

# Project of Airlines booking Systems.

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## Introduction

### **What is the system?**

The **Airline Booking System** is a database management system designed to manage airline ticket reservations, passenger details, flight schedules, and seat availability. It helps airlines streamline the booking process by storing and retrieving essential data efficiently.

### **Who will be the users?**

The system will have different types of users:

- **Passengers:** Users who book and manage their flight tickets.
- **Airline Staff:** Employees who update flight schedules, seat availability, and passenger details.
- **Administrators:** Manage the entire system, ensuring data security and proper functionality.

### **Future Scope**

- Integration with **AI** for price prediction based on demand.
- Implementation of **real-time seat availability updates**.
- Adding a **loyalty program** for frequent travelers.

- Enhanced security features like **biometric authentication** for passenger verification.

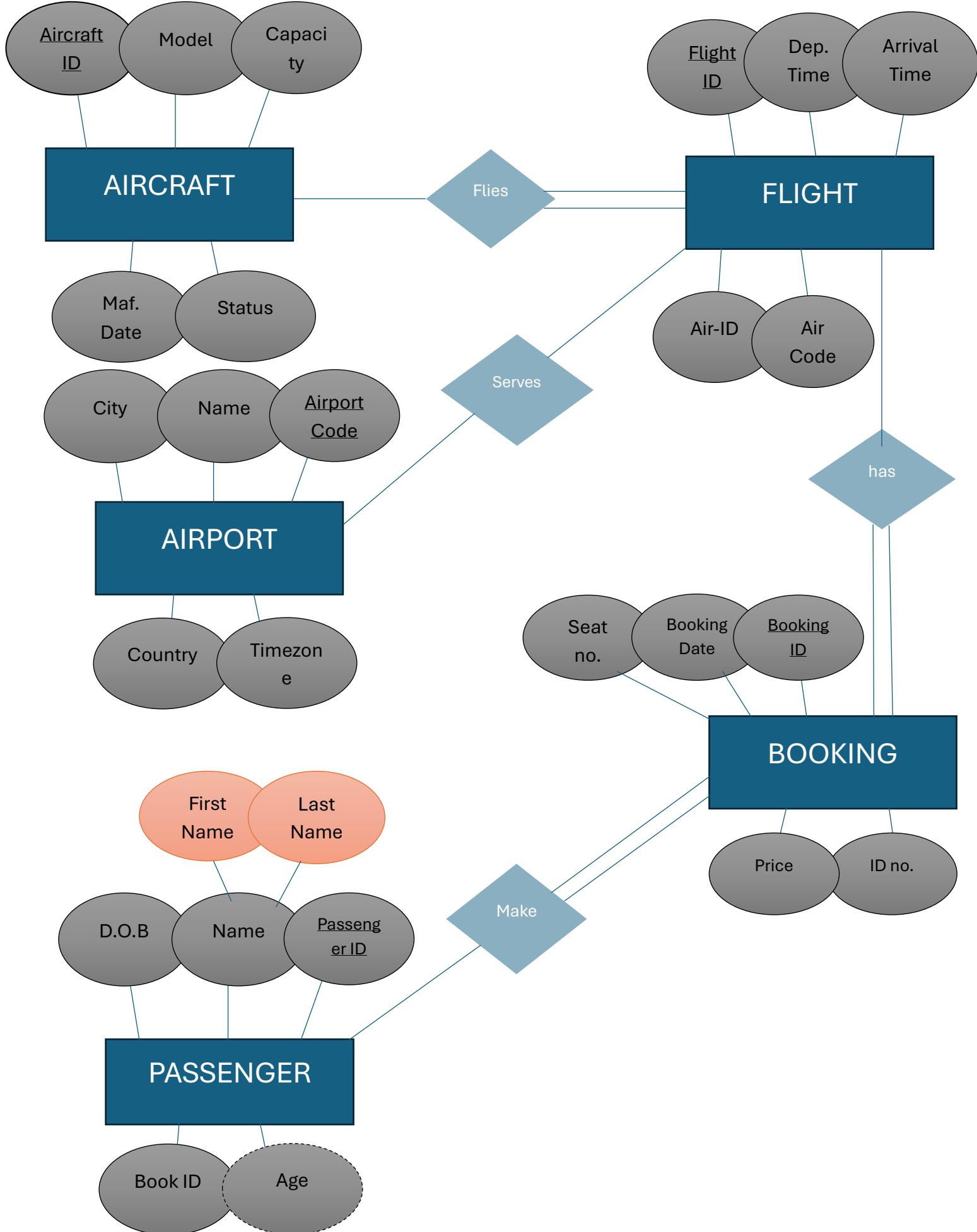
## Objective

The **main objective** of the Airline Booking System is to simplify the process of flight reservations, passenger management, and ticket booking. The system ensures smooth and efficient handling of flight schedules and seat availability.

