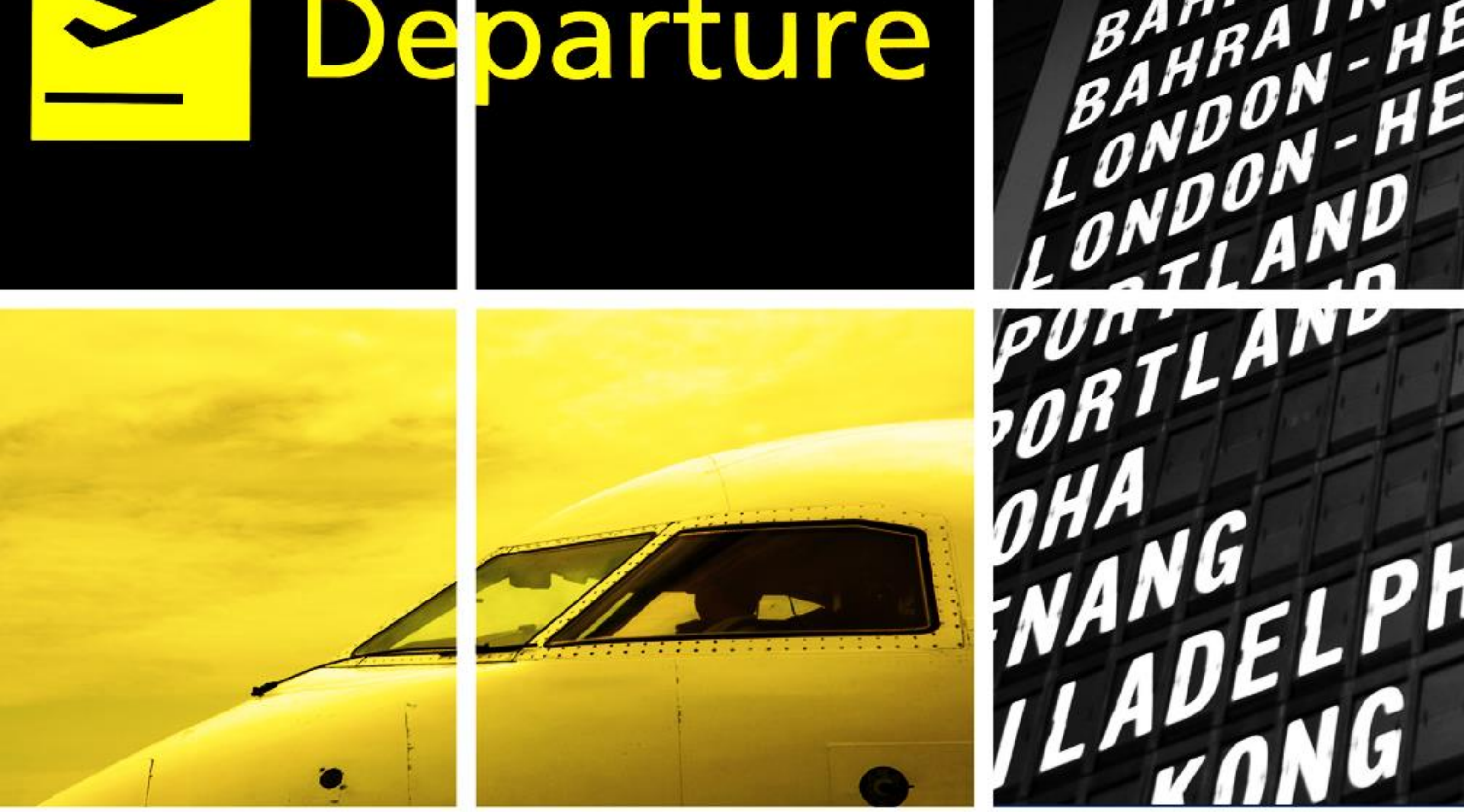

Airport luggage registration Database

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GROUP BI1911, BUSINESS INFORMATICS

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Introduction

We all love travels, and the airport is one of the main place that people go to in order to travel somewhere in this world, and the first step and one of the most important in the airport is registration the luggages, so does anyone knows what happen beyond the desktop where the employee use in order to register our luggages and give us that small ticket that they stick it in our suitcases?

Business process description

The process is mainly done by the employee but the passenger has also a role into that process which why we will devide the process into two part: the employee part and the passenger part

The employee

His mainly job is to check in the passenger, but in order to realize that he needs to check different informations from the passenger and register this data in the database

First of all, he needs to check weather the passenger already has flight ticket, he can check that in the airline company database if he is not registered then he must! Buy a flight ticket

Then the process of registration of the passenger in the flight start, the employee should take the passenger's passport and register the data that is already available in the passport, these data are (passport number, first name and family name, the date of birth, the citizenship, the expiration date of the passport) as he checks weather he is disabled or

Then next step is to register the luggage of the passenger but this is certainly if the passenger has a luggage, if not then there is no need to register them but he should check the Isluggage column by False, in case the luggage is available then it must be checked by TRUE and check the luggage data which are the weight and the size and the type, so all of them should satisfy the luggage services the passenger include otherwise the luggage will be refused and It need to apply some modification like reducing the weight of the suitcase

For example, a passenger flight indicate that he has the right for only one checked suitcase and one unchecked luggage, and the checked one should not surpass 24kg so in case of surpassing this charge this luggage will not be approved and he must reduce the weight till 24kg or less in order to be checked.

Another example is the size, if the size of the unchecked luggage is higher then the requirement then it will be definitely refused

After getting the luggage data (size, type weight,type) by the measuring operation and after satisfying the requirement the luggage will be registered in the database

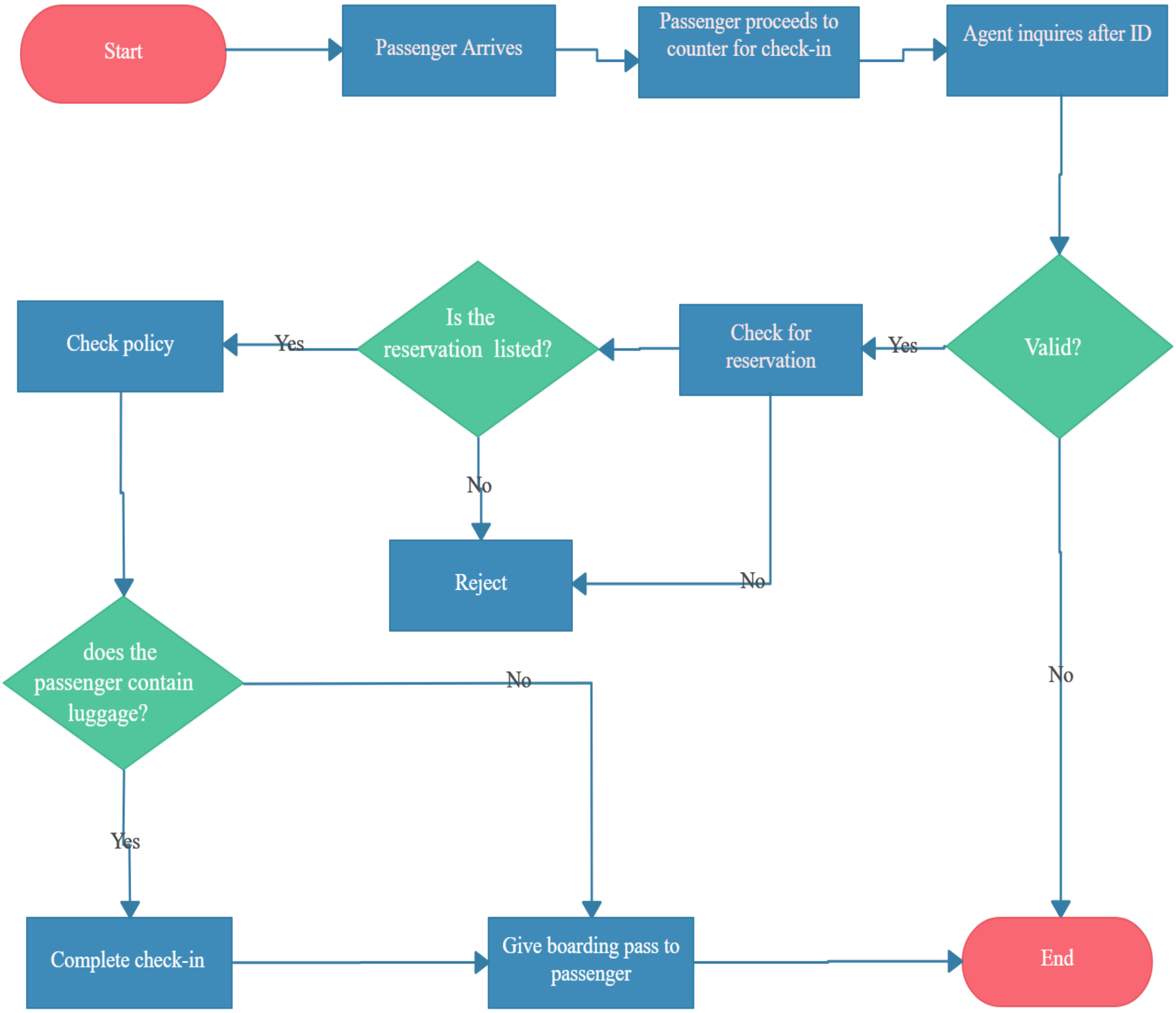
And passenger get an ID of his luggages and it like a sticker that they stick it on them.

The employee fills all the data including the flight details so he must fill the passenger data with the appropriate flight with adding the luggage data if it available

The passenger

The passenger basically he needs his passport as first degree and the flight ticket as second degree, he should provide his documents to the employee in the registration office and make sure his passport is did not died then he must show his luggage if he has, he should confirm that his luggage suit the requirement, in case it does not, then he should make some changes then provide the luggage for the re-checking again, if finally it will be approved then his process of check-in is finished and all he needs is to go on the boarding in the right time.

