Database Design on Library management system.

1.Entities of the library management system:

1. Login
2. Admin
3. Book
4. Customer
5. Supplier
6. Payment
7. Order

Attributes and relationships of each entity for the Library Management System.

Book:

- **Attributes:**
  ISBN
  Title
  Price
  Author
  QuantityInStock
  Availability
  Genre

- **Relationships:**
  One **Book** more than one **Customer** (One-to-Many)
  Many **Book** only one **Customer** (Many-to-One)

Admin

- **Attributes:**
  AdminID
  Name
  PhoneNo

- **Relationships:**
  One **Admin** more than one **Books** (One-to-Many)

Payment

- **Attributes**
  Transaction_Id
  Order_Id
  Payment_Method
  Transaction_Date
  Amount

- **Relationships:**
  Many **Payments** one **Customer** (Many-to-One)

Login

- **Attributes:**
  Login ID
  Password

- **Relationships:**
  One **User** one **Login** (One-to-One)

Customer

- **Attributes**:
  Customer_Id
  Customer_Name
  Customer_mobileNo
  Address

- **Relationships:**
  One **Customer** more than one **Many Books** (One-to-Many)
  Many **Customer** more than one **Many Books** (Many-to-Many)

Spplier

- **Attributes:**
  Id
  Name
  Address
  Contact_Information

- **Relationships:**
  One **Supplier** more than one **Many Customers** (One-to-Many)
  Many **Sppliers** more than one **Many Customers** (Many-to-Many)

Order

- **Attributes:**
  Order_Id
  Customer_Id
  Order_Date

- **Relationships:**
  Many **Orders** one **Customers** (Many-to-One)

Identify Relationships

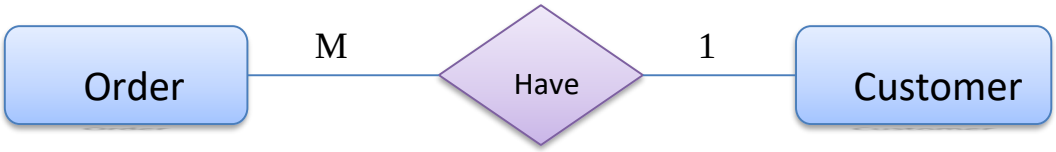
- Determine how entities are related to each other. There are three types of relationships: one-to-one (1:1), one-to-many (1:N), and many-to-many (N:M).
- Represent these relationships using lines connecting the entities.

Let's see a few examples of relationships:

One to One

One to Many

Many to One



Many to Many

2.Table Structure

1. Book

```
mysql> Desc BOOK;
+----------------------+-------------+------+-----+---------+-------+
| Field                | Type        | Null | Key | Default | Extra |
+----------------------+-------------+------+-----+---------+-------+
| Book_id              | bigint      | NO   | PRI | NULL    |       |
| Book_title           | varchar(255) | NO   |     | NULL    |       |
| Book_author          | varchar(255) | NO   |     | NULL    |       |
| Book_publicationYear | int         | YES  |     | NULL    |       |
| Book_isbn            | varchar(20) | YES  | UNI | NULL    |       |
| Book_genre           | varchar(50) | YES  |     | NULL    |       |
| Book_availability    | tinyint(1)  | YES  |     | NULL    |       |
| Book_price           | double      | YES  |     | NULL    |       |
| Book_quantityInStock | int         | YES  |     | NULL    |       |
+----------------------+-------------+------+-----+---------+-------+
9 rows in set (0.00 sec)
```

2. Customer

```
mysql> DESC CUSTOMER;
+------------------+-------------+------+-----+---------+-------+
| Field            | Type        | Null | Key | Default | Extra |
+------------------+-------------+------+-----+---------+-------+
| Customer_id      | bigint      | NO   | PRI | NULL    |       |
| Customer_name    | varchar(255) | NO   |     | NULL    |       |
| Customer_address | varchar(255) | YES  |     | NULL    |       |
| Customer_contact | varchar(20) | YES  |     | NULL    |       |
+------------------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

3. Admin

