DEUCENG
Dokuz Eylül University
Dept of Computer Engineering

DATABASE DESIGN

Due: 30th May 2017, 23:59

Goal

In this assignment, you are asked to design a database for an airport management. Below the detailed requirements of the scenario and requirements are given.

Scenario and Implementation Requirements

Computer Sciences Department frequent fliers have been complaining to Adnan Menderes Airport officials about the poor organization at the airport. As a result, the officials decided that all information related to the airport should be organized using a DBMS, and you have been hired to design the database. Your first task is to organize the information about all the airplanes stationed and maintained at the airport. The relevant information is as follows:

The following statements of business rules and relationships are used to construct an E-R model:

- Every airplane has a registration number and a name (e.g., Eagle, Winged Beauty, etc.), and each airplane is of a specific model (e.g., Airbus A380, etc.). It is not necessary to name the airplanes, but it must be unique if the name is given.
- The airport accommodates a number of airplane models, and each model is identified by a model number (e.g., DC-lO) and has a capacity and a weight.
- A number of technicians work at the airport. You need to store the name, SSN (Social Security Number), address, phone number, and salary of each technician.
- Each technician is an expert on one or more plane model(s), and his or her expertise may overlap with that of other technicians. This information about technicians must also be recorded.
- A number of traffic controllers also work at the airport. Traffic controllers must have an annual medical examination. All medical examinations has a type (e.g., blood, eye, full body, etc.) and a validation period (e.g., 4 months, 1 year, etc.). For each traffic controller, you must store the date of the most recent exam.
- All airport employees belong to a union. You must store the union membership number of each employee. You can assume that a social security number uniquely identifies for each employee.
- The airport has a number of tests that are used periodically to ensure that airplanes are still airworthy. Each test has a Federal Aviation Administration (FAA) test number, a name, a maximum possible score.
- The FAA requires the airport to keep track of each time a given airplane is tested by a given technician using a given test. For each testing event, the information needed is the date, the number of hours the technician spent doing the test, the score the airplane received on the test, test type, knowledge of which part of the plane belongs (e.g., engine, wing, etc.), a validation period (e.g., 4 months, 3 weeks, etc.), and the information that the airplane can pass the test.
- You can assume that the planes which are below a constant score (e.g., 50 points) not to be airworthy. If a plane cannot pass the test, it is taken the maintenance. You should store information about the maintenance type, broken part, broken reason (e.g., lack of engine oil, etc.), and maintenance period (e.g., 3 weeks, 1 month, etc.).

a) Construct an E-R diagram based on the preceding statements. Draw your diagram with Dia. (Or with another tool of your choice, as long as the ER is in the format that is practiced in the lecture.)
b) Assign the attributes to the appropriate entities. Indicate primary key and foreign key attributes.
c) According to *a* and *b*, create your database and tables. Insert 10 meaningful example records to each table. Meaningful examples should at least answer *d*'s queries. If we do not get results while testing your code with your examples, you will lose 5 points for each non-working query.
d) Write the SQLs of the following queries:
   1) Find the airplanes that can fly.
   2) Find the named and airworthy airplanes.
   3) Find the employees from the same district.
   4) Find the traffic controllers who need to have a medical examination.
   5) Find the member numbers of all unions and sort them ascending.
   6) Find the most malfunctioning airplane models.
   7) What is the most popular union among the technicians?
   8) Find the airplane nearest the end of the maintenance.
   9) Find the most durable airplane part.
   10) What is the most common broken reason among all airplanes?

Documentation

No special documentation is required for this assignment.

Submission

Submission will be made via Google-Classroom.

- Put the following files in a folder and name it as ***StudentID_Name_Surname*** (do not use Turkish characters.)
  - dia file (or another drawing file you choose)
  - db creation, table creation and record insertion scripts and SQLs in a txt file
- You lose 10 points for violating naming convention.
- Late submission is allowed but 10 points penalty applies for each day.

Honesty

Your submissions will be scanned among each other. Any assignments that are over the similarity threshold will get a zero regardless of their similarity. Excuses like "Hocam biz beraber yaptık" are directly ignored. This is an individual assignment. We strongly encourage you not to submit your assignment rather than a dishonest submission. Cheaters will be announced to public in Google Classroom as "Cheaters for assignment 3". So, please do what you can, not what your friends can. We strongly encourage you not to submit your assignment rather than a dishonest submission.

Grading

Note: Your scripts and queries will be tested in PostgreSQL.

• Database design & ER	30 %
• Fully coverage of requirements	20 %
• Primary and foreign keys, data types	10 %
• SQL queries	40 %

For Questions and guidance

For more information and further questions, please use Google-Classroom, where everybody can see and review the answers. E-mail messages will not be replied. We will try to answer any of your questions as soon as possible.