Faculty of Engineering
Helwan University

HELWAN UNIVERSITY

Helwan University
Faculty of Engineering

DBMS

Airlines System

Database

Dr. Hadeer Ahmed

Group No.07

Submission Date
28/12/2022

Prepared By:

Mohamed Mahmoud Abdel Aziz Elsehetry	21116
Mohamed Hassan Kamal	21066
Abdullah Fawzi Abdel Satar Salamah	21041
Moataz Mohamed Megahed	21047

Introduction

Airlines is having more transactions, causing day to day expanding business activities hard to manage its operations. To ensure more flexible service for customers, it’s highly recommended to implement Airlines Reservation System (ARS), a computerized system that will help manage all information related to flight, passengers, their contact details, reservation, transactions, schedule publishing, air far payments etc.

Purpose and Method

ADBS is operating on-spot airline reservation, and flight booking services with help of several Airports. Though having branches in multiple cities targeting a high range of customers.

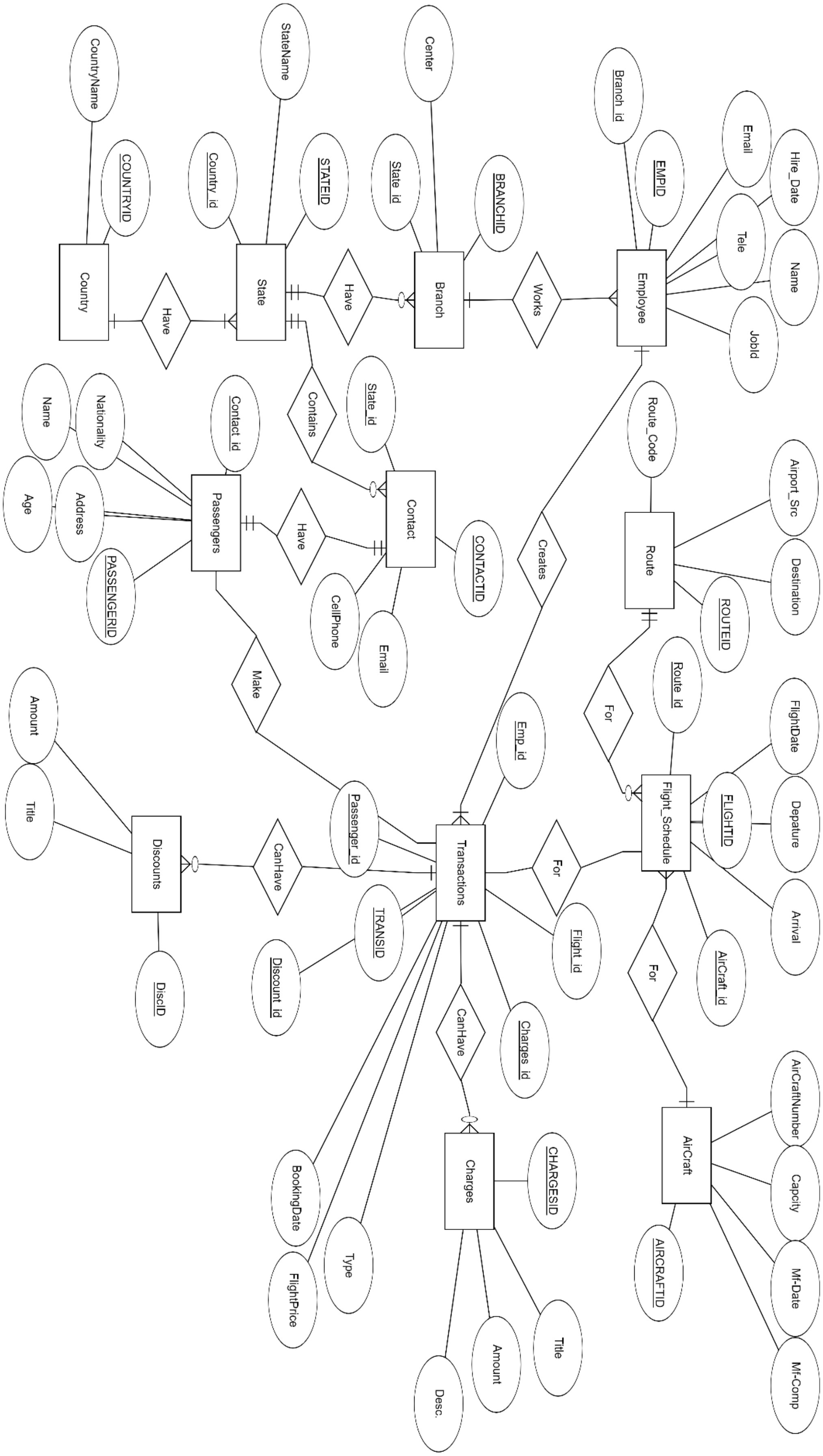
The purpose of the system is to facilitate reservation operations, link databases to each other accurately, and avoid human errors because one employee sometimes fails to satisfy customers in remote areas when they must travel for reservation and also when they need to travel for cancellation or flight day extension. The followings below are the system Entities, Attributes, and Relations.

