INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
BHOPAL INDIA, 462003

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Online Library Management System

Project Report

Semester - IV

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ABSTRACT

The E-Library Management Project is a comprehensive digital solution designed to modernize and streamline library operations. It utilizes web-based technologies to automate processes such as cataloging, borrowing, and returning materials, while also providing online access to a wide range of resources. The system includes features such as integration with external databases, user-friendly search and request functionalities, and user account management. By leveraging technology, the project aims to improve the efficiency and effectiveness of library management, enhance user experience, and promote digital literacy among patrons. The E-Library Management Project has the potential to transform traditional library practices, providing libraries with a modern and user-friendly platform for managing resources and delivering services in the digital age. It is expected to optimize library operations, increase accessibility to information, and enhance overall user satisfaction, making it a valuable asset for libraries seeking to adapt to the evolving needs of their communities in today's digital landscape.

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-: Introduction: -

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

- PROJECTS AIMS AND OBJECTIVES:

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

a) Online Book Reading
b) A search to column to search availability of book
c) Facility to download required book
d) Video tutorial for student
e) An admin login page where admin can modify source
f) Open link for learning websites

E-Library Management System is an application which refers to library systems which are generally small or medium in size. It is used by librarian to manage the library using a computerized system where he/she can add new books, videos and Page sources. Books and student maintenance modules are also included in this system which would keep track of the students using the library and also a detailed description about the books a library contains. With this computerized system there will be no loss of book record or member record which generally happens when a non computerized system is used.
All these modules are able to help librarian to manage the library with more convenience and in a more efficient way as compared to library systems which are not computerized.

1.1 Synopsis

Online Library Management System is an Automated Library System that handles the various functions of the library. It provides a complete solution to the library management software. The online Library Management System is classified into two parts Bar Code System and RFID System.

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

1.2 Features of Online Library Management System

- Integration of all records of students
- Manage the records systematically
- It can track any information online
- One can generate the reports
- Manage all information online

- Easy to maintain records
- It leads to fast book entry

The demand for Library Automation Software in India is increasing day by day with the advancement of the system. As we all are living in the digital age, everyone prefers quick and accurate service. Almost all schools and colleges prefer the Library Management System due to the organized and systematic management of the database. College Library Software helps the students to prepare their projects easily and in less time. It also helps in preparing notes and assignments.

Library Management System helps the students in better learning by providing quick access to the library system. With Advance Library Software they can easily find books, catalogs, magazines of their interest. The library is a great place to study and make notes which ultimately help in scoring a good score.

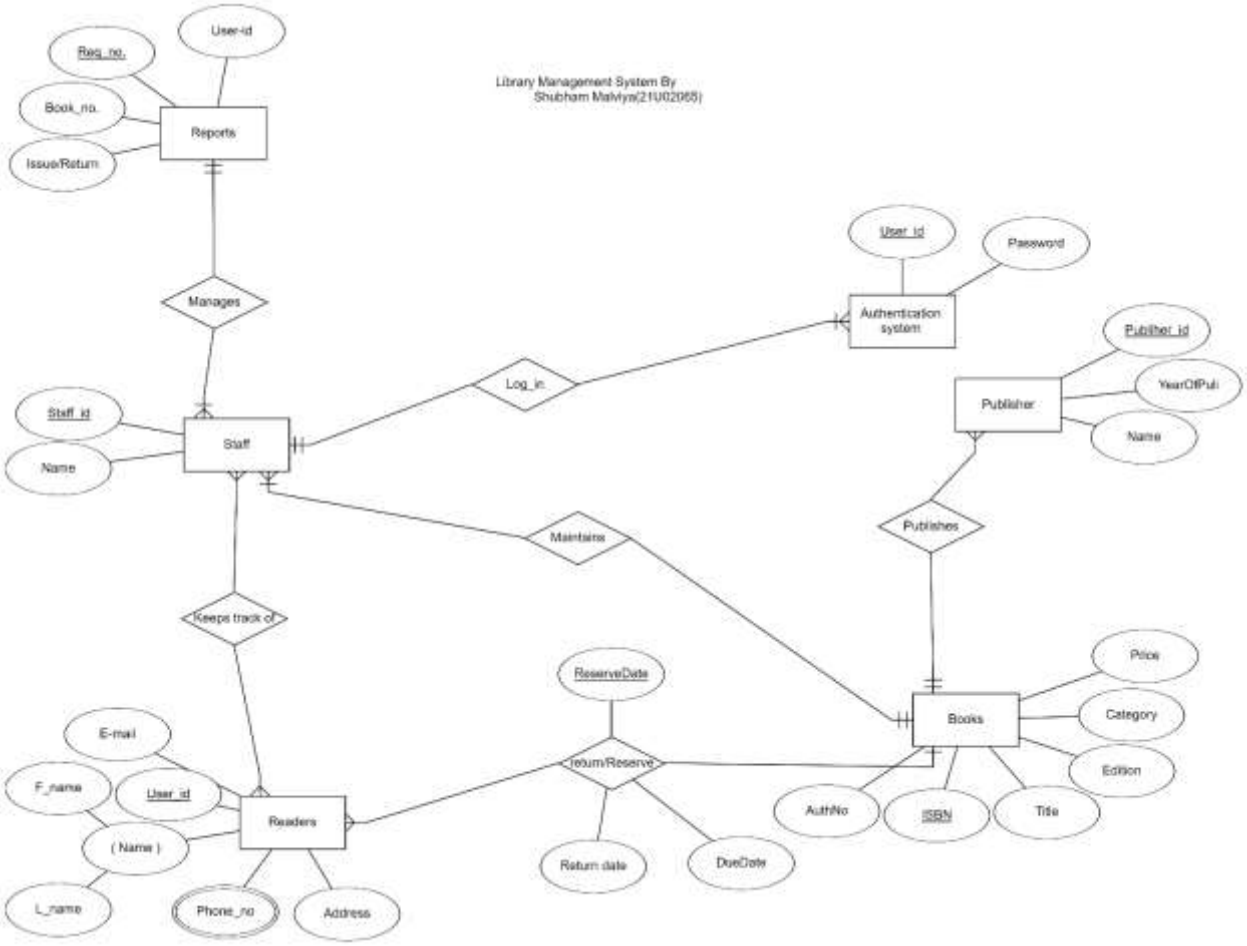
1.3 Advantages of Online Library Management System are:

- It is user-friendly software.
- It is cost-effective and easy to install.
- It helps in maintaining records.
- One can track any information through this system.
- It increases the efficiency.
- It saves human effort and time.
- It reduces the chances of error.
- It acts as an anti-theft.

As discussed, the Online Library Management System is categorized into two parts bar code system and RFID system. In a bar code system, books a unique bar code number is assigned to every book and with the help of a bar code reader, we can check the status of the book like when it is issued and returned. While RFID based library management system is a wireless-based system which helps in easy maintenance of records, which reduces the burden of a librarian and lead to fast-tracking of record.

Library Management System stores every information electronically and in an organized and systematic way which leads to effective results. It enhances the overall performance of the students and develops the habit of silent reading. The software is designed in such a way that it modernize the library system and help the students to make the best use of the Library Automation System.

-: E-R Model and Relational Model : -



- Some Tables for the library management system's database:
  1. Books(ISBN,Title, Author_no, Edition, Categories, Price)
  2. Student/Reader(User_id, F_name, L_name, E-mail, Phone_no, Address)
  3. Staff(Stf_id, Stf_Name, Stf_Address, Stf_gender, Stf_phoneNo)
  4. Reports(Reg_id, userid, bookno, issue/return)
  5. Auth_sys(User_id, Password)
  6. Publisher(Publisher_id, Year_of_publ, Name)
  7. Return/reserve(Reserve_date, Return_date, Due_date)

-: Tools and Technology Used : -

3.1 Hardware requirements:

- Intel core i5 2nd generation is used as a processor because it is fast than other processors an provide reliable and stable and we can run our pc for longtime. By using this processor, we can keep on developing our project without any worries.
- Ram 1 gb is used as it will provide fast reading and writing capabilities and will in turn support in processing.

