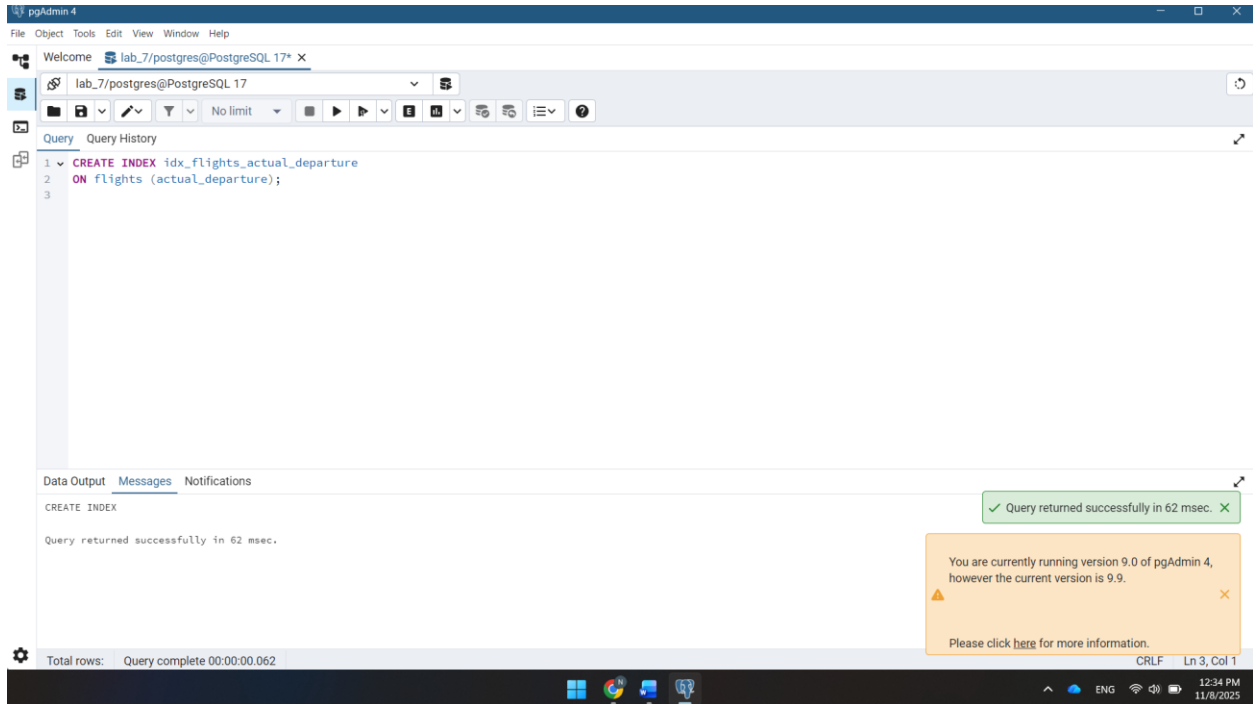
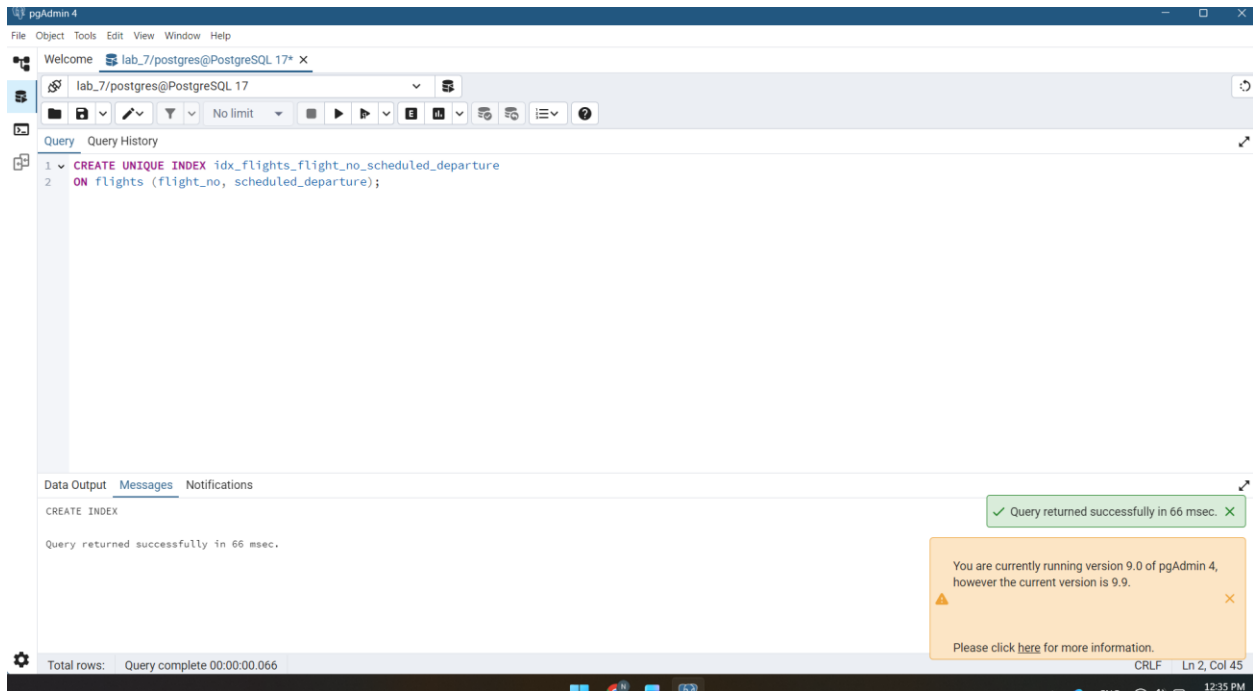


