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Introduction

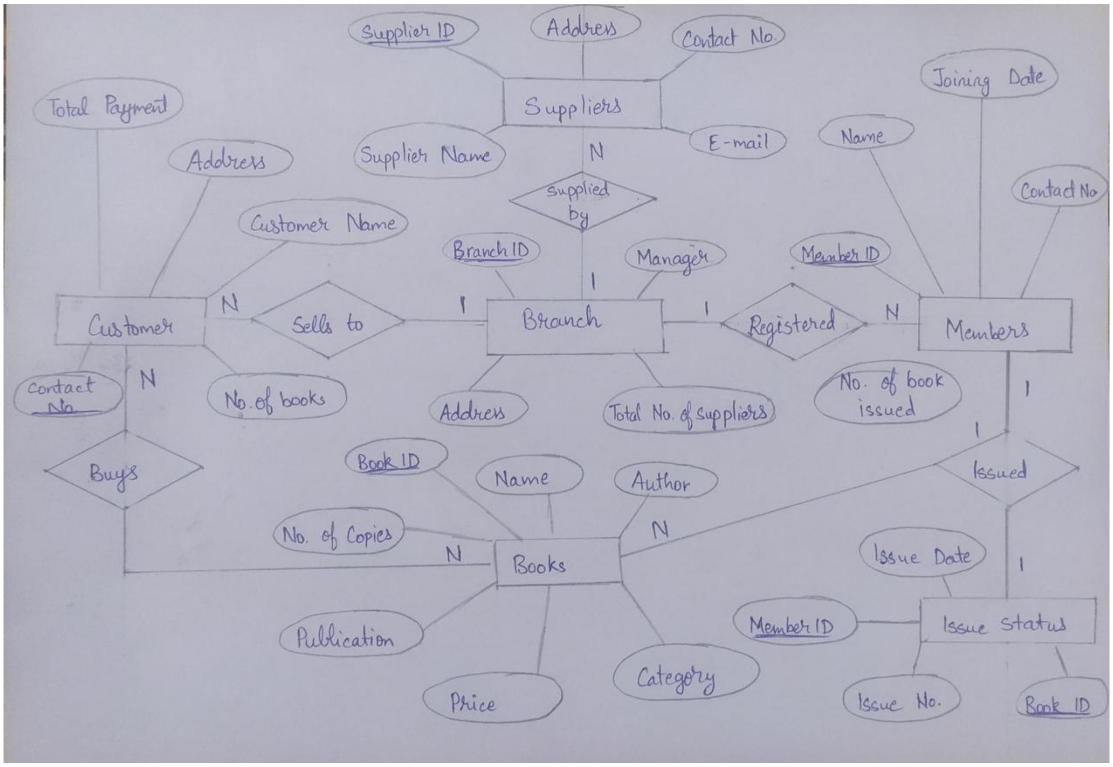
A Book Store is a collection of an organized information and resources which is available for people buying as well as borrowing.The main aim of this system is to develop a new programmed system that will conveying ever lasting solution to the manual base operations and to make available a channel through which staff can maintain the record easily and customers can access the information about the borrowed resources at whatever place they might find themselves. Book Store Management System allows the user to store the book details and the customer details. The implementation of the system in the organization will considerably reduce data entry, time and also provide readily calculated reports. It will also decrease the paperwork for the employees. The data entry would be more accurate than done in the paper.

We are creating a database to manage a Book Store. The traditional book stores are limited by storage space, this will have the potential to store much more information, simply because digital information requires very little physical space to contain them and media storage technologies are more affordable than ever before.

E-R Diagram

An Entity-relationship model (ER model) describes the structure of a database with the help of a diagram, which is known as Entity Relationship Diagram (ER Diagram). An ER model is a design or blueprint of a database that can later be implemented as a database. The main components of the E-R model are: entity set and relationship set.