3.2 Functional requirement:

Functional requirements describe what the system should do in terms of specific actions or functions. Here are some functional requirements for an online library management system:

- User authentication: The system should allow authorized users to log in to the system using their credentials, such as a username and password, and provide access to only the functions they are authorized to perform.
- Book management: The system should allow staff to add, edit, and delete book records, including information such as title, author, ISBN, and publication date.
- Reader management: The system should allow staff to add, edit, and delete reader records, including information such as name, contact information, and borrowing history.
- Book borrowing and return: The system should allow readers to borrow and return books, and staff to track the status of book loans and returns.
- Book search and reserve: The system should allow readers to search for books by various criteria, such as title, author, and keyword, and reserve books that are currently unavailable.
- Reporting: The system should allow staff to generate reports on various aspects of library operations, such as book circulation, overdue books, and popular titles.
- Notifications: The system should be able to send notifications to readers, such as reminders about overdue books or notifications when a reserved book becomes available.

Administrative functions: The system should allow administrators to manage system settings, such as user roles and permissions, and monitor system performance.

These functional requirements provide a basic outline of the actions and functions that an online library management system should be able to perform to support efficient library operations.

3.3 Software Requirements:

- **Software Tools**

Web browser: The library management system should be compatible with popular web browsers such as Google Chrome, Mozilla Firefox, and Microsoft Edge, as it will be accessed through a web interface.

Text editor: A text editor is needed for writing and editing HTML, CSS, and JavaScript code. Popular text editors include Visual Studio Code, Sublime Text, and Atom.

MySQL Workbench :- MySQL Workbench is a graphical user interface (GUI) tool for managing and interacting with MySQL databases. It provides a visual way to design, develop, and administer MySQL databases, making it easier for developers, DBAs

(database administrators), and data analysts to work with MySQL. MySQL Workbench offers a range of features, including database modeling, SQL code generation, data migration, query development and optimization, server administration, and more. It provides a visual representation of database schema, supports multiple MySQL connections, and offers a wide range of tools for managing and querying databases, making it a powerful tool for working with MySQL databases in a user-friendly manner.

- **Frontend Part**
  The front end is designed using of html ,Css, Java script.

HTML - HTMLorHyper Text Markup Languageis the main markuplanguage for creating web pages and other information that can be displayed in a web browser.HTML is written in the form of HTML elements consisting of tags enclosed in angle brackets (like), within the web page content. HTML tags most commonly come in pairs like and , although some tags represent empty elements and so are unpaired, for example Error! Filename not specified.. The first tag in a pair is the start tag, and the second tag is the end tag (they are also called opening tags and closing tags). In between these tags web designers can add text, further tags, comments and other types of text-based content. The purpose of a web browser is to read HTML documents and compose them into visible or audible web pages. The browser does not display the HTML tags, but uses the tags to interpret the content of the page.HTML elements form the building blocks of all websites. HTML allows images and objects to be embedded and can be used to create interactive forms. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. It can embed scripts written in languages such as JavaScript which affect the behavior of HTML web pages.

CSS - Cascading Style Sheets(CSS) is a style sheet language used fordescribing the look and formatting of a document written in a markup language. While most often used to style web pages and interfaces written in HTML and XHTML, the language can be applied to any kind of XML document, including plain XML, SVG and XUL. CSS is a cornerstone specification of the web and almost all web pages use CSS style sheets to describe their presentation.CSS is designed primarily to enable the separation of document content from document presentation, including elements such as the layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification. of presentation characteristics, enable multiple pages to share formatting, and reduce complexity and repetition in the structural content (such as by allowing for table less web design).CSS can also allow the same markup page to be presented in different styles for different rendering methods, such as on-screen, in print, by voice (when read out by a speech-based browser or screen reader) and on Braille-based, tactile devices. It can also be used to allow the web page to display differently depending on the screen size or device on which it is being viewed. While the author of a document typically links that document to a CSS file, readers can use a different style sheet, perhaps one on their own computer, to override the one the author has specified. However if the author or the reader did not link the document to a specific style sheet the default style of the browser will be applied.CSS specifies a priority scheme to determine which style rules apply if more than one rule matches against a particular element. In this so-called cascade, priorities or weights are calculated and assigned to rules, so that the results are predictable.

- **Backend Part**

Node.js - Node.js is an open-source, server-side JavaScript runtime that allows developers to run JavaScript code on the server. It features a non-blocking I/O model and a single-threaded event loop, making it highly efficient for handling concurrent connections and processing large numbers of requests. With its fast performance, cross-platform compatibility, and extensive ecosystem of libraries, Node.js has become a popular choice for building scalable, high-performance web applications, and is used by many big enterprises for their back-end development.

MYSQL - MySQL ("My S-Q-L", officially, but also called "My Sequel") is (as of July 2023) the world's second most widely used open-source relational database management system (RDBMS). It is named after co-founder Michael Widenius daughter, My. The SQL phrase stands for Structured Query Language. The MySQL development project has made its source code available under the terms of the 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. MySQL is a popular choice of database for use in web applications, and is a central component of the widely used LAMP open source web application software stack (and other 'AMP' stacks). LAMP is an acronym for "Linux, Apache, MySQL, Perl/PHP/Python." Free-software-open-source projects that require a full-featured database management system often use MySQL. For commercial use, several paid editions are available, and offer additional functionality. Applications which use MySQL databases.

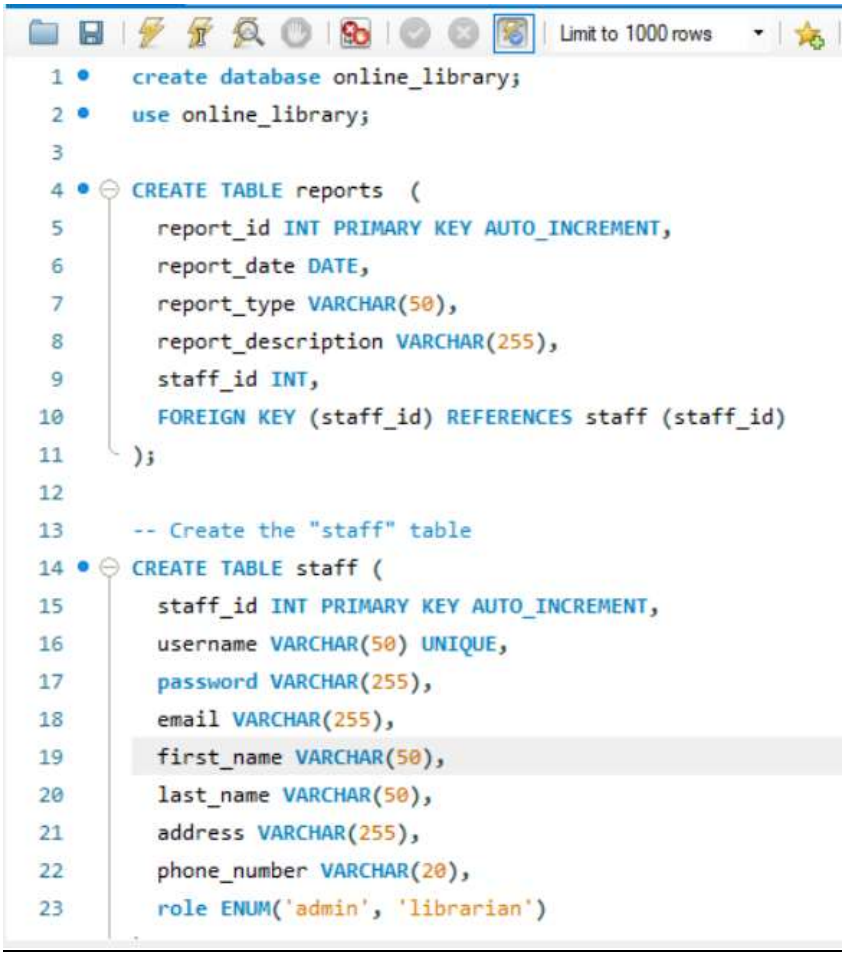
3.4 E-R diagram Requirement : It is a useful tool for visualizing the relationships between different entities and identifying the data requirements for a system.

