American International University

Introduction to Database

Project Title

Airlines Management System

Group No:3

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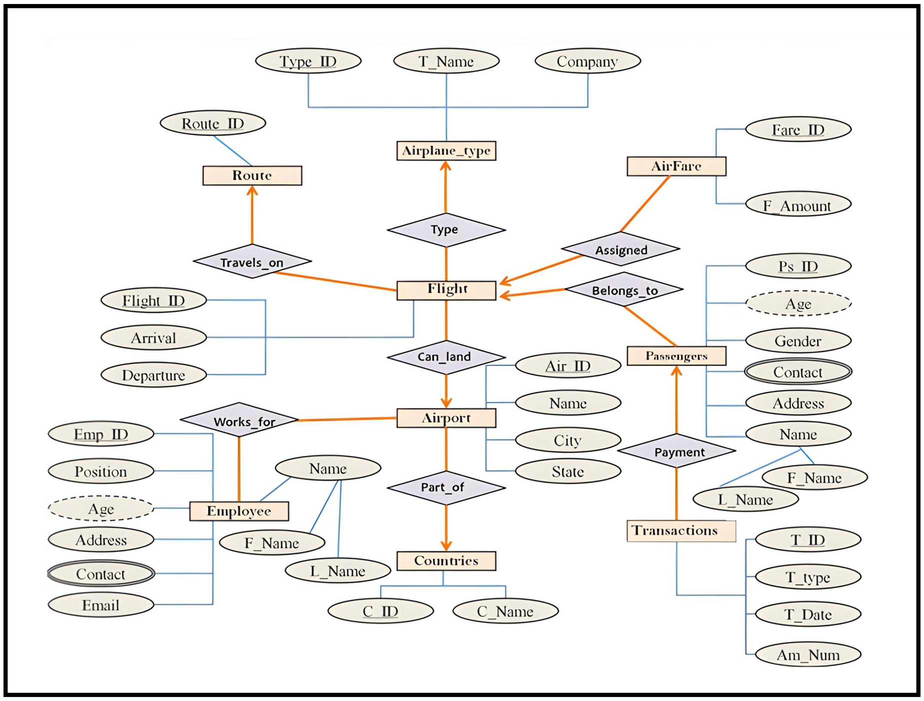
1 Introduction

The Airlines Management System is a sophisticated database project designed to revolutionize the management processes within the airline industry. This comprehensive system utilizes an Oracle server and SQL to establish and showcase the inter connectness of entity sets within an airline's database. The primary objective of this project is to create a centralized platform that enables efficient handling of flight operations, reservations, passenger information, and employee administration. By implementing the Airlines Management System, airlines can streamline and automate crucial functions such as flight scheduling, seat availability, and reservation management. The system also provides comprehensive tracking of passenger information, facilitating personalized services and efficient handling of special requests. Additionally, it simplifies employee management by assigning tasks, tracking performance, and facilitating effective communication within the organization. With the integration of payment methods and transaction records, the system ensures smooth financial operations and accurate reporting. Moreover, the Airlines Management System empowers airline administrators with real-time insights, enabling them to make data-driven decisions to optimize resource allocation, flight planning, and overall customer satisfaction. The Airlines Management System offers a robust solution to enhance operational efficiency, customer experience, and strategic decision-making within the airline industry. By leveraging a powerful database and intuitive interface, the system enables airlines to stay competitive and deliver exceptional services in the dynamic aviation landscape.

2 Er-Diagram



2.1 Explanation

An Airplane-type can be assigned to multiple Flights, and a Flight is associated with one Airplane-type. This relationship represents the aircraft type. A Flight travels on one Route, and a Route can have multiple Flights. This relationship represents the specific route traveled by a flight. A Flight can have multiple Airfares, and an Airfare is associated with one Flight. This relationship represents the pricing information assigned to a flight.A Flight can have multiple Passengers, and a Passenger belongs to one Flight. This relationship represents the passengers assigned to a flight. A Flight can land at one Airport, and an Airport can have multiple Flights landing at it. This relationship represents the airport where a flight can land.Each Employee can work at one Airport, and an Airport can have multiple Employees. This relationship represents the employees assigned to work at an airport. An Airport is part of one Country, and a Country can have multiple Airports.This relationship represents the country where an airport is located.A Passenger can have multiple Transactions, and a Transaction is associated with one Passenger. This relationship represents the payment transactions made by a passenger.

3 Relational Model

- **Airplane-Type** (Type-ID, Type-Name, Capacity)..

- **Airport** (Airport-ID, Airport-Name, Location)..

- **Countries** (Country-ID, Country-Name)..

- **Route** (Route-ID, Source-Airport-ID*, Destination-Airport-ID*)..

- **Flight** (Flight-ID, Departure-Time, Arrival-Time, Route-ID*, Airplane Type-ID*)..

- **AirFare** (AirFare-ID, Fare-Amount, Flight-ID*)..

- **Employee** (Employee-ID, First-Name, Last-Name, Position, Age, Phone, Address, Email, Airport-ID*)..

- **Passenger** (Passenger-ID, First-Name, Last-Name, Age, Gender, Phone, Address, Country-ID*)..

- **Transaction** (Transaction-ID, Transaction-Type, Transaction-Date, Amount-Number, Passenger-ID*, Flight-ID*)..

4 Normalization

Normalization is the process of organizing data in a database. It includes creating tables and establishing relationships between those tables according to rules designed both to protect the data and to make the database more flexible by eliminating redundancy and inconsistent dependency.

UNF(Unnormalized From)

- Initial stage of database design.
- Data may contain redundancy and anomalies.
- Data is organized in single table with repeating groups.

1NF(First Normal From)

- Eliminate repeating groups in individual tables.
- Create a separate table for each set of related data.
- Identify each set of related data with a primary key.

2NF(Second Normal From)

- The relation must already be in the First Normal Form (1NF).
- No Partial Dependency, non key attributes depend entire primary key.

3NF(Third Normal From)

- The relation must already be in the Second Normal Form (2NF).
- No Transitive Dependency, A non-prime (non-key) attribute should not depend on another non-prime attribute. In other words, if a non-key attribute depends on another non-key attribute, it must be moved to its own relation.