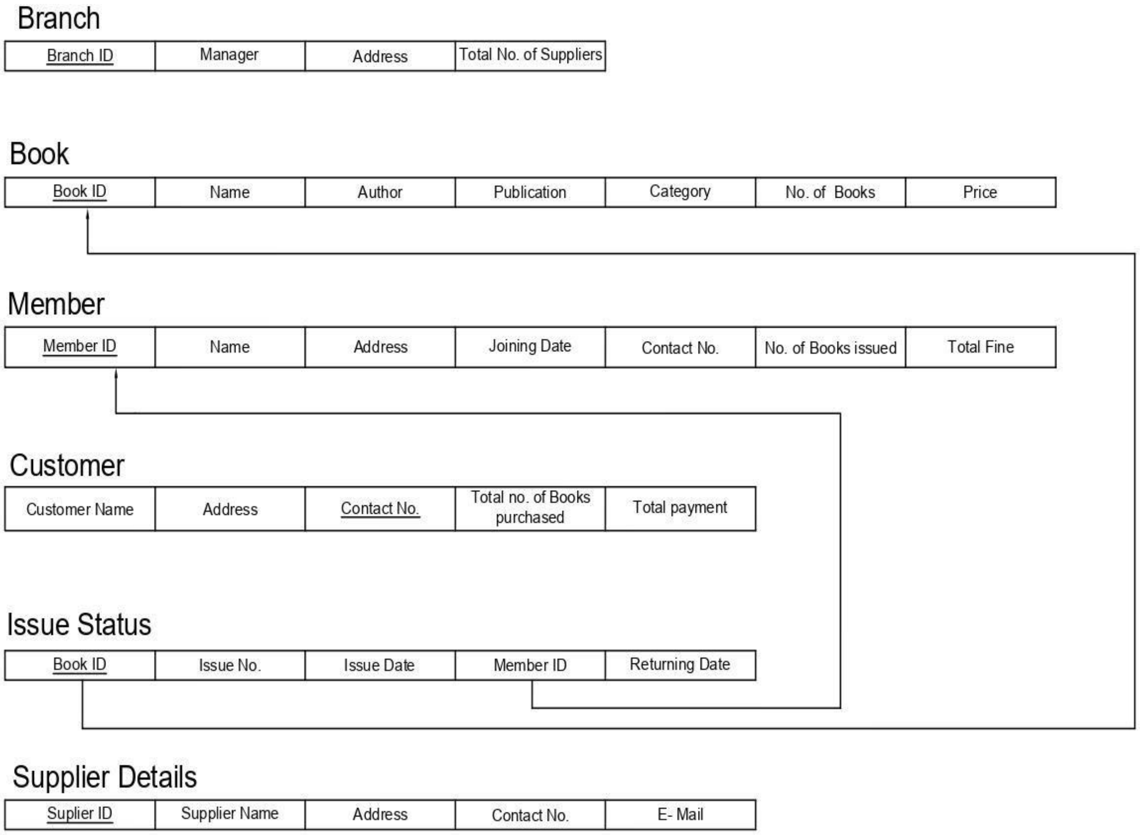
An ER diagram shows the relationship among entity sets. An entity set is a group of similar entities and these entities can have attributes. In terms of DBMS, an entity is a table or attribute of a table in a database, so by showing relationships among tables and their attributes, the ER diagram shows the complete logical structure of a database. Let's have a look at a simple ER diagram to understand this concept.



Schema Diagram

Schema diagram is a diagram which contains entities and the attributes that will define that schema. A schema diagram only shows us the database design. It does not show the actual data of the database. Schema can be a single table or it can have more than one table which is related. The schema represents the relationship between these tables.

Schema diagrams have an important function because they force database developers to transpose ideas to paper. This provides an overview of the entire database, while facilitating future database administrator work.



