Car Rental System

SQL Schema:

Database Creation:

CREATE database carRental;

```
mysql> create database carRental;
Query OK, 1 row affected (0.04 sec)

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| carrental          |
| information_schema |
| mysql              |
| performance_schema |
| practice           |
| sakila             |
| sys                |
| techshop           |
| world              |
+--------------------+
9 rows in set (0.03 sec)
```

1. Vehicle Table:
   • vehicleID (Primary Key) • make • model • year • dailyRate • available(0, 1) • passengerCapacity • engineCapacity

```
CREATE TABLE Vehicle (
    vehicleID INT PRIMARY KEY,
    make VARCHAR(100),
    model VARCHAR(100),
    year INT,
    dailyRate DECIMAL(10, 2),
    available ENUM('1', '0'),
```

passengerCapacity INT,

engineCapacity INT

);

```
mysql> CREATE TABLE Vehicle (
    ->     vehicleID INT PRIMARY KEY,
    ->     make VARCHAR(100),
    ->     model VARCHAR(100),
    ->     year INT,
    ->     dailyRate DECIMAL(10, 2),
    ->     available ENUM('1', '0'),
    ->     passengerCapacity INT,
    ->     engineCapacity INT
    -> );
Query OK, 0 rows affected (0.05 sec)

mysql> desc Vehicle;
+-------------------+---------------+------+-----+---------+-------+
| Field             | Type          | Null | Key | Default | Extra |
+-------------------+---------------+------+-----+---------+-------+
| vehicleID         | int           | NO   | PRI | NULL    |       |
| make              | varchar(100)  | YES  |     | NULL    |       |
| model             | varchar(100)  | YES  |     | NULL    |       |
| year              | int           | YES  |     | NULL    |       |
| dailyRate         | decimal(10,2) | YES  |     | NULL    |       |
| available         | enum('1','0') | 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(100),

lastName VARCHAR(100),

email VARCHAR(100),

phoneNumber VARCHAR(20)

);

```
mysql> CREATE TABLE Customer (
    ->     customerID INT PRIMARY KEY,
    ->     firstName VARCHAR(100),
    ->     lastName VARCHAR(100),
    ->     email VARCHAR(100),
    ->     phoneNumber VARCHAR(20)
    -> );
Query OK, 0 rows affected (0.03 sec)

mysql> desc Customer;
+-------------+--------------+------+-----+---------+-------+
| Field       | Type         | Null | Key | Default | Extra |
+-------------+--------------+------+-----+---------+-------+
| customerID  | int          | NO   | PRI | NULL    |       |
| firstName   | varchar(100) | YES  |     | NULL    |       |
| lastName    | varchar(100) | 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,
  vehicleID INT,
  customerID INT,
  startDate DATE,
  endDate DATE,
  type ENUM('DailyLease', 'MonthlyLease'),
  FOREIGN KEY(vehicleID) REFERENCES Vehicle(vehicleID),
  FOREIGN KEY(customerID) REFERENCES Customer(customerID)
);
```

```
mysql> CREATE TABLE Lease (
    ->     leaseID INT PRIMARY KEY,
    ->     vehicleID INT,
    ->     customerID INT,
    ->     startDate DATE,
    ->     endDate DATE,
    ->     type ENUM('DailyLease', 'MonthlyLease'),
    ->     FOREIGN KEY(vehicleID) REFERENCES Vehicle(vehicleID),
    ->     FOREIGN KEY(customerID) REFERENCES Customer(customerID)
    -> );
Query OK, 0 rows affected (0.12 sec)

mysql> desc Lease;
+------------+-----------------------------------+------+-----+---------+-------+
| Field      | Type                              | Null | Key | Default | Extra |
+------------+-----------------------------------+------+-----+---------+-------+
| leaseID    | int                               | NO   | PRI | NULL    |       |
| vehicleID  | int                               | YES  | MUL | NULL    |       |
| customerID | int                               | YES  | MUL | NULL    |       |
| startDate  | date                              | YES  |     | NULL    |       |
| endDate    | date                              | YES  |     | NULL    |       |
| type       | enum('DailyLease','MonthlyLease') | YES  |     | NULL    |       |
+------------+-----------------------------------+------+-----+---------+-------+
6 rows in set (0.01 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 (0.08 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)
```

Data Insertion:

Vehicle Table:

INSERT INTO Vehicle (vehicleID, make, model, Year, dailyRate, available, passengerCapacity, engineCapacity)

VALUES

(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);

