

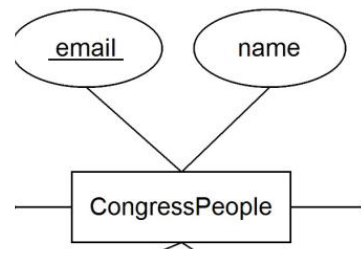
CS 4604: Introduction to Database Management Systems

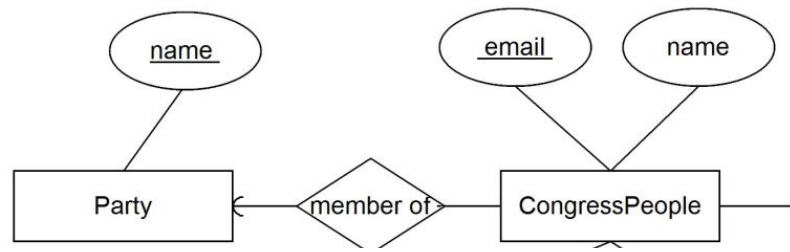
B. Aditya Prakash

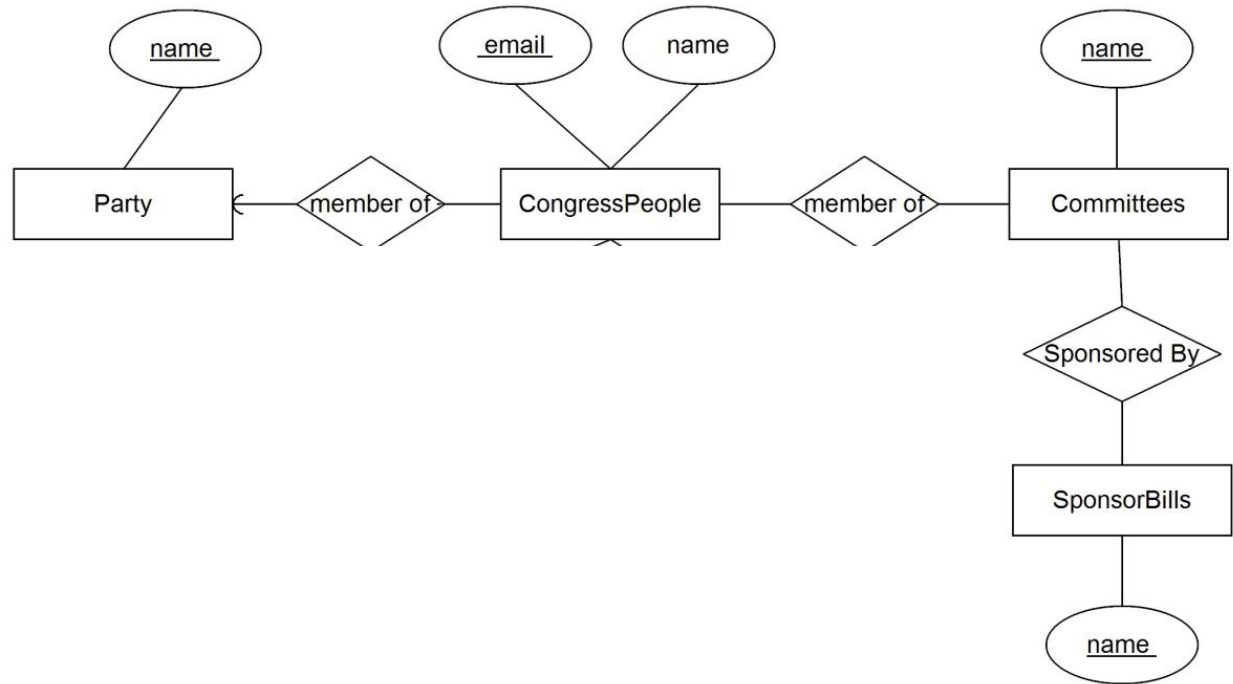
Lecture #12: E/R Diagrams Practice

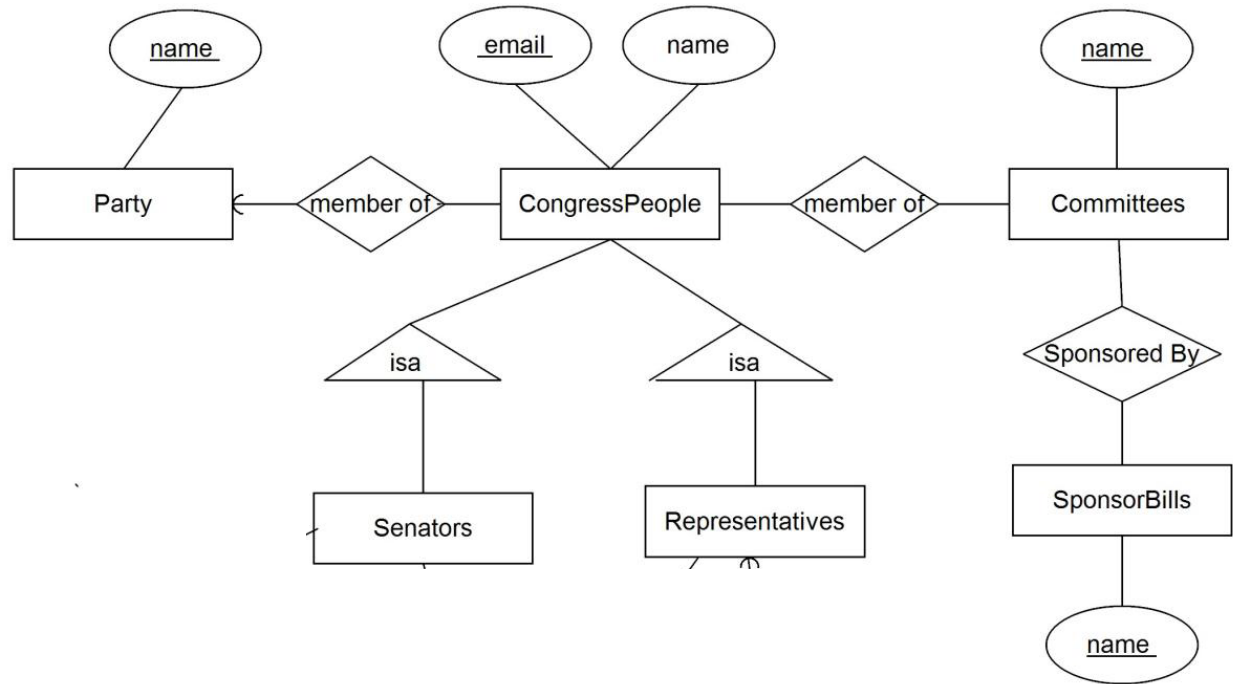
Example 1: US Congress

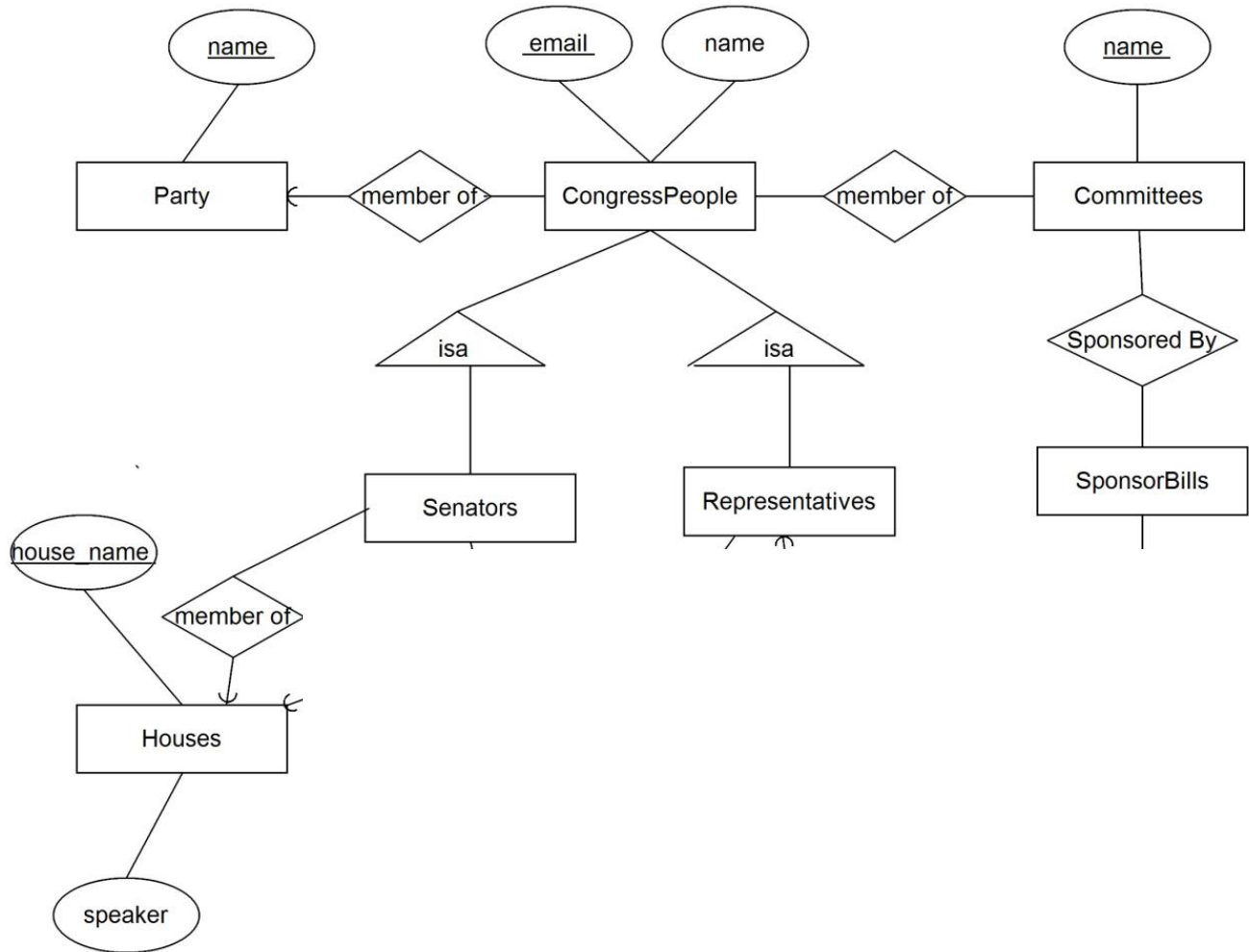
- The US Congress is bicameral meaning that it is composed of two houses: the House of Representatives and the Senate. Every state has exactly two Senators (a junior and a senior member), but a variable number of Representatives (exactly one per district). No senator can represent more than one state at a time. Likewise, no Representative can serve more than one district at a time. Every state has a variable number of districts (dependent on population), but every state has at least one district (in a state like Delaware the district boundaries are the state's borders). Districts have numbers (e.g., district 1). A given Congressperson (Senator or Representative) cannot serve in both houses at a given time. Congresspeople have names and e-mail addresses. Every Congressperson is a member of exactly one political party. Exactly one member of the House is designated as Speaker of the House. Lastly, Congresspeople belong to Congressional committees which have names and sponsor bills, which also have names."