Flowchart for check-in process



Start
Passenger Arrives
Passenger proceeds to counter for check-in
Agent inquires after ID
Valid?
Yes
Check for reservation
Is the reservation listed?
Yes
Check policy
No
Reject
No
No
does the passenger contain luggage?
No
Yes
Complete check-in
Give boarding pass to passenger
End

Airport’s Database information

In this part all the abbreviations that were used in the database is explained here

Attribute	Description	Values
AGE	The age of the passenger	{1 - 115}
AIRPORTCODE	The unique code abbreviation that each airport has	DXB, JFK, FRA…
AIRPORT_NAME	The fully name of the airport	Dubai International Aiport….
ARVCODE	Airport code of the arrival destination	DXB, JFK, FRA,…
ARVTIME	Timing of the Arrival flight	DXB, JFK, FRA,…
BLOCK	The block where the office is situated	A,B,C,…
CITY	The city where the airport is situated	Algiers, Moscow,Dubai,…
COUNTRY	The country where the airport is situated	Algeria, Russia, Italy…
CITIZENSHIP	The country where the passenger from	France, Russia, Mali
DEPCODE	Airport code of flight depart	DXB, JFK, FRA,…
DEPTIME	Depart time of the flight	DXB, JFK, FRA,…
DOB	Date of birth of the passenger	01-10-1998,…
EMPFULL_NAME	Employee full name	James Mcarthy,…
EMPPOST	Employee post	Check-in Assistant,…
EMP_ID	Employee ID	1004,1011,1012,…
EMAIL	Email of the passenger	Rodygarcia@gmail.com,...
FLIGHT_ID	The flight ID	1022,1023,1024,…

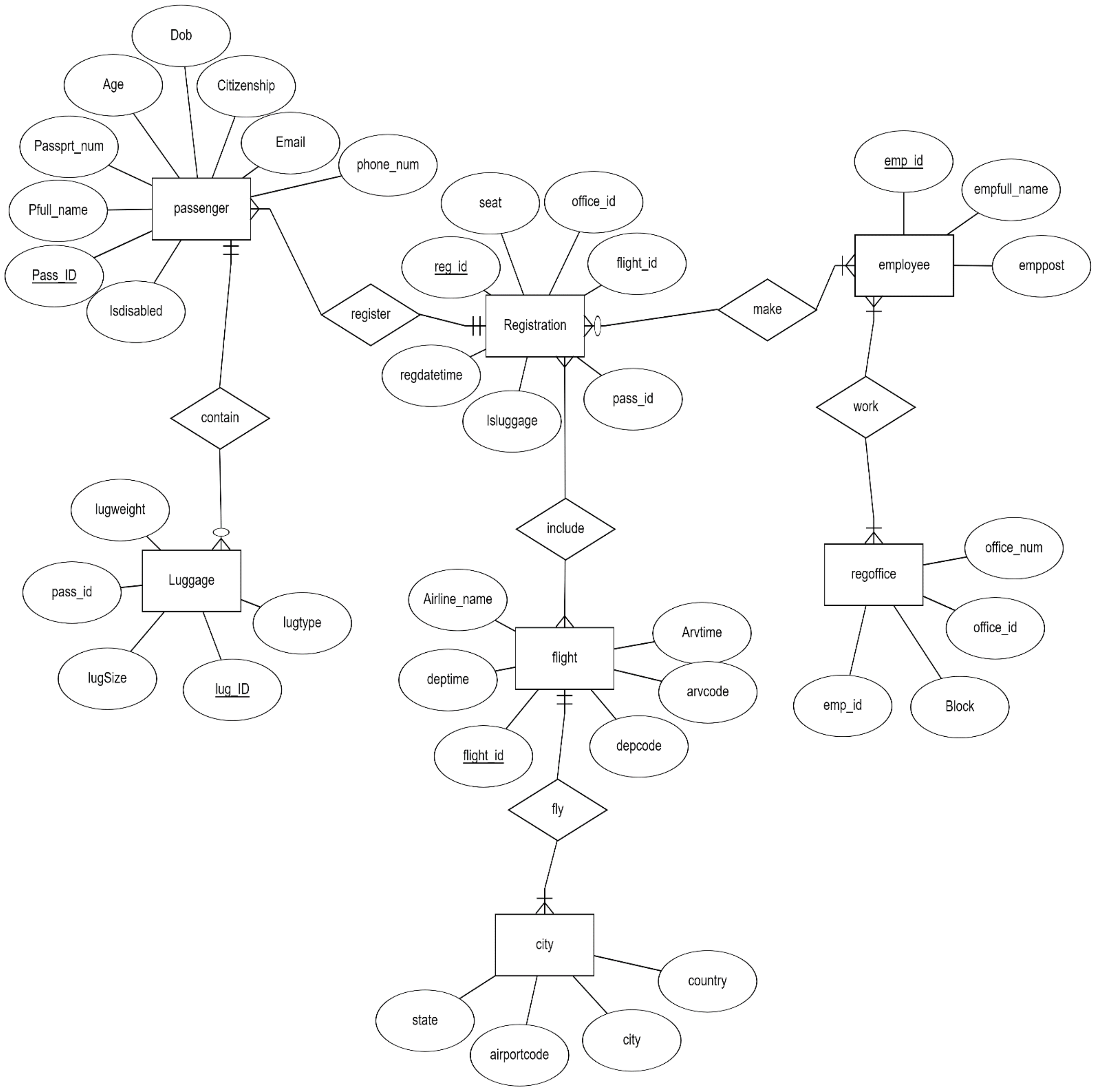
ISDISABLED	Weather the passenger is disabled or not	TRUE/FALSE
ISLUGGAGE	Weather the passenger has luggage or not	TRUE/FALSE
LUGSIZE	The size of the luggage	40,43,51,28,…
LUGTYPE	The luggage type	Unchecked,checked
LUGWEIGHT	The luggage wright	18,20,15,…
LUG_ID	The luggage ID	119,139,199,…
OFFICE_ID	The ID of the office	104,105,108
OFFICE_NUM	The number of the office where it positioned in the block	1,6,8,…
PASSPRT_NUM	The passport number of the passenger	2073190012
PASS_ID	The Passenger ID	1043,1022,…
PFULL_NAME	The Passenger full name	Wan zashen,Mike stewart,…
PHONE_NUM	The phone number of the passenger	+213552851904
REGDATETIME	The check-in registration date and time	2020-03-13 22:30:00,…
REG_ID	The ID of the check-in registration	3129,2391,3981,…
STATE	The state where the airport is situated	New York,Clifornia,…

Attributes: in the attributes column you can find all the attributes that are mentioned in the database, ordered order alphabetically A-Z

Description: in this column you can find the explanation of this attribute or what is the signification of the attribute in our database

Values: here you can the kind of values the actually the attribute give, they are examples of what form of data this attribute can be

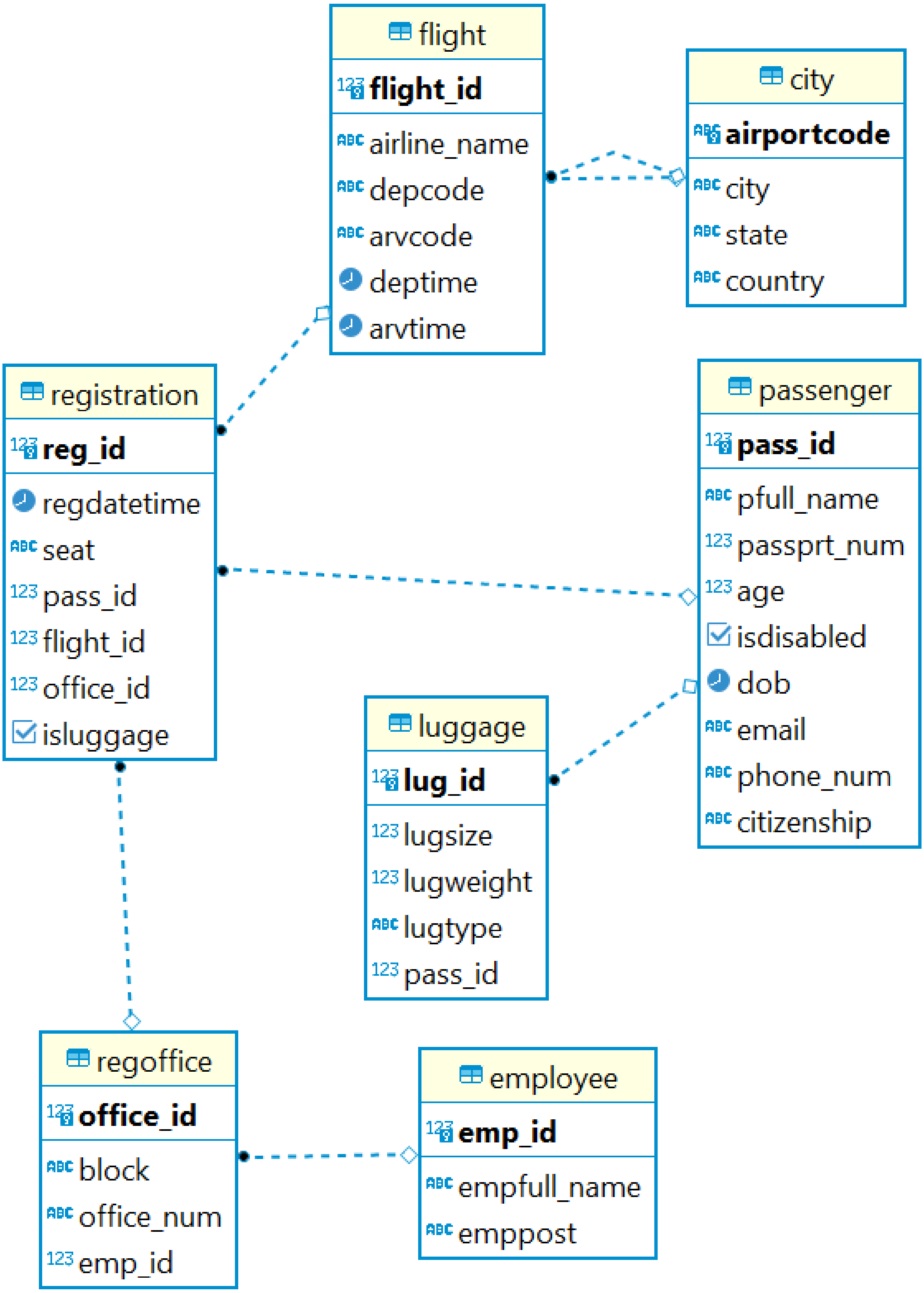
The ER-Diagram of the database



This is the Entity Relationship Diagram, also known as ERD, ER Diagram or ER model, is a type of structural diagram for use in database design. An ERD contains different symbols and connectors that visualize two important information: The major entities within the system scope, and the inter-relationships among these entities, this ER-diagram is made in ERDPlus free platform

So we can see all entities relationship, as we can see what every entity include as attributes, the Primary key in each entity

