DBMS
Course Design Report

Design Topic Online Airplane Reservation System

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Catalog

1. Objective and significance of the project

2. System operation environment description

3. System requirements analysis

3.1 Organization chart

3.2 Data flow graph and data dictionary

3.3 System function structure

4. Database design

4.1 Conceptual design (E-R diagram)

4.2 Logical structure design

4.3 Physical structure design

5. Database implementation and operation

5.1 Introduction of database management system

5.2 Database creation and data entry

5.3 Database query

5.4 Database control

6. Program design description

6.1 Database connection

6.2 System menu

6.3 User login

6.4 Data entry, modification and deletion

6.5 Database query

7. Summary of course design

7.1 Problems and solutions in curriculum design

7.2 Analysis of existing problems

7.3 Experience of curriculum design

1. Objective and significance of the project

The web based “airline reservation system” project is an attempt to stimulate the basic concepts of airline reservation system. The system enables the customer to do the things such as search for airline flights for two travel cities on a specified date, choose a flight based on the details, reservation of flight and cancellation of reservation.

The system allows the airline passenger to search for flights that are available between the two travel cities, namely the “Departure city” and “Arrival city” for a particular departure and arrival dates. The system displays all the flight’s details such as flight no, name, price and duration of journey etc.

After search the system display list of available flights and allows customer to choose a particular flight. Then the system checks for the availability of seats on the flight. If the seats are available then the system allows the passenger to book a seat. Otherwise it asks the user to choose another flight.

To book a flight the system asks the customer to enter his details such as name, address, city, state, credit card number and contact number. Then it checks the validity of card and book the flight and update the airline database and user database. The system also allows the customer to cancel his/her reservation, if any problem occurs.

2. System Operation Environment Description

Develop an Internet airline reservation system in two different ways. Both systems shall be client server systems. The first is to apply all the business logic in the thin client and server. Then, the system should be refactored into a system with thick clients, in which as much business logic as possible is executed by the clients. When a customer opens the client page, there should be a way to select the city of departure and destination and the date of travel. You can also choose an airline. The system should be able to find and Book itineraries by merging flights from different airlines. Each airline has its own database. When merging flights, the time required for connecting airports should be considered, i.e. connection time. When booking all flights of the same airline, the price will be discounted according to the airline's own discount (%).

3. System Requirements Analysis

The system shall have the following use cases:

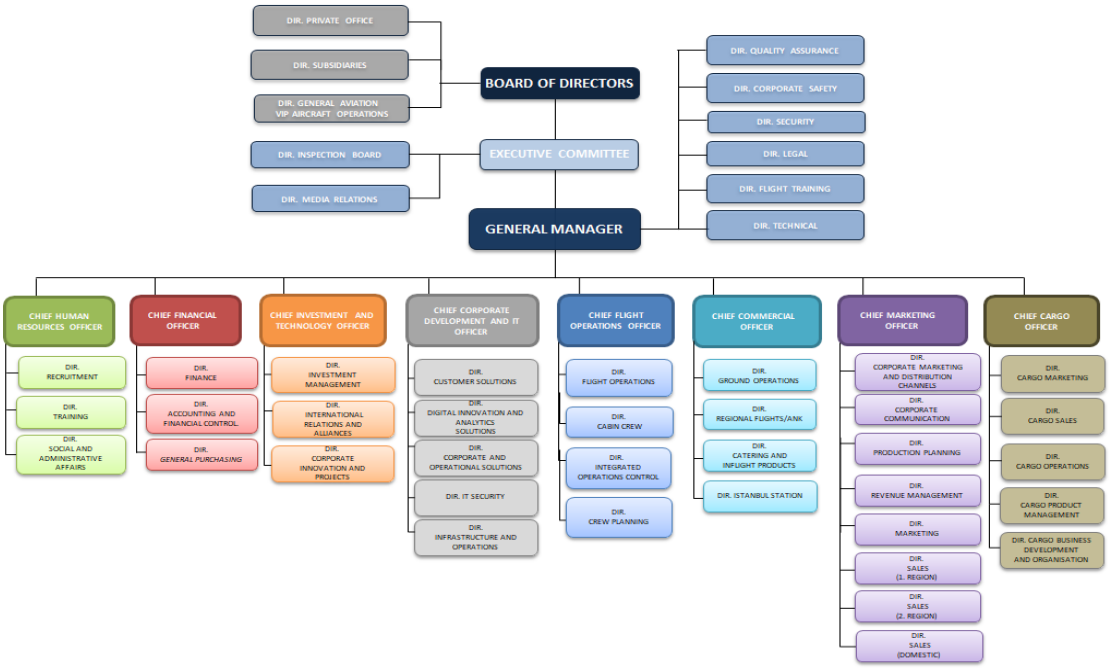
1. find the best (price or time) itinerary between a and B, including the following use cases:
    - *Choose the city of departure,*
    - *Select the destination city,*
    - *Select the date,*
    - *Choose to sort by price or by travel time,*
    - *Choose the number of people. Only consider flights with enough seats.*

    2. Use the following sub use case to book travel:
    - *select trip from the previous use case,*
    - *select seat preference (window, aisle or middle),*
    - *input passenger data,*
    - *submit the booking and get a receipt.*

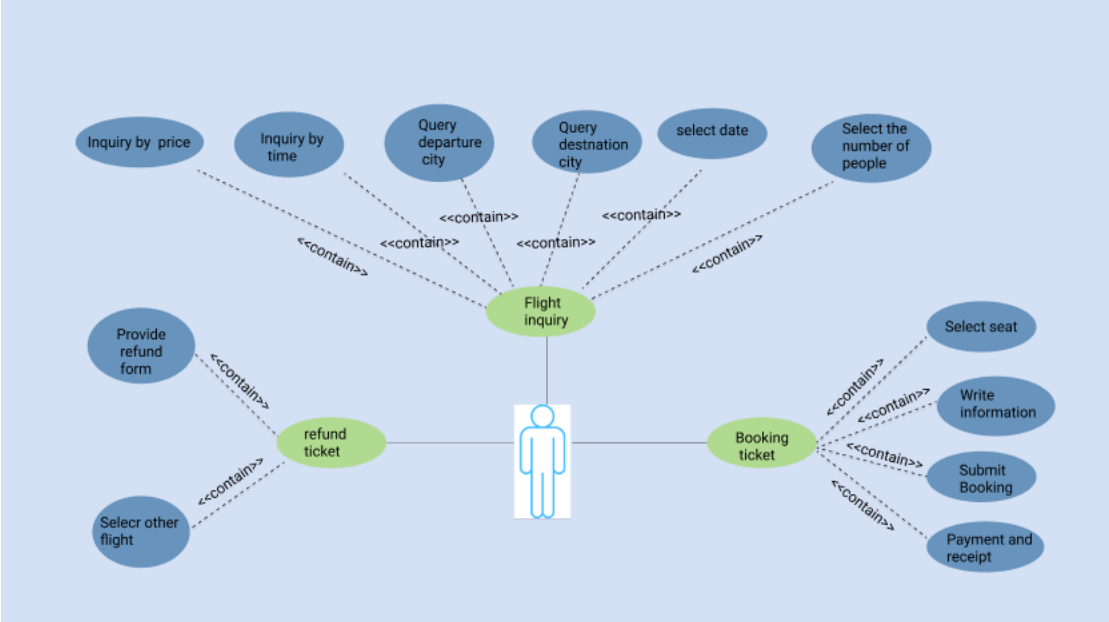
    3. Cancel the trip.

    Other use cases can also be considered

3.1 Organization chart



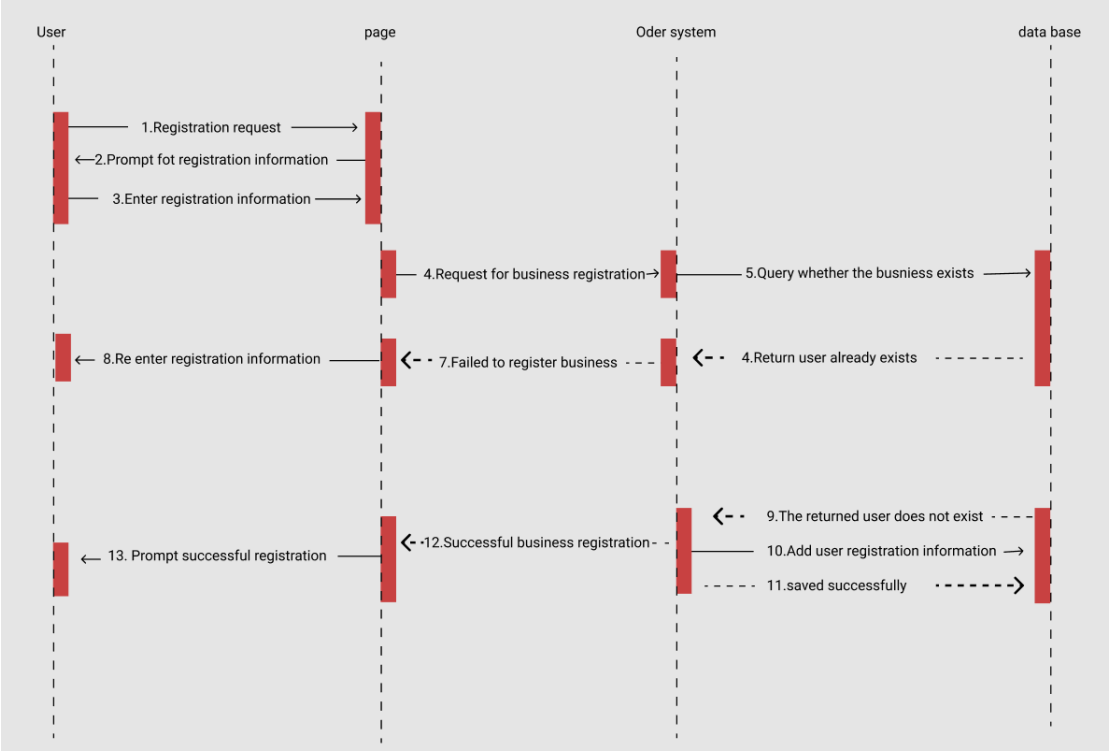
3.2 Data flow graph and data dictionary



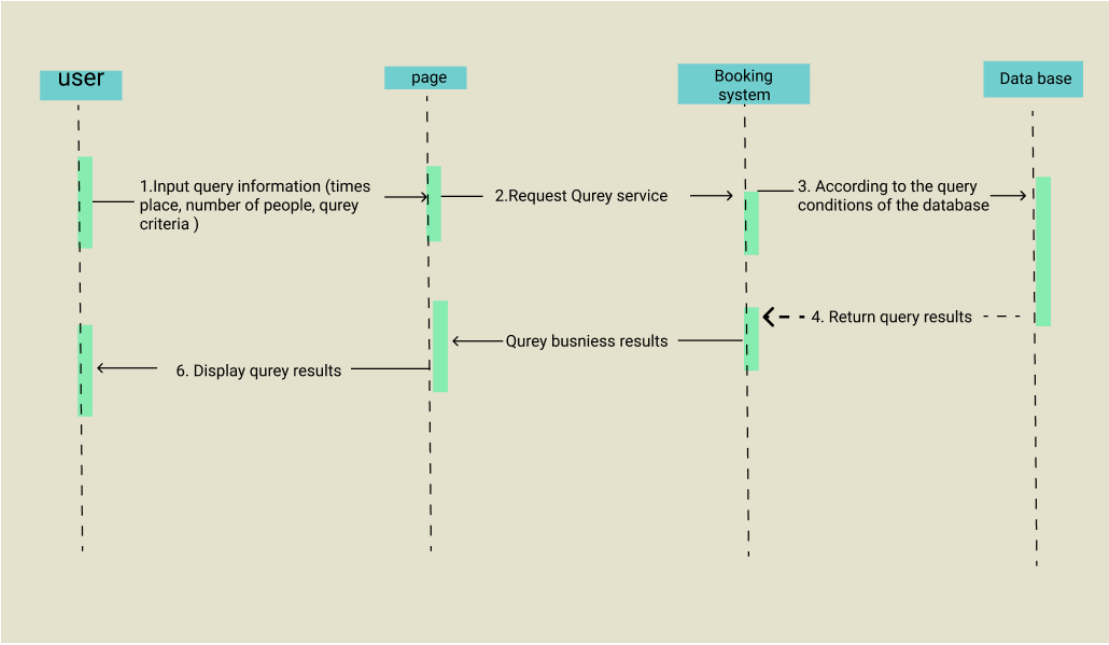
3.3 System function structure

3.3.1 Three layer C / S structure

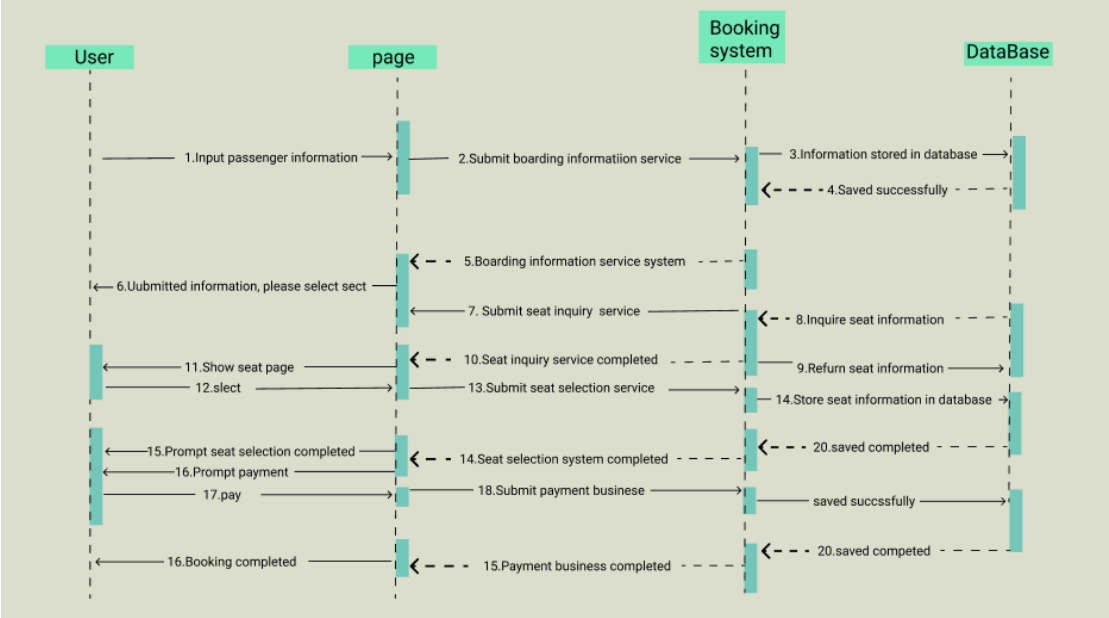
User registration sequence diagram:



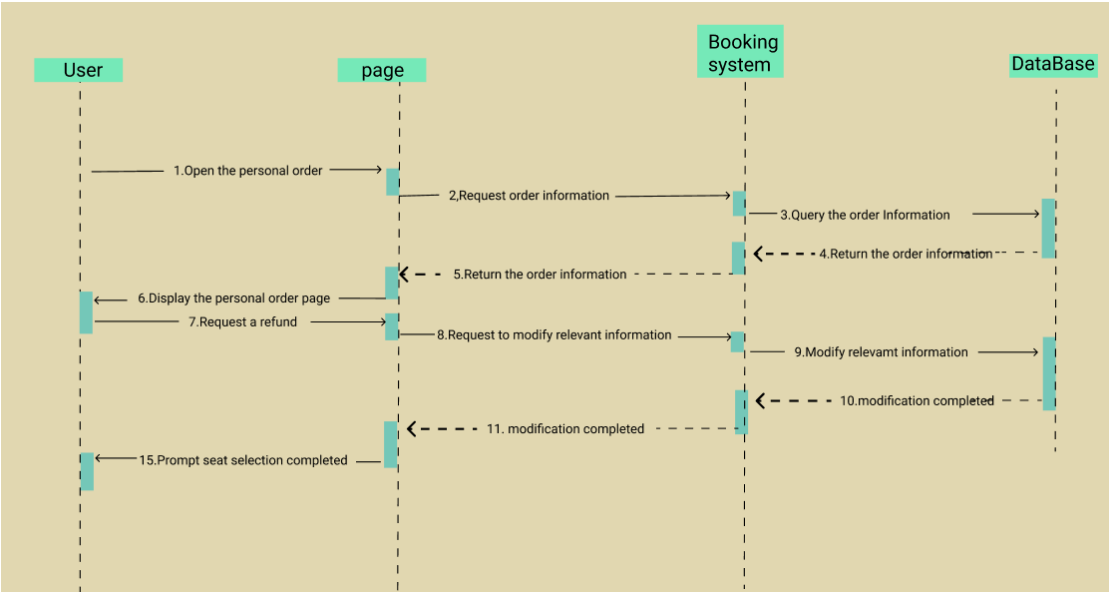
Flight query sequence diagram:



User booking sequence diagram:

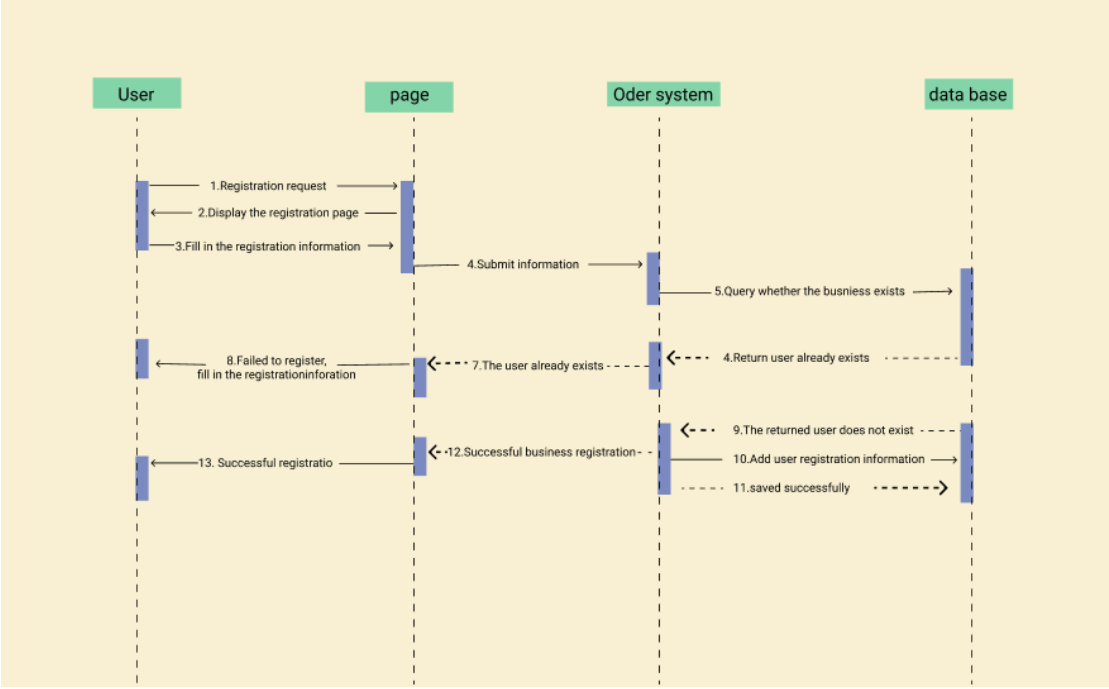


User refund sequence diagram:

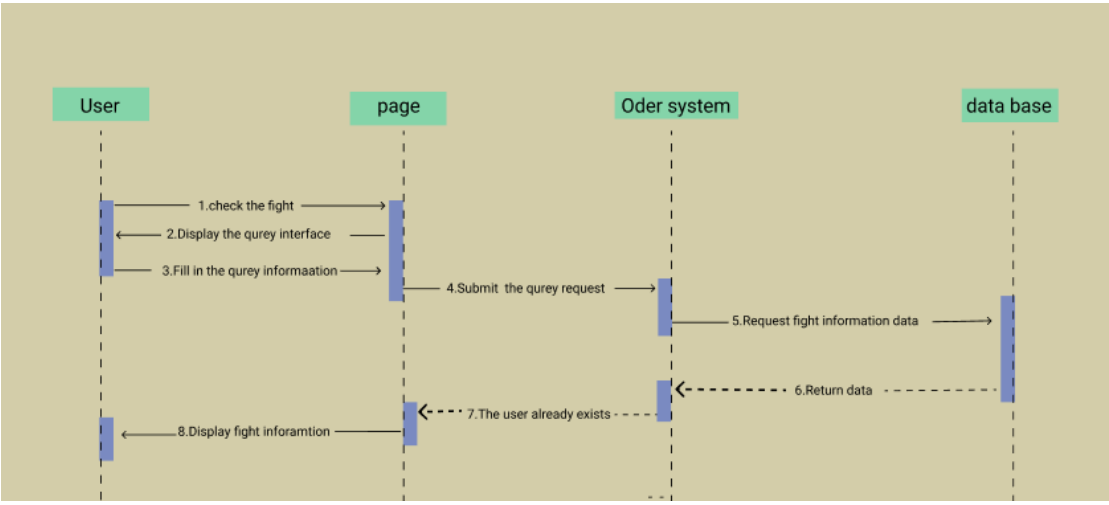


3.3.2 Two-layer C / S structure

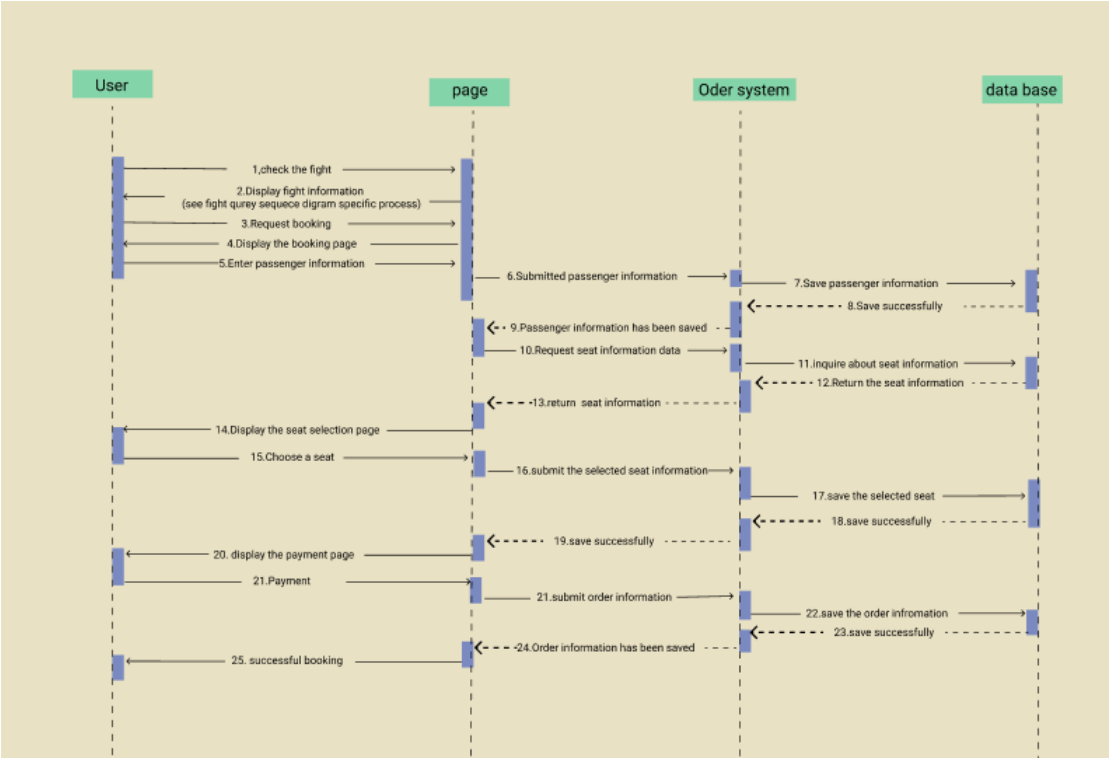
User registration timing chart:



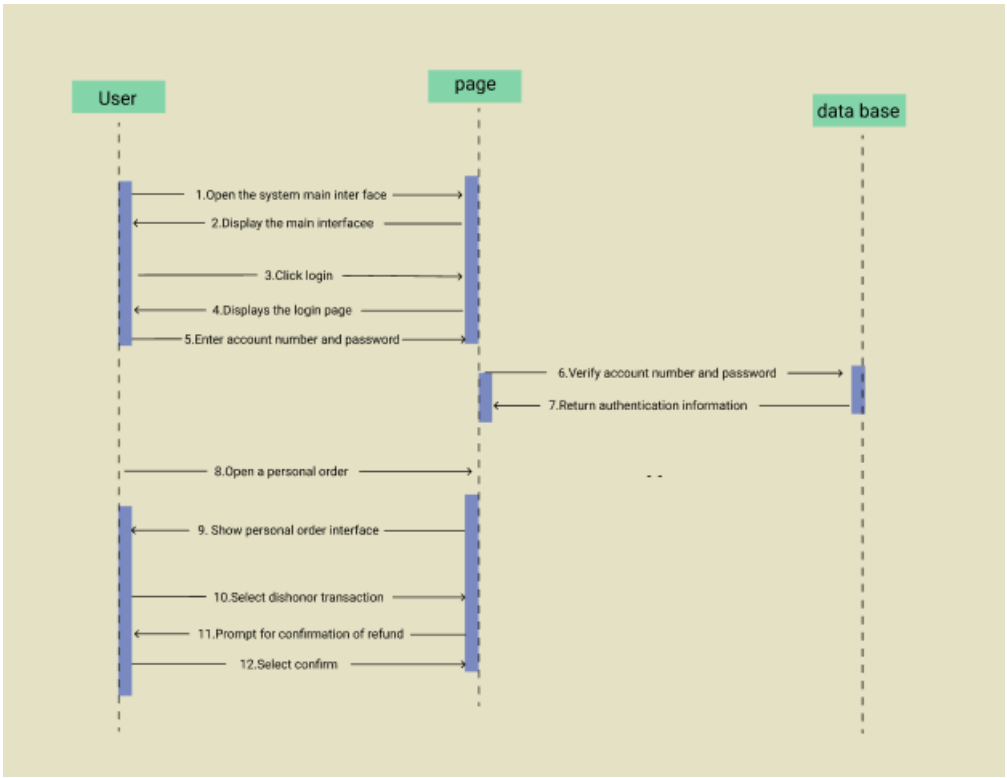
Fight inquiry sequence diagram:



User booking sequence diagram:



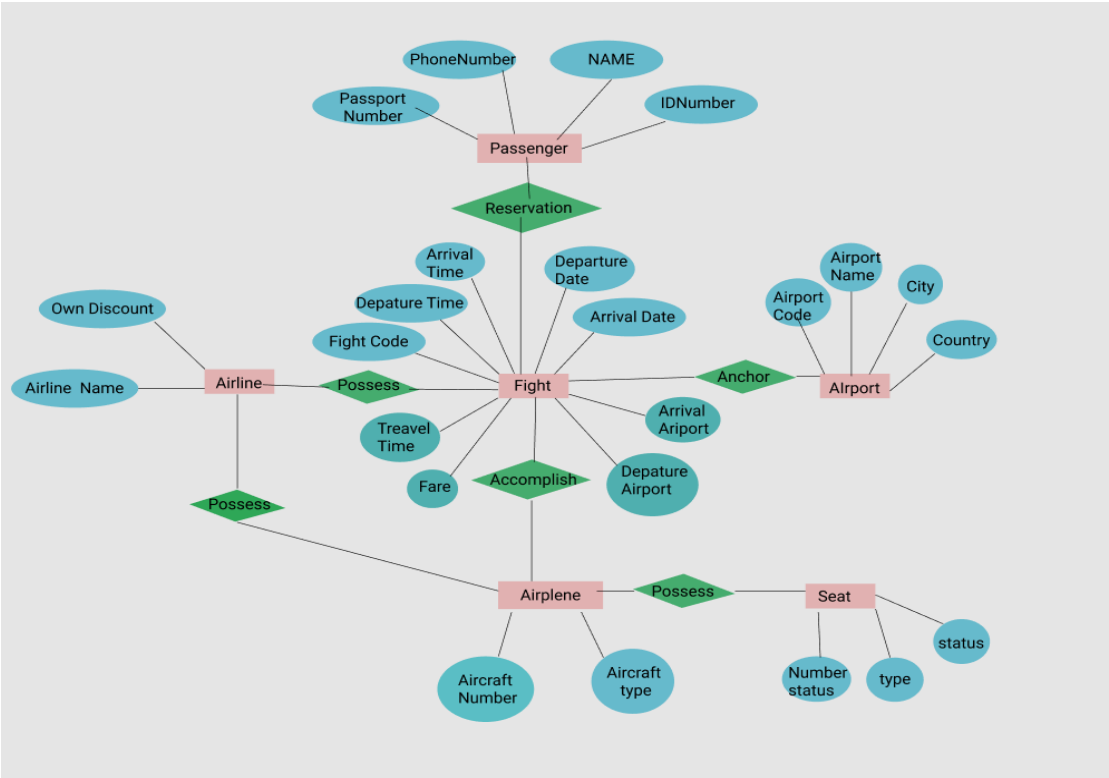
User refund sequence diagram:



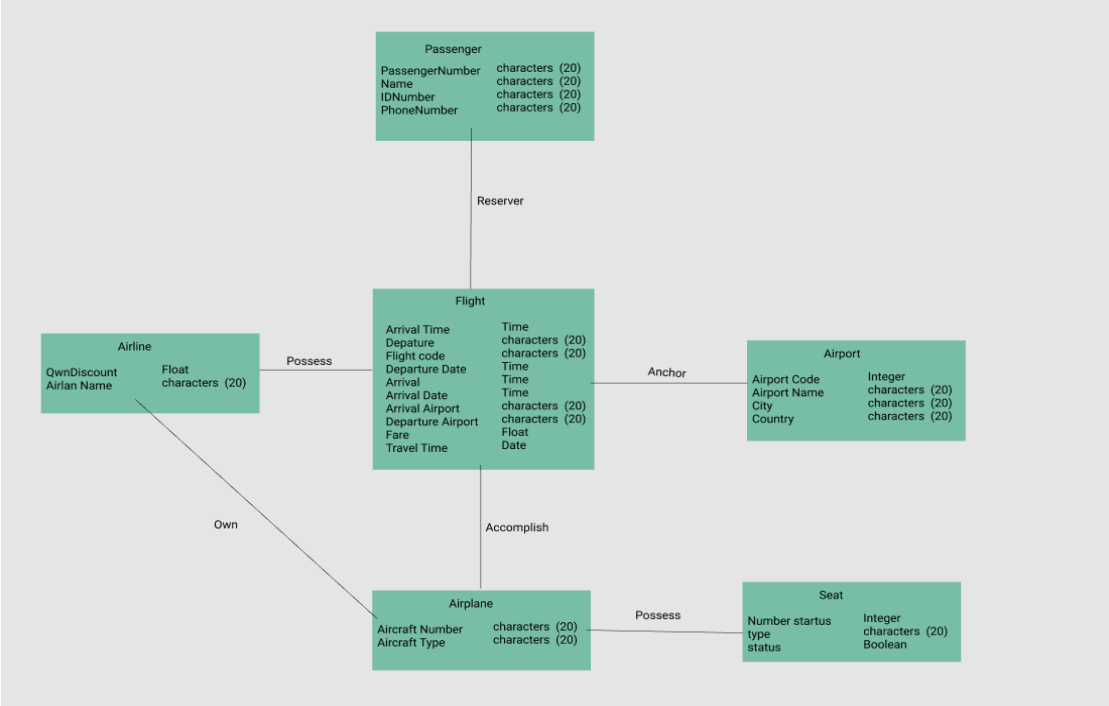
4. Database Design

4.1 Conceptual design (E-R diagram)

E-R Diagram:



Conceptual structure of design:



4.2 Logical structure design

The ER graph is transformed into a relational schema, and the attributes, functional dependencies, candidate codes and external codes of each relationship are determined, and the relational schema is normalized to at least 3NF:

Passengers (passport number, name, ID number, mobile phone number)

Reservation (passport number, flight number)

Flight (flight number, company name, aircraft number, departure date, departure time, arrival date, arrival time, departure airport, destination airport, travel time, cost)

Airlines (company name, discount)

Parking (airport number, flight number)

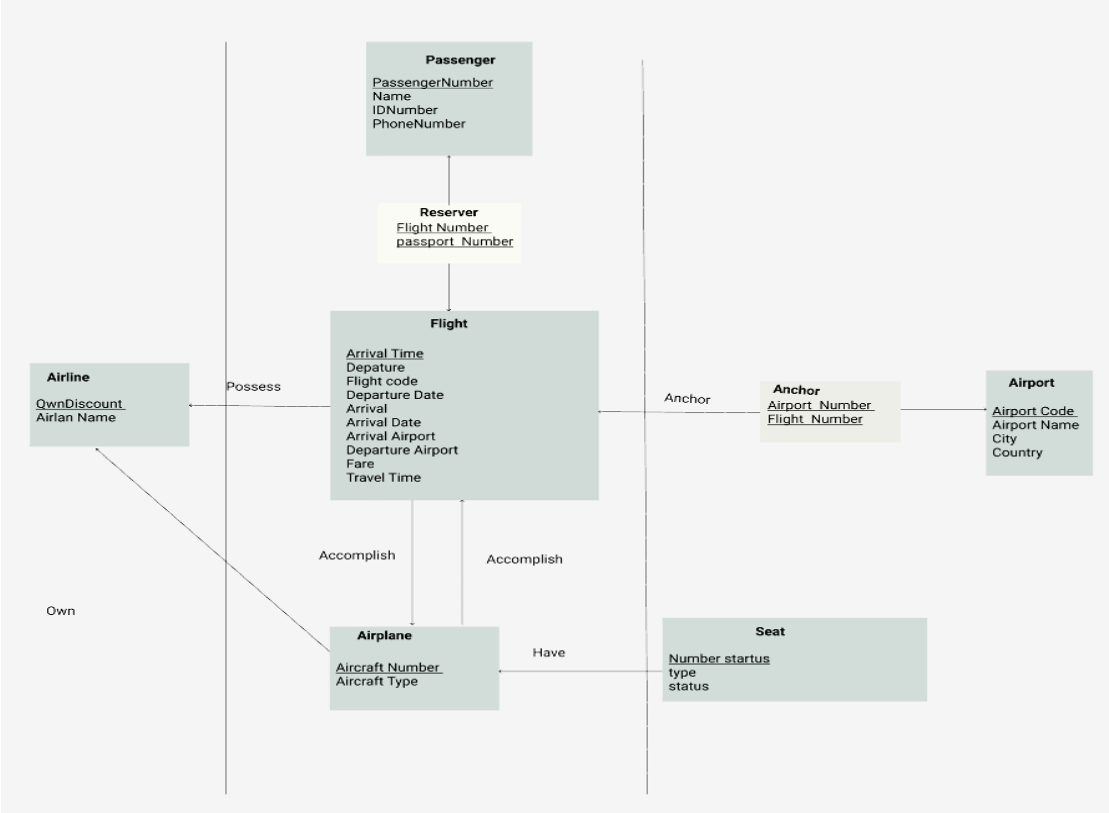
Airport (airport number, airport name, city, country)

