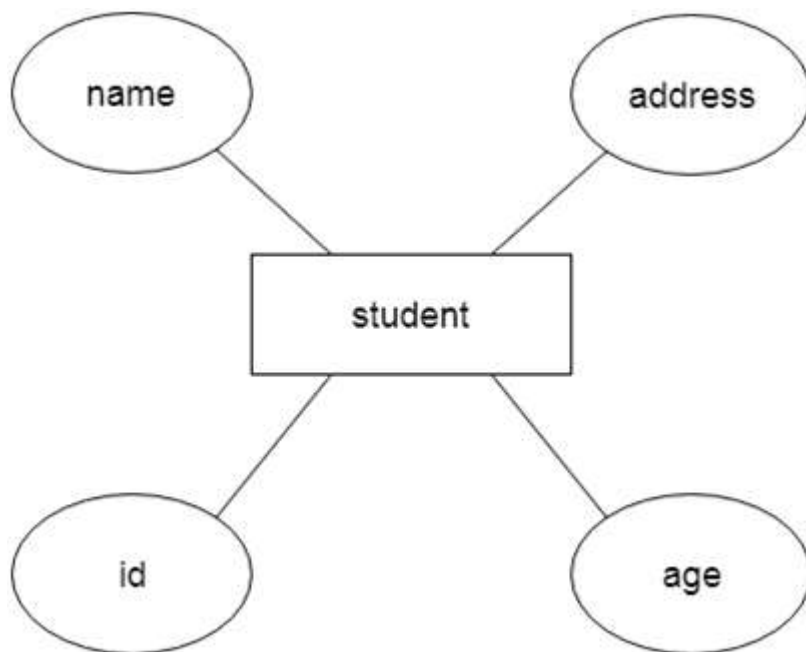


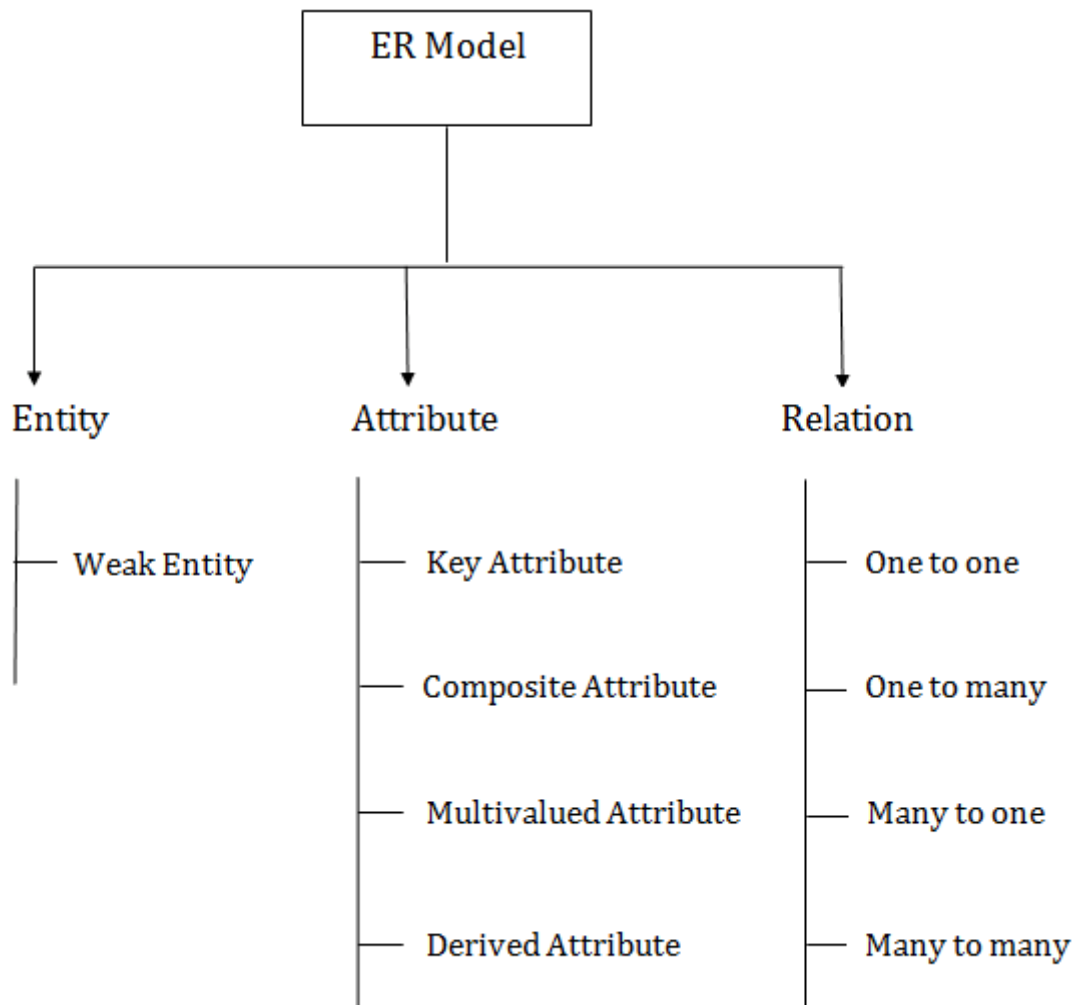
1. What is Entity Relationship Diagram?

