Project Description

The airport management system database project is implemented to manage and handle airport required data, passengers, employees, flights, tickets and etc. The users are the employees who are responsible for managing the airport system through the database and execute any of the stored procedures or triggers needed.

The database represents an AIRPORT which is located in a CITY and has AIRLINES. Each AIRPORT has many EMPLOYEES. Each AIRLINE has many FLIGHTS. Each FLIGHT has many PASSENGERS. Each PASSENGER can BOOK or CANCEL his TICKET. Each EMPLOYEE serves 1 or many PASSENGERS.

Tasks to be performed

- The system gives a broad picture of the underlying operational elements that affect airport management.
- The system should keep track of flights and flights could be canceled or delayed.
- The system should keep track of the passengers and their tickets bookings.
- The system should be able to update ticket prices and store ticket price history.
- The system should have necessary queries and it will be always updated with new queries to make the system better along the development process

ER Diagram and Relational Schema

Entities:

CITY

AIRPORT

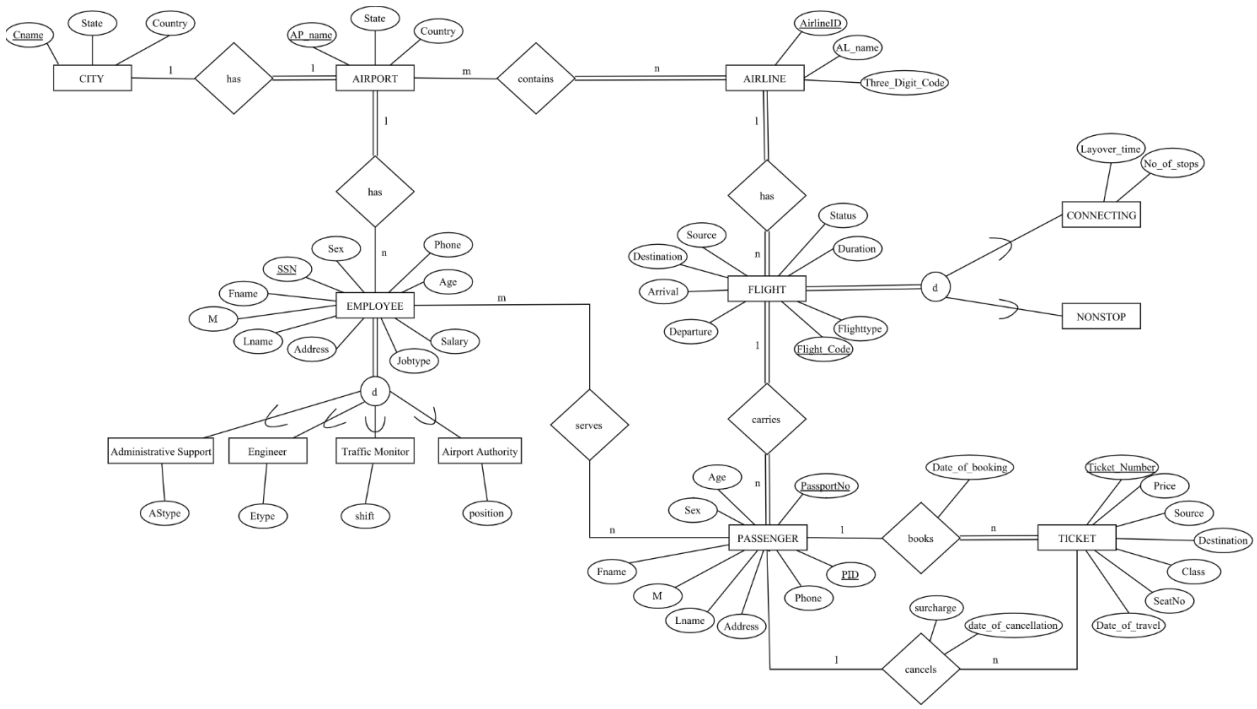
AIRLINE

EMPLOYEE (Administrative Support, Engineer, Traffic Monitor, Airport Authority)

FLIGHT (CONNECTING, NONSTOP)