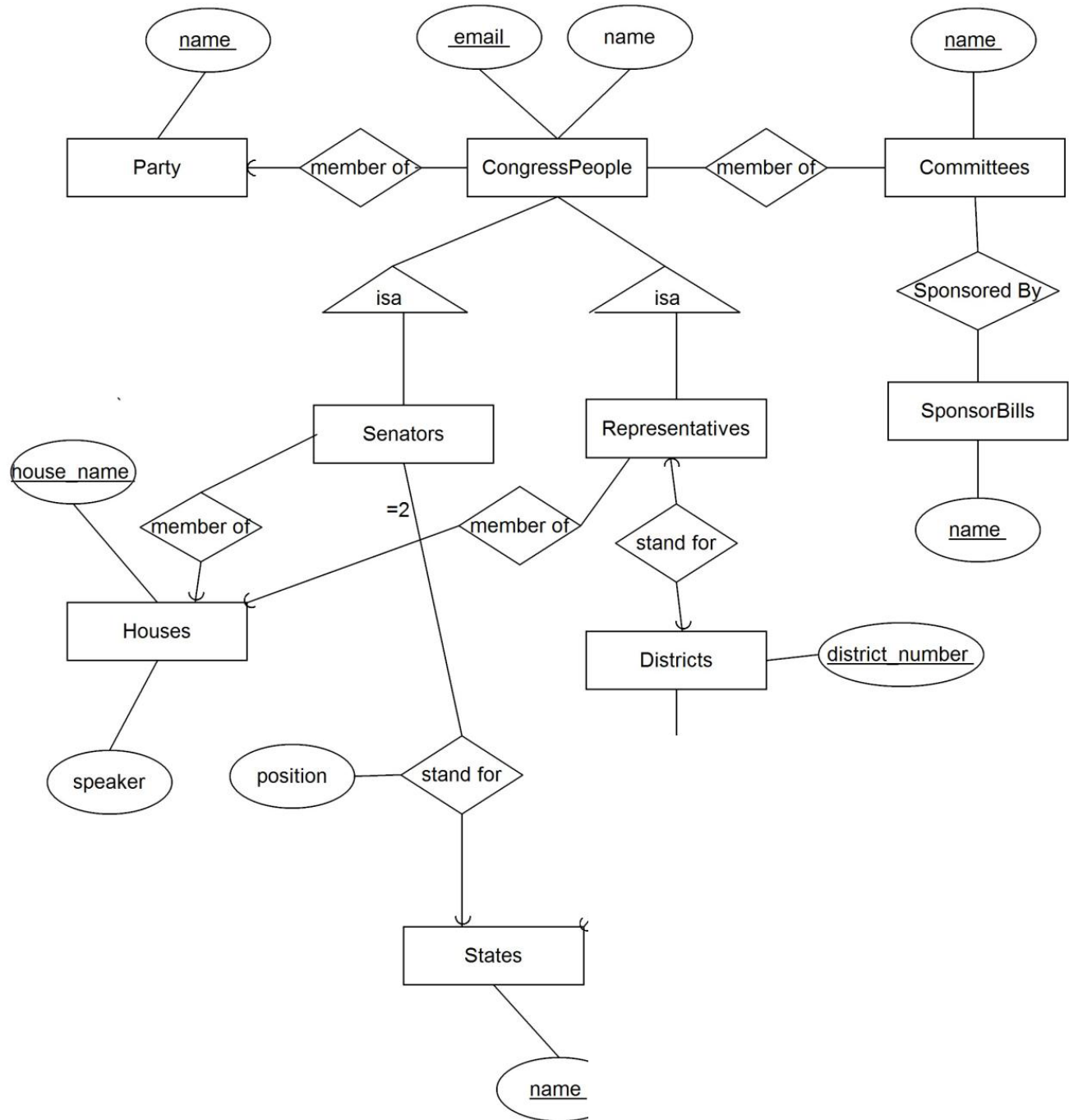


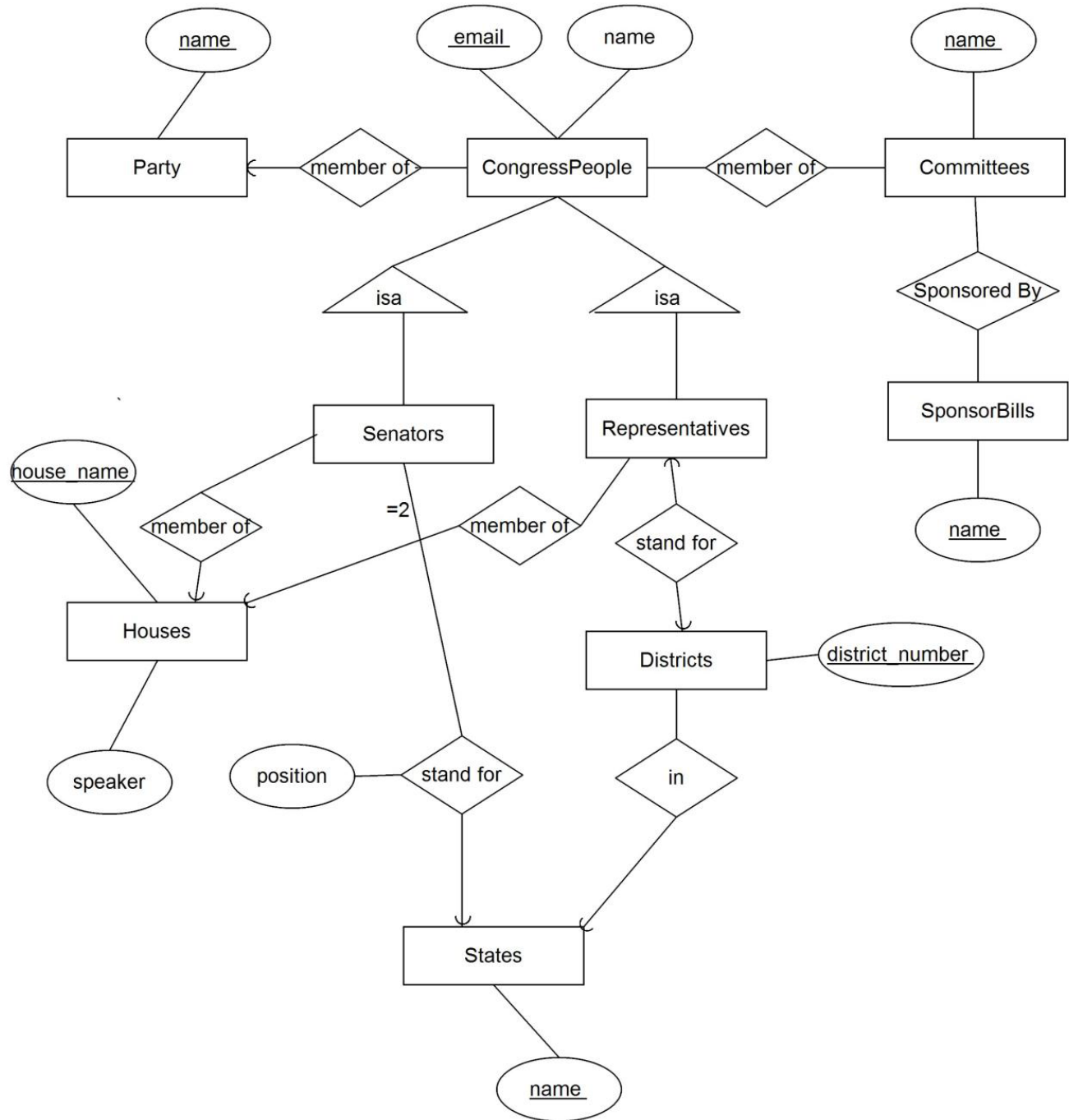






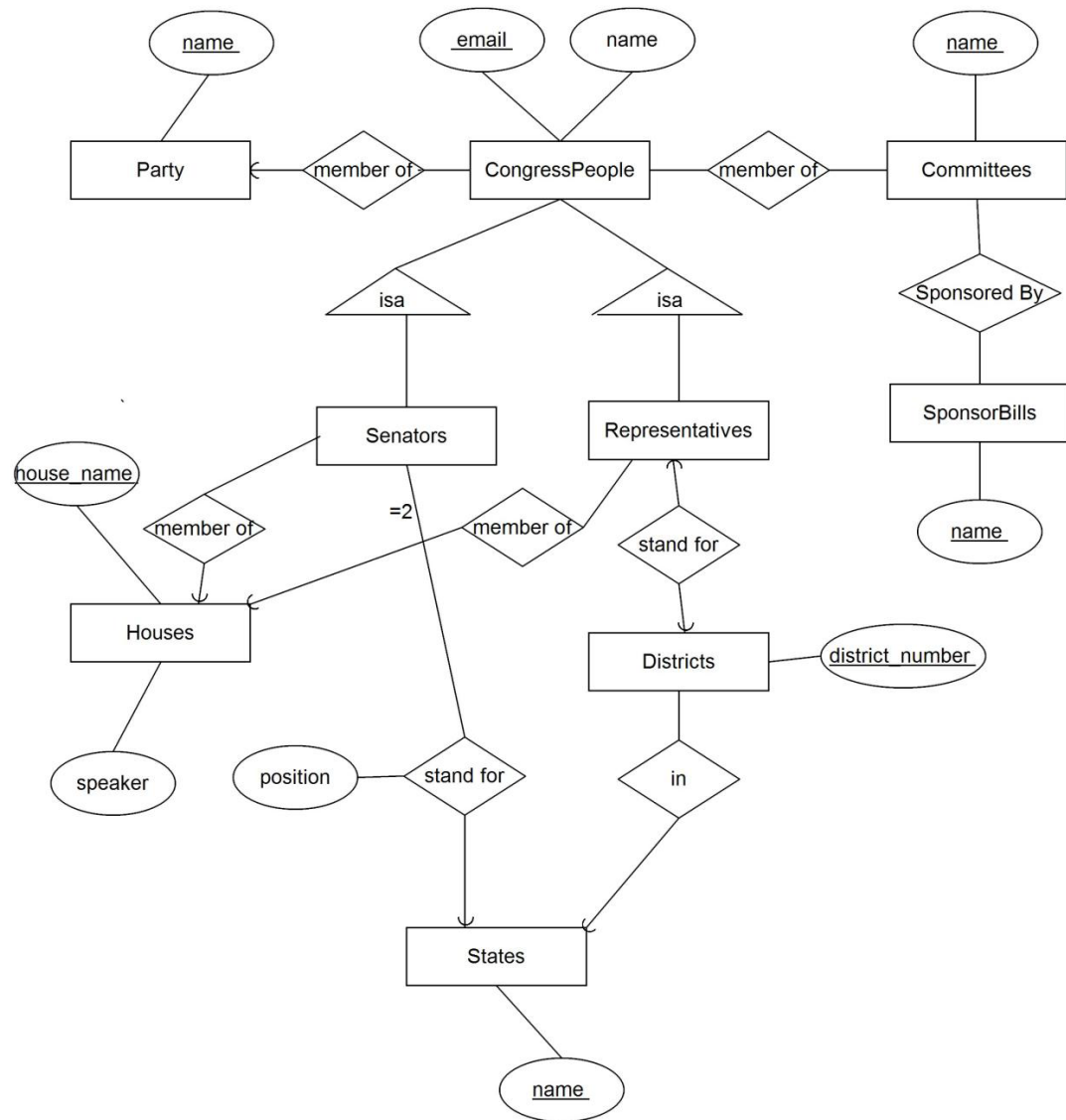






Notes:

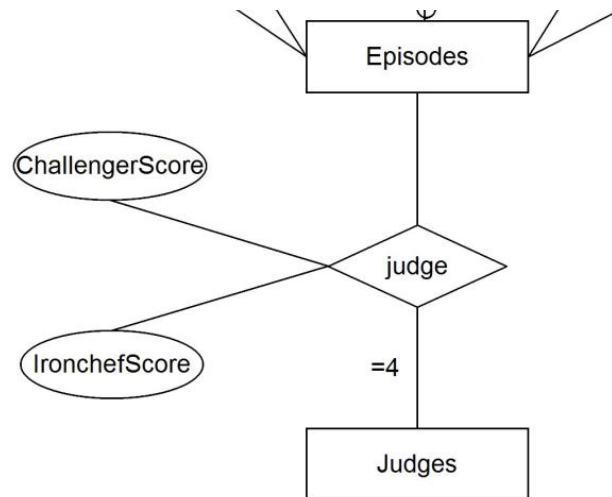
1. Speaker is NOT NULL

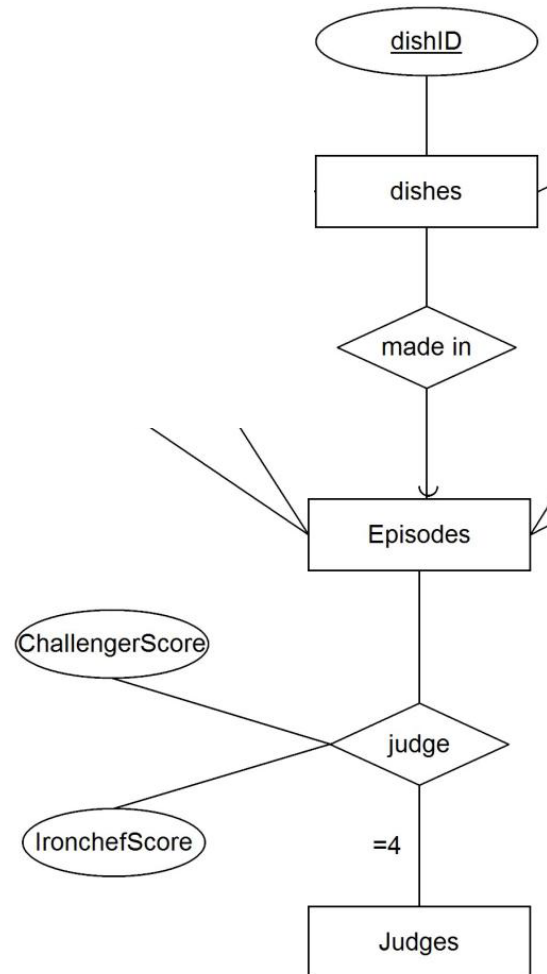


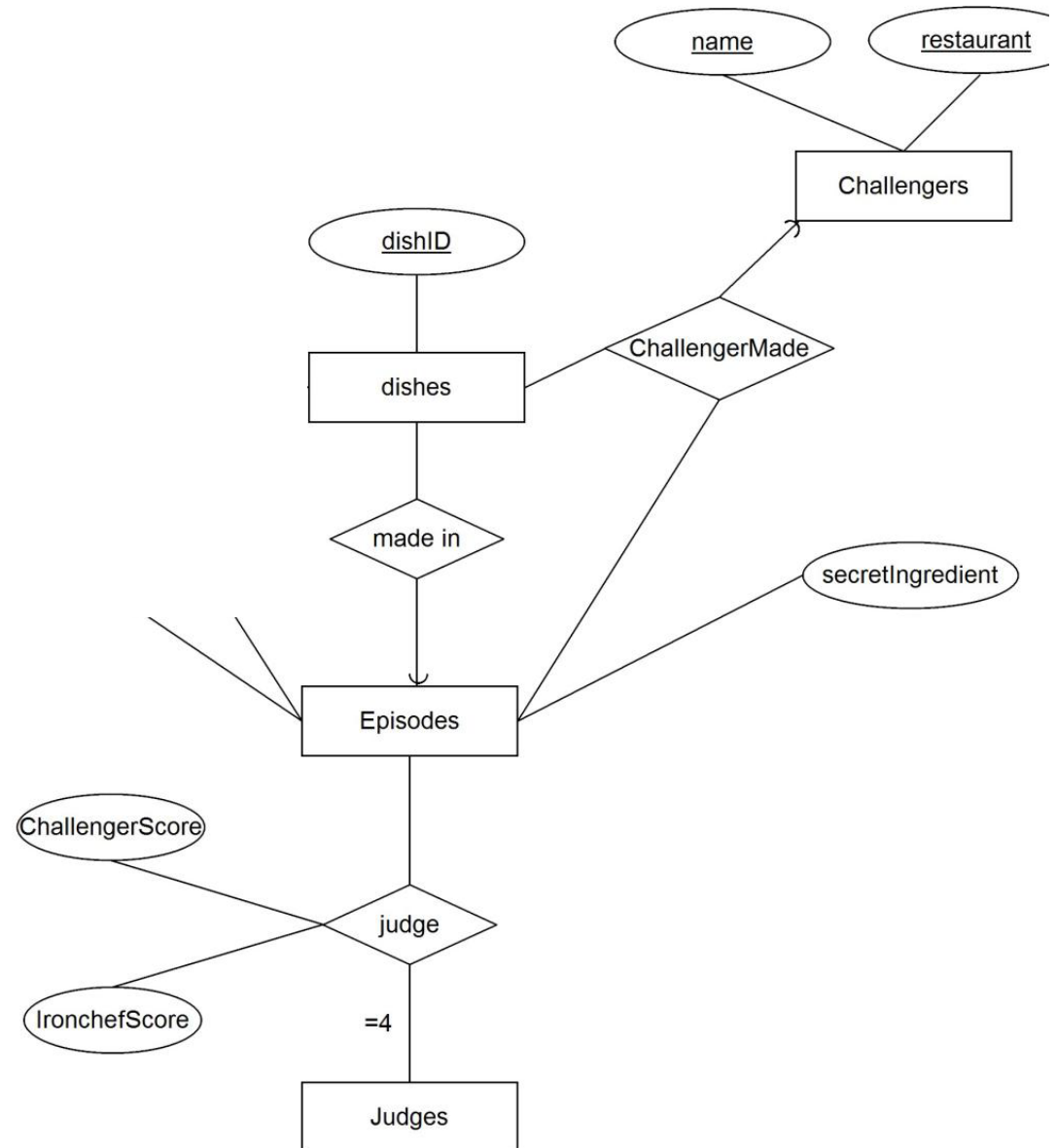
Example 2: Iron Chef

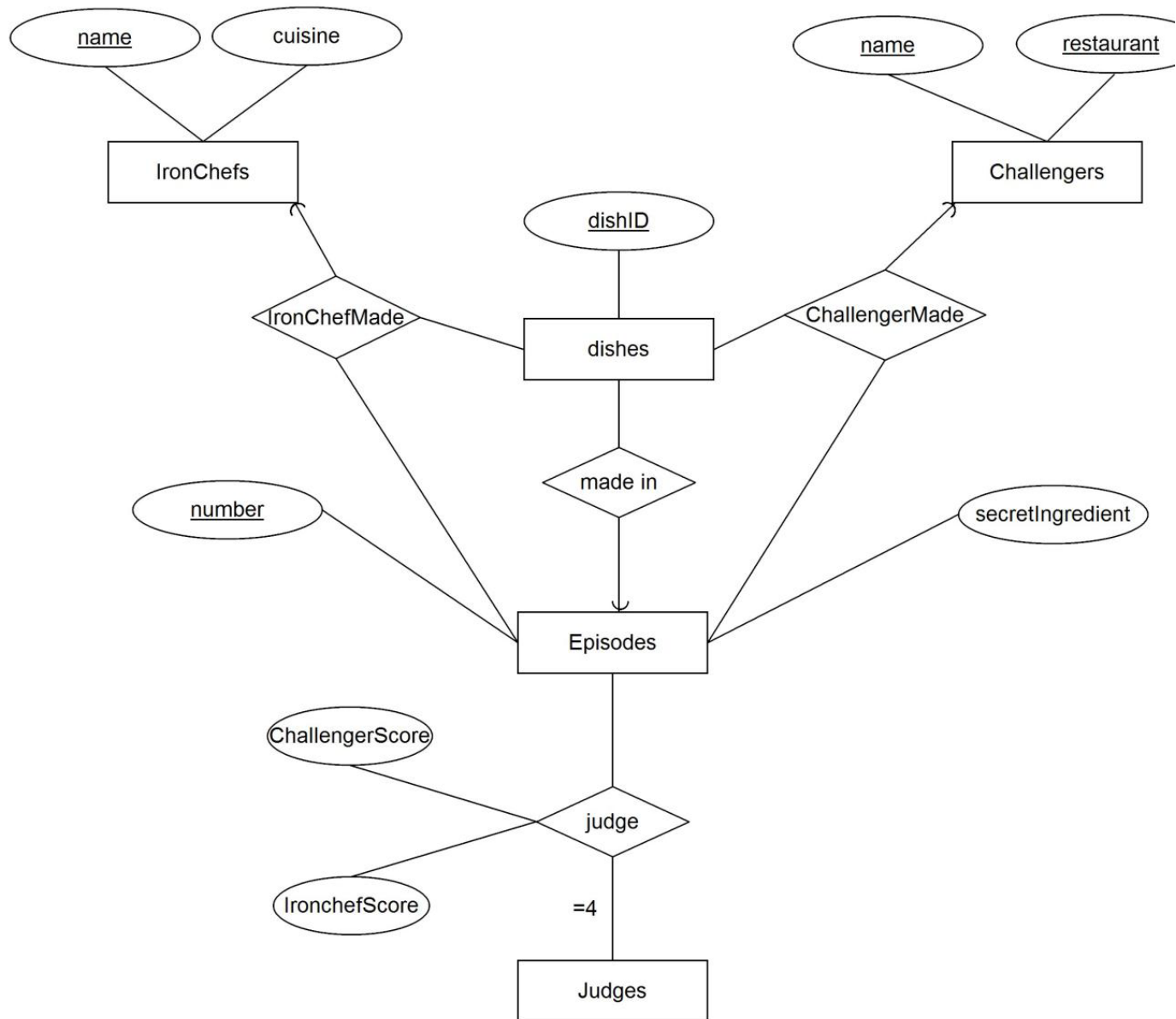
- In this question, you will draw an E/R diagram to model the television show Iron Chef. Do not worry if you have not seen this show! The show features a set of four Iron Chefs, each one an expert in precisely one of the following cuisines: Chinese, French, Italian, and Japanese. Iron Chefs are famous; their name serves to identify them uniquely. Each episode, identified by an episode number, features a competition between a challenger and one of the Iron Chefs. Each challenger is also quite famous; his/her name and restaurant are enough to identify the challenger. The challenger selects the Iron Chef he/she wants to compete with. Each competition features a secret ingredient unveiled at the beginning of the episode. The secret ingredient never repeats, i.e., two different competitions do not have the same secret ingredient. The challenger and the selected Iron Chef each have one hour to prepare a set of dishes that articulate the theme ingredient. At the end of the hour, a panel of four judges tastes these dishes. Each judge awards each competitor a score; the maximum score is 20. The competitor with the maximum number of points wins. There are no ties! A person can be a judge in multiple competitions. If you cannot model any aspect of this scenario, then mention them as notes. You may use notes to explain any other aspect of your design, for example, the type of an attribute. If you do not use notes, you are guaranteeing that your E/R diagram models this situation exactly.





