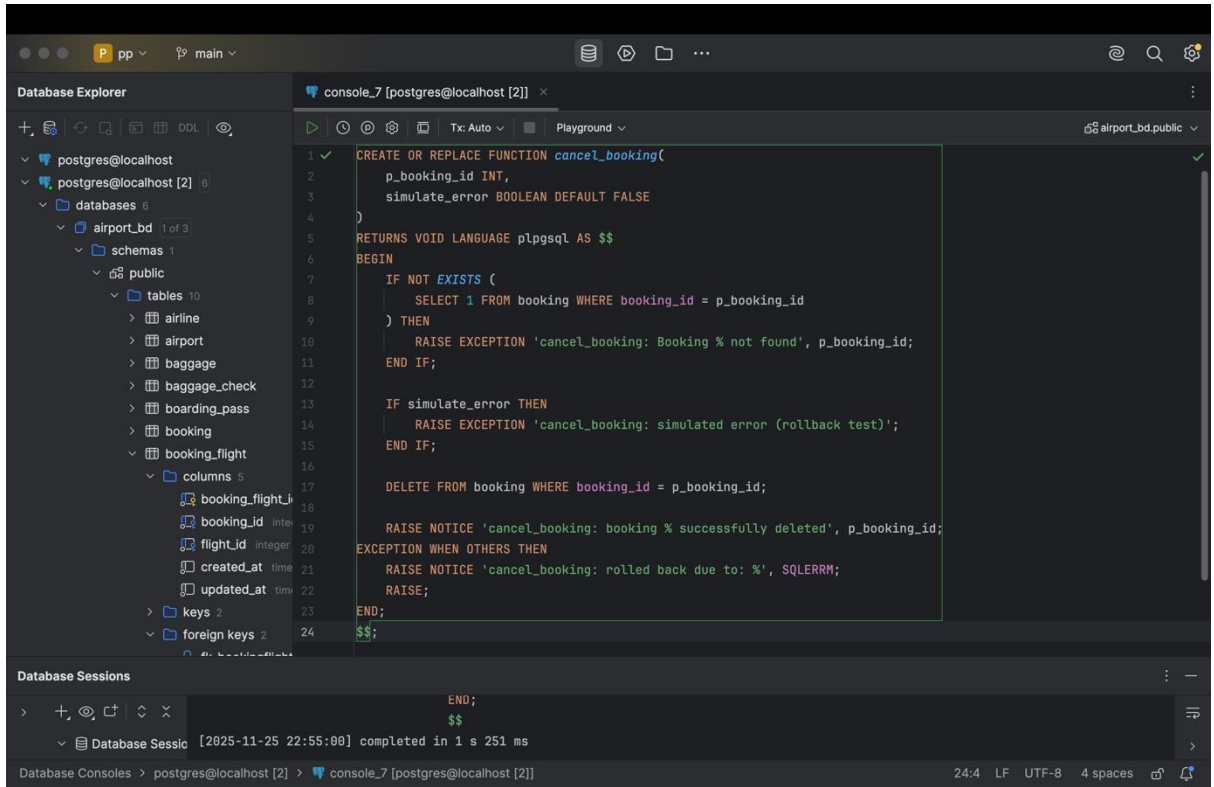


Laboratory work 9

1. A passenger cancels their booking. You need to remove the booking for the flight. Ensure the 'booking' table no longer contains the booking. Simulate an error to test rollback (for example, invalid booking_id).



The screenshot displays a PostgreSQL IDE interface. On the left, the 'Database Explorer' shows the 'airport_bd' database with a 'public' schema containing several tables, including 'booking'. The main editor shows a PL/pgSQL function named 'cancel_booking' with the following code:

```
1 CREATE OR REPLACE FUNCTION cancel_booking(  
2     p_booking_id INT,  
3     simulate_error BOOLEAN DEFAULT FALSE  
4 )  
5 RETURNS VOID LANGUAGE plpgsql AS $$  
6 BEGIN  
7     IF NOT EXISTS (  
8         SELECT 1 FROM booking WHERE booking_id = p_booking_id  
9     ) THEN  
10        RAISE EXCEPTION 'cancel_booking: Booking % not found', p_booking_id;  
11    END IF;  
12  
13    IF simulate_error THEN  
14        RAISE EXCEPTION 'cancel_booking: simulated error (rollback test)';  
15    END IF;  
16  
17    DELETE FROM booking WHERE booking_id = p_booking_id;  
18  
19    RAISE NOTICE 'cancel_booking: booking % successfully deleted', p_booking_id;  
20 EXCEPTION WHEN OTHERS THEN  
21     RAISE NOTICE 'cancel_booking: rolled back due to: %', SQLERRM;  
22     RAISE;  
23 END;  
24 $$;
```

