

RELIABLE AIRLINES
DATABASE DESIGN PROJECT
By Adam Sansone
UIN 676475522

TABLE OF CONTENTS

3 – Project Log

4 – Cumulative Design and Special Restrictions

5 – Table Creation

7 – SQL Table Insert Commands

8 – Populated Tables

11 – Reports

14 – Queries

Project Log		
Date	Time Spent	Activities Completed
2/10/2020	5pm - 6pm	Reviewed project specs and reviewed DBDL concepts
2/14/2020	3pm - 6pm	Wrote up user views and started design
2/17/2020	3pm-7pm	Continued working on user views and DBDL
2/18/2020	12pm - 2pm	Finished user views and DBDL and created the data structure diagram
2/24/2020	10am - 12pm	Added in special conditions and added in available seats to flight table
3/5/2020	10am - 11am	Finalized DBDL and reviewed all user views
3/18/2020	11am - 12pm	Created a few tables for 2nd part of project in Microsoft Access
3/20/2020	10am - 12pm	Finished creating tables in MS Access with SQL
3/23/2020	11am - 1pm	Inserted data into tables using SQL
3/25/2020	11am - 2pm	Finished creating reports a, b, d, and e in SQL
4/6/2020	10am - 3pm	Created reports b and c in SQL
4/8/2020	10am - 2pm	Worked on report c and query a
4/10/2020	10am - 12pm	Started putting together final writeup
4/16/2020	12pm - 3pm	Added all tables, some reports and some queries to final writeup
4/20/2020	10am - 3pm	Finished all reports but one and all queries but one and updated final writeup
4/24/2020	3pm - 9pm	Finished last report and query and updated final writeup
4/26/2020	7pm - 9pm	Last minute changes to available flights form

CUMULATIVE DESIGN

Plane (SerialNumber, TypeCode, ManYear, LastServDate, NextServDate)

FK TypeCode → PlaneType

PlaneType (TypeCode, TypeDesc, PlaneCapacity, PlaneRange)

Pilot (PilotNum, FName, LName, PilotBirthdate, PilotSSN, PilotCellNum, PilotSalary)

AK PilotSSN

PilotCerts (PilotNum, TypeCode, CertDate)

FK PilotNum → Pilot; TypeCode → PlaneType

Flight (FlightNum, OriginCode, DepartTime, DestCode, ArriveTime)

FK OriginCode/DestCode → City

SchFlight (FlightNum, FlightDate, FlightPlane, FlightPilot)

FK FlightNum → Flight; FlightPlane → Plane; FlightPilot → Pilot

City (CityCode, CityName, CityState, AirpotDesc)

SK CityName

Passenger (PassengerID, PassFirstName, PassLastName, PassBirthdate, PassPhoneNum, PassAddress, PassEmail*)

Booking (PassengerID, FlightNum, FlightDate)

FK PassengerID → Passenger; FlightNum, FlightDate → SchFlight

Special Restrictions: Seats available is a derived attribute. Sum of reservations made for a specific scheduled flight is deducted from the capacity of the plane type.

DESIGN STRUCTURE

TABLE CREATION

Create Booking ✕

```
CREATE TABLE Booking (
  Passenger_ID INT NOT NULL,
  Flight_Num INT NOT NULL,
  Flight_Date DATE NOT NULL,
  PRIMARY KEY (Passenger_ID, Flight_Num, Flight_Date),
  FOREIGN KEY (Passenger_ID) REFERENCES Passenger(Passenger_ID),
  FOREIGN KEY (Flight_Num, Flight_Date) REFERENCES Scheduled_Flight (Flight_Num, Flight_Date))
```

Create Flight ✕

```
CREATE TABLE Flight (
  Flight_Num INT NOT NULL,
  Origin VARCHAR(30) NOT NULL,
  Depart_Time TIME NOT NULL,
  Destination VARCHAR(30) NOT NULL,
  Arrival_Time TIME NOT NULL,
  PRIMARY KEY (Flight_Num),
  FOREIGN KEY (Origin) REFERENCES City(City_Code),
  FOREIGN KEY (Destination) REFERENCES City(City_Code))
```