Branch

Branch ID	Manager	Address	Total No. of Suppliers

Book

Book ID	Name	Author	Publication	Category	No. of Books	Price

Member

Member ID	Name	Address	Joining Date	Contact No.	No. of Books issued	Total Fine

Customer

Customer Name	Address	Contact No.	Total no. of Books purchased	Total payment

Issue Status

Book ID	Issue No.	Issue Date	Member ID	Returning Date

Supplier Details

Suplier ID	Supplier Name	Address	Contact No.	E- Mail

Creating Database Using MySQL

CREATING BASIC CONSTRUCT FOR DATABASE

```
mysql> create database bookStoreProject;
Query OK, 1 row affected (0.02 sec)

mysql> use bookStoreProject;
Database changed

mysql> CREATE TABLE CUSTOMER(Name varchar(50), Address varchar(100), Contact
int(10), Books_Purchased int(100), Payment int(10));
Query OK, 0 rows affected, 3 warnings (0.10 sec)

mysql> CREATE TABLE BRANCH(Branch_ID int(10), Manager varchar(20), Address
varchar(100), Total_Suppliers int(100));
Query OK, 0 rows affected, 2 warnings (0.06 sec)

mysql> CREATE TABLE MEMBERS(Member_ID int(10), Name varchar(20), Address
varchar(100), Join_Date date, Contact int(10), Total_Books_Issued int(1), Book_1
varchar(20), Book_2 varchar(20), Book_3 varchar(20), Book_4 varchar(20), Total_Fine
int(10));
Query OK, 0 rows affected, 4 warnings (0.07 sec)

mysql> CREATE TABLE ISSUE_STATUS(Book_ID int(10), Issue_No varchar(20),
Member_ID int(10), Issue_Date date, Return_Date date);
Query OK, 0 rows affected, 2 warnings (0.08 sec)

mysql> CREATE TABLE BOOK(Book_ID int(10), Name varchar(20), Author varchar(50),
