Coding Challenge - Car Rental System – SQL

SQL Schema:

1. **Vehicle Table :**
   - **vehicleID (Primary Key)**
   - **make**
   - **model**
   - **year**
   - **dailyRate**
   - **status (available, notAvailable)**
   - **passengerCapacity**
   - **engineCapacity**

```
create table Vehicle (
    vehicleID int primary key,
    make varchar(50),
    model varchar(50),
    year int,
    dailyRate decimal(10,2),
    status boolean,
    passengerCapacity int,
    engineCapacity int
);
```

```
mysql> create table Vehicle (
    ->     vehicleID int primary key,
    ->     make varchar(50),
    ->     model varchar(50),
    ->     year int,
    ->     dailyRate decimal(10,2),
    ->     status boolean,
    ->     passengerCapacity int,
    ->     engineCapacity int
    -> );
Query OK, 0 rows affected (0.03 sec)

mysql> desc VEhicle;
+-------------------+---------------+------+-----+---------+-------+
| Field             | Type          | Null | Key | Default | Extra |
+-------------------+---------------+------+-----+---------+-------+
| vehicleID         | int           | NO   | PRI | NULL    |       |
| make              | varchar(50)   | YES  |     | NULL    |       |
| model             | varchar(50)   | YES  |     | NULL    |       |
| year              | int           | YES  |     | NULL    |       |
| dailyRate         | decimal(10,2) | YES  |     | NULL    |       |
| status            | tinyint(1)    | YES  |     | NULL    |       |
| passengerCapacity | int           | YES  |     | NULL    |       |
| engineCapacity    | int           | YES  |     | NULL    |       |
+-------------------+---------------+------+-----+---------+-------+
8 rows in set (0.00 sec)
```

2. **Customer Table:**
   - **customerID (Primary Key)**
   - **firstName**
   - **lastName**
   - **email**
   - **phoneNumber**

```
create table Customer (
    customerID int primary key,
    firstName varchar(50),
    lastName varchar(50),
    email varchar(100),
    phoneNumber varchar(20)
);
```

```
mysql> create table Customer (
    ->     customerID int primary key,
    ->     firstName varchar(50),
    ->     lastName varchar(50),
    ->     email varchar(100),
    ->     phoneNumber varchar(20)
    -> );
Query OK, 0 rows affected (0.02 sec)

mysql> desc Customer;
+-------------+--------------+------+-----+---------+-------+
| Field       | Type         | Null | Key | Default | Extra |
+-------------+--------------+------+-----+---------+-------+
| customerID  | int          | NO   | PRI | NULL    |       |
| firstName   | varchar(50)  | YES  |     | NULL    |       |
| lastName    | varchar(50)  | YES  |     | NULL    |       |
| email       | varchar(100) | YES  |     | NULL    |       |
| phoneNumber | varchar(20)  | YES  |     | NULL    |       |
+-------------+--------------+------+-----+---------+-------+
5 rows in set (0.00 sec)
```

3. **Lease Table:**
   - **leaseID (Primary Key)**
   - **vehicleID (Foreign Key referencing Vehicle Table)**
   - **customerID (Foreign Key referencing Customer Table)**
   - **startDate**
   - **endDate**
   - **type (to distinguish between DailyLease and MonthlyLease)**

```
create table Lease (
    leaseID int primary key,
    carID int,
    customerID int,
    startDate date,
    endDate date,
    leaseType varchar(20),
    foreign key (carID) references Vehicle(vehicleID),
```

foreign key (customerID) references Customer(customerID)
);

```
mysql> create table Lease (
    ->     leaseID int primary key,
    ->     carID int,
    ->     customerID int,
    ->     startDate date,
    ->     endDate date,
    ->     leaseType varchar(20),
    ->     foreign key (carID) references Vehicle(vehicleID),
    ->     foreign key (customerID) references Customer(customerID)
    -> );
Query OK, 0 rows affected (0.05 sec)

mysql> desc Lease;
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| leaseID    | int         | NO   | PRI | NULL    |       |
| carID      | int         | YES  | MUL | NULL    |       |
| customerID | int         | YES  | MUL | NULL    |       |
| startDate  | date        | YES  |     | NULL    |       |
| endDate    | date        | YES  |     | NULL    |       |
| leaseType  | varchar(20) | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
6 rows in set (0.00 sec)
```