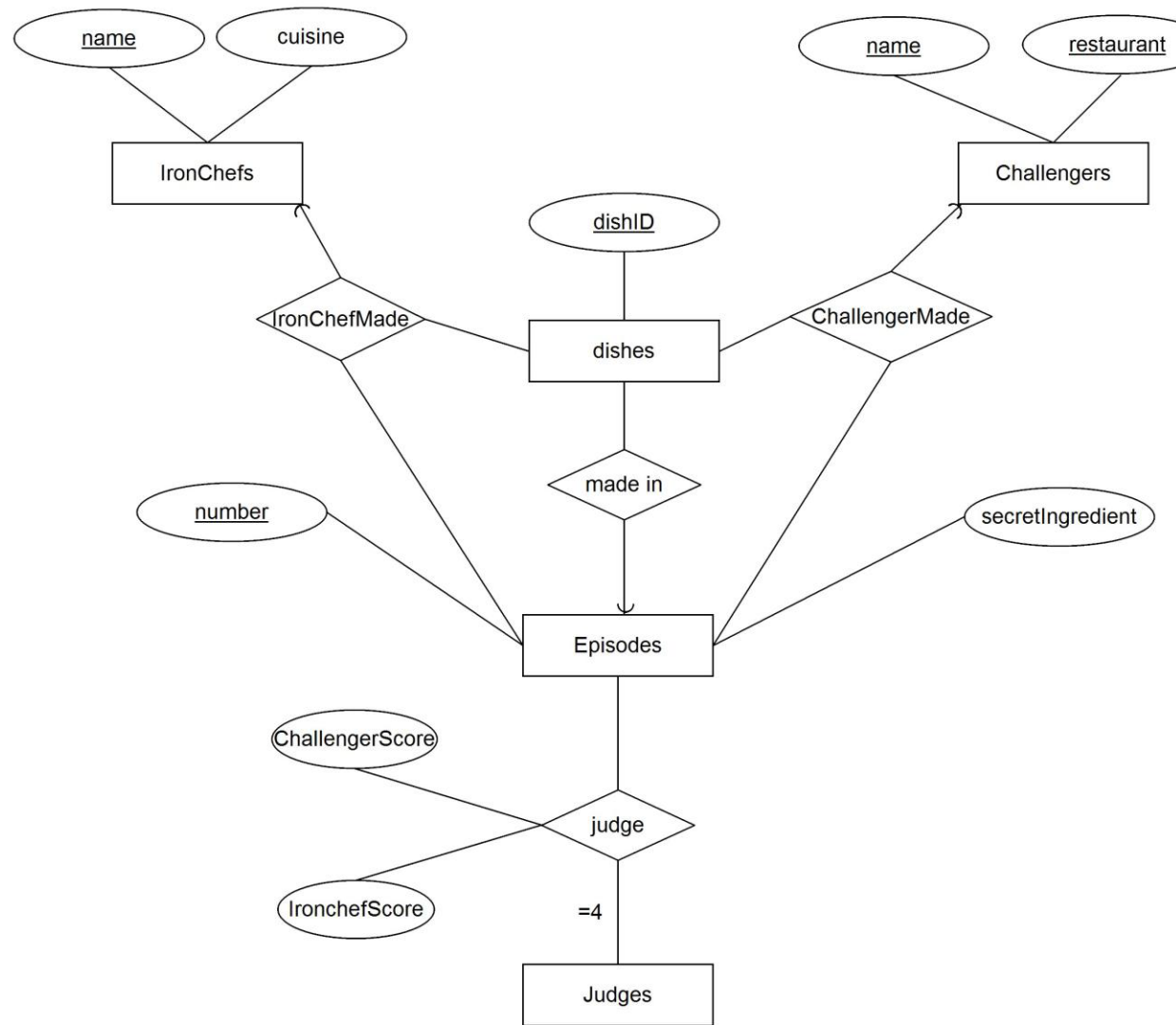






Notes:

1. SecretIngredient is NOT NULL

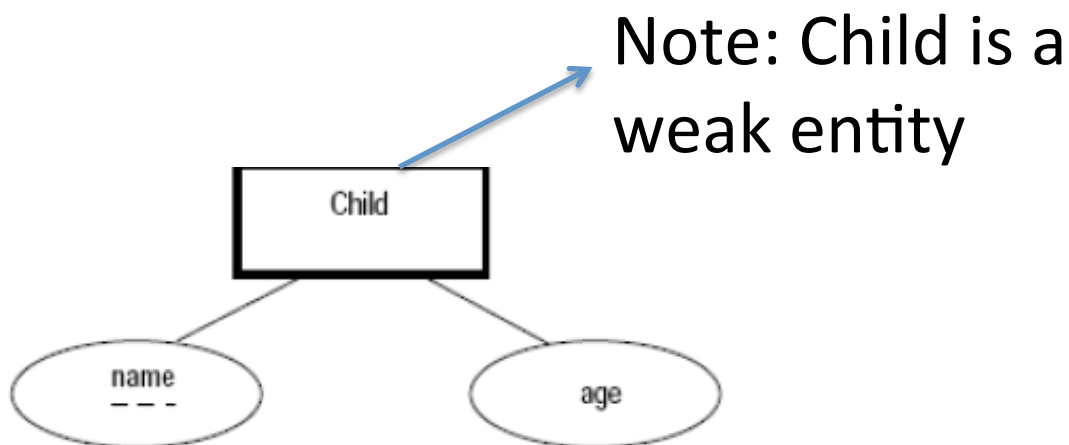
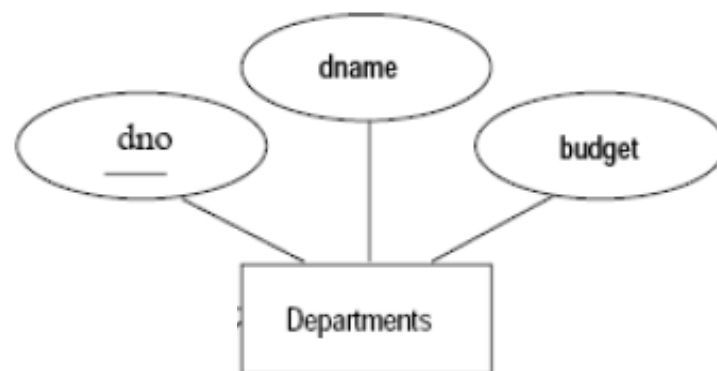
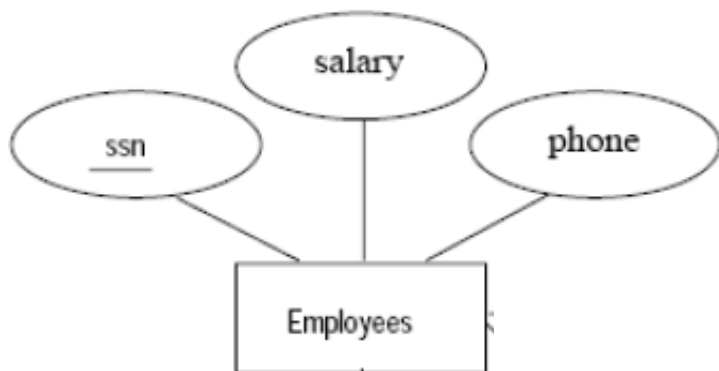


Example 3: Draw an E/R Diagram

- 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.

