30-12-2025 Day 3 – Subqueries, Set Operators & CTEs

1. Create Table commands

```
-- Passenger Profile
CREATE TABLE air_passenger_profile (
    profile_id VARCHAR(10) PRIMARY KEY,
    password VARCHAR(10) NOT NULL,
    first_name VARCHAR(10) NOT NULL,
    last_name VARCHAR(10),
    address VARCHAR(100),
    mobile_number BIGINT UNIQUE,
    email_id VARCHAR(30) UNIQUE
);

-- Flight Master
CREATE TABLE air_flight (
    flight_id VARCHAR(10) PRIMARY KEY,
    airline_id VARCHAR(10),
    airline_name VARCHAR(30),
    from_location VARCHAR(20),
    to_location VARCHAR(20),
    departure_time TIME,
    arrival_time TIME,
    duration TIME,
    total_seats INT
);

-- Flight Schedule / Pricing
CREATE TABLE air_flight_details (
    flight_id VARCHAR(10),
    flight_departure_date DATE,
    price DECIMAL(8,2),
    available_seats INT,
    PRIMARY KEY (flight_id, flight_departure_date),
    FOREIGN KEY (flight_id) REFERENCES air_flight(flight_id)
);

CREATE TABLE air_ticket_info (
    ticket_id VARCHAR(10) PRIMARY KEY,
    profile_id VARCHAR(10),
    flight_id VARCHAR(10),
    flight_departure_date DATE,
    status VARCHAR(10),
    FOREIGN KEY (profile_id) REFERENCES air_passenger_profile(profile_id),
    FOREIGN KEY (flight_id, flight_departure_date)
       REFERENCES air_flight_details(flight_id, flight_departure_date)
);

-- Credit Card Details
CREATE TABLE air_credit_card_details (
    profile_id VARCHAR(10),
    card_number BIGINT PRIMARY KEY,
    card_type VARCHAR(10),
    expiration_month INT,
    expiration_year INT,
    FOREIGN KEY (profile_id) REFERENCES air_passenger_profile(profile_id));
```

2. Insert commands

```
INSERT INTO air_passenger_profile VALUES
('P001','pwd1','Ravi','Kumar','Chennai',9000000001,'ravi@mail.com'),
('P002','pwd2','Anita','Sharma','Hyderabad',9000000002,'anita@mail.com'),
('P003','pwd3','Suresh','Rao','Bangalore',9000000003,'suresh@mail.com'),
('P004','pwd4','Meena','Iyer','Chennai',9000000004,'meena@mail.com'),
('P005','pwd5','Rahul','Verma','Delhi',9000000005,'rahul@mail.com'),
('P006','pwd6','Pooja','Singh','Mumbai',9000000006,'pooja@mail.com'),
('P007','pwd7','Arjun','Reddy','Hyderabad',9000000007,'arjun@mail.com'),
('P008','pwd8','Neha','Gupta','Pune',9000000008,'neha@mail.com'),
('P009','pwd9','Vikas','Malhotra','Chandigarh',9000000009,'vikas@mail.com'),
('P010','pwd10','Kiran','Patel','Ahmedabad',9000000010,'kiran@mail.com');

INSERT INTO air_flight VALUES
('F101','A01','ABC Airlines','Chennai','Hyderabad','06:00','07:30','01:30',180),
('F102','A01','ABC Airlines','Chennai','Delhi','09:00','11:30','02:30',180),
('F103','A01','ABC Airlines','Hyderabad','Chennai','18:00','19:30','01:30',180),
('F104','A01','ABC Airlines','Mumbai','Delhi','07:00','09:00','02:00',200),
('F105','A01','ABC Airlines','Delhi','Mumbai','17:00','19:00','02:00',200),
('F106','A01','ABC Airlines','Chennai','Bangalore','08:00','09:15','01:15',150),
('F107','A01','ABC Airlines','Bangalore','Hyderabad','10:00','11:30','01:30',150),
('F108','A01','ABC Airlines','Pune','Delhi','12:00','14:30','02:30',160),
('F109','A01','ABC Airlines','Delhi','Chennai','15:00','18:00','03:00',180),
('F110','A01','ABC Airlines','Hyderabad','Mumbai','20:00','21:30','01:30',170);

INSERT INTO air_flight_details VALUES
('F101','2024-03-10',3500,50),
('F101','2024-04-15',4000,40),
('F102','2024-04-05',5500,60),
('F103','2024-04-18',3600,45),
('F104','2024-05-12',4800,70),
('F105','2024-04-20',4700,65),
('F106','2024-04-08',3000,80),
('F107','2024-06-01',3200,75),
('F108','2024-04-25',5200,55),
('F109','2024-03-22',5100,50);

INSERT INTO air_ticket_info VALUES
('T001','P001','F101','2024-03-10','BOOKED'),
('T002','P001','F101','2024-04-15','BOOKED'),
('T003','P002','F101','2024-04-15','BOOKED'),
('T004','P002','F102','2024-04-05','BOOKED'),
('T005','P002','F105','2024-04-20','BOOKED'),
('T006','P003','F103','2024-04-18','BOOKED'),
('T007','P004','F101','2024-04-15','BOOKED'),
('T008','P005','F106','2024-04-08','BOOKED'),
('T009','P006','F108','2024-04-25','BOOKED'),
('T010','P007','F109','2024-03-22','BOOKED');
```

```
INSERT INTO air_credit_card_details VALUES
('P001',4111111111111111,'VISA',12,2026),
('P002',4222222222222222,'VISA',11,2025),
('P003',4333333333333333,'MASTER',10,2027),
('P004',4444444444444444,'VISA',9,2026),
('P005',4555555555555555,'MASTER',8,2028),
('P006',4666666666666666,'VISA',7,2026),
('P007',4777777777777777,'MASTER',6,2027),
('P008',4888888888888888,'VISA',5,2025),
('P009',4999999999999999,'MASTER',4,2028),
('P010',4000000000000000,'VISA',3,2026);
```