1. Identify entities: The E-R diagram should clearly identify the entities involved in the system. This may include entities such as books, readers, staff, publishers, and authentication systems.
2. Define relationships: The E-R diagram should define the relationships between different entities. For example, books may be written by authors, published by publishers, and borrowed by readers.
3. Identify attributes: The E-R diagram should identify the attributes of each entity, which are the specific characteristics or properties that define each entity. For example, the attributes of a book entity may include title, author, ISBN, and publication date.
4. Consider system constraints: The E-R diagram should consider any constraints that may affect the system design, such as limitations on the number of books a reader can borrow at once or the number of staff members who can access the system.

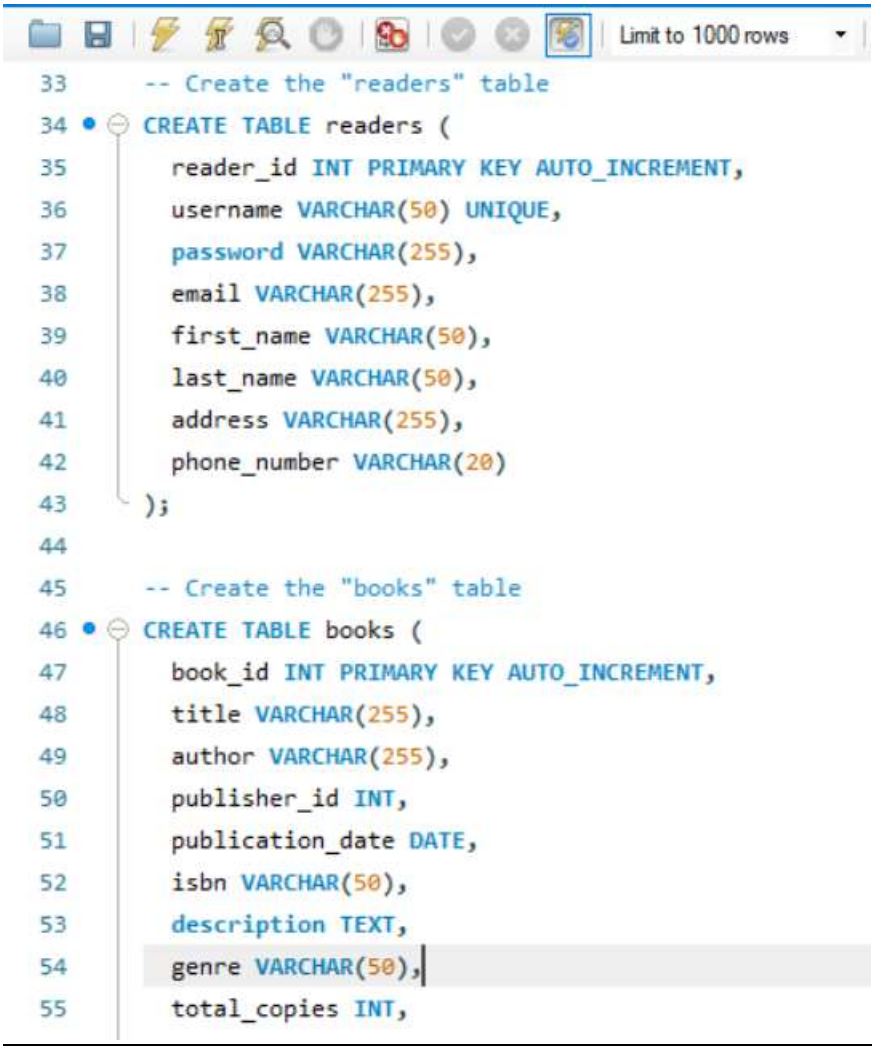
-: System Design: -

4.1 The Code of Making database and tables according to the E-R Diagram

Code:

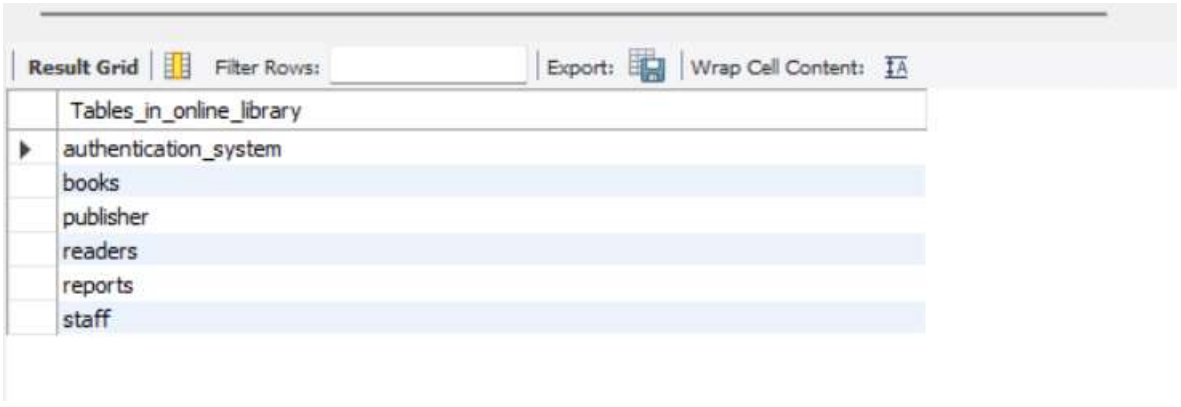


```
create database online_library;
use online_library;

CREATE TABLE reports  (
  report_id INT PRIMARY KEY AUTO_INCREMENT,
  report_date DATE,
  report_type VARCHAR(50),
  report_description VARCHAR(255),
  staff_id INT,
  FOREIGN KEY (staff_id) REFERENCES staff (staff_id)
);

-- Create the "staff" table
CREATE TABLE staff (
  staff_id INT PRIMARY KEY AUTO_INCREMENT,
  username VARCHAR(50) UNIQUE,
  password VARCHAR(255),
  email VARCHAR(255),
  first_name VARCHAR(50),
  last_name VARCHAR(50),
  address VARCHAR(255),
  phone_number VARCHAR(20),
  role ENUM('admin', 'librarian')
```


