

CS504-003

G01462169

# REPORT ON PROJECT

## LIBRARY MANAGEMENT SYSTEM

CS504

PRINCIPLES OF DATA MANAGEMENT AND DATA MINING

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## 1.INTRODUCTION

A database management system(DBMS) is an instance of technology or software that helps with data management. Several popular databases include MongoDB, Oracle, MySQL and many. Database management systems perform a wide range of functions, including creating new databases, storing data in them, updating databases that already exist, and removing data from them. A database management system gives you control over how data is stored, modified, and retrieved. In addition, it provides database security. A Database Management System efficiently organizes and retrieves data while ensuring security, and integrity. It supports backup, and recovery, streamlines data modelling and administration, and interfaces with other systems to optimize performance. DBMS is indispensable for managing and securing data across various applications.

## 2.SCOPE OF THE PROJECT

This project entails establishing and implementing a comprehensive Database Management System (DBMS) tailored for a library. This involves designing database structures, integrating tables for assets, users, staff, and transactions, ensuring the security, integrity, and scalability of data, and providing functionalities such as monitoring overdue items, managing borrowing and returning, and setting up alerts for staff regarding overdue materials.

## 3.ENTITY AND RELATIONSHIP(ER)

A model for identifying entities that can be represented in a database and displaying the relationships between those entities is called the Entity Relational Model. The schema specified by the ER data model shows a database's overall structure logically.

ER model is drawn using Entities and Attributes. We need to represent the Primary key of each entity. Entities are represented in Rectangle. Attributes are represented in Oval.

**Primary Key:** Primary Key is a unique attribute from other attributes. Primary Key is represented by underlining in the ER diagram.

The Entities we use in this Project has attributes, Primary Keys. Each Entity and attributes are explained below:

**1.Author:** Represents the authors of the books or materials in the library.

### Attributes:

Author\_ID : Unique identifier which is unique for each author.

Name: Name of the Author.

Birth\_Date: Represents birth date of the author.

Nationality: Represents Nationality of the author.

**2.Authorship:** Relationship between authors and materials.

**Attributes:**

Authorship\_ID: A unique identifier for authorship records.

Author\_ID: Reference to the Author.

Material\_ID: Reference to the material authored in the material entity.

**3. Material:** Tells about the items such as books, magazines, Journals, Novels.

**Attributes:**

Material\_ID: A unique identifier for each material.

Title: Title of each material.

Publication\_Date: Date of Publication of the material.

Catalog\_ID: Reference to catalog entry of material.

Genre\_ID: Reference to Genre of the material.

**4.Catalog:** Tells about the availability and location of materials available in library.

**Attributes:**

Catalog\_ID: A unique identifier for catalog.

Name: Name of the catalog in the library.

Location: Location of the material.

**5.Genre:** Represents different genres of materials in the library.

**Attributes:**

Genre\_ID: A unique identifier for each genre.

Name: Name of the genre.

Description: explains about the genre.

**6.Borrow:** Tells about borrowing activity of materials in the library by members.

**Attributes:**

Borrow\_ID: A unique identifier for each borrowing activity.

Material\_ID: References to the borrowed material.

Member\_ID: References to the member borrowed material..

Staff\_ID: References to the staff member initiated the borrowing transaction.

Borrow\_Date: Date of borrowing the material.

Due\_Date: Material Due date.

Return\_Date: Material returned date.

**7.Staff:** Represents the staff of library who is responsible for managing the library materials.

**Attributes:**

Staff\_ID: A unique identifier for every staff member.

Name: Name of the staff member.

Contact\_Info: Contact information of the staff member includes email, phone address.

Job\_Title: Describes the role of the staff member.

Hire\_Date: Date when the staff member is hired.

**8.Member:** members who can borrow materials from the library.

**Attributes:**

Member\_ID: A unique identifier for each member.

Name: Represents name of the member.

Contact\_info: Contact information of Member include email, phone number.

Join\_Date: Date when the member joined in the library.

## 4.DESIGN

### 4.1 Entity Relationship Diagram:

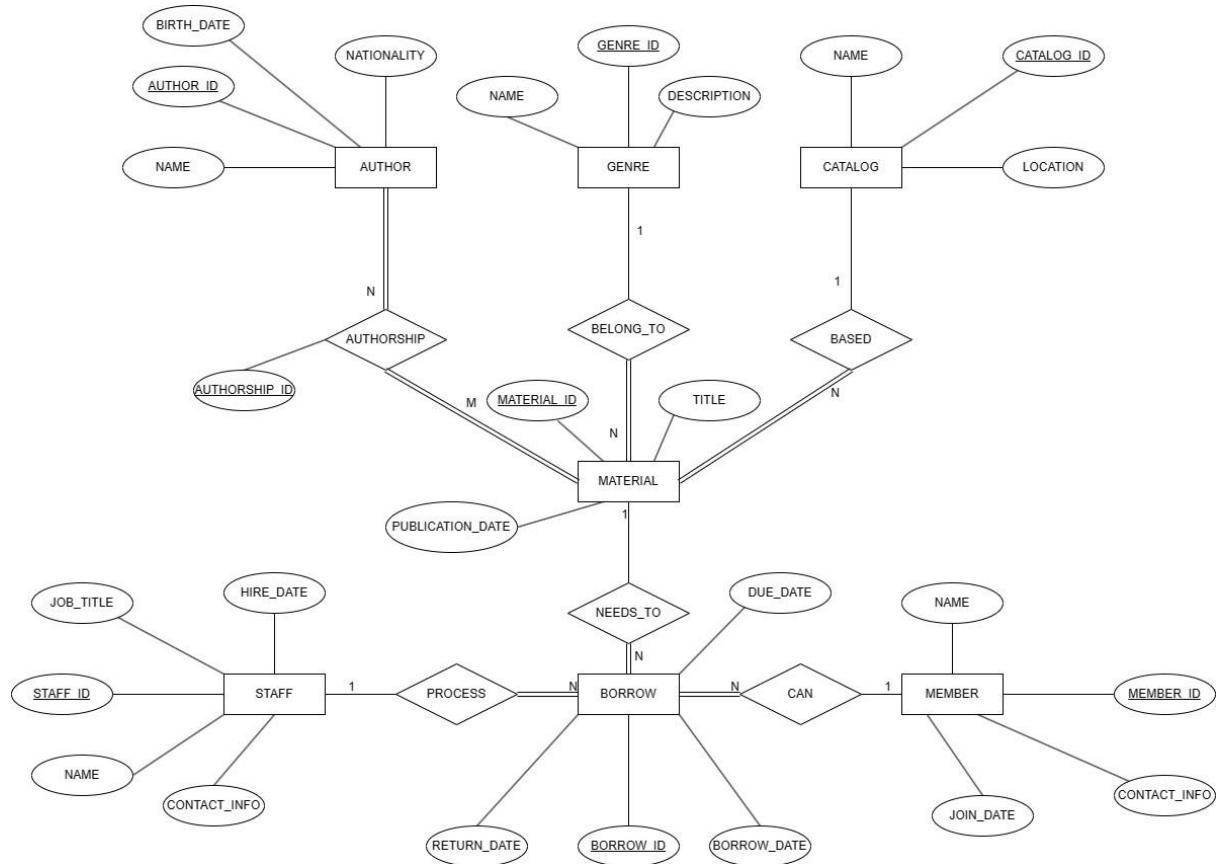


Fig: 4.1.1 ER Model.

The ER Model has many Entities and Entities has many attributes, relationships, Cardinality Ratios.

### **Entities:**

Author: The author entity has attributes such as Name, Author\_ID, Birth\_Date ,Nationality. Author\_ID is the primary key.

Genre: Name,Description,Genre\_ID are the attributes and Genre\_ID is the primary key.

Catalog: Name, Catalog\_ID, Location are the attributes and Catalog\_ID is the primary key.

Material: Material\_ID, Publication\_Date, Title are the attributes and Material\_ID is the unique attribute.

Member: Member has Name, Member\_ID, Contact\_Info, Join\_Date as attributes. Primary key is Member\_ID.

Staff: Contact\_Info, Name, Staff\_ID, Job\_title, Hire\_Date are the attributes. Staff\_ID is the primary key.

Borrow: Borrow\_ID, Borrow\_Date, Return\_Date, Due\_Date are the attributes. Primary Key is Borrow\_ID.

### **Relationships:**

Authorship: Authorship stands as a relationship between Author and Material. Authorship has attribute Authorship\_ID.

Belongs\_To: This relationship connects Material and Genre Entities.

Based: This relationship connects Material and Catalog Entities.

Needs\_To: Relationship that connects Material and Borrow.

Can: This serves as a relation between Borrow and Member Entities.

Process: This relationship connects Staff and Borrow Entites.

### **Cardinality Ratios:**

The concept of Cardinality Ratio is crucial in Database Management System. The number of times and entity from an entity set participates in a relationship set is represented by cardinality Ratio. The number of rows in a relationship can also be Cardinality. The different types of Cardinality Ratios include:

1. One to One
2. One to Many
3. Many to One
4. Many to Many

The Cardinality Ratio between Author and Material entities is M:N which is Many-to-Many Relationship. An Author can write N materials and a material can be written by M authors. Both entities have Total Participation.

The Cardinality ratio between Material and Genre is N:1 which is Many-to-One Relationship. A genre can have N materials and a material can only have one Genre. Material has total participation with Belong\_To and Genre has partial participation with Belong\_To.

The Cardinality ratio between Material and Catalog is N:1 which is a Many-to-One Relationship. Catalog can have N materials and material can have 1 catalog\_id. The relationship has total participation with Material.

The Cardinality ratio between Material and Borrow is 1:N Which is a Many-to-One Relationship. Material has partial participation with relationship and Borrow has Total participation.

The cardinality ratio between Staff and Borrow is 1:N which is a One-to-Many Relationship. Staff has the partial participation and Borrow has the total participation with relationship.

The cardinality Ratio between Borrow and Member is N:1 which is Many-to-One Relationship. One member can borrow many things. Member has the partial participation and borrow has the Total participation with the relationship.

## 4.2. Entity Relationship Schema Diagram

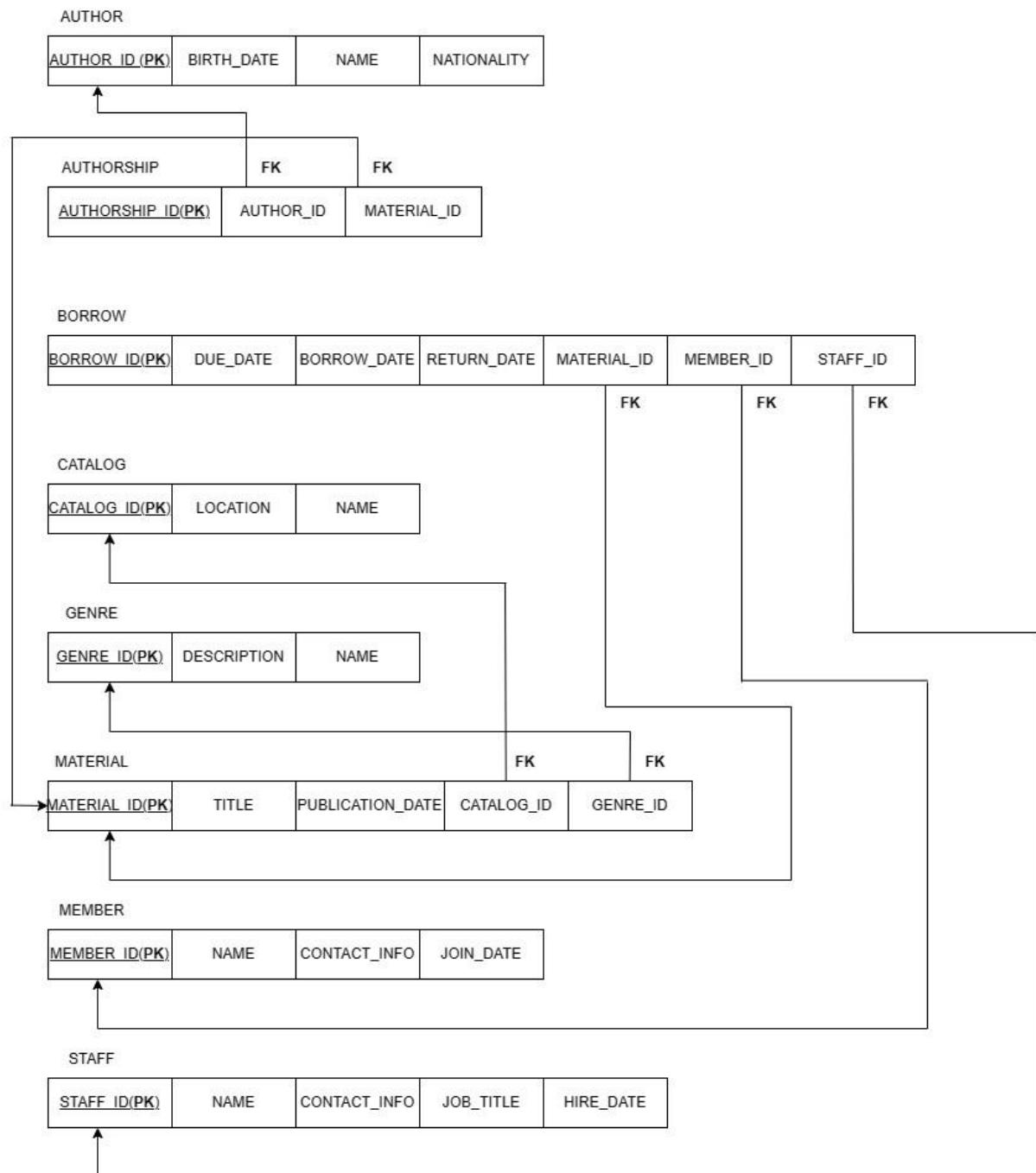


Fig.4.2.1 Relationship model.