```
MySQL 8.0 Command Line Cli

mysql> desc Admin;
+---------------+-------------+------+-----+---------+-------+
| Field         | Type        | Null | Key | Default | Extra |
+---------------+-------------+------+-----+---------+-------+
| Admin_Id      | bigint      | NO   | PRI | NULL    |       |
| Admin_Name    | varchar(255) | NO   |     | NULL    |       |
| Admin_Contact | varchar(20) | YES  |     | NULL    |       |
+---------------+-------------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

4.Payment

```
mysql> desc payment;
+-----------------+-------------+------+-----+---------+-------+
| Field           | Type        | Null | Key | Default | Extra |
+-----------------+-------------+------+-----+---------+-------+
| Payment_id      | bigint      | NO   | PRI | NULL    |       |
| Order_id        | bigint      | YES  | MUL | NULL    |       |
| paymentMethod   | varchar(50) | YES  |     | NULL    |       |
| transactionDate | timestamp   | YES  |     | NULL    |       |
+-----------------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)

mysql>
```

5.Login

```
MySQL 8.0 Command Line Cli

mysql> desc login;
+----------+-------------+------+-----+---------+-------+
| Field    | Type        | Null | Key | Default | Extra |
+----------+-------------+------+-----+---------+-------+
| Username | varchar(50) | NO   | PRI | NULL    |       |
| Password | varchar(50) | NO   |     | NULL    |       |
+----------+-------------+------+-----+---------+-------+
2 rows in set (0.00 sec)
```

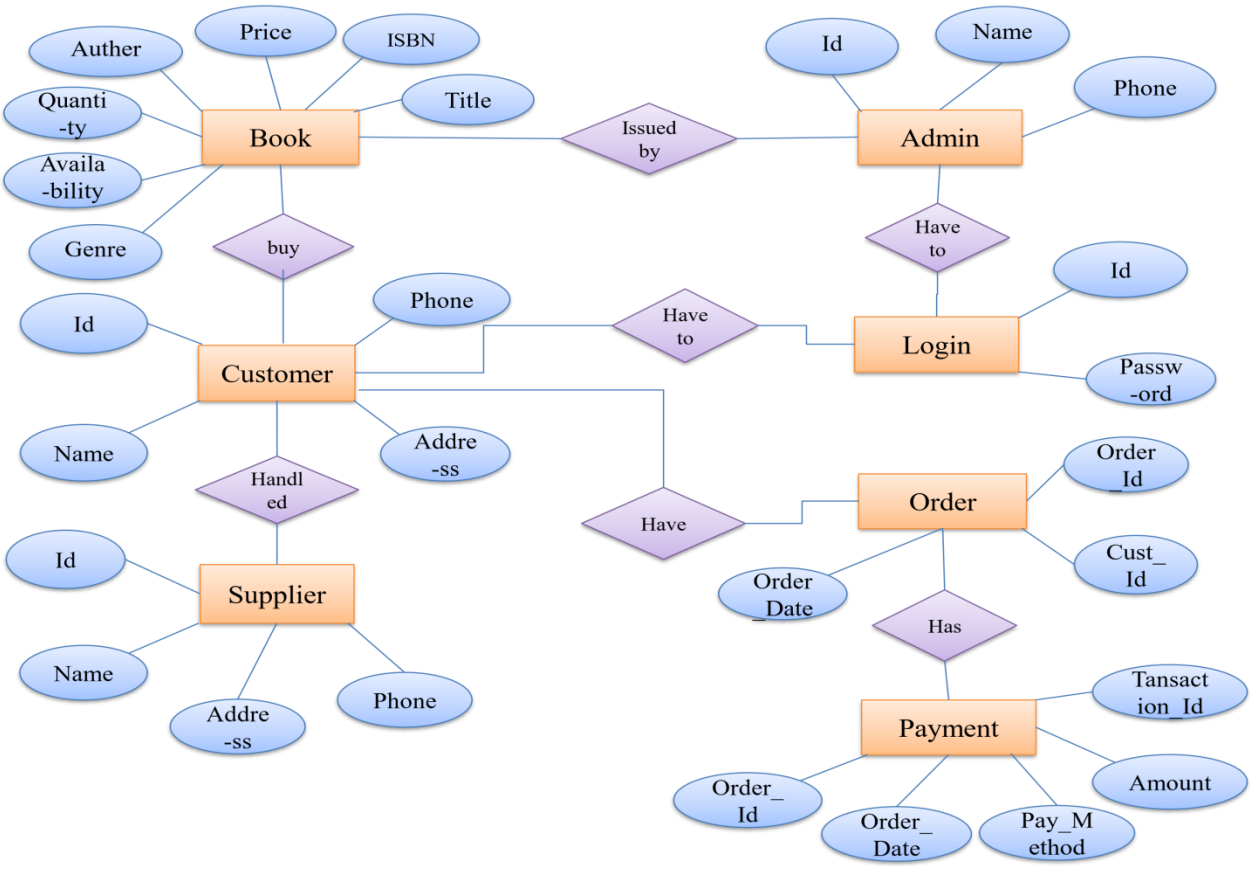
6. Supplier

```
mysql> desc supplier;
+------------------+-------------+------+-----+---------+-------+
| Field            | Type        | Null | Key | Default | Extra |
+------------------+-------------+------+-----+---------+-------+
| Supplier_id      | bigint      | NO   | PRI | NULL    |       |
| Supplier_name    | varchar(255) | NO   |     | NULL    |       |
| Supplier_address | varchar(255) | YES  |     | NULL    |       |
| Supplier_contact | varchar(20)  | YES  |     | NULL    |       |
+------------------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

7.Order_Table