BCNF(Boyce-Codd Normal Form)

- The relation must already be in the Third Normal Form (3NF).
- No Non-Trivial Dependencies, it means BCNF focuses on eliminating non-trivial functional dependencies. A non-trivial functional dependency occurs when a non-prime (non-key) attribute depends on another non-prime attribute, creating redundancy and potential anomalies.

5 Table Creation

- Airplane-Type

CREATE TABLE Airplane-Type (Type-ID NUMBER PRIMARY KEY,Type-Name VARCHAR2(100), Capacity NUMBER);

DESCRIBE AIRPLANE-TYPE;

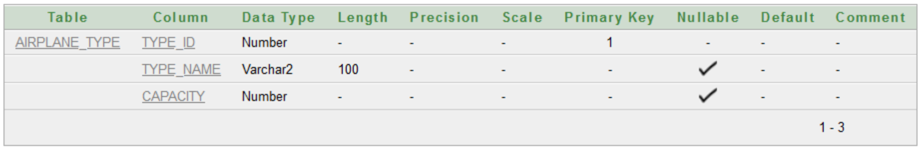


Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
AIRPLANE_TYPE	TYPE_ID	Number	-	-	-	1	-	-	-
	TYPE_NAME	Varchar2	100	-	-	-	✓	-	-
	CAPACITY	Number	-	-	-	-	✓	-	-
								1 - 3	

- Airport

CREATE TABLE Airport (Airport-ID NUMBER PRIMARY KEY, Airport-Name VARCHAR2(100), Location VARCHAR2(50));

DESCRIBE AIRPORT;

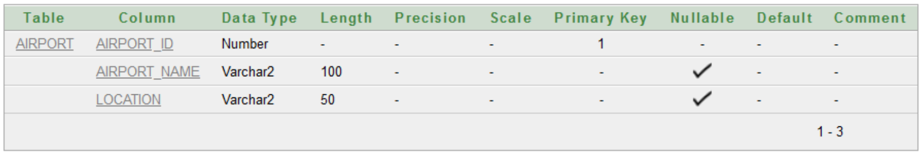


Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
AIRPORT	AIRPORT_ID	Number	-	-	-	1	-	-	-
	AIRPORT_NAME	Varchar2	100	-	-	-	✓	-	-
	LOCATION	Varchar2	50	-	-	-	✓	-	-
								1 - 3	

- Countries

CREATE TABLE Countries (Country-ID NUMBER PRIMARY KEY, Country-Name VARCHAR2(50));

DESCRIBE COUNTRIES;

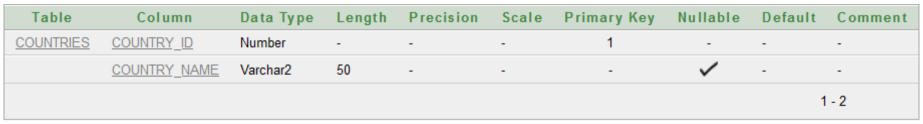


Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
COUNTRIES	COUNTRY_ID	Number	-	-	-	1	-	-	-
	COUNTRY_NAME	Varchar2	50	-	-	-	✓	-	-
								1 - 2	

- Route

CREATE TABLE Route (Route-ID NUMBER PRIMARY KEY, Source-Airport-ID NUMBER REFERENCES Airport(Airport-ID), Destination-Airport-ID NUMBER REFERENCES Airport(Airport-ID));

DESCRIBE ROUTE;

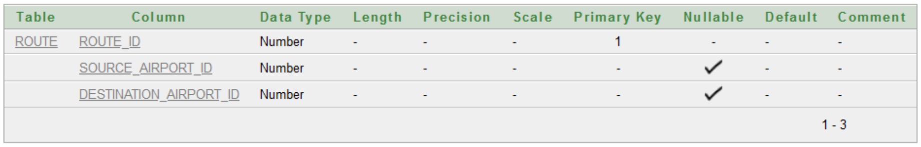


Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
ROUTE	ROUTE_ID	Number	-	-	-	1	-	-	-
	SOURCE_AIRPORT_ID	Number	-	-	-	-	✓	-	-
	DESTINATION_AIRPORT_ID	Number	-	-	-	-	✓	-	-
									1 - 3

- Flight

CREATE TABLE Flight (Flight-ID NUMBER PRIMARY KEY, Route-ID NUMBER REFERENCES Route(Route-ID), Airplane-Type-ID NUMBER REFERENCES Airplane-Type(Type-ID), Departure-Time TIMESTAMP, Arrival-Time TIMESTAMP);

DESCRIBE FLIGHT;

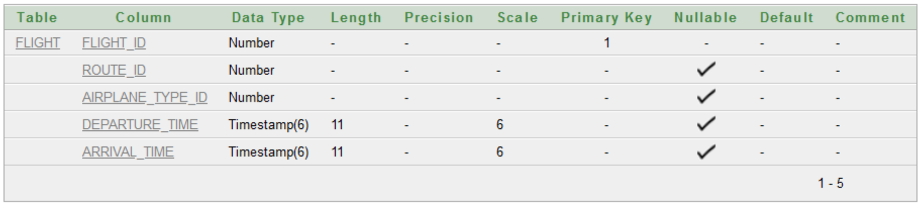


Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
FLIGHT	FLIGHT_ID	Number	-	-	-	1	-	-	-
	ROUTE_ID	Number	-	-	-	-	✓	-	-
	AIRPLANE_TYPE_ID	Number	-	-	-	-	✓	-	-
	DEPARTURE_TIME	Timestamp(6)	11	-	6	-	✓	-	-
	ARRIVAL_TIME	Timestamp(6)	11	-	6	-	✓	-	-
									1 - 5

- Airfare

CREATE TABLE Airfare (Airfare-ID NUMBER PRIMARY KEY, Flight-ID NUMBER REFERENCES Flight(Flight-ID), Fare-Amount NUMBER);

DESCRIBE AIRFARE;

