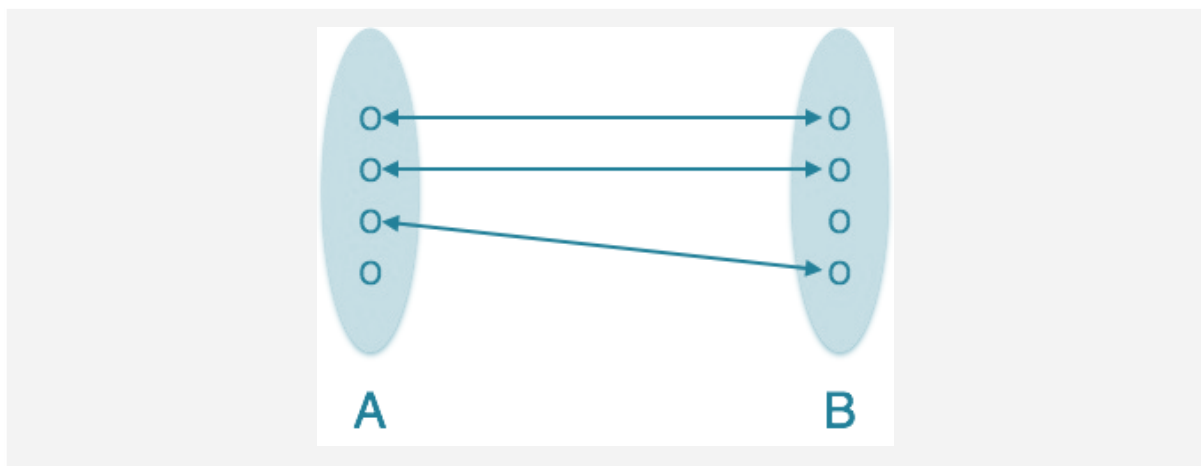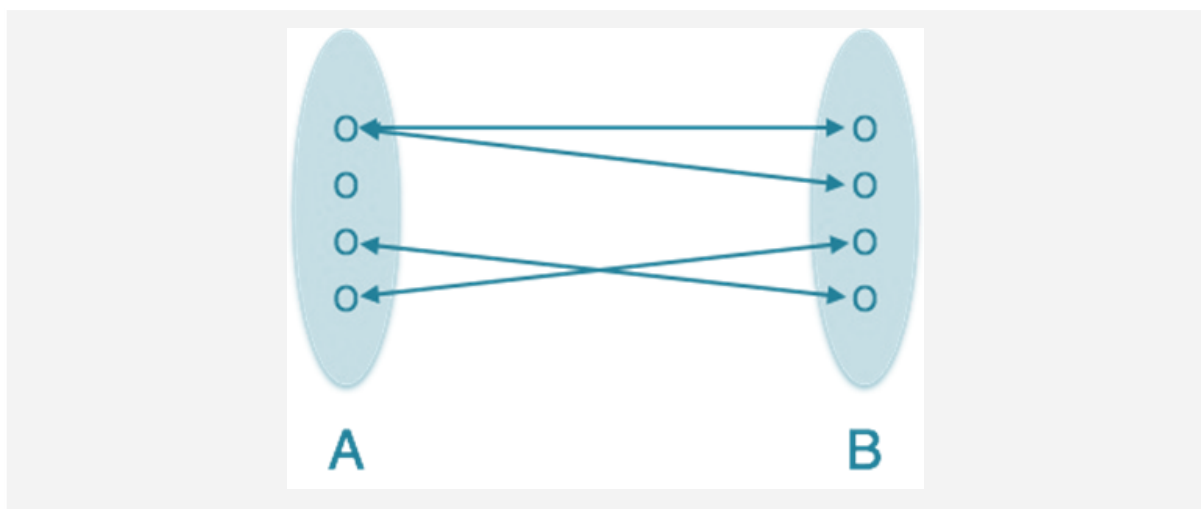# Relationships

One-to-one :
One entity from entity set A can be associated with at most one entity of entity set B and vice versa.