```
mysql> desc Order_Table;
+-------------+-----------+------+-----+---------+-------+
| Field       | Type      | Null | Key | Default | Extra |
+-------------+-----------+------+-----+---------+-------+
| Order_id    | bigint    | NO   | PRI | NULL    |       |
| Customer_id | bigint    | YES  | MUL | NULL    |       |
| orderDate   | timestamp | YES  |     | NULL    |       |
+-------------+-----------+------+-----+---------+-------+
3 rows in set (0.00 sec)
```

3.ERD Diagram:



4. Creating a Database:

SQL command

CREATE DATABASE LMS;

5. Using a Database:

USE use LMS;

6. Creating the tables for each entity:

```
CREATE TABLE Login (
    Username VARCHAR(50) PRIMARY KEY,
    Password VARCHAR(50) NOT NULL
);

-- Create Admin table
CREATE TABLE Admin (
    Admin_Id BIGINT PRIMARY KEY,
    Admin_Name VARCHAR(255) NOT NULL,
    Admin_Contact VARCHAR(20)
);

-- Create Book table
CREATE TABLE Book (
    Book_id BIGINT PRIMARY KEY,
    Book_title VARCHAR(255) NOT NULL,
    Book_author VARCHAR(255) NOT NULL,
    Book_publicationYear INT,
    Book_isbn VARCHAR(20) UNIQUE,
    Book_genre VARCHAR(50),
```

```
    Book_availability BOOLEAN,
    Book_price DOUBLE PRECISION,
    Book_quantityInStock INT
);

-- Create Customer table
CREATE TABLE Customer (
    Customer_id BIGINT PRIMARY KEY,
    Customer_name VARCHAR(255) NOT NULL,
    Customer_address VARCHAR(255),
    Customer_contact VARCHAR(20)
);

-- Create Order table
CREATE TABLE Order_table (
    Order_id BIGINT PRIMARY KEY,
    Customer_id BIGINT,
    orderDate TIMESTAMP,
    FOREIGN KEY (Customer_id) REFERENCES Customer(Customer_id)
);