Publication varchar(20), Category varchar(20), Total_Copies int(10), Price int(10));
Query OK, 0 rows affected, 3 warnings (0.06 sec)

mysql> CREATE TABLE Supplier_Details(Supplier_ID int(10), Supplier_Name varchar(20),
Address varchar(50), Contact int(10), eMail varchar(50));
Query OK, 0 rows affected, 2 warnings (0.07 sec)
```

CREATING PRIMARY KEYS

```
mysql> ALTER TABLE Supplier_Details
-> ADD Primary Key (Supplier_ID);
Query OK, 0 rows affected (0.12 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
mysql> ALTER TABLE Branch
-> ADD Primary Key (Branch_ID);
Query OK, 0 rows affected (0.10 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Members
-> ADD Primary Key (Member_ID);
Query OK, 0 rows affected (0.12 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Book
-> ADD Primary Key (Book_ID);
Query OK, 0 rows affected (0.10 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Customer
-> ADD Primary Key (Contact);
Query OK, 0 rows affected (0.11 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Issue_Status
-> ADD Primary Key (Book_ID);
Query OK, 0 rows affected (0.14 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

CREATING REFERENCES FOR MAKING JOINS

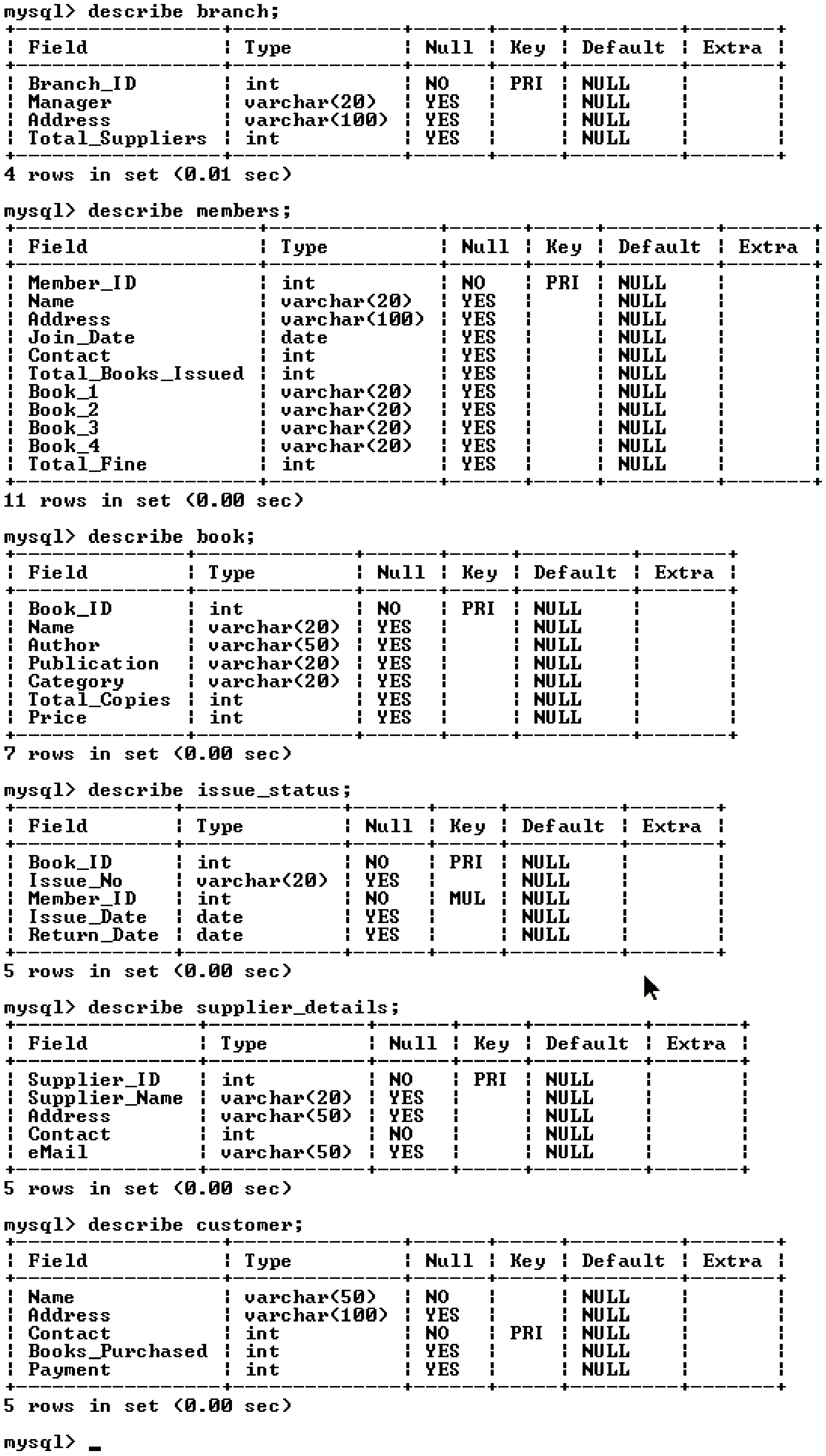
```
mysql> ALTER TABLE Issue_Status
-> ADD Foreign Key (Book_ID) references Book(Book_ID);
Query OK, 0 rows affected (0.14 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Issue_Status
-> ADD Foreign Key (Member_ID) references Members(Member_ID);
Query OK, 0 rows affected (0.18 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