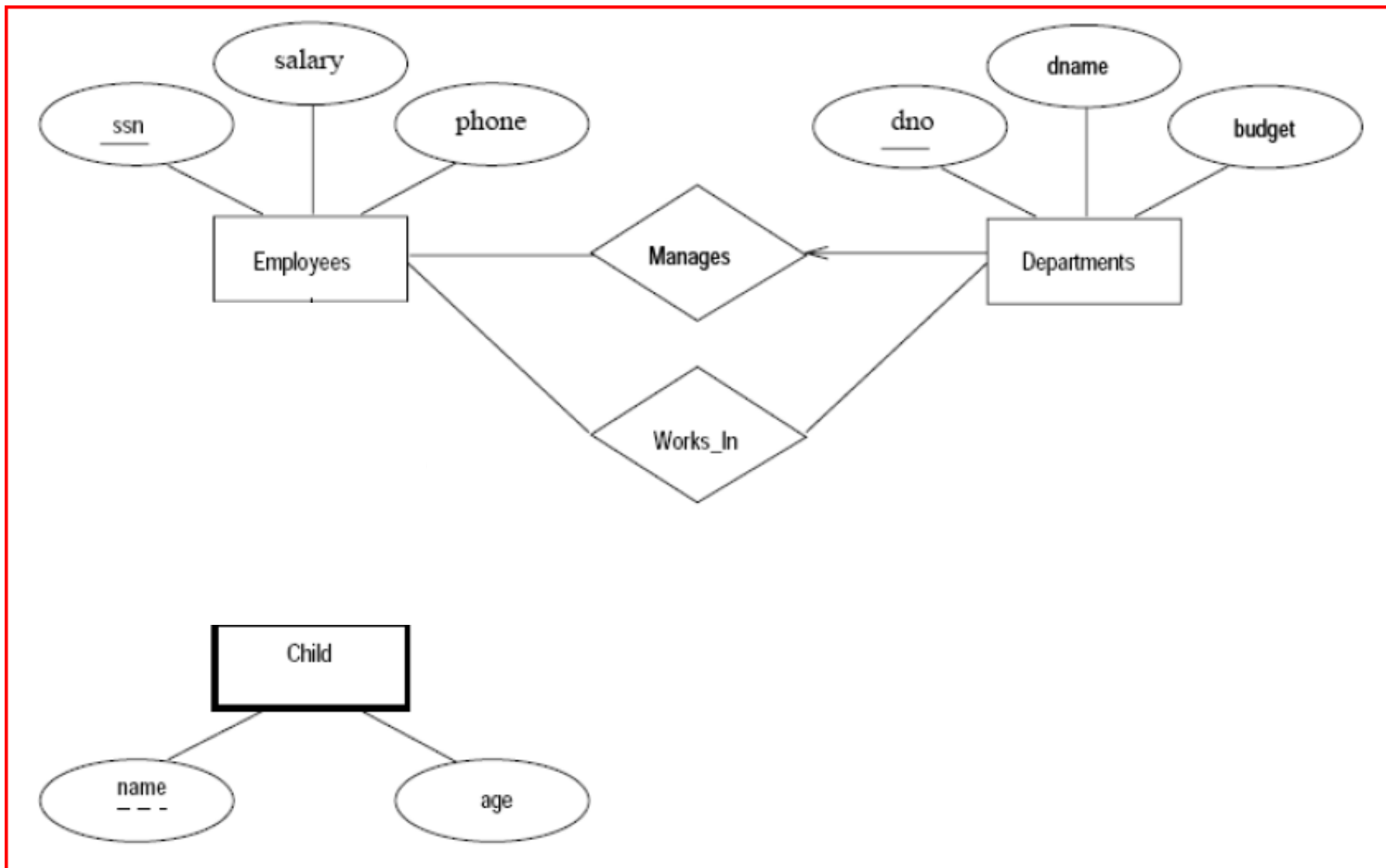


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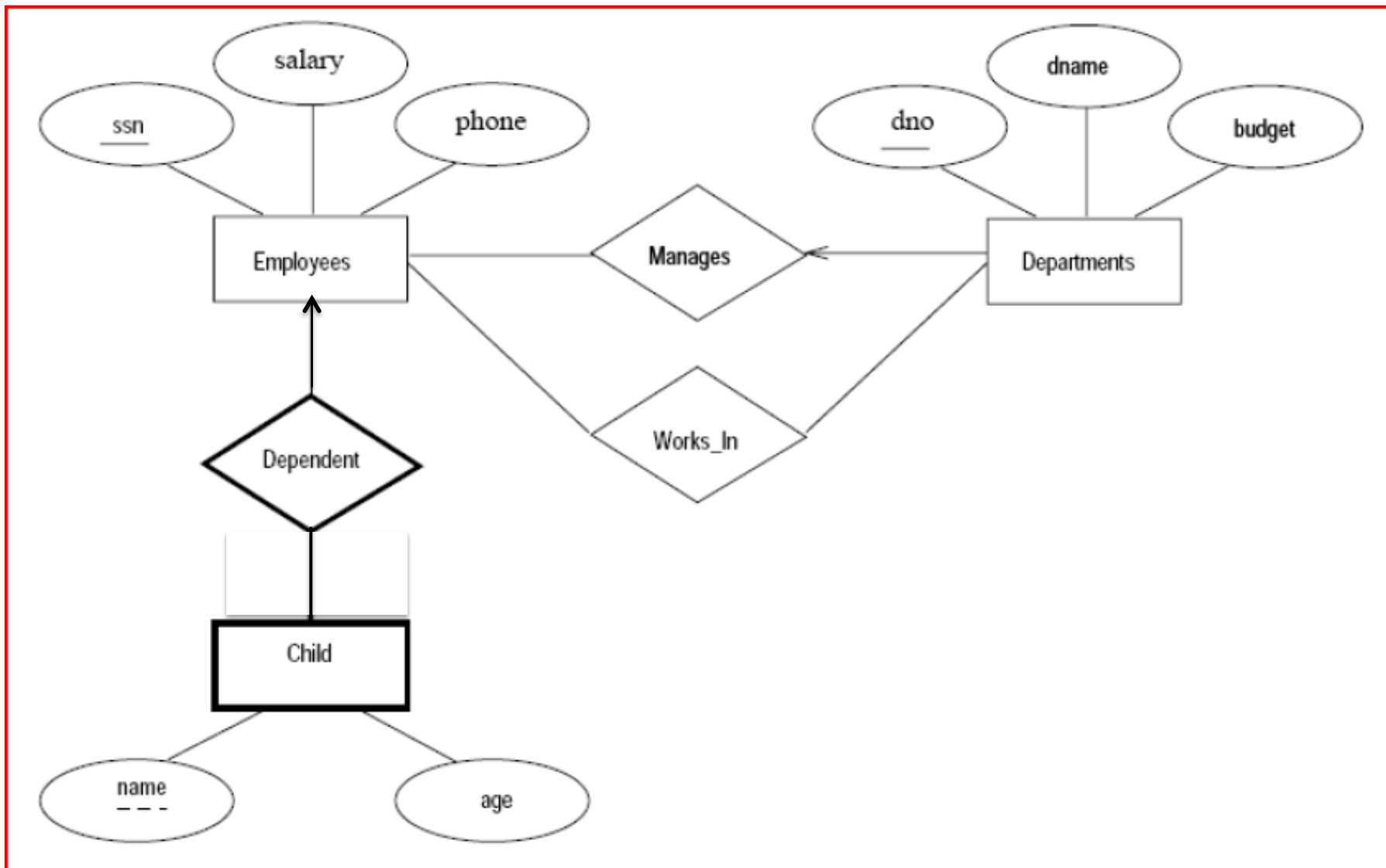


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- each