The Airport Database System.

Course : Database Management System I

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About Airport Database :

The Database represents each Airport keeping its unique Airport Code,the Airport Name and the City. Each Airline Flight has a unique number,the Airline for the Flight , and the Weekdays on which the Flight is scheduled. A Flight is composed of one or more Flight LEGs (for example ,flight number C000123 from New York to Los Angeles may have two Flight LEGs ; leg 1 from New York to Houston and leg 2 from Houston to Los Angeles). Each Flight LEG has a Departure Airport and Scheduled Departure time and an Arrival Airport and Scheduled Arrival Time.

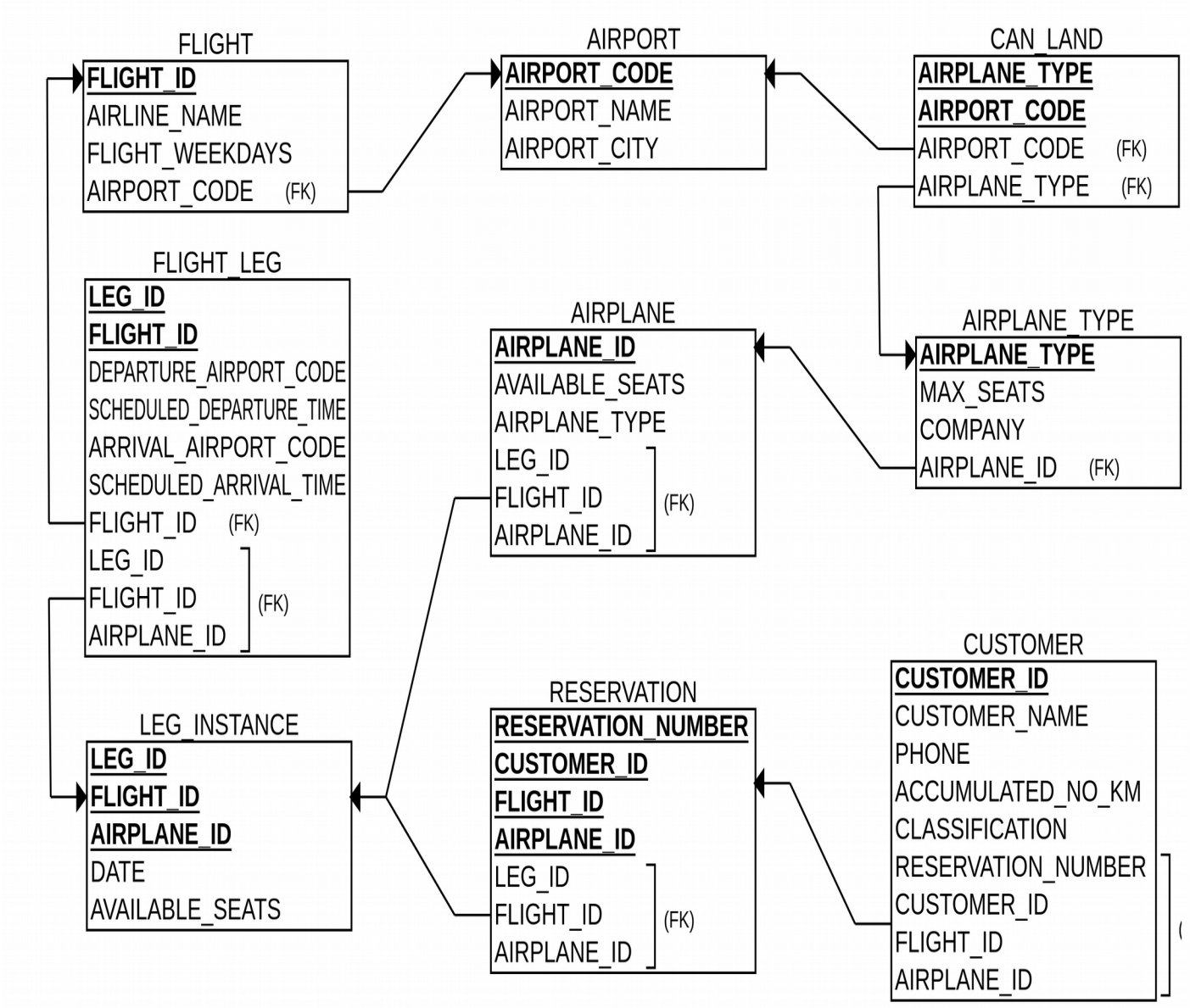
A LEG Instance is an instance of a Flight LEG on Specific Date(for example; C000123 leg 1 on July 30,1989). The actual Departure and Arrival Airports and Times are recorded for each flight leg after the flight leg has been concluded .The number of Available seats and the Airplane used in the LEG Instance are also kept. The customer Reservations on Each Leg Instance includes Customer Name.Phone and Seat Number for each reservation , information on Airplane and Airplane Types are also kept.

