LIBRARY MANAGEMENT SYSTEM

SUBMITTED BY

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INTRODUCTION

A Library Management System (LMS) is a comprehensive software application designed to manage and streamline the various operations of a library. In today's digital age, libraries face numerous challenges, such as efficiently managing books, tracking borrowing and returning processes, maintaining accurate records, and enhancing user experience. This project aims to create an efficient and user-friendly Library Management System using MySQL as the database management system.

Objectives of the Library Management System

The primary objectives of this Library Management System project are as follows:

1. **Book Management**: To facilitate the addition, deletion, and modification of book records in the library database. This includes details like title, author, category, ISBN, rental price, and availability status.

2. **User Management**: To manage customer information efficiently, including registration, updating personal details, and maintaining a record of issued and returned books.

3. **Issuing and Returning Books**: To track the issuance and return of books, ensuring that the library can manage inventory effectively and maintain accurate records of borrowed books.

4. **Branch Management**: To manage multiple library branches and their employees, including details about branch addresses, managers, and contact information.

5. **Reporting and Analytics**: To generate reports that provide insights into library operations, such as the most borrowed books, customer activity, and branch performance.

DATA REQUIREMENTS

Entities

- Branch
- Employee
- Books
- Customer
- IssueStatus
- ReturnStatus

Attributes

Branch

- Branch_no (Primary Key)

- Manager_Id

- Branch_address

- Contact_no

Employee

- **Emp_Id** (Primary Key)

- Emp_name

- Position

- Salary

- Branch_no (Foreign Key referencing Branch)

Books

- **ISBN** (Primary Key)

- Book_title

- Category

- Rental_Price

- Status (Yes/No)

- Author

- Publisher

Customer

- **Customer_Id** (Primary Key)

- Customer_name

- Customer_address

- Reg_date

IssueStatus

- **Issue_Id** (Primary Key)

- Issued_cust (Foreign Key referencing Customer)

- Issued_book_name

- Issue_date

- Isbn_book (Foreign Key referencing Books)

ReturnStatus

- **Return_Id** (Primary Key)

- Return_cust (Foreign Key referencing Customer)

- Return_book_name

- Return_date

- Isbn_book2 (Foreign Key referencing Books)

CREATING DATABASE USING MYSQL

Creating Tables

```
--  Create the database

CREATE DATABASE library;

--  Use the database

USE library;

--  Create the tables

-- Branch table

CREATE TABLE Branch (

    Branch_no INT PRIMARY KEY,

    Manager_Id INT,

    Branch_address VARCHAR(255),

    Contact_no VARCHAR(15)

);

DESC Branch;

-- Employee table

CREATE TABLE Employee (

    Emp_Id INT PRIMARY KEY,

    Emp_name VARCHAR(255),

    Position VARCHAR(100),

    Salary DECIMAL(10, 2),

    Branch_no INT,

    FOREIGN KEY (Branch_no) REFERENCES Branch(Branch_no)

);

DESC Employee;

-- Books table

CREATE TABLE Books (
```

```sql
    ISBN VARCHAR(255) PRIMARY KEY,

    Book_title VARCHAR(255),

    Category VARCHAR(100),

    Rental_Price DECIMAL(10, 2),

    Status ENUM('yes', 'no'),

    Author VARCHAR(255),

    Publisher VARCHAR(255)

    );

    DESC Books;
-- Customer table
CREATE TABLE Customer (

    Customer_Id INT PRIMARY KEY,

    Customer_name VARCHAR(255),

    Customer_address VARCHAR(255),

    Reg_date DATE
);
DESC Customer;
-- IssueStatus table
CREATE TABLE IssueStatus (

    Issue_Id INT PRIMARY KEY,

    Issued_cust INT,

    Issued_book_name VARCHAR(255),

    Issue_date DATE,

    Isbn_book VARCHAR(255),

    FOREIGN KEY (Issued_cust) REFERENCES Customer(Customer_Id),

    FOREIGN KEY (Isbn_book) REFERENCES Books(ISBN)
);
 DESC IssueStatus;
```

-- ReturnStatus table

```
CREATE TABLE ReturnStatus (

    Return_Id INT PRIMARY KEY,

    Return_cust INT,

    Return_book_name VARCHAR(255),

    Return_date DATE,

    Isbn_book2 VARCHAR(255),

    FOREIGN KEY (Return_cust) REFERENCES Customer(Customer_Id),

    FOREIGN KEY (Isbn_book2) REFERENCES Books(ISBN)

);

DESC ReturnStatus;
```

Inserting Data

-- Insert data into **Branch table**

```
INSERT INTO Branch (Branch_no, Manager_Id, Branch_address, Contact_no)

VALUES

(1, 100, '123 Main St North City' , '39841975'),

(2, 101, '456 Gandhi St South City', '32039873'),

(3, 102, '789 Avenue St Town City', '323345678'),

(4, 103, '321 Mall St Down City', '32457861');

SELECT * FROM Branch;
```

-- Insert data into **Employee table**

```
INSERT INTO Employee (Emp_Id, Emp_name, Position, Salary, Branch_no)

VALUES

(1, 'Alice Ann', 'Manager', 60000, 1),

(2, 'Smith John', 'Assistant Manager', 40000, 1),

(3, 'Cathyeline Bob', 'Clerk', 35000, 2),

(4, 'David Dane', 'Manager', 62000, 2),
```

