Name: Yen Pham

CS5350

Implementation plan

My project for this CS5350 class is to design and implement a database for an airline. The database will keep track of customers and their reservations, flights and their status, seat assignment on individual flights, and the schedule and routing of future flights. My process to do this project is first, I will list out the data requirements, such as table Passenger has what attributes and what is the table primary key, or what subclass of the table if any. Then, I will prepare the EER diagram model which state how many relationship and the type of relationships in the tables. After that, I will do table normalization and separate tables to make sure all tables have the least duplicates. Tables will be created and tested using platform Microsoft SQL server (version 2019) and language T SQL. As I am doing alone for this project, I will focus on building database instead of utilizing interfaces, so there will be no interface. My drafts for each table should look like:

Customer(CustomerID, name, date of birth, address, city, zip code, country phone number, email, phone number)

Airports (AirportID, airport name, location)

Flights (Fight ID, routeID(s), number of stops, departure time for each route, departure location for each route, arrival time for each route, arrival location for each route, services, aircraft, status)

Routes (RouteID, initial airport, destination airport, alternate airport, duration)

Aircrafts (PlaneID, amenities, number of carry-on spaces, number of seats for business class, number of seats for economy class, number of seats for first class)

Itinerary (ConfirmationID, book date, departure time, departure airport, arrival time, arrival airport, duration, fare type, cost, passengerID, planeID, routeID)

Fares(Fare types, Description, Conditions)

Tickets (TicketID, boarding time, passenger ID, departure time, departure airport, gate, zone, seat, planeID, number of carry-on bags, number of checked bags)

My first goal when designing database for an airline is to create a function that supports searching flights on origins and destinations, and also by departure date. To search flights on origin and destination, we will need to join two tables Flights and Airport together and search for departure or arrival location, then print out list of flights, departure airport's and arrival airport's.

If we want to find flights based on departure time or arrival time, we can just look up departure time on Flights table only, and print out flights information.

Some passengers will prefer non-stop flights when they choose the flight, however non-stop flight may be very expensive when the flight date is coming. Therefore, we will make a query in the Flights table that help the passenger look for the top 20 most affordable flights from A to B, including both non-stop and connecting flights.

We also need to make sure that the number of people who booked a specific flight and chose a specific class (economy, business, 1st class) cannot be more than the number of seats available for that class in the airplane, so we need to join the Flights and the Aircraft table with criteria flight.aircraft = aircraft.planeID. After that, we'll calculate the total number of people who book a specific class and compare that number to the available seats for that class.

Before the flight, we also want to know if there are enough space in the aircraft to take on the carry-on luggage or not (sometimes when the space to store passengers' carry-on luggages are full, so we need to join the table Tickets and Aircraft together (aircraft.planeID = ticket.planeID). We will count the total number of carry-on bags on that flight and compare that number to the total number of carry-on spaces in the aircraft.