

**Name: Zain Kashif, Rahima Farrukh**

**Roll No: L1F22BSCS1110, L1F22BSCS1101**

**Section: D16**

**Course Instructor: Sir Afham Nazir**

**Database and Management System**

**Project Name: Airline Management System (AIROWINGS)**

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**Entities:**

1. **Aircraft**
2. **Flight**
3. **Passenger**
4. **Crew**
5. **Ticket**
6. **Airport**
7. **Maintenance Schedule**
8. **Maintenance Record**
9. **Baggage**
10. **Payment**

**Attributes and description:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Entity** | **Attributes** | **Type** | **Data Type** |
| **1.** | **Aircraft** | **AircraftID** | **Primary Key** | **VARCHAR** |
|  |  | **AircraftType** | **Simple Attribute** | **CHAR** |
|  |  | **TotalSeats** | **Simple Attribute** | **INT** |
|  |  | **LastMaintenanceDate** | **Simple Attribute** | **DATE** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Entity** | **Attributes** | **Type** | **Data Type** |
| **2.** | **Flight** | **FlightID** | **Primary Key** | **VARCHAR** |
|  |  | **DepartureAirport** | **Simple Attribute** | **CHAR** |
|  |  | **ArrivalAirport** | **Simple Attribute** | **CHAR** |
|  |  | **DepartureDateTime** | **Simple Attribute** | **DATETIME** |
|  |  | **ArrivalDateTime** | **Simple Attribute** | **DATETIME** |
|  |  | **FlightDuration** | **Simple Attribute** | **TIME** |
|  |  | **Status (delay,cancelled, etc.)** | **Simple Attribute** | **CHAR** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Entity** | **Attributes** | **Type** | **Data Type** |
| **3.** | **Passenger** | **PassengerID** | **Primary Key** | **VARCHAR** |
|  |  | **PassengerName**  **(F.name, L.name)** | **Composite Attribute** | **CHAR** |
|  |  | **Gender** | **Simple Attribute** | **CHAR** |
|  |  | **DOB** | **Simple Attribute** | **DATE** |
|  |  | **Age** | **Derived Attribute** | **INT** |
|  |  | **PhoneNumber**  **(P.number, S.number)** | **Multivalued Attribute** | **INT** |
|  |  | **Email** | **Simple Attribute** | **VARCHAR** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Entity** | **Attributes** | **Type** | **Data Type** |
| **4.** | **Crew** | **CrewID** | **Primary Key** | **VARCHAR** |
|  |  | **CrewName**  **(F.name, L.name)** | **Composite Attribute** | **CHAR** |
|  |  | **Position**  **(Pilot, Staff, Hostess, etc.)** | **Simple Attribute** | **CHAR** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Entity** | **Attributes** | **Type** | **Data Type** |
| **5.** | **Tricket** | **TicketID** | **Primary Key** | **VARCHAR** |
|  |  | **SeatNumber** | **Simple Attribute** | **VARCHAR** |
|  |  | **Class**  **(Economy, Business, etc.)** | **Simple Attribute** | **CHAR** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Entity** | **Attributes** | **Type** | **Data Type** |
| **6.** | **Airport** | **AirpotID** | **Primary Key** | **VARCHAR** |
|  |  | **AirportName** | **Simple Attribute** | **CHAR** |
|  |  | **Location** | **Simple Attribute** | **CHAR** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Entity** | **Attributes** | **Type** | **Data Type** |
| **7.** | **Maintenance Schedule** | **ScheduleID** | **Primary Key** | **VARCHAR** |
|  |  | **ScheduleDate** | **Simple Attribute** | **DATE** |
|  |  | **Description** | **Simple Attribute** | **CHAR** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Entity** | **Attributes** | **Type** | **Data Type** |
| **8.** | **Maintenance Record** | **RecordID** | **Primary Key** | **VARCHAR** |
|  |  | **CompletionDate** | **Simple Attribute** | **DATE** |