## Key Objectives:

1. **Booking Management** – Allow users to book, modify, and cancel tickets easily.
2. **Ticket Handling** – Generate and store ticket details, including passenger information.
3. **Buyer & Passenger Database** – Maintain a structured database for passengers, storing details like name, age, contact information, and travel history.
4. **Flight Scheduling** – Manage flight timings, routes, and seat availability.
5. **Payment Processing** – Integrate secure payment gateways for hassle-free transactions.
6. **Data Security & Integrity** – Ensure proper access control and data protection to prevent unauthorized changes.

# ER DIAGRAM



# RELATIONAL SCHEMA

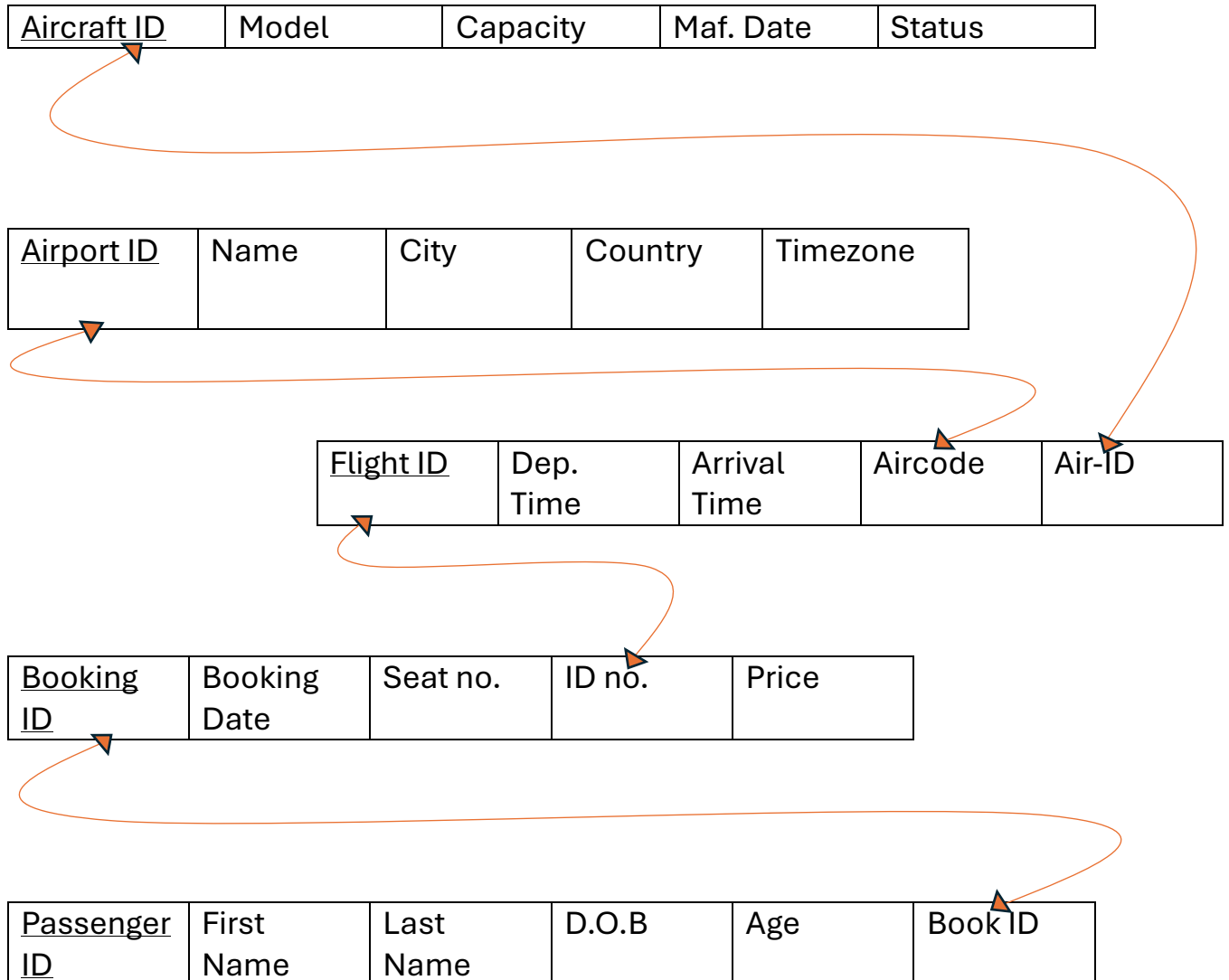
<u>Aircraft ID</u>	Model	Capacity	Maf. Date	Status
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<u>Airport ID</u>	Name	City	Country	Timezone
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<u>Flight ID</u>	Dep. Time	Arrival Time	Aircode	Air-ID
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<u>Booking ID</u>	Booking Date	Seat no.	ID no.	Price
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<u>Passenger ID</u>	First Name	Last Name	D.O.B	Age	Book ID
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# Databases or Tables

