ER model

- ER model stands for Entity-Relationship model. It is a high level data model. This model is used to define the data elements and relationship for a specified system.
- It develops a conceptual design for the database. It also develops a very simple and easy to design view of data.
- In ER modeling, the database structure is portrayed as a diagram called an entity-relationship diagram.

For example: If we design a school database then student will be an entity with attributes like address, name, id, age etc. an address can be another entity with attributes like city, street name, pincode etc. and there will be a relationship between them.
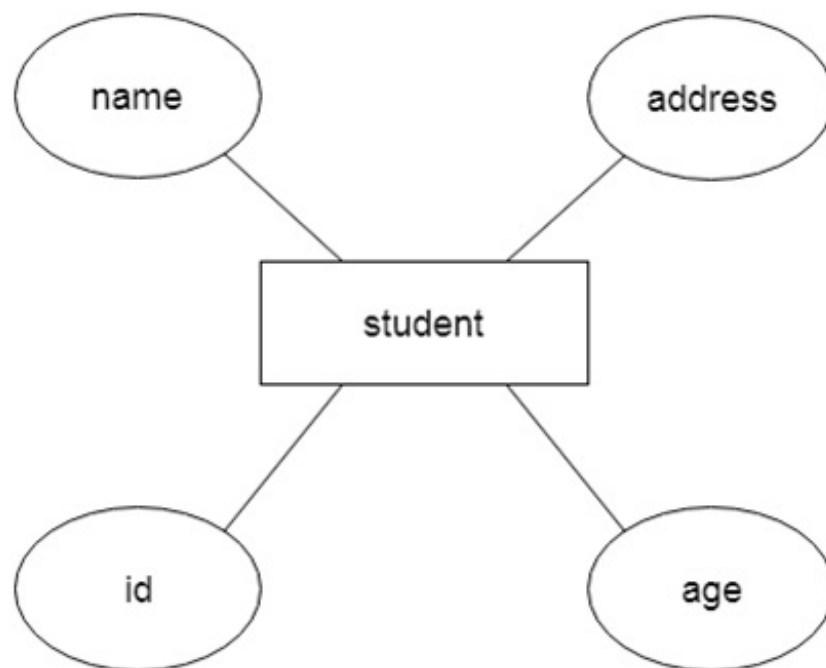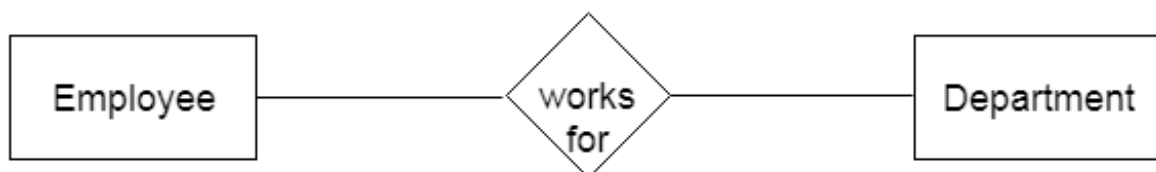