# Lab-7



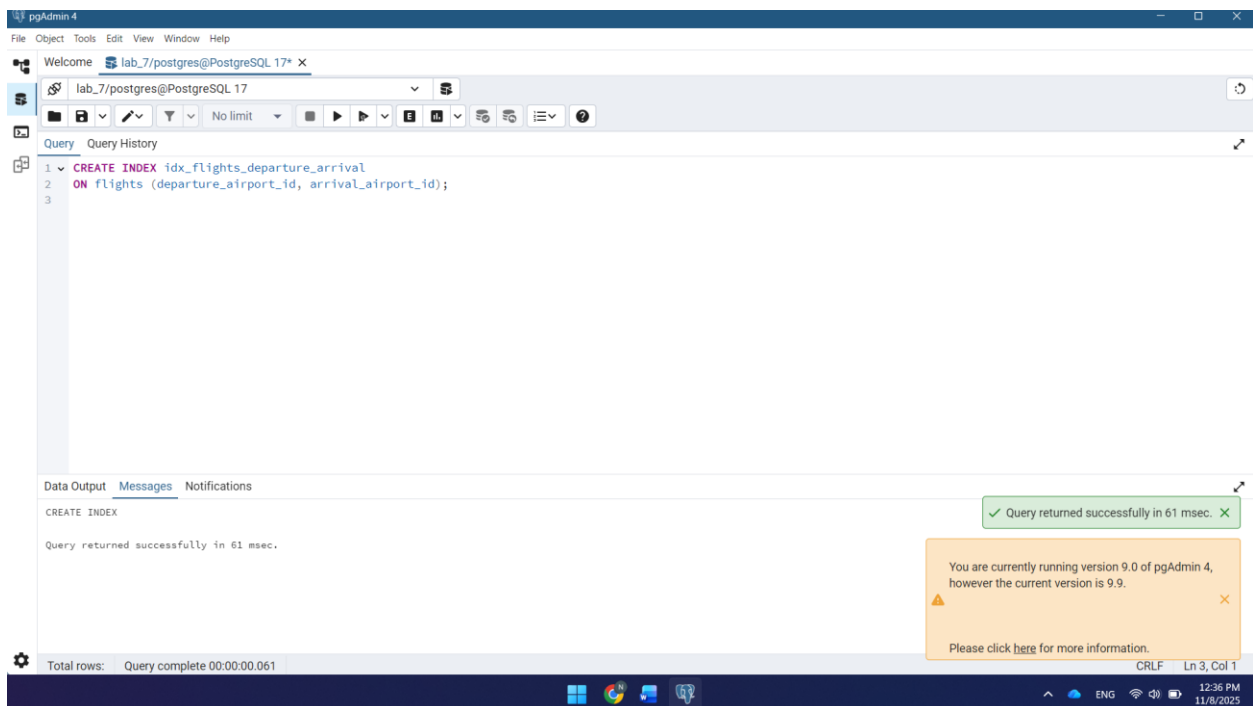
1

```
CREATE INDEX idx_flights_actual_departure
ON flights (actual_departure);
```