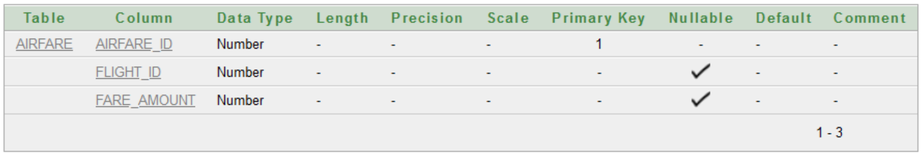


Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
AIRFARE	AIRFARE_ID	Number	-	-	-	1	-	-	-
	FLIGHT_ID	Number	-	-	-	-	✓	-	-
	FARE_AMOUNT	Number	-	-	-	-	✓	-	-
									1 - 3

- Employee

CREATE TABLE Employee (Employee-ID NUMBER PRIMARY KEY,First-NameVARCHAR2(50),Last-Name VARCHAR2(50),Position VARCHAR2(50), Age NUMBER, Phone NUMBER,Address VARCHAR2(40),Email VARCHAR2 (50), Airport-ID NUMBER REFERENCES Airport(Airport-ID));

DESCRIBE EMPLOYEE;

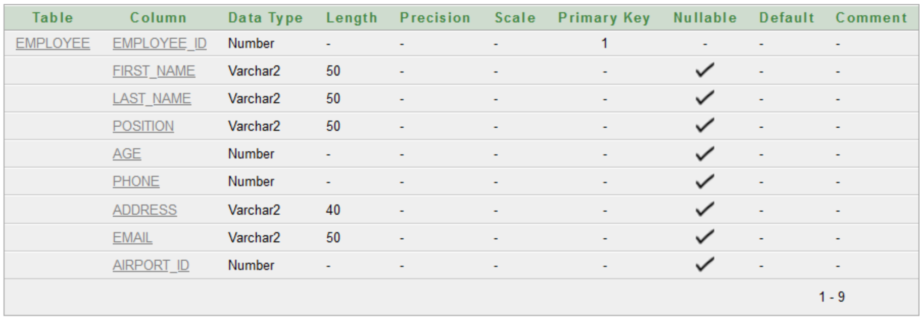


Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
EMPLOYEE	EMPLOYEE_ID	Number	-	-	-	1	-	-	-
	FIRST_NAME	Varchar2	50	-	-	-	✓	-	-
	LAST_NAME	Varchar2	50	-	-	-	✓	-	-
	POSITION	Varchar2	50	-	-	-	✓	-	-
	AGE	Number	-	-	-	-	✓	-	-
	PHONE	Number	-	-	-	-	✓	-	-
	ADDRESS	Varchar2	40	-	-	-	✓	-	-
	EMAIL	Varchar2	50	-	-	-	✓	-	-
	AIRPORT_ID	Number	-	-	-	-	✓	-	-
								1 - 9	

- Passenger

CREATE TABLE Passenger(Passenger-ID NUMBER PRIMARY KEY,First-Name VARCHAR2(50),Last-Name VARCHAR2(50),Age NUMBER,Gender VARCHAR2(10),Phone NUMBER,Address VARCHAR(50),Country-ID NUMBER REFERENCES Countries(Country-ID));

DESCRIBE PASSENGER;

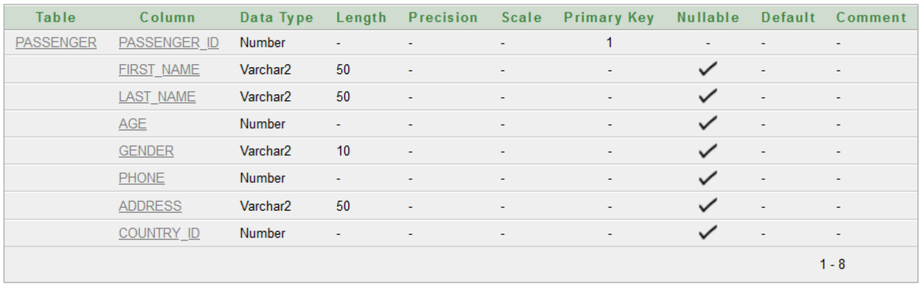


Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
PASSENGER	PASSENGER_ID	Number	-	-	-	1	-	-	-
	FIRST_NAME	Varchar2	50	-	-	-	✓	-	-
	LAST_NAME	Varchar2	50	-	-	-	✓	-	-
	AGE	Number	-	-	-	-	✓	-	-
	GENDER	Varchar2	10	-	-	-	✓	-	-
	PHONE	Number	-	-	-	-	✓	-	-
	ADDRESS	Varchar2	50	-	-	-	✓	-	-
	COUNTRY_ID	Number	-	-	-	-	✓	-	-
								1 - 8	

- Transaction

CREATE TABLE Transaction (Transaction-ID NUMBER PRIMARY KEY, Transaction-Type VARCHAR2(20), Passenger-ID NUMBER REFERENCES Passenger(Passenger-ID), Flight-ID NUMBER REFERENCES Flight(Flight-ID),Transaction-Date TIMESTAMP,Amount NUMBER);

DESCRIBE TRANSACTION;

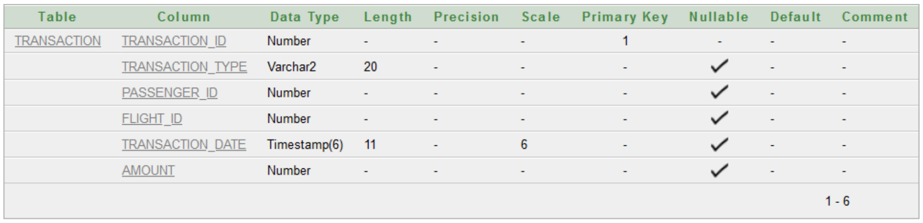


Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
TRANSACTION	TRANSACTION_ID	Number	-	-	-	1	-	-	-
	TRANSACTION_TYPE	Varchar2	20	-	-	-	✓	-	-
	PASSENGER_ID	Number	-	-	-	-	✓	-	-
	FLIGHT_ID	Number	-	-	-	-	✓	-	-
	TRANSACTION_DATE	Timestamp(6)	11	-	6	-	✓	-	-
	AMOUNT	Number	-	-	-	-	✓	-	-

