# DBT ASSIGNMENT-1

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**SEM:5 , SECTION: F**

## Review, Introduction and Details Of the Database

The database I had opted for my project in 4th semester was AIRLINES DATABASE. I am using the same for further improvements , implementing and experimenting the advanced concepts that we learn in this course.

I have revisited it and I have named CITY table as CITY_PARTITION because I am going to partition this table and I have added a new attribute CITY_CODE into it to perform more operations and for convenience.

### Entities used:

CITY_PARTITION

| CNAME | STATE | COUNTRY | CITY_CODE |
|---|---|---|---|

AIRPORT

| AP_NAME | STATE | COUNTRY |
|---|---|---|

AIRLINE

| AIRLINEID | AL_NAME | THREE_DIGIT_CODE |
|---|---|---|

FLIGHT

| FLIGHT_CODE | SOURCE | DESTINATION | ARRIVAL | DEPARTURE | STATUS | DURATION | FLIGHT_TYPE | LAYOVER_TIME | NO_OF_STOPS |
|---|---|---|---|---|---|---|---|---|---|

PASSENGER

| PID | PASSPORTNO | FNAME | M | LNAME | ADDRESS | PHONE | AGE | SEX |
|---|---|---|---|---|---|---|---|---|

TICKET

| TICKET_NUMBER | SOURCE | DESTINATION | DATE_OF_TRAVEL | SEAT_NO | CLASS | PRICE |
|---|---|---|---|---|---|---|

EMPLOYEE

| SSN | FNAME | M | LNAME | ADDRESS | PHONE | AGE | SEX | JOBTYPE | SALARY |
|---|---|---|---|---|---|---|---|---|---|

After constructing **ER Diagram** and **Relational Model** , we can make decisions about the Entities and their Relations:

| **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 |

## Functional Dependencies:

AP_NAME →{STATE,COUNTRY,CNAME}

AIRLINEID → {AL_NAME, THREE_DIGIT_CODE}

PASSPORTNO → { FNAME, M, LNAME, ADDRESS, PHONE, AGE, SEX }

PID → FLIGHT_CODE

{ DATE_OF_BOOKING, SOURCE, DESTINATION, CLASS } → PRICE

DATE_OF_CANCELLATION → SURCHARGE

JOBTYPE → SALARY

SSN → { FNAME, M, LNAME, ADDRESS, PHONE, AGE, SEX, PHONE, ADDRESS }

## Normalization:

Looking at the Above functional dependencies, we see that, there are some violations of 2NF,3NF.

### So after Normalizing into 3NF, the schema or the tables looks like:

CITY_PARTITION (<u>CITY_CODE</u>, CNAME, STATE, COUNTRY)

AIRPORT (<u>AP_NAME</u>, STATE, COUNTRY,CITY_CODE)

AIRLINE (AIRLINEID, AL_NAME, THREE_DIGIT_CODE)

CONTAINS (AIRLINEID, AP_NAME)

FLIGHT (FLIGHT_CODE, SOURCE, DESTINATION, ARRIVAL, DEPARTURE, STATUS, DURATION, FLIGHTTYPE, LAYOVER_TIME, NO_OF_STOPS, AIRLINEID)

PASSENGER1 (PID, PASSPORTNO)

PASSENGER2(PASSPORTNO, FNAME, M, LNAME, ADDRESS, PHONE, AGE, SEX)

PASSENGER3 (PID, FLIGHT_CODE)

TICKET1 (TICKET_NUMBER, SOURCE, DESTINATION, DATE_OF_BOOKING, DATE_OF_TRAVEL, SEATNO, CLASS, DATE_OF_CANCELLATION, PID, PASSPORTNO)

TICKET2 (DATE_OF_BOOKING, SOURCE, DESTINATION, CLASS, PRICE)

TICKET3 (DATE_OF_CANCELLATION, SURCHARGE)

EMPLOYEE1 (SSN, FNAME, M, LNAME, ADDRESS, PHONE, AGE, SEX, JOBTYPE, ASTYPE, ETYPE, SHIFT, POSITION, AP_NAME)

EMPLOYEE2(JOBTYPE, SALARY)

SERVES (SSN, PID, PASSPORTNO)

So there are total 14 tables in the database.

After Normalization we check for LOSSLESS JOIN PROPERTY.

I have performed the test using Chase's Algorithm. And the steps and proofs are included in the file **LOSSLESS_JOIN**