VISVESVARAYA TECHNOLOGICAL UNIVERSITY

JNANA SANGAMA, MACHHE BELAGAVI – 590018

KARNATAKA

A Mini-Project Report
On
"LIBRARY MANAGEMENT SYSTEM"

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DBMS LABORATORRY WITH MINI PROJECT (18CSL58) COURSE OF Vth SEMESTER

Submitted by

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Channabasaveshwara Institute of Technology
(Affiliated to VTU, Belgaum & Approved by AICTE, New Delhi)
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CERTIFICATE

This is to certify that the project entitled **"LIBRARY MANAGEMENT SYSTEM"** has been successfully carried out by BHARATH KALYAN S **[1CG18CS017]** and BHARATHESH M R **[1CG18CS018]** in partial fulfillment for the V semester during the academic year **2020 - 21**. It is certified that all the corrections / suggestions indicated for internal assessment have been incorporated in the report. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the V semester.

Signature of Guide

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External Viva

Name of Examiners	**Signature with date**
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DECLARATION

We, **BHARATH KALYAN S** and **BHARATHESH M R,** students of V Semester, B.E**,** in Computer Science and Engineering**, C.I.T, Gubbi**, hereby declare that the project work entitled **"LIBRARY MANAGEMENT SYSTEM"**, embodies the report of our project work carried out independently by us under the guidance of **Mr. Mahesh N**, Assistant Professor, Department of CSE, CIT, Gubbi, as partial fulfillment of requirements for the V Semester during the academic year **2020-21**. We further declare that the project has not been submitted for the award of any other degree.

Place: GUBBI
Date:

BHARATH KALYAN S
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ABSTRACT

The project Library Management System creates software that stores and manages all the data needed to describe the personal and their framework within an agency. It includes definition of various levels of hierarchy in an agency, the price structure pertaining to every element in this hierarchy, the description of every department functioning in the organization and the overall product database which integrates elements in all the afore mentioned. It has a database administration that has access to the entire database, in regards with viewing, deleting and update of information. The exclusive right is implemented using authorized access.

A library is a business that prepares and serves food and drinks to customers. Meals are generally served and eaten on the premises, but many restaurants also offer take-out and food delivery services. Restaurants vary greatly in appearance and offerings, including a wide variety of cuisines and service models ranging from inexpensive fast food restaurants and cafeterias, to mid-priced family restaurants, to high-priced luxury establishments.

ACKNOWLEDGEMENT

A great deal of time and lot of effort has gone into completing this project report and documenting it. The number of hours spent in getting through various books and other materials related to this topic chosen by me have reaffirmed its power and utility in doing this project.

Several special people have contributed significantly to this effort. First, we are grateful to our institution **Channabasaveshwara Institute of Technology**, Gubbi, which provides us an opportunity in fulfilling our most cherished desire of reaching the goal.

We acknowledge and express our sincere thanks to our beloved Principal & Director **Dr. Suresh D S** for his many valuable suggestions and continuous encouragement and support in the academic endeavours.

We express our sincere gratitude to **Dr. Shantala C P,** Vice Principal & Head, Department of CSE, for providing her constructive criticisms and suggestions.

We wish to express our deep sense of gratitude to **Mr. Mahesh N,** Department of Computer Science and Engineering for all the guidance and who still remains a constant driving force and motivated through innovative ideas with tireless support and advice during the course of project to examine and helpful suggestions offered, which has contributed immeasurably to the quality of the final report.

Project Associates:

BHARATH KALYAN S [1CG18CS017]

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CONTENTS

CHAPTER 1

INTRODUCTION

The project Library Management [1] system creates software that stores and manages all the data needed to describe the personal and their framework within an agency. It has a database administration that has access to the entire database, in regards with viewing, deleting and update of information. The exclusive right is implemented using authorized access.

The history of libraries began with the first efforts to organize collections of documents. Topics of interest include accessibility of the collection, acquisition of materials, arrangement and finding tools, the book trade, the influence of the physical properties of the different writing materials, language distribution, role in education, rates of literacy, budgets, staffing, libraries for specially targeted audiences, architectural merit, patterns of usage, and the role of libraries in a nation's cultural heritage, and the role of government, church or private sponsorship. Since the 1960s, issues of computerization and digitization have arisen.

A college library management is a project that manages and stores books information electronically according to students needs. The system helps library manager to keep a constant track of all the books available in the library. It allows both the admin and the student to search for the desired book. It becomes necessary for colleges to keep a continuous check on the books issued and returned and even calculate fine. This task if carried out manually will be tedious and includes chances of mistakes. These errors are avoided by allowing the system to keep track of information such as issue date, last date to return the book and even the stats.

CHAPTER 2

HISTORICAL REVIEW

2.1 History of Libraries

The history of libraries began with the first efforts to organize collections of documents. Topics of interest include accessibility of the collection, acquisition of materials, arrangement and finding tools, the book trade, the influence of the physical properties of the different writing materials, language distribution, role in education, rates of literacy, budgets, staffing, libraries for specially targeted audiences, architectural merit, patterns of usage, and the role of libraries in a nation's cultural heritage, and the role of government, church or private sponsorship. Since the 1960s, issues of computerization and digitization have arisen.

The first libraries consisted of archives of the earliest form of writing – the clay tablets in cuneiform script discovered in temple rooms in Sumer some dating back to 2600 BC. About an inch thick, tablets came in various shapes and sizes. Mud-like clay was placed in the wooden frames, and the surface was smoothed for writing and allowed to dry until damp. After being inscribed, the clay dried in the sun, or for a harder finish, was baked in a kiln. For storage, tablets could be stacked on edge, side by side, the contents described by a title written on the edge that faced out and was readily seen. The first libraries appeared five thousand years ago in Southwest Asia's Fertile Crescent, an area that ran from Mesopotamia to the Nile in Africa. Known as the cradle of civilization, the Fertile Crescent was the birthplace of writing, sometime before 3000 BC. (Murray, Stuart A.P.) These

archives, which mainly consisted of the records of commercial transactions or inventories, mark the end of prehistory and the start of history

2.2 History of Database Management System

Following the technology progress in the areas of processors, computer memory, computer storage, and computer networks, the sizes, capabilities, and performance of databases and their respective DBMSs have grown in orders of magnitude. The development of database technology can be divided into three eras based on data model or structure: navigational, SQL/relational, and post-relational.[2] The two main early navigational data models were the hierarchical model, epitomized by IBM's IMS system, and the CODASYL model (network model), implemented in a number of products such as IDMS.

The relational model employs sets of ledger-style tables, each used for a different type of entity. Only in the mid-1980s did computing hardware become powerful enough to allow the wide deployment of relational systems (DBMSs plus applications). By the early 1990s, however, relational systems dominated in all large-scale data processing applications, and as of 2015 they remain dominant: IBM DB2, Oracle, MySQL, and Microsoft SQL Server are the top DBMS. The dominant database language, standardized SQL for the relational model, has influenced database languages for other data models.

2.3 History of MySQL

MySQL is an open-source relational database management system . MySQL is written in C and C++. Its SQL parser is written in yacc, but it uses a home-brewed lexical analyzer. MySQL works on many system platforms, including Linux, macOS, Microsoft Windows, NetBSD. MySQL is offered under

two different editions: the open source MySQL Community Server and the proprietary Enterprise Server. MySQL Enterprise Server is differentiated by a series of proprietary extensions which install as server plugins, but otherwise shares the version numbering system and is built from the same code base.[1]

Major features that are available in MySQL are a broad subset of ANSI SQL 99,as well as extensions, Cross-platform support, Stored procedures, using a procedural language that closely adheres to SQL/PSM, Triggers, Cursors, Updatable views, Online DDL when using the InnoDB Storage Engine. Many programming languages with language-specific APIs include libraries for accessing MySQL databases. These include MySQL Connector/Net for integration with Microsoft's Visual Studio and the JDBC driver for Java. In addition, an ODBC interface called MySQL Connector/ODBC allows additional programming languages that support the ODBC interface to communicate with a MySQL database, such as ASP or ColdFusion.