Limit to 1000 rows
-- Create the "readers" table
CREATE TABLE readers (
reader_id INT PRIMARY KEY AUTO_INCREMENT,
username VARCHAR(50) UNIQUE,
password VARCHAR(255),
email VARCHAR(255),
first_name VARCHAR(50),
last_name VARCHAR(50),
address VARCHAR(255),
phone_number VARCHAR(20)
);
-- Create the "books" table
CREATE TABLE books (
book_id INT PRIMARY KEY AUTO_INCREMENT,
title VARCHAR(255),
author VARCHAR(255),
publisher_id INT,
publication_date DATE,
isbn VARCHAR(50),
description TEXT,
genre VARCHAR(50),
total_copies INT,

```sql
-- Create the "books" table
CREATE TABLE books (
  book_id INT PRIMARY KEY AUTO_INCREMENT,
  title VARCHAR(255),
  author VARCHAR(255),
  publisher_id INT,
  publication_date DATE,
  isbn VARCHAR(50),
  description TEXT,
  genre VARCHAR(50),
  total_copies INT,
  available_copies INT,
  FOREIGN KEY (publisher_id) REFERENCES publisher (publisher_id)
);

-- Create the "publisher" table
CREATE TABLE publisher (
  publisher_id INT PRIMARY KEY AUTO_INCREMENT,
  publisher_name VARCHAR(255),
  address VARCHAR(255),
  phone_number VARCHAR(20),
  email VARCHAR(255)
);
```

Now by this, we made all the Table of Online-Library Management System That shows:



Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Tables_in_online_library
authentication_system
books
publisher
readers
reports
staff

We forgot about the table of Borrow so:-

```sql
CREATE TABLE `borrow` (
  `borrow_id` int NOT NULL AUTO_INCREMENT,
  `book_id` int NOT NULL,
  `reader_id` int NOT NULL,
  `borrow_date` date NOT NULL,
  `due_date` date NOT NULL,
  `return_date` date DEFAULT NULL,
  `returned` tinyint(1) NOT NULL DEFAULT '0',
  PRIMARY KEY (`borrow_id`),
  KEY `book_id` (`book_id`),
  KEY `reader_id` (`reader_id`),
  CONSTRAINT `borrow_ibfk_1` FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`),
  CONSTRAINT `borrow_ibfk_2` FOREIGN KEY (`reader_id`) REFERENCES `readers` (`reader_id`),
  CONSTRAINT `borrow_ibfk_3` FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`) ON UPDATE CASCADE,
  CONSTRAINT `borrow_ibfk_4` FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`) ON UPDATE CASCADE,
  CONSTRAINT `borrow_ibfk_5` FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`) ON UPDATE CASCADE,
  CONSTRAINT `borrow_ibfk_6` FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`) ON UPDATE CASCADE,
  CONSTRAINT `borrow_ibfk_7` FOREIGN KEY (`reader_id`) REFERENCES `readers` (`reader_id`) ON UPDATE CASCADE
) ENGINE=InnoDB AUTO_INCREMENT=13 DEFAULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci
```

4.2 The Code of Inserting the value of the Table according to their attributes:

```sql
-- Insert sample data into the "reports" table
INSERT INTO reports (report_date, report_type, report_description, staff_id)
VALUES ('2023-03-01', 'Inventory', 'Updated the library inventory', 1),
       ('2023-03-15', 'Complaint', 'Received a complaint from a reader about a damaged book', 2),
       ('2023-03-31', 'Financial', 'Prepared a financial report for the library', 1);

-- Insert sample data into the "staff" table
INSERT INTO staff (username, password, email, first_name, last_name, address, phone_number, role)
VALUES ('admin', 'password123', 'admin@example.com', 'John', 'Doe', '123 Main St', '555-1234', 'admin'),
       ('librarian1', 'password456', 'librarian1@example.com', 'Jane', 'Smith', '456 Park Ave', '555-5678', 'librarian'),
       ('librarian2', 'password789', 'librarian2@example.com', 'Bob', 'Johnson', '789 Oak St', '555-9012', 'librarian');

-- Insert sample data into the "authentication_system" table
INSERT INTO authentication_system (username, password, role)
VALUES ('admin', 'password123', 'admin'),
       ('librarian1', 'password456', 'librarian'),
       ('librarian2', 'password789', 'librarian'),
       ('reader1', 'password123', 'reader'),
       ('reader2', 'password456', 'reader');
```

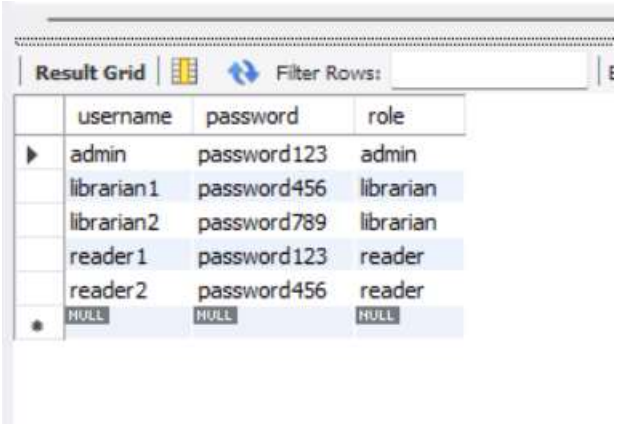
```
-- Insert sample data into the "readers" table
INSERT INTO readers (username, password, email, first_name, last_name, address, phone_number)
VALUES ('reader1', 'password123', 'reader1@example.com', 'Emily', 'Jones', '234 Elm St', '555-3456'),
       ('reader2', 'password456', 'reader2@example.com', 'Michael', 'Lee', '567 Pine Ave', '555-6789'),
       ('reader3', 'password789', 'reader3@example.com', 'Olivia', 'Wilson', '890 Maple St', '555-0123');

-- Insert sample data into the "books" table
INSERT INTO books (title, author, publisher_id, publication_date, isbn, description, genre, total_copies, available_copies)
VALUES ('To Kill a Mockingbird', 'Harper Lee', 1, '1960-07-11', '9780061120084', 'A classic novel about racial injustice in the 1930s.', 'F
       ('The Great Gatsby', 'F. Scott Fitzgerald', 2, '1925-04-10', '9780743273565', 'A story of the decadence and excess of the Roaring Tw
       ('1984', 'George Orwell', 3, '1949-06-08', '9780451524935', 'A dystopian novel about a totalitarian regime.', 'Fiction', 8, 5),
       ('The Catcher in the Rye', 'J.D. Salinger', 4, '1951-07-16', '9780316769174', 'A coming-of-age novel about a teenage boy.', 'Fiction
       ('Pride and Prejudice', 'Jane Austen', 5, '1813-01-28', '9780486284736', 'A romantic comedy of manners set in early 19th century Eng

-- Insert sample data into the "publisher" table
INSERT INTO publisher (publisher_name, address, phone_number, email)
VALUES ('HarperCollins Publishers', '10 E 53rd St', '555-1212', 'info@harpercollins.com'),
       ('Scribner', '1230 Avenue of the Americas', '555-3434', 'info@scribner.com'),
       ('Secker & Warburg', '14 Carlisle St', '555-5656', 'info@seckerwarburg.com'),
       ('Little, Brown and Company', '1290 Avenue of the Americas', '555-7878', 'info@littlebrown.com'),
       ('Dover Publications', '31 E 2nd St', '555-9090', 'info@doverpublications.com');
```

4.3 Tables :

Now by this, we made all the Table of Online-Library Management System
That shows:

- By the Code:

1. SELECT * FROM online_library.authentication_system;



Result Grid | Filter Rows:

username	password	role
admin	password123	admin
librarian1	password456	librarian
librarian2	password789	librarian
reader1	password123	reader
reader2	password456	reader
NULL	NULL	NULL