(5, 'Eve Steve', 'Clerk', 32000, 3),

(6, 'Frank Mark', 'Librarian', 61000, 4),

(7, 'Grace Antony', 'Assistant Manager', 42000, 3),

(8,'Keerthy Arun','Clerk',30000,1),

(9,'Amal Jith','Assistant Manager',45000,4),

(10,'Wilson Thomas','Librarian',55000,1),

(11,'Mike Brown','Manager',65000,4),

(12,'Emily Emin','Librarian',54000,2),

(13,'Mary Simon','Assistant Manager',45000,2),

(14,'Jack Prince','Librarian',58000,3),

(15,'Hamilin James','Manager',65000,3),

(16,'Neha Ijaz','Clerk',34000,4),

(17,'Nancy Adam','Assistant Librarian',25000,1),

(18,'Lee Levis','Assistant Librarian',30000,2),

(19,'Rachel Paul','Assistant Librarian',38000,3),

(20,'Alwin Meel','Assistant Librarian',35000,4);

SELECT * FROM Employee;

-- Insert data into **Books table**

INSERT INTO Books (ISBN, Book_title, Category, Rental_Price, Status, Author, Publisher)

VALUES

 ('978-3-16-148410-0', 'The Great Gatsby', 'Fiction', 4.99, 'yes', 'F. Scott Fitzgerald', 'Scribner'),

   ('978-0-14-017739-8', 'Nineteen eighty four', 'History', 5.99, 'yes', 'George Orwell', 'Penguin Books'),

   ('978-0-452-28423-4', 'To Kill a Mockingbird', 'Fiction', 6.49, 'no', 'Harper Lee', 'J.B. Lippincott & Co.'),

   ('978-0-7432-7356-5', 'The Catcher in the Rye', 'Fiction', 5.79, 'yes', 'J.D. Salinger', 'Little, Brown and Company'),

   ('978-0-375-72451-6', 'The Road', 'Thriller', 6.99, 'yes', 'Cormac McCarthy', 'Knopf'),

   ('978-0-316-76948-0', 'The Shining', 'Horror', 7.99, 'no', 'Stephen King', 'Doubleday'),

```sql
    ('978-0-618-34624-3', 'The Hobbit', 'Fantasy', 8.49, 'yes', 'J.R.R. Tolkien', 'Houghton Mifflin'),

    ('978-0-15-101026-4', 'Life of Pi', 'Adventure', 7.49, 'yes', 'Yann Martel', 'Harcourt'),

    ('978-0-394-82852-7', 'Beloved', 'History', 6.99, 'no', 'Toni Morrison', 'Alfred A. Knopf'),

    ('978-0-345-39180-3', 'A Game of Thrones', 'Fantasy', 8.99, 'yes', 'George R.R. Martin', 'Bantam
        Books');

SELECT * FROM Books;

INSERT INTO Books (ISBN, Book_title, Category, Rental_Price, Status, Author, Publisher)

VALUES

 ('978-1-5011-8774-7', 'The Silent Patient', 'Thriller', 5.49, 'yes', 'Alex Michaelides', 'Celadon
        Books'),

    ('978-0-06-235820-2', 'Where the Crawdads Sing', 'Mystery', 6.29, 'no', 'Delia Owens', 'G.P.
        Putnam\'s Sons'),

    ('978-0-345-39181-0', 'A Clash of Kings', 'Fantasy', 8.49, 'yes', 'George R.R. Martin', 'Bantam
        Books'),

    ('978-1-4767-6453-9', 'All the Light We Cannot See', 'History', 7.49, 'no', 'Anthony Doerr',
        'Scribner'),

    ('978-0-7432-7357-2', 'Frankenstein', 'Science Fiction', 4.99, 'yes', 'Mary Shelley', 'Lackington,
        Hughes, Harding, Mavor & Jones'),

    ('978-1-4767-2726-8', 'The Nightingale', 'History', 7.19, 'yes', 'Kristin Hannah', 'St. Martin\'s
        Press'),

    ('978-0-14-044926-6', 'The Odyssey', 'Epic', 5.29, 'yes', 'Homer', 'Penguin Classics'),

    ('978-0-06-112008-4', 'Brave New World', 'Fiction', 6.49, 'no', 'Aldous Huxley', 'Chatto &
        Windus'),

    ('978-0-312-42289-9', 'The Hunger Games', 'Science Fiction', 6.99, 'yes', 'Suzanne Collins',
        'Scholastic Press'),

    ('978-0-06-093546-7', 'The Alchemist', 'Philosophy', 5.99, 'yes', 'Paulo Coelho', 'HarperTorch');

SELECT * FROM Books;

INSERT INTO Books (ISBN, Book_title, Category, Rental_Price, Status, Author, Publisher)

VALUES

('978-0-345-39182-7', 'A Storm of Swords', 'Fantasy', 25.99, 'no', 'George R.R. Martin', 'Bantam
        Books'),
```

('978-0-671-02735-7', 'The Stand', 'Horror', 9.49, 'yes', 'Stephen King', 'Doubleday'),

('978-0-141-18771-9', 'Moby-Dick', 'Adventure', 27.79, 'yes', 'Herman Melville', 'Harper & Brothers'),

('978-0-7432-7358-9', 'Pride and Prejudice', 'Romance', 28.49, 'no', 'Jane Austen', 'T. Egerton'),

('978-0-312-24213-0', 'Catching Fire', 'Science Fiction', 6.99, 'yes', 'Suzanne Collins', 'Scholastic Press'),

('978-1-5011-6556-1', 'The Institute', 'Thriller', 7.49, 'yes', 'Stephen King', 'Scribner'),

