



# **Project: Library Management System**

**Course Code : CSE 202**

**Course Title : Database Management System Sessional**

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# Library Management System

## 1 Introduction

The **Library Management System** (LMS) is designed to manage the operations of a library in an organized and efficient manner. This system simplifies the process of maintaining records of books, members, and transactions (like reserving and returning books), ensuring smooth library operations. It allows librarians to manage book inventories, track member activities, and record transactions, offering a comprehensive solution for both administrators and members.

## 2 Project Description

This project develops a database system that records and manages the library's key resources: books, members, and administrators. The system includes modules for login management, member registration, book management, and transaction handling. The library administrators will be able to track book availability and issue/return history, while members can reserve books and check their statuses.

The system uses a **relational database** with multiple tables connected by primary and foreign keys. It ensures data integrity and provides functionalities such as adding, updating, and deleting records.

## 3 Goals and Objectives

The objectives of this project are:

- build a database-driven system that manages book inventory, member information, and transactions.
- To provide a secure login system for admins and members.
- ensure accurate tracking of book reservations and returns.
- offer a user-friendly interface for both members and library staff to interact with the system.
- We will use Html, Css, Javascript, NodeJs and My Sql workbench to offer a nice and attractive User Interface
- To maintain data consistency and ensure efficient data retrieval for library reporting.

## 4 Primary Key and Foreign Key for Each Table

- **Login Table:**

- *Primary Key*: Email
- *Attributes*: Email (Unique), Password, UserType (Admin/User)

- **Registration Table:**

- *Primary Key*: Username
- *Foreign Key*: Email (linked to Login.Email)
- *Attributes*: Username, Email, Phone, Address, Birthdate

- **Admin Table:**

- *Primary Key*: Admin id
- *Attributes*: Admin id, Admin mail, Phone

- **Books Table:**

- *Primary Key*: Book id
- *Attributes*: Book id, Book name, Author name, Quantity

- **Members Table:**

- *Primary Key*: Member id
- *Foreign Key*: Username (linked to Registration.Username)
- *Attributes*: Member id, Member name, Username

- **Transaction Table:**

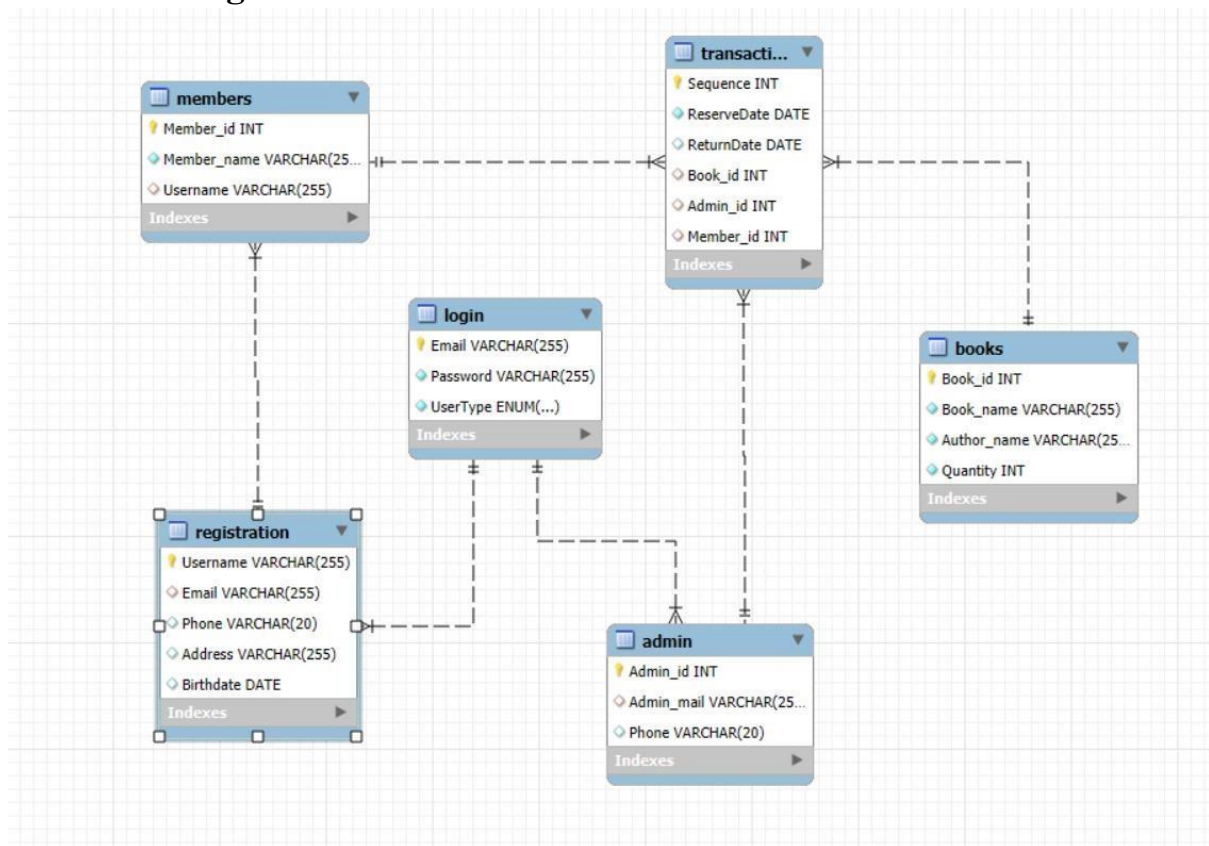
- *Primary Key*: Sequence
- *Foreign Keys*: Book id (linked to Books.Book id), Admin id (linked to Admin.Admin id), Member id (linked to Members.Member id)
- *Attributes*: Sequence, ReserveDate, ReturnDate, Book id, Admin id, Member id