- ER model stands for an 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, Suppose we design a school database. In this database, the student will be an entity with attributes like address, name, id, age, etc. The address can be another entity with attributes like city, street name, pin code, etc and there will be a relationship between them.



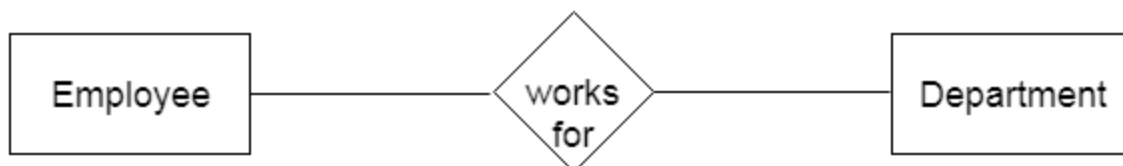
Component of ER Diagram



1. Entity:

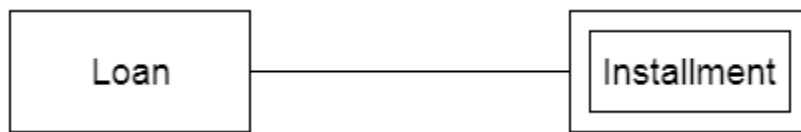
An entity may be any object, class, person or place. In the ER diagram, an entity can be represented as rectangles.

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



a. Weak Entity

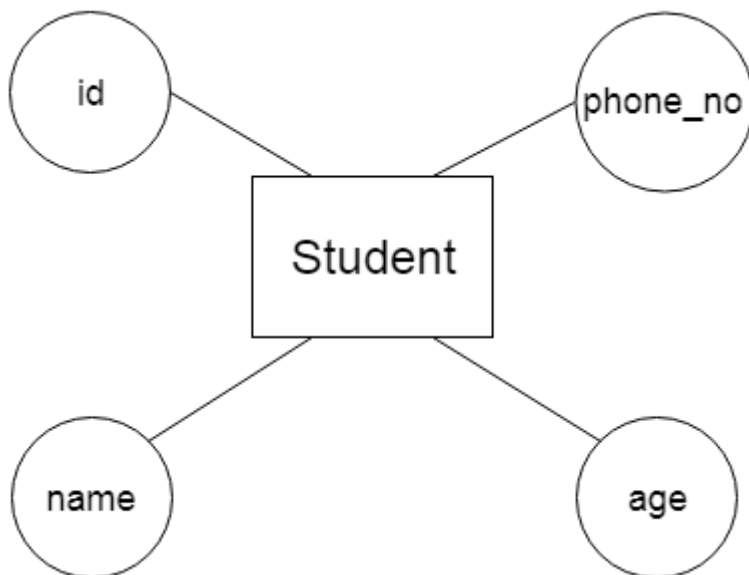
An entity that depends on another entity called a weak entity. The weak entity doesn't contain any key attribute of its own. The weak entity is represented by a double rectangle.