CHAPTER 3

REQUIREMENT SPECIFICATION

3.1 System Requirements

The basic requirements for the development of this mini project are as follows

3.1.1 Hardware Configuration

1. Processor: Intel core i3 or above
2. Ram:512 MB
3. Hard disk:20 GB

3.1.2 Software Configuration

1. Front end tool: HTML
2. Back end tool: MySQL
3. Development tools: XAMPP server
4. IDE : Eclipse & IntelliJ
5. Documentation tool: Microsoft office 2003 or above

3.2 Development Environment

3.2.1 Frontend-Java

Java [2] is an entire programming language resembling C or C++. It takes a sophisticated programmer to create Java code. And it requires a sophisticated programmer to maintain it. With Java, you can create complete applications. Or you can attach a small group of instructions, a Java "applet" that improves your basic HTML. A Java Applet can also cause text to change colour when you roll over it. A game, a calendar, a scrolling text banner can all be created with Java Applets. There are sometimes compatibility problems between Java and various

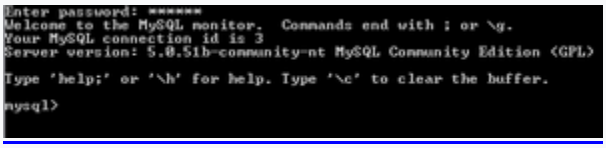
browsers, operating systems or computers, and if not written correctly, it can be slow to load. Java is a powerful programming language with excellent security, but you need to be aware of the tradeoffs.

3.2.2 Backend-MySQL

It is an open source relational database management system (RDBMS). The MySQL [2] development project has made its source code available under the terms of GNU General Public License, as well as under a variety of proprietary agreements. MySQL was owned and sponsored by a single for-profit firm, the Swedish company MySQL AB, now owned by Oracle Corporation. For proprietary use, several paid editions are available, and offered additional functionality. MySQL is central component of LAMP open-source web application software stack. LAMP is an acronym of "Linux, Apache, MySQL, Perl/PHP/Python". Application that use the MySQL database include TTPO3, MODx, Joomal, WordPress, phpBB, MyBB, and Drupal. MySQL is also used in many high-profiles. Large-scale websites, including Google, Facebook, Twitter, Flickr, YouTube.

XAMPP

XAMPP is a small and light Apache distribution containing the most common web development technologies in a single package. XAMPP is available as a free download in two specific packages: full and lite. While the full package download provides a wide array of development tools, XAMPP Lite contains the necessary technologies that meet the Ontario Skills Competition standards.The light version is a small package containing Apache HTTP Server, PHP, MySQL, phpMyAdmin, Openssl, and SQLite.



Screenshot of the default MySQL command-line banner and prompt

Original author(s)	MySQL AB
Developer(s)	Oracle Corporation
Initial release	23 May 1995; 22 years ago
Stable release	5.7.20[1] / 16 October 2017; 37 days ago
Preview release	8.0.3 rc[2] / 21 September 2017; 2 months ago
Repository	https://github.com/mysql/mysql-server, git://anongit.gentoo.org/proj/mysql-extras.git
Development status	Active
Written in	C, C++[3]
Operating system	Windows, Linux, Solaris, macOS, FreeBSD[4]
Available in	English
Type	RDBMS
License	GPL (version 2) or proprietary[5]
Website	www.mysql.com

Fig 3.1 MySQL Command Line

The above figure shows MySQL Command Line, its author and other details.

Normalization

Normalization [3] is a process of organizing the data in database to avoid data redundancy, insertion anomaly, update anomaly & deletion anomaly. To overcome these anomalies we need to normalize the data. There are 4 basic types of normalizations. They are:

- First normal form(1NF)
- Second normal form(2NF)
- Third normal form(3NF)
- Boyce & Codd normal form (BCNF)

A table is said to be in 2NF if the two conditions stated are satisfied. The table is in First normal form and all the non-prime attribute are dependent on the proper subset of any candidate key of table. The attribute that is not part of any candidate key are known as non-prime attribute.

A table design is said to be in 3NF if the table is in 2NF and Transitive functional dependency of non-prime attribute on any super key are removed.

A table design is said to be in BCNF if there is only one super key.

CHAPTER 4

SYSTEM DESIGN

4.1 E-R Diagram

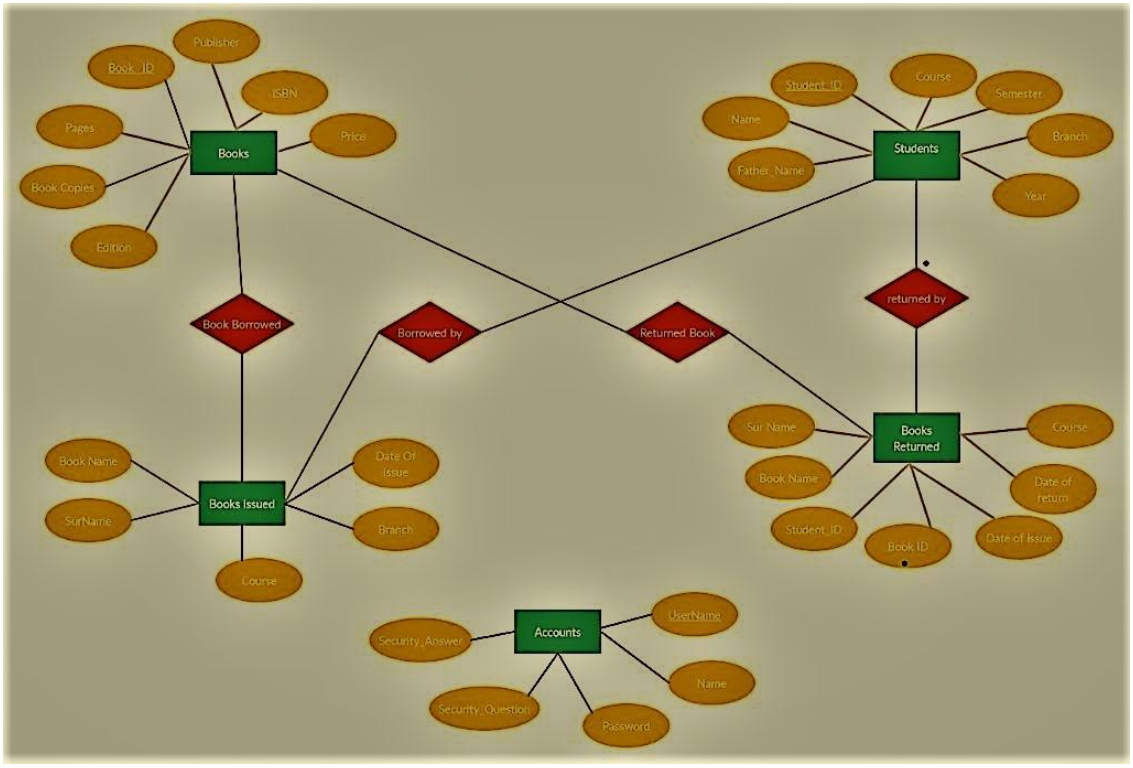


Figure 4.1 E-R Diagram of Library Management System

An entity–relationship [4] model (ER model) describes inter-related things of interest in a specific domain of knowledge. An ER model is composed of entity types (which classify the things of interest) and specifies relationships that can exist between instances of those entity types.

In software engineering an ER model is commonly formed to represent things that a business needs to remember in order to perform business processes. Consequently, the ER model becomes an abstract data model that defines a data or

Information structure that can be implemented in database, typically a relational database.

4.2 Schema Diagram

The database schema [4] of a database system is its structure described in a formal language supported by the database management system (DBMS). The term "schema" refers to the organization of data as a blueprint of how the database is constructed (divided into database tables in the case of relational databases). The formal definition of a database schema is a set of formulas (sentences) called integrity constraints imposed on a database.

