

Create Database :-

CREATE DATABASE car_rental;

Use Database :-

USE car_rental;

Schema Creation :-

Vehicle -

```
CREATE TABLE Vehicle (  
    vehicleID INT AUTO_INCREMENT PRIMARY KEY,  
    make VARCHAR(50) NOT NULL,  
    model VARCHAR(50) NOT NULL,  
    year YEAR NOT NULL,  
    dailyRate DECIMAL(10, 2) NOT NULL,  
    status TINYINT(1) NOT NULL,  
    passengerCapacity INT NOT NULL,  
    engineCapacity DECIMAL(7, 2) NOT NULL  
);
```

```
INSERT INTO Vehicle (vehicleID, make, model, year, dailyRate, status,  
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, 4, 2599),  
(9, 'Audi', 'A4', 2022, 55.00, 1, 5, 2500),  
(10, 'Lexus', 'ES', 2023, 54.00, 1, 5, 2500);
```

Customer :-

```
CREATE TABLE Customer (  
    customerID INT AUTO_INCREMENT PRIMARY KEY,
```

```
    firstName VARCHAR(50) NOT NULL,  
    lastName VARCHAR(50) NOT NULL,  
    email VARCHAR(100) NOT NULL UNIQUE,  
    phoneNumber VARCHAR(15) NOT NULL  
);
```

```
INSERT INTO Customer (firstName, lastName, email, phoneNumber)  
VALUES  
( 'John', 'Doe', 'johndoe@example.com', '555-123-4567'),  
( 'Jane', 'Smith', 'janesmith@example.com', '555-123-4567'),  
( 'Robert', 'Johnson', 'robert@example.com', '555-789-1234'),  
( 'Sarah', 'Brown', 'sarah@example.com', '555-456-7890'),  
( 'David', 'Lee', 'david@example.com', '555-987-6543'),  
( 'Laura', 'Hall', 'laura@example.com', '555-234-5678'),  
( 'Michael', 'Davis', 'michael@example.com', '555-876-5432'),  
( 'Emma', 'Wilson', 'emma@example.com', '555-432-1098'),  
( 'William', 'Taylor', 'william@example.com', '555-321-6547'),  
( 'Olivia', 'Adams', 'olivia@example.com', '555-765-4321');
```

Lease : -

```
CREATE TABLE Lease (  
    leaseID INT AUTO_INCREMENT PRIMARY KEY,  
    vehicleID INT,  
    customerID INT,  
    startDate DATE NOT NULL,  
    endDate DATE NOT NULL,  
    leaseType ENUM('Daily', 'Monthly') NOT NULL,  
    FOREIGN KEY (vehicleID) REFERENCES Vehicle(vehicleID),  
    FOREIGN KEY (customerID) REFERENCES Customer(customerID)  
);
```

```
INSERT INTO Lease (vehicleID, customerID, startDate, endDate, leaseType)  
VALUES  
(1, 1, '2023-01-01', '2023-01-05', 'Daily'),  
(2, 2, '2023-02-15', '2023-02-28', 'Monthly'),  
(3, 3, '2023-03-10', '2023-03-15', 'Daily'),  
(4, 4, '2023-04-20', '2023-04-30', 'Monthly'),  
(5, 5, '2023-05-05', '2023-05-10', 'Daily'),  
(4, 3, '2023-06-15', '2023-06-30', 'Monthly'),  
(7, 7, '2023-07-01', '2023-07-10', 'Daily'),  
(8, 8, '2023-08-12', '2023-08-15', 'Monthly'),
```

```
(3, 3, '2023-09-07', '2023-09-10', 'Daily'),  
(10, 10, '2023-10-10', '2023-10-31', 'Monthly');
```

Payment :-

```
CREATE TABLE Payment (  
    paymentID INT AUTO_INCREMENT PRIMARY KEY,  
    leaseID INT,  
    paymentDate DATE NOT NULL,  
    amount DECIMAL(10, 2) NOT NULL,  
    FOREIGN KEY (leaseID) REFERENCES Lease(leaseID)  
);
```

```
INSERT INTO Payment (leaseID, paymentDate, amount)  
VALUES  
(1, '2023-01-03', 200.00),  
(2, '2023-02-20', 1000.00),  
(3, '2023-03-12', 75.00),  
(4, '2023-04-25', 900.00),  
(5, '2023-05-07', 60.00),  
(6, '2023-06-18', 1200.00),  
(7, '2023-07-03', 40.00),  
(8, '2023-08-14', 1100.00),  
(9, '2023-09-09', 80.00),  
(10, '2023-10-25', 1500.00);
```

