Laboratory Work 1

Course: Databases

Topic: ERD Diagram – International Airport System

3. Normalization

All tables conform to the Third Normal Form (3NF):
- 1NF: All attributes are atomic.
- 2NF: Non-key attributes depend only on the primary key.
- 3NF: No transitive dependencies.

Example: Passenger details are stored in Passenger, not in Booking. Airport details are stored in Airport and referenced by Flight.

4. Relationships

These tables establish various types of relationships, including:

✅ One-to-Many (1:N)

Airline → Flight

One airline operates many flights.

Airport → Flight

One airport can be a departure/arrival for many flights.

Flight → Booking

One flight can have many bookings.

Passenger → Booking

One passenger can have many bookings.

Booking → Baggage

One booking can have many baggage items.

Booking → Booking_change

One booking can have many change records.

Booking → Boarding_pass

One booking can generate many boarding passes.

Booking → Baggage_check → Security_check

One booking produces baggage checks, and each baggage check can have a related security check

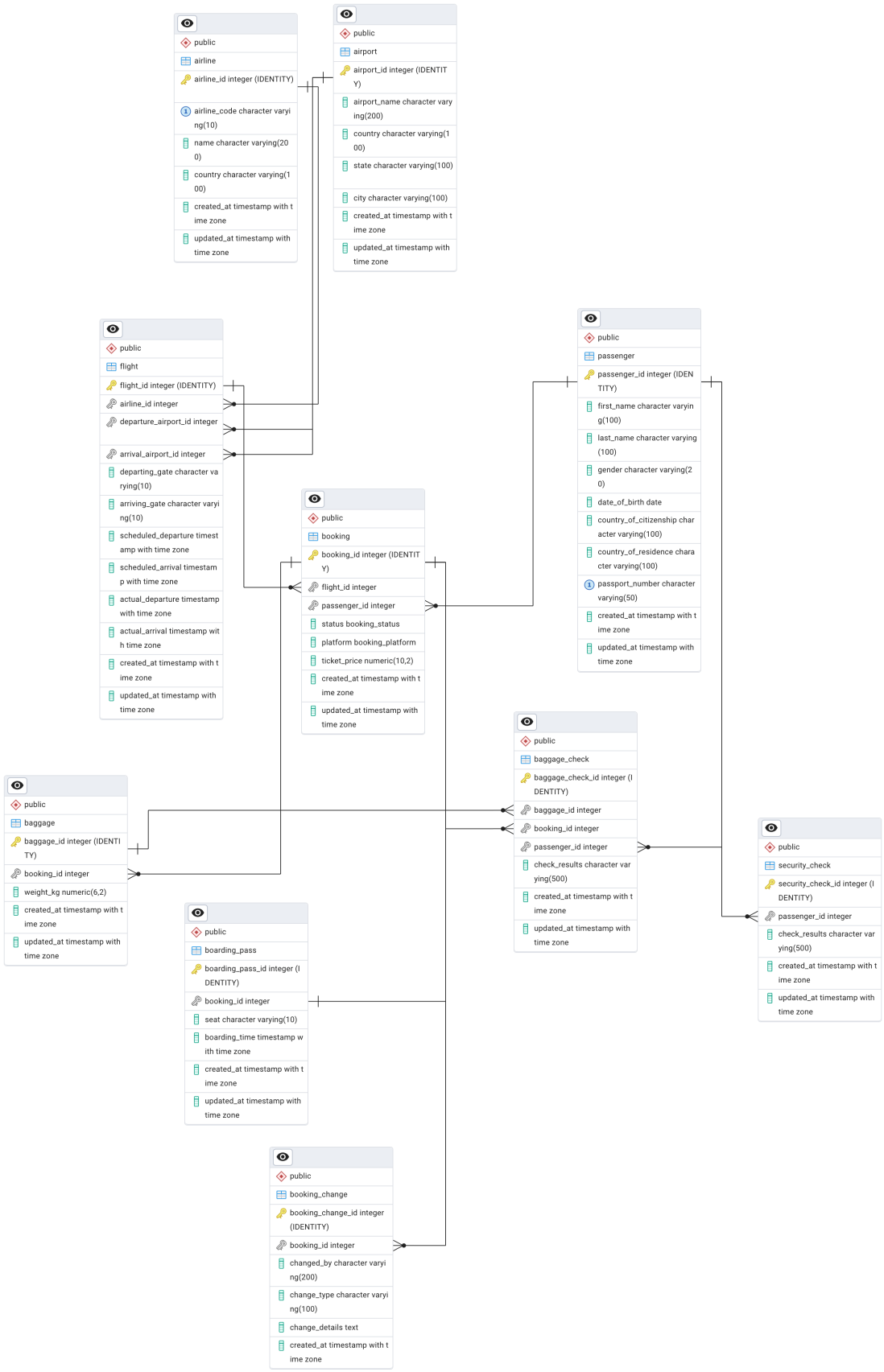
✅ Many-to-Many (M:N)

Flights ↔ Passengers

This is many-to-many in real life: a passenger can fly on many flights, and a flight carries many passengers.

In the schema, this is resolved through the booking table.

(flight_id + passenger_id stored in booking).ERD diagram


public
airline
airline_id integer (IDENTITY)
airline_code character varying(10)
name character varying(200)
country character varying(100)
created_at timestamp with time zone
updated_at timestamp with time zone
public
airport
airport_id integer (IDENTITY)
airport_name character varying(200)
country character varying(100)
state character varying(100)
city character varying(100)
created_at timestamp with time zone
updated_at timestamp with time zone
public
flight
flight_id integer (IDENTITY)
airline_id integer
departure_airport_id integer
arrival_airport_id integer
departing_gate character varying(10)
arriving_gate character varying(10)
scheduled_departure timestamp with time zone
scheduled_arrival timestamp with time zone
actual_departure timestamp with time zone
actual_arrival timestamp with time zone
created_at timestamp with time zone
updated_at timestamp with time zone
public
passenger
passenger_id integer (IDENTITY)
first_name character varying(100)
last_name character varying(100)
gender character varying(20)
date_of_birth date
country_of_citizenship character varying(100)
country_of_residence character varying(100)
passport_number character varying(50)
created_at timestamp with time zone
updated_at timestamp with time zone
public
booking
booking_id integer (IDENTITY)
flight_id integer
passenger_id integer
status booking_status
platform booking_platform
ticket_price numeric(10,2)
created_at timestamp with time zone
updated_at timestamp with time zone
public
baggage_check
baggage_check_id integer (IDENTITY)
baggage_id integer
booking_id integer
passenger_id integer
check_results character varying(500)
created_at timestamp with time zone
updated_at timestamp with time zone
public
baggage
baggage_id integer (IDENTITY)
booking_id integer
weight_kg numeric(6,2)
created_at timestamp with time zone
updated_at timestamp with time zone
public
security_check
security_check_id integer (IDENTITY)
passenger_id integer
check_results character varying(500)
created_at timestamp with time zone
updated_at timestamp with time zone
public
boarding_pass
boarding_pass_id integer (IDENTITY)
booking_id integer
seat character varying(10)
boarding_time timestamp with time zone
created_at timestamp with time zone
updated_at timestamp with time zone
public
booking_change
booking_change_id integer (IDENTITY)
booking_id integer
changed_by character varying(200)
change_type character varying(100)
change_details text
created_at timestamp with time zone

YELLOW KEY in diagram is PRIMARY KEY

GREY KEY in diagram is foreign key