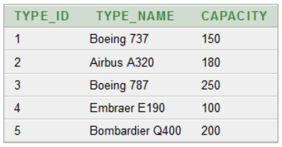
1 - 6

6 Value Insertion

- Airplane-Type

```
INSERT INTO Airplane-Type VALUES (1, ’Boeing 737’, 150);
INSERT INTO Airplane-Type VALUES (2, ’Airbus A320’, 180);
INSERT INTO Airplane-Type VALUES (3, ’Boeing 787’, 250);
INSERT INTO Airplane-Type VALUES ((4, ’Embraer E190’, 100);
INSERT INTO Airplane-Type VALUES (5, ’Bombardier Q400’, 200);
```

```
SELECT * FROM AIRPLANE-TYPE;
```

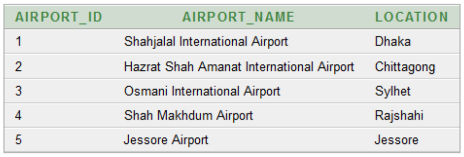


TYPE_ID	TYPE_NAME	CAPACITY
1	Boeing 737	150
2	Airbus A320	180
3	Boeing 787	250
4	Embraer E190	100
5	Bombardier Q400	200

- Airport

```
INSERT INTO Airport VALUES
(1, ’Shahjalal International Airport’, ’Dhaka’);
(2, ’Hazrat Shah Amanat International Airport’, ’Chittagong’);
(3, ’Osmani International Airport’, ’Sylhet’);
(4, ’Shah Makhdum Airport’, ’Rajshahi’);
(5, ’Jessore Airport’, ’Jessore’);
```

```
SELECT * FROM AIRPORT;
```

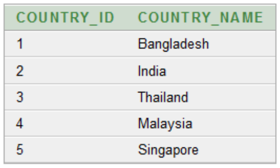


AIRPORT_ID	AIRPORT_NAME	LOCATION
1	Shahjalal International Airport	Dhaka
2	Hazrat Shah Amanat International Airport	Chittagong
3	Osmani International Airport	Sylhet
4	Shah Makhdum Airport	Rajshahi
5	Jessore Airport	Jessore

- Countries

```
INSERT INTO Countries VALUES (1, ’Bangladesh’);
INSERT INTO Countries VALUES (2, ’India’);
INSERT INTO Countries VALUES (3, ’Thailand’);
INSERT INTO Countries VALUES (4, ’Malaysia’);
INSERT INTO Countries VALUES (5, ’Singapore’);
```

```
SELECT * FROM COUNTRIES;
```

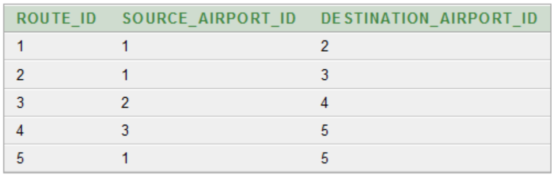


COUNTRY_ID	COUNTRY_NAME
1	Bangladesh
2	India
3	Thailand
4	Malaysia
5	Singapore

- Route

```
INSERT INTO Route VALUES (1, 1, 2);
INSERT INTO Route VALUES (2, 1, 3);
INSERT INTO Route VALUES (3, 2, 4);
INSERT INTO Route VALUES (4, 3, 5);
INSERT INTO Route VALUES (5, 1, 5);
```

```
SELECT * FROM ROUTE;
```

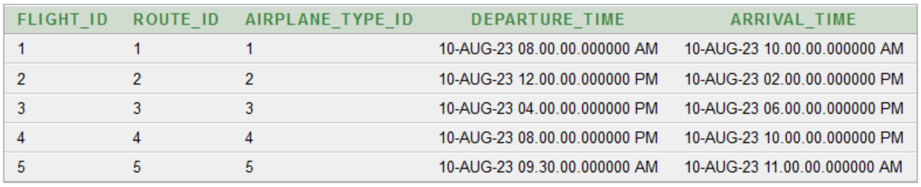


ROUTE_ID	SOURCE_AIRPORT_ID	DESTINATION_AIRPORT_ID
1	1	2
2	1	3
3	2	4
4	3	5
5	1	5

- Flight

```
INSERT INTO Flight VALUES
(1, 1, 1, TO-TIMESTAMP(’2023-08-10 08:00:00’, ’YYYY-MM-DD HH24:MI:SS’),
TO-TIMESTAMP(’2023-08-10 10:00:00’, ’YYYY-MM-DD HH24:MI:SS’));
(2, 2, 2, TO-TIMESTAMP(’2023-08-10 12:00:00’, ’YYYY-MM-DD HH24:MI:SS’),
TO-TIMESTAMP(’2023-08-10 14:00:00’, ’YYYY-MM-DD HH24:MI:SS’));
(3, 3, 3, TO-TIMESTAMP(’2023-08-10 16:00:00’, ’YYYY-MM-DD HH24:MI:SS’),
TO-TIMESTAMP(’2023-08-10 18:00:00’, ’YYYY-MM-DD HH24:MI:SS’));
(4, 4, 4, TO-TIMESTAMP(’2023-08-10 20:00:00’, ’YYYY-MM-DD HH24:MI:SS’),
TO-TIMESTAMP(’2023-08-10 22:00:00’, ’YYYY-MM-DD HH24:MI:SS’));
(5, 5, 5, TO-TIMESTAMP(’2023-08-10 09:30:00’, ’YYYY-MM-DD HH24:MI:SS’),
TO-TIMESTAMP(’2023-08-10 11:00:00’, ’YYYY-MM-DD HH24:MI:SS’));
```

```
SELECT * FROM FLIGHT;
```

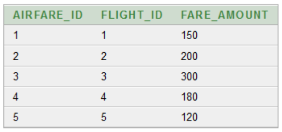


FLIGHT_ID	ROUTE_ID	AIRPLANE_TYPE_ID	DEPARTURE_TIME	ARRIVAL_TIME
1	1	1	10-AUG-23 08.00.00.000000 AM	10-AUG-23 10.00.00.000000 AM
2	2	2	10-AUG-23 12.00.00.000000 PM	10-AUG-23 02.00.00.000000 PM
3	3	3	10-AUG-23 04.00.00.000000 PM	10-AUG-23 06.00.00.000000 PM
4	4	4	10-AUG-23 08.00.00.000000 PM	10-AUG-23 10.00.00.000000 PM
5	5	5	10-AUG-23 09.30.00.000000 AM	10-AUG-23 11.00.00.000000 AM