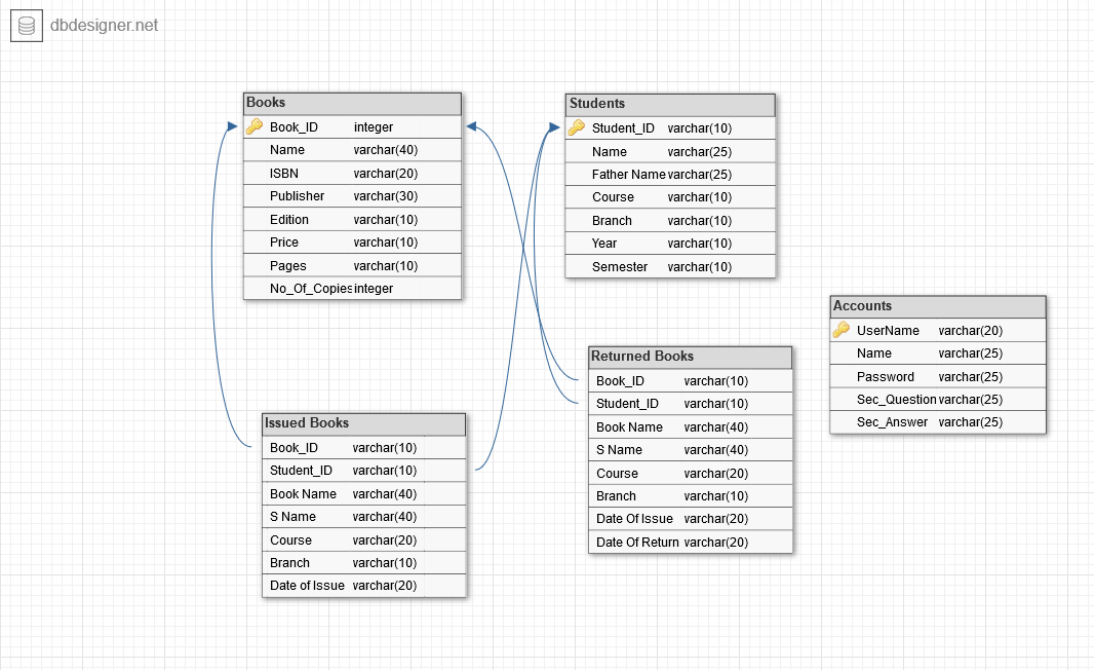


Figure 4.2 Schema Diagram

Above is the schema diagram for ER Diagram shown in the Fig 4.1

It shows the relationship between all foreign key attributes and primary key attributes.

CHAPTER 5

SYSTEM IMPLEMENTATION

5.1 Modules Description

***Create,** create table statement is used to create table to store data. Integrity constraints like primary key, foreign key, unique key, can be defined while creating the table.

Queries:

5.1.1 Account Table

```
CREATE TABLE `account` (
  `username` varchar(20) NOT NULL,
  `name` varchar(25) NOT NULL,
  `password` varchar(25) NOT NULL,
  `sec_q` varchar(25) NOT NULL,
  `sec_ans` varchar(25) NOT NULL,  PRIMARY KEY (`username`);
```

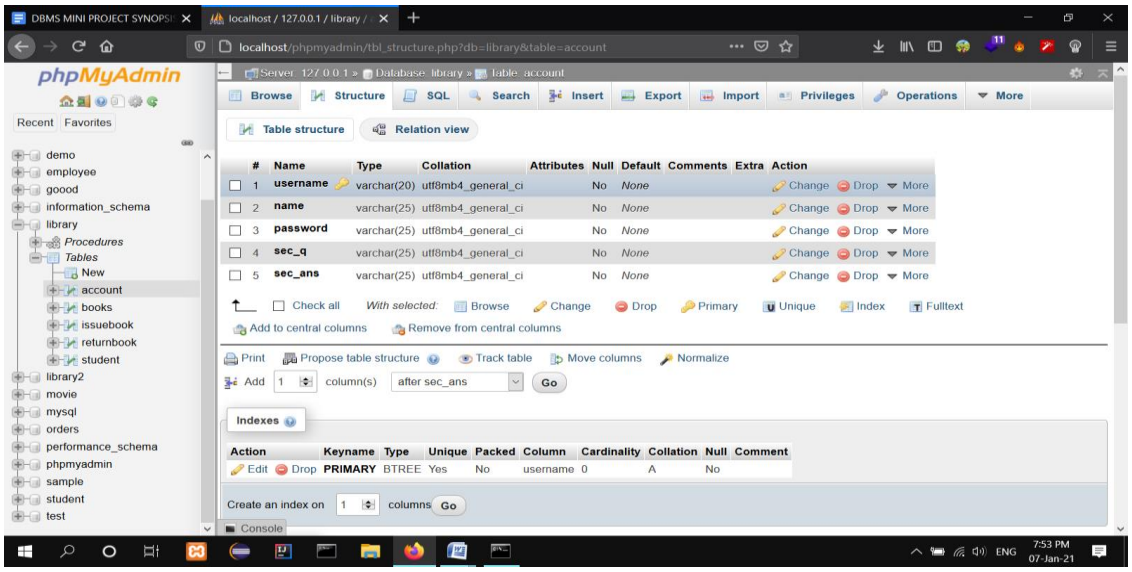


Figure 5.1: Account Table Description.

Figure 5.1 shows the Librarians registered in the Database.

5.1.2 Books table

```
CREATE TABLE `books` (
  `book_id` varchar(10) NOT NULL,
  `name` varchar(40) DEFAULT NULL,
  `isbn` varchar(20) DEFAULT NULL,
  `publisher` varchar(30) DEFAULT NULL,
  `edition` varchar(10) DEFAULT NULL,
  `price` varchar(10) DEFAULT NULL,
  `pages` varchar(10) DEFAULT NULL,
  `no_of_copies` int(11) DEFAULT NULL,
  PRIMARY KEY (`book_id`);
```

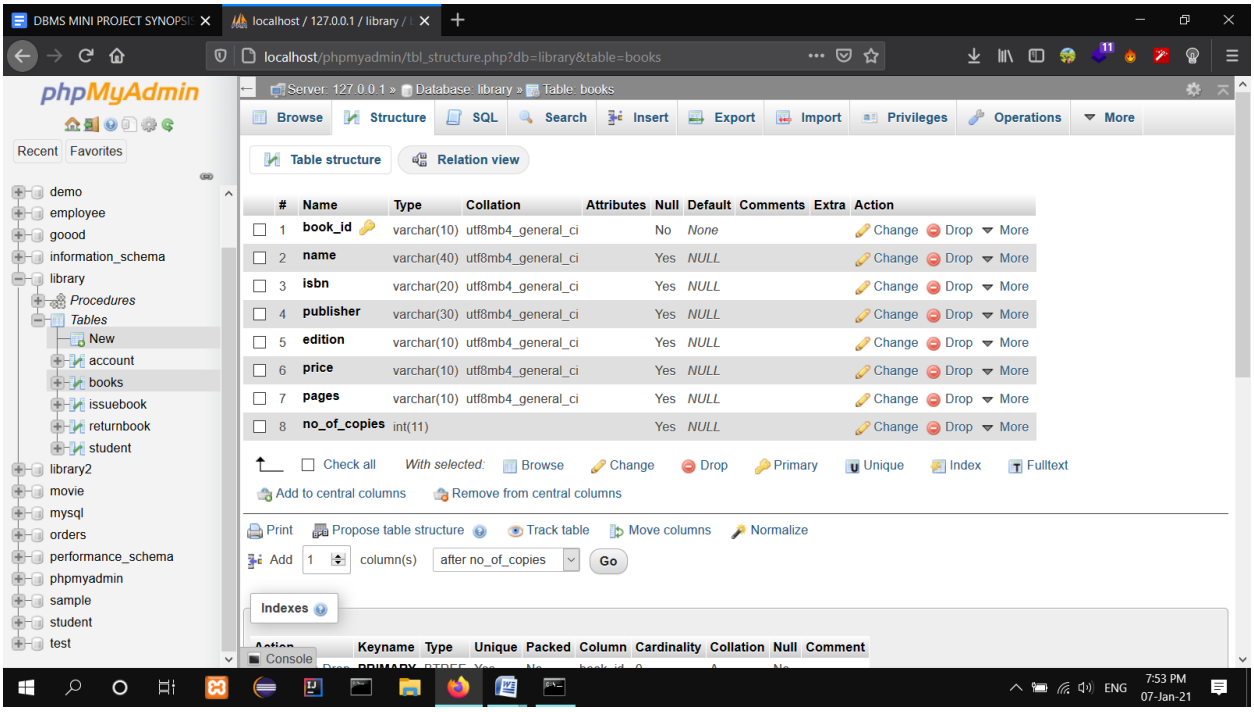


Figure 5.2: Books table description.

Figure 5.2 shows all available books in the Library.