-- Create Supplier table
CREATE TABLE Supplier (
    Supplier_id BIGINT PRIMARY KEY,
    Supplier_name VARCHAR(255) NOT NULL,
    Supplier_address VARCHAR(255),
    Supplier_contact VARCHAR(20)
```

);

-- Create Payment table

CREATE TABLE Payment (

Payment_id BIGINT PRIMARY KEY,

Order_id BIGINT,

paymentMethod VARCHAR(50),

transactionDate TIMESTAMP,

FOREIGN KEY (Order_id) REFERENCES Order_table(Order_id)

);

7. Insert records

-- Insert records into Login table

INSERT INTO Login (Username, Password) VALUES
('Sahil kapur', 'Pass@123'),

-- Insert records into Admin table
INSERT INTO Admin (Admin_Id, Admin_Name, Admin_Contact) VALUES
(101, 'Samiksha Giramkar', '2637647438'),

-- Insert records into Book table
INSERT INTO Book (Book_id, Book_title, Book_author, Book_publicationYear, Book_isbn, Book_genre, Book_availability, Book_price, Book_quantityInStock) VALUES
(1, 'The Pillars of the Earth', 'Ken Follett', 1989, '978-0451225245', 'Historical Fiction', true, 19.99, 50),
(2, 'A Brief History of Time', 'Stephen Hawking', 1988, '978-0553380163', 'Science, Physics', false, 29.99, 30),
(3, 'A Tale of Two Cities', 'Charles Dickens',1859, '978-0141439600', 'Historical Fiction', true, 24.99, 25),
(4, 'Cosmos', 'Carl Sagan', 1980, '978-0345539434', 'Astronomy', false, 39.99, 15);

-- Insert records into Customer table
INSERT INTO Customer (Customer_id, Customer_name, Customer_address, Customer_contact) VALUES
(11, 'Kajal Singh', 'Ahmednagar', '5365465757'),
(22, 'Raj Pandit', 'Mumbai', '767464546'),
(33, 'Kavya Das', 'Pune', '738798399'),
(44, 'Shreya Jadhav', 'Nagpur', '3737376746');

-- Insert records into Order_table table
INSERT INTO Order_table (Order_id, Customer_id, orderDate) VALUES
(21, 11, '2023-01-01 12:00:00'),
(22, 22, '2023-02-02 14:30:00'),
(23, 33, '2023-03-03 10:00:00'),
(24, 44, '2023-04-04 16:45:00');

-- Insert records into Supplier table
INSERT INTO Supplier (Supplier_id, Supplier_name, Supplier_address, Supplier_contact)
VALUES
(123, 'Supriya', 'Baramati', '5645647788'),
(124, 'Sujit', 'Chennai', '3546576677'),
(125, 'rita', 'Pune', '7675653478'),
(126, 'kiran', 'Nashik', '78977654457');

-- Insert records into Payment table
INSERT INTO Payment (Payment_id, Order_id, paymentMethod, transactionDate)
VALUES
(221, 21, 'Credit Card', '2023-01-02 10:45:00'),
(222, 22, 'PayPal', '2023-02-03 16:00:00'),
(223, 23, 'Bank Transfer', '2023-03-04 09:30:00'),
(224, 24, 'Cash', '2023-04-05 12:15:00');

8. Select records:

Write SQL queries to retrieve and manage data.

For example:

Retrieve all books:

*Select * FROM Book;*

Retrieve a user Address and name of computer Science Branch:

SELECT Name, Address

FROM User;

WHERE Book_Id = '1';

SELECT Book_title
FROM Book

WHERE Book_genre = *'Historical Fiction';*

9. Update records

Write SQL statements to update record. For example:

Update a User Address:

UPDATE User

Update Supplier SET address = ‘Mumbai'
Where Name = 'Sujit';

10. Delete records

Write SQL statements to delete record.
Delete FROM Customer
Where Where Customer_Id =’11';