In [3]:
```sql
%load_ext sql
%sql mysql+mysqlconnector://root:root@localhost/carRental
```

The sql extension is already loaded. To reload it, use:
  %reload_ext sql

In [4]:
```sql
%%sql
use carRental;
```

 * mysql+mysqlconnector://root:***@localhost/carRental
0 rows affected.

Out[4]: []

In [100…
```sql
%%sql
create table if not exists Vehicle(
    vehicleID int auto_increment primary key,
    make varchar(50) not null,
    model varchar(50) not null,
    year int not null,
    dailyRate decimal(10,2) not null,
    status bit not null,
    passengerCapacity int not null,
    engineCapacity int not null
)
```

 * mysql+mysqlconnector://root:***@localhost/carRental
0 rows affected.

Out[100… []

In [101…
```sql
%%sql
create table if not exists Customer(
    customerID int auto_increment primary key,
    firstName varchar(100) not null,
    lastName varchar(100) not null,
    email varchar(255) unique not null,
    phoneNumber varchar(20) unique not null
)
```

 * mysql+mysqlconnector://root:***@localhost/carRental
0 rows affected.

Out[101… []

In [102…
```sql
%%sql
create table if not exists Lease(
    leaseID int auto_increment primary key,
    vehicleID  int not null,
    customerID int not null,
    startDate date not null,
    endDate date not null,
    leaseType varchar(10) not null,
    foreign key (vehicleID) references Vehicle(vehicleID) on delete cascade,
    foreign key (customerID) references Customer(customerID) on delete cascade
)
```

```
 * mysql+mysqlconnector://root:***@localhost/carRental
0 rows affected.
```

Out[102... []

In [103...
```sql
%%sql
create table if not exists Payment(
    paymentID int auto_increment primary key,
    leaseID int not null,
    paymentDate date null,
    amount decimal(10,2),
    foreign key (leaseId) references Lease(leaseID) on delete cascade
);
```

```
 * mysql+mysqlconnector://root:***@localhost/carRental
0 rows affected.
```

Out[103... []

In [104...
```sql
%%sql
show tables;
```

```
 * mysql+mysqlconnector://root:***@localhost/carRental
4 rows affected.
```

Out[104...

Tables_in_carrental
customer
lease
payment
vehicle

In [105...
```sql
%%sql
INSERT INTO Vehicle (make, model, year, dailyRate, status, passengerCapacity, engin
('Toyota', 'Camry', 2022, 50.00, 1, 4, 1450),
('Honda', 'Civic', 2023, 45.00, 1, 7, 1500),
('Ford', 'Focus', 2022, 48.00, 0, 4, 1400),
('Nissan', 'Altima', 2023, 52.00, 1, 7, 1200),
('Chevrolet', 'Malibu', 2022, 47.00, 1, 4, 1800),
('Hyundai', 'Sonata', 2023, 49.00, 0, 7, 1400),
('BMW', '3 Series', 2023, 60.00, 1, 7, 2499),
('Mercedes', 'C-Class', 2022, 58.00, 1, 8, 2599),
('Audi', 'A4', 2022, 55.00, 0, 4, 2500),
('Lexus', 'ES', 2023, 54.00, 1, 4, 2500);
```

```
 * mysql+mysqlconnector://root:***@localhost/carRental
10 rows affected.
```

Out[105... []

In [106...
```sql
%%sql
INSERT INTO Customer (firstName, lastName, email, phoneNumber) VALUES
('John', 'Doe', 'johndoe@example.com', '555-555-5555'),
('Jane', 'Smith', 'janesmith@example.com', '555-123-4567'),
('Robert', 'Johnson', 'robert@example.com', '555-789-1234'),
('Sarah', 'Brown', 'sarah@example.com', '555-456-7890'),
```

```sql
('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');
```

 * mysql+mysqlconnector://root:***@localhost/carRental
10 rows affected.

Out[106…   []

In [107…
```sql
%%sql
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');
```

 * mysql+mysqlconnector://root:***@localhost/carRental
10 rows affected.

Out[107…   []

In [108…
```sql
%%sql
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);
```

 * mysql+mysqlconnector://root:***@localhost/carRental
10 rows affected.

Out[108…   []

In [109…
```sql
%%sql
# 1. Update the daily rate for a Mercedes car to 68.
update vehicle set dailyRate=68 where make='Mercedes';
```

 * mysql+mysqlconnector://root:***@localhost/carRental
1 rows affected.

Out[109…   []

In [110...
```sql
%%sql
select * from vehicle where make='Mercedes';
```

* mysql+mysqlconnector://root:***@localhost/carRental
1 rows affected.

