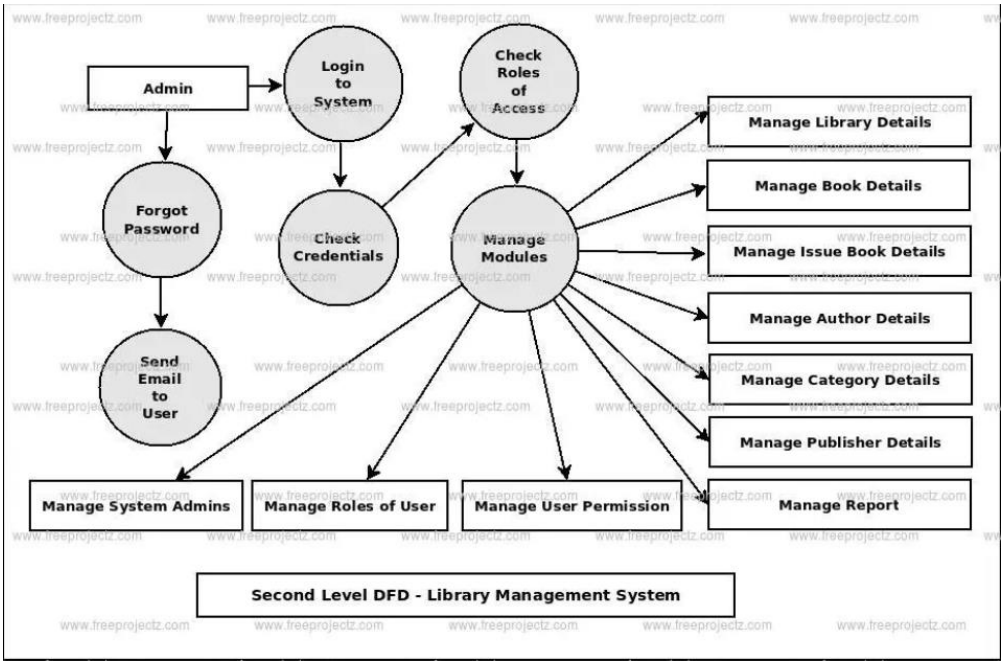

Fig: 4.5 Second Level DFD

4.6 Use Case Diagram

We have three main actors in our system:

- **Librarian**: Mainly responsible for adding and modifying books, book items, and users. The Librarian can also issue, reserve, and return book items.
- **Member**: All members can search the catalogue, as well as check-out, reserve, renew, and return a book.
- **System**: Mainly responsible for sending notifications for overdue books, cancelled reservations, etc.

Here are the top use cases of the Library Management System:

- **Add/Remove/Edit book**: To add, remove or modify a book or book item.
- **Search catalogue**: To search books by title, author, subject or publication date.
- **Register new account/cancel membership**: To add a new member or cancel the membership of an existing member.
- **Check-out book**: To borrow a book from the library.
- **Reserve book**: To reserve a book which is not currently available.
- **Renew a book**: To reborrow an already checked-out book.
- **Return a book**: To return a book to the library which was issued to a member.

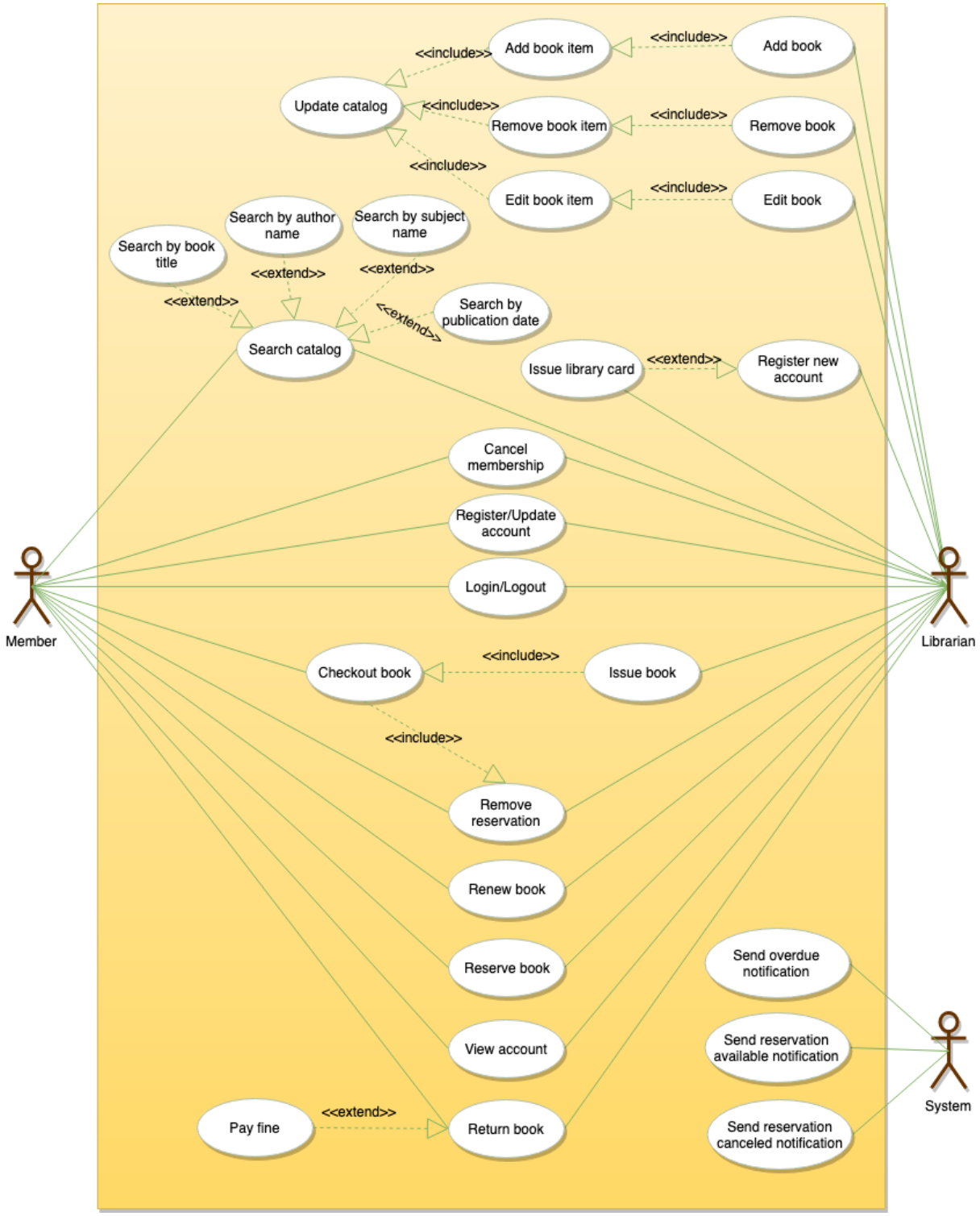

Fig: 4.6 Use Case Diagram

CHAPTER 5

IMPLEMENTATION AND TESTING

Implementation is the stage where the theoretical design is turned into a working system. The most crucial stage in achieving a new successful system and in giving confidence on the new system for the users that it will work efficiently and effectively.

The system can be implemented only after thorough testing is done and if it is found to work according to the specification.

It involves careful planning, investigation of the current system and its constraints on implementation, design of methods to achieve the changeover and an evaluation of change over methods apart from planning. Two major tasks of preparing the implementation are education and training of the users and testing of the system.

The more complex the system being implemented, the more involved will be the systems analysis and design effort required just for implementation.

The implementation phase comprises of several activities. The required hardware and software acquisition are carried out. The system may require some software to be developed. For this, programs are written and tested. The user then changes over to his new fully tested system and the old system is discontinued.

Testing is a process of executing a program with the intent of finding an error. Testing is a crucial element of software quality assurance and presents ultimate review of specification, design and coding.

System Testing is an important phase. Testing represents an interesting anomaly for the software. Thus, a series of testing are performed for the proposed system before the system is ready for user acceptance testing.

A good test case is one that has a high probability of finding an as undiscovered error. A successful test is one that uncovers an as undiscovered error.