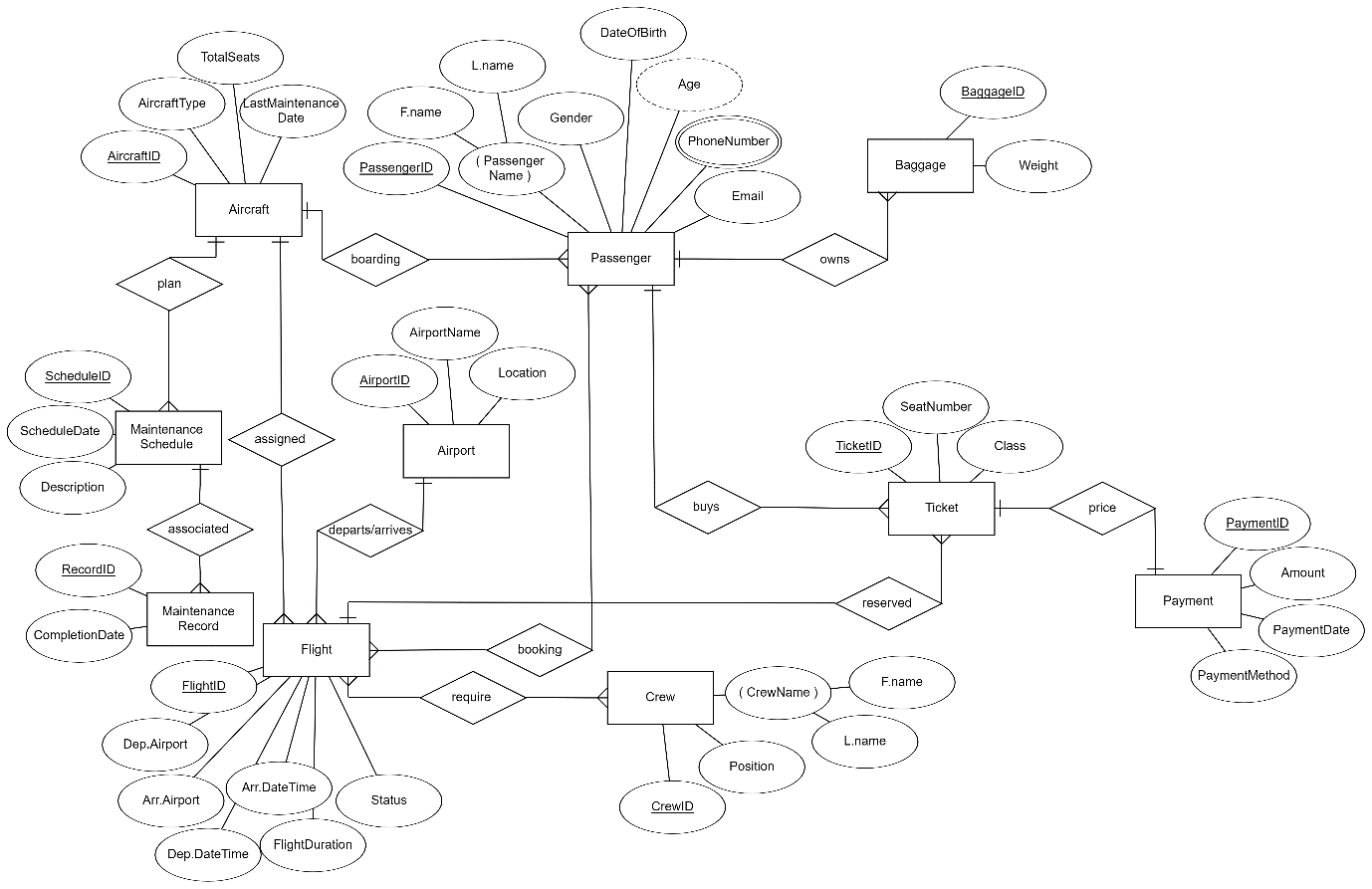
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Entity** | **Attributes** | **Type** | **Data Type** |
| **9.** | **Baggage** | **BaggageID** | **Primary Key** | **VARCHAR** |
|  |  | **Weight** | **Simple Attribute** | **FLOAT** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Entity** | **Attributes** | **Type** | **Data Type** |
| **10.** | **Payment** | **PaymentID** | **Primary Key** | **VARCHAR** |
|  |  | **Amount** | **Simple Attribute** | **FLOAT** |
|  |  | **PaymentDate** | **Simple Attribute** | **DATE** |
|  |  | **PaymentMethod** | **Simple Attribute** | **CHAR** |

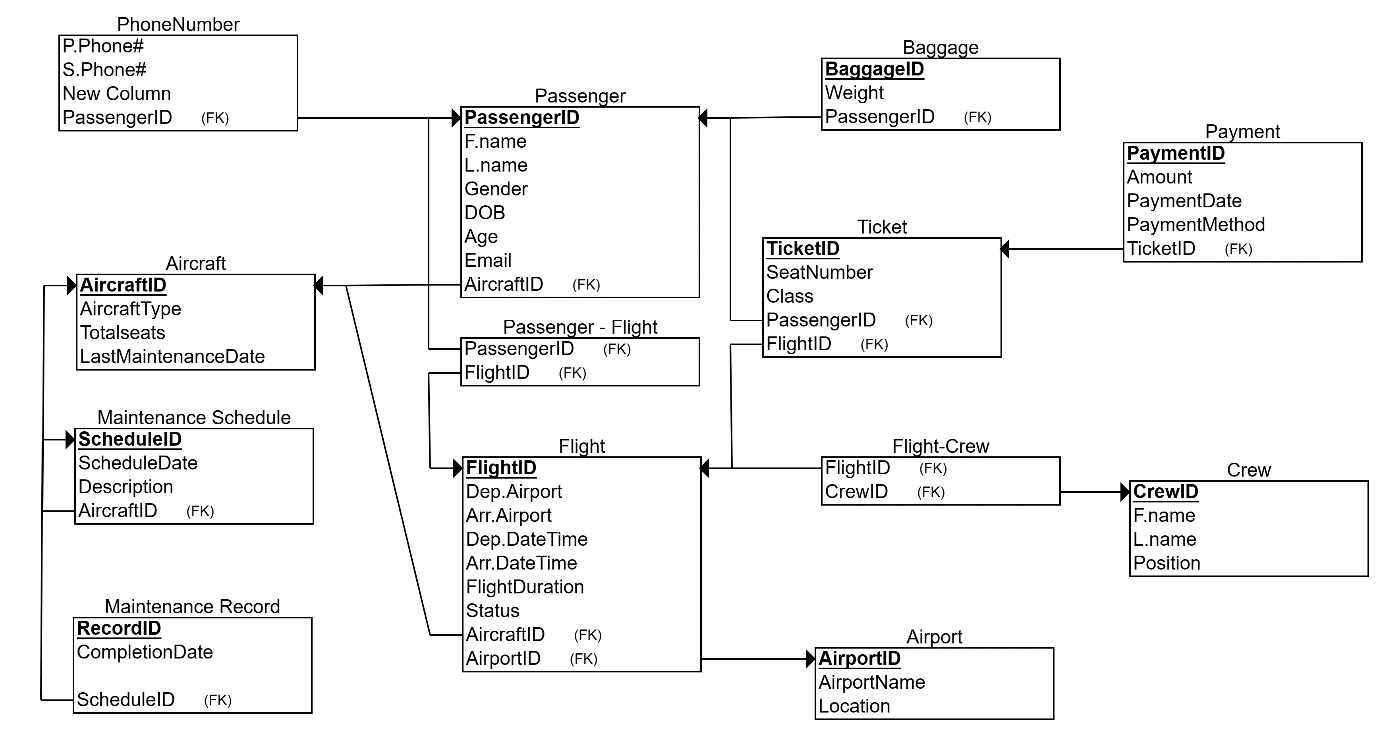
**Relationships:**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Relationship between** | **Relationship** | **Description** |
| **1.** | **Aircraft – Flight** | **One to Many** | **An aircraft can have multiple flights, but a flight can not have multiple aircrafts. Hence one aircraft has many flights.** |
| **2.** | **Aircraft – Passenger** | **One to Many** | **An aircraft can seat many passengers, but many passengers can’t sit on many aircrafts.**  **Hence one aircraft has many passengers.** |
| **3.** | **Flight – Passenger** | **Many to Many** | **A flight can have multiple passengers, and multiple passengers can be on multiple flights.**  **Hence many flights have many passengers.** |
| **4.** | **Flights – Crew** | **Many to Many** | **Every flight requires a crew and a crew member can be assigned to many flights.**  **Hence many flights have many crew members.** |