('978-0-345-39183-4', 'A Feast for Crows', 'Fantasy', 30.99, 'no', 'George R.R. Martin', 'Bantam Books'),

('978-0-679-40310-6', 'The Handmaid\'s Tale', 'Fiction', 35.49, 'yes', 'Margaret Atwood', 'McClelland & Stewart'),

('978-0-06-231500-7', 'Educated', 'Memoir', 7.19, 'yes', 'Tara Westover', 'Random House'),

('978-0-06-085052-4', 'The Book Thief', 'History', 27.49, 'yes', 'Markus Zusak', 'Knopf Books');

SELECT * FROM Books;

INSERT INTO Books (ISBN, Book_title, Category, Rental_Price, Status, Author, Publisher)

VALUES

('978-0-452-28425-8', 'Slaughterhouse-Five', 'Science Fiction', 38.49, 'no', 'Kurt Vonnegut', 'Delacorte Press'),

('978-1-5011-8838-6', 'The Midnight Library', 'Fantasy', 6.79, 'yes', 'Matt Haig', 'Canongate Books'),

('978-0-14-303943-3', 'One Hundred Years of Solitude', 'Magical Realism', 5.99, 'yes', 'Gabriel García Márquez', 'Harper & Row'),

('978-0-446-31078-9', 'The Da Vinci Code', 'Thriller', 36.99, 'yes', 'Dan Brown', 'Doubleday'),

('978-0-15-601219-4', 'The Little Prince', 'Fable', 29.29, 'no', 'Antoine de Saint-Exupéry', 'Reynal & Hitchcock'),

('978-1-5011-7326-0', 'The Last House on Needless Street', 'Horror', 7.49, 'yes', 'Catriona Ward', 'Tor Nightfire'),

('978-0-14-118280-3', 'Crime and Punishment', 'History', 25.99, 'yes', 'Fyodor Dostoevsky', 'Penguin Classics'),

('978-0-14-243717-9', 'The Grapes of Wrath', 'Fiction', 28.49, 'yes', 'John Steinbeck', 'The Viking Press'),

('978-0-452-28426-5', 'Animal Farm', 'History', 4.99, 'no', 'George Orwell', 'Secker & Warburg'),

('978-1-5011-5686-7', 'Anxious People', 'Humor', 26.49, 'yes', 'Fredrik Backman', 'Atria Books');

INSERT INTO Books (ISBN, Book_title, Category, Rental_Price, Status, Author, Publisher)

VALUES

('978-1-250-00325-5', 'The Invisible Life of Addie LaRue', 'Fantasy', 27.99, 'yes', 'V.E. Schwab', 'Tor Books'),

('978-0-141-18025-5', 'Dracula', ' Horror', 5.49, 'no', 'Bram Stoker', 'Archibald Constable and Company'),

('978-0-670-81302-8', 'The Goldfinch', 'Fiction', 28.49, 'yes', 'Donna Tartt', 'Little, Brown and Company'),

('978-0-06-268697-7', 'The Song of Achilles', 'Fantasy', 26.99, 'yes', 'Madeline Miller', 'Bloomsbury Publishing'),

('978-0-316-76948-7', 'Pet Sematary', 'Horror', 27.49, 'no', 'Stephen King', 'Doubleday'),

('978-3-216-3212-8','An Autobiography','History',30.55,'yes','Jawarharlal Nehru','HW Publishers');

INSERT INTO Books (ISBN, Book_title, Category, Rental_Price, Status, Author, Publisher)

VALUES

('978-0-679-74472-6', 'The Rise and Fall of the Third Reich', 'History', 30.00, 'yes', 'William L. Shirer', 'Simon & Schuster'),

('978-0-14-303573-2', 'Guns, Germs, and Steel', 'History', 28.00, 'yes', 'Jared Diamond', 'W. W. Norton & Company'),

('978-0-375-75682-9', 'Team of Rivals: The Political Genius of Abraham Lincoln', 'History', 22.00, 'no', 'Doris Kearns Goodwin', 'Simon & Schuster'),

('978-0-06-231609-9', 'A People's History of the United States', 'History', 17.50, 'yes', 'Howard Zinn', 'HarperCollins'),

('978-0-307-47293-7', '1776', 'History', 19.00, 'no', 'David McCullough', 'Simon & Schuster'),

('978-0-307-95781-3', 'The Wright Brothers', 'History', 21.00, 'yes', 'David McCullough', 'Simon & Schuster'),

('978-0-307-59480-5', 'The Great Bridge: The Epic Story of the Building of the Brooklyn Bridge', 'History', 20.00, 'yes', 'David McCullough', 'Simon & Schuster'),

('978-0-670-84660-3', 'Alexander Hamilton', 'History', 25.00, 'no', 'Ron Chernow', 'Penguin Press'),

('978-1-4767-7871-5', 'Sapiens: A Brief History of Humankind', 'History', 28.00, 'yes', 'Yuval Noah Harari', 'Harper'),

('978-0-307-29136-0', 'The Guns of August', 'History', 15.00, 'no', 'Barbara W. Tuchman', 'Random House');

SELECT* FROM Books;

-- Insert data into **Customer table**

INSERT INTO Customer (Customer_Id, Customer_name, Customer_address, Reg_date)

