Marmara University – Faculty of Engineering – Department of Computer Engineering

Fall 2020 – CSE3055 Database Systems
Homework #1

Due: 02.11.2020.Mon 23:59

1) [40 pts] Match the following terms to the appropriate definitions

_____ disjointness constraint

_____ weak entity

_____ attribute

_____ subtype discriminator

_____ cardinality constraint

_____ degree

_____ completeness constraint

_____ identifier

_____ ternary

_____ composite key

a) Whether an instance of a supertype must also be a member of at least one subtype

b) contains two (or more) attributes

c) Depends on the existence of another entity type

d) Property of an entity

e) Whether an instance of a supertype may simultaneously be a member of two (or more) subtypes

f) Specifies maximum and minimum number of instances

g) Number of participating entity types in relationship

h) Uniquely identifies entity instances

i) Relationship of degree 3

j) An attribute of the supertype whose values determine the target subtype(s)

2) [60 pts] The Prescriptions-R-X chain of pharmacies has offered to give you a free lifetime supply of medicine if you design its database. Given the rising cost of health care, you agree. Here's the information that you gather:

- Patients are identified by an SSN, and their names, addresses, birthdate, and ages must be recorded.
- Doctors are identified by an SSN. For each doctor, the name, specialty, and years of experience must be recorded. Doctors have one or more specialties.
- 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 sold by a given pharmaceutical company, and the trade name identifies a drug uniquely from among the products of that company. If a pharmaceutical company is deleted, you need not keep track of its products any longer.
- Each pharmacy has a name, address, and phone number. Address is composed of city, state, and zipcode.
- Every patient has a primary physician. Every doctor has at least one patient.
- 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. 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.
- Pharmaceutical companies have long-term contracts with pharmacies. A pharmaceutical company can contract with several pharmacies, and a pharmacy can contract with several pharmaceutical companies. For each contract, you have to store a start date, an end date, and the text of the contract.
- Pharmacies appoint a supervisor for each contract. There must always be a supervisor for each contract, but the contract supervisor can change over the lifetime of the contract.

a) Draw an ER diagram that captures the preceding information. Identify any constraints not captured by the ER diagram.

b) How would your design change if each drug must be sold at a fixed price by all pharmacies?

c) How would your design change if the design requirements change as follows: If a doctor prescribes the same drug for the same patient more than once, several such prescriptions may have to be stored.

IMPORTANT NOTES:

1) Write the following sentence on the first page of your document: "I hereby swear that the work done on this homework is totally my own; and on my honor, I have neither given nor received any unauthorized and/or inappropriate assistance for this homework. I understand that by the school code, violation of these principles will lead to a zero grade and is subject to harsh discipline issues."

2) In case of any form of copying and cheating on solutions, all parts will get ZERO points. You should submit your own work. In case of any forms of cheating or copying, both giver and receiver are equally culpable and suffer equal penalties. All types of plagiarism will result in zero points from the homework.

3) Use a software to draw ER diagrams and submit the output/screenshot of it. If you use your handwriting other than the diagrams, your handwriting should be readable, clear and neat. If possible, do not use any handwriting.

4) Please zip and submit your files using filename YourNumberHW1.zip (e.g.: 150118123HW1.zip) to the site http://ues.marmara.edu.tr before deadline.

5) Do not send homework submissions through e-mail. E-mail attachments will not be accepted as valid submissions.

6) You are responsible for making sure you are turning in the right file, and that it is not corrupted in anyway. We will not allow resubmissions if you turn in the wrong file, even if you can prove that you have not modified the file after the deadline.

7) No groups are allowed.

8) Grade evaluation may be done on selected parts of the homework, so try to complete all parts of your homework successfully.

9) No late submissions will be accepted.