2. Attribute

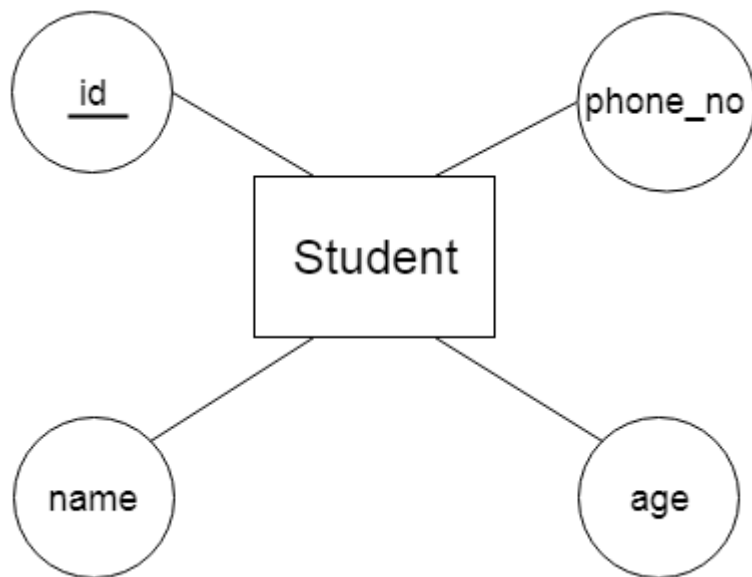
The attribute is used to describe the property of an entity. Eclipse is used to represent an attribute.

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



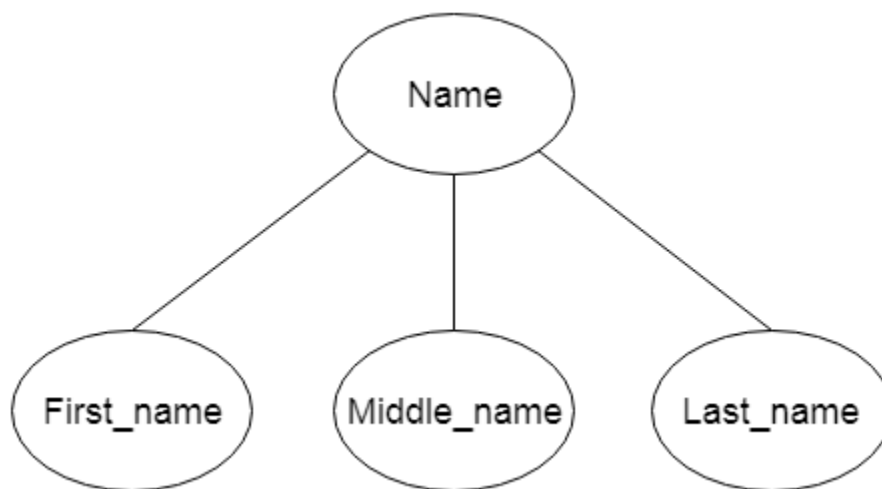
a. Key Attribute

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



b. Composite Attribute

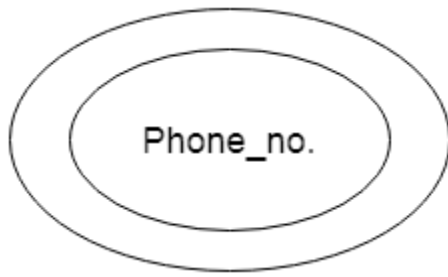
An attribute that composed of many other attributes is known as a composite attribute. The composite attribute is represented by an ellipse, and those ellipses are connected with an ellipse.