3. Queries

a. Write a query to display the average monthly ticket cost for each flight in ABC Airlines. The query should display the Flight_Id, From_location, To_Location, Month Name as "Month_Name" and average price as "Average_Price". Display the records sorted in ascending order based on flight id and then by Month Name.

```
SELECT
   f.flight_id,
   f.from_location,
   f.to_location,
   DATENAME(MONTH, fd.flight_departure_date) AS Month_Name,
   AVG(fd.price) AS Average_Price
FROM air_flight f
JOIN air_flight_details fd ON f.flight_id = fd.flight_id
WHERE f.airline_name = 'ABC Airlines'
GROUP BY
   f.flight_id, f.from_location, f.to_location,
   DATENAME(MONTH, fd.flight_departure_date),
   MONTH(fd.flight_departure_date)
ORDER BY f.flight_id, MONTH(fd.flight_departure_date);
```

Results | Messages

	flight_id	from_location	to_location	Month_Name	Average_Price
1	F101	Chennai	Hyderabad	March	3500.000000
2	F101	Chennai	Hyderabad	April	4000.000000
3	F102	Chennai	Delhi	April	5500.000000
4	F103	Hyderabad	Chennai	April	3600.000000
5	F104	Mumbai	Delhi	May	4800.000000
6	F105	Delhi	Mumbai	April	4700.000000
7	F106	Chennai	Bangalore	April	3000.000000
8	F107	Bangalore	Hyderabad	June	3200.000000
9	F108	Pune	Delhi	April	5200.000000
10	F109	Delhi	Chennai	March	5100.000000

b. Write a query to display the customer(s) who has/have booked least number of tickets in ABC Airlines. The Query should display profile_id, customer's first_name, Address and Number of tickets booked as "No_of_Tickets". Display the records sorted in ascending order based on customer's first name.

```sql
SELECT
    p.profile_id,
    p.first_name,
    p.address,
    COUNT(t.ticket_id) AS No_of_Tickets
FROM air_passenger_profile p
JOIN air_ticket_info t ON p.profile_id = t.profile_id
GROUP BY p.profile_id, p.first_name, p.address
HAVING COUNT(t.ticket_id) = (
    SELECT MIN(cnt)
    FROM (
        SELECT COUNT(*) cnt
        FROM air_ticket_info
        GROUP BY profile_id
    ) x
)
ORDER BY p.first_name;
```

