Shanghai New York University
Project for Databases CSCI-SHU 213

Objective:

The objective of this course project is to provide a realistic experience in the design process of a relational database and corresponding applications. We will focus on conceptual design, logical design, implementation, operation, maintenance of a relational database. We will also implement an associated web based application to communicate with the database (retrieve information, store information etc).

Project Overview:

The course project for this semester is online Air Ticket Reservation System. Using this system, customers can search for flights, purchase flights ticket, view their upcoming flight status or see their past flights etc. There will be three types of users of this system - Customers, Booking Agents and Airline Staff (Administrator). Booking Agents will book flights for other Customers, can get a fixed commission. They can view their monthly reports and get total commission. Airline Staff will add new airplanes, create new flights, and update flight status. In general this will be simple air ticket reservation system.

3 Parts of the Project:

1. **WORK INDIVIDUALLY** Create an ER diagram based on the description below.

2. **WORK INDIVIDUALLY** Create a relational database design (relational Schema, write table definitions in SQL, write some queries etc) based on ER diagram.

3. Develop a web application for the system. **You may work with a partner or individually for this part**.

Project Description

There are several airports (**Airport**), each consisting of a unique name and a city.

There are several airlines (**Airline**), each with a unique name. Each airline owns several airplanes. An airplane (**Airplane**) consists of the airline that owns it, a unique identification number within that airline, and the amount of seats on the airplane.

Each airline operates flights (**Flight**), which consist of the airline operating the flight, unique a flight number within that airline, departure airport, departure time, arrival airport, arrival time, a price, and the identification number of the airplane for the flight.

A ticket (**Ticket**) can be purchased for a flight either by a Customer or Booking Agent (more on these below), and will consist of the customer's email address, the airline name, the flight number, and a booking_agent_ID. If a Booking Agent purchases the ticket then their booking_agent_ID will be used, and if a Customer purchases the ticket then the booking_agent_ID should be null. Each ticket will have a ticket ID number which is unique in this System.

Anyone (including users not signed in) can see upcoming flights based on the source airport, destination airport, source city, or destination city. Additionally, anyone can see the status (delayed/on time etc) of in progress flights based on an airline and flight number combination.

There are three types of users for this system: Customer, Booking Agent, and Airline Staff.

Customer:
Each Customer has a name, email, password, address (composite attribute consisting of building_number, street, city, state), phone_number, passport_number, passport_expiration, passport_country, and date_of_birth. Each Customer's email is unique, and they will sign into the system using their email address and password.

Customers must be logged in to purchase a flight ticket.

Customers can purchase a ticket for a flight as long as there is still room on the plane. This is based on the amount of tickets already booked for the flight and the seating capacity of the airplane assigned to the flight and customer needs to pay the associated price for that flight (to make it simple, we will consider that all tickets' price of a flight is fixed). No credit number or other related information is necessary.

Customer will be able to see their upcoming flights or previous flights taken for the airline they logged in.

Booking Agent:
The role of a Booking Agent is similar to that of a Customer. A Booking Agent's purpose is to purchase a ticket on behalf of a Customer (with the same restrictions of seat availability as above), but that Booking Agent will receive a 10% commission from the ticket price.

A Booking Agent consists of a unique email, a password, and a booking_agent_ID. In order for a Booking Agent to sign into the system, they must enter all three of these items.

Once logged in, a Booking Agent will be able to see the amount of commission they received in the past 30 days, the average commission they received per ticket booked, and the total number of tickets they booked.

Airline Staff:
Each Airline Staff has a unique username, a password, a first name, a last name, a date of birth, and the airline name that they work for. Airline Staff work for one particular airline.

Airline Staff will be able to add new airplanes into the system for the airline they work for.

Airline Staff will set in progress flight statuses in the system.

Each Airline Staff can create new flights only for the particular airline that they work for and set the ticket price for flight. They will also be able to see all in-progress, upcoming, and previous flights for the airline that they work for, as well as a list of passengers for the flights.

In addition, Airline Staff will be able to see a list of all flights a particular Customer has taken only on that particular airline.

Airline Staff will also be able to see the most frequent customer within the last year, see the amount of tickets sold each month, and see the top 5 Booking Agents for the past month and past year based on sales.

Airline Staff can query for how many flights get delayed/on-time etc.

What You Should Do for Part 1:

Design an ER diagram for online Air Ticket Reservation System described above. Draw the ER diagram neatly. You may draw it by hand or using a design tool. Design tool preferred. Please create a PDF file and submit using NYU Classes.

When you do this, think about: which information should be represented as attributes, which as entity sets or relationship sets? Are any of the entity sets weak entity sets? If so, what is the identifying strong entity set? What is the primary keys (or discriminant) of each entity set? What are the cardinality constraints on the relationship sets?

The total project grade will be **30% of your course grade**. Part 1 counts for about **20% of the project grade**. There may also be a quiz or exam question(s) based on the project.