

The screenshot shows the pgAdmin 4 interface. On the left is the Object Explorer, which lists database objects for the schema BD_Lab2/postgres@PostgreSQL 17*. The tree includes nodes for Indexes, RLS Policies, Rules, Triggers, booking_flight, flights, and other system objects like Constraints, Indexes, RLS Policies, Rules, and Triggers. The booking_flight node is expanded, showing its five columns: booking_flight_id, booking_id, flight_id, created_at, and updated_at. The flights node is also expanded, showing its twelve columns: flight_id, sch_departure_time, sch_arrival_time, departing_airport_id, arriving_airport_id, departing_gate, arriving_gate, airline_id, act_departure_time, act_arrival_time, created_at, and updated_at. The flights node also has constraints, indexes, RLS policies, rules, and triggers listed under it. The main window contains a query editor with the following content:

```
1 #1
2 CREATE INDEX idx_flights_actual_departure ON flights(act_departure_time);
```

Below the query editor is a Data Output tab showing the results of the CREATE INDEX command:

CREATE INDEX

Query returned successfully in 269 msec.

Total rows: Query complete 00:00:00.269 LF Ln 2, Col 1

Object Explorer

- > Indexes
- > RLS Policies
- > Rules
- > Triggers
- booking_flight
 - > Columns(5)
 - booking_flight_id
 - booking_id
 - flight_id
 - created_at
 - updated_at
- > Constraints
- > Indexes
- > RLS Policies
- > Rules
- > Triggers
- flights
 - > Columns(12)
 - flight_id
 - sch_departure_time
 - sch_arrival_time
 - departing_airport_id
 - arriving_airport_id
 - departing_gate
 - arriving_gate
 - airline_id
 - act_departure_time
 - act_arrival_time
 - created_at
 - updated_at
- > Constraints
- > Indexes
- > RLS Policies
- > Rules
- > Triggers

BD_Lab2/postgres@PostgreSQL 17*

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No limit

Query History

```
1 #1
2 CREATE INDEX idx_flights_actual_departure ON flights(act_departure_time);
3
4 #2
5 CREATE UNIQUE INDEX idx_flights_unique_flight
6 ON flights(flight_id, sch_departure_time);
```

Data Output Messages Notifications

CREATE INDEX

Query returned successfully in 67 msec.

Total rows: Query complete 00:00:00.067

✓ Query returned successfully in 67 msec. ✘

LF Ln 5, Col 1

Object Explorer BD_Lab2/postgres@PostgreSQL 17* X

BD_Lab2/postgres@PostgreSQL 17

No limit

Query History

```
1 #1
2 CREATE INDEX idx_flights_actual_departure ON flights(act_departure_time);
3
4 #2
5 CREATE UNIQUE INDEX idx_flights_unique_flight
6 ON flights(flight_id, sch_departure_time);
7
8 #3
9 CREATE INDEX idx_flights_airports
10 ON flights(departing_airport_id, arriving_airport_id);
```

Data Output Messages Notifications

CREATE INDEX

Query returned successfully in 62 msec.

Total rows: Query complete 00:00:00.062

✓ Query returned successfully in 62 msec. ×

LF Ln 9, Col 1

Object Explorer

- > Indexes
- > RLS Policies
- > Rules
- > Triggers
- booking_flight
 - Columns(5)
 - booking_flight_id
 - booking_id
 - flight_id
 - created_at
 - updated_at
- > Constraints
- > Indexes
- > RLS Policies
- > Rules
- > Triggers
- flights
 - Columns(12)
 - flight_id
 - sch_departure_time
 - sch_arrival_time
 - departing_airport_id
 - arriving_airport_id
 - departing_gate
 - arriving_gate
 - airline_id
 - act_departure_time
 - act_arrival_time
 - created_at
 - updated_at
- > Constraints
- > Indexes
- > RLS Policies
- > Rules
- > Triggers

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Query History

```
1 #1
2 CREATE INDEX idx_flights_actual_departure ON flights(act_departure_time);
3
4 #2
5 CREATE UNIQUE INDEX idx_flights_unique_flight
6 ON flights(flight_id, sch_departure_time);
7
8 #3
9 CREATE INDEX idx_flights_airports
10 ON flights(departing_airport_id, arriving_airport_id);
11
12 #4
13 DROP INDEX IF EXISTS idx_flights_airports;
14
15
16 #5
17 EXPLAIN ANALYZE
18 SELECT * FROM flights
19 WHERE departing_airport_id = 2 AND arriving_airport_id = 1;
20
21
```

Data Output Messages Notifications

Showing rows: 1 to 5 Page No: 1 of 1

QUERY PLAN

| text |
|---|
| 1 Seq Scan on flights (cost=0.00..1.42 rows=1 width=214) (actual time=0.016..0.016 rows=0 loops=... |
| 2 Filter: ((departing_airport_id = 2) AND (arriving_airport_id = 1)) |
| 3 Rows Removed by Filter: 28 |
| 4 Planning Time: 0.234 ms |
| 5 Execution Time: 0.031 ms |

Total rows: 5 Query complete 00:00:00.082 ✓ Successfully run. Total query runtime: 82 msec. 5 rows affected. LF Ln 13, Col 1

Object Explorer BD_Lab2/postgres@PostgreSQL 17*

Query History

```
4 #2
5 CREATE UNIQUE INDEX idx_flights_unique_flight
6 ON flights(flight_id, sch_departure_time);
7
8 #3
9 CREATE INDEX idx_flights_airports
10 ON flights(departing_airport_id, arriving_airport_id);
11
12 #4
13 DROP INDEX IF EXISTS idx_flights_airports;
14
15
16 EXPLAIN ANALYZE
17 SELECT * FROM flights
18 WHERE departing_airport_id = 2 AND arriving_airport_id = 1;
19
20 #5
21 EXPLAIN ANALYZE
22 SELECT flight_id, sch_departure_time, act_departure_time
23 FROM flights
24 WHERE departing_airport_id = 1 AND arriving_airport_id = 2;
25
26
```