## 4.3 IMPLEMENTATION

To implement the data, firstly we need to create a Database and add create tables into database and insert values into tables.

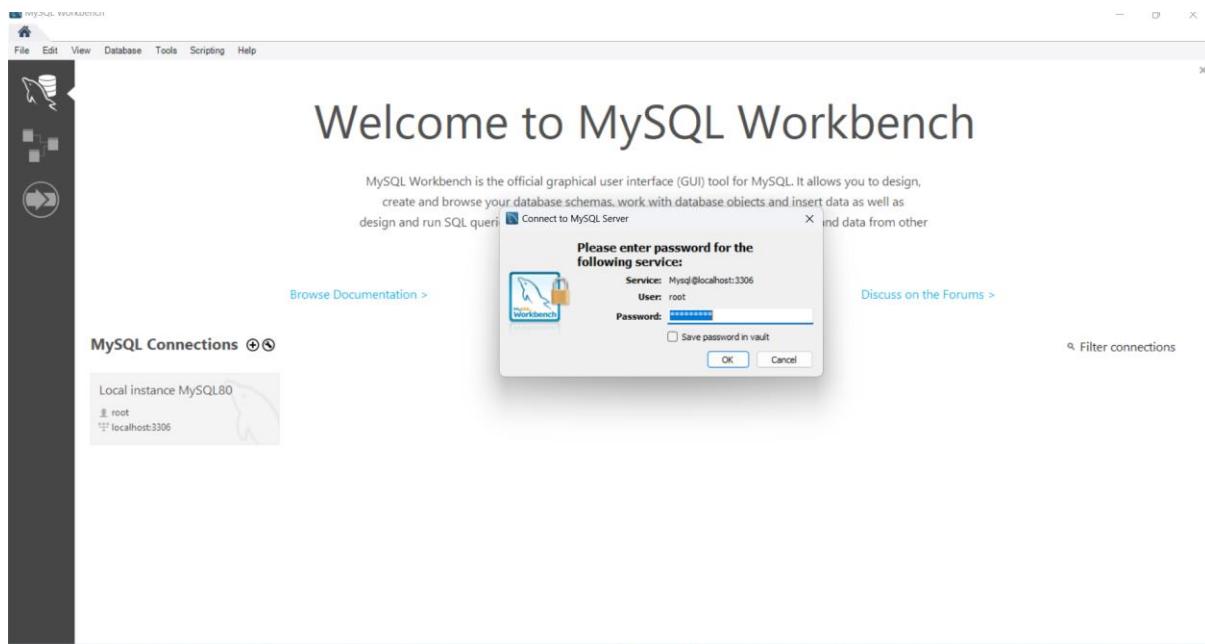
### 4.3.1 Database Creation

Step-1: Open MySQL.

Step-2: Connect to the SQL server.

Step-3: Click on New SQL Tab.

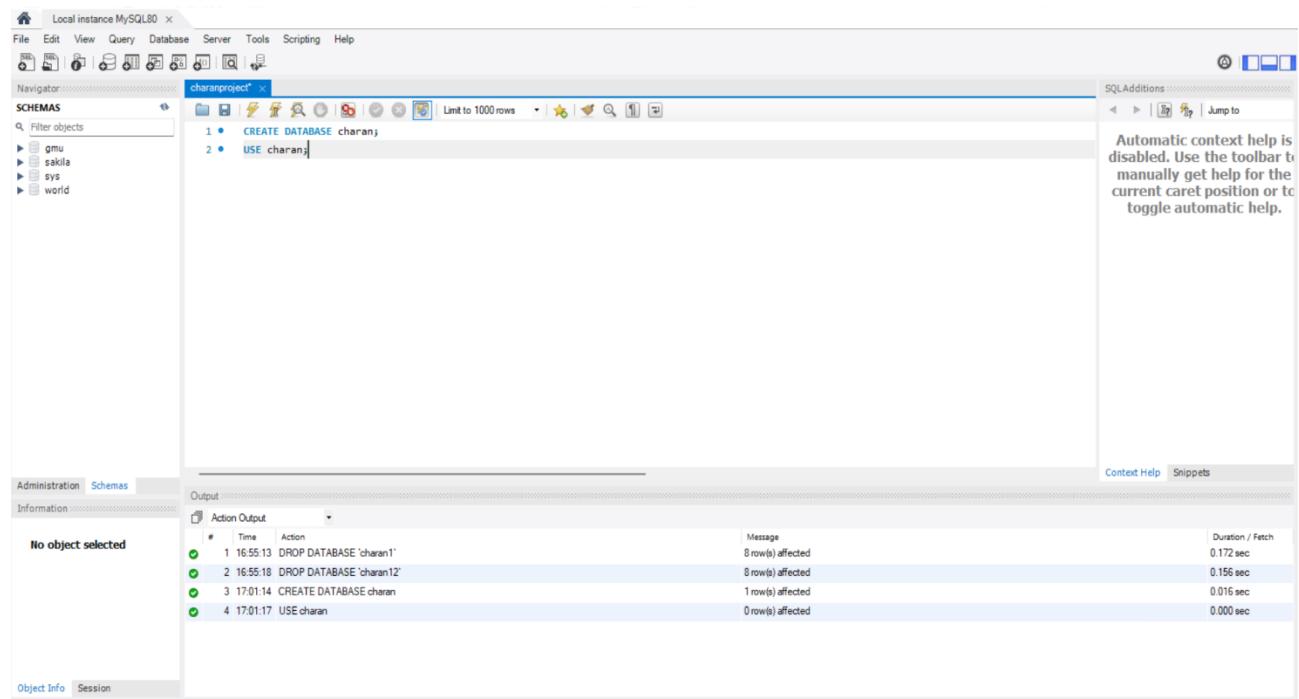
Step-4: Write a query to create a new database .



#### Query for creating database:

```
CREATE DATABASE charan;
```

```
USE charan;
```



### 4.3.2 Creating tables

```
CREATE TABLE Catalog(Catalog_ID INT NOT NULL PRIMARY KEY, Location
VARCHAR(50), Name VARCHAR(20));
```

```
CREATE TABLE Genre(Genre_ID INT NOT NULL PRIMARY KEY, Name
VARCHAR(100), Description VARCHAR(300));
```

```
CREATE TABLE Material(Material_ID INT NOT NULL PRIMARY KEY, Title
VARCHAR(80), Publication_Date DATE, Catalog_ID INT, Genre_ID INT, FOREIGN
KEY(Catalog_ID) REFERENCES Catalog(Catalog_ID), Foreign KEY(Genre_ID)
REFERENCES Genre(Genre_ID));
```

```
CREATE TABLE Member(Member_ID INT NOT NULL PRIMARY KEY, Name
VARCHAR(200), Contact_Info VARCHAR(160), Join_Date DATE);
```

```
CREATE TABLE Staff(Staff_ID INT NOT NULL PRIMARY KEY, Name VARCHAR(100),
Contact_Info VARCHAR(150), Job_Title VARCHAR(100), Hire_Date DATE);
```

```
CREATE TABLE Author(Author_ID INT NOT NULL PRIMARY KEY, Name VARCHAR(100), Birth_Date DATE, Nationality VARCHAR(100));
```

```
CREATE TABLE Authorship(Authorship_ID INT NOT NULL PRIMARY KEY, Author_ID INT, Material_ID INT, FOREIGN KEY(Author_ID) REFERENCES Author(Author_ID), FOREIGN KEY(Material_ID) REFERENCES Material(Material_ID));
```

```
CREATE TABLE Borrow(Borrow_ID INT NOT NULL PRIMARY KEY, Material_ID INT, Member_ID INT, Staff_ID INT, Borrow_Date DATE, Due_Date DATE, Return_Date DATE, FOREIGN KEY (Material_ID) REFERENCES Material(Material_ID), FOREIGN KEY(Member_ID) REFERENCES Member(Member_ID), FOREIGN KEY(Staff_ID) REFERENCES Staff(Staff_ID));
```

**Session 1 (charanproject):**

#	Time	Action	Message	Duration / Fetch
1	17:17:19	CREATE TABLE Genre(Genre_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Description VARCHAR(300))	0 row(s) affected	0.046 sec
2	17:17:23	CREATE TABLE Material(Material_ID INT NOT NULL PRIMARY KEY,Title VARCHAR(80),Publication_Date DATE,Catalog_ID INT,Genre_ID INT,FOREIGN KEY(Catalog_ID) REFERENCES Catalog(Catalog_ID),Foreign KEY(Genre_ID) REFERENCES Genre(Genre_ID))	0 row(s) affected	0.078 sec
3	17:17:29	CREATE TABLE Member(Member_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(200),Contact_Info VARCHAR(160),Join_Date DATE)	0 row(s) affected	0.047 sec
4	17:17:37	CREATE TABLE Staff(Staff_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Contact_Info VARCHAR(150),Job_Title VARCHAR(100),Hire_Date DATE)	0 row(s) affected	0.047 sec
5	17:17:43	CREATE TABLE Author(Author_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Birth_Date DATE,Nationality VARCHAR(100))	0 row(s) affected	0.047 sec
6	17:17:48	CREATE TABLE Authorship(Authorship_ID INT NOT NULL PRIMARY KEY,Author_ID INT,Material_ID INT,FOREIGN KEY(Author_ID) REFERENCES Author(Author_ID),FOREIGN KEY(Material_ID) REFERENCES Material(Material_ID))	0 row(s) affected	0.063 sec
7	17:17:56	CREATE TABLE Borrow(Borrow_ID INT NOT NULL PRIMARY KEY,Material_ID INT,Member_ID INT,Staff_ID INT,Foreign Key(Material_ID) REFERENCES Material(Material_ID),Foreign Key(Member_ID) REFERENCES Member(Member_ID),Foreign Key(Staff_ID) REFERENCES Staff(Staff_ID))	0 row(s) affected	0.094 sec

**Session 2:**

#	Time	Action	Message	Duration / Fetch
1	17:17:19	CREATE TABLE Genre(Genre_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Description VARCHAR(300))	0 row(s) affected	0.046 sec
2	17:17:23	CREATE TABLE Material(Material_ID INT NOT NULL PRIMARY KEY,Title VARCHAR(80),Publication_Date DATE,Catalog_ID INT,Genre_ID INT,FOREIGN KEY(Catalog_ID) REFERENCES Catalog(Catalog_ID),Foreign KEY(Genre_ID) REFERENCES Genre(Genre_ID))	0 row(s) affected	0.078 sec
3	17:17:29	CREATE TABLE Member(Member_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(200),Contact_Info VARCHAR(160),Join_Date DATE)	0 row(s) affected	0.047 sec
4	17:17:37	CREATE TABLE Staff(Staff_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Contact_Info VARCHAR(150),Job_Title VARCHAR(100),Hire_Date DATE)	0 row(s) affected	0.047 sec
5	17:17:43	CREATE TABLE Author(Author_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Birth_Date DATE,Nationality VARCHAR(100))	0 row(s) affected	0.047 sec
6	17:17:48	CREATE TABLE Authorship(Authorship_ID INT NOT NULL PRIMARY KEY,Author_ID INT,Material_ID INT,FOREIGN KEY(Author_ID) REFERENCES Author(Author_ID),FOREIGN KEY(Material_ID) REFERENCES Material(Material_ID))	0 row(s) affected	0.063 sec
7	17:17:56	CREATE TABLE Borrow(Borrow_ID INT NOT NULL PRIMARY KEY,Material_ID INT,Member_ID INT,Staff_ID INT,Foreign Key(Material_ID) REFERENCES Material(Material_ID),Foreign Key(Member_ID) REFERENCES Member(Member_ID),Foreign Key(Staff_ID) REFERENCES Staff(Staff_ID))	0 row(s) affected	0.094 sec

### 4.3.3 Inserting values into tables

It is very important to insert values into tables for manipulating or processing the data. We need to insert values as per the datatypes given in the command given while creating the table.

```
INSERT INTO Catalog(Catalog_ID,Name,Location)
```

```
VALUES(1,'Books','A1.1'),
```

```
(2,'Magazines','B2.1'),
```

```
(3,'E-Books','C3.1'),
```

```
(4,'Audiobooks','D4.1'),
```

```
(5,'Journals','E5.1'),
```

```
(6,'Newspaper','F6.1'),
```

```
(7,'Maps','G7.1'),
```

```
(8,'Novels','H8.1'),
```

```
(9,'SheetMusic','I9.1'),
```

```
(10,'Educational','J10.1');
```

```
INSERT INTO Genre(Genre_ID,Name,Description)
```

```
VALUES(1,'General Fiction','Literary works with a focus on character and plot development, exploring various themes and human experiences.'),
```

```
(2,'Mystery & Thriller','Suspenseful stories centered around crime, investigation, or espionage with an emphasis on tension and excitement.'),
```

```
(3,'Science Fiction & Fantasy','Imaginative works that explore alternate realities, futuristic concepts, and magical or supernatural elements.'),
```

```
(4,'Horror & Suspense','Stories designed to evoke fear, unease, or dread, often featuring supernatural or psychological elements.'),
```

```
(5,'Dystopian & Apocalyptic','Depictions of societies in decline or collapse, often exploring themes of political and social oppression or environmental disaster.'),
```

```
(6,'Classics','Enduring works of literature that have stood the test of time, often featuring rich language and complex themes.'),
```

```
(7,'Historical Fiction','Fictional stories set in the past, often based on real historical events or figures, and exploring the customs and experiences of that time.'),
```