- Airfare

```
INSERT INTO Airfare VALUES (1, 1, 150);
INSERT INTO Airfare VALUES (2, 2, 200);
INSERT INTO Airfare VALUES (3, 3, 300);
INSERT INTO Airfare VALUES (4, 4, 180);
INSERT INTO Airfare VALUES (5, 5, 120);

SELECT * FROM AIRFARE;
```

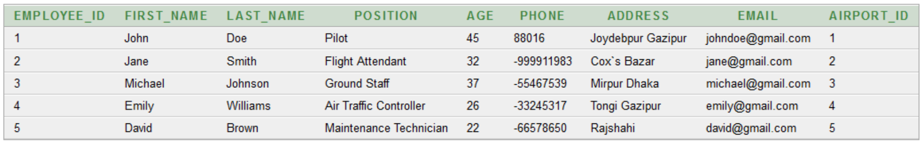


AIRFARE_ID	FLIGHT_ID	FARE_AMOUNT
1	1	150
2	2	200
3	3	300
4	4	180
5	5	120

- Employee

```
INSERT INTO Employee VALUES
(1, ’John’, ’Doe’, ’Pilot’,45, +88016-00000000, ’Joydebpur Gazipur’,
’johndoe@gmail.com’, 1);
(2, ’Jane’, ’Smith’, ’Flight Attendant’,32,+88016-999999999, ’Cox‘s Bazar’,
’jane@gmail.com’, 2);
(3, ’Michael’, ’Johnson’, ’Ground Staff’,37,+88016-55555555, ’Mirpur Dhaka’,
’michael@gmail.com’, 3);
(4, ’Emily’, ’Williams’, ’Air Traffic Controller’,26,+88016-33333333, ’Tongi Ga
zipur’, ’emily@gmail.com’, 4);
(5, ’David’, ’Brown’, ’Maintenance Technician’,22,+88016-66666666, ’Rajshahi’,
’david@gmail.com’, 5);

SELECT * FROM EMPLOYEE;
```

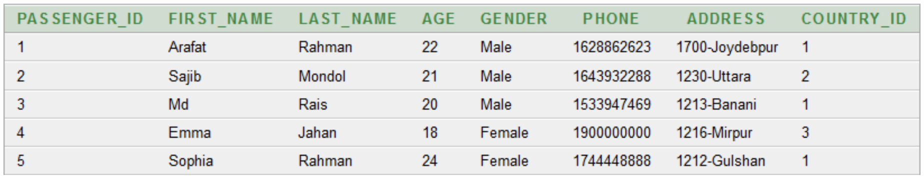


EMPLOYEE_ID	FIRST_NAME	LAST_NAME	POSITION	AGE	PHONE	ADDRESS	EMAIL	AIRPORT_ID
1	John	Doe	Pilot	45	88016	Joydebpur Gazipur	johndoe@gmail.com	1
2	Jane	Smith	Flight Attendant	32	-999911983	Cox`s Bazar	jane@gmail.com	2
3	Michael	Johnson	Ground Staff	37	-55467539	Mirpur Dhaka	michael@gmail.com	3
4	Emily	Williams	Air Traffic Controller	26	-33245317	Tongi Gazipur	emily@gmail.com	4
5	David	Brown	Maintenance Technician	22	-66578650	Rajshahi	david@gmail.com	5

- Passenger

```
INSERT INTO Passenger VALUES
(1, ’Arafat’, ’Rahman’, 22, ’Male’, 01628862623, ’1700-Joydebpur’, 1);
(2, ’Sajib’, ’Mondol’, 21, ’Male’, 01643932288, ’1230-Uttara’, 2);
(3, ’Md’, ’Rais’, 20, ’Male’, 01533947469, ’1213-Banani’, 1);
(4, ’Emma’, ’Jahan’, 18, ’Female’, 01900000000, ’1216-Mirpur’, 3);
(5, ’Sophia’, ’Rahman’, 24, ’Female’, 01744448888, ’1212-Gulshan’, 1);

SELECT * FROM PASSENGER;
```

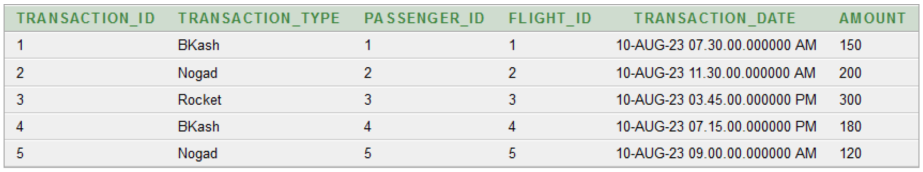


PASSENGER_ID	FIRST_NAME	LAST_NAME	AGE	GENDER	PHONE	ADDRESS	COUNTRY_ID
1	Arafat	Rahman	22	Male	1628862623	1700-Joydebpur	1
2	Sajib	Mondol	21	Male	1643932288	1230-Uttara	2
3	Md	Rais	20	Male	1533947469	1213-Banani	1
4	Emma	Jahan	18	Female	1900000000	1216-Mirpur	3
5	Sophia	Rahman	24	Female	1744448888	1212-Gulshan	1

- Transaction

INSERT INTO Transaction VALUES (1,’BKash’, 1, 1, TO-TIMESTAMP(’2023-08-10 07:30:00’, ’YYYY-MM-DD HH24:MI:SS’), 150);
INSERT INTO Transaction VALUES (2,’Nogad’, 2, 2, TO-TIMESTAMP(’2023-08-10 11:30:00’, ’YYYY-MM-DD HH24:MI:SS’), 200);
INSERT INTO Transaction VALUES (3,’Rocket’, 3, 3, TO-TIMESTAMP(’2023-08-10 15:45:00’, ’YYYY-MM-DD HH24:MI:SS’), 300);
INSERT INTO Transaction VALUES (4,’BKash’, 4, 4, TO-TIMESTAMP(’2023-08-10 19:15:00’, ’YYYY-MM-DD HH24:MI:SS’), 180);
INSERT INTO Transaction VALUES (5,’Nogad’, 5, 5, TO-TIMESTAMP(’2023-08-10 09:00:00’, ’YYYY-MM-DD HH24:MI:SS’), 120);