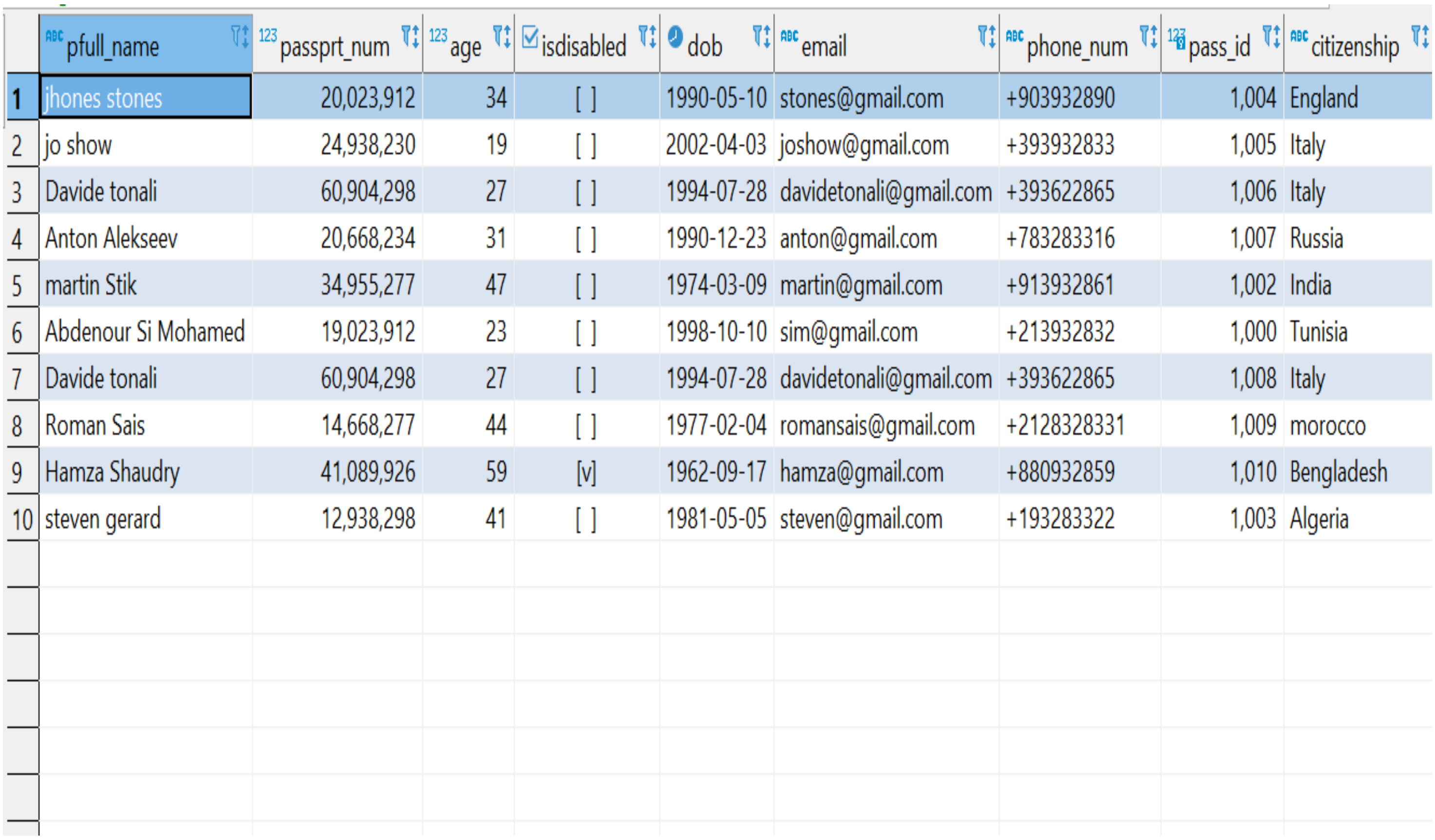
Relational Schema of the Database



This **relational schema** is a set of **relational** tables and associated items that are related to one another. All of the base tables, views, indexes, domains, user roles, stored modules, and other items that a user creates to fulfill the data needs of a particular enterprise or set of applications belong to one **schema**, and it is an outline of how data is organized. It can be a graphic illustration, or another kind of chart used to understand how each table is laid out, including the columns and the types of data they hold and how tables connect

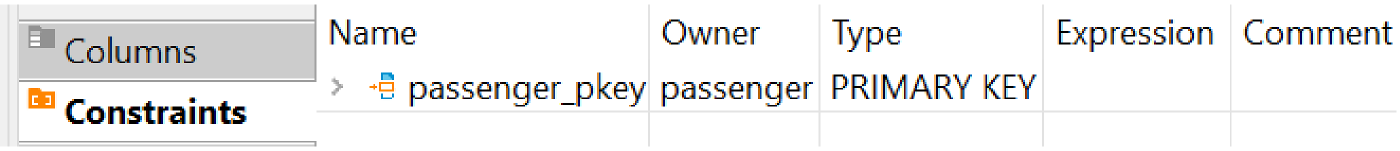
Data example

1) Passenger table



	pfull_name	passprt_num	age	isdisabled	dob	email	phone_num	pass_id	citizenship
1	jhones stones	20,023,912	34	[ ]	1990-05-10	stones@gmail.com	+903932890	1,004	England
2	jo show	24,938,230	19	[ ]	2002-04-03	joshow@gmail.com	+393932833	1,005	Italy
3	Davide tonali	60,904,298	27	[ ]	1994-07-28	davidetonali@gmail.com	+393622865	1,006	Italy
4	Anton Alekseev	20,668,234	31	[ ]	1990-12-23	anton@gmail.com	+783283316	1,007	Russia
5	martin Stik	34,955,277	47	[ ]	1974-03-09	martin@gmail.com	+913932861	1,002	India
6	Abdenour Si Mohamed	19,023,912	23	[ ]	1998-10-10	sim@gmail.com	+213932832	1,000	Tunisia
7	Davide tonali	60,904,298	27	[ ]	1994-07-28	davidetonali@gmail.com	+393622865	1,008	Italy
8	Roman Sais	14,668,277	44	[ ]	1977-02-04	romansais@gmail.com	+2128328331	1,009	morocco
9	Hamza Shaudry	41,089,926	59	[v]	1962-09-17	hamza@gmail.com	+880932859	1,010	Bengladesh
10	steven gerard	12,938,298	41	[ ]	1981-05-05	steven@gmail.com	+193283322	1,003	Algeria

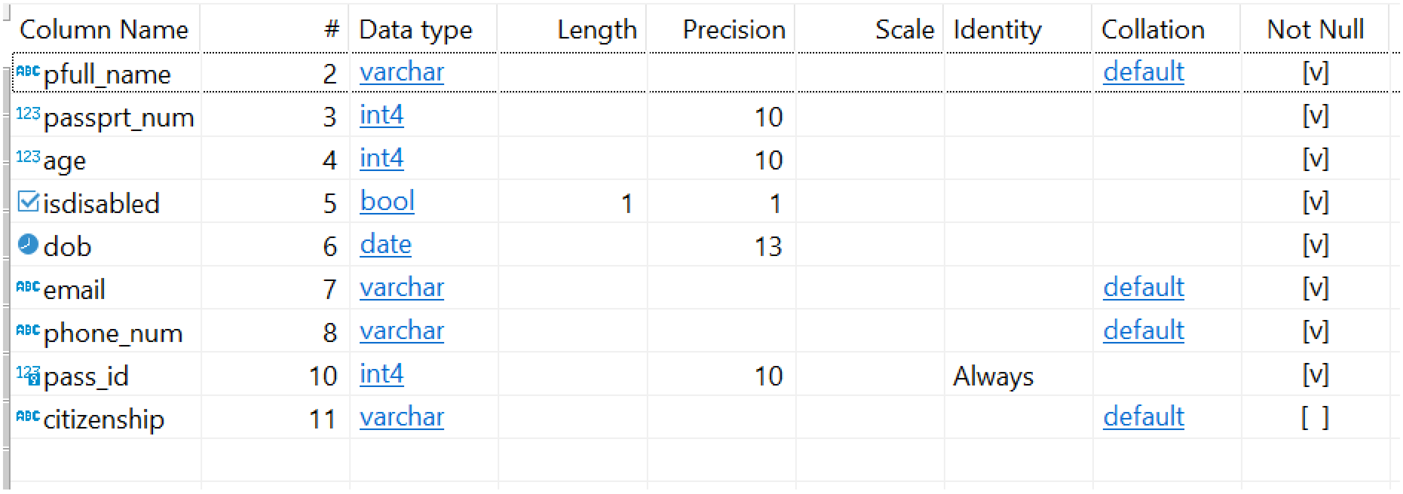
In the passenger table you can see all the passenger data including his ID which is the most important, full name, the passport number,weather he is disabled or not, his date of birth, the citizenship, the contact information (phone number and email) This table's primary key is the passenger ID (pass_id) as it is shown in the picture bellow



Name	Owner	Type	Expression	Comment
passenger_pkey	passenger	PRIMARY KEY		

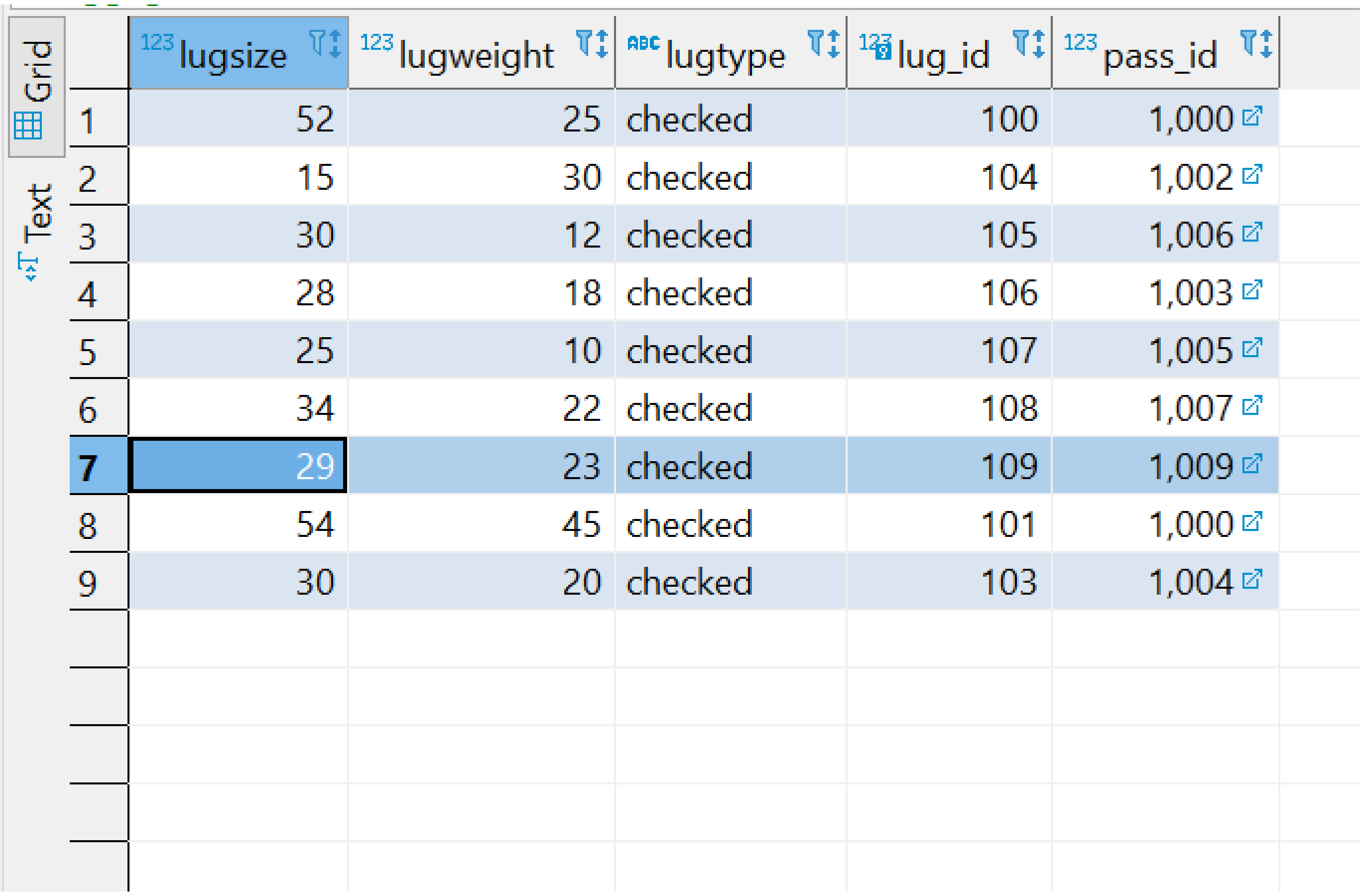
NOTE: the Passenger table has no foreign key!