2

**CREATE INDEX idx\_flights\_flight\_no\_scheduled\_departure  
ON flights (flight\_no, scheduled\_departure);**

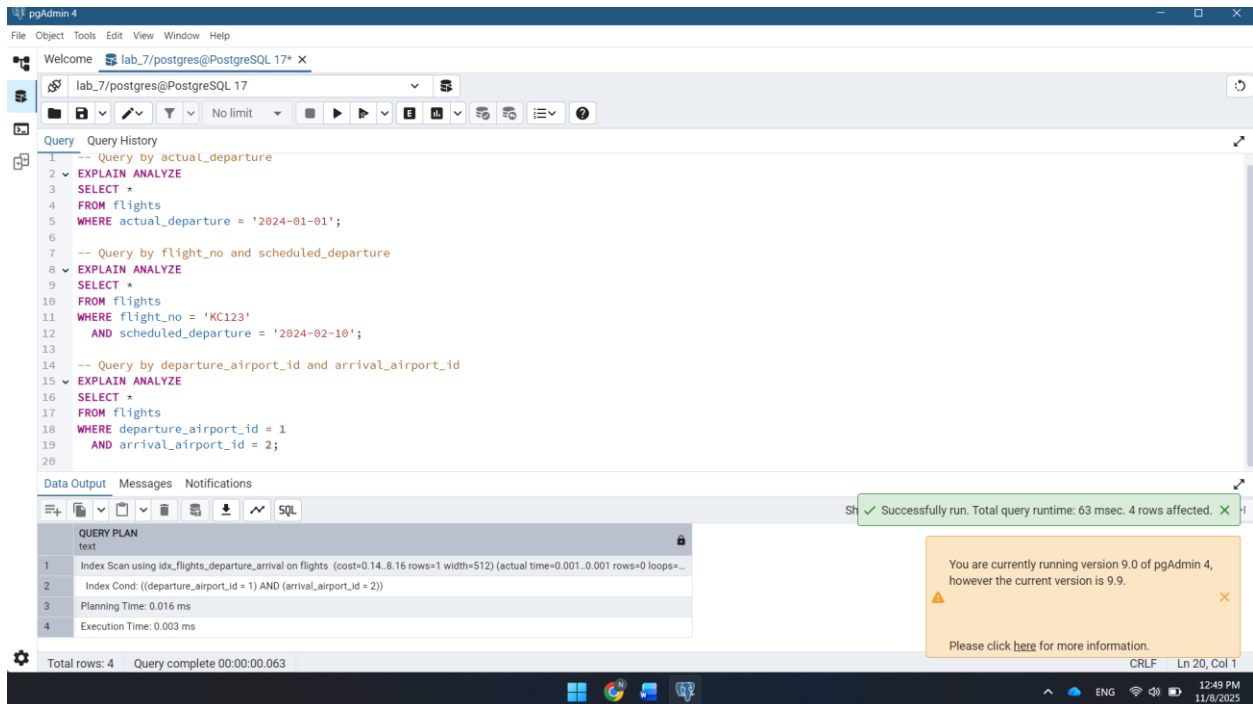


3

**CREATE INDEX idx\_flights\_departure\_arrival**  
**ON flights (departure\_airport\_id, arrival\_airport\_id);**

**4**

## Queries without indexes



**-- Query by actual\_departure**

**EXPLAIN ANALYZE**

**SELECT \***

**FROM flights**

**WHERE actual\_departure = '2024-01-01';**

**-- Query by flight\_no and scheduled\_departure**

**EXPLAIN ANALYZE**

**SELECT \***

**FROM flights**

**WHERE flight\_no = 'KC123'**

**AND scheduled\_departure = '2024-02-10';**

**-- Query by departure\_airport\_id and arrival\_airport\_id**

**EXPLAIN ANALYZE**

**SELECT \***

**FROM flights**

**WHERE departure\_airport\_id = 1**

**AND arrival\_airport\_id = 2;**

**Queries with indexes**

The screenshot shows the pgAdmin 4 interface with a SQL editor and a query plan. The SQL editor contains the following queries:

```
1 CREATE INDEX IF NOT EXISTS idx_flights_actual_departure
2 ON flights(actual_departure);
3
4 CREATE UNIQUE INDEX IF NOT EXISTS idx_unique_flight_no_scheduled_departure
5 ON flights(flight_no, scheduled_departure);
6
7 CREATE INDEX IF NOT EXISTS idx_flights_departure_arrival
8 ON flights(departure_airport_id, arrival_airport_id);
9
10
11
12 -- Query by actual_departure
13 EXPLAIN ANALYZE
14 SELECT *
15 FROM flights
16 WHERE actual_departure = '2024-01-01';
17
18 -- Query by flight_no and scheduled_departure
19 EXPLAIN ANALYZE
20 SELECT *
```

The query plan for the second query is shown below:

Step	Index	Index Cond	Planner Time	Execution Time
1	Index Scan using idx_flights_departure_arrival on flights	(cost=0.14..8.16 rows=1 width=512) (actual time=0.002..0.002 rows=0 loops=...)		
2	Index Cond	((departure_airport_id = 1) AND (arrival_airport_id = 2))		
3		Planning Time: 0.039 ms		
4		Execution Time: 0.007 ms		

A green notification bar at the bottom of the SQL editor states: "Successfully run. Total query runtime: 75 msec. 4 rows affected." An orange warning box on the right side of the interface says: "You are currently running version 9.0 of pgAdmin 4, however the current version is 9.9. Please click [here](#) for more information."

**CREATE INDEX IF NOT EXISTS idx\_flights\_actual\_departure**

**ON flights(actual\_departure);**

```
CREATE UNIQUE INDEX IF NOT EXISTS  
idx_unique_flight_no_scheduled_departure  
ON flights(flight_no, scheduled_departure);
```

```
CREATE INDEX IF NOT EXISTS idx_flights_departure_arrival  
ON flights(departure_airport_id, arrival_airport_id);
```

```
-- Query by actual_departure  
EXPLAIN ANALYZE  
SELECT *  
FROM flights  
WHERE actual_departure = '2024-01-01';
```