5.1.3 Students Details table

```
CREATE TABLE `student` (
  `student_id` varchar(10) NOT NULL,
  `name` varchar(25) NOT NULL,
  `father` varchar(25) NOT NULL,
  `course` varchar(10) DEFAULT NULL,
  `branch` varchar(10) DEFAULT NULL,
  `year` varchar(10) DEFAULT NULL,
  `semester` varchar(10) DEFAULT NULL,
  PRIMARY KEY (`student_id`),
  CONSTRAINT `CONSTRAINT_1` CHECK (`name` <> ''),
  CONSTRAINT `CONSTRAINT_2` CHECK (`father` <> ''));
```

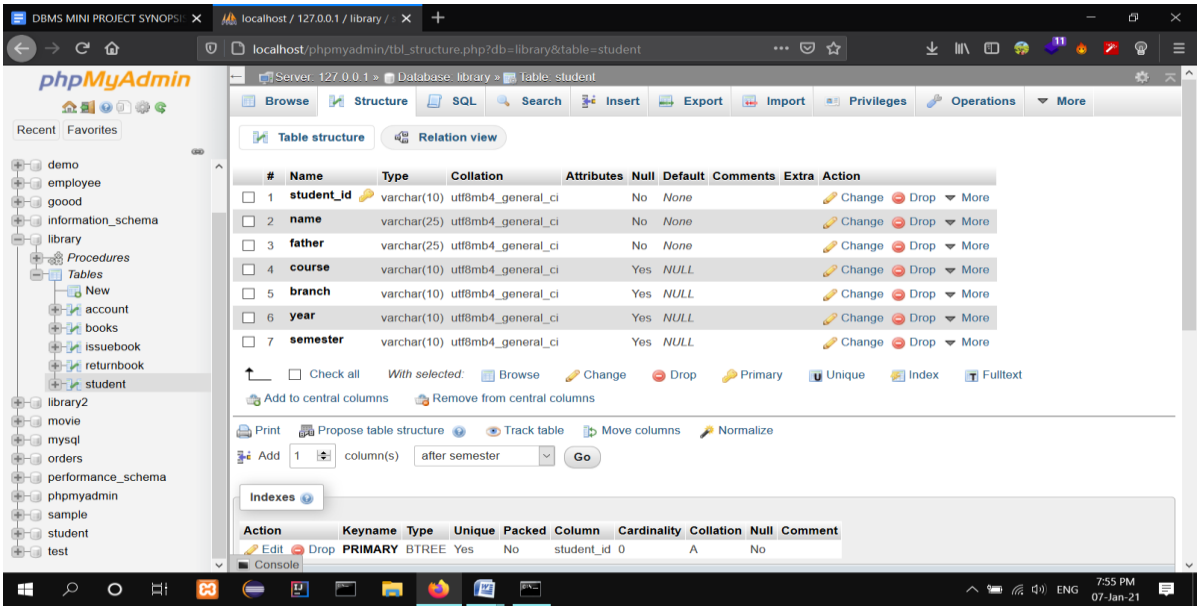


Figure 5.3: Student Details table description.

Figure 5.3 shows all registered students to use Library.

5.1.4 Issued Books table

```
CREATE TABLE `issuebook` (
`book_id` varchar(10) DEFAULT NULL,
`student_id` varchar(10) DEFAULT NULL,
`bname` varchar(40) DEFAULT NULL,
`sname` varchar(40) DEFAULT NULL,
`course` varchar(20) DEFAULT NULL,
`branch` varchar(10) DEFAULT NULL,
`dateOfIssue` varchar(20) DEFAULT NULL,
KEY `book_id` (`book_id`),
KEY `student_id` (`student_id`),
FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`) ON DELETE CASCADE, FOREIGN KEY (`student_id`) REFERENCES `student` (`student_id`) ON DELETE CASCADE);
```

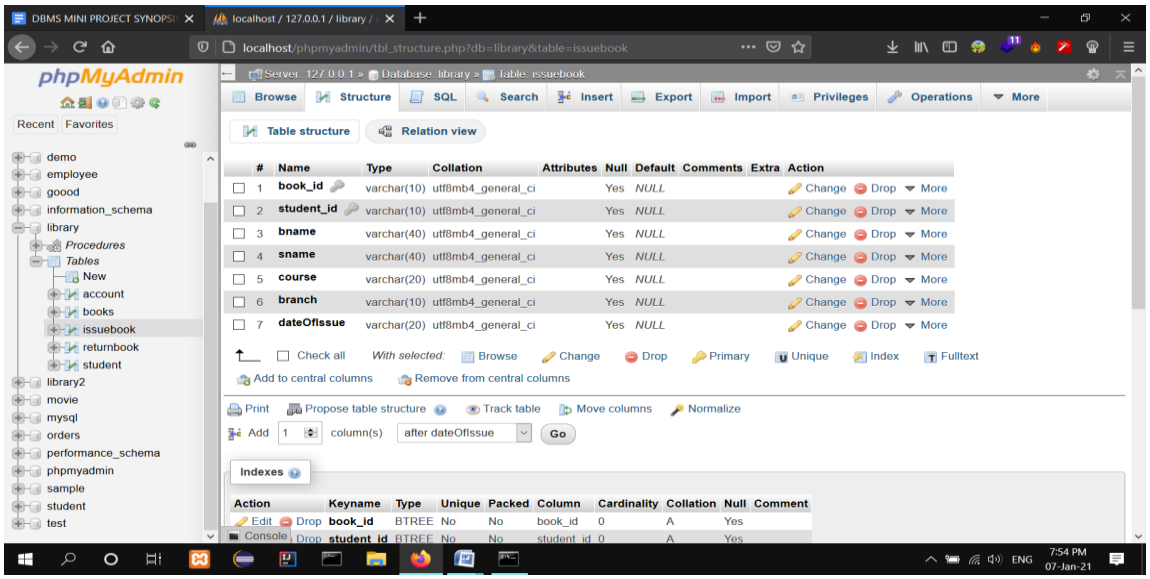


Figure 5.4: Issued Books table description.

Figure 5.4 shows all the issued books for a particular student.

5.1.5 Returned Books table

```
CREATE TABLE `returnbook` (
  `book_id` varchar(10) DEFAULT NULL,
  `student_id` varchar(10) DEFAULT NULL,
  `bname` varchar(40) DEFAULT NULL,
  `sname` varchar(40) DEFAULT NULL,
  `course` varchar(20) DEFAULT NULL,
  `branch` varchar(10) DEFAULT NULL,
  `dateofissue` varchar(20) DEFAULT NULL,
  `dateofreturn` varchar(20) DEFAULT NULL,
  KEY `book_id` (`book_id`), KEY `student_id` (`student_id`),
  FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`) ON DELETE CASCADE, FOREIGN KEY (`student_id`) REFERENCES `student` (`student_id`) ON DELETE CASCADE);
```

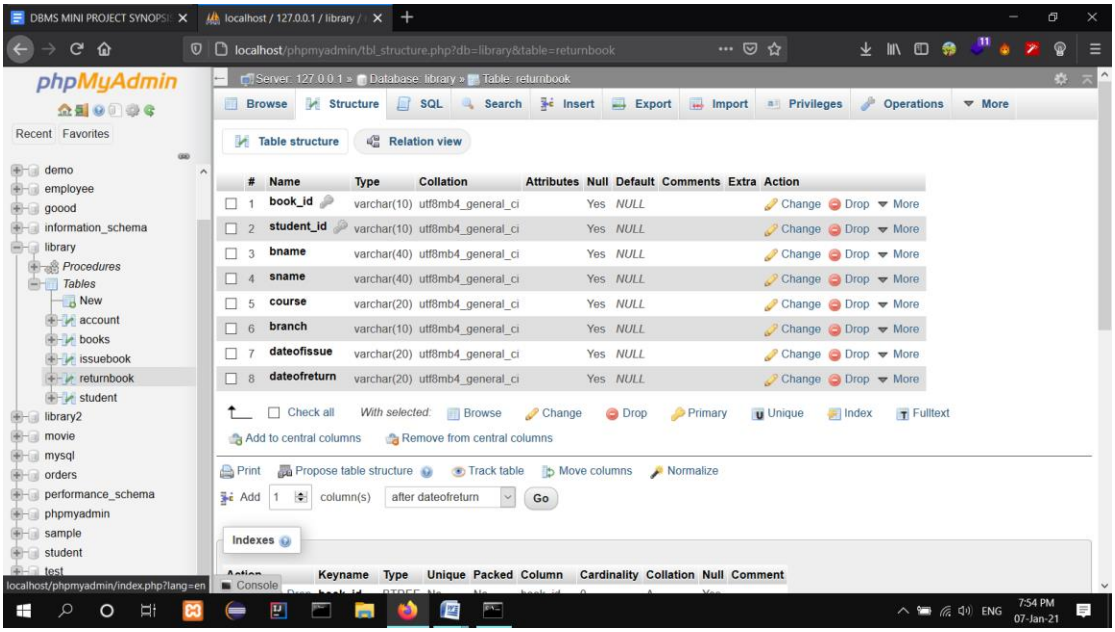


Figure 5.5: Returned Books table description

Figure 5.5 shows all books returned.