And here is the table’s data details



Column Name	#	Data type	Length	Precision	Scale	Identity	Collation	Not Null
pfull_name	2	varchar					default	[v]
passprt_num	3	int4		10				[v]
age	4	int4		10				[v]
isdisabled	5	bool	1	1				[v]
dob	6	date		13				[v]
email	7	varchar					default	[v]
phone_num	8	varchar					default	[v]
pass_id	10	int4		10		Always		[v]
citizenship	11	varchar					default	[ ]

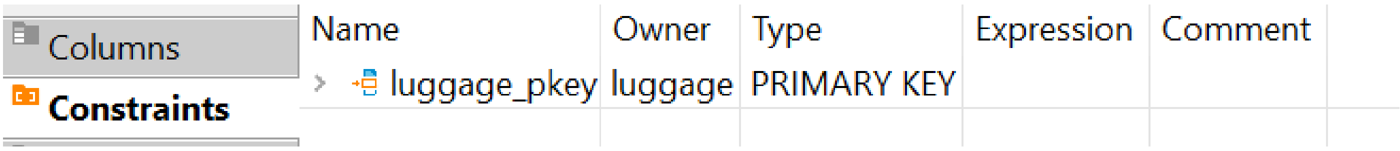
2) Luggage table



	lugsize	lugweight	lugtype	lug_id	pass_id
1	52	25	checked	100	1,000
2	15	30	checked	104	1,002
3	30	12	checked	105	1,006
4	28	18	checked	106	1,003
5	25	10	checked	107	1,005
6	34	22	checked	108	1,007
7	29	23	checked	109	1,009
8	54	45	checked	101	1,000
9	30	20	checked	103	1,004

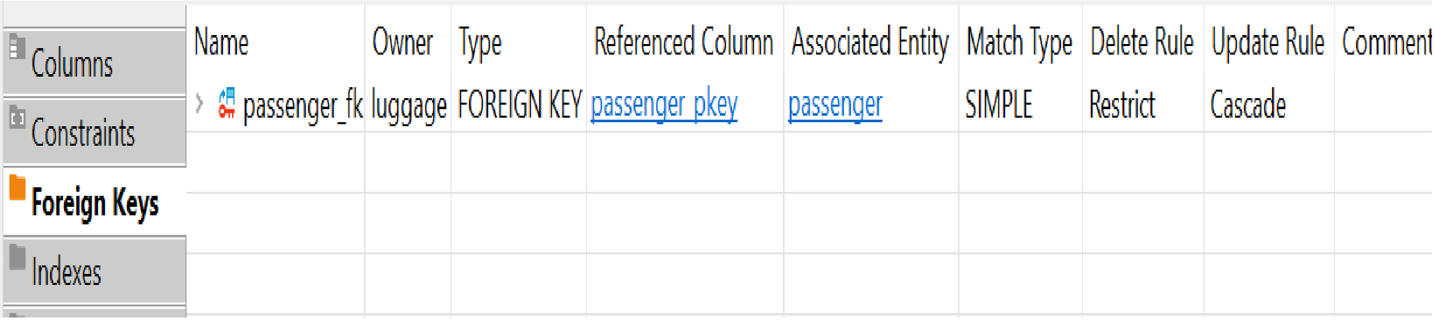
- This table contains the luggage details such as the luggage type, size and weight

- The primary key of this table is the luggage ID



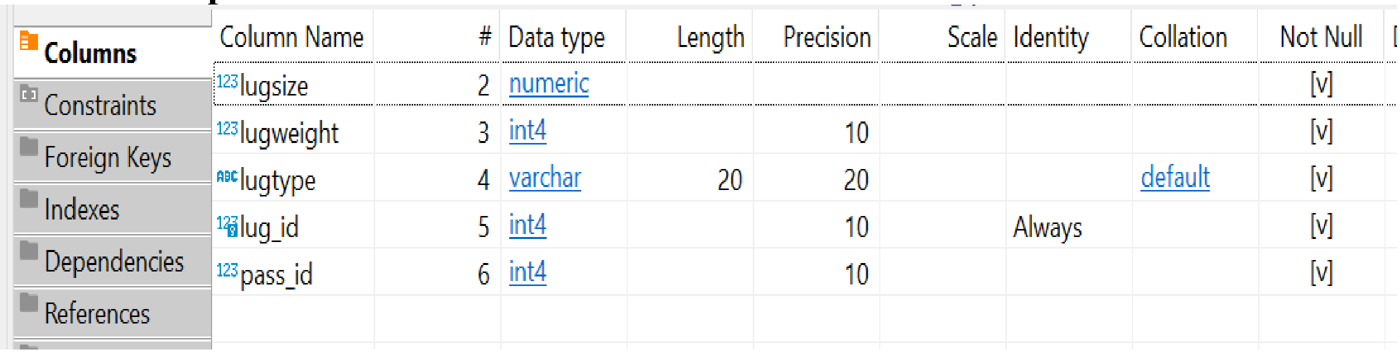
Name	Owner	Type	Expression	Comment
luggage_pkey	luggage	PRIMARY KEY		

Note : this table contains a foreign key which the passenger ID, but why ?
Actually here I had kind of problem with the foreign keys, first I had luggage_id as foreign key in the passenger table then but in this case the passenger can not have more then one luggage ID which is mean not more then one luggage so it will be a problem for the passenger who has more then one luggage
So with Adding foreign key in the luggage table the passenger now can have more then one luggage registered by his unique passenger_ID



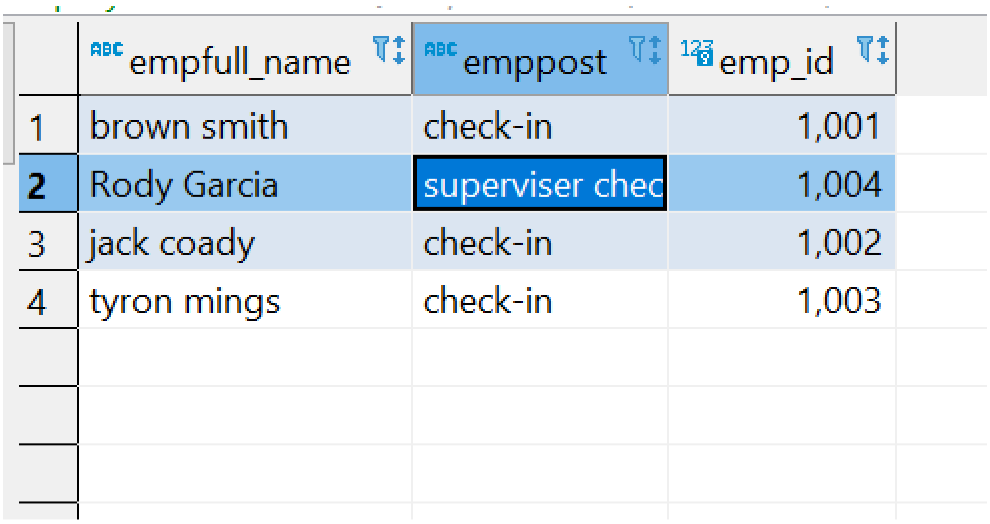
Name	Owner	Type	Referenced Column	Associated Entity	Match Type	Delete Rule	Update Rule	Comment
passenger_fk	luggage	FOREIGN KEY	passenger_pkey	passenger	SIMPLE	Restrict	Cascade	

And this is a picture with data details



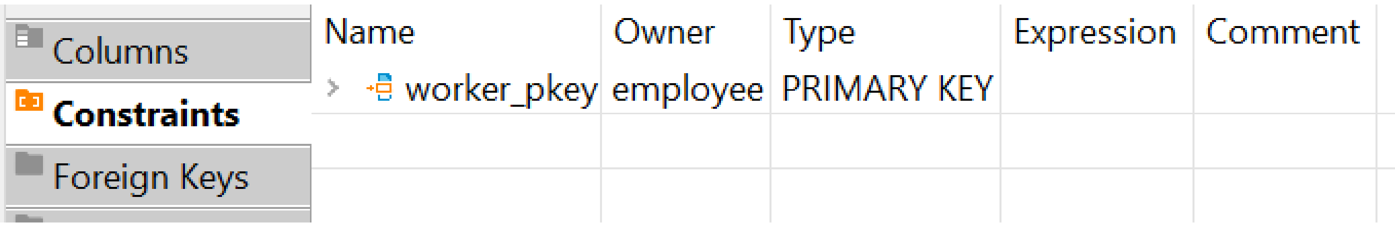
Column Name	#	Data type	Length	Precision	Scale	Identity	Collation	Not Null
lugsize	2	numeric						[v]
lugweight	3	int4		10				[v]
lugtype	4	varchar	20	20			default	[v]
lug_id	5	int4		10		Always		[v]
pass_id	6	int4		10				[v]

3) Employee table



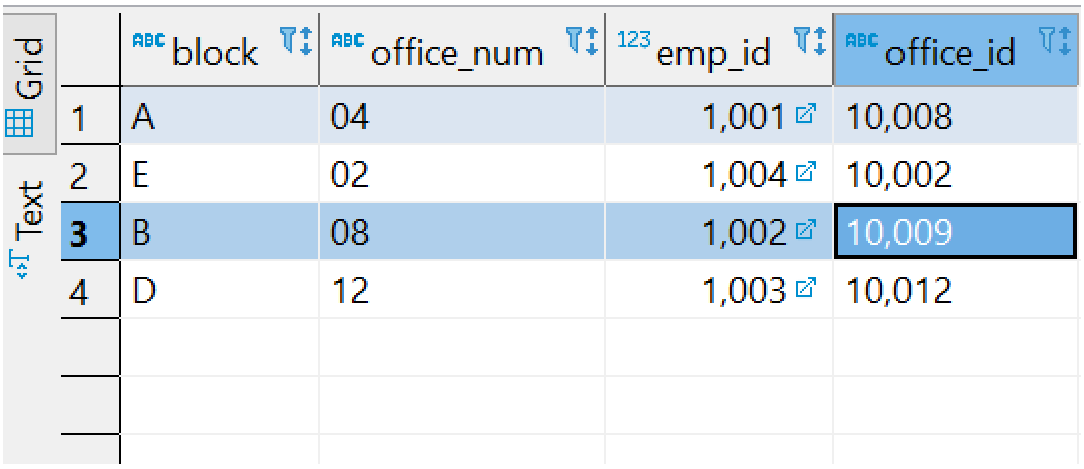
	empfull_name	emppost	emp_id
1	brown smith	check-in	1,001
2	Rody Garcia	superviser chec	1,004
3	jack coady	check-in	1,002
4	tyron mings	check-in	1,003

The employee table contains the employee full name, the employee ID which is his primary Key
And last thing is the employee post (emppost)



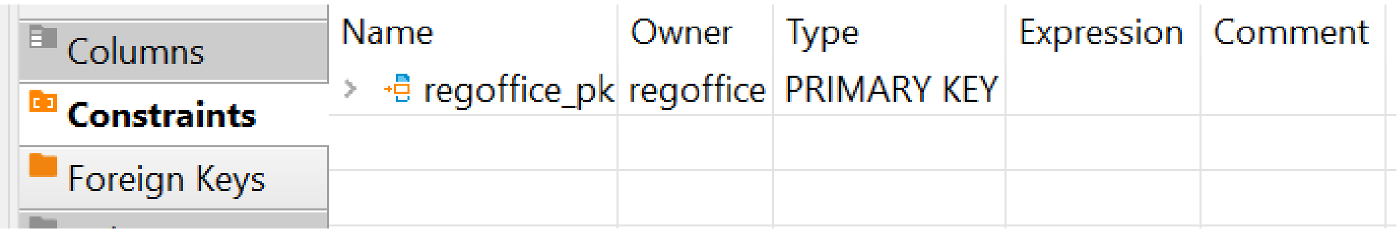
Name	Owner	Type	Expression	Comment
worker_pkey	employee	PRIMARY KEY		

4) Registration Office table (regoffice)

