

Entity → An entity is a person, place, object, event in user environment about which data is collected.

Any living/non-living thing about which data is collected.

Entity = Table in database

e.g. If information about students at SRCC is being collected, then student is an entity.

If information about Publishers in Delhi is being collected then Publisher is an entity.

In ER diagram entity is represented by a rectangle.

Attribute → is a characteristics of entity that is of interest to user.

What infoⁿ about entity is being collected.

e.g. for student's entity - Name, College, Roll No, Address.

Types of Attribute

1. Composite vs. Simple attribute :-

↓

which can be further subdivided to have independent meaning e.g. Name of a person can be broken down into first Name, Middle Name & last Name. Address of a person can be broken down into block, city, state. Age of a person can be broken down into year, months & days.

A simple attribute cannot be subdivided e.g. Gender.

2. Single valued vs. Multivalued attribute :- A single valued attribute can store only a single value. such as marital status of a person can only be married, unmarried and divorced.

Gender can be either male/female/others.

Multivalued attribute can store multiple values e.g. Qualification of a person - Graduate, Post-Graduate, MBA

You can store all these values in one row.

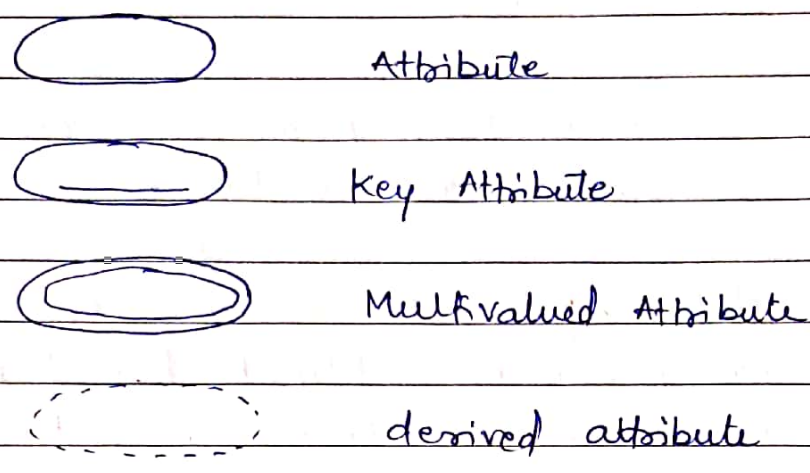
3. Stored & derived attribute :- Suppose there are 2 attributes (D.O.B & Age). The 2 attributes are related in such a way that value of one can be derived from another. The attribute whose value has been derived (Age) is derived attribute & other is stored attribute. (D.O.B)

Basic pay, DA (5% of BP), HRA (10% of Basic + DA)

Key attribute :- The attribute whose value is unique for each row in an entity. e.g. students Roll No, license no, Aadhar No.

A key attribute is also known as identifier.

ER diagram representation of attributes



RELATIONSHIP

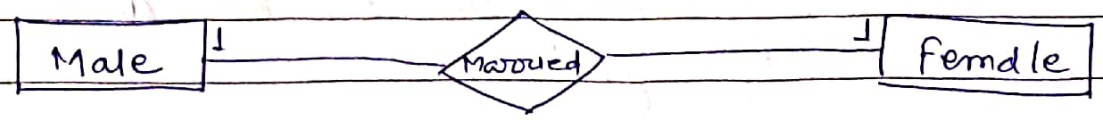
means some association b/w 2 or more entities. The entities that are enrolled in a relationship are known as participants. Relationship noted by a diagonal in ER diagram.

3 types of Relationship

1. One-to-one relationship :- for every row of entity 1 there is only one row in corresponding entity 2, and vice versa.

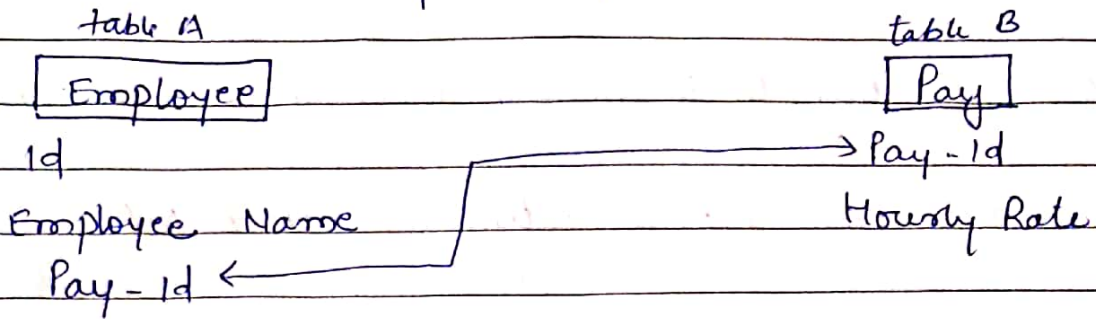
Denoted by (1:1)

e.g. 2 entities Male & female in a city. We want to establish a relationship b/w these two entities on the basis of marriage, i.e. who is married to whom.



One male can be married to one female at a time and vice-versa.

(Not the best example. Exception Sharia law)

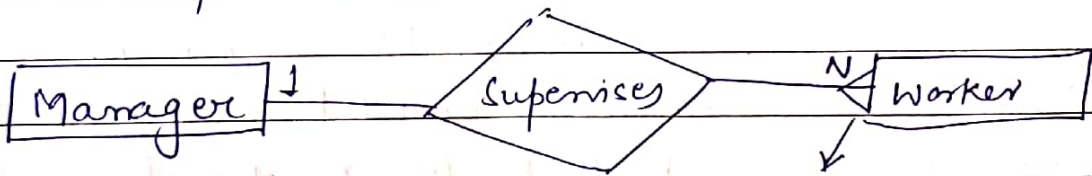


This is not a common relationship as data stored in table B can be easily stored in table A.

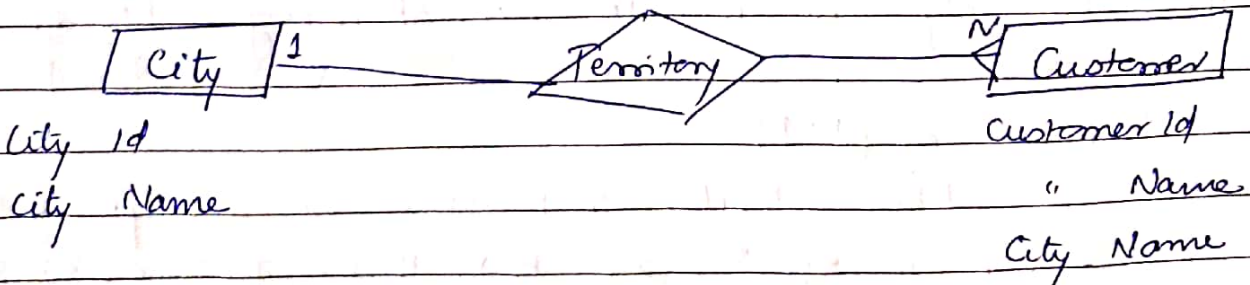
2. **One to many relationship** :- For one row in entity A there can be many row in entity B but for one row in entity B there can only one matching row in entity A.

Most common type of relationship.
 Denoted by 1:N

eg.



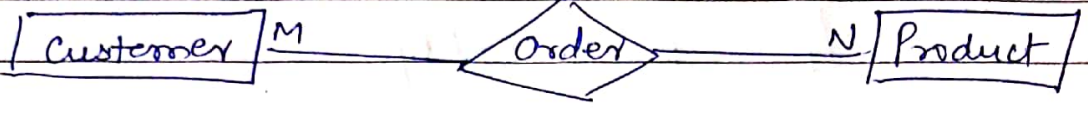
crowfoot in diagram, represents many row



One city can have many customer, but a customer can belong to 1 city only.

3. Many-to-many relationship :- A row in entity A can have many matching rows in entity B and vice versa. (M:N)

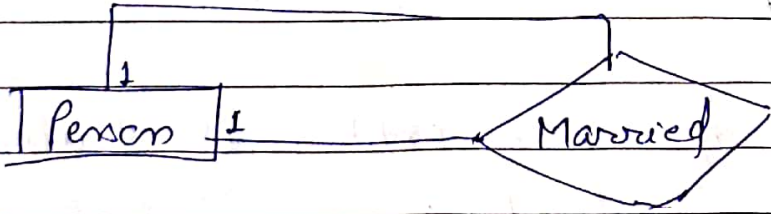
e.g.



↓ Customer can order many product, 1 product can be ordered by many customer.

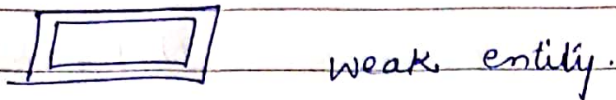
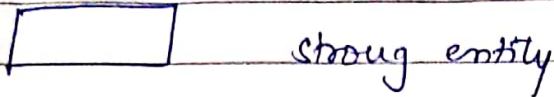
In MS-Access, many-to-many relationship can't be modelled directly. Instead the relship is broken as multiple one-to-many relationship.

On the basis of no. of participants in a relationship it can be unary (one participant), binary (2 participant) and ternary (3 participant) relationship.

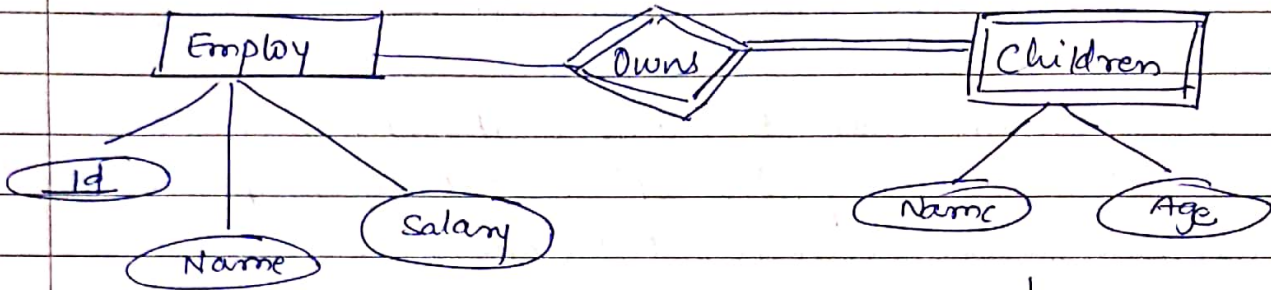


Strong vs Weak entity

An entity that has a primary or key attribute is known as strong entity. An entity that doesn't have a key attribute is weak entity.

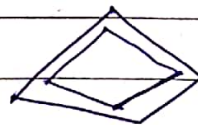
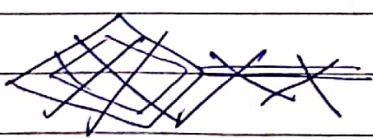


eg.



↓
possibility of 2 children with same name & age.

The relationship b/w a strong and a weak entity is known as identifying relationship. Denoted by



Double lined diamond.

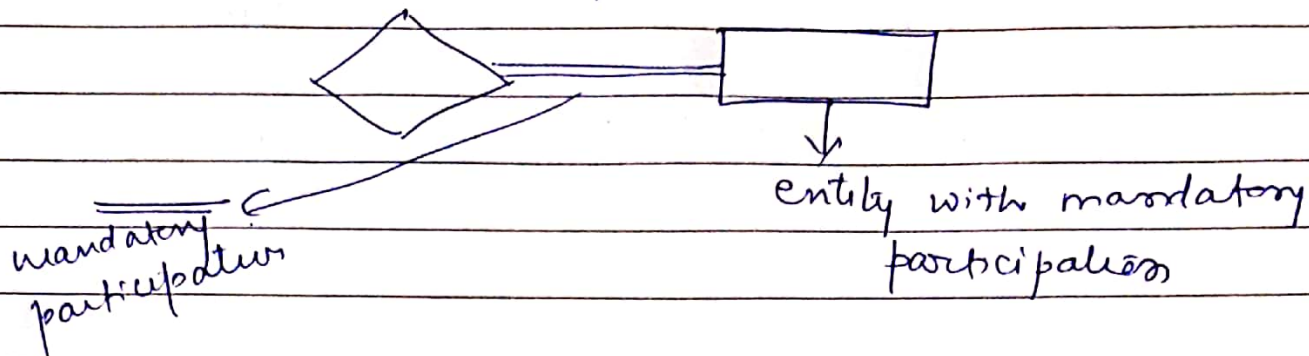
Relationship b/w strong entities is known as non-identifying relationship.

Recursive relationship - If same entity appears more than once in a relationship. Unary relationships are recursive relationship.

Optional vs Mandatory participation

If all entity in an entity set must participate in a relationship we say its participation is mandatory.

Denoted by double line: ~~for relationship line~~



If it does not require an entity to participate in a relationship it is optional participation, denoted by single line.