Book Issue Implementation

```
<?php
require('dbconn.php');
$bookid = $_GET['id1'];
$rollno = $_GET['id2'];
$sql = "select Category from LMS.user where RollNo='$rollno'";
$result = $conn->query($sql);
$row = $result->fetch_assoc();
$category = $row['Category'];
if ($category == 'GEN' || $category == 'OBC') {
        $sql1="update LMS.record set Date_of_Issue = curdate(), Due_Date = date_add (curdate(),
        interval 60 day), Renewals_left =1 where BookId='$bookid' and RollNo='$rollno'";
        if ($conn->query($sql1) === TRUE) {
                $sql3="update LMS.book set Availability=Availability-1 where BookId='$bookid'";
                $result=$conn->query($sql3);
                $sql5 = "insert into LMS.message (RollNo, Msg, Date, Time) values ('$rollno', 'Your
                request for issue of BookId: $bookid has been accepted', curdate(), curtime())";
                $result=$conn->query($sql5);
                echo "<script type='text/javascript'>alert('Success') </script>";
                header ("Refresh:0.01; url=issue_requests.php", true, 303);
        } else {
                echo "<script type='text/javascript'>alert('Error') </script>";
                header ("Refresh:1; url=issue_requests.php", true, 303);
        }
} else {
        $sql2 = "update LMS.record set Date_of_Issue = curdate(), Due_Date = date_add (curdate(),
        interval 180 day), Renewals_left = 1 where BookId = '$bookid' and RollNo = '$rollno'";
        if($conn->query($sql2) === TRUE) {
                $sql4="update LMS.book set Availability=Availability-1 where BookId='$bookid'";
                $result=$conn->query($sql4);
                $sql6="insert into LMS.message (RollNo,Msg,Date,Time) values ('$rollno','Your
                request for issue of BookId: $bookid has been accepted',curdate(),curtime())";
                $result=$conn->query($sql6);
                echo "<script type='text/javascript'>alert('Success') </script>";
                header ("Refresh:1; url=issue_requests.php", true, 303);
        } else {
```

```
                echo "<script type='text/javascript'> alert('Error') </script>";
                header (Refresh:1; url=issue_requests.php", true, 303);
        }
}
?>
```

Book Renewal Implementation

```
<?php
require('dbconn.php');
$bookid = $_GET['id1'];
rollno = $_GET['id2'];
$sql = "select Category from LMS.user where RollNo='$rollno'";
$result = $conn->query($sql);
$row = $result->fetch_assoc();
$category = $row['Category'];
if ($category == 'GEN' || $category == 'OBC') {
        $sql1="update LMS.record set Due_Date = date_add (Due_Date, interval 60 day),
        Renewals_left = 0 where BookId = '$bookid' and RollNo = '$rollno'";
        if ($conn->query($sql1) === TRUE) {
                $sql3 = "delete from LMS.renew where BookId='$bookid' and RollNo='$rollno'";
                $result = $conn->query($sql3);
                $sql5 = "insert into LMS.message (RollNo, Msg, Date, Time) values ('$rollno', 'Your
                request for renewal of BookId: $bookid has been accepted', curdate(), curtime())";
                $result = $conn->query($sql5);
                echo "<script type = 'text/javascript'> alert('Success') </script>";
                header ("Refresh:0.01; url = renew_requests.php", true, 303);
        } else {
                echo "<script type = 'text/javascript'> alert('Error') </script>";
                header ("Refresh:0.01; url = renew_requests.php", true, 303);
        }
   } else {
        $sql2 = "update LMS.record set Due_Date = date_add (Due_Date,interval 180 day),
        Renewals_left = 0 where BookId = '$bookid' and RollNo = '$rollno'";
        if ($conn->query($sql2) === TRUE) {
                $sql4 = "delete from LMS.renew where BookId = '$bookid' and RollNo = '$rollno'";
                $result = $conn->query($sql4);
                $sql6 = "insert into LMS. message (RollNo, Msg, Date, Time) values ('$rollno', 'Your
```

```
                request for renewal of BookId: $bookid has been accepted', curdate(), curtime())";
                $result = $conn->query($sql6);
                echo "<script type = 'text/javascript'> alert('Success') </script>";
                header ("Refresh:0.01; url = renew_requests.php", true, 303);
        } else {
                echo "<script type = 'text/javascript'> alert('Error') </script>";
                header ("Refresh:0.01; url = renew_requests.php", true, 303);
        }
}
?>
```

Book Renewal Implementation

```
<?php
require('dbconn.php');
$bookid = $_GET['id1'];
$rollno = $_GET['id2'];
$dues = $_GET['id3'];
$sql = "select Category from LMS.user where RollNo = '$rollno'";
$result = $conn->query($sql);
row = $result->fetch_assoc();
$category = $row['Category'];
$sql1 = "update LMS.record set Date_of_Return = curdate(), Dues = '$dues' where BookId ='$bookid'
and RollNo = '$rollno'";
if($conn->query($sql1) === TRUE) {
        $sql3 = "update LMS.book set Availability = Availability+1 where BookId = '$bookid'";
        $result = $conn->query($sql3);
        $sql4 = "delete from LMS.return where BookId = '$bookid' and RollNo = '$rollno'";
        $result = $conn->query($sql4);
        $sql6 = "delete from LMS.renew where BookId = '$bookid' and RollNo = '$rollno'";
        $result = $conn->query($sql6);
        $sql5 = "insert into LMS.message (RollNo, Msg, Date, Time) values ('$rollno', 'Your request
        for return of BookId: $bookid has been accepted', curdate(), curtime())";
        $result = $conn->query($sql5);
        echo "<script type = 'text/javascript'> alert('Success') </script>";
        header ("Refresh:0.01; url = return_requests.php", true, 303);
} else {
        echo "<script type = 'text/javascript'> alert('Error') </script>";
```

```
        header ("Refresh:1; url = return_requests.php", true, 303);
}
?>
```

Testing Objectives

1. Testing is a process of executing a program with the intent of finding an error.
2. A good test case is one that has a probability of finding a yet undiscovered error.
3. A successful test is one that uncovers an undiscovered error.

Testing Principles

1. All tests should be traceable to end user requirements.
2. Tests should be planned long before testing begins.
3. Testing should begin on a small scale and progress towards testing in large.
4. Exhaustive testing is not possible.
5. To be most effective testing should be conducted by an independent third party.

The primary objective for test case design is to derive a set of tests that has the highest livelihood for uncovering defects in software. To accomplish this objective two different categories of test case design techniques are used. They are

- White box testing.
- Black box testing.

White-box testing

White box testing focus on the program control structure. Test cases are derived to ensure that all statements in the program have been executed at least once during testing and that all logical conditions have been executed.

Block-box testing

Black box testing is designed to validate functional requirements without regard to the internal workings of a program. Black box testing mainly focuses on the information domain of the software, deriving test cases by partitioning input and output in a manner that provides through test coverage. Incorrect and missing functions, interface errors, errors in data structures, error in functional logic are the errors falling in this category.

Testing strategies

A strategy for software testing must accommodate low-level tests that are necessary to verify that all small source code segment has been correctly implemented as well as high-level tests that validate major system functions against customer requirements.

Testing fundamentals

Testing is a process of executing program with the intent of finding error. A good test case is one that has high probability of finding an undiscovered error. If testing is conducted successfully it uncovers the errors in the software. Testing cannot show the absence of defects, it can only show that software defects present.

Testing Information flow

Information flow for testing flows the pattern. Two class of input provided to test the process. The software configuration includes a software requirements specification, a design specification and source code.

Test configuration includes test plan and test cases and test tools. Tests are conducted and all the results are evaluated. That is test results are compared with expected results. When erroneous data are uncovered, an error is implied and debugging commences.

Unit Testing

Unit testing is essential for the verification of the code produced during the coding phase and hence the goal is to test the internal logic of the modules. Using the detailed design description as a guide, important paths are tested to uncover errors within the boundary of the modules. These tests were carried out during the programming stage itself. All units of Vienna SQL were successfully tested.

Integration testing

Integration testing focuses on unit tested modules and build the program structure that is dictated by the design phase.

System testing

System testing tests the integration of each module in the system. It also tests to find discrepancies between the system and its original objective, current specification and system documentation. The primary concern is the compatibility of individual modules. Entire system is working properly or not will be tested here, and specified path ODBC connection will correct

or not, and giving output or not are tested here these verifications and validations are done by giving input values to the system and by comparing with expected output. Top-down testing implementing here.

Acceptance Testing

This testing is done to verify the readiness of the system for the implementation. Acceptance testing begins when the system is complete. Its purpose is to provide the end user with the confidence that the system is ready for use. It involves planning and execution of functional tests, performance tests and stress tests in order to demonstrate that the implemented system satisfies its requirements.

Tools to special importance during acceptance testing include:

- Test coverage Analyzer – records the control paths followed for each test case.
- Timing Analyzer – also called a profiler, reports the time spent in various regions of the code are areas to concentrate on to improve system performance.
- Coding standards – static analysers and standard checkers are used to inspect code for deviations from standards and guidelines.

CHAPTER 6

SNAPSHOTS

The figure 6.1 **S**hows Students and admin can login to their respective portals through the login page.

