ITM-500 Winter 2022

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Assignment 2
Due Tuesday April 5, 2022 at 1:00pm

Total Marks: 200

This assignment could be done as a **group** or **individually**. The **maximum size of a group is 4** (smaller groups of size 2 and 3 are accepted, but there is no exception for group sizes larger than 4). **Your group members must be from sections 011 and 021 (Tuesday Class).**

While it is understood that groups may share their expertise and communicate with each other, each group's work must reflect sufficient individual group effort to merit its grade. Sharing complete solutions with other groups is not acceptable. Such blatant collusion will result in a grade reduction for both groups and in extreme cases could result in a zero and a charge of academic misconduct.

Part 1 and Part 2 below are completely separate requirements and should be addressed as such. They do not constitute a single integrated problem. **Part 1 and Part 2 are totally unrelated.**

Part 1 – 100 marks

Using the following narrative about an electric car tracking system by ABC Inc., **design and document a logical data model using Erwin (or draw.io) and draw the entity relationship diagram (ERD)**. You should also make and document any reasonable assumptions where you feel the case is vague or ambiguous or missing any data necessary to meet the requirements. However, you cannot ignore or overrule the requirements that are explicitly stated. Show all cardinality, primary keys and foreign keys. Use verbs to clarify the relationships. Show only the attributes that are contained explicitly in the case.

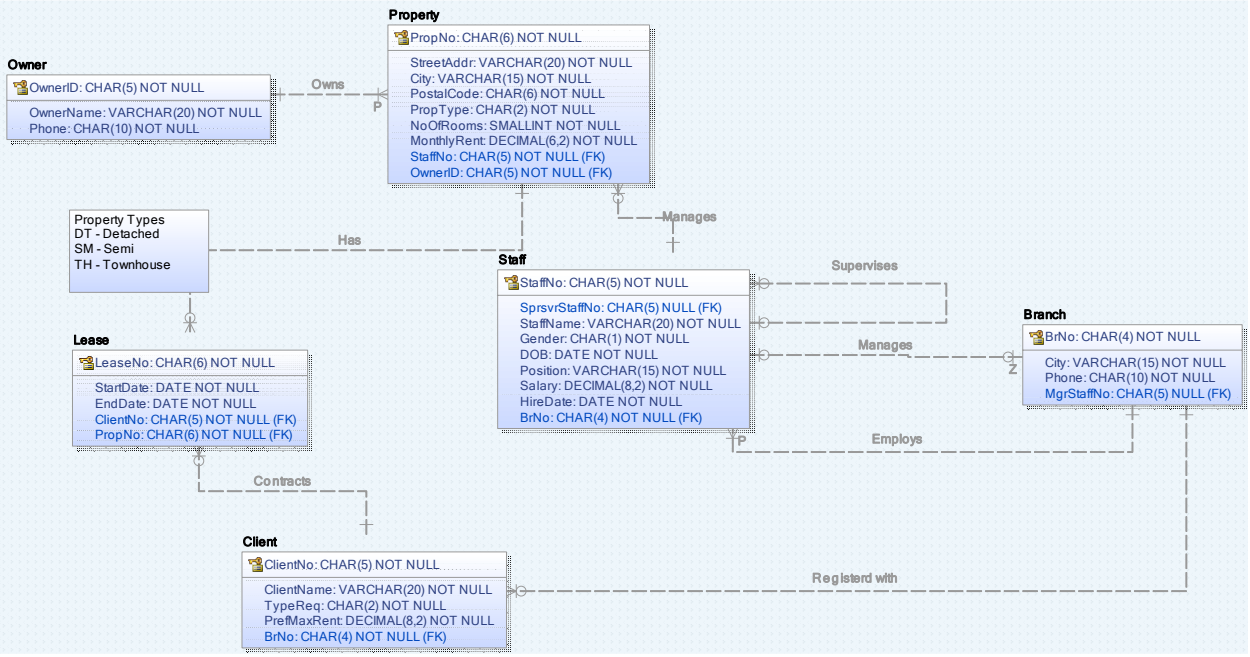
The ABC Inc. has a car tracking system which requires a system to meet the following operations and requirements:

- Employees may use cars owned by ABC for officially sanctioned travel. The cars may be used by employees to travel to other locations on company business. The cars used for such travel are located in the ABC Car System (ABCCS).
- For all employees the information retained includes department code and name, employee id, name and internal phone ext.
- An employee may reserve a car for use. Required for a reservation is the expected departure date and return date, car type required, and destination. This employee will subsequently check out and return the car. These actual dates will also be recorded as well as the identification of the employee who releases the car and then subsequently, the employee who receives it on return. When a car is checked out its car identification number and odometer reading is recorded. When a car is returned, the odometer reading is again recorded. The employee's department will then be internally billed at a mileage rate based on the car type. Each car type (e.g., Truck, Sedan, etc.) has a standard mileage rate.
- All routine car maintenance is performed by ABCCS. Each time a car requires maintenance, a maintenance log entry is completed and assigned an entry number. The log includes the car identification, a brief description of each type of maintenance activity required as there may be several and the log entry date. Subsequently the actual date the maintenance was completed is added as well as the name and identification of the mechanic releasing the car back into service. Only mechanics that have an inspection authorization may release a car.
- Each maintenance activity associated with a maintenance log may require multiple parts. The type and quantity of parts used will be recorded as well as the identification of the mechanic performing that particular maintenance activity. ABCCS maintains a parts inventory for parts such as oil, oil filters, air filters and belts of various types. Each part kept in inventory will have an ABCCS part number and a description. The parts inventory is checked daily to monitor parts usage and to reorder parts that reach the "minimum quantity on hand" level.

Part 2 – 100 marks

Given the **logical ERD** below, undertake the following:

1. Using SQL Server create a database called “ITM500W22A2”.
2. Define all primary keys, foreign keys and data types.
3. Populate tables with sufficient data to adequately test all aspects of your queries. (See Note below).
4. Develop and write the SQL statements necessary to satisfy the queries. The queries are in “**Assignment2Part2Queries.sql**” file.



ATTENTION. A lease is considered “active” if the end date of the lease is greater than the current date (i.e., the end date is sometime in the future). There can be lease history entries in the database (i.e., leases where the end date is in the past). A property could therefore be associated with a current lease as well as completed leases. The SQL function GetDate () in MS SQL Server should be used to retrieve the current date from the system. No views should be employed in this assignment. While no question would require it, you may use dynamic temporary tables as a technique.

General Notes:

i) Queries that do not return sufficient data will lose marks. If no output is generated that query will receive a zero. All queries must generate some output.
ii) Use column aliases where appropriate.
iii) Suppress duplicate rows where appropriate for output based on your actual test data results even if not specifically requested by the question.

Supplementary Notes:

1. If you are moving databases between different team members you may need to execute the following command against the database after attaching it in order to be able to view the database diagram. In a query window with the correct database in the drop-down window of the object explorer panel enter:

sp_changedbowner 'sa'

and execute.

2. Remember to define all your Foreign Keys (FK) BEFORE entering data or you may get referential integrity errors which will be hard to find and correct when trying to save these definitions subsequently via your database diagram changes.

3. If your database attaches in a Read Only mode try launching SQL Server Management Studio as "Administrator" (right click on SQL Server Management Studio and choose 'Run as administrator').

4. When entering data that involves 2 way or recursive relationships leave the FK as NULL on the first pass and go back and complete the entries when all parents for such relationships have been entered successfully.

5. When deleting a feature from an Erwin diagram make sure you answer yes to the pop-up question "do you also want them deleted from the model" else while not visible it may continue to influence features of your diagram. If you suspect a problem, you can always check the entries under the Model Explorer (to the left) to see if all entries are correct.

What to hand in:

1) **For Part 1:** Take a screen shot of the Erwin ERD model (or draw.io ERD model). Paste the screen shot in a MS Word document. Also, write any assumptions that you have made about your design in the MS word document. Submit the MS Word document.
2) **For Part 2:** A file that contains your answers in SQL to the above questions (similar format to lab solutions). Include the questions in your file too (again, the same format as labs). You can submit .sql or .txt or .pdf or .docx files.
    - **Note:** You **do not have to email the database**. You create and populate the database and fill it up with some data so that you can test your queries against the database and see the results. We have our own populated database to test your SQL answers.
3) If you do the project in a group, a text file containing names and email addresses of the group members.

How to hand in:

- One of the group members should **email** the above files (ERD diagram and its assumptions, the file with SQL queries, and the name of the group members) before the deadline to **paula.lima@ryerson.ca**
- If you do the project in a group, you should **copy (CC) your team members** in the email.

Late Submission Penalty:

Here is the penalty for late submission:

- Within 24 hours: You will lose 25% of your mark.
- Within 48 hours: You will lose 50% of your mark.
- Within 72 hours: You will lose 75% of your mark.
- After 72 hours: You will get the mark of 0 for Assignment 2.