Aircraft (aircraft number, flight number, company name, aircraft type)

Seat (seat number, aircraft number, type, status)

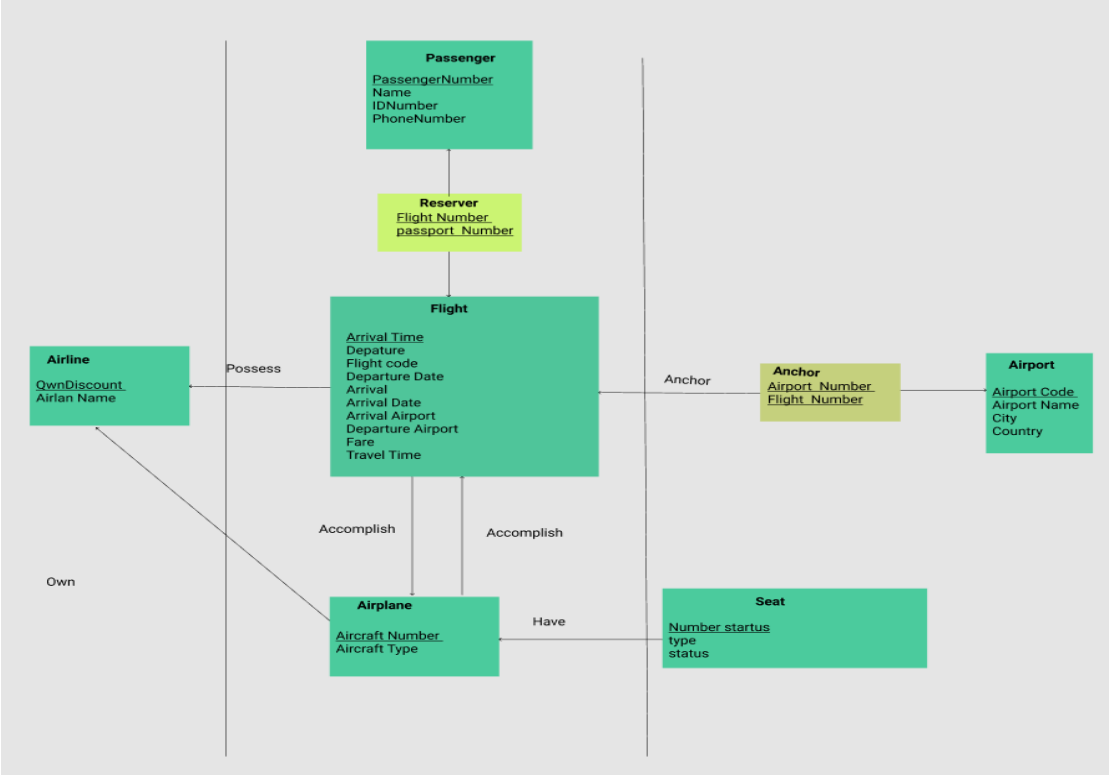
In the above relational mode, the underline is the main code of horizontal line, and the underline is the outer code of wavy line

Logical structure diagram of design:



4.3 Physical structure design

Physical structure diagram of design:



5. Database Implementation and Operation

5.1 Introduction of database management system

Starting from the database design, the database is designed according to the data involved in the system and their relations and constraints. Then, according to the basic access operation of the database, the basic Dao is designed for the later complex functions. According to the requirements, we divide the function into three main parts: vote, reservation and refund. Based on this, the front-end page is designed, and then according to the data required by the front-end page, the servlet is used to process the data retrieved from the database and the data returned from the front-end page to realize the interaction between the front-end and the front-end.

The main design idea of front-end page is simple and clear, and then unify the distribution and style of each page. The front page is responsible for display and response. The back-end designs the servlet program according to the three use case diagrams of ballot, booking and refund. It stores the flight information, passenger information and seat selection information selected by the user into the session domain. Once the transaction submission fails, the data is rolled back, and the user's temporary seat selection number is displayed back to the seat selection page with the servlet. When the user clicks on the ticket reservation, the user's information will be preserved when the user returns the ticket, the

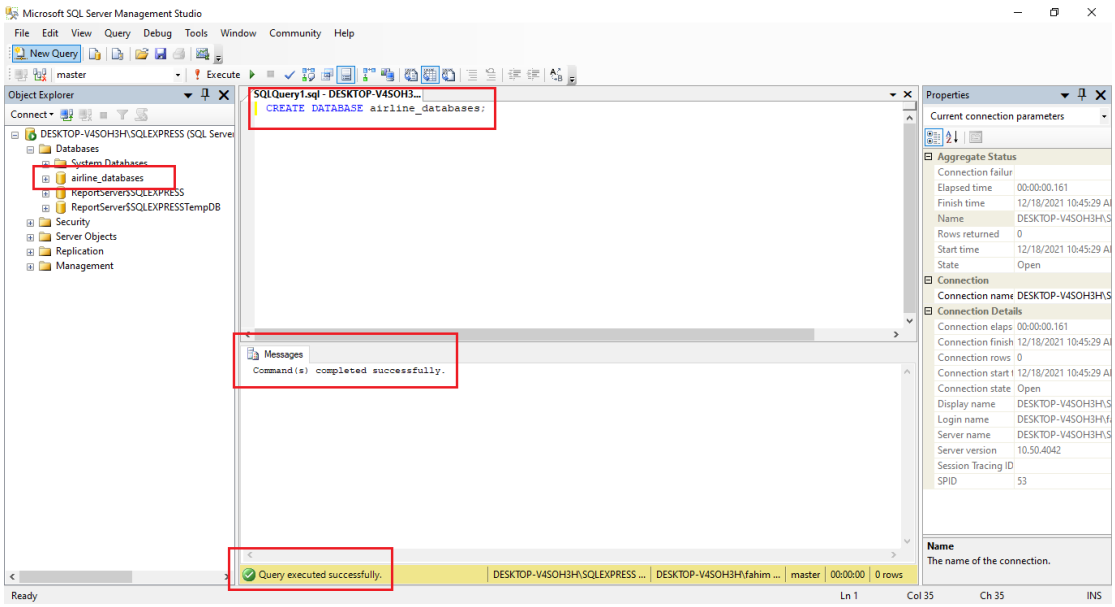
booking information of the user in the database will be deleted and the session field will be cleared. The data used by the servlet is obtained from the database by Dao, and the data processed by the servlet is also stored in the database by Dao, so as to realize the information interaction between the front-end, business processing and database layers.

5.2 Database creation and data entry

Database creation, table creation and data entry code screenshot

Database Creation:

```
CREATE DATABASE airline_databases
```



```
USE airline_databases
```

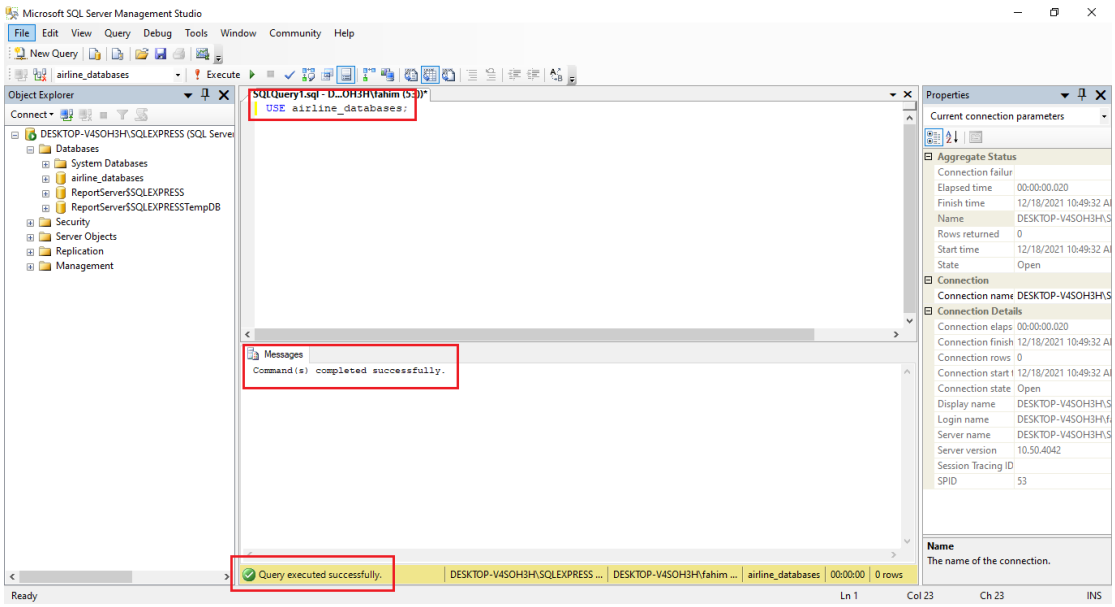
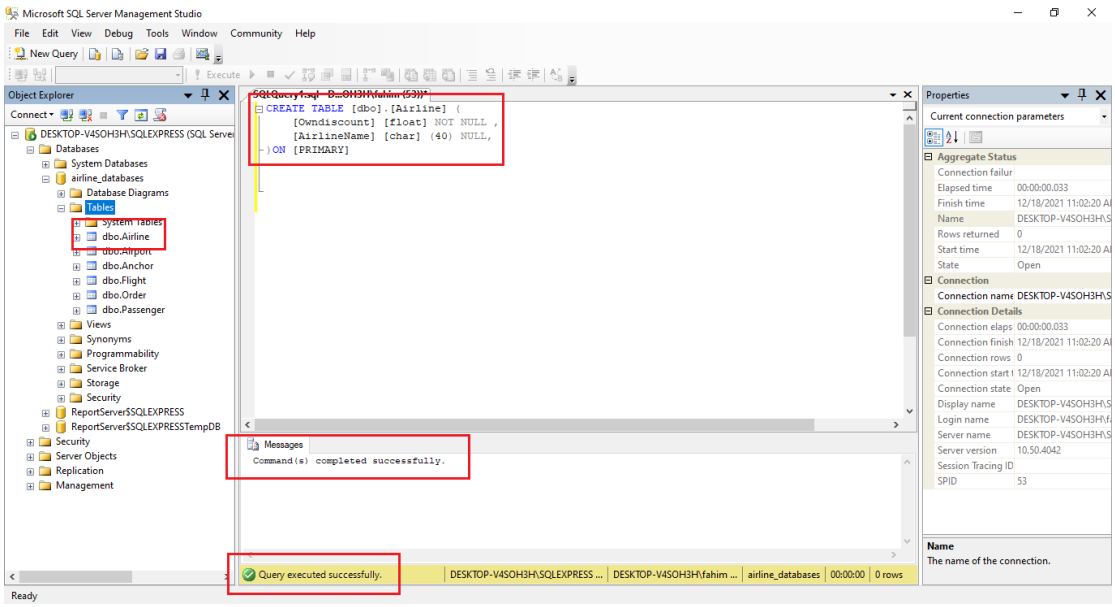


Table Creation:

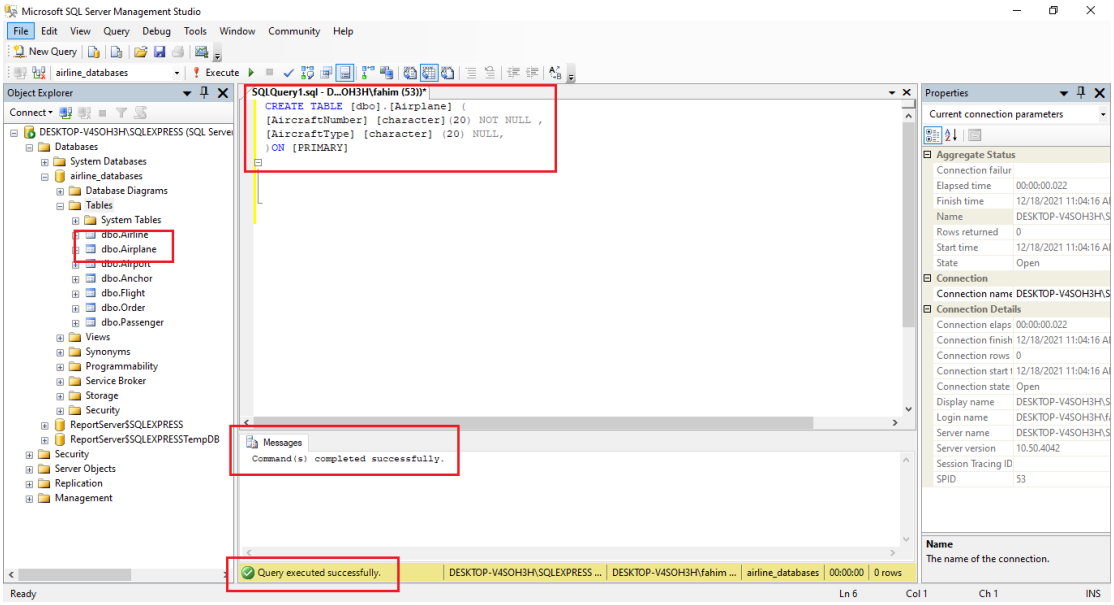
Airline:

```
CREATE TABLE [dbo].[Airline] (
    [Owndiscount] [float] NOT NULL ,
    [AirlineName] [char] (40) NULL,
)ON [PRIMARY]
```



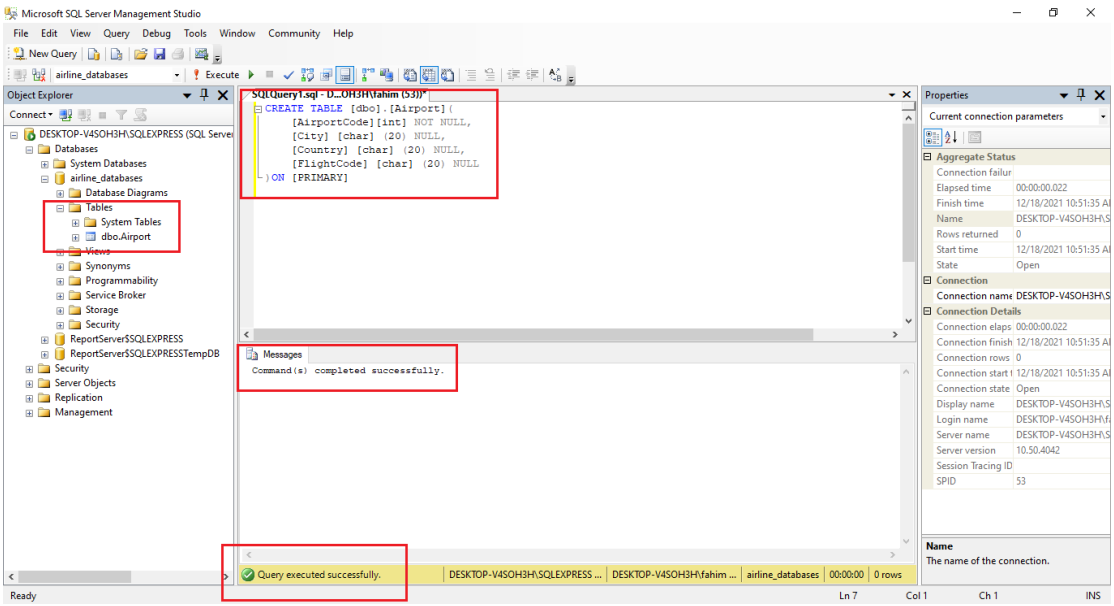
Airplane:

```
CREATE TABLE [dbo].[Airplane] (
[AircraftNumber] [character](20) NOT NULL ,
[AircraftType] [character] (20) NULL,
)ON [PRIMARY]
```



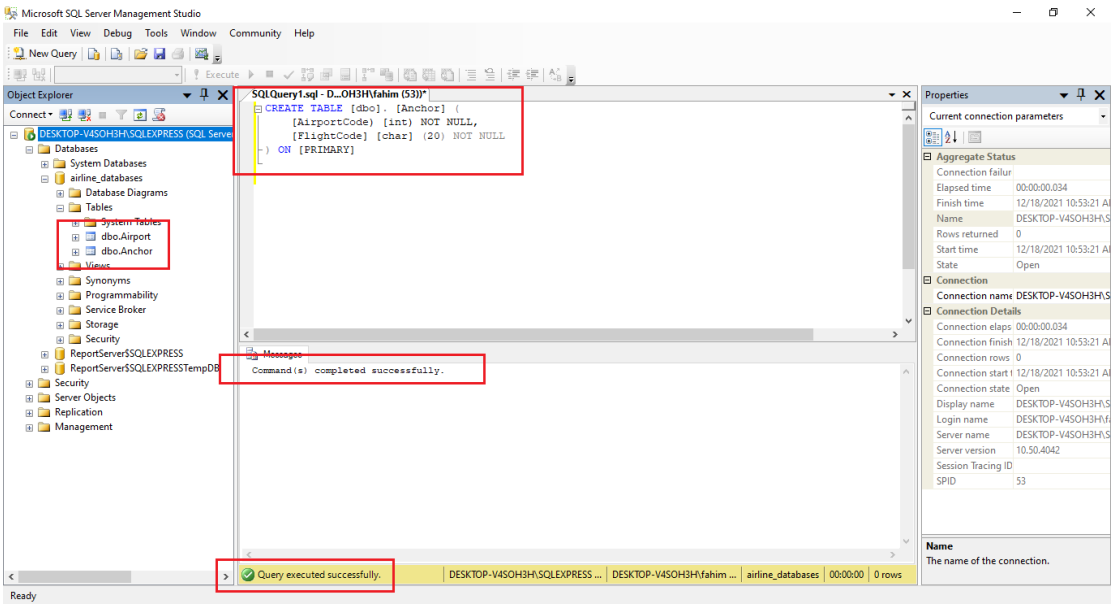
Airport:

```
CREATE TABLE [dbo].[Airport](
    [AirportCode][int] NOT NULL,
    [City] [char] (20) NULL,
    [Country] [char] (20) NULL,
    [FlightCode] [char] (20) NULL
)ON [PRIMARY]
```