```
mysql> INSERT INTO Vehicle (vehicleID, make, model, Year, dailyRate, available, passengerCapacity, engineCapacity)
    -> VALUES
    -> (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);
Query OK, 10 rows affected (0.01 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql> select * from Vehicle;
+-----------+-----------+----------+------+-----------+-----------+------------------+----------------+
| vehicleID | make      | model    | year | dailyRate | available | 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)
```

Customer Table:

INSERT INTO Customer (customerID, firstName, lastName, email, phoneNumber)

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 (customerID, firstName, lastName, email, phoneNumber)
    -> 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 (0.02 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)
```

Lease Table:

INSERT INTO Lease (leaseID, vehicleID, customerID, startDate, endDate, type)

VALUES

(1, 1, 1, '2023-01-01', '2023-01-05', 'DailyLease'),

(2, 2, 2, '2023-02-15', '2023-02-28', 'MonthlyLease'),

(3, 3, 3, '2023-03-10', '2023-03-15', 'DailyLease'),

(4, 4, 4, '2023-04-20', '2023-04-30', 'MonthlyLease'),

(5, 5, 5, '2023-05-05', '2023-05-10', 'DailyLease'),

(6, 4, 3, '2023-06-15', '2023-06-30', 'MonthlyLease'),

(7, 7, 7, '2023-07-01', '2023-07-10', 'DailyLease'),

(8, 8, 8, '2023-08-12', '2023-08-15', 'MonthlyLease'),

(9, 3, 3, '2023-09-07', '2023-09-10', 'DailyLease'),

(10, 10, 10, '2023-10-10', '2023-10-31', 'MonthlyLease');

```
mysql> INSERT INTO Lease (leaseID, vehicleID, customerID, startDate, endDate, type)
    -> VALUES
    -> (1, 1, 1, '2023-01-01', '2023-01-05', 'DailyLease'),
    -> (2, 2, 2, '2023-02-15', '2023-02-28', 'MonthlyLease'),
    -> (3, 3, 3, '2023-03-10', '2023-03-15', 'DailyLease'),
    -> (4, 4, 4, '2023-04-20', '2023-04-30', 'MonthlyLease'),
    -> (5, 5, 5, '2023-05-05', '2023-05-10', 'DailyLease'),
    -> (6, 4, 3, '2023-06-15', '2023-06-30', 'MonthlyLease'),
    -> (7, 7, 7, '2023-07-01', '2023-07-10', 'DailyLease'),
    -> (8, 8, 8, '2023-08-12', '2023-08-15', 'MonthlyLease'),
    -> (9, 3, 3, '2023-09-07', '2023-09-10', 'DailyLease'),
    -> (10, 10, 10, '2023-10-10', '2023-10-31', 'MonthlyLease');
Query OK, 10 rows affected (0.01 sec)
Records: 10  Duplicates: 0  Warnings: 0

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

Payment Table:

INSERT INTO Payment (paymentID, leaseID, paymentDate, amount)

VALUES

(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);

```
mysql> INSERT INTO Payment (paymentID, leaseID, paymentDate, amount)
    -> VALUES
    -> (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);
Query OK, 10 rows affected (0.02 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 (0.01 sec)
```

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

   UPDATE Vehicle

   SET dailyRate = 68

   WHERE make = 'Mercedes';

```
mysql> UPDATE Vehicle
    -> SET dailyRate = 68
    -> WHERE make = 'Mercedes';
Query OK, 1 row affected (0.02 sec)
Rows matched: 1  Changed: 1  Warnings: 0
```