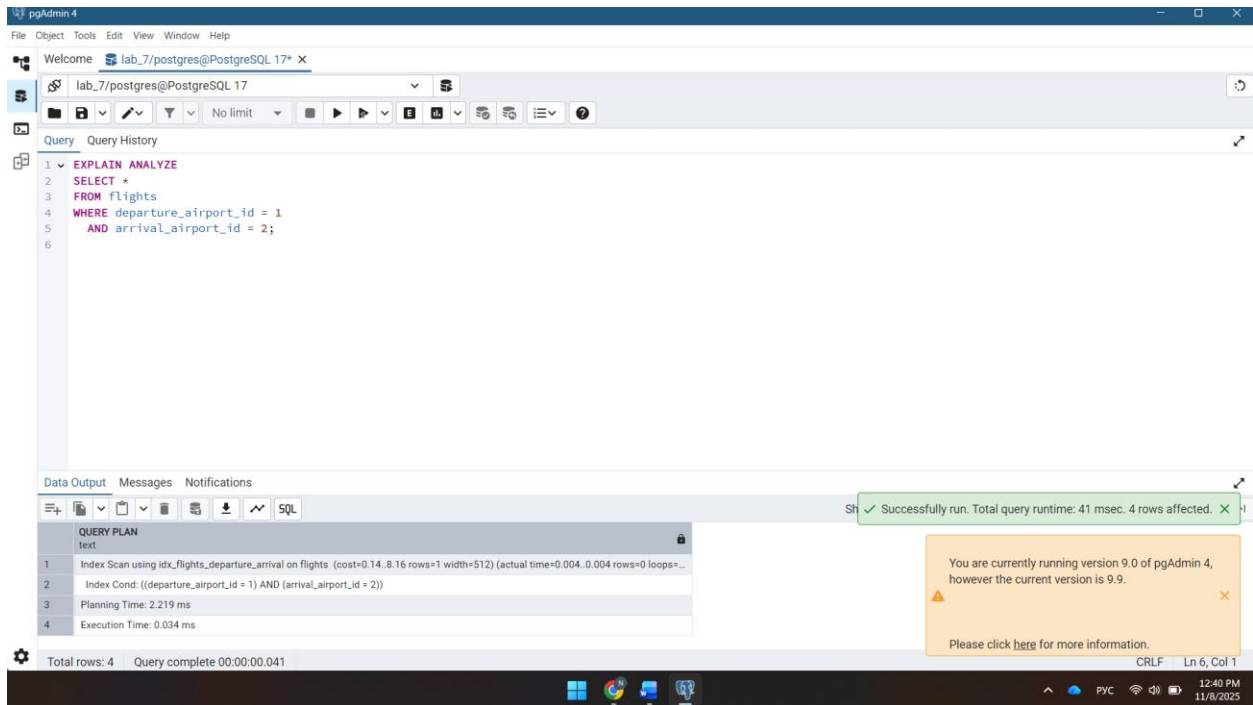
```
-- Query by flight_no and scheduled_departure  
EXPLAIN ANALYZE  
SELECT *  
FROM flights  
WHERE flight_no = 'KC123'  
AND scheduled_departure = '2024-02-10';
```

```
-- Query by departure_airport_id and arrival_airport_id  
EXPLAIN ANALYZE  
SELECT *
```