Database Design for ADBS

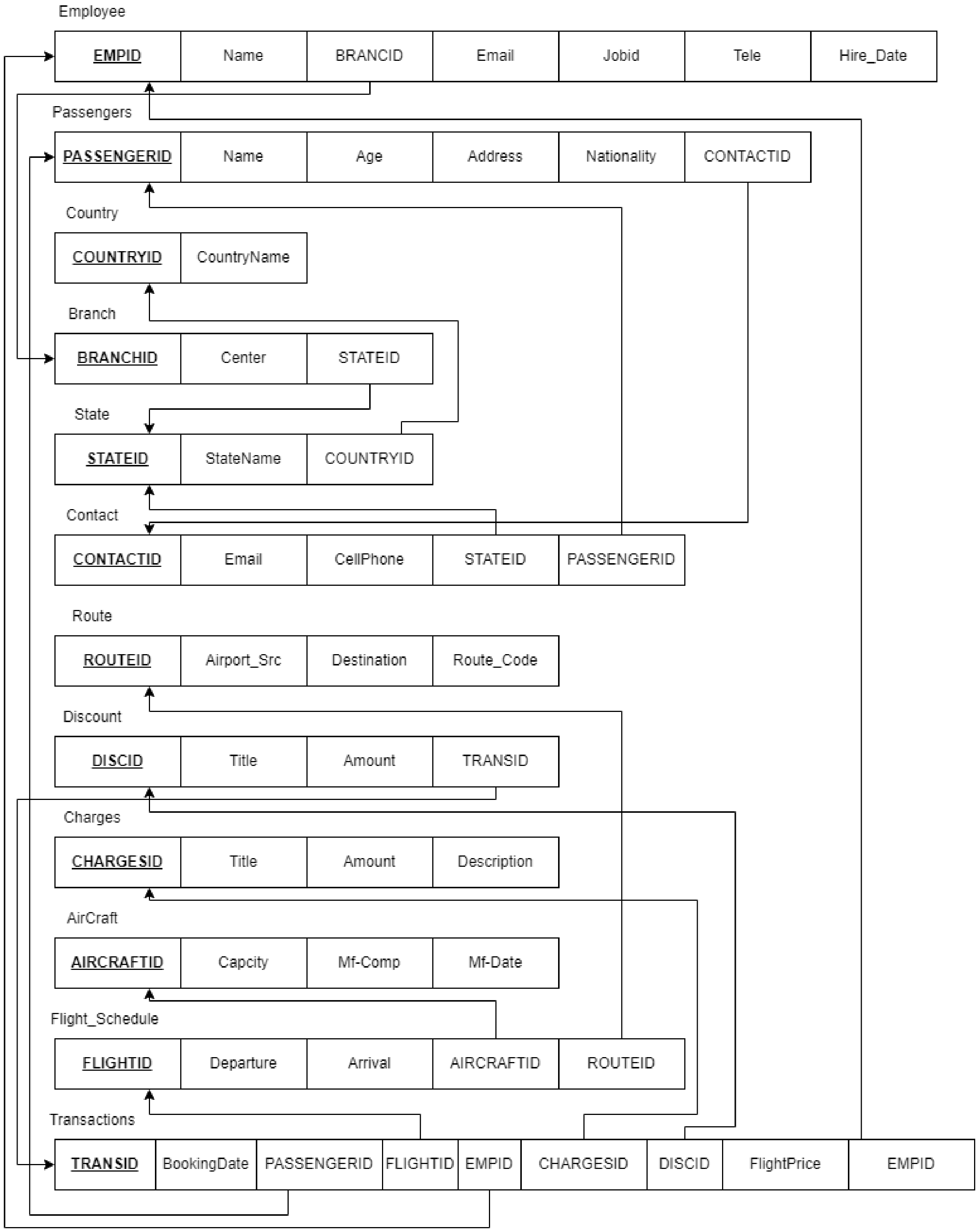
Entities List:

- AirCraft
- Branch
- Charges
- Contact
- Country
- Discounts
- Employee
- Flight_Schedule
- Passengers
- Route
- State
- Transactions

Database ER Diagram



Database Relational Table Diagram



Employee

EMPID	Name	BRANCID	Email	Jobid	Tele	Hire_Date

Passengers

PASSENGERID	Name	Age	Address	Nationality	CONTACTID

Country

COUNTRYID	CountryName

Branch

BRANCHID	Center	STATEID

State

STATEID	StateName	COUNTRYID

Contact

CONTACTID	Email	CellPhone	STATEID	PASSENGERID

Route

ROUTEID	Airport_Src	Destination	Route_Code

Discount

DISCID	Title	Amount	TRANSID

Charges

CHARGESID	Title	Amount	Description

AirCraft

AIRCRAFTID	Capcity	Mf-Comp	Mf-Date

Flight_Schedule

FLIGHTID	Departure	Arrival	AIRCRAFTID	ROUTEID

Transactions

TRANSID	BookingDate	PASSENGERID	FLIGHTID	EMPID	CHARGESID	DISCID	FlightPrice	EMPID

Tables Creation with SQL

AirCraft Table

```
CREATE TABLE IF NOT EXISTS "AirCraft" (
"AircraftId"    INTEGER,
"Aircraft_Number"   nVarchar(32),
"Capacity"  INTEGER,
"Mf_Comp"   nVarchar(32),
"Mf_Date"   Date,
PRIMARY KEY("AircraftId"));
```

Charges Table

```
CREATE TABLE IF NOT EXISTS "Charges" (
"ChargeId"  INTEGER,
"Title" nVarchar(32),
"Amount"    INTEGER,
"Descr" TEXT,
PRIMARY KEY("ChargeId"));
```

Country Table

```
CREATE TABLE IF NOT EXISTS "Country" (
"CountryId" INTEGER,
"CountryName"   nVarChar(32),
PRIMARY KEY("CountryId"));
```

Employee Table

```
CREATE TABLE IF NOT EXISTS "Employee" (
"EmpId" INTEGER,
"Name"  nVarChar(32),
"Branch_id" INTEGER,
"Email" nVarChar(32),
"JobId" nVarChar(32),
"Tel"   nVarChar(32),
"Hire_date" Date,
PRIMARY KEY("EmpId"),
FOREIGN KEY("Branch_id") REFERENCES
"Branch"("BranchId"));
```

Passengers Table

```
CREATE TABLE IF NOT EXISTS "Passengers" (
"PassengerId"   INTEGER,
"Name"  nVarChar(32),
"Age"   INTEGER,
"Address"   nVarChar(64),
"Nationality"   nVarChar(32),
"Contact_id"    INTEGER,
PRIMARY KEY("PassengerId"),
FOREIGN KEY("Contact_id") REFERENCES
"Contact"("ContactId"));
```

Route Table

```
CREATE TABLE IF NOT EXISTS "Route" (
"RouteId"   INTEGER,
"Airport_Src"   nVarChar(64),
"Destination"   nVarChar(64),
"Route_Code"    TEXT UNIQUE,
PRIMARY KEY("RouteId"));
```

Contact Table

```
CREATE TABLE IF NOT EXISTS "Contact" (
"ContactId" INTEGER,
"Email" nVarchar(64),
"CellPhone" nVarchar(64),
"State_id"  INTEGER,
PRIMARY KEY("ContactId"));
```