VALUES

(001, 'Alex Tom', '999 Willow St, North City', '2021-08-20'),

(002, 'Mary Johnson', '1010 Oak Ave,South City ', '2022-09-01'),

(003, 'James Cameron', '333 Palm Dr, Downtown City', '2021-09-10'),

(004, 'Sophia Lee', '444 Redwood Rd, Avenues City', '2020-09-15'),

(005, 'George Martin', '555 Fir Ln, Mall City', '2022-09-20'),

(006, 'Davis DJ', '777 Aspen Pl, Downtown City', '2021-09-25'),

(007, 'Daniel Harris', '888 Cedar Cir, South City', '2021-09-30'),

(008, 'Emma Thompson', '999 Birch Blvd, North City', '2022-10-01'),

(009, 'Liam White', '1010 Maple St, Mall City', '2021-10-05'),

(010, 'Olivia Williams', '2020 Oakwood Dr, City Lane', '2021-10-10');

SELECT * FROM Customer;

INSERT INTO Customer (Customer_Id, Customer_name, Customer_address, Reg_date)

VALUES

(011, 'Ethan Clark', '111 Lakeview Rd, North City', '2021-08-05'),

(012, 'Ava Patel', '222 Riverbank St, Mall street', '2023-08-15'),

(013, 'Noah Wright', '333 Hilltop Dr, Avenues Mall City', '2023-08-25'),

(014, 'Mia King', '444 Forest Ln, Nagar City', '2021-09-02'),

(015, 'Oliver Hall', '555 Park Ave, Downtown City', '2023-09-06'),

(016, 'Charlotte Scott', '666 Meadow Rd, City South', '2022-09-10'),

(017, 'Isabella Young', '777 Brookside Dr, Media City', '2023-09-18'),

(018, 'Lucas Baker', '888 Seaside St, City North', '2021-09-22'),

(019, 'Amelia Turner', '999 Mountain View Dr, Downtown City', '2023-09-28'),

(020, 'Mason Adams', '1010 Sunset Blvd, Mall Lane', '2020-09-30'),

(021, 'Harper Nelson', '1111 Oceanfront Rd, Galleria City', '2023-10-03'),

(022, 'Elijah Mitchell', '1212 Elmwood Ave, Dragon City', '2023-10-05'),

(023, 'Sophia Perez', '1313 Pineview Dr, Electronics City', '2019-10-07'),

(024, 'William Carter', '1414 Lakefront Cir, City Street', '2023-10-08'),

(025, 'Avery Morris', '1515 Valleyview St, Mall City', '2023-10-09'),

(026, 'Benjamin Reed', '1616 Highland Rd, Avenues City', '2022-10-10'),

(027, 'Lily Walker', '1717 Oakwood St, Mall Street', '2021-10-11'),

(028, 'James Bell', '1818 Maple Grove Ln, Downtown City', '2023-10-12'),

(029, 'Emily Ward', '1919 Birchwood Dr, Island City', '2021-10-13'),

(030, 'Michael Sanders', '2020 Redwood Ct, Festival City', '2023-10-14'),

(031, 'Abigail Barnes', '2121 Cedar Ridge Rd, Mall City', '2021-10-15');

INSERT INTO Customer (Customer_Id, Customer_name, Customer_address, Reg_date)

VALUES

(039, 'Samuel Brooks', '2323 Willow St, City Festival', '2023-10-16'),

(040, 'Ella Howard', '2424 River Rd, City North', '2020-10-17'),

(041, 'Henry Parker', '2525 Sunset Dr, City Street', '2023-10-18'),

(042, 'Scarlett Bailey', '2626 Hillcrest Ave, City Town', '2023-10-19'),

(043, 'Jack Foster', '2727 Maple St, City L1', '2021-10-20'),

(044, 'Victoria Hayes', '2828 Cedar St, City Media', '2023-10-21'),

(045, 'Leo Cooper', '2929 Oak St, City N1', '2023-10-22'),

(046, 'Grace Brooks', '3030 Birch St, City Mall', '2021-10-23'),

(047, 'Owen Morris', '3131 Elm St, City South', '2023-10-24'),

(048, 'Lillian Henderson', '3232 Redwood St, City North', '2021-10-25');

Select * From Customer;