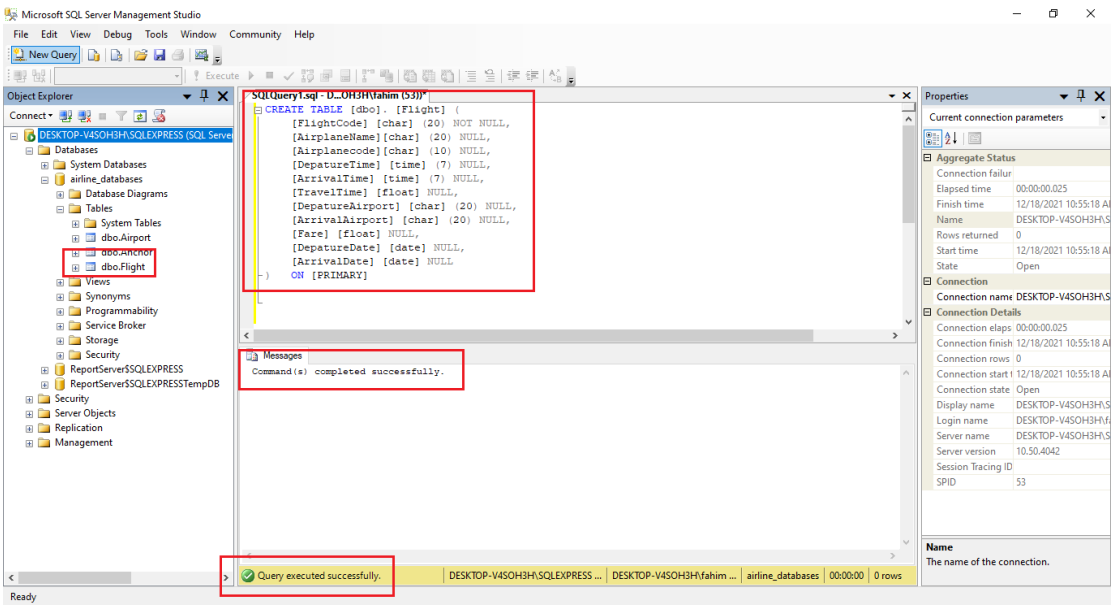
Anchor:

```
CREATE TABLE [dbo]. [Anchor] (
    [AirportCode) [int) NOT NULL,
    [FlightCode] [char] (20) NOT NULL
) ON [PRIMARY]
```



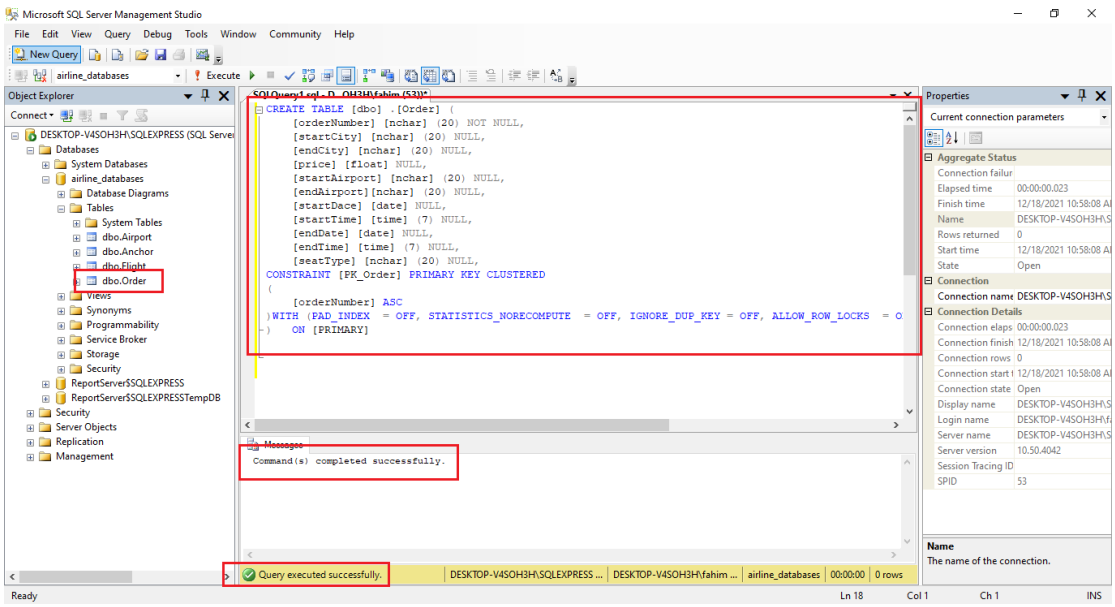
Flight:

```
CREATE TABLE [dbo]. [Flight] (
    [FlightCode] [char] (20) NOT NULL,
    [AirplaneName][char] (20) NULL,
    [Airplanecode][char] (10) NULL,
    [DepatureTime] [time] (7) NULL,
    [ArrivalTime] [time] (7) NULL,
    [TravelTime] [float] NULL,
    [DepatureAirport] [char] (20) NULL,
    [ArrivalAirport] [char] (20) NULL,
    [Fare] [float] NULL,
    [DepatureDate] [date] NULL,
    [ArrivalDate] [date] NULL
)    ON [PRIMARY]
```



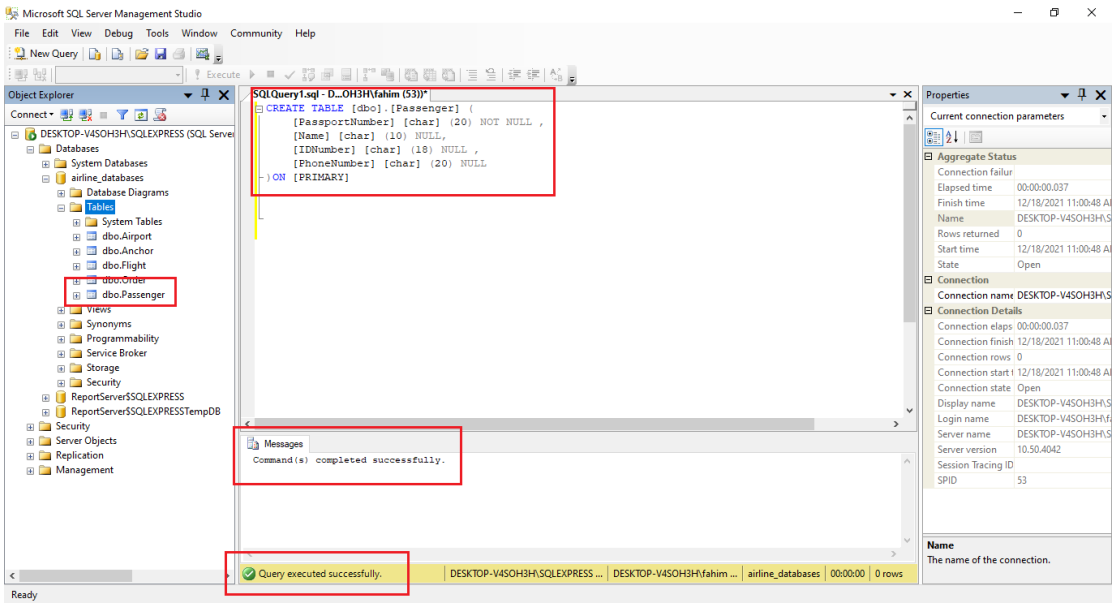
Order:

```
CREATE TABLE [dbo] .[Order] (
    [orderNumber] [nchar] (20) NOT NULL,
    [startCity] [nchar] (20) NULL,
    [endCity] [nchar] (20) NULL,
    [price] [float] NULL,
    [startAirport] [nchar] (20) NULL,
    [endAirport][nchar] (20) NULL,
    [startDace] [date] NULL,
    [startTime] [time] (7) NULL,
    [endDate] [date] NULL,
    [endTime] [time] (7) NULL,
    [seatType] [nchar] (20) NULL,
CONSTRAINT [PK_Order] PRIMARY KEY CLUSTERED
(
    [orderNumber] ASC
)WITH (PAD_INDEX  = OFF, STATISTICS_NORECOMPUTE  = OFF,
IGNORE_DUP_KEY = OFF, ALLOW_ROW_LOCKS  = ON,
ALLOW_PAGE_LOCKS  = ON) ON [PRIMARY]
)ON [PRIMARY]
```



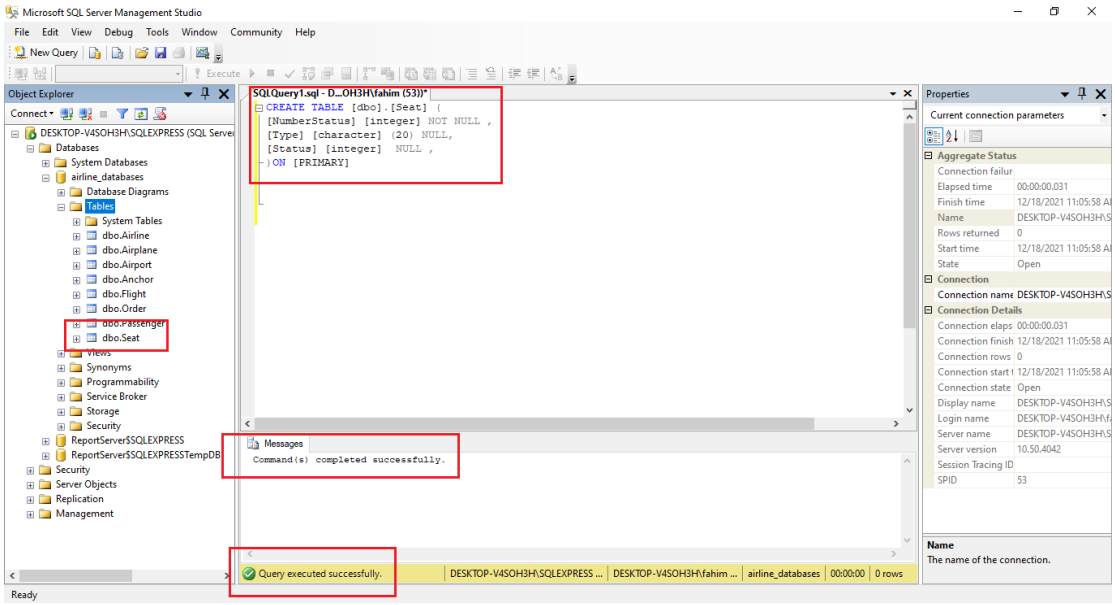
Passenger:

```
CREATE TABLE [dbo].[Passenger] (
    [PassportNumber] [char] (20) NOT NULL ,
    [Name] [char] (10) NULL,
    [IDNumber] [char] (18) NULL ,
    [PhoneNumber] [char] (20) NULL
)ON [PRIMARY]
```



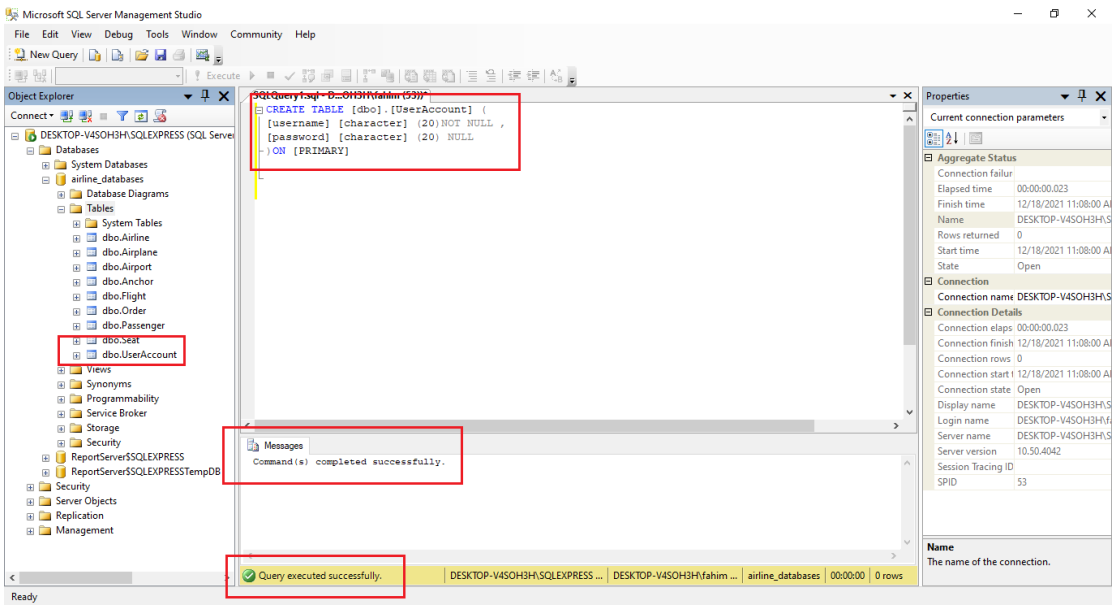
Seat:

```
CREATE TABLE [dbo].[Seat] (
[NumberStatus] [integer] NOT NULL ,
[Type] [character] (20) NULL,
[Status] [integer]    NULL ,
)ON [PRIMARY]
```



User:

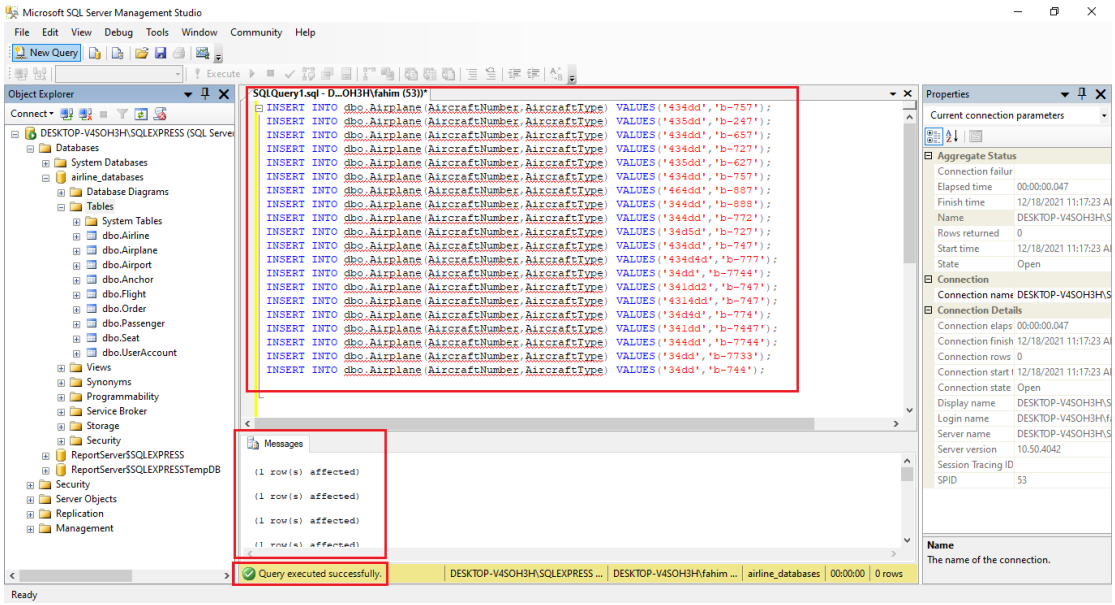
```
CREATE TABLE [dbo].[UserAccount] (
[username] [character] (20)NOT NULL ,
[password] [character] (20) NULL
)ON [PRIMARY]
```



Data Entry:

Data insert at airplane table:

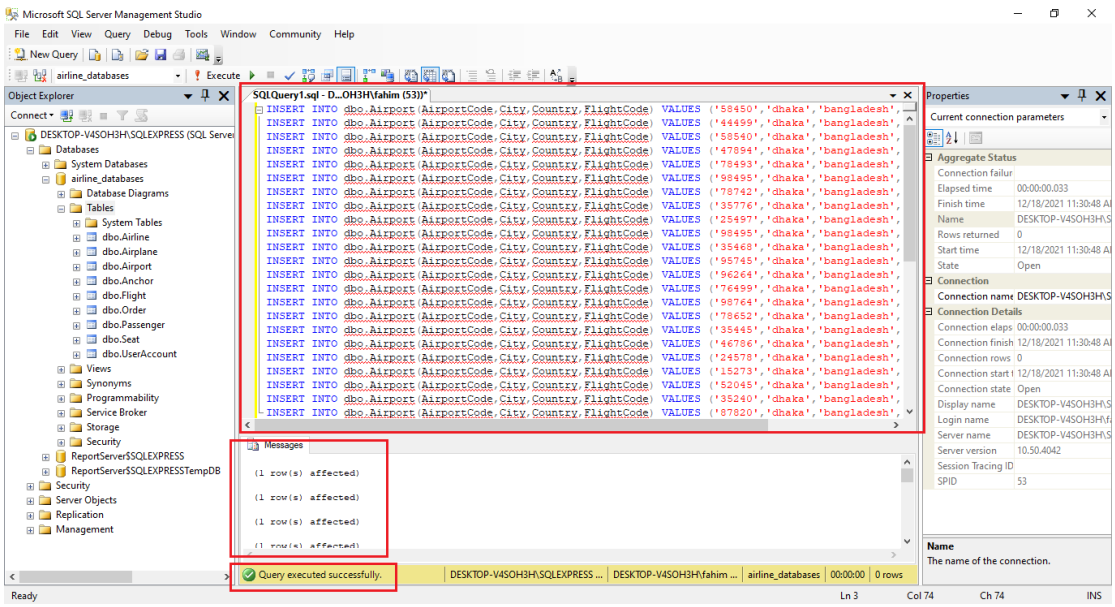
```
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('434dd','b-757');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('435dd','b-247');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('434dd','b-657');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('434dd','b-727');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('435dd','b-627');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('434dd','b-757');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('464dd','b-887');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('344dd','b-888');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('344dd','b-772');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('34d5d','b-727');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('434dd','b-747');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('434d4d','b-777');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('34dd','b-7744');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('341dd2','b-747');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('4314dd','b-747');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('34d4d','b-774');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('341dd','b-7447');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('344dd','b-7744');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('34dd','b-7733');
INSERT INTO dbo.Airplane(AircraftNumber,AircraftType) VALUES('34dd','b-744');
```



Data insert at Airport table:

```
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('58450','dhaka','bangladesh','dhsbgf');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('44499','dhaka','bangladesh','jakdek');
```

```
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('58540','dhaka','bangladesh','dhsbgf');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('47894','dhaka','bangladesh','jausgi');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('78493','dhaka','bangladesh','rgeghi');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('98495','dhaka','bangladesh','werssg');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('78742','dhaka','bangladesh','xtrdyh');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('35776','dhaka','bangladesh','qgfrnb');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('25497','dhaka','bangladesh','ndrtsg');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('98495','dhaka','bangladesh','pouidg');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('35468','dhaka','bangladesh','asxgre');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('95745','dhaka','bangladesh','veszra');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('96264','dhaka','bangladesh','hdrdrt');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('76499','dhaka','bangladesh','qgbtyh');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('98764','dhaka','bangladesh','mtcfyu');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('78652','dhaka','bangladesh','xcvgrd');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('35445','dhaka','bangladesh','adfvvb');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('46786','dhaka','bangladesh','btrhsa');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('24578','dhaka','bangladesh','xcvxcf');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('15273','dhaka','bangladesh','rtbgnf');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('52045','dhaka','bangladesh','caewtt');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('35240','dhaka','bangladesh','pytfvg');
INSERT INTO dbo.Airport(AirportCode,City,Country,FlightCode) VALUES
('87820','dhaka','bangladesh','xzcvsd');
```



Data insert at Flight table:

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('FFES','China Southern','44ddw','10:34:09 AM','7:04:09
AM','3.2','Bejing','Wuhan','342.3','1-28-2021','1-28-2018');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('FFES','Eastern Airlines','46tgf','6:3:09 AM','9:04:09
PM','5.6','Wuhan','Guangzhou','342.3','1-28-2021','1-28-2021');

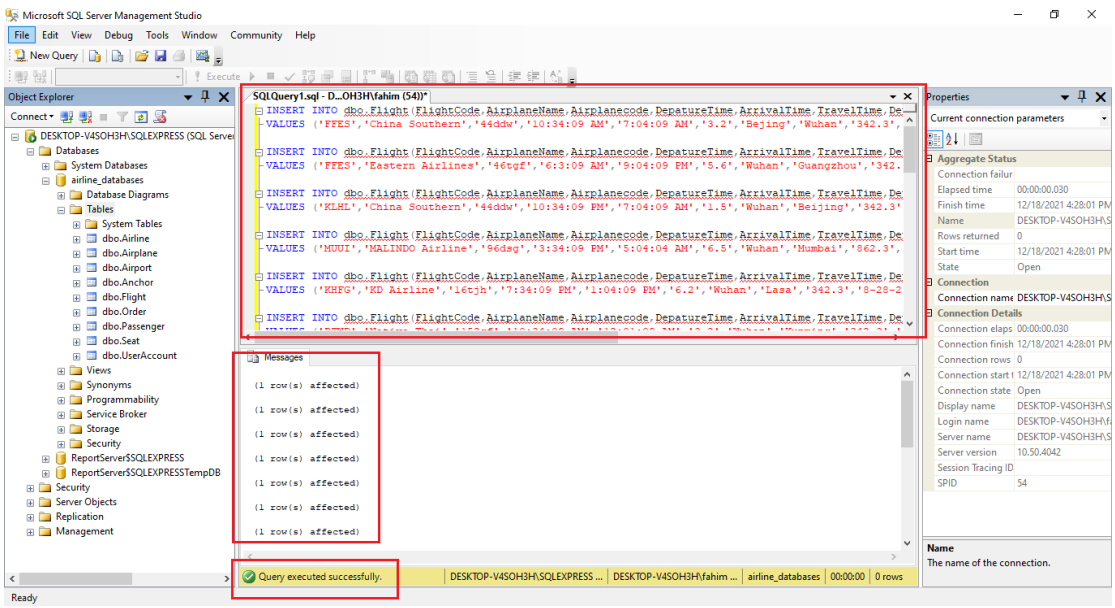
INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('KLHL','China Southern','44ddw','10:34:09 PM','7:04:09
AM','1.5','Wuhan','Beijing','342.3','6-2-2021','6-28-2021');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('MUUI','MALINDO Airline','96dsg','3:34:09 PM','5:04:04
AM','6.5','Wuhan','Mumbai','862.3','2-28-2021','2-28-2021');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)

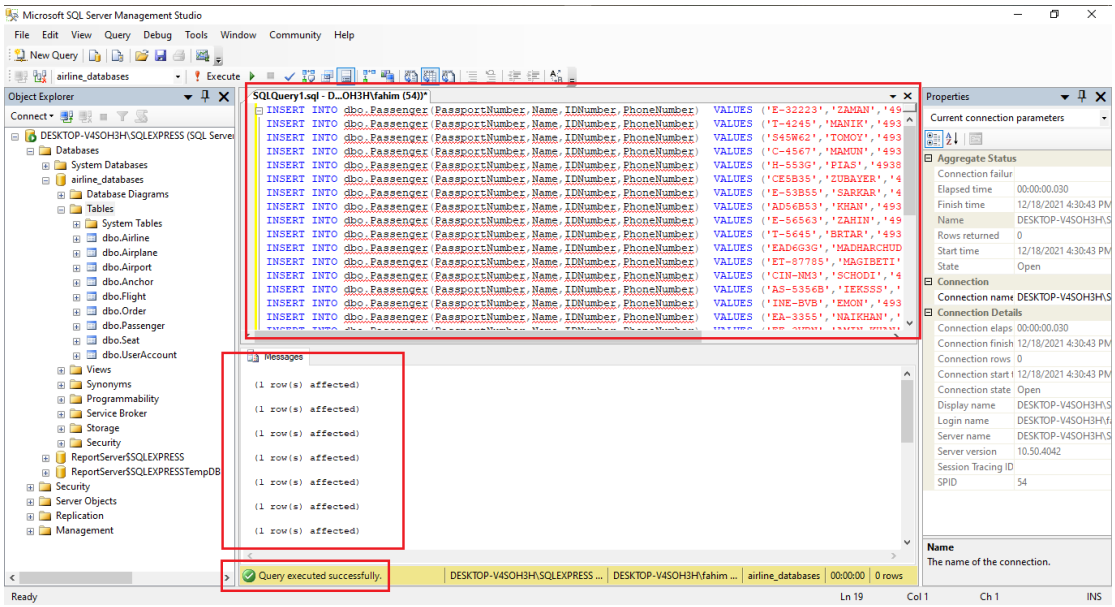
```
VALUES ('KHFG','KD Airline','16tjh','7:34:09 PM','1:04:09
PM','6.2','Wuhan','Lasa','342.3','8-28-2021','8-28-2021');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('DFWD','Native Thai','152gf','10:34:09 AM','12:01:09
AM','3.2','Wuhan','Kunming','342.3','5-8-2021','5-8-2021');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('SGGV','China Southern','479DER','10:34:09 AM','3:02:09
PM','3.2','Wuhan','Pakistan','342.3','1-28-2021','1-28-2018');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('JGKBN','Scot Airline','496dw','10:34:09 AM','2:04:01
AM','3.2','Wuhan','Bali','342.3','1-28-2021','1-28-2018');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('KJHKD',' Air Machigan','46mc','6:34:02 PM','9:04:09
AM','3.2','Wuhan','Washington','4569.3','6-9-2021','6-9-2021');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('SDGRF','Air Beijing','BJ454','1:34:09 PM','10:04:09
PM','3.2','Wuhan','Beijing','342.3','5-12-2021','5-12-2021');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('DSRGFD','US Bangla','Boeng178','1:00:00 AM','3:00:00
AM','3.2','Wuhan','Dhaka','3752.3','1-28-2021','1-28-2021');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('FFES','China Southern','44ddw','10:34:09 AM','10:04:09
AM','3.2','Wuhan','Shanghai','342.3','5-8-2021','5-8-2021');
```

```
INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('DFWD','NAtive Thai','152gf','10:34:09 AM','7:04:09
AM','3.2','Wuhan','Kunming','342.3','5-8-2021','5-8-2021')

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('FFES','China Southern','44ddw','10:34:09 AM','7:04:09
AM','3.2','Wuhan','Kalkatta','342.3','12-28-2021','12-28-2021');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('FFES','China Eastern','644kl','10:34:09 AM','7:04:09
AM','3.2','Wuhan','Lanzhou','342.3','1-28-2021','1-28-2021');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('FFES','Air Asia','44ddw','10:34:09 AM','7:04:09
AM','3.2','Wuhan','Giangxi','342.3','12-2-2021','12-2-2021');

INSERT INTO
dbo.Flight(FlightCode,AirplaneName,Airplanecode,DepatureTime,ArrivalTime,TravelTime,
DepatureAirport,ArrivalAirport,Fare,DepatureDate,ArrivalDate)
VALUES ('FFES','China Southern','44ddw','10:34:09 AM','7:04:09
AM','3.2','Bejing','Wuhan','342.3','12-28-2021','12-28-2021');
```



Data insert for Passenger table:

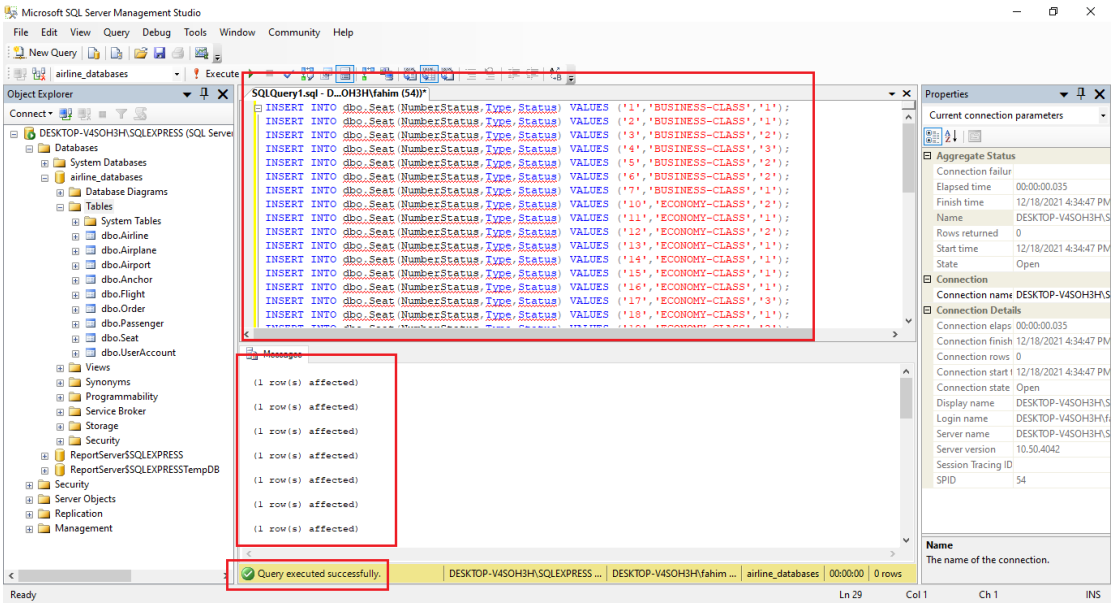
```
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('E-32223','ZAMAN','493882NJD','5465335');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('T-4245','MANIK','493882NJD','5658375');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('S45W62','TOMOY','493882NJD','57643');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('C-4567','MAMUN','493882NJD','96876553');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('H-553G','PIAS','493882NJD','36756453');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('CE5B35','ZUBAYER','493882NJD','3865645');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('E-53B55','SARKAR','493882NJD','8675453');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('AD56B53','KHAN','493882NJD','675646756');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('E-56563','ZAHIN','493882NJD','87564556');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('T-5645','BRTAR','493882NJD','678675436');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('EAD6G3G','MADHARCHUD','493882NJD','47865746');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('ET-87785','MAGIBETI','493882NJD','5768786');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('CIN-NM3','SCHODI','493882NJD','86756466');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('AS-5356B','IEKSSS','493882NJD','7564567');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('INE-BVB','EMON','493882NJD','8675646735');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('EA-3355','NAIKHAN','493882NJD','857645365');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('EE-3VBN','AMIN KHAN','493882NJD','646537876');
INSERT INTO dbo.Passenger(PassportNumber,Name,IDNumber,PhoneNumber) VALUES ('EAA36GV','JAMIN KHAN','493882NJD','8675645656');
```



Data insert for Seat table:

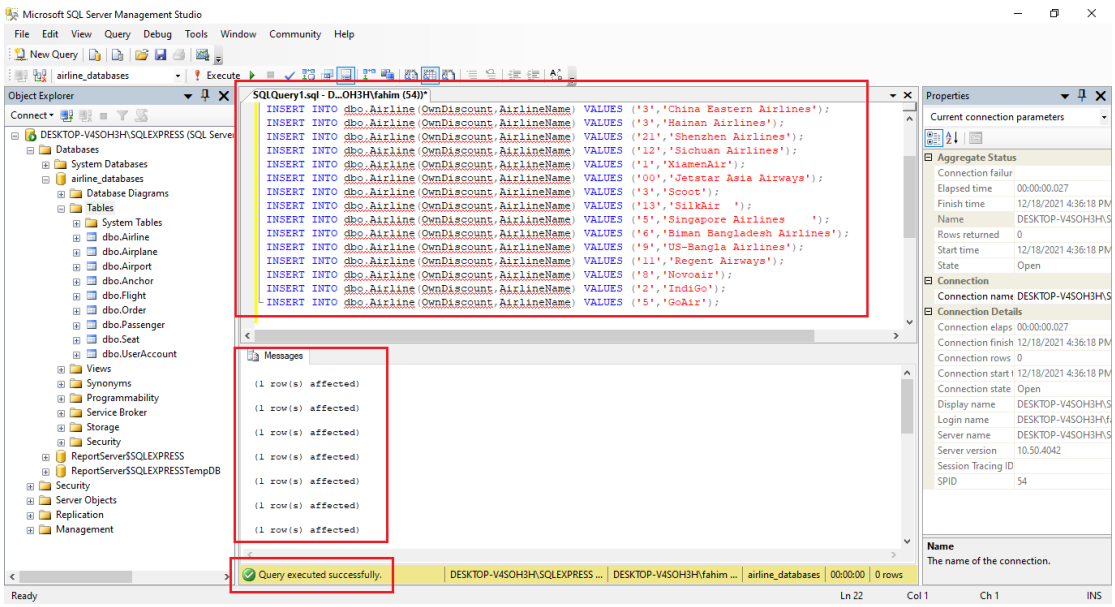
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('1','BUSNIESS-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('2','BUSNIESS-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('3','BUSNIESS-CLASS','2');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('4','BUSNIESS-CLASS','3');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('5','BUSNIESS-CLASS','2');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('6','BUSNIESS-CLASS','2');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('7','BUSNIESS-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('10','ECONOMY-CLASS','2');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('11','ECONOMY-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('12','ECONOMY-CLASS','2');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('13','ECONOMY-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('14','ECONOMY-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('15','ECONOMY-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('16','ECONOMY-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('17','ECONOMY-CLASS','3');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('18','ECONOMY-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('19','ECONOMY-CLASS','2');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('20','ECONOMY-CLASS','2');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('21','ECONOMY-CLASS','2');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('22','ECONOMY-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('23','ECONOMY-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('24','ECONOMY-CLASS','3');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('25','ECONOMY-CLASS','2');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('26','ECONOMY-CLASS','1');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('27','ECONOMY-CLASS','3');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('28','ECONOMY-CLASS','2');
INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('29','ECONOMY-CLASS','1');

