PES UNIVERSITY, BANGALORE

Department of Computer Science and Engineering

B. Tech (CSE) – 5th Semester – Aug-Dec 2023

UE21CS351A – Database Management Systems
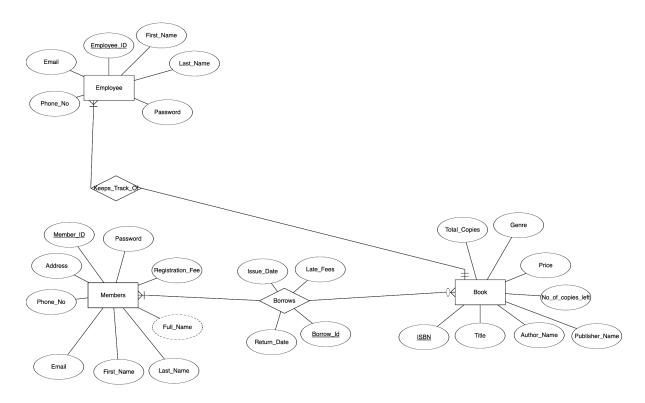
PROJECT REPORT

Library Database Management System

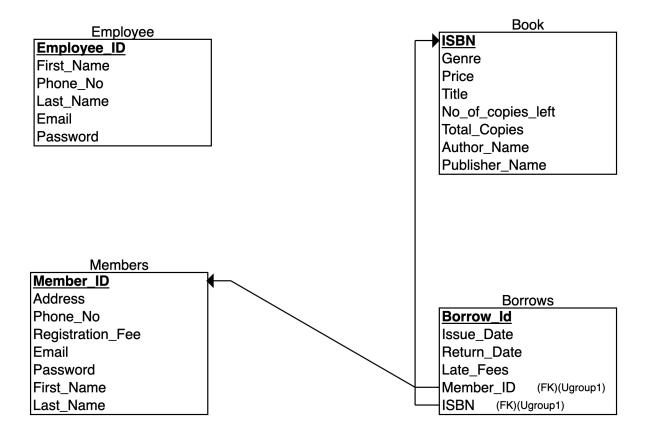| Rishab Gongulur	PES1UG21CS488
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Short Abstract

The Library Management System is a streamlined application built using Streamlit and MySQL, designed to facilitate efficient management of a library's resources. The system incorporates user authentication for both employees and library members, ensuring secure access to various functionalities. Employees can log in, perform tasks such as issuing and returning books, and manage the library database. Additionally, a user registration feature allows individuals to register as library members, providing them with unique member IDs for future transactions. The system utilizes stored procedures for seamless member registration. The interface is visually enhanced using Streamlit's capabilities, providing a user-friendly experience. This project emphasizes security, usability, and effective library resource management.

Entity Relationship Diagram

Relational Schema

Employee
Employee_ID
First_Name
Phone_No
Last_Name
Email
Password

Book
ISBN
Genre
Price
Title
No_of_copies_left
Total_Copies
Author_Name
Publisher_Name

Members
Member_ID
Address
Phone_No
Registration_Fee
Email
Password
First_Name
Last_Name

Borrows
Borrow_Id	
Issue_Date	
Return_Date	
Late_Fees	
Member_ID	(FK)(Ugroup1)
ISBN	(FK)(Ugroup1)