5.2 OPERATIONS PERFORMED:

***Insertion,** insertion is use to insert the tuple or row to the table. We insert value from frontend by making use HTTP the value inserted from to frontend will be going to store in backend database in XAMPP Server.

***Algorithm for Insert**

Step 1: BEGIN

Step 2: Get all the necessary values required for insertion into variable defined in the method.

Step 3: Define the query for insertion as stated.

Step 4: Execute the Query.

Step 5: END

***Update,** update will help to edit the tables in the database. In this project we have given update option for table package, to update the place column in package table.

***Algorithm for Update**

Step 1: BEGIN

Step 2: Get all the necessary values required for updating the values from the text field.

Step 3: Define the Query for Updating as stated above.

Step 4: Execute the Query.

Step 5: END

***Delete,** delete will help us to delete a tuple or row from the table. In this project we have delete option for table employee to delete the particular row or employee information from the table.

***Algorithm for Delete**

Step 1: BEGIN

Step 2: Get the identification number of the entity which is to be deleted.

Step 3: Display the details and ask whether to confirm the deletion process.

Step 4: Execute the Query and show Confirm Message Dialog Box.

Step 5: END

*** Trigger,** a trigger [6] is a special kind of stored procedure that automatically executes when an event occurs in the database server. DML triggers execute when a user tries to modify data through a data manipulation language(DML) event. DML events are INSERT, UPDATE, OR DELETE statements on a table or view. In this project we added trigger on trigger on table package to give discount of 10% if the group has more than 10 travelers

***Stored procedure,** a stored procedure [5] is a set of Structure Query Language (SQL) statements with an assigned name, which are stored in a relational database management system as a group, so it can be reused and shared by multiple programs. Stored procedure can access or modify data in a database, in this project we added stored procedure for table package to find income of our site.

CHAPTER 6

SAMPLE OUTPUT

6.1 Screenshots

6.1.1 Welcome Page

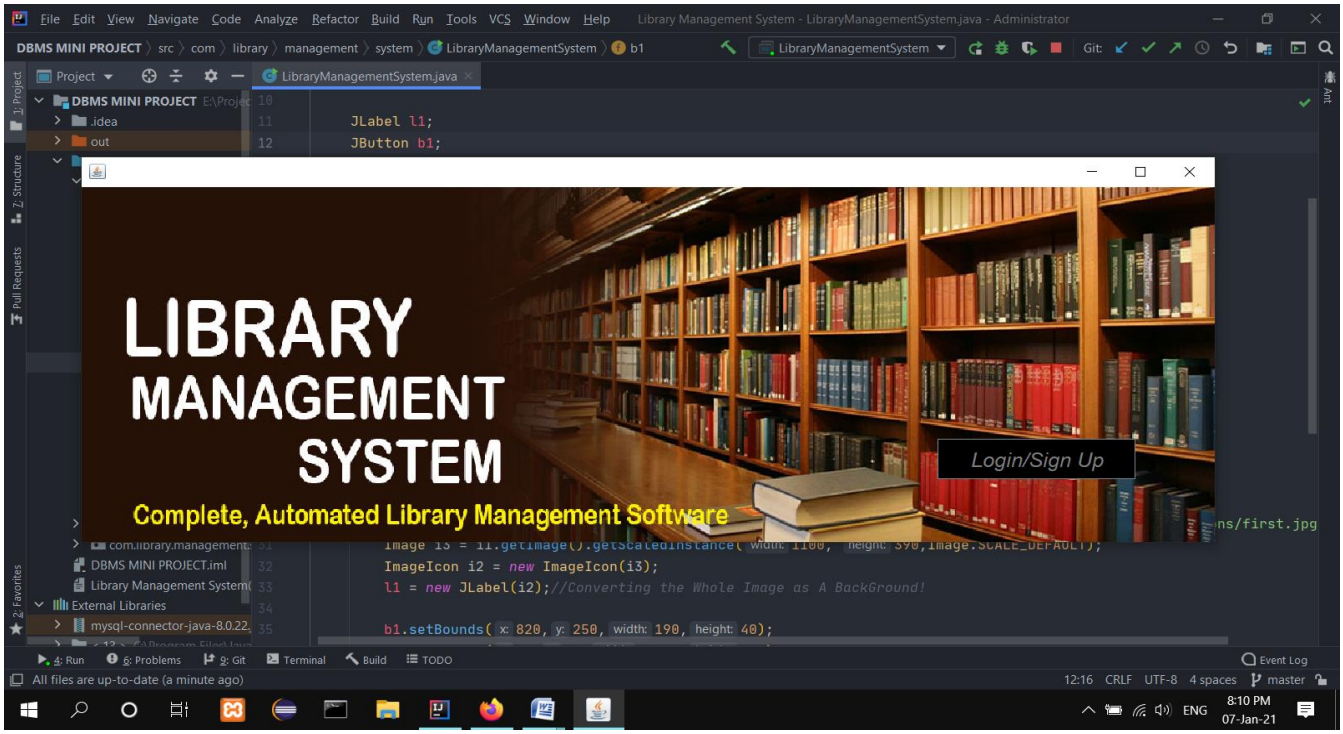


Fig 6.1 Welcome page

Figure 6.1 is the Welcome Page. It is a homepage for the Library Management System where the Admin click on Login/Sign Up button to open Login/Sign Up Page.

This JFrame is just a picture with a Button and a Label Components.

6.1.2 Login Frame

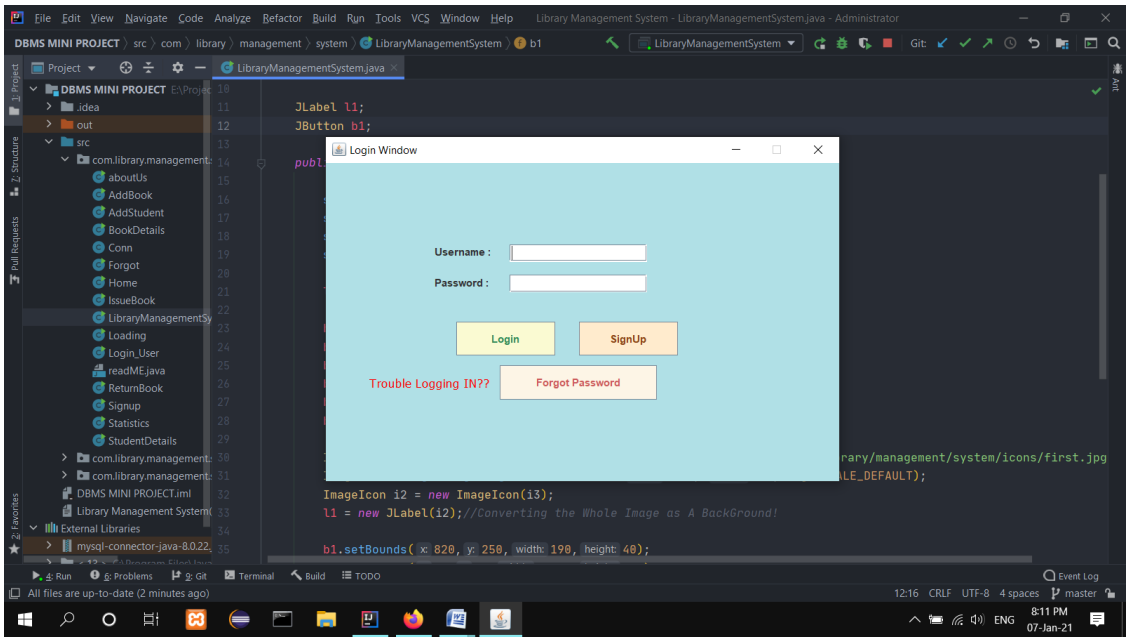


Fig 6.2 Login Page

Figure 6.2 is the Login Page where a Admin can Log In or a new Librarian can create new Account.

6.1.3 Forgot Panel

Fig 6.3 Forgot Panel

Figure 6.3 is the forgot panel where the Admin can reset his password by providing correct answer to the security question.