Charges Table

```
CREATE TABLE IF NOT EXISTS "Branch" (
"BranchId"  INTEGER,
"Center"    nVarchar(32),
"State_id"  INTEGER,
PRIMARY KEY("BranchId"));
```

Charges Table

```
CREATE TABLE IF NOT EXISTS "State" (
"StateId"   INTEGER,
"StateName" TEXT,
"Country_id"    INTEGER,
PRIMARY KEY("StateId"),
FOREIGN KEY("Country_id") REFERENCES
"Country"("CountryId"));
```

Transactions Table

```
CREATE TABLE IF NOT EXISTS "Transactions" (
"TransId"   integer NOT NULL,
"BookingDate"   datetime,
"Passenger_id"  integer,
"Flight_id" integer,
"Type"  bit,
"Employee_id"   integer,
"Charges_id"    integer,
"Discount_id"   integer,
"FlightPrice"   numeric,
PRIMARY KEY("TransId"),
FOREIGN KEY("Employee_id") REFERENCES
"Employee"("EmpId"),
FOREIGN KEY("Passenger_id") REFERENCES
"Passengers"("PassengerId"),
FOREIGN KEY("Discount_id") REFERENCES
"Discounts"("DiscId"),
FOREIGN KEY("Charges_id") REFERENCES
"Charges"("ChargeId"), FOREIGN KEY("Flight_id")
REFERENCES "Flight_Schedule"("FlightId"));
```

Discounts Table

```
CREATE TABLE IF NOT EXISTS "Discounts" (
"DiscId"    INTEGER,
"Title" nVarChar(32),
"Amount"    TEXT,
PRIMARY KEY("DiscId"));

CREATE TABLE IF NOT EXISTS "Flight_Schedule" (
"FlightId"  integer NOT NULL,
"Flight_Date"   datetime,
"Departure" nvarchar(52) COLLATE NOCASE,
"Arrival"   nvarchar(52) COLLATE NOCASE,
"AirCraft_id"   integer,
"Route_id"  integer,
PRIMARY KEY("FlightId"),
FOREIGN KEY("AirCraft_id") REFERENCES
"AirCraft"("AircraftId"),
FOREIGN KEY("Route_id") REFERENCES
"Route"("RouteId")
```

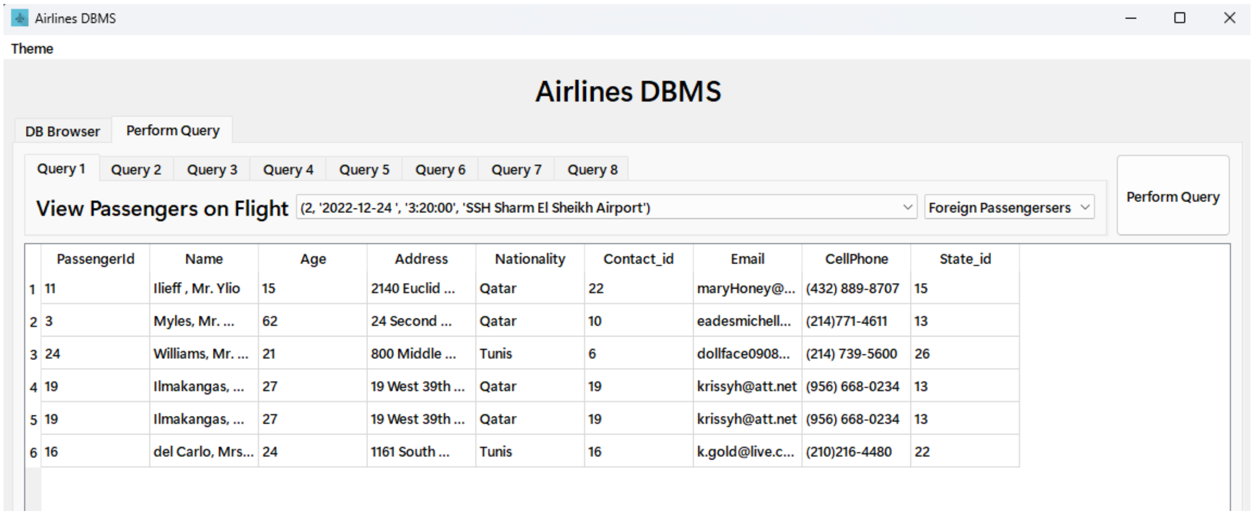
Prepared SQL Queries

1. View passengers on certain flight (Foreign passengers Or All passengers option)

- **SQL Query (Foreign passengers):**

```
SELECT P.PassengerId, P.Name, P.Age, P.Address, P.Nationality,
       P.Contact_id, C.Email, C.CellPhone, C.State_id
FROM   Transactions AS T, Passengers AS P, Contact AS C
WHERE  T.Passenger_id=P.PassengerId  AND P.Contact_id=C.ContactId AND
       T.Flight_id  selectedFlightID  AND P.Nationality NOT LIKE 'Egy%'
```

- **Output:**



View Passengers on Flight (2, '2022-12-24 ', '3:20:00', 'SSH Sharm El Sheikh Airport') Foreign Passengersers

