

# CMPT 354 –Database Systems I (Section D100)

## Assignment #3

Instructor: Richard Frank (rfrank@sfu.ca)

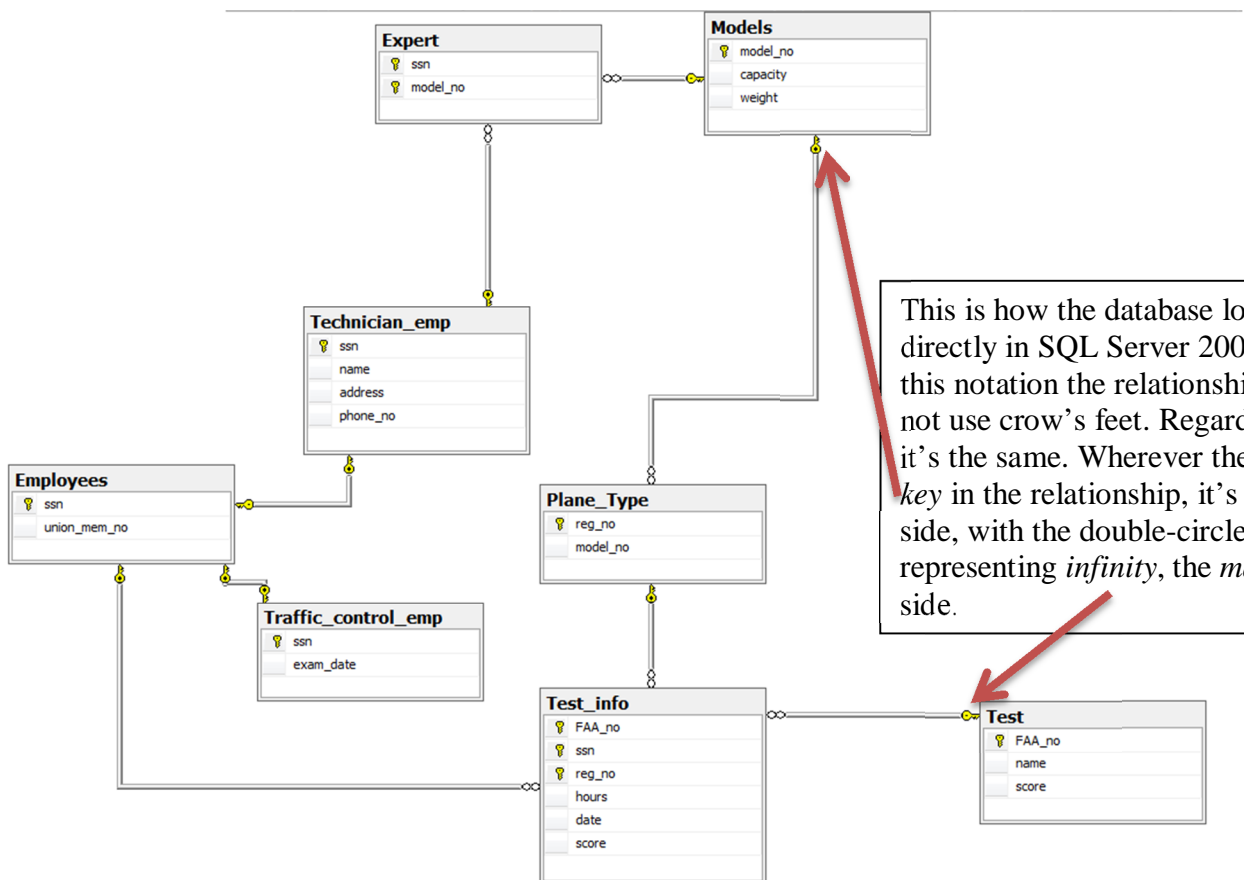
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Total Marks: 50 (5% of the Individual Assignments)

Due Date: Sept 30, 14:30

### Question 1)

Based off the E-R Model, posted on the website as part of the solution for assignment #2, please draw out the Relational Model [15 marks], and then write the SQL CREATE TABLE commands to create this schema [20 marks] including all key and null constraints. If a business constraint cannot be captured at the database level, note it.



