BSc (Hons) in Information Technology

Specialized in Cyber Security

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IE2042 - Database Management Systems for Security

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Group Assignment

Database Design, Implementation and Security

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Script
3. Data Base Implement

```sql
CREATE DATABASE AIRLINE_RESERVATION;

USE AIRLINE_RESERVATION;

CREATE TABLE Airplane_Type (
        Type_Name VARCHAR(10),
        Max_No_Of_Seat INT NOT NULL,
        Owend_Company CHAR (30) NOT NULL,

        CONSTRAINT Airplane_Type_PK PRIMARY KEY (Type_Name)
);

CREATE TABLE Airplane (
        ID CHAR(5),
        Airplane_Name CHAR(20),
        No_Of_Seat INT NOT NULL,
        Type_Name VARCHAR(10),

        CONSTRAINT Airplane_PK PRIMARY KEY (ID),
        CONSTRAINT Airplane_Type_FK FOREIGN KEY (Type_Name) REFERENCES
Airplane_Type(Type_Name)
);

CREATE TABLE Airport(
        Airport_Code CHAR(5),
        Airport_Name VARCHAR(30) NOT NULL,
        City VARCHAR(20) NOT NULL,
        States VARCHAR(20) NOT NULL,

        CONSTRAINT Airport_PK PRIMARY KEY (Airport_Code),
);

CREATE TABLE Land (
        ID CHAR(5),
        Airport_Code CHAR(5),

        CONSTRAINT Land_PK PRIMARY KEY (ID,Airport_Code),
        CONSTRAINT Land_ID_FK FOREIGN KEY (ID) REFERENCES Airplane(ID),
        CONSTRAINT Land_Acode_FK FOREIGN KEY (Airport_Code) REFERENCES
Airport(Airport_Code)
);

CREATE TABLE Flight (
        Filght_Number CHAR(10),
        Airline_Name VARCHAR(20) NOT NULL,
        Scheduler_Name VARCHAR(20) NOT NULL,

        CONSTRAINT Flight_PK PRIMARY KEY (Filght_Number)

);
```

```sql
CREATE TABLE Flight_Leg (

        Leg_Number CHAR(5),
        Depature_Time Time NOT NULL,
        Arrival_Time Time NOT NULL,
        Flight_Number CHAR(10) NOT NULL,
        Airplane_Code CHAR(5) NOT NULL,

        CONSTRAINT Flight_Leg_PK PRIMARY KEY (Leg_Number),
        CONSTRAINT Flight_Leg_FNumber_FK FOREIGN KEY (Flight_Number) REFERENCES
Flight(Filght_Number),
        CONSTRAINT Flight_Leg_ACode_FK FOREIGN KEY (Airplane_Code) REFERENCES
Airport(Airport_Code)
);

CREATE TABLE Flight_Fare (

        Fare_Code CHAR(5),
        Restriction CHAR(60),
        Amount FLOAT NOT NULL,
        Filght_Number CHAR(10) NOT NULL,


        CONSTRAINT Flight_Fare_PK PRIMARY KEY (Fare_Code),
        CONSTRAINT Flight_Fare_FNumber_FK FOREIGN KEY (Filght_Number) REFERENCES
Flight(Filght_Number)
);

CREATE TABLE Leg_Instance (

        Date Date DEFAULT GETDATE(),
        No_Of_Available_Seats INT ,
        ID CHAR(5) NOT NULL,
        Leg_Number CHAR(5) NOT NULL,

        CONSTRAINT Leg_Instance_PK PRIMARY KEY (Date) ,
        CONSTRAINT Leg_Instance_ID_FK FOREIGN KEY (ID) REFERENCES Airplane(ID) ,
        CONSTRAINT Leg_Instance_LNumber_FK FOREIGN KEY (Leg_Number) REFERENCES
Flight_Leg(Leg_Number),
);


CREATE TABLE Seat (

        Seat_Number CHAR(13),
        Customer_Name Char(30) NOT NULL,
        Date DATE DEFAULT GETDATE()NOT NULL,

        CONSTRAINT Seat_Number_FK PRIMARY KEY (Seat_Number),
        CONSTRAINT Sate_Date_FK FOREIGN KEY (Date) REFERENCES Leg_Instance(Date),
);

CREATE TABLE Phone_Number (

        Seat_Number CHAR(13),
        Phone_Number CHAR(10),

        CONSTRAINT Phone_Number_PK PRIMARY KEY (Phone_Number ,Seat_Number),
```

```
              CONSTRAINT Phone_Number_Seat_number_FK FOREIGN KEY (Seat_Number) REFERENCES
Seat(Seat_Nu
```