Below the code editor, the 'Database Sessions' panel shows the execution of the function. The session log indicates that the function was executed successfully, with a notice message: 'cancel_booking: booking % successfully deleted'. The session completed in 1 s 251 ms.

2. Rescheduling a flight. You need to reschedule a flight. Verify the 'flights' table reflects the new departure time. Simulate an error to test rollback (for example, invalid flight_id).

The screenshot shows a PostgreSQL IDE interface. On the left, the 'Database Explorer' pane displays the database structure: 'postgres@localhost' > 'postgres@localhost [2]' > 'databases 8' > 'airport_bd 1 of 3' > 'schemas 1' > 'public' > 'tables 10'. The 'booking_flight' table is expanded, showing columns: 'booking_flight_id', 'booking_id' (integer), 'flight_id' (integer), 'created_at' (time), and 'updated_at' (time). The 'keys 2' section is also visible.

The main editor pane shows a SQL script for creating or replacing a function named 'reschedule_flight'. The function takes three parameters: 'p_flight_id' (INT), 'p_new_departure' (TIMESTAMP), and 'simulate_error' (BOOLEAN DEFAULT FALSE). It returns VOID and is written in PL/pgSQL. The script includes a BEGIN block with an IF NOT EXISTS check for the flight_id. If it exists, it raises an exception. If simulate_error is true, it raises a simulated error. Otherwise, it updates the 'flights' table with the new departure time and the current timestamp. It then raises a notice and handles any other exceptions by raising a SQLERRM. The script ends with END; and \$\$.

The 'Database Sessions' pane at the bottom shows a transaction 'Tx: reschedule_flight(10...9:30:00, FALSE):void' completed in 16 ms on 2025-11-25 at 23:03:41.

3. Updating ticket prices. You need to decrease the ticket price for a specific flight for all existing bookings. If an error occurs, no changes should be applied.

The screenshot shows the same PostgreSQL IDE interface. The 'Database Explorer' pane is identical to the previous screenshot.

The main editor pane shows a SQL script for creating or replacing a function named 'decrease_ticket_prices'. The function takes three parameters: 'p_flight_id' (INT), 'p_amount' (DECIMAL(7,2)), and 'simulate_error' (BOOLEAN DEFAULT FALSE). It returns VOID and is written in PL/pgSQL. The script includes a BEGIN block with an IF NOT EXISTS check for the flight_id. If it exists, it raises an exception. If simulate_error is true, it raises a simulated error. Otherwise, it updates the 'booking' table, decreasing the ticket price by the specified amount (using GREATEST to ensure it doesn't go below 0) and setting the updated_at to the current timestamp. It then raises a notice and handles any other exceptions by raising a SQLERRM. The script ends with END; and \$\$.

The 'Database Sessions' pane at the bottom shows a transaction 'Tx: reschedule_flight(10...9:30:00, FALSE):void' completed in 5 ms on 2025-11-25 at 23:05:51.

