CS3431: Project Description
C-Term, 2019
Building a Database Application
Phase 1: Conceptual (ER) and Logical (Relational) Design

Post Date: Jan. 18, 2019
Due Date: Jan. 29, 2019 (11:00AM)
Teams: The project is done in teams of two.

Note: Phases 2 and 3 of actually building and querying the DB will depend on this phase. Therefore, give it a careful thinking and design.

Description:

In this phase you are required to build a database for a ***Hospital System***. You will provide the Entity Relationship Diagram (ERD), and the relational model that captures the following requirements:

- The hospital has many employees, for each employee we keep the ID (unique), first, and last names, job title, salary, and the office number.
- Employees have three categories, regular employees, division managers where each one manages several regular employees, and general managers where each one manages several division managers. The three categories of employees share the same attributes mentioned above.
- The hospital has different types of equipment. For each type, we have the type ID (unique), model, description, operational instructions, and the number of units (actual equipment) of that type. Then, each unit (equipment) has its own serial number (unique), the year of purchase, and the last inspection time.
    - Think of the types as “MRI”, “Ultrasound”, “CT Scanner”, …You can treat these names as the *Type ID*
    - Then under, for example, “MRI”, the hospital may have many actual units…
- The hospital has several rooms; each room contains several equipment units. For each room we need to keep the room number (unique), currently occupied or not (flag), and the equipment units in this room.
- Each room can be used to provide multiple services or operations. Examples of these services are: Intensive care unit (ICU), Consulting room, Ward room, Emergency room, Operating room, etc. We need the model to capture for each room the services it may provide.
- Patients are admitted into the hospital. For each patient, we keep track of their SSN (unique), first and last names, address, and Tel. number. Patients can be admitted several times to the hospital, and the model should capture for each admission the admission time (date/time of admission) and the leave time (date/time of exit).
- For each patient admission (visit), we need to keep track of which room(s) the patient stayed in, and the staying period for each room (start date and end date).

We also need to keep track of total payment for this visit, and how much of this payment will be covered by insurance (e.g., the percentage that the insurance will cover).

- The hospital has many doctors, for each doctor we keep the ID (unique), first and last names, specialty, and gender.
- For each patient visit, we need to keep track of which doctor(s) have examined the patient, and what was the result of this examination (the doctor's comments).
- At the end of a patient's visit, the patient may schedule a future visit. We want the model to capture these scheduled visits (capture the dates of these future visits).
- Doctors have access to all rooms in the hospital (so we will not capture specific relationship between doctors and rooms). However, employees have access to specific rooms, and we want our model to capture that. That is, capture each employee has access to which room.

Requirements:

1. Design an ERD that captures the above requirements. Follow the notations given in the course slides, and also follow the given guidelines for Good Design.

2. State any assumptions that you make in addition to the above requirements.

3. Create a relational model for the above application. You need to follow the rules that convert the ERD to relational model. The only requirement in this phase is to define what are the relations (tables) and their primary keys. No other constraints are required in this phase. The desired format of the relational model that you should deliver is as follows:

    a. If you have a relation named R with columns A1, A2, ..An and the primary key is A1, then your relational model should have:
    "R(A1, A2,…, An)"
    b. So, no Create Table statements are required in this phase.

Grading:

The maximum grade is 100 Points. No Late submissions.

Deliverables:

Each team should deliver a report containing the above requirements. ***Make sure to write your Group ID, and all members' names inside the submitted file.***

Submission (Each team give one submission):

- Submit electronically by the due date via canvas.wpi.edu website. Make sure your report is in .doc, .ppt, or .pdf formats. **(Recommended)**
- No hand-drawn diagrams are accepted.
- Make sure your design and writing is clear, otherwise the TAs will take 10 points out.