4. **Payment Table:**

• paymentID (Primary Key)

• leaseID (Foreign Key referencing Lease Table)

• paymentDate

• amount

create table Payment (
paymentID int primary key,
leaseID int,
paymentDate date,
amount decimal(10,2),
foreign key (leaseID) references Lease(leaseID)
);

```
mysql> create table Payment (
    ->     paymentID int primary key,
    ->     leaseID int,
    ->     paymentDate date,
    ->     amount decimal(10,2),
    ->     foreign key (leaseID) references Lease(leaseID)
    -> );
Query OK, 0 rows affected (0.04 sec)

mysql> desc Payment;
+-------------+---------------+------+-----+---------+-------+
| Field       | Type          | Null | Key | Default | Extra |
+-------------+---------------+------+-----+---------+-------+
| paymentID   | int           | NO   | PRI | NULL    |       |
| leaseID     | int           | YES  | MUL | NULL    |       |
| paymentDate | date          | YES  |     | NULL    |       |
| amount      | decimal(10,2) | YES  |     | NULL    |       |
+-------------+---------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

Inserting Values:

1. **Vehicle Table :**

insert into Vehicle values
(1, 'Toyota', 'Camry', 2022, 50, 1, 4, 1450),
(2, 'Honda', 'Civic', 2023, 45, 1, 7, 1500),
(3, 'Ford', 'Focus', 2022, 48, 0, 4, 1400),
(4, 'Nissan', 'Altima', 2023, 52, 1, 7, 1200),
(5, 'Chevrolet', 'Malibu', 2022, 47, 1, 4, 1800),
(6, 'Hyundai', 'Sonata', 2023, 49, 0, 7, 1400),
(7, 'BMW', '3 Series', 2023, 60, 1, 7, 2499),
(8, 'Mercedes', 'C-Class', 2022, 58, 1, 8, 2599),
(9, 'Audi', 'A4', 2022, 55, 0, 4, 2500),
(10, 'Lexus', 'ES', 2023, 54, 1, 4, 2500);

```
mysql> insert into Vehicle values
    -> (1, 'Toyota', 'Camry', 2022, 50, 1, 4, 1450),
    -> (2, 'Honda', 'Civic', 2023, 45, 1, 7, 1500),
    -> (3, 'Ford', 'Focus', 2022, 48, 0, 4, 1400),
    -> (4, 'Nissan', 'Altima', 2023, 52, 1, 7, 1200),
    -> (5, 'Chevrolet', 'Malibu', 2022, 47, 1, 4, 1800),
    -> (6, 'Hyundai', 'Sonata', 2023, 49, 0, 7, 1400),
    -> (7, 'BMW', '3 Series', 2023, 60, 1, 7, 2499),
    -> (8, 'Mercedes', 'C-Class', 2022, 58, 1, 8, 2599),
    -> (9, 'Audi', 'A4', 2022, 55, 0, 4, 2500),
    -> (10, 'Lexus', 'ES', 2023, 54, 1, 4, 2500);
Query OK, 10 rows affected (0.00 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql> select * from Vehicle;
+-----------+-----------+----------+------+-----------+--------+-------------------+----------------+
| vehicleID | make      | model    | year | dailyRate | status | passengerCapacity | engineCapacity |
+-----------+-----------+----------+------+-----------+--------+-------------------+----------------+
|         1 | Toyota    | Camry    | 2022 |     50.00 |      1 |                 4 |           1450 |
|         2 | Honda     | Civic    | 2023 |     45.00 |      1 |                 7 |           1500 |
|         3 | Ford      | Focus    | 2022 |     48.00 |      0 |                 4 |           1400 |
|         4 | Nissan    | Altima   | 2023 |     52.00 |      1 |                 7 |           1200 |
|         5 | Chevrolet | Malibu   | 2022 |     47.00 |      1 |                 4 |           1800 |
|         6 | Hyundai   | Sonata   | 2023 |     49.00 |      0 |                 7 |           1400 |
|         7 | BMW       | 3 Series | 2023 |     60.00 |      1 |                 7 |           2499 |
|         8 | Mercedes  | C-Class  | 2022 |     58.00 |      1 |                 8 |           2599 |
|         9 | Audi      | A4       | 2022 |     55.00 |      0 |                 4 |           2500 |
|        10 | Lexus     | ES       | 2023 |     54.00 |      1 |                 4 |           2500 |
+-----------+-----------+----------+------+-----------+--------+-------------------+----------------+
10 rows in set (0.00 sec)
```

2. **Customer Table:**

insert into Customer values
(1, 'John', 'Doe', 'johndoe@example.com', '555-555-5555'),
(2, 'Jane', 'Smith', 'janesmith@example.com', '555-123-4567'),
(3, 'Robert', 'Johnson', 'robert@example.com', '555-789-1234'),
(4, 'Sarah', 'Brown', 'sarah@example.com', '555-456-7890'),
(5, 'David', 'Lee', 'david@example.com', '555-987-6543'),
(6, 'Laura', 'Hall', 'laura@example.com', '555-234-5678'),
(7, 'Michael', 'Davis', 'michael@example.com', '555-876-5432'),
(8, 'Emma', 'Wilson', 'emma@example.com', '555-432-1098'),
(9, 'William', 'Taylor', 'william@example.com', '555-321-6547'),
(10, 'Olivia', 'Adams', 'olivia@example.com', '555-765-4321');