Create City ✕

```
CREATE TABLE City (
  City_Code VARCHAR(3) NOT NULL,
  City_Name VARCHAR(30) NOT NULL,
  City_State VARCHAR(2) NOT NULL,
  Airport_Desc VARCHAR(30),
  PRIMARY KEY (City_Code))
```

Create Passenger ✕

```
CREATE TABLE Passenger (
  Passenger_ID INT NOT NULL,
  First_Name VARCHAR(30) NOT NULL,
  Last_Name VARCHAR(30) NOT NULL,
  Birthdate DATE NOT NULL,
  Phone_Number VARCHAR(30) NOT NULL,
  Address VARCHAR(30),
  Email VARCHAR(30),
  PRIMARY KEY (Passenger_ID))
```

Create Pilot ✕

```
CREATE TABLE Pilot (
  Pilot_Num INT NOT NULL,
  First_Name VARCHAR(30) NOT NULL,
  Last_Name VARCHAR(30) NOT NULL,
  Phone_Num VARCHAR(30) NOT NULL,
  Birthdate DATE NOT NULL,
  SSN VARCHAR(12) UNIQUE NOT NULL,
  Salary INT NOT NULL,
  PRIMARY KEY (Pilot_Num))
```

Create Pilot_Certs ✕

```
CREATE TABLE Pilot_Certs (
  Pilot_Num INT NOT NULL,
  Type_Code VARCHAR(8) NOT NULL,
  Cert_Date DATE,
  PRIMARY KEY (Pilot_Num, Type_Code),
  FOREIGN KEY (Pilot_Num) REFERENCES Pilot(Pilot_Num),
  FOREIGN KEY (Type_Code) REFERENCES Plane_Type(Type_Code))
```

Create Plane X

```
CREATE TABLE Plane (  
  Serial_Num VARCHAR(12) NOT NULL,  
  Type_Code VARCHAR(8) NOT NULL,  
  Man_Year DATE NOT NULL,  
  Last_Serv DATE,  
  Next_Serv DATE NOT NULL,  
  PRIMARY KEY (Serial_Num),  
  FOREIGN KEY (Type_Code) REFERENCES Plane_Type(Type_Code))
```










Create Plane_Type X

```
CREATE TABLE Plane_Type (  
  Type_Code VARCHAR(8) NOT NULL,  
  Type_Desc VARCHAR(30) NOT NULL,  
  Plane_Cap INT NOT NULL,  
  Plane_Range INT NOT NULL,  
  PRIMARY KEY (Type_Code))
```

Create Scheduled_Flight X

```
CREATE TABLE Scheduled_Flight (  
  Flight_Num INT NOT NULL,  
  Flight_Date DATE NOT NULL,  
  Plane VARCHAR(12) NOT NULL,  
  Pilot INT NOT NULL,  
  PRIMARY KEY (Flight_Num, Flight_Date),  
  FOREIGN KEY (Flight_Num) REFERENCES Flight(Flight_Num),  
  FOREIGN KEY (Plane) REFERENCES Plane(Serial_Num),  
  FOREIGN KEY (Pilot) REFERENCES Pilot(Pilot_Num))
```

