

# Enhanced Entity Relationship Diagram - EER

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# Review of ER Diagram

Step 1: Identify all the entities

Step 2: Identify relationships

Step 3: Add attributes

# Question - 1

- Construct an ER diagram of a Company. The Employees of the company “works for” assigned departments as well as manages them. Each department is in “control” of a specific project and the employees also “work” directly for these projects. Every employee in the organization have some “dependents” that are affected with the actions of the employee. (Note: These dependents are employee’s family who leave the premises when the employee also leaves). The ER diagram must identify all the attributes, relationships and the cardinalities associated.

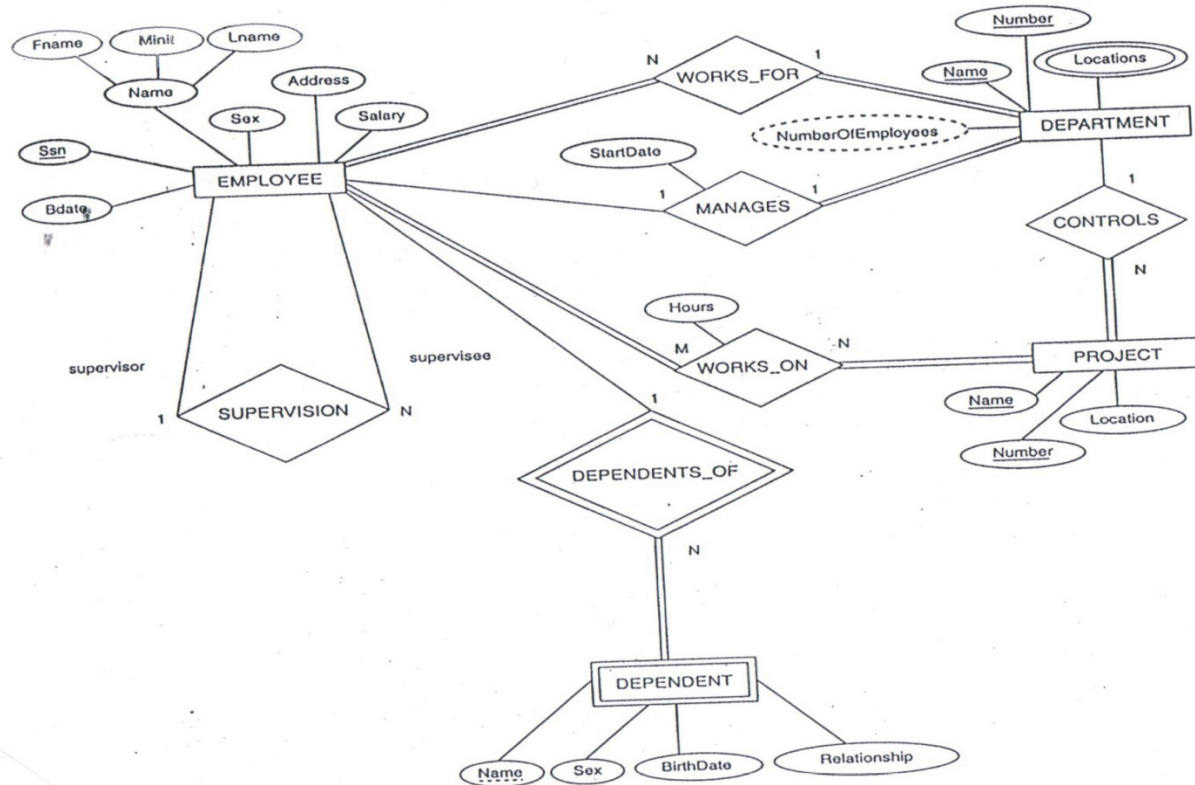
# Let's break the question!

- Construct an ER diagram of a Company. The Employees of the company “works for” assigned departments as well as manages them.

- Each department is in “control” of a specific project and the employees also “work” directly for these projects.

- Every employee in the organization have some “dependents” that are affected with the actions of the employee. (Note: These dependents are employee’s family who leave the premises when the employee also leaves).
- The ER diagram must identify all the attributes, relationships and the cardinalities associated.