```
mysql> insert into Customer values
    -> (1, 'John', 'Doe', 'johndoe@example.com', '555-555-5555'),
    -> (2, 'Jane', 'Smith', 'janesmith@example.com', '555-123-4567'),
    -> (3, 'Robert', 'Johnson', 'robert@example.com', '555-789-1234'),
    -> (4, 'Sarah', 'Brown', 'sarah@example.com', '555-456-7890'),
    -> (5, 'David', 'Lee', 'david@example.com', '555-987-6543'),
    -> (6, 'Laura', 'Hall', 'laura@example.com', '555-234-5678'),
    -> (7, 'Michael', 'Davis', 'michael@example.com', '555-876-5432'),
    -> (8, 'Emma', 'Wilson', 'emma@example.com', '555-432-1098'),
    -> (9, 'William', 'Taylor', 'william@example.com', '555-321-6547'),
    -> (10, 'Olivia', 'Adams', 'olivia@example.com', '555-765-4321');
Query OK, 10 rows affected (0.01 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql> select * from Customer;
+------------+-----------+----------+----------------------+--------------+
| customerID | firstName | lastName | email                | phoneNumber  |
+------------+-----------+----------+----------------------+--------------+
|          1 | John      | Doe      | johndoe@example.com  | 555-555-5555 |
|          2 | Jane      | Smith    | janesmith@example.com | 555-123-4567 |
|          3 | Robert    | Johnson  | robert@example.com   | 555-789-1234 |
|          4 | Sarah     | Brown    | sarah@example.com    | 555-456-7890 |
|          5 | David     | Lee      | david@example.com    | 555-987-6543 |
|          6 | Laura     | Hall     | laura@example.com    | 555-234-5678 |
|          7 | Michael   | Davis    | michael@example.com  | 555-876-5432 |
|          8 | Emma      | Wilson   | emma@example.com     | 555-432-1098 |
|          9 | William   | Taylor   | william@example.com  | 555-321-6547 |
|         10 | Olivia    | Adams    | olivia@example.com   | 555-765-4321 |
+------------+-----------+----------+----------------------+--------------+
10 rows in set (0.00 sec)
```

3. **Lease Table:**

insert into Lease values
(1, 1, 1, '2023-01-01', '2023-01-05', 'Daily'),
(2, 2, 2, '2023-02-15', '2023-02-28', 'Monthly'),
(3, 3, 3, '2023-03-10', '2023-03-15', 'Daily'),
(4, 4, 4, '2023-04-20', '2023-04-30', 'Monthly'),
(5, 5, 5, '2023-05-05', '2023-05-10', 'Daily'),
(6, 4, 3, '2023-06-15', '2023-06-30', 'Monthly'),
(7, 7, 7, '2023-07-01', '2023-07-10', 'Daily'),
(8, 8, 8, '2023-08-12', '2023-08-15', 'Monthly'),
(9, 3, 3, '2023-09-07', '2023-09-10', 'Daily'),
(10, 10, 10, '2023-10-10', '2023-10-31', 'Monthly');