Out[110...

vehicleID	make	model	year	dailyRate	status	passengerCapacity	engineCapacity
8	Mercedes	C-Class	2022	68.00	1	8	2599

In [111...
```sql
%%sql
# 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+mysqlconnector://root:***@localhost/carRental
3 rows affected.
3 rows affected.
1 rows affected.

Out[111...   []

In [112...
```sql
%%sql
select * from customer limit 3;
```

* mysql+mysqlconnector://root:***@localhost/carRental
3 rows affected.

Out[112...

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

In [113...
```sql
%%sql
select * from payment limit 3;
```

* mysql+mysqlconnector://root:***@localhost/carRental
3 rows affected.

Out[113...

paymentID	leaseID	paymentDate	amount
1	1	2023-01-03	200.00
2	2	2023-02-20	1000.00
4	4	2023-04-25	900.00

In [114…
```sql
%%sql
select * from lease limit 3;
```

* mysql+mysqlconnector://root:***@localhost/carRental
3 rows affected.

Out[114…

leaseID	vehicleID	customerID	startDate	endDate	leaseType
1	1	1	2023-01-01	2023-01-05	Daily
2	2	2	2023-02-15	2023-02-28	Monthly
4	4	4	2023-04-20	2023-04-30	Monthly

In [25]:
```sql
%%sql
# due to on delete cascade all the child tables will be deleted
delete from customer
where customerId = 4;
```

* mysql+mysqlconnector://root:***@localhost/carRental
1 rows affected.

Out[25]: []

In [115…
```sql
%%sql
# 3. Rename the "paymentDate" column in the Payment table to "transactionDate"
Alter table payment
rename column paymentDate to transactionDate;
```

* mysql+mysqlconnector://root:***@localhost/carRental
0 rows affected.

Out[115… []

In [116…
```sql
%%sql
select * from payment limit 2;
```

* mysql+mysqlconnector://root:***@localhost/carRental
2 rows affected.

Out[116…

paymentID	leaseID	transactionDate	amount
1	1	2023-01-03	200.00
2	2	2023-02-20	1000.00

In [120…
```sql
%%sql
# 4. Find a specific customer by email.
select * from customer
where email='johndoe@example.com';
```

* mysql+mysqlconnector://root:***@localhost/carRental
1 rows affected.

Out[120…

customerID	firstName	lastName	email	phoneNumber
1	John	Doe	johndoe@example.com	555-555-5555

In [122...
```sql
%%sql
# 5. Get active leases for a specific customer.
select * from lease
where customerid=5 and (enddate>=curdate() or month(enddate)>=3);
```

    * mysql+mysqlconnector://root:***@localhost/carRental
    1 rows affected.

Out[122...

leaseID	vehicleID	customerID	startDate	endDate	leaseType
5	5	5	2023-05-05	2023-05-10	Daily

In [123...
```sql
%%sql
# 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='555-123-4567';
```

    * mysql+mysqlconnector://root:***@localhost/carRental
    1 rows affected.

Out[123...

paymentID	leaseID	transactionDate	amount
2	2	2023-02-20	1000.00

In [124...
```sql
%%sql
# 7. Calculate the average daily rate of all available cars.
select avg(dailyrate) as Average_Daily_Rate
from vehicle
where status=1;
```

    * mysql+mysqlconnector://root:***@localhost/carRental
    1 rows affected.

Out[124...

Average_Daily_Rate
53.714286

In [125...
```sql
%%sql
#  8. Find the car with the highest daily rate.
select make as Car from vehicle
order by dailyrate desc
limit 1;
```

    * mysql+mysqlconnector://root:***@localhost/carRental
    1 rows affected.

Out[125...

Car
Mercedes

In [126...
```sql
%%sql
# 9. Retrieve all cars leased by a specific customer.
select v.*
from vehicle v
```

```sql
join lease l on v.vehicleid=l.vehicleid
where l.customerid=7;
```

* mysql+mysqlconnector://root:***@localhost/carRental
1 rows affected.

Out[126…]

vehicleID	make	model	year	dailyRate	status	passengerCapacity	engineCapacity
7	BMW	3 Series	2023	60.00	1	7	2499

In [127…]
```sql
%%sql
# 10. Find the details of the most recent lease.
select * from lease
order by startdate desc
limit 1;
```

* mysql+mysqlconnector://root:***@localhost/carRental
1 rows affected.

Out[127…]

leaseID	vehicleID	customerID	startDate	endDate	leaseType
10	10	10	2023-10-10	2023-10-31	Monthly

In [87]:
```sql
%%sql
# 11. List all payments made in the year 2023.
select * from payment
where year(transactiondate)=2023;
```

* mysql+mysqlconnector://root:***@localhost/carRental
1 rows affected.

Out[87]:

paymentID	leaseID	transactionDate	amount
4	4	2023-04-25	900.00

In [90]:
```sql
%%sql
# 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+mysqlconnector://root:***@localhost/carRental
0 rows affected.