## 5 Table Relations and Attribute List with Data Types

Table Name	Attribute Name	Data Type	Constraints
Login	Email	VARCHAR(255)	PRIMARY KEY, UNIQUE
	Password	VARCHAR(255)	NOT NULL
	UserType	VARCHAR(50)	NOT NULL
Registration	Username	VARCHAR(255)	PRIMARY KEY
	Email	VARCHAR(255)	FOREIGN KEY (Login)
	Phone	VARCHAR(20)	NOT NULL

	Address	TEXT	NOT NULL
	Birthdate	DATE	NOT NULL
Admin	Admin id	VARCHAR(50)	PRIMARY KEY
	Admin mail	VARCHAR(255)	UNIQUE
	Phone	VARCHAR(20)	NOT NULL
Books	Book id	INT	PRIMARY KEY
	Book name	VARCHAR(255)	NOT NULL
	Author name	VARCHAR(255)	NOT NULL
	Quantity	INT	NOT NULL
Members	Member id	VARCHAR(50)	PRIMARY KEY
	Member name	VARCHAR(255)	NOT NULL
	Username	VARCHAR(255)	FOREIGN KEY (Registration)
Transaction	Sequence	INT	PRIMARY KEY
	ReserveDate	DATE	NOT NULL
	ReturnDate	DATE	NULLABLE
	Book id	INT	FOREIGN KEY (Books)
	Admin id	VARCHAR(50)	FOREIGN KEY (Admin)
	Member id	VARCHAR(50)	FOREIGN KEY (Members)

