Exercise 1 ER Modeling DBS

1. Construct an ER diagram for a hospital with the following user requirements:

- The hospital has wards identified by a ward number. A ward is located in a particular block and on a particular floor.
- Each ward consists of different rooms. All rooms have room numbers unique only to the ward but not unique between different wards. Each ward has at least one room.
- Rooms may be of different sizes, with different number of beds and possibly with attached bathrooms. Rooms with the same number of beds need not be of the same size nor have similar bath facilities.
- When a patient registers, information about his CPR#, first name, surname, address, date of birth, registration date and gender are recorded. Upon discharge, the discharge date is also recorded.
- If a patient is allocated to a room, no bed allocation details are recorded.
- There are three categories of wards: cardiology, pediatrics, and surgery. Each pediatric ward has a number of baby nurseries, while each surgical ward has a number of intensive care units (ICU).
- During his/her hospitalization, a patient may undergo surgical treatment, whereby multiple operations are possible. Complex procedures might require multiple surgeons.
- An operation is characterized by the type of operation and the normal duration. The date / time of a particular operation has to be recorded.
- Every surgeon has been involved in at least one operation but not every operation type has been carried out in this hospital.
- Information about nurses includes staff#, first name, surname, and date of joining.
- Every nurse is assigned to a ward. A ward is staffed by many nurses. However, a ward is managed by only one nurse. Not every nurse manages a ward.
- Nurses are designated as student nurses or registered nurses. The particular year of study for student nurses and the year of graduation and rank for registered nurses are also stored.

2. Design an ER model for a university library's database with the following requirements. The library keeps books with book identifiers, titles, authors and years of publication. Each book belongs to a certain topical category which is identified by the category name. Each book category may have a parent category and / or multiple subcategories. Books can be borrowed by library members. Library members are identified by their identification numbers. The other member information including name, address and telephone numbers are also stored. There are differently named types of memberships. Each membership type has a different cap on the number of books that can be borrowed and the loan duration. It is assumed that a member can borrow a book several times on different dates. Each book loan also comes with a return date determined by the loan duration of the membership type. The library restricts its textbooks, reference books and student reports to be used within the library, i.e. these types of books cannot be loaned. For textbooks, reference books and student reports, the course name, subject topic and school are required, respectively. Finally, the topical categories of books that can be borrowed are restricted by the membership type. State all assumptions clearly.

Exercise 1 ER Modeling DBS

3. You have been asked to design a database about a university, which records the following information:

- Each professor has an SSN (Social Security Number), a name, and a rank (e.g., Associate Professor).
- Each project is identified by a project number. Each project also has a starting date and an ending date.
- Each project is always managed by one professor.
- Each project is worked on by one or more professors.
- Professors can work on multiple projects. Professors can also manage multiple projects.
- Each department has a unique department number, a department name, and a main office.
- Each department can have a professor (department chair) who runs the department. A department can have no more than one department chair, but may temporarily have no chair.
- Professors can work in one or more departments, but a professor cannot be chair of more than one department.
- Draw an E/R diagram based on the description above. Specify any additional assumptions leading to your design.