INSERT INTO SQL STATEMENTS

 Insert Into Booking ✕ INSERT INTO Booking VALUES (104, 1, '02/10/2020');	 Insert Into City ✕ INSERT INTO City VALUES ('LA', 'Los Angeles', 'CA', 'LAX');
 Insert Into Flight ✕ INSERT INTO Flight VALUES (9, 'CHI', '10:00:00 AM', 'ORL', '1:00:00 PM');	
 Insert Into Passenger ✕ INSERT INTO Passenger VALUES (105, 'James', 'Gunn', '03/03/1995', '888-709-0987', '123 Whisp Ln.', 'JGunn@email.com');	
 Insert Into Pilot ✕ INSERT INTO Pilot VALUES (2, 'Jane', 'Jones', '234-5678', '03/11/1980', '123456789', 65000);	 Insert Into Pilot_Certs ✕ INSERT INTO Pilot_Certs VALUES (2, 'A310', 05/15/2005);
 Insert Into Plane ✕ INSERT INTO Plane VALUES ('C1234', 'A310', 3/20/2010, 3/20/2020, 9/20/2020);	 Insert Into Plane_Type ✕ INSERT INTO Plane_Type VALUES ('A310', 'Airbus', 220, 5002);
 Insert Into Scheduled_Flight ✕ INSERT INTO Scheduled_Flight VALUES (9, '4/13/2020', 'F1234', 4);	

POPULATED TABLES

Booking				
Passenger_ID	Flight_Num	Flight_Date	Click to Add	
100	1	2/10/2020		
100	2	2/10/2020		
101	3	4/10/2020		
101	4	4/11/2020		
102	1	2/10/2020		
103	1	2/10/2020		
104	1	2/10/2020		
*				

City					
City_Code	City_Name	City_State	Airport_Des	Click to Add	
+	ATL	Atlanta	GA	ATL	
+	CHI	Chicago	IL	ORD	
+	DAL	Dallas	TX	DFW	
+	DEN	Denver	CO	DEN	
+	LA	Los Angeles	CA	LAX	
+	NYC	New York	NY	JFK	
+	ORL	Orlando	FL	MCO	
+	SEA	Seattle	WA	SEA	
+	SFO	San Francisco	CA	SFO	
*					

Flight						
Flight_Num	Origin	Depart_Time	Destination	Arrival_Time	Click to Add	
+	1 CHI	4:00:00 PM	LA	8:00:00 PM		
+	2 LA	10:00:00 PM	CHI	3:00:00 AM		
+	3 CHI	2:00:00 PM	NYC	5:00:00 PM		
+	4 NYC	9:00:00 AM	CHI	1:00:00 PM		
+	5 CHI	8:00:00 AM	DAL	12:00:00 PM		
+	6 DAL	2:00:00 PM	NYC	5:00:00 PM		
+	7 DEN	10:00:00 AM	CHI	3:00:00 PM		
+	8 ATL	6:00:00 AM	SEA	12:00:00 PM		
+	9 CHI	10:00:00 AM	ORL	1:00:00 PM		
*						

Passenger							
	Passenger_I	First_Name	Last_Name	Birthdate	Phone_Num	Address	Email
+	100	Bob	Smith	4/12/1990	630-445-7885	123 Fake St.	
+	101	Mary	BoPeep	3/20/1890	630-221-1245	111 Sheep Ln.	
+	102	Joe	John	4/11/1970	630-111-2222	45 W. Heart St.	
+	103	Jason	Lee	5/10/1960	708-123-1414	2 Dot Rd	
+	104	Abigail	Pun	10/10/2000	630-456-4567	12 E. Heart St.	
+	105	James	Gunn	3/3/1995	888-709-0987	123 Whisp Ln.	JGunn@email.

Pilot							
	Pilot_Num	First_Name	Last_Name	Phone_Num	Birthdate	SSN	Salary
+	1	John	Smith	123-4567	3/11/1975	234567891	65000
+	2	Jane	Jones	234-5678	3/11/1980	123456789	65000
+	3	Albert	King	345-6789	6/10/1982	345678901	65000
+	4	Joy	Palace	456-7891	10/10/1979	456789102	70000

Pilot_Certs		
Pilot_Num	Type_Code	Cert_Date
1	747	5/10/1980
1	767	5/10/1980
2	767	6/20/2000
2	A310	6/20/2000
2	A320	6/20/2000
2	A330	6/20/2000
3	747	4/10/2000
3	767	4/10/2000
3	787	4/10/2000
4	A310	1/10/1990
4	A320	1/10/1990
4	A330	1/10/1990