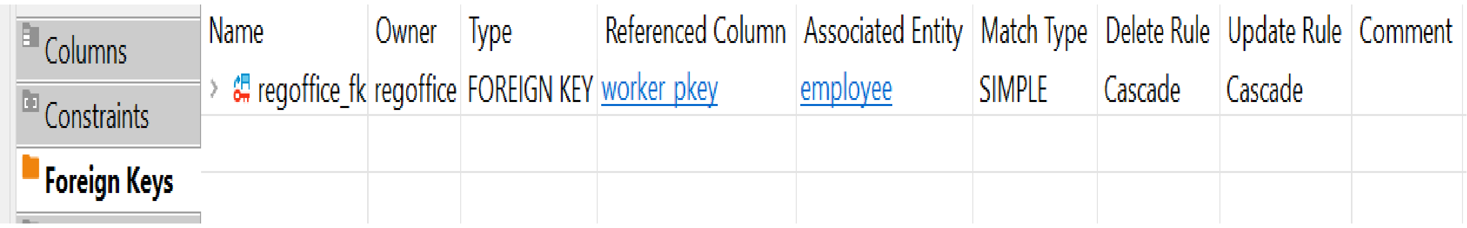


	block	office_num	emp_id	office_id
1	A	04	1,001	10,008
2	E	02	1,004	10,002
3	B	08	1,002	10,009
4	D	12	1,003	10,012

This table has all informations of the registration office where the check-in process Happens in the airport
So it contains the block of the office, his number, and the office ID
As we know that in every office there is one or more employees so the emp-id here represents the foreign key that link the two tables (regoffice and employee table)

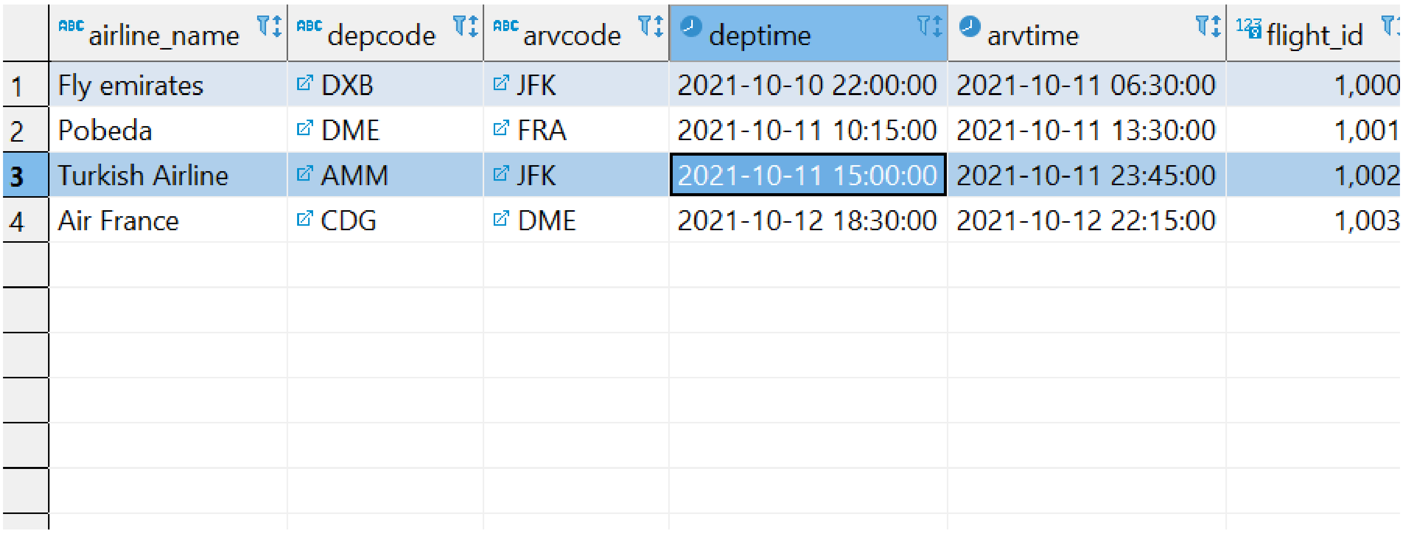


Name	Owner	Type	Expression	Comment
regoffice_pk	regoffice	PRIMARY KEY		



Name	Owner	Type	Referenced Column	Associated Entity	Match Type	Delete Rule	Update Rule	Comment
regoffice_fk	regoffice	FOREIGN KEY	worker pkey	employee	SIMPLE	Cascade	Cascade	

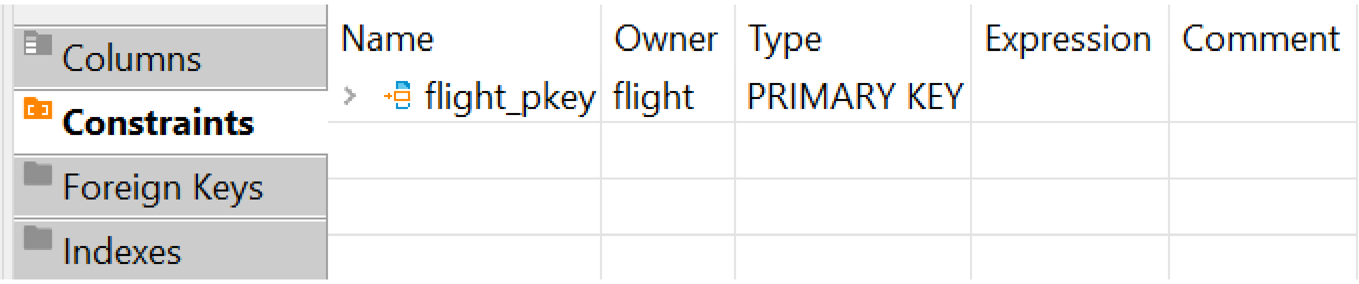
5)Flight table



	airline_name	depcode	arvcode	deptime	arvtime	flight_id
1	Fly emirates	DXB	JFK	2021-10-10 22:00:00	2021-10-11 06:30:00	1,000
2	Pobeda	DME	FRA	2021-10-11 10:15:00	2021-10-11 13:30:00	1,001
3	Turkish Airline	AMM	JFK	2021-10-11 15:00:00	2021-10-11 23:45:00	1,002
4	Air France	CDG	DME	2021-10-12 18:30:00	2021-10-12 22:15:00	1,003

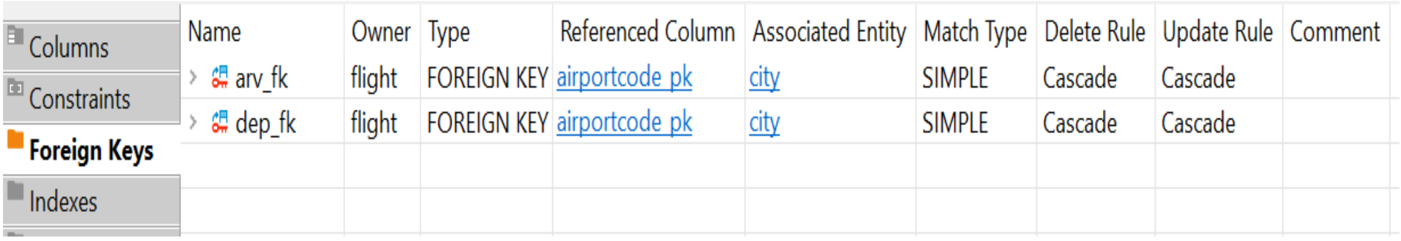
The flight table Has the different data on the flight, starting from the flight IT to flying time

We can find the name of the Airline company, the airport depart code, the airport arrival code,
The date and time of the depart and the arrival
Obviously the primary key here is the flight ID as it shown bellow



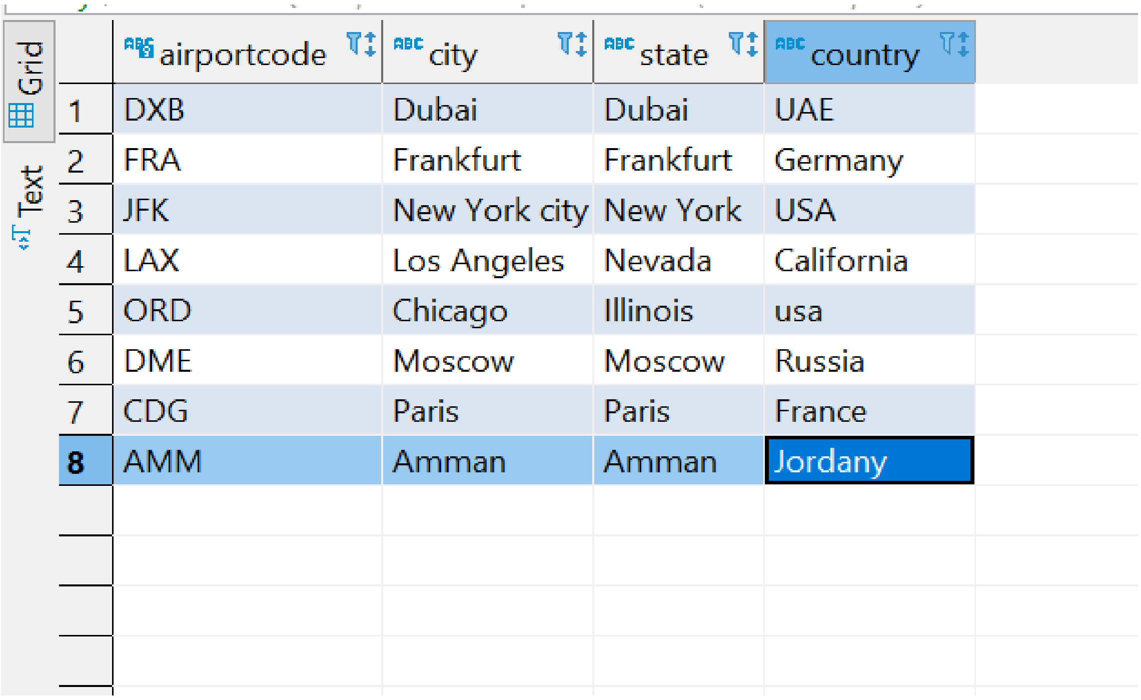
Name	Owner	Type	Expression	Comment
flight_pkey	flight	PRIMARY KEY		

And the table is linked an other table which is the city table through the depart code and arrival code , and we will discuss more about this table next



Name	Owner	Type	Referenced Column	Associated Entity	Match Type	Delete Rule	Update Rule	Comment
arv_fk	flight	FOREIGN KEY	airportcode pk	city	SIMPLE	Cascade	Cascade	
dep_fk	flight	FOREIGN KEY	airportcode pk	city	SIMPLE	Cascade	Cascade	

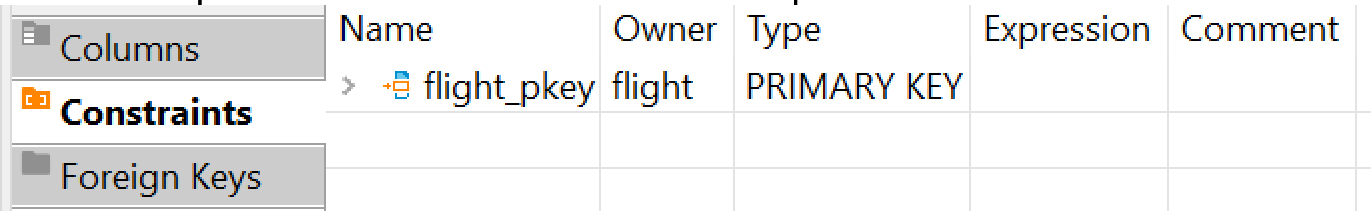
6)city table



	airportcode	city	state	country
1	DXB	Dubai	Dubai	UAE
2	FRA	Frankfurt	Frankfurt	Germany
3	JFK	New York city	New York	USA
4	LAX	Los Angeles	Nevada	California
5	ORD	Chicago	Illinois	usa
6	DME	Moscow	Moscow	Russia
7	CDG	Paris	Paris	France
8	AMM	Amman	Amman	Jordany