Component of ER Diagram
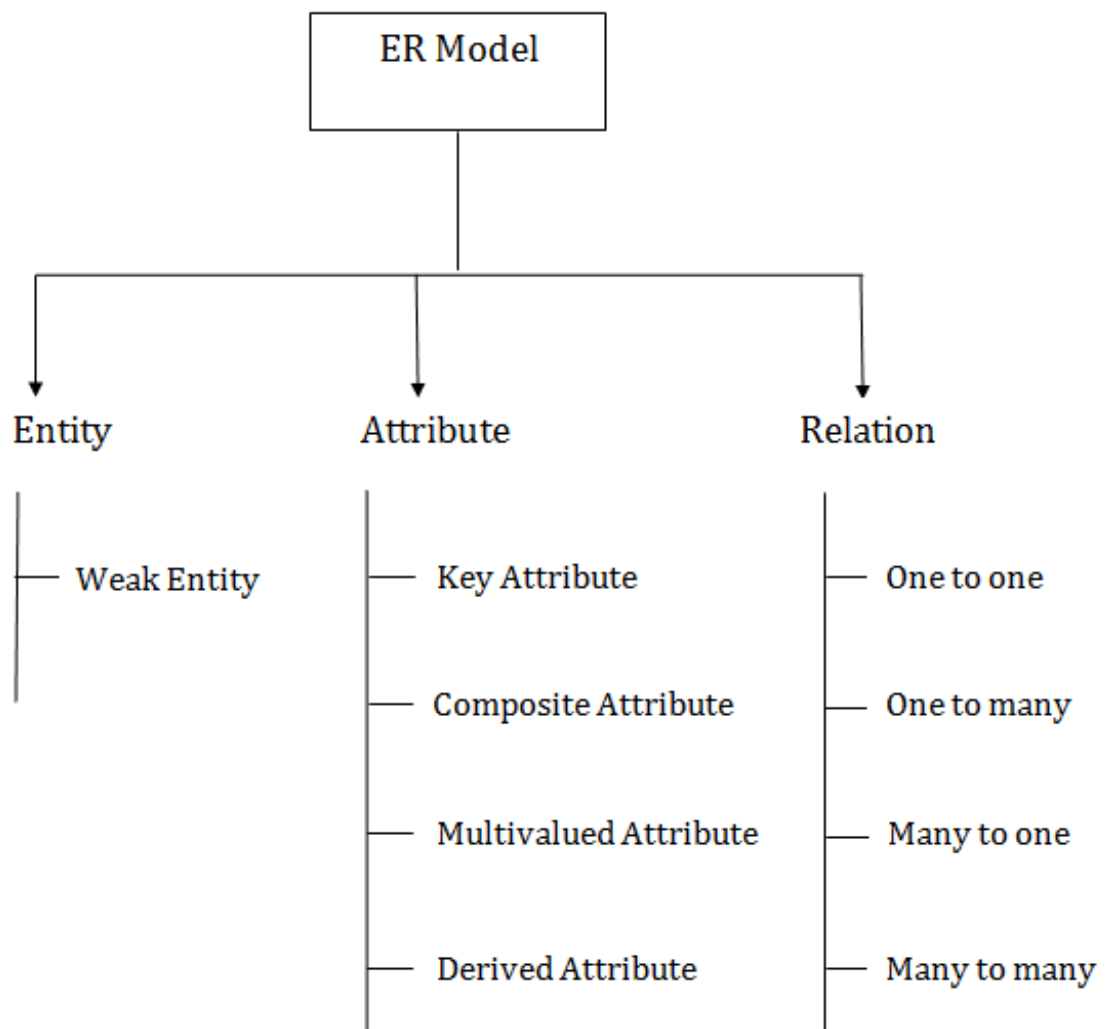
1. Entity:

An entity may be any object, class, person or place. In ER diagram, an entity can be represented as rectangles.

Consider an organization as an example- manager, product, employee, department etc. can be taken as entity.
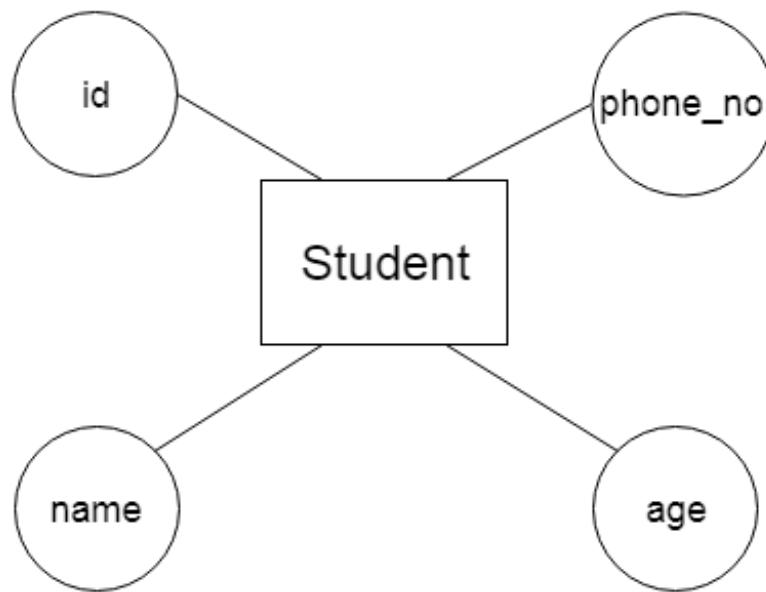