One-to-many :
One entity from entity set A can be associated with more than one entity of entity set B however an entity from entity set B, can be associated with at most one entity.
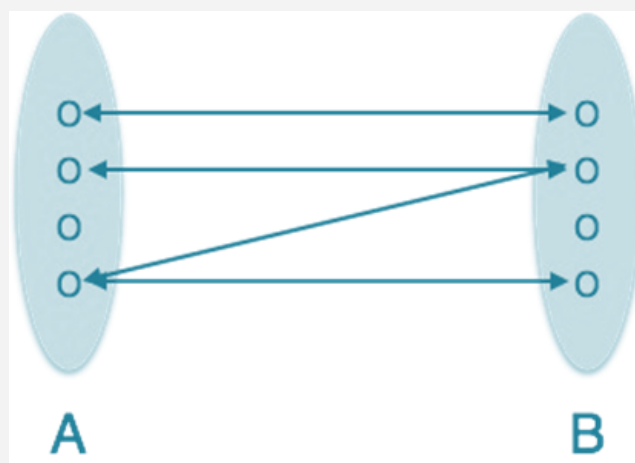
Many-to-one:

More than one entity from entity set A can be associated with at most one entity of entity set B, however an entity from entity set B can be associated with more than one entity from entity set A.
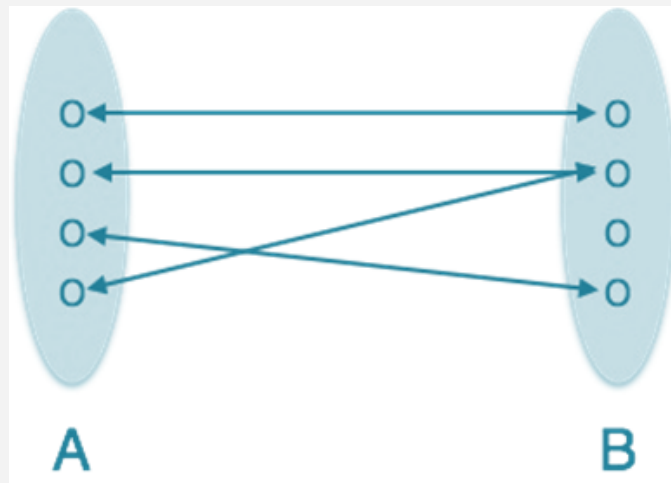
Many-to-many :

One entity from A can be associated with more than one entity from B and vice versa.

Total and Partial Partition

Total Participation is when each entity in the entity set occurs in at least one relationship in that relationship set.
Entity fully participates in the relationship indicated by double lines drawn from entity to relationship.

Partial Participation is all entities do not involve in the relationship
Entity partially participates in the relationship indicated by single lines drawn from entity to relationship.
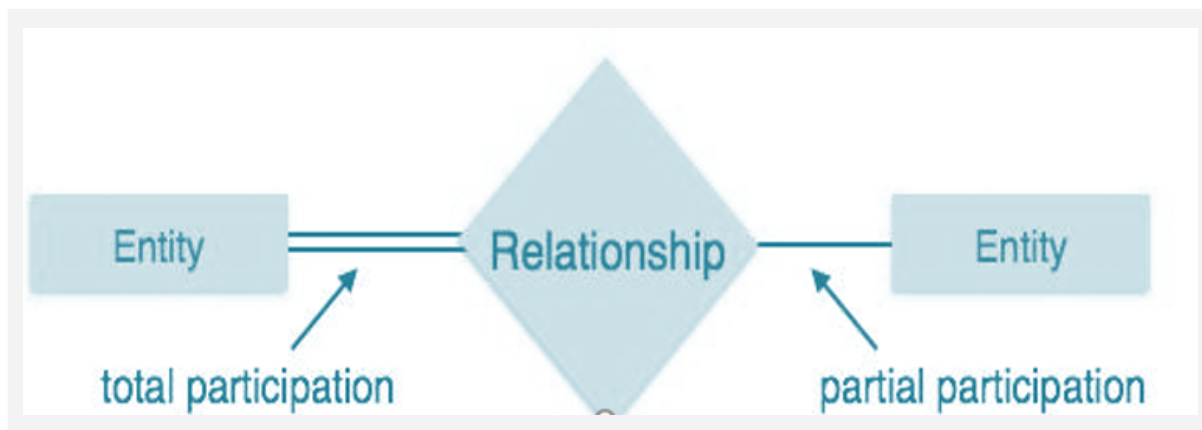
Creating an ER Diagram

Entities: An entity is an object or concept about which you want to store information.

A **weak entity** is an entity that must be defined by a foreign key relationship with another entity as it cannot be uniquely identified by its own attributes alone.

W.ENTITY

Relationships: Relationships are represented by diamond shape, and show how two entities share information in the database.

RELATIONSHIP

Attributes: Attributes are represented by ovals. A key attribute is the unique, distinguishing characteristic of the entity.

For example, an employee's social security number might be the employee's key attribute

ATTRIBUTE

A **multivalued attribute** can have more than one value.

For example, an employee entity can have multiple skill values.

ATTRIBUTE

Relationships:
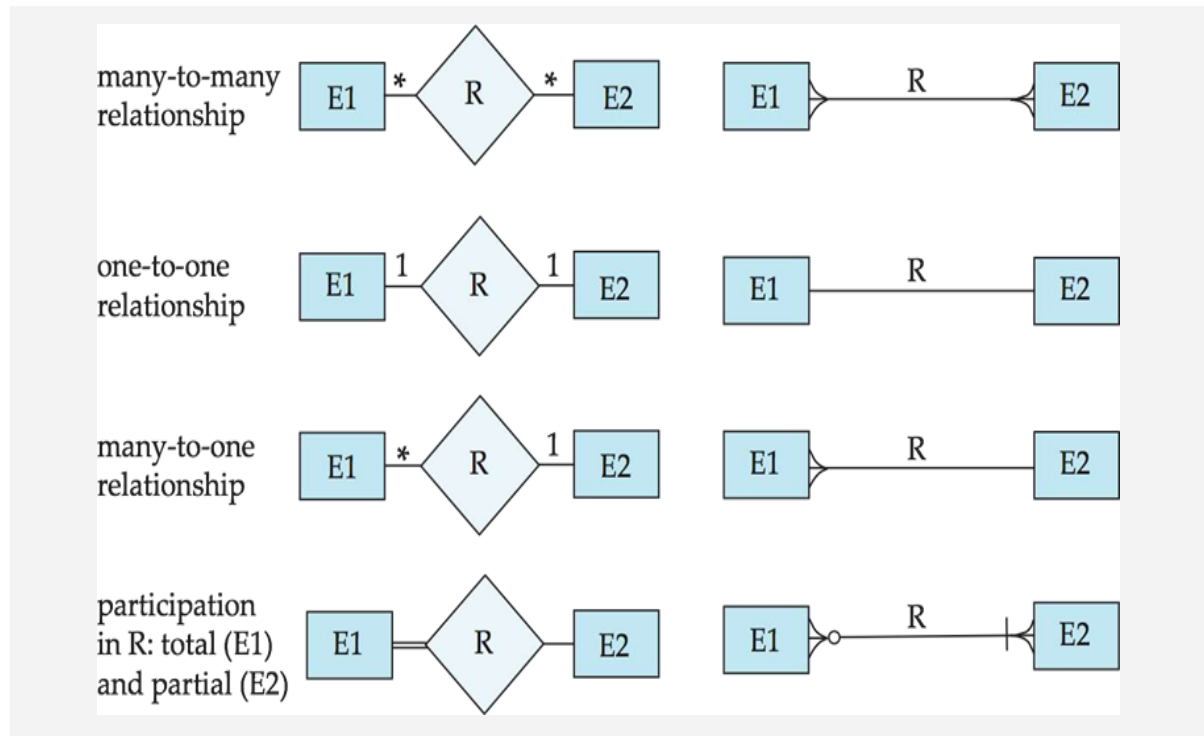
Generalization

The process of generalizing entities, where the generalized entities contain the properties of all the generalized entities, is called generalization.

In generalization, a number of entities are brought together into one generalized entity based on their similar characteristics.