## Passenger Table

Passenger_ID	First_Name	Last_Name	D.O.B	Age	Book_ID
1	John	Doe	1990-05-14	34	101
2	Alice	Smith	1985-11-20	39	102
3	Micheal	Brown	1992-07-08	32	103

## Flight Table

Flight_ID	Dep_Time	Arrival_Time	Aircode	Air_ID
201	10:30:00	14:00:00	AA101	301
202	15:45:00	18:20:00	BA202	302
203	08:00:00	11:30:00	LH303	303

## Aircraft Table

Aircraft_ID	Model	Capacity	Maf_Date	Status
301	Boeing 737	180	2015-06-15	Active
302	Airbus A320	200	2018-03-22	Active
303	Boeing 787	250	2020-09-10	Under Maintenance

## Booking Table

Booking_ID	Booking_Date	Seat_no	ID_no	Price
101	2025-04-01	12A	1	350.00
102	2025-04-02	7C	2	450.00
103	2025-04-03	18B	3	600.00

## Airport Table

Airport_ID	Name	City	Country	Timezone
401	Heathrow Airport	London	UK	GMT+0
402	JFK International	New York	USA	GMT-5
403	Changi Airport	Singapore	Singapore	GMT+8

## SQL Queries

### 1. DDL (Data Definition Language) Queries

These queries create the database schema.

#### **Create Table**

```
CREATE TABLE Aircraft (  
    Aircraft_ID INT PRIMARY KEY,  
    Model VARCHAR(50),  
    Capacity INT,  
    Maf_Date DATE,  
    Status VARCHAR(20)  
);
```

Output:

Field	Type	Null	Key	Default	Extra
Aircraft_ID	int	NO	PRI	NULL	
Model	varchar(50)	YES		NULL	
Capacity	int	YES		NULL	
Maf_Date	date	YES		NULL	
Status	varchar(20)	YES		NULL	

```
CREATE TABLE Booking (  
    Booking_ID INT PRIMARY KEY,  
    Booking_Date DATE,  
    Seat_no VARCHAR(5),  
    ID_no INT,  
    Price DECIMAL(10,2)  
);
```

Output:

Field	Type	Null	Key	Default	Extra
Booking_ID	int	NO	PRI	NULL	
Booking_Date	date	YES		NULL	
Seat_no	varchar(5)	YES		NULL	
ID_no	int	YES		NULL	
Price	decimal(10,2)	YES		NULL	

```
CREATE TABLE Airport (  
    Airport_ID INT PRIMARY KEY,  
    Name VARCHAR(50),  
    City VARCHAR(50),  
    Country VARCHAR(50),  
    Timezone VARCHAR(50)  
);
```

Output:

Field	Type	Null	Key	Default	Extra
Airport_ID	int	NO	PRI	NULL	
Name	varchar(50)	YES		NULL	
City	varchar(50)	YES		NULL	
Country	varchar(50)	YES		NULL	
Timezone	varchar(50)	YES		NULL	



```
CREATE TABLE Passenger (
    Passenger_ID INT PRIMARY KEY,
    First_Name VARCHAR(50),
    Last_Name VARCHAR(50),
    D_O_B DATE,
    Age INT,
    Book_ID INT,
    FOREIGN KEY (Book_ID) REFERENCES
Booking(Booking_ID)
);
```

Output:

Field	Type	Null	Key	Default	Extra
Passenger_ID	int	NO	PRI	NULL	
First_Name	varchar(50)	YES		NULL	
Last_Name	varchar(50)	YES		NULL	
D_O_B	date	YES		NULL	
Age	int	YES		NULL	
Book_ID	int	YES	MUL	NULL	

```
CREATE TABLE Flight (
    Flight_ID INT PRIMARY KEY,
    Dep_Time TIME,
    Arrival_Time TIME,
    Aircode VARCHAR(10),
    Air_ID INT,
    FOREIGN KEY (Air_ID) REFERENCES
Aircraft(Aircraft_ID)
);
```

Output:

Field	Type	Null	Key	Default	Extra
Flight_ID	int	NO	PRI	NULL	
Dep_Time	time	YES		NULL	
Arrival_Time	time	YES		NULL	
Aircode	varchar(10)	YES		NULL	
Air_ID	int	YES	MUL	NULL	

## 2. DML (Data Manipulation Language) Queries

These queries insert, update, and delete data.

### Insert Data

```
INSERT INTO Booking (Booking_ID, Booking_Date,
Seat_no, ID_no, Price)
VALUES
(101, '2025-04-01', '12A', 1, 350.00),
(102, '2025-04-02', '7C', 2, 450.00),
(103, '2025-04-03', '18B', 3, 600.00);
```

Output:

Booking_ID	Booking_Date	Seat_no	ID_no	Price
101	2025-04-01	12A	1	350.00
102	2025-04-02	7C	2	450.00
103	2025-04-03	18B	3	600.00

```
INSERT INTO Passenger (Passenger_ID, First_Name,
Last_Name, D_O_B, Age, Book_ID)
VALUES
(1, 'John', 'Doe', '1990-05-14', 34, 101),
(2, 'Alice', 'Smith', '1985-11-20', 39, 102),
(3, 'Michael', 'Brown', '1992-07-08', 32, 103);
```

Output:

Passenger_ID	First_Name	Last_Name	D_O_B	Age	Book_ID
1	John	Doe	1990-05-14	34	101
2	Alice	Smith	1985-11-20	39	102
3	Michael	Brown	1992-07-08	32	103

```
INSERT INTO Aircraft(Aircraft_ID, Model, Capacity,
Maf_Date, Status)
VALUES
(301, 'Boeing737', 180, '2015-06-15', 'Active'),
(302, 'AirbusA320', 200, '2018-03-22', 'Active'),
(303, 'Boeing787', 250, '2020-09-10', 'Under
Maintenance');
```

Output:

Aircraft_ID	Model	Capacity	Maf_Date	Status
301	Boeing737	180	2015-06-15	Active
302	AirbusA320	200	2018-03-22	Active
303	Boeing787	250	2020-09-10	Under Maintenance

```

INSERT INTO Airport(Airport_ID, Name, City, Country,
Timezone)
VALUES
(401, 'Heathrow Airport', 'London', 'UK', 'GMT+0'),
(402, 'JFK International', 'New York', 'USA', 'GMT-
5'),
(403, 'Changi Airport', 'Singapore', 'Singapore',
'GMT+8');

```

Output:

Airport_ID	Name	City	Country	Timezone
401	Heathrow Airport	London	UK	GMT+0
402	JFK International	New York	USA	GMT-5
403	Changi Airport	Singapore	Singapore	GMT+8

```

INSERT INTO Flight (Flight_ID, Dep_Time,
Arrival_Time, Aircode, Air_ID)
VALUES
(201, '10:30:00', '14:00:00', 'AA101', 301),
(202, '15:45:00', '18:20:00', 'BA202', 302),
(203, '08:00:00', '11:30:00', 'LH303', 303);