```
mysql> insert into Lease values
    -> (1, 1, 1, '2023-01-01', '2023-01-05', 'Daily'),
    -> (2, 2, 2, '2023-02-15', '2023-02-28', 'Monthly'),
    -> (3, 3, 3, '2023-03-10', '2023-03-15', 'Daily'),
    -> (4, 4, 4, '2023-04-20', '2023-04-30', 'Monthly'),
    -> (5, 5, 5, '2023-05-05', '2023-05-10', 'Daily'),
    -> (6, 4, 3, '2023-06-15', '2023-06-30', 'Monthly'),
    -> (7, 7, 7, '2023-07-01', '2023-07-10', 'Daily'),
    -> (8, 8, 8, '2023-08-12', '2023-08-15', 'Monthly'),
    -> (9, 3, 3, '2023-09-07', '2023-09-10', 'Daily'),
    -> (10, 10, 10, '2023-10-10', '2023-10-31', 'Monthly');
Query OK, 10 rows affected (0.01 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql> select * from Lease;
+---------+-------+------------+------------+------------+-----------+
| leaseID | carID | customerID | startDate  | endDate    | leaseType |
+---------+-------+------------+------------+------------+-----------+
|       1 |     1 |          1 | 2023-01-01 | 2023-01-05 | Daily     |
|       2 |     2 |          2 | 2023-02-15 | 2023-02-28 | Monthly   |
|       3 |     3 |          3 | 2023-03-10 | 2023-03-15 | Daily     |
|       4 |     4 |          4 | 2023-04-20 | 2023-04-30 | Monthly   |
|       5 |     5 |          5 | 2023-05-05 | 2023-05-10 | Daily     |
|       6 |     4 |          3 | 2023-06-15 | 2023-06-30 | Monthly   |
|       7 |     7 |          7 | 2023-07-01 | 2023-07-10 | Daily     |
|       8 |     8 |          8 | 2023-08-12 | 2023-08-15 | Monthly   |
|       9 |     3 |          3 | 2023-09-07 | 2023-09-10 | Daily     |
|      10 |    10 |         10 | 2023-10-10 | 2023-10-31 | Monthly   |
+---------+-------+------------+------------+------------+-----------+
10 rows in set (0.00 sec)
```

4. **Payment Table:**

insert into Payment values
(1, 1, '2023-01-03', 200),
(2, 2, '2023-02-20', 1000),
(3, 3, '2023-03-12', 75),
(4, 4, '2023-04-25', 900),
(5, 5, '2023-05-07', 60),
(6, 6, '2023-06-18', 1200),
(7, 7, '2023-07-03', 40),
(8, 8, '2023-08-14', 1100),
(9, 9, '2023-09-09', 80),
(10, 10, '2023-10-25', 1500);

```
mysql> insert into Payment values
    -> (1, 1, '2023-01-03', 200),
    -> (2, 2, '2023-02-20', 1000),
    -> (3, 3, '2023-03-12', 75),
    -> (4, 4, '2023-04-25', 900),
    -> (5, 5, '2023-05-07', 60),
    -> (6, 6, '2023-06-18', 1200),
    -> (7, 7, '2023-07-03', 40),
    -> (8, 8, '2023-08-14', 1100),
    -> (9, 9, '2023-09-09', 80),
    -> (10, 10, '2023-10-25', 1500);
Query OK, 10 rows affected (0.01 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql> select * from Payment;
+-----------+---------+-------------+---------+
| paymentID | leaseID | paymentDate | amount  |
+-----------+---------+-------------+---------+
|         1 |       1 | 2023-01-03  |  200.00 |
|         2 |       2 | 2023-02-20  | 1000.00 |
|         3 |       3 | 2023-03-12  |   75.00 |
|         4 |       4 | 2023-04-25  |  900.00 |
|         5 |       5 | 2023-05-07  |   60.00 |
|         6 |       6 | 2023-06-18  | 1200.00 |
|         7 |       7 | 2023-07-03  |   40.00 |
|         8 |       8 | 2023-08-14  | 1100.00 |
|         9 |       9 | 2023-09-09  |   80.00 |
|        10 |      10 | 2023-10-25  | 1500.00 |
+-----------+---------+-------------+---------+
10 rows in set (0.00 sec)
```

Query:

1. Update the daily rate for a Mercedes car to 68.

update Vehicle

set dailyRate = 68

where make = 'Mercedes' and model = 'C-Class';