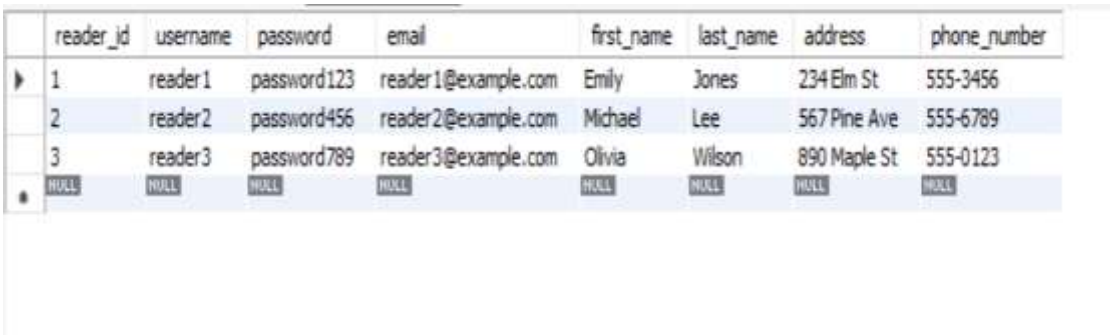
2. SELECT * FROM online_library.books;

book_id	title	author	publisher_id	publication_date	isbn	description	genre	total_copies	available_c
1	To Kill a Mockingbird	Harper Lee	1	1960-07-11	9780061120084	A classic novel about racial injustice in the 1930s.	Fiction	5	3
2	The Great Gatsby	F. Scott Fitzgerald	2	1925-04-10	9780743273565	A story of the decadence and excess of the Ro...	Fiction	10	7
3	1984	George Orwell	3	1949-06-08	9780451524935	A dystopian novel about a totalitarian regime.	Fiction	8	5
4	The Catcher in the Rye	J.D. Salinger	4	1951-07-16	9780316769174	A coming-of-age novel about a teenage boy.	Fiction	6	4
5	Pride and Prejudice	Jane Austen	5	1813-01-28	9780486284736	A romantic comedy of manners set in early 19th...	Fiction	12	9
6	To Kill a Mockingbird	Harper Lee	1	1960-07-11	9780061120084	A classic novel about racial injustice in the 1930s.	Fiction	5	3
7	The Great Gatsby	F. Scott Fitzgerald	2	1925-04-10	9780743273565	A story of the decadence and excess of the Ro...	Fiction	10	7
8	1984	George Orwell	3	1949-06-08	9780451524935	A dystopian novel about a totalitarian regime.	Fiction	8	5
9	The Catcher in the Rye	J.D. Salinger	4	1951-07-16	9780316769174	A coming-of-age novel about a teenage boy.	Fiction	6	4
10	Pride and Prejudice	Jane Austen	5	1813-01-28	9780486284736	A romantic comedy of manners set in early 19th...	Fiction	12	9
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

3. SELECT * FROM online_library.publisher;

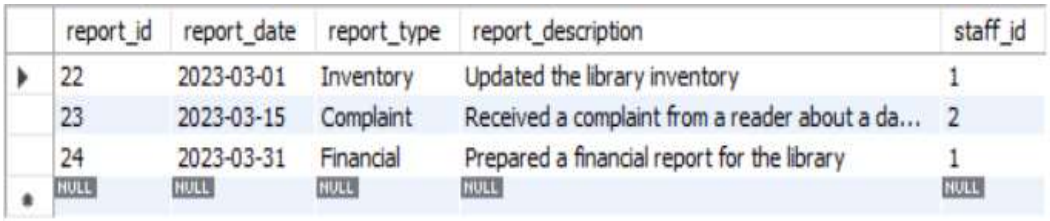
	publisher_id	publisher_name	address	phone_number	email
	1	HarperCollins Publishers	10 E 53rd St	555-1212	info@harpercollins.com
	2	Scribner	1230 Avenue of the Americas	555-3434	info@scribner.com
	3	Secker & Warburg	14 Carlisle St	555-5656	info@seckerwarburg.com
	4	Little, Brown and Company	1290 Avenue of the Americas	555-7878	info@littlebrown.com
	5	Dover Publications	31 E 2nd St	555-9090	info@doverpublications.com
	6	HarperCollins Publishers	10 E 53rd St	555-1212	info@harpercollins.com
	7	Scribner	1230 Avenue of the Americas	555-3434	info@scribner.com
	8	Secker & Warburg	14 Carlisle St	555-5656	info@seckerwarburg.com
	9	Little, Brown and Company	1290 Avenue of the Americas	555-7878	info@littlebrown.com
	10	Dover Publications	31 E 2nd St	555-9090	info@doverpublications.com
	11	HarperCollins Publishers	10 E 53rd St	555-1212	info@harpercollins.com
	12	Scribner	1230 Avenue of the Americas	555-3434	info@scribner.com
	13	Secker & Warburg	14 Carlisle St	555-5656	info@seckerwarburg.com
	14	Little, Brown and Company	1290 Avenue of the Americas	555-7878	info@littlebrown.com
	15	Dover Publications	31 E 2nd St	555-9090	info@doverpublications.com
▶*	NULL	NULL	NULL	NULL	NULL

4. SELECT * FROM online_library.readers;



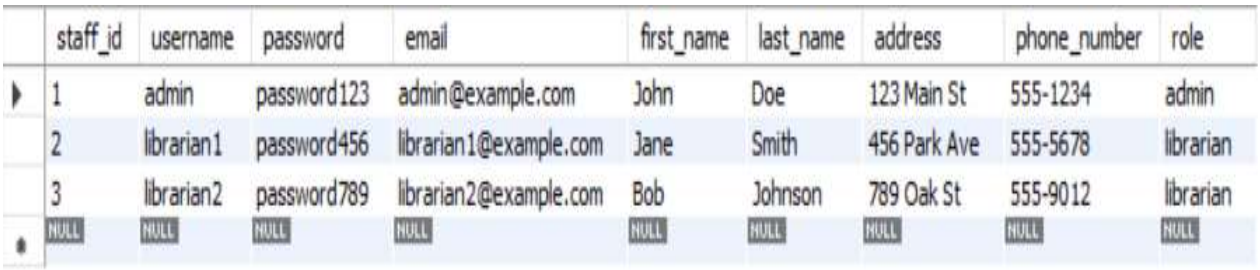
reader_id	username	password	email	first_name	last_name	address	phone_number
1	reader1	password123	reader1@example.com	Emily	Jones	234 Elm St	555-3456
2	reader2	password456	reader2@example.com	Michael	Lee	567 Pine Ave	555-6789
3	reader3	password789	reader3@example.com	Olivia	Wilson	890 Maple St	555-0123
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

5. SELECT * FROM online_library.reports;



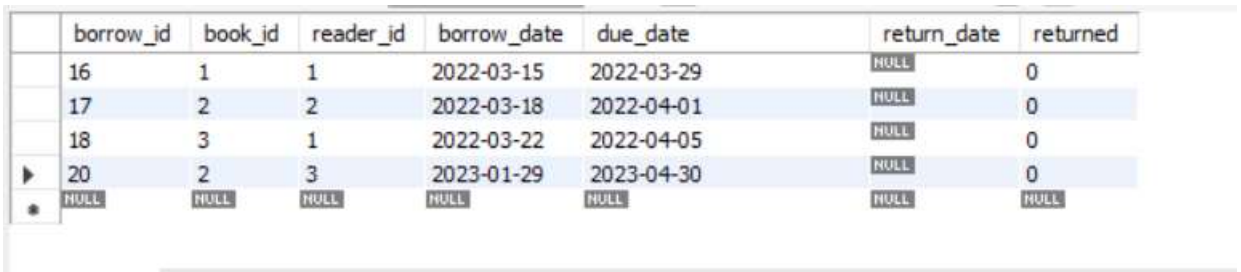
report_id	report_date	report_type	report_description	staff_id
22	2023-03-01	Inventory	Updated the library inventory	1
23	2023-03-15	Complaint	Received a complaint from a reader about a da...	2
24	2023-03-31	Financial	Prepared a financial report for the library	1
NULL	NULL	NULL	NULL	NULL