Results | Messages

	profile_id	first_name	address	No_of_Tickets
1	P007	Arjun	Hyderabad	1
2	P004	Meena	Chennai	1
3	P006	Pooja	Mumbai	1
4	P005	Rahul	Delhi	1
5	P003	Suresh	Bangalore	1

c. Write a query to display the number of flight services between locations in a month. The Query should display From_Location, To_Location, Month as “Month_Name” and number of flight services as “No_of_Services”. Hint: The Number of Services can be calculated from the number of scheduled departure dates of a flight. The records should be displayed in ascending order based on From_Location and then by To_Location and then by month name.

```sql
SELECT
    f.from_location,
    f.to_location,
    DATENAME(MONTH, fd.flight_departure_date) AS Month_Name,
    COUNT(fd.flight_departure_date) AS No_of_Services
FROM air_flight f
JOIN air_flight_details fd ON f.flight_id = fd.flight_id
GROUP BY
    f.from_location,
    f.to_location,
    DATENAME(MONTH, fd.flight_departure_date),
    MONTH(fd.flight_departure_date)
ORDER BY f.from_location, f.to_location, MONTH(fd.flight_departure_date);
```

Results | Messages

	from_location	to_location	Month_Name	No_of_Services
1	Bangalore	Hyderabad	June	1
2	Chennai	Bangalore	April	1
3	Chennai	Delhi	April	1
4	Chennai	Hyderabad	March	1
5	Chennai	Hyderabad	April	1
6	Delhi	Chennai	March	1
7	Delhi	Mumbai	April	1
8	Hyderabad	Chennai	April	1
9	Mumbai	Delhi	May	1
10	Pune	Delhi	April	1

d. Write a query to display the customer(s) who has/have booked maximum number of tickets in ABC Airlines. The Query should display profile_id, customer's first_name, Address and Number of tickets booked as "No_of_Tickets". Display the records in ascending order based on customer's first name.

```
SELECT
   p.profile_id,
   p.first_name,
   p.address,
   COUNT(t.ticket_id) AS No_of_Tickets
FROM air_passenger_profile p
JOIN air_ticket_info t ON p.profile_id = t.profile_id
GROUP BY p.profile_id, p.first_name, p.address
HAVING COUNT(t.ticket_id) = (
   SELECT MAX(cnt)
   FROM (
      SELECT COUNT(*) cnt
      FROM air_ticket_info
      GROUP BY profile_id
   ) x
)
ORDER BY p.first_name;
```

Results | Messages

	profile_id	first_name	address	No_of_Tickets
1	P002	Anita	Hyderabad	3

e. Write a query to display the number of tickets booked from Chennai to Hyderabad. The Query should display passenger profile_id,first_name,last_name, Flight_Id , Departure_Date and number of tickets booked as "No_of_Tickets". Display the records sorted in ascending order based on profile id and then by flight id and then by departure date.

```
SELECT
    p.profile_id,
    p.first_name,
    p.last_name,
    f.flight_id,
    t.flight_departure_date,
    COUNT(t.ticket_id) AS No_of_Tickets
FROM air_ticket_info t
JOIN air_passenger_profile p ON t.profile_id = p.profile_id
JOIN air_flight f ON t.flight_id = f.flight_id
WHERE f.from_location = 'Chennai'
  AND f.to_location = 'Hyderabad'
GROUP BY
    p.profile_id, p.first_name, p.last_name,
    f.flight_id, t.flight_departure_date
ORDER BY p.profile_id, f.flight_id, t.flight_departure_date;
```

Results | Messages

	profile_id	first_name	last_name	flight_id	flight_departure_date	No_of_Tickets
1	P001	Ravi	Kumar	F101	2024-03-10	1
2	P001	Ravi	Kumar	F101	2024-04-15	1
3	P002	Anita	Sharma	F101	2024-04-15	1
4	P004	Meena	Iyer	F101	2024-04-15	1

f. Write a query to display flight id,from location, to location and ticket price of flights whose departure is in the month of april.

```
SELECT
    f.flight_id,
    f.from_location,
    f.to_location,
    fd.price
FROM air_flight f
JOIN air_flight_details fd ON f.flight_id = fd.flight_id
WHERE MONTH(fd.flight_departure_date) = 4;
```

