

Bansilal Ramnath Agarwal Charitable Trust's

Vishwakarma Institute of Technology, Pune-37

(Anautonomous Institute of Savitribai Phule Pune University)



Department of Multidisciplinary Engineering

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Experiment – 1

Title: Choose a database application; you propose to work on throughout the course. Perform requirement analysis in detail for the same. Draw an entity Relationship diagram for the proposed database.

Description:

- Entity-Relationship (ER) Model is based on the notion of real-world entities and relationships among them. While formulating real-world scenarios into the database model, the ER Model creates an entity set, relationship set, general attributes, and constraints.
- In ER modeling, the database structure is portrayed as a diagram called an **Entity-relationship diagram**
- ER diagrams are created based on three basic concepts: entities, attributes, and relationships.

An entity is a “thing” or an “object” in the real world that is distinguishable from all other objects

For example, each person in an enterprise is an entity.

Each entity has **attributes**—the particular properties that describe it. Or Attributes are descriptive properties possessed by each member of an entity set.

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

The logical association among entities is called a **relationship**. Relationships are mapped with entities in various ways. Mapping cardinalities define the number of associations between two entities.

- **An entity set** is a set of entities of the same type that share the same properties, or attributes. The set of all persons who are customers at a given bank, for example, can be defined as the entity set customer.
- **Types of Attributes:**
 - **Key Attribute:** The key attribute is used to represent the main characteristics of an entity. It represents a primary key.

- **Simple Attribute:** Simple attributes can't be divided any further. For example, a student's dept_name. It is also called an atomic value.
 - **Composite Attribute:** It is possible to break down composite attributes. For example, a student's full name may be further divided into first name, second name, and last name.
 - **Derived Attribute:** Does not include in the physical database. However, their values are derived from other attributes present in the database.
 - **Multivalued Attribute:** Multivalued attributes can have more than one value.
- **KEYS in DBMS**

It is an attribute or set of attributes which helps you to identify a row(tuple) in a relation(table). They allow you to find the relation between two tables.

- **Relationship**

The logical association among entities is called **relationship**. Relationships are mapped with entities in various ways. Mapping cardinalities define the number of associations between two entities.

Relationship Mapping Cardinalities:

- One to one
An entity in *A* is associated with *at most* one entity in *B*, and an entity in *B* is associated with *at most* one entity in *A*.
- One to many
An entity in *A* is associated with any number (zero or more) of entities in *B*. An entity in *B*, however, can be associated with *at most* one entity in *A*.
- Many to One
An entity in *A* is associated with *at most* one entity in *B*. An entity in *B*, however, can be associated with any number (zero or more) of entities in *A*.

- Many to many

An entity in *A* is associated with any number (zero or more) of entities in *B*, and an entity in *B* is associated with any number (zero or more) of entities in *A*.

- **Inheritance Relationship (Superclass Subclass Relationship) :**

A Superclass is a class from which many subclasses can be created. Subclasses include characteristics of the superclass. The relationship between sub class and super-class is denoted with *d in a circle*.

- **Generalization:**

Generalization is the process of generalizing the entities which contain the properties of all the generalized entities, i.e., subclasses are combined to make a superclass.

- **Specialization:**

It is the reverse process of Generalization.


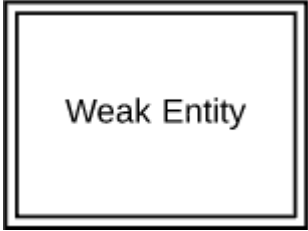
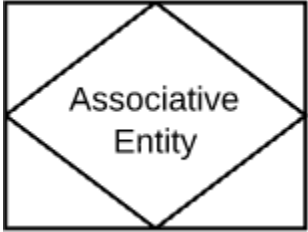
Specialization is a process that defines a group entities which is divided into subgroups based on their characteristic.

- **Aggregation:**

Aggregation can be defined as a procedure for combining multiple entities into one. In database management, it is a design system performed to model relationships between a group of entities and another relationship. Its main motive is treating these relationships as a single one.

To create an ER Diagram following 5 steps need to be performed:

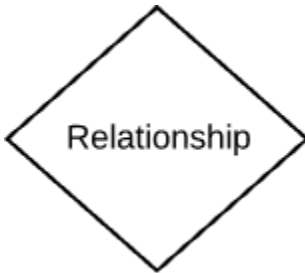
1. Entity identification
2. Relationship Identification
3. Cardinality Identification
4. Identify Attributes
5. Create ERD

Entity Symbol	Name	Description
	Strong entity	These shapes are independent from other entities, and are often called parent entities, since they will often have weak entities that depend on them. They will also have a primary key, distinguishing each occurrence of the entity.
	Weak entity	Weak entities depend on some other entity type. They don't have primary keys, and have no meaning in the diagram without their parent entity.
	Associative entity	Associative entities relate the instances of several entity types. They also contain attributes specific to the relationship between those entity instances.

Entity Symbol.

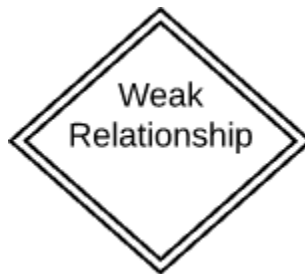
Name

Description



Relationship

Relationships are associations between or among entities.



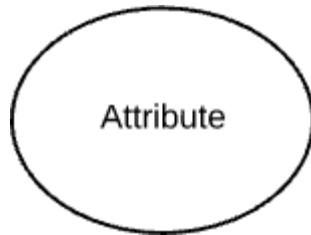
Weak relationship

Weak Relationships are connections between a weak entity and its owner.

Attribute Symbol

Name

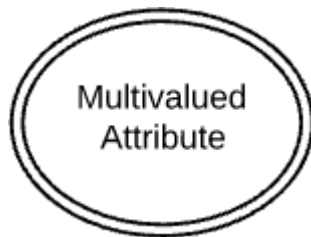
Description



Attribute

Attribute

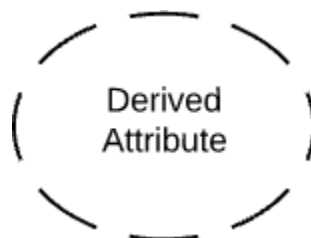
Attributes are characteristics of an entity, a many-to-many relationship, or a one-to-one relationship.



Multivalued
Attribute

Multivalued
attribute

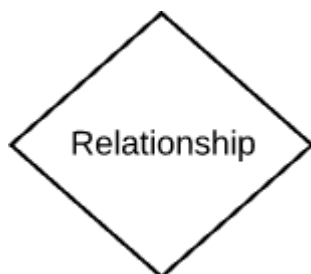
Multivalued attributes are those that are can take on more than one value.



Derived
Attribute

Derived
attribute

Derived attributes are attributes whose value can be calculated from related attribute values.



Relationship

Relationship

Relationships are associations between or among entities.

Screenshots/Output:

