

1.4 Relational Databases: Homework (Basic)

Open the **Flight Search UI** of the educational application and find some flights that give results (please refer to General Materials of the course for information about the application and your account).

1. Explore how objects are shown on UI, and find them in the DB.
2. Where is it in the DB (use ER-diagram to find)
3. How do the tables relate to each other?
4. What types of relations can you see?
5. What data types are used?

Open the **Passenger booking UI** of the educational application. Answer the same questions.

1. Explore how objects are shown on UI, and find them in the DB.

A page: **Search Flight**
Search a Flight

From	To	Departure Time
<input type="text" value="Dallas Love Field"/>	<input type="text" value="Dallas Love Field"/>	<input type="text" value="dd/mm/yyyy"/>
		<input type="button" value="Search"/>

Result

ID	Flight Number	From	To	Departure time	Arrival time	Flight Charge	Aircraft	Available Seats
52	chi-cedar01	Chicago Airport	Cedar Rapid Airport	2023-10-07 07:00	2023-10-07 09:00	90.0	Boeing 307	100/100

We can see on the UI 3 fields in the area “Search a Flight”:

From – which relates to table airport in the DB, field **airport_name**. *I think that the realization is through departure_airport_airport_id (table flight) (which is a foreign key from the table airport) to table airport.*

To – which also relates to table airport in the DB, field **airport_name**. *I think that the realization is through destination_airport_airport_id (table flight), (which is a foreign key from the table airport) to table airport.*

Departure Time (shown as *Departure Time on UI* instead of *Departure date*) – which relates to table flight (**departure_date**) in the DB.

We can see on the UI in the area “Result” fields:

ID - which relates to table flight **flight_id** (Primary key).

Flight Number - which relates to table flight **flight_number**.

From - which relates to table airport **airport_name** through foreign key departure_airport_airport_id from table flight.

To - which relates to table airport **airport_name** through foreign key destination_airport_airport_id from table flight.

Departure time - which relates to table flight, fields **departure_date** + **departure_time**.

Arrival time - which relates to table flight, fields **arrival_date**+ **arrival_time**.

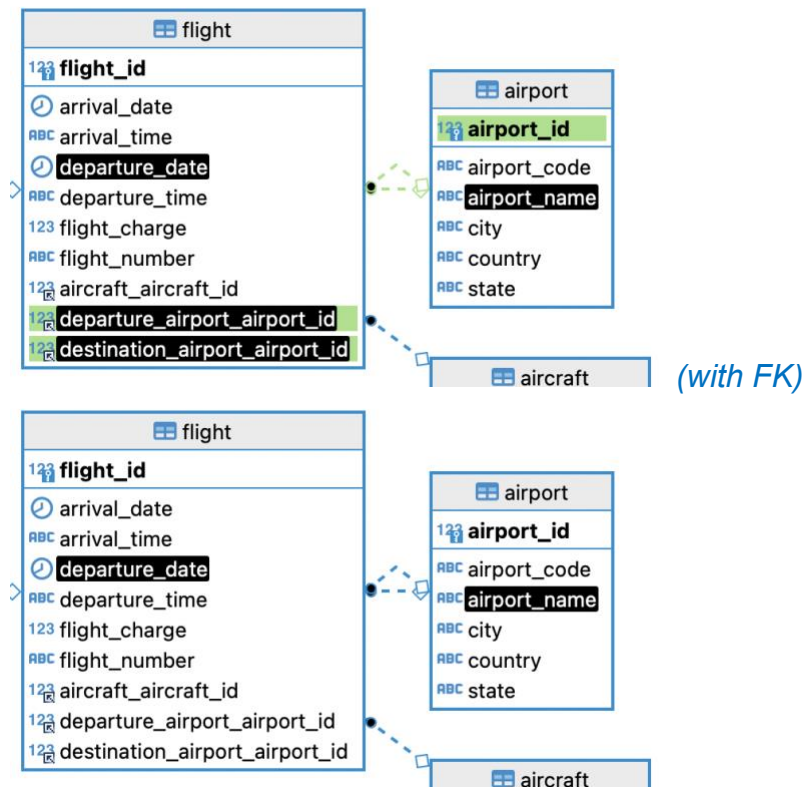
Flight Charge - which relates to table flight **flight_charge**.

Aircraft - - which relates to table aircraft **model**.

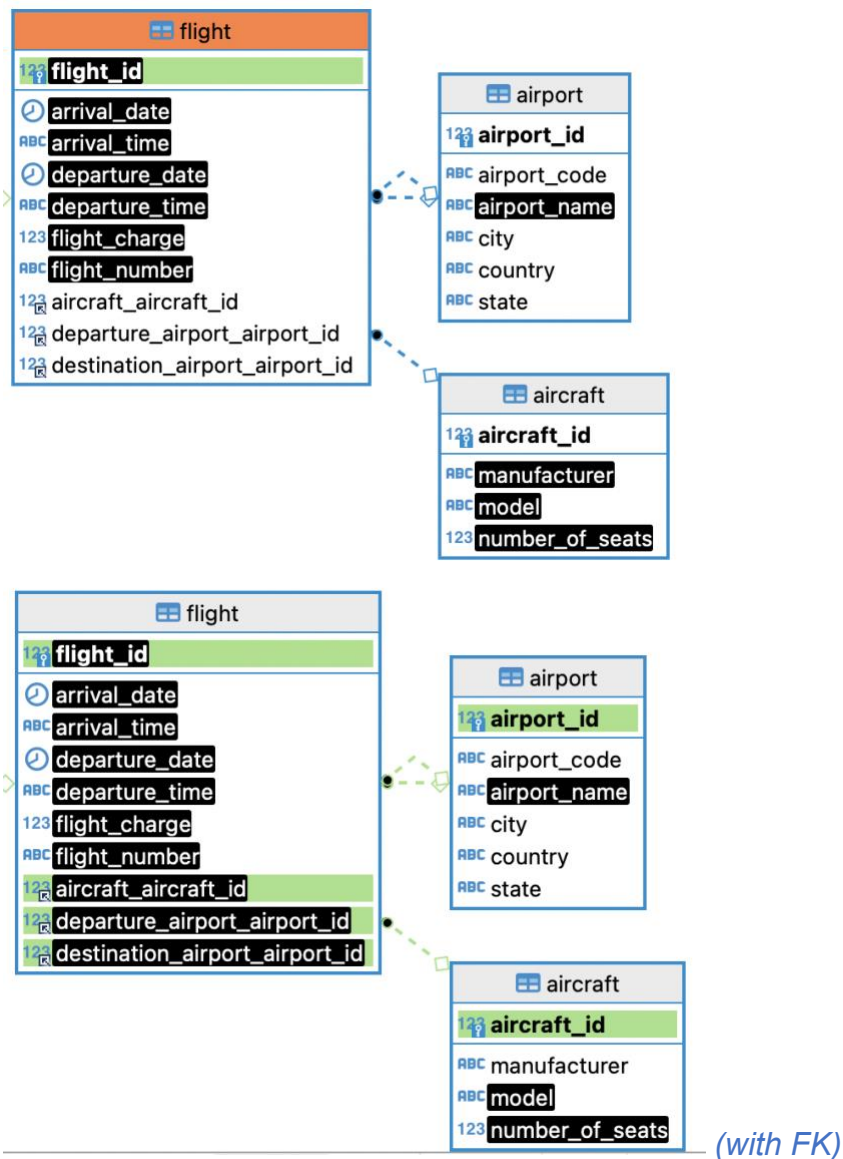
Available Seats - which relates to table aircraft **number_of_seats**. I have a question here – In the DB we have number_of_seats on the aircraft. How can we know a real number of available seats? Are there any calculations in the process?

2. Where is it in the DB (use ER-diagram to find)

Search a Flight:



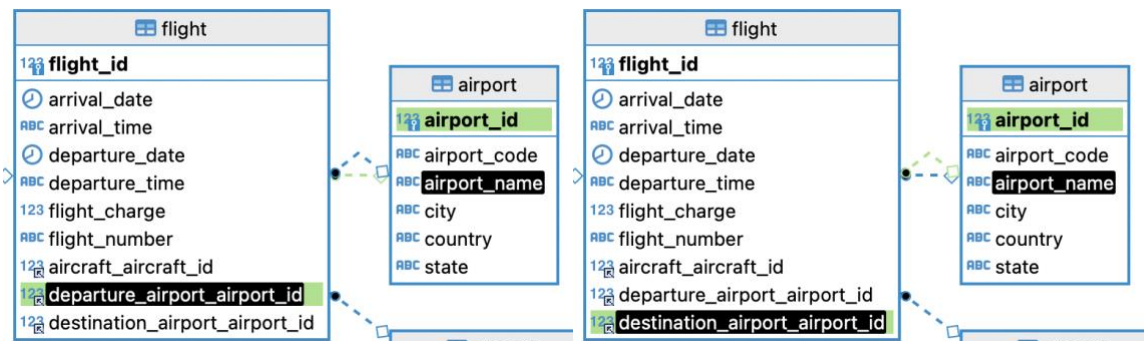
Result:



3. How do the tables relate to each other?

Search a Flight:

We have 2 tables related: flight and airport. There is a double relationship between the flight and the airport tables and 2 airport IDs in the flight table.

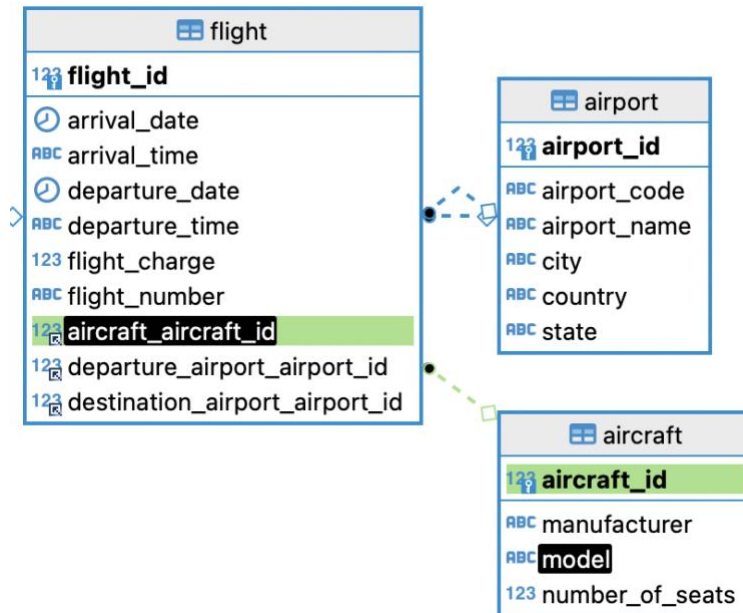


In the first relationship **airport_id** (Primary Key in the table airport) is linked as **departure_airport_airport_id** to the table flight (foreign key from the table airport). And through this relationship we get **departure_airport_airport_id** -> **airport_name**.

In the second relationship `airport_id` (Primary Key in the table `airport`) is linked as **`destination_airport_airport_id`** to the table `flight` (foreign key from the table `airport`). Through this relationship we get `destination_airport_airport_id` -> `airport_name`.

Result:

We have 3 related tables. The relationship between `flight` and `airport` described above. There is also a relationship between `flight` and `aircraft` where `aircraft_id` (Primary Key in the table `aircraft`) is linked as `aircraft_aircraft_id` to the table `flight` (foreign key from the table `aircraft`). Through this relationship we get `aircraft_aircraft_id` -> `model`.