c. Multivalued Attribute

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

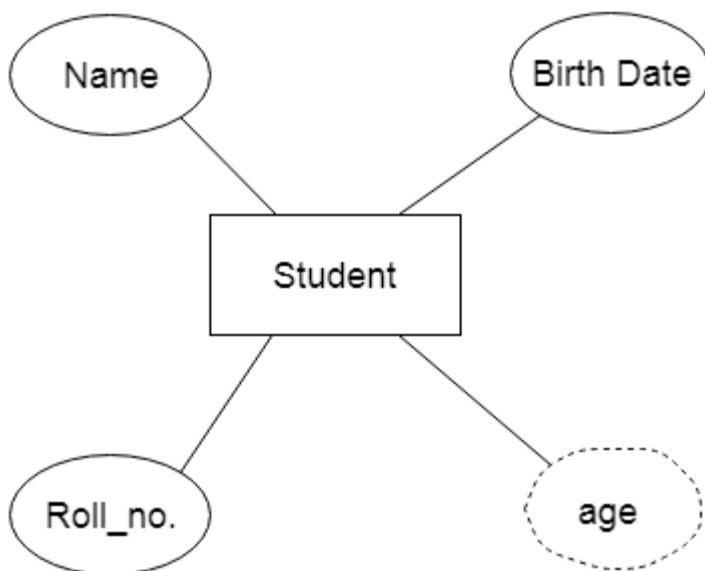
For example, a student can have more than one phone number.



d. Derived Attribute

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

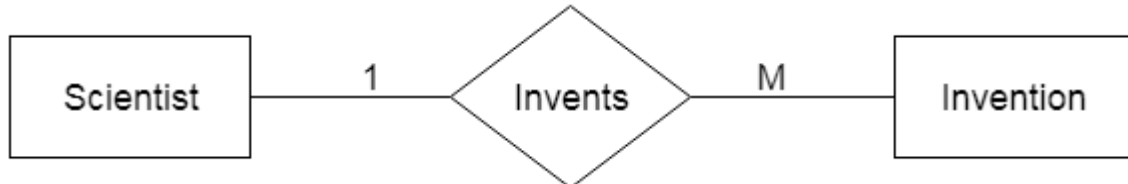
For example, A female can marry to one male, and a male can marry to one female.



b. One-to-many relationship

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

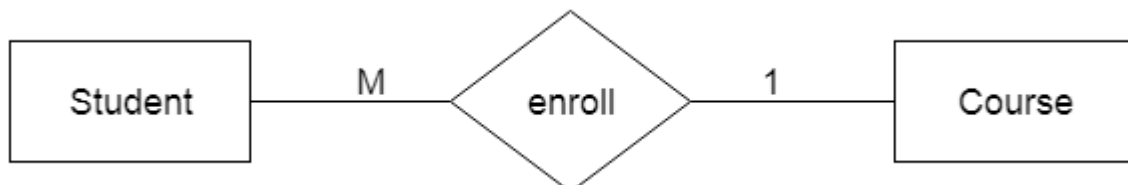
For example, Scientist can invent many inventions, but the invention is done by the only specific scientist.



c. Many-to-one relationship

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

For example, Employee can assign by many projects and project can have many employees.



