

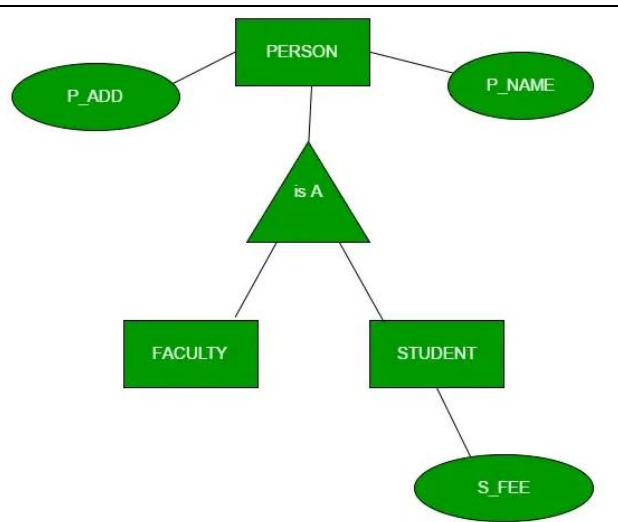
## Generalization, Specialization and Aggregation in ER Model

Generalization, Specialization, and Aggregation in ER model are used for data abstraction in which an abstraction mechanism is used to hide details of a set of objects. Some of the terms were added to the Enhanced ER Model, where some new concepts were added. These new concepts are:

- Generalization
- Specialization
- Aggregation

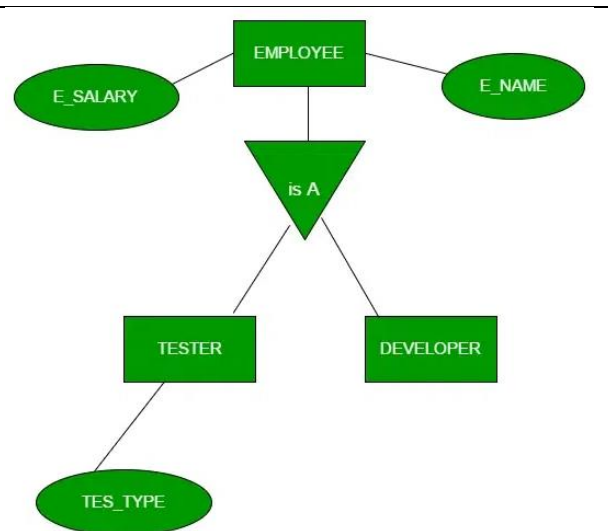
### Generalization:

Generalization is the process of extracting common properties from a set of entities and creating a generalized entity from it. It is a bottom-up approach in which two or more entities can be generalized to a higher-level entity if they have some attributes in common. For Example, STUDENT and FACULTY can be generalized to a higher-level entity called PERSON as shown in Figure 1. In this case, common attributes like P\_NAME, and P\_ADD become part of a higher entity (PERSON), and specialized attributes like S\_FEE become part of a specialized entity (STUDENT).



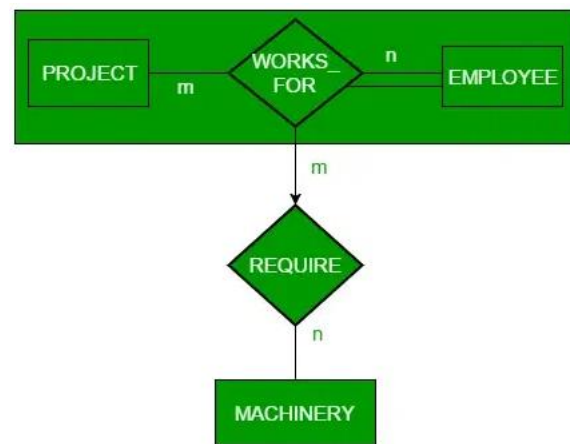
### Specialization:

In specialization, an entity is divided into sub-entities based on its characteristics. It is a top-down approach where the higher-level entity is specialized into two or more lower-level entities. For Example, an EMPLOYEE entity in an Employee management system can be specialized into DEVELOPER, TESTER, etc. as shown in Figure 2. In this case, common attributes like E\_NAME, E\_SAL, etc. become part of a higher entity (EMPLOYEE), and specialized attributes like TES\_TYPE become part of a specialized entity (TESTER).



### Aggregation:

An ER diagram is not capable of representing the relationship between an entity and a relationship which may be required in some scenarios. In those cases, a relationship with its corresponding entities is aggregated into a higher-level entity. Aggregation is an abstraction through which we can represent relationships as higher-level entity sets. For Example, an Employee working on a project may require some machinery. So, REQUIRE relationship is needed between the relationship WORKS\_FOR and entity MACHINERY. Using aggregation, WORKS\_FOR relationship with its entities EMPLOYEE and PROJECT is aggregated into a single entity and relationship REQUIRE is created between the aggregated entity and MACHINERY.



### Representing Aggregation Via Schema:

To represent aggregation, create a schema containing the following things.

- The primary key to the aggregated relationship
- The primary key to the associated entity set
- Descriptive attribute, if exists

#### **1. What are Generalization, Specialization, and Aggregation in ER Model?**

**Answer:** Generalization is the higher level of understanding of data from lower levels of data whereas Specialization is the process of defining one or more entities from present entities and Aggregation is the process of combining two or more entities.

#### **2. What is the purpose of the Generalization?**

**Answer:** Generalization is simply gathering the common properties from entities and creating a generalized concept from those extracted data. Generalization helps in improving the flexibility, and reusability of the database.

#### **3. Why is generalization important in the database?**

**Answer:** Generalization is important in the database because it helps to gather important information so that it becomes easier and faster for the user the analysis of data and it also helps in making decisions faster.