Assignment #2

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Total Marks: 50 (5% of the Individual Assignments)
Due Date: Sept 23, 14:30
NOTE: We will be building off of the answer to "Assignment 2 - Question 1" for Assignment 3. Thus A3 will contain the solutions to A2Q1, hence A2 will need to be submitted *on time*. For late submissions, after A3 has been released, A2Q1 cannot be marked.

Question 1)

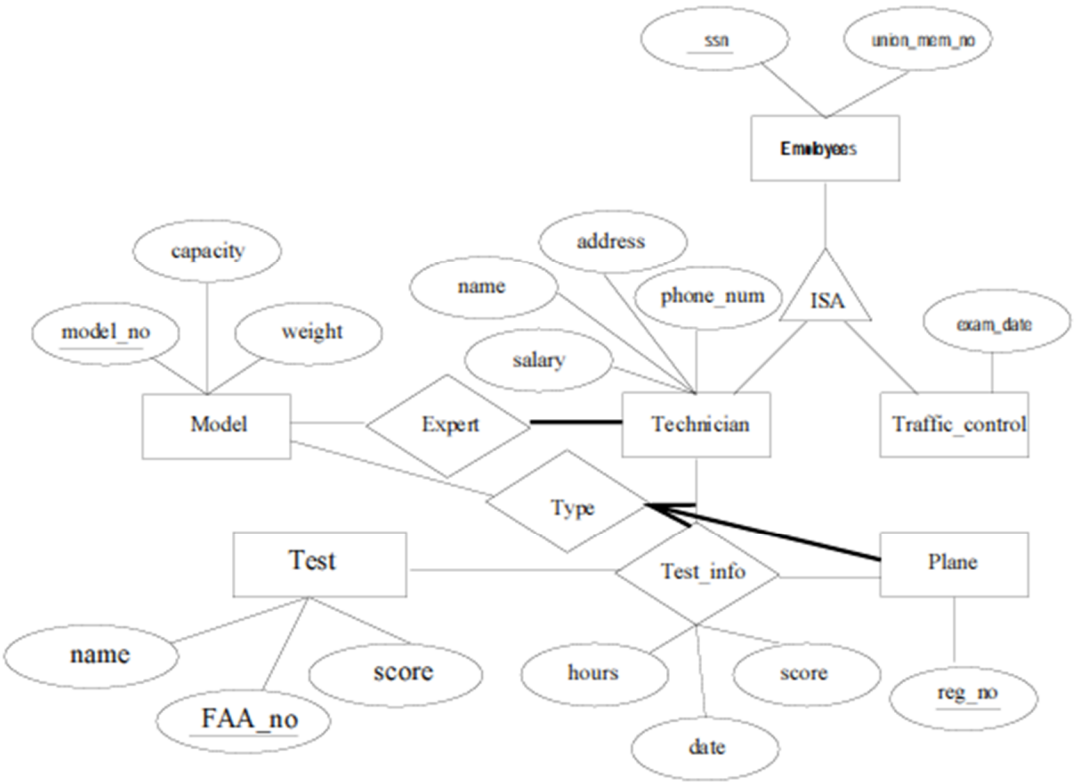
Please complete Exercise 2.6 of the text. It is here for reference:

Computer Sciences Department frequent fliers have been complaining to Dane County 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:

- Every airplane has a registration number, and each airplane is of a specific model.
- The airport accommodates a number of airplane models, and each model is identified by a model number (e.g., DC-10) and has a capacity and a weight.
- A number of technicians work at the airport. You need to store the name, SSN, 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.
- Traffic controllers must have an annual medical examination. For each traffic controller, you must store the date of the most recent exam.
- All airport employees (including technicians) belong to a union. You must store the union membership number of each employee. You can assume that each employee is uniquely identified by a social security number.
- The airport has a number of tests that are used periodically to ensure that airplanes are still airworthy. ach test has a Federal Aviation Administration (FAA) test number, a name, and 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, and the score the airplane received on the test.

1. Draw an ER diagram for the airport database. Be sure to indicate the various attributes of each entity and relationship set; also specify the key and participation constraints for each relationship set. Specify any necessary overlap and covering constraints as well (in English).

   [15 points for correct attributes + 10 for correct entities + 10 for correct relationships = 35 points]



2. The FAA passes a regulation that tests on a plane must be conducted by a technician who is an expert on that model.
   a. How would you express this constraint in the ER diagram?
   b. If you cannot express it, explain briefly.

   [5 points]

   a. Since all airline employees belong to a union, there is a covering constraint on the Employees ISA hierarchy.
   b. You cannot note the expert technician constraint the FAA requires in an ER diagram. There is no notation for equivalence in an ER diagram and this is what is needed: the Expert relation must be equivalent to the Type relation.

Question 2)

- Please download SQL Server 2008 R2 from: http://www.microsoft.com/express/database/
- Install SQL Server 2008
- Download the AdventureWorksLT database from the course website.
- Follow the instructions, found in another document, on the website.

Execute the following commands and write down the results. We will cover the details and meanings of the commands later on in the course. For the moment, I want to verify that everyone successfully set up the AdventureWorks database, so do not worry about understanding the meaning of the commands. [2 points each]

a) Tell me the number of records in the Address table.
   SELECT COUNT(*) FROM SalesLT.Address
   = 450
b) Tell me the average order quantity sold.
   SELECT AVG(OrderQty) FROM SalesLT.SalesOrderDetail
   = 3
c) Tell me the number of Product Models (tuples/records returned as a result of this query)
   SELECT DISTINCT(Name) FROM SalesLT.ProductModel
   = 128
d) Tell me the number of addresses in Bellevue.
   SELECT COUNT(*) FROM SalesLT.Address WHERE City = 'Bellevue'
   = 2
e) Tell me the amount of the largest Sales Order.
   SELECT MAX(TotalDue) FROM SalesLT.SalesOrderHeader
   = 119960.824