CS 504 Fall 2021 Project 1

DUE: 10/08/2021 by 11:59PM

Project Description

The goal of this assignment is to design a conceptual schema using the EER data model, incorporating this schema into a RDBMS and running queries on this database.

Part 1: Design an EER data model (30 points)

Draw an EER diagram according to the notations discussed in class to accurately represent the design description below. You can use any tools to draw the EER diagram or simply draw it by hand. In your diagram, indicate all the super classes, subclasses, entity sets, relationship sets, cardinality ratios, participations, attributes, and primary keys. Clearly specify any reasonable assumptions if they are not specified in the design specification. Submit your EER diagram and the assumptions you make in a PDF file.

Design Specification:

The following is a description of a database of hospital information.

As a large service organization, Valley Creek Community Hospital depends on a large number of persons for its continued success. There are four groups of people on whom the hospital is most dependent: Employees, Physicians, Patients, and Volunteers. There are several common attributes that are shared by all of these persons: Person_ID (unique identifier), Name, Birth_date, Phone, and Address. Each address can be accessed as Street_address, City, State, and Zip_code individually and the entire address can also be retrieved as a unit. Each of the four groups has at least one specific attribute of its own. Employees have a Date_hired, Volunteers have a Skill, Physicians have a Specialty and Pager#, and Patients have a Contact_date. There might be additional personnel in the hospital community who do not belong to one of these four groups even though their numbers are relatively small. However, a particular person may belong to more than one groups at any given time (for example, Patient and Volunteer).

Each patient has one and only one physician responsible for that patient. A given physician may not be responsible for any patient at a given time or may be responsible for one or more patients. Patients are divided into two groups: inpatient and outpatient. Each inpatient has a Date_admitted attribute. Each outpatient is scheduled for one or more visits. Each visit has two attributes: Date (partial identifier) and Comments. Notice that a visit cannot exist without an outpatient entity.

Employees are subdivided into three groups: Nurses, Staff, and Technicians. Nurses have an attribute Certificate that indicates the qualification. Staff has an attribute Job_class. Technicians have one or more Skills. Each technician is assigned to one or more laboratories. Attributes of

laboratories include Name (unique identifier) and Location. A laboratory must have one or more technicians assigned.

Part 2: Map the EER diagram from part 1 into relation schemas (20 points)

Convert your EER diagram from part 1 into relational schemas. In a PDF file, specify the followings for each relation:
(i) the name of the relation,
(ii) the names of its attributes,
(iii) the domain of each attribute,
(iv) the primary key, and
(v) the foreign key(s), if any.

Part 3: Create a relational database based on part 2 and query the database (50 points)

Now, you are ready for implementation. Use appropriate naming conventions for all of your tables and attributes. Write SQL commands to create tables and all other structures from part 2. For each table in your database, specify primary key and indicate all reasonable foreign key constraints, if any. Please populate sufficient data into the database so that your queries can produce some results.

Write the following queries in SQL and execute them on the database you created.

1. Find the hire dates of all nurses who have an RN certificate.

2. Find the zip codes of all physicians who are specialized in ENT.

3. Find the names of all patients who are also volunteers at the hospital.

4. Find the total number of patients that Dr. Smith is responsible for.

5. For each job class of staff, find the IDs of the youngest staff members belonging to this class.

6. Find the pager# of each physician who has not been responsible for any patient yet.

Include all your SQL commands (create, insert, and query statements) in a single script file(.sql). Please make sure that your script runs on sqlplus (Oracle) or mysql on Zeus. If not, please schedule a demo with your GTA. Submit your script file and a log file (.txt) showing the output of running the script including the query results.

Some Tips:

1) At the beginning of your script, drop all tables that you are about to create. For example:

   sqlplus: drop table physicians cascade constraints;
   mysql: drop table physicians cascade;

2) If you have trouble creating a particular table, try a different name. A name (like order, group, user, etc.) may be a **reserved word**.
3) When creating tables that contain foreign keys, make sure the tables that are referenced have already been created.
4) In order to run your script and capture the output of your script, use the following command:

   sqlplus: spool logname.txt
   @scriptname.sql
   mysql: tee logname.txt
   source scriptname.sql

5) In order to run your script on Zeus, you can transfer files to Zeus. For example:

   scp scriptname.sql netid@zeus.vse.gmu.edu:.
   Transfer files back to your local machine:
   scp netid@zeus.vse.gmu.edu:filename .

   More information: https://labs.vse.gmu.edu/index.php/FAQ/SSH

Instructions for connecting to Oracle/MySQL

https://labs.vse.gmu.edu/index.php/Services/Services
Click on MySQL or Oracle to get instructions.
Follow the link on the instructions page to activate your account to gain access.

Three ways to access Oracle/MySQL on-campus:
1) Access Oracle/MySQL on VSE LAB machines.
2) SSH to zeus.vse.gmu.edu by **ssh netid@zeus.vse.gmu.edu**
   Oracle: run the command **sqlplus** once you are connected and enter your Oracle username and password when prompted.
   MySQL: **mysql -h helios.vse.gmu.edu -u username -p**
3) Install SQL Developer and make a connection.
   More information: https://labs.vse.gmu.edu/index.php/Services/Oracle#sqldeveloper

Two ways to access Oracle/MySQL off-campus:
1) Connect to VPN and then SSH to zeus.vse.gmu.edu by following the steps above.
2) Connect to VPN and then create a connection from SQL Developer GUI.