(8,'Epic Poetry & Mythology','Ancient or traditional stories and poems,often featuring heroes,gods,and mythical creatures,and exploring cultural values and beliefs.');

```
INSERT INTO Material(Material_ID,Title,Publication_Date,Catalog_ID,Genre_ID)
VALUES(1,'The Catcher in the Rye','1951-07-16',1,1),
(2,'To Kill a Mockingbird','1960-07-11',2,1),
(3,'The Da Vinci Code','2003-04-01',3,2),
(4,'The Hobbit','1937-09-21',4,3),
(5,'The Shining','1977-01-28',5,4),
(6,'Pride and Prejudice','1813-01-28',1,1),
(7,'The Great Gatsby','1925-04-10',2,1),
(8,'Moby Dick','1851-10-18',3,1),
(9,'Crime and Punishment','1866-01-01',4,1),
(10,'The Hitchhiker"s Guide to the Galaxy','1979-10-12',5,3),
(11,'1984','1949-06-08',1,5),
(12,'Animal Farm','1945-08-17',2,5),
(13,'The Haunting of Hill House','1959-10-17',3,4),
(14,'Brave New World','1932-08-01',4,5),
(15,'The Chronicles of Narnia:The Lion the Witch and the Wardrobe','1950-10-16',5,3),
(16,'The Adventures of Huckleberry Finn','1884-12-10',6,1),
(17,'The Catch-22','1961-10-11',7,1),
(18,'The Picture of Dorian Gray','1890-07-01',8,1),
(19,'The Call of Cthulhu','1928-02-01',9,4),
(20,'Harry Potter and the Philosopher"s Stone','1997-06-26',10,3),
(21,'Frankenstein','1818-01-01',6,4),
(22,'A Tale of Two Cities','1859-04-30',7,1),
(23,'The Iliad','1750-01-01',8,6),
(24,'The Odyssey','1725-01-01',9,6),
(25,'The Brothers Karamazov','1880-01-01',10,1),
```

(26,'The Divine Comedy','1320-01-01',6,6),  
(27,'The Grapes of Wrath','1939-04-14',7,1),  
(28,'The Old Man and the Sea','1952-09-01',8,1),  
(29,'The Count of Monte Cristo','1844-01-01',9,1),  
(30,'A Midsummer Night"s Dream','1596-01-01',10,7),  
(31,'The Tricky Book','1888-01-01',10,7);

INSERT INTO Member(Member\_ID,Name,Contact\_Info,Join\_Date)  
VALUES(1,'Alice Johnson','alice.johnson@email.com','2018-01-10'),  
(2,'Bob Smith','bob.smith@email.com','2018-03-15'),  
(3,'Carol Brown','carol.brown@email.com','2018-06-20'),  
(4,'David Williams','david.williams@email.com','2018-09-18'),  
(5,'Emily Miller','emily.miller@email.com','2019-02-12'),  
(6,'Frank Davis','frank.davis@email.com','2019-05-25'),  
(7,'Grace Wilson','grace.wilson@email.com','2019-08-15'),  
(8,'Harry Garcia','harry.garcia@email.com','2019-11-27'),  
(9,'Isla Thomas','isla.thomas@email.com','2020-03-04'),  
(10,'Jack Martinez','jack.martinez@email.com','2020-07-01'),  
(11,'Kate Anderson','kate.anderson@email.com','2020-09-30'),  
(12,'Luke Jackson','luke.jackson@email.com','2021-01-18'),  
(13,'Mia White','mia.white@email.com','2021-04-27'),  
(14,'Noah Harris','noah.harris@email.com','2021-07-13'),  
(15,'Olivia Clark','olivia.clark@email.com','2021-10-05'),  
(16,'Peter Lewis','peter.lewis@email.com','2021-12-01'),  
(17,'Quinn Hall','quinn.hall@email.com','2022-02-28'),  
(18,'Rachel Young','rachel.young@email.com','2022-06-17'),  
(19,'Sam Walker','sam.walker@email.com','2022-09-25'),  
(20,'Tiffany Allen','tiffany.allen@email.com','2022-12-10');

```
INSERT INTO Staff(Staff_ID,Name,Contact_Info,Job_Title,Hire_Date)
VALUES(1,'Amy Green','amy.green@email.com','Librarian','2017-06-01'),
(2,'Brian Taylor','brian.taylor@email.com','Library Assistant','2018-11-15'),
(3,'Christine King','chris.king@email.com','Library Assistant','2019-05-20'),
(4,'Daniel Wright','dan.wright@email.com','Library Technician','2020-02-01');
```

```
INSERT INTO Author(Author_ID,Name,Birth_Date,Nationality)
```

```
VALUES(1,'Jane Austen','1775-12-16','British'),
(2,'Ernest Hemingway','1899-07-21','American'),
(3,'George Orwell','1903-06-25','British'),
(4,'Scott Fitzgerald','1896-09-24','American'),
(5,'J.K. Rowling','1965-07-31','British'),
(6,'Mark Twain','1835-11-30','American'),
(7,'Leo Tolstoy','1828-09-09','Russian'),
(8,'Virginia Woolf','1882-01-25','British'),
(9,'Gabriel Márquez','1927-03-06','Colombian'),
(10,'Charles Dickens','1812-02-07','British'),
(11,'Harper Lee','1926-04-28','American'),
(12,'Oscar Wilde','1854-10-16','Irish'),
(13,'William Shakespeare','1564-04-26','British'),
(14,'Franz Kafka','1883-07-03','Czech'),
(15,'James Joyce','1882-02-02','Irish'),
(16,'J.R.R. Tolkien','1892-01-03','British'),
(17,'Emily Brontë','1818-07-30','British'),
(18,'Toni Morrison','1931-02-18','American'),
(19,'Fyodor Dostoevsky','1821-11-11','Russian'),
(20,'Lucas Piki','1847-10-16','British');
```

```
INSERT INTO Authorship(Authorship_ID,Author_ID,Material_ID)
VALUES(1,1,1),(2,2,2),(3,3,3),(4,4,4),(5,5,5),(6,6,6),(7,7,7),(8,8,8),(9,9,9),(10,10,10),(11,11,
11),(12,12,12),(13,13,13),(14,14,14),(15,15,15),(16,16,16),(17,17,17),(18,18,18),(19,19,19),(
20,20,20),(21,1,21),(22,2,22),(23,3,22),(24,3,23),(25,4,24),(26,5,25),(27,6,26),(28,7,27),(29,8
,28),(30,19,28),(31,9,29),(32,10,30),(33,8,30),(34,2,29);
```

```
INSERT      INTO
Borrow(Borrow_ID,Material_ID,Member_ID,Staff_ID,Borrow_Date,Due_Date,Return_Date
)
VALUES(1,1,1,1,'2018-09-12','2018-03-10','2018-09-30'),
(2,2,2,1,'2018-10-15','2018-11-05','2018-10-29'),
(3,3,3,1,'2018-12-20','2019-01-10','2019-01-08'),
(4,4,4,1,'2019-03-11','2019-04-01','2019-03-27'),
(5,5,5,1,'2019-04-20','2019-05-11','2019-05-05'),
(6,6,6,1,'2019-07-05','2019-07-26','2019-07-21'),
(7,7,7,1,'2019-09-10','2019-10-01','2019-09-25'),
(8,8,8,1,'2019-11-08','2019-11-29','2019-11-20'),
(9,9,9,1,'2020-01-15','2020-02-05','2020-02-03'),
(10,10,10,1,'2020-03-12','2020-04-02','2020-03-28'),
(11,1,11,2,'2020-05-14','2020-06-04','2020-05-28'),
(12,2,12,2,'2020-07-21','2020-08-11','2020-08-02'),
(13,3,13,2,'2020-09-25','2020-10-16','2020-10-15'),
(14,4,1,2,'2020-11-08','2020-11-29','2020-11-24'),
(15,5,2,2,'2021-01-03','2021-01-24','2021-01-19'),
(16,6,3,2,'2021-02-18','2021-03-11','2021-03-12'),
(17,17,4,2,'2021-04-27','2021-05-18','2021-05-20'),
(18,18,5,2,'2021-06-13','2021-07-04','2021-06-28'),
(19,19,6,2,'2021-08-15','2021-09-05','2021-09-03'),
(20,20,7,2,'2021-10-21','2021-11-11',NULL),
(21,21,1,3,'2021-11-29','2021-12-20',NULL),
(22,22,2,3,'2022-01-10','2022-01-31','2022-01-25'),
```

(23,23,3,3,'2022-02-07','2022-02-28','2022-02-23'),  
(24,24,4,3,'2022-03-11','2022-04-01','2022-03-28'),  
(25,25,5,3,'2022-04-28','2022-05-19','2022-05-18'),  
(26,26,6,3,'2022-06-22','2022-07-13','2022-07-08'),  
(27,27,7,3,'2022-08-04','2022-08-25','2022-08-23'),  
(28,28,8,3,'2022-09-13','2022-10-04','2022-09-28'),  
(29,29,9,3,'2022-10-16','2022-11-06','2022-11-05'),  
(30,30,8,3,'2022-11-21','2022-12-12','2022-12-05'),  
(31,1,9,4,'2022-12-28','2023-01-18',NULL),  
(32,2,1,4,'2023-01-23','2023-02-13',NULL),  
(33,3,10,4,'2023-02-02','2023-02-23','2023-02-17'),  
(34,4,11,4,'2023-03-01','2023-03-22',NULL),  
(35,5,12,4,'2023-03-10','2023-03-31',NULL),  
(36,6,13,4,'2023-03-15','2023-04-05',NULL),  
(37,7,17,4,'2023-03-25','2023-04-15',NULL),  
(38,8,8,4,'2023-03-30','2023-04-20',NULL),  
(39,9,9,4,'2023-03-26','2023-04-16',NULL),  
(40,10,20,4,'2023-03-28','2023-04-18',NULL);

The screenshot shows the MySQL Workbench interface with the following details:

- File Bar:** Local instance MySQL80, File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Navigator:** SCHEMAS: gmu, sakila, sys, world. Current database: charanproject.
- SQL Editor:** Contains the SQL code for creating tables Borrow, Catalog, Material, Member, Staff, Author, and Authorship, and inserting data into Catalog.
- Output Window:** Action Output table showing the execution of 13 statements, all successful with 0 rows affected.
- Help Panel:** Automatic context help disabled. Use the toolbar manually get help for ti current caret position or toggle automatic help.

```
CREATE TABLE Borrow(Borrow_ID INT NOT NULL PRIMARY KEY,Material_ID INT,Member_ID INT,Staff_ID INT,Borrow_Date DATE,Due_Date DATE,  
Return_Date DATE,FOREIGN KEY(Material_ID) REFERENCES Material(Material_ID),FOREIGN KEY(Member_ID) REFERENCES Member(Member_ID),  
FOREIGN KEY(Staff_ID) REFERENCES Staff(Staff_ID));  
  
INSERT INTO Catalog(Catalog_ID,Name,Location)  
VALUES(1,'Books','A1.1'),  
(2,'Magazines','B2.1'),  
(3,'E-Books','C3.1'),  
(4,'Audiobooks','D4.1'),  
(5,'Journals','E5.1'),  
(6,'Newspaper','F6.1'),  
(7,'Maps','G7.1'),  
(8,'Novels','H8.1'),  
(9,'SheetMusic','I9.1'),  
(10,'Educational','J10.1');
```

#	Time	Action	Message	Duration / Fetch
7	17:17:23	CREATE TABLE Material(Material_ID INT NOT NULL PRIMARY KEY,Title VARCHAR(80),Publication_Date D...	0 row(s) affected	0.078 sec
8	17:17:29	CREATE TABLE Member(Member_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(200),Contact_Info VA...	0 row(s) affected	0.047 sec
9	17:17:37	CREATE TABLE Staff(Staff_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Contact_Info VARCHA...	0 row(s) affected	0.047 sec
10	17:17:43	CREATE TABLE Author(Author_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Birth_Date DATE,N...	0 row(s) affected	0.047 sec
11	17:17:48	CREATE TABLE Authorship(Authorship_ID INT NOT NULL PRIMARY KEY,Author_ID INT,Material_ID INT,FO...	0 row(s) affected	0.063 sec
12	17:17:56	CREATE TABLE Borrow(Borrow_ID INT NOT NULL PRIMARY KEY,Material_ID INT,Member_ID INT,Staff_ID I...	0 row(s) affected	0.094 sec
13	17:27:52	INSERT INTO Catalog(Catalog_ID,Name,Location) VALUES(1,'Books','A1.1'),(2,'Magazines','B2.1'),(3,'E-Books','C3.1')	10 row(s) affected Records: 10 Duplicates: 0 Warnings: 0	0.015 sec

Local instance MySQL80 ×

File Edit View Query Database Server Tools Scripting Help

Navigator

charanproject

SCHEMAS

- gmw
- sakila
- sys
- world

charanproject

```

31     ('Newspaper','F6.1'),
32     ('Maps','G7.1'),
33     ('Novels','H8.1'),
34     ('SheetMusic','I9.1'),
35     ('Educational','J10.1');
36
37
38 •   INSERT INTO Genre(Genre_ID,Name,Description)
39     VALUES(1,'General Fiction','Literary works with a focus on character and plot development, exploring various themes and human experiences.'),
40     (2,'Mystery & Thriller','Suspenseful stories centered around crime, investigation, or espionage with an emphasis on tension and excitement.'),
41     (3,'Science Fiction & Fantasy','Imaginative works that explore alternate realities, futuristic concepts, and magical or supernatural elements.')
42     (4,'Horror & Suspense','Stories designed to evoke fear, unease, or dread, often featuring supernatural or psychological elements.')
43     (5,'Dystopian & Apocalyptic','Depictions of societies in decline or collapse, often exploring themes of political and social oppression or environmental crisis.')
44     (6,'Classics','Enduring works of literature that have stood the test of time, often featuring rich language and complex themes.')
45     (7,'Historical Fiction','Fictional stories set in the past, often based on real historical events or figures, and exploring the customs and experiences of different eras.')
46     (8,'Epic Poetry & Mythology','Ancient or traditional stories and poems, often featuring heroes, gods, and mythical creatures, and exploring cultural and historical contexts.')
47
48

```

Administration Schemas

Information

No object selected

Action Output

#	Time	Action	Message	Duration / Fetch
8	17:17:29	CREATE TABLE Member(Member_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(200),Contact_Info VA... 0 row(s) affected		0.047 sec
9	17:17:37	CREATE TABLE Staff(Staff_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Contact_Info VARCHA... 0 row(s) affected		0.047 sec
10	17:17:43	CREATE TABLE Author(Author_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Birth_Date DATE,N... 0 row(s) affected		0.047 sec
11	17:17:48	CREATE TABLE Authorship(Authorship_ID INT NOT NULL PRIMARY KEY,Author_ID INT,Material_ID INT,FO... 0 row(s) affected		0.063 sec
12	17:17:56	CREATE TABLE Borrow(Borrow_ID INT NOT NULL PRIMARY KEY,Material_ID INT,Member_ID INT,Staff_ID I... 0 row(s) affected		0.094 sec
13	17:27:52	INSERT INTO Catalog(Catalog_ID,Name,Location) VALUES(1,'Books','A1 1'), (2,'Magazines','B2 1'), (3,'E-Book... 10 rows affected Records: 10 Duplicates: 0 Warnings: 0		0.015 sec
14	17:29:55	INSERT INTO Genre(Genre_ID,Name,Description) VALUES(1,'General Fiction','Literary works with a focus on ... 8 row(s) affected Records: 8 Duplicates: 0 Warnings: 0		0.000 sec

Object Info Session

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or toggle automatic help.