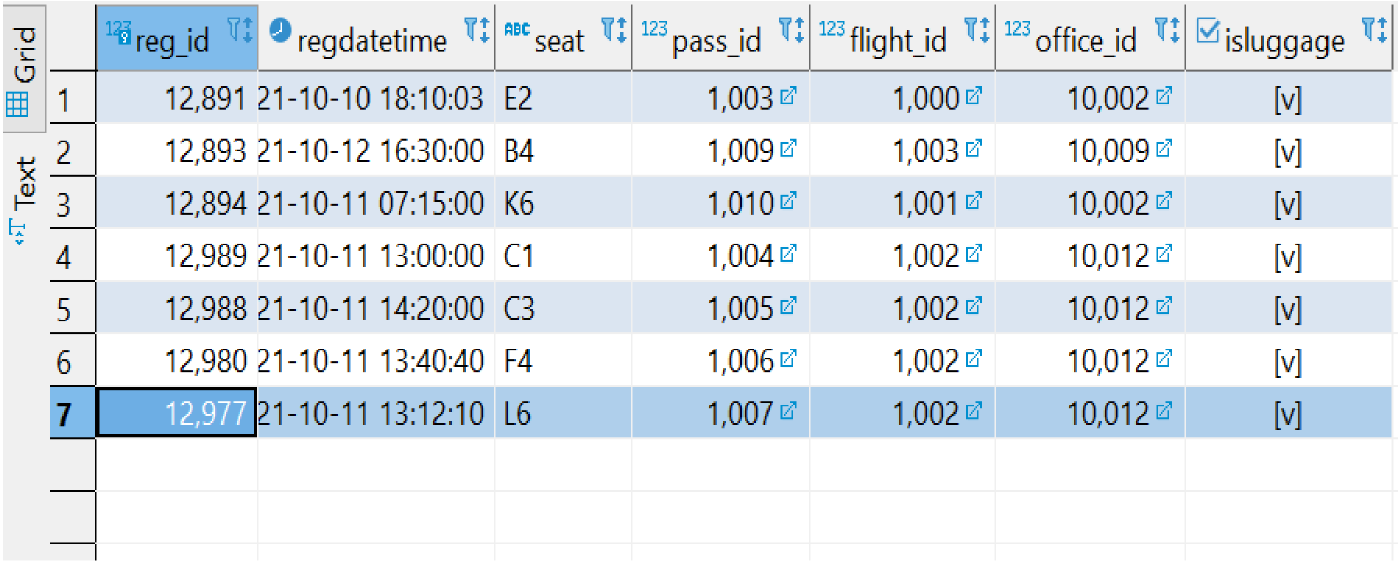
In this table we can find the details of the airport information such as the city, country and the state

As I mentioned before the city table is linked with flight table through the code of the airport, since every airport has a unique code so we can find more data about
The depart airport or the arrival airport in this table
Since it unique then the ID of this table is the airport code



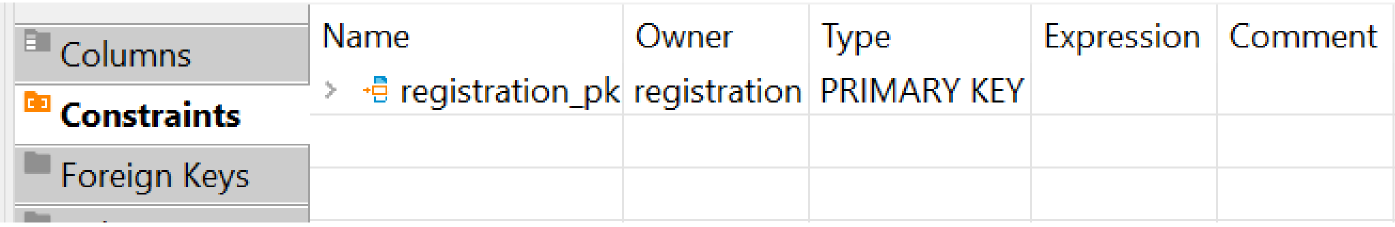
Name	Owner	Type	Expression	Comment
flight_pkey	flight	PRIMARY KEY		

7) Registration table



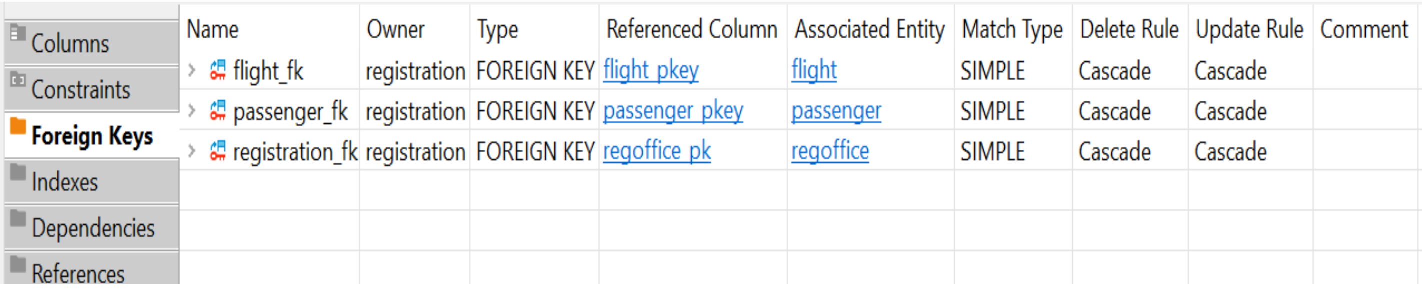
	reg_id	regdatetime	seat	pass_id	flight_id	office_id	isluggage
1	12,891	21-10-10 18:10:03	E2	1,003	1,000	10,002	[v]
2	12,893	21-10-12 16:30:00	B4	1,009	1,003	10,009	[v]
3	12,894	21-10-11 07:15:00	K6	1,010	1,001	10,002	[v]
4	12,989	21-10-11 13:00:00	C1	1,004	1,002	10,012	[v]
5	12,988	21-10-11 14:20:00	C3	1,005	1,002	10,012	[v]
6	12,980	21-10-11 13:40:40	F4	1,006	1,002	10,012	[v]
7	12,977	21-10-11 13:12:10	L6	1,007	1,002	10,012	[v]

- So the process of the registration check-in happens here and this is the final process. The result of this process is the isuance of the boarding Pass and the seat of the passenger
-The primary key is the registration ID (reg_id)



Name	Owner	Type	Expression	Comment
registration_pk	registration	PRIMARY KEY		

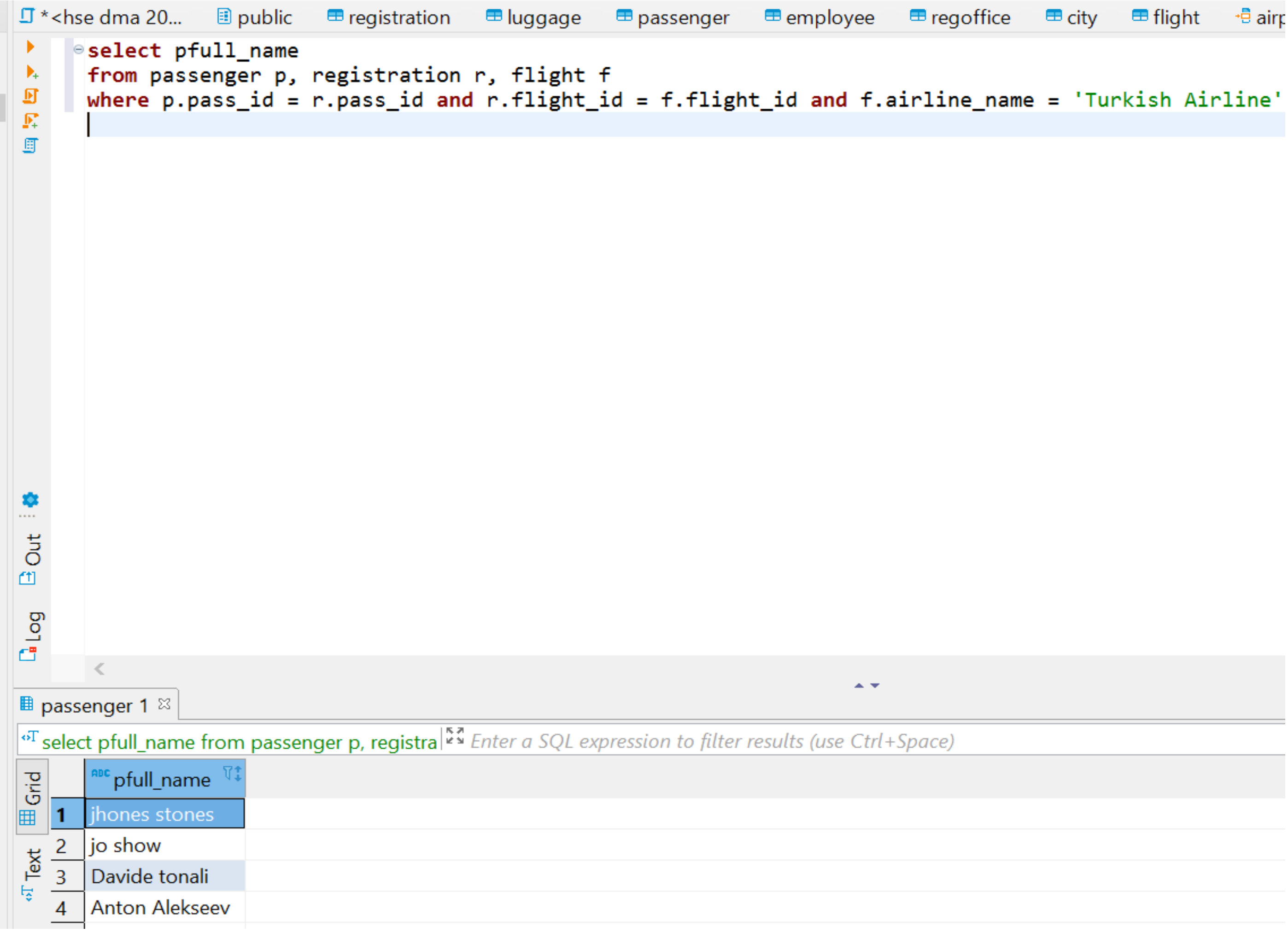
-This table is linked with different other tables (passenger, flight, and regoffice tables) through the foreign keys



Name	Owner	Type	Referenced Column	Associated Entity	Match Type	Delete Rule	Update Rule	Comment
flight_fk	registration	FOREIGN KEY	flight_pkey	flight	SIMPLE	Cascade	Cascade	
passenger_fk	registration	FOREIGN KEY	passenger_pkey	passenger	SIMPLE	Cascade	Cascade	
registration_fk	registration	FOREIGN KEY	regoffice_pk	regoffice	SIMPLE	Cascade	Cascade	

Data manipulation with SQL queries

In this query we will extact all the passengers name that are registered with the fligh of turkish Airline
And this is the result of our query