-- Insert data into **IssueStatus table**

INSERT INTO IssueStatus (Issue_Id, Issued_cust, Issued_book_name, Issue_date, Isbn_book)

```sql
VALUES

(1001,002,'The silent patient','2023-06-01','978-1-5011-8774-7'),

(1002,012,'The Alchemist','2023-03-02','978-0-06-093546-7'),

(1003,015,'The Institute','2022-07-09','978-1-5011-6556-1'),

(1004,020,'A Clash of kings','2023-05-12','978-0-345-39181-0'),

(1005,022,'The Odyssey','2024-04-22','978-0-14-044926-6'),

(1006,007,'The Stand','2023-06-12','978-0-671-02735-7'),

(1007,024,'The Hunger Games','2023-06-25', '978-0-312-42289-9'),

(1008,005,'The Nightingale','2023-06-10','978-1-4767-2726-8'),

(1009,006,'Moby - Dick','2024-08-08','978-0-141-18771-9'),

(1010,003,'Catching Fire','2024-03-22','978-0-312-24213-0'),

(1011,025,'Educated','2023-06-20','978-0-06-231500-7'),

(1012,030,'The Great Gatsby','2023-06-13','978-3-16-148410-0'),

(1013,039,'Nineteen eighty four','2023-08-01','978-0-14-017739-8'),

(1014,041,'The Hobbit','2023-07-11','978-0-618-34624-3');

SELECT * FROM IssueStatus;

INSERT INTO IssueStatus (Issue_Id, Issued_cust, Issued_book_name, Issue_date, Isbn_book)

VALUES

(1015,047,'The Catcher in the Rye','2023-06-02','978-0-7432-7356-5'),

(1016,046,'The Road','2022-07-11','978-0-375-72451-6'),

(1017,045,'Life of Pi','2023-08-04','978-0-15-101026-4'),

(1018,043,'The Book Theif','2023-06-24','978-0-06-085052-4'),

(1019,042,'The Midnight Library','2023-06-15','978-1-5011-8838-6'),

(1020,004,'Anxious People','2023-04-03','978-1-5011-5686-7'),

(1021,009,'The Grape of wrath','2024-05-10','978-0-14-243717-9'),

(1022,010,'An Autobiography','2023-06-30','978-3-216-3212-8'),

(1023,018,'The Goldfinch','2023-06-11','978-0-670-81302-8'),

(1024,019,'Guns,Germs and Steel','2022-02-11','978-0-14-303573-2'),
```

```sql
(1025,016,'The Wright brothers','2023-06-02','978-0-307-95781-3'),

(1026,028,'Sapiens:A Brief History','2022-07-01','978-1-4767-7871-5'),

(1027,027,'The Great Bridge','2023-06-16','978-0-307-59480-5'),

(1028,028,'The Song of Achilles','2023-04-02','978-0-06-268697-7'),

(1029,029,'A Game of Thrones','2023-06-20','978-0-345-39180-3'),

(1030,013,'Frankenstein','2023-06-18','978-0-7432-7357-2');

SELECT * FROM IssueStatus;

-- Insert data into ReturnStatus table

INSERT INTO ReturnStatus (Return_Id, Return_cust, Return_book_name, Return_date,
    Isbn_book2)

VALUES

(2000,020,'A Clash of kings','2023-06-13','978-0-345-39181-0'),

(2001,003,'Catching Fire','2024-04-23','978-0-312-24213-0'),

(2002,041,'The Hobbit','2023-08-12','978-0-618-34624-3'),

(2003,012,'The Alchemist','2023-04-03','978-0-06-093546-7'),

(2004,005,'The Nightingale','2023-07-11','978-1-4767-2726-8'),

(2005,030,'The Great Gatsby','2023-07-20','978-3-16-148410-0'),

(2006,046,'The Road','2022--6-12','978-0-375-72451-6'),

(2007,029,'A Game of Thrones','2023-06-20','978-0-345-39180-3'),

(2008,045,'Life of Pi','2023-07-03','978-0-15-101026-4'),

(2009,004,'Anxious people','2024-05-05','978-1-5011-5686-7'),

(2010,016,'The Wright Brothers','2023-07-01','978-0-307-95781-3'),

(2011,007,'The Stand','2023-07-20','978-0-671-02735-7'),

(2012,025,'Educated','2023-07-25','978-0-06-231500-7'),

(2013,010,'An Autobiography','2023-07-03','978-3-216-3212-8'),

(2014,027,'The Great Bridge','2023-07-02','978-0-307-59480-5'),

(2015,013,'Frankenstein','2023-07-19','978-0-7432-7357-2');

 SELECT * FROM ReturnStatus;
```

-- 1.Retrieve book title, category, and rental price of all available books

```sql
SELECT Book_title, Category, Rental_Price FROM Books WHERE Status = 'yes';
```

Book_title	Category	Rental_Price
The Book Thief	History	27.49
The Alchemist	Philosophy	5.99
Educated	Memoir	7.19
A People's History of the United States	History	17.50
The Song of Achilles	Fantasy	26.99
Nineteen eighty four	History	5.99
The Odyssey	Epic	5.29
Crime and Punishment	History	25.99
The Grapes of Wrath	Fiction	28.49
Guns, Germs, and Steel	History	28.00
One Hundred Years of Solitude	Magical R...	5.99
Moby-Dick	Adventure	27.79
Life of Pi	Adventure	7.49
The Great Bridge: The Epic Story of th...	History	20.00
The Wright Brothers	History	21.00
Catching Fire	Science Fi...	6.99
The Hunger Games	Science Fi...	6.99
A Game of Thrones	Fantasy	8.99
A Clash of Kings	Fantasy	8.49
The Road	Thriller	6.99
The Da Vinci Code	Thriller	36.99
The Hobbit	Fantasy	8.49
The Goldfinch	Fiction	28.49
The Stand	Horror	9.49
The Handmaid's Tale	Fiction	35.49

Books 1 ×

Output

-- 2.Retrieve employee names and their respective salaries in descending order of salary

SELECT Emp_name, Salary FROM Employee ORDER BY Salary DESC;

```
311     -- 2.Retrieve employee names and their respective salaries in descending order of salary
312 •   SELECT Emp_name, Salary FROM Employee ORDER BY Salary DESC;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Emp_name	Salary
Mike Brown	65000.00
Hamilin James	65000.00
David Dane	62000.00
Frank Mark	61000.00
Alice Ann	60000.00
Jack Prince	58000.00
Wilson Thomas	55000.00
Emily Emin	54000.00
Amal Jith	45000.00
Mary Simon	45000.00
Grace Antony	42000.00
Smith John	40000.00
Rachel Paul	38000.00
Cathyeline Bob	35000.00
Alwin Meel	35000.00
Neha Ijaz	34000.00
Eve Steve	32000.00
Keerthy Arun	30000.00
Lee Levis	30000.00
Nancy Adam	25000.00

-- 3.Retrieve book titles and the corresponding customers who issued them

SELECT B.Book_title, C.Customer_name

FROM IssueStatus I

JOIN Books B ON I.Isbn_book = B.ISBN

JOIN Customer C ON I.Issued_cust = C.Customer_Id;

