CAR RENTAL SYSTEM

- Create the database

create database carrentalsystem;

use carrentalsystem;

CREATING THE TABLES

- Creating Vehicle Table with Referential Integrity

```
CREATE TABLE Vehicle (
vehicleID INT PRIMARY KEY,
make VARCHAR(50),
model VARCHAR(50),
year INT,
dailyRate DECIMAL(10,2),
status TINYINT, -- 1 for available, 0 for not available
passengerCapacity INT,
engineCapacity INT
);
```

Field	Type	Null	Key	Default
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	YES		NULL
passengerCapacity	int	YES		NULL
engineCapacity	int	YES		NULL

- Creating Customer Table

```
CREATE TABLE Customer (
customerID INT PRIMARY KEY,
firstName VARCHAR(50),
lastName VARCHAR(50),
email VARCHAR(100) UNIQUE,
phoneNumber VARCHAR(20) UNIQUE
```

);

Field	Type	Null	Key	Default
customerID	int	NO	PRI	NULL
firstName	varchar(50)	YES		NULL
lastName	varchar(50)	YES		NULL
email	varchar(100)	YES	UNI	NULL
phoneNumber	varchar(20)	YES	UNI	NULL

- Creating Lease Table

CREATE TABLE Lease (
leaseID INT PRIMARY KEY,
vehicleID INT,
customerID INT,
startDate DATE,
endDate DATE,
leaseType VARCHAR(20),
FOREIGN KEY (vehicleID) REFERENCES Vehicle(vehicleID) ON DELETE CASCADE ON UPDATE CASCADE,
FOREIGN KEY (customerID) REFERENCES Customer(customerID) ON DELETE CASCADE ON UPDATE CASCADE
);

Field	Type	Null	Key	Default
leaseID	int	NO	PRI	NULL
vehicleID	int	YES	MUL	NULL
customerID	int	YES	MUL	NULL
startDate	date	YES		NULL
endDate	date	YES		NULL
leaseType	varchar(20)	YES		NULL

- Creating Payment Table

CREATE TABLE Payment (
paymentID INT PRIMARY KEY,
leaseID INT,
paymentDate DATE,
amount DECIMAL(10,2),

FOREIGN KEY (leaseID) REFERENCES Lease(leaseID) ON DELETE CASCADE ON UPDATE CASCADE
);

Field	Type	Null	Key	Default
paymentID	int	NO	PRI	NULL
leaseID	int	YES	MUL	NULL
paymentDate	date	YES		NULL
amount	decimal(10,2)	YES		NULL

INSERTING THE VALUES INTO THE TABLE

- Inserting Data into Vehicle Table

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, 8, 2599),
(9, 'Audi', 'A4', 2022, 55.00, 0, 4, 2500),
(10, 'Lexus', 'ES', 2023, 54.00, 1, 4, 2500);

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

- Inserting Data into 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');

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

- Inserting Data into Lease Table

INSERT INTO Lease (leaseID, vehicleID, customerID, startDate, endDate, leaseType) 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');

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
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

- Inserting Data into 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);

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

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

UPDATE Vehicle

SET dailyRate = 68

WHERE make = 'Mercedes';

--to display

SELECT * FROM Vehicle WHERE make = 'Mercedes';

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

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

DELETE FROM Payment

WHERE leaseID IN (SELECT leaseID FROM Lease WHERE customerID = 3);

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
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

DELETE FROM Lease

WHERE customerID = 3;

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
5	5	5	2023-05-05	2023-05-10	Daily
7	7	7	2023-07-01	2023-07-10	Daily
8	8	8	2023-08-12	2023-08-15	Monthly
10	10	10	2023-10-10	2023-10-31	Monthly

DELETE FROM Customer

WHERE customerID = 3;

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

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

```
ALTER TABLE Payment
RENAME COLUMN paymentDate TO transactionDate;
-- Verify the column rename
SHOW COLUMNS FROM Payment;
```

Field	Type	Null	Key	Default
paymentID	int	NO	PRI	NULL
leaseID	int	YES	MUL	NULL
transactionDate	date	YES		NULL
amount	decimal(10,2)	YES		NULL

4.Find a specific customer by email.