MySQL Workbench

Local instance MySQL80 ×

File Edit View Query Database Server Tools Scripting Help

Navigator

charanproject

SCHEMAS

- gmw
- sakila
- sys
- world

charanproject

```

49 •   INSERT INTO Material(Material_ID,Title,Publication_Date,Catalog_ID,Genre_ID)
50     VALUES(1,'The Catcher in the Rye','1951-07-16',1,1),
51     (2,'To Kill a Mockingbird','1960-07-11',2,1),
52     (3,'The Da Vinci Code','2003-04-01',3,2),
53     (4,'The Hobbit','1937-09-21',4,3),
54     (5,'The Shining','1977-01-28',5,4),
55     (6,'Pride and Prejudice','1813-01-28',1,1),
56     (7,'The Great Gatsby','1925-04-10',2,1),
57     (8,'Moby Dick','1851-10-18',3,1),
58     (9,'Crime and Punishment','1866-01-01',4,1),
59     (10,'The Hitchhiker''s Guide to the Galaxy','1979-10-12',5,3),
60     (11,'1984','1949-06-08',1,5),
61     (12,'Animal Farm','1945-08-17',2,5),
62     (13,'The Haunting of Hill House','1959-10-17',3,4),
63     (14,'Brave New World','1932-08-01',5,5),
64     (15,'The Chronicles of Narnia: The Lion the Witch and the Wardrobe','1950-10-16',5,3),
65     (16,'The Adventures of Huckleberry Finn','1884-12-10',6,1),
66     (17,'The Catch-22','1961-10-11',7,1),
67     (18,'The Picture of Dorian Gray','1890-07-01',8,1),

```

Administration Schemas

Information

No object selected

Action Output

#	Time	Action	Message	Duration / Fetch
8	17:17:29	CREATE TABLE Member(Member_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(200),Contact_Info VA... 0 row(s) affected		0.047 sec
9	17:17:37	CREATE TABLE Staff(Staff_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Contact_Info VARCHA... 0 row(s) affected		0.047 sec
10	17:17:43	CREATE TABLE Author(Author_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Birth_Date DATE,N... 0 row(s) affected		0.047 sec
11	17:17:48	CREATE TABLE Authorship(Authorship_ID INT NOT NULL PRIMARY KEY,Author_ID INT,Material_ID INT,FO... 0 row(s) affected		0.063 sec
12	17:17:56	CREATE TABLE Borrow(Borrow_ID INT NOT NULL PRIMARY KEY,Material_ID INT,Member_ID INT,Staff_ID I... 0 row(s) affected		0.094 sec
13	17:27:52	INSERT INTO Catalog(Catalog_ID,Name,Location) VALUES(1,'Books','A1 1'), (2,'Magazines','B2 1'), (3,'E-Book... 10 rows affected Records: 10 Duplicates: 0 Warnings: 0		0.015 sec
14	17:29:55	INSERT INTO Genre(Genre_ID,Name,Description) VALUES(1,'General Fiction','Literary works with a focus on ... 8 row(s) affected Records: 8 Duplicates: 0 Warnings: 0		0.000 sec

Object Info Session

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or toggle automatic help.

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator: Schemas

Filter objects

charanproject

Limit to 1000 rows

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

```

64      (15,'The Chronicles of Narnia:The Lion the Witch and the Wardrobe','1950-10-16',5,3),
65      (16,'The Adventures of Huckleberry Finn','1884-12-10',6,1),
66      (17,'The Catch-22','1961-10-11',7,1),
67      (18,'The Picture of Dorian Gray','1890-07-01',8,1),
68      (19,'The Call of Cthulhu','1928-02-01',9,4),
69      (20,'Harry Potter and the Philosopher''s Stone','1997-06-26',10,3),
70      (21,'Frankenstein','1818-01-01',6,4),
71      (22,'A Tale of Two Cities','1859-04-30',7,1),
72      (23,'The Iliad', '1750-01-01',9,6),
73      (24,'The Odyssey', '1725-01-01',9,6),
74      (25,'The Brothers Karamazov', '1880-01-01',10,1),
75      (26,'The Divine Comedy', '1320-01-01',6,6),
76      (27,'The Grapes of Wrath', '1939-04-14',7,1),
77      (28,'The Old Man and the Sea', '1952-09-01',9,1),
78      (29,'The Count of Monte Cristo', '1844-01-01',9,1),
79      (30,'A Midsummer Night''s Dream', '1596-01-01',18,7),
80      (31,'The Tricky Book', '1888-01-01',10,7)
81
82

```

Administration Schemas

Information

No object selected

Action Output

#	Time	Action	Message	Duration / Fetch
9	17:17:37	CREATE TABLE Staff(Staff_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Contact_Info VARCHAR(100))	0 row(s) affected	0.047 sec
10	17:17:43	CREATE TABLE Author(Author_ID INT NOT NULL PRIMARY KEY,Name VARCHAR(100),Birth_DATE_N...	0 row(s) affected	0.047 sec
11	17:17:48	CREATE TABLE Authorship(Authorhip_ID INT NOT NULL PRIMARY KEY,Author_ID INT,Material_ID INT,FO...	0 row(s) affected	0.061 sec
12	17:17:56	CREATE TABLE Borrow(Borrow_ID INT NOT NULL PRIMARY KEY,Material_ID INT,Member_ID INT,Staff_ID L...	0 row(s) affected	0.094 sec
13	17:27:52	INSERT INTO Catalog(Catalog_ID,Name,Location) VALUES('Books','A1'), ('Magazines','B2'), ('E-Book...')	10 row(s) affected Records: 10 Duplicates: 0 Warnings: 0	0.015 sec
14	17:29:55	INSERT INTO Genre(Genre_ID,Name,Description) VALUES('General Fiction','Literary works with a focus on ...')	8 row(s) affected Records: 8 Duplicates: 0 Warnings: 0	0.000 sec
15	17:32:11	INSERT INTO Material(Material_ID,Title,Publication_Date,Catalog_ID,Genre_ID) VALUES('1','The Catcher in th...	31 row(s) affected Records: 31 Duplicates: 0 Warnings: 0	0.015 sec

Object Info Session

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator: Schemas

Filter objects

charanproject

Limit to 1000 rows

SQLAdditions

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

```

80      (31,'The Tricky Book', '1888-01-01',10,7);
81
82
83 •    INSERT INTO Member(Member_ID,Name,Contact_Info,Join_Date)
84     VALUES(1,'Alice Johnson','alice.johnson@email.com','2018-01-10'),
85     (2,'Bob Smith','bob.smith@email.com','2018-03-15'),
86     (3,'Carol Brown','carol.brown@email.com','2018-06-20'),
87     (4,'David Williams','david.williams@email.com','2018-09-18'),
88     (5,'Emily Miller','emily.miller@email.com','2019-02-12'),
89     (6,'Frank Davis','frank.davis@email.com','2019-05-25'),
90     (7,'Grace Wilson','grace.wilson@email.com','2019-08-15'),
91     (8,'Harry Garcia','harry.garcia@email.com','2019-11-27'),
92     (9,'Isla Thomas','isla.thomas@email.com','2020-03-04'),
93     (10,'Jack Martinez','jack.martinez@email.com','2020-07-01'),
94     (11,'Kate Anderson','kate.anderson@email.com','2020-09-30'),
95     (12,'Luke Jackson','luke.jackson@email.com','2021-01-18'),
96     (13,'Mia White','mia.white@email.com','2021-04-27'),
97     (14,'Noah Harris','noah.harris@email.com','2021-07-13'),
98     (15,'Olivia Clark','olivia.clark@email.com','2021-10-05'),
99     (16,'Peter Lewis','peter.lewis@email.com','2021-12-01'),
100    (17,'Quinn Hall','quinn.hall@email.com','2022-02-28'),
101    (18,'Rachel Young','rachel.young@email.com','2022-06-17'),
102    (19,'Sam Walker','sam.walker@email.com','2022-09-25'),
103    (20,'Tiffany Allen','tiffany.allen@email.com','2022-12-10')
104

```

Administration Schemas

Information

No object selected

Action Output

#	Time	Action	Message	Duration / Fetch
15	17:32:11	INSERT INTO Material(Material_ID,Title,Publication_Date,Catalog_ID,Genre_ID) VALUES('1','The Catcher in th...	31 row(s) affected Records: 31 Duplicates: 0 Warnings: 0	0.015 sec
16	17:33:26	INSERT INTO Member(Member_ID,Name,Contact_Info,Join_Date) VALUES(1,'Alice Johnson','alice.johnson@...	20 row(s) affected Records: 20 Duplicates: 0 Warnings: 0	0.015 sec

Object Info Session

Local instance MySQL80 ×

File Edit View Query Database Server Tools Scripting Help

Navigator

charaproject

SCHEMAS

Filter objects

MySQL Navigator

```

95 (12,'Luke Jackson','luke.jackson@email.com','2021-01-18'),
96 (13,'Mia White','mia.white@email.com','2021-04-27'),
97 (14,'Noah Harris','noah.harris@email.com','2021-07-13'),
98 (15,'Olivia Clark','olivia.clark@email.com','2021-10-05'),
99 (16,'Peter Lewis','peter.lewis@email.com','2021-12-01'),
100 (17,'Quinn Hall','quinn.hall@email.com','2022-02-28'),
101 (18,'Rachel Young','rachel.young@email.com','2022-06-17'),
102 (19,'Sam Walker','sam.walker@email.com','2022-09-25'),
103 (20,'Tiffany Allen','tiffany.allen@email.com','2022-12-10');

104
105
106 • INSERT INTO Staff(Staff_ID,Name,Contact_Info,Job_Title,Hire_Date)
107 VALUES(1,'Amy Green','amy.green@email.com','Librarian','2017-06-01'),
108 (2,'Briam Taylor','briam.taylor@email.com','Library Assistant','2018-11-15'),
109 (3,'Christine King','christine.king@email.com','Library Assistant','2019-05-20'),
110 (4,'Daniel Wright','dan.wright@email.com','Library Technician','2020-02-01');
111
112
113

```

Administration Schemas

Information

No object selected

Action Output

#	Time	Action	Message	Duration / Fetch
11	17:17:48	CREATE TABLE Author(Author_ID INT NOT NULL PRIMARY KEY,Author_ID INT,Material_ID INT,FO...	0 row(s) affected	0.051 sec
12	17:17:56	CREATE TABLE Borrow(Borrow_ID INT NOT NULL PRIMARY KEY,Material_ID INT,Member_ID INT,Staff_ID I...	0 row(s) affected	0.094 sec
13	17:27:52	INSERT INTO Catalog(Catalog_ID,Name,Location) VALUES(1,'Books','A1 1'),(2,'Magazines','B2 1'),(3,'E-Book...	10 row(s) affected Records: 10 Duplicates: 0 Warnings: 0	0.015 sec
14	17:29:55	INSERT INTO Genre(Genre_ID,Name,Description) VALUES(1,'General Fiction','Literary works with a focus on ...')	8 row(s) affected Records: 8 Duplicates: 0 Warnings: 0	0.000 sec
15	17:32:11	INSERT INTO Material(Material_ID,Title,Publication_Date,Catalog_ID,Genre_ID) VALUES(1,'The Catcher in th...	31 row(s) affected Records: 31 Duplicates: 0 Warnings: 0	0.015 sec
16	17:33:26	INSERT INTO Member(Member_ID,Name,Contact_Info,Join_Date) VALUES(1,'Alice Johnson','alice.johnson@...	20 row(s) affected Records: 20 Duplicates: 0 Warnings: 0	0.015 sec
17	17:34:28	INSERT INTO Staff(Staff_ID,Name,Contact_Info,Job_Title,Hire_Date) VALUES(1,'Amy Green','amy.green@email...	4 row(s) affected Records: 4 Duplicates: 0 Warnings: 0	0.016 sec

Object Info Session

Context Help Snippets

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

MySQL Workbench

File Edit View Query Database Server Tools Scripting Help

Navigator

charaproject

SCHEMAS

Filter objects

MySQL Navigator

```

113 • INSERT INTO Author(Author_ID,Name,Birth_Date,Nationality)
VALUES(1,'Jane Austen','1775-12-16','British'),
(2,'Ernest Hemingway','1899-07-21','American'),
(3,'George Orwell','1903-06-25','British'),
(4,'Scott Fitzgerald','1896-09-24','American'),
(5,'J.K. Rowling','1965-07-31','British'),
(6,'Mark Twain','1835-11-30','American'),
(7,'Leo Tolstoy','1828-09-09','Russian'),
(8,'Virginia Woolf','1882-01-25','British'),
(9,'Gabriel García Márquez','1927-03-06','Colombian'),
(10,'Charles Dickens','1812-02-07','British'),
(11,'Harper Lee','1926-04-28','American'),
(12,'Oscar Wilde','1854-10-16','Irish'),
(13,'William Shakespeare','1564-04-26','British'),
(14,'Franz Kafka','1883-07-03','Czech'),
(15,'James Joyce','1882-02-02','Irish'),
(16,'J.R.R.Tolkien','1892-01-03','British'),
(17,'Emily Bronte','1818-07-30','British'),
(18,'Toni Morrison','1931-02-18','American'),
(19,'Fyodor Dostoevsky','1821-11-11','Russian'),
(20,'Lucas Piki','1847-10-16','British');

134