4. Insert Data into Tables

```sql
USE AIRLINE_RESERVATION

INSERT INTO Airplane_Type VALUES ('JumJetBe' , 450 , 'Being')
INSERT INTO Airplane_Type VALUES ('MidJetAi' , 300 , 'Air Bus')
INSERT INTO Airplane_Type VALUES ('LigJetSa' , 200 , 'Sairan')
INSERT INTO Airplane_Type VALUES ('MidJetBe' , 320 , 'Beign')

INSERT INTO AirPlane VALUES ('JB101','Boeing 777X', 446 ,'JumJetBe')
INSERT INTO AirPlane VALUES ('MA101','Airbus A350', 300 ,'MidJetAi')
INSERT INTO AirPlane VALUES ('MB101','Boeing 727', 295 ,'MidJetBe')
INSERT INTO AirPlane VALUES ('JB104','Boeing 787', 450 ,'JumJetBe')
INSERT INTO AirPlane VALUES ('LS101','Boeing C-97', 197 ,'LigJetSa')
INSERT INTO AirPlane VALUES ('MB102','Boeing 737', 319 ,'MidJetBe')
INSERT INTO AirPlane VALUES ('LS102','Boeing Business Jet', 189 ,'LigJetSa')
INSERT INTO AirPlane VALUES ('MA103','Airbus A380', 250 ,'MidJetAi')
INSERT INTO AirPlane VALUES ('JB102','Boeing 797', 430 ,'JumJetBe')
INSERT INTO AirPlane VALUES ('MB103','Boeing 727BX', 314 ,'MidJetBe')
INSERT INTO AirPlane VALUES ('JB103','Boeing 797 NMA', 450 ,'JumJetBe')
INSERT INTO AirPlane VALUES ('LS103','Boeing C-17', 200 ,'LigJetSa')
INSERT INTO AirPlane VALUES ('LS104','Boeing C135', 195 ,'LigJetSa')
INSERT INTO AirPlane VALUES ('MB104','Boeing 747', 315 ,'MidJetBe')

INSERT INTO Airport VALUES ( 'Sy111' , 'Sydney' , 'Sydney' , 'Wales' )
INSERT INTO Airport VALUES ( 'Ch211' , 'Changi' , 'Changi' , 'Singapore' )
INSERT INTO Airport VALUES ( 'Ha311' , 'Haneda' , 'Ota' , 'Tokyo' )
INSERT INTO Airport VALUES ( 'Cd411' , 'CDG' , 'Loures' , 'France' )

INSERT INTO Land VALUES ('JB101' , 'Sy111' )
INSERT INTO Land VALUES ('MA101' , 'Ch211' )
INSERT INTO Land VALUES ('MB101' , 'Cd411' )
INSERT INTO Land VALUES ('JB104' , 'Cd411' )
INSERT INTO Land VALUES ('LS101' , 'Sy111' )
INSERT INTO Land VALUES ('MB102' , 'Sy111' )
INSERT INTO Land VALUES ('LS102' , 'Ch211' )
INSERT INTO Land VALUES ('MA103' , 'Cd411' )
INSERT INTO Land VALUES ('JB102' , 'Sy111' )
INSERT INTO Land VALUES ('MB103' , 'Sy111' )
INSERT INTO Land VALUES ('JB103' , 'Cd411' )
INSERT INTO Land VALUES ('LS103' , 'Cd411' )
INSERT INTO Land VALUES ('LS104' , 'Sy111' )
INSERT INTO Land VALUES ('MB104' , 'Ch211' )

INSERT INTO Flight VALUES ('AA111','Asiana Airline','Tin Tin')
INSERT INTO Flight VALUES ('AC111','Air China','Fred')
INSERT INTO Flight VALUES ('QA111','Qatar A','Gihan')

INSERT INTO Flight_Leg VALUES ('10111' ,'06:30' ,'07:10' ,'AA111' ,'Sy111' )
INSERT INTO Flight_Leg VALUES ('10112' ,'08:00' ,'08:40' ,'AC111' ,'Ch211' )
INSERT INTO Flight_Leg VALUES ('10113' ,'12:40' ,'13:20' ,'QA111' ,'Ch211' )
INSERT INTO Flight_Leg VALUES ('10114' ,'15:20' ,'16:00' ,'QA111' ,'Sy111' )
```

```sql
INSERT INTO Flight_Leg VALUES ('10115' ,'16:20' ,'16:20' ,'AC111' ,'Ch211' )

INSERT INTO Flight_Fare VALUES ('KL203' ,'less than 5 seats only' ,125000.00 ,'AC111')
INSERT INTO Flight_Fare VALUES ('CL210' ,'age should be 20+ ' ,350000.00 ,'AA111')
INSERT INTO Flight_Fare VALUES ('SL120' ,'hold between 3 to 7 days' ,252500.00 ,'QA111')