```
mysql> select * from Vehicle;
+-----------+-----------+----------+------+-----------+-----------+-------------------+----------------+
| vehicleID | make      | model    | year | dailyRate | available | 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 = 10);

```
mysql> DELETE FROM Payment
    -> WHERE leaseID IN (SELECT leaseID FROM Lease WHERE customerID = 10);
Query OK, 1 row affected (0.02 sec)

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 |
+-----------+---------+-------------+---------+
9 rows in set (0.00 sec)
```

DELETE FROM Lease

WHERE customerID = 10;

```
mysql> DELETE FROM Lease
    -> WHERE customerID = 10;
Query OK, 1 row affected (0.01 sec)

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

DELETE FROM Customer

WHERE customerID = 10;

```
mysql> DELETE FROM Customer
    -> WHERE customerID = 10;
Query OK, 1 row affected (0.01 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 |
|          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 |
+------------+-----------+----------+-----------------------+--------------+
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 (0.07 sec)
Records: 0  Duplicates: 0  Warnings: 0

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

4. Find a specific customer by email.

   SELECT * FROM Customer

   WHERE email = 'michael@example.com';

```
mysql> SELECT * FROM Customer
    -> WHERE email = 'michael@example.com';
+------------+-----------+----------+--------------------+--------------+
| customerID | firstName | lastName | email              | phoneNumber  |
+------------+-----------+----------+--------------------+--------------+
|          7 | Michael   | Davis    | michael@example.com | 555-876-5432 |
+------------+-----------+----------+--------------------+--------------+
1 row in set (0.00 sec)
```

5. Get active leases for a specific customer.

   INSERT INTO Lease (leaseID, vehicleID, customerID, startDate, endDate, type)
   VALUES
   (11, 6, 6, '2024-04-15', '2024-04-25', 'DailyLease'),
   (12, 9, 9, '2024-04-20', '2024-05-20', 'MonthlyLease');

   INSERT INTO Payment (paymentID, leaseID, transactionDate, amount)
   VALUES
   (11, 11, '2024-04-17', 150.00),
   (12, 12, '2024-04-22', 1000.00);

   SELECT * from Lease
   WHERE CustomerID = 9

AND endDate >= CURDATE();

```
mysql> SELECT * from Lease
    -> WHERE CustomerID = 9
    -> AND endDate >= CURDATE();
+---------+-----------+------------+------------+------------+--------------+
| leaseID | vehicleID | customerID | startDate  | endDate    | type         |
+---------+-----------+------------+------------+------------+--------------+
|      12 |         9 |          9 | 2024-04-20 | 2024-05-20 | MonthlyLease |
+---------+-----------+------------+------------+------------+--------------+
1 row in set (0.00 sec)
```

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

SELECT * FROM Payment

WHERE leaseID IN (SELECT leaseID FROM Lease WHERE customerID IN

(SELECT customerID FROM Customer WHERE phoneNumber = '555-555-5555'));

```
mysql> SELECT * FROM Payment
    -> WHERE leaseID IN (SELECT leaseID FROM Lease WHERE customerID IN
    -> (SELECT customerID FROM Customer WHERE 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 available = '1';

```
mysql> SELECT AVG(dailyRate) AS averageDailyRate FROM Vehicle
    -> WHERE available = '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 | available           | passengerCapacity | engineCapacity |
+-----------+----------+---------+------+-----------+---------------------+-------------------+----------------+
|         8 | Mercedes | C-Class | 2022 |     68.00 | 0x01                |                 8 |           2599 |
+-----------+----------+---------+------+-----------+---------------------+-------------------+----------------+
1 row in set (0.00 sec)
```

9. Retrieve all cars leased by a specific customer.

```
SELECT * FROM Vehicle
WHERE vehicleID IN (SELECT vehicleID FROM Lease WHERE customerID = 9);
```

```
mysql> SELECT * FROM Vehicle
    -> ORDER BY dailyRate DESC LIMIT 1;
+-----------+----------+---------+------+-----------+-----------+-------------------+----------------+
| vehicleID | make     | model   | year | dailyRate | available | passengerCapacity | engineCapacity |
+-----------+----------+---------+------+-----------+-----------+-------------------+----------------+
|         8 | Mercedes | C-Class | 2022 |     68.00 | 1         |                 8 |           2599 |
+-----------+----------+---------+------+-----------+-----------+-------------------+----------------+
1 row in set (0.00 sec)
```

10. Find the details of the most recent lease.