| **5.** | **Flight – Airport** | **Many to One** | **Many flights can be on one airport, and a flight can not be on many airports.**  **Hence one airport can have multiple flights.** |
|  |  |  |  |
| **6.** | **Aircraft – Maintenance Schedule** | **One to Many** | **An aircraft can have multiple maintenance schedule, but each maintenance schedule is associated with only one aircraft.**  **Hence one aircraft has many maintenance schedules.** |
| **7.** | **Maintenance Schedule – Maintenance Record** | **One to Many** | **A maintenance schedule can have multiple maintenance records, but each maintenance record is associated with only one maintenance schedule.**  **Hence a maintenance schedule has many records.** |
| **8.** | **Passenger – Ticket** | **One to Many** | **A passenger can have multiple tickets, but each ticket is own by only one passenger.**  **Hence a passenger can buy many tickets.** |
| **9.** | **Passenger – Baggage** | **One to Many** | **A passenger can have many baggage items, but each baggage item belongs to only one passenger.**  **Hence a passenger can own many baggage items.** |
| **10.** | **Flight – Ticket** | **One to Many** | **A flight can have multiple tickets, but each ticket is associated with only one flight.**  **Hence a flight can have many tickets.** |
|  |  |  |  |
| **11.** | **Payment – Ticket** | **One to One** | **Each payment is associated with one ticket, and each ticket corresponds to one payment.**  **Hence one payment is associated with one ticket.** |
|  |  |  |  |