For Each Airplane Type(for Example ,DC-10),the Type Name,manufacturing Company, Maximum Number of Seats are kept .The Airports in which planes of this type CAN Land are kept in the database. For each Airplane , The Airplane Id ,Total number of seats and the Type are kept. Customers are classified into types (Gold,Silver & Platinum) based on their amount of accumulated kilometers.

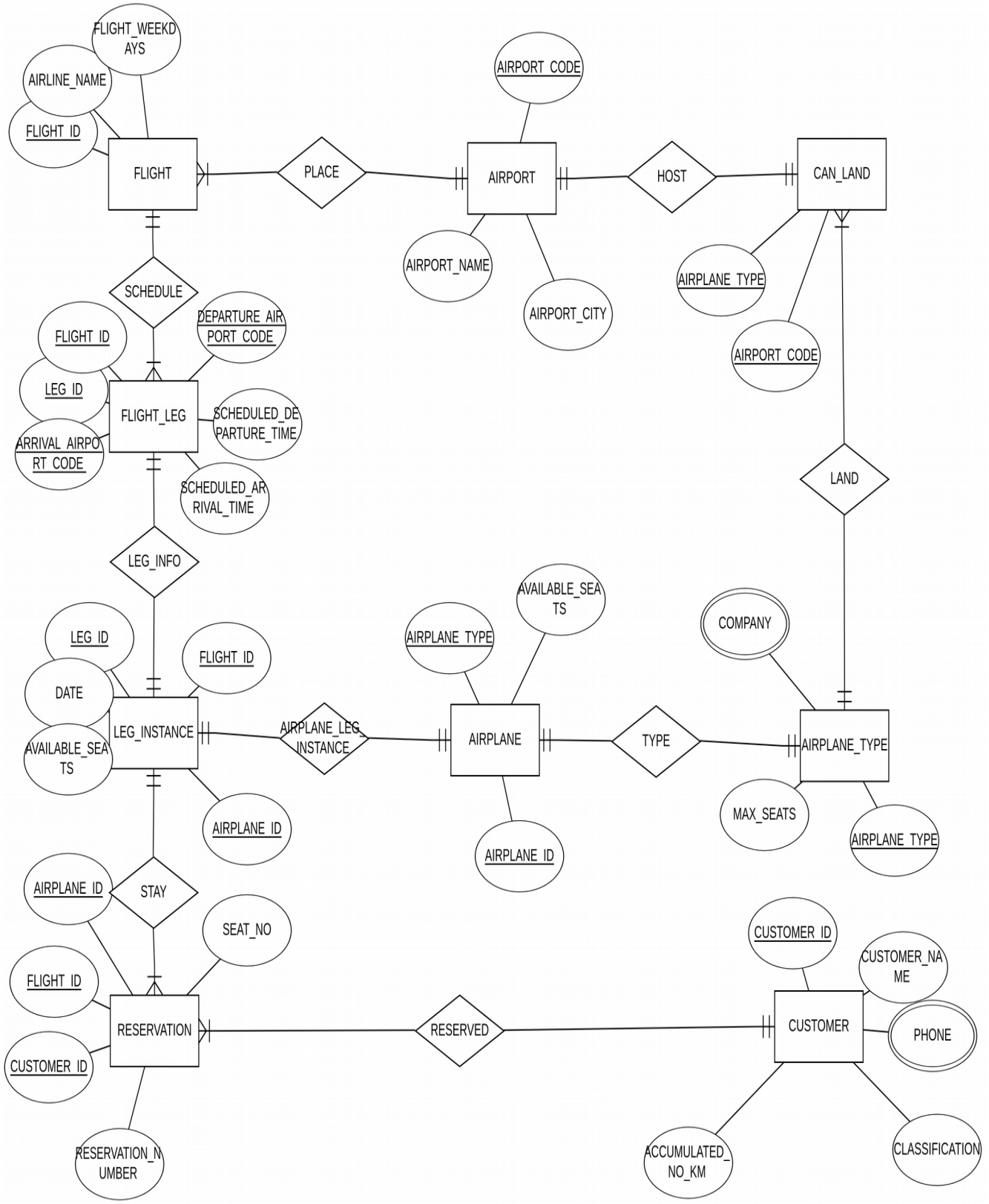
Entities

Entity	Attribute
AIRPORT	AIRPORT_CODE,AIRPORT_NAME, AIRPORT_CITY.
FLIGHT	FLIGHT_ID,AIRLINE_NAME, FLIGHT_WEEKDAYS.
FLIGHT_LEG	LEG_ID, FLIGHT_ID , DEPARTURE_AIRPORT_CODE, SCHEDULED_DEPARTURE_TIME, ARRIVAL_AIRPORT_CODE , SCHEDULED_ARRIVAL_TIME.
LEG_INSTANCES	FLIGHT_ID, LEG_ID, DATE, AIRPLANE_ID, AVAILABLE_SEATS.
AIRPLANE	AIRPLANE_ID,AVAILABLE_SEATS,AIRPLANE_TYPE.
CUSTOMER	CUSTOMER_ID,CUSTOMER_NAME,PHONE, ACCUMULATED_NO_KM,CLASSIFICATION.
RESERVATION	RESERVATION_NUMBER,CUSTOMER_ID,FLIGHT_ID,SEAT_NUMBER,AIRPLANE_ID
AIRPLANE_TYPE	AIRPLANE_TYPE,COMPANY,MAX_SEATS.