a. Weak Entity

An entity that depends on another entity called as weak entity. Weak entity doesn't contain any key attribute of its own. Weak entity is represented by double rectangle.
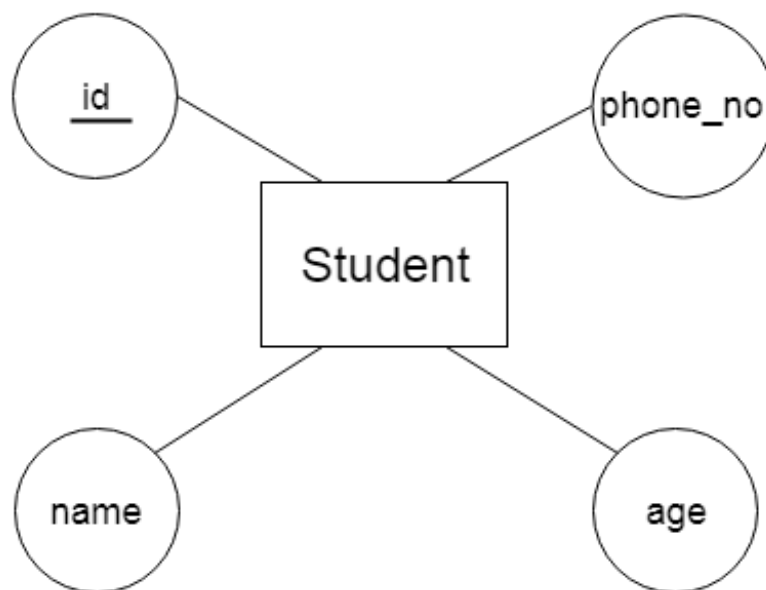

2. Attribute

Attribute is used to describe the property of an entity. Eclipse is used to represent an attribute.

**For example:** id, age, contact number, name etc. can be attributes of a student.

a. Key Attribute

Key attribute is used to represent main characteristics of an entity. It represents a primary key. Key attribute is represented by ellipse with the text underlined.

b. Composite Attribute

An attribute that composed of many other attributes is known as composite attribute. Composite attribute is represented by ellipse and those ellipses are connected with an ellipse.
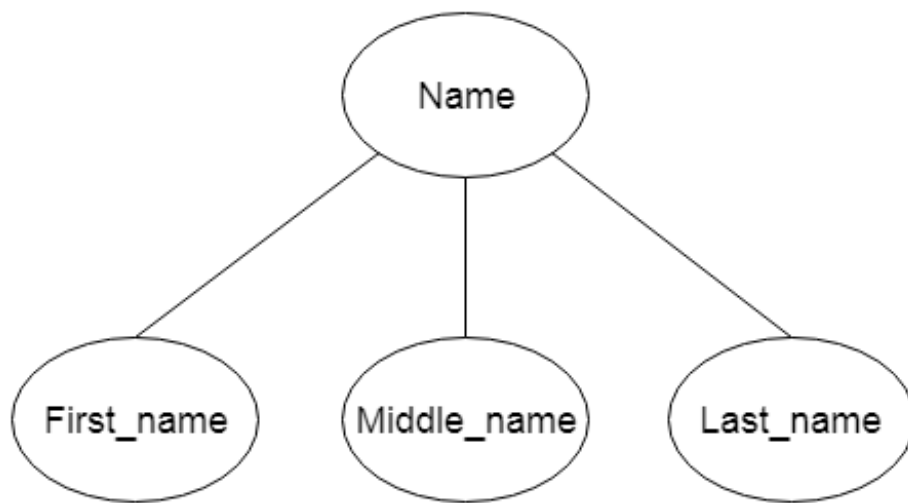
c. Multivalued Attribute

An attribute can have more than one value. These attributes are known as multivalued attribute. Double oval is used to represent multivalued attribute.

For example: a student can have more than one phone number.

d. Derived Attribute

An attribute that can be derived from other attribute is known as derived attribute. It can be represented by dashed ellipse.