6.1.4 Home Page

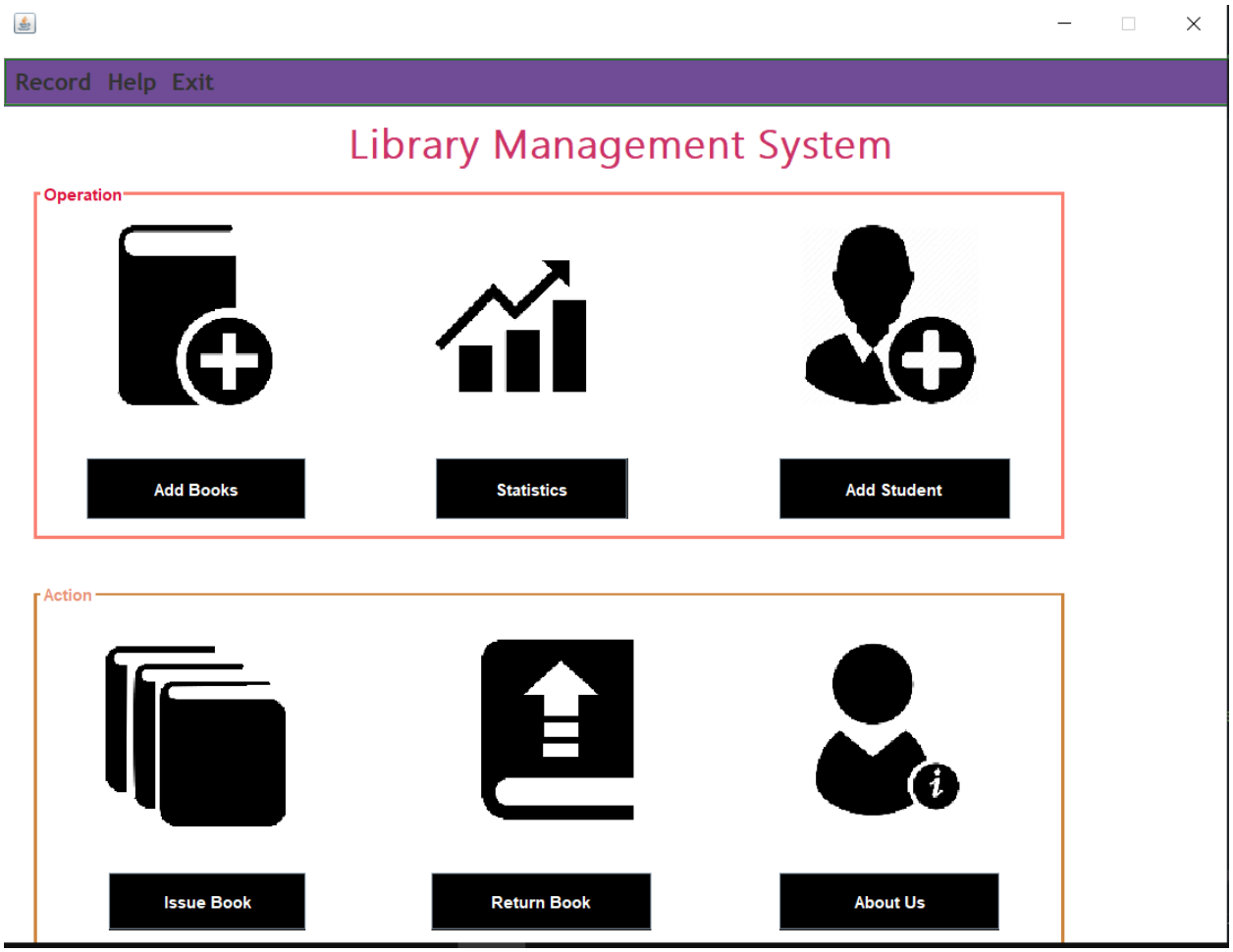


Fig 6.4 Home Page

Figure 6.4 is the Home Page where all the main functions are provided. Admin can add, delete books and students and also can see the Statistics of the Books like books issued to particular students and books received by the students .Also Admin can search specific student details in this Main Home Page.

6.1.5 Add Students Page

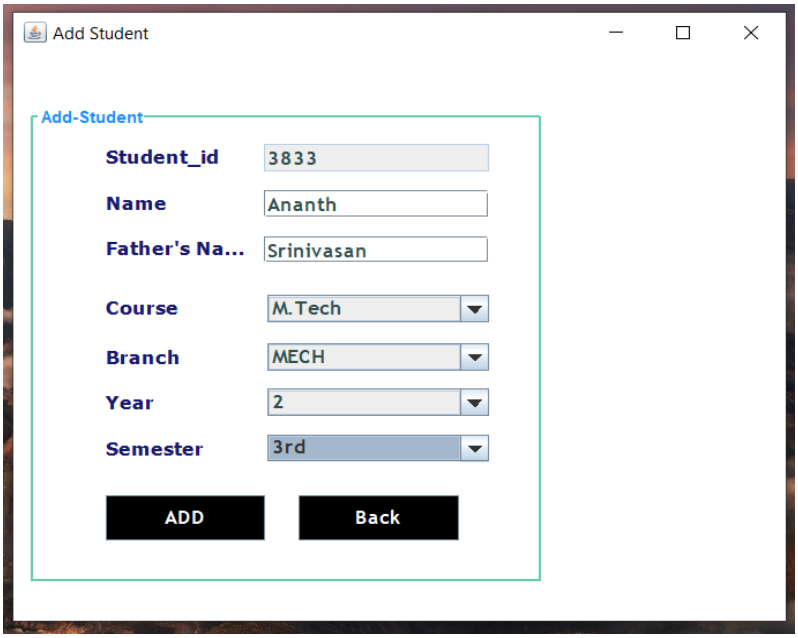


Fig 6.5 Add Students Frame

Figure 6.5 shows the JFrame where we can add Students to the Database.

6.1.6 Add Books Page

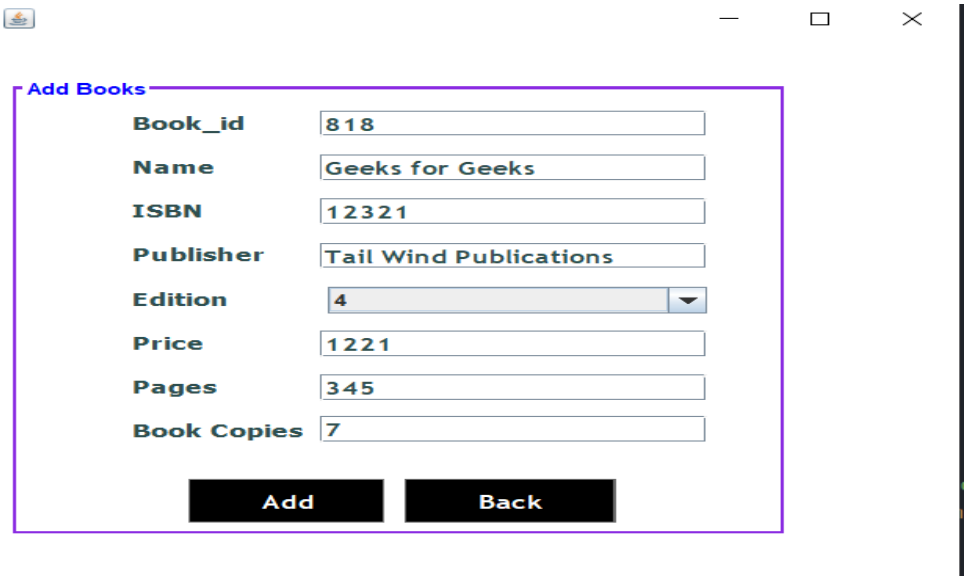


Fig 6.6 Add Books Frame

Figure 6.6 shows the JFrame where we can add Books to the Database.

6.1.7 Issue Books Page

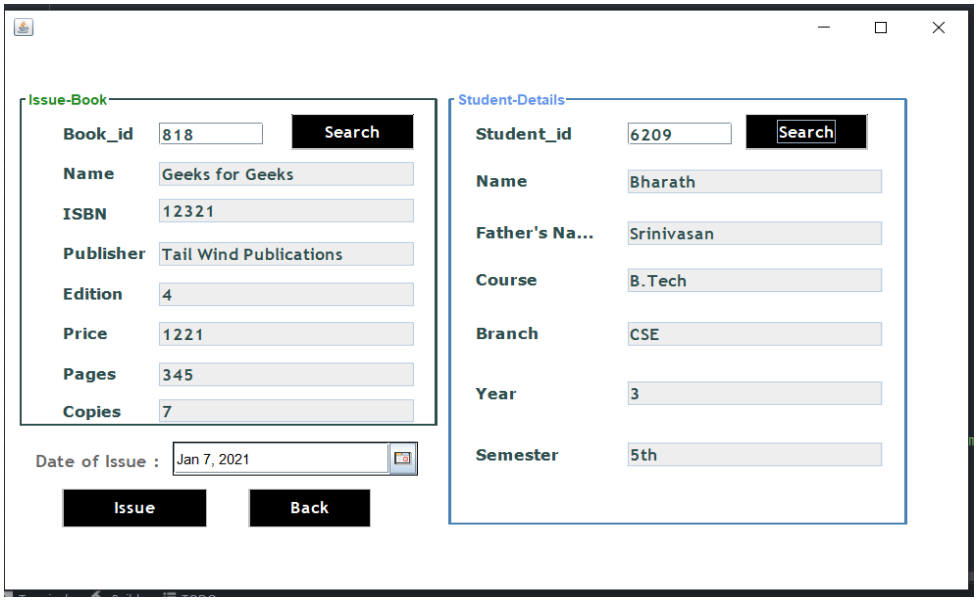


Fig 6.7 Issue Books Frame

Figure 6.7 shows JFrame where books are Issued with Book_ID and Student_ID.