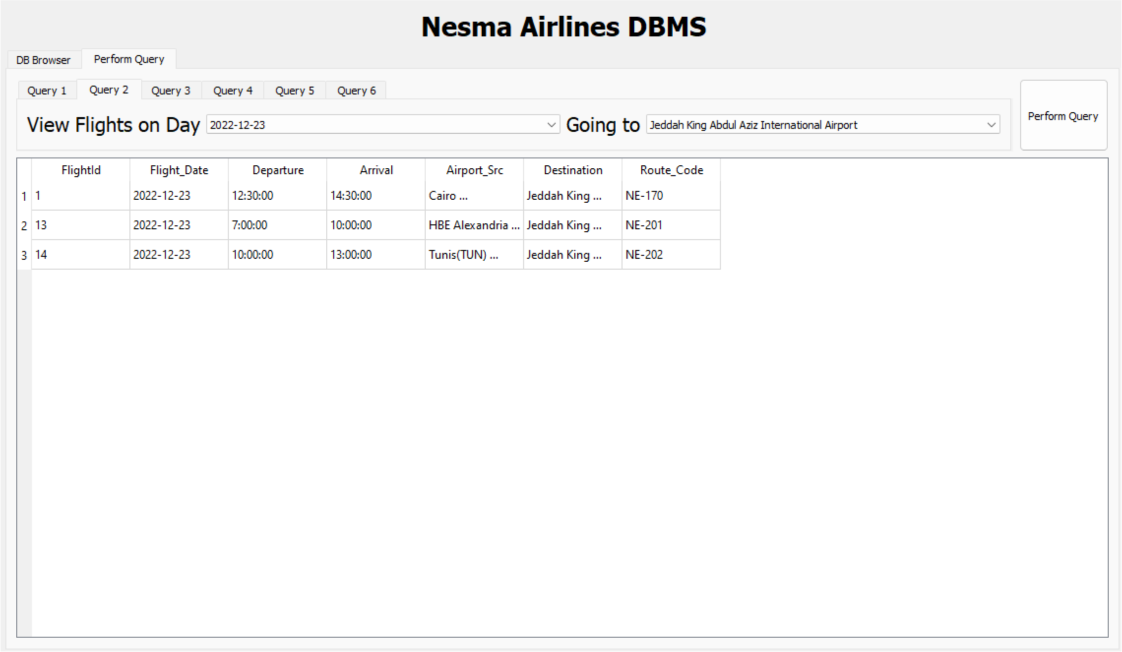
	PassengerId	Name	Age	Address	Nationality	Contact_id	Email	CellPhone	State_id
1	11	Ilieff , Mr. Ylio	15	2140 Euclid ...	Qatar	22	maryHoney@...	(432) 889-8707	15
2	3	Myles, Mr. ...	62	24 Second ...	Qatar	10	eadesmichell...	(214)771-4611	13
3	24	Williams, Mr. ...	21	800 Middle ...	Tunis	6	dollface0908...	(214) 739-5600	26
4	19	Ilmakangas, ...	27	19 West 39th ...	Qatar	19	krissyh@att.net	(956) 668-0234	13
5	19	Ilmakangas, ...	27	19 West 39th ...	Qatar	19	krissyh@att.net	(956) 668-0234	13
6	16	del Carlo, Mrs...	24	1161 South ...	Tunis	16	k.gold@live.c...	(210)216-4480	22

2. View Flights on (certain Day) Going to (Certain Airport)

- **SQL Query:**

```
SELECT DISTINCT F.FlightId, F.Flight_Date, F.Departure,
               F.Arrival, R.Airport_Src, R.Destination, R.Route_Code
FROM    Flight_Schedule AS F, Route AS R
WHERE F.Route_id=R.RouteId AND F.Flight_Date=SelectedDate AND
R.Destination=SelectedDistination
```

- **Output**:



View Flights on Day 2022-12-23 Going to Jeddah King Abdul Aziz International Airport

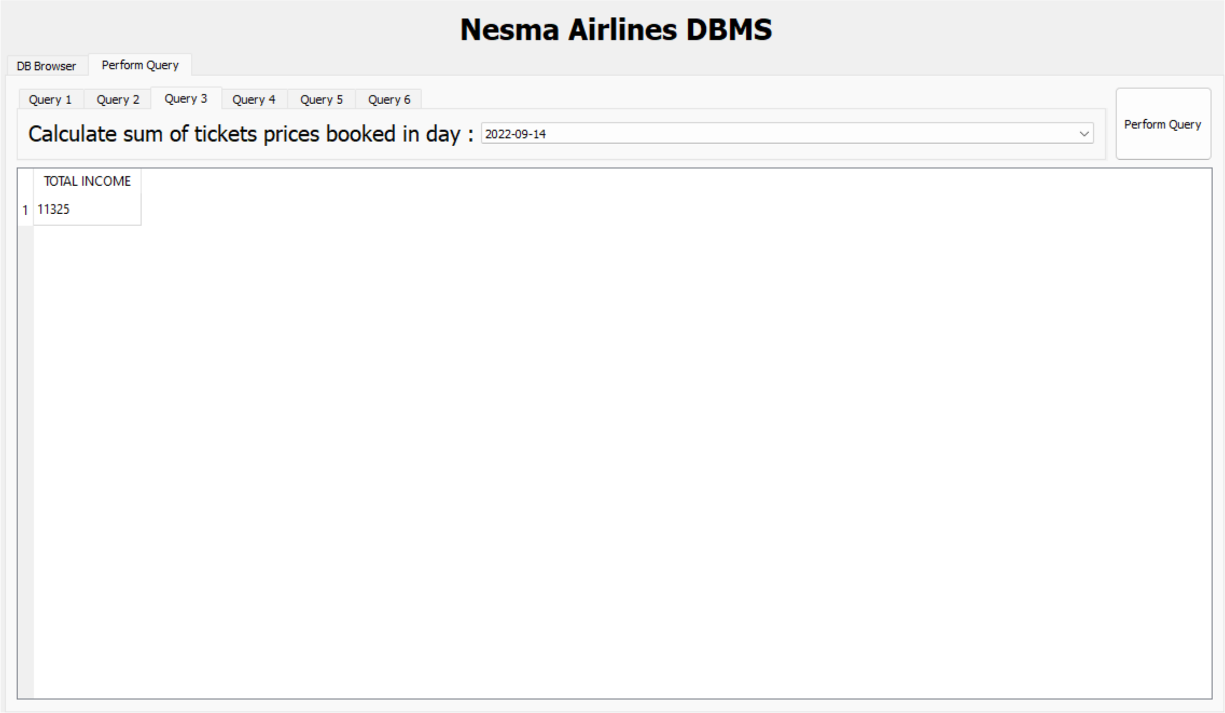
	FlightId	Flight_Date	Departure	Arrival	Airport_Src	Destination	Route_Code
1	1	2022-12-23	12:30:00	14:30:00	Cairo ...	Jeddah King ...	NE-170
2	13	2022-12-23	7:00:00	10:00:00	HBE Alexandria ...	Jeddah King ...	NE-201
3	14	2022-12-23	10:00:00	13:00:00	Tunis(TUN) ...	Jeddah King ...	NE-202

