1 Purpose

To analyze the requirements, design, implement, document and test a database application to automate an airline database system. The database system should perform the following basic functions:

1. Let staff make entries when a passenger makes reservations on a flight.
2. Let staff enter flight information before and after the flight including flight schedule, passenger check-in etc.
3. Let staff enter information on aircraft maintenance and details.

The users of the application are staff members of the airline. It is assumed that all users have network computers capable of running a modern Web browser.

2 Information needs

In an airline database system, a number of different types of information need to be maintained. They are classified according to the activities that take place:

- When a flight is scheduled, the following information is needed:
  - Flight number
  - Date
  - Aircraft type(from those provided\(^1\))
  - Source city and state(from list of cities provided\(^2\))
  - Destination city and state(from list of cities provided)
  - Scheduled departure time(s) and date(s)
  - Scheduled arrival time(s) and date(s)

\(^1\)The possible types of aircraft are: Boeing 727, 737, 747 and Airbus A300, 320, 340
\(^2\)The cities in which the airline operates: New York, Washington D.C., Baltimore, L.A., San Francisco, Seattle, Chicago, Newark, Detroit, Boston, Raleigh, Tucson, Columbus, Tampa, Houston, Las Vegas, Minneapolis, Atlanta, Pittsburgh and Toronto
• Flight crew and other flight information has to be entered:
  – Flight number
  – Date
  – Flight captain
  – Flight co-pilot
  – Flight engineer
  – Head steward/hostess
  – Number of seats booked
  – Fare information
  – Number of passengers on board
  – Fuel status

It is assumed that none of the flight crew change for the entire duration of the flight.

• The following information on the flight passengers is required:
  – Flight Number
  – Date
  – Social Security Number
  – First and last name
  – Age
  – Reservation status
  – Flight Class
  – Seat number
  – Amount charged
  – Contact address

• For each aircraft owned/leased by the airline, the following information needs to be maintained:
  – Aircraft identification number
  – Bought/leased
  – Capacity of aircraft
  – Year of manufacture
  – Year of acquisition
  – Model number
  – Checked by
  – Date of last service
  – Category of aircraft service

Course Project-II
Problems registered
Last FAA inspection date
Fuel requirements

• For the pilots, flight engineer and stewards/air-hostesses, the following information is needed:
  – SSN
  – First and last name
  – Contact address
  – Qualifications
  – Year of joining
  – Aircraft to fly/service
  – Date of last health checkup

• Address should be maintained in the following format wherever appropriate:
  – Street
  – Apartment number
  – City
  – State
  – Zip
  – Telephone numbers(home and office)
  – Email address

3 Functions

The database application should be able to handle the occurrence of the following events:

• When a flight is scheduled, the following information is entered:
  – Flight number
  – Source and destination cities and state(s)
  – Departure and arrival time(s) and date(s) at each city
  – Crew member information in the form
  – SSN
  – Duty

• When a passenger books a ticket, the following information is entered:
  – SSN
  – Name
– Contact address
– Ticket type
– Amount paid
– Status of reservation (Confirmed/Waiting with waiting number)

• Before a flight’s departure, the following information is entered/modified:
  – Departure time(s) and date(s) may be changed if the flight is re-scheduled
  – Arrival time(s) and date(s) may be changed if the flight is rescheduled
  – Fuel position
  – Ground engineer’s pre-flight check report (free text format)
  – Captain’s pre-flight report (free text format)
  – When a passenger checks in, the information entered is:
    * SSN
    * Seat number assigned

• The following information needs to be entered/modified after the journey’s completion:
  – Number of miles flown
  – Duration of flight
  – Captain’s post-flight report
  – Ground engineer’s post-flight check report

4 Materials to submit

When the project is completed, a project repost and any code needs to be submitted. You also need to demonstrate the database application.

4.1 Project Report

The project is to be done in five phases. The Project report should have a separate section for each phase. The project phases are:

1. Analysis of the requirements of the project and a high-level description of the tasks involved.

2. This phase involves the following
   • Develop an Entity-Relationship model detailing the relations involved.
   • Identify the attributes of the entities and the relations along with the primary key for each entity.
   • List the constraints for each relation and entity.

Course Project-IV
• Give details of the procedures that you will implement in the database application.

You should be able to explain the reasons for the particular design approach you have chosen.

3. This phase involves the following:
   • Design an Oracle database based on the design developed in section B.
   • Implement SQL tables for the relations and the constraints. Maintain scripts for the creation of tables.
   • Justify your design choices.

4. This phase consists of the following:
   • Write Java code to access, update and administer SQL tables made.
   • Develop a user interface, using which each of these functions should be performed.
   • Create indexes for the database application. Justify the reasons.
   • Integrate the user interface and rest of the database application.

5. Make a user’s guide for the database application.

5 Project Demonstration

You will demonstrate the project to the instructor and answer questions regarding the project during the demonstration. The demonstrations will be held between (6–8) July.

Before the demonstration, populate the tables with data for
   • At least 5 aircraft
   • 20 cities in which the airline operates
   • Schedule at least 10 flights
   • Each flight should have the details of at least 10 passengers and at least 4 crew.

The demonstration should include scheduling flights, entering and updating a flight’s information, passenger booking and cancellation of a flight, entering and updating preflight and post–flight information.

Miscellaneous

The final project report should document all the activities with appropriate E–R diagrams, relation schema, etc. It should also give a list of the limitations of the application and give possibilities for improvement. Features and functions other than specified in the document can also be added but should be documented clearly and demonstrated as well.