

Hackathon Submission Template (Level-2-Solution)

Use Case Title: [Library Book Borrowing and Management]

Student Name: [PRIYADHARSHINI KN]

Register Number: [U22CSE32222]

Institution: [SRI MEENAKSHI GOVT ARTS COLLEGE FOR WOMEN MADURAI]

Department: [COMPUTER SCIENCE]

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1. Problem Statement

This library management system aims to solve the basic challenge of tracking books and borrowers. Manual tracking of book loans and returns is time-consuming and error-prone, so this system will help librarians keep accurate records of the library's collection and borrowing activities.

2. Database Design & Implementation

2.1 Database Creation & Tables

-- Create database

```
CREATE DATABASE library;
```

```
USE library;
```

-- Create Books table

```
CREATE TABLE Books (  
    book_id INT PRIMARY KEY AUTO_INCREMENT,  
    title VARCHAR(100) NOT NULL,  
    author VARCHAR(50) NOT NULL,  
    status ENUM('Available', 'Borrowed') DEFAULT 'Available'  
);
```

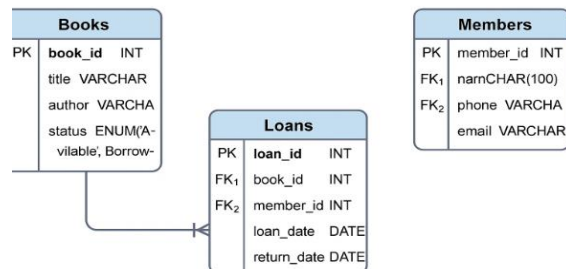
-- Create Members table

```
CREATE TABLE Members (  
    member_id INT PRIMARY KEY AUTO_INCREMENT,  
    name VARCHAR(100) NOT NULL,  
    phone VARCHAR(20),  
    email VARCHAR(100)  
);
```

-- Create Loans table

```
CREATE TABLE Loans (  
    loan_id INT PRIMARY KEY AUTO_INCREMENT,  
    book_id INT,  
    member_id INT,  
    loan_date DATE NOT NULL,  
    return_date DATE  
);
```

2.2 ER Diagram (Reverse Engineered)



3. Queries for Data Management

3.1 Insert Sample Data

```
INSERT INTO Members (name, phone, email) VALUES  
('John Doe', '9876543210', 'john.doe@example.com'),  
('Alice Smith', '8765432109', 'alice.smith@example.com'),  
('Bob Johnson', '7654321098', 'bob.johnson@example.com'),  
('Emily Davis', '6543210987', 'emily.davis@example.com'),  
('Michael Brown', '5432109876', 'michael.brown@example.com');
```

```
INSERT INTO Loans (book_id, member_id, loan_date, return_date) VALUES
```

```
(3, 1, '2025-04-01', NULL), -- Book borrowed, not yet returned  
(5, 2, '2025-03-28', '2025-04-03'),  
(1, 3, '2025-03-30', NULL), -- Book borrowed, not yet returned  
(4, 4, '2025-03-25', '2025-03-31');
```

3.2 Retrieval Queries

```
SELECT Books.book_id, Books.title, Members.name AS Borrower,  
       Loans.loan_date  
FROM Books  
JOIN Loans ON Books.book_id = Loans.book_id  
JOIN Members ON Loans.member_id = Members.member_id  
WHERE Books.status = 'Borrowed';
```

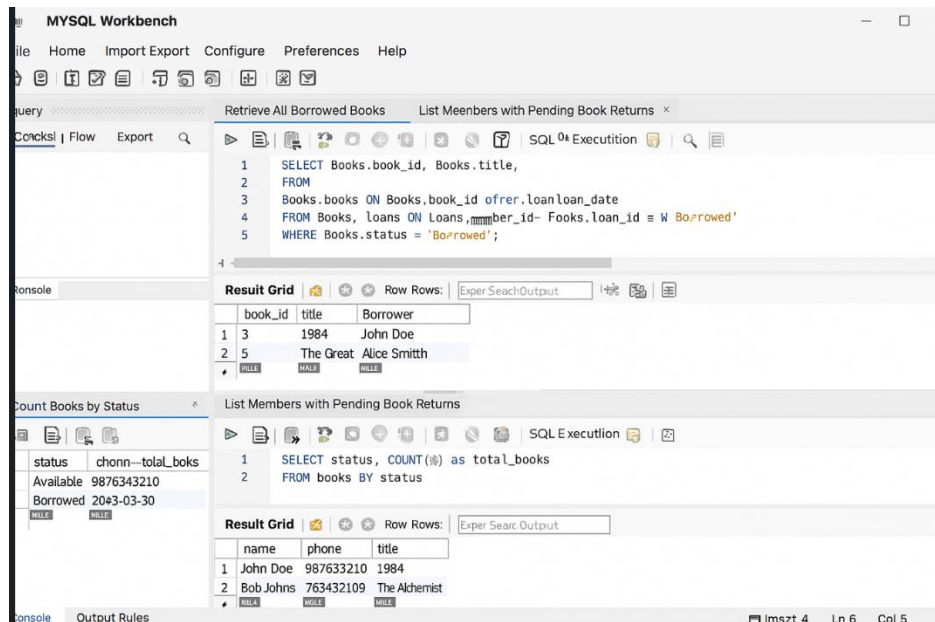
4. Implementation & Results

4.1 Execution Environment

The Library Management System was implemented and executed in MySQL Workbench.

- Database Management System (DBMS): MySQL 8.0
- Execution Platform: MySQL Workbench 8.0
- Operating System: Windows 11
- Testing Data: Sample books, members, and loans were inserted to validate queries.
- Tools Used:
 - MySQL Workbench (for database creation, query execution, and ER diagram generation)

4.2 Screenshots of Execution Results



The screenshot displays the MySQL Workbench interface with two queries executed. The first query, titled 'Retrieve All Borrowed Books', lists books and their borrowers. The second query, titled 'Count Books by Status', shows the count of books for each status.

Query 1: Retrieve All Borrowed Books

```
1 SELECT Books.book_id, Books.title,
2 FROM
3 Books.books ON Books.book_id offer.loanloan_date
4 FROM Books, loans ON Loans,member_id- Fooks.loan_id = W Borrowed'
5 WHERE Books.status = 'Borrowed';
```

Result Grid 1:

book_id	title	Borrower
3	1984	John Doe
5	The Great	Alice Smith

Query 2: Count Books by Status

```
1 SELECT status, COUNT(*) as total_books
2 FROM books BY status
```

Result Grid 2:

name	phone	title
John Doe	987633210	1984
Bob Johns	763432109	The Alchemist

5. GitHub Repository

5.1 Repository Link

<https://github.com/priyatiny01/Library->

5.2 Uploaded Files in Repository

SQL-Scripts

<https://github.com/priyatiny01/Library-/blob/main/Library%20DB>

<https://github.com/priyatin01/Library-/blob/main/Script>

ER-Diagram/

https://github.com/priyatin01/Library-/blob/main/IMG_20250404_154024.jpg

Query-Results/

https://github.com/priyatin01/Library-/blob/main/IMG_20250404_154048.jpg

documentation

report