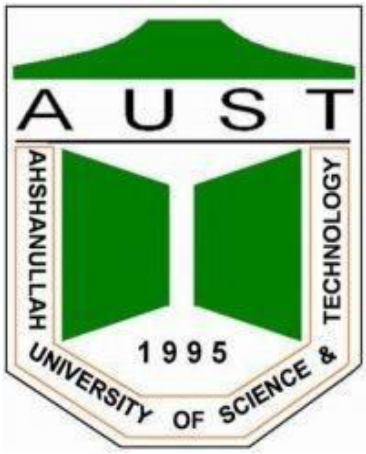

Ahsanullah University of Science & Technology

Department of Computer Science & Engineering

Course No : CSE3104

Course Title : Database Lab

Date of Submission : 30.09.2018

Submitted To : Mr. Nazmus Sakib

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Project Objective:

The main objective of this project is to design and develop an Airline Reservation System. This project is mainly intended for the customers, who use the airline websites to make reservations on flights. The users will be able to the time and places of their flights. Users can buy tickets either through an agent or through a flight company. The system will also provide information about the workers working at different airport with their salary, job description and personal information.

Features of the Project:

Provide information about airport, flight, ticket, supplier and worker. City, name of airport. Flight number, arrival hour, departure hour, Arrival airport, departure airport of a flight. User can book tickets in two different ways. Either through a flight company or a booking agent and collect information about their tickets. The airline companies can access the employee's details like their name, salary and other information who work at different airports.

Types of users:

- Passenger.
- Supplier (Agent or Flight Company).

Features grouping according to the users:

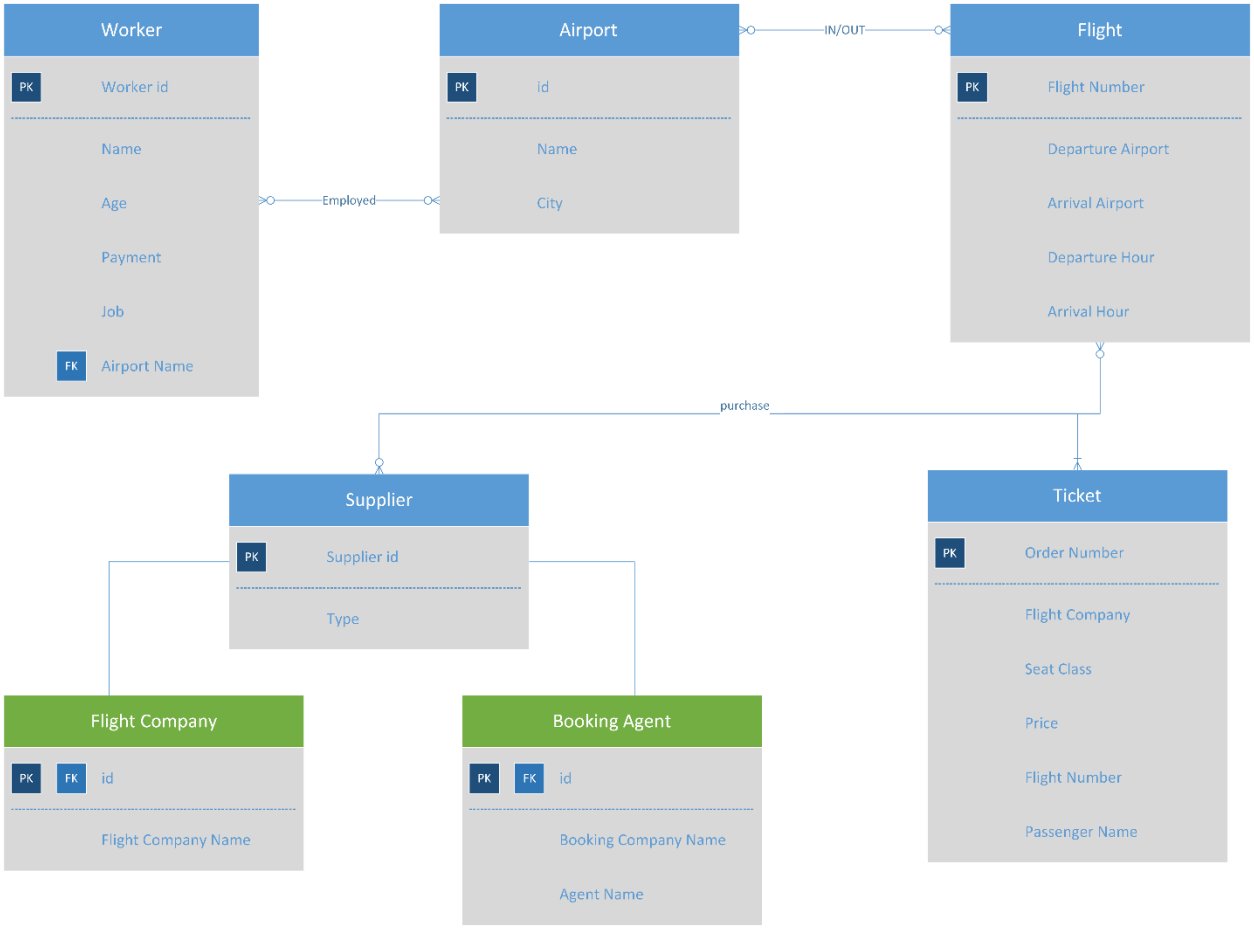
- Features for Passenger:
  Access information about Flight information like arrival and departure hour, airport name and city. They can book tickets in two ways (agent or Flight Company).