3. Calculate sum of tickets prices booked in (Certain Day)

- **SQL Query:**

```
SELECT COUNT(FlightPrice) AS 'Number of Flights', sum(FlightPrice) AS
       'TOTAL INCOME'
FROM   Transactions AS T
WHERE  T.BookingDate = SelectedDate
```

- **Output**:



Calculate sum of tickets prices booked in day : 2022-09-14

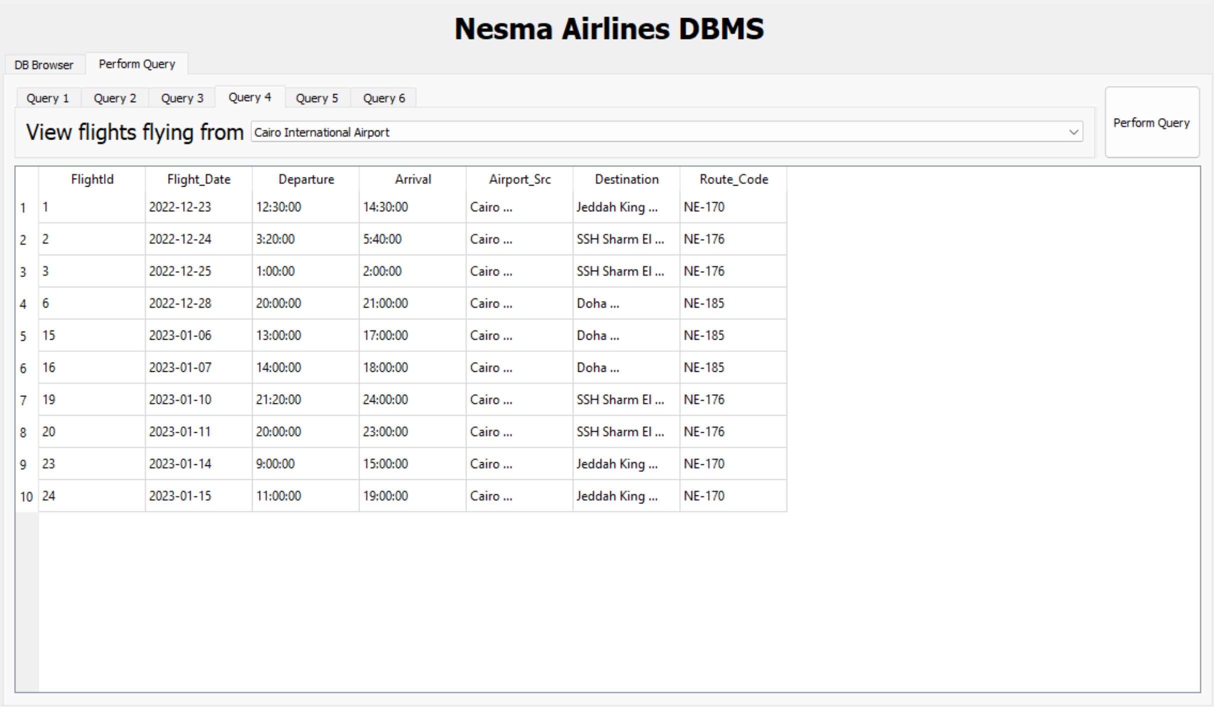
	TOTAL INCOME
1	11325

4. View Flights flying from (Certain Airport)

- **SQL Query:**

```
SELECT F.FlightId, F.Flight_Date, F.Departure, F.Arrival, R.Airport_Src,
                R.Destination, R.Route_Code
FROM Flight_Schedule AS F, Route AS R
WHERE F.Route_id=R.RouteId AND R.Airport_Src = selectedFlightID
```

- **Output**:



View flights flying from Cairo International Airport

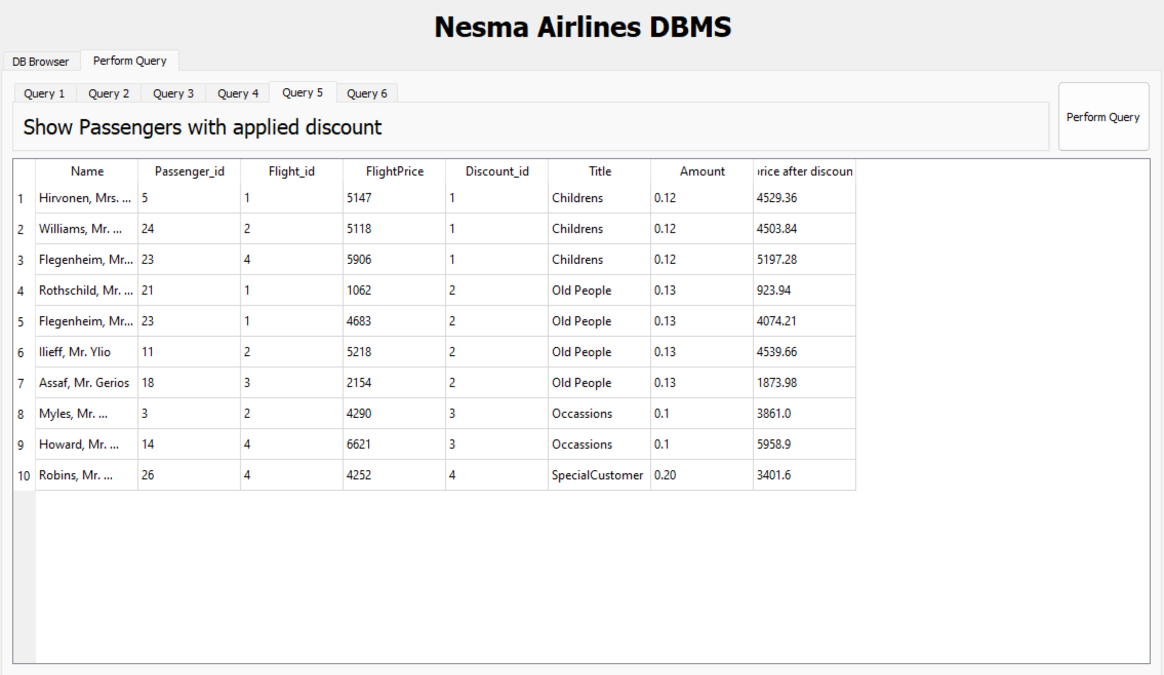
	FlightId	Flight_Date	Departure	Arrival	Airport_Src	Destination	Route_Code
1	1	2022-12-23	12:30:00	14:30:00	Cairo ...	Jeddah King ...	NE-170
2	2	2022-12-24	3:20:00	5:40:00	Cairo ...	SSH Sharm El ...	NE-176
3	3	2022-12-25	1:00:00	2:00:00	Cairo ...	SSH Sharm El ...	NE-176
4	6	2022-12-28	20:00:00	21:00:00	Cairo ...	Doha ...	NE-185
5	15	2023-01-06	13:00:00	17:00:00	Cairo ...	Doha ...	NE-185
6	16	2023-01-07	14:00:00	18:00:00	Cairo ...	Doha ...	NE-185
7	19	2023-01-10	21:20:00	24:00:00	Cairo ...	SSH Sharm El ...	NE-176
8	20	2023-01-11	20:00:00	23:00:00	Cairo ...	SSH Sharm El ...	NE-176
9	23	2023-01-14	9:00:00	15:00:00	Cairo ...	Jeddah King ...	NE-170
10	24	2023-01-15	11:00:00	19:00:00	Cairo ...	Jeddah King ...	NE-170

