

HackathonSubmissionTemplate(Level-2-Solution)

UseCaseTitle:[LibraryBookBorrowingandManagement]

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DateofSubmission:[06-04-2025]

1. ProblemStatement

This library management system aims to solve the basic challenge of tracking booksandborrowers.Manualtrackingofbookloansandreturnsistime-consuming and error-prone,sothissystemwillhelp librarianskeepaccuraterecordsofthelibrary's collection and borrowing activities.

2. DatabaseDesign&Implementation

DatabaseCreation&Tables

--Createdatabase

```
CREATEDATABASElibrary;
```

```
USE library;
```

-- Create Books table

```
CREATETABLEBooks(  
    book_idINTPRIMARYKEYAUTO_INCREMENT,title  
    VARCHAR(100) NOT NULL,  
    authorVARCHAR(50)NOTNULL,  
    statusENUM('Available','Borrowed')DEFAULT'Available'  
);
```

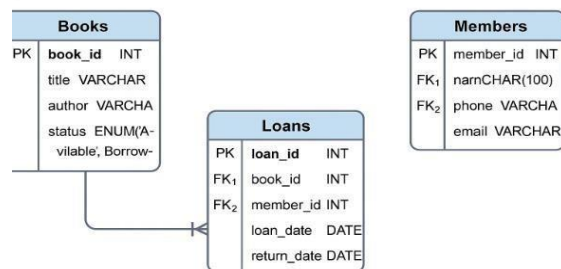
-- Create Members table

```
CREATETABLEMembers(  
    member_idINTPRIMARYKEYAUTO_INCREMENT,  
    name VARCHAR(100) NOT NULL,  
    phoneVARCHAR(20),  
    emailVARCHAR(100)  
);
```

-- Create Loans table

```
CREATETABLELoans(  
    loan_idINTPRIMARYKEYAUTO_INCREMENT,  
    book_id INT,  
    member_idINT,  
    loan_dateDATENOTNULL,  
    return_date DATE  
);
```

ERDiagram(ReverseEngineered)



3. QueriesforDataManagement

InsertSampleData

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

```
INSERTINTOLOans(book_id,member_id,loan_date,return_date)VALUES
```

```
(3,1,'2025-04-01',NULL),--Bookborrowed,notyetreturned(5,2,
'2025-03-28','2025-04-03'),
(1,3,'2025-03-30',NULL),--Bookborrowed,notyetreturned(4,4,
'2025-03-25','2025-03-31');
```

RetrievalQueries

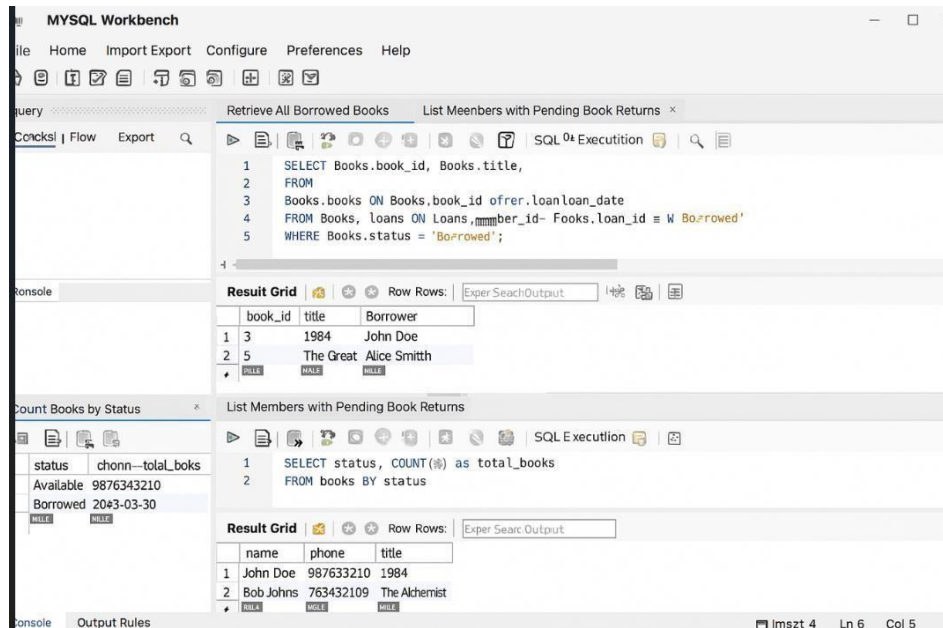
```
SELECTBooks.book_id,Books.title,Members.nameASBorrower, Loans.loan_dateb
FROMBooks
JOINLoansONBooks.book_id=Loans.book_id
JOINMembersONLoans.member_id=Members.member_id
WHEREBooks.status='Borrowed';4.Implementation&Results
```

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)

Screenshots of Execution Results



The screenshot shows 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 'List Members with Pending Book Returns', lists members and their pending returns.

Query 1: Retrieve All Borrowed Books

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

Result Grid:

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

Query 2: List Members with Pending Book Returns

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

Result Grid:

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

5. GitHub Repository

Repository Link

https://github.com/poorni5/Poornima_5419EE60C2C270C9FED400790122633F

UploadedFilesinRepository

SQL-Scripts

https://github.com/poorni5/Poornima_5419EE60C2C270C9FED400790122633F/blob/main/scripts

ER-Diagram/

https://github.com/poorni5/Poornima_5419EE60C2C270C9FED400790122633F/blob/main/ERdiagram.png

Query-Results/

https://github.com/poorni5/Poornima_5419EE60C2C270C9FED400790122633F/blob/main/output.png

documentation

https://github.com/poorni5/Poornima_5419EE60C2C270C9FED400790122633F/blob/main/HackathonSubmission2.pdf