Hackathon Submission Template (Level-2-Solution)

Use Case Title: [Library Book Borrowing and Management]

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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

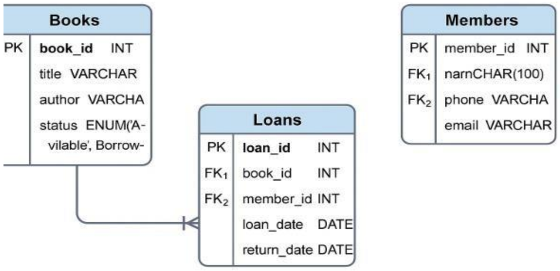
```
-- Create database
CREATE DATABASE library;
USE library;

-- 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

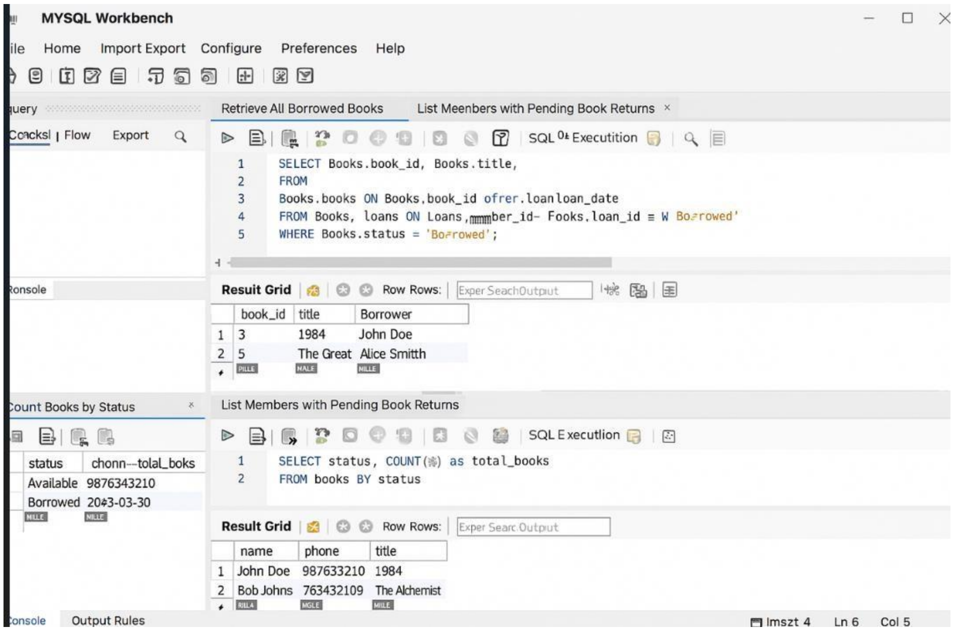
```
SELECT Books.book_id, Books.title, Members.name AS Borrower,
Loans.loan_dateb
FROM Books
JOIN Loans ON Books.book_id = Loans.book_id
JOIN Members ON Loans.member_id = Members.member_id
WHERE Books.status = 'Borrowed';4. Implementation & Results
```

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



Retrieve All Borrowed Books

```
SELECT Books.book_id, Books.title,
FROM
Books.books ON Books,book_id ofrer.loanloan_date
FROM Books, loans ON Loans,mmmber_id- Fooks,loan_id ≡ W Bo⸗rowed'
WHERE Books.status = 'Bo⸗rowed';
```

	book_id	title	Borrower
1	3	1984	John Doe
2	5	The Great	Alice Smitth
⬩	PILLE	MALE	NILLE

Count Books by Status

status	chonn--tolal_boks
Available	9876343210
Borrowed	20¢3-03-30
MILLE	NILLE

List Members with Pending Book Returns

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

	name	phone	title
1	John Doe	987633210	1984
2	Bob Johns	763432109	The Alchemist
⬩	RILLA	MGLE	MILE

5. GitHub Repository

5.1 Repository Link

https://github.com/durgarajamaruthappan/libruaryhttps://github.com/durgarajamaruthappan/libruary

5.2 Uploaded Files in Repository

SQL-Scripts

https://github.com/durgarajamaruthappan/libruary/blob/main/liburary
ER-Diagram/
https://github.com/durgarajamaruthappan/libruary/blob/main/nanmuthalvan.png

Query-Results/

https://github.com/durgarajamaruthappan/libruary/blob/main/nanmuthalvan2.png