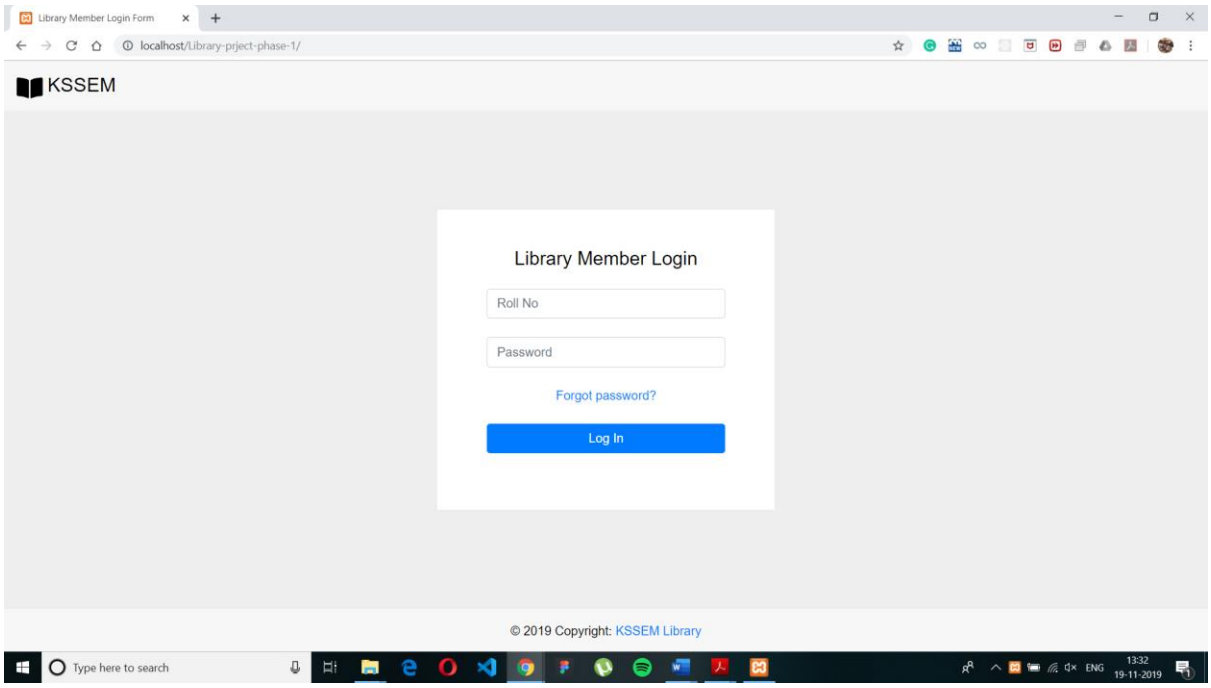

Fig:6.1 Login Page

Student Section

The figure 6.2 Students can view and navigate to all the features provided for the students.

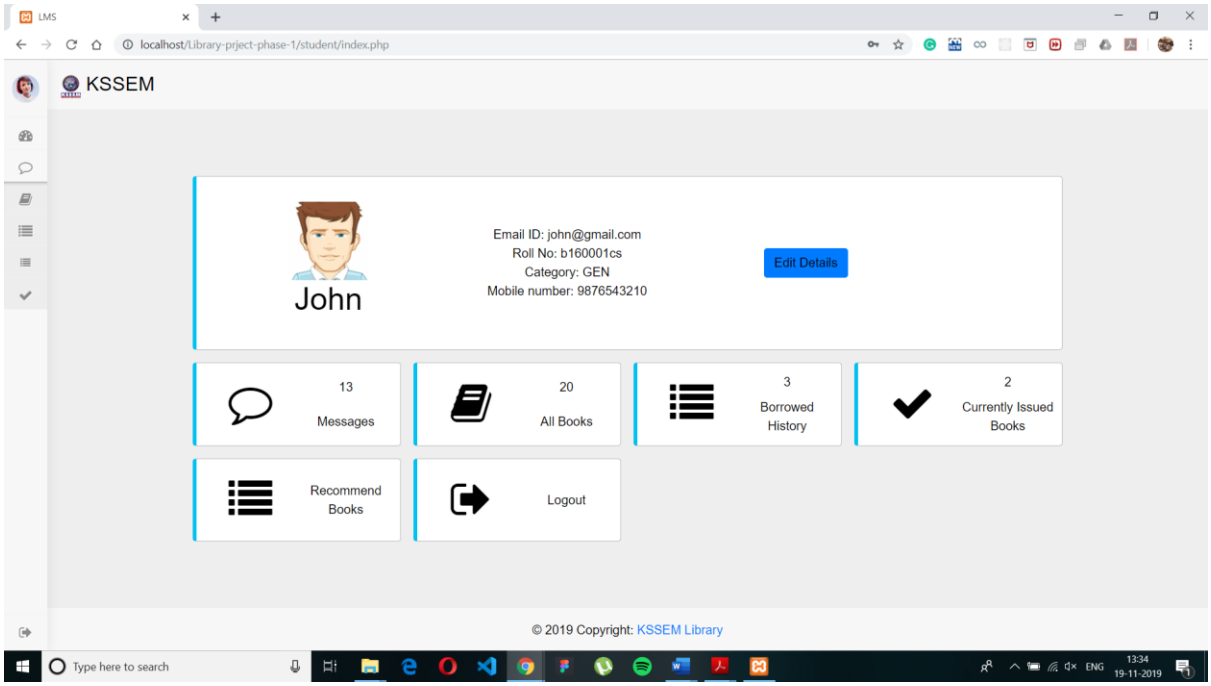

Fig:6.2: Student Dashboard

The figure 6.3 Students can view the messages sent via admin in this page.

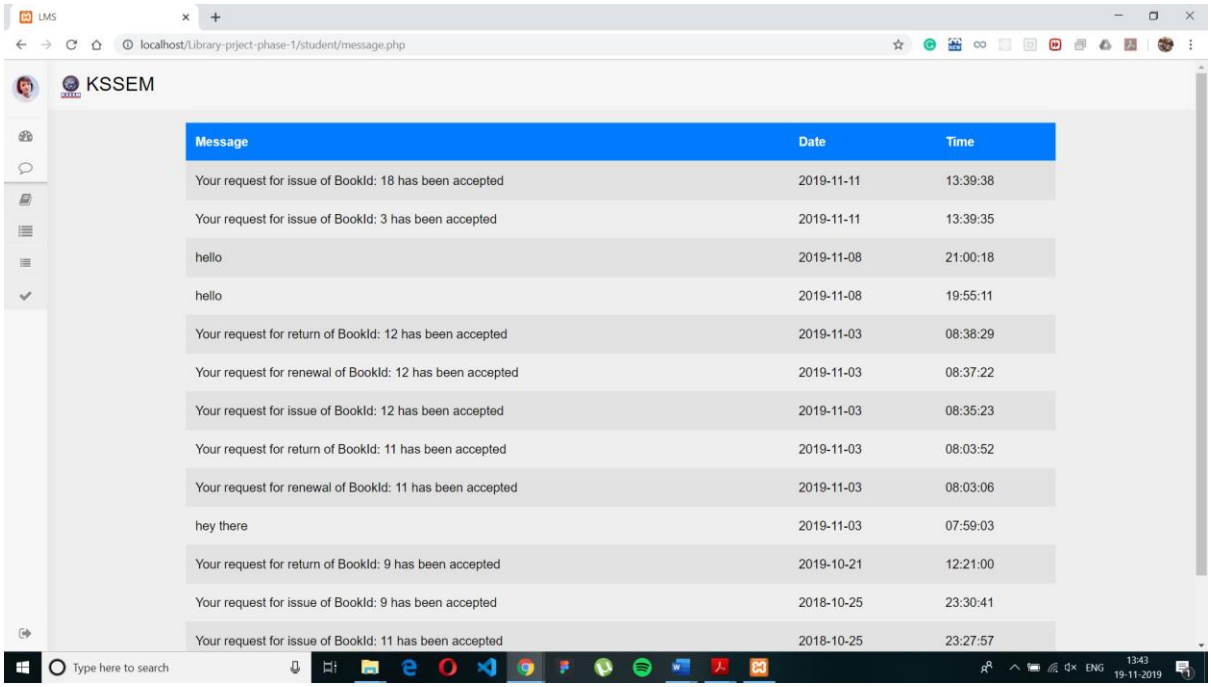

Fig:6.3 Messages page

The figure 6.4 Students can view all books (available/unavailable) and send issue requests to admin.

