Entity Relationship (ER) Diagram

Contents

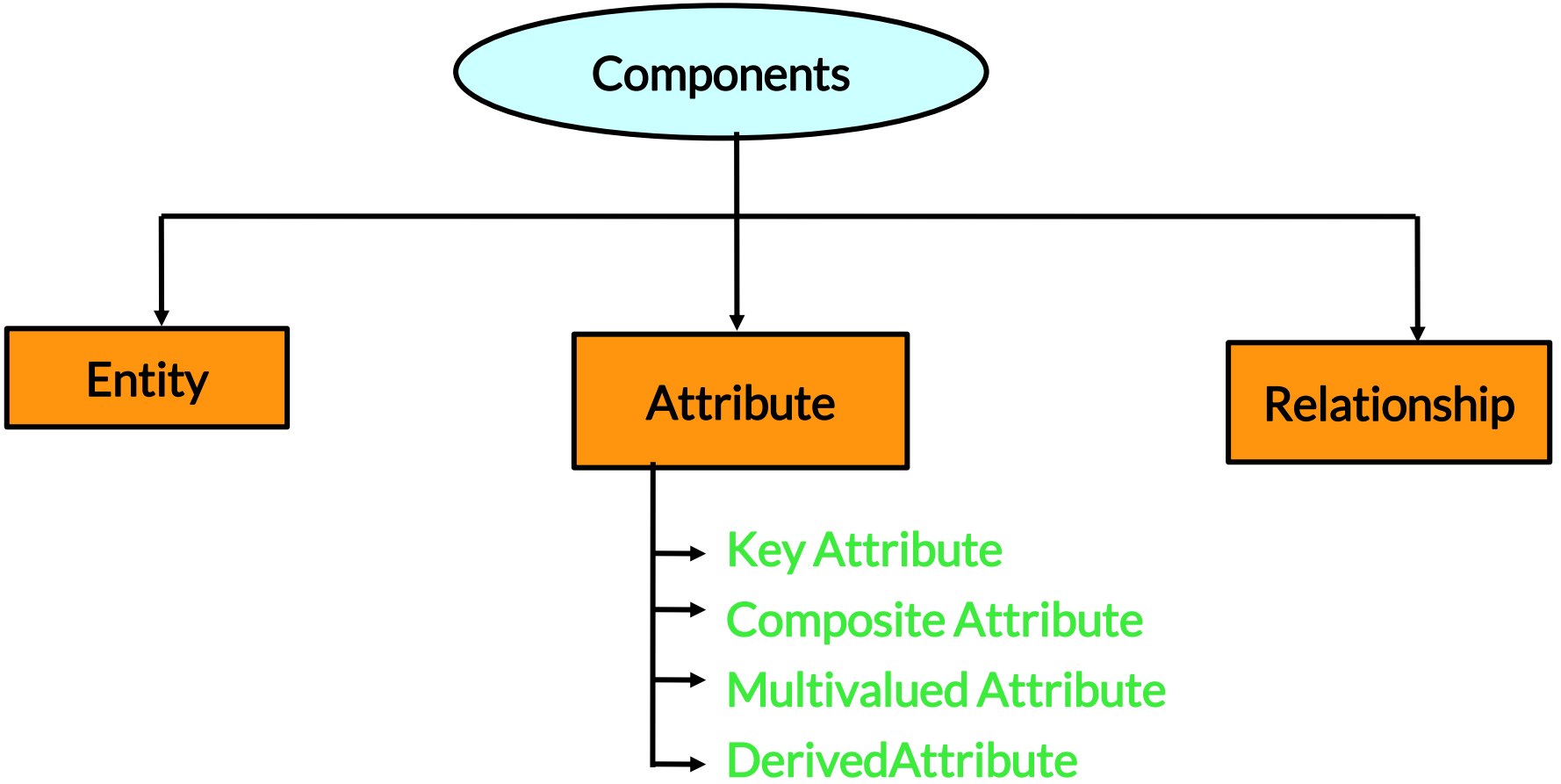
Entity Relationship (ER) Diagram

- An Entity Relationship (ER) Diagram is a type of flowchart that illustrates how “entities” such as people, objects or concepts relate to each other within a system.
- ER Diagrams are most often used to design or debug relational databases in the fields of software engineering, business information systems, education and research.
- Purpose is to create accurate reflection of the real world in a database