Plane					
	Serial_Num	Type_Code	Man_Year	Last_Serv	Next_Serv
+	A1234	747	1/10/1970	4/6/2019	4/6/2020
+	B1234	767	4/20/1980	1/10/2020	1/10/2021
+	C1234	A310	3/25/2020	2/14/2020	2/14/2021
+	D1234	787	4/1/2019	4/1/2019	4/1/2020
+	E1234	A320	8/15/1980	8/15/2019	8/15/2020
+	F1234	A330	11/23/1990	11/23/2019	11/23/2020

Plane_Type X				
	Type_Code ▾	Type_Desc ▾	Plane_Cap ▾	Plane_Range ▾
+	747	Boeing1	366	8357
+	767	Boeing2	216	6385
+	787	Boeing3	248	7305
+	A310	Airbus1	220	5002
+	A320	Airbus3	132	6940
+	A330	Airbus2	290	11750

Scheduled_Flight X				
	Flight_Num ▾	Flight_Date ▾	Plane ▾	Pilot ▾
+	1	2/10/2020	A1234	1
+	2	2/10/2020	A1234	1
+	3	4/10/2020	C1234	2
+	4	4/11/2020	B1234	2
+	5	4/8/2020	D1234	3
+	6	4/7/2020	D1234	3
+	7	4/7/2020	E1234	4
+	9	4/13/2020	F1234	4

REPORTS

A)

Select * From Plane_Type X

SELECT *
FROM Plane_Type;

Plane Type X

Plane Type

Thursday, April 16, 2020
2:10:10 PM

Type Code	Type Description	Capacity	Range
787	Boeing3	248	7305
A330	Airbus2	290	11750
A320	Airbus3	132	6940
747	Boeing1	366	8357
767	Boeing2	216	6385
A310	Airbus1	220	5002

6

Page 1 of 1

B)

Select From Plane/Plane_Type X

SELECT Plane.Serial_Num, Plane.Type_Code, Plane_Type.Type_Desc
FROM Plane INNER JOIN Plane_Type ON Plane.Type_Code = Plane_Type.Type_Code;

Aircraft X

Aircraft

Thursday, April 16, 2020
2:12:39 PM

Serial Number	Type Code	Type Description
D1234	787	Boeing3
F1234	A330	Airbus2
E1234	A320	Airbus3
A1234	747	Boeing1
B1234	767	Boeing2
C1234	A310	Airbus1

6

Page 1 of 1

c)

Select From Pilot/Pilot_Certs

```

SELECT P.Pilot_Num, P.First_Name, P.Last_Name, T.Type_Code, T.Type_Desc, S.Flight_Num, S.Flight_Date, S.Plane
FROM Pilot AS P, Pilot_Certs AS C, Plane_Type AS T, Scheduled_Flight AS S, Plane AS A
WHERE P.Pilot_Num = S.Pilot
AND S.Plane = A.Serial_Num
AND A.Type_Code = T.Type_Code
AND P.Pilot_Num = C.Pilot_Num
AND C.Type_Code = T.Type_Code;

```

Pilot Certification Form

Pilot Certification with Sch. Flights

Friday, April 24, 2020
8:20:19 PM

Pilot ID	First Name	Last Name	Plane Code	Plane Description	Flight #	Flight Date	Plane Serial #
3	Albert	King	787	Boeing3	6	4/7/2020	D1234
3	Albert	King	787	Boeing3	5	4/8/2020	D1234
4	Joy	Palace	A330	Airbus2	9	4/13/2020	F1234
4	Joy	Palace	A320	Airbus3	7	4/7/2020	E1234
1	John	Smith	747	Boeing1	1	2/10/2020	A1234
1	John	Smith	747	Boeing1	2	2/10/2020	A1234
2	Jane	Jones	767	Boeing2	4	4/11/2020	B1234
2	Jane	Jones	A310	Airbus1	3	4/10/2020	C1234

8

D)