```
mysql> update Vehicle
    -> set dailyRate = 68
    -> where make = 'Mercedes' and model = 'C-Class';
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from Vehicle;
+-----------+-----------+----------+------+-----------+--------+-------------------+----------------+
| vehicleID | make      | model    | year | dailyRate | status | passengerCapacity | engineCapacity |
+-----------+-----------+----------+------+-----------+--------+-------------------+----------------+
|         1 | Toyota    | Camry    | 2022 |     50.00 |      1 |                 4 |           1450 |
|         2 | Honda     | Civic    | 2023 |     45.00 |      1 |                 7 |           1500 |
|         3 | Ford      | Focus    | 2022 |     48.00 |      0 |                 4 |           1400 |
|         4 | Nissan    | Altima   | 2023 |     52.00 |      1 |                 7 |           1200 |
|         5 | Chevrolet | Malibu   | 2022 |     47.00 |      1 |                 4 |           1800 |
|         6 | Hyundai   | Sonata   | 2023 |     49.00 |      0 |                 7 |           1400 |
|         7 | BMW       | 3 Series | 2023 |     60.00 |      1 |                 7 |           2499 |
|         8 | Mercedes  | C-Class  | 2022 |     68.00 |      1 |                 8 |           2599 |
|         9 | Audi      | A4       | 2022 |     55.00 |      0 |                 4 |           2500 |
|        10 | Lexus     | ES       | 2023 |     54.00 |      1 |                 4 |           2500 |
+-----------+-----------+----------+------+-----------+--------+-------------------+----------------+
10 rows in set (0.00 sec)
```

2. Delete a specific customer and all associated leases and payments.

delete from Payment where leaseID in (select leaseID from Lease where customerID = 3);

delete from Lease where customerID = 3;

delete from Customer where customerID = 3;

```
mysql> delete from Payment where leaseID in (select leaseID from Lease where customerID = 3);
Query OK, 3 rows affected (0.01 sec)

mysql> delete from Lease where customerID = 3;
Query OK, 3 rows affected (0.00 sec)

mysql> delete from Customer where customerID = 3;
Query OK, 1 row affected (0.00 sec)

mysql> select * from Customer;
+------------+-----------+----------+----------------------+--------------+
| customerID | firstName | lastName | email                | phoneNumber  |
+------------+-----------+----------+----------------------+--------------+
|          1 | John      | Doe      | johndoe@example.com  | 555-555-5555 |
|          2 | Jane      | Smith    | janesmith@example.com | 555-123-4567 |
|          4 | Sarah     | Brown    | sarah@example.com    | 555-456-7890 |
|          5 | David     | Lee      | david@example.com    | 555-987-6543 |
|          6 | Laura     | Hall     | laura@example.com    | 555-234-5678 |
|          7 | Michael   | Davis    | michael@example.com  | 555-876-5432 |
|          8 | Emma      | Wilson   | emma@example.com     | 555-432-1098 |
|          9 | William   | Taylor   | william@example.com  | 555-321-6547 |
|         10 | Olivia    | Adams    | olivia@example.com   | 555-765-4321 |
+------------+-----------+----------+----------------------+--------------+
9 rows in set (0.00 sec)
```

3. Rename the "paymentDate" column in the Payment table to "transactionDate".

alter table Payment rename column paymentDate to transactionDate;

```
mysql> alter table Payment rename column paymentDate to transactionDate;
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> select * from Payment;
+-----------+---------+-----------------+---------+
| paymentID | leaseID | transactionDate | amount  |
+-----------+---------+-----------------+---------+
|         1 |       1 | 2023-01-03      |  200.00 |
|         2 |       2 | 2023-02-20      | 1000.00 |
|         4 |       4 | 2023-04-25      |  900.00 |
|         5 |       5 | 2023-05-07      |   60.00 |
|         7 |       7 | 2023-07-03      |   40.00 |
|         8 |       8 | 2023-08-14      | 1100.00 |
|        10 |      10 | 2023-10-25      | 1500.00 |
+-----------+---------+-----------------+---------+
7 rows in set (0.00 sec)
```

4. Find a specific customer by email.

select * from Customer where email = 'sarah@example.com';

