Practice Sheet
Chapter 3 (ER Models)

*Solutions are at the end of the document. SOLVE IT YOURSELF first.

Question 1: Suppose you are given the following requirements for a simple database for the National Hockey League (NHL):

- The NHL has many teams,
- Each team has a unique name, a city and a coach
- Each player belongs to only one team.
- Each player has a unique phone number, name, a position (such as left wing or goalie), a skill level, and a set of injury records.
- Each team has exactly 1 captain who is a player.
- a game is played between two teams (referred to as host_team and guest_team) and has a date (such as May 11th, 1999) and a score (such as 4 to 2).

Construct a clean and concise ER diagram for the NHL database.

Question 2: Draw the ER diagram which models an online bookstore.

- Books have year, title, price, unique ISBN and at least 1 author. Books are published by exactly 1 publisher. Each publisher has a unique name, address, phone, email and unique website.
- Customers have a unique userID, name, phone number, email and billing address. Billing address is composed of street, city, zip, country.
- Each customer has one shopping cart, the shopping cart has a unique id. Books can be added to shopping carts. They can add more than one book of the same title at the same time, so quantity and date attributes are required.
- All copies of the same book are stored in one of the warehouses owned by the bookstore; The warehouse has a unique id, an address, a phone number and a manager.

Question 3: A pet store wants to design a database system for inventory and sales tracking. The requirements for the store are given below:

- The store sells different kinds of pets. The pets have a name, type, description, unique tag number, price and cost.
- The profit for each pet is calculated using price and cost. Profit will not be stored in the database but should be shown with the appropriate symbol in the diagram.
- Different suppliers supply the pets to the store. The supplier name, location and unique phone numbers are stored. Also, the shipping time and date from the supplier for each pet is recorded.
- The store keeps a record of all customers- national_id, name, address, email and contact.The customers can buy 1 or more pets from the store. The delivery date and time for the purchase is also recorded.
- The pets are often taken to the Vet in case of diseases or checkups. The vet's address, name, unique phone and fees are stored. For each visit to the vet, the date, time, all medicines and reason are recorded.

- A customer can refer other customers to the store. The referrer will get points for each referral.

Draw an ER diagram for the pet store.
Show at least 1 multivalued and 1 composite attribute.
Write down all assumptions(if any). Assumptions can only be made regarding the relationship constraints (cardinality ratio or participation constraint) and only if it is not indicated in the question. All assumptions must be logical.

Consider a university database for the scheduling of classrooms for exams. The data requirements are given below:

- Courses have unique name, department, credits and unique course code
- The university has buildings. The buildings have a unique number, address, building manager name and manager phone number.
- Each building has several rooms. The rooms have a room number which is composed of floor number(such as 1, 2, 3) and serial number (such as 01, 02, 03). The same floor and serial exist in all buildings, so the room number is not unique, unless combined with the building number. Rooms also have a total capacity and type
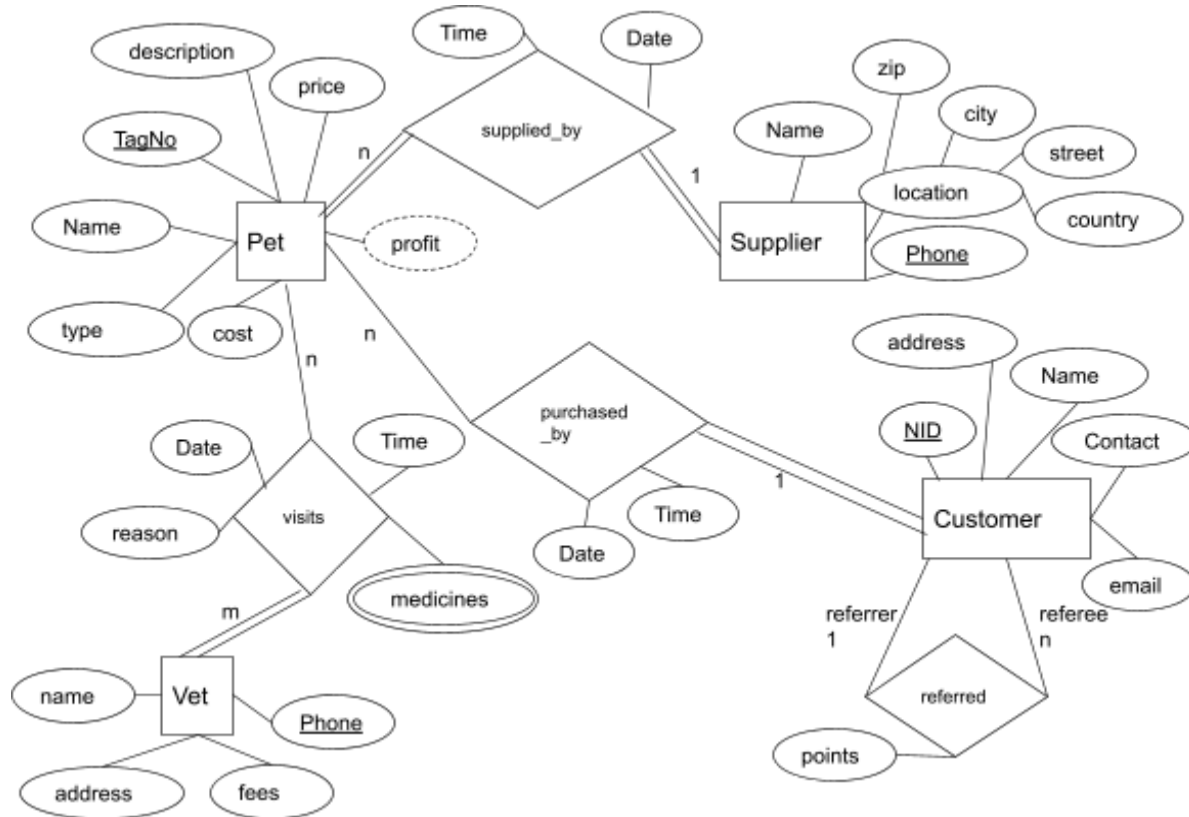- Course exams are held in rooms. The date, time of exam and the type of exam (such as mid or final) is recorded.
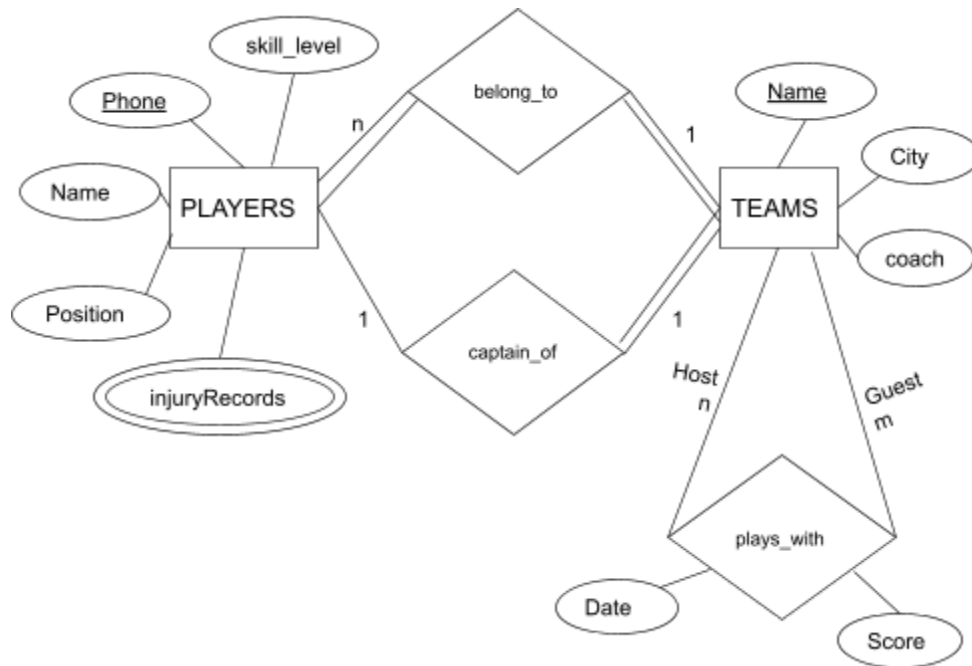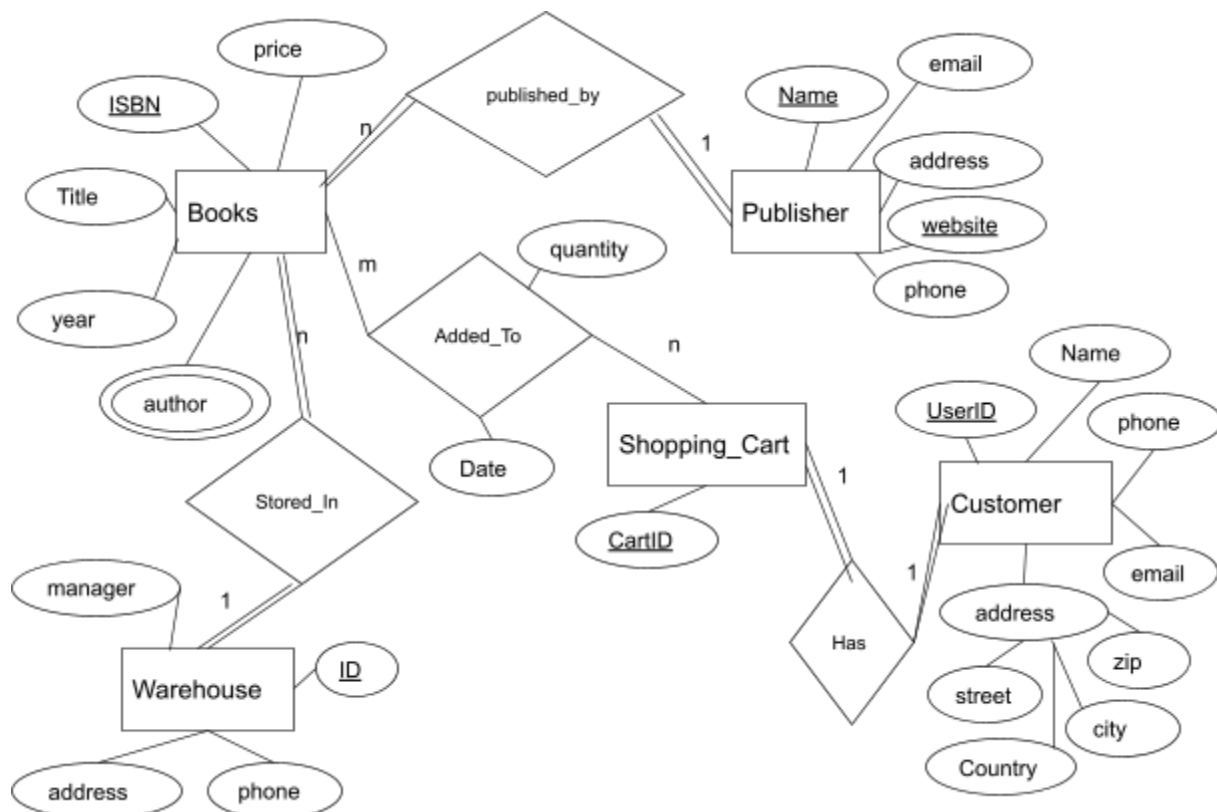
Answer 1:

Answer 2:

Multivalued: medicines
Composite: locations
Assumptions:
1. Referral is not mandatory
2. All vets in the database have treated at least 1 pet at some point in time.
3. The store has no other service except pet selling, so a person must have bought a pet to become a customer