CAN_LAND	AIRPLANE_TYPE,AIRPORT_CODE.

SCHEMA DIAGRAM



ER DIAGRAM


FLIGHT_WEEKDAYS
AIRLINE_NAME
FLIGHT ID
FLIGHT
PLACE
AIRPORT_CODE
AIRPORT
HOST
CAN_LAND
AIRPORT_NAME
AIRPORT_CITY
AIRPLANE_TYPE
AIRPORT_CODE
SCHEDULE
FLIGHT ID
DEPARTURE_AIRPORT_CODE
LEG ID
FLIGHT_LEG
SCHEDULED_DEPARTURE_TIME
ARRIVAL_AIRPORT_CODE
SCHEDULED_ARRIVAL_TIME
LAND
LEG_INFO
AVAILABLE_SEATS
COMPANY
LEG ID
FLIGHT ID
AIRPLANE_TYPE
DATE
LEG_INSTANCE
AIRPLANE_LEG_INSTANCE
AIRPLANE
TYPE
AIRPLANE_TYPE
AVAILABLE_SEATS
MAX_SEATS
AIRPLANE ID
AIRPLANE ID
AIRPLANE_TYPE
AIRPLANE ID
STAY
SEAT_NO
CUSTOMER_ID
CUSTOMER_NAME
FLIGHT ID
RESERVATION
RESERVED
CUSTOMER
PHONE
CUSTOMER ID
ACCUMULATED_NO_KM
CLASSIFICATION
RESERVATION_NUMBER

RELATIONS

Name	Entities involved
Place	Where Flight Can belongs.
Scheduled	Every flight has a Scheduled.
LEG_INFO	A FLIGHT_LEG has a certain Instance of time.
STAY	Where Passengers spend their time for upcoming flight.
RESERVED	CUSTOMER reserved a RESERVATION.
LAND	AIRPLANE land airport.
TYPE	An AIRPLANE type.