INSERT INTO dbo.Seat(NumberStatus,Type,Status) VALUES ('30','ECONOMY-CLASS','2');



Data insert for Airline table:

INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('3','China Southern Airlines');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('1','American Airlines');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('3','Delta Air Lines');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('22','Frontier Airlines');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('4','Hawaiian Airlines ');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('10','Air China');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('3','China Eastern Airlines');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('3','Hainan Airlines');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('21','Shenzhen Airlines');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('12','Sichuan Airlines');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('1','XiamenAir');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('00','Jetstar Asia Airways');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('3','Scoot');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('13','SilkAir ');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('5','Singapore Airlines ');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('6','Biman Bangladesh Airlines');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('9','US-Bangla Airlines');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('11','Regent Airways');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('8','Novoair');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('2','IndiGo');
INSERT INTO dbo.Airline(OwnDiscount,AirlineName) VALUES ('5','GoAir');



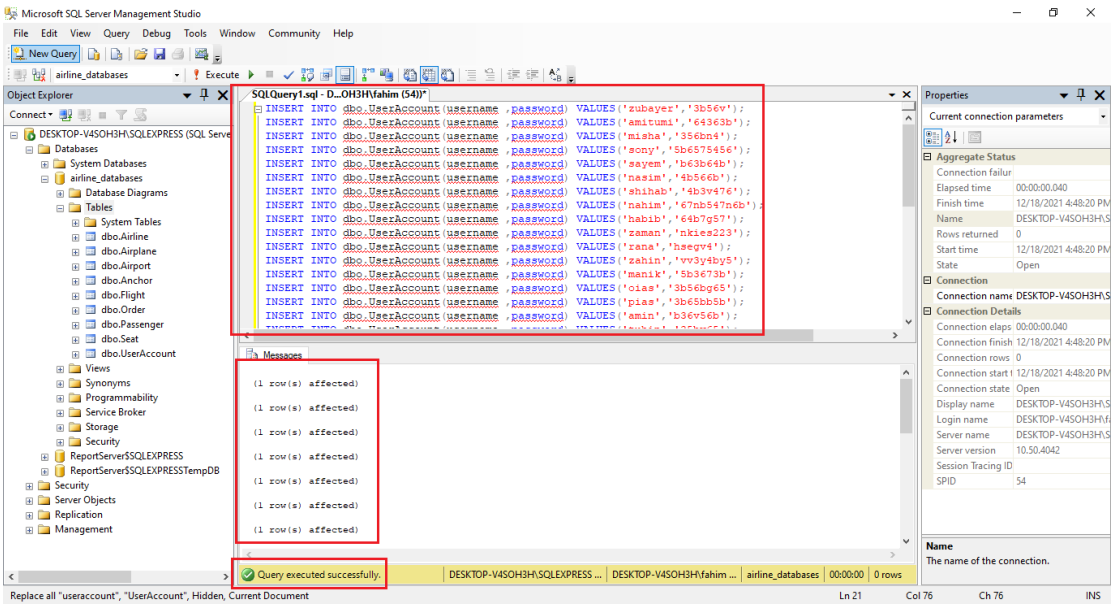
Data insert for UserAccount table:

In here I face some problem, its “call string or binary would be truncated.”

Then I overcome this problem by using proper size of string. Its data insert for a passenger user account information. When a passenger come and use my website/application for search or query she/he should create account/login. So we need to store client user name and password.

```
INSERT INTO dbo.UserAccount(username ,password) VALUES('zubayer','3b56v');
INSERT INTO dbo.UserAccount(username ,password) VALUES('amitumi','64363b');
INSERT INTO dbo.UserAccount(username ,password) VALUES('misha','356bn4');
INSERT INTO dbo.UserAccount(username ,password) VALUES('sony','5b6575456');
INSERT INTO dbo.UserAccount(username ,password) VALUES('sayem','b63b64b');
INSERT INTO dbo.UserAccount(username ,password) VALUES('nasim','4b566b');
INSERT INTO dbo.UserAccount(username ,password) VALUES('shihab','4b3v476');
INSERT INTO dbo.UserAccount(username ,password) VALUES('nahim','67nb547n6b');
INSERT INTO dbo.UserAccount(username ,password) VALUES('habib','64b7g57');
INSERT INTO dbo.UserAccount(username ,password) VALUES('zaman','nkies223');
INSERT INTO dbo.UserAccount(username ,password) VALUES('rana','hsegv4');
INSERT INTO dbo.UserAccount(username ,password) VALUES('zahin','vv3y4by5');
INSERT INTO dbo.UserAccount(username ,password) VALUES('manik','5b3673b');
INSERT INTO dbo.UserAccount(username ,password) VALUES('oias','3b56bg65');
INSERT INTO dbo.UserAccount(username ,password) VALUES('pias','3b65bb5b');
INSERT INTO dbo.UserAccount(username ,password) VALUES('amin','b36v56b');
```

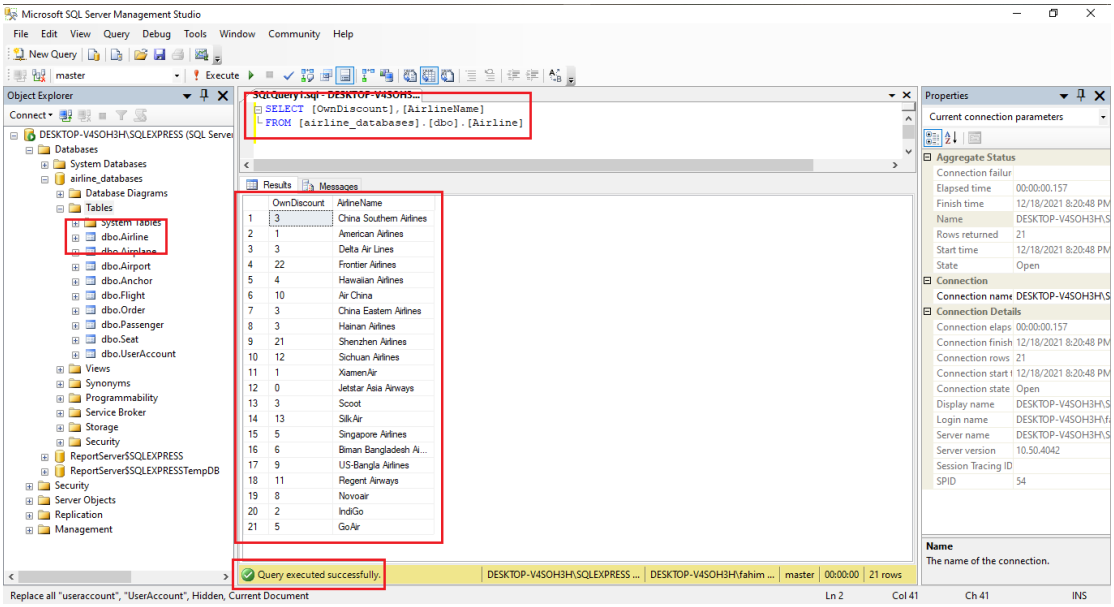
```
INSERT INTO dbo.UserAccount(username ,password) VALUES('tuhin','35bv65');
INSERT INTO dbo.UserAccount(username ,password) VALUES('kamal','5n7b6n');
INSERT INTO dbo.UserAccount(username ,password) VALUES('laoshi','b35b76');
INSERT INTO dbo.UserAccount(username ,password) VALUES('santi','b453636v');
INSERT INTO dbo.UserAccount(username ,password) VALUES('lalamia','3nb6bn');
INSERT INTO dbo.UserAccount(username ,password) VALUES('fahim','fm6fm6');
INSERT INTO dbo.UserAccount(username ,password) VALUES('sayma','sm03f');
```



5.3 Database query

Airline:

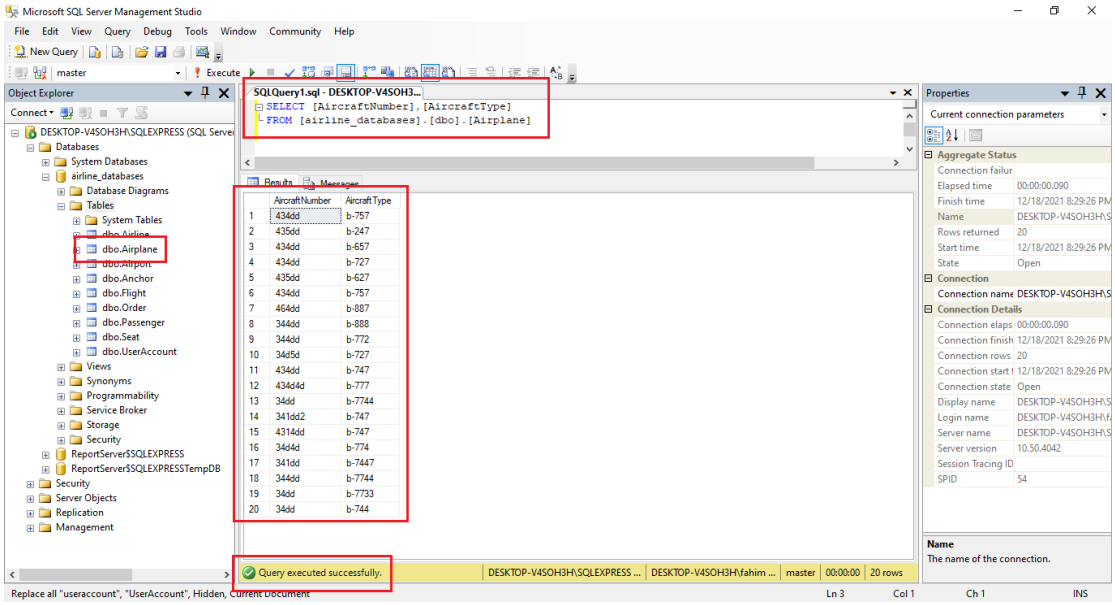
```
SELECT [OwnDiscount],[AirlineName]
FROM [airline_databases].[dbo].[Airline]
```



Airplane:

SELECT [AircraftNumber],[AircraftType]

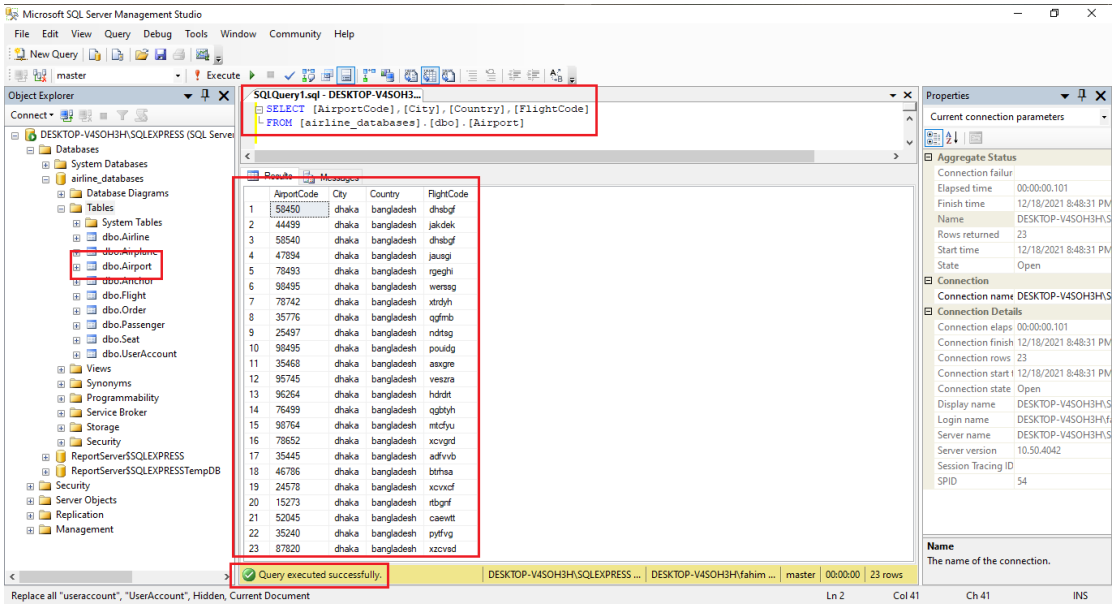
FROM [airline_databases].[dbo].[Airplane]



Airport:

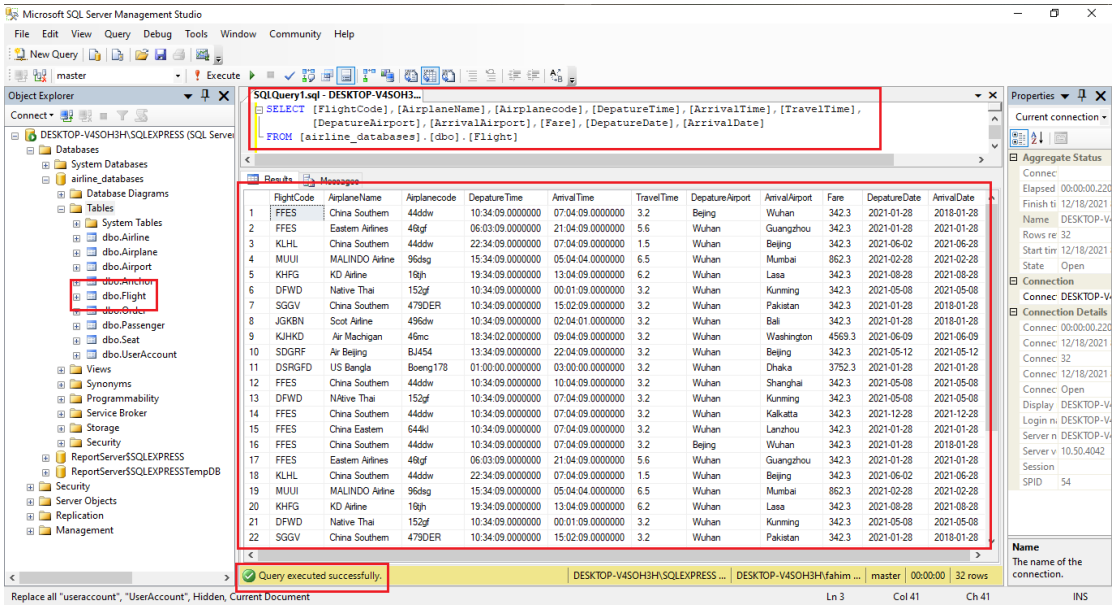
SELECT [AirportCode],[City],[Country],[FlightCode]

FROM [airline_databases].[dbo].[Airport]



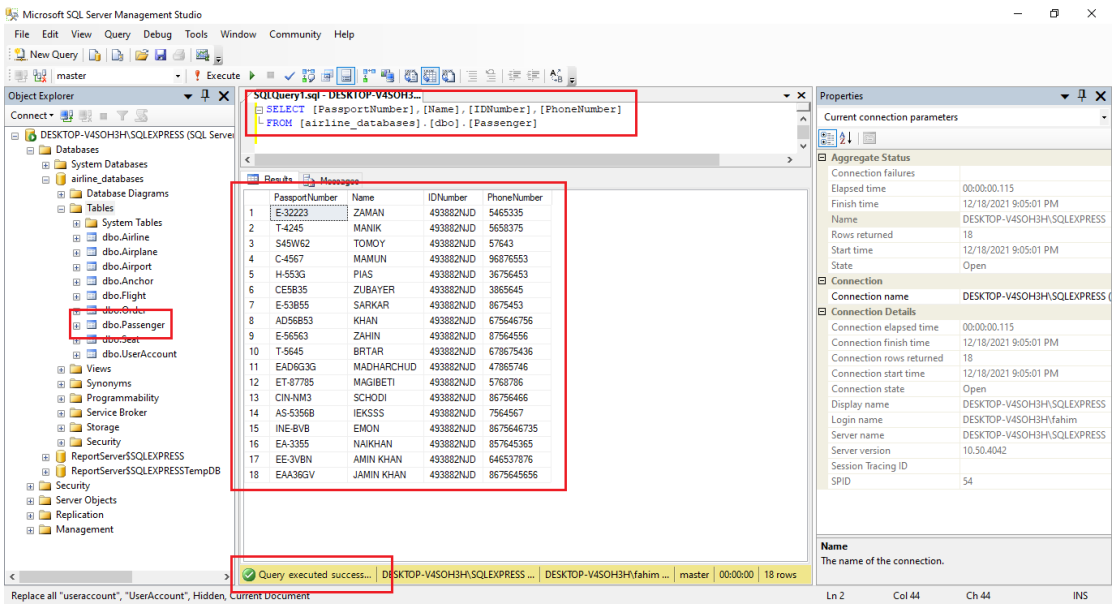
Flight:

```
SELECT [FlightCode],[AirplaneName],[Airplanecode],[DepatureTime],
       [ArrivalTime],[TravelTime],[DepatureAirport],
       [ArrivalAirport],[Fare],[DepatureDate],[ArrivalDate]
FROM [airline_databases].[dbo].[Flight]
```