6. SELECT * FROM online_library.staff;



staff_id	username	password	email	first_name	last_name	address	phone_number	role
1	admin	password123	admin@example.com	John	Doe	123 Main St	555-1234	admin
2	librarian1	password456	librarian1@example.com	Jane	Smith	456 Park Ave	555-5678	librarian
3	librarian2	password789	librarian2@example.com	Bob	Johnson	789 Oak St	555-9012	librarian
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

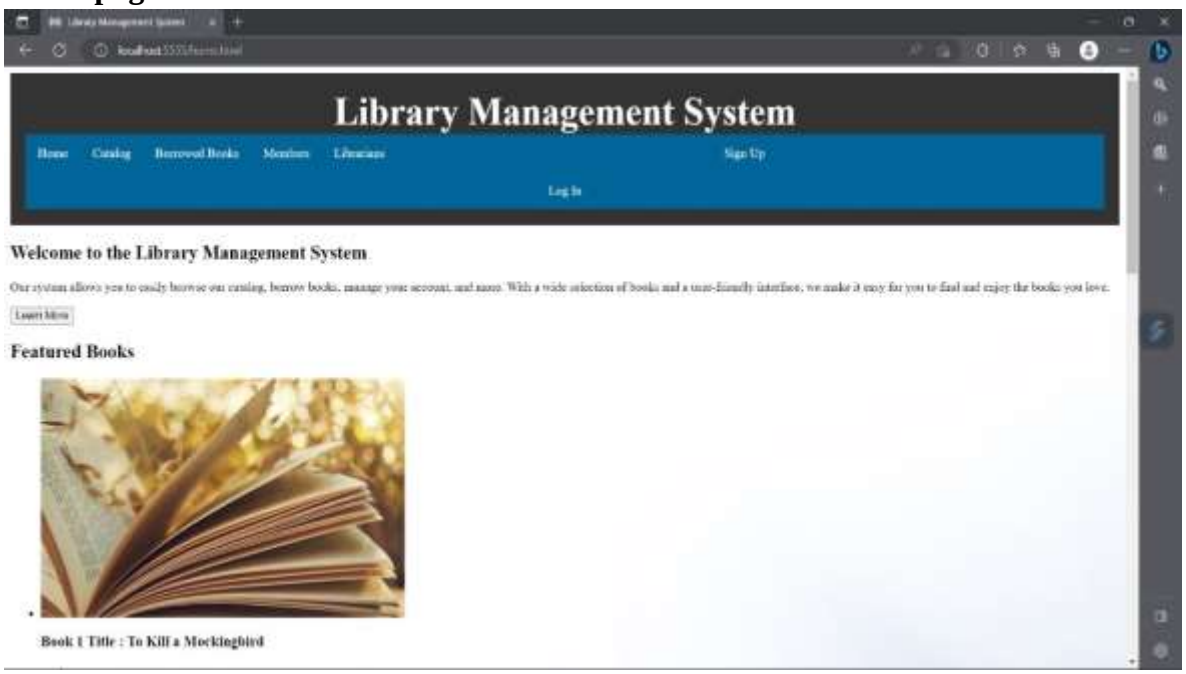
7. USE online_library;
   SELECT * FROM online_library.borrow;



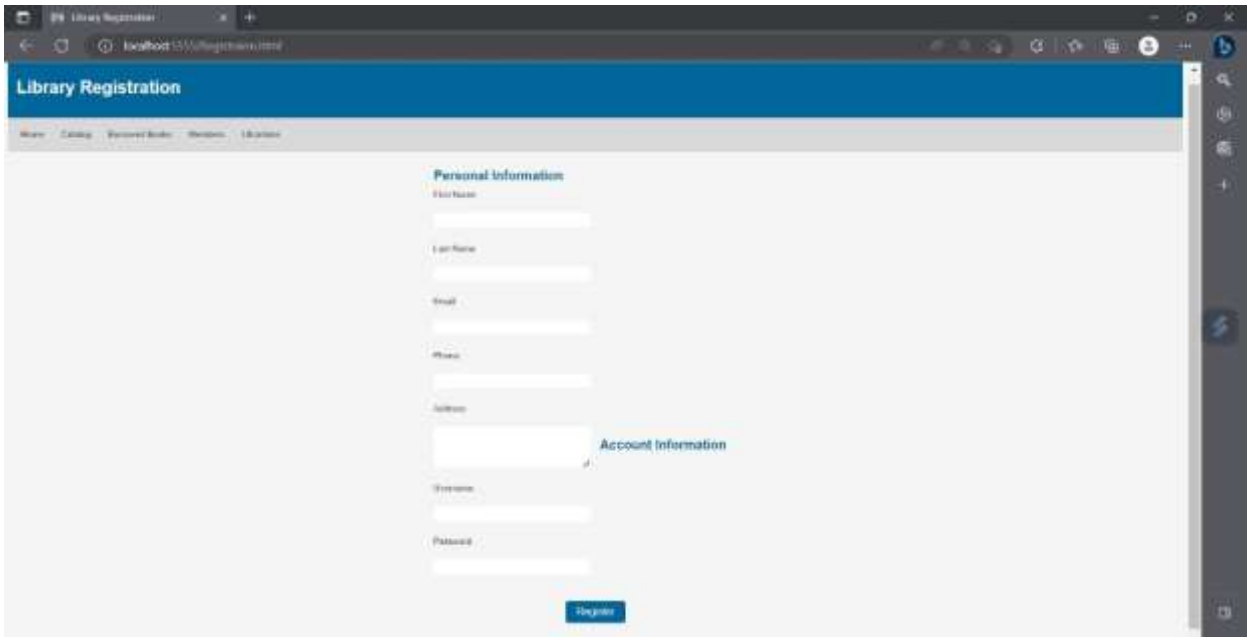
borrow_id	book_id	reader_id	borrow_date	due_date	return_date	returned
16	1	1	2022-03-15	2022-03-29	NULL	0
17	2	2	2022-03-18	2022-04-01	NULL	0
18	3	1	2022-03-22	2022-04-05	NULL	0
20	2	3	2023-01-29	2023-04-30	NULL	0
NULL	NULL	NULL	NULL	NULL	NULL	NULL