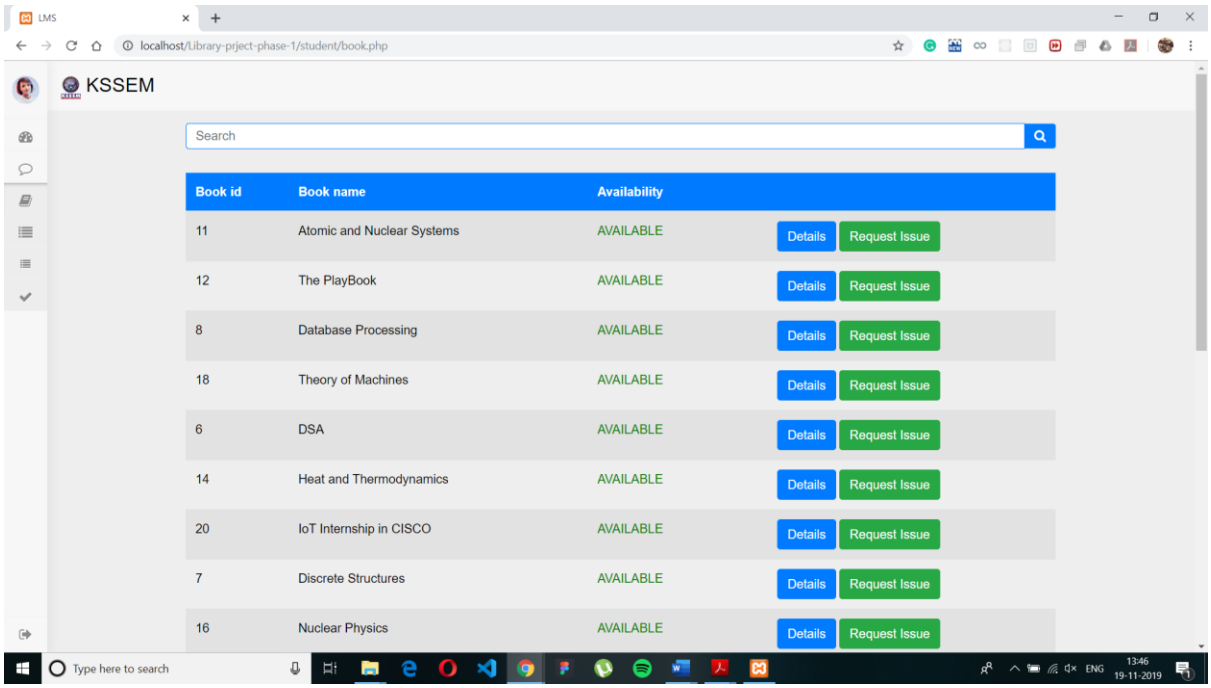

Fig:6.4 View Books

The figure 6.5 Students can view their issue history in this page.

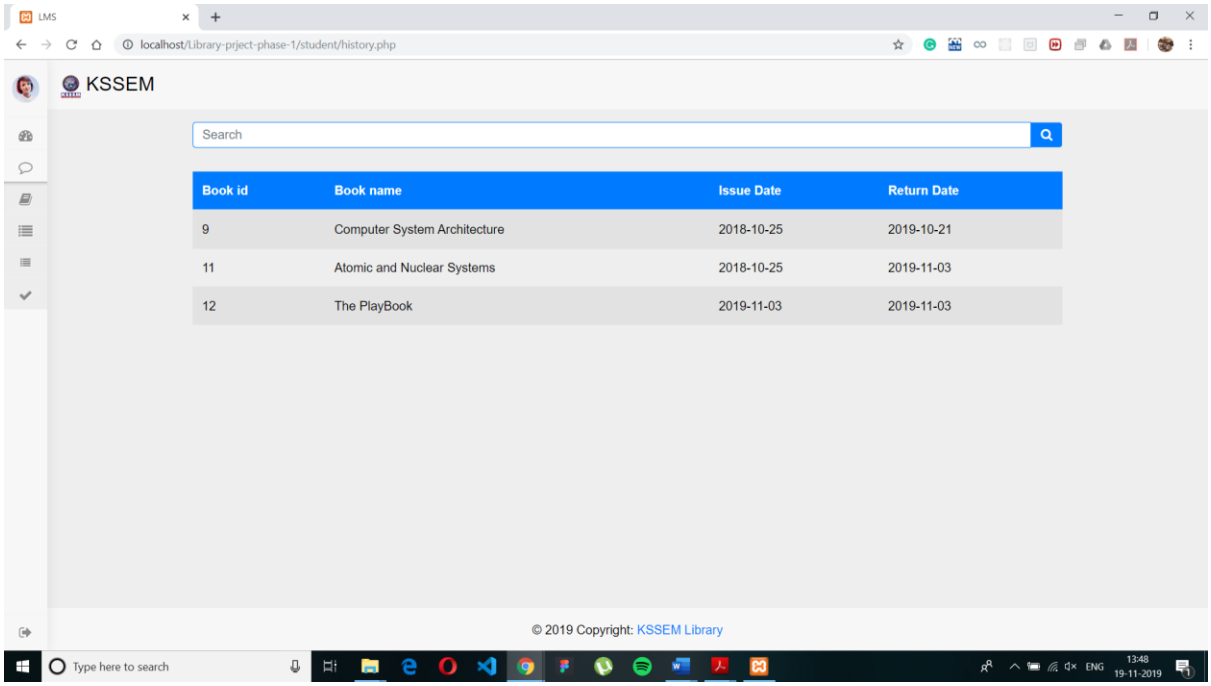

Fig: 6.5 Borrowed History

The figure 6.6 Students can recommend books to admin via form in this page.

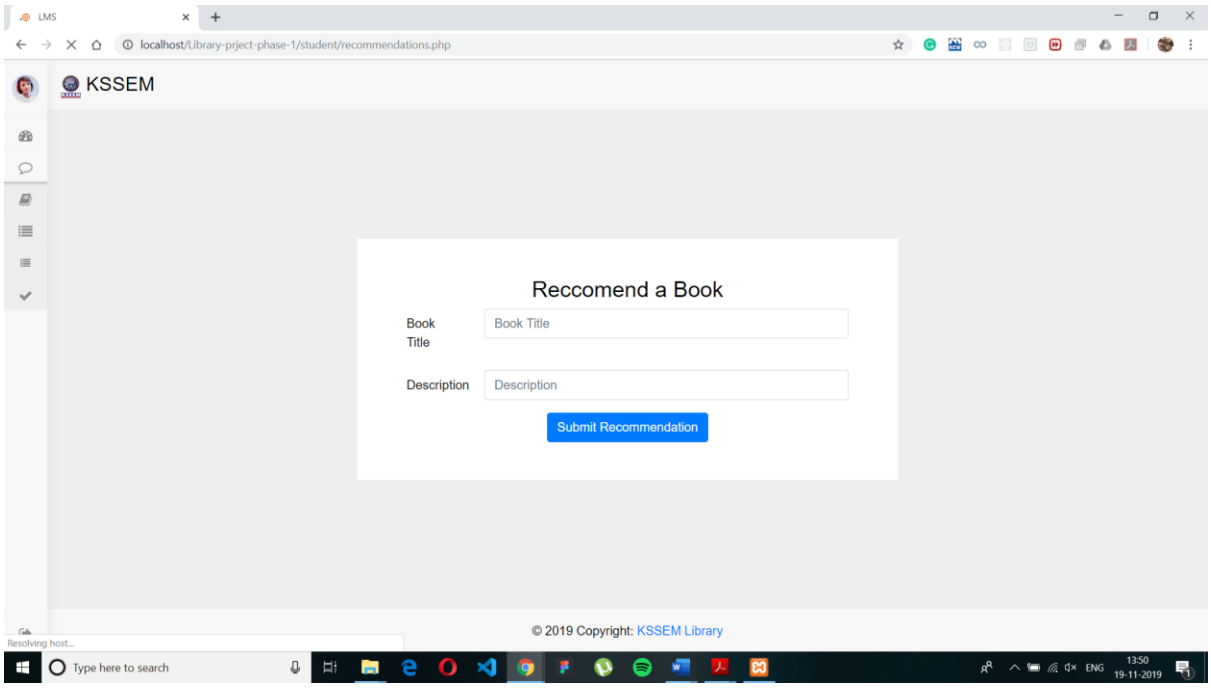

Fig: 6.6 Recommend a Book

The figure 6.7 Students can view books currently issued by them and send renew/return requests.