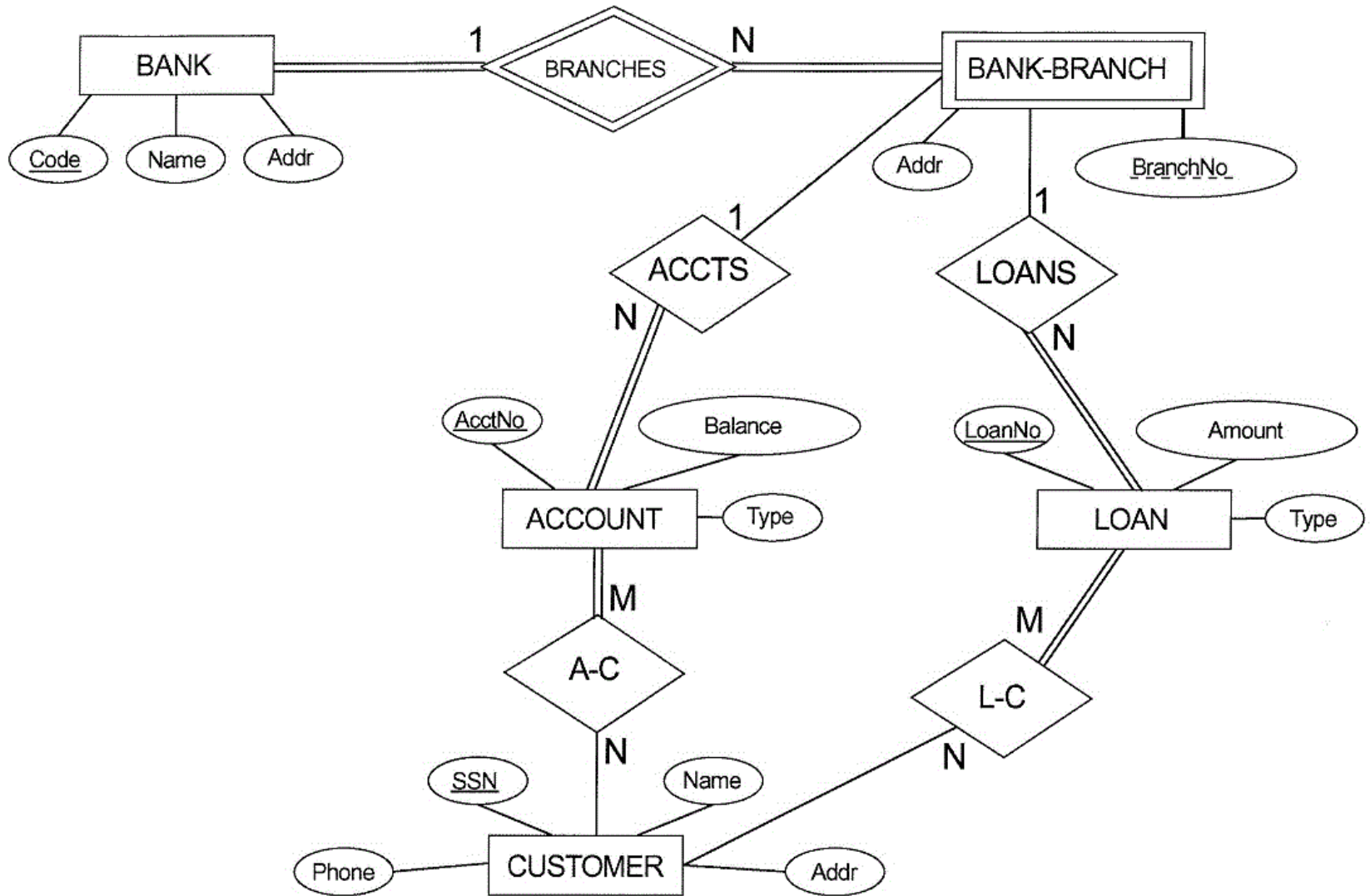
# Answer!!



## Question-2

- Create an ER diagram for a Bank database. One bank can have **multiple branches**. Each bank branch is responsible for creating customer **accounts** and issuing **loans**. Customer can access their account information and loan types from **account** and **loan** departments respectively. Please specify the attributes and the cardinalities associated with each relationship.





Let's get started with EER – Enhanced Entity  
Relationship Diagram!!!

# What is EER Diagram?

- It is a high-level data model that incorporates the extensions to the original ER model.
- With their enhanced features, you can plan databases more thoroughly by delving into the properties and constraints with more precision.

# Features

- Creates a design that is precise and accurate.
- It shows the constraints and data properties more precisely.
- It is used to represent a collection of objects that is union of objects of different of different entity types.