Data Definition Language – SQL Commands

```sql
CREATE DATABASE Library;
USE Library;

-- Create Employee table
CREATE TABLE Employee (
    First_Name VARCHAR(255),
    Last_Name VARCHAR(255),
    Email VARCHAR(255),
    Phone_No VARCHAR(20),
    Employee_ID INT PRIMARY KEY,
    Password VARCHAR(255)
);

-- Create Members table
CREATE TABLE Members (
    First_Name VARCHAR(255),
    Last_Name VARCHAR(255),
    Email VARCHAR(255),
```
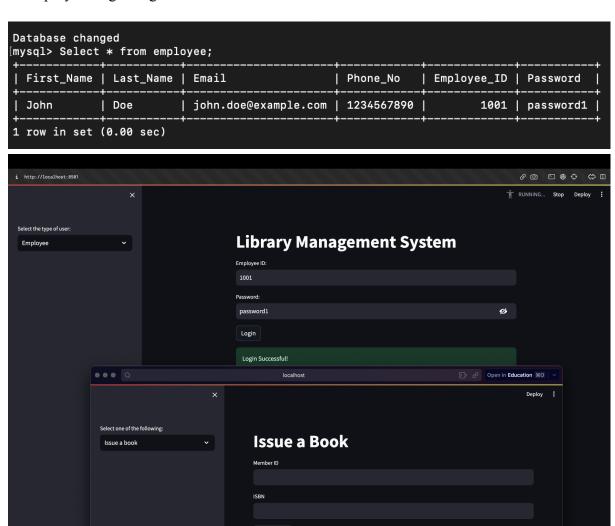
```sql
    Phone_No VARCHAR(20),
    Full_Name VARCHAR(255),
    Address VARCHAR(255),
    Member_ID INT AUTO_INCREMENT PRIMARY KEY,
    Password VARCHAR(255),
    Registration_Fee INT DEFAULT 200
);

-- Create Book table
CREATE TABLE Book(
    ISBN VARCHAR(13) PRIMARY KEY,
    Title VARCHAR(255),
    Author_Name VARCHAR(255),
    Publisher_Name VARCHAR(255),
    Genre VARCHAR(255),
    Price DECIMAL(10, 2),
    Total_No_Of_Copies INT,
    No_of_Copies_Left INT

);

-- Create Borrow Table
CREATE TABLE Borrow(
    Borrow_ID INT AUTO_INCREMENT PRIMARY KEY,
    Member_ID INT,
    ISBN VARCHAR(13),
    Issue_Date DATE,
    Return_Date DATE,
    Late_Fees DECIMAL(10, 2)
);



-- Define the "Borrows" relationship
ALTER TABLE Borrow
ADD CONSTRAINT FK_Book_Members
FOREIGN KEY (Member_ID)
REFERENCES Members(Member_ID);

ALTER TABLE Borrow
ADD CONSTRAINT FK_Book
FOREIGN KEY (ISBN)
REFERENCES Book(ISBN);
```
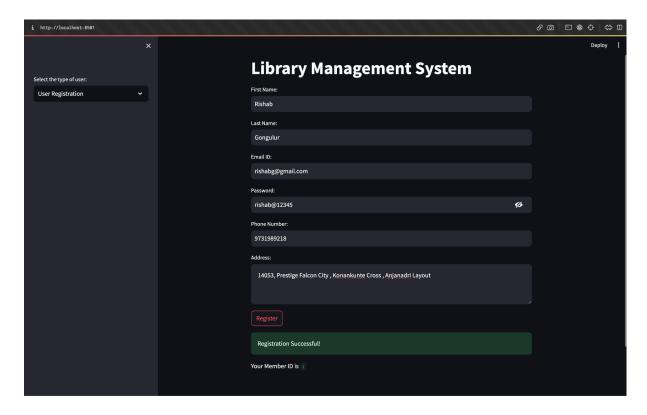
CRUD Operations
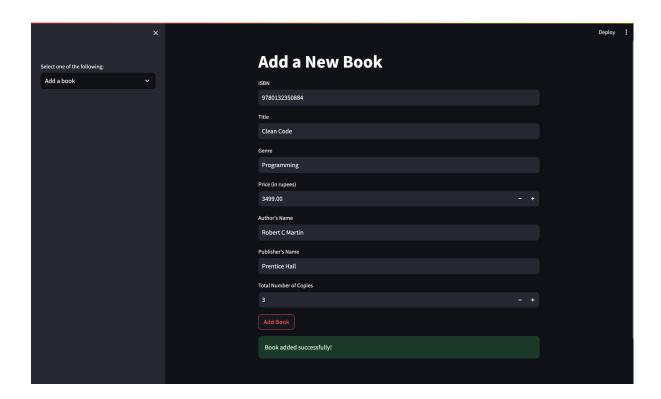
1. Employee Login Page

2. General User Registration


```
[mysql> select * from members;
Empty set (0.00 sec)

mysql>
```


Library Management System

First Name:
Rishab

Last Name:
Gongulur

Email ID:
rishabg@gmail.com

Password:
rishab@12345

Phone Number:
9731989218

Address:
14053, Prestige Falcon City , Konankunte Cross , Anjanadri Layout

[Register]

Registration Successful!