Uses of entity relationship diagrams

- Database design
- Database troubleshooting
- Research
- Business process re-engineering

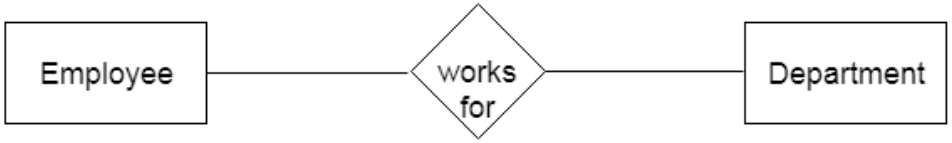
Components of an ER diagram



Components of an ERD -- Entity

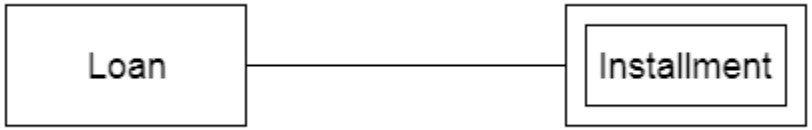
- An entity may be any object, class, person or place. In the ER diagram, an entity can be represented as rectangles. Example:Manager, Product.

Figure 1:



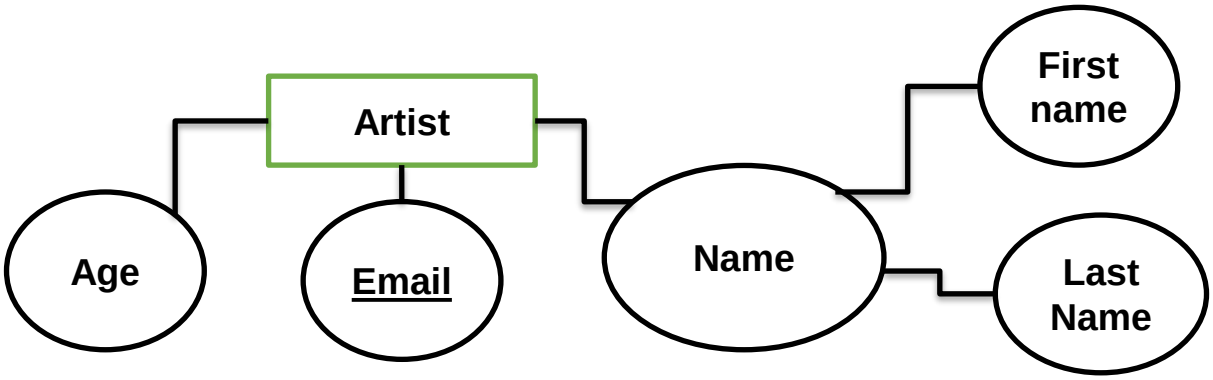
- An entity that depends on another entity called a weak entity. The weak entity doesn't contain any key attribute of its own. The weak entity is represented by a double rectangle.

Figure 2:



Components of an ERD -- Attribute

- The attribute is used to describe the property of an entity. Eclipse is used to represent an attribute. For example: id, age.