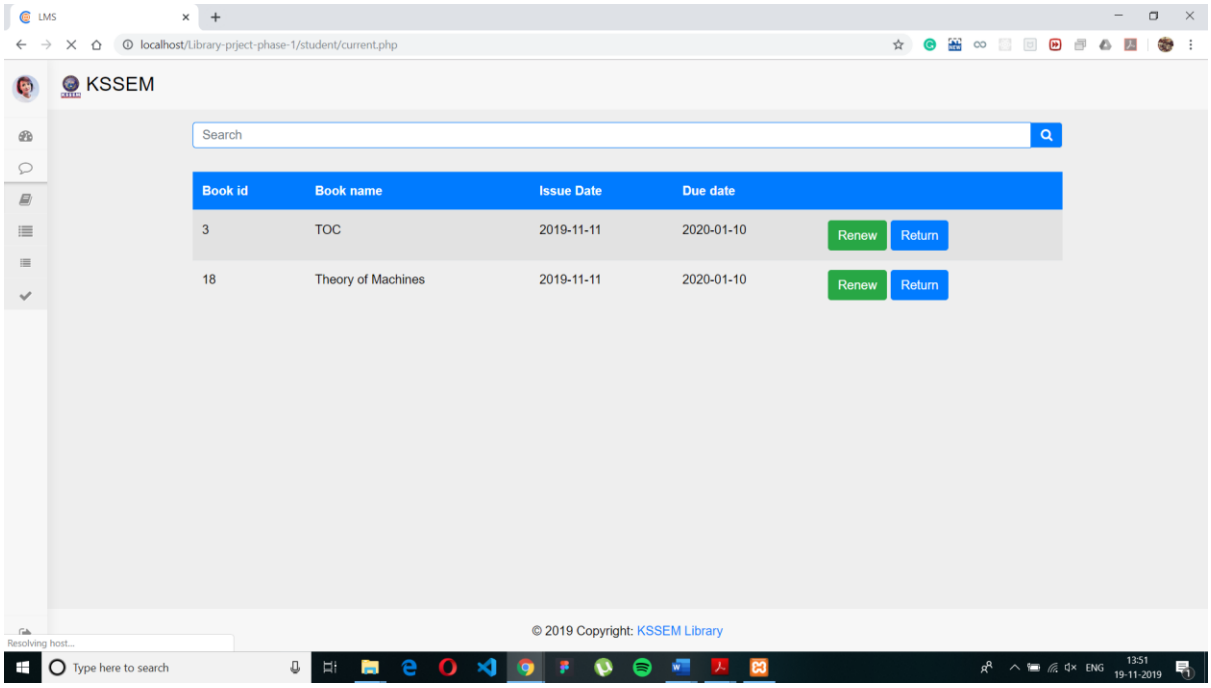

Fig: 6.7 Currently Issued Books

The figure 6.8 Students can view and update their profile details in this page.

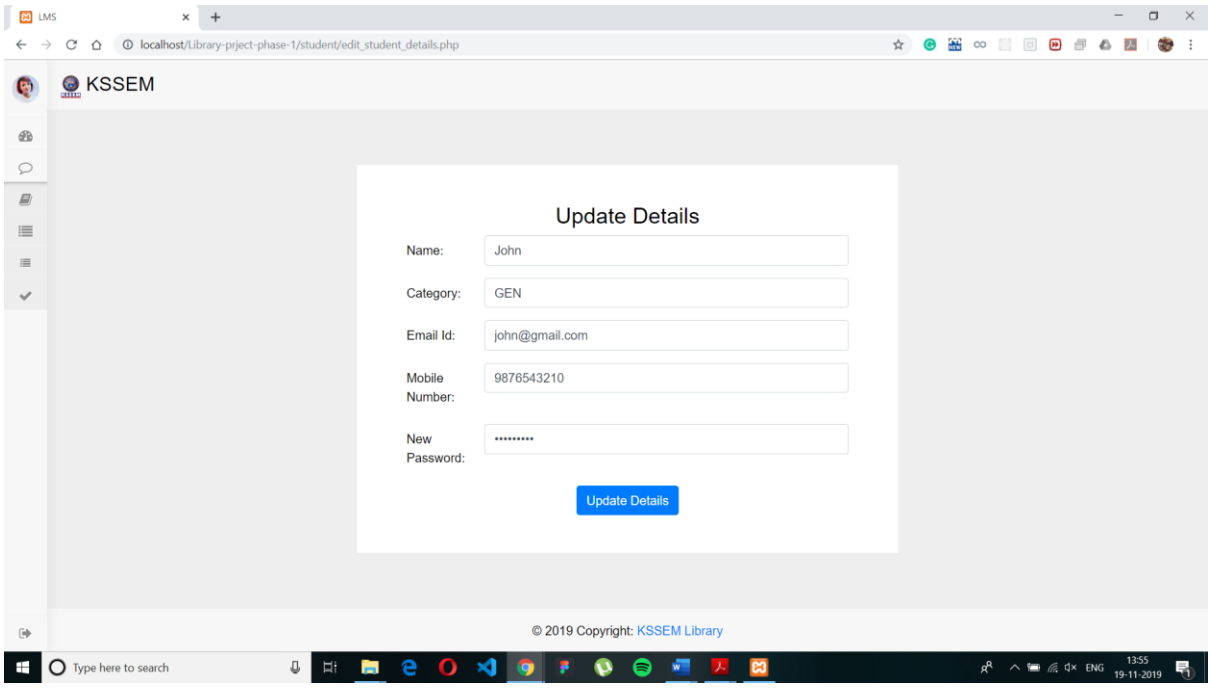

Fig:6.8 Student's Profile Update

Admin Section

The figure 6.9 Admin can view and navigate to all the features provided by the system.

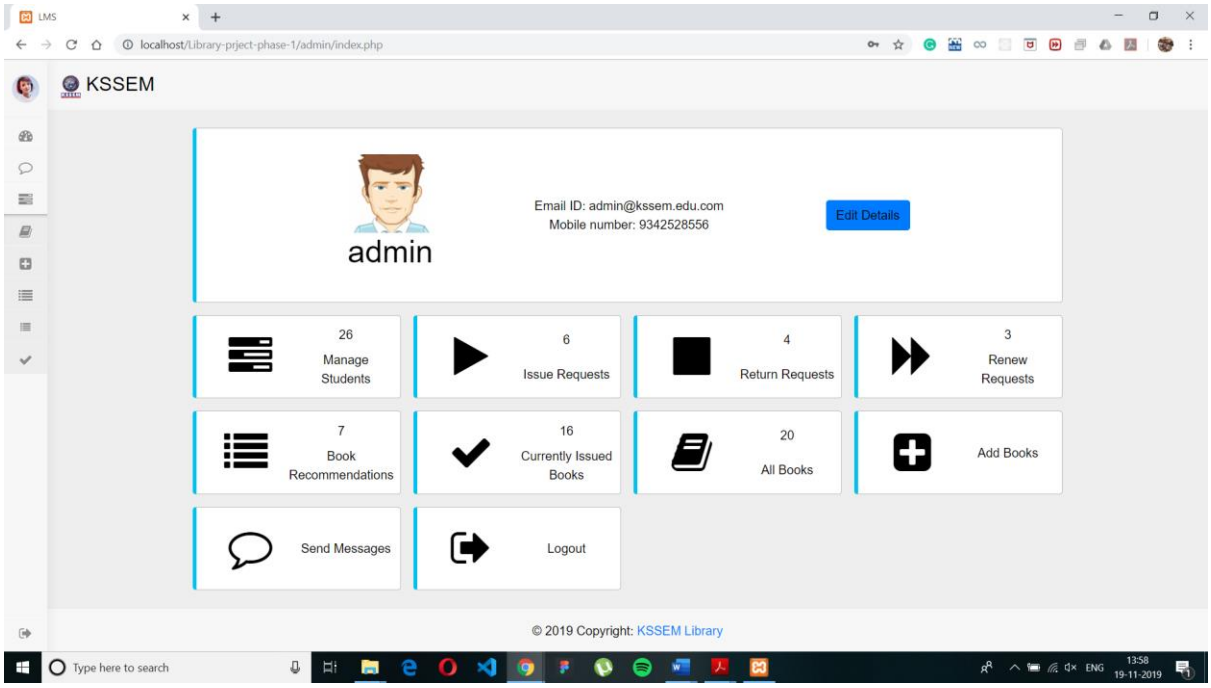

Fig: 6.9 Admin Dashboard

The figure 6.10 Admin can view details of all students in this page.