**FROM flights**

**WHERE departure\_airport\_id = 1**

**AND arrival\_airport\_id = 2;**



**5**

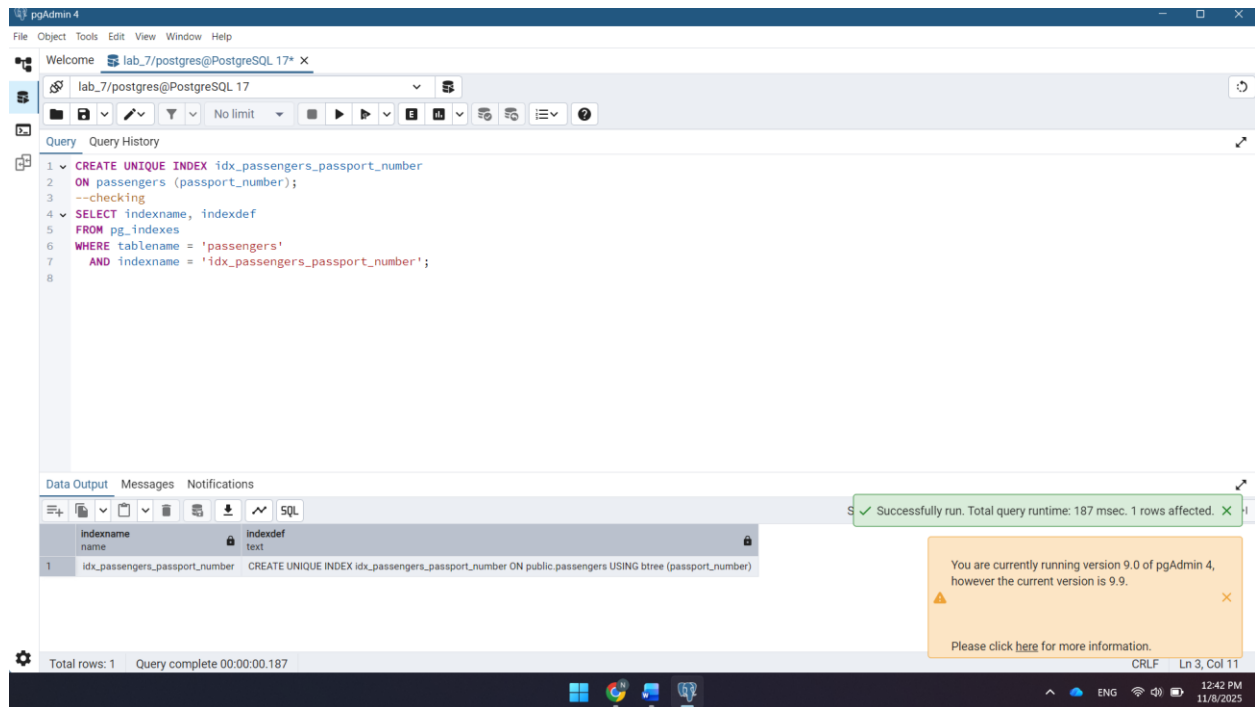
**EXPLAIN ANALYZE**

**SELECT \***

**FROM flights**

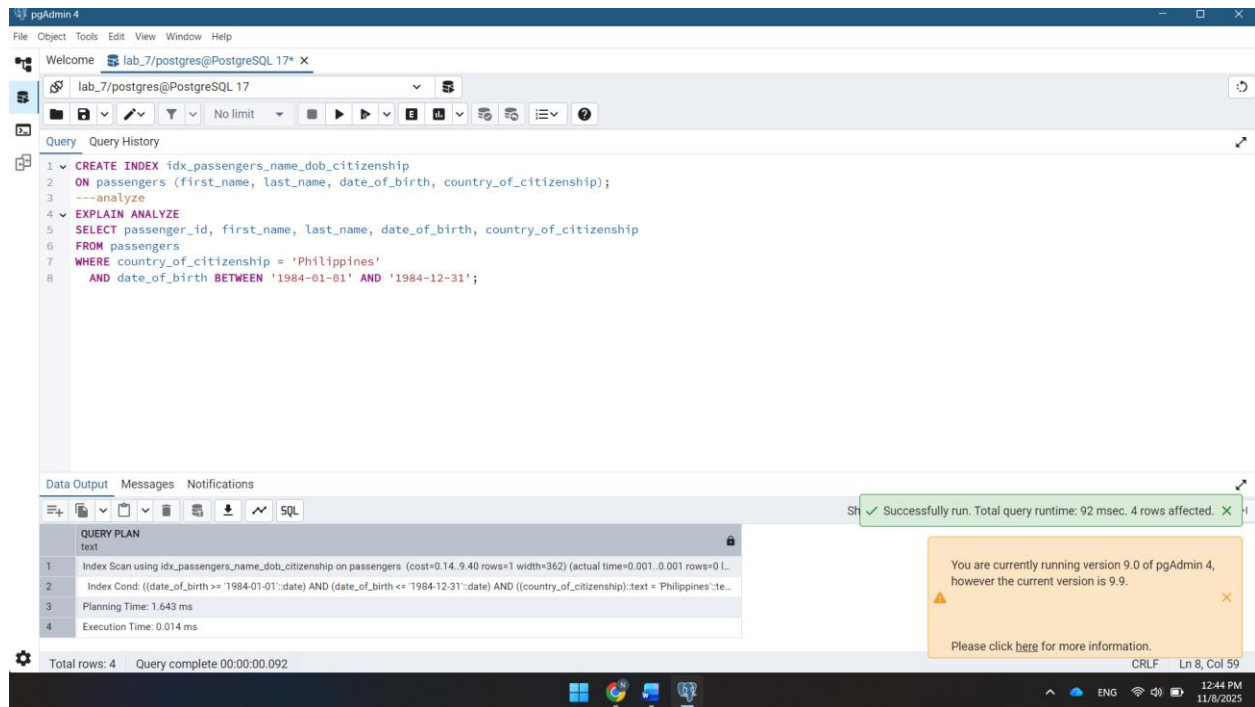
**WHERE departure\_airport\_id = 1**

**AND arrival\_airport\_id = 2;**



6

```
CREATE UNIQUE INDEX idx_passengers_passport_number
ON passengers (passport_number);
--checking
SELECT indexname, indexdef
FROM pg_indexes
WHERE tablename = 'passengers'
AND indexname = 'idx_passengers_passport_number';
```