4. What types of relations can you see?

Types of relationships:

One-to-many (`flight` - `airport`). One airport could service several flights, but having several airports in one flight is impossible on this DB.

One-to-one (`flight` - `aircraft`). One flight relates to only one aircraft and one aircraft relates to only one flight.

5. What data types are used?

Column Name	Data Type	
flight_id	bigint	
arrival_date	date	
arrival_time	varchar(255)	
departure_date	date	
departure_time	varchar(255)	
flight_charge	double	
flight_number	varchar(255)	
aircraft_aircraft_id (FK)	aircraft_id	bigint
departure_airport_airport_id (FK)	airport_id	int
destination_airport_airport_id (FK)		
airport_name	varchar(255)	
model	varchar(255)	
number_of_seats	int	

Open the [Passenger booking UI](#) of the educational application. Answer the same questions.

1. Explore how objects are shown on UI, and find them in the DB.

A page: [Verify Booking](#)

[Search:](#)

Verify Booking

In order to verify your ticket please provide your Flight Id and Passenger Id below.

Flight Id	Passenger Id	<input type="button" value="Search"/>
<input type="text" value="5"/>	<input type="text" value="8"/>	

After pressing on Search button fields Flight Id and Passenger Id are empty. We cannot verify or check our search results. Is it right or not?

How should a user know what is the Passenger Id? I think it is more relevant to search according to passengers passport, for example.

[Result:](#)

Verify Booking

In order to verify your ticket please provide your Flight Id and Passenger Id below.

Flight Id	Passenger Id	<input type="button" value="Search"/>
<input type="text" value="5"/>	<input type="text" value="8"/>	

Verified Successfully!

Customer Info

ID	First Name	Last Name	Phone Number	Passport Number	Email
8	John	Doe	6414513308	78998787	john@test.ru

Flight Info

Flight Number	From	To	Departure	Arrival	Flight Charge	Aircraft
dallas-dubai100	Dallas Love Field	Dubai Creek SPB	2023-10-04 08:00	2023-10-04 10:30	1200.0	Boeing 307

We can see on the UI 2 fields in the “[Search area](#)”:

Flight Id - which relates to table passenger, field **flight_flight_id** in the DB. / *think that the realization is through flight_flight_id (table passenger) (which is a foreign key from the table passenger) to table flight.*

Passenger Id - which relates to table passenger, field **passenger_id** in the DB.

Customer Info:

ID - which relates to table passenger **passenger_id** (Primary key).

First Name - which relates to table passenger **first_name**

Last Name - which relates to table passenger **last_name**

Phone Number - which relates to table passenger **phone_number**

Passport Number - which relates to table passenger **passport_number**

Email - which relates to table passenger **email**

Flight Info:

Flight Number - which relates to table flight **flight_number** in the DB.

From - which relates to table airport **airport_name** through foreign key **departure_airport_airport_id** from table flight.

To - which relates to table airport **airport_name** through foreign key **destination_airport_airport_id** from table flight.

Departure - which relates to table flight, fields **departure_date** + **departure_time**.

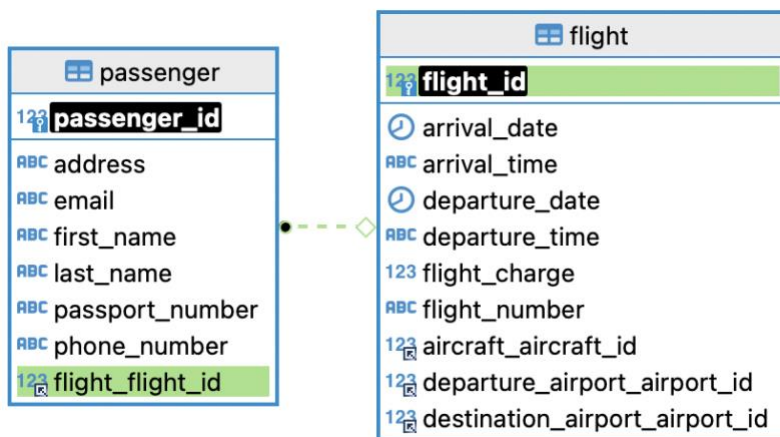
Arrival - which relates to table flight, fields **arrival_date** + **arrival_time**.

Flight Charge - which relates to table flight **flight_charge**.

Aircraft- which relates to table aircraft **model**.

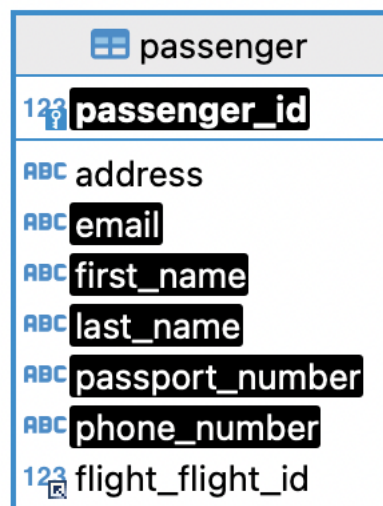
2. Where is it in the DB (use ER-diagram to find)

Search engine:

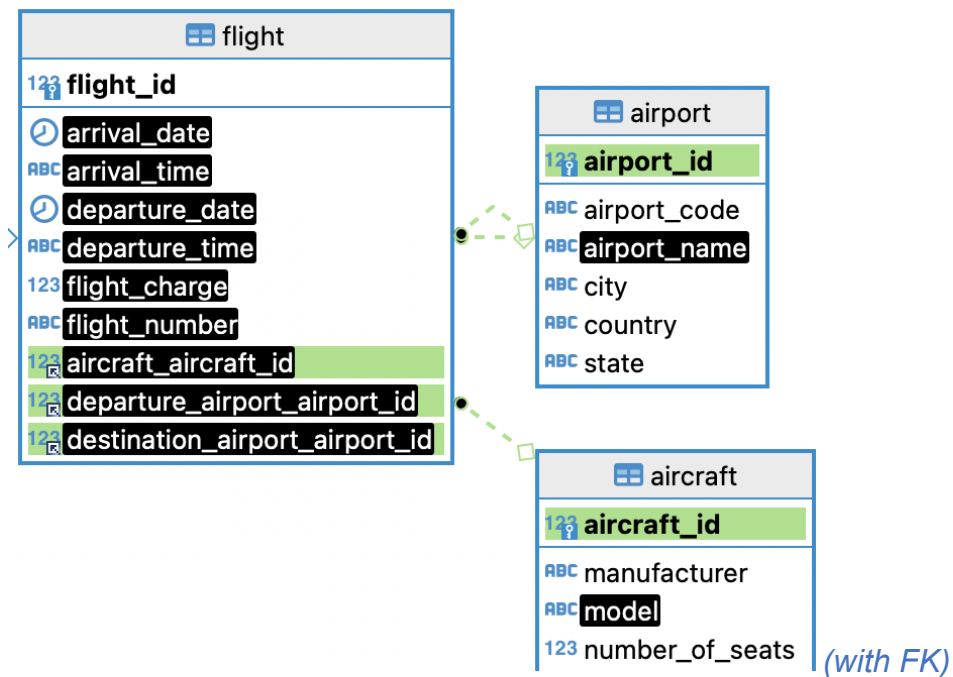


(with FK)

Customer Info:

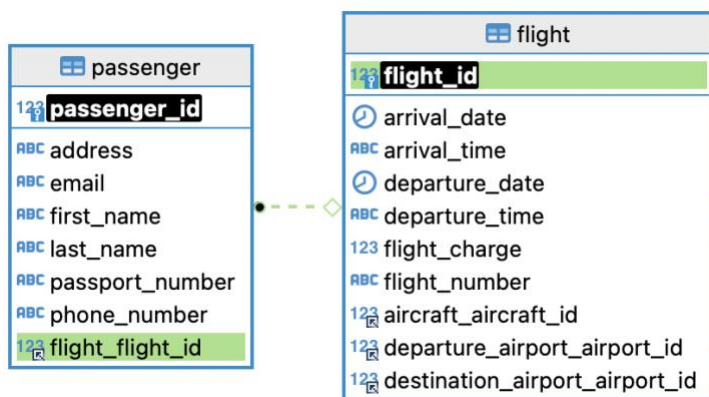


Flight Info:



3. How do the tables relate to each other?

Search engine:

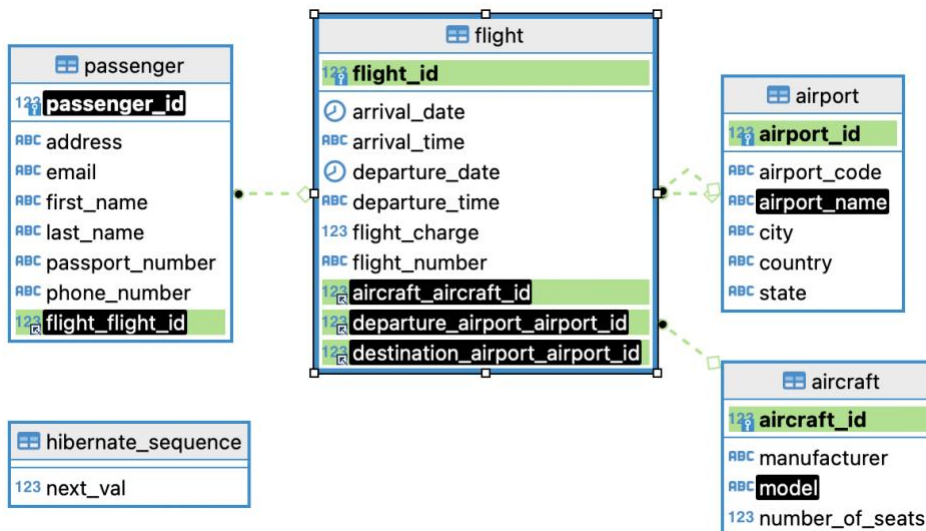


We have 2 tables related: passenger and flight.

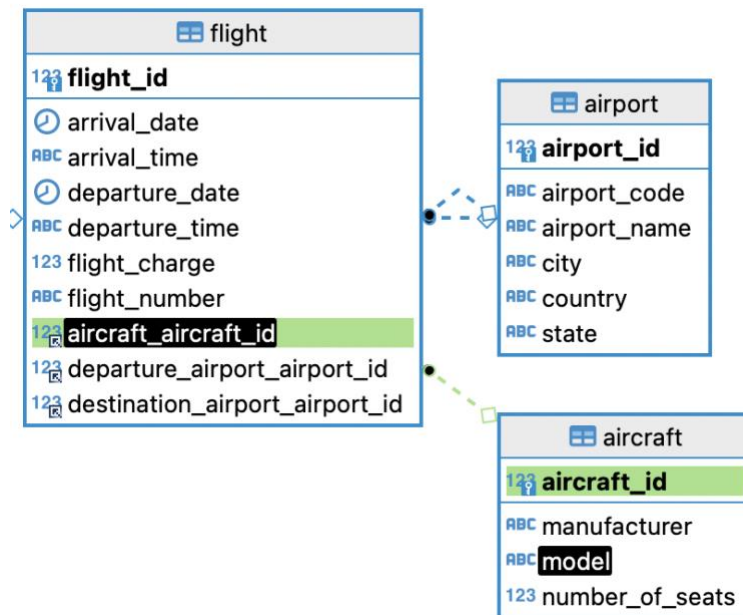
In this relationship **flight_id** (Primary Key in the table **flight**) is linked as **flight_flight_id** to the table **passenger** (foreign key from the table **flight**). And through this relationship we get **flight_flight_id** -> **passenger_id**.