# ER v/s EER: When to use What?

- An ER diagram gives you the visual outlook of your database. It details the relationships and attributes of its entities, paving the way for a smooth database development in the steps ahead.
- EER diagrams, on the other hand, are perfect for taking a more detailed look at your information. When your database contains a larger amount of data it is best to turn to an enhanced model to more deeply understand your model.

# Rule of Thumb


The more complicated the data, the more likely you'll need to use an EER diagram to make sure you're properly organizing every relationship.

# Concepts of EER Diagram

An EER diagram provides you with all the elements of an ER diagram while adding:

- Subclasses and superclasses.
- Specialization and generalization.
- Category or union types.
- Aggregation.

# Subclasses and Superclasses

- Sub class and Super class relationship leads the concept of Inheritance.
- The relationship between sub class and super class is denoted with  symbol.



# Superclass

- Super class is an entity type that has a relationship with one or more subtypes.
- An entity cannot exist in database merely by being member of any super class.

# Subclass

- Sub class is a group of entities with unique attributes.
- Sub class inherits properties and attributes from its super class.

# Example

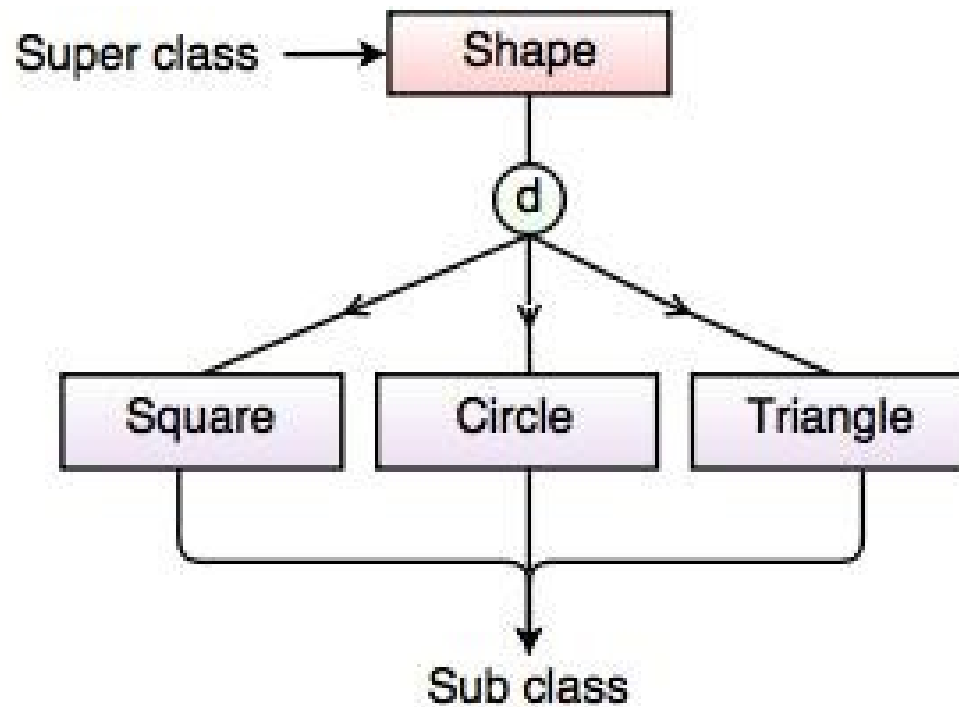
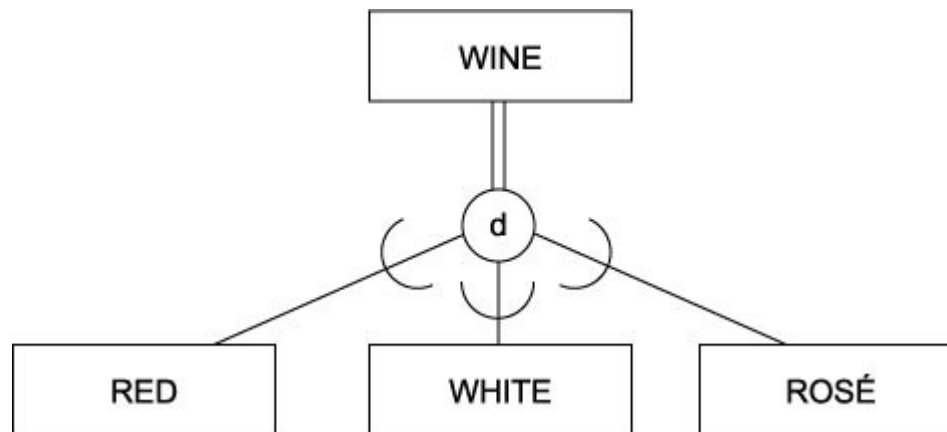