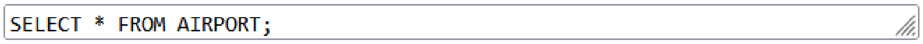
SELECT * FROM TRANSACTION;



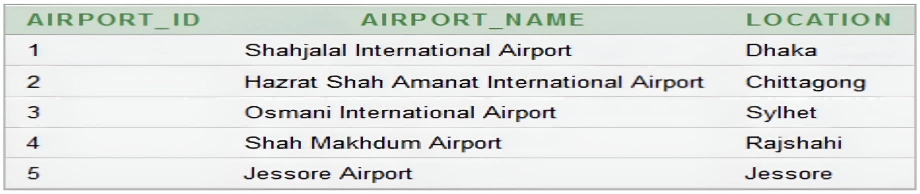
TRANSACTION_ID	TRANSACTION_TYPE	PASSENGER_ID	FLIGHT_ID	TRANSACTION_DATE	AMOUNT
1	BKash	1	1	10-AUG-23 07.30.00.000000 AM	150
2	Nogad	2	2	10-AUG-23 11.30.00.000000 AM	200
3	Rocket	3	3	10-AUG-23 03.45.00.000000 PM	300
4	BKash	4	4	10-AUG-23 07.15.00.000000 PM	180
5	Nogad	5	5	10-AUG-23 09.00.00.000000 AM	120

7 Query Writing

1. List all Airports

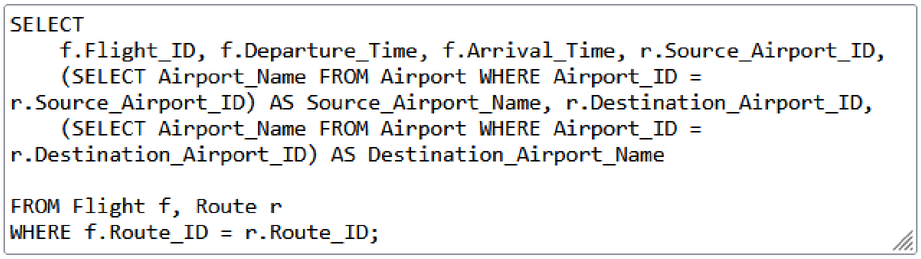


```
SELECT * FROM AIRPORT;
```



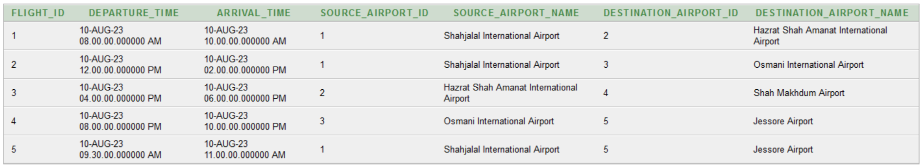
AIRPORT_ID	AIRPORT_NAME	LOCATION
1	Shahjalal International Airport	Dhaka
2	Hazrat Shah Amanat International Airport	Chittagong
3	Osmani International Airport	Sylhet
4	Shah Makhdum Airport	Rajshahi
5	Jessore Airport	Jessore

2. Retrieve flight details with source and destination airport names.



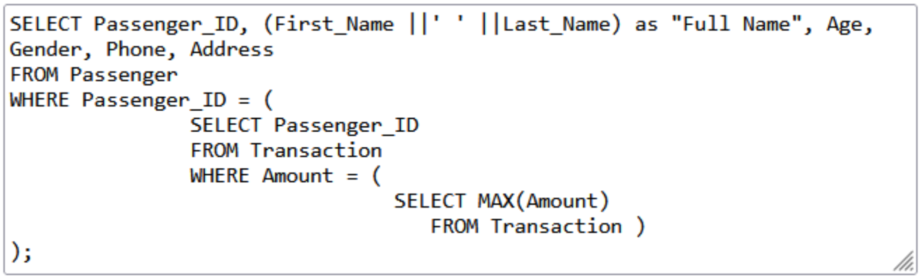
```
SELECT
    f.Flight_ID, f.Departure_Time, f.Arrival_Time, r.Source_Airport_ID,
    (SELECT Airport_Name FROM Airport WHERE Airport_ID =
r.Source_Airport_ID) AS Source_Airport_Name, r.Destination_Airport_ID,
    (SELECT Airport_Name FROM Airport WHERE Airport_ID =
r.Destination_Airport_ID) AS Destination_Airport_Name

FROM Flight f, Route r
WHERE f.Route_ID = r.Route_ID;
```

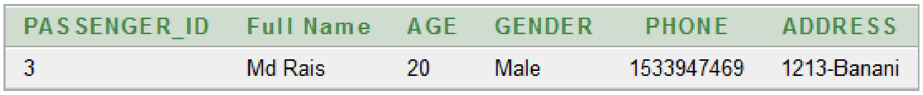


FLIGHT_ID	DEPARTURE_TIME	ARRIVAL_TIME	SOURCE_AIRPORT_ID	SOURCE_AIRPORT_NAME	DESTINATION_AIRPORT_ID	DESTINATION_AIRPORT_NAME
1	10-AUG-23 08.00.00.000000 AM	10-AUG-23 10.00.00.000000 AM	1	Shahjalal International Airport	2	Hazrat Shah Amanat International Airport
2	10-AUG-23 12.00.00.000000 PM	10-AUG-23 02.00.00.000000 PM	1	Shahjalal International Airport	3	Osmani International Airport
3	10-AUG-23 04.00.00.000000 PM	10-AUG-23 06.00.00.000000 PM	2	Hazrat Shah Amanat International Airport	4	Shah Makhdum Airport
4	10-AUG-23 08.00.00.000000 PM	10-AUG-23 10.00.00.000000 PM	3	Osmani International Airport	5	Jessore Airport
5	10-AUG-23 09.30.00.000000 AM	10-AUG-23 11.00.00.000000 AM	1	Shahjalal International Airport	5	Jessore Airport

