**Team 7 Airline Reservation System**

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**Database Purpose:**

The database is designed to support an airline reservation system, managing flight information, bookings, and airport operations. It enables efficient data collection, processing, and reporting for operational and analytical purposes.

**Business Problems Addressed:**

* Optimization of flight and crew scheduling to improve efficiency.
* Management of bookings and ticketing to enhance customer experience.
* Manage flight schedules, gate assignments, and ground handling services efficiently to reduce turnaround times and enhance operational efficiency.
* Tracking of luggage to ensure reliable handling and minimize losses or delays.
* Analysis of route profitability and airport operations to inform strategic decision-making.
* Offer robust analytics and reporting for informed decision-making, marketing campaigns, and route planning.

**Business Rules:**

* A Passenger can make multiple Bookings.
* Each Booking corresponds to one Passenger and one Flight.
* Each flight must be associated with a specific aircraft and airline company.
* Every booking must result in the generation of a ticket.
* Crew assignments are to be managed per flight.
* Luggage is to be tracked per passenger.
* Shops are located within Airports and serve passengers and staff.

**Design decisions:**

| **Entity** | **Purpose** | **Relationship to Other Entities** |
| --- | --- | --- |
| Aircraft | To record specific details about planes, including model, seating capacity, and manufacturer. This is crucial for planning flights, maintenance, crew assignment, and passenger accommodation. | An aircraft has a one-to-many relationship with flights, as one aircraft can be used for multiple flights. It also has a one-to-many relationship with seats, representing the different seating arrangements on the aircraft. |
| Airline Company | To maintain details about each airline company, such as name and headquarters. This entity is essential for organizing flights, partnerships, and legal compliance across operating countries. | An airline company has a one-to-many relationship with flights, as it operates multiple flights. It also has a one-to-many relationship with aircraft, owning or leasing multiple aircraft. |
| Flight Schedule | To keep a timetable for flights, detailing scheduled departure and arrival times. This helps in managing expectations for both passengers and crew and assists in logistics planning. | A flight schedule has a one-to-one relationship with a flight, as each flight is assigned a specific schedule. |
| Booking | To handle the reservation details for passengers, including flight numbers and booking dates. This is central to the sales process and customer service. | Each booking has a one-to-one relationship with tickets, as each booking results in the creation of a unique ticket. Bookings have a many-to-one relationship with passengers, as a passenger can make multiple bookings. |
| Ticket | To represent the sale of a flight seat to a passenger. It includes details such as fare, status, and passenger information, fundamental for boarding and financial reconciliation. | A ticket has a one-to-one relationship with a booking, and a many-to-one relationship with passengers, as one passenger can have multiple tickets for different flights. |
| Seat | To detail the seating arrangement on an aircraft, including class and availability status. It is vital for inventory management, passenger comfort, and maximizing revenue. | A seat has a one-to-one relationship with a ticket, as each ticket assigns a passenger to a specific seat. Seats have a many-to-one relationship with aircraft, as multiple seats are part of a single aircraft. |
| Passenger | To store personal and contact information of individuals traveling on flights. This data is critical for legal compliance, customer relationship management, and safety protocols. | Passengers have a one-to-many relationship with bookings and tickets, as a single passenger can book multiple flights and, therefore, have multiple tickets. |
| Luggage | To track passengers' luggage, ensuring proper handling and minimizing the risk of loss or delay. Includes details such as weight, dimensions, and status. | Luggage has a one-to-one relationship with passengers, as each piece of luggage is associated with a specific passenger. |
| Crew | To manage the staff involved in operating a flight, including pilots and flight attendants, with their respective qualifications and positions. | Crew members have a many-to-one relationship with flights, as multiple crew members are assigned to a single flight. |
| Flight Route | To define the path a flight will take, including departure and arrival airports, and any stopovers. This influences flight planning, ticket sales, and route profitability analysis. | A flight route has a one-to-one relationship with a flight, as each flight follows a specific route. |
| Shop | To administer the commercial establishments within an airport, including their name, location, and operational hours, which enhance the airport experience and generate additional revenue. | Shops have a many-to-one relationship with airports, as multiple shops can be located within a single airport. |
| Airport | To catalog information about the infrastructure of airports from which flights depart and arrive, including amenities and runway details, critical for flight operations and passenger services. | An airport has a one-to-many relationship with flights, as one airport can be the point of departure or arrival for many flights. |
| Flight | To record details about individual flights, including times, routes, and status. | A flight has a many-to-one relationship with airports (both origin and destination), as many flights can depart from or arrive at a single airport. Flights have a one-to-many relationship with bookings since a single flight can be booked by many passengers. |