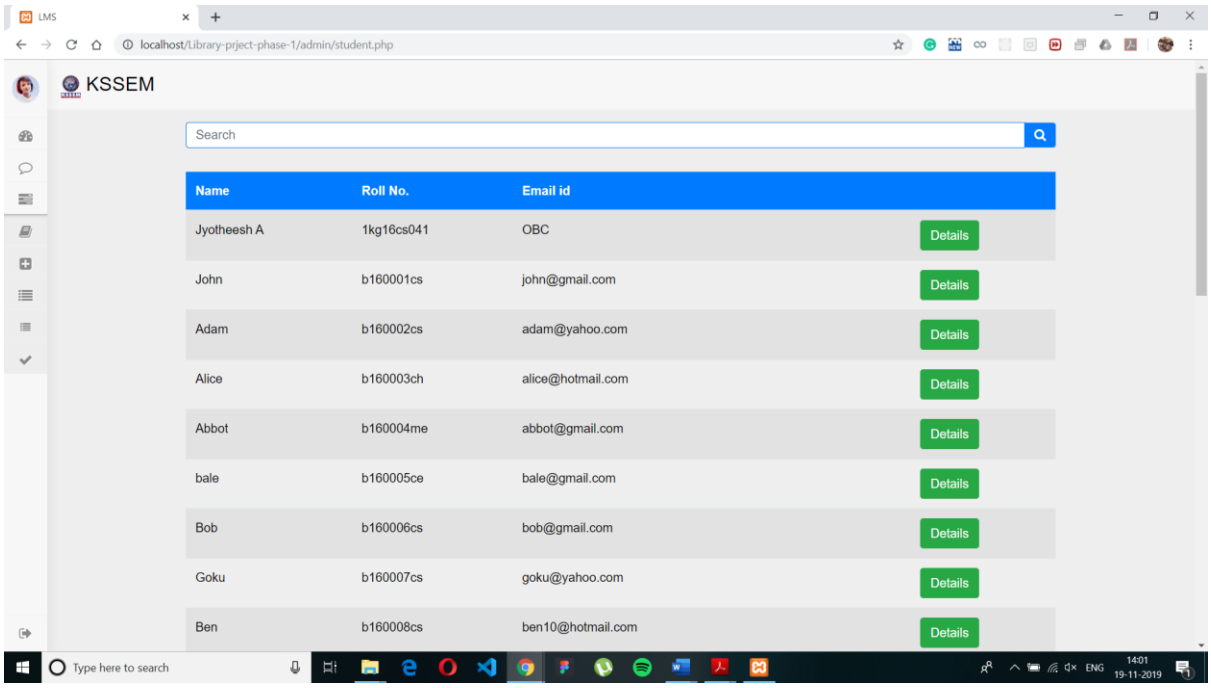

Fig: 6.10 View Student Details

The figure 6.11 Admin can send messages to students via form in this page.

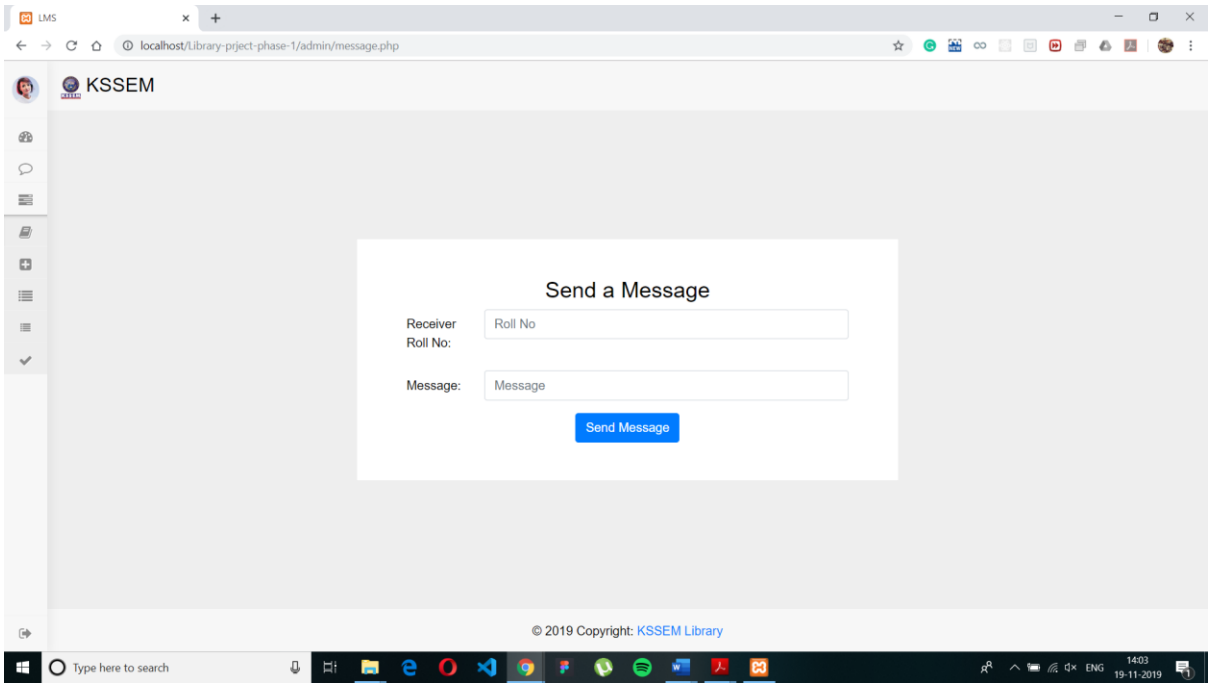

Fig:6.11 Send Message

The figure 6.12 Admin can view and update details of all books in library.

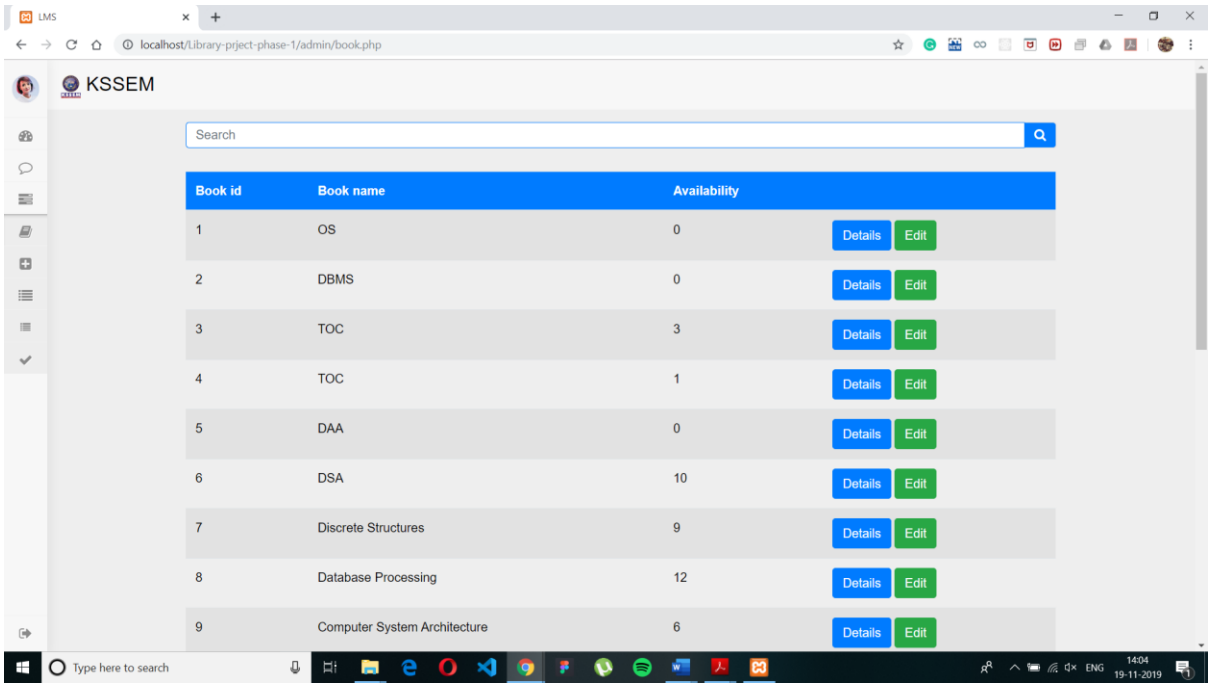

Fig: 6.12 View and Update Book Details

The figure 6.13 Admin can add new books to library via form in this page.