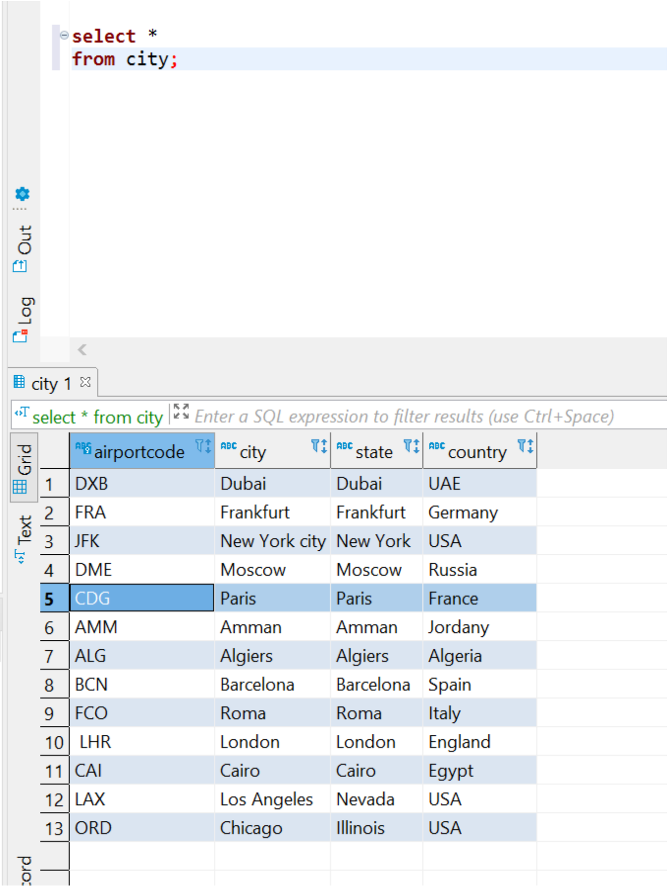
```sql
select pfull_name
from passenger p, registration r, flight f
where p.pass_id = r.pass_id and r.flight_id = f.flight_id and f.airline_name = 'Turkish Airline'
```

select pfull_name from passenger p, registra

	pfull_name
1	jhones stones
2	jo show
3	Davide tonali
4	Anton Alekseev

Visualization

Since the database is not filled yet with many data In order to get better results in term of visualization and data analysis but let’s try to make something interesting with the available data
Let’s extract the data of all the countries and cities of the airport locations that are available



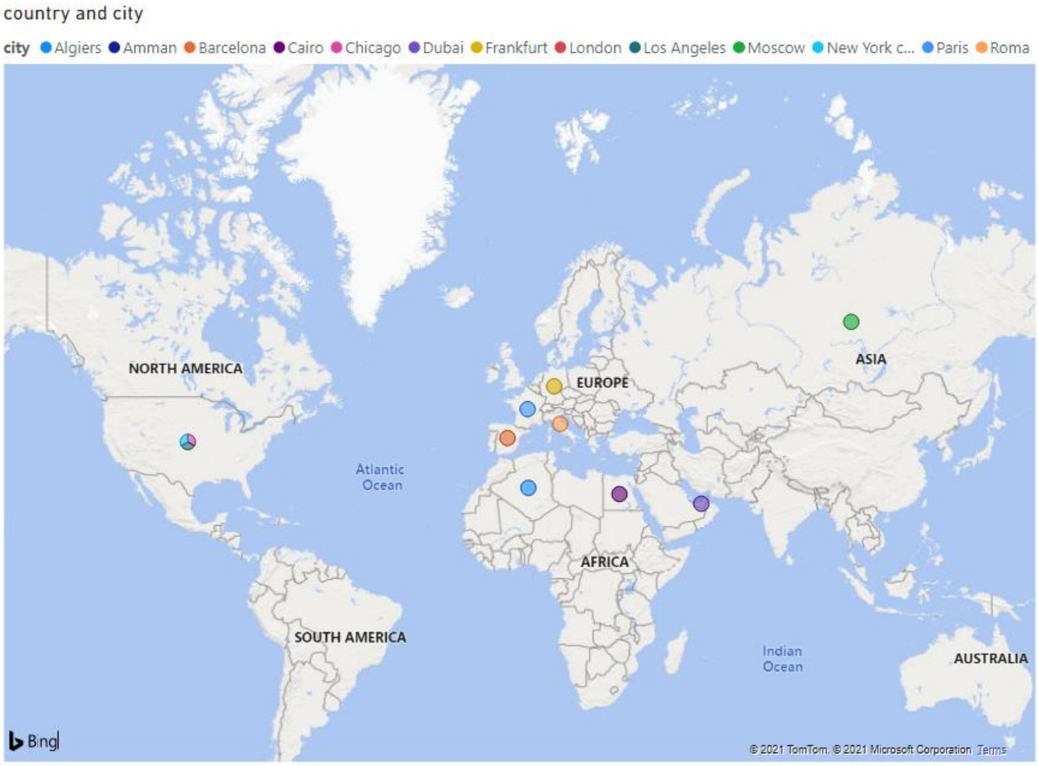
```
select *
from city;
```

city 1

select * from city | Enter a SQL expression to filter results (use Ctrl+Space)

	airportcode	city	state	country
1	DXB	Dubai	Dubai	UAE
2	FRA	Frankfurt	Frankfurt	Germany
3	JFK	New York city	New York	USA
4	DME	Moscow	Moscow	Russia
5	CDG	Paris	Paris	France
6	AMM	Amman	Amman	Jordany
7	ALG	Algiers	Algiers	Algeria
8	BCN	Barcelona	Barcelona	Spain
9	FCO	Roma	Roma	Italy
10	LHR	London	London	England
11	CAI	Cairo	Cairo	Egypt
12	LAX	Los Angeles	Nevada	USA
13	ORD	Chicago	Illinois	USA

And now let’s make a map visualization for the data that we got



country and city
city ● Algiers ● Amman ● Barcelona ● Cairo ● Chicago ● Dubai ● Frankfurt ● London ● Los Angeles ● Moscow ● New York c... ● Paris ● Roma
NORTH AMERICA
EUROPE
ASIA
Atlantic Ocean
AFRICA
SOUTH AMERICA
Indian Ocean
AUSTRALIA
Bing
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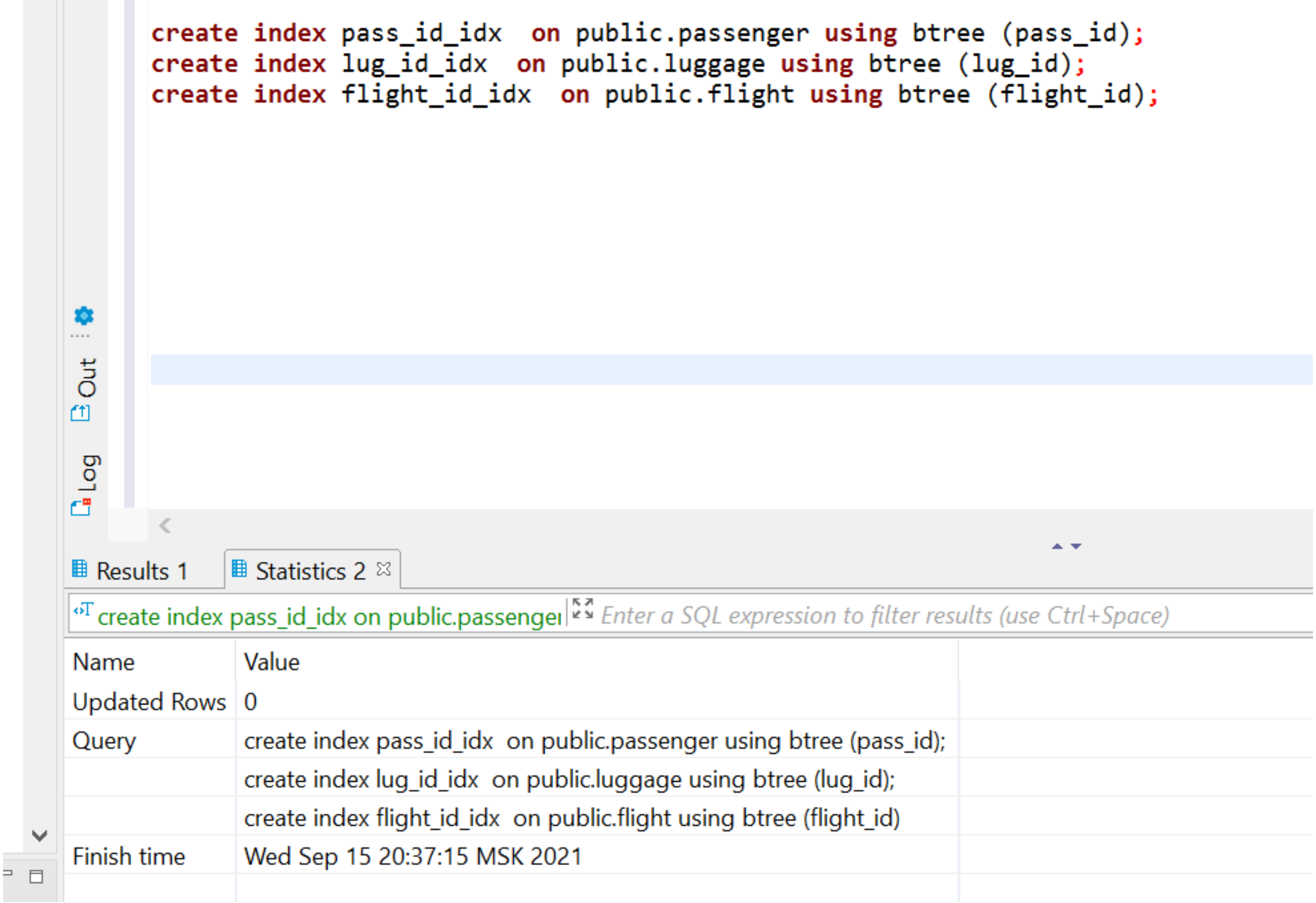
It clear that the colors mention the airport location, and for the USA we can see a cercle with 3 colors which is mean that there are 3 different airports in US

INDEXES

Let’s add some indexes on the luggage ID, Passenger ID and flight ID in order to make the manipulation on the database smother and faster!



```
create index pass_id_idx  on public.passenger using btree (pass_id);
create index lug_id_idx  on public.luggage using btree (lug_id);
create index flight_id_idx  on public.flight using btree (flight_id);
```

Out
Log
Results 1
Statistics 2
create index pass_id_idx on public.passenger
Enter a SQL expression to filter results (use Ctrl+Space)