```

Administration Schemas

Information

No object selected

Action Output

#	Time	Action	Message	Duration / Fetch
16	17:33:26	INSERT INTO Member(Member_ID,Name,Contact_Info,Join_Date) VALUES(1,'Alice Johnson','alice.johnson@...	20 row(s) affected Records: 20 Duplicates: 0 Warnings: 0	0.015 sec
17	17:34:28	INSERT INTO Staff(Staff_ID,Name,Contact_Info,Job_Title,Hire_Date) VALUES(1,'Amy Green','amy.green@email...	4 row(s) affected Records: 4 Duplicates: 0 Warnings: 0	0.016 sec
18	17:35:40	INSERT INTO Author(Author_ID,Name,Birth_Date,Nationality) VALUES(1,'Jane Austen','1775-12-16','British'),(2,...	20 row(s) affected Records: 20 Duplicates: 0 Warnings: 0	0.016 sec

Object Info Session

Context Help Snippets

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

- gmw
- sakila
- sys
- world

charaproject

```

120     (7,'Leo Tolstoy','1828-09-09','Russian'),
121     (8,'Virginia Woolf','1882-01-25','British'),
122     (9,'Gabriel Marquez','1927-03-06','Colombian'),
123     (10,'Charles Dickens','1812-02-07','British'),
124     (11,'Harper Lee','1926-04-28','American'),
125     (12,'Oscar Wilde','1854-10-16','Irish'),
126     (13,'William Shakespeare','1564-04-26','British'),
127     (14,'Franz Kafka','1883-07-03','Czech'),
128     (15,'James Joyce','1882-02-02','Irish'),
129     (16,'J.R.R.Tolkien','1892-01-03','British'),
130     (17,'Emily Bronte','1818-07-30','British'),
131     (18,'Toni Morrison','1931-02-18','American'),
132     (19,'Fyodor Dostoevsky','1821-11-11','Russian'),
133     (20,'Lucas Piki','1847-10-16','British')
134
135
136 • INSERT INTO Authorship(Authorship_ID,Author_ID,Material_ID)
137 VALUES(1,1,1),(2,2,2),(3,3,3),(4,4,4),(5,5,5),(6,6,6),(7,7,7),(8,8,8),(9,9,9),(10,10,10),(11,11,11),(12,12,12),(13,13,13),(14,14,14),
138 (15,15,15),(16,16,16),(17,17,17),(18,18,18),(19,19,19),(20,20,20),(21,21,21),(22,22,22),(23,23,23),(24,24,24),(25,25,25),(26,26,26),
139 (27,27,27),(28,28,28),(29,29,29),(30,30,30),(31,31,31),(32,32,32),(33,33,33),(34,34,34),(35,35,35)
140
141

```

No object selected

Administration Schemas Information

Object Info Session

Output

Action Output

#	Time	Action	Message	Duration / Fetch
17	17:34:28	INSERT INTO Staff(Staff_ID,Name,Contact_Info,Job_Title,Hire_Date)	VALUES('Amy Green','amy.green@em...')	4 row(s) affected Records: 4 Duplicates: 0 Warnings: 0 0.016 sec
18	17:35:40	INSERT INTO Author(Author_ID,Name,Birth_Date,Nationality)	VALUES('Jane Austen','1775-12-16','British')	(2,... 20 row(s)) affected Records: 20 Duplicates: 0 Warnings: 0 0.016 sec
19	17:36:40	INSERT INTO Authorship(Authorship_ID,Author_ID,Material_ID)	VALUES(1,1,1),(2,2,2),(3,3,3),(4,4,4),(5,5,5),(... 34 row(s)) affected Records: 34 Duplicates: 0 Warnings: 0 0.016 sec	

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

- gmw
- sakila
- sys
- world

charaproject

```

140
141 • INSERT INTO Borrow(Borrow_ID,Material_ID,Member_ID,Staff_ID,Borrow_Date,Due_Date,Return_Date)
142 VALUES(1,1,1,1,'2018-09-12','2018-03-18','2018-09-30'),
143 ('2,2,2,2,'2018-10-15','2018-11-05','2018-10-29'),
144 ('3,3,3,3,'2018-12-28','2019-01-10','2019-01-08'),
145 ('4,4,4,4,'2019-03-11','2019-04-01','2019-03-27'),
146 ('5,5,5,5,'2019-04-28','2019-05-13','2019-05-05'),
147 ('6,6,6,6,'2019-07-05','2019-07-26','2019-07-21'),
148 ('7,7,7,7,'2019-09-10','2019-10-01','2019-09-25'),
149 ('8,8,8,8,'2019-11-08','2019-11-29','2019-11-20'),
150 ('9,9,9,9,'2020-01-15','2020-02-05','2020-02-03'),
151 ('10,10,10,10,'2020-03-12','2020-04-02','2020-03-28'),
152 ('11,11,11,11,'2020-05-14','2020-06-04','2020-05-28'),
153 ('12,12,12,12,'2020-07-21','2020-08-11','2020-08-02'),
154 ('13,13,13,13,'2020-09-25','2020-10-16','2020-10-15'),
155 ('14,14,14,14,'2020-11-08','2020-11-29','2020-11-24'),
156 ('15,15,15,15,'2021-01-03','2021-01-24','2021-01-19'),
157 ('16,16,16,16,'2021-02-18','2021-03-11','2021-03-12'),
158 ('17,17,17,17,'2021-04-27','2021-05-18','2021-05-20'),
159 ('18,18,18,18,'2021-06-13','2021-07-04','2021-06-28'),
160 ('19,19,19,19,'2021-08-15','2021-09-05','2021-09-03'),
161 ('20,20,20,20,'2021-10-21','2021-11-11','NULL'),
162 ('21,21,21,21,'2021-11-29','2021-12-20','NULL'),

```

No object selected

Administration Schemas Information

Object Info Session

Output

Action Output

#	Time	Action	Message	Duration / Fetch
18	17:35:40	INSERT INTO Author(Author_ID,Name,Birth_Date,Nationality)	VALUES('Jane Austen','1775-12-16','British')	(2,... 20 row(s)) affected Records: 20 Duplicates: 0 Warnings: 0 0.016 sec
19	17:36:40	INSERT INTO Authorship(Authorship_ID,Author_ID,Material_ID)	VALUES(1,1,1),(2,2,2),(3,3,3),(4,4,4),(5,5,5),(... 34 row(s)) affected Records: 34 Duplicates: 0 Warnings: 0 0.016 sec	
20	17:37:27	INSERT INTO Borrow(Borrow_ID,Material_ID,Member_ID,Staff_ID,Borrow_Date,Due_Date,Return_Date)	VALUES(... 40 row(s)) affected Records: 40 Duplicates: 0 Warnings: 0 0.016 sec	

The screenshot shows the MySQL Workbench interface. In the top-left, the 'Schemas' pane lists 'charanproject' as the current database, which contains the 'charan', 'charan', 'gmu', 'sakila', 'sys', and 'world' schemas. The main area displays a large block of SQL code consisting of approximately 180 INSERT statements. The bottom-right corner of the interface has a note: 'Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.' Below the code, the 'Output' pane shows the execution log with three entries, each indicating a successful insertion into the 'Catalog' table. The log includes columns for Time, Action, Message, and Duration / Fetch.

```

161     (28,20,7,2,'2021-10-21','2021-11-11',NULL),
162     (21,21,1,3,'2021-11-29','2021-12-20',NULL),
163     (22,22,1,2,'2022-01-10','2022-01-31','2022-01-25'),
164     (23,23,3,2,'2022-02-07','2022-02-28','2022-02-23'),
165     (24,24,4,3,'2022-03-11','2022-04-01','2022-03-28'),
166     (25,25,5,3,'2022-04-26','2022-05-19','2022-05-18'),
167     (26,26,6,3,'2022-06-22','2022-07-13','2022-07-08'),
168     (27,27,7,3,'2022-08-04','2022-08-25','2022-08-23'),
169     (28,28,8,3,'2022-09-13','2022-10-04','2022-09-28'),
170     (29,29,9,3,'2022-10-16','2022-11-06','2022-11-05'),
171     (30,30,8,3,'2022-11-21','2022-12-12','2022-12-05'),
172     (31,1,9,4,'2022-12-28','2023-01-18',NULL),
173     (32,2,11,4,'2023-01-23','2023-02-13',NULL),
174     (33,3,10,4,'2023-02-02','2023-02-23','2023-02-17'),
175     (34,4,11,4,'2023-03-01','2023-03-22',NULL),
176     (35,5,12,4,'2023-03-18','2023-03-31',NULL),
177     (36,6,13,4,'2023-03-15','2023-04-05',NULL),
178     (37,7,17,4,'2023-03-25','2023-04-15',NULL),
179     (38,8,18,4,'2023-03-30','2023-04-20',NULL),
180     (39,9,9,4,'2023-03-26','2023-04-16',NULL),
181     (40,10,20,4,'2023-03-28','2023-04-18',NULL)
182
183
184
185
186
187
188
189 • SELECT * FROM Catalog;
190
191

```

Output:

#	Time	Action	Message	Duration / Fetch
18	17:35:40	INSERT INTO Author(Author_ID,Name,Birth_Date,Nationality) VALUES(1,'Jane Austen','1775-12-16','British')	(2... 20 row(s) affected Records: 20 Duplicates: 0 Warnings: 0	0.016 sec
19	17:36:40	INSERT INTO Authorship(Authorship_ID,Author_ID,Material_ID) VALUES(1,1,1),(2,2,2),(3,3,3),(4,4,4),(5,5,5),(6,6,6),(7,7,7),(8,8,8),(9,9,9),(10,10,1)	(34 row(s) affected Records: 34 Duplicates: 0 Warnings: 0	0.016 sec
20	17:37:27	INSERT INTO Borrow(Borrow_ID,Material_ID,Member_ID,Staff_ID,Borrow_Date,Due_Date,Return_Date) VALUES(1,1,1,1,'2023-03-28','2023-04-18',NULL)	(40 row(s) affected Records: 40 Duplicates: 0 Warnings: 0	0.016 sec

## 5. QUERYING AND MANIPULATION

### 5.1 Selecting:

Searching an element in the database uses SELECT statement.

The screenshot shows the MySQL Workbench interface. The 'Schemas' pane lists 'charanproject' as the current database, which contains the 'charan', 'charan', 'gmu', 'sakila', 'sys', and 'world' schemas. The main area displays a single SQL query: 'SELECT \* FROM Catalog;'. The bottom-right corner of the interface has a note: 'Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.' Below the query, the 'Output' pane shows the execution log with three entries, each indicating a successful selection from the 'Catalog' table. The log includes columns for Time, Action, Message, and Duration / Fetch.

```

182
183
184
185
186
187
188
189 • SELECT * FROM Catalog;
190
191

```

Result Grid | Filter Rows: Catalog\_ID Location Name

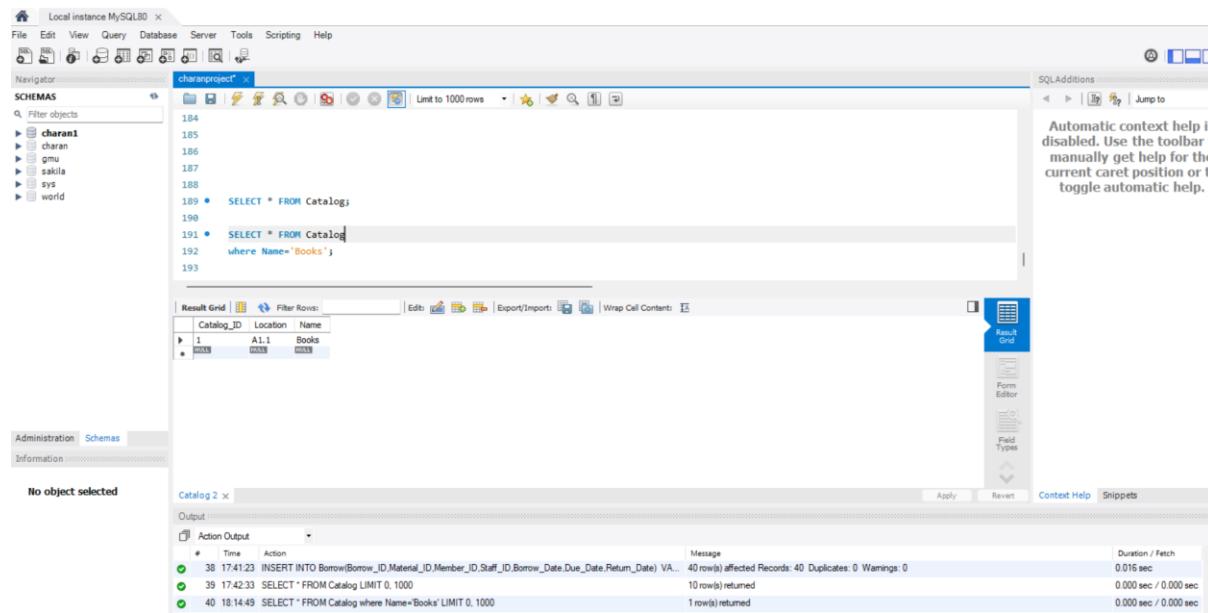
Catalog_ID	Location	Name
1	A1.1	Books
2	B2.1	Magazines
3	C3.1	E-Books
4	D4.1	Audiobooks
5	E5.1	Journals
6	F6.1	Newspaper
7	G7.1	Maps
8	H8.1	Novels
9	I9.1	SheetMusic
10	J10.1	Educational

Output:

#	Time	Action	Message	Duration / Fetch
37	17:41:23	INSERT INTO Author(Author_ID,Name,Birth_Date,Nationality) VALUES(1,'Jane Austen','1775-12-16','British')	(34 row(s) affected Records: 34 Duplicates: 0 Warnings: 0	0.015 sec
38	17:41:23	INSERT INTO Authorship(Authorship_ID,Author_ID,Material_ID) VALUES(1,1,1),(2,2,2),(3,3,3),(4,4,4),(5,5,5),(6,6,6),(7,7,7),(8,8,8),(9,9,9),(10,10,1)	(40 row(s) affected Records: 40 Duplicates: 0 Warnings: 0	0.016 sec
39	17:42:33	SELECT * FROM Catalog LIMIT 0, 1000	10 row(s) returned	0.000 sec / 0.000 sec

It displays all the elements from the catalog table.

