Airline Management System – Project Report

1) Introduction:

The Airline Reservation System project demonstrates the design and implementation of a basic database for managing flight bookings, customer data, seat allocation, and flight details for an airline. This SQL-driven system provides a foundation for understanding the relationships and operations involved in airline reservation management in a real-world scenario, with streamlined table structures, constraints, and sample triggers.

2) Abstract:

This project aims to develop a relational database schema for an airline reservation system that efficiently stores and organizes information about flights, customers, seat availability, and bookings. The solution leverages SQL features like primary and foreign keys, ENUM types, and triggers to ensure data integrity and automate seat status updates. The system supports key functions: flight listing, seat inventory management, customer registration, booking and cancellation workflows, and real-time reporting of flight and seat status.

3) Tools Used:

- **MySQL:** Database engine for schema creation, data manipulation, and query execution.
- **SQL:** For creating tables, views, triggers, and running queries.
- **Any SQL GUI (e.g., MySQL Workbench, VS Code SQL extensions):** To interact with and visualize the database.

4) Steps involved in building the project:

a) Schema Design:

- Designed core tables: Flights, Customers, Seats, and Bookings.
- Defined relationships using primary and foreign key constraints for data integrity.

b) Table Creation:

- Implemented tables to store flight details (FlightID, FlightNumber, Origin, Destination, timings), customer information, seat inventory, and booking transactions.
- Seats table includes class (Economy, Business, First) and real-time availability tracking.

c) Data Population:

Inserted sample records into Flights, Customers, Seats, and Bookings for two flights, two customers, and associated bookings.

d) Seat Availability Automation:

Created triggers (After Booking, After Cancellation) to automatically update seat availability upon booking or cancellation, ensuring consistency without manual intervention.

e) Reporting and Views:

- Defined a FlightAvailability view to present up-to date seat status per flight.
- Provided typical queries for searching available seats for a specific flight, listing flights between given cities and dates, and generating booking reports.

5) Conclusion:

This project demonstrates fundamental SQL data modeling concepts applied to airline reservation workflows. The schema ensures integrity, automates common updates via triggers, and enables robust reporting through SQL queries and views. Extending this foundation can support additional features such as payment integration, user authentication, and flight schedule changes, making it suitable for larger-scale airline reservation systems.