```
314        -- 3.Retrieve book titles and the corresponding customers who issued them
315 •      SELECT B.Book_title, C.Customer_name
316        FROM IssueStatus I
317        JOIN Books B ON I.Isbn_book = B.ISBN
318        JOIN Customer C ON I.Issued_cust = C.Customer_Id;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: A

Book_title	Customer_name
The Silent Patient	Mary Johnson
The Alchemist	Ava Patel
The Institute	Oliver Hall
A Clash of Kings	Mason Adams
The Odyssey	Elijah Mitchell
The Stand	Daniel Harris
The Hunger Games	William Carter
The Nightingale	George Martin
Moby-Dick	Davis DJ
Catching Fire	James Cameron
Educated	Avery Morris
The Great Gatsby	Michael Sanders
Nineteen eighty four	Samuel Brooks
The Hobbit	Henry Parker
The Catcher in th...	Owen Morris
The Road	Grace Brooks
Life of Pi	Leo Cooper
The Book Thief	Jack Foster
The Midnight Library	Scarlett Bailey
Anxious People	Sophia Lee
The Grapes of Wr...	Liam White
An Autobiography	Olivia Williams
The Goldfinch	Lucas Baker
Guns, Germs, and...	Amelia Turner
The Wright Brothers	Charlotte Scott

Sapiens: A Brief Hi...	James Bell
The Great Bridge: ...	Lily Walker
The Song of Achilles	James Bell
A Game of Thrones	Emily Ward
Frankenstein	Noah Wright

Result 3 ×   ⓘ Read Only

Output

-- 4.Retrieve the total count of books in each category

```
SELECT Category, COUNT(*) AS Total_Books FROM Books GROUP BY
Category;
```

```
319
320     -- 4.Retrieve the total count of books in each category
321 •   SELECT Category, COUNT(*) AS Total_Books FROM Books GROUP BY Category;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Category	Total_Books
History	18
Philosophy	1
Fiction	7
Memoir	1
Mystery	1
Fantasy	8
Epic	1
Magical Realism	1
Horror	1
Adventure	2
Fable	1
Science Fiction	4
Horror	4
Thriller	4
Romance	1
Humor	1

Result 1 ×   ⓘ Read Only

Output

-- 5.Retrieve employee names and positions for employees with salaries above Rs. 50,000

```
SELECT Emp_name, Position FROM Employee WHERE Salary > 50000;
```

```
323     -- 5.Retrieve employee names and positions for employees with salaries above Rs. 50,000
324 •   SELECT Emp_name, Position FROM Employee WHERE Salary > 50000;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Emp_name	Position
Alice Ann	Manager
David Dane	Manager
Frank Mark	Librarian
Wilson Thomas	Librarian
Mike Brown	Manager
Emily Emin	Librarian
Jack Prince	Librarian
Hamilin James	Manager

-- 6.List customers who registered before 2022-01-01 and have not issued any books

```sql
SELECT C.Customer_name

FROM Customer C

LEFT JOIN IssueStatus I ON C.Customer_Id = I.Issued_cust

WHERE C.Reg_date < '2022-01-01'

  AND I.Issued_cust IS NULL;
```

```
326      -- 6.List customers who registered before 2022-01-01 and have not issued any books
327 •    SELECT C.Customer_name
328      FROM Customer C
329      LEFT JOIN IssueStatus I ON C.Customer_Id = I.Issued_cust
330      WHERE C.Reg_date < '2022-01-01'
331        AND I.Issued_cust IS NULL;
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

Customer_name
Alex Tom
Ethan Clark
Mia King
Sophia Perez
Abigail Barnes
Ella Howard
Lillian Henderson

-- 7.Retrieve branch numbers and the total count of employees in each branch

```sql
SELECT Branch_no, COUNT(*) AS Total_Employees FROM Employee GROUP
BY Branch_no;
```

```
333      -- 7.Retrieve branch numbers and the total count of employees in each branch
334 •    SELECT Branch_no, COUNT(*) AS Total_Employees FROM Employee GROUP BY Branch_no;
335
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: IA