Types of Attributes

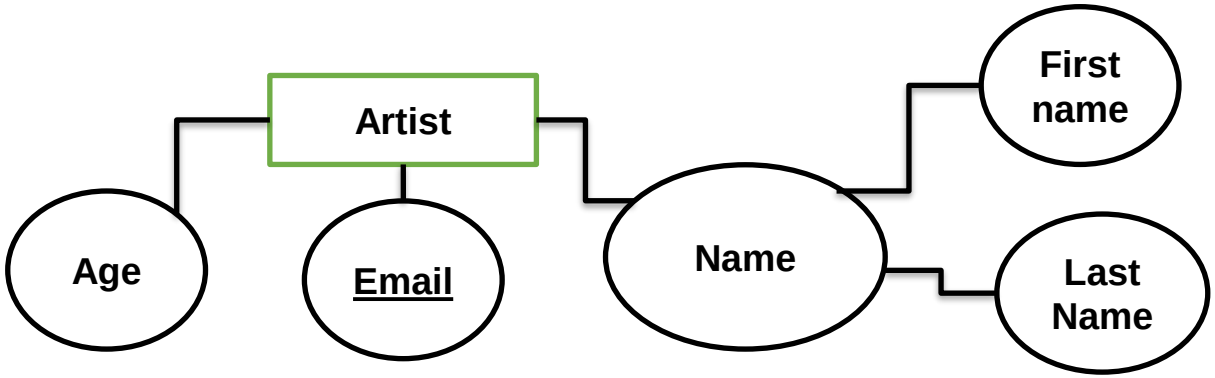
Key Attribute

- The key attribute is used to represent the main characteristics of an entity.

  It represents a primary key.

Composite Attribute

- An attribute that composed of many other attributes.