Your Member ID is 1


```
mysql> select * from members;
+------------+-----------+------------------+-----------+----------------+----------------------------------------------------------------+-----------+--------------+------------------+
| First_Name | Last_Name | Email            | Phone_No  | Full_Name      | Address                                                        | Member_ID | Password     | Registration_Fee |
+------------+-----------+------------------+-----------+----------------+----------------------------------------------------------------+-----------+--------------+------------------+
| Rishab     | Gongulur  | rishabg@gmail.com| 9731989218| Rishab Gongulur| 14053, Prestige Falcon City , Konankunte Cross , Anjanadri Layout |         1 | rishab@12345 |              200 |
+------------+-----------+------------------+-----------+----------------+----------------------------------------------------------------+-----------+--------------+------------------+
1 row in set (0.00 sec)
```
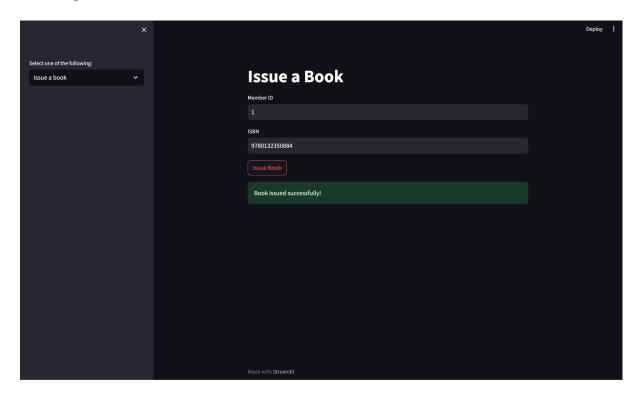
3. Adding a book


```
[mysql> select * from book;
Empty set (0.00 sec)
```


Add a New Book

ISBN
9780132350884

Title
Clean Code

Genre
Programming

Price (in rupees)
3499.00   – +

Author's Name
Robert C Martin

Publisher's Name
Prentice Hall

Total Number of Copies
3   – +

Add Book

Book added successfully!


```
[mysql> select * from book;
+---------------+------------+----------------+----------------+-------------+---------+-------------------+-------------------+
| ISBN          | Title      | Author_Name    | Publisher_Name | Genre       | Price   | Total_No_Of_Copies | No_of_Copies_Left |
+---------------+------------+----------------+----------------+-------------+---------+-------------------+-------------------+
| 9780132350884 | Clean Code | Robert C Martin | Prentice Hall  | Programming | 3499.00 |                 3 |                 3 |
+---------------+------------+----------------+----------------+-------------+---------+-------------------+-------------------+
1 row in set (0.00 sec)
```

4. Issuing a book

Issue a Book

Member ID

1

ISBN

9780132350884

Issue Book

Book issued successfully!

```
[mysql> select * from borrow;
+-----------+-----------+----------------+------------+-------------+-----------+
| Borrow_ID | Member_ID | ISBN           | Issue_Date | Return_Date | Late_Fees |
+-----------+-----------+----------------+------------+-------------+-----------+
|         1 |         1 | 9780132350884  | 2023-11-23 | NULL        |      NULL |
+-----------+-----------+----------------+------------+-------------+-----------+
1 row in set (0.01 sec)

[mysql> select * from book;
+----------------+------------+----------------+----------------+-------------+---------+-------------------+------------------+
| ISBN           | Title      | Author_Name    | Publisher_Name | Genre       | Price   | Total_No_Of_Copies | No_of_Copies_Left |
+----------------+------------+----------------+----------------+-------------+---------+-------------------+------------------+
| 9780132350884  | Clean Code | Robert C Martin | Prentice Hall  | Programming | 3499.00 |                 3 |                2 |
+----------------+------------+----------------+----------------+-------------+---------+-------------------+------------------+
1 row in set (0.00 sec)
```

5. Returning a book


```
[mysql> select * from borrow;
+-----------+-----------+----------------+------------+-------------+-----------+
| Borrow_ID | Member_ID | ISBN           | Issue_Date | Return_Date | Late_Fees |
+-----------+-----------+----------------+------------+-------------+-----------+
|         1 |         1 | 9780132350884  | 2023-11-23 | 2023-12-20  |    210.00 |
+-----------+-----------+----------------+------------+-------------+-----------+
1 row in set (0.00 sec)

[mysql> select * from book;
+----------------+------------+----------------+----------------+-------------+---------+--------------------+-------------------+
| ISBN           | Title      | Author_Name    | Publisher_Name | Genre       | Price   | Total_No_Of_Copies | No_of_Copies_Left |
+----------------+------------+----------------+----------------+-------------+---------+--------------------+-------------------+
| 9780132350884  | Clean Code | Robert C Martin| Prentice Hall  | Programming | 3499.00 |                  3 |                 3 |
+----------------+------------+----------------+----------------+-------------+---------+--------------------+-------------------+
1 row in set (0.00 sec)
```