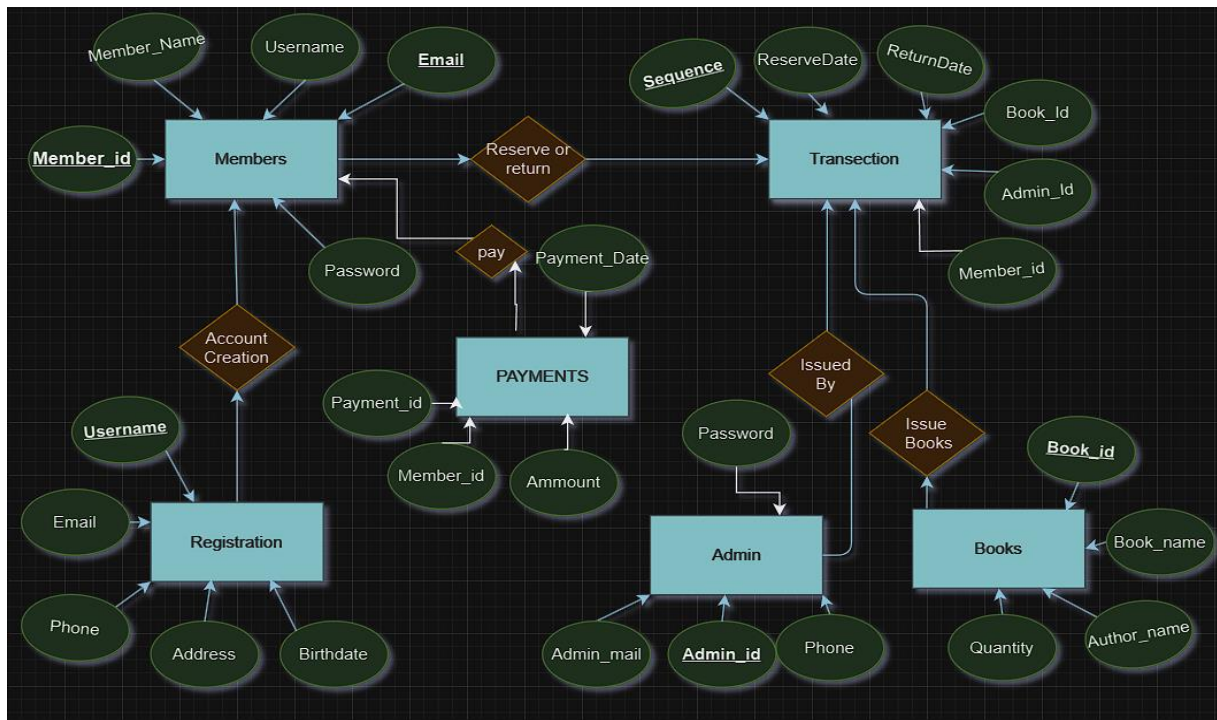
## 6 Schema Diagram



The schema diagram represents the relationships between tables, showing how each table is connected using primary and foreign keys. For example:

- *Login* and *Registration* are connected by the *Email* attribute.
- *Books*, *Members*, and *Transaction* are linked through foreign key constraints, ensuring data integrity between book reservations and member/admin information.

## 7 E-R Diagram

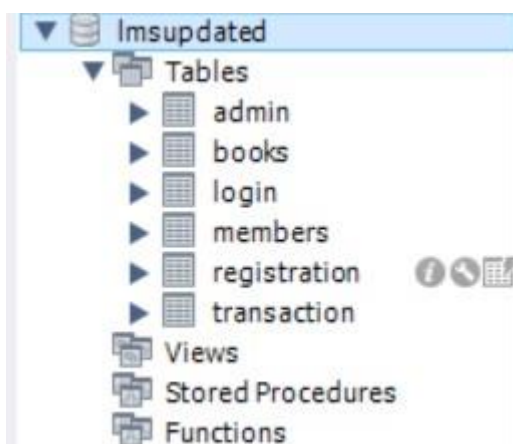


The E-R diagram consists of:

- **Entities:** Login, Admin, Members, Books, Transactions.
- **Relationships:**
  - An admin oversees multiple transactions.
  - A member can reserve multiple books, but each book can only be reserved by one member at a time.
  - Each transaction is associated with a specific book and a specific member.

This E-R diagram visually represents how these entities are related in the system.

## 8 Database implementation:



## 9 SQL Queries:

- `SELECT * FROM Books WHERE Author_name = 'J.R.R. Tolkien';`

	Book_id	Book_name	Author_name	Quantity
▶	7	The Lord of the Rings	J.R.R. Tolkien	8
	8	The Hobbit	J.R.R. Tolkien	9
•	NULL	NULL	NULL	NULL

- `SELECT Admin_mail, Phone FROM Admin  
WHERE Phone LIKE '111%';`

	Admin_mail	Phone
▶	alice.smith@example.com	1112223333

- `SELECT Book_name, Quantity  
FROM Books  
WHERE Quantity BETWEEN 5 AND 10;`

	Book_name	Quantity
▶	The Great Gatsby	10
	To Kill a Mockingbird	5
	Pride and Prejudice	7
	The Lord of the Rings	8
	The Hobbit	9
	Crime and Punishment	6

- `SELECT Member_name, Username  
FROM Members  
WHERE Member_name = 'David White' OR Member_name = 'Eva Green';`

	Member_name	Username
▶	David White	david_white
	Eva Green	eva_green

- UPDATE Admin  
SET Phone = '9999999999'  
WHERE Admin\_id = 2101002;

26 18:55:34 UPDATE Admin SET Phone = '9999999999' WH... 1 row(s) affected Rows matched: 1 Changed: 1 ... 0.016 sec

- DELETE FROM Transaction WHERE Sequence = 3;
- SELECT AVG(Quantity) AS AverageReservedBooks  
FROM Books  
WHERE Book\_id IN (SELECT Book\_id FROM Transaction);

	AverageReservedBooks
▶	6.9000

## 10 .Used Languages

For Frontend development use HTML,CSS, Express JS. For backend ,use Node.js.For database use MySql ,and npmmysql2nodemon is the module that use for this project.