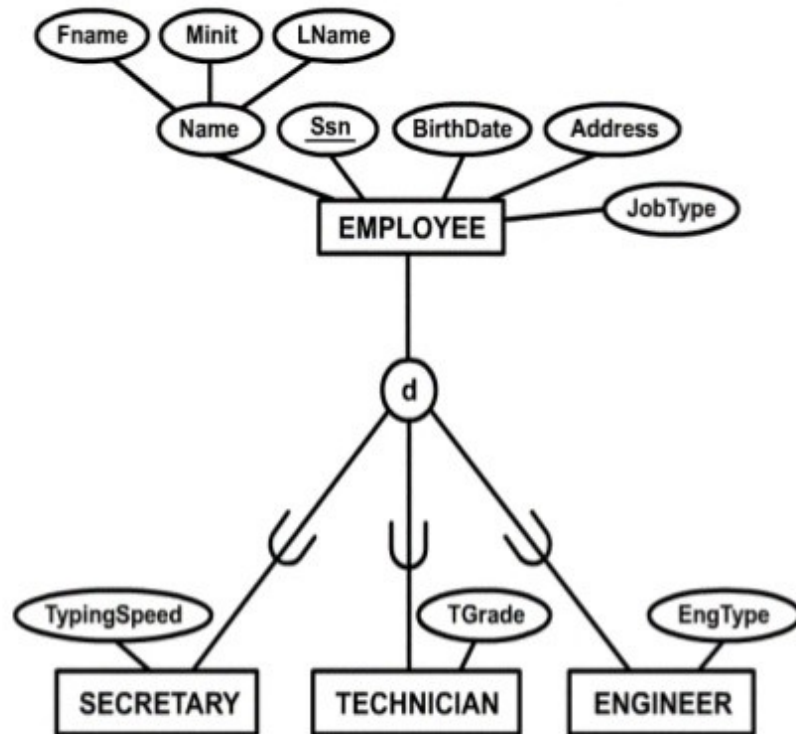
Fig. Super class/Sub class Relationship

# More examples...



# A superclass/subclass EER diagram

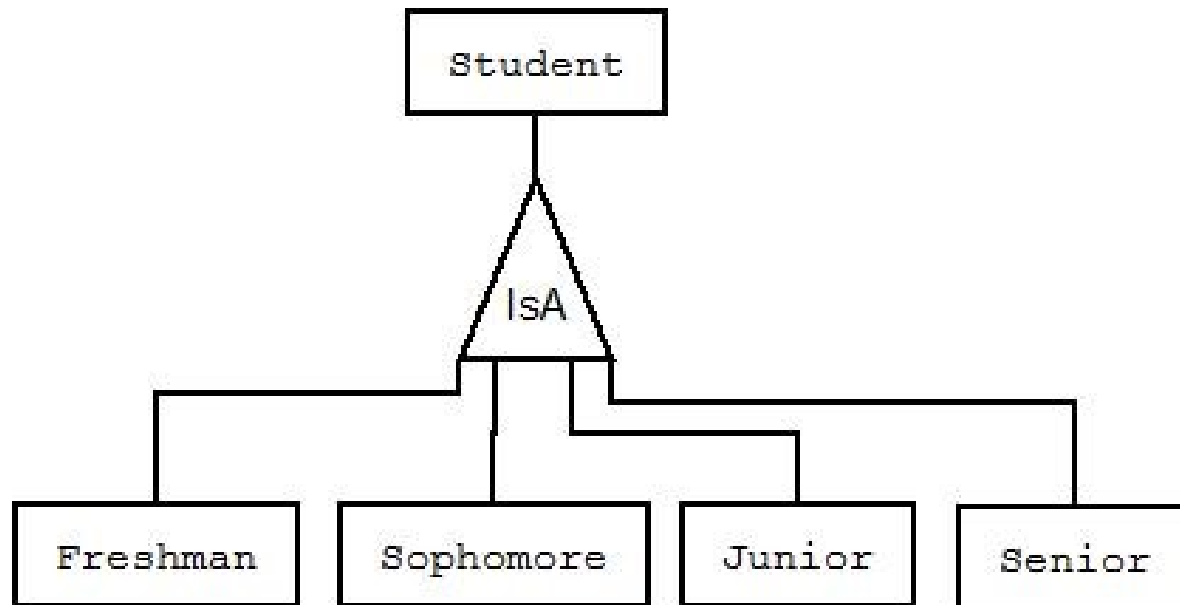
## Example of Specialization



The subset symbol on each line connecting a subclass to the circle indicates direction of the superclass/subclass relationship.

