GROUP 3

DESIGN DOCUMENT - AIRPORT MANAGEMENT SYSTEM

1. Apoorv Dhaygude - 002207325
2. Pranitee Majukar - 002209824
3. Nitish Belagali - 002645514
4. Abhishek Mathukiya - 002839155

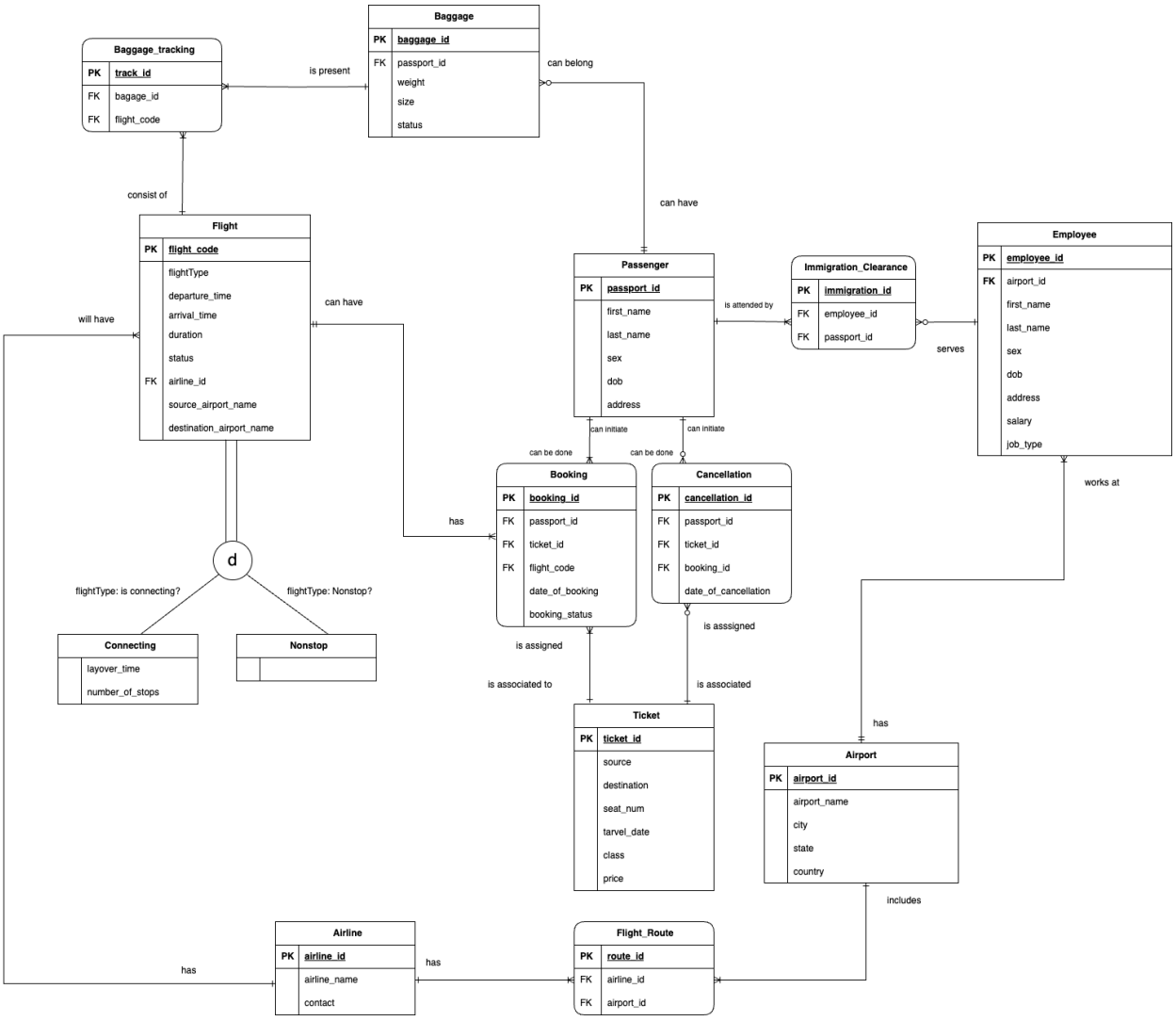
Database Purpose:

- **Efficiency:** Streamlining airport operations to minimize delays, optimize resource allocation, and enhance overall efficiency.
- **Passenger Experience:** Providing a seamless and pleasant travel experience through efficient check-in processes, baggage handling, and information services.
- **Data Management:** Capturing, storing, and analyzing data related to flights, passengers, and baggage to improve decision-making and enhance services.
- **Integration:** Integrating various airport systems and technologies, including baggage handling systems, passenger information displays, and security systems, to create a cohesive and interconnected environment.
- **Resource Management:** Efficiently managing airport resources, such as runways, gates, baggage carousels, and check-in counters, to maximize utilization.