6.1.8 Return Books Page

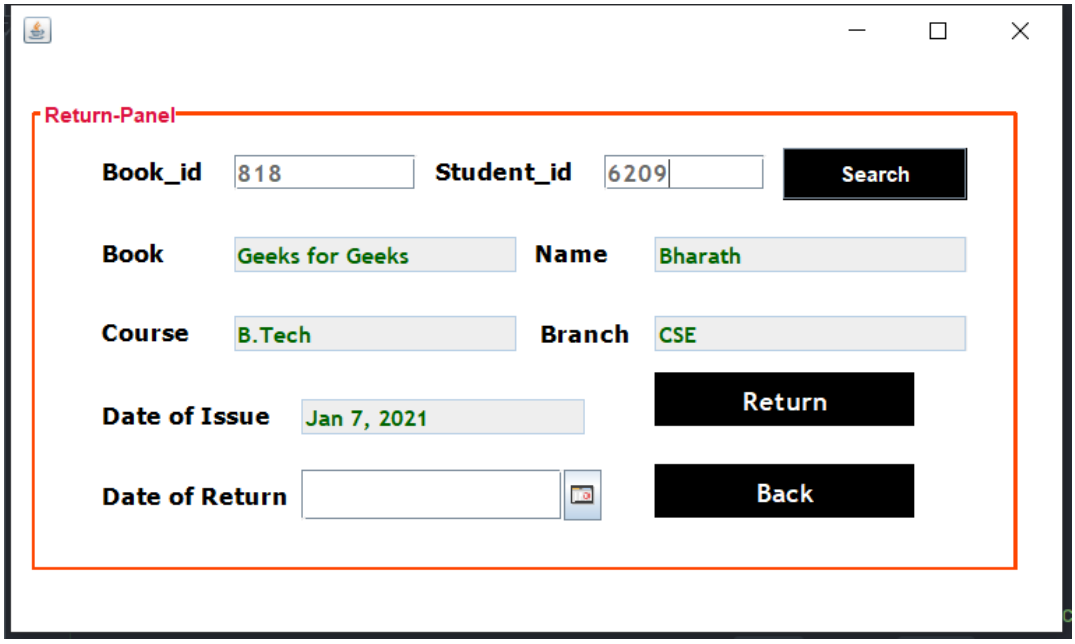


Fig 6.8 Return Books Frame

Figure 6.8 shows JFrame of Returning Books.

6.1.9 Book Statistics

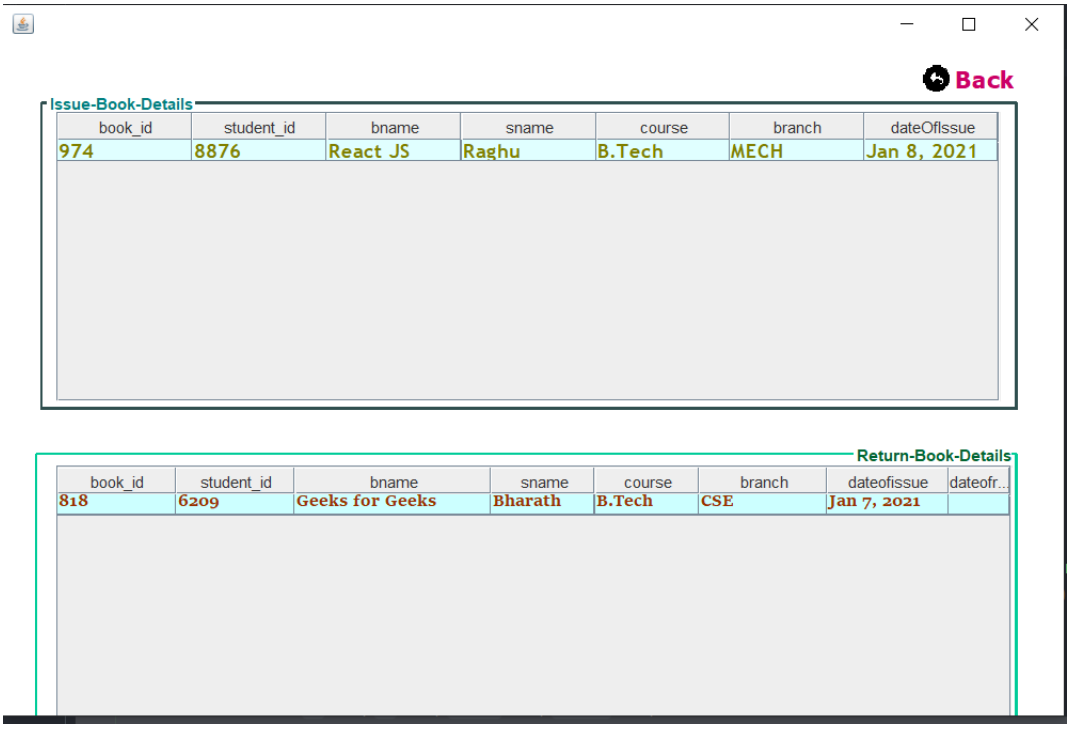
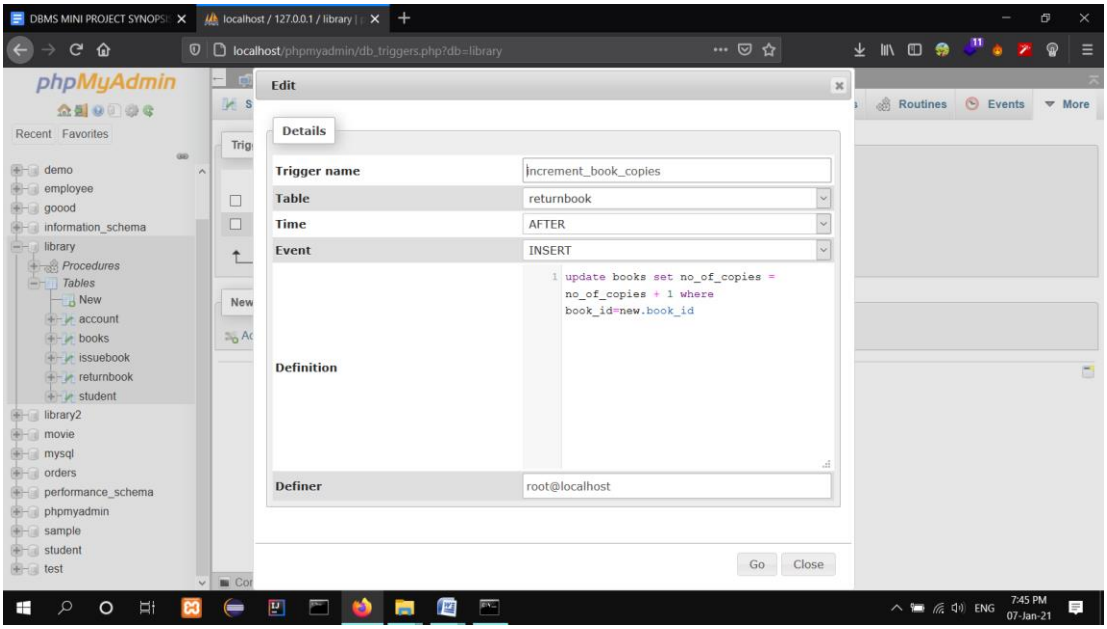


Fig 6.9 Book Statistics

Figure 6.9 shows the Books Issued and Received by the Students.