For example, pigeons, house sparrows, crows and doves can all be generalized as Birds.
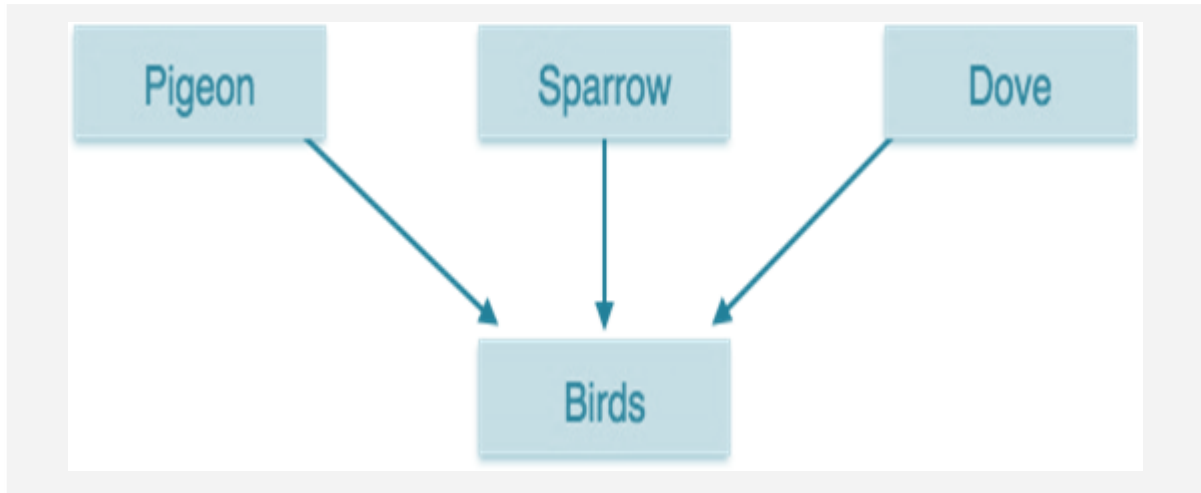
Specialization

Specialization is the opposite of generalization. In specialization, a group of entities is divided into subgroups based on their characteristics.

Take a group 'Person' for example. A person has a name, date of birth, gender, etc. These properties are common in all persons, human beings. But in a company, persons can be identified as an employee, employer, customer, or vendor, based on what role they play in the company.

Similarly, in a school database, persons can be specialized as teacher, students, or a staff, based on what role they play in school as entities.
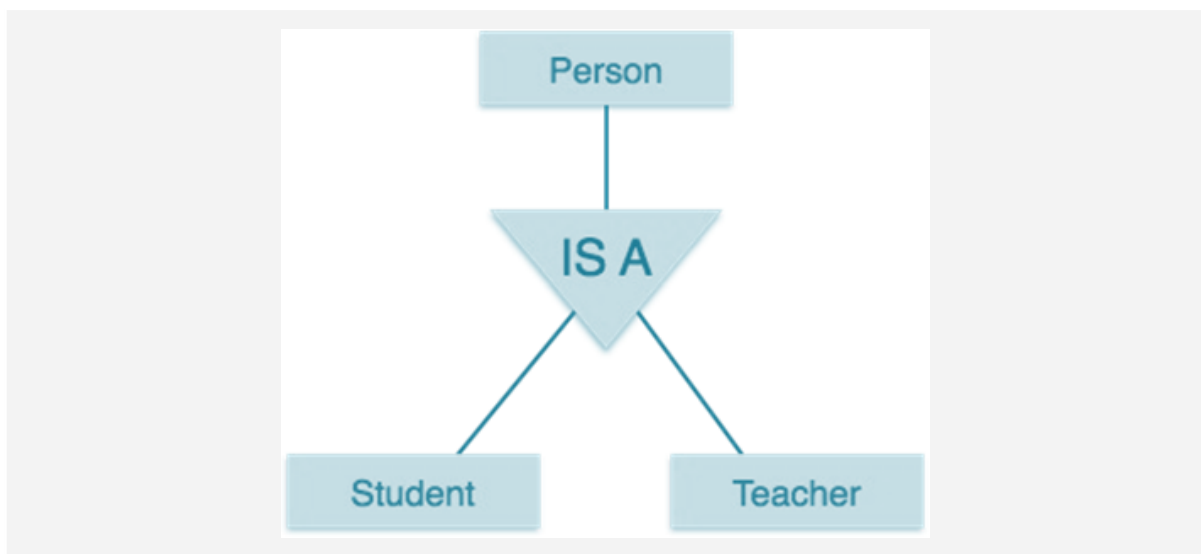
Aggregation

Aggregation refers to the process by which entities are combined to form a single meaningful entity.

