COSC265 Tutorial 1: Entity-Relationship model

Aim: At the end of this tutorial you should be able to design simple ER schemas.

Required Preparation: Please read the tasks and design your solutions before coming to the tutorial. You will have an opportunity to discuss your solutions with the tutor.

Tasks: Draw ER diagrams for the following situations:

1. Entities:
    a. Ship: A ship has a name, registration code, gross tonnage, and a year of construction. Ships are classified as cargo or passenger.
    b. Restaurant: A restaurant has a name, address, seating capacity, phone number, and style of food (French, Russian, Chinese).
    c. Cow: A dairy cow has a name, date of birth, breed (eg Holstein) and a numbered plastic ear tag.
2. Relationships
    a. A farmer can have many cows, but a cow belongs to only one farmer.
    b. Farmers can own cows or share cows with other farmers.
    c. A university has many students, and a student can attend at most one university.
    d. An aircraft can have many passengers, but a passenger can be on only one flight at a time.
    e. A nation can have many states and a state many cities.
    f. A hamburger shop makes several types of hamburgers, and the same ingredient can be used with several types of hamburgers.
    g. A patient can have many physicians, and a physician can have many patients.
    h. A student can attend more than one class, and the same class can have many students.
    i. The Center for the Study of World Trade keeps track of trade treaties between nations. For each treaty, it records details of countries signing the treaty and where and when it was signed.
3. Databases
    a. An art researcher has asked you to design a database to record details of artists and museums in which their paintings are displayed. For each painting, the researcher wants to know the size of the canvas year painted, title and style. The nationality, date of birth and death of each artist must be recorded. For each museum, record details of its location and speciality, if it has one.
    b. You are chosen to design a database for the University Accommodation Office. Each hall of residence has a name, number, address, phone number and a hall manager. The halls provide only single rooms, each with a room number (unique within the University) and a weekly rent rate. The total number of rooms should also be available. Student may rent rooms throughout the academic year for various periods of time. For each individual rent agreement between a student and the accommodation office there is a unique lease number, the date of the start of the rent period and the end date (if known). For each student currently renting a room or on the waiting list, we store the ID number, name, home address, date of birth, status of his/her application waitlisted/placed) and the category of student (for example, 1UG for the first year undergraduate student). Whenever possible, information on a student's next-of-kin is stored, which includes the name, relationship, address and contact phone.

4. Examine the given ER schema. Try to reconstruct the requirements. Identify any deficiencies present in this schema.