# IsA Relationship

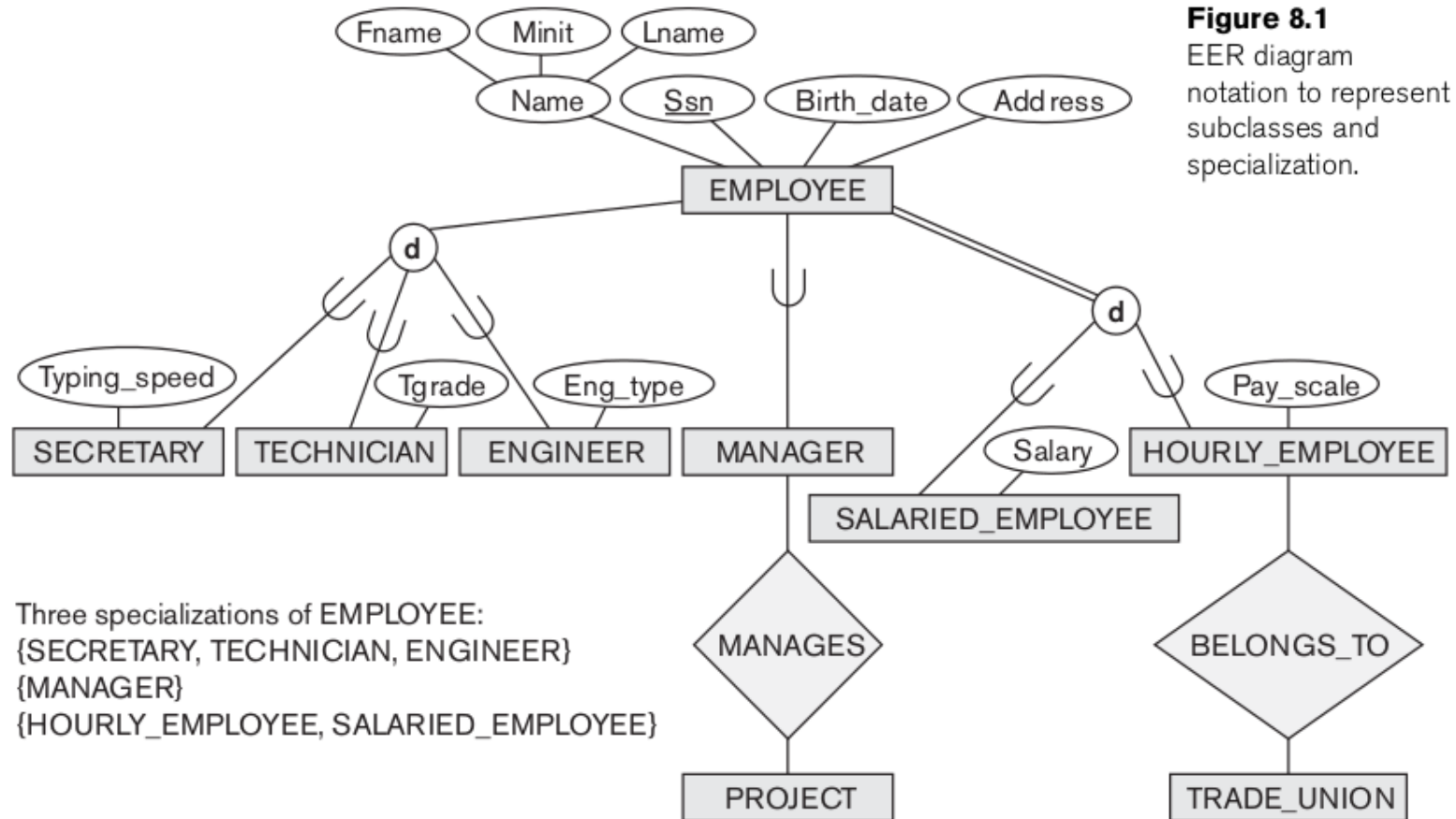
- These relationships are also called as IsA relationships.



# Question

- Construct an EER diagram with the EMPLOYEE as a superclass. The employees can be Secretary, Engineer and Technician. An employee can also be a Manager. The pay of the employee is either fixed or hourly.