5. View Passengers with applied Discounts

- **SQL Query:**

```
SELECT Passengers.Name, Transactions.Passenger_id, Transactions.Flight_id,
       Transactions.FlightPrice, Transactions.Discount_id, Discounts.Title,
       Discounts.Amount, (FlightPrice - (FlightPrice*Amount)) AS 'price after
       discount'
FROM Transactions INNER JOIN Discounts INNER JOIN Passengers
     ON Transactions.Discount_id=Discounts.DiscId  AND
     Transactions.Passenger_id=Passengers.PassengerId ORDER BY
     Transactions.Discount_id
```

- **Output**:



Show Passengers with applied discount

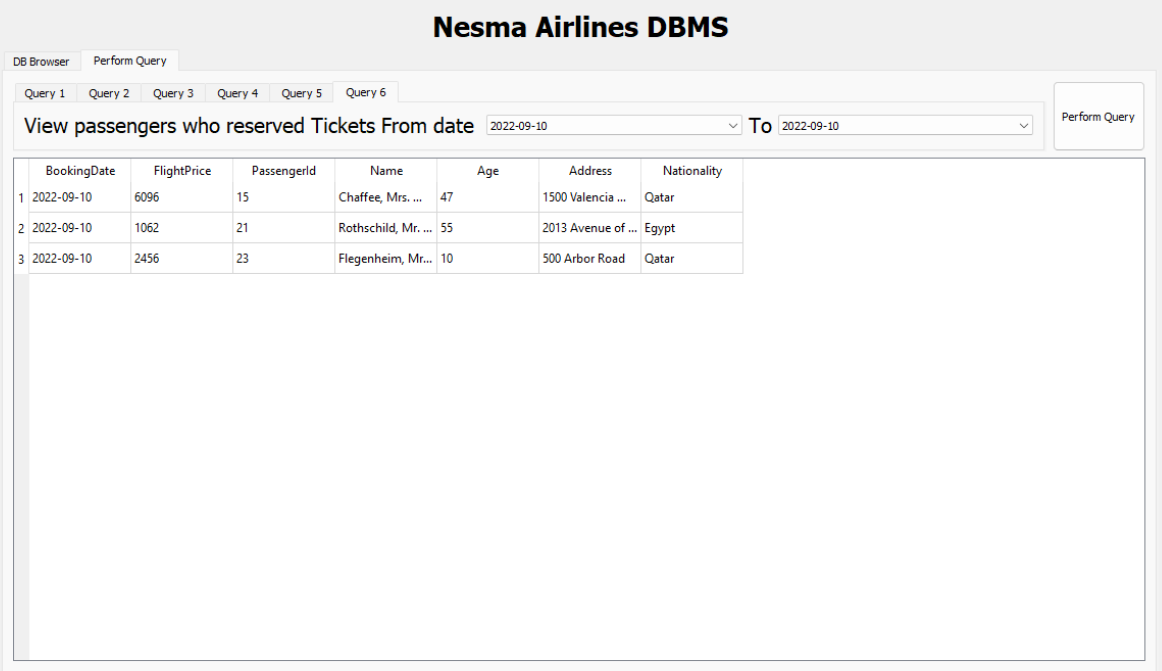
	Name	Passenger_id	Flight_id	FlightPrice	Discount_id	Title	Amount	›rice after discoun
1	Hirvonen, Mrs. ...	5	1	5147	1	Childrens	0.12	4529.36
2	Williams, Mr. ...	24	2	5118	1	Childrens	0.12	4503.84
3	Flegenheim, Mr...	23	4	5906	1	Childrens	0.12	5197.28
4	Rothschild, Mr. ...	21	1	1062	2	Old People	0.13	923.94
5	Flegenheim, Mr...	23	1	4683	2	Old People	0.13	4074.21
6	Ilieff, Mr. Ylio	11	2	5218	2	Old People	0.13	4539.66
7	Assaf, Mr. Gerios	18	3	2154	2	Old People	0.13	1873.98
8	Myles, Mr. ...	3	2	4290	3	Occassions	0.1	3861.0
9	Howard, Mr. ...	14	4	6621	3	Occassions	0.1	5958.9
10	Robins, Mr. ...	26	4	4252	4	SpecialCustomer	0.20	3401.6

6. View Passenger who reserved tickets from (Certain Date) to (Certain Date)

- **SQL Query:**

```
SELECT T.BookingDate, T.FlightPrice, P.PassengerId, P.Name, P.Age,
                P.Address, P.Nationality\
FROM    Transactions AS T, Passengers AS P\
WHERE T.Passenger_id=P.PassengerId AND T.BookingDate >= Date1 AND
T.BookingDate <= Date2 ORDER BY T.BookingDate
```