Data Output Messages Notifications

Showing rows: 1 to 5 Page No: 1 of 1

QUERY PLAN text

- Seq Scan on flights (cost=0.00..1.42 rows=1 width=20) (actual time=0.019..0.024 rows=1 loops=...)
- Filter: ((departing_airport_id = 1) AND (arriving_airport_id = 2))
- Rows Removed by Filter: 27
- Planning Time: 0.552 ms
- Execution Time: 0.037 ms

Total rows: 5 Query complete 00:00:00.077 ✓ Successfully run. Total query runtime: 77 msec. 5 rows affected. LF Ln 21, Col 1

Object Explorer BD_Lab2/postgres@PostgreSQL 17*

Query History

```
33 ✓ SELECT indexname, indexdef
FROM pg_indexes
WHERE tablename = 'passengers';
34
35
36
37
38 ✓ INSERT INTO passengers (first_name, last_name, passport_number)
VALUES
('Ivan', 'Ivanov', 'AB123456'),
('Petr', 'Petrov', 'AB123456');
39
40
41
42
43
44 ✓ #7
45
46
47 CREATE INDEX idx_passengers_search
ON passengers(first_name, last_name, date_of_birth, country_of_citizenship);
48
49
50
51 ✓ EXPLAIN ANALYZE
SELECT * FROM passengers
WHERE country_of_citizenship = 'Philippines'
AND EXTRACT(YEAR FROM date_of_birth) = 1984;
52
53
54
55
```

Data Output Messages Notifications

Showing rows: 1 to 5 Page No: 1 of 1

QUERY PLAN text

```
1 Seq Scan on passengers (cost=0.00..2.03 rows=1 width=64) (actual time=0.025..0.026 rows=0 loops=1)
2 Filter: (((country_of_citizenship)::text = 'Philippines'::text) AND (EXTRACT(year FROM date_of_birth) = '1984'::numerical))
3 Rows Removed by Filter: 59
4 Planning Time: 2.675 ms
5 Execution Time: 0.042 ms
```

Total rows: 5 Query complete 00:00:00.230 ✓ Successfully run. Total query runtime: 230 msec. 5 rows affected. LF Ln 47, Col 1

Object Explorer

- > Constraints
- > Indexes
- > RLS Policies
- > Rules
- > Triggers
- > booking_flight
 - Columns (5)
 - booking_flight_id
 - booking_id
 - flight_id
 - created_at
 - updated_at
- > Constraints
- > Indexes
- > RLS Policies
- > Rules
- > Triggers
- > flights
- > passengers
 - Columns (10)
 - passenger_id
 - first_name
 - last_name
 - date_of_birth
 - gender
 - country_of_citizenship
 - country_of_residence
 - passport_number
 - created_at
 - updated_at
- > Constraints
- > Indexes
- > RLS Policies
- > Rules
- > Triggers

BD_Lab2/postgres@PostgreSQL 17*

Query History

```
24 WHERE departing_airport_id = 1 AND arriving_airport_id = 2;
25
26
27 #6
28
29 CREATE UNIQUE INDEX idx_passengers_passport_unique
30 ON passengers(passport_number);
31
32
33
34
35 #7
36
37
38 CREATE INDEX idx_passengers_search
39 ON passengers(first_name, last_name, date_of_birth, country_of_citizenship);
40
41
42 EXPLAIN ANALYZE
43 SELECT * FROM passengers
44 WHERE country_of_citizenship = 'Philippines'
45 AND EXTRACT(YEAR FROM date_of_birth) = 1984;
```

Data Output Messages Notifications

CREATE INDEX

Query returned successfully in 155 msec.

Total rows: Query complete 00:00:00.155

✓ Query returned successfully in 155 msec. LF Ln 29, Col 1

Object Explorer

- > Constraints
- > Indexes
- > RLS Policies
- > Rules
- > Triggers
- > booking_flight
 - Columns(5)
 - booking_flight_id
 - booking_id
 - flight_id
 - created_at
 - updated_at
- > Constraints
- > Indexes
- > RLS Policies
- > Rules
- > Triggers
- > flights
- > passengers
 - Columns(10)
 - passenger_id
 - first_name
 - last_name
 - date_of_birth
 - gender
 - country_of_citizenship
 - country_of_residence
 - passport_number
 - created_at
 - updated_at
- > Constraints
- > Indexes
- > RLS Policies
- > Rules
- > Triggers

BD_Lab2/postgres@PostgreSQL 17*

Query History

```

36
37
38 CREATE INDEX idx_passengers_search
39 ON passengers(first_name, last_name, date_of_birth, country_of_citizenship);
40
41
42 EXPLAIN ANALYZE
43 SELECT * FROM passengers
44 WHERE country_of_citizenship = 'Philippines'
45 AND EXTRACT(YEAR FROM date_of_birth) = 1984;
46
47 #8
48
49
50 SELECT
51   indexname,
52   indexdef
53 FROM pg_indexes
54 WHERE tablename = 'passengers';
55
56
57
58

```

Data Output Messages Notifications

| indexname name | indexdef text |
|-------------------------|--|
| 1 passengers_pkey | CREATE UNIQUE INDEX passengers_pkey ON public.passengers USING btree (passenger_id) |
| 2 uq_passenger_passport | CREATE UNIQUE INDEX uq_passenger_passport ON public.passengers USING btree (passport_number) |

Total rows: 2 Query complete 00:00:00.073

Successfully run. Total query runtime: 73 msec. 2 rows affected.