```
mysql> select * from Customer where email = 'sarah@example.com';
+------------+-----------+----------+-------------------+--------------+
| customerID | firstName | lastName | email             | phoneNumber  |
+------------+-----------+----------+-------------------+--------------+
|          4 | Sarah     | Brown    | sarah@example.com | 555-456-7890 |
+------------+-----------+----------+-------------------+--------------+
1 row in set (0.00 sec)
```

5. Get active leases for a specific customer.

select * from Lease where customerID = 4;

```
mysql> select * from Lease where customerID = 4;
+---------+-------+------------+------------+------------+-----------+
| leaseID | carID | customerID | startDate  | endDate    | leaseType |
+---------+-------+------------+------------+------------+-----------+
|       4 |     4 |          4 | 2023-04-20 | 2023-04-30 | Monthly   |
+---------+-------+------------+------------+------------+-----------+
1 row in set (0.00 sec)
```

6. Find all payments made by a customer with a specific phone number.

```
select p.* from Payment p
join Lease l on p.leaseID = l.leaseID
join Customer c on l.customerID = c.customerID
where c.phoneNumber = '555-555-5555';
```

```
mysql> select p.* from Payment p
    -> join Lease l on p.leaseID = l.leaseID
    -> join Customer c on l.customerID = c.customerID
    -> where c.phoneNumber = '555-555-5555';
+-----------+---------+-----------------+--------+
| paymentID | leaseID | transactionDate | amount |
+-----------+---------+-----------------+--------+
|         1 |       1 | 2023-01-03      | 200.00 |
+-----------+---------+-----------------+--------+
1 row in set (0.00 sec)
```

7. Calculate the average daily rate of all available cars.

```
select avg(dailyRate) as averageDailyRate from Vehicle where status = 1;
```

```
mysql> select avg(dailyRate) as averageDailyRate from Vehicle where status = 1;
+------------------+
| averageDailyRate |
+------------------+
|        53.714286 |
+------------------+
1 row in set (0.00 sec)
```

8. Find the car with the highest daily rate.

```
select * from Vehicle
order by dailyRate desc
limit 1;
```

```
mysql> select * from Vehicle
    -> order by dailyRate desc
    -> limit 1;
+-----------+----------+---------+------+-----------+--------+-------------------+----------------+
| vehicleID | make     | model   | year | dailyRate | status | passengerCapacity | engineCapacity |
+-----------+----------+---------+------+-----------+--------+-------------------+----------------+
|         8 | Mercedes | C-Class | 2022 |     68.00 |      1 |                 8 |           2599 |
+-----------+----------+---------+------+-----------+--------+-------------------+----------------+
1 row in set (0.00 sec)
```

9. Retrieve all cars leased by a specific customer.

select v.* from Vehicle v

join Lease l on v.vehicleID = l.carID

where l.customerID = 4;

```
mysql> select v.* from Vehicle v
    -> join Lease l on v.vehicleID = l.carID
    -> where l.customerID = 4;
+-----------+--------+--------+------+-----------+--------+-------------------+----------------+
| vehicleID | make   | model  | year | dailyRate | status | passengerCapacity | engineCapacity |
+-----------+--------+--------+------+-----------+--------+-------------------+----------------+
|         4 | Nissan | Altima | 2023 |     52.00 |      1 |                 7 |           1200 |
+-----------+--------+--------+------+-----------+--------+-------------------+----------------+
1 row in set (0.00 sec)
```

10. Find the details of the most recent lease.

select * from Lease

order by endDate desc

limit 1;

```
mysql> select * from Lease
    -> order by endDate desc
    -> limit 1;
+---------+-------+------------+------------+------------+-----------+
| leaseID | carID | customerID | startDate  | endDate    | leaseType |
+---------+-------+------------+------------+------------+-----------+
|      10 |    10 |         10 | 2023-10-10 | 2023-10-31 | Monthly   |
+---------+-------+------------+------------+------------+-----------+
1 row in set (0.00 sec)
```

11. List all payments made in the year 2023.

select * from Payment

where year(transactionDate) = 2023;

```
mysql> select * from Payment
    -> where year(transactionDate) = 2023;
+-----------+---------+-----------------+---------+
| paymentID | leaseID | transactionDate | amount  |
+-----------+---------+-----------------+---------+
|         1 |       1 | 2023-01-03      |  200.00 |
|         2 |       2 | 2023-02-20      | 1000.00 |
|         4 |       4 | 2023-04-25      |  900.00 |
|         5 |       5 | 2023-05-07      |   60.00 |
|         7 |       7 | 2023-07-03      |   40.00 |
|         8 |       8 | 2023-08-14      | 1100.00 |
|        10 |      10 | 2023-10-25      | 1500.00 |
+-----------+---------+-----------------+---------+
7 rows in set (0.00 sec)
```

12. Retrieve customers who have not made any payments.