```
SELECT * FROM Lease
ORDER BY startDate DESC LIMIT 1;
```

```
mysql> SELECT * FROM Lease
    -> ORDER BY startDate DESC LIMIT 1;
+---------+-----------+------------+------------+------------+--------------+
| leaseID | vehicleID | customerID | startDate  | endDate    | type         |
+---------+-----------+------------+------------+------------+--------------+
|      12 |         9 |          9 | 2024-04-20 | 2024-05-20 | MonthlyLease |
+---------+-----------+------------+------------+------------+--------------+
1 row in set (0.00 sec)
```

11. List all payments made in the year 2023.

```
SELECT * FROM Payment
WHERE transactionDate BETWEEN '2023-01-01' AND '2023-12-31';
```

```
mysql> SELECT * FROM Payment
    -> WHERE transactionDate BETWEEN '2023-01-01' AND '2023-12-31';
+-----------+---------+-----------------+---------+
| paymentID | leaseID | transactionDate | 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 |
+-----------+---------+-----------------+---------+
9 rows in set (0.00 sec)
```

12. Retrieve customers who have not made any payments.

INSERT INTO Customer (customerID, firstName, lastName, email, phoneNumber)
VALUES
(10, 'Justin', 'Timberlake', 'justin@example.com', '555-765-4333');

SELECT * FROM Customer
WHERE customerID NOT IN (SELECT DISTINCT customerID from Lease WHERE
leaseID IN (SELECT DISTINCT leaseID from Payment));

```
mysql> SELECT * FROM Customer
    -> WHERE customerID NOT IN ( SELECT DISTINCT customerID from Lease WHERE
    -> leaseID IN ( SELECT DISTINCT leaseID from Payment ));
+------------+-----------+------------+-------------------+--------------+
| customerID | firstName | lastName   | email             | phoneNumber  |
+------------+-----------+------------+-------------------+--------------+
|         10 | Justin    | Timberlake | justin@example.com | 555-765-4333 |
+------------+-----------+------------+-------------------+--------------+
1 row in set (0.01 sec)
```

13. Retrieve Car Details and Their Total Payments.

SELECT v.vehicleID, v.make, v.model, v.year, v.dailyRate, v.available,
v.passengerCapacity, v.engineCapacity,
SUM(p.amount) as TotalPayment
FROM Vehicle v
LEFT JOIN Lease l ON l.vehicleID = v.vehicleID
LEFT JOIN Payment p ON l.leaseID = p.leaseID
GROUP BY v.vehicleID;

```
mysql> SELECT v.vehicleID, v.make, v.model, v.year, v.dailyRate, v.available, v.passengerCapacity, v.engineCapacity,
    -> SUM(p.amount) as TotalPayment
    -> FROM Vehicle v
    -> LEFT JOIN Lease l ON l.vehicleID = v.vehicleID
    -> LEFT JOIN Payment p ON l.leaseID = p.leaseID
    -> GROUP BY v.vehicleID;
+-----------+-----------+----------+------+-----------+-----------+------------------+----------------+--------------+
| vehicleID | make      | model    | year | dailyRate | available | passengerCapacity | engineCapacity | TotalPayment |
+-----------+-----------+----------+------+-----------+-----------+------------------+----------------+--------------+
|         1 | Toyota    | Camry    | 2022 |     50.00 | 1         |                4 |           1450 |       200.00 |
|         2 | Honda     | Civic    | 2023 |     45.00 | 1         |                7 |           1500 |      1000.00 |
|         3 | Ford      | Focus    | 2022 |     48.00 | 0         |                4 |           1400 |       155.00 |
|         4 | Nissan    | Altima   | 2023 |     52.00 | 1         |                7 |           1200 |      2100.00 |
|         5 | Chevrolet | Malibu   | 2022 |     47.00 | 1         |                4 |           1800 |        60.00 |
|         6 | Hyundai   | Sonata   | 2023 |     49.00 | 0         |                7 |           1400 |       150.00 |
|         7 | BMW       | 3 Series | 2023 |     60.00 | 1         |                7 |           2499 |        40.00 |
|         8 | Mercedes  | C-Class  | 2022 |     68.00 | 1         |                8 |           2599 |      1100.00 |
|         9 | Audi      | A4       | 2022 |     55.00 | 0         |                4 |           2500 |      1000.00 |
|        10 | Lexus     | ES       | 2023 |     54.00 | 1         |                4 |           2500 |         NULL |
+-----------+-----------+----------+------+-----------+-----------+------------------+----------------+--------------+
10 rows in set (0.00 sec)
```

14. Calculate Total Payments for Each Customer.