department is *managed* by an employee;





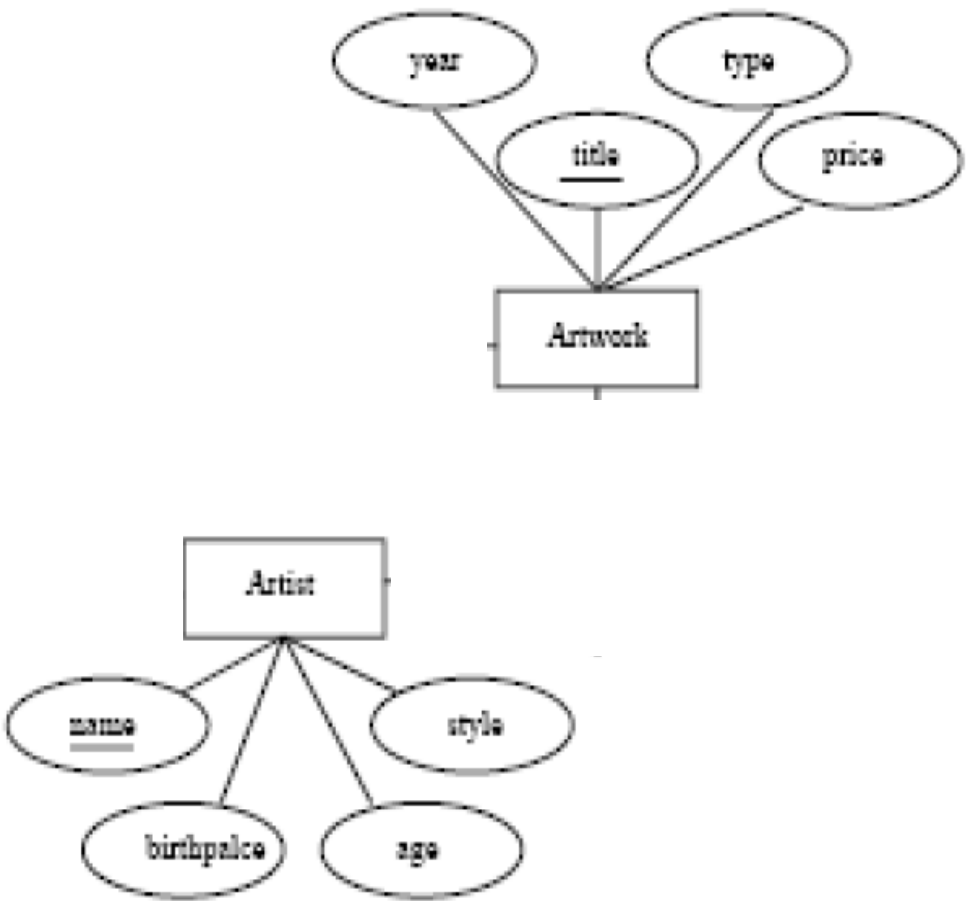
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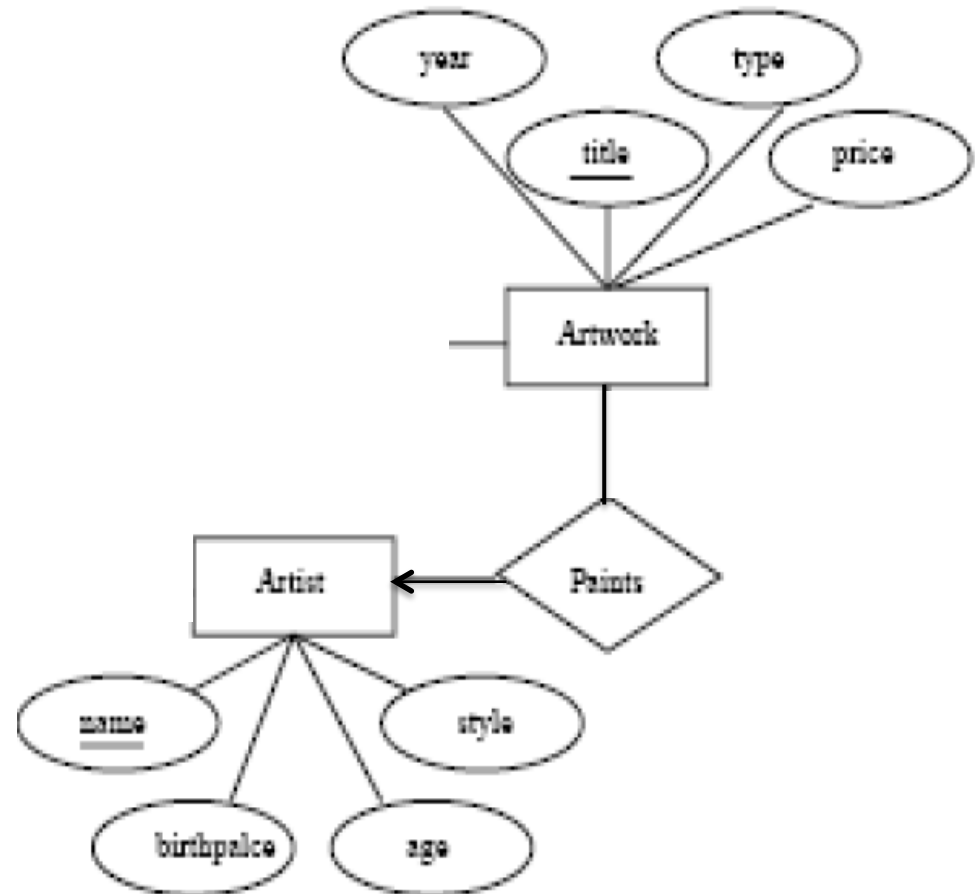
Example 4: Art Galleries