Branch_no	Total_Employees
1	5
2	5
3	5
4	5

-- 8. Retrieve the names of customers who issued books in June 2023

```sql
SELECT Customer_name

FROM Customer

WHERE Customer_Id IN (

    SELECT Issued_cust

    FROM IssueStatus

    WHERE Issue_date BETWEEN '2023-06-01' AND '2023-06-30'

);
```
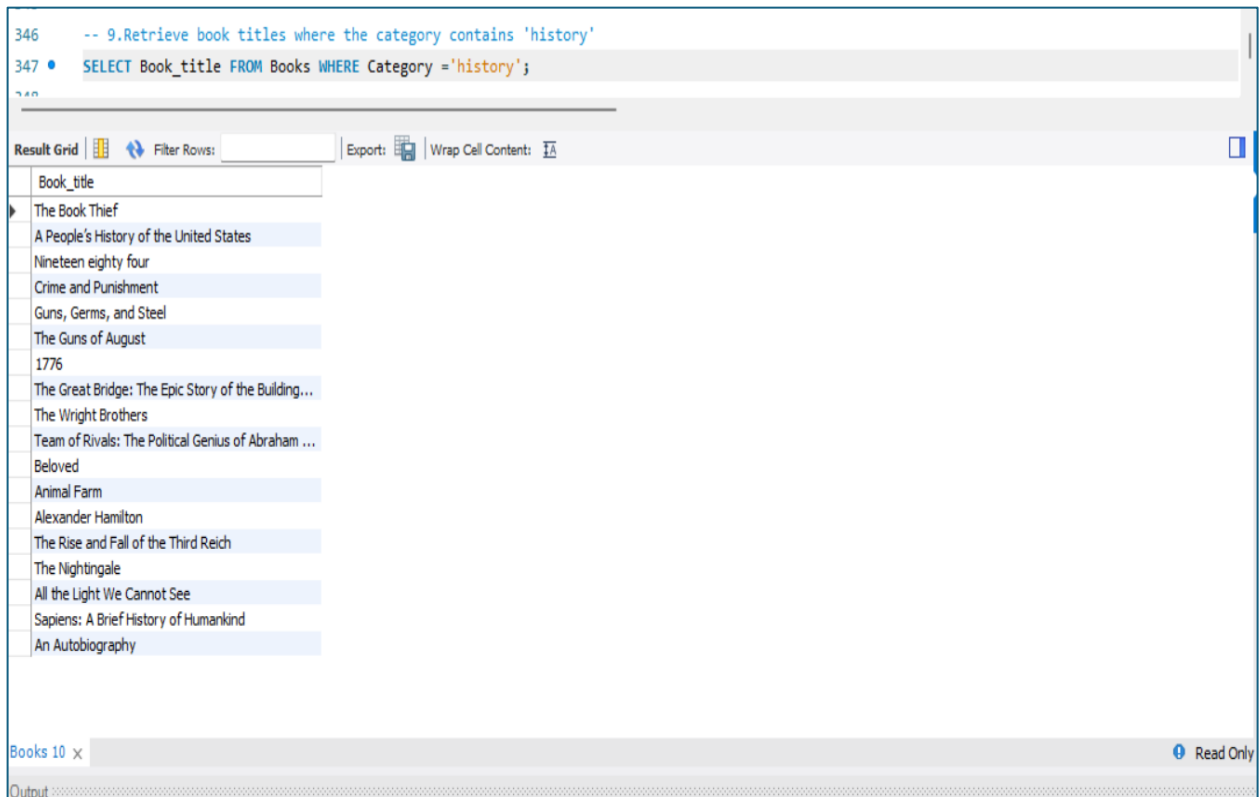
```
337        -- 8. Retrieve the names of customers who issued books in June 2023
338 ●     SELECT Customer_name
339       FROM Customer
340    ⊖  WHERE Customer_Id IN (
341           SELECT Issued_cust
342           FROM IssueStatus
343           WHERE Issue_date BETWEEN '2023-06-01' AND '2023-06-30'
344       );
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content: 𝐼A

Customer_name
Mary Johnson
Daniel Harris
William Carter
George Martin
Avery Morris
Michael Sanders
Owen Morris
Jack Foster
Scarlett Bailey
Olivia Williams
Lucas Baker
Charlotte Scott
Lily Walker
Emily Ward
Noah Wright

-- 9.Retrieve book titles where the category contains 'history'

```sql
SELECT Book_title FROM Books WHERE Category ='history';
```

```
346    -- 9.Retrieve book titles where the category contains 'history'
347 •  SELECT Book_title FROM Books WHERE Category ='history';
```
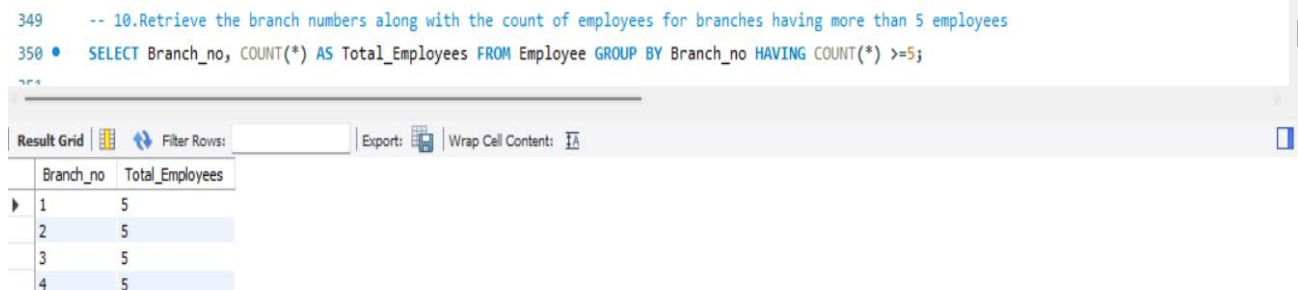
Book_title
The Book Thief
A People's History of the United States
Nineteen eighty four
Crime and Punishment
Guns, Germs, and Steel
The Guns of August
1776
The Great Bridge: The Epic Story of the Building...
The Wright Brothers
Team of Rivals: The Political Genius of Abraham ...
Beloved
Animal Farm
Alexander Hamilton
The Rise and Fall of the Third Reich
The Nightingale
All the Light We Cannot See
Sapiens: A Brief History of Humankind
An Autobiography

Books 10 ×   ① Read Only

Output

-- 10.Retrieve the branch numbers along with the count of employees for branches having more than 5 employees

```sql
SELECT Branch_no, COUNT(*) AS Total_Employees FROM Employee GROUP
BY Branch_no HAVING COUNT(*) >=5;
```