4. A passenger updates their details. Ensure the update is reflected across all associated records, including bookings.

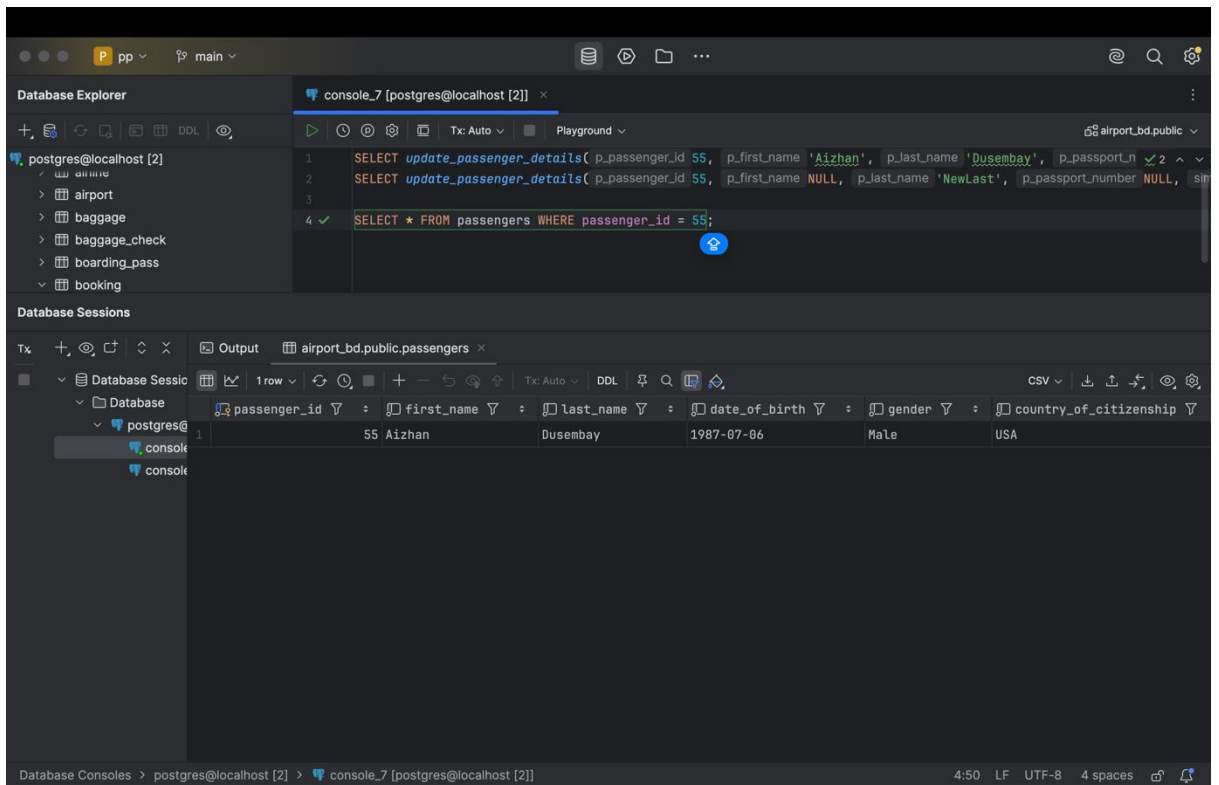
The image shows a PostgreSQL IDE interface with two panels. The top panel displays the 'Database Explorer' on the left, showing a database schema with tables like 'airline', 'airport', 'baggage', 'baggage_check', 'boarding_pass', 'booking', 'columns', 'keys', 'foreign keys', 'indexes', 'checks', 'booking_flight', 'flights', 'passengers', 'security_check', 'views', and 'routines'. The main editor shows a SQL script for creating a function 'update_passenger_details'.

```
1 CREATE OR REPLACE FUNCTION update_passenger_details(  
2     p_passenger_id INT,  
3     p_first_name VARCHAR DEFAULT NULL,  
4     p_last_name VARCHAR DEFAULT NULL,  
5     p_passport_number VARCHAR DEFAULT NULL,  
6     simulate_error BOOLEAN DEFAULT FALSE  
7 )  
8 RETURNS VOID LANGUAGE plpgsql AS $$  
9 BEGIN  
10     IF NOT EXISTS (SELECT 1 FROM passengers WHERE passenger_id = p_passenger_id) THEN  
11         RAISE EXCEPTION 'update_passenger_details: Passenger % not found', p_passenger_id;  
12     END IF;  
13  
14     IF simulate_error THEN  
15         RAISE EXCEPTION 'update_passenger_details: simulated error (rollback test)';  
16     END IF;  
17  
18     UPDATE passengers  
19     SET first_name = COALESCE(p_first_name, first_name),  
20         last_name = COALESCE(p_last_name, last_name),  
21         passport_number = COALESCE(p_passport_number, passport_number),  
22         updated_at = NOW()  
23     WHERE passenger_id = p_passenger_id;  
24  
25     RAISE NOTICE 'update_passenger_details: passenger % updated', p_passenger_id;  
26 EXCEPTION WHEN OTHERS THEN  
27     RAISE NOTICE 'update_passenger_details: rolled back due to: %', SQLERRM;  
28     RAISE;  
29 END;  
30 $$;
```