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

```
UPDATE Vehicle  
SET dailyRate = 68.00  
WHERE make = 'Mercedes';
```

```

mysql> UPDATE Vehicle
    -> SET dailyRate = 68.00
    -> WHERE make = 'Mercedes';
Query OK, 1 row affected (0.14 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from Vehicle
    -> ;
+-----+-----+-----+-----+-----+-----+-----+-----+
| vehicleID | make   | model  | year | dailyRate | status | passengerCapacity | engineCapacity |
+-----+-----+-----+-----+-----+-----+-----+-----+
| 1 | Toyota | Camry  | 2022 | 150.00 | 1 | 4 | 1450.00 |
| 2 | Honda  | Civic  | 2023 | 45.00 | 1 | 7 | 1500.00 |
| 3 | Ford   | Focus  | 2022 | 48.00 | 0 | 4 | 1400.00 |
| 4 | Nissan | Altima | 2023 | 52.00 | 1 | 7 | 1200.00 |
| 5 | Chevrolet | Malibu | 2022 | 47.00 | 1 | 4 | 1800.00 |
| 6 | Hyundai | Sonata | 2023 | 49.00 | 0 | 7 | 1400.00 |
| 7 | BMW    | 3 Series | 2023 | 60.00 | 1 | 7 | 2499.00 |
| 8 | Mercedes | C-Class | 2022 | 68.00 | 1 | 4 | 2599.00 |
| 9 | Audi   | A4      | 2022 | 55.00 | 1 | 5 | 2500.00 |
| 10 | Lexus  | ES      | 2023 | 54.00 | 1 | 5 | 2500.00 |
+-----+-----+-----+-----+-----+-----+-----+-----+
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 = 1);

DELETE FROM Lease

WHERE customerID = 1;

DELETE FROM Customer

WHERE customerID = 1;

```
mysql> DELETE FROM Payment
-> WHERE leaseID IN (SELECT leaseID FROM Lease WHERE customerID = 1);
Query OK, 1 row affected (0.18 sec)

mysql> DELETE FROM Lease
-> WHERE customerID = 1;
Query OK, 1 row affected (0.13 sec)

mysql> DELETE FROM Customer
-> WHERE customerID = 1;
Query OK, 1 row affected (0.09 sec)

mysql> select * from Customer
-> ;
+-----+-----+-----+-----+-----+
| customerID | firstName | lastName | email | phoneNumber |
+-----+-----+-----+-----+-----+
| 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 |
+-----+-----+-----+-----+-----+
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 (0.60 sec)
Records: 0 Duplicates: 0 Warnings: 0

mysql> select * from Payment
-> ;
```

| paymentID | leaseID | transactionDate | amount |
|-----------|---------|-----------------|---------|
| 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 |

9 rows in set (0.00 sec)

4. Find a specific customer by email.

SELECT * FROM Customer WHERE email = 'robert@example.com';

```
mysql> SELECT * FROM Customer WHERE email = 'robert@example.com';
```

| customerID | firstName | lastName | email | phoneNumber |
|------------|-----------|----------|--------------------|--------------|
| 3 | Robert | Johnson | robert@example.com | 555-789-1234 |

1 row in set (0.00 sec)

5. Get active leases for a specific customer.

```
SELECT L.*
FROM Lease L
JOIN Customer C ON L.customerID = C.customerID
WHERE C.customerID = 2
AND CURDATE() BETWEEN L.startDate AND L.endDate;
```

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 = '555-987-6543'
    )
);

```

```

mysql> SELECT *
-> FROM Payment
-> WHERE leaseID IN (
->     SELECT leaseID
->     FROM Lease
->     WHERE customerID IN (
->         SELECT customerID
->         FROM Customer
->         WHERE phoneNumber = '555-987-6543'
->     )
-> );

```

| paymentID | leaseID | transactionDate | amount |
|-----------|---------|-----------------|--------|
| 5 | 5 | 2023-05-07 | 60.00 |

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 |
|------------------|
| 53.875000 |

1 row in set (0.00 sec)

8. Find the car with the highest daily rate.

```
SELECT MAX(dailyrate) from Vehicle;
```

```
SELECT *  
FROM Vehicle  
ORDER BY dailyRate DESC  
LIMIT 1;
```

```
mysql> SELECT MAX(dailyRate) FROM Vehicle;  
+-----+  
| MAX(dailyRate) |  
+-----+  
|          68.00 |  
+-----+  
1 row in set (0.00 sec)
```