- Features for supplier:
  Suppliers can access passenger names and their flight information. They can also access worker details like their salary, job description and personal details.

Name of the entities with Primary Key:

- Airport: id
- Worker: WorkerID
- Employed: AirportId, WorkerID
- Flight: FlightNumber
- INOUT: AirportId, FlightNumber
- Ticket: OrderNumber
- Supplier: SupplierID
- Flight Company: SupplierID
- BookingAgent: SupplierID
- Purchase: FlightNumber, SupplierID

Entity Relationship(ER) Diagram:



Relational Model:

CREATE TABLE Airport(

AirportName VARCHAR(30) NOT NULL,

City VARCHAR(30) NOT NULL,

id INTEGER NOT NULL,

PRIMARY KEY (id),

);

```
CREATE TABLE Worker(
WorkerID INTEGER NOT NULL,
Name VARCHAR(30) NOT NULL,
Age INTEGER NOT NULL,
Payment DECIMAL(18,2) NOT NULL,
Job VARCHAR(30) NOT NULL,
AirportId INTEGER NOT NULL,
PRIMARY KEY (WorkerID),
FOREIGN KEY (AirportId) REFERENCES Airport (id)
);


CREATE TABLE Employed(
AirportId INTEGER NOT NULL,
WorkerID INTEGER NOT NULL,
id INTEGER NOT NULL,
PRIMARY KEY (AirportId, WorkerID),
FOREIGN KEY (AirportId) REFERENCES Airport (id),
FOREIGN KEY (WorkerID) REFERENCES Worker (WorkerID)
);
```

```
CREATE TABLE Flight(
FlightNumber INTEGER NOT NULL,
DepartureHour time NOT NULL,
DepartureAirport INTEGER NOT NULL,
ArrivalHour time NOT NULL,
ArrvalAirport INTEGER NOT NULL,
PRIMARY KEY (FlightNumber),
);

CREATE TABLE INOUT(
AirportId INTEGER NOT NULL,
FlightNumber INTEGER NOT NULL,
PRIMARY KEY(AirportId, FlightNumber),
FOREIGN KEY(AirportId) REFERENCES Airport(id),
FOREIGN KEY(FlightNumber) REFERENCES Flight(FlightNumber)
);
```

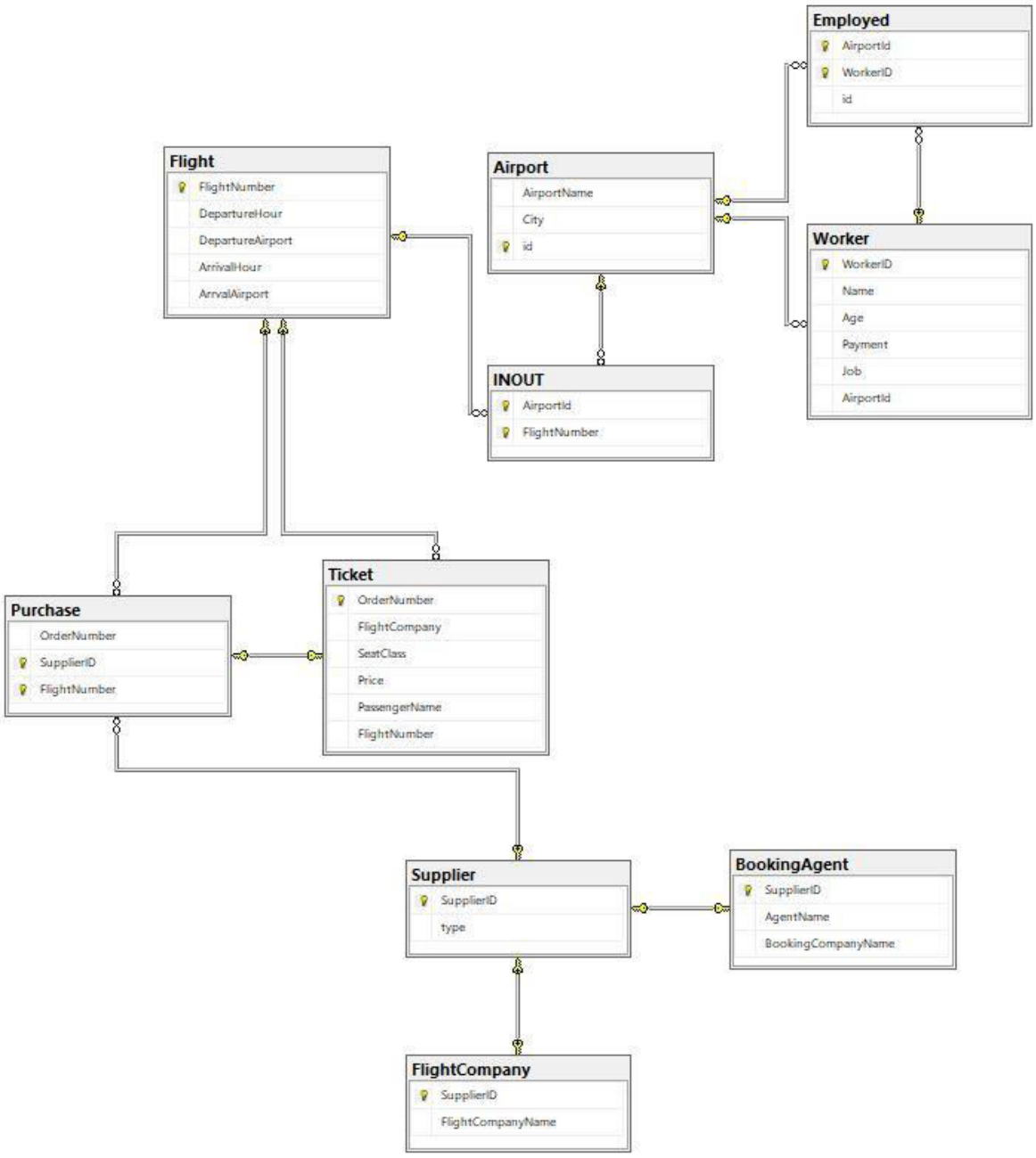
```
CREATE TABLE Ticket(
OrderNumber INTEGER NOT NULL,
FlightCompany VARCHAR(30) NOT NULL,
SeatClass VARCHAR(30) NOT NULL,
Price DECIMAL(18,2) NOT NULL,
PassengerName  VARCHAR(30) NOT NULL,
FlightNumber INTEGER NOT NULL,
PRIMARY KEY (OrderNumber),
FOREIGN KEY (FlightNumber) REFERENCES Flight (FlightNumber)
);

CREATE TABLE Supplier(
SupplierID INTEGER NOT NULL,
type VARCHAR(30) NOT NULL,
PRIMARY KEY (SupplierID)
);
CREATE TABLE FlightCompany(
SupplierID INTEGER NOT NULL,
FlightCompanyName VARCHAR(30) NOT NULL,
FOREIGN KEY (SupplierID) REFERENCES Supplier (SupplierID),
PRIMARY KEY (SupplierID)
);
```

```
CREATE TABLE BookingAgent(
SupplierID INTEGER NOT NULL,
AgentName VARCHAR(30) NOT NULL,
BookingCompanyName VARCHAR(30) NOT NULL,
FOREIGN KEY (SupplierID) REFERENCES Supplier (SupplierID),
PRIMARY KEY (SupplierID)
);
```

```
CREATE TABLE Purchase(
OrderNumber INTEGER NOT NULL,
SupplierID INTEGER NOT NULL,
FlightNumber INTEGER NOT NULL,
PRIMARY KEY (FlightNumber, SupplierID),
FOREIGN KEY (OrderNumber) REFERENCES Ticket (OrderNumber),
FOREIGN KEY (SupplierID) REFERENCES Supplier (SupplierID),
FOREIGN KEY (FlightNumber) REFERENCES Flight (FlightNumber),
UNIQUE(OrderNumber)
);
```