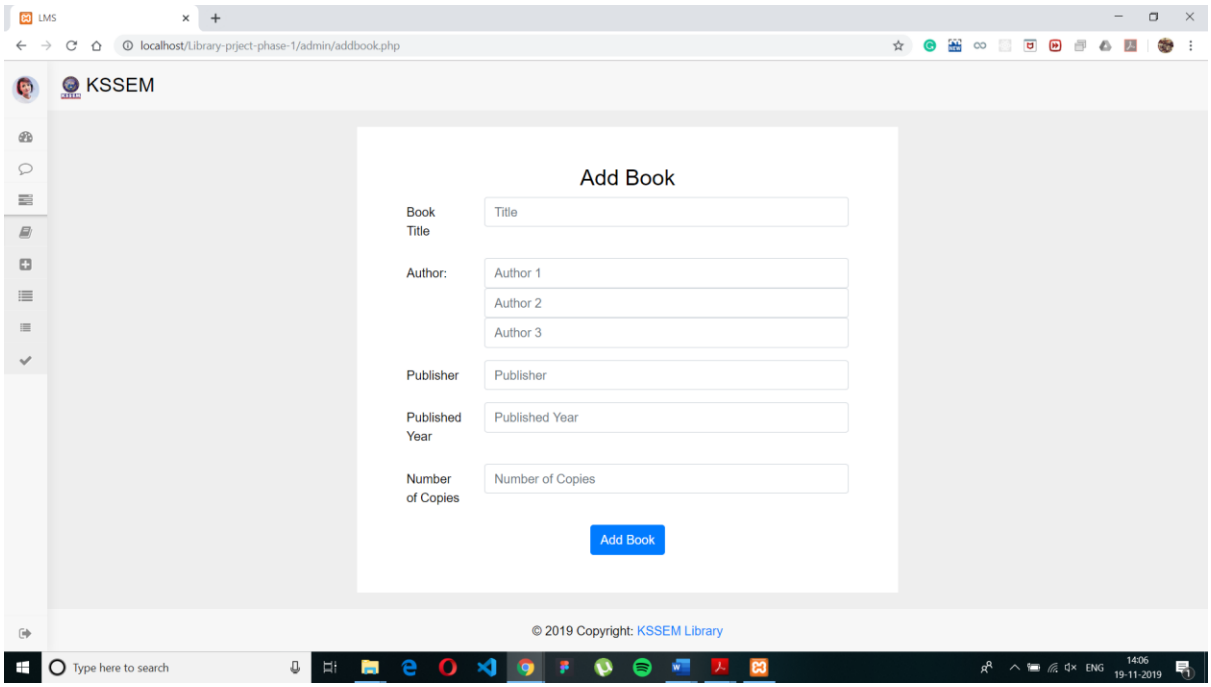

Fig: 6.13 Add Books

The figure 6.14 Admin can view issue/ renew/ return requests and process them in this page.

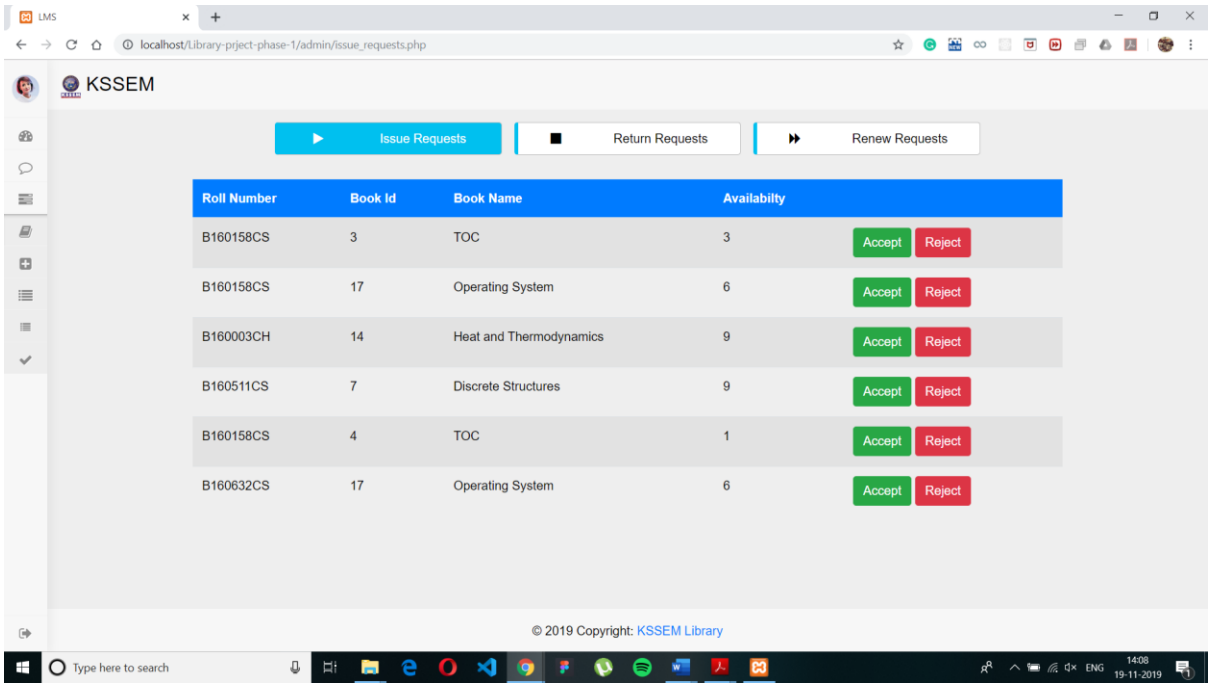

Fig: 6.14 View Requests

The figure 6.15 Admin can view recommendations sent by students in this page.

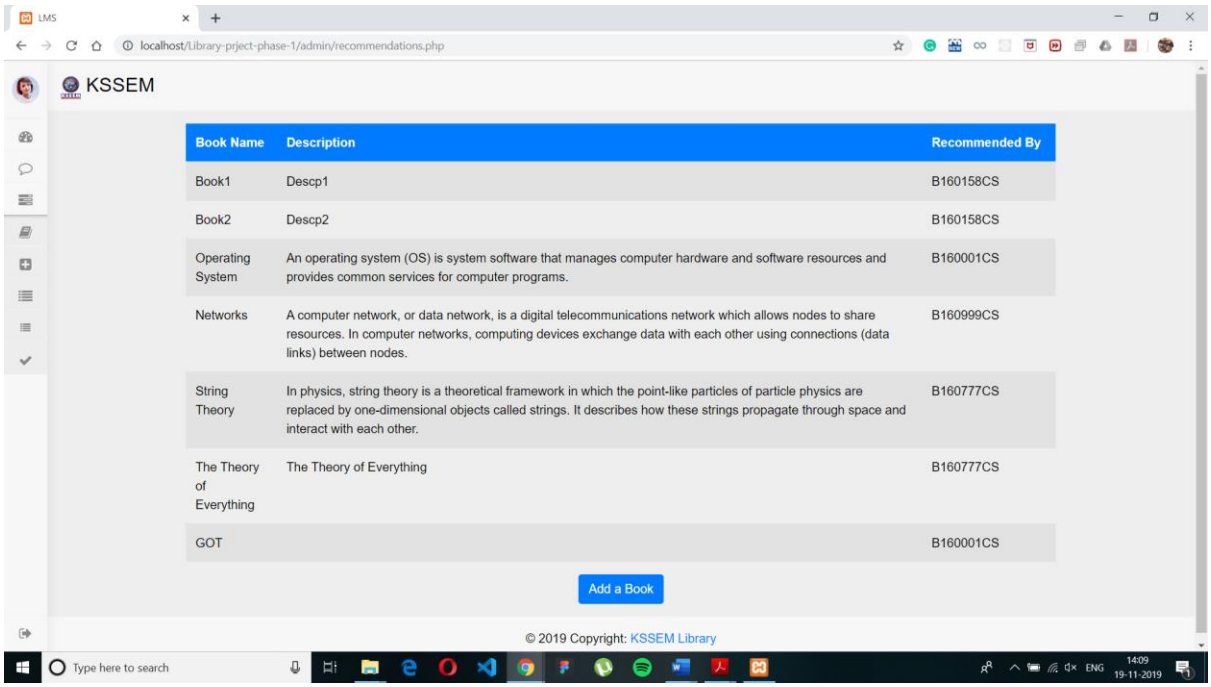

Fig: 6.15 View Recommendations

The figure 6.16 Admin can view all books currently issued by the students.