3. Find the passengers who have booked the most expensive flight.

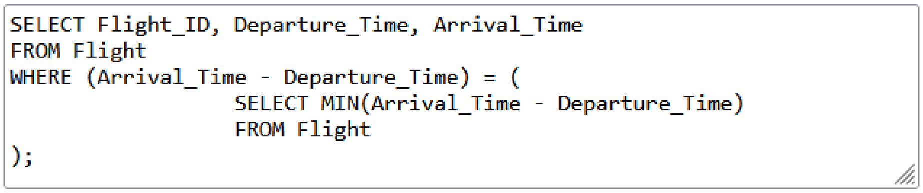


```
SELECT Passenger_ID, (First_Name ||' ' ||Last_Name) as "Full Name", Age,
Gender, Phone, Address
FROM Passenger
WHERE Passenger_ID = (
               SELECT Passenger_ID
               FROM Transaction
               WHERE Amount = (
                                SELECT MAX(Amount)
                                   FROM Transaction )
);
```

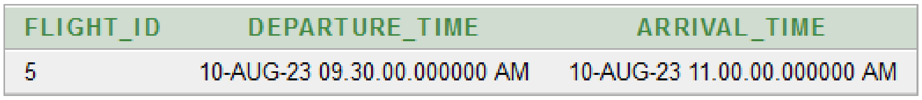


PASSENGER_ID	Full Name	AGE	GENDER	PHONE	ADDRESS
3	Md Rais	20	Male	1533947469	1213-Banani

4. Retrieve flights that have the shortest duration.

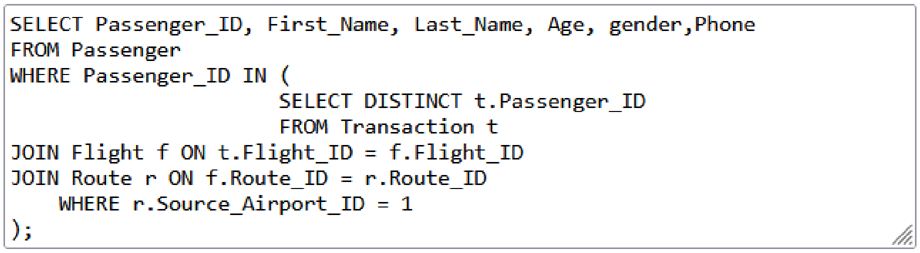


```
SELECT Flight_ID, Departure_Time, Arrival_Time
FROM Flight
WHERE (Arrival_Time - Departure_Time) = (
                  SELECT MIN(Arrival_Time - Departure_Time)
                  FROM Flight
);
```

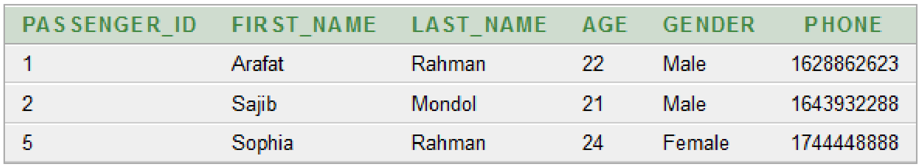


FLIGHT_ID	DEPARTURE_TIME	ARRIVAL_TIME
5	10-AUG-23 09.30.00.000000 AM	10-AUG-23 11.00.00.000000 AM

5. List passengers who have booked flights departing specific airport.

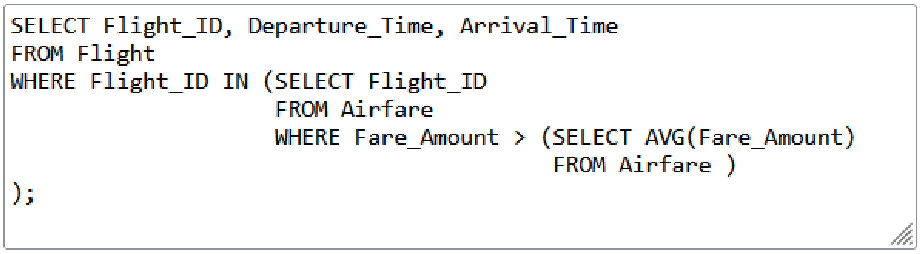


```
SELECT Passenger_ID, First_Name, Last_Name, Age, gender,Phone
FROM Passenger
WHERE Passenger_ID IN (
                      SELECT DISTINCT t.Passenger_ID
                      FROM Transaction t
JOIN Flight f ON t.Flight_ID = f.Flight_ID
JOIN Route r ON f.Route_ID = r.Route_ID
    WHERE r.Source_Airport_ID = 1
);
```

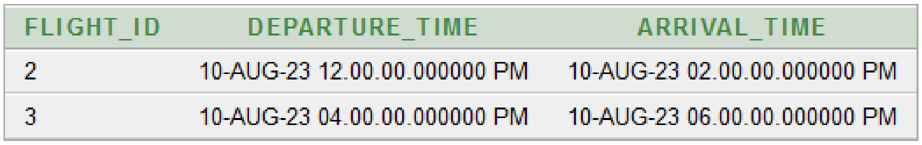


PASSENGER_ID	FIRST_NAME	LAST_NAME	AGE	GENDER	PHONE
1	Arafat	Rahman	22	Male	1628862623
2	Sajib	Mondol	21	Male	1643932288
5	Sophia	Rahman	24	Female	1744448888

6. Find flights with fares higher than the average fare amount.

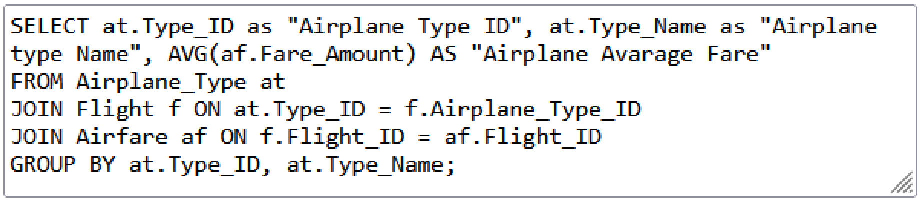


```
SELECT Flight_ID, Departure_Time, Arrival_Time
FROM Flight
WHERE Flight_ID IN (SELECT Flight_ID
                    FROM Airfare
                    WHERE Fare_Amount > (SELECT AVG(Fare_Amount)
                                        FROM Airfare )
);
```