Results | Messages

	flight_id	from_location	to_location	price
1	F101	Chennai	Hyderabad	4000.00
2	F102	Chennai	Delhi	5500.00
3	F103	Hyderabad	Chennai	3600.00
4	F105	Delhi	Mumbai	4700.00
5	F106	Chennai	Bangalore	3000.00
6	F108	Pune	Delhi	5200.00

g. Write a query to display the average cost of the tickets in each flight on all scheduled dates. The query should display flight_id, from_location, to_location and Average price as “Price”. Display the records sorted in ascending order based on flight id and then by from_location and then by to_location.

```
SELECT
   f.flight_id,
   f.from_location,
   f.to_location,
   AVG(fd.price) AS Price
FROM air_flight f
JOIN air_flight_details fd ON f.flight_id = fd.flight_id
GROUP BY f.flight_id, f.from_location, f.to_location
ORDER BY f.flight_id, f.from_location, f.to_location;
```

Results Messages

	flight_id	from_location	to_location	Price
1	F101	Chennai	Hyderabad	3750.000000
2	F102	Chennai	Delhi	5500.000000
3	F103	Hyderabad	Chennai	3600.000000
4	F104	Mumbai	Delhi	4800.000000
5	F105	Delhi	Mumbai	4700.000000
6	F106	Chennai	Bangalore	3000.000000
7	F107	Bangalore	Hyderabad	3200.000000
8	F108	Pune	Delhi	5200.000000
9	F109	Delhi	Chennai	5100.000000

h. Write a query to display the customers who have booked tickets from Chennai to Hyderabad. The query should display profile_id, customer_name (combine first_name & last_name with comma in b/w), address of the customer. Give an alias to the name as customer_name. Hint: Query should fetch unique customers irrespective of multiple tickets booked. Display the records sorted in ascending order based on profile id.

```
SELECT DISTINCT
   p.profile_id,
   CONCAT(p.first_name, ',', p.last_name) AS customer_name,
   p.address
FROM air_ticket_info t
JOIN air_passenger_profile p ON t.profile_id = p.profile_id
JOIN air_flight f ON t.flight_id = f.flight_id
WHERE f.from_location = 'Chennai'
  AND f.to_location = 'Hyderabad'
ORDER BY p.profile_id;
```

Results Messages

	profile_id	customer_name	address
1	P001	Ravi,Kumar	Chennai
2	P002	Anita,Sharma	Hyderabad
3	P004	Meena,Iyer	Chennai

i. Write a query to display profile id of the passenger(s) who has/have booked maximum number of tickets. In case of multiple records, display the records sorted in ascending order based on profile id.

```
SELECT profile_id
FROM air_ticket_info
GROUP BY profile_id
HAVING COUNT(*) = (
   SELECT MAX(cnt)
   FROM (
      SELECT COUNT(*) cnt
      FROM air_ticket_info
      GROUP BY profile_id
   ) x
)
ORDER BY profile_id;
```

Results Messages

	profile_id
1	P002

j. Write a query to display the total number of tickets as "No_of_Tickets" booked in each flight in ABC Airlines. The Query should display the flight_id, from_location, to_location and the number of tickets. Display only the flights in which atleast 1 ticket is booked. Display the records sorted in ascending order based on flight id

```
SELECT
f.flight_id,
f.from_location,
f.to_location,
COUNT(t.ticket_id) AS No_of_Tickets
FROM air_flight f
JOIN air_ticket_info t ON f.flight_id = t.flight_id
GROUP BY f.flight_id, f.from_location, f.to_location
HAVING COUNT(t.ticket_id) >= 1
ORDER BY f.flight_id;
```

Results Messages

	flight_id	from_location	to_location	No_of_Tickets
1	F101	Chennai	Hyderabad	4
2	F102	Chennai	Delhi	1
3	F103	Hyderabad	Chennai	1
4	F105	Delhi	Mumbai	1
5	F106	Chennai	Bangalore	1
6	F108	Pune	Delhi	1
7	F109	Delhi	Chennai	1