- **Output:**



View passengers who reserved Tickets From date 2022-09-10 To 2022-09-10

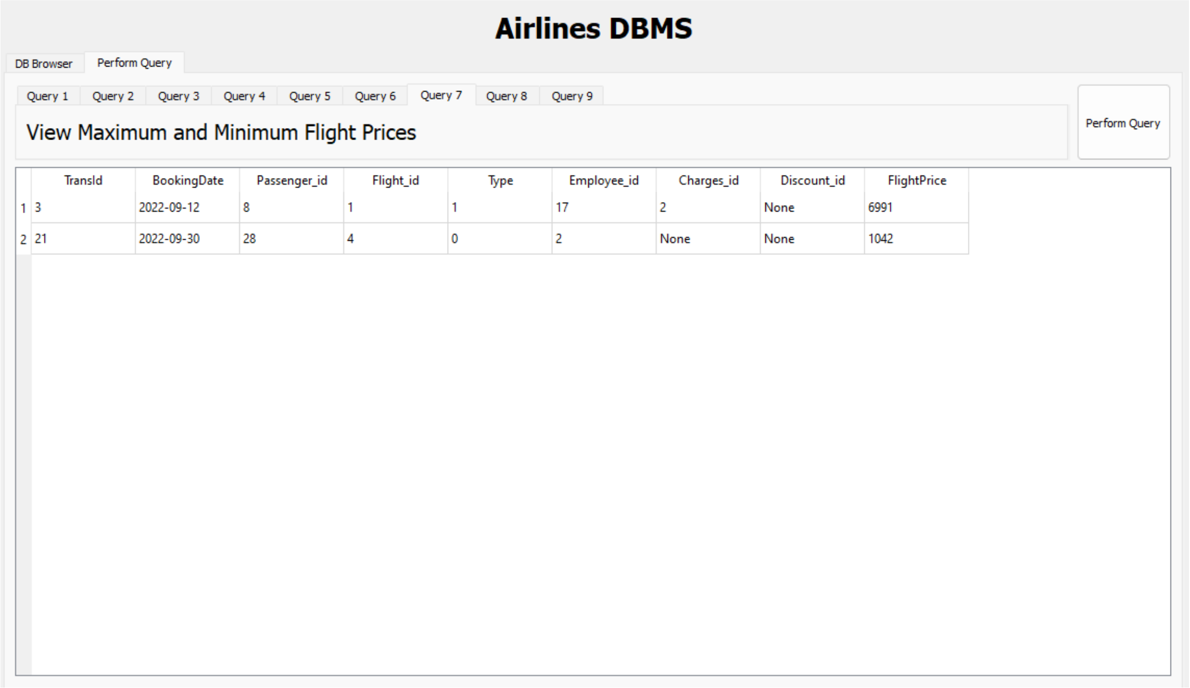
	BookingDate	FlightPrice	PassengerId	Name	Age	Address	Nationality
1	2022-09-10	6096	15	Chaffee, Mrs. ...	47	1500 Valencia ...	Qatar
2	2022-09-10	1062	21	Rothschild, Mr. ...	55	2013 Avenue of ...	Egypt
3	2022-09-10	2456	23	Flegenheim, Mr...	10	500 Arbor Road	Qatar

7. View Minimum and Maximum Flight Prices

- **SQL Query:**

```
SELECT *
FROM Transactions
Where FlightPrice IN (Select max(FlightPrice) From Transactions)
Or FlightPrice IN (Select min(FlightPrice) From Transactions);
```

- **Output**:



View Maximum and Minimum Flight Prices

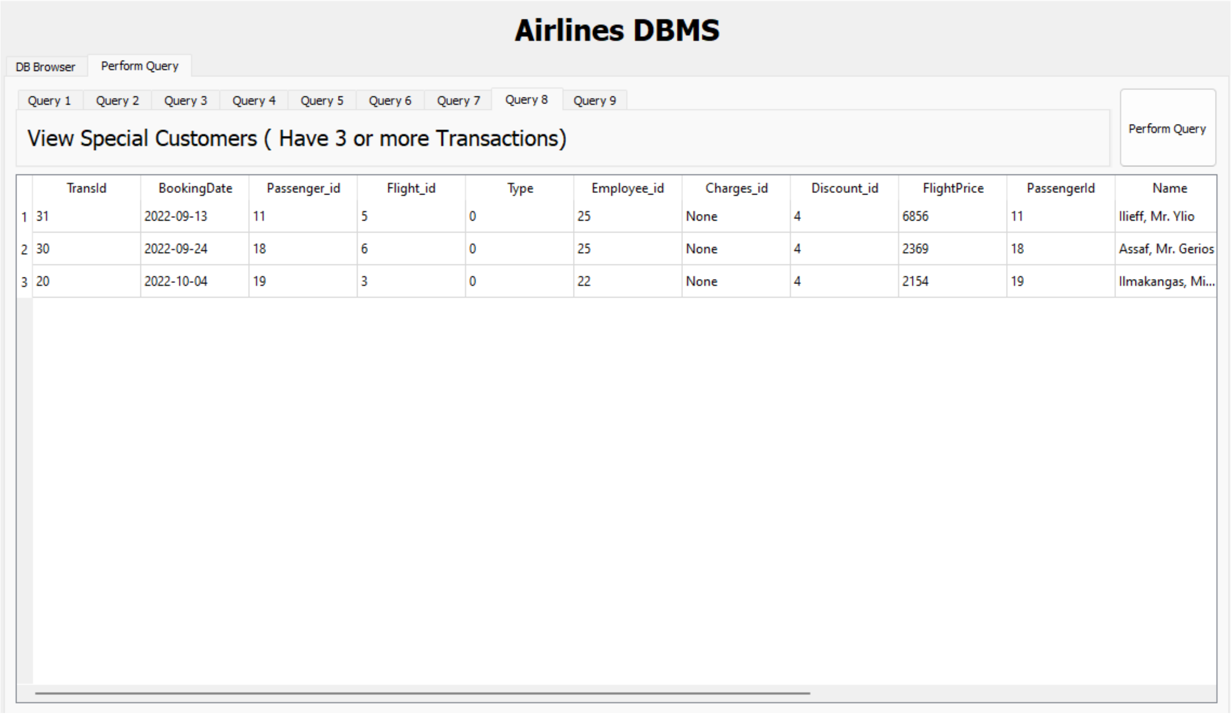
	TransId	BookingDate	Passenger_id	Flight_id	Type	Employee_id	Charges_id	Discount_id	FlightPrice
1	3	2022-09-12	8	1	1	17	2	None	6991
2	21	2022-09-30	28	4	0	2	None	None	1042