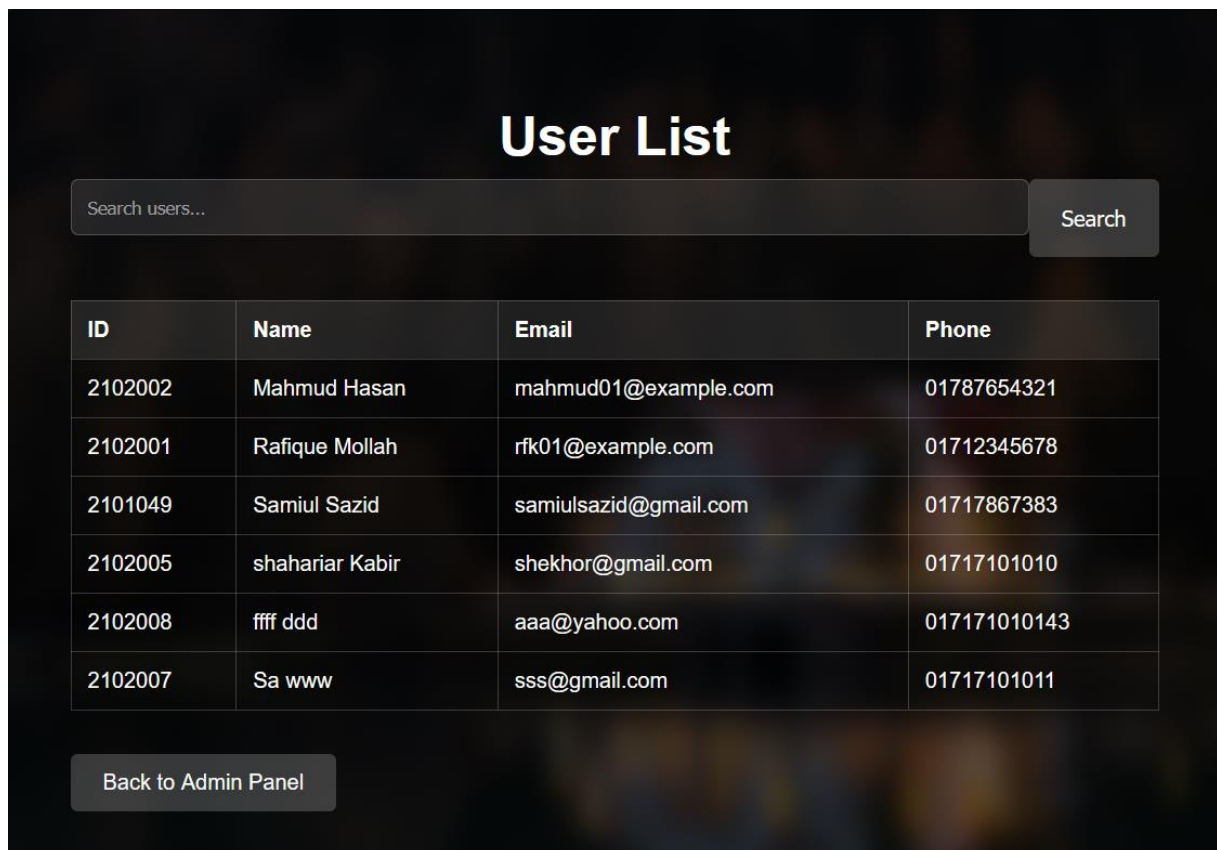
### Admin functionality :

As an admin, you have the ability to manage various aspects of the system. You can view the user list, which allows you to access details of all registered users, their activities, and account information. If needed, you can also add new books to the library by providing essential details like the title, author, genre, ISBN, and availability. Additionally, you have the authority to add new admins to the system, assigning specific roles and permissions to manage and oversee operations. Admins can also access and update their own profile and information, ensuring their personal details and settings are up-to-date. You can record user transactions, including keeping track of books borrowed or returned,



maintaining a complete transaction history. The search books feature enables you to search for books by title, author, genre, or ISBN, and check the availability of each book in the library. Finally, admins can manage due payments, overseeing any unpaid fees from users, sending reminders, and managing fines or payment deadlines as necessary

See user list as an admin :



ID	Name	Email	Phone
2102002	Mahmud Hasan	mahmud01@example.com	01787654321
2102001	Rafique Mollah	rfk01@example.com	01712345678
2101049	Samiul Sazid	samiulsazid@gmail.com	01717867383
2102005	shahariar Kabir	shekhor@gmail.com	01717101010
2102008	ffff ddd	aaa@yahoo.com	017171010143
2102007	Sa www	sss@gmail.com	01717101011

Back to Admin Panel

Admin can also add books .As he manage whole system ,he add also books as this is the purpose of this project .Maintain books,staffs,transaction and so on .