- You want to 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.
- Galleries keep information about artists, their names (which are unique), birthplaces, age, and style of art. For each piece of artwork, 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

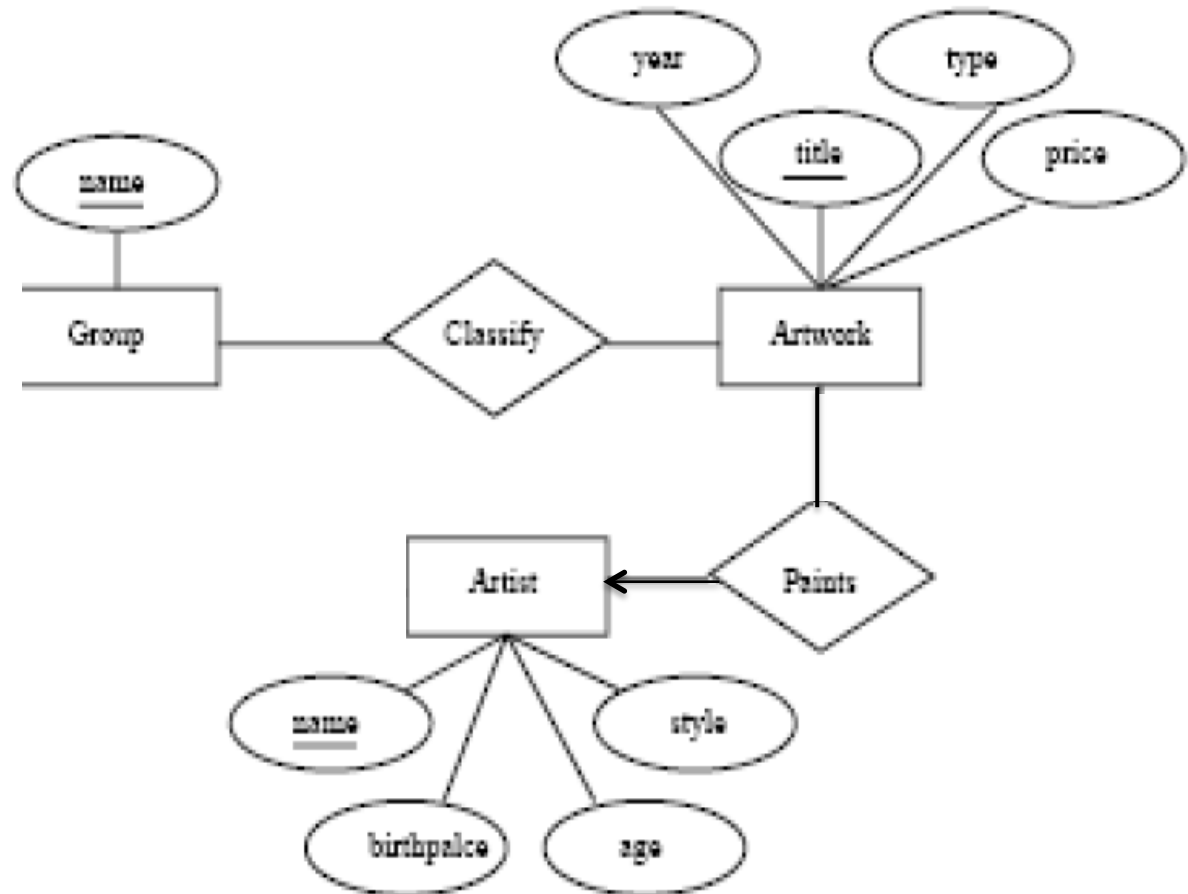
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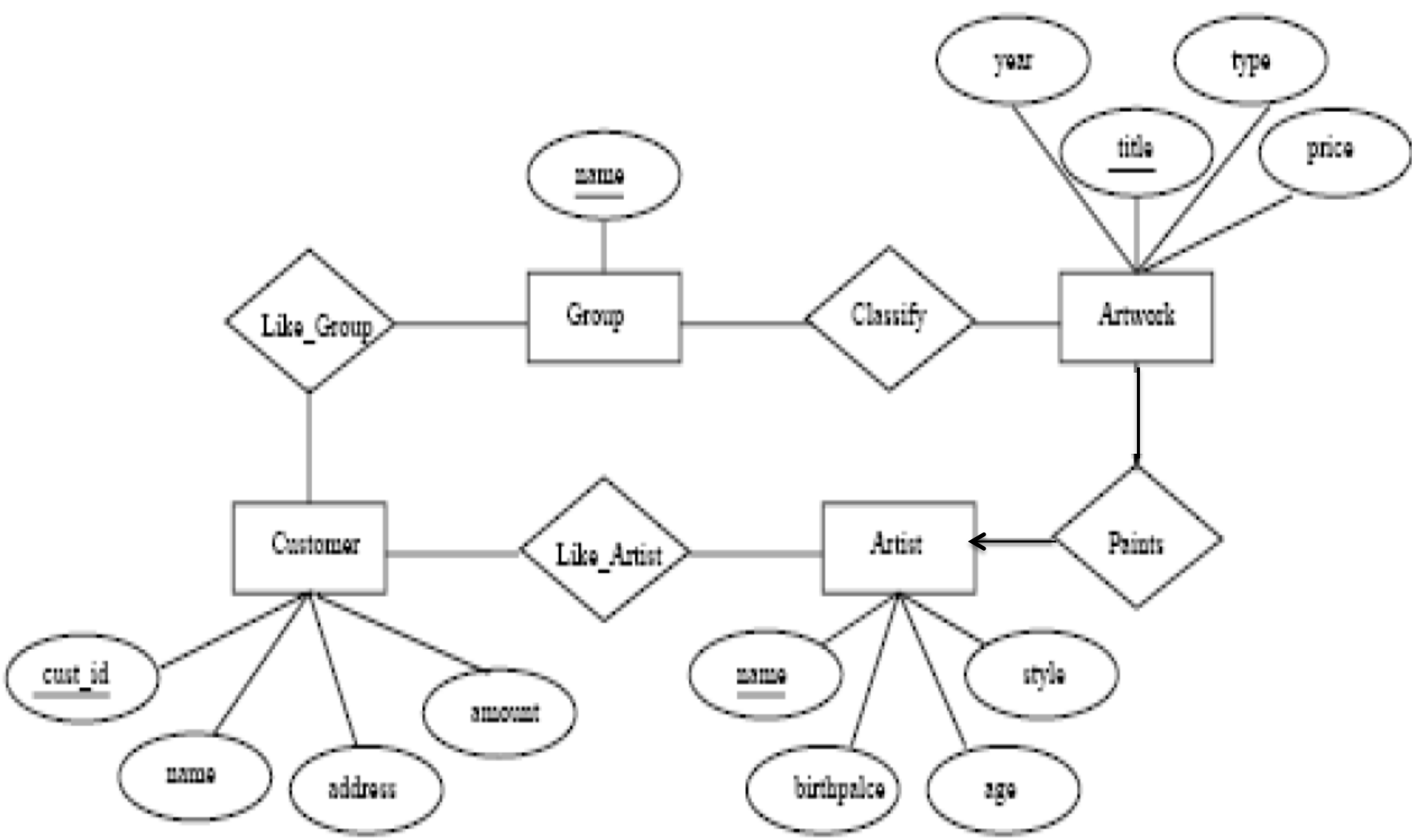