6. Deleting a book from the library
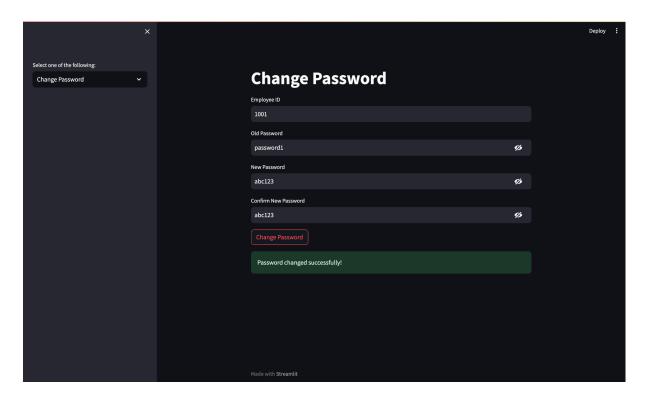
```
mysql> select * from book;
+---------------+------------+----------------+----------------+-------------+---------+-------------------+-------------------+
| ISBN          | Title      | Author_Name    | Publisher_Name | Genre       | Price   | Total_No_Of_Copies | No_of_Copies_Left |
+---------------+------------+----------------+----------------+-------------+---------+-------------------+-------------------+
| 9780132350884 | Clean Code | Robert C Martin | Prentice Hall  | Programming | 3499.00 |                 3 |                 3 |
+---------------+------------+----------------+----------------+-------------+---------+-------------------+-------------------+
1 row in set (0.00 sec)
```
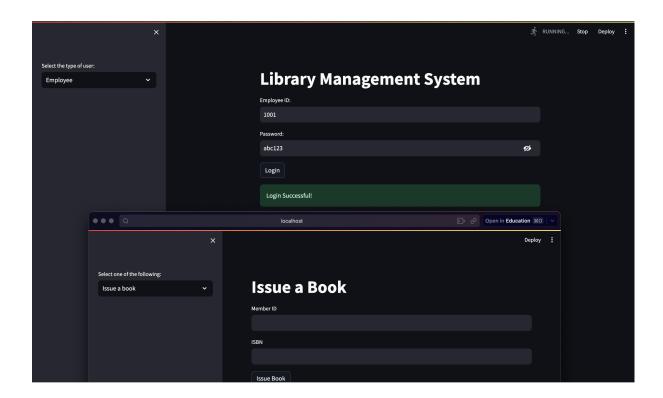


```
[mysql> select * from book;
 Empty set (0.00 sec)

[mysql> select * from borrow;
 Empty set (0.00 sec)
```

7. Change of login password for the employee
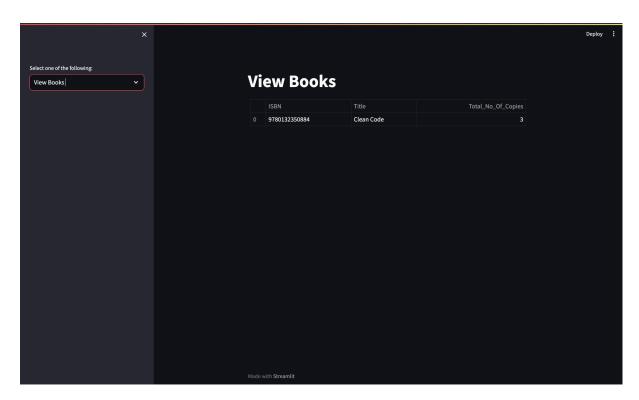
```
[mysql> select * from employee;
+------------+-----------+----------------------+------------+-------------+-----------+
| First_Name | Last_Name | Email                | Phone_No   | Employee_ID | Password  |
+------------+-----------+----------------------+------------+-------------+-----------+
| John       | Doe       | john.doe@example.com | 1234567890 |        1001 | password1 |
+------------+-----------+----------------------+------------+-------------+-----------+
1 row in set (0.00 sec)
```
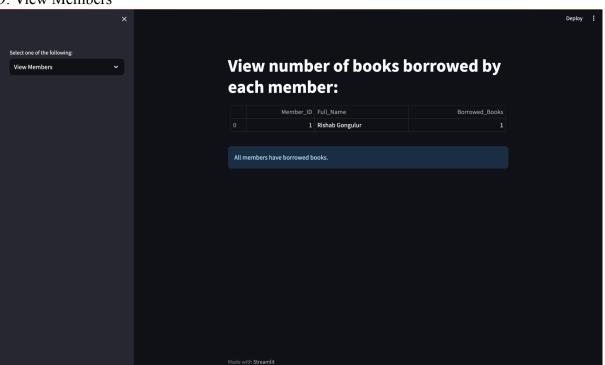


```
[mysql> select * from employee;
+------------+-----------+----------------------+------------+-------------+-----------+
| First_Name | Last_Name | Email                | Phone_No   | Employee_ID | Password  |
+------------+-----------+----------------------+------------+-------------+-----------+
| John       | Doe       | john.doe@example.com | 1234567890 |        1001 | abc123    |
+------------+-----------+----------------------+------------+-------------+-----------+
1 row in set (0.00 sec)
```
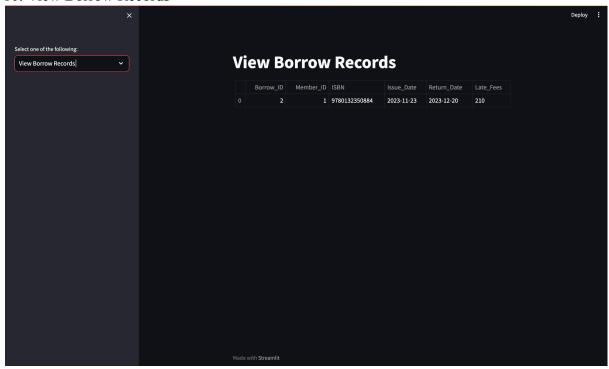
8. View Books