NORMALIZING BY REMOVING NULL VALUES

```
mysql> ALTER TABLE Supplier_Details
-> Modify Supplier_ID int NOT NULL;
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

```
mysql> ALTER TABLE Supplier_Details
-> Modify Contact int NOT NULL;
Query OK, 0 rows affected (0.12 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Issue_Status
-> Modify Book_ID int NOT NULL;
Query OK, 0 rows affected (0.03 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Issue_Status
-> Modify Member_ID int NOT NULL;
Query OK, 0 rows affected (0.12 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Book
-> Modify Book_ID int NOT NULL;
Query OK, 0 rows affected (0.03 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Members
-> Modify Member_ID int NOT NULL;
Query OK, 0 rows affected (0.03 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> ALTER TABLE Branch
-> Modify Branch_ID int NOT NULL;
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

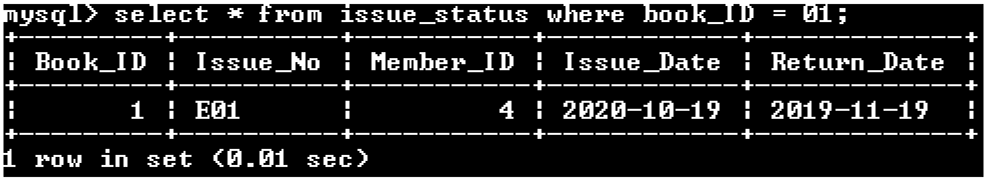
COMPLETE STRUCTURE OF TABLES IN THE DATABASE



```
mysql> describe branch;
+-----------------+--------------+------+-----+---------+-------+
| Field           | Type         | Null | Key | Default | Extra |
+-----------------+--------------+------+-----+---------+-------+
| Branch_ID       | int          | NO   | PRI | NULL    |       |
| Manager         | varchar(20)  | YES  |     | NULL    |       |
| Address         | varchar(100) | YES  |     | NULL    |       |
| Total_Suppliers | int          | YES  |     | NULL    |       |
+-----------------+--------------+------+-----+---------+-------+
4 rows in set (0.01 sec)

mysql> describe members;
+--------------------+--------------+------+-----+---------+-------+
| Field              | Type         | Null | Key | Default | Extra |
+--------------------+--------------+------+-----+---------+-------+
| Member_ID          | int          | NO   | PRI | NULL    |       |
| Name               | varchar(20)  | YES  |     | NULL    |       |
| Address            | varchar(100) | YES  |     | NULL    |       |
| Join_Date          | date         | YES  |     | NULL    |       |
| Contact            | int          | YES  |     | NULL    |       |
| Total_Books_Issued | int          | YES  |     | NULL    |       |
| Book_1             | varchar(20)  | YES  |     | NULL    |       |
| Book_2             | varchar(20)  | YES  |     | NULL    |       |
| Book_3             | varchar(20)  | YES  |     | NULL    |       |
| Book_4             | varchar(20)  | YES  |     | NULL    |       |
| Total_Fine         | int          | YES  |     | NULL    |       |
+--------------------+--------------+------+-----+---------+-------+
11 rows in set (0.00 sec)

mysql> describe book;
+--------------+-------------+------+-----+---------+-------+
| Field        | Type        | Null | Key | Default | Extra |
+--------------+-------------+------+-----+---------+-------+
| Book_ID      | int         | NO   | PRI | NULL    |       |
| Name         | varchar(20) | YES  |     | NULL    |       |
| Author       | varchar(50) | YES  |     | NULL    |       |
| Publication  | varchar(20) | YES  |     | NULL    |       |
| Category     | varchar(20) | YES  |     | NULL    |       |
| Total_Copies | int         | YES  |     | NULL    |       |
| Price        | int         | YES  |     | NULL    |       |
+--------------+-------------+------+-----+---------+-------+
7 rows in set (0.00 sec)

mysql> describe issue_status;
+-------------+-------------+------+-----+---------+-------+
| Field       | Type        | Null | Key | Default | Extra |
+-------------+-------------+------+-----+---------+-------+
| Book_ID     | int         | NO   | PRI | NULL    |       |
| Issue_No    | varchar(20) | YES  |     | NULL    |       |
| Member_ID   | int         | NO   | MUL | NULL    |       |
| Issue_Date  | date        | YES  |     | NULL    |       |
| Return_Date | date        | YES  |     | NULL    |       |
+-------------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)

mysql> describe supplier_details;
+---------------+-------------+------+-----+---------+-------+
| Field         | Type        | Null | Key | Default | Extra |
+---------------+-------------+------+-----+---------+-------+
| Supplier_ID   | int         | NO   | PRI | NULL    |       |
| Supplier_Name | varchar(20) | YES  |     | NULL    |       |
| Address       | varchar(50) | YES  |     | NULL    |       |
| Contact       | int         | NO   |     | NULL    |       |
| eMail         | varchar(50) | YES  |     | NULL    |       |
+---------------+-------------+------+-----+---------+-------+
5 rows in set (0.00 sec)

mysql> describe customer;
+-----------------+--------------+------+-----+---------+-------+
| Field           | Type         | Null | Key | Default | Extra |
+-----------------+--------------+------+-----+---------+-------+
| Name            | varchar(50)  | NO   |     | NULL    |       |
| Address         | varchar(100) | YES  |     | NULL    |       |
| Contact         | int          | NO   | PRI | NULL    |       |
| Books_Purchased | int          | YES  |     | NULL    |       |
| Payment         | int          | YES  |     | NULL    |       |
+-----------------+--------------+------+-----+---------+-------+
5 rows in set (0.00 sec)

mysql> _
```

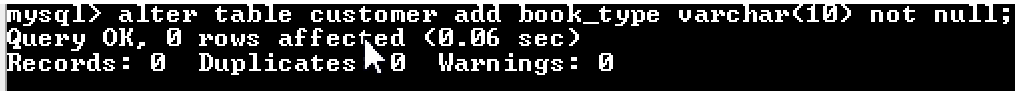
Test Queries

1. Display Issue status of book 01



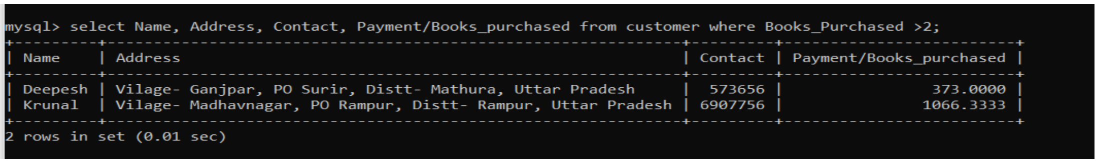
```
mysql> select * from issue_status where book_ID = 01;
+---------+----------+-----------+------------+-------------+
¦ Book_ID ¦ Issue_No ¦ Member_ID ¦ Issue_Date ¦ Return_Date ¦
+---------+----------+-----------+------------+-------------+
¦       1 ¦ E01      ¦         4 ¦ 2020-10-19 ¦ 2019-11-19  ¦
+---------+----------+-----------+------------+-------------+
1 row in set (0.01 sec)
```