**Entity Relationship Diagram:**

****

**Relational Schema:**

****

**SQL:**

**-- create the database**

**create database PROJECT;**

**use PROJECT;**

**-- create the AIRPORT table**

**create table AIRPORT(**

**AirportID varchar(10) primary key,**

**AirportName char(100),**

**Location char(100)**

**);**

**-- create the AIRCRAFT table**

**create table AIRCRAFT(**

**AircraftID varchar(10) primary key,**

**AircraftType char(50),**

**TotalSeats int,**

**LastMaintenanceDate date**

**);**

**-- create the PASSENGER table**

**create table PASSENGER(**

**PassengerID varchar(10) primary key,**

**FirstName char(50),**

**LastName char(50),**

**Gender char(1),**

**DOB date,**

**Age int,**

**Email varchar(100),**

**AircraftID varchar(10)**

**);**

**-- create the PHONENUMBER table**

**create table PHONENUMBER(**

**PrimaryPhone bigint,**

**SecondaryPhone bigint,**

**PassengerID varchar(10)**

**);**

**-- create the BAGGAGE table**

**create table BAGGAGE(**

**BaggageID varchar(10) primary key,**

**Weight float,**

**PassengerID varchar(10)**

**);**

**-- create the TICKET table**

**create table TICKET(**

**TicketID varchar(10) primary key,**

**SeatNumber varchar(10),**

**Class char(50),**

**PassengerID varchar(10),**

**FlightID varchar(10)**

**);**

**-- create the PAYMENT table**

**create table PAYMENT(**

**PaymentID varchar(10) primary key,**

**Amount float,**

**PaymentDate date,**

**PaymentMethod char(50),**

**TicketID varchar(10)**

**);**

**-- create the CREW table**

**create table CREW(**

**CrewID varchar(10) primary key,**

**FirstName char(50),**

**LastName char(50),**

**Position char(50)**

**);**

**-- create the FLIGHT table**

**create table FLIGHT(**

**FlightID varchar(10) primary key,**

**DepAirport char(50),**

**ArrAirport char(50),**

**DepDateTime datetime,**

**ArrDateTime datetime,**

**FlightDuration time,**

**Status char(50),**

**AircraftID varchar(10),**

**AirportID varchar(10)**

**);**

**-- create the FLIGHT\_CREW table**

**create table FLIGHT\_CREW(**

**CrewID varchar(10),**

**FlightID varchar(10),**

**primary key (CrewID, FlightID)**

**);**

**-- create the PASSENGER\_FLIGHT table**

**create table PASSENGER\_FLIGHT(**

**PassengerID varchar(10),**

**FlightID varchar(10),**

**primary key (PassengerID, FlightID)**

**);**

**-- create the MAINTENANCE\_SCHEDULE table**

**create table MAINTENANCE\_SCHEDULE(**

**ScheduleID varchar(10) primary key,**

**ScheduleDate date,**

**Description char(255),**

**AircraftID varchar(10)**

**);**

**-- create the MAINTENANCE\_RECORD table**

**create table MAINTENANCE\_RECORD(**

**RecordID varchar(10) primary key,**

**CompletionDate date,**

**ScheduleID varchar(10)**

**);**

**show tables;**

**-- add Foreign Keys in tables**

**alter table PASSENGER**

**add foreign key (AircraftID) references AIRCRAFT(AircraftID);**

**alter table PHONENUMBER**

**add foreign key (PassengerID) references PASSENGER(PassengerID);**

**alter table BAGGAGE**

**add foreign key (PassengerID) references PASSENGER(PassengerID);**

**alter table TICKET**

**add foreign key (PassengerID) references PASSENGER(PassengerID);**

**alter table TICKET**

**add foreign key (FlightID) references FLIGHT(FlightID);**

**alter table PAYMENT**

**add foreign key (TicketID) references TICKET(TicketID);**

**alter table FLIGHT**

**add foreign key (AircraftID) references AIRCRAFT(AircraftID);**

**alter table FLIGHT**

**add foreign key (AirportID) references AIRPORT(AirportID);**

**alter table FLIGHT\_CREW**

**add foreign key (CrewID) references CREW(CrewID);**

**alter table FLIGHT\_CREW**

**add foreign key (FlightID) references FLIGHT(FlightID);**

**alter table PASSENGER\_FLIGHT**

**add foreign key (PassengerID) references PASSENGER(PassengerID);**

**alter table PASSENGER\_FLIGHT**

**add foreign key (FlightID) references FLIGHT(FlightID);**

**alter table MAINTENANCE\_SCHEDULE**

**add foreign key (AircraftID) references AIRCRAFT(AircraftID);**

**alter table MAINTENANCE\_RECORD**

**add foreign key (ScheduleID) references MAINTENANCE\_SCHEDULE(ScheduleID);**

**desc AIRPORT;**

**-- Insert data into AIRPORT table**

**insert into AIRPORT (AirportID, AirportName, Location)**

**values ('KHI', 'Jinnah International Airport', 'Karachi'),**

**('LHE', 'Allama Iqbal International Airport', 'Lahore'),**

**('ISB', 'Islamabad International