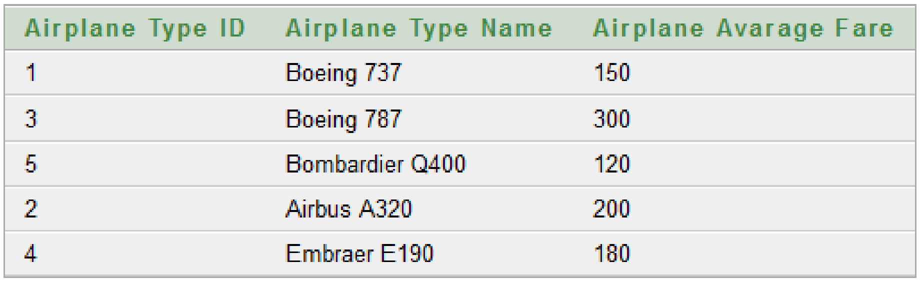


FLIGHT_ID	DEPARTURE_TIME	ARRIVAL_TIME
2	10-AUG-23 12.00.00.000000 PM	10-AUG-23 02.00.00.000000 PM
3	10-AUG-23 04.00.00.000000 PM	10-AUG-23 06.00.00.000000 PM

7. Find the average fare amount for each airplane type.

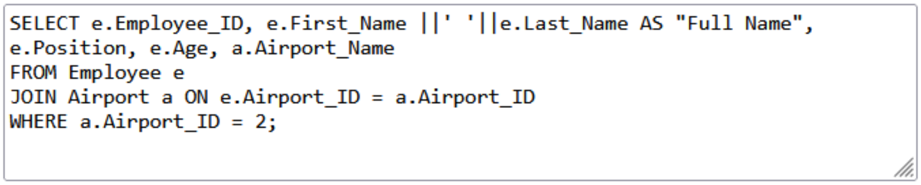


```
SELECT at.Type_ID as "Airplane Type ID", at.Type_Name as "Airplane
type Name", AVG(af.Fare_Amount) AS "Airplane Avarage Fare"
FROM Airplane_Type at
JOIN Flight f ON at.Type_ID = f.Airplane_Type_ID
JOIN Airfare af ON f.Flight_ID = af.Flight_ID
GROUP BY at.Type_ID, at.Type_Name;
```

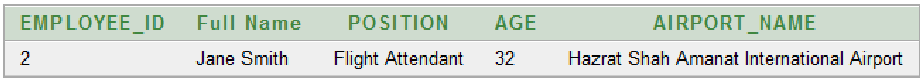


Airplane Type ID	Airplane Type Name	Airplane Avarage Fare
1	Boeing 737	150
3	Boeing 787	300
5	Bombardier Q400	120
2	Airbus A320	200
4	Embraer E190	180

8. List employees and their positions at a specific airport.

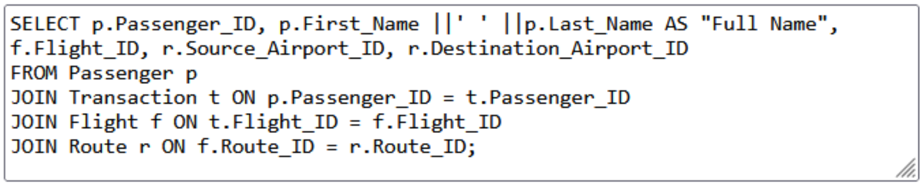


```
SELECT e.Employee_ID, e.First_Name ||' '||e.Last_Name AS "Full Name",
e.Position, e.Age, a.Airport_Name
FROM Employee e
JOIN Airport a ON e.Airport_ID = a.Airport_ID
WHERE a.Airport_ID = 2;
```

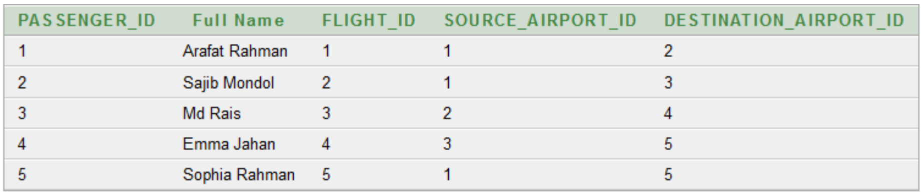


EMPLOYEE_ID	Full Name	POSITION	AGE	AIRPORT_NAME
2	Jane Smith	Flight Attendant	32	Hazrat Shah Amanat International Airport

9. Retrieve passenger details along with their flights.



```
SELECT p.Passenger_ID, p.First_Name ||' ' ||p.Last_Name AS "Full Name",
f.Flight_ID, r.Source_Airport_ID, r.Destination_Airport_ID
FROM Passenger p
JOIN Transaction t ON p.Passenger_ID = t.Passenger_ID
JOIN Flight f ON t.Flight_ID = f.Flight_ID
JOIN Route r ON f.Route_ID = r.Route_ID;
```



PASSENGER_ID	Full Name	FLIGHT_ID	SOURCE_AIRPORT_ID	DESTINATION_AIRPORT_ID
1	Arafat Rahman	1	1	2
2	Sajib Mondol	2	1	3
3	Md Rais	3	2	4
4	Emma Jahan	4	3	5
5	Sophia Rahman	5	1	5

8 Conclusion

In summary, the ”Airlines Management System” database serves as a robust foundation for the efficient management of various aspects within an airline operation. With well-defined tables representing passengers, flights, routes, airplane types, airfares, airports, employees, countries, and transactions, the database enables seamless organization and retrieval of essential data. Through established relationships, it ensures data integrity and empowers users to access passenger information, flight details, pricing, and staff records. This database fosters streamlined operations, accurate record-keeping, and effective decision-making for optimized airline management.

Thank You