**Extra Problems (for practice): ER Modeling**

**Scenario 1: Project Management**

The Information Technology department of BigMart acts as an internal consulting organization for the rest of the company. They want to track their project assignments to the other departments. A project is considered to be a self-contained piece of work that has a beginning date and an end date, although this is often a projected date that can change as the project progresses. A project is also described by a project id, description, the internal client (department), and the type of project (i.e., network infrastructure, database development, application development, etc.).

Employees are assigned to projects. The database should track information for each employee, including their employee id, first and last name, title, office location, office phone, and email. Each employee may be assigned to more than one project and more than one employee can work on the same project.

They also want to be able to make the best choices for assigning people to projects. To do this, the company tracks skills possessed by each employee and required for each project. A skill is defined by its skill id, description and its difficulty level (i.e., low, medium, high). An employee can have multiple skills, and multiple employees can have the same skill. Similarly, a project can require more than one skill, and more than one project may require the same skill.

The company also wants to track billable hours, which includes start period, end period, and the number of hours worked during that period. Billable hours can only by recorded when an employee is assigned to a project.

**Scenario 2: Hospital Staff and Patients**

First Philadelphia Hospital wants to create a database to track patients and their assignment to Doctors. Patients are described by their first and last name, address, and patient ID. Doctors are described by their first and last name, office number, and their employee ID.

Patients have at least one insurer, and they might not have insurance at all. Details about the insurer include its name, address, and a provider number. A patient’s policy number should be recorded also, as it describes the relationship between the patient and their insurer.

Patients are assigned to a room. A room is described by a building name, a room number, and a shortcode that uniquely describes the room. They are assigned to only one room, and each room can house two patients. Doctors are assigned to patients, and can be assigned to more than one patient. Patients can be assigned to more than one doctor. This means two patients in the same room may have different doctors.

The database should also track procedures performed on patients. This transaction is called a treatment, and is a combination of one doctor, one patient, and one procedure. If a patient has two procedures done during the same stay, they are recorded as two different treatments. So doctors, patients, and procedures can be associated with more than one treatment.

Information about the treatment is described by the treatment ID, the treatment date, and the outcome. A procedure is described by a ProcedureID, the name of the procedure, whether it is in-patient or out-patient, and the type (general medicine, surgery, etc.).