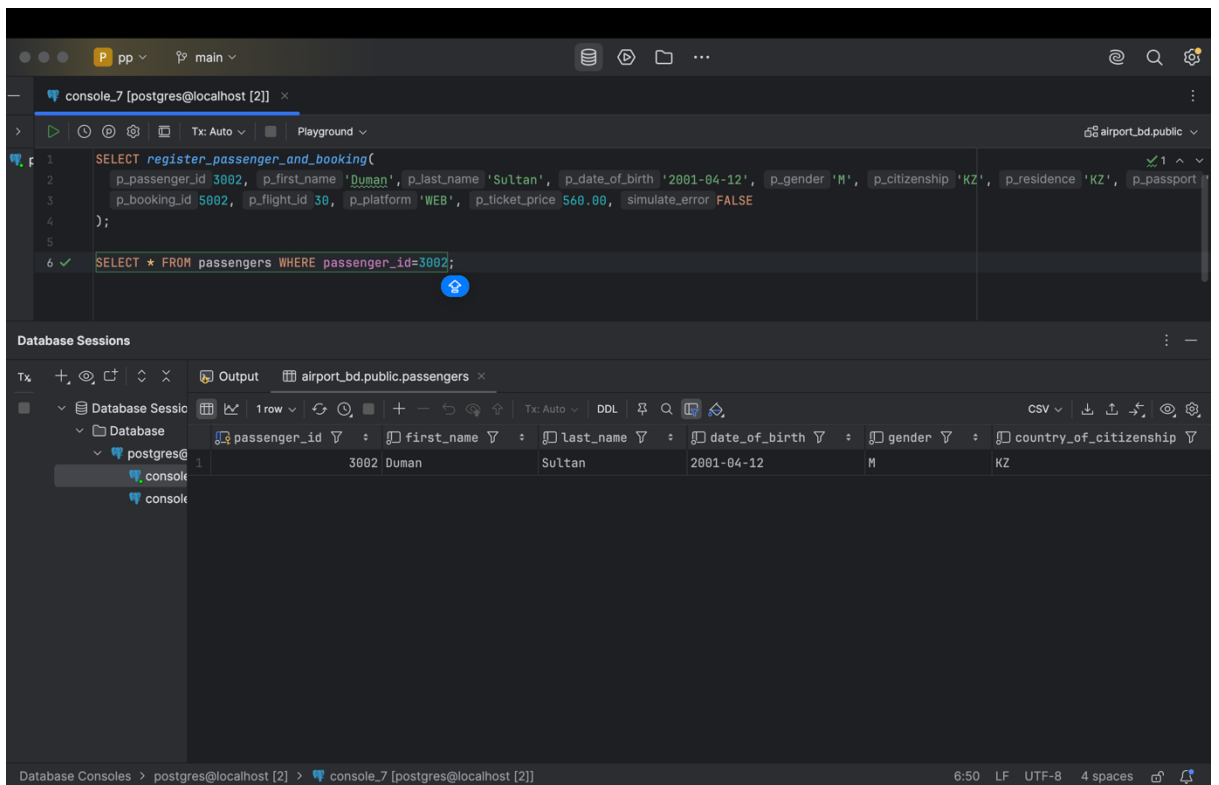
The bottom panel shows the 'Database Sessions' tab with a session named 'console_7' selected. The 'Output' tab displays the execution results of the function, showing a notice and completion status.

```
1 ✓ CREATE OR REPLACE FUNCTION update_passenger_details(  
2     p_passenger_id INT,  
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[2025-11-25 23:15:06] completed in 7 ms



5. A new passenger is registered, and a booking is created. Ensure the new passenger is added and the booking succeeds.



The image displays two screenshots of a PostgreSQL console interface, likely from a development tool like pgAdmin or a similar IDE. The top screenshot shows the definition of a PL/pgSQL function named `register_passenger_and_booking`. The function takes several parameters: `p_passenger_id` (INT), `p_first_name` (VARCHAR), `p_last_name` (VARCHAR), `p_date_of_birth` (DATE), `p_gender` (VARCHAR), `p_citizenship` (VARCHAR), `p_residence` (VARCHAR), `p_passport` (VARCHAR), `p_booking_id` (INT), `p_flight_id` (INT), `p_platform` (VARCHAR), `p_ticket_price` (DECIMAL(7,2)), and a default parameter `simulate_error` (BOOLEAN DEFAULT FALSE). The function returns VOID and is written in the PL/pgSQL language. It includes logic to check if a flight exists, raise exceptions for errors or simulation, and insert data into the `passengers` and `booking` tables. The bottom screenshot shows the same function definition, but with the `VALUES` clause for the `INSERT INTO booking` statement completed, including `created_at NOW()`, `updated_at NOW()`, and `status 'ACTIVE'`. The console output on the right shows the function was created successfully. The bottom status bar indicates the database is `postgres@localhost [2]` and the session is `console_7 [postgres@localhost [2]]`.