INSERT INTO Flight_Fare VALUES ('ID201' ,'age should be 20+ ' ,75000.00 ,'QA111')
INSERT INTO Flight_Fare VALUES ('KL321' ,'hold between 3 to 7 days' ,100000.00 ,'AA111')
INSERT INTO Flight_Fare VALUES ('KL212' ,'hold between 3 to 7 days' ,175000.00 ,'QA111')

INSERT INTO Leg_Instance VALUES ('2022-10-01' ,223 ,'JB101' ,'10111')
INSERT INTO Leg_Instance VALUES ('2022-10-02' ,132 ,'JB103' ,'10112')
INSERT INTO Leg_Instance VALUES ('2022-10-03' ,54 ,'MB101' ,'10111')
INSERT INTO Leg_Instance VALUES ('2022-10-04' ,20 ,'JB103' ,'10112')
INSERT INTO Leg_Instance VALUES ('2022-10-05' ,123 ,'JB101' ,'10113')
INSERT INTO Leg_Instance VALUES ('2022-10-06' ,54 ,'MB101' ,'10112')
INSERT INTO Leg_Instance VALUES ('2022-10-07' ,27 ,'JB102' ,'10114')
INSERT INTO Leg_Instance VALUES ('2022-10-08' ,23 ,'MA103' ,'10111')
INSERT INTO Leg_Instance VALUES ('2022-10-09' ,47 ,'MB101' ,'10114')
INSERT INTO Leg_Instance VALUES ('2022-10-10' ,34 ,'JB103' ,'10113')
INSERT INTO Leg_Instance VALUES ('2022-10-11' ,143 ,'JB103' ,'10112')
INSERT INTO Leg_Instance VALUES ('2022-10-12' ,25 ,'MB104' ,'10114')

INSERT INTO Seat VALUES ('S0000000111' ,'Marry Ann' ,'2022-10-01')
INSERT INTO Seat VALUES ('S0000000112' ,'Janna Sri' ,'2022-10-04')
INSERT INTO Seat VALUES ('S0000000113' ,'Kavinga' ,'2022-10-10')
INSERT INTO Seat VALUES ('S0000000114' ,'Savi Sarashvathi' ,'2022-10-08')
INSERT INTO Seat VALUES ('S0000000115' ,'Abhi' ,'2022-10-01')
INSERT INTO Seat VALUES ('S0000000116' ,'Denih' ,'2022-10-06')
INSERT INTO Seat VALUES ('S0000000117' ,'Gihan' ,'2022-10-10')
INSERT INTO Seat VALUES ('S0000000118' ,'Ethen Hort' ,'2022-10-08')
INSERT INTO Seat VALUES ('S0000000119' ,'Suhaib' ,'2022-10-04')
INSERT INTO Seat VALUES ('S0000000110' ,'Janith' ,'2022-10-11')
INSERT INTO Seat VALUES ('S0000000211' ,'Tom Cruise' ,'2022-10-01')
INSERT INTO Seat VALUES ('S0000000212' ,'Author' ,'2022-10-11')
INSERT INTO Seat VALUES ('S0000000213' ,'Jhony Dep' ,'2022-10-06')
INSERT INTO Seat VALUES ('S0000000214' ,'Chris Hemsworth' ,'2022-10-04')
INSERT INTO Seat VALUES ('S0000000215' ,'Keeth' ,'2022-10-11')

INSERT INTO Phone_Number VALUES ('S0000000111','0753146001')
INSERT INTO Phone_Number VALUES ('S0000000112','0753146002')
INSERT INTO Phone_Number VALUES ('S0000000113','0753146003')
INSERT INTO Phone_Number VALUES ('S0000000113','0753146004')
INSERT INTO Phone_Number VALUES ('S0000000118','0753146005')
INSERT INTO Phone_Number VALUES ('S0000000118','0753146006')
INSERT INTO Phone_Number VALUES ('S0000000213','0753146007')
INSERT INTO Phone_Number VALUES ('S0000000211','0753146008')
INSERT INTO Phone_Number VALUES ('S0000000214','0753146009')
INSERT INTO Phone_Number VALUES ('S0000000215','0753146010')
INSERT INTO Phone_Number VALUES ('S0000000114','0753146012')
INSERT INTO Phone_Number VALUES ('S0000000116','0753146013')
INSERT INTO Phone_Number VALUES ('S0000000117','0753146014')
INSERT INTO Phone_Number VALUES ('S0000000119','0753146015')
INSERT INTO Phone_Number VALUES ('S0000000212','0753146016')
```