Out[90]:

customerID	firstName	lastName	email	phoneNumber

In [91]:
```sql
%%sql
# 13. Retrieve Car Details and Their Total Payments.
select v.vehicleid,v.make, v.model, sum(p.amount) as Total_Payments  from vehicle v
left join lease l on v.vehicleid = l.vehicleid
left join payment p on l.leaseid = p.leaseid
group by v.vehicleid,v.make, v.model
```

* mysql+mysqlconnector://root:***@localhost/carRental
10 rows affected.

Out[91]:

vehicleid	make	model	Total_Payments
1	Toyota	Camry	200.00
2	Honda	Civic	1000.00
3	Ford	Focus	None
4	Nissan	Altima	900.00
5	Chevrolet	Malibu	60.00
6	Hyundai	Sonata	1200.00
7	BMW	3 Series	40.00
8	Mercedes	C-Class	1100.00
9	Audi	A4	80.00
10	Lexus	ES	1500.00

In [92]:
```sql
%%sql
# 14. Calculate Total Payments for Each Customer.
select C.customerID, C.firstName, C.lastName, sum(amount) as Total_payements from c
left join lease l on c.customerid = l.customerid
left join payment p on l.leaseid = p.leaseid
group by C.customerID, C.firstName, C.lastName;
```

 * mysql+mysqlconnector://root:***@localhost/carRental
9 rows affected.

Out[92]:

customerID	firstName	lastName	Total_payements
1	John	Doe	200.00
2	Jane	Smith	1000.00
4	Sarah	Brown	900.00
5	David	Lee	60.00
6	Laura	Hall	1200.00
7	Michael	Davis	40.00
8	Emma	Wilson	1100.00
9	William	Taylor	80.00
10	Olivia	Adams	1500.00

In [93]:
```sql
%%sql
# 15. List Car Details for Each Lease.
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;
```

* mysql+mysqlconnector://root:***@localhost/carRental
9 rows affected.

Out[93]:

leaseID	firstName	lastName	make	model	startDate	endDate	leaseType
1	John	Doe	Toyota	Camry	2025-01-01	2025-06-30	Monthly
2	Jane	Smith	Honda	Civic	2024-02-15	2024-08-28	Daily
4	Sarah	Brown	Nissan	Altima	2023-04-20	2023-04-30	Monthly
5	David	Lee	Chevrolet	Malibu	2025-05-05	2025-07-10	Daily
6	Laura	Hall	Hyundai	Sonata	2024-06-15	2024-12-30	Monthly
7	Michael	Davis	BMW	3 Series	2025-07-01	2025-09-10	Daily
8	Emma	Wilson	Mercedes	C-Class	2024-08-12	2024-08-15	Monthly
9	William	Taylor	Audi	A4	2025-09-07	2025-12-10	Daily
10	Olivia	Adams	Lexus	ES	2024-10-10	2024-10-31	Monthly

In [47]:
```sql
%%sql
# 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+mysqlconnector://root:***@localhost/carRental
0 rows affected.

Out[47]:

leaseID	firstName	lastName	make	model	startDate	endDate

In [94]:
```sql
%%sql
# 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+mysqlconnector://root:***@localhost/carRental
1 rows affected.

Out[94]:

customerID	firstName	lastName	totalSpent
10	Olivia	Adams	1500.00

In [95]:
```sql
%%sql
# 18. List All Cars with Their Current Lease Information.
select v.vehicleID, v.make, v.model, l.leaseID, l.startDate, l.endDate, c.firstName
from vehicle v
left join lease l on v.vehicleID = v.vehicleID
```

```
left join customer c on l.customerID = c.customerID
limit 10
```

* mysql+mysqlconnector://root:***@localhost/carRental
10 rows affected.

Out[95]:

vehicleID	make	model	leaseID	startDate	endDate	firstName	lastName
1	Toyota	Camry	10	2024-10-10	2024-10-31	Olivia	Adams
1	Toyota	Camry	9	2025-09-07	2025-12-10	William	Taylor
1	Toyota	Camry	8	2024-08-12	2024-08-15	Emma	Wilson
1	Toyota	Camry	7	2025-07-01	2025-09-10	Michael	Davis
1	Toyota	Camry	6	2024-06-15	2024-12-30	Laura	Hall
1	Toyota	Camry	5	2025-05-05	2025-07-10	David	Lee
1	Toyota	Camry	4	2023-04-20	2023-04-30	Sarah	Brown
1	Toyota	Camry	2	2024-02-15	2024-08-28	Jane	Smith
1	Toyota	Camry	1	2025-01-01	2025-06-30	John	Doe
2	Honda	Civic	10	2024-10-10	2024-10-31	Olivia	Adams

In [ ]:

```
left join customer c on l.customerID = c.customerID
limit 10
```