For example: A person's age changes over time and can be derived from another attribute like: Date of birth.
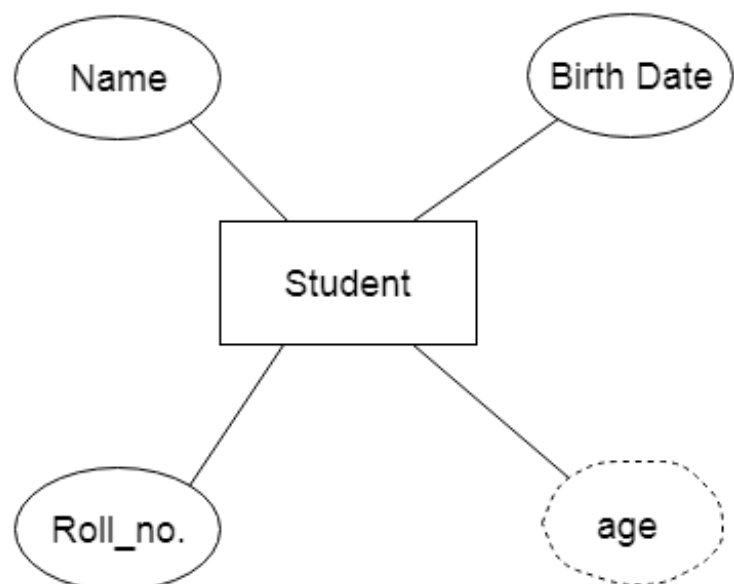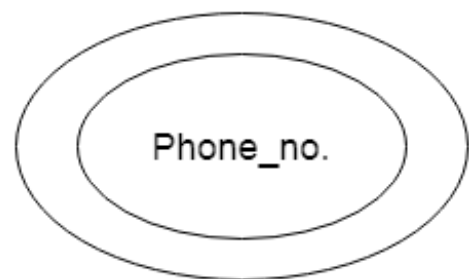
3. Relationship

A relationship is used to describe the relation between entities. Diamond or rhombus is used to represent the relationship.

Types of relationship are as follows:

a. One-to-One Relationship

When only one instance of an entity is associated with the relationship then it is known as one to one relationship.
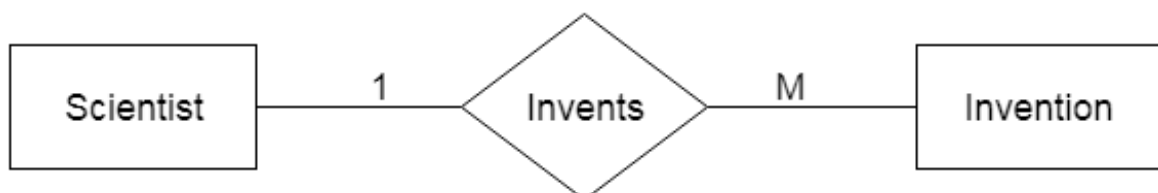
For example: A female can marry to one male and a male can marry to one female.

b. One-to-many relationship

When only one instance of entity on the left and more than one instance of an entity on the right associates with the relationship then this is known as one-to-many relationship.

For example: Scientist can invent many inventions but invention are done by only specific scientist.

c. Many-to-one relationship

When more than one instance of entity on the left and only one instance of an entity on the right associates with the relationship then it is known as many-to-one relationship.

For example: Student enrolls for only one course but a course can have many students.

d. Many-to-many relationship

When more than one instance of entity on the left and more than one instance of an entity on the right associates with the relationship then it is known as many-to-many relationship.
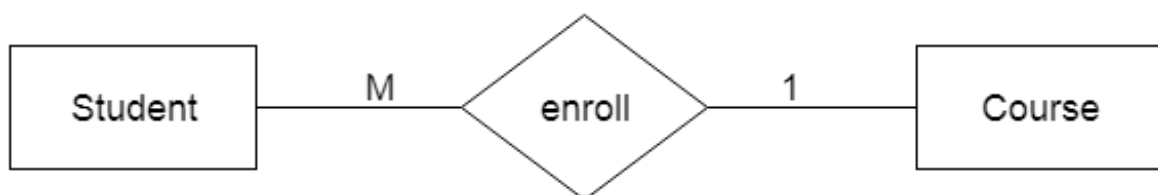
For example: Employee can assign by many projects and project can have many employees.

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┌────────────┐         ╱╲                   ┌────────────┐
│  Employee  │───M────╱  ╲─── M ───────────│  Project   │
└────────────┘       ╱ is  ╲                └────────────┘
                     ╲assigned╱
                      ╲    ╱
                       ╲  ╱
                        ╲╱
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Employee — M — is assigned — M — Project