Database Diagram (Generated From SQL Server):



SQL queries grouped under different types of users:

- Passenger:

--> 1. Show all the airport information

```
SELECT * FROM Airport
```

--> 2. Show all the Flight Details

```
SELECT * FROM Flight
```

--> 3. Show all the ticket information

```
SELECT * FROM Ticket
```

--> 4. Show all the supplier info who are Flight Company

```
SELECT * FROM FlightCompany
```

--> 5. Show all the supplier info who are Booking Agent

```
SELECT * FROM BookingAgent
```

--> 6. Show all the airports that are in Dhaka

```
SELECT * FROM Airport WHERE City='Dhaka'
```

--> 7. Show the location of Shah Poran Airport

```
SELECT * FROM Airport WHERE AirportName='Shah Poran Airport'
```

--> 8. Show the airports that starts with Shah

```
SELECT * FROM Airport WHERE AirportName='Shah%'
```

--> 9. Show the arrival hour of Flight Number 1

```
SELECT ArrivalHour FROM Flight WHERE FlightNumber = 1
```

--> 10. Show all the Flights leaving Shahjalal Airport

```
SELECT * FROM Flight WHERE
DepartureAirport
IN (SELECT id FROM Airport
WHERE AirportName='Shahjalal Airport')
```

--> 11. Show the last departure hour of Flight No. 2

```
SELECT TOP 1 * FROM Flight WHERE FlightNumber= 2 ORDER BY
DepartureHour DESC
```

--> 12. Show all the flights arriving at Chennai Airport

```
SELECT * FROM Flight WHERE
ArrivalAirport
IN (SELECT id FROM Airport WHERE
AirportName='Chennai International Airport')
```

--> 13. Show all the flights arriving at Dhaka City

```
SELECT * FROM Flight WHERE ArrivalAirport IN (SELECT id FROM
Airport WHERE City='Dhaka')
```

--> 14. Show the Departure airport of Flight No. 3

```
SELECT DepartureAirport FROM Flight WHERE FlightNumber = 3
```

--> 15. Show the Flights arriving at Chennai today

```
SELECT * FROM Flight WHERE
cast(GETDATE() as DATE) = cast(ArrivalHour as DATE)
AND ArrivalAirport IN
(SELECT id FROM Airport WHERE AirportName='Chennai
International Airport')
```