9. View Members

10. View Borrow Records

List of Functionalities

1. Employee Login:
Employees can log in by providing their Employee ID and password.

2. Employee Authentication:
Verifies employee credentials by querying the MySQL database.

3. Book Addition:
Allows employees to add new books to the library database. Checks if the book with the given ISBN already exists and updates the number of copies if it does.

4. Book Issuing:
Enables employees to issue books to library members. Checks if the user has already issued three books without returning before allowing a new issue. Checks if the requested book is available for borrowing.

5. Book Return:
Allows employees to record the return of a borrowed book.
Calculates late fees based on the return date and updates the Book and Borrow tables accordingly.

6. Book Deletion:
Permits employees to delete books from the library database.
Checks if the book exists and if it has been returned before deletion.

7. Member View:
Displays a table showing the number of borrowed books by each library member.
Lists members who have not borrowed any books.

8.Book View:
Displays a table showing the ISBN, title, and total number of copies for each book in the library.

9.Borrow Records View:
Displays a table showing all borrow records, including information about the member, book, issue date, return date, and late fees.

10.Password Change:
Allows employees to change their password after successful login.
Verifies the old password before updating the password in the database.

11.User Registration:
Allows new users to register as library members.
Utilises the stored procedure RegisterMember for member registration.

Procedures and Triggers

```sql
-- Concatenate the first name and last name and update the Full_Name column in the
member table
DELIMITER //
CREATE TRIGGER after_member_insert_concat_name
BEFORE INSERT
ON Members FOR EACH ROW
BEGIN
    SET NEW.Full_Name = CONCAT(NEW.First_Name, ' ', NEW.Last_Name);
END;
//
DELIMITER ;


-- Procedure to handle the registration of a new member
DELIMITER //
CREATE PROCEDURE RegisterMember(
    IN p_First_Name VARCHAR(255),
    IN p_Last_Name VARCHAR(255),
    IN p_Email VARCHAR(255),
    IN p_Password VARCHAR(255),
    IN p_Phone_No VARCHAR(20),
    IN p_Address VARCHAR(255)
)
BEGIN
    -- Insert the new member without specifying Member_ID (auto-increment)
    INSERT INTO Members (Phone_No, Address, First_Name, Last_Name, Email, Password)
    VALUES (p_Phone_No, p_Address, p_First_Name, p_Last_Name, p_Email, p_Password);
END
//
DELIMITER ;


-- Create a trigger to update No_of_Copies_Left when a book is issued
DELIMITER //
CREATE TRIGGER after_borrow_insert
AFTER INSERT ON Borrow FOR EACH ROW
BEGIN
    -- Decrease the number of copies left for the issued book
    UPDATE Book
    SET No_of_Copies_Left = No_of_Copies_Left - 1
    WHERE ISBN = NEW.ISBN;
END;
//
DELIMITER ;
```