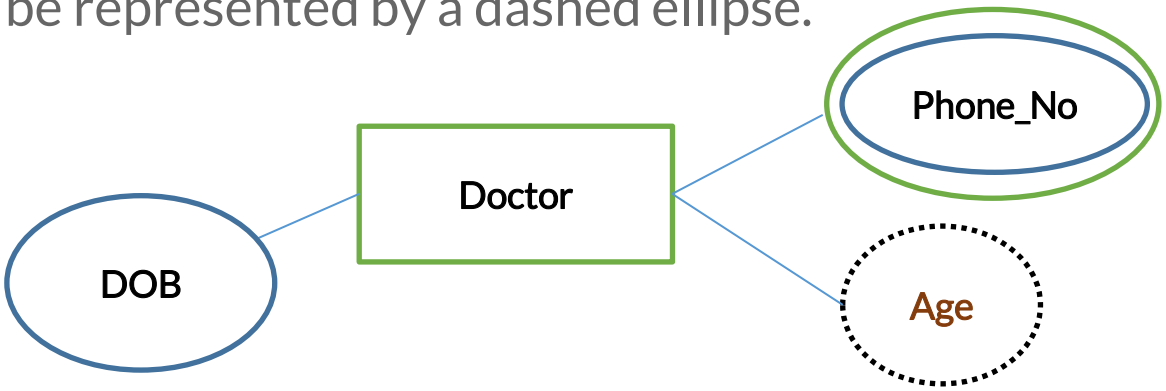
Types of Attributes

Multivalued Attribute

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

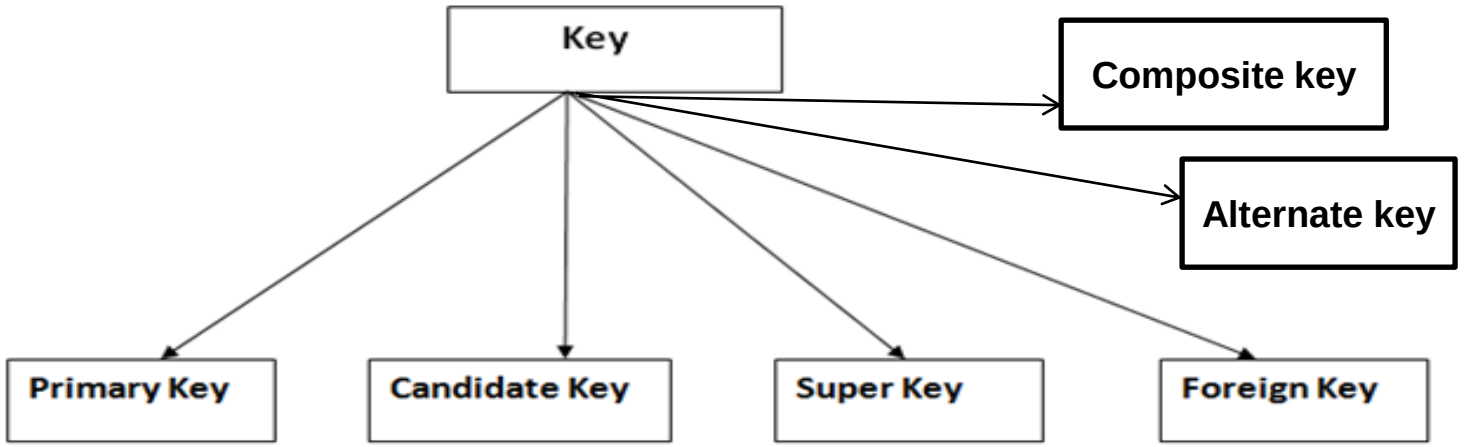
Derived Attribute

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



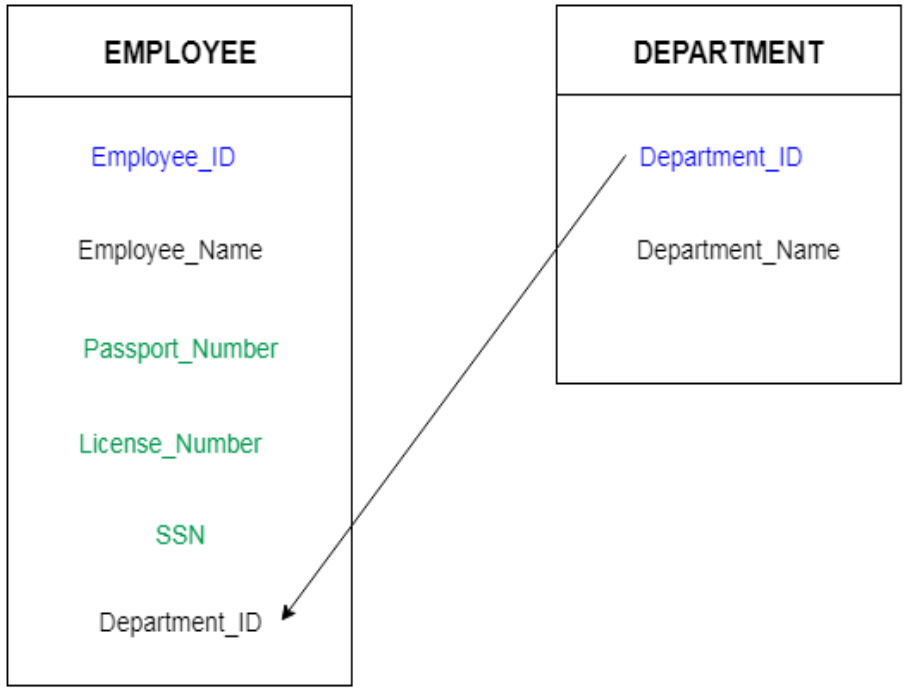
Database Keys

- A key is an attribute or a set of attributes in a relation that identifies a tuple in a relation
- The keys are defined to access or sequence the stored data quickly and smoothly
- Used to create relationship between different tables