```
SELECT c.customerID, c.firstName, c.lastName, SUM(p.amount) AS totalPayments
FROM Customer c
LEFT JOIN Lease l ON c.customerID = l.customerID
LEFT JOIN Payment p ON l.leaseID = p.leaseID
GROUP BY c.customerID;
```

```
mysql> SELECT c.customerID, c.firstName, c.lastName, SUM(p.amount) AS totalPayments
    -> FROM Customer c
    -> LEFT JOIN Lease l ON c.customerID = l.customerID
    -> LEFT JOIN Payment p ON l.leaseID = p.leaseID
    -> GROUP BY c.customerID;
+------------+-----------+------------+---------------+
| customerID | firstName | lastName   | totalPayments |
+------------+-----------+------------+---------------+
|          1 | John      | Doe        |        200.00 |
|          2 | Jane      | Smith      |       1000.00 |
|          3 | Robert    | Johnson    |       1355.00 |
|          4 | Sarah     | Brown      |        900.00 |
|          5 | David     | Lee        |         60.00 |
|          6 | Laura     | Hall       |        150.00 |
|          7 | Michael   | Davis      |         40.00 |
|          8 | Emma      | Wilson     |       1100.00 |
|          9 | William   | Taylor     |       1000.00 |
|         10 | Justin    | Timberlake |          NULL |
+------------+-----------+------------+---------------+
10 rows in set (0.00 sec)
```

15. List Car Details for Each Lease.

```
SELECT l.leaseID, v.vehicleID, v.make, v.model, l.startDate, l.endDate

FROM Lease l

LEFT JOIN Vehicle v ON l.vehicleID = v.vehicleID;
```

```
mysql> SELECT l.leaseID, v.vehicleID, v.make, v.model, l.startDate, l.endDate
    -> FROM Lease l
    -> LEFT JOIN Vehicle v ON l.vehicleID = v.vehicleID;
+---------+-----------+-----------+----------+------------+------------+
| leaseID | vehicleID | make      | model    | startDate  | endDate    |
+---------+-----------+-----------+----------+------------+------------+
|       1 |         1 | Toyota    | Camry    | 2023-01-01 | 2023-01-05 |
|       2 |         2 | Honda     | Civic    | 2023-02-15 | 2023-02-28 |
|       3 |         3 | Ford      | Focus    | 2023-03-10 | 2023-03-15 |
|       4 |         4 | Nissan    | Altima   | 2023-04-20 | 2023-04-30 |
|       5 |         5 | Chevrolet | Malibu   | 2023-05-05 | 2023-05-10 |
|       6 |         4 | Nissan    | Altima   | 2023-06-15 | 2023-06-30 |
|       7 |         7 | BMW       | 3 Series | 2023-07-01 | 2023-07-10 |
|       8 |         8 | Mercedes  | C-Class  | 2023-08-12 | 2023-08-15 |
|       9 |         3 | Ford      | Focus    | 2023-09-07 | 2023-09-10 |
|      11 |         6 | Hyundai   | Sonata   | 2024-04-15 | 2024-04-25 |
|      12 |         9 | Audi      | A4       | 2024-04-20 | 2024-05-20 |
+---------+-----------+-----------+----------+------------+------------+
11 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.vehicleID = v.vehicleID
WHERE l.endDate >= CURDATE();

```
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.vehicleID = v.vehicleID
    -> WHERE l.endDate >= CURDATE();
+---------+-----------+----------+---------+--------+------------+------------+
| leaseID | firstName | lastName | make    | model  | startDate  | endDate    |
+---------+-----------+----------+---------+--------+------------+------------+
|      11 | Laura     | Hall     | Hyundai | Sonata | 2024-04-15 | 2024-04-25 |
|      12 | William   | Taylor   | Audi    | A4     | 2024-04-20 | 2024-05-20 |
+---------+-----------+----------+---------+--------+------------+------------+
2 rows 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 totalSpentOnLeases

FROM Customer c

JOIN Lease l ON c.customerID = l.customerID

JOIN Payment p ON l.leaseID = p.leaseID

GROUP BY c.customerID

ORDER BY totalSpentOnLeases DESC LIMIT 1;