4.4 Screenshots of Frontend part (E-Library Website)

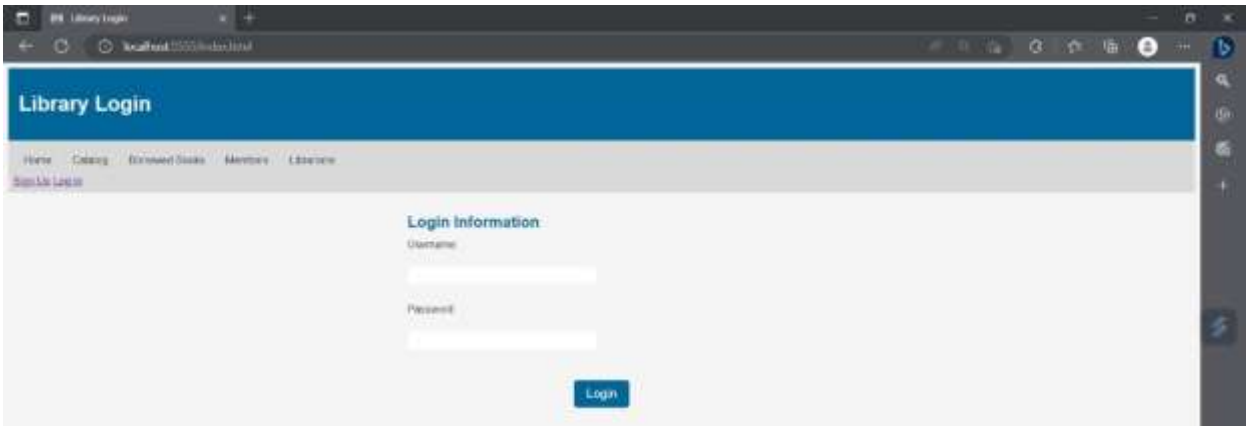
- **Home page**



- **Sign Up**

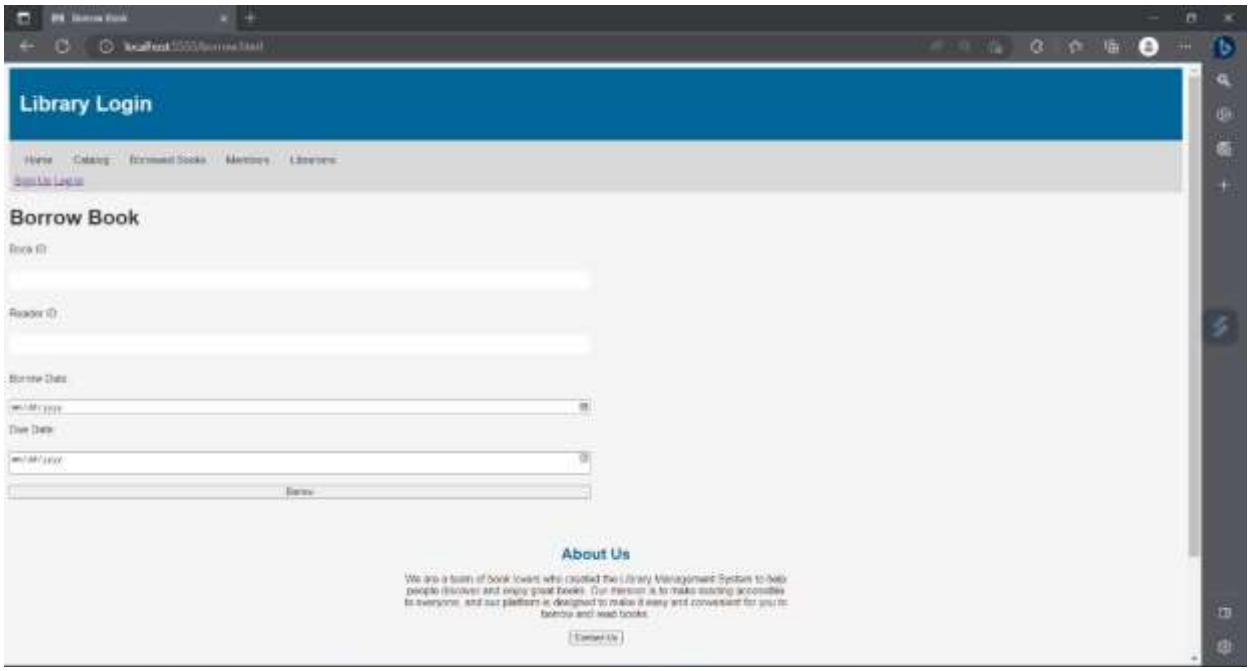


- **Login**

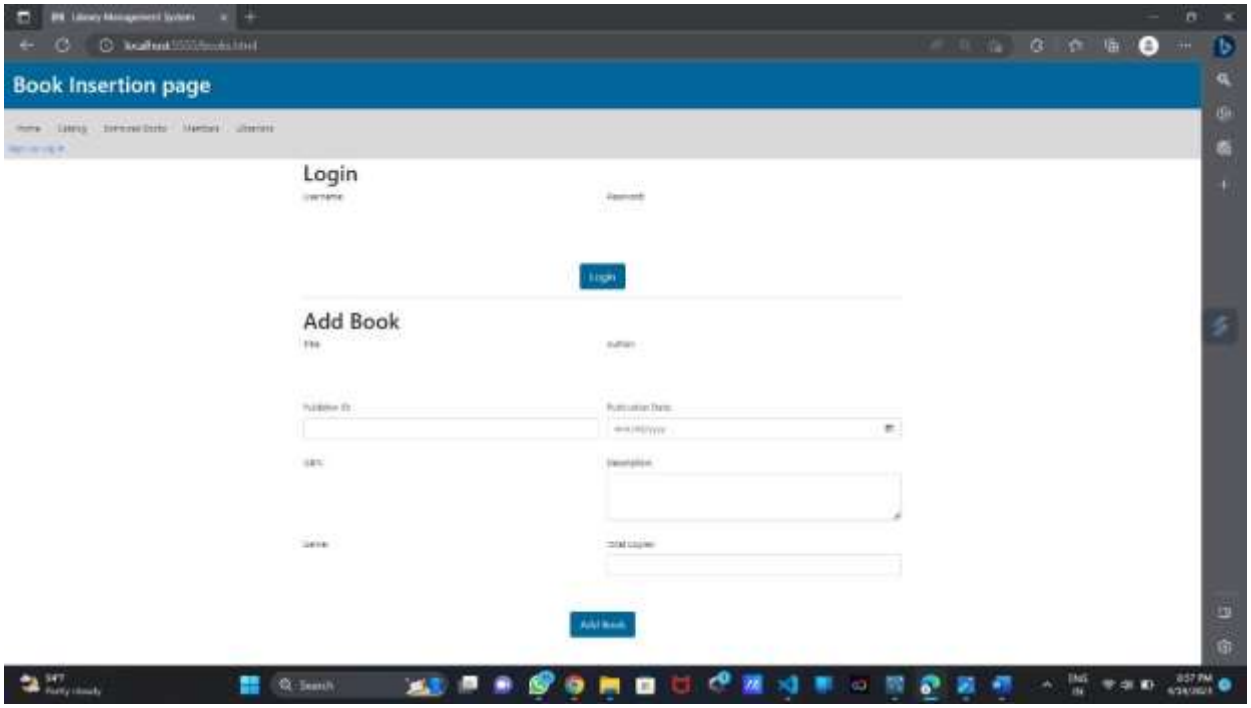


- **Catalog**

- **Borrow Book**



- **Insert Book**



4.5: Screenshots of Server Making (Using NodeJs)

```
const mysql = require('mysql');
const express = require('express');
const bodyParser = require('body-parser');
const app = express();

const connection = mysql.createConnection({
    host: 'localhost',
    port: '3306',
    user: 'root',
    password: 'Shu@9799',
    database: 'online_library'
});
app.use(express.static('C:/Users/shubh/Desktop/dbms/library_management_project/library_management_project'));
connection.connect((err) => {
    if (err) {
        console.error('Error connecting to database: ' + err.stack);
        return;
    }
    console.log('Connected to database.');
});

app.use(bodyParser.urlencoded({ extended: false }));

app.post('/login', (req, res) => {
    const { username, password } = req.body;

    // query the database to check credentials
    connection.query('SELECT * FROM authentication_system WHERE username = ? AND password = ?', [username, pa
        if (error) {
            console.error(error);
            res.status(500).send('Internal Server Error');
        } else if (results.length === 0) {
            res.status(401).send('Invalid Credentials');
        } else {
            res.send('Login Successful');
        }
    });
```

```
app.post('/register', (req, res) => {
    const firstName = req.body['first-name'];
    const lastName = req.body['last-name'];
    const email = req.body['email'];
    const phone = req.body['phone'];
    const address = req.body['address'];
    const username = req.body['username'];
    const password = req.body['password'];

    // Insert the user data into the database
    connection.query('INSERT INTO readers (username, password, email, first_name, last_name, address,phone_number) VALUES (?, ?, ?, ?, ?, ?,
        [username, password, email, firstName, lastName, address, phone], (error, results) => {
            if (error) {
                throw error;
            }
            console.log('User registered successfully');
            res.redirect('/');
        });
});
app.post('/ADDbook', (req, res) => {
    const title = req.body['title'];
    const author = req.body['author'];
    const publisher_id = req.body['publisher_id'];
    const publication_date = req.body['publication_date'];
    const isbn = req.body['isbn'];
    const description = req.body['descriptioo'];
    const genre = req.body['genre'];
    const total_copies = req.body['total_copies'];

    // Insert the user data into the database
    connection.query('INSERT INTO books (title, author, publisher_id, publication_date, isbn, description, genre,total_copies) VALUES (?, ?,
        [title, author, publisher_id, publication_date, isbn, description, genre, total_copies], (error, results) => {
            if (error) {
                throw error;
            }
```

```
app.get('/books-count', (req, res) => {
    // Query the books table to get the count
    pool.query('SELECT COUNT(*) AS count FROM books', (error, results) => {
        if (error) {
            console.error(error);
            return res.status(500).send('Server Error');
        }

        // Return the count as JSON
        res.json({ count: results[0].count });
    });
});

app.post('/borrow', (req, res) => {
    const book_id = req.body['book_id'];
    const reader_id = req.body['reader_id'];
    const borrow_date = req.body['borrow_date'];
    const due_date = req.body['due_date'];
    const returned = '0';

    // Insert the user data into the database
    connection.query('INSERT INTO borrow (book_id, reader_id, borrow_date, due_date, returned) VALUES (?,?,?,?,?)',
        [book_id, reader_id, borrow_date, due_date, returned], (error, results) => {
            if (error) {
                throw error;
            }

            console.log('The book is borrowed');
            res.redirect('/');
        });
});

// start the server
app.listen(5555, () => {
    console.log('Server started on port 5555');
});
```

-: Testing: -

- Query 1.) Retrieve the total number of books in the library's inventory: -