6.2.0 TRIGGERS



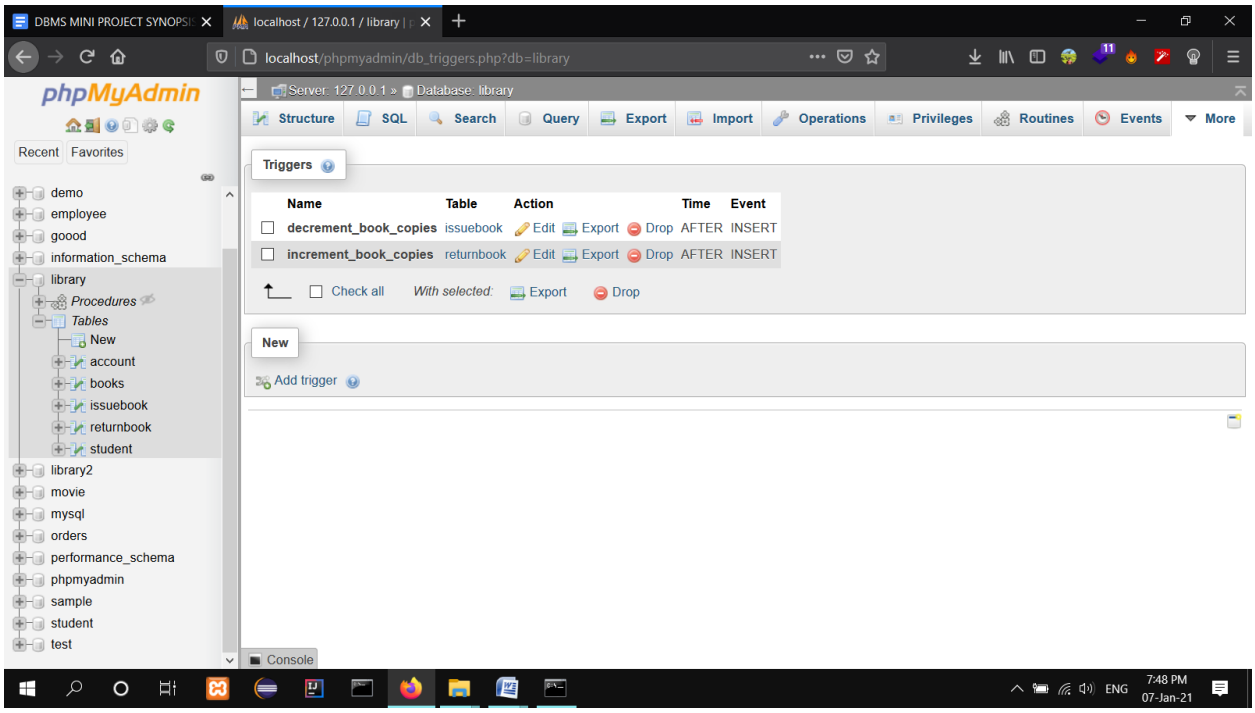
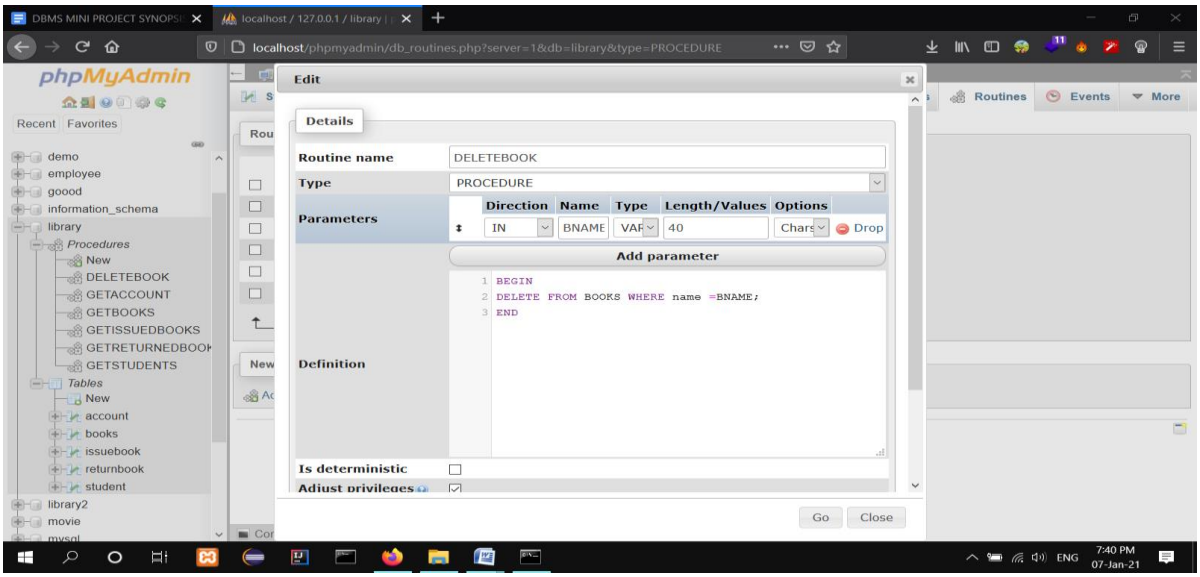


Fig 6.10 TRIGGER

Figure 6.10 shows the triggers Incrementing & Decrementing Book Copies.

6.2.1 STORED PROCEDURES



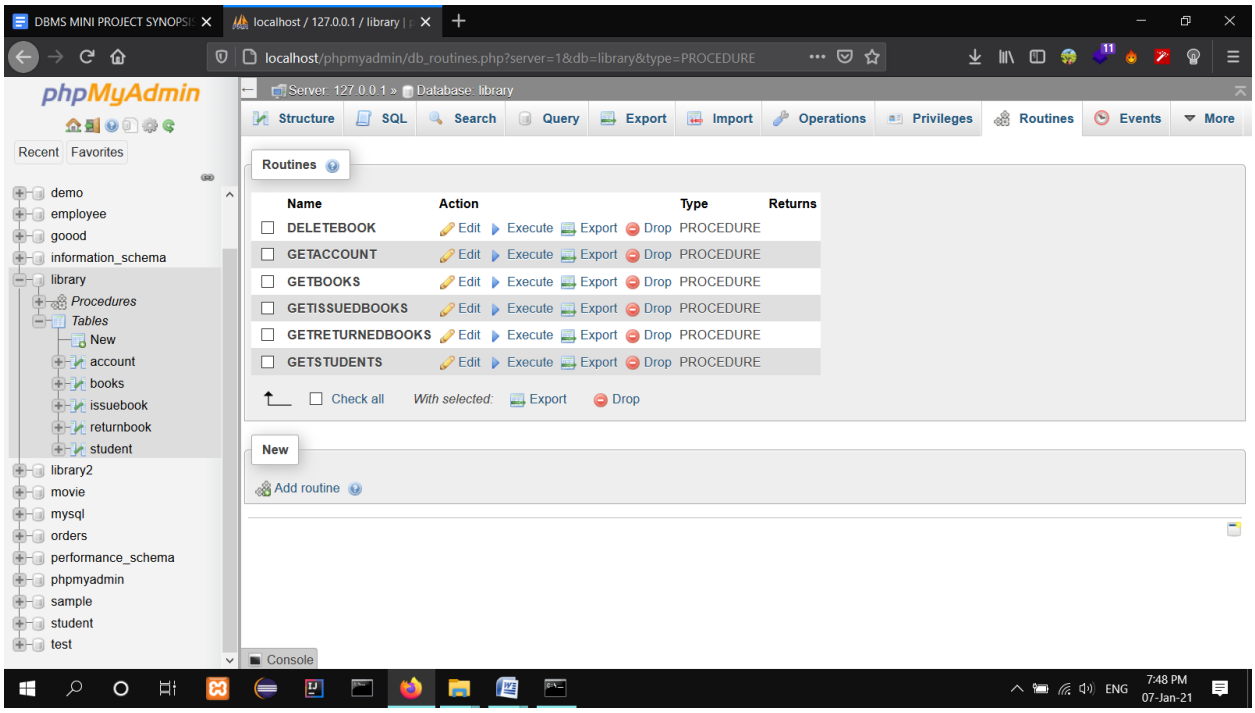


Fig 6.11 STORED PROCEDURES

Figure 6.11 shows the Stored Procedures used to retrieve the information of the Deleted Books, Accounts Available, Books Available, Issued Books, Returned Books and Students Registered.

CHAPTER 7

CONCLUSION

To conclude the description about the project, this was developed using XAMPP Server with Java & MySQL based on the requirement specification of the users and analysis of the existing system, with flexibility for future enhancement. Library Management System is very useful for agency managers. This software is designed for Librarian Admin who want to keep the record of the books in library that are circulated in the library.

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