```
mysql> SELECT c.customerID, c.firstName, c.lastName, SUM(p.amount) AS totalSpentOnLeases
    -> FROM Customer c
    -> JOIN Lease l ON c.customerID = l.customerID
    -> JOIN Payment p ON l.leaseID = p.leaseID
    -> GROUP BY c.customerID
    -> ORDER BY totalSpentOnLeases DESC LIMIT 1;
+------------+-----------+----------+--------------------+
| customerID | firstName | lastName | totalSpentOnLeases |
+------------+-----------+----------+--------------------+
|          3 | Robert    | Johnson  |            1355.00 |
+------------+-----------+----------+--------------------+
1 row in set (0.00 sec)
```

18. List All Cars with Their Current Lease Information

SELECT v.vehicleID, v.make, v.model, l.startDate, l.endDate, c.firstName, c.lastName
FROM Vehicle v
LEFT JOIN Lease l ON v.vehicleID = l.vehicleID
LEFT JOIN Customer c ON l.customerID = c.customerID;

```
mysql> SELECT v.vehicleID, v.make, v.model, l.startDate, l.endDate, c.firstName, c.lastName
    -> FROM Vehicle v
    -> LEFT JOIN Lease l ON v.vehicleID = l.vehicleID
    -> LEFT JOIN Customer c ON l.customerID = c.customerID;
+-----------+-----------+----------+------------+------------+-----------+----------+
| vehicleID | make      | model    | startDate  | endDate    | firstName | lastName |
+-----------+-----------+----------+------------+------------+-----------+----------+
|         1 | Toyota    | Camry    | 2023-01-01 | 2023-01-05 | John      | Doe      |
|         2 | Honda     | Civic    | 2023-02-15 | 2023-02-28 | Jane      | Smith    |
|         3 | Ford      | Focus    | 2023-03-10 | 2023-03-15 | Robert    | Johnson  |
|         3 | Ford      | Focus    | 2023-09-07 | 2023-09-10 | Robert    | Johnson  |
|         4 | Nissan    | Altima   | 2023-04-20 | 2023-04-30 | Sarah     | Brown    |
|         4 | Nissan    | Altima   | 2023-06-15 | 2023-06-30 | Robert    | Johnson  |
|         5 | Chevrolet | Malibu   | 2023-05-05 | 2023-05-10 | David     | Lee      |
|         6 | Hyundai   | Sonata   | 2024-04-15 | 2024-04-25 | Laura     | Hall     |
|         7 | BMW       | 3 Series | 2023-07-01 | 2023-07-10 | Michael   | Davis    |
|         8 | Mercedes  | C-Class  | 2023-08-12 | 2023-08-15 | Emma      | Wilson   |
|         9 | Audi      | A4       | 2024-04-20 | 2024-05-20 | William   | Taylor   |
|        10 | Lexus     | ES       | NULL       | NULL       | NULL      | NULL     |
+-----------+-----------+----------+------------+------------+-----------+----------+
12 rows in set (0.00 sec)
```