2. What are attributes in ER Model? Explain Multivalued and Derived attribute?

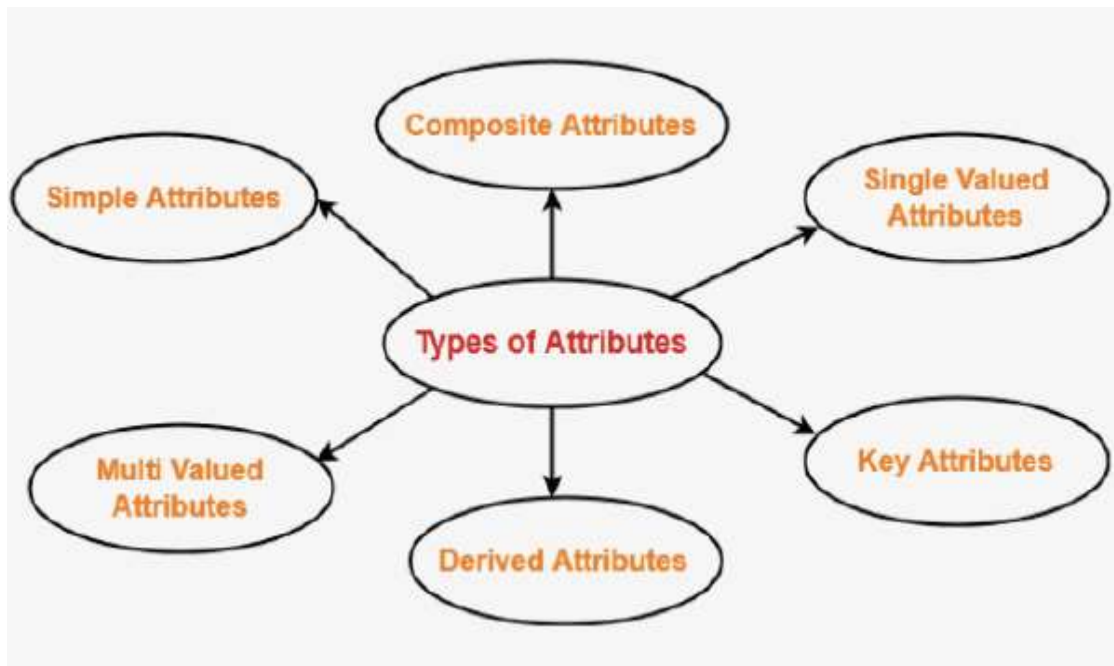
In a database management system (DBMS), an attribute is a piece of data that describes an [entity](#). For example, in a customer database, the attributes might be name, address, and phone number. In a product database, the attributes might be name, price, and date of manufacture. Each attribute has a specific data type, such as string, integer, or date.

Attributes can be used to describe both simple and complex entities. A product, for example, might be described by a single attribute such as name or price. However, it can also be described by multiple attributes such as name, price, and date of manufacture. In addition, some attributes might be used to describe other attributes. For example, an attribute called "color" might describe a product's color.

Types of Attributes in DBMS

Let's understand the different types of attributes in DBMS, along with their examples. In DBMS, the different types of attributes available are:

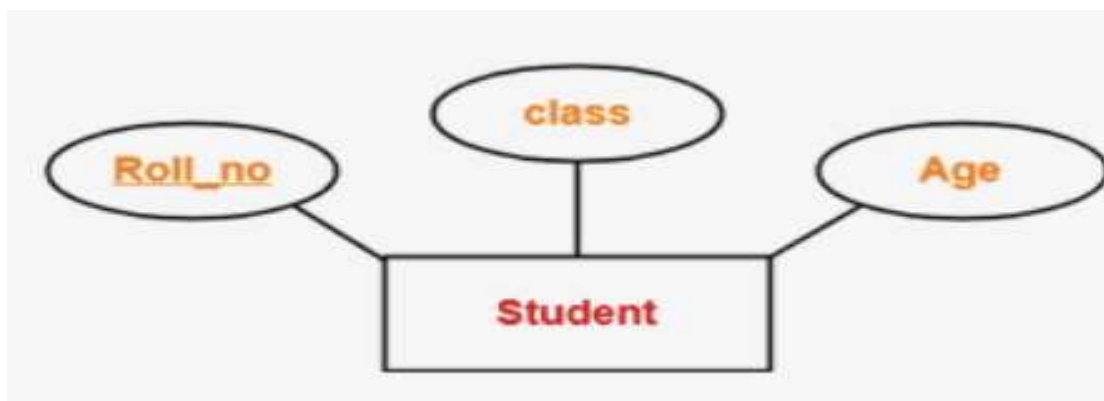
1. Simple Attributes
2. Composite Attributes
3. Single Valued Attributes
4. Multivalued Attributes
5. Derived Attributes
6. Complex Attributes
7. Key Attributes
8. Stored Attributes