Airport', 'Islamabad'),**

**('PEW', 'Bacha Khan International Airport', 'Peshawar'),**

**('MUX', 'Multan International Airport', 'Multan'),**

**('SKT', 'Sialkot International Airport', 'Sialkot'),**

**('UET', 'Quetta International Airport', 'Quetta'),**

**('LYP', 'Faisalabad International Airport', 'Faisalabad'),**

**('KDU', 'Skardu International Airport', 'Skardu'),**

**('GIL', 'Gilgit Airport', 'Gilgit'),**

**('SKZ', 'Sukkar Airport', 'Sukkar'),**

**('TUK', 'Turbat Airport', 'Turbat'),**

**('GWD', 'Gwadar International Airport', 'Gwadar'),**

**('RYK', 'Sheikh Zayed International Airport', 'Rahim Yar Khan'),**

**('BHV', 'Bahawalpur Airport', 'Bahawalpur');**

**-- Insert data into AIRCRAFT table**

**insert into AIRCRAFT (AircraftID, AircraftType, TotalSeats, LastMaintenanceDate)**

**values ('001', 'Boeing 777', 314, '2024-01-01'),**

**('002', 'Airbus A320', 180, '2024-02-01'),**

**('030', 'Boeing 737', 162, '2024-03-01'),**

**('004', 'ATR 72', 70, '2024-04-01'),**

**('050', 'Airbus A380', 500, '2024-05-01'),**

**('006', 'Boeing 747', 1554, '2024-06-01'),**

**('070', 'Embraer 175', 80, '2024-07-01'),**

**('008', 'Bombardier Q400', 80, '2024-08-01'),**

**('090', 'Airbus Beluga XL', 800, '2024-09-01'),**

**('010', 'T45 Goshawk', 260, '2024-10-01'),**

**('000', 'VC-25A Air Force One', 320, '2024-11-01'),**

**('017', 'F-15E Strike Eagle', 40, '2024-12-01'),**

**('031', 'British Aerospace ATP', 480, '2025-01-01'),**

**('100', 'Diamond DA-50 Magnum', 110, '2025-02-01'),**

**('015', 'Eclipse 400 ECJ', 200, '2025-03-01');**

**-- Insert data into PASSENGER table**

**insert into PASSENGER (PassengerID, FirstName, LastName, Gender, DOB, Age, Email, AircraftID)**

**values ('001', 'Ali', 'Khan', 'M', '1990-01-01', 34, 'ali.khan@example.com', '001'),**

**('002', 'Sara', 'Ahmed', 'F', '1985-05-05', 39, 'sara.ahmed@example.com', '002'),**

**('003', 'Usman', 'Saeed', 'M', '1982-03-15', 42, 'usman.saeed@example.com', '030'),**

**('004', 'Ayesha', 'Kamal', 'F', '1995-07-25', 29, 'ayesha.kamal@example.com', '004'),**

**('005', 'Bilal', 'Zafar', 'M', '1978-11-30', 46, 'bilal.zafar@example.com', '050'),**

**('006', 'Azam', 'Khan', 'M', '1990-01-01', 34, 'azam.khan@example.com', '006'),**

**('007', 'Sana', 'Sohail', 'F', '1985-05-05', 39, 'Sana.sohail@example.com', '070'),**

**('008', 'Saeed', 'Ghani', 'M', '1982-03-15', 42, 'saeed.ghani@example.com', '008'),**

**('009', 'Ayesha', 'Siddique', 'F', '1995-07-25', 29, 'ayesha.siddique@example.com', '090'),**

**('010', 'Bilal', 'Ahmed', 'M', '1978-11-30', 46, 'bilal.ahmed@example.com', '010'),**

**('011', 'Muhammad', 'Ali', 'M', '1990-01-01', 34, 'muhammad.ali@example.com', '000'),**

**('012', 'Sara', 'Ali', 'F', '1985-05-05', 39, 'sara.ali@example.com', '017'),**

**('013', 'Usman', 'Sohail', 'M', '1982-03-15', 42, 'usman.sohail@example.com', '031'),**

**('014', 'Ayesha', 'Khan', 'F', '1995-07-25', 29, 'ayesha.khan@example.com', '100'),**

**('015', 'Bilal', 'Ali', 'M', '1978-11-30', 46, 'bilal.ali@example.com', '015');**

**-- Insert data into PHONENUMBER table**

**insert into PHONENUMBER (PrimaryPhone, SecondaryPhone, PassengerID)**

**values (3001234567, 3007654321, '001'),**

**(3009876543, 3005678901, '002'),**

**(3002345678, 3008765432, '003'),**

**(3003456789, 3009876543, '004'),**

**(300451890, 3000987354, '005'),**

**(3001324667, 3007634021, '006'),**

**(3009876543, 3005678901, '007'),**

**(3002345678, 3008765432, '008'),**

**(3003456789, 3009876543, '009'),**

**(3004517190, 3000982104, '010'),**

**(3001222517, 3007456312, '011'),**

**(3001871543, 3005608901, '012'),**

**(3002305608, 3008723543, '013'),**

**(3003436189, 3009871503, '014'),**

**(3004765809, 3000967854, '015');**

**-- Insert data into BAGGAGE table**

**insert into BAGGAGE (BaggageID, Weight, PassengerID)**

**values ('001', 23.5, '001'),**

**('020', 20.0, '002'),**

**('003', 25.0, '003'),**

**('040', 18.0, '004'),**

**('005', 30.0, '005'),**

**('060', 23.5, '006'),**

**('007', 20.0, '007'),**

**('080', 25.0, '008'),**

**('009', 18.0, '009'),**

**('010', 30.0, '010'),**

**('011', 23.5, '011'),**

**('012', 20.0, '012'),**

**('013', 25.0, '013'),**

**('014', 18.0, '014'),**

**('015', 30.0, '015');**

**-- Insert data into FLIGHT table**

**insert into FLIGHT (FlightID, DepAirport, ArrAirport, DepDateTime, ArrDateTime, FlightDuration, Status, AircraftID, AirportID)**