8. Find the car with the highest daily rate.

```
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 | 4 | 2599.00 |  
+-----+  
1 row in set (0.00 sec)
```

9. Retrieve all cars leased by a specific customer.

```
SELECT V.*, L.*  
FROM Vehicle V  
JOIN Lease L ON V.vehicleID = L.vehicleID  
WHERE L.customerID = 2;
```

```
mysql> SELECT V.*, L.*  
-> FROM Vehicle V  
-> JOIN Lease L ON V.vehicleID = L.vehicleID  
-> WHERE L.customerID = 2;  
+-----+  
| vehicleID | make | model | year | dailyRate | status | passengerCapacity | engineCapacity | leaseID | vehicleID | customerID | startDate |  
| endDate | leaseType |  
+-----+  
|          2 | Honda | Civic | 2023 | 45.00 | 1 | 7 | 1500.00 | 2 | 2 | 2 | 2023-02-15 |  
| 2023-02-28 | Monthly |  
+-----+  
1 row in set (0.00 sec)
```

10. Find the details of the most recent lease.

```
SELECT *  
FROM Lease  
ORDER BY startDate DESC
```


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 | leaseType |
|---------|-----------|------------|------------|------------|-----------|
| 10 | 10 | 9 | 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 |
|-----------|---------|-----------------|---------|
| 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 |

9 rows in set (0.00 sec)

12. Retrieve customers who have not made any payments.

```
SELECT C.*
FROM Customer C
LEFT JOIN Lease L ON C.customerID = L.customerID
LEFT JOIN Payment P ON L.leaseID = P.leaseID
WHERE P.paymentID IS NULL;
```

```
mysql> SELECT C.*
      -> FROM Customer C
      -> LEFT JOIN Lease L ON C.customerID = L.customerID
      -> LEFT JOIN Payment P ON L.leaseID = P.leaseID
      -> WHERE P.paymentID IS NULL;
```

| 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.*, SUM(P.amount) AS totalPayments
FROM Vehicle V
JOIN Lease L ON V.vehicleID = L.vehicleID
JOIN Payment P ON L.leaseID = P.leaseID
GROUP BY V.vehicleID;
```

14. Calculate Total Payments for Each Customer.

```
SELECT C.customerID, C.firstName, C.lastName, COALESCE(SUM (P.amount), 0) 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, COALESCE(SUM(P.amount), 0) 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 |
|------------|-----------|----------|---------------|
| 2 | Jane | Smith | 1000.00 |
| 3 | Robert | Johnson | 1355.00 |
| 4 | Sarah | Brown | 900.00 |
| 5 | David | Lee | 60.00 |
| 6 | Laura | Hall | 0.00 |
| 7 | Michael | Davis | 40.00 |
| 8 | Emma | Wilson | 1100.00 |
| 9 | William | Taylor | 0.00 |
| 10 | Olivia | Adams | 1500.00 |

9 rows in set (0.00 sec)

15. List Car Details for Each Lease.

```
SELECT V.*, L.*
FROM Vehicle V
JOIN Lease L ON V.vehicleID = L.vehicleID;
```

```
mysql> SELECT V.*, L.*
-> FROM Vehicle V
-> JOIN Lease L ON V.vehicleID = L.vehicleID;
```

| vehicleID | make | model | year | dailyRate | status | passengerCapacity | engineCapacity | leaseID | vehicleID | customerID | startDate | endDate | leaseType |
|-----------|-----------|----------|------|-----------|--------|-------------------|----------------|---------|-----------|------------|------------|------------|-----------|
| 2 | Honda | Civic | 2023 | 45.00 | 1 | 7 | 1500.00 | 2 | 2 | 2 | 2023-02-15 | 2023-02-28 | Monthly |
| 3 | Ford | Focus | 2022 | 48.00 | 4 | 4 | 1400.00 | 3 | 3 | 3 | 2023-03-10 | 2023-03-15 | Daily |
| 4 | Nissan | Altima | 2023 | 52.00 | 7 | 7 | 1200.00 | 4 | 4 | 4 | 2023-04-20 | 2023-04-30 | Monthly |
| 5 | Chevrolet | Malibu | 2022 | 47.00 | 4 | 5 | 1800.00 | 5 | 5 | 5 | 2023-05-05 | 2023-05-10 | Daily |
| 4 | Nissan | Altima | 2023 | 52.00 | 7 | 7 | 1200.00 | 6 | 4 | 3 | 2023-06-15 | 2023-06-30 | Monthly |
| 7 | BMW | 3 Series | 2023 | 60.00 | 7 | 7 | 2499.00 | 7 | 7 | 7 | 2023-07-01 | 2023-07-10 | Daily |
| 8 | Mercedes | C-Class | 2022 | 68.00 | 4 | 8 | 2599.00 | 8 | 8 | 8 | 2023-08-12 | 2023-08-15 | Monthly |
| 3 | Ford | Focus | 2022 | 48.00 | 0 | 4 | 1400.00 | 9 | 3 | 3 | 2023-09-07 | 2023-09-10 | Daily |
| 10 | Lexus | ES | 2023 | 54.00 | 5 | 10 | 2500.00 | 10 | 10 | 10 | 2023-10-10 | 2023-10-31 | Monthly |

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

```
SELECT L.*, C.*, V.*
FROM Lease L
JOIN Customer C ON L.customerID = C.customerID
JOIN Vehicle V ON L.vehicleID = V.vehicleID
WHERE CURDATE() BETWEEN L.startDate AND L.endDate;
```

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

```
SELECT C.customerID, C.firstName, C.lastName, COALESCE(SUM(P.amount), 0) AS
totalSpent
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
ORDER BY totalSpent DESC
LIMIT 1;
```

```
mysql> SELECT C.customerID, C.firstName, C.lastName, COALESCE(SUM(P.amount), 0) AS totalSpent
-> 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
-> ORDER BY totalSpent DESC
-> LIMIT 1;
+-----+-----+-----+-----+
| customerID | firstName | lastName | totalSpent |
+-----+-----+-----+-----+
| 10 | Olivia | Adams | 1500.00 |
+-----+-----+-----+-----+
1 row in set (0.32 sec)
```

18. List All Cars with Their Current Lease Information.

```
SELECT V.*
FROM Vehicle V
LEFT JOIN Lease L ON V.vehicleID = L.vehicleID
AND CURDATE() BETWEEN L.startDate AND L.endDate;
```

18. List All Cars with Their Current Lease Information.

```
SELECT V.*, L.*
FROM Vehicle V
LEFT JOIN Lease L ON V.vehicleID = L.vehicleID
AND CURDATE() BETWEEN L.startDate AND L.endDate;
```

```
mysql> SELECT V.*, L.*
-> FROM Vehicle V
-> LEFT JOIN Lease L ON V.vehicleID = L.vehicleID
-> AND CURDATE() BETWEEN L.startDate AND L.endDate;
```

| | vehicleID | make | model | year | dailyRate | status | passengerCapacity | engineCapacity | leaseID | vehicleID | customerID | startDate | endDate | leaseType |
|----|-----------|-----------|----------|------|-----------|--------|-------------------|----------------|---------|-----------|------------|-----------|---------|-----------|
| 1 | 1 | Toyota | Camry | 2022 | 50.00 | 1 | 4 | 1450.00 | NULL | NULL | NULL | NULL | NULL | NULL |
| 2 | 2 | Honda | Civic | 2023 | 45.00 | 1 | 7 | 1500.00 | NULL | NULL | NULL | NULL | NULL | NULL |
| 3 | 3 | Ford | Focus | 2022 | 48.00 | 0 | 4 | 1400.00 | NULL | NULL | NULL | NULL | NULL | NULL |
| 4 | 4 | Nissan | Altima | 2023 | 52.00 | 1 | 7 | 1200.00 | NULL | NULL | NULL | NULL | NULL | NULL |
| 5 | 5 | Chevrolet | Malibu | 2022 | 47.00 | 1 | 4 | 1800.00 | NULL | NULL | NULL | NULL | NULL | NULL |
| 6 | 6 | Hyundai | Sonata | 2023 | 49.00 | 0 | 7 | 1400.00 | NULL | NULL | NULL | NULL | NULL | NULL |
| 7 | 7 | BMW | 3 Series | 2023 | 60.00 | 1 | 7 | 2499.00 | NULL | NULL | NULL | NULL | NULL | NULL |
| 8 | 8 | Mercedes | C-Class | 2022 | 68.00 | 1 | 4 | 2599.00 | NULL | NULL | NULL | NULL | NULL | NULL |
| 9 | 9 | Audi | A4 | 2022 | 55.00 | 1 | 5 | 2500.00 | NULL | NULL | NULL | NULL | NULL | NULL |
| 10 | 10 | Lexus | ES | 2023 | 54.00 | 1 | 5 | 2500.00 | NULL | NULL | NULL | NULL | NULL | NULL |

10 rows in set (0.00 sec)