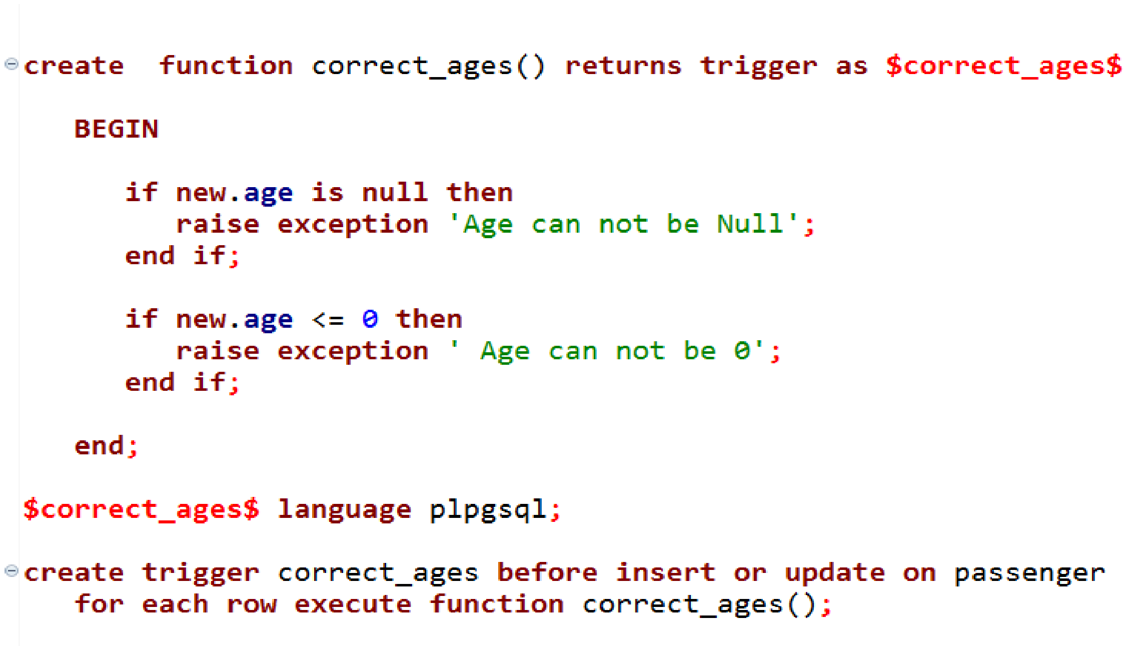
Name	Value
Updated Rows	0
Query	create index pass_id_idx on public.passenger using btree (pass_id);
	create index lug_id_idx on public.luggage using btree (lug_id);
	create index flight_id_idx on public.flight using btree (flight_id)
Finish time	Wed Sep 15 20:37:15 MSK 2021

And here we see the process is done with creating a btree index on the tables luggage, passenger and flight

Triggers

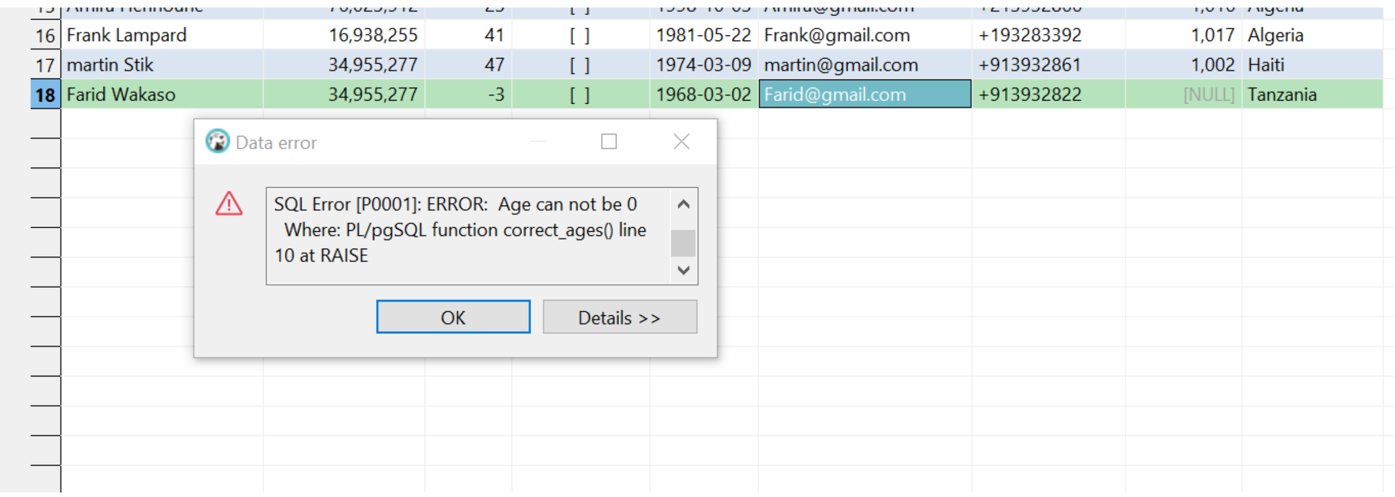
For the trigger functions I actually added two triggers, one for the age controlling (passenger table)
And second for luggage controlling (luggage table)

1- **Age controlling:** this trigger will executed on each row of the passenger table and will be raised when the age of the passenger is negative! And it obviously the age can never be a positive value! And the figure bellow clarify how this trigger is created



```
create  function correct_ages() returns trigger as $correct_ages$

   BEGIN

      if new.age is null then
         raise exception 'Age can not be Null';
      end if;

      if new.age <= 0 then
         raise exception ' Age can not be 0';
      end if;

   end;

$correct_ages$ language plpgsql;

create trigger correct_ages before insert or update on passenger
   for each row execute function correct_ages();
```

Let’s try to test this trigger with negative age value



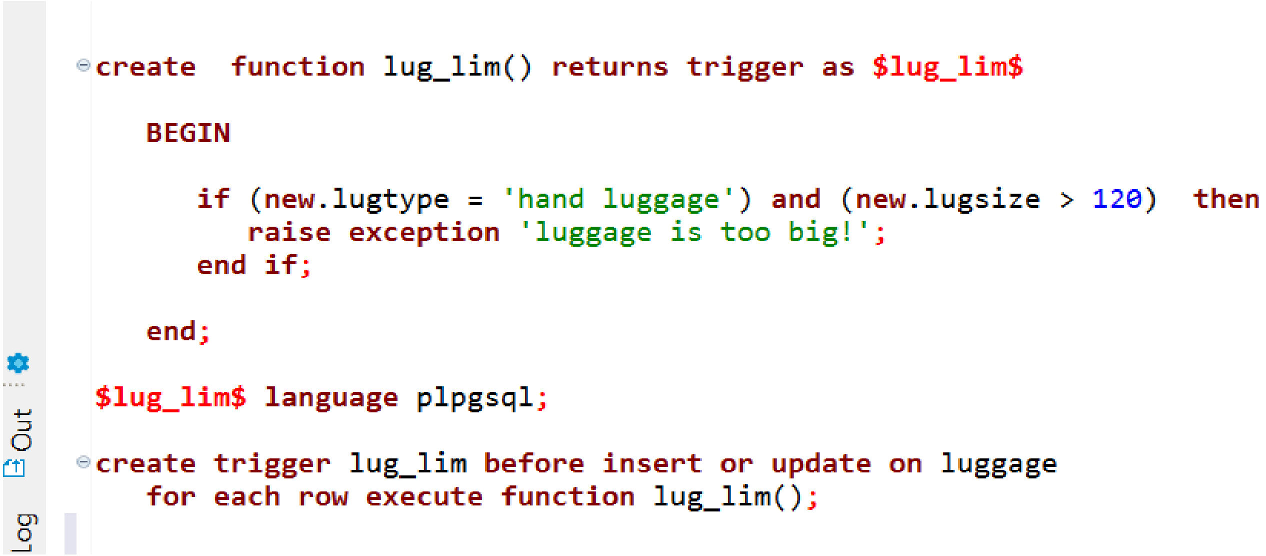
15	Amira [illegible]	[illegible]	23	[ ]	[illegible]	Amira@gmail.com	[illegible]	[illegible]	Algeria
16	Frank Lampard	16,938,255	41	[ ]	1981-05-22	Frank@gmail.com	+193283392	1,017	Algeria
17	martin Stik	34,955,277	47	[ ]	1974-03-09	martin@gmail.com	+913932861	1,002	Haiti
18	Farid Wakaso	34,955,277	-3	[ ]	1968-03-02	Farid@gmail.com	+913932822	[NULL]	Tanzania

SQL Error [P0001]: ERROR: Age can not be 0
  Where: PL/pgSQL function correct_ages() line 10 at RAISE

We can see here that we can not register Farid Wakaso because of the trigger of the negative age

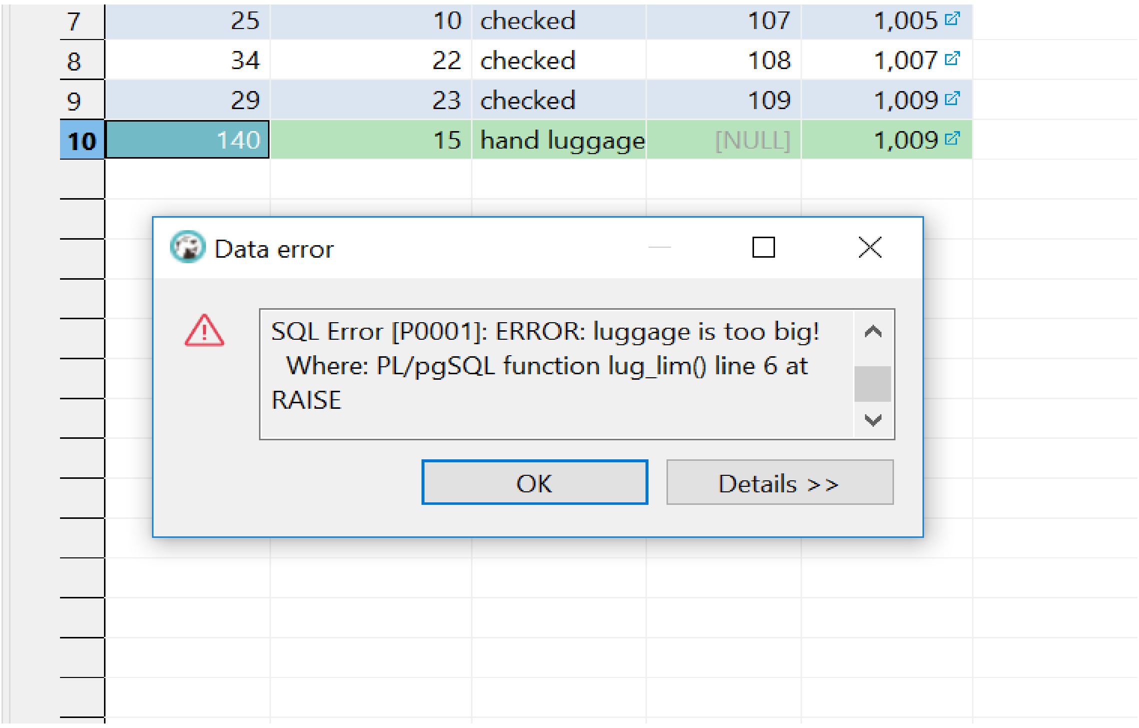
2- **Luggage controlling:** in this trigger we put a limit for the luggage size but only for the hand luggage type! And the size Max is 120cm

And the figure bellow clarify how this trigger is created



```
create  function lug_lim() returns trigger as $lug_lim$

   BEGIN

      if (new.lugtype = 'hand luggage') and (new.lugsize > 120)  then
         raise exception 'luggage is too big!';
      end if;

   end;

$lug_lim$ language plpgsql;

create trigger lug_lim before insert or update on luggage
   for each row execute function lug_lim();
```

Let’s try to test this trigger with high luggage size



7	25	10	checked	107	1,005
8	34	22	checked	108	1,007
9	29	23	checked	109	1,009
10	140	15	hand luggage	[NULL]	1,009

Data error

```
SQL Error [P0001]: ERROR: luggage is too big!
  Where: PL/pgSQL function lug_lim() line 6 at
RAISE
```

The trigger works successfully!

In the end the database name is Airport_luggage_registration_db_382 in dbeaver server