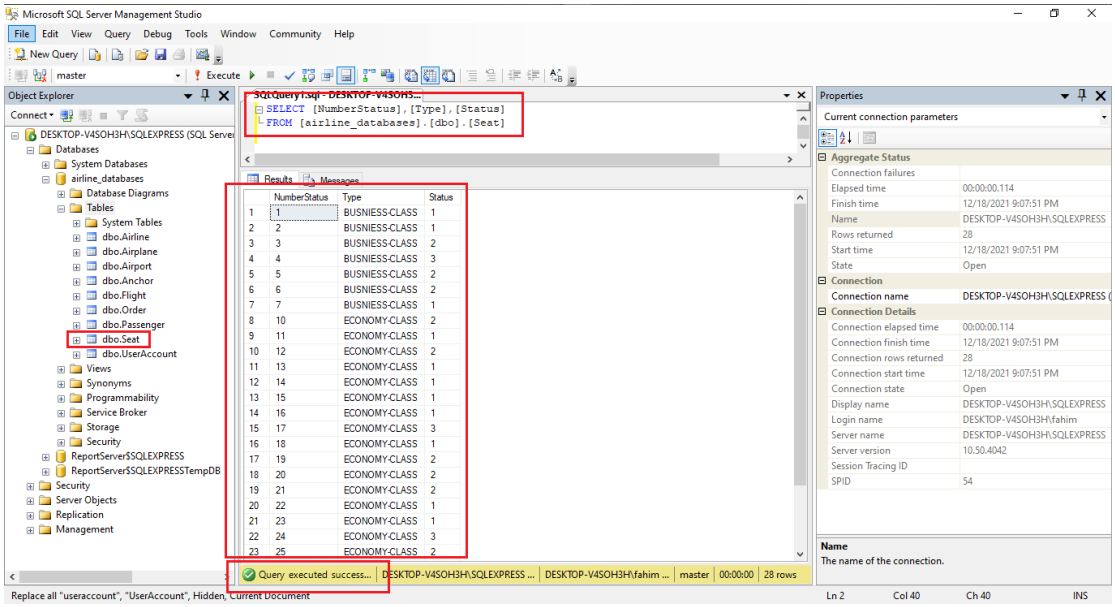
Passenger:

```
SELECT [PassportNumber],[Name],[IDNumber],[PhoneNumber]
FROM [airline_databases].[dbo].[Passenger]
```



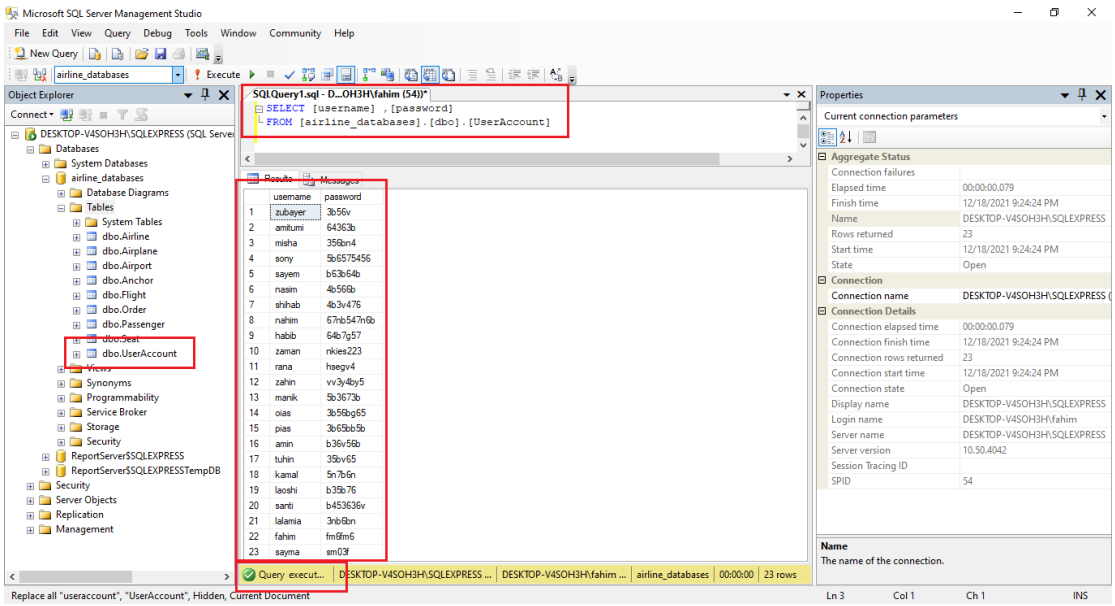
Seat:

```
SELECT [NumberStatus],[Type],[Status]
FROM [airline_databases].[dbo].[Seat]
```



UserAccount:

```
SELECT [username] ,[password]
FROM [airline_databases].[dbo].[UserAccount]
```



5.4 Database control

The software architecture involved in this experiment is two modes of C/S structure: fat client mode and thin client mode, i.e. two-stage structure and three-dimensional structure. The server of fat client mode is only responsible for data management, while the client is responsible for interactive interface and business processing. The thin client joins the application server to deal with the business logic and rules, so that the client's task is only responsible for representation, which simplifies the task.

In this experiment, the aircraft reservation system stores all kinds of data including airport, flight and seat. Business logic includes the corresponding flight, seat, passenger access, and the cost of flight comparison and evaluation to select a better flight. The presentation layer is mainly used to select flights, seats and orders.

If the two-tier C/S structure is selected, the server is only responsible for data management, and the logical processing, including flight comparison, will be carried out directly on the presentation page. That is to use java code to process data in JSP_page, and then display the data on this page. If it is a three-tier C/S structure, we will use the servlet to process the data, and the JSP page will submit the form to the servlet. In terms of security, the two-tier structure directly interacts with the database, which is less secure than the three-tier structure. In terms of

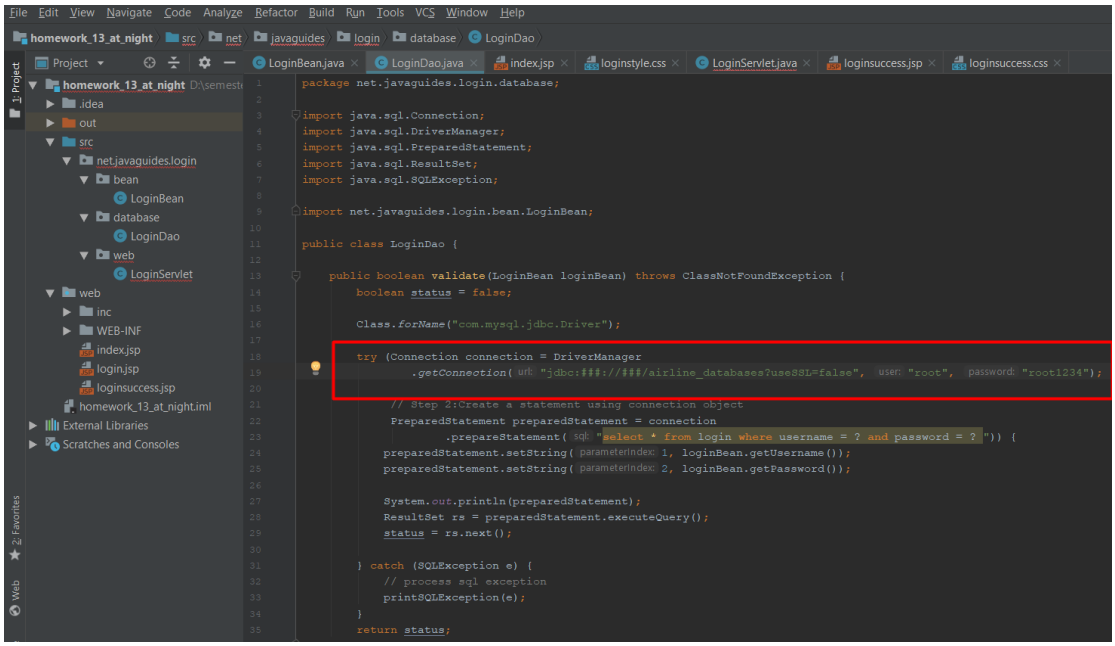
performance, the two-tier client takes on more tasks, and the page loading is slower than the three-tier structure, so the performance is not dominant. Moreover, the coupling of the three-layer structure is looser, which is more convenient for modification.

If the number of databases, users and aircraft companies of the system is further increased, the two-tier client will be easier in data management and database sharing due to its simple task. However, due to the heavy task of logical processing, the page loading will be further slow, which will make the user experience decline.

6. Program Design Description

6.1 Database connection

Connect to my local database and enter my account password (create java Dao class + servlet)



6.2 System menu

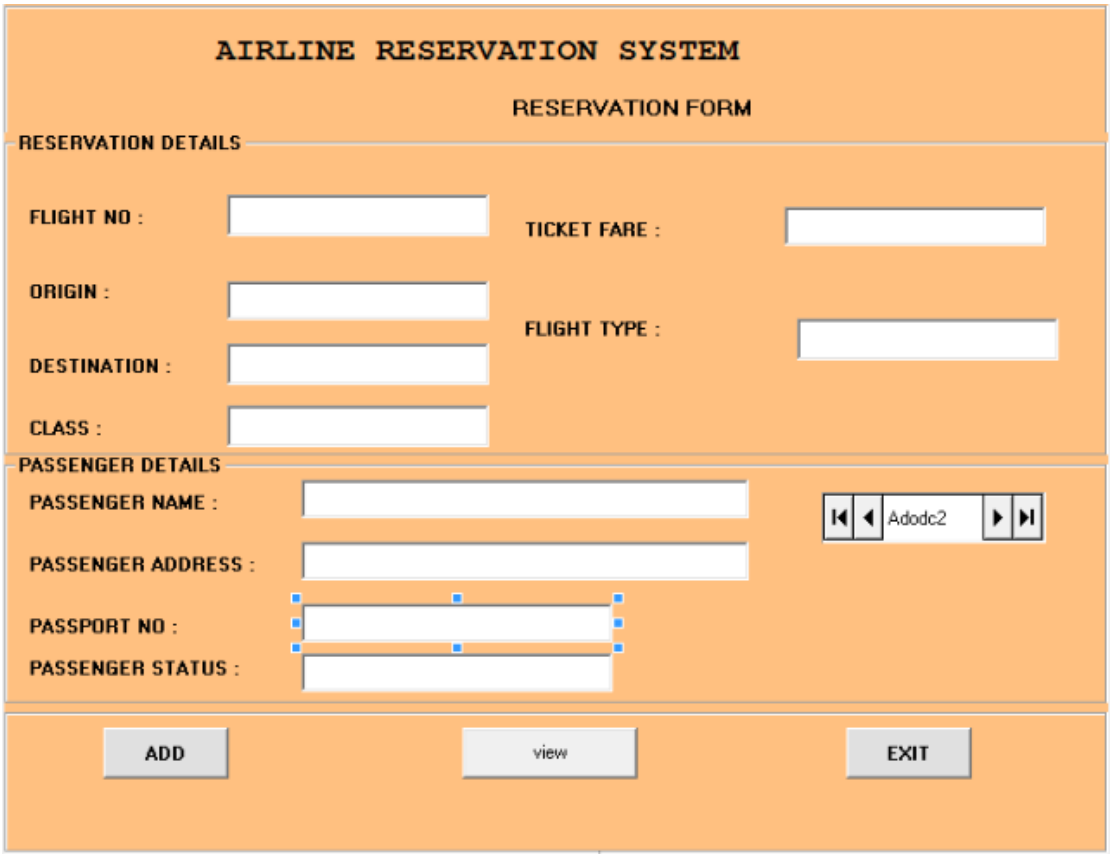
1. Open the reservation form-

- Select the flight
- Destination
- Ticket fair
- Seat
- Passenger details etc.

2. System program-

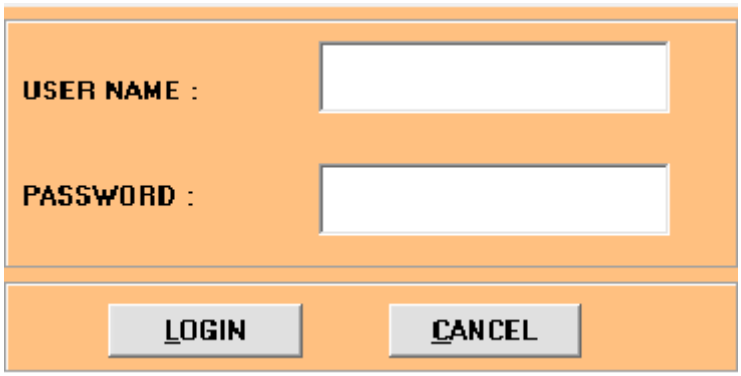
- Query of airline has its own database.
- When merging flights, the time required for connecting airports

should be considered, i.e. connection time. When booking all flights of the same airline, the price will be discounted according to the airline's own discount (%).



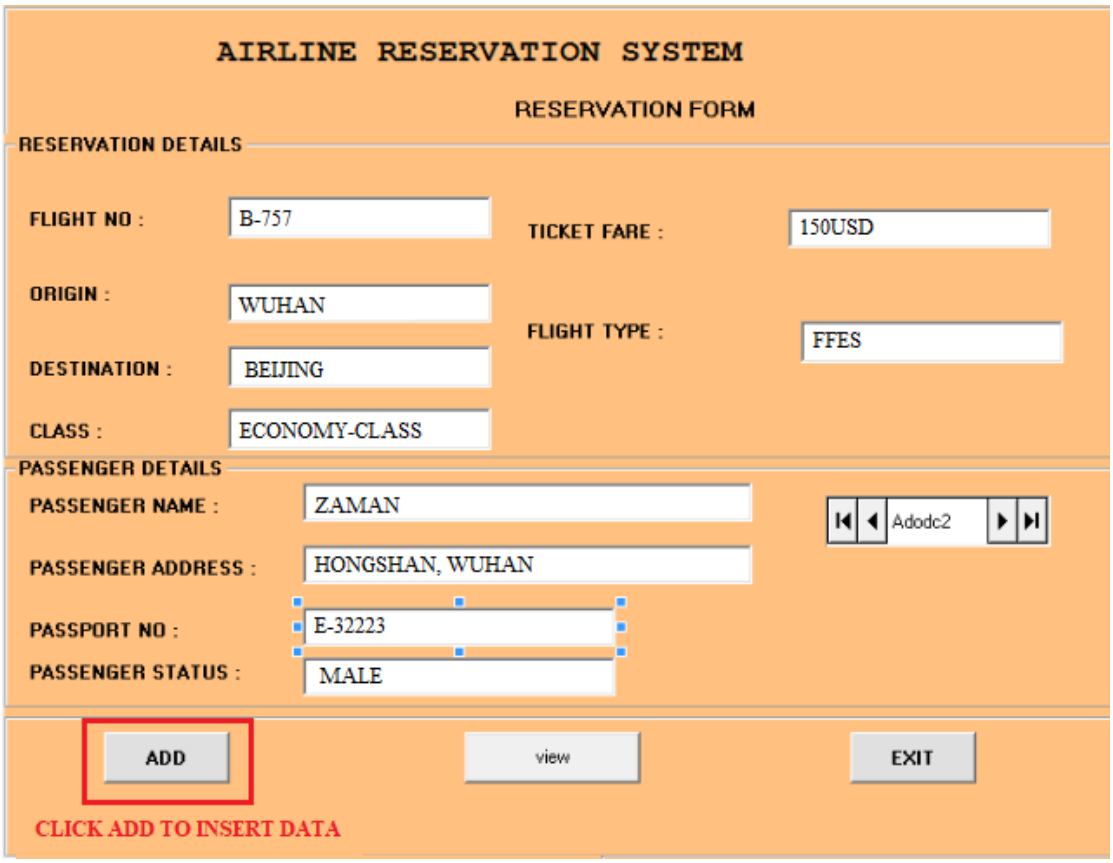
6.3 User login

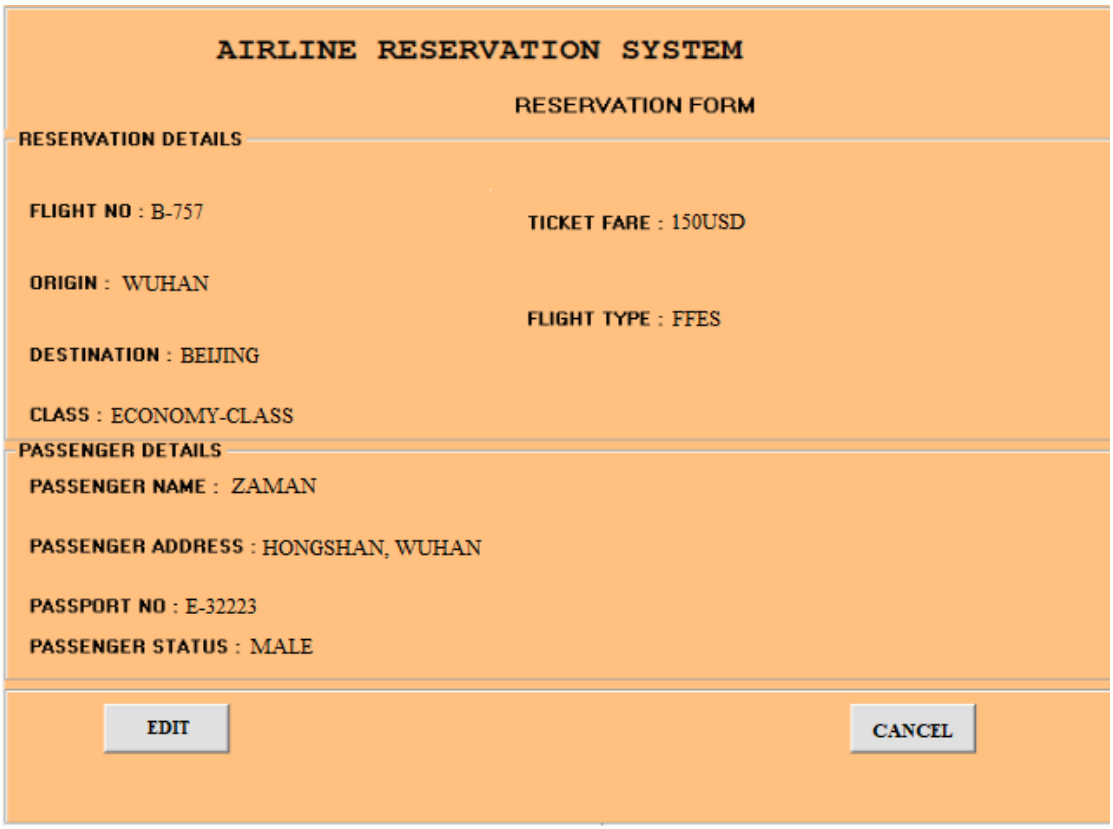
First we have to login using the username and password. Then we can see the reservation form.



