

# Entity Relationship Model

- A basic component of the model is the Entity-Relationship diagram which is used to visually represent the data objects.
- The utility of ER Model is :
  - It maps well to relational model. The constructs used in the ER model can easily be transformed into relational tables.
  - It is simple and easy to understand. So, can be used to communicate the design to the end user.

# Entity Relationship Model Contd...

- Basic constructs of ER Modeling
  - Entities:
    - They are the principal data objects about which information is to be collected.
    - They are classified as
      - Independent
      - Dependent
    - Example:
      - employees,
      - projects etc.

# Entity Relationship Model Contd...

- Relationships:

- It represents an association between two or more entities.
- They are classified in terms of-
  - degree
  - connectivity
  - cardinality
  - existence

# Entity Relationship Model Contd...

## – Attributes:

- It describe the entity of which they are associated.
- A particular instance of attribute is value.
- The domain of an attribute is the collection of all possible values an attribute can have.
- They are classified as-
  - identifiers
  - descriptors

# Entity Relationship Model Contd...

- Degree of a relationship
  - It is the number of entities associated with the relationship.
  - Binary relationships is the association between two entities (most common type).
  - Most modeling approaches consider only binary relationships, so ternary or n-ary relationship is broken into two or more binary relationship.

# Entity Relationship Model Contd...

- Connectivity and Cardinality:
  - Connectivity
    - It describes the mapping of associated entity instances in the relationship.
    - The values of connectivity are “one” or “many”.
  - Cardinality
    - It is the actual number of related occurrences for each of the two entities.
  - The basic type of connectivity for relations are:
    - one-to-one
    - one-to-many
    - many-to-many

# Entity Relationship Model Contd...

## – Direction:

- It indicates the originating entity of a binary relationship.
- Parent entity is the entity from which relationship originates.
- Child entity is the entity where the relationship terminates.
- It is determined by its connectivity.

# Entity Relationship Model Contd...

## – Type:

- Identifying relationship is one in which one of the child entities is also a dependent entity.
- Non-identifying relationship is one in which both entities are independent.

## – Existence:

- It denotes whether the existence of an entity instance is dependent upon the existence of another, related, entity instance.
- It is defined as either mandatory or optional.



# Entity Relationship Model Contd...

- Generalization Hierarchies:
  - It is the form of abstraction that specifies that two or more entities that share a common data can be generalized into higher level entity type called supertype or generic entity.
  - Subtypes can be
    - mutually exclusive
    - overlapping
  - Generalization hierarchies can be nested.

# ER Notation

- entities are represented by labeled rectangles. The label is the name of the entity. Entity names should be singular nouns.
- relationships are represented by a solid line connecting two entities. The name of the relationship is written above the line. Relationship names should be verbs.
- attributes, when included, are listed inside the entity rectangle. Attributes which are identifiers are underlined. Attribute names should be singular nouns.

# ER Notation Contd...

- cardinality of many is represented by a line ending in a crow's foot. If the crow's foot is omitted, the cardinality is one.
- existence is represented by placing a circle or a perpendicular bar on the line. Mandatory existence is shown by the bar (looks like a 1) next to the entity for an instance is required. Optional existence is shown by placing a circle next to the entity that is optional

# ER Notation Contd...