```
1 CREATE OR REPLACE FUNCTION register_passenger_and_booking(  
2     p_passenger_id INT,  
3     p_first_name VARCHAR,  
4     p_last_name VARCHAR,  
5     p_date_of_birth DATE,  
6     p_gender VARCHAR,  
7     p_citizenship VARCHAR,  
8     p_residence VARCHAR,  
9     p_passport VARCHAR,  
10    p_booking_id INT,  
11    p_flight_id INT,  
12    p_platform VARCHAR,  
13    p_ticket_price DECIMAL(7,2),  
14    simulate_error BOOLEAN DEFAULT FALSE  
15 )  
16 RETURNS VOID LANGUAGE plpgsql AS $$  
17 BEGIN  
18     IF NOT EXISTS (SELECT 1 FROM flights WHERE flight_id = p_flight_id) THEN  
19         RAISE EXCEPTION 'register_passenger_and_booking: Flight % not found', p_flight_id;  
20     END IF;  
21  
22     IF simulate_error THEN  
23         RAISE EXCEPTION 'register_passenger_and_booking: simulated error (rollback test)';  
24     END IF;  
25  
26     INSERT INTO passengers(  
27         passenger_id, first_name, last_name, date_of_birth, gender,  
28         country_of_citizenship, country_of_residence, passport_number, created_at, updated_at  
29     ) VALUES (  
30         p_passenger_id, p_first_name, p_last_name, p_date_of_birth, p_gender,  
31         p_citizenship, p_residence, p_passport, created_at NOW(), updated_at NOW()  
32     );  
33  
34     INSERT INTO booking(  
35         booking_id, flight_id, passenger_id, booking_platform, created_at, updated_at, status, ticket_price  
36     ) VALUES (  
37         p_booking_id, p_flight_id, p_passenger_id, p_platform, created_at NOW(), updated_at NOW(), status 'ACTIVE',  
38         p_ticket_price  
39     );  
40     RAISE NOTICE 'register_passenger_and_booking: passenger % and booking % created', p_passenger_id, p_booking_id;  
41 EXCEPTION WHEN OTHERS THEN  
42     RAISE NOTICE 'register_passenger_and_booking: rolled back due to: %', SQLERRM;  
43     RAISE;  
44 END;  
45 $$;
```

6. Increase the ticket price for all bookings on a specific flight by a fixed amount.

The screenshot shows a PostgreSQL console window with the following SQL code:

```
1 CREATE OR REPLACE FUNCTION increase_ticket_prices(p_flight_id INT, p_amount DECIMAL(7,2))
2 RETURNS VOID LANGUAGE plpgsql AS $$
3 BEGIN
4     IF NOT EXISTS (SELECT 1 FROM flights WHERE flight_id = p_flight_id) THEN
5         RAISE EXCEPTION 'increase_ticket_prices: Flight % not found', p_flight_id;
6     END IF;
7
8     UPDATE booking
9     SET ticket_price = ticket_price + p_amount,
10        updated_at = NOW()
11     WHERE flight_id = p_flight_id;
12
13     RAISE NOTICE 'increase_ticket_prices: prices increased by % for flight %', p_amount, p_flight_id;
14 EXCEPTION WHEN OTHERS THEN
15     RAISE NOTICE 'increase_ticket_prices: rolled back due to: %', SQLERRM;
16     RAISE;
17 END;
18 $$;
```

The console also shows the 'Database Sessions' panel with the following output:

```
IF NOT EXISTS (SELECT 1 FROM flights WHERE flight_id = p_flight_id) THEN
RAISE EXCEPTION 'increase_ticket_prices: Flight % not found', p_flight_id;
END IF;

UPDATE booking
SET ticket_price = ticket_price + p_amount,
    updated_at = NOW()
```

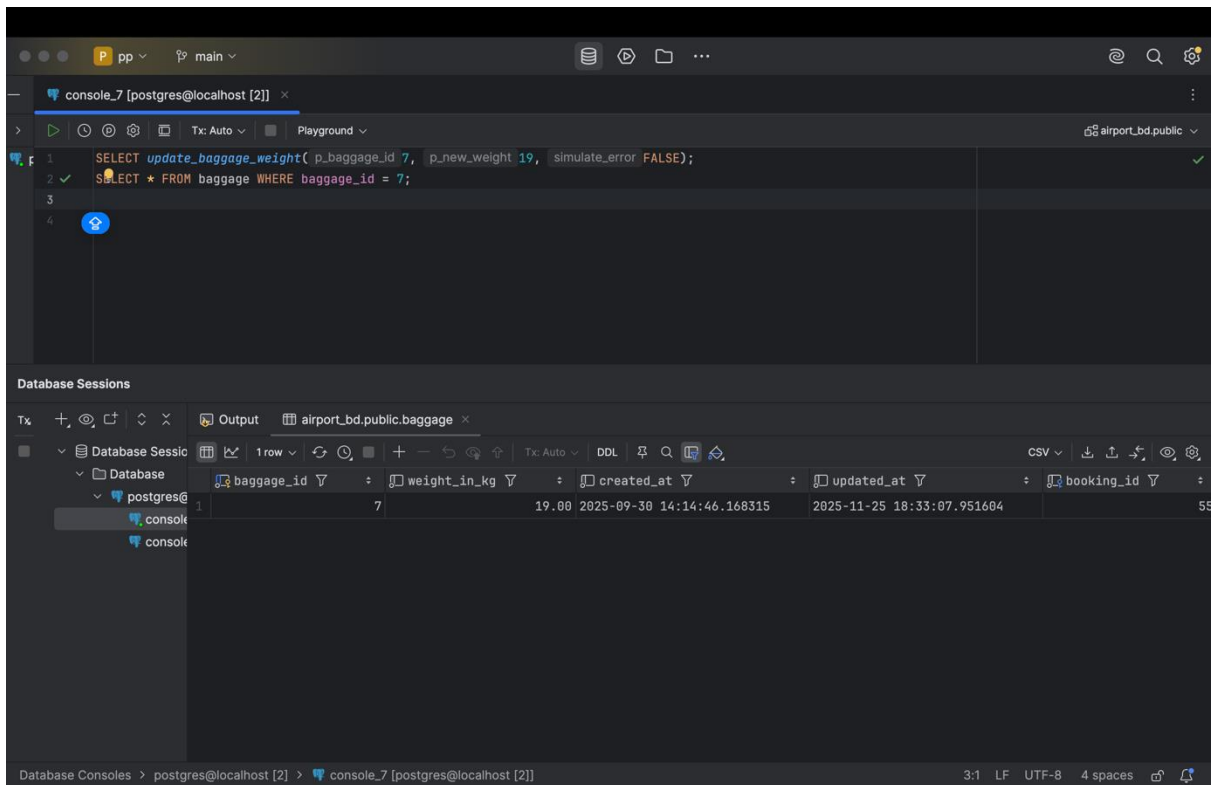