DDL Scripts

FLIGHT

```
CREATE TABLE FLIGHT
 (

  FLIGHT_ID INT NOT NULL,
  AIRLINE_NAME VARCHAR(45) NOT NULL,
  FLIGHT_WEEKDAYS DATE ,
  PRIMARY KEY (FLIGHT_ID)

 );
```

AIRPORT

```
CREATE TABLE AIRPORT
(

  AIRPORT_CODE INT UNIQUE NOT NULL,
  AIRPORT_NAME VARCHAR(45) NOT NULL,
  AIRPORT_CITY VARCHAR(45) NOT NULL,
  PRIMARY KEY (AIRPORT_CODE)

);
```

FLIGHT_LEG

```
CREATE TABLE FLIGHT_LEG
(

 LEG_ID INT NOT NULL,
 FLIGHT_ID INT NOT NULL,
 DEPARTURE_AIRPORT_CODE INT NOT NULL,
 SCHEDULED_DEPARTURE_TIME DATETIME NOT NULL,
 ARRIVAL_AIRPORT_CODE INT NOT NULL,
 SCHEDULED_ARRIVAL_TIME DATETIME NOT NULL,

 PRIMARY KEY (LEG_ID),
 FOREIGN KEY (FLIGHT_ID) REFERENCES FLIGHT(FLIGHT_ID) ON DELETE NO ACTION  ON     UPDATE NO
 ACTION,
FOREIGN KEY(DEPARTURE_AIRPORT_CODE) REFERENCES AIRPORT(AIRPORT_CODE) ON DELETE NO
ACTION ON UPDATE NO ACTION,
 FOREIGN KEY(ARRIVAL_AIRPORT_CODE) REFERENCES AIRPORT(AIRPORT_CODE) ON DELETE NO
ACTION ON UPDATE NO ACTION

);
```

AIRPLANE_TYPE:

```
CREATE TABLE AIRPLANE_TYPE
(

 AIRPLANE_TYPE VARCHAR(30) UNIQUE NOT NULL,
 MAX_SEATS INT NOT NULL,
 COMPANY VARCHAR(30) NOT NULL,
 PRIMARY KEY (AIRPLANE_TYPE)
```

```
);
```

AIRPLANE

```
CREATE TABLE AIRPLANE
(

 AIRPLANE_ID INT NOT NULL,
 AVAILABLE_SEATS INT NOT NULL,
 AIRPLANE_TYPE VARCHAR(20) NOT NULL,
 PRIMARY KEY (AIRPLANE_ID),
 FOREIGN KEY (AIRPLANE_TYPE) REFERENCES AIRPLANE_TYPE(AIRPLANE_TYPE) ON
 DELETE NO ACTION ON UPDATE NO ACTION

);
```

LEG_INSTANCES

```
CREATE TABLE LEG_INSTANCE
(
 LEG_ID INT NOT NULL,
 FLIGHT_ID INT NOT NULL,
 DATE DATE NOT NULL,
 AVAILABLE_SEATS INT NOT NULL,
 AIRPLANE_ID INT NOT NULL,

 PRIMARY KEY (LEG_ID,FLIGHT_ID),
 FOREIGN KEY (LEG_ID) REFERENCES FLIGHT_LEG(LEG_ID) ON DELETE NO ACTION ON UPDATE NO
 ACTION,
 FOREIGN KEY (FLIGHT_ID) REFERENCES FLIGHT_LEG(FLIGHT_ID) ON DELETE NO ACTION ON UPDATE
 NO ACTION,
 FOREIGN KEY (AIRPLANE_ID) REFERENCES AIRPLANE(AIRPLANE_ID) on DELETE NO ACTION ON
 UPDATE NO ACTION

);
```