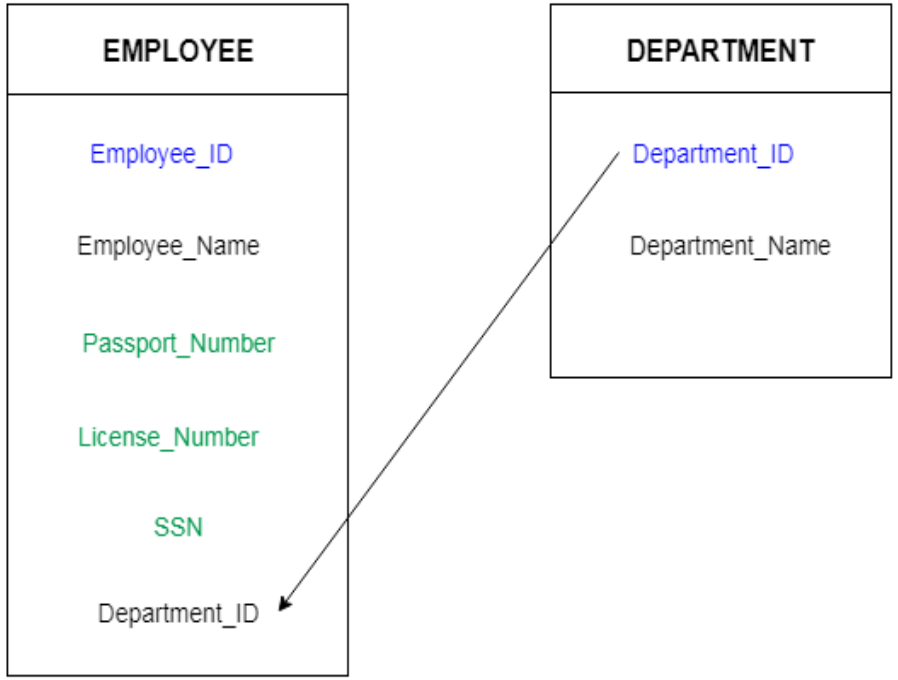
Types of Database Keys

- **Primary key**: It is the first key which is used to identify one and only one instance of an entity uniquely.
- **Candidate key** :The remaining attributes except for primary key are considered as a candidate key.
- **Foreign key** :Foreign keys are the column of the table which is used to point to the primary key of another table.



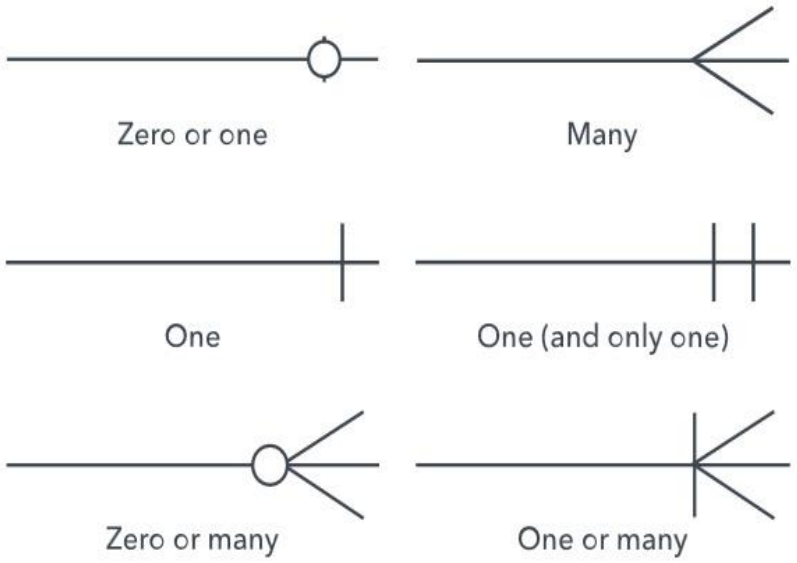
Types of Database Keys

- **Super key:** Attribute or combination of attributes in a relation that identifies a tuple uniquely within the relation
- **Alternate key** : The candidate keys that are not selected as a primary key are known as Alternate key
- **Composite key** : The primary key that consists of two or more attributes .