Select * From City X

```
SELECT *
FROM City
ORDER BY City_Name;
```

Cities X

Cities Thursday, April 16, 2020 2:14:28 PM

City_Code	City_Name	City_State	Airport_Desc
ATL	Atlanta	GA	ATL
CHI	Chicago	IL	ORD
DAL	Dallas	TX	DFW
DEN	Denver	CO	DEN
LA	Los Angeles	CA	LAX
NYC	New York	NY	JFK
ORL	Orlando	FL	MCO
SFO	San Francisco	CA	SFO
SEA	Seattle	WA	SEA

9

Page 1 of 1

E)

Select From Plane X

```
SELECT Serial_Num, Man_Year, Last_Serv, Next_Serv
FROM Plane;
```

Service Record X

Service Record Thursday, April 16, 2020 2:15:34 PM

Serial_Num	Man_Year	Last_Serv	Next_Serv
A1234	1/10/1970	4/6/2019	4/6/2020
B1234	4/20/1980	1/10/2020	1/10/2021
C1234	3/25/2020	2/14/2020	2/14/2021
D1234	4/1/2019	4/1/2019	4/1/2020
E1234	8/15/1980	8/15/2019	8/15/2020
F1234	11/23/1990	11/23/2019	11/23/2020

6

Page 1 of 1

QUERIES

A)

Given Origin/Dest, Flights Available

```
SELECT S.Flight_Num, S.Flight_Date, T.Plane_Cap - COUNT(B.Passenger_ID) AS [Available Seats]
FROM Scheduled_Flight AS S, Flight AS F, City AS C, City AS D, Booking AS B, Plane_Type AS T, Plane AS P
WHERE S.Flight_Num = F.Flight_Num
AND
S.Flight_Num = B.Flight_Num
AND
S.Plane = P.Serial_Num
AND
P.Type_Code = T.Type_Code
AND
C.City_Name = [Origin City]
AND
D.City_Name = [Destination City]
GROUP BY S.Flight_Num, S.Flight_Date, F.Origin, F.Destination, T.Plane_Cap;
```

Enter Parameter Value ? X

Origin City

Chicago

OK Cancel

Enter Parameter Value ? X

Destination City

Los Angeles

OK Cancel

Flights Available	
Flight Number	1
Flight Date	2/10/2020
Available Seats	362
Flight Number	2
Flight Date	2/10/2020
Available Seats	365
Flight Number	3
Flight Date	4/10/2020
Available Seats	219
Flight Number	4
Flight Date	4/11/2020
Available Seats	215

B)

Given Date, Pilot Info ✕

```

SELECT S.Pilot, P.First_Name, P.Last_Name, S.Plane, T.Type_Desc
FROM Scheduled_Flight AS S, Pilot AS P, Plane AS O, Plane_Type AS T
WHERE S.Pilot = P.Pilot_Num
AND
S.Plane = O.Serial_Num
AND
O.Type_Code = T.Type_Code
AND
S.Flight_Date = [Flight Date];

```

Enter Parameter Value ? ✕

Flight Date

4/7/2020

OK Cancel

Pilot Info Form ✕

Pilot Info Form

Pilot ID	First Name	Last Name	Plane Serial #	Plane Description
1	Albert	King	D1234	Boeing3
4	Joy	Palace	E1234	Airbus3

C)

Given Flight, Flight Info ✕

```

SELECT F.Flight_Num, F.Origin, C.City_Name, F.Depart_Time, F.Destination, D.City_Name, F.Arrival_Time
FROM Flight AS F, City AS C, City AS D
WHERE F.Origin = C.City_Code
AND
F.Destination = D.City_Code
AND
F.Flight_Num = [Flight Number];

```

Enter Parameter Value ? ✕

Flight Number

1

OK Cancel

Flight Info Form ✕

Flight Info Form

Flight #	Origin	City Name	Depart Time	Destination	City Name	Arrival Time
1	CHI	Chicago	4:00:00 PM	LA	Los Angeles	8:00:00 PM