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

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

5. Get active leases for a specific customer.

```
SELECT * FROM Lease
WHERE customerID = 3 AND endDate >= CURDATE();
```

leaseID	vehicleID	customerID	startDate	endDate	leaseType
NULL	NULL	NULL	NULL	NULL	NULL

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 = '555-789-1234';
```

paymentID	leaseID	transactionDate	amount

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

```
SELECT AVG(dailyRate) AS averageDailyRate
FROM Vehicle
WHERE status = 1;
```

averageDailyRate
53.714286

8. Find the car with the highest daily rate.

```
SELECT * FROM Vehicle
WHERE dailyRate = (SELECT MAX(dailyRate) FROM Vehicle);
```

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

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;
```

vehicleID	make	model	year	dailyRate	status	passengerCapacity	engineCapacity

10. Find the details of the most recent lease.

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

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

11. List all payments made in the year 2023.

```
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

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;
```

customerID	firstName	lastName	email	phoneNumber
6	Laura	Hall	laura@example.com	555-234-5678
9	William	Taylor	william@example.com	555-321-6547

13. Retrieve Car Details and Their Total Payments.

```
SELECT v.vehicleID, v.make, v.model, v.year, 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, v.make, v.model, v.year;
```

vehicleID	make	model	year	totalPayments
1	Toyota	Camry	2022	200.00
2	Honda	Civic	2023	1000.00
4	Nissan	Altima	2023	900.00
5	Chevrolet	Malibu	2022	60.00
7	BMW	3 Series	2023	40.00
8	Mercedes	C-Class	2022	1100.00
10	Lexus	ES	2023	1500.00

14. Calculate Total Payments for Each Customer.

```
SELECT c.customerID, c.firstName, c.lastName, SUM(p.amount) AS totalPayments
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	totalPayments
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

15. List Car Details for Each Lease.

```
SELECT l.leaseID, v.vehicleID, v.make, v.model, v.year, l.startDate, l.endDate, l.leaseType
FROM Lease l
JOIN Vehicle v ON l.vehicleID = v.vehicleID;
```

leaseID	vehicleID	make	model	year	startDate	endDate	leaseType
1	1	Toyota	Camry	2022	2023-01-01	2023-01-05	Daily
2	2	Honda	Civi	2023	2023-02-15	2023-02-28	Monthly
4	4	Nissan	Altima	2023	2023-04-20	2023-04-30	Monthly
5	5	Chevrolet	Malibu	2022	2023-05-05	2023-05-10	Daily
7	7	BMW	3 Series	2023	2023-07-01	2023-07-10	Daily
8	8	Mercedes	C-Class	2022	2023-08-12	2023-08-15	Monthly
10	10	Lexus	ES	2023	2023-10-10	2023-10-31	Monthly

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

```
SELECT l.leaseID, c.customerID, c.firstName, c.lastName, v.vehicleID, v.make, v.model, v.year,
l.startDate, l.endDate, l.leaseType
FROM Lease l
JOIN Customer c ON l.customerID = c.customerID
JOIN Vehicle v ON l.vehicleID = v.vehicleID
WHERE l.endDate >= CURDATE();
```

leaseID	customerID	firstName	lastName	vehicleID	make	model	year	startDate	endDate	leaseType

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;
```

customerID	firstName	lastName	totalSpent
10	Olivia	Adams	1500.00

18. List All Cars with Their Current Lease Information.

```
SELECT v.vehicleID, v.make, v.model, v.year, l.leaseID, l.startDate, l.endDate, l.leasetype, c.customerID, 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	year	leaseID	startDate	endDate	leasetype	customerID	firstName	lastName
1	Toyota	Camry	2022	1	2023-01-01	2023-01-05	Daily	1	John	Doe
2	Honda	Civic	2023	2	2023-02-15	2023-02-28	Monthly	2	Jane	Smith
3	Ford	Focus	2022	NULL	NULL	NULL	NULL	NULL	NULL	NULL
4	Nissan	Altima	2023	4	2023-04-20	2023-04-30	Monthly	4	Sarah	Brown
5	Chevrolet	Malibu	2022	5	2023-05-05	2023-05-10	Daily	5	David	Lee
6	Hyundai	Sonata	2023	NULL	NULL	NULL	NULL	NULL	NULL	NULL
7	BMW	3 Series	2023	7	2023-07-01	2023-07-10	Daily	7	Michael	Davis
8	Mercedes	C-Class	2022	8	2023-08-12	2023-08-15	Monthly	8	Emma	Wilson
9	Audi	A4	2022	NULL	NULL	NULL	NULL	NULL	NULL	NULL
10	Lexus	ES	2023	10	2023-10-10	2023-10-31	Monthly	10	Olivia	Adams