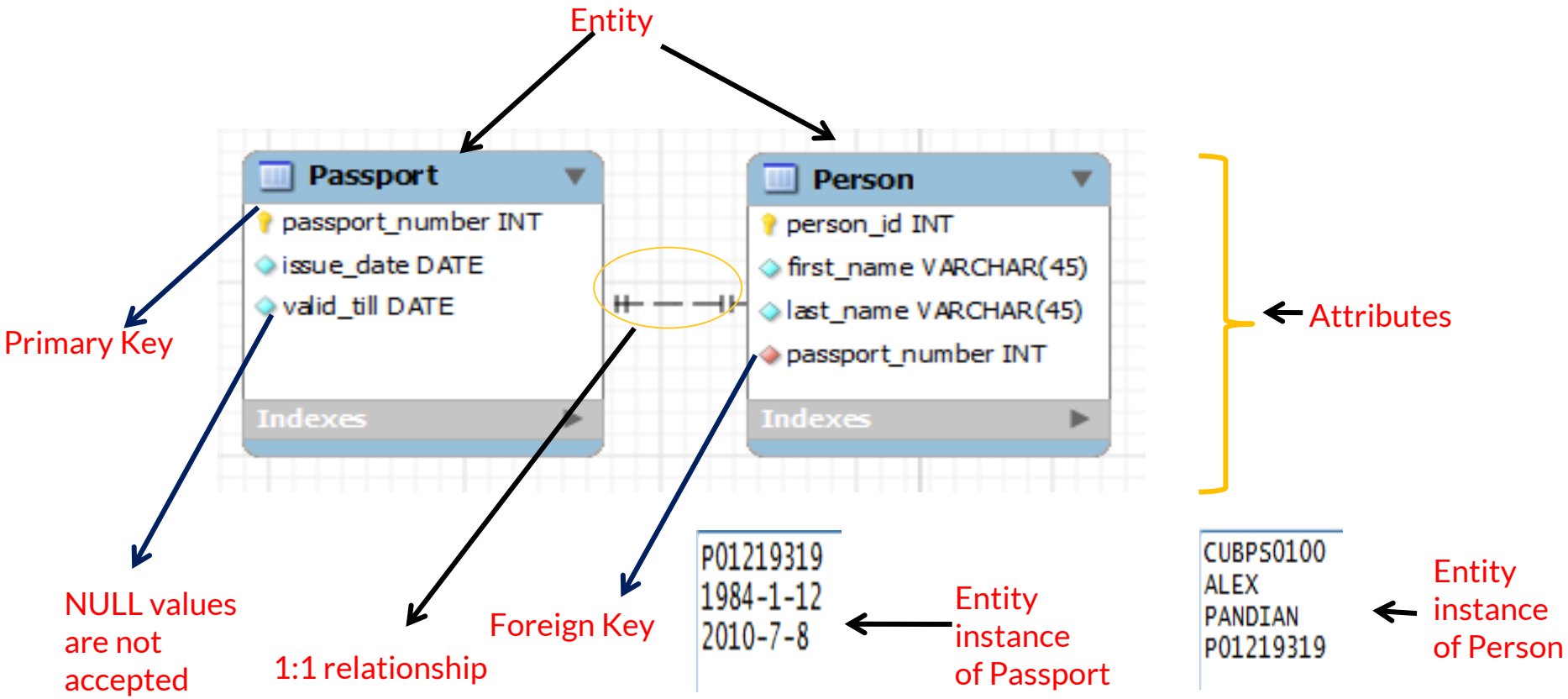
Components of an ERD -- Relationship

- **Relationship**: How entities act upon each other or are associated with each other.
- **Cardinality** : Defines the numerical attributes of the relationship between two entities or entity sets. The three main cardinal relationships are one-to-one, one-to-many, and many-many.



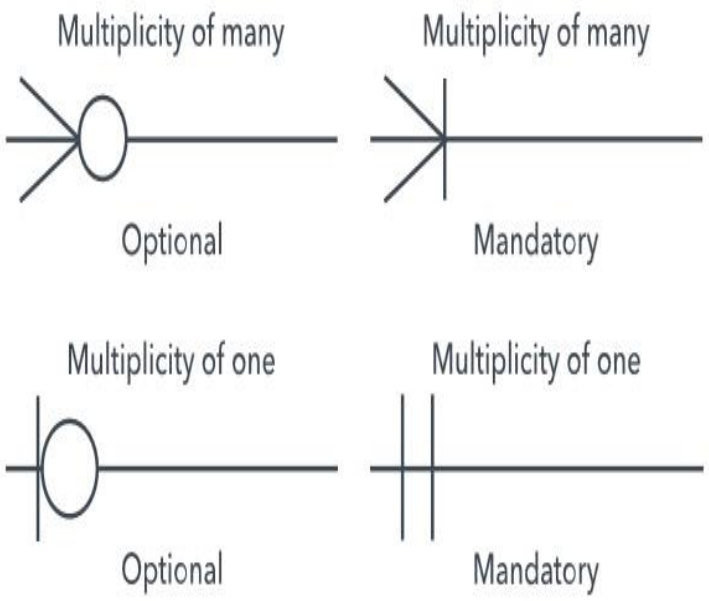
One to One Relationship (1 : 1)