**values ('010', 'KHI', 'LHE', '2024-06-10 10:00:00', '2024-06-10 12:00:00', '02:00:00', 'On Time', '001', 'KHI'),**

**('002', 'LHE', 'ISB', '2024-06-11 15:00:00', '2024-06-11 16:00:00', '01:00:00', 'Delayed', '002', 'LHE'),**

**('030', 'ISB', 'KHI', '2024-06-12 18:00:00', '2024-06-12 20:00:00', '02:00:00', 'On Time', '030', 'ISB'),**

**('004', 'KHI', 'PEW', '2024-06-13 08:00:00', '2024-06-13 09:30:00', '01:30:00', 'Cancelled', '004', 'KHI'),**

**('050', 'PEW', 'SKT', '2024-06-14 11:00:00', '2024-06-14 12:00:00', '01:00:00', 'On Time', '050', 'PEW'),**

**('006', 'KHI', 'LHE', '2024-06-10 10:00:00', '2024-06-10 12:00:00', '02:00:00', 'On Time', '006', 'KHI'),**

**('070', 'LHE', 'ISB', '2024-06-11 15:00:00', '2024-06-11 16:00:00', '01:00:00', 'Delayed', '070', 'LHE'),**

**('008', 'ISB', 'KHI', '2024-06-12 18:00:00', '2024-06-12 20:00:00', '02:00:00', 'On Time', '008', 'ISB'),**

**('090', 'KHI', 'PEW', '2024-06-13 08:00:00', '2024-06-13 09:30:00', '01:30:00', 'Cancelled', '090', 'KHI'),**

**('000', 'PEW', 'SKT', '2024-06-14 11:00:00', '2024-06-14 12:00:00', '01:00:00', 'On Time', '010', 'PEW'),**

**('011', 'KHI', 'LHE', '2024-06-10 10:00:00', '2024-06-10 12:00:00', '02:00:00', 'On Time', '000', 'KHI'),**

**('012', 'LHE', 'ISB', '2024-06-11 15:00:00', '2024-06-11 16:00:00', '01:00:00', 'Delayed', '017', 'LHE'),**

**('013', 'ISB', 'KHI', '2024-06-12 18:00:00', '2024-06-12 20:00:00', '02:00:00', 'On Time', '031', 'ISB'),**

**('014', 'KHI', 'PEW', '2024-06-13 08:00:00', '2024-06-13 09:30:00', '01:30:00', 'Cancelled', '100', 'KHI'),**

**('015', 'PEW', 'SKT', '2024-06-14 11:00:00', '2024-06-14 12:00:00', '01:00:00', 'On Time', '015', 'PEW');**

**-- Insert data into TICKET table**

**insert into TICKET (TicketID, SeatNumber, Class, PassengerID, FlightID)**

**values ('001', '12A', 'Economy', '001', '010'),**

**('002', '14C', 'Economy', '002', '002'),**

**('003', '16B', 'Business', '003', '030'),**

**('004', '18D', 'First', '004', '004'),**

**('005', '20E', 'Economy', '005', '050'),**

**('006', '22A', 'Economy', '006', '006'),**

**('007', '24C', 'Economy', '007', '070'),**

**('008', '26B', 'Business', '008', '008'),**

**('009', '28D', 'First', '009', '090'),**

**('010', '30E', 'Economy', '010', '000'),**

**('011', '32A', 'Economy', '011', '011'),**

**('012', '34C', 'Economy', '012', '012'),**

**('013', '36B', 'Business', '013', '013'),**

**('014', '38D', 'First', '014', '014'),**

**('015', '40E', 'Economy', '015', '015');**

**-- Insert data into PAYMENT table**

**insert into PAYMENT (PaymentID, Amount, PaymentDate, PaymentMethod, TicketID)**

**values ('001', 15000.0, '2024-06-01', 'Credit Card', '001'),**

**('002', 16000.0, '2024-06-02', 'Debit Card', '002'),**

**('003', 25000.0, '2024-06-03', 'Credit Card', '003'),**

**('004', 35000.0, '2024-06-04', 'Cash', '004'),**

**('005', 10000.0, '2024-06-05', 'Debit Card', '005'),**

**('006', 15000.0, '2024-06-01', 'Credit Card', '006'),**

**('007', 16000.0, '2024-06-02', 'Debit Card', '007'),**

**('008', 25000.0, '2024-06-03', 'Credit Card', '008'),**

**('009', 35000.0, '2024-06-04', 'Cash', '009'),**

**('010', 10000.0, '2024-06-05', 'Debit Card', '010'),**

**('011', 15000.0, '2024-06-01', 'Credit Card', '011'),**

**('012', 16000.0, '2024-06-02', 'Debit Card', '012'),**

**('013', 25000.0, '2024-06-03', 'Credit Card', '013'),**

**('014', 35000.0, '2024-06-04', 'Cash', '014'),**

**('015', 10000.0, '2024-06-05', 'Debit Card', '015');**

**-- Insert data into CREW table**

**insert into CREW (CrewID, FirstName, LastName, Position)**

**values ('001', 'Asad', 'Ali', 'Pilot'),**

**('002', 'Nida', 'Hussain', 'Flight Attendant'),**

**('003', 'Raza', 'Khan', 'Co-Pilot'),**

**('004', 'Sana', 'Zafar', 'Flight Attendant'),**

**('005', 'Kamran', 'Sheikh', 'Pilot'),**

**('006', 'Ali', 'Asad', 'Pilot'),**

**('007', 'Nidia', 'Nadeem', 'Flight Attendant'),**

**('008', 'Ahir', 'Khaan', 'Co-Pilot'),**

**('009', 'Sania', 'Zafar', 'Flight Attendant'),**

**('010', 'Kamran', 'Akmal', 'Pilot'),**

**('011', 'Muhammad', 'Ali', 'Pilot'),**

**('012', 'Sheeza', 'Hussain', 'Flight Attendant'),**

**('013', 'Rehmaan', 'Khan', 'Co-Pilot'),**

**('014', 'Ashfa', 'Burhan', 'Flight Attendant'),**

**('015', 'Umar', 'Sheikh', 'Pilot');**

**-- Insert data into FLIGHT\_CREW table**

**insert into FLIGHT\_CREW (CrewID, FlightID)**

**values ('001', '010'),**

**('002', '002'),**

**('003', '030'),**

**('004', '004'),**

**('005', '050'),**

**('006', '006'),**

**('007', '070'),**

**('008', '008'),**

**('009', '090'),**

**('010', '000'),**

**('011', '011'),**

**('012', '012'),**

**('013', '013'),**

**('014', '014'),**

**('015', '015');**

**-- Insert data into PASSENGER\_FLIGHT table**

**insert into PASSENGER\_FLIGHT (PassengerID, FlightID)**

**values ('001', '010'),**

**('002', '002'),**

**('003', '030'),**

**('004', '004'),**

**('005', '050'),**

**('006', '006'),**

**('007', '070'),**

**('008', '008'),**

**('009', '090'),**

**('010', '000'),**

**('011', '011'),**

**('012', '012'),**

**('013', '013'),**

**('014', '014'),**

**('015', '015');**

**-- Insert data into MAINTENANCE\_SCHEDULE table**

**insert into MAINTENANCE\_SCHEDULE (ScheduleID, ScheduleDate, Description, AircraftID)**

**values ('001', '2024-07-01', 'Routine Maintenance', '001'),**

**('002', '2024-08-01', 'Engine Check', '002'),**

**('003', '2024-09-01', 'Avionics