To search for a particular element in the table we can write the condition using WHERE clause.

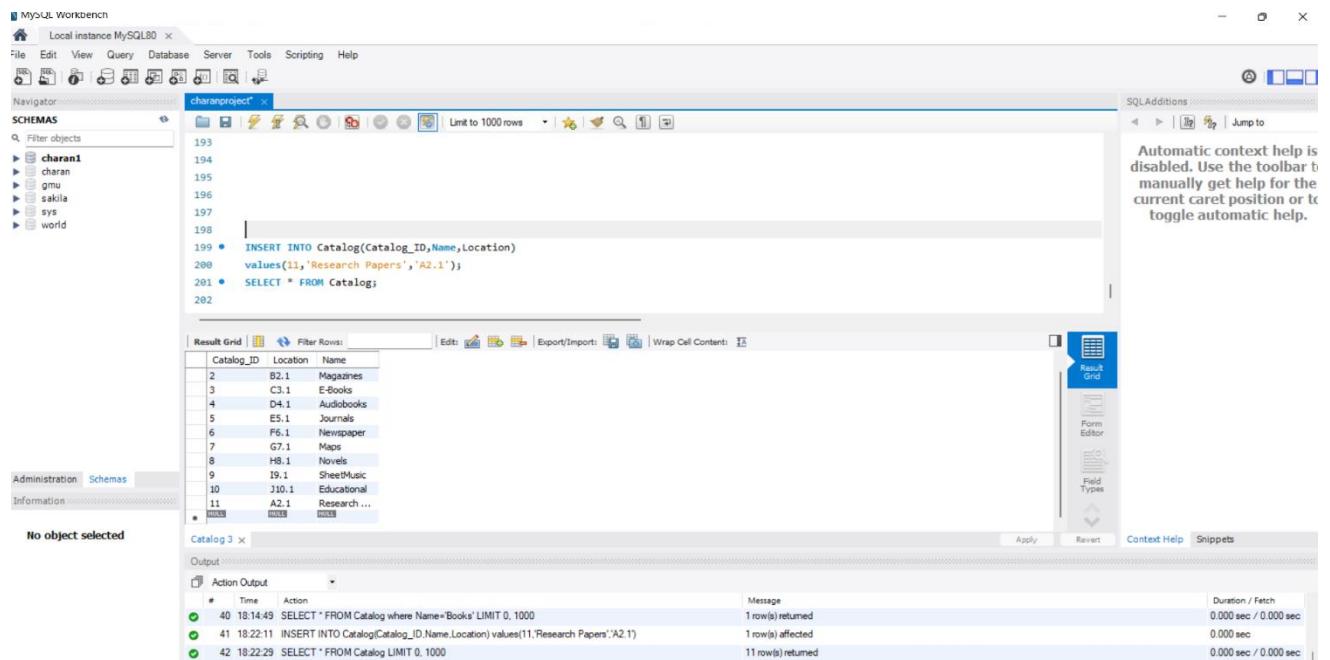


The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the schema 'charanproject' containing tables like charan, gmu, sakila, sys, and world.
- SQL Editor:** Displays two queries:
  - Line 189: `SELECT * FROM Catalog;`
  - Line 191: `SELECT * FROM Catalog  
where Name='Books';`
- Result Grid:** Shows the result of the second query, which is a single row:
 

Catalog_ID	Location	Name
1	A1.1	Books
- Action Output:** Shows the execution log with three entries:
  - Line 38: INSERT INTO Borrow(Borrow\_ID,Material\_ID,Member\_ID,Staff\_ID,Borrow\_Date,Due\_Date,Return\_Date) VA... 40 rows affected Records: 40 Duplicates: 0 Warnings: 0 Duration / Fetch: 0.015 sec
  - Line 39: SELECT \* FROM Catalog LIMIT 0, 1000 10 row(s) returned 0.000 sec / 0.000 sec
  - Line 40: SELECT \* FROM Catalog where Name='Books' LIMIT 0, 1000 1 row(s) returned 0.000 sec / 0.000 sec

## 5.2 Insert:



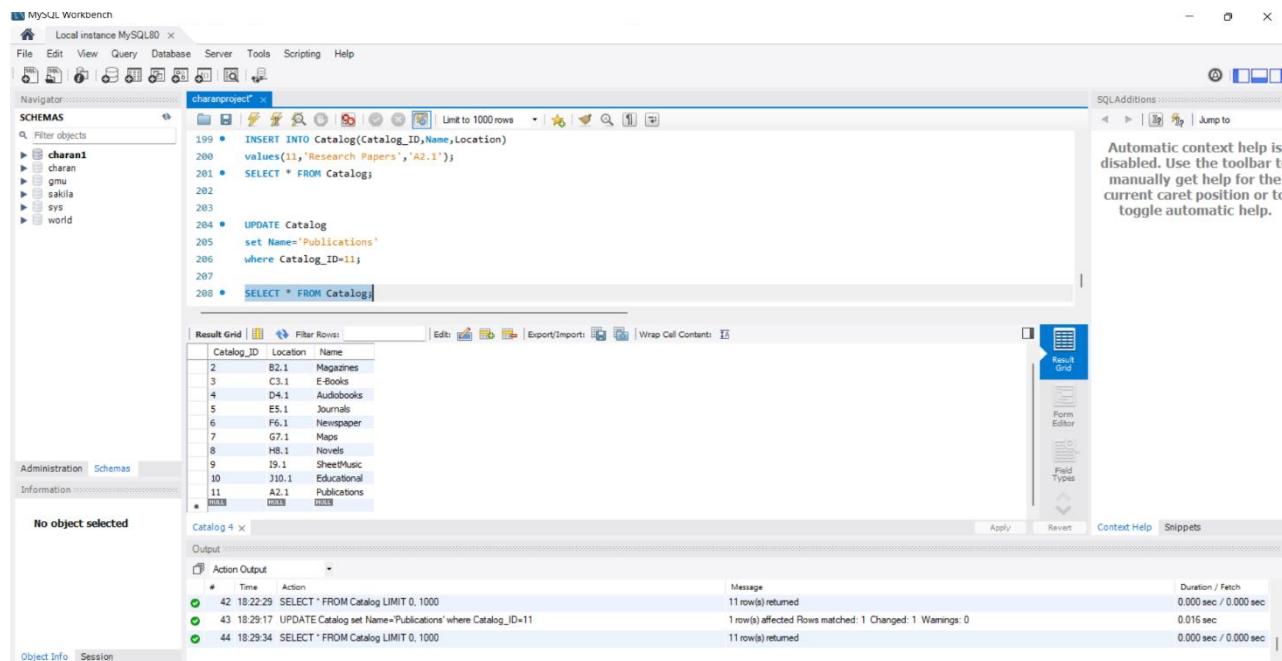
The screenshot shows the MySQL Workbench interface with the following details:

- Navigator:** Shows the schema 'charanproject' containing tables like charan, gmu, sakila, sys, and world.
- SQL Editor:** Displays three queries:
  - Line 193: `INSERT INTO Catalog(Catalog_ID,Name,Location)`
  - Line 199: `values(11,'Research Papers','A2.1');`
  - Line 201: `SELECT * FROM Catalog;`
- Result Grid:** Shows the result of the third query, displaying all 11 rows in the Catalog table:
 

Catalog_ID	Location	Name
2	B2.1	Magazines
3	C3.1	E-books
4	D4.1	Audiobooks
5	E5.1	Journals
6	F6.1	Newspaper
7	G7.1	Mags
8	H8.1	Novels
9	I9.1	SheetMusic
10	J10.1	Educational
11	A2.1	Research ...
- Action Output:** Shows the execution log with three entries:
  - Line 40: SELECT \* FROM Catalog where Name='Books' LIMIT 0, 1000 1 row(s) returned 0.000 sec / 0.000 sec
  - Line 41: INSERT INTO Catalog(Catalog\_ID,Name,Location) values(11,'Research Papers','A2.1') 1 row(s) affected 0.000 sec
  - Line 42: SELECT \* FROM Catalog LIMIT 0, 1000 11 row(s) returned 0.000 sec / 0.000 sec

Here we have inserted a new data called ‘Research Papers’ into catalog table.

### 5.3 Update:



The screenshot shows the MySQL Workbench interface with a query editor containing the following SQL code:

```

199 • INSERT INTO Catalog(Catalog_ID,Name,Location)
  values(11,'Research Papers','A2.1');
200
201 • SELECT * FROM Catalog;
202
203
204 • UPDATE Catalog
  set Name='Publications'
  where Catalog_ID=11;
205
206 • SELECT * FROM Catalog;

```

The Result Grid shows the updated data in the Catalog table:

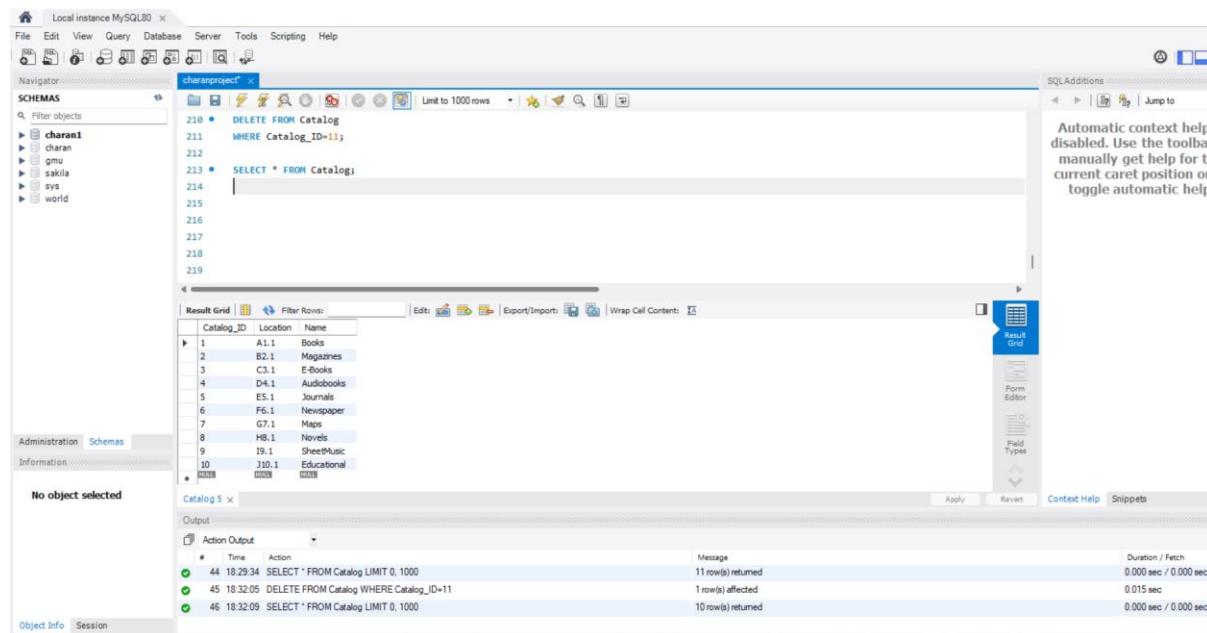
Catalog_ID	Location	Name
2	B2.1	Magazines
3	C3.1	E-Books
4	D4.1	Audiobooks
5	E5.1	Journals
6	F6.1	Newspaper
7	G7.1	Maps
8	H8.1	Novels
9	I9.1	SheetMusic
10	J10.1	Educational
11	A2.1	Publications

The Action Output pane shows the execution log:

- 42 18:22:29 SELECT \* FROM Catalog LIMIT 0, 1000
- 43 18:29:17 UPDATE Catalog set Name='Publications' where Catalog\_ID=11
- 44 18:29:34 SELECT \* FROM Catalog LIMIT 0, 1000

After Inserting the values in Catalog table we can update the inserted values by using ‘UPDATE’ Clause.

### 5.4 Deleting:



The screenshot shows the MySQL Workbench interface with a query editor containing the following SQL code:

```

210 • DELETE FROM Catalog
  WHERE Catalog_ID=11;
211
212
213 • SELECT * FROM Catalog;
214
215
216
217
218
219

```

The Result Grid shows the Catalog table after the deletion:

Catalog_ID	Location	Name
1	A1.1	Books
2	B2.1	Magazines
3	C3.1	E-Books
4	D4.1	Audiobooks
5	E5.1	Journals
6	F6.1	Newspaper
7	G7.1	Maps
8	H8.1	Novels
9	I9.1	SheetMusic
10	J10.1	Educational

The Action Output pane shows the execution log:

- 44 18:29:34 SELECT \* FROM Catalog LIMIT 0, 1000
- 45 18:32:05 DELETE FROM Catalog WHERE Catalog\_ID=11
- 46 18:32:09 SELECT \* FROM Catalog LIMIT 0, 1000

The Records we entered can be deleted using DELETE Clause. The data is inserted into Catalog and it is updated using UPDATE Clause and Deleted using DELETE Clause.