PASSENGER

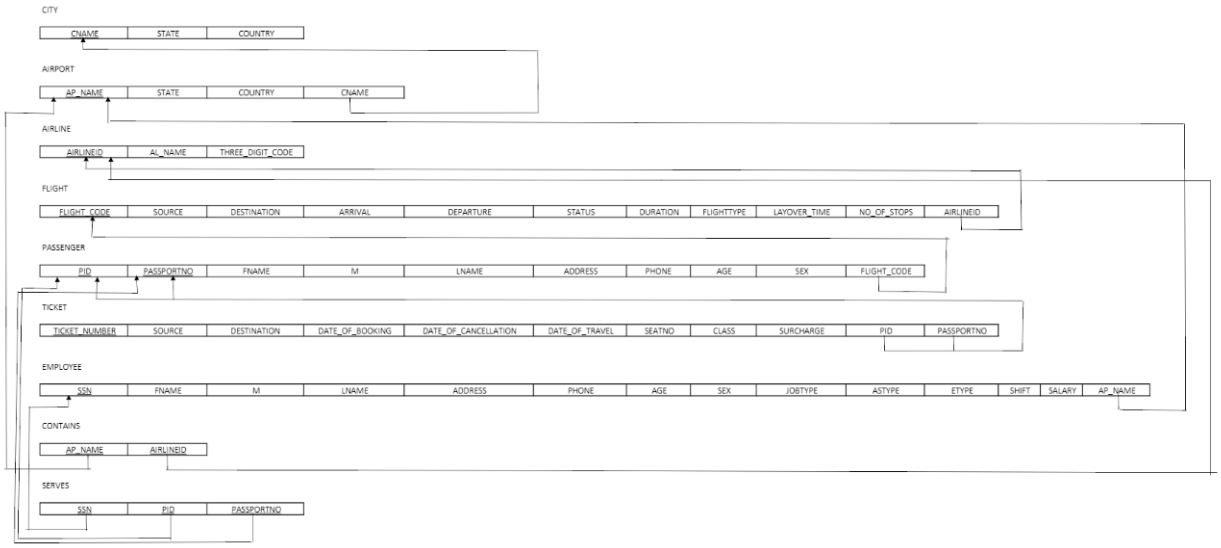
TICKET



Relationships:

Entity 1	Name of the Relationship	Entity 2	Cardinality
City	has	Airport	1:1
Airport	contains	Airline	m : n
Airport	has	Employee	1 : n
Airline	has	Flight	1 : n
Flight	carries	Passengers	1 : n
Employee	serves	Passengers	m : n
Passenger	books	Ticket	1 : n
Passenger	cancels	Ticket	1 : n

Relational Schema



Database Functions:

Query about economy passengers for specific flight.

Query about flights according to their status, either delayed or on time.

Trigger on update of ticket price and store old ticket price in a new table.

Trigger on update of flight status to add the flight to new table for delayed flights

Airport Names and Codes:

Our reference : IATA - Codes - Airline and Location Codes Search

Airport Name	IATA Airport code
Louisville International Airport	SDF
Chandigarh International Airport	IXC
Dallas/Fort Worth International Airport	DFW
Indira Gandhi International Airport	DEL
Chhatrapati Shivaji International Airport	BOM
San Francisco International Airport	SFO
Frankfurt Airport	FRA
George Bush Intercontinental Airport	IAH
John F. Kennedy International Airport	JFK
Tampa International Airport	TPA

SQL

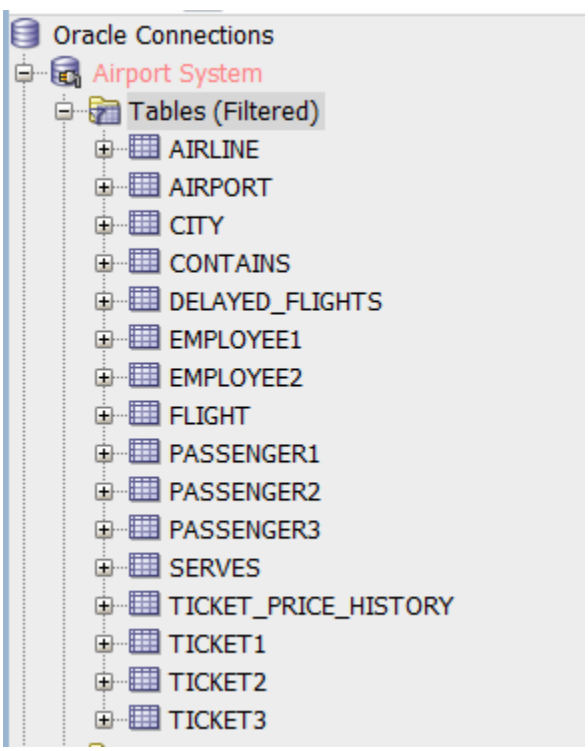
All scripts are submitted with this report