1. Simple Attributes

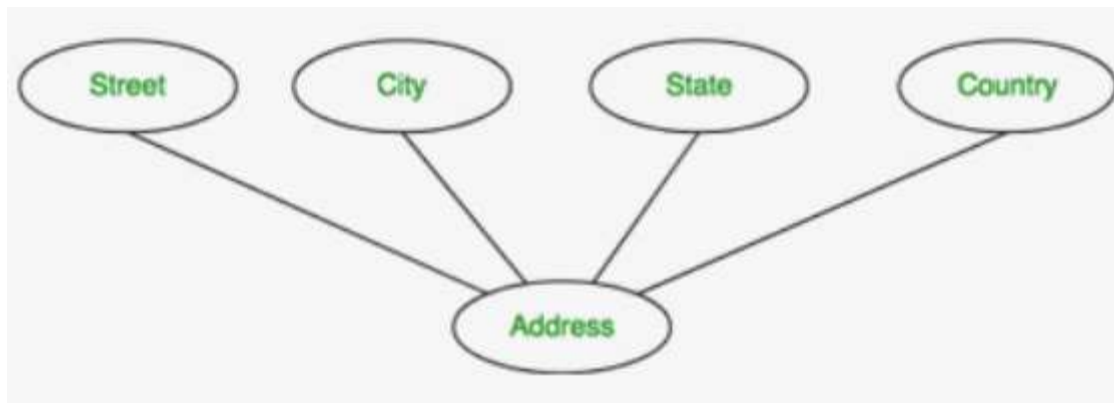
Simple attributes are those that cannot be further divided into sub-attributes.

For example, A student's roll number of a student or the employee identification number. These attributes are usually assigned by an organization and are used to identify an individual within that organization uniquely. Databases and other systems often use simple attributes to track and manage information.



2. Composite Attributes

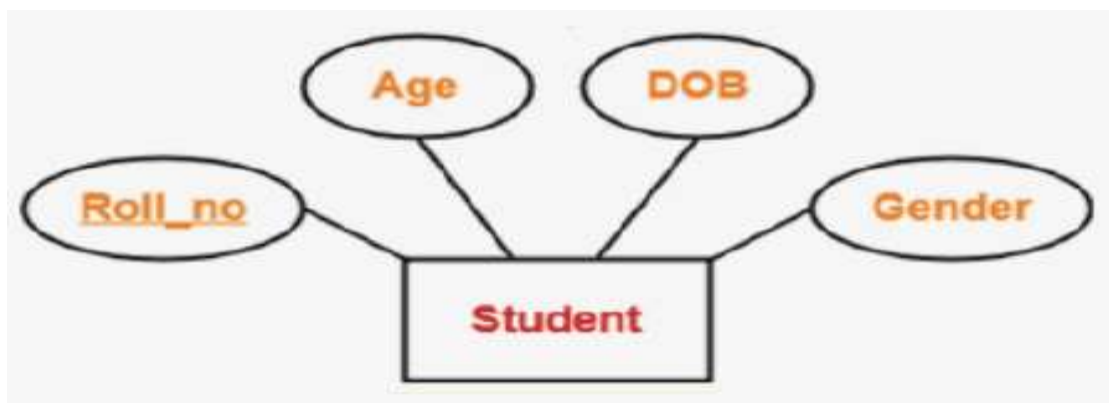
Composite attributes are made up of two or more simple attributes. For example, a person's address may be a composite attribute that is made up of the person's street address, city, state, and zip code. Composite attributes can be used to create more complex data models and can be helpful when trying to represent data in a concise way.