## 6.QUERIES/UPDATES

1. Which materials are currently available in the library? If a material is borrowed and not returned, it's not considered as available.

### QUERY:

```
SELECT Title FROM Material WHERE Material_ID NOT IN(  
SELECT Material_ID FROM Borrow WHERE Return_Date IS NULL);
```

The screenshot shows the MySQL Workbench interface with the following details:

- File Bar:** Local instance MySQL80, File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Navigator:** charanproject\*, Schemas: charan1, charan, gmu, sakila, sys, world.
- SQL Editor:** Query tab, SQL code:  
286 • 287 SELECT Title FROM Material WHERE Material\_ID NOT IN(  
288     SELECT Material\_ID FROM Borrow WHERE Return\_Date IS NULL);  
289  
290  
291
- Result Grid:** Title column showing a list of book titles: The Da Vind Code, 1984, Animal Farm, The Haunting of Hill House, Brave New World, The Chronicles of Narnia: The Lion the Witch and... (truncated), The Adventures of Huckleberry Finn, The Catch-22, The Picture of Dorian Gray, The Call of Cthulhu, A Tale of Two Cities, The Blad, The Odyssey, The Brothers Karamazov, The Divine Comedy, The Grapes of Wrath, The Old Man and the Sea, The Count of Monte Cristo.
- Output Tab:** Action Output table showing log entries:

#	Time	Action	Message	Duration / Fetch
45	18:32:05	DELETE FROM Catalog WHERE Catalog_ID=11	1 row(s) affected	0.015 sec
46	18:32:09	SELECT * FROM Catalog LIMIT 0, 1000	10 row(s) returned	0.000 sec / 0.000 sec
47	18:35:50	SELECT Title FROM Material WHERE Material_ID NOT IN(SELECT Material_ID FROM Borrow WHERE Ret...	20 row(s) returned	0.000 sec / 0.000 sec

The screenshot shows the MySQL Workbench interface. In the top-left, the Navigator pane lists databases: charenp, gmu, sakila, sys, and world. The central area displays a query results grid titled 'Result Grid' with the column 'Title'. The results list various titles from a database, such as 'The Haunting of Hill House', 'Brave New World', 'The Adventures of Huckleberry Finn', etc. To the right of the results grid is a vertical toolbar with icons for 'Result Grid', 'Form Editor', 'Field Types', 'Query Stats', and 'Execution Plan'. A status bar at the bottom indicates the session is 'Read Only'. The bottom of the screen shows the Windows taskbar with various pinned icons.

2. Which materials are currently overdue? Suppose today is 04/01/2023, and show the borrow date and due date of each material.

#### QUERY:

```

SELECT M.Title,B.Borrow_Date,B.Due_Date,M.Material_ID
FROM Material as M,Borrow as B
WHERE M.Material_ID=B.Material_ID AND B.Return_Date IS NULL AND
B.Due_Date<'2023-04-01';

```

The screenshot shows the MySQL Workbench interface. In the top-left, the 'Navigator' pane lists databases: charan1, charan, gmu, sakila, sys, and world. The 'charan1' database is selected. In the center, the 'charanproject' tab contains a query window with the following SQL code:

```

208
209
210
211
212
213
214 •  SELECT M.Title,B.Borrow_Date,B.Due_Date,M.Material_ID
215   FROM Material as M,Borrow as B
216 WHERE M.Material_ID=B.Material_ID AND B.Return_Date IS NULL AND B.Due_Date<'2023-04-01'
217
218
219

```

Below the query window is a 'Result Grid' showing the results of the query:

Title	Borrow_Date	Due_Date	Material_ID
Harry Potter and the Philosopher's Stone	2021-10-21	2021-11-11	20
Frankenstein	2021-11-29	2021-12-20	21
The Catcher in the Rye	2022-12-28	2023-01-18	1
To Kill a Mockingbird	2023-01-23	2023-02-13	2
The Hobbit	2023-03-01	2023-03-22	4
The Shining	2023-03-10	2023-03-31	5

At the bottom of the interface, the 'Output' pane displays the execution log:

#	Time	Action	Message	Duration / Fetch
46	18:32:09	SELECT * FROM Catalog LIMIT 0, 1000	10 row(s) returned	0.000 sec / 0.000 sec
47	18:35:50	SELECT Title FROM Material WHERE Material_ID NOT IN (SELECT Material_ID FROM Borrow WHERE Ret...)	20 row(s) returned	0.000 sec / 0.000 sec
48	19:39:42	SELECT M.Title,B.Borrow_Date,B.Due_Date,M.Material_ID FROM Material as M,Borrow as B WHERE M.Material_ID=B.Material_ID AND B.Return_Date IS NULL AND B.Due_Date<'2023-04-01'	6 row(s) returned	0.016 sec / 0.000 sec

3. What are the top 10 most borrowed materials in the library? Show the title of each material and order them based on their available counts.

### QUERY:

```

SELECT M.Title, COUNT(*) AS Total_Count
FROM Material AS M
JOIN Borrow AS B ON M.Material_ID = B.Material_ID
GROUP BY M.Title
ORDER BY Total_Count DESC
LIMIT 10;

```

The screenshot shows the MySQL Workbench interface. In the top-left, the 'Navigator' pane lists schemas: charan1, charan, gmu, sakila, sys, and world. The main area displays a query window with the following SQL code:

```

217
218
219 •  SELECT M.Title, COUNT(*) AS Total_Count
220   FROM Material AS M
221   JOIN Borrow AS B ON M.Material_ID = B.Material_ID
222   GROUP BY M.Title
223   ORDER BY Total_Count DESC
224   LIMIT 10;

```

The 'Result Grid' shows the following data:

Title	Total_Count
The Catcher in the Rye	3
To Kill a Mockingbird	3
The Da Vinci Code	3
The Hobbit	3
The Shining	3
Pride and Prejudice	3
The Great Gatsby	2
Moby Dick	2
Crime and Punishment	2
The Hitchhiker's Guide to the Galaxy	2

The 'Output' pane at the bottom shows the execution log:

#	Time	Action	Message	Duration / Fetch
47	18:35:50	SELECT Title FROM Material WHERE Material_ID NOT IN (SELECT Material_ID FROM Borrow WHERE Ret...	20 row(s) returned	0.000 sec / 0.000 sec
48	19:39:42	SELECT M.Title,B.Borrow_Date,B.Due_Date,M.Material_ID FROM Material AS M JOIN Borrow AS B WHERE M.Mat...	6 row(s) returned	0.016 sec / 0.000 sec
49	20:04:04	SELECT M.Title,COUNT(*) AS Total_Count FROM Material AS M JOIN Borrow AS B ON M.Material_ID = B.M...	10 row(s) returned	0.016 sec / 0.000 sec

4. How many materials has the author Lucas Piki written?

### QUERY:

```

SELECT COUNT(Material_ID) AS Count_Value_of_Lucas_Piki
FROM Authorship
WHERE Author_ID=(

    SELECT Author_ID
    FROM Author
    WHERE Name='Lucas Piki');

```

```

225
226 •  SELECT COUNT(Material_ID) AS Count_Value_of_Lucas_Piki
227   FROM Authorship
228   WHERE Author_ID=(  

229     SELECT Author_ID
230     FROM Author
231     WHERE Name='Lucas Piki');
232
233
234
235
236
237
238
  
```

Result Grid | Filter Rows: Export: Wrap Cell Content: Result Grid  
Count\_Value\_of\_Lucas\_Piki  
1

No object selected

Action Output

#	Time	Action	Message	Duration / Fetch
48	19:39:42	SELECT M.Title,B.Borrow_Date,B.Due_Date,M.Material_ID FROM Material as M JOIN Borrow as B WHERE M.Material_ID = B.Material_ID AND B.Borrower_ID = 1	6 row(s) returned	0.016 sec / 0.000 sec
49	20:04:04	SELECT M.Title,COUNT(*) AS Total_Count FROM Material AS M JOIN Borrow AS B ON M.Material_ID = B.Material_ID GROUP BY M.Material_ID	10 row(s) returned	0.016 sec / 0.000 sec
50	20:12:28	SELECT COUNT(Material_ID) AS Count_Value_of_Lucas_Piki FROM Authorship WHERE Author_ID=( SELECT Author_ID FROM Author WHERE Name='Lucas Piki');	1 row(s) returned	0.000 sec / 0.000 sec

Object Info Session

5. How many materials were written by two or more authors?

**QUERY:**

`SELECT COUNT(*)`

`FROM(SELECT Material_ID FROM Authorship GROUP BY Material_ID HAVING COUNT(*)>1) AS authors;`

```

238
239   FROM Author
240   WHERE Name='Lucas Piki';
241
242
243
244
245 •  SELECT COUNT(*)
246   FROM(SELECT Material_ID FROM Authorship GROUP BY Material_ID HAVING COUNT(*)>1) AS
247   authors;
248
249
250
251
252
253
254
  
```

Result Grid | Filter Rows: Export: Wrap Cell Content: Result Grid  
COUNT(\*)  
4

No object selected

Action Output

#	Time	Action	Message	Duration / Fetch
49	20:04:04	SELECT M.Title,COUNT(*) AS Total_Count FROM Material AS M JOIN Borrow AS B ON M.Material_ID = B.Material_ID GROUP BY M.Material_ID	10 row(s) returned	0.016 sec / 0.000 sec
50	20:12:28	SELECT COUNT(Material_ID) AS Count_Value_of_Lucas_Piki FROM Authorship WHERE Author_ID=( SELECT Author_ID FROM Author WHERE Name='Lucas Piki');	1 row(s) returned	0.000 sec / 0.000 sec
51	20:14:03	SELECT COUNT(*) FROM(SELECT Material_ID FROM Authorship GROUP BY Material_ID HAVING COUNT(*)>1) AS authors;	1 row(s) returned	0.000 sec / 0.000 sec

6. What are the most popular genres in the library ranked by the total number of borrowed times of each genre?

**QUERY:**

```
SELECT G.Name AS Genre_Name, COUNT(*) AS Count
FROM Borrow AS B
INNER JOIN Material AS M ON B.Material_ID = M.Material_ID
INNER JOIN Genre AS G ON M.Genre_ID = G.Genre_ID
GROUP BY G.Name
ORDER BY Count DESC;
```

The screenshot shows the MySQL Workbench interface with the following details:

- File Bar:** Local instance MySQL80, File, Edit, View, Query, Database, Server, Tools, Scripting, Help.
- Schemas:** Navigator pane shows Schemas: chareat, charen, gmu, sakila, sys, world.
- Query Editor:** Shows the SQL query from the previous code block. Lines 240-253 are visible.
- Result Grid:** Shows the results of the query:

Genre_Name	Count
General Fiction	22
Science Fiction & Fantasy	6
Horror & Suspense	5
Mystery & Thriller	3
Classics	3
Historical Fiction	1
- Action Output:** Shows log entries for the query execution:

#	Time	Action	Message	Duration / Fetch
50	20:12:28	SELECT COUNT(Material_ID) AS Count, Value_of_Lucas_Piki FROM Authorship WHERE Author_ID=( SELECT COUNT(*) FROM(SELECT Material_ID FROM Authorship GROUP BY Material_ID HAVING COUNT(...)) AS T )	SE... 1 row(s) returned	0.000 sec / 0.000 sec
51	20:14:03	SELECT COUNT(*) FROM(SELECT Material_ID FROM Authorship GROUP BY Material_ID HAVING COUNT(...)) AS T	SE... 1 row(s) returned	0.000 sec / 0.000 sec
52	20:23:04	SELECT G.Name AS Genre_Name, COUNT(*) AS Count FROM Borrow AS B INNER JOIN Material AS M ON B.Material_ID = M.Material_ID INNER JOIN Genre AS G ON M.Genre_ID = G.Genre_ID GROUP BY G.Name ORDER BY Count DESC;	SE... 6 row(s) returned	0.000 sec / 0.000 sec

7. How many materials had been borrowed from 09/2020-10/2020?

**QUERY:**

```
SELECT M.Title,COUNT(*) AS Count
FROM Borrow AS B
JOIN Material AS M ON B.Material_ID=M.Material_ID
WHERE B.Borrow_Date>='2020-09-01' AND B.Borrow_Date<='2020-10-31'
GROUP BY M.Title;
```

The screenshot shows the MySQL Workbench interface with the following details:

- File Edit View Query Database Server Tools Scripting Help**: The top menu bar.
- Navigator**: Shows the database schema with **charanproject** selected, containing **charan1**, **charan**, **gnu**, **sakila**, **sys**, and **world**.
- SQL Editor**: The main area where the query is typed:

```
246 ORDER BY Count DESC;
247
248 • SELECT M.Title,COUNT(*) AS Count
249 FROM Borrow AS B
250 JOIN Material AS M ON B.Material_ID=M.Material_ID
251 WHERE B.Borrow_Date>='2020-09-01' AND B.Borrow_Date<='2020-10-31'
252 GROUP BY M.Title|
```
- Result Grid**: Displays the query results:

Title	Count
The Da Vinci Code	1
- SQL Additions**: A panel on the right with the message: "Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help."
- Output**: A log of actions taken:

#	Time	Action	Message	Duration / Fetch
51	20:14:03	SELECT COUNT(*) FROM(SELECT Material_ID FROM Authorship GROUP BY Material_ID HAVING COUNT(...)	1 row(s) returned	0.000 sec / 0.000 sec
52	20:23:04	SELECT G.Name AS Genre_Name, COUNT(*) AS Count FROM Borrow AS B INNER JOIN Material AS M ON ...	6 row(s) returned	0.000 sec / 0.000 sec
53	20:25:36	SELECT M.Title,COUNT(*) AS Count FROM Borrow AS B JOIN Material AS M ON B.Material_ID=M.Material_I...	1 row(s) returned	0.000 sec / 0.000 sec

