**CS3431 C16 Wong**

**Assignment 1: Entity-Relationship & Relational Models**

Post Date: Jan. 20, 2016 at noon.

Due Date: Jan. 26, 2016 at noon. Submit hardcopy in class.

**General Instructions**

* The homework is to be done individually.
* In your ERD design, clearly indicate the keys and the cardinalities of the relationships. Include discriminators, if they exist. Do not use multi-way relationships. Replace them with a new entity with multiple binary relationships instead.
* Any assumptions you make, which are not stated in the problem definition, need to written explicitly. The assumptions you add must be “in addition” to the specified requirements in the problem definition without deleting any of these requirements.
* Indicate if there is any information (constraints or other concepts) listed in the description that cannot be modeled by the ER model.

**Problem 1 – Teams**

* Each player has a name.
* Each fan has a name, favorite team, favorite players, and favorite color.
* Each team has a name, its players, its team captain who is also one of its players, and the colors of the uniform with a maximum of three colors. Note that a set of colors is not a suitable attribute type for teams.
* One of the players of the team (the captain) is a leader for the other players on the team.
* A captain cannot exist without a team but a player can. Recently formed teams can exist without players or colors.

**Problem 2 – Patient and Organ Matching**

* Each patient has unique health care ID, name, address, blood type, and DoB (date of birth) properties
* Doctors have a physician number (unique ID), name
* Patient doctors have a specialty and an associated hospital. Patient doctors can treat many treat patients and a patient may have many patient doctors.
* OP (Organ Procurement) doctors have an associated organ bank and type of organ they work with. For example, livers or kidneys. OP doctors may care for many organs available to be matched, but each organ can have only a single OP doctor assigned to it. In the case of a newly obtained organ, there may be a lag time before the organ is assigned to an OP doctor.
* There are other types of doctors than patient doctors and OP doctors. Doctors may also be more than one type of doctor. For example, there can be an OP doctor that treats patients and conducts research.
* Organs have a unique number assigned per OP doctor, but that number can be used by other OP doctors. Organs also have a blood type.
* For each patient-organ transplant, there a single patient that is matched to a single organ. The patient’s doctor performs the operation. We need to capture the date of the operation and whether it was successful.

**Problem 3 – Library Magazine Subscriptions**

* Magazines subscriptions have a unique name, category, and price
* Libraries have a unique account ID, name, and address
* A library can order one or more different magazine subscriptions. There is a quantity associated with each magazine which permits a library to order multiple copies. The order date and total price also needs to be captured.
* The library can cancel a subscription. In this case, which magazine, the quantity, the cancel date and the original subscription order needs to be tracked.

**Problem 4 – Relational Model**

Create a relational model (the CREATE TABLE statements) for the following database:

* A surgeon has a unique physician ID, name, address, and specialty with a default value of ‘Emergency’
* A patient has a unique health care ID, name, and condition.
* The model must check that the condition takes on the values of either ‘Critical’ or ‘Serious’
* Each patient has one major injury (mandatory attribute) that is to be operated on and optionally one minor injury to be operated on.
* Surgeons operate on patients on a given day and operations are given a unique ID.

Your CREATE TABLE statements should clearly indicate the following:

1. attribute names and their data types (choose appropriate types)
2. primary keys in each table
3. NULL (or NOT NULL) and the DEFAULT constraints
4. CHECK domain constrains
5. foreign key constraints

**Grading:**

The maximum grade is 100 points. **Late submissions receive a 0** because solutions will be posted shortly after class!

**Deliverables:**

This is an **individual** project and so each student will hand in a hardcopy (paper) at the beginning of class (noon). You are to use drawing tools such as MS Word to create your ERDs. Do not turn in hand-drawn assignments. If you need help, please check the course syllabus for office hour times or use the discussion board for your questions.