2. Add a column called book type in Customer table



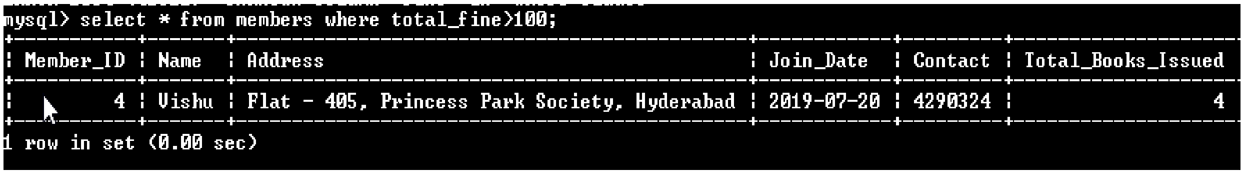
```
mysql> alter table customer add book_type varchar(10) not null;
Query OK, 0 rows affected (0.06 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

3. Calculate average per book cost where customer purchased > 2 books

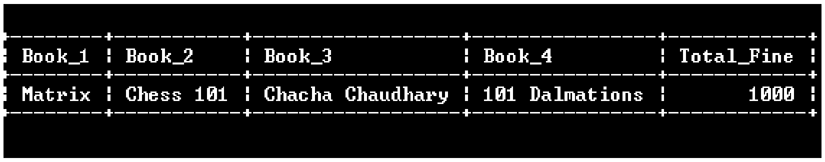


```
mysql> select Name, Address, Contact, Payment/Books_purchased from customer where Books_Purchased >2;
+---------+----------------------------------------------------------+---------+-------------------------+
| Name    | Address                                                  | Contact | Payment/Books_purchased |
+---------+----------------------------------------------------------+---------+-------------------------+
| Deepesh | Vilage- Ganjpar, PO Surir, Distt- Mathura, Uttar Pradesh  |  573656 |                373.0000 |
| Krunal  | Vilage- Madhavnagar, PO Rampur, Distt- Rampur, Uttar Pradesh | 6907756 |               1066.3333 |
+---------+----------------------------------------------------------+---------+-------------------------+
2 rows in set (0.01 sec)
```

4. Show Members with fine>100

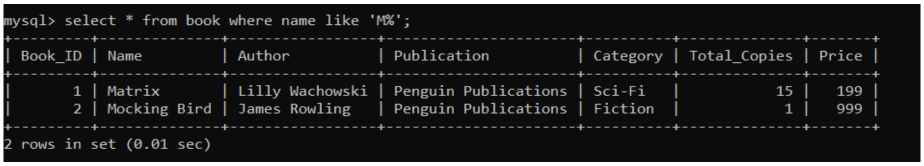


```
mysql> select * from members where total_fine>100;
+-----------+-------+------------------------------------------+------------+---------+--------------------
¦ Member_ID ¦ Name  ¦ Address                                  ¦ Join_Date  ¦ Contact ¦ Total_Books_Issued
+-----------+-------+------------------------------------------+------------+---------+--------------------
¦         4 ¦ Vishu ¦ Flat - 405, Princess Park Society, Hyderabad ¦ 2019-07-20 ¦ 4290324 ¦                  4
+-----------+-------+------------------------------------------+------------+---------+--------------------
1 row in set (0.00 sec)
```



```
+--------+-----------+-----------------+---------------+------------+
¦ Book_1 ¦ Book_2    ¦ Book_3          ¦ Book_4        ¦ Total_Fine ¦
+--------+-----------+-----------------+---------------+------------+
¦ Matrix ¦ Chess 101 ¦ Chacha Chaudhary ¦ 101 Dalmations ¦       1000 ¦
+--------+-----------+-----------------+---------------+------------+
```

5. Show books with first letter ‘M’



```
mysql> select * from book where name like 'M%';
+---------+--------------+-----------------+----------------------+----------+--------------+-------+
| Book_ID | Name         | Author          | Publication          | Category | Total_Copies | Price |
+---------+--------------+-----------------+----------------------+----------+--------------+-------+
|       1 | Matrix       | Lilly Wachowski | Penguin Publications | Sci-Fi   |           15 |   199 |
|       2 | Mocking Bird | James Rowling   | Penguin Publications | Fiction  |            1 |   999 |
+---------+--------------+-----------------+----------------------+----------+--------------+-------+
2 rows in set (0.01 sec)
```

Conclusion

We think that our project has all the features that are required for a Book Store. SQL database management application which is very well used in the modern world in organising and manipulating a database. Depending on the user or users, if an organisation has multiple users then they should go for SQL server based applications. This project shows how to create tables in SQL and how to create simple data manipulation language and data definition language with how to execute them. It also shows how relationships are established with the concepts of primary and foreign key within a table. Lastly, the project shows how queries are created in SQL server, queries like the create command, view, update, alter etc.