```
349    -- 10.Retrieve the branch numbers along with the count of employees for branches having more than 5 employees
350 •  SELECT Branch_no, COUNT(*) AS Total_Employees FROM Employee GROUP BY Branch_no HAVING COUNT(*) >=5;
```
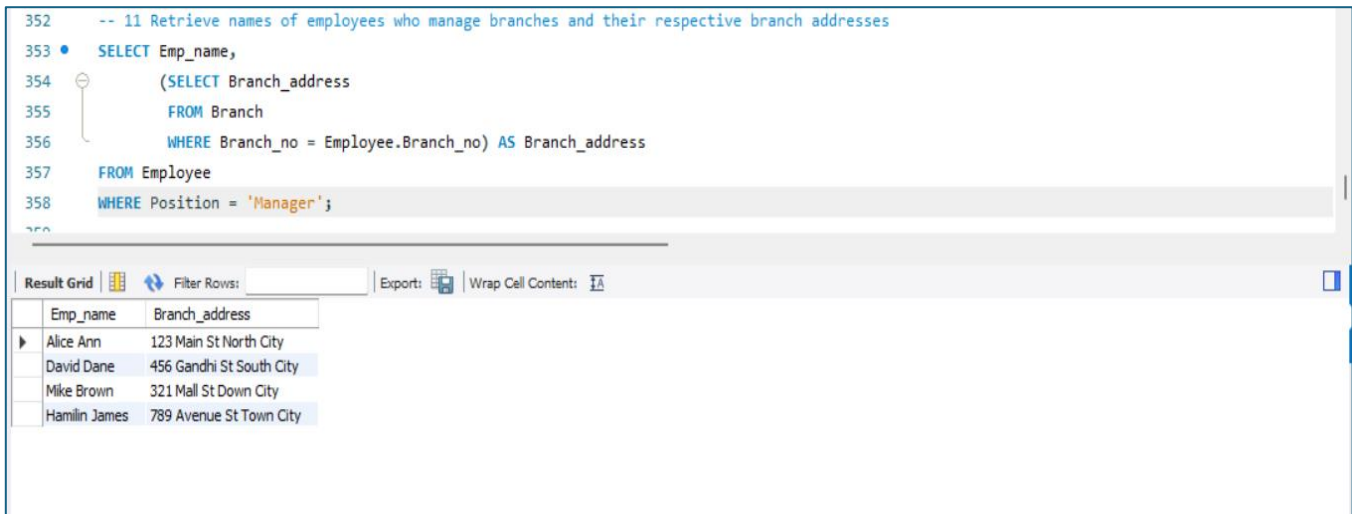
Branch_no	Total_Employees
1	5
2	5
3	5
4	5

-- 11 Retrieve names of employees who manage branches and their respective branch addresses

```
SELECT Emp_name,

    (SELECT Branch_address

     FROM Branch

     WHERE Branch_no = Employee.Branch_no) AS Branch_address

FROM Employee

WHERE Position = 'Manager';
```

```
352      -- 11 Retrieve names of employees who manage branches and their respective branch addresses
353  •   SELECT Emp_name,
354  ⊖        (SELECT Branch_address
355             FROM Branch
356             WHERE Branch_no = Employee.Branch_no) AS Branch_address
357      FROM Employee
358      WHERE Position = 'Manager';
```

Result Grid	Filter Rows:	Export:	Wrap Cell Content:
Emp_name	Branch_address
Alice Ann	123 Main St North City
David Dane	456 Gandhi St South City
Mike Brown	321 Mall St Down City
Hamilin James	789 Avenue St Town City

-- 12. Display the names of customers who have issued books with a rental price higher than Rs. 25.

```
SELECT Customer_name

FROM Customer

WHERE Customer_Id IN (

    SELECT I.Issued_cust

    FROM IssueStatus I

    WHERE I.Isbn_book IN (

        SELECT B.ISBN

        FROM Books B
```

```
        WHERE B.Rental_Price > 25

      )

    );
```

```
360     -- 12. Display the names of customers who have issued books with a rental price higher than Rs. 25.
361  •  SELECT Customer_name
362     FROM Customer
363  ⊖  WHERE Customer_Id IN (
364         SELECT I.Issued_cust
365         FROM IssueStatus I
366  ⊖      WHERE I.Isbn_book IN (
367             SELECT B.ISBN
368             FROM Books B
369             WHERE B.Rental_Price > 25
370         )
371     );
```

| Result Grid | 🔢 | 🔀 | Filter Rows: | Export: 📊 | Wrap Cell Content: 🔠 | ▯ |

Customer_name
Sophia Lee
Davis DJ
Liam White
Olivia Williams
Lucas Baker
Amelia Turner
James Bell
Jack Foster

CONCLUSION

The **Library Management System (LMS)** developed using MySQL has successfully achieved its objectives of simplifying and automating the essential operations of a library. This project demonstrates the use of a relational database to manage critical components like book inventory, customer records, employee details, and transaction logs (for issuing and returning books) across different library branches.

Key Achievements of the Project:

1. **Efficient Book and Inventory Management:**
   - The system ensures that the library's collection of books is well-organized and easily manageable. It keeps track of book details, availability status, and allows library staff to add or update information as needed.
2. **Seamless Issuing and Returning of Books:**
   - The LMS efficiently handles the issuance and return processes by maintaining real-time records of which customer has borrowed which book, and when it was returned. This reduces the chances of errors and ensures that books are returned on time.
3. **Branch and Employee Management:**
   - For libraries with multiple branches, the system allows each branch to be managed independently, while employees are assigned to specific branches, making the system scalable for larger organizations.
4. **Improved Customer Experience:**
   - Customers can register with the library, view available books, and manage their borrowing history easily, leading to a better and more organized user experience.
5. **Reporting and Analytics:**
   - The system provides basic reporting capabilities, such as generating reports on the most borrowed books, the number of employees per branch, and customer activity. These insights help the library administration make informed decisions.