```
SELECT SUM(total_copies) AS total_books
FROM books;
```

Output :-

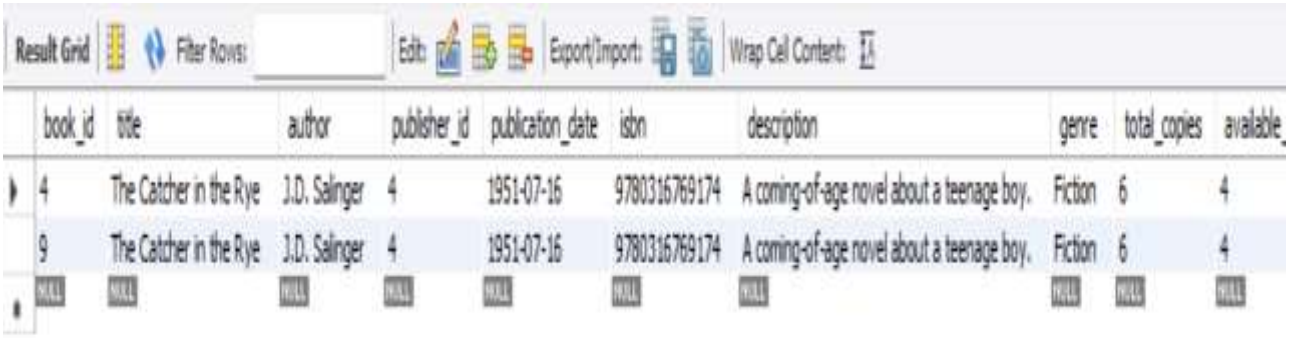
Result Grid | Filter Rows:

total_books
82

- Query 2.) Find all books written by a specific author ” J.D. Salinger”:

```
SELECT * FROM books WHERE author = 'J.D. Salinger';
```

Output :-



book_id	title	author	publisher_id	publication_date	isbn	description	genre	total_copies	available_
4	The Catcher in the Rye	J.D. Salinger	4	1951-07-16	9780316769174	A coming-of-age novel about a teenage boy.	Fiction	6	4
9	The Catcher in the Rye	J.D. Salinger	4	1951-07-16	9780316769174	A coming-of-age novel about a teenage boy.	Fiction	6	4
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

- Query 3.) List of all books that is available:-

SELECT * FROM books WHERE available_copies > 0;

Output :-

book_id	title	author	publisher_id	publication_date	isbn	description	genre	total_copies	avail
1	To Kill a Mockingbird	Harper Lee	1	1960-07-11	9780061120084	A classic novel about racial injustice in the 1930s.	Fiction	5	3
2	The Great Gatsby	F. Scott Fitzgerald	2	1925-04-10	9780743273565	A story of the decadence and excess of the Ro...	Fiction	10	7
3	1984	George Orwell	3	1949-06-08	9780451524935	A dystopian novel about a totalitarian regime.	Fiction	8	5
4	The Catcher in the Rye	J.D. Salinger	4	1951-07-16	9780316769174	A coming-of-age novel about a teenage boy.	Fiction	6	4
5	Pride and Prejudice	Jane Austen	5	1813-01-28	9780486284736	A romantic comedy of manners set in early 19th...	Fiction	12	9
7	The Great Gatsby	F. Scott Fitzgerald	2	1925-04-10	9780743273565	A story of the decadence and excess of the Ro...	Fiction	10	7
8	1984	George Orwell	3	1949-06-08	9780451524935	A dystopian novel about a totalitarian regime.	Fiction	8	5
9	The Catcher in the Rye	J.D. Salinger	4	1951-07-16	9780316769174	A coming-of-age novel about a teenage boy.	Fiction	6	4
10	Pride and Prejudice	Jane Austen	5	1813-01-28	9780486284736	A romantic comedy of manners set in early 19th...	Fiction	12	9
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

- Query 4.) List of all books that is available:

DELETE FROM readers WHERE reader_id = 2;
SELECT * FROM online_library.readers;

Output :-

reader_id	username	password	email	first_name	last_name	address	phone_number
1	reader1	password123	reader1@example.com	Emily	Jones	234 Elm St	555-3456
3	reader3	password789	reader3@example.com	Olivia	Wilson	890 Maple St	555-0123
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

- Query .5) Retrieve the average number of books checked out per month for the past year:

```
SELECT AVG(checkouts_per_month) AS avg_checkouts
FROM (
   SELECT COUNT(*) / 12 AS checkouts_per_month
   FROM borrow
   WHERE YEAR(borrow_date) = YEAR(CURRENT_DATE - INTERVAL 1 YEAR)
   GROUP BY MONTH(borrow_date)
) AS monthly_checkouts;
```

Output :-

Result Grid | Filter Rows:

avg_checkouts
0.25000000

-: Result and Discussion :-

The implementation of a library management system using HTML, CSS, and Node.js has resulted in positive outcomes, including streamlined library operations, improved user experience, and increased accessibility to library resources. The system automates processes such as cataloging, borrowing, and returning materials, and provides a user-friendly web interface for patrons to search, request, and manage library materials. Integration with external databases ensures efficient storage and retrieval of library data, and the use of modern web technologies results in a responsive and visually appealing user interface. Despite challenges encountered during development, the system is now a reliable and functional solution for managing library operations, with potential for further improvements based on user feedback and technology advancements.

-: Conclusion: -

This website provides a computerized version of the library management system which will benefit the students as well as the staff of the library. It makes the entire process online where

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

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

-: References :-

- https://www.w3schools.com/html/
- https://www.w3schools.com/css/
- https://www.w3schools.com/nodejs/
- https://www.tutorialspoint.com/nodejs/index.htm
- https://www.javatpoint.com/mysql-tutorial