7

**CREATE INDEX idx\_passengers\_name\_dob\_citizenship**

**ON passengers (first\_name, last\_name, date\_of\_birth,  
country\_of\_citizenship);**

**---analyze**

**EXPLAIN ANALYZE**

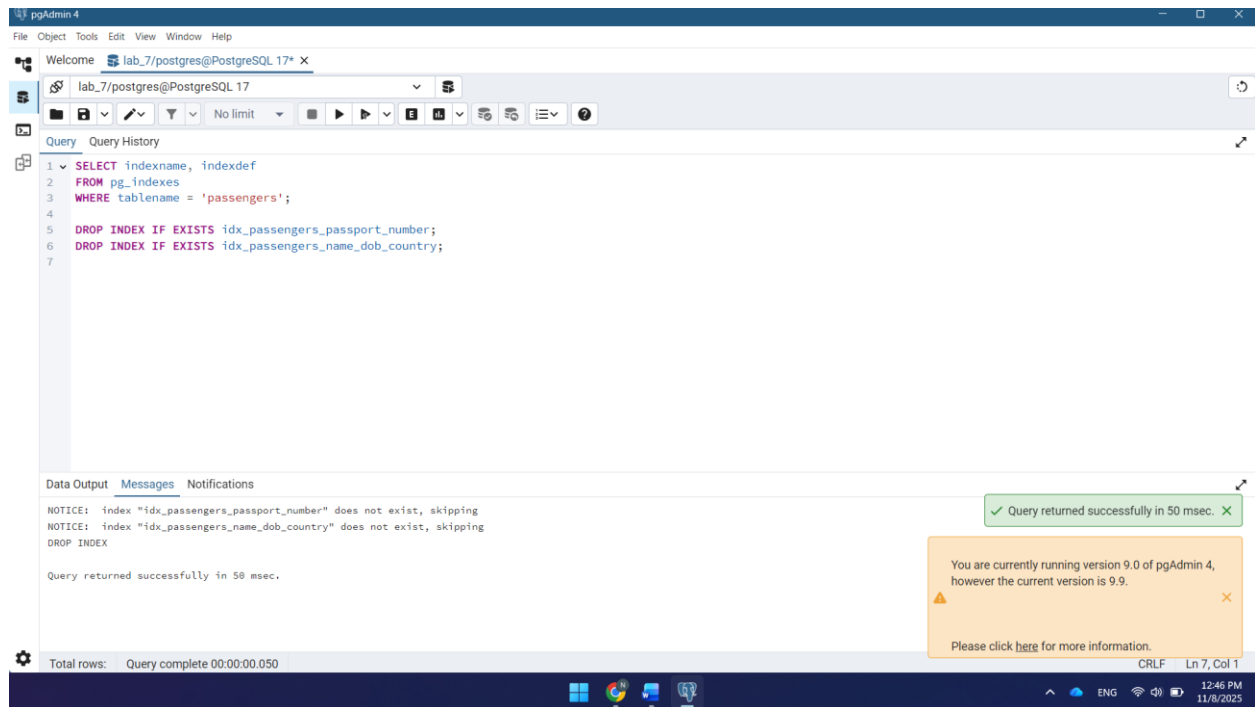
**SELECT passenger\_id, first\_name, last\_name, date\_of\_birth,  
country\_of\_citizenship**

**FROM passengers**

**WHERE country\_of\_citizenship = 'Philippines'**

**AND date\_of\_birth BETWEEN '1984-01-01' AND '1984-12-31';**





8

**SELECT indexname, indexdef**

**FROM pg\_indexes**

**WHERE tablename = 'passengers';**

**DROP INDEX IF EXISTS idx\_passengers\_passport\_number;**

**DROP INDEX IF EXISTS idx\_passengers\_name\_dob\_country;**