Proposed Solution:

We propose an Airline Management System, which is a centralized database system for managing a large set of Airlines and passengers' data within an Airport. This system will ensure the centralization of airline management operations integrating various functions for efficient control and management. This system will handle passenger profiles and baggage tracking which will ensure hassle-free travel for the passengers.

Modified ERD :



Entity Description:

- **Employee**: An employee is a person working at the airport. An employee may be an administrative support, engineer, traffic monitor, or an airport authority. The task of the employee is to serve the passenger for his hassle-free immigration process and travel.

- **Airport**: The Airport entity describes where it is located and the airlines associated with it. It includes fostering connections between regions and expediting the transportation of individuals and goods.

- **Flight**: The "Flight" entity in an airport management system contains essential information about scheduled flights, including flight_code, flight_type, departure, arrival, and more. It is a core component for managing flight operations, scheduling, passenger reservations, and real-time flight monitoring within the airport system.

- **Passenger**: In an airport system, the Passenger entity contains traveler data such as passport numbers, names, contact information, and passenger IDs. This entity is pivotal for optimizing passenger services, managing reservations, and ensuring a seamless travel experience.

- **Airline**: This “Airline” entity represents the airlines that operate at the airport. It is used to store and manage information about the various airlines that provide flights and services at the airport.

- **Ticket**: The “ticket” entity represents the various aspects and details associated with airline tickets. This entity contains information related to the sale and management of tickets for airline flights.

- **City:** The "City” entity typically represents information related to the cities served by the airport and may include details about the city itself, its associated airport(s), and other relevant data.

- **Baggage**: The ‘Baggage’ entity is associated with the passenger’s baggage which they will carry during their travel from one city to another. Baggage is mapped with the particular passenger ID and flight ID which will efficiently track the baggage for the passenger.

- **Booking:** The “Booking” entity is associated with passengers and tickets. It typically represents information related to passenger flight bookings. This entity contains data associated with passenger bookings, booking IDs, and flight IDs.

- **Cancellation:** The "Cancellation" associative entity in an airport management system is responsible for documenting reservation cancellations. It offers specific cancellation IDs linked to individual passengers, along with their corresponding ticket and passenger IDs.

Entity Relationships:

- **Flight and Bookings:** A flight can have one or many bookings but a booking has mandatory one flight.

- **Flights and Baggage:** Flights may or may not carry baggage and baggage may or may not be present in flight.

- **Passenger and Employee:** A passenger is attended by one or many employees(mandatory many) but not all employees serve a passenger.

- **Flight and Airline:** A flight should have an airline(mandatory one) and an airline should have one or many flights(mandatory many).

- **Airline and Airport:** An airline can be present at an airport, but the airport includes many airlines.

- **Passenger and Bookings:** A flight can initiate one or many bookings, but a booking can be done by one passenger.

- **Booking and Ticket:** A booking is assigned to a ticket and a ticket is associated with one or many bookings.

- **Passenger and Cancellation:** A passenger can initiate no or many cancellations but cancellation must be done by a passenger.

- **Cancellation and Ticket:** Cancellation is assigned to a ticket, but a ticket can be associated with zero to many cancellations.

- **Employee and Airport:** An airport has many employees and employees should work at one(mandatory one) airport.

- **Baggage and Passenger:** A passenger can have zero or many baggage but a piece of baggage can belong to a passenger.

Modifications -

- Assumptions:
    1. The city has a single major international airport
    2. Our analysis focuses exclusively on international flights.

- Additions of three associative entities and their relations:
    1. Flights-**Baggage Tracking**-Baggage - Baggage Tracking is an associative entity that links Flights and Baggage. Therefore, a flight consists of multiple pieces of baggage and many baggages are present on the flights. Here, the track ID is the primary key, baggage ID and flight code are the foreign keys.
    2. Airline-**Flight Route**-Airport - The Flight Route is an associative entity between the Airport and the Airline. An airline has multiple airports and an Airport includes multiple airlines. Here, Route ID is the primary key, and Airline ID, and Airport ID are Foreign Keys.
    3. Passenger-**Immigration Clearance**-Employee: Immigration Clearance is an associative entity between Passenger and Employee. The passenger is attended by multiple employees and an Employee serves zero or many passengers.
       Here, Immigration ID is the primary key, and Employee ID, and Passport ID are the foreign keys.

- Subtype Supertypes Relations:

    1. Supertype - Flight
       Subtype - Connecting and Non-Stop
       Disjoint constraint - A flight can be either connecting or non-stop but not both at the same time.