ISTE-230 Introduction to Database and Data Modeling

## Practice Exercise # 7 – ‘Has-A’ Relationships

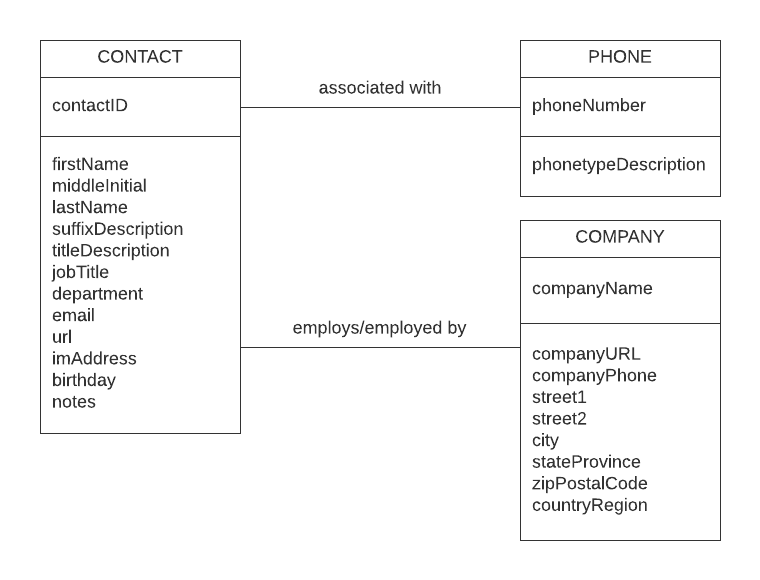
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**All assignments will be graded with regard to the standards that were discussed in class, which can be found in the Standards Content area.**

**Problem #1**

Given the following business rules, please complete the E-R diagram below:

* A CONTACT does not have to be associated with a PHONE.
* A CONTACT can be associated with many PHONEs.
* A PHONE must be associated with a CONTACT.
* A PHONE can associated with many CONTACTs.
* A COMPANY does not have to employ any CONTACTs.
* A CONTACT does not have to be employed by a COMPANY.
* A COMPANY can employ many CONTACTs.
* A CONTACT is employed at most one COMPANY.
* A COMPANY:subsidiary does not have to be owned by a COMPANY:parent.
* A COMPANY:parent does not have to own a COMPANY:subsidiary.
* A COMPANY:subsidiary can be owned by no more than one COMPANY:parent.
* A COMPANY:parent can own many COMPANYs:subsidiaries.

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**YOUR ANSWER (Diagram above completed):**

**Problem #2**

Given the following E-R diagram, please answer each question.



1. What is the identifier of COUNTRY?

**YOUR ANSWER:** Code

1. Provide an example of an entity instance of LANGUAGE?

**YOUR ANSWER:** English

1. What is the cardinality ratio for the ‘has/within’ relationship between COUNTRY and CITY?

**YOUR ANSWER:**

COUNTRY can contain many cities

COUNTRY may contain 0 cities

CITY must have a country

CITY may have at most 1 country

1. What is the type of relationship between COUNTRY and LANGUAGE (1:1, 1:N, or M:N)?

**YOUR ANSWER:** M:N

1. Does a COUNTRY have to have a CITY? How can you tell that from the diagram?

**YOUR ANSWER:** Country does not have to have a city. This is known because the country -> city line contains a circle instead of a vertical line.

1. Does a CITY have to have a COUNTRY? How can you tell that from the diagram?

**YOUR ANSWER:** A city must have a country. This is known because the city -> country connector has a vertical line.

1. Can a COUNTRY have more than one CITY? How can you tell that from the diagram?

**YOUR ANSWER:** A country may have many cities. This is because the connector has the crow’s foot on the country -> city side.

1. Can a CITY have more than one COUNTRY? How can you tell that from the diagram?

**YOUR ANSWER:** A city may have at most one country. This is known because there is no crow’s foot on the city -> country line.

1. Please list the relationship verb phrases for all recursive relationships appearing in the diagram.

**YOUR ANSWER:** I don’t see any recursive relationships in the diagram.

1. Please list the relationship verb phrases for all relationships in the diagram that have a degree of 2.

**YOUR ANSWER:**

CITY must be within exactly one COUNTRY.

COUNTRY can have multiple CITIES.

COUNTRY does not have to have a CITY.

COUNTRY may speak multiple languages.

COUNTRY must speak one language.

LANGUAGE must be spoken in one COUNTRY.

LANGUAGE may be spoken in multiple COUNTRIES.

CONTINENT may span multiple COUNTRIES.

CONTINENT must contain one COUNTRY.

COUNTRY must span exactly one CONTINENT.