CUSTOMER

```
CREATE TABLE CUSTOMER
(

 CUSTOMER_ID INT NOT NULL UNIQUE,
 CUSTOMER_NAME VARCHAR(30) NOT NULL,
 PHONE INT NOT NULL,

 ACCUMULATED_NO_KM INT NOT NULL,
 CLASSIFICATION VARCHAR(40) NOT NULL,
 PRIMARY KEY (CUSTOMER_ID)

);
```

RESERVATION

```
CREATE TABLE RESERVATION
(
 RESERVATION_NUMBER INT NOT NULL,
 CUSTOMER_ID INT NOT NULL,
 FLIGHT_ID INT NOT NULL,
 SEAT_NUMBER INT NOT NULL,
 AIRPLANE_ID INT NOT NULL,

 PRIMARY KEY (RESERVATION_NUMBER),
 FOREIGN KEY (CUSTOMER_ID) REFERENCES CUSTOMER(CUSTOMER_ID) ON DELETE NO ACTION ON
UPDATE NO ACTION,

 FOREIGN KEY (AIRPLANE_ID) REFERENCES AIRPLANE(AIRPLANE_ID) ON DELETE NO ACTION ON
UPDATE NO ACTION,
 FOREIGN KEY (FLIGHT_ID) REFERENCES FLIGHT(FLIGHT_ID) ON DELETE NO ACTION ON UPDATE NO
ACTION
);
```

CAN_LAND

```
CREATE TABLE CAN_LAND
(
 AIRPLANE_TYPE VARCHAR(30) NOT NULL,
 AIRPORT_CODE INT NOT NULL,
 FOREIGN KEY (AIRPLANE_TYPE) REFERENCES AIRPLANE_TYPE(AIRPLANE_TYPE) ON DELETE NO
ACTION ON UPDATE NO ACTION,
 FOREIGN KEY (AIRPORT_CODE) REFERENCES AIRPORT(AIRPORT_CODE) ON DELETE NO ACTION ON
UPDATE NO ACTION


);
```

Table Design and Structure

Airport

AIRPORT_CODE	AIRPORT_NAME	AIRPORT_CITY
1	Shah Jalal Airport	Dhaka
2	Shah Amanat Airport	Chattogram
3	Osmani Airport	Sylhet
4	Coxs Bazar Airport	Coxsbazar
5	Jessore Airport	Jessore

primary key: **AIRPORT_CODE**

FLIGHT

FLIGHT_ID	AIRLINE_NAME	FLIGHT_WEEKDAYS
30	Dhaka Airways	2021-01-01
31	Chattogram Airways	2021-01-02
32	Airways	2021-01-03
33	Sylhet Airways	2021-01-04
34	Coxsbazar Airways	2021-01-05

primary key: ***FLIGHT_ID***

FLIGHT_LEG

LEG_ID	FLIGHT_ID	DEPARTURE_AIRPORT_CODE	SCHEDULED_DEPARTURE_TIME	ARRIVAL_AIRPORT_CODE	SCHEDULED_ARRIVAL_TIME
1001	30	1	2021-02-01 16:59:59	1	2021-02-01 02:59:59
1002	31	2	2021-02-02 17:59:59	2	2021-02-02 03:59:59
1003	32	3	2021-02-03 18:59:59	3	2021-02-03 04:59:59
1004	33	4	2021-02-04 19:59:59	4	2021-02-04 05:59:59
1005	34	5	2021-02-05 20:59:59	5	2021-02-05 06:59:59

primary key: ***LEG_ID*** ***foreign key :*** ***FLIGHT_ID, DEPARTURE_AIRPORT_CODE, ARRIVAL_AIRPORT_CODE***

