Database Design
4-1: Supertypes and Subtypes
Practice Solutions
Vocabulary

Directions: Identify the vocabulary word for each definition below.

Exhaustive	All subtypes are listed without omission.
Supertype	A means of classifying an entity that has subtypes.
Subtype/Subentity	Something an entity may be split into based on common attributes and/or relationships.
Mutually Exclusive	Each instance of a supertype is an instance of only one possible subtype.

Try It / Solve It

1. Identify which item off of the following list is the supertype entity and which items are the subtypes of that entity.

   Solution:

   Amputation = subtype
   Visual Impairment = subtype
   Hearing Impairment = subtype
   Disability = supertype
   Paralysis = subtype

2. For each rule stated, indicate if the rule is applicable to supertypes or subtypes.

   Solution:

Subtypes	They share common attributes
Subtypes	They inherit all attributes and relationships of the entity
Subtype	It never exists alone
Supertype	It contains the attributes held in common by all instances

3. Name three things you consider when modeling supertypes and subtypes.

   Solution:
   - Is this subtype a kind of supertype?
   - Have I covered all possible cases? (exhaustive)
   - Does the instance fit into one and only one subtype? (mutually exclusive)

4. Find the incorrect subtypes in the illustration. Explain why you think the subtype is incorrect. Adjust the model to improve it.

Solution: The subtypes for AUTOMOBILE are not mutually exclusive. A 4-DOOR VEHICLE could also be a SEDAN and/or a SPORT UTILITY VEHICLE. Suggestion for improvement: remove 4-door vehicle subtype. Consider making “number of doors” an attribute of the supertype. Add other non-overlapping subtypes or an “OTHER” subtype.

The subtypes of BUILDING are not exhaustive. Surely there are other BUILDINGs that are not a HOUSE. Add more subtypes or add an OTHER subtype. Some possible subtypes of building are OFFICE, SCHOOL, and FACTORY. Ask students to name other examples of BUILDINGs that could be subtypes.

5. Read the following scenario and construct an ERD that contains at least two subtypes of the entity PRODUCT. Show clearly which attributes belong to the entity supertype, and which belong to the subtypes. Identify a UID for the entity.

   "Our shops sell several kinds of women's clothing, including dresses, skirts and blouses. Of course each product has a name, a description, and a price. Oh, and sizes too: all products have a waist size. Dresses and skirts have a hem length but blouses don't. Dresses and blouses have a chest size, but skirts don't."

   Solution: This is tricky because the subtype attributes overlap. For example, hem length is an attribute of two of the three subtypes (two of four if you include an OTHER subtype). Either the hem length can be an attribute of both subtypes DRESS and SKIRT, or hem length can be an attribute of the supertype, with a null value for instances of BLOUSE.