Entity - Relationship Model

→ It is a conceptual and visual representation of data within an organization.

→ It is used to design databases and is based on the perception of the real world as consisting of entities and relationships.

→ Entity
  → It represents a real-world object, such as person, place, thing or event.
  → It has physical existence
  → It can be uniquely identified.
  → It has two types:-
  ① Strong entity
    ↳ which can be uniquely identified.
  ② weak entity
    ↳ It doesn't have sufficient attributes, to select a uniquely identifiable attribute
    ↳ weak entity depends on strong entity for existence.

★ Represented by rectangle box

| car |

→ Attributes

→ These are characteristics or pro-perties that are associated with an entity.

→ It describes specific details or information about the entity.

→ Each attribute provides additional information about the entity.

→ Ex:- For entity car,

① Brand : Toyota
② Model : Camry
③ Year : 2020
④ Color : Silver

* Representation

(Attribute)

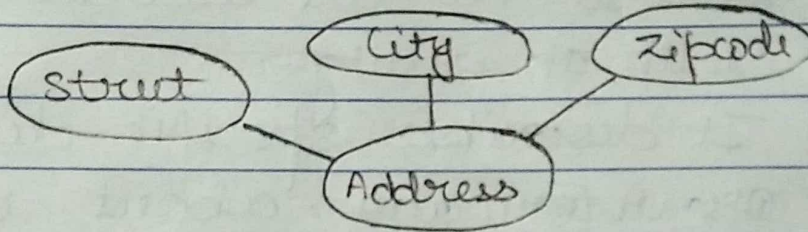→ Types of Attributes

① Simple Attribute
An attribute that cannot be further divided into smaller subparts.
ex:- Age or Name

② Composite Attribute
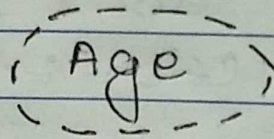An attribute that can be divided into smaller subparts, each with its own meaning.

ex:- Address can be divided into "street", "city" and "zip code".

③ Derived Attribute

An attribute that can be derived from other attributes.

ex:- "Age" can be derived from "Date of Birth".

④ Key Attribute

An attribute that uniquely identifies an entity within an entity set. For example, "employee ID" in an "employee" entity.

⑤ Multi-valued Attribute

An attribute that can hold multiple values for a single entity.

ex:- "Phone numbers" for a "contact" entity.

$$\boxed{\text{Phone numbers}}$$

⑥ Null-Valued attribute

An attribute that may not have a value for certain entities. It can be represented as Null.

→ It may indicate "not applicable" which means value doesn't exist or it may indicate "unknown" which means missing entry.

→ Relationships

→ It refers to the association or connections between entities.

→ These relationships define how different entities are related to each other and how they interact within the database.

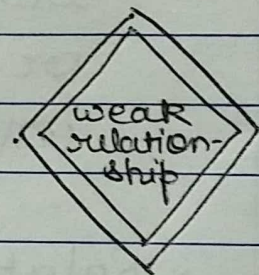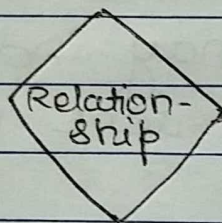→ strong relationship exists between two independent entities.

→ Weak relationship exists between weak entity and its owner / strong entity.

→ Degree of a relationship repre-
sents no. of entities participating
in a relationship.

① Unary → Only one entities partici-
pates.

② Binary → Two entities partici-
pates.

③ Ternary → Three entities parti-
cipates.

→ Relationship constraints.

① Mapping cardinality / cardinality
ratio

→ Number of entities to which
another entity can be associ-
ated via a relationship.

→ One to One

Entity in A associates with at-
most one entity in B, where
A & B are enity sets.

→ One to Many

Entity in A associated with
N entity in B. while entity

in B is associated with atmost one entity in A.

→ Many to One
entity in A associated with atmost one enity in B. while entity in B can be associated with N entity in A.
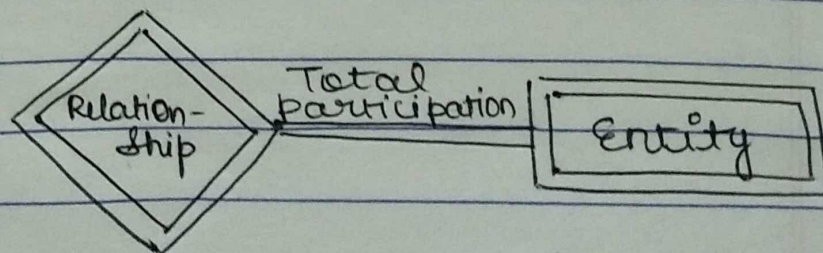
→ Many to Many
Entity in A associated with N entity in B. while entity in B also associated with N entity in A.

② Participation Constraints
It is of two types
① Partial Participation: In this not all entities are involved in the relationship instance.
② Total Participation: Each entity must be involved in atleast one relationship ins- tance.

Entity Relationship Diagram - Department Relationships