Aggregation is an abstraction for building composite objects from their component objects.
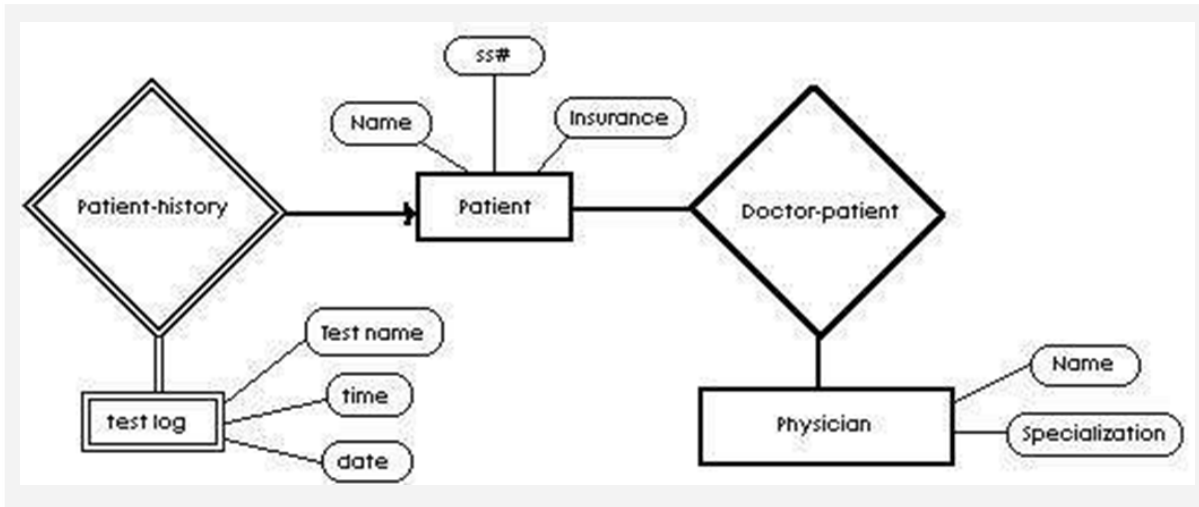
Aggregation is used to represent a relationship between a whole object and its component parts.

If we need to express a relationship among relationships, then we should use aggregation
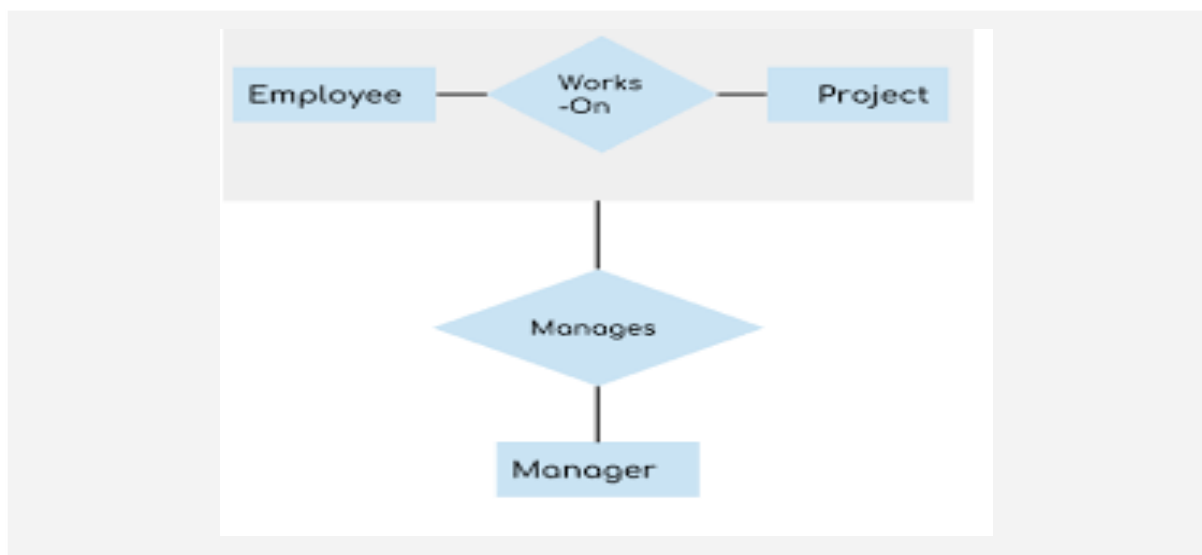
Problems:

Construct an ER diagram for a hospital with a set of patients and a set of doctors. Associate with each patient a log of the various tests and examinations conducted.

Construct an ER diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents.