

BCA Part II

Paper XI: DBMS using Access

Topic: Attributes used in E-R diagram

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An Entity Relationship Diagram (ERD) is a visual representation of different entities within a system and how they relate to each other.

Symbols and Notations used in ER diagram



Entity



Attribute



Relationship



**Weak
Entity**



**Multivalued
Attribute**



**Weak
Relationship**

There are three basic elements in an ER Diagram: entity, attribute, relationship. There are more elements which are based on the main elements. They are weak entity, multi valued attribute, derived attribute, weak relationship, and recursive relationship. Cardinality and ordinality are two other notations used in ER diagrams to further define relationships.

Entity

An entity can be a person, place, event, or object that is relevant to a given system. For example, a school system may include students, teachers, major courses, subjects, fees, and other items. Entities are represented in ER diagrams by a rectangle and named using singular nouns.

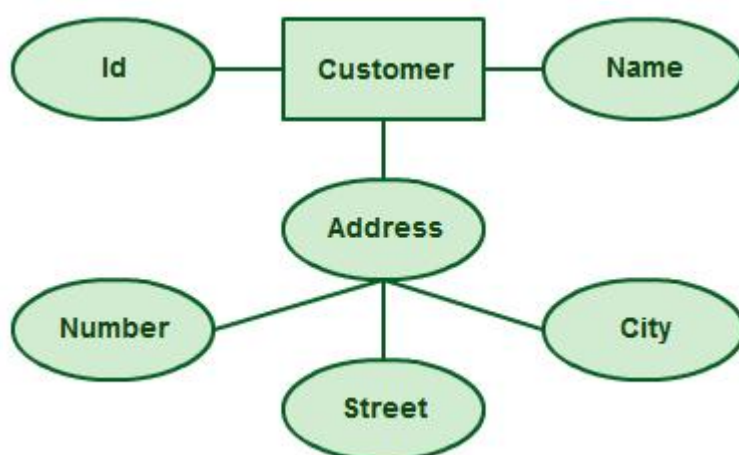
Weak Entity

A weak entity is an entity that depends on the existence of another entity. In more technical terms it can be defined as an entity that cannot be identified by its own attributes. It uses a foreign key combined with its attributed to form the primary key. An entity like order item is a good example for this. The order item will be meaningless without an order so it depends on the existence of the order.



Attribute

An attribute is a property, trait, or characteristic of an entity, relationship, or another attribute. For example, the attribute Inventory Item Name is an attribute of the entity Inventory Item. An entity can have as many attributes as necessary. Meanwhile, attributes can also have their own specific attributes. For example, the attribute “customer address” can have the attributes number, street, city, and state. These are called composite attributes. Note that some top level ER diagrams do not show attributes for the sake of simplicity. In those that do, however, attributes are represented by oval shapes.



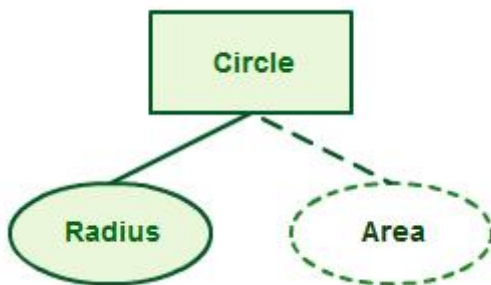
Multivalued Attribute

If an attribute can have more than one value it is called a multi-valued attribute. It is important to note that this is different from an attribute having its own attributes. For example, a teacher entity can have multiple subject values.



Derived Attribute

An attribute based on another attribute. This is found rarely in ER diagrams. For example, for a circle, the area can be derived from the radius.



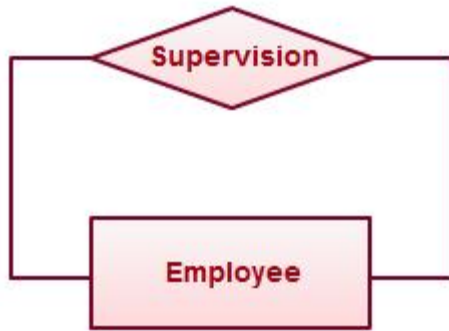
Relationship

A relationship describes how entities interact. For example, the entity "Carpenter" may be related to the entity "table" by the relationship "builds" or "makes". Relationships are represented by diamond shapes and are labeled using verbs.



Recursive Relationship

If the same entity participates more than once in a relationship it is known as a recursive relationship. In the below example an employee can be a supervisor and be supervised, so there is a recursive relationship.



Cardinality and Ordinality

These two further defines relationships between entities by placing the relationship in the context of numbers. In an email system, for example, one account can have multiple contacts. The relationship, in this case, follows a “one to many” model. There are a number of notations used to present cardinality in ER diagrams. Chen, UML, Crow’s foot, Bachman are some of the popular notations. [Creately](#) supports Chen, UML and Crow’s foot notations. The following example uses UML to show cardinality.

