2110322: ER-Exercises

Exercise 1

A university database contains information about professors (identified by social security number, or SSN) and courses (identified by courseid). Professors teach courses; each of the following situations concerns the Teaches relationship set. For each situation, draw an ER diagram that describes it (assuming no further constraints hold).

Exercise 1 (Cont.)

1. Professors can teach the same course in several semesters, and each offering must be recorded.

2. Professors can teach the same course in several semesters, and only the most recent such offering needs to be recorded. (Assume this condition applies in all subsequent questions.)

3. Every professor must teach some course.

4. Every professor teaches exactly one course (no more, no less).

5. Every professor teaches exactly one course (no more, no less), and every course must be taught by some professor.

6. Now suppose that every course can only be taught by a team of professors jointly, and each professor can join many teams. Model this situation, introducing additional entity sets and relationship sets if necessary.

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Exercise 2

- A company database needs to store information about employees (identified by *ssn, with salary and phone as attributes), departments (identified by dno,* with *dname and budget as attributes), and children of employees (with name and age* as attributes).

- Employees *work in departments; each department is managed by an* employee; a child must be identified uniquely by *name when the parent (who is an* employee; assume that only one parent works for the company) is known. We are not interested in information about a child once the parent leaves the company.

Draw an ER diagram that captures this information.

First,…

- We should design the entities and relationships.
    - "Employees *work in departments…*"
    - "*…each department is managed by an* employee…"
    - "…a child must be identified uniquely by *name when the parent (who is an* employee; assume that only one parent works for the company) is known."

Then,...

- We will design the constraints.
  - "...*each department is managed by **an** employee*..."
  - "...a child must be identified uniquely by *name when the parent (who is an* employee; assume that only one parent works for the company) is known. "
  - "We are not interested in information about a child once the parent leaves the company."

solution...

Exercise 3

- Although you always wanted to be an artist, you ended up being an expert on databases. *Your love in art is still there, however, so you set up a database company,* ArtBase, that builds a product for art galleries. The core of this product is a database with a schema that captures all the information that galleries need to maintain.

Requirements...

- Galleries keep information about artists, their names (which are unique), birthplaces, age,and style of art. For each piece of artwork of the artist, the year it was made, its unique title, its type of art (e.g., painting, lithograph, sculpture, photograph), and its price must be stored. Pieces of artwork are also classified into groups of various kinds, for example, portraits, still lifes, works by Picasso, or works of the 19th century; a given piece may belong to more than one group.

- Each group is identified by a name (like those just given) that describes the group. Finally, galleries keep information about customers. For each customer, galleries keep that person's unique name, address, total amount of dollars spent in the gallery (very important!), and the artists and groups of art that the customer tends to like.

   Draw the ER diagram for the database.

Hint hint hint ….

- Like before, we begin with the entities and relationships.
- "…artists, their names (which are unique), birthplaces, age, and style of art."
- "For each piece of artwork of the artist, the year it was made, its unique title, its type of art … and its price must be stored."
- "Pieces of artwork are also classified into groups of various kinds, … Each group is identified by a name (like those just given) that describes the group. "
- For each customer, galleries keep that person's unique name, address, total amount of dollars spent in the gallery (very important!), and the artists and groups of art that the customer tends to like.

Anything more??

- Now we look at constraints.
  - Although not explicitly mentioned in the problem, we assume that each piece of artwork had to be painted by an artist.
  - We also assume that each piece of artwork was created by exactly one artist.
- Suppose we had several piece of artwork with the same title, and we told them apart by artist?
  - Example: "What is Love?" by Cheryl D, "What is Love?" by Joe Brown, etc.

solution...