Result:

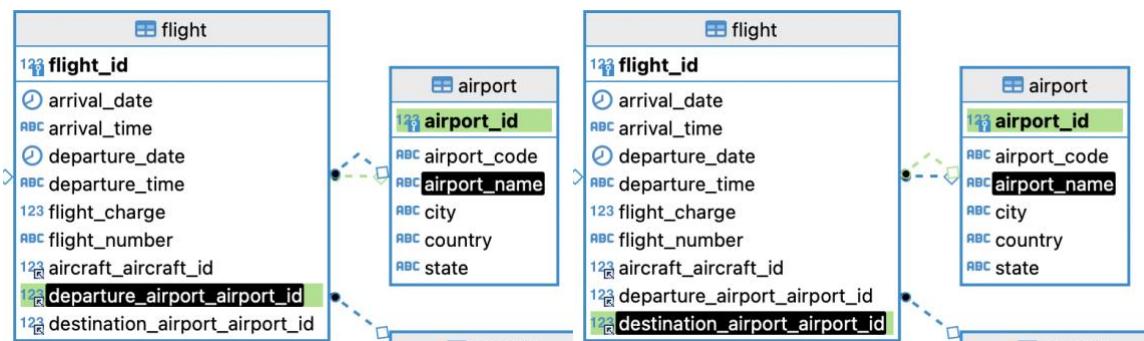
We have 4 related tables. The relationship between flight and passenger described above.



There is also a relationship between flight and aircraft where aircraft_id (Primary Key in the table aircraft) is linked as aircraft_aircraft_id to the table flight (foreign key from the table aircraft). Through this relationship we get aircraft_aircraft_id -> model.



We also have 2 tables related: flight and airport. There is a double relationship between the flight and the airport tables and 2 airport IDs in the flight table.



In the first relationship airport_id (Primary Key in the table airport) is linked as **departure_airport_airport_id** to the table flight (foreign key from the table airport). And through this relationship we get departure_airport_airport_id -> airport_name.

In the second relationship `airport_id` (Primary Key in the table `airport`) is linked as **destination_airport_id** to the table `flight` (foreign key from the table `airport`). Through this relationship we get `destination_airport_id` -> `airport_name`.

4. What types of relations can you see?

Types of relationships:

One-to-many (flight - airport). One airport could service several flights, but having several airports in one flight is impossible on this DB.

One-to-one (flight - aircraft). One flight relates to only one aircraft and one aircraft relates to only one flight.

One-to-Many (passenger - flight). One flight relates to many passengers, but having several flights to one passenger is impossible on this DB.

5. What data types are used?

Column Name	Data Type	
<code>flight_id</code>	<code>bigint</code>	
<code>passenger_id</code>	<code>bigint</code>	
<code>first_name</code>	<code>varchar(255)</code>	
<code>last_name</code>	<code>varchar(255)</code>	
<code>phone_number</code>	<code>varchar(255)</code>	
<code>passport_number</code>	<code>varchar(255)</code>	
<code>flight_number</code>	<code>varchar(255)</code>	
<code>airport_name</code>	<code>varchar(255)</code>	
<code>departure_date</code>	<code>date</code>	
<code>departure_time</code>	<code>varchar(255)</code>	
<code>arrival_date</code>	<code>date</code>	
<code>arrival_time</code>	<code>varchar(255)</code>	
<code>flight_charge</code>	<code>double</code>	
<code>aircraft_id</code> (FK)	<code>aircraft_id</code>	<code>bigint</code>
<code>departure_airport_id</code> (FK)	<code>airport_id</code>	<code>int</code>
<code>destination_airport_id</code> (FK)		
<code>flight_id</code> (FK)	<code>flight_id</code>	<code>bigint</code>
<code>model</code>	<code>varchar(255)</code>	