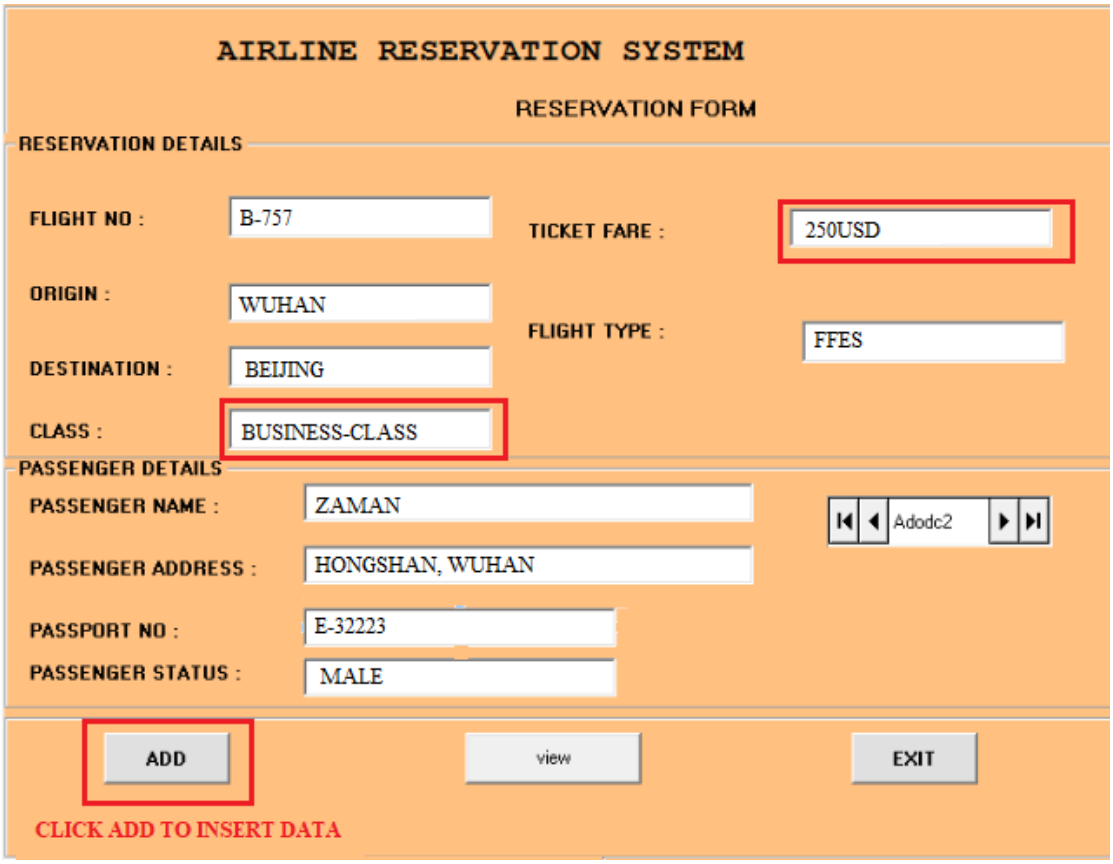
6.4 Data entry, modification and deletion

Data Entry: Here we have to enter all the data according to our choice and then click the “ADD” button. As a result, all the data will be entered in the database.





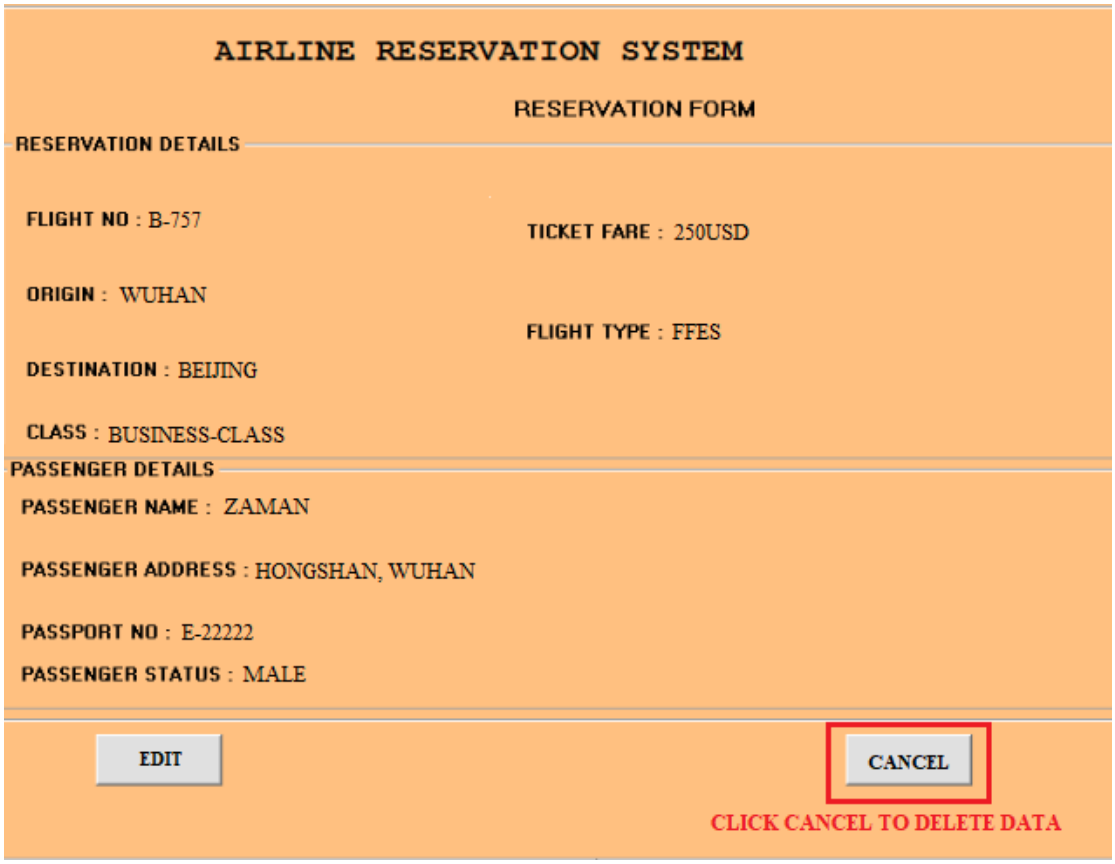
Modification: For data modification click the "EDIT" button. Then we modified some data and click the "ADD" button.



After Modification:

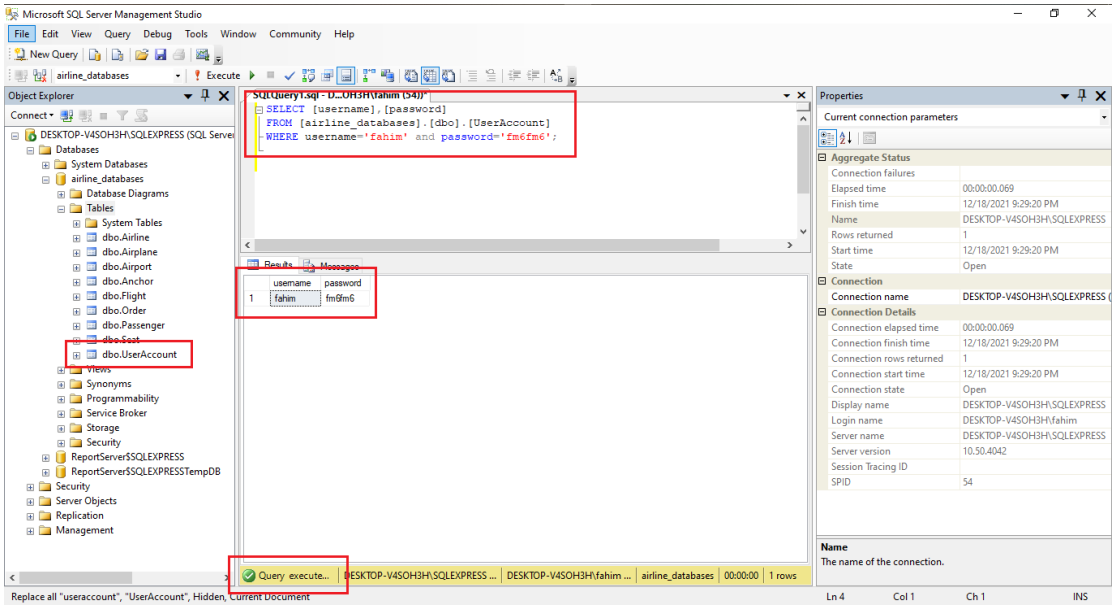
Deletion: For delete all the data we have to click the “CANCEL” button.

As a result, all the data will be deleted from the database.

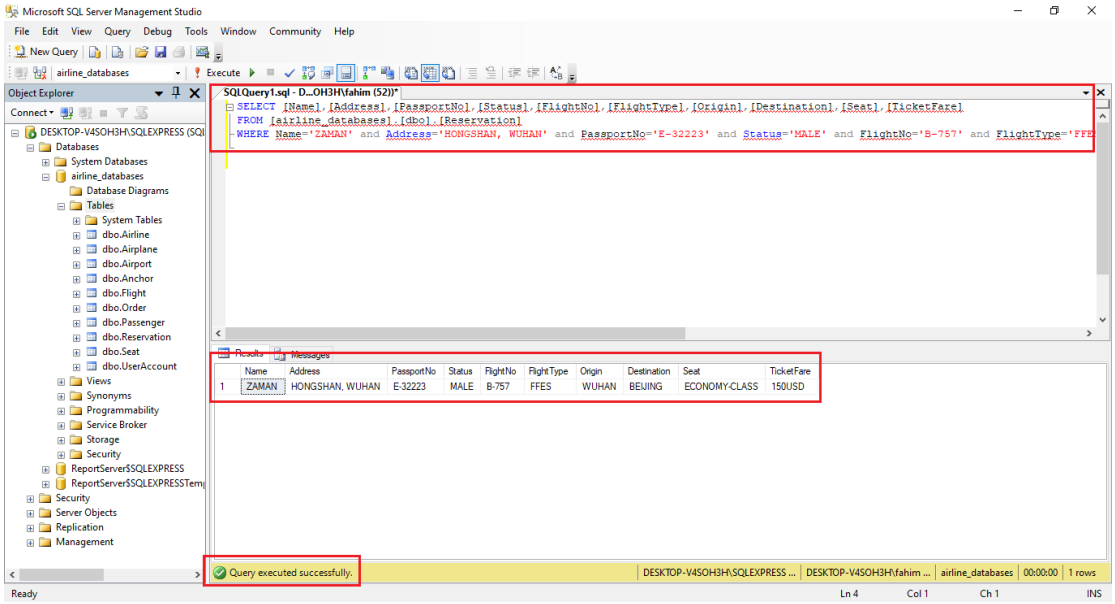


6.5 Database query

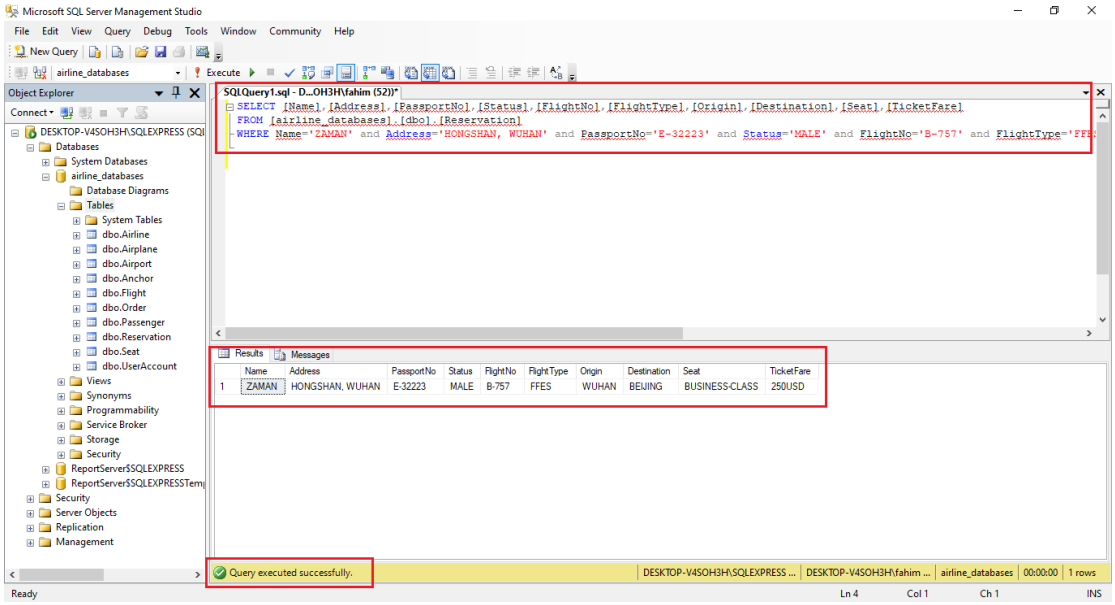
User Login: After enter the username and password we can see the user data in the database.



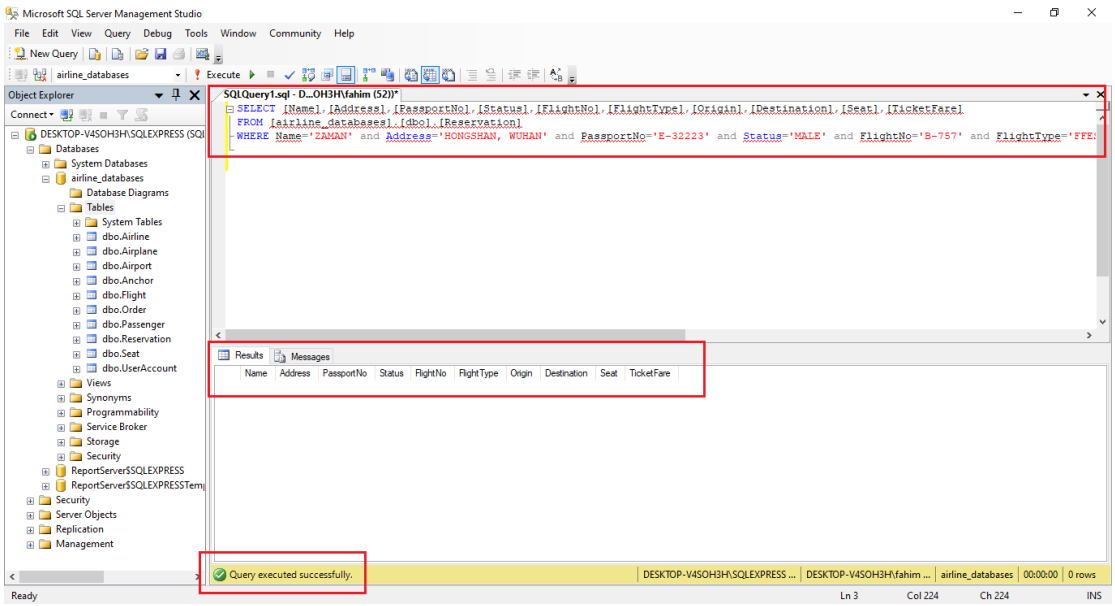
Data Entry: After enter all the data in the reservation form we can see all the data in the database.



Modification: After modify some data in the reservation form we can see the modified data in the database.



Deletion: After delete all the data in the reservation form we can't see the data in the database anymore.



7. Summary of Course Design

7.1 Problems and solutions in curriculum design

1. Haven’t deep knowledge about store process in database. After complete this project, know me able to connect, modify the remote connection.

2. Now I am able to insertion and values. And have knowledge modify values which are already inserted in a table.

3. If has there any kind of type defined error like string, varchar, char, int, float etc. Now I am able to resolve.

7.2 Analysis of existing problems

In this database project (airplane database management) we are used to insertion data in our local database directly (means an operators only they can insert).

But I future, it’s can update like real time data insertion.

If we create an application it’s can be able to call (.json) API from Airlines Company and airport management center. And then our application can modify API data and convert it SQL language and real-time dynamic insert, modify and deletion on database.

7.3 Experience of curriculum design

In the project curriculum design

- Connect a local database software like Ms SQL 2008, MySQL etc.
- Create/build database
- Create table
- Create schema
- Create or make relationship between a table to another table
- Insert data, modification and deletion by (database management operator)
- Passenger query

I also learn java (database connection servlet and Dao class) how to create a java class and how connect a. In additional to these, how to overcome my database by Dao class laziness, How to find a quick and accurate solution using the Internet (Google). Special from https://stackoverflow.com/ how to get my answer. And a best website for learning Database is https://www.geeksforgeeks.org/dbms/