8. How do you update the “Harry Potter and the Philosopher's Stone” when it is returned on 04/01/2023?

### QUERY:

UPDATE Borrow

```
SET Return_Date='2023-04-01'
```

```
WHERE Material_ID=(
```

```
    SELECT Material_ID
```

```
    FROM Material
```

```
    WHERE Title='Harry Potter and the Philosopher's Stone'
```

```
) AND Return_Date IS NULL;
```

SELECT \*FROM Borrow

WHERE Material\_ID=20;

The screenshot shows the MySQL Workbench interface. The query editor window contains the following SQL code:

```

253
254 • UPDATE Borrow
255     SET Return_Date='2023-04-01'
256     WHERE Material_ID=(
257         SELECT Material_ID
258         FROM Material
259         WHERE Title='Harry Potter and the Philosopher's Stone'
260     ) AND Return_Date IS NULL;
261
262 • SELECT *FROM Borrow
263 WHERE Material_ID=20;
264
265
266

```

The results grid below shows one row of data:

Borrow_ID	Material_ID	Member_ID	Staff_ID	Borrow_Date	Due_Date	Return_Date
20	20	7	2	2021-10-21	2021-11-11	2023-04-01

The output pane at the bottom shows the execution log:

#	Time	Action	Message	Duration / Fetch
53	20:25:36	SELECT M.Title,COUNT(*) AS Count FROM Borrow AS B JOIN Material AS M ON B.Material_ID=M.Material_ID WHERE B.Return_Date IS NULL	1 row(s) returned	0.000 sec / 0.000 sec
54	20:27:31	UPDATE Borrow SET Return_Date='2023-04-01' WHERE Material_ID=( SELECT Material_ID FROM Material WHERE Title='Harry Potter and the Philosopher's Stone' ) AND Return_Date IS NULL	1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0	0.016 sec
55	20:27:46	SELECT *FROM Borrow WHERE Material_ID=20 LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec

9. How do you delete the member Emily Miller and all her related records from the database?

**QUERY:**

```
SET SQL_SAFE_UPDATES = 0;
```

```
DELETE FROM Borrow WHERE Member_ID=(SELECT Member_ID FROM Member WHERE Name='Emily Miller');
```

```
DELETE FROM MEMBER WHERE Name='Emily Miller';
```

```
SELECT * FROM Member
```

```
WHERE Name='Emily Miller';
```

```
SET SQL_SAFE_UPDATES = 1;
```

#	Time	Action	Message	Duration / Fetch
59	21:11:43	SELECT * FROM Member WHERE Name='Emily Miller' LIMIT 0, 1000	0 row(s) returned	0.015 sec / 0.000 sec
60	21:11:55	SET SQL_SAFE_UPDATES = 1	0 row(s) affected	0.000 sec
61	21:12:03	SELECT * FROM Member WHERE Name='Emily Miller' LIMIT 0, 1000	0 row(s) returned	0.015 sec / 0.000 sec

Firstly we need to remove the safe update mode as mysql software enables safe update by default. So, by using `SET SQL_SAFE_UPDATES=0;` we disable the safe update and after running the queries we need to enable the safe update using `SET SQL_SAFE_UPDATES=1;` because disabling it for long time may cause security related consequences.

10. How do you add the following material to the database?

Title: New book

Date: 2020-08-01

Catalog: E-Books

Genre: Mystery & Thriller

Author: Lucas Luke

**QUERY:**

```
INSERT INTO Material(Material_ID,Title,Publication_Date,Catalog_ID,Genre_ID)
Values(32,'New book','2020-08-01',(SELECT Catalog_ID FROM Catalog WHERE Name='E-Books'),
(SELECT Genre_ID FROM Genre WHERE Name='Mystery&Thriller'));
insert into Author(Author_ID, Name)
values( 21,'Lucas Luke');
INSERT INTO Authorship(Authorship_ID,Author_ID,Material_ID)
Values(35,(SELECT Author_ID FROM Author WHERE Name='Lucas Lake'),(SELECT
Material_ID FROM Material WHERE Title='New book'));
```

SELECT \* From Author;

SELECT \*From Material;

SELECT \*From Authorship;

Local instance MySQL50

```

File Edit View Query Database Server Tools Scripting Help
Navigator: charanproject
SCHEMAS
Filter objects
charan1
charan
gmu
sakila
sys
world

277 • INSERT INTO Material(Material_ID,Title,Publication_Date,Catalog_ID,Genre_ID)
278   Values(32,'New book','2020-08-01',(SELECT Catalog_ID FROM Catalog WHERE Name='E-Books'),
279   (SELECT Genre_ID FROM Genre WHERE Name='Mystery&Thriller')));
280
281 • insert into Author(Author_ID, Name)
282   values( 21,'Lucas Luke');
283
284 • INSERT INTO Authorship(Authorship_ID,Author_ID,Material_ID)
285   Values(35,(SELECT Author_ID FROM Author WHERE Name='Lucas Luke'),(SELECT Material_ID FROM Material WHERE Title='New book'));
286
287 • SELECT * From Author;
288 • SELECT *From Material;
289 • SELECT *From Authorship;
290

```

No object selected

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: | Result Grid | Form Editor | Context Help | Snippets

Material_ID	Title	Publication_Date	Catalog_ID	Genre_ID
28	The Old Man and the Sea	1952-09-01	8	1
29	The Count of Monte Cristo	1844-01-01	9	1
30	A Midsummer Night's Dream	1596-01-01	10	7
31	The Tricky Book	1888-01-01	10	7
32	New book	2020-08-01	3	2

Output:

Action Output

#	Time	Action	Message	Duration / Fetch
71	21:23:59	SELECT *From Material LIMIT 0, 1000	32 row(s) returned	0.000 sec / 0.000 sec
72	21:24:41	Refresh Recordset	There are pending changes. Please commit or rollback first.	
73	21:24:50	SELECT *From Material LIMIT 0, 1000	32 row(s) returned	0.000 sec / 0.000 sec

Object Info | Session

Local instance MySQL80

```

File Edit View Query Database Server Tools Scripting Help
Navigator: charanproject
SCHEMAS
Filter objects
charan1
charan
gmu
sakila
sys
world

277 • INSERT INTO Material(Material_ID,Title,Publication_Date,Catalog_ID,Genre_ID)
278   Values(32,'New book','2020-08-01',(SELECT Catalog_ID FROM Catalog WHERE Name='E-Books'),
279   (SELECT Genre_ID FROM Genre WHERE Name='Mystery&Thriller')));
280
281 • insert into Author(Author_ID, Name)
282   values( 21,'Lucas Luke');
283
284 • INSERT INTO Authorship(Authorship_ID,Author_ID,Material_ID)
285   Values(35,(SELECT Author_ID FROM Author WHERE Name='Lucas Luke'),(SELECT Material_ID FROM Material WHERE Title='New book'));
286
287 • SELECT * From Author;
288 • SELECT *From Material;
289 • SELECT *From Authorship;
290

```

No object selected

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: | Result Grid | Form Editor | Context Help | Snippets

Author_ID	Name	Birth_Date	Nationality
14	Franz Kafka	1883-07-03	Czech
15	James Joyce	1882-02-02	Irish
16	J.R.R.Tolkien	1892-01-03	British
17	Emily Bronte	1818-07-30	British
18	Toni Morrison	1931-02-18	American
19	Fyodor Dostoevsky	1821-11-11	Russian
20	Lucas Pki	1847-10-16	British
21	Lucas Luke	1990-01-01	British

Output:

Action Output

#	Time	Action	Message	Duration / Fetch
72	21:24:41	Refresh Recordset	There are pending changes. Please commit or rollback first.	
73	21:24:50	SELECT *From Material LIMIT 0, 1000	32 row(s) returned	0.000 sec / 0.000 sec
74	21:28:25	SELECT *From Author LIMIT 0, 1000	21 row(s) returned	0.016 sec / 0.000 sec

Object Info | Session

The screenshot shows the MySQL Workbench interface. The top menu bar includes File, Edit, View, Query, Database, Server, Tools, Scripting, and Help. The left sidebar displays the Navigator with SCHEMAS (charant, charan1, charan2, gmu, sakila, sys, world) and Administration (Schemas, Information). The main area contains a script editor with the following SQL code:

```

277 • INSERT INTO Material(Material_ID,Title,Publication_Date,Catalog_ID,Genre_ID)
278   Values(32,'New book','2020-08-01',(SELECT Catalog_ID FROM Catalog WHERE Name='E-Books'),
279          (SELECT Genre_ID FROM Genre WHERE Name='Mystery&Thriller')));
280
281 • insert into Author(Author_ID, Name)
282   values( 21,'Lucas Luke');
283
284 • INSERT INTO Authorship(Authorship_ID,Author_ID,Material_ID)
285   Values(39,(SELECT Author_ID FROM Author WHERE Name='Lucas Luke'),(SELECT Material_ID FROM Material WHERE Title='New book'));
286
287 • SELECT * From Author;
288 • SELECT *From Material;
289 • SELECT *From Authorship;
```
The bottom section shows a Result Grid with the following data:
```

| Authorship_ID | Author_ID | Material_ID |
|---------------|-----------|-------------|
| 30            | 19        | 28          |
| 31            | 9         | 29          |
| 32            | 10        | 30          |
| 33            | 8         | 30          |
| 34            | 2         | 29          |
| 35            | 21        | 32          |

The Results pane shows the following log entries:

| #  | Time     | Action                                | Message            | Duration / Fetch      |
|----|----------|---------------------------------------|--------------------|-----------------------|
| 73 | 21:24:50 | SELECT *From Material LIMIT 0, 1000   | 32 row(s) returned | 0.000 sec / 0.000 sec |
| 74 | 21:28:25 | SELECT * From Author LIMIT 0, 1000    | 21 row(s) returned | 0.016 sec / 0.000 sec |
| 75 | 21:30:24 | SELECT *From Authorship LIMIT 0, 1000 | 35 row(s) returned | 0.000 sec / 0.000 sec |

## 7.DESIGN OF EXTENDED FEATURES

1. Alert staff about overdue materials on a daily-basis?

CREATE PROCEDURE Overdue()

BEGIN

```

DECLARE count_of_overdue INT;
SELECT COUNT(*) INTO overdue_count
FROM BORROW
WHERE Return_Date IS NULL
AND Due_Date < CURDATE();
SELECT CONCAT('There are ', overdue_count, ' overdue materials.') AS Message;
IF count_of_overdue> 0 THEN
  SELECT Due_Date AS Due_Date
  FROM BORROW
  WHERE Return_Date IS NULL
  AND Due_Date < CURDATE();
ELSE
  SELECT 'No overdue materials' AS Due_Date;
END IF;
END;
```

```
CREATE EVENT IF NOT EXISTS overdue_materials
ON SCHEDULE EVERY 1 DAY
STARTS DATE_ADD(CURRENT_DATE, INTERVAL 1 DAY)
COMMENT 'Send an alert on due materials '
DO
BEGIN
    CALL Overdue();
END;
```

**Explanation:**

In a library database, overdue items are to be found and reported on using the `Overdue` method. It keeps track of the amount of past-due materials and shows the total in a message. It includes a list of the due dates for any overdue materials. It gives a notice indicating that there are no past-due materials. The purpose of the `overdue\_materials` event is to automate the daily execution of the `Overdue` function. It is set to run daily, beginning the day following its construction. The event makes sure that staff members are informed on a daily basis about any materials that are past due, by implementing the overdue method. The alert method is useful in sending alert message.

2. Automatically deactivate the membership based on the member's overdue occurrence (>= three times). And reactivate the membership once the member pays the overdue fee.

```
CREATE TRIGGER DeactivateMembership AFTER INSERT ON BORROW FOR EACH
ROW
BEGIN
    IF (SELECT COUNT(*)
        FROM BORROW
        WHERE Member_ID = NEW.Member_ID
        AND Return_Date IS NULL
        AND Due_Date < CURRENT_DATE()) >= 3 THEN
        UPDATE MEMBER
        SET Status_of_Membership = 'Inactive'
        WHERE Member_ID = NEW.Member_ID;
    END IF;
END;
```

```
CREATE TRIGGER Activate_Membership_again AFTER UPDATE ON BORROW FOR
EACH ROW
BEGIN
    IF NEW.Return_Date IS NOT NULL AND OLD.Return_Date IS NULL THEN
        UPDATE MEMBER
        SET Status_of_Membership = 'Active'
        WHERE Member_ID = NEW.Member_ID;
    END IF;
END;
```

**Explanation:**

Automated processes are crucial to the library management system's ability to run smoothly and enforce membership policies. Triggers have been added to the database to manage membership statuses depending on borrowing activity in order to make this easier. "DeactivateMembership" is the first trigger that keeps track of when new borrow records are added to the database. As soon as it is inserted, it assesses the linked member's borrowing history and finds instances in which the member accumulated three or more past-due instances. In the event that this kind of situation occurs, indicating repeated past-due behavior, the trigger immediately modifies the member's membership status to "Inactive". The second trigger is "Activate\_Membership\_again" which responds to changes in borrowing data, with a particular emphasis on the status of borrowed objects being returned. When it notices that a borrowed item has been returned, indicated by a non-null return date in the updated record and taking into account that the prior return date was null, it steps in to restore the linked member's membership status. The trigger makes sure that members can quickly have their borrowing rights back after meeting their commitments by immediately returning them to active status in such cases. This streamlines the administration of membership statuses based on borrowing activity and promotes member accountability by facilitating the smooth management of membership statuses.

**CONCLUSION:**

In summary, the database for the library management system has been effectively created and contains relevant information such as details about the books, authors, genres, members, employees, and borrowing records. The database structure makes it possible to store and retrieve information efficiently, which makes it easier to do a variety of queries and administrative tasks involving libraries. Certain tasks, including informing employees about overdue materials or updating membership statuses depending on borrowing activity, can be automated by implementing triggers and events. All things considered the database offers a strong framework for organizing library materials and enhancing the members and staff experience. To meet changing needs and make sure the library management system runs well, more improvements and optimizations can be developed.