8. View Special Customers who (Have 3 or more Transactions)

- **SQL Query:**

  Select *
  From Transactions T **JOIN** Passengers p **ON** T.Passenger_id == p.PassengerId
  JOIN Discounts d **ON** d.DiscId == T.Discount_id
  GROUP BY T.Passenger_id
  Having Count(T.Passenger_id) >=3 **AND** Max(T.TransId);

- **Output**:



View Special Customers (Have 3 or more Transactions)

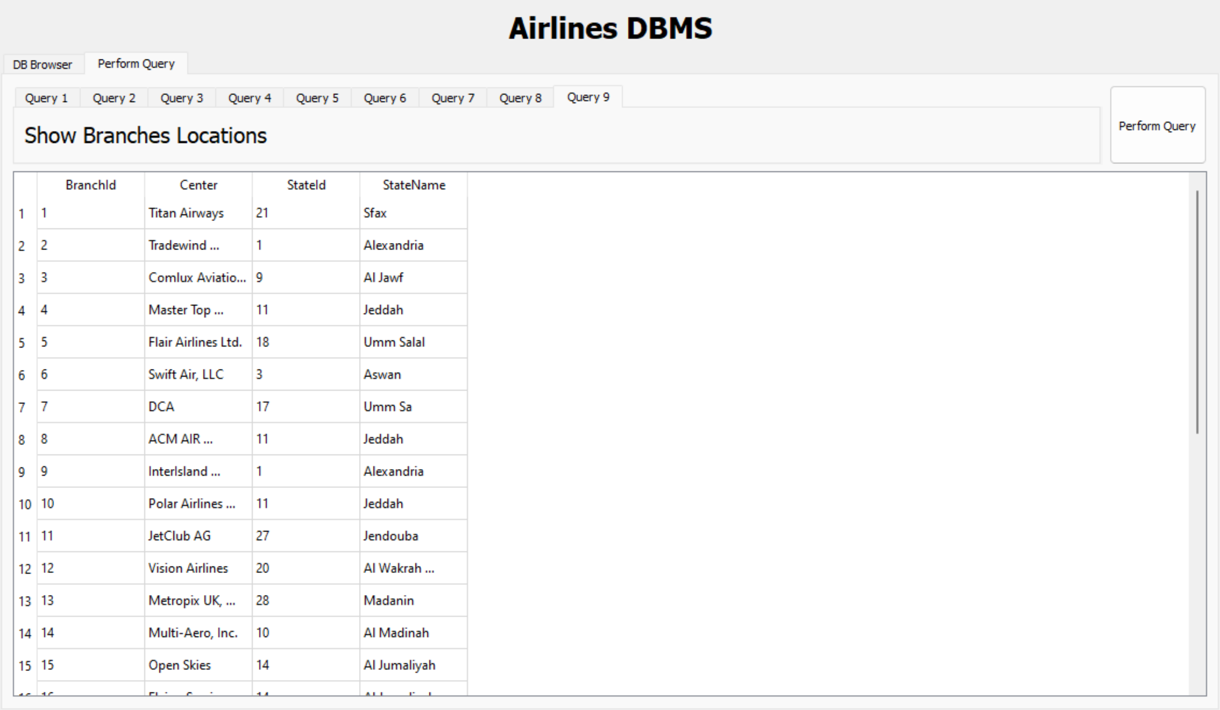
	TransId	BookingDate	Passenger_id	Flight_id	Type	Employee_id	Charges_id	Discount_id	FlightPrice	PassengerId	Name
1	31	2022-09-13	11	5	0	25	None	4	6856	11	Ilieff, Mr. Ylio
2	30	2022-09-24	18	6	0	25	None	4	2369	18	Assaf, Mr. Gerios
3	20	2022-10-04	19	3	0	22	None	4	2154	19	Ilmakangas, Mi...

9. A Query to Find where each branch Center is located

- **SQL Query:**

  SELECT B.BranchId,B.Center,S.StateId, S.StateName
  FROM Branch AS B LEFT **OUTER JOIN** State AS S
  ON B.State_id = S.StateId

- **SQL Query:**



Show Branches Locations

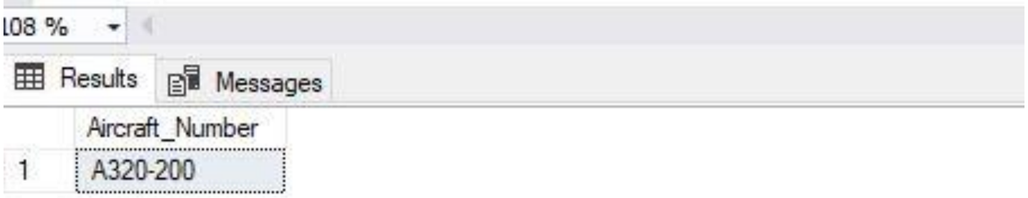
	BranchId	Center	StateId	StateName
1	1	Titan Airways	21	Sfax
2	2	Tradewind ...	1	Alexandria
3	3	Comlux Aviatio...	9	Al Jawf
4	4	Master Top ...	11	Jeddah
5	5	Flair Airlines Ltd.	18	Umm Salal
6	6	Swift Air, LLC	3	Aswan
7	7	DCA	17	Umm Sa
8	8	ACM AIR ...	11	Jeddah
9	9	Interlsland ...	1	Alexandria
10	10	Polar Airlines ...	11	Jeddah
11	11	JetClub AG	27	Jendouba
12	12	Vision Airlines	20	Al Wakrah ...
13	13	Metropix UK, ...	28	Madanin
14	14	Multi-Aero, Inc.	10	Al Madinah
15	15	Open Skies	14	Al Jumaliyah

10. View Flight Schedule for Certain Aircraft Number

- **SQL Query:**

```
SELECT A.Aircraft_Number
From Aircraft as A
(Where AircraftId = Any SELECT F.Aircraft_id FROM Flight_Schedule F
Where AirCraft_id = 1)
```

- **OUTPUT:**



	Aircraft_Number
1	A320-200