7. Update a baggage weight. A passenger updates the declared weight of their baggage. Ensure that the change is correctly reflected in the database.

The screenshot shows a PostgreSQL console window with the following SQL code:

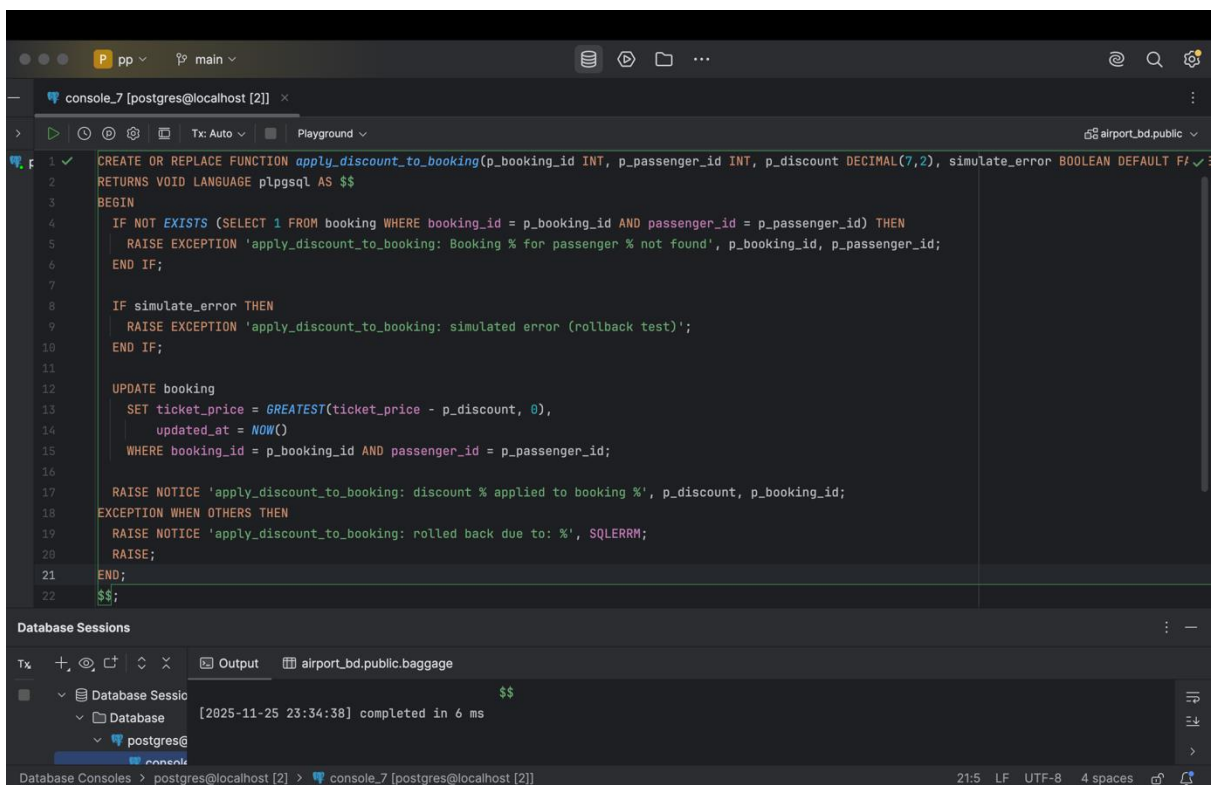
```
1 CREATE OR REPLACE FUNCTION update_baggage_weight(p_baggage_id INT, p_new_weight DECIMAL(4,2), simulate_error BOOLEAN DEFAULT FALSE)
2 RETURNS VOID LANGUAGE plpgsql AS $$
3 BEGIN
4     IF NOT EXISTS (SELECT 1 FROM baggage WHERE baggage_id = p_baggage_id) THEN
5         RAISE EXCEPTION 'update_baggage_weight: Baggage % not found', p_baggage_id;
6     END IF;
7
8     IF simulate_error THEN
9         RAISE EXCEPTION 'update_baggage_weight: simulated error (rollback test)';
10    END IF;
11
12    UPDATE baggage
13    SET weight_in_kg = p_new_weight,
14        updated_at = NOW()
15    WHERE baggage_id = p_baggage_id;
16
17    RAISE NOTICE 'update_baggage_weight: baggage % weight set to % kg', p_baggage_id, p_new_weight;
18 EXCEPTION WHEN OTHERS THEN
19    RAISE NOTICE 'update_baggage_weight: rolled back due to: %', SQLERRM;
20    RAISE;
21 END;
22 $$;
```

The console also shows the 'Database Sessions' panel with the following output:

```
EXCEPTION WHEN OTHERS THEN
RAISE NOTICE 'update_baggage_weight: rolled back due to: %', SQLERRM;
RAISE;
END;
```

- Apply a discount to a booking for a specific passenger. If any error occurs, roll back.



- Reschedule all bookings for a flight to a new flight.

ppmain

console_7 [postgres@localhost [2]]

Playground

airport_bd.public

```
1 CREATE OR REPLACE FUNCTION reschedule_all_bookings(p_old_flight_id INT, p_new_flight_id INT, simulate_error BOOLEAN DEFAULT FALSE)
2 RETURNS VOID LANGUAGE plpgsql AS $$
3 BEGIN
4     IF NOT EXISTS (SELECT 1 FROM flights WHERE flight_id = p_old_flight_id) THEN
5         RAISE EXCEPTION 'reschedule_all_bookings: Old flight % not found', p_old_flight_id;
6     END IF;
7     IF NOT EXISTS (SELECT 1 FROM flights WHERE flight_id = p_new_flight_id) THEN
8         RAISE EXCEPTION 'reschedule_all_bookings: New flight % not found', p_new_flight_id;
9     END IF;
10
11     IF simulate_error THEN
12         RAISE EXCEPTION 'reschedule_all_bookings: simulated error (rollback test)';
13     END IF;
14
15     UPDATE booking
16     SET flight_id = p_new_flight_id,
17         updated_at = NOW()
18     WHERE flight_id = p_old_flight_id;
19
20     UPDATE booking_flight
21     SET flight_id = p_new_flight_id,
22         updated_at = NOW()
23     WHERE flight_id = p_old_flight_id;
24
25     RAISE NOTICE 'reschedule_all_bookings: moved bookings from % to %', p_old_flight_id, p_new_flight_id;
26 EXCEPTION WHEN OTHERS THEN
27     RAISE NOTICE 'reschedule_all_bookings: rolled back due to: %', SQLERRM;
28 END;
```

Database Sessions

postgres@localhost [2] console_7 [postgres@localhost [2]] 19:1 LF UTF-8 4 spaces

ppmain

console_7 [postgres@localhost [2]]

Playground

airport_bd.public

```
14
15     UPDATE booking
16     SET flight_id = p_new_flight_id,
17         updated_at = NOW()
18     WHERE flight_id = p_old_flight_id;
19
20     UPDATE booking_flight
21     SET flight_id = p_new_flight_id,
22         updated_at = NOW()
23     WHERE flight_id = p_old_flight_id;
24
25     RAISE NOTICE 'reschedule_all_bookings: moved bookings from % to %', p_old_flight_id, p_new_flight_id;
26 EXCEPTION WHEN OTHERS THEN
27     RAISE NOTICE 'reschedule_all_bookings: rolled back due to: %', SQLERRM;
28     RAISE;
29 END;
30 $$;
```

Database Sessions

Output

apply_discount_to_bo...1, 10.00, FALSE):void airport_bd.public.booking

Database Sessio

Database

postgres@

console

console

EXCEPTION WHEN OTHERS THEN

RAISE NOTICE 'reschedule_all_bookings: rolled back due to: %', SQLERRM;

RAISE;

END;

\$\$

[2025-11-25 23:36:12] completed in 5 ms

Database Consoles > postgres@localhost [2] console_7 [postgres@localhost [2]] 19:1 LF UTF-8 4 spaces