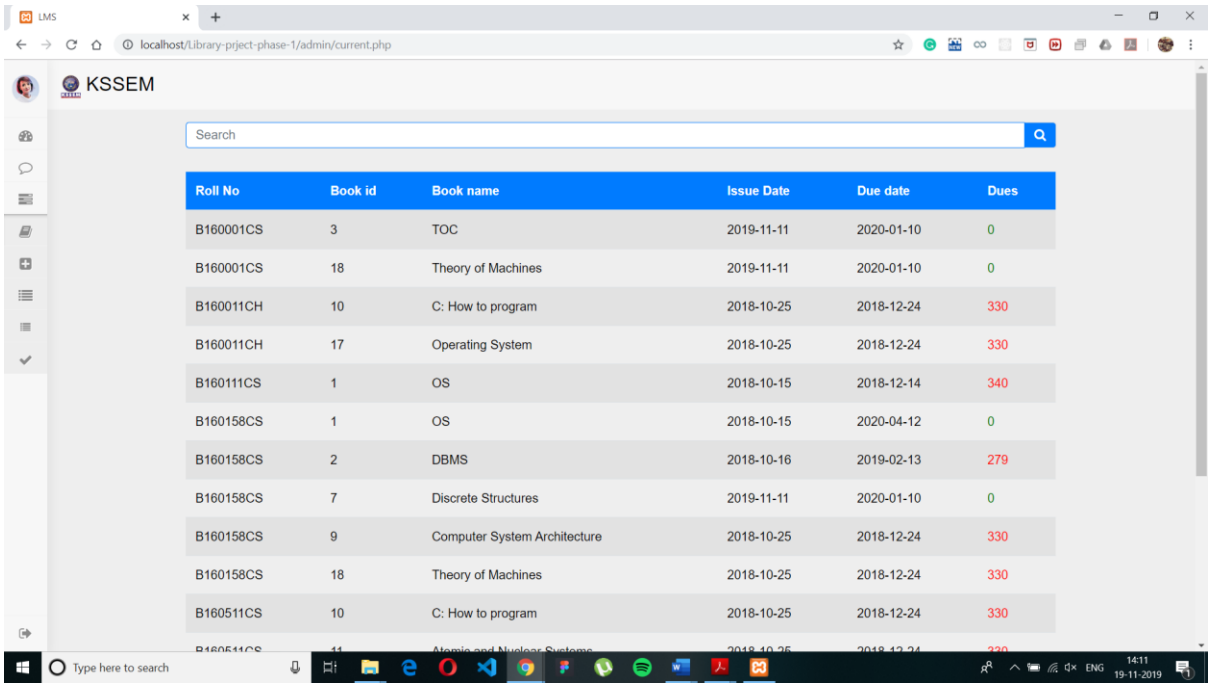

Fig: 6.16 Currently Issued Books

The figure 6.17 Admin can view and update his/her profile in this page.

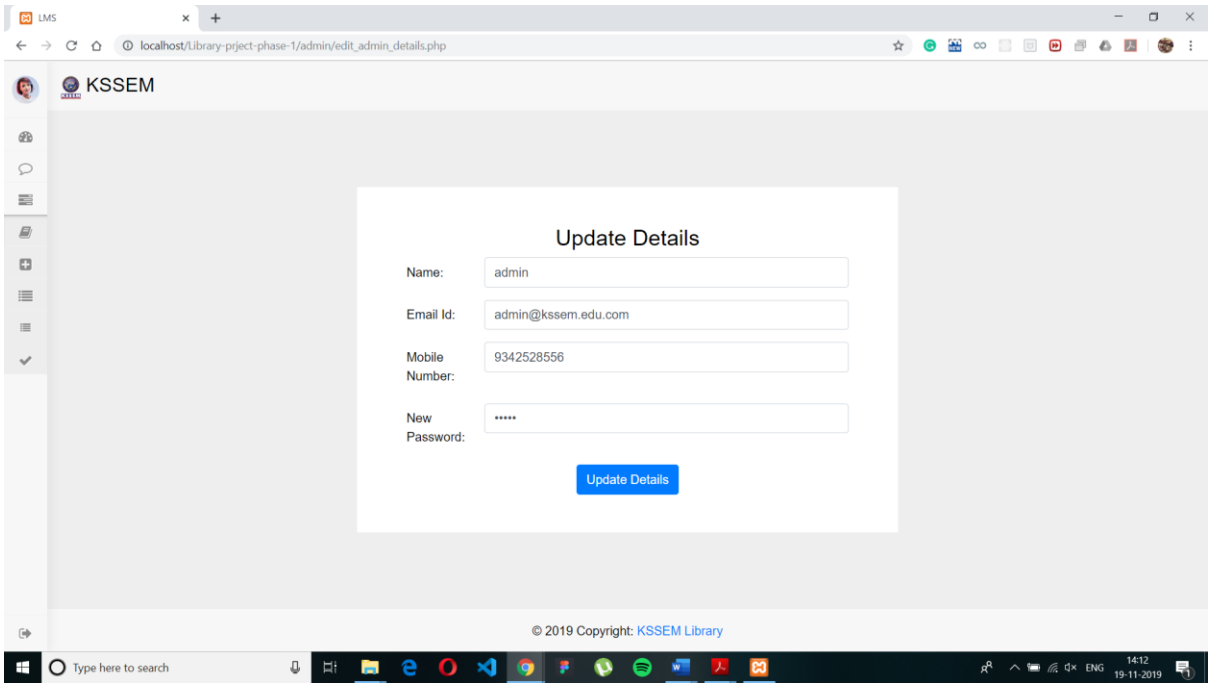

Fig: 6.17 Admin's Profile Update

The figure 6.18 Admin can register the library member in this page.

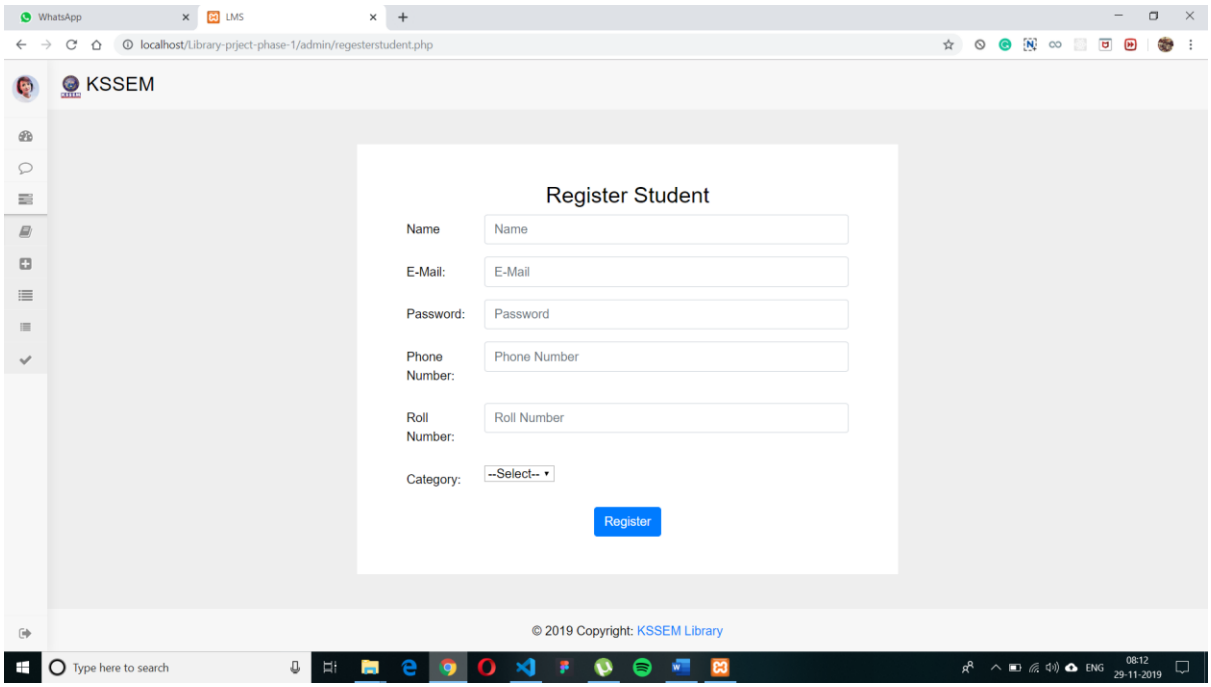

Fig: 6.18 Member Registration

CONCLUSION

The availability of new technology has enabled automation of nearly all services provided in any facet of life. The library is not an exception to this great idea; hence it comes with a good number of advantages when all the activities that take place in it are automated. New jobs will always be created as a result of automation. Staff will always be motivated to work with new automated systems, since a lot of paperwork is eliminated, and functions and services are concentrated just within the power of a mouse click and input of data into the system. Costs are incurred only once; when buying the system, and training personnel. Users have the convenience of accessing the system from the comfort of their locations since its web based. Cost benefit analysis of the system also shows that it generates more revenue than expenses hence the system is economically feasible.

FUTURE ENHANCEMENT

The bellow-mentioned points are the enhancements which can be done to increase the applicability and usage of this project. Here we can maintain the records of books and transactions.

- We can give more advanced software for College Library Management includes more facilities.
- We will host the platform on online servers to make it accessible worldwide.
- Integrate multiple load balancers to distribute the loads of the system.
- Make online payments to clear the dues.

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[10] PHP: https://www.php.net/manual/en/index.php.

[11] Bootstrap: https://getbootstrap.com/docs/4.0/getting-started/introduction/.

[12] Flexbox: https://css-tricks.com/snippets/css/a-guide-to-flexbox/.

[13] CSS Grid: http://grid.malven.co/.