

1

The screenshot shows the pgAdmin 4 interface. The left pane is the Object Explorer, displaying a tree structure of database objects. Under the 'Tables(10)' node, the 'airline' table is selected. The right pane contains a query editor window with the following SQL command:

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

The status bar at the bottom right indicates "Query returned successfully in 80 msec." and "Query complete 00:00:00.080".

2

The screenshot shows the pgAdmin 4 interface. The left pane is the Object Explorer, displaying a tree structure of database objects. Under the 'Tables(10)' node, the 'airline' table is selected. The right pane contains a query editor window with the following SQL command:

```
CREATE UNIQUE INDEX idx_flight_unique ON flights(flight_no, scheduled_departure);
```

The status bar at the bottom right indicates "Query returned successfully in 62 msec." and "Query complete 00:00:00.062".

3

5

The screenshot shows the pgAdmin 4 interface. The left pane is the Object Explorer, displaying a database structure with tables like airline, airport, baggage, etc. The right pane is the SQL editor. A query is being run:

```
CREATE INDEX idx_airport_pair ON flights(departure_airport_id, arrival_airport_id);
```

The status bar at the bottom indicates "Query complete 00:00:00.034". Below the status bar, error messages are displayed:

ERROR: отношение "idx_airport_pair" уже существует
ОШИБКА: отношение "idx_airport_pair" уже существует
SQL state: 42P07

6

The screenshot shows the pgAdmin 4 interface. The left pane is the Object Explorer. The right pane is the SQL editor. A query is being run:

```
EXPLAIN ANALYZE
SELECT * FROM flights
WHERE departure_airport_id = 1 AND arrival_airport_id = 2;
```

The status bar at the bottom indicates "Query complete 00:00:00.049". Below the status bar, a message box says "Successfully run. Total query runtime: 49 msec. 7 rows affected." The middle section of the interface shows the "Data Output" tab with the query plan:

QUERY PLAN
1 Bitmap Heap Scan on flights (cost=4.30..9.97 rows=2 width=61) (actual time=0.048..0.051 rows=2 loops=1)
2 Recheck Cond ((departure_airport_id = 1) AND (arrival_airport_id = 2))
3 Heap Blocks: exact=2
4 -> Bitmap Index Scan on idx_airport_pair (cost=0.00..4.29 rows=2 width=0) (actual time=0.038..0.039 rows=2 loops=1)
5 Index Cond: ((departure_airport_id = 1) AND (arrival_airport_id = 2))
6 Planning Time: 1.298 ms
7 Execution Time: 0.083 ms

7

```

CREATE UNIQUE INDEX idx_passport_unique ON passengers(passport_number);
SELECT indexname, indexdef
FROM pg_indexes
WHERE tablename = 'passengers' AND indexname = 'idx_passport_unique';
SELECT MAX(passenger_id) FROM passengers;
INSERT INTO passengers (passenger_id, first_name, last_name, date_of_birth, gender,
country_of_citizenship, country_of_residence, passport_number, created_at, update_at)
VALUES (9601, 'John', 'Doe', '1980-01-01', 'M', 'USA', 'USA', 'UNIQUE001', CURRENT_DATE, CURRENT_DATE);
INSERT INTO passengers (passenger_id, first_name, last_name, date_of_birth, gender,
country_of_citizenship, country_of_residence, passport_number, created_at, update_at)
VALUES (9602, 'Jane', 'Smith', '1990-02-02', 'F', 'UK', 'UK', 'UNIQUE001', CURRENT_DATE, CURRENT_DATE);

```

Error message:

ERROR: повторяющееся значение ключа нарушает ограничение уникальности "idx_passport_unique"
Ключ "(passport_number)=(UNIQUE001)" уже существует.

Ошибка:

ОШИБКА: повторяющееся значение ключа нарушает ограничение уникальности "idx_passport_unique"
SQL state: 23505
Detail: Ключ "(passport_number)=(UNIQUE001)" уже существует.

Total rows: 0 Query complete 00:00:00.039 CRLF Ln 13, Col 1

8

```

CREATE INDEX idx_passenger_details ON passengers(first_name, last_name, date_of_birth);
EXPLAIN ANALYZE
SELECT * FROM passengers
WHERE country_of_citizenship = 'Philippines'
AND EXTRACT(YEAR FROM date_of_birth) = 1984;

```

Error message:

ERROR: отношение "idx_passenger_details" уже существует

Ошибка:

ОШИБКА: отношение "idx_passenger_details" уже существует
SQL state: 42P07

Total rows: 5 Query complete 00:00:00.055 CRLF Ln 8, Col 1