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```
1. CREATE TABLE Expert (    ssn          CHAR(11),
                           model_no INTEGER,
                           PRIMARY KEY (ssn, model_no),
                           FOREIGN KEY (ssn) REFERENCES Technician_Emp,
                           FOREIGN KEY (model_no) REFERENCES Models)
```

The participation constraint cannot be captured in the table.

```
2. CREATE TABLE Models (    model_no  INTEGER,
                           capacity  INTEGER,
                           weight    INTEGER,
                           PRIMARY KEY (model_no))
```

```
3. CREATE TABLE Employees (ssn          CHAR(11),
                             union_mem_no INTEGER,
                             PRIMARY KEY (ssn))
```

```
4. CREATE TABLE Technician_emp ( ssn      CHAR (11),
                                   name     CHAR(20),
                                   address   CHAR(20),
                                   phone_no CHAR(14),
                                   PRIMARY KEY (ssn),
                                   FOREIGN KEY (ssn)
                                       REFERENCES Employees
                                       ON DELETE CASCADE)
```

```
5. CREATE TABLE Traffic control emp ( ssn      CHAR(11),
                                        exam_date DATE,
                                        PRIMARY KEY (ssn),
                                        FOREIGN KEY (ssn)
                                            REFERENCES Employees
                                            ON DELETE CASCADE)
```

```
6. CREATE TABLE Plane_Type (reg_no  INTEGER,
                              model_no INTEGER,
                              PRIMARY KEY (reg_no),
                              FOREIGN KEY (model_no) REFERENCES Models)
```

```
7. CREATE TABLE Test_info ( FFA_no INTEGER,
                              ssn     CHAR(11),
                              reg_no  INTEGER,
                              hours   INTEGER,
                              date     DATE,
```

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```
score    INTEGER,  
PRIMARY KEY (ssn, reg_no, FAA_no),  
FOREIGN KEY (reg_no) REFERENCES Plane_Type,  
FOREIGN KEY (FAA_no) REFERENCES Test,  
FOREIGN KEY (ssn) REFERENCES Employees)
```

```
8. CREATE TABLE Test ( FAA_no INTEGER,  
name      VARCHAR(50),  
score     INTEGER,  
PRIMARY KEY (FAA_no) )
```

The constraint that tests on a plane must be conducted by a technician who is an expert on that model can be expressed in SQL as follows.

Not possible since SQL Server (and many others) do not allow for subqueries in CHECK constraints.

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### Question 2)

For the AdventureWorksLT database, installed in Assignment 2, schema available online, answer the following:

- a) What is the SQL command to return the full name(s) and full address(es) of all customers living in Montreal or Houston? [4 marks]

```
SELECT FirstName, MiddleName, LastName, AddressLine1, City, StateProvince,
       CountryRegion, PostalCode
FROM SalesLT.Customer C, SalesLT.CustomerAddress CA, SalesLT.Address A
WHERE C.CustomerID = CA.CustomerID
      AND CA.AddressID = A.AddressID
      AND (City = 'Montreal' OR City = 'Houston')
```

- b) What is the SQL command to return the full address(es) of all orders with total order price of more than \$100,000? [3 marks]

```
SELECT AddressLine1, City, StateProvince, CountryRegion, PostalCode
FROM SalesLT.SalesOrderHeader SOH, SalesLT.Address A
WHERE TotalDue > 100000
      AND SOH.ShipToAddressID = A.AddressID
```

- c) Could the fields that make up the full address be the primary (composite) key to the Address table? Is this a good idea? Why, or why not? [3 marks]

Yes, it could be the primary key since it is as unique as AddressID. It is not a good idea because there are too many fields that make up the composite key, too much data stored in other tables. Plus, if it is a primary key, then there is no need for the Address table.

### Question 3)

Install Visual Studio 2010, either the full version from the CS department, or the Express version downloaded from Microsoft. During installation, specify all the components of VB.NET and C# so all of it is installed.

This question is straight-forward and is designed to ensure that you have everything up and running, and you can upload code into the electronic submission service.

Do this:

- Create a new application
- put a *label* onto the form
- Calculate how many products there are in the AdventureWorks database via a SQL query to the database.
- Write a friendly message to the TA during run-time telling him how many products there are.

[5 marks]