5.

I.Triggers

```sql
CREATE TRIGGER avail_seat_validation
ON leg_instance
FOR INSERT, UPDATE AS
BEGIN
    DECLARE @seat INT
    SELECT @seat - No_Of_Available_Seats
    FROM inserted

     IF(@seat < 0)
     BEGIN
         PRINT 'All seats are booked'
         ROLLBACK TRANSACTION
         END
END

CREATE TRIGGER Update_Seat_Details
ON Leg_instance
FOR INSERT
AS
BEGIN
DECLARE @S_date DATE , @L_ID INT

SELECT @S_date = date , @L_ID = ID  FROM inserted

INSERT INTO Seat (date,Seat_Number) values (@S_date,@L_ID)

END
```

II. Views

```sql
--Show Airplane Detail when enter the customer name and date show all passenger related
data--

CREATE VIEW [ALLFlightDetails] AS
SELECT DISTINCT ST.Customer_Name , LI.Leg_Number , LI.ID , LI.No_Of_Available_Seats
,AI.Airplane_Name ,
AI.Type_Name
FROM Seat ST , Leg_Instance LI INNER JOIN Airplane AI ON AI.ID = LI.ID
WHERE ST.Customer_Name = 'Gihan' AND ST.Date = LI.Date

select *
From ALLFlightDetails


drop view ALLFlightDetails;

--When Enter the airplane ID show all details of airplane and currently landed airport--

CREATE VIEW [AirPlane_States] AS
SELECT AIP.Airport_Name , AIP.City ,APT.Owend_Company , AP.Airplane_Name , AP.Type_Name
FROM  Airport AIP , Airplane_Type APT , Airplane AP  INNER JOIN Land LD ON LD.ID = AP.ID
WHERE LD.Airport_Code = AIP.Airport_Code AND
            APT.Type_Name = AP.Type_Name AND
            AP.ID = 'JB101';

SELECT *
FROM AirPlane_States

drop view AirPlane_States
```

III. Index

```
--index in Seat table for Customer details

CREATE INDEX customer_details
ON Seat (Customer_Name,Date);

--index in Flightleg table for Arrival/Departure Times

CREATE INDEX travelling_details
ON Flight_Leg (Arrival_Time ,Departure_Time );
```

IV. Procedures

Procedure Number 01
```
--List all flight legs that depart or arrive at "Sydney" airport --
-- Procedure Number 01 --

CREATE PROCEDURE Find_Flight_Leg (@Airport VARCHAR(30), @Legno CHAR(5) OUTPUT )
AS
      BEGIN
              SELECT FL.Leg_Number
              FROM Flight_Leg FL INNER JOIN Airport A ON FL.Airplane_Code =
A.Airport_Code
              WHERE A.Airport_Name = @Airport
      END

DECLARE @Leg CHAR(5)
EXEC Find_Flight_Leg 'Sydney', @Leg OUTPUT
PRINT 'Leg No : ' + @Leg;
```

Procedure Number 02
```
-- List all airplanes that can land at "Singapore" airport --
-- procedure Number 02 --

CREATE PROCEDURE Airplane_Land_Details ( @AirPState VARCHAR(20) ,@ID CHAR(5) OUTPUT ,
@AP_name CHAR(20) OUTPUT)

AS
      BEGIN
              SELECT AP.ID , AP.Airplane_Name
              FROM Airport AI , Airplane AP INNER JOIN Land L ON L.ID = AP.ID
              WHERE AI.States = @AirPState AND Ai.Airport_Code = L.Airport_Code
      END

DECLARE @PID CHAR(5) , @AP_Nam CHAR(20);
EXEC Airplane_Land_Details 'Singapore', @PID OUTPUT ,@AP_Nam OUTPUT
PRINT 'Air Plane Id :' + @PID + 'Airplane Name' + @AP_Nam ;
```

Procedure Number 03
```
--Increase the fare of all tickets on flight "KL203" by 20% --
-- procedure Number 03 --


CREATE PROCEDURE Fare_Incease (@Valeu FLOAT , @FCode CHAR(5) )
AS
        BEGIN
                UPDATE Flight_Fare
                SET Amount = Amount + Amount *(@Valeu / 100)
                WHERE Fare_Code = @FCode
        END

EXEC Fare_Incease 20 , 'KL203'

select *
from Flight_Fare
```


Procedure Number 04
```
-- PROCEDURE --
-- List all the flights taken by passenger "Marry Ann" --

CREATE PROCEDURE Flight_List (@P_Name CHAR(30) , @F_NO CHAR(5) OUTPUT)
AS
        BEGIN
                    SELECT @F_NO = LI.ID
                    FROM Seat S INNER JOIN Leg_Instance LI ON S.Date = LI.Date
                    WHERE S.Customer_Name = @P_Name
      END

DECLARE @Flig_NO CHAR(5)
EXEC Flight_List 'Marry Ann' , @Flig_NO OUTPUT
PRINT 'Flight Number: ' + @Flig_NO

drop procedure Flight_List

SELECT LI.ID
FROM Seat S INNER JOIN Leg_Instance LI ON S.Date = LI.Date
WHERE S.Customer_Name = 'Marry Ann'
```