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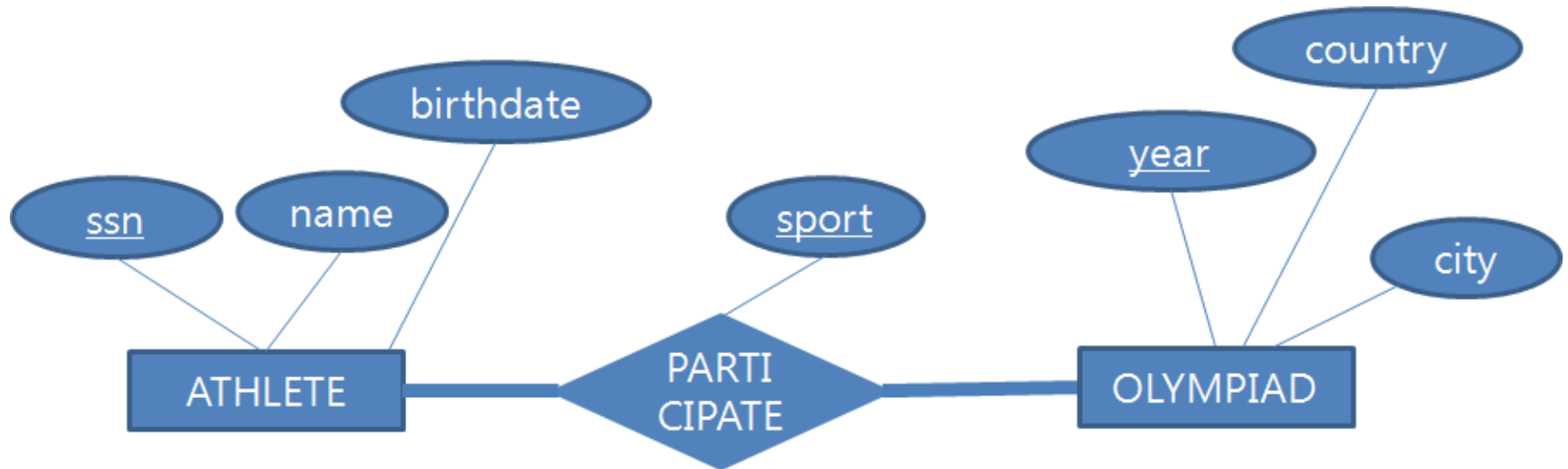




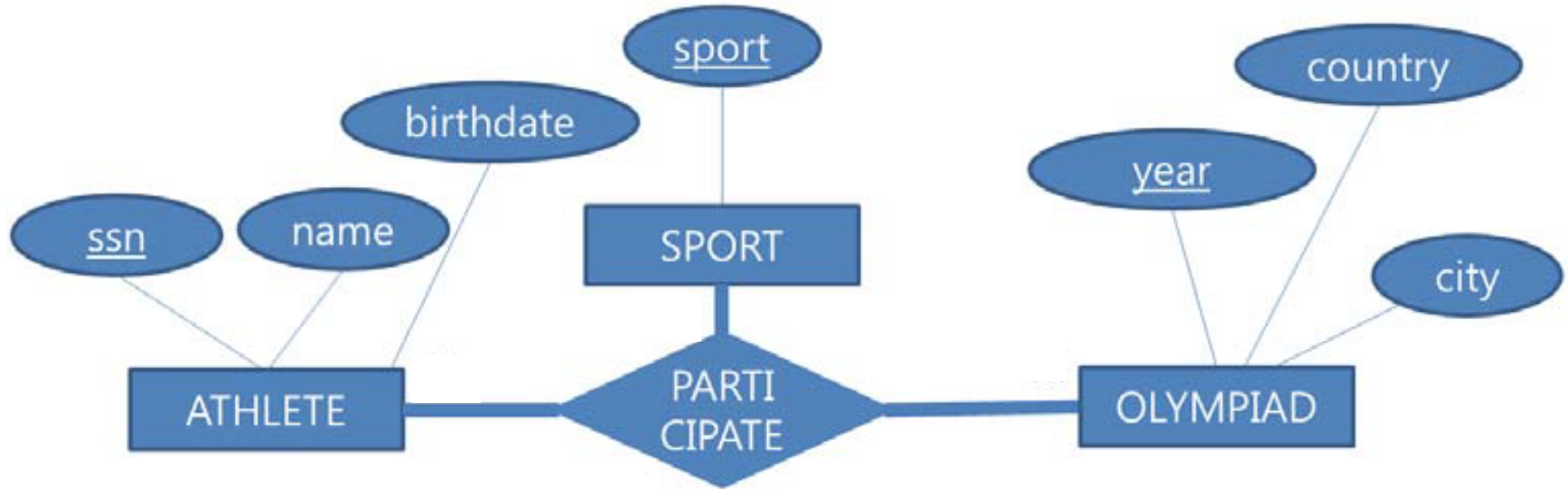
Example: Olympic Database

- We want to design a database for storing the information of U.S. athletes and their participations in Olympic games.
- An athlete has his/her SSN, the name, and the birth date.
- Each Olympiad has the year, the country, and the city. For example, the 2008 Olympic game was held in Beijing, China.
- An athlete can participate in several sports in an Olympiad. For example, Michael Armstrong participated in the swimming, diving, and water polo events.
- Every athlete in our database participated in at least one Olympiad. Every Olympiad has at least one athlete (and actually, several thousands).

Solution 1

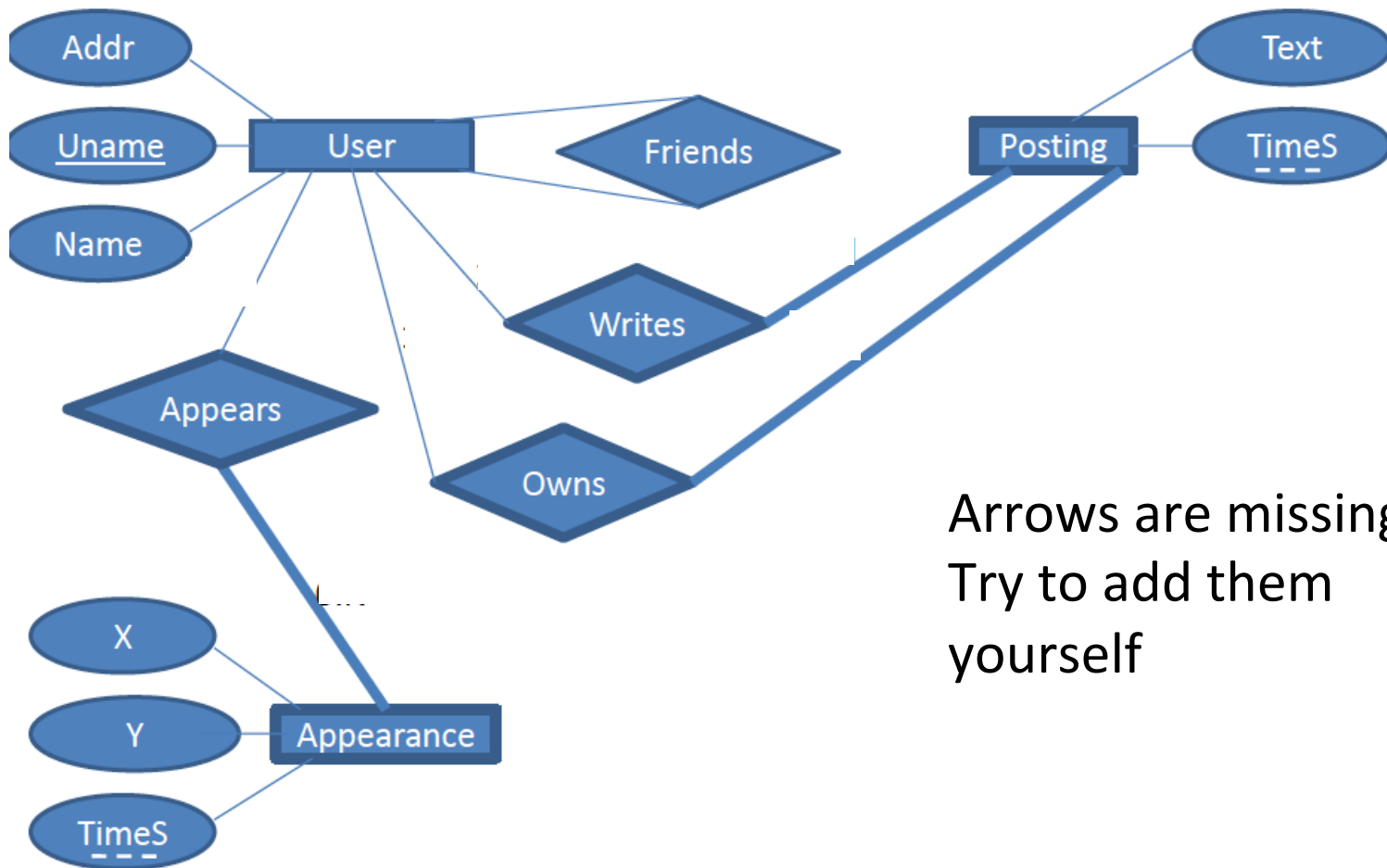


Solution 2



Example: Social Network

- For every user, we want to record the name, the unique username and address. We also want to support the following functions, and record the necessary information:
- People make friends with other people. Thus a user may have zero or more friends.
- People write postings on “walls”. A person may write zero or more postings. Note that a user may write postings on his/her own wall, as well as on other people’s walls. For each posting we want to record the author, the owner of the wall on which it appears, and the timestamp.
- For users that opt-in to a functionality like dopplr.com, we want to record their “appearances”, whenever they choose to upload their position (say, through their mobile phone). For each “appearance” of a user, we want to record the (x, y) co-ordinates.



Arrows are missing!
 Try to add them
 yourself