CSC 370 - SUMMER 2017
DATABASE SYSTEMS
ASSIGNMENT 1
UNIVERSITY OF VICTORIA

Due: Monday, May 15th, 2017 at 4:00pm. **Late assignments will not be accepted.**

Submit your answers on paper in the CSc 370 dropbox on the second floor of the ECS building. Answers must be well formatted and legible or they will not be marked.

Question 1: Real Estate [10 marks]
Following the constraints below, construct an E/R diagram (including primary keys) to model a residential real estate database, which contains home listings for multiple real estate agencies. Each agency employs multiple agents, and each agent is involved in listing properties (acting on behalf of sellers) and buying properties (on behalf of purchasers). Your solution will be marked on completeness (all aspects are included), faithfulness (the data model reflects the constraints accurately) and elegance (unnecessary complexity is avoided). Note that since the constraints are stated in plain english, some assumptions may be required in your interpretation of them; state any such assumptions. If you create any attributes beyond the ones listed below, include a brief description of the purpose of each. Remember to include primary keys for each entity in the diagram.

- Each agency has a name, office address, website and phone number.
- Each real estate agent must be employed by an agency. Agents have a name, cell number and email address.
- Clients (people who are looking to buy or sell) each have a name, primary address, phone number and email address.
- Clients may be buyers or sellers (or both). Each buyer has an associated maximum budget.
- Each client (buyer or seller) has one associated real estate agent. It is not permitted for clients to have two agents simultaneously.
- A property has an asking price, annual property tax, address, number of bedrooms and number of bathrooms. Note that addresses will include the appropriate apartment or suite number if necessary (so two apartments in the same building will be assumed to have distinct addresses).
- Each property is listed by exactly one seller.
- A property may be a condominium, in which case it will also have an associated monthly strata fee. Not all properties are condominiums.
- A sale is a transaction between buyer and seller for a particular property. Each sale has a date and sale price.

Question 2: Pharmacies [10 marks]

Consider the following description of a chain of pharmacies.

- Patients are uniquely identified by a healthcare number and also have a name, address, and age. Doctors are identified by a doctor ID number. For each doctor, the name, specialty, and years of experience must also be recorded. Every patient can have multiple physicians but each has a primary physician. Each pharmaceutical company is identified by name and has a phone number.
- For each drug, the trade name and formula must be recorded.
- Each drug is produced by exactly one pharmaceutical company, and the trade name identifies a drug only *among the products of that company.*
- Each pharmacy has a name, address, and phone number. Each pharmacy sells several drugs and has a price for each. A drug could be sold at several pharmacies, and the price could vary from one pharmacy to another.
- Doctors prescribe drugs for patients. A doctor could prescribe one or more drugs for several patients, and a patient could obtain prescriptions from several doctors. Each prescription has a date and a quantity associated with it. We need to know who has prescribed what for whom. You can assume that if a doctor prescribes the same drug for the same patient more than once, only the last such prescription needs to be stored.

Using the above information answer the following questions,

(a) Using the same guidelines as Question 1, draw an E/R diagram capturing the above information.
(b) Translate your E/R diagram into tables and write the SQL statements for the table creation. Specify primary keys.
(c) Write SQL INSERT statements to insert at least one tuple (that you create) into each table.

Question 3: Hospitals [8 marks]

Suppose we have two kinds of doctors: hospital doctors and family physicians. In addition to the doctor's ID number, name, specialty, and years of experience, we want to record the hospital name for the hospital doctors, and the office address for the family physicians. Doctors are permitted to both work at a hospital and be a family physician. Also there can be doctors for whom we don't know whether they are working in a hospital and/or whether they are family physicians or whether they are not working at all.

(a) Using the same guidelines as Question 1, draw an E/R diagram capturing the doctor class hierarchy.
(b) Translate your E/R diagram into tables and write the SQL statements for the table creation. Specify primary keys.
(c) Write SQL INSERT statements to insert at least one tuple (that you create) into each table.