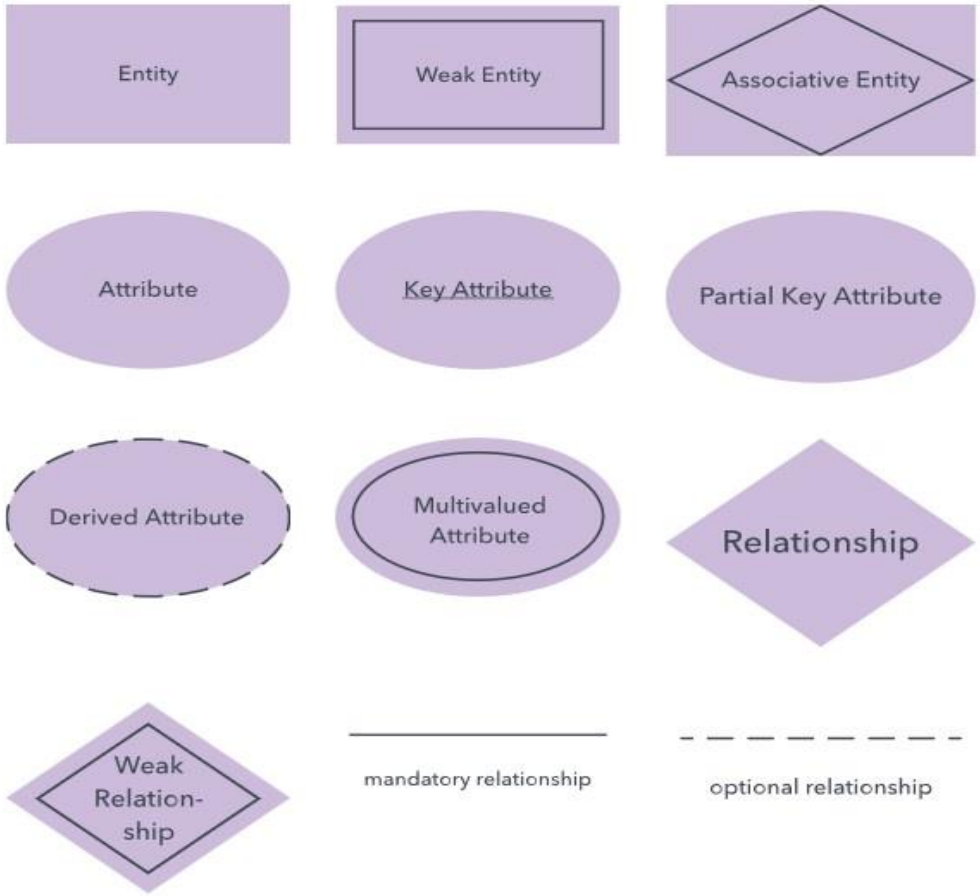
- A single entity instance in one entity class is related to a single entity instance in another entity class.



ERD symbols and notations

- There are several notation systems, which are similar but vary in a few specifics.





How to draw a basic ER diagram

Purpose and scope: Define the purpose and scope of what you're analyzing or modeling.

Entities: Identify the entities that are involved. When you're ready, start drawing them in rectangles and labeling them as nouns.

Relationships: Determine how the entities are all related. Draw lines between them to signify the relationships and label them.

Attributes: Layer in more detail by adding key attributes of entities. Attributes are often shown as ovals.

Cardinality: Show whether the relationship is 1-1, 1-many or many-to-many.

Limitations of ER diagrams and models

- Only for relational data
- Not for unstructured data
- Difficulty integrating with an existing database

THANK YOU