```
select * from Customer c
where not exists (
select 1
from Lease l
join Payment p on l.leaseID = p.leaseID
where l.customerID = c.customerID
);
```

```
mysql> select * from Customer c
    -> where not exists (
    -> select 1
    -> from Lease l
    -> join Payment p on l.leaseID = p.leaseID
    -> where l.customerID = c.customerID
    -> );
+------------+-----------+----------+---------------------+--------------+
| customerID | firstName | lastName | email               | phoneNumber  |
+------------+-----------+----------+---------------------+--------------+
|          6 | Laura     | Hall     | laura@example.com   | 555-234-5678 |
|          9 | William   | Taylor   | william@example.com | 555-321-6547 |
+------------+-----------+----------+---------------------+--------------+
2 rows in set (0.00 sec)
```

13. Retrieve Car Details and Their Total Payments.

```
select v.vehicleID, v.make, v.model, sum(p.amount) as totalPayments
from Vehicle v
join Lease l on v.vehicleID = l.carID
join Payment p on l.leaseID = p.leaseID
group by v.vehicleID, v.make, v.model;
```

```
mysql> select v.vehicleID, v.make, v.model, sum(p.amount) as totalPayments
    -> from Vehicle v
    -> join Lease l on v.vehicleID = l.carID
    -> join Payment p on l.leaseID = p.leaseID
    -> group by v.vehicleID, v.make, v.model;
+-----------+-----------+----------+---------------+
| vehicleID | make      | model    | totalPayments |
+-----------+-----------+----------+---------------+
|         1 | Toyota    | Camry    |        200.00 |
|         2 | Honda     | Civic    |       1000.00 |
|         4 | Nissan    | Altima   |        900.00 |
|         5 | Chevrolet | Malibu   |         60.00 |
|         7 | BMW       | 3 Series |         40.00 |
|         8 | Mercedes  | C-Class  |       1100.00 |
|        10 | Lexus     | ES       |       1500.00 |
+-----------+-----------+----------+---------------+
7 rows in set (0.00 sec)
```

14. Calculate Total Payments for Each Customer.

```
select c.customerID, c.firstName, c.lastName, sum(p.amount) as totalPaid
from Customer c
join Lease l on c.customerID = l.customerID
join Payment p on l.leaseID = p.leaseID
group by c.customerID, c.firstName, c.lastName;
```

```
mysql> select c.customerID, c.firstName, c.lastName, sum(p.amount) as totalPaid
    -> from Customer c
    -> join Lease l on c.customerID = l.customerID
    -> join Payment p on l.leaseID = p.leaseID
    -> group by c.customerID, c.firstName, c.lastName;
+------------+-----------+----------+-----------+
| customerID | firstName | lastName | totalPaid |
+------------+-----------+----------+-----------+
|          1 | John      | Doe      |    200.00 |
|          2 | Jane      | Smith    |   1000.00 |
|          4 | Sarah     | Brown    |    900.00 |
|          5 | David     | Lee      |     60.00 |
|          7 | Michael   | Davis    |     40.00 |
|          8 | Emma      | Wilson   |   1100.00 |
|         10 | Olivia    | Adams    |   1500.00 |
+------------+-----------+----------+-----------+
7 rows in set (0.00 sec)
```

15. List Car Details for Each Lease.

```
select l.leaseID, v.make, v.model, v.year, l.startDate, l.endDate
from Lease l
join Vehicle v on l.carID = v.vehicleID;
```