```

Output:

Flight_ID	Dep_Time	Arrival_Time	Aircode	Air_ID
201	10:30:00	14:00:00	AA101	301
202	15:45:00	18:20:00	BA202	302
203	08:00:00	11:30:00	LH303	303

## Update Data

Modify existing records.

```
UPDATE Passenger
SET Age = 35
WHERE Passenger_ID = 1;
```

Output:

Passenger_ID	First_Name	Last_Name	D_O_B	Age	Book_ID
1	John	Doe	1990-05-14	35	101
2	Alice	Smith	1985-11-20	39	102
3	Michael	Brown	1992-07-08	32	103

## Delete Data

Remove specific records.

```
DELETE FROM Passenger WHERE Book_ID = 103;
DELETE FROM Booking WHERE Booking_ID = 103;
```

Output:

Booking_ID	Booking_Date	Seat_no	ID_no	Price
101	2025-04-01	12A	1	350.00
102	2025-04-02	7C	2	450.00

### 3. Retrieval Queries

Fetching relevant data.

#### Get all flight details

```
SELECT * FROM Flight;
```

Output:

Flight_ID	Dep_Time	Arrival_Time	Aircode	Air_ID
201	10:30:00	14:00:00	AA101	301
202	15:45:00	18:20:00	BA202	302
203	08:00:00	11:30:00	LH303	303

#### Find passengers who booked flights after April 1, 2025

```
SELECT First_Name, Last_Name, Booking_Date
FROM Passenger
JOIN Booking ON Passenger.Book_ID =
Booking.Booking_ID
WHERE Booking.Booking_Date > '2025-04-01';
```

Output:

First_Name	Last_Name	Booking_Date
Alice	Smith	2025-04-02

## Find flights departing from a specific airport

```
SELECT Flight_ID, Dep_Time, Arrival_Time  
FROM Flight  
WHERE Aircode = 'AA101';
```

Output:

Flight_ID	Dep_Time	Arrival_Time
201	10:30:00	14:00:00

## 4. Joins & Views

### Join Passengers with their Bookings

```
SELECT Passenger.First_Name, Passenger.Last_Name,  
Booking.Seat_no, Booking.Price  
FROM Passenger  
JOIN Booking ON Passenger.Book_ID =  
Booking.Booking_ID;
```

Output:

First_Name	Last_Name	Seat_no	Price
John	Doe	12A	350.00
Alice	Smith	7C	450.00

## Create a View for Active Flights

```
CREATE VIEW ActiveFlights AS
SELECT Flight_ID, Dep_Time, Arrival_Time, Aircode
FROM Flight
WHERE Dep_Time IS NOT NULL;
```

Output:

```
mysql> CREATE VIEW ActiveFlights AS
-> SELECT Flight_ID, Dep_Time, Arrival_Time, Aircode
-> FROM Flight
-> WHERE Dep_Time IS NOT NULL;
Query OK, 0 rows affected (0.01 sec)
```

## 5.COUNT Queries

### Count Total Passengers

```
SELECT COUNT(*) AS Total_Passengers FROM Passenger;
```

Output:



Total_Passengers
2

## Count Total Flights

```
SELECT COUNT(*) AS Total_Flights FROM Flight;
```

Output:

Total_Flights
3

## 6.SUM Queries

### Calculate Total Revenue from Bookings

```
SELECT SUM(Price) AS Total_Revenue FROM Booking;
```

Output:

Total_Revenue
800.00

## Calculate Total Capacity of All Aircrafts

```
SELECT SUM(Capacity) AS Total_Seat_Capacity FROM Aircraft;
```

Output:

Total_Seat_Capacity
630

## Conclusion for the Airline Booking System

- The system successfully stores passenger, flight, aircraft, booking, and airport data.
- SQL queries allow for efficient data retrieval, revenue tracking, and capacity management.
- Aggregate functions like **COUNT**, **SUM**, and **AVG** help analyze flight trends and profitability.
- Future improvements can include adding stored procedures for automated booking processing and triggers for flight status updates.