# Answer!





# Specialization and Generalization

- Generalization - the process of defining a general entity type from a collection of specialized entity types.
- Specialization - the opposite of generalization, since it defines subtypes of the supertype and determines the relationship between the two.

# Generalization

- Generalization is the process of generalizing the entities which contain the properties of all the generalized entities.
- It is a **bottom up** approach, in which two lower level entities combine to form a higher level entity.

# Generalization Contd...

- It defines a general entity type from a set of specialized entity type.
- It minimizes the difference between the entities by identifying the common features.

# Example

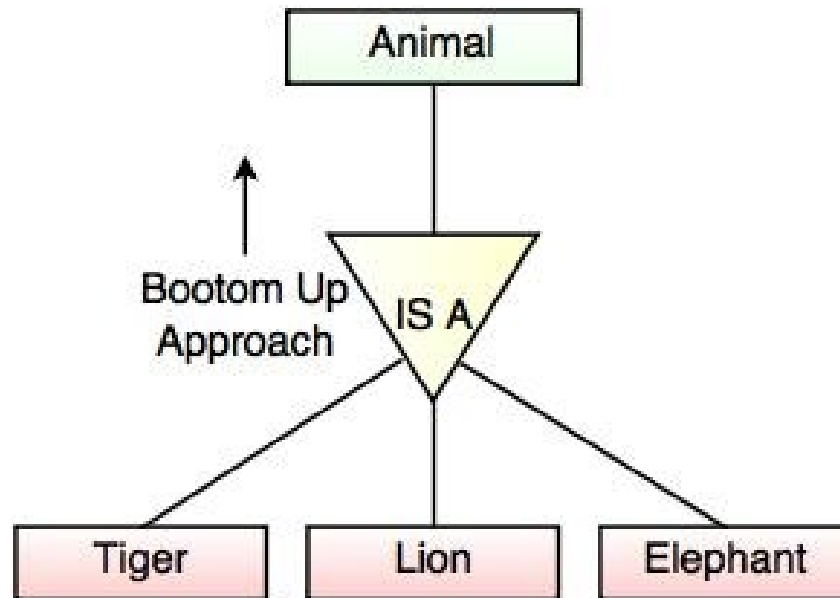


Fig. Generalization

In the above example, Tiger, Lion, Elephant can all be generalized as Animals.

# Specialization

- Specialization is a process that defines a group entities which is divided into sub groups based on their characteristic.
- It is a **top down** approach, in which one higher entity can be broken down into two lower level entity.

# Specialization Contd..

- It defines one or more sub class for the super class and also forms the superclass/subclass relationship.

# Example

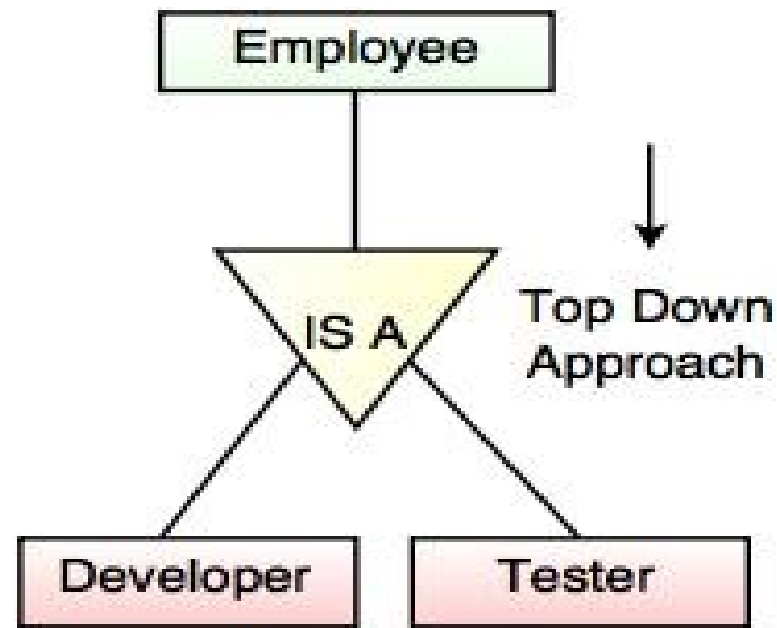


Fig. Specialization

Employee can be specialized as Developer or Tester, based on what role they play in an Organization.

Can you come up with examples of  
Specialization and Generalization???