```
mysql> select l.leaseID, v.make, v.model, v.year, l.startDate, l.endDate
    -> from Lease l
    -> join Vehicle v on l.carID = v.vehicleID;
+---------+-----------+----------+------+------------+------------+
| leaseID | make      | model    | year | startDate  | endDate    |
+---------+-----------+----------+------+------------+------------+
|       1 | Toyota    | Camry    | 2022 | 2023-01-01 | 2023-01-05 |
|       2 | Honda     | Civic    | 2023 | 2023-02-15 | 2023-02-28 |
|       4 | Nissan    | Altima   | 2023 | 2023-04-20 | 2023-04-30 |
|       5 | Chevrolet | Malibu   | 2022 | 2023-05-05 | 2023-05-10 |
|       7 | BMW       | 3 Series | 2023 | 2023-07-01 | 2023-07-10 |
|       8 | Mercedes  | C-Class  | 2022 | 2023-08-12 | 2023-08-15 |
|      10 | Lexus     | ES       | 2023 | 2023-10-10 | 2023-10-31 |
+---------+-----------+----------+------+------------+------------+
7 rows in set (0.00 sec)
```

16. Retrieve Details of Active Leases with Customer and Car Information.

```
select l.leaseID, c.firstName, c.lastName, v.make, v.model, l.startDate, l.endDate
from Lease l
join Customer c on l.customerID = c.customerID
join Vehicle v on l.carID = v.vehicleID
where '2023-08-14' between l.startDate and l.endDate;
```

```
mysql> select l.leaseID, c.firstName, c.lastName, v.make, v.model, l.startDate, l.endDate
    -> from Lease l
    -> join Customer c on l.customerID = c.customerID
    -> join Vehicle v on l.carID = v.vehicleID
    -> where '2023-08-14' between l.startDate and l.endDate;
+---------+-----------+----------+----------+---------+------------+------------+
| leaseID | firstName | lastName | make     | model   | startDate  | endDate    |
+---------+-----------+----------+----------+---------+------------+------------+
|       8 | Emma      | Wilson   | Mercedes | C-Class | 2023-08-12 | 2023-08-15 |
+---------+-----------+----------+----------+---------+------------+------------+
1 row in set (0.00 sec)
```

17. Find the Customer Who Has Spent the Most on Leases.

```
select c.customerID, c.firstName, c.lastName, sum(p.amount) as totalSpent
from Customer c
join Lease l on c.customerID = l.customerID
join Payment p on l.leaseID = p.leaseID
group by c.customerID, c.firstName, c.lastName
order by totalSpent desc
limit 1;
```

```
mysql> select c.customerID, c.firstName, c.lastName, sum(p.amount) as totalSpent
    -> from Customer c
    -> join Lease l on c.customerID = l.customerID
    -> join Payment p on l.leaseID = p.leaseID
    -> group by c.customerID, c.firstName, c.lastName
    -> order by totalSpent desc
    -> limit 1;
+------------+-----------+----------+------------+
| customerID | firstName | lastName | totalSpent |
+------------+-----------+----------+------------+
|         10 | Olivia    | Adams    |    1500.00 |
+------------+-----------+----------+------------+
1 row in set (0.00 sec)
```

18. List All Cars with Their Current Lease Information.

select v.vehicleID, v.make, v.model, l.leaseID, l.startDate, l.endDate

from Vehicle v

left join Lease l on v.vehicleID = l.carID;

```
mysql> select v.vehicleID, v.make, v.model, l.leaseID, l.startDate, l.endDate
    -> from Vehicle v
    -> left join Lease l on v.vehicleID = l.carID;
+-----------+-----------+----------+---------+------------+------------+
| vehicleID | make      | model    | leaseID | startDate  | endDate    |
+-----------+-----------+----------+---------+------------+------------+
|         1 | Toyota    | Camry    |       1 | 2023-01-01 | 2023-01-05 |
|         2 | Honda     | Civic    |       2 | 2023-02-15 | 2023-02-28 |
|         3 | Ford      | Focus    |    NULL | NULL       | NULL       |
|         4 | Nissan    | Altima   |       4 | 2023-04-20 | 2023-04-30 |
|         5 | Chevrolet | Malibu   |       5 | 2023-05-05 | 2023-05-10 |
|         6 | Hyundai   | Sonata   |    NULL | NULL       | NULL       |
|         7 | BMW       | 3 Series |       7 | 2023-07-01 | 2023-07-10 |
|         8 | Mercedes  | C-Class  |       8 | 2023-08-12 | 2023-08-15 |
|         9 | Audi      | A4       |    NULL | NULL       | NULL       |
|        10 | Lexus     | ES       |      10 | 2023-10-10 | 2023-10-31 |
+-----------+-----------+----------+---------+------------+------------+
10 rows in set (0.00 sec)
```