Update', '030'),**

**('004', '2024-10-01', 'Cabin Refurbishment', '004'),**

**('005', '2024-11-01', 'Complete Overhaul', '050'),**

**('006', '2024-07-01', 'Routine Maintenance', '006'),**

**('007', '2024-08-01', 'Engine Check', '070'),**

**('008', '2024-09-01', 'Avionics Update', '008'),**

**('009', '2024-10-01', 'Cabin Refurbishment', '090'),**

**('010', '2024-11-01', 'Complete Overhaul', '010'),**

**('011', '2024-07-01', 'Routine Maintenance', '000'),**

**('012', '2024-08-01', 'Engine Check', '017'),**

**('013', '2024-09-01', 'Avionics Update', '031'),**

**('014', '2024-10-01', 'Cabin Refurbishment', '100'),**

**('015', '2024-11-01', 'Complete Overhaul', '015');**

**-- Insert data into MAINTENANCE\_RECORD table**

**insert into MAINTENANCE\_RECORD (RecordID, CompletionDate, ScheduleID)**

**values ('001', '2024-07-02', '001'),**

**('002', '2024-08-02', '002'),**

**('003', '2024-09-02', '003'),**

**('004', '2024-10-02', '004'),**

**('005', '2024-11-02', '005'),**

**('006', '2024-07-02', '006'),**

**('007', '2024-08-02', '007'),**

**('008', '2024-09-02', '008'),**

**('009', '2024-10-02', '009'),**

**('010', '2024-11-02', '010'),**

**('011', '2024-07-02', '011'),**

**('012', '2025-08-02', '012'),**

**('013', '2025-09-02', '013'),**

**('014', '2025-10-02', '014'),**

**('015', '2025-11-02', '015');**

**-- find airports located in Karachi**

**select \* from AIRPORT**

**where location = 'Karachi';**

**-- find aircraft with more than 200 seats**

**select \* from AIRCRAFT**

**where totalseats > 200;**

**-- find all male passengers**

**select \* from PASSENGER**

**where gender = 'M';**

**-- find baggage with weight greater than 25 kg**

**select \* from BAGGAGE**

**where weight > 25.0;**

**-- find payments made by credit card and amount greater than 20000**

**select \* from PAYMENT**

**where paymentmethod = 'Credit Card' and amount > 20000;**

**-- find all crew members who are pilots**

**select \* from CREW**

**where position = 'Pilot';**

**-- find flights operated by crew C001**

**select \* from FLIGHT\_CREW**

**where crewid = 'C001';**

**-- find maintenance schedules after '2024-08-01'**

**select \* from MAINTENANCE\_SCHEDULE**

**where scheduledate > '2024-08-01';**

**-- find maintenance records completed after '2024'**

**select \* from MAINTENANCE\_RECORD**

**where completiondate like '2024%';**

**-- find all baggage items with weight greater than 20 and less than 30 kg**

**select \* from BAGGAGE**

**where weight > 20.0 and weight < 30.0;**

**-- find all passengers older than 40 years**

**select \* from PASSENGER**

**where age > 40;**

**-- find all passengers with primary phone numbers**

**select \* from PHONENUMBER**

**where primaryphone is not null;**

**-- find passengers who are not male, aged between 30 and 50, and have an email ending with '.com'**

**select \* from PASSENGER**

**where gender != 'M' and age between 30 and 50 and email like '%.com';**

**-- find flights that are cancelled**

**select \* from FLIGHT**

**where status = 'cancelled';**

**-- find flights arriving at airports ending with 'E'?**

**select \* from FLIGHT**

**where ArrAirport like '%E';**

**-- PHASE 4**

**-- JOINS**

**-- Inner Joins**

**select a.AirportID ,a.AirportName, f.FlightID, ac.AircraftID**

**from AIRPORT as a**

**inner join FLIGHT as f**

**on a.AirportID = f.FlightID**

**inner join AIRCRAFT as ac**

**on f.AircraftID = ac.AircraftID;**

**select f.FlightID ,a.AircraftID ,a.AircraftType, ap.AirportID**

**from FLIGHT as f**

**inner join AIRCRAFT as a**

**on f.FlightID = a.AircraftID**

**inner join AIRPORT as ap**

**on f.FlightID = ap.AirportID;**

**select p.PassengerID,p.FirstName,p.LastName,t.TicketID,t.SeatNumber,t.FlightID**

**from PASSENGER as p**

**inner join TICKET as t**

**on p.PassengerID = t.TicketID;**

**select a.AircraftID,a.AircraftType,a.LastMaintenanceDate,m.ScheduleID,m.ScheduleDate,f.flightID**

**from AIRCRAFT as a**

**inner join MAINTENANCE\_SCHEDULE as m**

**on a.AircraftID = m.ScheduleID**

**inner join FLIGHT as f**

**on a.AircraftID = f.AircraftID;**

**select p.PassengerID,p.FirstName,p.LastName,b.BaggageID,b.Weight**

**from PASSENGER as p**

**inner join BAGGAGE as b**

**on p.PassengerID = b.BaggageID;**

**-- Left Joins**

**select a.AirportID ,a.AirportName, f.FlightID, ac.AircraftID**

**from AIRPORT as a**

**left join FLIGHT as f**

**on a.AirportID = f.FlightID**

**left join AIRCRAFT as ac**

**on f.AircraftID = ac.AircraftID;**

**select f.FlightID ,a.AircraftID ,a.AircraftType, ap.AirportID**

**from FLIGHT as f**

**left join AIRCRAFT as a**

**on f.FlightID = a.AircraftID**

**left join AIRPORT as ap**

**on f.FlightID = ap.AirportID;**

**select p.PassengerID,p.FirstName,p.LastName,t.TicketID,t.SeatNumber,t.FlightID**

**from PASSENGER as p**

**left join TICKET as t**

**on p.PassengerID = t.TicketID;**

**select a.AircraftID,a.AircraftType,a.LastMaintenanceDate,m.ScheduleID,m.ScheduleDate,f.flightID**

**from AIRCRAFT as a**

**left join MAINTENANCE\_SCHEDULE as m**

**on a.AircraftID = m.ScheduleID**

**left join FLIGHT as f**

**on a.AircraftID = f.AircraftID;**

**select p.PassengerID,p.FirstName,p.LastName,b.BaggageID,b.Weight**

**from PASSENGER as p**

**left join BAGGAGE as b**

**on p.PassengerID = b.BaggageID;**

**-- Right Join**

**select a.AirportID ,a.AirportName, f.FlightID, ac.AircraftID**