AIRPLANE_TYPE

AIRPLANE_TYPE	MAX_SEATS	COMPANY
Air Chattogram	100	Chattogram.CO
Air Coxsbazar	500	Coxsbazar.CO
Air Delhi	1600	Delhi.CO
Air Dhaka	200	Dhaka.CO
Air Jessore	700	Jessore.CO

primary key: ***AIRPLANE_TYPE***

AIRPLANE

AIRPLANE_ID	AVAILABLE_SEATS	AIRPLANE_TYPE
5001	100	Air Chattogram
5002	500	Air Coxsbazar
5003	200	Air Dhaka
5004	700	Air Jessore
5005	400	Air Sylhet

primary key: ***AIRPLANE_ID*** ***foreign key:*** ***AIRPLANE_TYPE***

LEG_INSTANCE

LEG_ID	FLIGHT_ID	DATE	AVAILABLE_SEATS	AIRPLANE_ID
1001	30	2021-01-01	200	5003
1002	31	2021-01-02	100	5001
1003	32	2021-01-03	700	5004

primary key: ***LEG_ID,FLIGHT_ID*** ***foreign key:*** ***LEG_ID ,FLIGHT_ID , AIRPLANE_ID***

CUSTOMER

CUSTOMER_ID	CUSTOMER_NAME	PHONE	ACCUMULATED_NO_KM	CLASSIFICATION
30010	Rahim	12345	1050	Platinum
30011	Kahim	51234	1051	Gold
30012	Asif	12335	1052	Silver

primary key : ***CUSTOMER_ID***

RESERVATION

RESERVATION_NUMBER	CUSTOMER_ID	FLIGHT_ID	SEAT_NUMBER	AIRPLANE_ID
6001	30010	30	200	5003
6002	30011	31	0	5001
6003	30012	32	700	5004

primary key : ***RESERVATION_NUMBER*** ***foreign key :*** ***CUSTOMER_ID , AIRPLANE_ID,*** ***FLIGHT_ID***

CAN_LAND

AIRPLANE_TYPE	AIRPORT_CODE
Air Dhaka	1
Air Coxsbazar	4
Air Chattogram	2

foreign key : ***AIRPLANE_TYPE, AIRPORT_CODE***

Query

 # Show all tuples in Airplane table.

>> SELECT * FROM AIRPLANE;

AIRPLANE_ID	AVAILABLE_SEATS	AIRPLANE_TYPE
5001	100	Air Chattogram
5002	500	Air Coxsbazar
5003	200	Air Dhaka
5004	700	Air Jessore

 # Update Customer Table on Customer Classification on following condition.

>> Update CUSTOMER SET CLASSIFICATION = Platinum WHERE CLASSIFICATION= ‘Gold’.

 # Delete a Tuple on Airport on the following condition.

>> DELETE FROM AIRPORT WHERE AIRPORT_NAME = ‘Osmani Airport’.

 # AIRPLANE_TYPE from AIRPLANE_TYPE Table which have capacity between 500 to 1000.

>> SELECT AIRPLANE_TYPE FROM AIRPLANE_TYPE WHERE MAX_SEATS BETWEEN 500 AND 1000;

AIRPLANE_TYPE
Air Coxsbazar
Air Jessore
Air Newyork

 # ALL Airport Name Where Starting by “Shah”:

>>SELECT AIRPORT_NAME,AIRPORT_CITY FROM AIRPORT WHERE AIRPORT_NAME LIKE "Shah%";

AIRPORT_NAME	AIRPORT_CITY
Shah Jalal Airport	Dhaka
Shah Amanat Airport	Chattogram

 # List Airplanes that have more that 200 seats.

>> SELECT * FROM AIRPLANE WHERE AIRPLANE.AVAILABLE_SEATS>200;

AIRPLANE_ID	AVAILABLE_SEATS	AIRPLANE_TYPE
5002	500	Air Coxsbazar
5004	700	Air Jessore
5005	400	Air Sylhet

 # LIST ALL RESERVATION FOR DIRECT FLIGHT:

>> SELECT RESERVATION_NUMBER FROM RESERVATION WHERE FLIGHT_ID NOT IN((SELECT FLIGHT_ID FROM FLIGHT_LEG));

RESERVATION_NUMBER
6008

 # COUNT THE NUMBER OF CUSTOMER FOR CLASSIFICATION OF GOLD,PLATINUM,SILVER.

>>SELECT CLASSIFICATION,COUNT(*) FROM CUSTOMER GROUP BY CLASSIFICATION;

CLASSIFICATION	COUNT(*)
Gold	3
Platinum	1
Silver	3

 # Find Which Company's Airplane has Max Seat

>>SELECT COMPANY FROM AIRPLANE_TYPE WHERE MAX_SEATS = (SELECT MAX(MAX_SEATS) FROM AIRPLANE_TYPE);

COMPANY
Melbourne.CO

 # Find The Frequency of Classification where Any Classification having more than 2 times and show their Name and Phone Number.

>> SELECT CUSTOMER_NAME,PHONE FROM CUSTOMER WHERE CLASSIFICATION IN (SELECT CLASSIFICATION FROM CUSTOMER GROUP BY CLASSIFICATION HAVING COUNT(*) > 2);

CUSTOMER_NAME	PHONE
Kahim	51234
Asif	12335
Akbar	14545

 # Check which AIRPORT_NAME and CITY can land flight now.

>>SELECT AIRPORT_NAME,AIRPORT_CITY FROM AIRPORT WHERE EXISTS(SELECT AIRPORT_CODE FROM CAN_LAND WHERE AIRPORT.AIRPORT_CODE = CAN_LAND.AIRPORT_CODE);

AIRPORT_NAME	AIRPORT_CITY
Shah Jalal Airport	Dhaka
Shah Amanat Airport	Chattogram
Osmani Airport	Sylhet
Coxs Bazar Airport	Coxsbazar
Jessore Airport	Jessore

 # AIRPLANE_ID and their AIRLINE_NAME and FLIGHT_WEEKDAYS.

>> SELECT FLIGHT.AIRLINE_NAME ,FLIGHT.FLIGHT_WEEKDAYS,FLIGHT_LEG.LEG_ID,FLIGHT_LEG.DEPARTURE_AIRPORT_CODE,FLIGHT_LEG.ARRIVAL_AIRPORT_CODE FROM FLIGHT LEFT OUTER JOIN FLIGHT_LEG ON (FLIGHT.FLIGHT_ID = FLIGHT_LEG.FLIGHT_ID);

AIRLINE_NAME	FLIGHT_WEEKDAYS	LEG_ID	DEPARTURE_AIRPORT_CODE	ARRIVAL_AIRPORT_CODE
Dhaka Airways	2021-01-01	1001	1	1
Chattogram Airways	2021-01-02	1002	2	2
Airways	2021-01-03	1003	3	3
Sylhet Airways	2021-01-04	1004	4	4
Coxsbazar Airways	2021-01-05	1005	5	5
New York Airways	2021-01-03	1006	6	6
Melbourne Airways	2021-01-06	*NULL*	*NULL*	*NULL*
London Airways	2021-01-07	1007	7	7

Conclusion

Information technology prospered in 21’th century with much turbulence at the beginning and inspired other people to pursue this field of study and become professional .The experts developed and brought consistent changes us to it for improvement and easier successfully and functionally. One of the developments was the introduction of the databases .Databases are one of the cornerstones of information technology specially in the current century .Their magnitude is extremely high because this piece of technology has widespread use in different places ranging from small shops to giant incorporations. Thier usage is on daily basis . Everyone is interacting with databases one way or other either directly or indirectly. During the semester , Sir Abu Ahmed Ferdaus delivered us lectures regarding the database concepts and taught us pragmatically ,how to create a database and interact with it both as a creator and a user of it. Finally I am supposed to come up with a project of creating a database for and Aiport.Generally describing the database , it keeps records of a of a diversified array of airports and their attributes such as respective codes,names and whatnot. It has exactly 9 tables with their related attributes. Moreover all the codes used while inserting the data into the database,quering for the data from the database , and altering the data in the database have been provided in the document.

********* THE END**********