Here is the screen shot of this project that how a admin can add book name in the system

## Add Books

Admin can also which book are store in the library like this :

## Search Books

Book ID	Title	Author	Quantity
1	Bangla Sahityer Itihash	Bibhutibhushan Bandopadhyay	9
2	Bhoot Chaturdashi	Humayun Ahmed	15
3	Shonar Bangla	Rabindranath Tagore	20
4	Chokher Bali	Rabindranath Tagore	12
5	Pather Dabi	Subhas Chandra Bose	5
6	Ruposhi Bangla	Kazi Nazrul Islam	10
7	Demonetisation	Satyajit Ray	30
8	Kabi	Jibanananda Das	8
9	Shibpurur Jiban	Nabaneeta Dev Sen	15
10	Bangla Lok-Sahitya	Satyendranath Dutta	7
11	Chhoto Nae	Bibhutibhushan Bandopadhyav	25

Other functionality will be :

## Add Admins

Full Name

Email

Phone Number

Password

Confirm Password

Add Admin

Back to Admin Panel

## Record a Transaction

Member ID:

Enter Member ID

Please fill out this field.

Reserve Date

dd / mm / yyyy

Return Date

dd / mm / yyyy

Select Book:

Bangla Sahityer Itihash by Bibhutibhushan Bandopadhyay

Submit Transaction

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## Payments

ID	Name	Last Payment	Status	Due Months
2101049	Samiul Sazid	Wed Dec 11 2024 00:00:00 GMT+0600 (Bangladesh Standard Time)	Completed	0
2102001	Rafique Mollah	Sun Dec 01 2024 00:00:00 GMT+0600 (Bangladesh Standard Time)	Due	1
2102002	Mahmud Hasan	Mon Dec 02 2024 00:00:00 GMT+0600 (Bangladesh Standard Time)	Due	1
2102003		N/A	Due	0
2102004		N/A	Due	0
2102005	shahariar Kabir	Thu Dec 12 2024 00:00:00 GMT+0600 (Bangladesh Standard Time)	Completed	0
2102006		N/A	Due	0
2102007	Sa www	N/A	Due	0
2102008	ffff ddd	N/A	Due	0

## Admin Profile

**ID:** 2101001

**Name:** Rahul Dash BK

**Email:** admin01@example.com

**Phone:** 01812345679

Edit Profile

Back to Admin Panel

## Edit Profile

Name:

Email:

Phone:

Update Profile

Back to Profile

### User Functionality

## Edit Profile

Name:

Email:

Phone:

Update Profile

Back to Profile

## Profile

**Member ID:** 2101049  
**Full Name:** Samiul Sazid  
**Email:** samiulsazid@gmail.com  
**Username:** Sammo  
**Phone Number:** 01717867383  
**Address:** Naogaon  
**Birthdate:** Wed Dec 31 2003 00:00:00 GMT+0600 (Bangladesh Standard Time)

[Edit Profile](#)

[Back to User Panel](#)

## Payment Information

**Member ID:** 2101049

**Last Paid Date:** 2024-12-10

**Days Left to Pay:** Payment is due

[Pay Now](#)

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## My Transactions

Transaction ID	Admin ID	Member ID	Book Name	Reserve Date	Return Date
13	2101001	2101049	Bangla Sahityer Itihash	Wed Dec 11 2024 00:00:00 GMT+0600 (Bangladesh Standard Time)	Wed Dec 18 2024 00:00:00 GMT+0600 (Bangladesh Standard Time)
14	2101001	2101049	Bangla Sahityer Itihash	Sun Dec 15 2024 00:00:00 GMT+0600 (Bangladesh Standard Time)	Thu Dec 26 2024 00:00:00 GMT+0600 (Bangladesh Standard Time)
15	2101001	2101049	New	Sat Dec 14 2024 00:00:00 GMT+0600 (Bangladesh Standard Time)	Sun Dec 29 2024 00:00:00 GMT+0600 (Bangladesh Standard Time)

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## Book Authors

Bibhutibhushan Bandopadhyay

Humayun Ahmed

Rabindranath Tagore

Subhas Chandra Bose

Kazi Nazrul Islam

Satyajit Ray

Jibanananda Das

## 11.Future Enhancements

- Otp verification
- Email Notifications for Payments and Reservations.
- Password Hashing for Security
- Buy hosting and get our website online
- Add Authentic Payment System

## 12 . Conclusion

The **Library Management System** offers an effective solution for managing libraries, handling book transactions, and keeping track of users and administrators efficiently. This proposal outlines the design and implementation of the database, ensuring that all critical operations such as reservations, returns, and member management are performed securely and efficiently.