**from AIRPORT as a**

**right join FLIGHT as f**

**on a.AirportID = f.FlightID**

**right join AIRCRAFT as ac**

**on f.AircraftID = ac.AircraftID;**

**select f.FlightID ,a.AircraftID ,a.AircraftType, ap.AirportID**

**from FLIGHT as f**

**right join AIRCRAFT as a**

**on f.FlightID = a.AircraftID**

**right join AIRPORT as ap**

**on f.FlightID = ap.AirportID;**

**select p.PassengerID,p.FirstName,p.LastName,t.TicketID,t.SeatNumber,t.FlightID**

**from PASSENGER as p**

**right join TICKET as t**

**on p.PassengerID = t.TicketID;**

**select a.AircraftID,a.AircraftType,a.LastMaintenanceDate,m.ScheduleID,m.ScheduleDate,f.flightID**

**from AIRCRAFT as a**

**right join MAINTENANCE\_SCHEDULE as m**

**on a.AircraftID = m.ScheduleID**

**right join FLIGHT as f**

**on a.AircraftID = f.AircraftID;**

**select p.PassengerID,p.FirstName,p.LastName,b.BaggageID,b.Weight**

**from PASSENGER as p**

**right join BAGGAGE as b**

**on p.PassengerID = b.BaggageID;**

**-- Cross Join**

**select a.AirportID ,a.AirportName, f.FlightID, ac.AircraftID**

**from AIRPORT as a**

**cross join FLIGHT as f**

**on a.AirportID = f.FlightID**

**cross join AIRCRAFT as ac**

**on f.AircraftID = ac.AircraftID;**

**select f.FlightID ,a.AircraftID ,a.AircraftType, ap.AirportID**

**from FLIGHT as f**

**cross join AIRCRAFT as a**

**on f.FlightID = a.AircraftID**

**cross join AIRPORT as ap**

**on f.FlightID = ap.AirportID;**

**select p.PassengerID,p.FirstName,p.LastName,t.TicketID,t.SeatNumber,t.FlightID**

**from PASSENGER as p**

**cross join TICKET as t**

**on p.PassengerID = t.TicketID;**

**select a.AircraftID,a.AircraftType,a.LastMaintenanceDate,m.ScheduleID,m.ScheduleDate,f.flightID**

**from AIRCRAFT as a**

**cross join MAINTENANCE\_SCHEDULE as m**

**on a.AircraftID = m.ScheduleID**

**cross join FLIGHT as f**

**on a.AircraftID = f.AircraftID;**

**select p.PassengerID,p.FirstName,p.LastName,b.BaggageID,b.Weight**

**from PASSENGER as p**

**cross join BAGGAGE as b**

**on p.PassengerID = b.BaggageID;**

**-- Full Join**

**select p.PassengerID,p.FirstName,p.LastName,b.BaggageID,b.Weight**

**from PASSENGER as p**

**left join BAGGAGE as b**

**on p.PassengerID = b.BaggageID**

**UNION**

**select p.PassengerID,p.FirstName,p.LastName,b.BaggageID,b.Weight**

**from PASSENGER as p**

**right join BAGGAGE as b**

**on p.PassengerID = b.BaggageID;**

**select p.PassengerID,p.FirstName,p.LastName,t.TicketID,t.SeatNumber,t.FlightID**

**from PASSENGER as p**

**left join TICKET as t**

**on p.PassengerID = t.TicketID**

**UNION**

**select p.PassengerID,p.FirstName,p.LastName,t.TicketID,t.SeatNumber,t.FlightID**

**from PASSENGER as p**

**right join TICKET as t**

**on p.PassengerID = t.TicketID;**

**select a.AircraftID,a.AircraftType,a.LastMaintenanceDate,m.ScheduleID,m.ScheduleDate**

**from AIRCRAFT as a**

**left join MAINTENANCE\_SCHEDULE as m**

**on a.AircraftID = m.ScheduleID**

**UNION**

**select a.AircraftID,a.AircraftType,a.LastMaintenanceDate,m.ScheduleID,m.ScheduleDate**

**from AIRCRAFT as a**

**right join MAINTENANCE\_SCHEDULE as m**

**on a.AircraftID = m.ScheduleID;**

**select f.FlightID ,a.AircraftID ,a.AircraftType**

**from FLIGHT as f**

**left join AIRCRAFT as a**

**on f.FlightID = a.AircraftID**

**UNION**

**select f.FlightID ,a.AircraftID ,a.AircraftType**

**from FLIGHT as f**

**right join AIRCRAFT as a**

**on f.FlightID = a.AircraftID;**

**select a.AirportID ,a.AirportName, f.FlightID**

**from AIRPORT as a**

**left join FLIGHT as f**

**on a.AirportID = f.FlightID**

**UNION**

**select a.AirportID ,a.AirportName, f.FlightID**

**from AIRPORT as a**

**left join FLIGHT as f**

**on a.AirportID = f.FlightID;**

**-- AGGREGATE FUNCIONS**

**select count(\*)**

**from AIRPORT;**

**select max(Amount)**

**from PAYMENT;**

**select sum(Amount)**

**from PAYMENT;**

**select avg(Amount)**

**from PAYMENT;**

**select count(AircraftID)**

**from AIRCRAFT**

**where AircraftID > 001;**

**-- NESTED QUERIES**

**select FirstName, LastName**

**from PASSENGER**

**where PassengerID = ( select PassengerID**

**from PASSENGER**

**where Email = 'sara.ahmed@example.com');**

**select PaymentID,PaymentDate,PaymentMethod**

**from Payment**

**where amount > ( select avg(Amount)**

**from PAYMENT);**

**select PaymentID,PaymentDate,PaymentMethod**

**from Payment**

**where amount = ( select min(Amount)**

**from PAYMENT);**

**select PaymentID,PaymentDate,PaymentMethod**

**from Payment**

**where PaymentID = ( select count(TicketID)**

**from PAYMENT);**

**select PaymentID,PaymentDate,PaymentMethod**

**from Payment**

**where amount = ( select max(Amount)**

**from PAYMENT);**

**-- Correlated Queries**

**select FirstName,LastName**

**from PASSENGER**

**where exists( select Gender**

**where PassengerID = AircraftID);**

**select AircraftID,AircraftType**

**from Aircraft**

**where not exists( select AircraftID**

**where TotalSeats > 100);**

**select AircraftID,AircraftType**

**from Aircraft**

**where exists( select AircraftID**

**where TotalSeats < 100);**

**select PaymentID**

**from PAYMENT**

**where amount > ( select avg(Amount)**

**from PAYMENT**

**where PaymentID=TicketID);**

**select FirstName,LastName**

**from Crew**

**where 10 > ( select count(CrewID)**

**from CREW**

**where Position = 'Co-Pilot');**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***