--> 16. Show the Flights leaving Dhaka Today

```
SELECT * FROM Flight WHERE
cast(GETDATE() as DATE) = cast(DepartureHour as DATE)
AND DepartureAirport IN (SELECT id FROM Airport WHERE
City='Dhaka')
```

--> 17. Show the flights that arrived at Sylhet 28th September 2018

```
SELECT * FROM Flight WHERE
cast(ArrivalHour as DATE) = '2018-09-28'
AND ArrivalAirport
IN (SELECT id FROM Airport WHERE City='Sylhet')
```

--> 18. Show the flight leaving Dhaka for Sylhet Today after 7 pm.

```
SELECT * FROM Flight WHERE
cast(DepartureHour as DATE) = cast(GETDATE() as DATE)
AND DATEPART(HOUR, GETDATE()) >= 19 AND ArrivalAirport
IN (SELECT id FROM Airport WHERE City='Sylhet')
AND DepartureAirport IN (SELECT id FROM Airport WHERE
City='Dhaka')
```

--> 19. Show the flight arriving Chennai From Dhaka Today after 10 pm.

```
SELECT * FROM Flight WHERE
cast(ArrivalHour as DATE) = cast(GETDATE() as DATE)
AND DATEPART(HOUR, GETDATE()) >= 22 AND DepartureAirport
IN (SELECT id FROM Airport WHERE City='Dhaka')
AND ArrivalAirport IN (SELECT id FROM Airport WHERE City =
'Chennai')
```

--> 20. Show the ticket price of each Seat Class That leaves Dhaka and goes to Chennai

```
SELECT SeatClass, Price FROM Ticket WHERE
FlightNumber
IN (SELECT FlightNumber FROM Flight WHERE
DepartureAirport
IN (SELECT id FROM Airport WHERE City = 'Dhaka')
AND ArrivalAirport
IN (SELECT id FROM Airport WHERE City = 'Chennai')) GROUP BY
SeatClass, Price
```

- Supplier:

--> 21. Show all the Worker Information

```
SELECT * FROM Worker
```

--> 22. Show the flights arriving three days ago

```
SELECT * FROM Flight WHERE ArrivalHour =  DATEADD(day, -3,
GETDATE())
```

--> 23. Show all the Passenger name Details Who are in Business Class in Flight number 1

```
SELECT PassengerName FROM Ticket WHERE
SeatClass='Business' AND FlightNumber = 1
```

--> 24. Show the ticket price of each Seat Class Where Flight Number = 1

```
SELECT SeatClass, Price FROM Ticket WHERE FlightNumber = 1
GROUP BY SeatClass, Price
```

--> 25. Show the passenger details of order number 2

```
SELECT * FROM Ticket WHERE OrderNumber = 2
```

--> 26. Show the passenger details under US Bangla Airline

```
SELECT * FROM Ticket WHERE FlightCompany IN (SELECT
SupplierID FROM FlightCompany WHERE
FlightCompanyName='US Bangla%')
```

--> 27. Show the tickets sold under Different Flight Companies

```
SELECT B.Name, Total from
(SELECT FlightCompany, COUNT(Ordernumber) AS 'Total' FROM
Ticket
GROUP BY FlightCompany) A
JOIN
(SELECT SupplierID, FlightCompanyname AS 'Name' FROM
FlightCompany
UNION
SELECT SupplierID, BookingCompanyName FROM BookingAgent)
B
ON A.FlightCompany=B.SupplierID
```

--> 28. Find the passengers who booked under booking agent named Eimo

```
SELECT PassengerName FROM Ticket WHERE
FlightCompany IN (SELECT SupplierID FROM BookingAgent WHERE
AgentName='Eimo')
```

--> 29. Find the agent name of the passenger Name Nabil

```
SELECT AgentName FROM BookingAgent WHERE SupplierID IN
(SELECT FlightCompany FROM Ticket WHERE PassengerName =
'Nabil')
```