3. Single Valued Attributes

Single-valued attributes can only have one value. For example, a person's Social Security Number is a single-valued attribute. Social Security Numbers are used to uniquely identify individuals in the United States and are, therefore, single-valued attributes.

Examples of single-valued attributes include employee numbers, customer numbers, and product codes. Single-valued attributes are typically used to provide a unique identifier for an entity and are often used in databases.



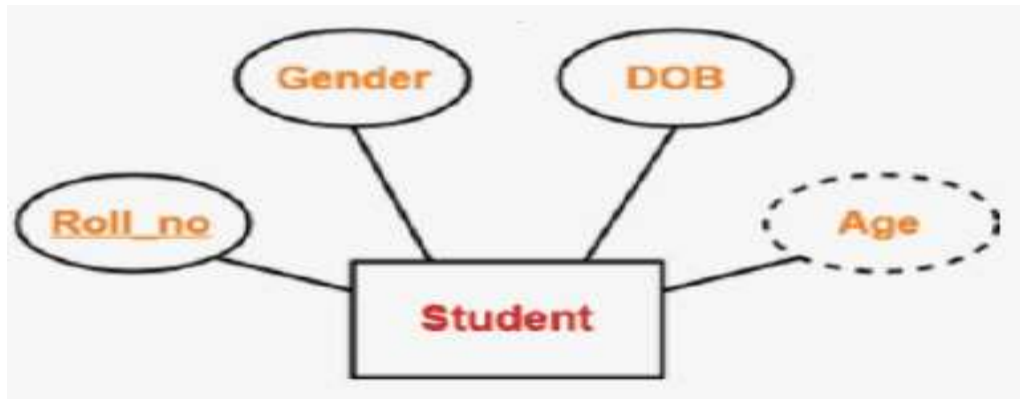
4. Multivalued Attributes

Multivalued attributes can have more than one value. For example, a person may have multiple email addresses or phone numbers. Multivalued attributes in DBMS are often used to store information about relationships between entities. For instance, an employee entity might have a multivalued attribute called "dependents" that stores the names of the employee's dependents. Multivalued attributes can also be used to represent hierarchical data.

5. Derived Attributes

Derived attributes are based on other attributes and are not stored directly in the database.

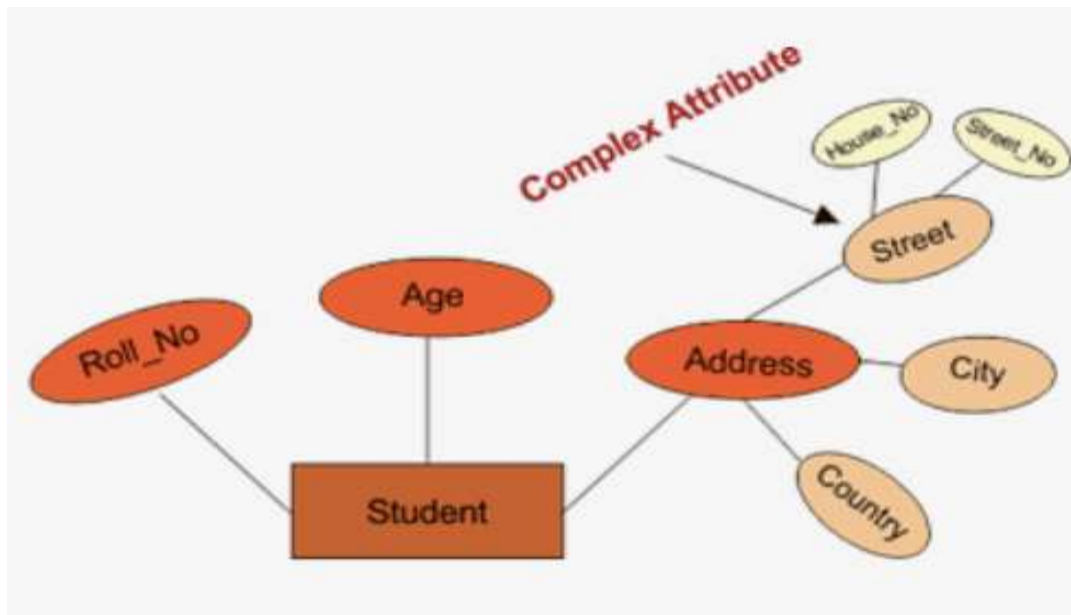
For example: Consider a database of employees. Each employee has a date of birth, and we might want to calculate their age. However, age is a derived attribute because it can be determined from the date of birth. As such, it would not make sense to store it directly in the database. Here is an example diagram of a derived attribute in DBMS:



6. Complex Attributes

The complex attribute in DBMS involves both multivalued and composite attributes. For example, someone might have more than one house, and each house might have more than one phone. The phone is then considered a complex attribute.

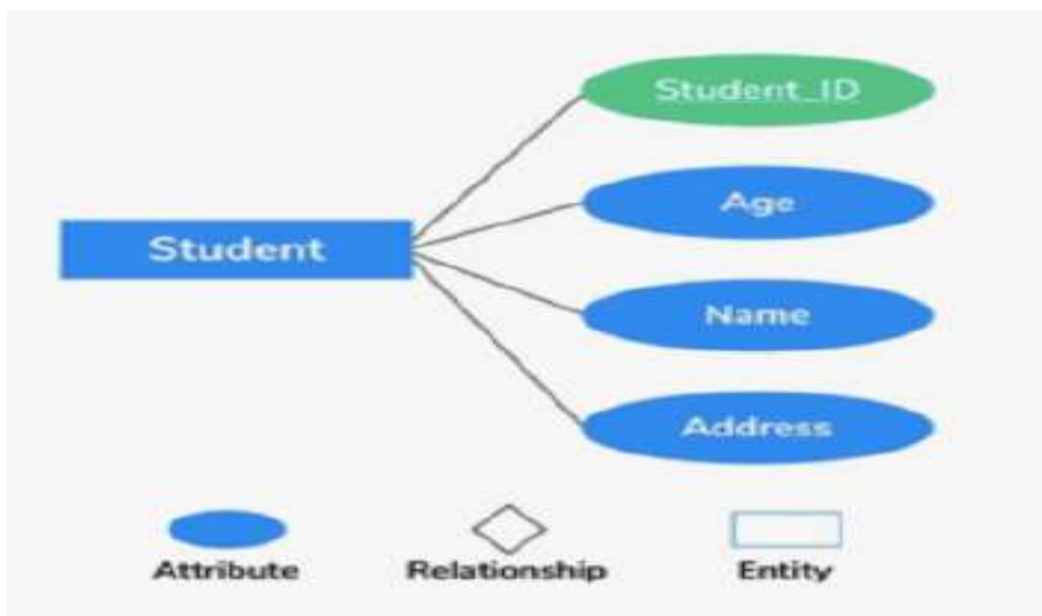
In the example above, the phone number is a composite attribute of the area code, exchange, and line number. Complex attributes are often used in database design to represent relationships between entities. Here is a complex attribute example explained in the form of a diagram.



7. Key Attributes

DBMS's key attributes are used to uniquely identify each row in a table. Usually, there is more than one key attribute in a table (primary key and foreign key).

For example: In a table of employees, the employee ID would be the primary key, while the manager ID would be the foreign key.



8. Stored Attributes

In a DBMS, stored attributes are the data that remain constant and fixed for an entity instance. These values help in deriving the derived attributes.

For example: consider a customer entity in a bank. The customer's name, age, and address would be stored attributes. The customer's account balance (a derived attribute) could be calculated based on the transactions (another stored attribute) associated with the customer.

So, these are the different attribute types in DBMS and their importance. We believe, by now, you must be intrigued to learn more about the most wanted database in the world. If yes, do consider a [MongoDB Administrative Course keywords](#) to get access to 100+ courses and experience 24 hours of instructor training.

