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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 ENUM('available', 'notAvailable'),
   passengerCapacity INT,
   engineCapacity DECIMAL(10,2)
);
```

```
mysql> CREATE DATABASE CarRentalSystems;
Query OK, 1 row affected (0.076 sec)

mysql> USE CarRentalSystems;
Database changed
mysql> CREATE TABLE Vehicle (vehicleID INT PRIMARY KEY, make VARCHAR(50), model VARCHAR(50), year INT, dailyRate DECIMAL(10,2), status ENUM('available', 'no
tAvailable'), passengerCapacity INT, engineCapacity DECIMAL(10,2));
Query OK, 0 rows affected (0.353 sec)

mysql>
```

```
INSERT INTO Vehicle VALUES
(1, 'Toyota', 'Camry', 2022, 50.00, 'available', 4, 1450),
(2, 'Honda', 'Civic', 2023, 45.00, 'available', 7, 1500),
(3, 'Ford', 'Focus', 2022, 48.00, 'notAvailable', 4, 1400),
(4, 'Nissan', 'Altima', 2023, 52.00, 'available', 7, 1200),
(5, 'Chevrolet', 'Malibu', 2022, 47.00, 'available', 4, 1800),
(6, 'Hyundai', 'Sonata', 2023, 49.00, 'notAvailable', 7, 1400),
(7, 'BMW', '3 Series', 2023, 60.00, 'available', 7, 2499),
(8, 'Mercedes', 'C-Class', 2022, 58.00, 'available', 8, 2599),
(9, 'Audi', 'A4', 2022, 55.00, 'notAvailable', 4, 2500),
(10, 'Lexus', 'ES', 2023, 54.00, 'available', 4, 2500);
```

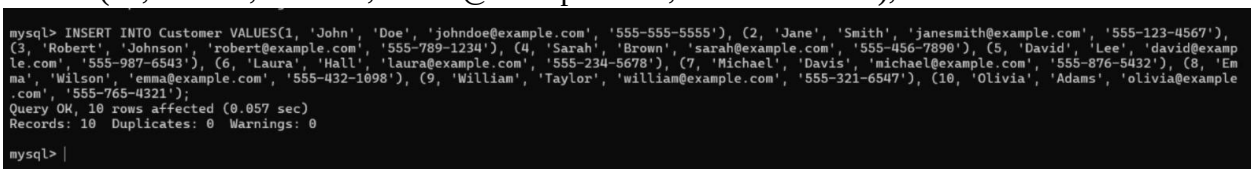
```
mysql> INSERT INTO Vehicle VALUES (1, 'Toyota', 'Camry', 2022, 50.00, 'available', 4, 1450), (2, 'Honda', 'Civic', 2023, 45.00, 'available', 7, 1500), (3, '
Ford', 'Focus', 2022, 48.00, 'notAvailable', 4, 1400), (4, 'Nissan', 'Altima', 2023, 52.00, 'available', 7, 1200), (5, 'Chevrolet', 'Malibu', 2022, 47.00, '
available', 4, 1800), (6, 'Hyundai', 'Sonata', 2023, 49.00, 'notAvailable', 7, 1400), (7, 'BMW', '3 Series', 2023, 60.00, 'available', 7, 2499), (8, 'Merced
es', 'C-Class', 2022, 58.00, 'available', 8, 2599), (9, 'Audi', 'A4', 2022, 55.00, 'notAvailable', 4, 2500), (10, 'Lexus', 'ES', 2023, 54.00, 'available', 4
, 2500);
Query OK, 10 rows affected (0.085 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql>
```

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) UNIQUE,
   phoneNumber VARCHAR(20)
);
```


```
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');
```



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,
    leaseType ENUM('Daily', 'Monthly'),
    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, leaseType ENUM('Daily', 'Monthly'), FOREIGN
 KEY (vehicleID) REFERENCES Vehicle(vehicleID), FOREIGN KEY (customerID) REFERENCES Customer(customerID));
Query OK, 0 rows affected (0.524 sec)

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');
```

```
mysql> INSERT INTO Lease VALUES (1, 1, 1, '2023-01-01', '2023-01-05', 'Daily'), (2, 2, 2, '2023-02-15', '2023-02-28', 'M
onthly'), (3, 3, 3, '2023-03-10', '2023-03-15', 'Daily'), (4, 4, 4, '2023-04-20', '2023-04-30', 'Monthly'), (5, 5, 5, '2
023-05-05', '2023-05-10', 'Daily'), (6, 4, 3, '2023-06-15', '2023-06-30', 'Monthly'), (7, 7, 7, '2023-07-01', '2023-07-1
0', '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 (0.081 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql>
```

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 (0.476 sec)

mysql>
```

INSERT INTO Payment 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 VALUES (1, 1, '2023-01-03', 200.00), (2, 2, '2023-02-20', 1000.00), (3, 3, '2023-03-12', 75.0
0), (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 (0.054 sec)
Records: 10  Duplicates: 0  Warnings: 0

mysql>
```

1. Update the daily rate for a Mercedes car to 68. 1500.00

   UPDATE Vehicle SET dailyRate = 68 WHERE make = 'Mercedes';

```
mysql> UPDATE Vehicle SET dailyRate = 68 WHERE make = 'Mercedes';
Query OK, 1 row affected (0.146 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql>
```

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

   DELETE FROM Payment WHERE leaseID IN (SELECT leaseID FROM Lease
   WHERE customerID = 5);

```
mysql> DELETE FROM Payment WHERE leaseID IN (SELECT leaseID FROM Lease WHERE customerID = 5);
Query OK, 1 row affected (0.058 sec)

mysql>
```

   DELETE FROM Lease WHERE customerID = 5;

```
mysql> DELETE FROM Lease WHERE customerID = 5;
Query OK, 1 row affected (0.046 sec)

mysql>
```

DELETE FROM Customer WHERE customerID = 5;

```
mysql> DELETE FROM Customer WHERE customerID = 5;
Query OK, 1 row affected (0.050 sec)

mysql>
```

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

   ALTER TABLE Payment CHANGE paymentDate transactionDate DATE;

```
mysql> ALTER TABLE Payment CHANGE paymentDate transactionDate DATE;
Query OK, 0 rows affected (0.146 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql>
```

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 (0.014 sec)

mysql>
```

5. Get active leases for a specific customer.

   SELECT * FROM Lease WHERE customerID = 3 AND CURDATE() BETWEEN startDate AND endDate;

```
mysql> SELECT * FROM Lease WHERE customerID = 3 AND CURDATE() BETWEEN startDate AND endDate;
Empty set (0.008 sec)

mysql>
```

(OR)

INSERT INTO Lease VALUES (11, 5, 3, CURDATE(), DATE_ADD(CURDATE(), INTERVAL 5 DAY), 'Daily');

SELECT * FROM Lease WHERE customerID = 3 AND CURDATE() BETWEEN startDate AND endDate;

```
mysql> INSERT INTO Lease VALUES (11, 5, 3, CURDATE(), DATE_ADD(CURDATE(), INTERVAL 5 DAY), 'Daily');
Query OK, 1 row affected (0.119 sec)

mysql> SELECT * FROM Lease WHERE customerID = 3 AND CURDATE() BETWEEN startDate AND endDate;
+---------+-----------+------------+------------+------------+-----------+
| leaseID | vehicleID | customerID | startDate  | endDate    | leaseType |
+---------+-----------+------------+------------+------------+-----------+
|      11 |         5 |          3 | 2025-06-17 | 2025-06-22 | Daily     |
+---------+-----------+------------+------------+------------+-----------+
1 row in set (0.020 sec)

mysql> |
```

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 = '555-456-7890';

```
mysql> SELECT P.* FROM Payment P JOIN Lease L ON P.leaseID = L.leaseID JOIN Customer C ON L.customerID = C.customerID WH
ERE C.phoneNumber = '555-456-7890';
+-----------+---------+-----------------+--------+
| paymentID | leaseID | transactionDate | amount |
+-----------+---------+-----------------+--------+
|         4 |       4 | 2023-04-25      | 900.00 |
+-----------+---------+-----------------+--------+
1 row in set (0.031 sec)

mysql> |
```

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

SELECT AVG(dailyRate) AS avgRate FROM Vehicle WHERE status = 'available';

```
mysql> SELECT AVG(dailyRate) AS avgRate FROM Vehicle WHERE status = 'available';
+------------+
| avgRate    |
+------------+
| 53.714286 |
+------------+
1 row in set (0.030 sec)

mysql> |
```

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 | available |                 8 |        2599.00 |
+-----------+----------+---------+------+-----------+-----------+-------------------+----------------+
1 row in set (0.010 sec)

mysql>
```

9. Retrieve all cars leased by a specific customer.

SELECT V.* FROM Vehicle V
JOIN Lease L ON V.vehicleID = L.vehicleID
WHERE L.customerID = 3;

```
mysql> SELECT V.* FROM Vehicle V JOIN Lease L ON V.vehicleID = L.vehicleID WHERE L.customerID = 3;
+-----------+----------+--------+------+-----------+-------------+-------------------+----------------+
| vehicleID | make     | model  | year | dailyRate | status      | passengerCapacity | engineCapacity |
+-----------+----------+--------+------+-----------+-------------+-------------------+----------------+
|         3 | Ford     | Focus  | 2022 |     48.00 | notAvailable |                 4 |        1400.00 |
|         4 | Nissan   | Altima | 2023 |     52.00 | available    |                 7 |        1200.00 |
|         3 | Ford     | Focus  | 2022 |     48.00 | notAvailable |                 4 |        1400.00 |
|         5 | Chevrolet | Malibu | 2022 |     47.00 | available    |                 4 |        1800.00 |
+-----------+----------+--------+------+-----------+-------------+-------------------+----------------+
4 rows in set (0.009 sec)

mysql>
```

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 | vehicleID | customerID | startDate  | endDate    | leaseType |
+---------+-----------+------------+------------+------------+-----------+
|      11 |         5 |          3 | 2025-06-17 | 2025-06-22 | Daily     |
+---------+-----------+------------+------------+------------+-----------+
1 row in set (0.034 sec)

mysql>
```

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 |
|         3 |       3 | 2023-03-12      |   75.00 |
|         4 |       4 | 2023-04-25      |  900.00 |
|         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 (0.024 sec)

mysql>
```

12. Retrieve customers who have not made any payments.

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

```
mysql> SELECT * FROM Customer WHERE customerID NOT IN ( SELECT DISTINCT customerID FROM Lease WHERE leaseID IN (SELECT l
easeID FROM Payment));
+------------+-----------+----------+--------------------+--------------+
| 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 (0.024 sec)

mysql>
```

13. Retrieve Car Details and Their Total Payments.

```
SELECT V.make, V.model, SUM(P.amount) AS totalPayment
FROM Vehicle V
JOIN Lease L ON V.vehicleID = L.vehicleID
JOIN Payment P ON L.leaseID = P.leaseID
GROUP BY V.vehicleID;
```

```
mysql> SELECT V.make, V.model, SUM(P.amount) AS totalPayment FROM Vehicle V JOIN Lease L ON V.vehicleID = L.vehicleID JO
IN Payment P ON L.leaseID = P.leaseID GROUP BY V.vehicleID;
+----------+----------+--------------+
| make     | model    | totalPayment |
+----------+----------+--------------+
| Toyota   | Camry    |       200.00 |
| Honda    | Civic    |      1000.00 |
| Ford     | Focus    |       155.00 |
| Nissan   | Altima   |      2100.00 |
| BMW      | 3 Series |        40.00 |
| Mercedes | C-Class  |      1100.00 |
| Lexus    | ES       |      1500.00 |
+----------+----------+--------------+
7 rows in set (0.011 sec)

mysql>
```

14. Calculate Total Payments for Each Customer.

    SELECT 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;

```
mysql> SELECT C.firstName, C.lastName, SUM(P.amount) AS totalSpent FROM Customer C JOIN Lease L ON C.customerID = L.cust
omerID JOIN Payment P ON L.leaseID = P.leaseID GROUP BY C.customerID;
+-----------+----------+------------+
| firstName | lastName | totalSpent |
+-----------+----------+------------+
| John      | Doe      |     200.00 |
| Jane      | Smith    |    1000.00 |
| Robert    | Johnson  |    1355.00 |
| Sarah     | Brown    |     900.00 |
| Michael   | Davis    |      40.00 |
| Emma      | Wilson   |    1100.00 |
| Olivia    | Adams    |    1500.00 |
+-----------+----------+------------+
7 rows in set (0.008 sec)

mysql>
```

15. List Car Details for Each Lease.

    SELECT L.leaseID, V.make, V.model, V.year FROM Lease L
    JOIN Vehicle V ON L.vehicleID = V.vehicleID;

```
mysql> SELECT L.leaseID, V.make, V.model, V.year FROM Lease L JOIN Vehicle V ON L.vehicleID = V.vehicleID;
+---------+-----------+----------+------+
| leaseID | make      | model    | year |
+---------+-----------+----------+------+
|       1 | Toyota    | Camry    | 2022 |
|       2 | Honda     | Civic    | 2023 |
|       3 | Ford      | Focus    | 2022 |
|       9 | Ford      | Focus    | 2022 |
|       4 | Nissan    | Altima   | 2023 |
|       6 | Nissan    | Altima   | 2023 |
|      11 | Chevrolet | Malibu   | 2022 |
|       7 | BMW       | 3 Series | 2023 |
|       8 | Mercedes  | C-Class  | 2022 |
|      10 | Lexus     | ES       | 2023 |
+---------+-----------+----------+------+
10 rows in set (0.014 sec)

mysql>
```

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

```
SELECT L.*, C.firstName, C.lastName, V.make, V.model
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;
```

```
mysql> SELECT L.*, C.firstName, C.lastName, V.make, V.model 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;
+---------+-----------+------------+------------+------------+-----------+-----------+----------+-----------+--------+
| leaseID | vehicleID | customerID | startDate  | endDate    | leaseType | firstName | lastName | make      | model  |
+---------+-----------+------------+------------+------------+-----------+-----------+----------+-----------+--------+
|      11 |         5 |          3 | 2025-06-17 | 2025-06-22 | Daily     | Robert    | Johnson  | Chevrolet | Malibu |
+---------+-----------+------------+------------+------------+-----------+-----------+----------+-----------+--------+
1 row in set (0.011 sec)

mysql>
```

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

```
SELECT 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
ORDER BY totalSpent DESC
LIMIT 1;
```

```
mysql> SELECT C.firstName, C.lastName, SUM(P.amount) AS totalSpent FROM Customer C JOIN Lease L ON C.customerID = L.cust
omerID JOIN Payment P ON L.leaseID = P.leaseID GROUP BY C.customerID ORDER BY totalSpent DESC LIMIT 1;
+-----------+----------+------------+
| firstName | lastName | totalSpent |
+-----------+----------+------------+
| Olivia    | Adams    |    1500.00 |
+-----------+----------+------------+
1 row in set (0.024 sec)

mysql>
```

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.vehicleID
WHERE CURDATE() BETWEEN L.startDate AND L.endDate;
```

```
mysql> SELECT V.vehicleID, V.make, V.model, L.leaseID, L.startDate, L.endDate FROM Vehicle V LEFT JOIN Lease L ON V.vehi
cleID = L.vehicleID WHERE CURDATE() BETWEEN L.startDate AND L.endDate;
+-----------+-----------+--------+---------+------------+------------+
| vehicleID | make      | model  | leaseID | startDate  | endDate    |
+-----------+-----------+--------+---------+------------+------------+
|         5 | Chevrolet | Malibu |      11 | 2025-06-17 | 2025-06-22 |
+-----------+-----------+--------+---------+------------+------------+
1 row in set (0.013 sec)

mysql>
```