Created tables and inserted values for testing

Worksheet | Query Builder

```sql
CREATE TABLE CITY
(CNAME VARCHAR2(15) NOT NULL,
STATE VARCHAR2(15),
COUNTRY VARCHAR(30),
PRIMARY KEY(CNAME));



INSERT INTO CITY (CNAME, STATE, COUNTRY) VALUES('Louisville','Kentucky','United States');
INSERT INTO CITY (CNAME, STATE, COUNTRY) VALUES ('Chandigarh','Chandigarh','India');
INSERT INTO CITY (CNAME, STATE, COUNTRY) VALUES ('Fort Worth','Texas','United States');
INSERT INTO CITY (CNAME, STATE, COUNTRY) VALUES('Delhi','Delhi','India');
INSERT INTO CITY (CNAME, STATE, COUNTRY) VALUES('Mumbai','Maharashtra','India');
INSERT INTO CITY (CNAME, STATE, COUNTRY) VALUES('San Francisco', 'California', 'United States');
INSERT INTO CITY (CNAME, STATE, COUNTRY) VALUES('Frankfurt','Hesse','Germany');
INSERT INTO CITY (CNAME, STATE, COUNTRY) VALUES('Houston','Texas','United States');
INSERT INTO CITY (CNAME, STATE, COUNTRY) VALUES('New York City','New York','United States');
INSERT INTO CITY (CNAME, STATE, COUNTRY) VALUES('Tampa', 'Florida', 'United States');

CREATE TABLE AIRPORT
(AP_NAME VARCHAR2(100) NOT NULL,
STATE VARCHAR2(15),
COUNTRY VARCHAR(30),
CNAME VARCHAR2(15),
PRIMARY KEY(AP_NAME),
FOREIGN KEY(CNAME) REFERENCES CITY(CNAME) ON DELETE CASCADE);



INSERT INTO AIRPORT (AP_NAME, STATE, COUNTRY, CNAME) VALUES('Louisville International Airport','Kentucky','United States','Louisville');
```

Messages - Log



Procedure 1:

This procedure gets all the economy passengers details which are heading to DFW

```
CREATE OR REPLACE PROCEDURE DFWECONOMYPASSENGERS AS
CURSOR ECOPASSDETAILS is
select al.AL_NAME,fl.FLIGHT_CODE,p2.FNAME,p2.LNAME,p2.PASSPORTNO,t.CLASS,t.DATE_OF_TRAVEL,t.DESTINATION,t.SOURCE,t.SEATNO,t.TICKET_NUMBER from Airl
where al.AIRLINEID = fl.AIRLINEID
and  p1.PID= p3.PID
and  p1.PASSPORTNO =p2.PASSPORTNO
and fl.FLIGHT_CODE = p3.FLIGHT_CODE
and t.PASSPORTNO = p2.PASSPORTNO
and t.CLASS='ECONOMY' and t.DESTINATION='DFW';

PASSDETAILS ECOPASSDETAILS%rowtype;

BEGIN

Open ECOPASSDETAILS ;
   LOOP
    fetch ECOPASSDETAILS into PASSDETAILS;
     EXIT WHEN ECOPASSDETAILS%NOTFOUND;
   dbms_output.put_line (PASSDETAILS.AL_NAME || '  ' || PASSDETAILS.FLIGHT_CODE || '  ' || PASSDETAILS.FNAME || '  ' || PASSDETAILS.LNAME|| '  ' |

    END LOOP;
     close ECOPASSDETAILS;
  END DFWECONOMYPASSENGERS;
```

Output:

```
SET SERVEROUTPUT ON
exec DFWECONOMYPASSENGERS();
```

Script Output

Task completed in 0.277 seconds

```
Air India Limited  AI2014  ALEN  SMITH  A1234568  ECONOMY  BOM  32A  11234111122
Air India Limited  AI2014  ALIA  BHAT  P3452390  ECONOMY  BOM  37C  1258776199490
British Airways  BA3056  LAKSHMI  SHARMA  B8765430  ECONOMY  BOM  43B  2206543545545
Qatar Airways  QR2305  RIA  GUPTA  R8990566  ECONOMY  BOM  33F  5893069766787


PL/SQL procedure successfully completed.
```