--> 30. Find the passenger who booked under Flight Company

```
SELECT * FROM Ticket WHERE FlightCompany IN (SELECT
SupplierID FROM FlightCompany)
```

--> 31. Find the passenger who booked under Booking Agent

```
SELECT * FROM Ticket WHERE FlightCompany IN (SELECT
SupplierID FROM BookingAgent)
```

--> 32. Find the booking company name of an agent named Faisal

```
SELECT BookingCompanyName FROM BookingAgent WHERE
AgentName='Faisal'
```

--> 33. Find the total number of bookings of booking companies

```
SELECT B.Name, Total from
(SELECT FlightCompany, COUNT(Ordernumber) AS 'Total' FROM
Ticket
GROUP BY FlightCompany) A
JOIN
(SELECT SupplierID, BookingCompanyName AS 'Name' FROM
BookingAgent) B
ON A.FlightCompany=B.SupplierID
```

--> 34. Find the total number of bookings under Flight company

```
SELECT B.Name, Total from
(SELECT FlightCompany, COUNT(Ordernumber) AS 'Total' FROM
Ticket
GROUP BY FlightCompany) A
JOIN
(SELECT SupplierID, FlightCompanyname AS 'Name' FROM
FlightCompany) B
ON A.FlightCompany=B.SupplierID
```

--> 35. Show the Workers who work at Shahjalal Airport

```
SELECT * FROM Worker WHERE
AirportId IN
(SELECT id FROM Airport WHERE AirportName = 'Shahjalal
Airport')
```

--> 36. Show The payments of all the workers in Descending order

```
SELECT * FROM Worker ORDER BY Payment DESC
```

--> 37. List out the workers who earn between 15000 and 20000

```
SELECT * FROM Worker WHERE Payment >= 15000 AND Payment
<= 20000
```

--> 38. List out the top three earning workers

```
SELECT TOP 3 Name FROM
Worker ORDER BY Payment DESC
```

--> 39. Show the second most earning Worker

```
SELECT TOP 1 Name FROM Worker
WHERE Payment <> MAX(Payment)
ORDER BY Payment DESC
```

--> 40. Show the third most earning Worker

```
SELECT TOP 1 Name FROM (SELECT TOP 3 * FROM Worker ORDER
BY Payment DESC)B ORDER BY Payment DESC
```

--> 41. Show the Maximum, Average and Minimum Payment of workers according to Job

```
SELECT Job,
Max(Payment) AS 'Max Salary',
Min(Payment) AS 'Min Salary',
AVG(Payment) AS 'AVG Salary'
FROM Worker Group By Job
```

--> 42. Increase the Payment of the workers who are above 30 years old

```
UPDATE Worker
SET Payment = Payment + 10000
WHERE Age > 30
```

--> 43. Increase the Payment of the all the flight Attendent 25%

```
UPDATE Worker
SET Payment = (Payment * 1.25)
WHERE Job = 'Flight Attendent'
```

```
--> 44. Show the total worker at each airport
SELECT AirportId, Airport.AirportName, COUNT(WorkerID) AS
'Total Worker' FROM Worker INNER JOIN Airport
ON Worker.AirportId = Airport.id
GROUP BY AirportId, AirportName
```

```
--> 45. Show the maximum paid worker in each airport
SELECT AirportId, Airport.AirportName, Name AS 'Worker Name',
Max(Payment) AS 'Max Payment' FROM Worker
INNER JOIN Airport ON
Worker.AirportId = Airport.id
GROUP BY AirportId, Name, AirportName
```

Project Limitations:

The system is unable to provide detailed information. For Example: the users are unable to know the status of their flight. Not much information about the supplier companies. No Detailed information about airports either.

Conclusion and Future Work:

The purpose of our project is to make it easy for people who wants to travel different places both for business or pleasure. The system's supposed to overcome the problem of wasting valuable time.

We hope to make it more than just a reservation system and overcome all the limitations. We hope one day we can make it a full-fledged airline management system.