Procedure 2:

This procedure gets the details of flights by their status

```
CREATE OR REPLACE PROCEDURE FLIGHTSBYSTATUS
(
  IN_STATUS IN VARCHAR2
) AS

CURSOR fSTATUS is
select  distinct f.FLIGHT_CODE ,al.AL_NAME ,f.ARRIVAL,f.departure,f.SOURCE,f.DESTINATION,f.STATUS,f.FLIGHTTYPE from Airline al ,Airport ap,flight f
where al.AIRLINEID=f.AIRLINEID
and  f.STATUS =IN_STATUS;

FlightStatus fSTATUS%rowtype;

BEGIN
  Open fSTATUS ;
   LOOP
    fetch fSTATUS into FlightStatus;
     EXIT WHEN fSTATUS%NOTFOUND;
   dbms_output.put_line (FlightStatus.FLIGHT_CODE || '  ' || FlightStatus.AL_NAME || '  ' || FlightStatus.ARRIVAL || '  ' || FlightStatus.departure

    END LOOP;
     close fSTATUS;
END FLIGHTSBYSTATUS;
```

Output:

```
SET SERVEROUTPUT ON
exec FLIGHTSBYSTATUS('Delayed');
-- or--
SET SERVEROUTPUT ON
exec FLIGHTSBYSTATUS('On-time');
```

Script Output

Task completed in 0.121 seconds

```
AI127  Air India Limited  02:10  03:15  BOM  DFW  Delayed  Connecting
QR2305  Qatar Airways  13:00  13:55  BOM  DFW  Delayed  Non-stop
QR1902  Qatar Airways  22:00  22:50  IXC  IAH  Delayed  Non-stop


PL/SQL procedure successfully completed.
```

```
SET SERVEROUTPUT ON
exec FLIGHTSBYSTATUS('On-time');
```

Script Output

Task completed in 0.036 seconds

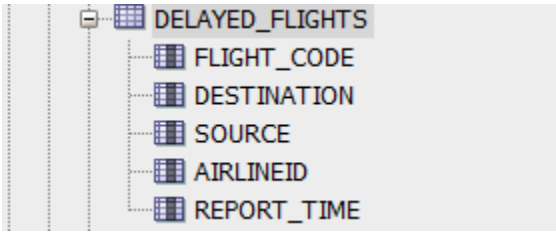
```
LH9876  Lufthansa  05:50  06:35  JFK  BOM  On-time  Non-stop
AI2014  Air India Limited  02:10  03:15  BOM  DFW  On-time  Connecting
EY1234  Ethiad Airways  19:20  20:05  JFK  TPA  On-time  Connecting
AA4367  American Airlines  18:10  18:55  SFO  FRA  On-time  Non-stop
9W2334  Jet Airways  23:00  13:45  IAH  DEL  On-time  Direct
EK3456  Emirates  18:50  19:40  BOM  SFO  On-time  Non-stop
BA1689  British Airways  10:20  10:55  FRA  DEL  On-time  Non-stop
BA3056  British Airways  02:15  02:55  BOM  DFW  On-time  Connecting


PL/SQL procedure successfully completed.
```

Trigger 1:

When the flight status is delayed then the flight is logged into another table

```
CREATE OR REPLACE TRIGGER DELAYEDFLIGHTS
AFTER INSERT ON FLIGHT
FOR EACH ROW
DECLARE

BEGIN
    if updating('STATUS')
    then
       insert into delayed_flights (FLIGHT_CODE, SOURCE, DESTINATION , AIRLINEID ,report_time) values(:new.flight_code,:new.source,:new.destinatio
end if;

END;
```

This is the audit table



Trigger 2:

Salary update

```
CREATE OR REPLACE TRIGGER UPDATEDSalary AFTER
  INSERT OR
  UPDATE OF SALARY ON EMPLOYEE2
  FOR EACH ROW
DECLARE
JOBTYPE EMPLOYEE2.JOBTYPE%TYPE;
BEGIN
  CASE
    WHEN (JOBTYPE= 'Administrative Support') THEN
      UPDATE EMPLOYEE2 SET SALARY=SALARY+SALARY*.10;
    WHEN (JOBTYPE= 'ENGINEER') THEN
      UPDATE EMPLOYEE2 SET SALARY=SALARY+SALARY*.05;
    WHEN (JOBTYPE= 'TRAFFIC MONITOR') THEN
      UPDATE EMPLOYEE2 SET SALARY=SALARY+SALARY*.25;
    WHEN (JOBTYPE= 'AIRPORT AUTHORITY') THEN
      UPDATE EMPLOYEE2 SET SALARY=SALARY+SALARY*.45;
    END CASE;
END;
```

Trigger 3:

Update ticket price and store it in ticket2 table.

```sql
CREATE OR REPLACE TRIGGER TICKET_PRICE_HISTORY
BEFORE UPDATE OF PRICE
ON TICKET2
FOR EACH ROW

BEGIN
INSERT INTO TICKET_PRICE_HISTORY
VALUES(:OLD.DATE_OF_BOOKING, :OLD.SOURCE, :OLD.DESTINATION, :OLD.CLASS, :OLD.PRICE);

END;
```

Output:

```sql
UPDATE TICKET2
SET PRICE=150000
WHERE DATE_OF_BOOKING ='11-NOV-16'
AND SOURCE='BOM'
AND DESTINATION='DFW'
AND CLASS='ECONOMY'
```

Script Output

Task completed in 0.149 seconds

```
1 row updated.
```

	DATE_OF_BOOKING	SOURCE	DESTINA...	CLASS	PRICE
1	11-NOV-16	BOM	DFW	ECONOMY	125000

Business Rule 1:

business_rule1.sql | business_rule2.sql

Worksheet | Query Builder

```
ALTER TABLE TICKET1
ADD CONSTRAINT TICKET_NO_LENGTH CHECK (LENGTH(TICKET_NUMBER)=13)
ENABLE NOVALIDATE;

INSERT INTO TICKET1(TICKET_NUMBER, SOURCE, DESTINATION, DATE_OF_BOOKING, DATE_OF_CANCELLATION, DATE_OF_TRAVEL, SEATNO, CLASS, PID, PASSPORTNO)
VALUES(00112341111221,'BOM','DFW','11-MAY-16','','15-DEC-16','32A','ECONOMY',1,'A12345678');
```

Script Output | Task completed in 0.034 seconds

```
Error starting at line : 5 in command -
INSERT INTO TICKET1(TICKET_NUMBER, SOURCE, DESTINATION, DATE_OF_BOOKING, DATE_OF_CANCELLATION, DATE_OF_TRAVEL, SEATNO, CLASS, PID, PASSPORTNO)
VALUES(00112341111221,'BOM','DFW','11-MAY-16','','15-DEC-16','32A','ECONOMY',1,'A12345678')
Error report -
ORA-02290: check constraint (C##OBAIDAIRPORT.TICKET_NO_LENGTH) violated
```

Business Rule 2:

business_rule1.sql | business_rule2.sql

Worksheet | Query Builder

```
ALTER TABLE EMPLOYEE1
ADD CONSTRAINT AGE_LIMIT CHECK(AGE<65);

INSERT INTO EMPLOYEE1(SSN, FNAME, M, LNAME, ADDRESS, PHONE, AGE, SEX, JOBTYPE, ASTYPE, ETYPE, SHIFT, POSITION, AP_NAME)
VALUES(123456799,'RAM','M','SHARMA','731 HILL TOWN, ARLINGTON, TX',4356789365, 66, 'M','ADMINISTRATIVE SUPPORT','RECEPTIONIST','','','','Louisvill
```

Script Output | Task completed in 0.041 seconds

```
Error starting at line : 4 in command -
INSERT INTO EMPLOYEE1(SSN, FNAME, M, LNAME, ADDRESS, PHONE, AGE, SEX, JOBTYPE, ASTYPE, ETYPE, SHIFT, POSITION, AP_NAME)
VALUES(123456799,'RAM','M','SHARMA','731 HILL TOWN, ARLINGTON, TX',4356789365, 66, 'M','ADMINISTRATIVE SUPPORT','RECEPTIONIST','','','','Louisville In
Error report -
ORA-02290: check constraint (C##OBAIDAIRPORT.AGE_LIMIT) violated
```