ER Model:

- **belongs to object based logical model**
- **used to design logical view of database**
- **it always describes the database using pictorial representation**
- **E stands for Entity. Entity is a real world object**
- **R stands for relationship**

Types of Attributes:

1. **Simple and Composite Attribute**
   Ex for simple attribute is height
   Ex for composite attribute is Name (first name, middle name, last name)
2. **Single valued and Multivalued Attribute**
   Ex for single valued attribute is color
   Ex for multivalued attribute is contact_no
3. **Derived Attribute**
   Ex Total
4. **Null Attribute**

Entity: A real world object

Entity Set: Entities of same type forms an Entity Set

Relation (between two sets in set theory):

Let A and B be two sets then a relation R is defined over sets A and B as R={(x,y) | x belongs A and y belongs to B and xRy}

Ex:

A={1,2,3}, B={1,2,3,4,5,6,7,8,9,10}

R={(x,y) | x belongs to A and y belongs to B and y=x**2}

R={(1,1), (2,4), (3,9)}

Relationship Set (Binary Relation): Let E1 and E2 be two entity sets, e1 and e2 be entities of E1 and E2 respectively. A relationship set R is defined over E1 and E2 as

R={(e1, e2) | e1 belongs to E1 and e2 belongs to E2 and e1Re2}

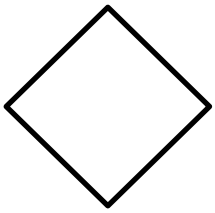
For n Entity sets definition for relationship set,

Let E1, E2….En be n entity sets, e1, e2…en be entities of E1, E2…En respectively. A relationship set R is defined over E1, E2…En as

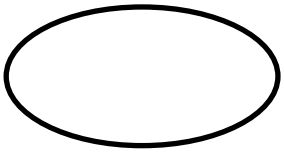
R={(e1, e2, … en) | e1 belongs to E1 and e2 belongs to E2 and ……en belongs to En and e1Re2…Ren}

SYMBOLS USED IN ER MODEL

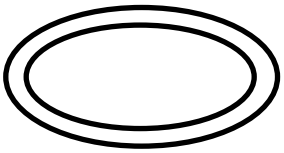
Entity Set



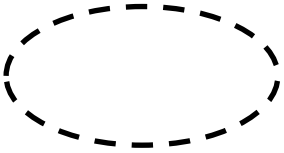
Relationship Set



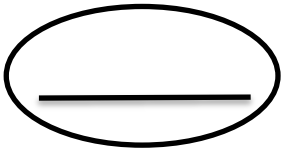
Attribute



Multivalued Attribute



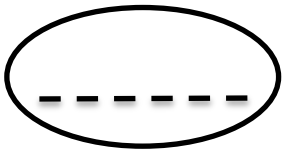
Derived Attribute



Primary Key

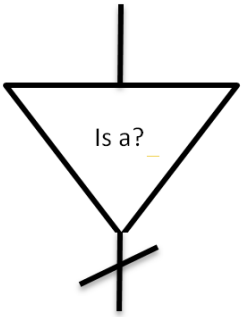
Link

Weak Entity set



Weak Primary Key

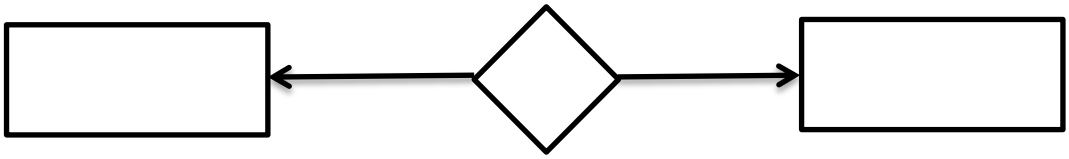
Total Participation



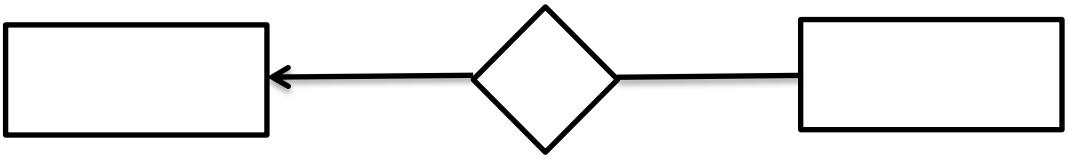
Specialization

Mapping Cardinalities

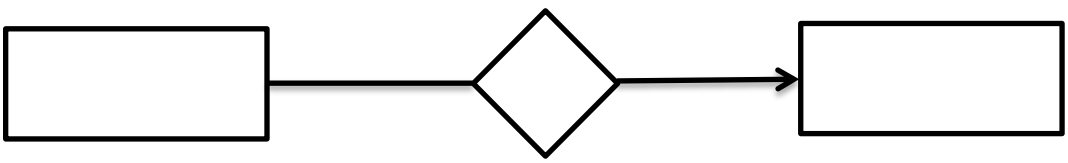
1-1



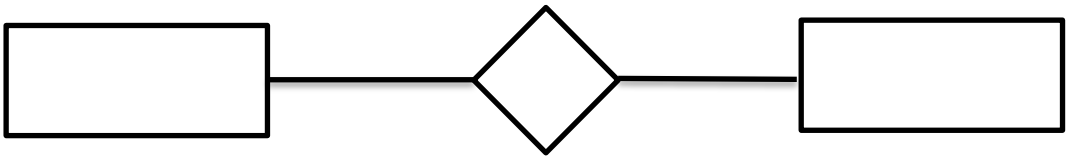
1-M



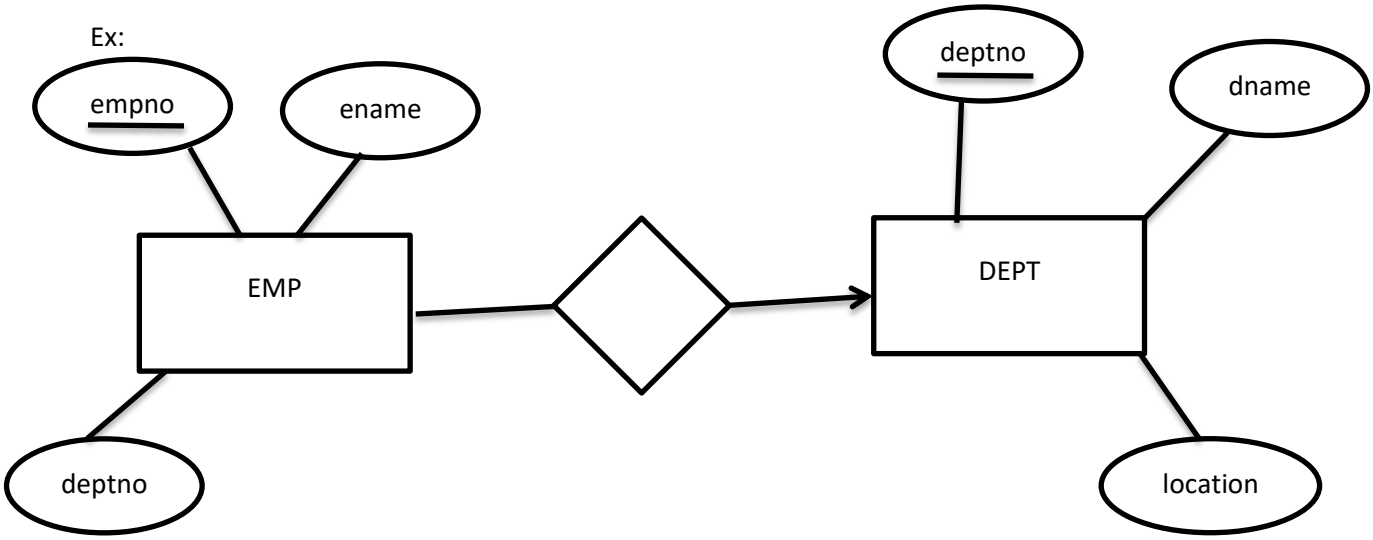
M-1



M-M



Ex:



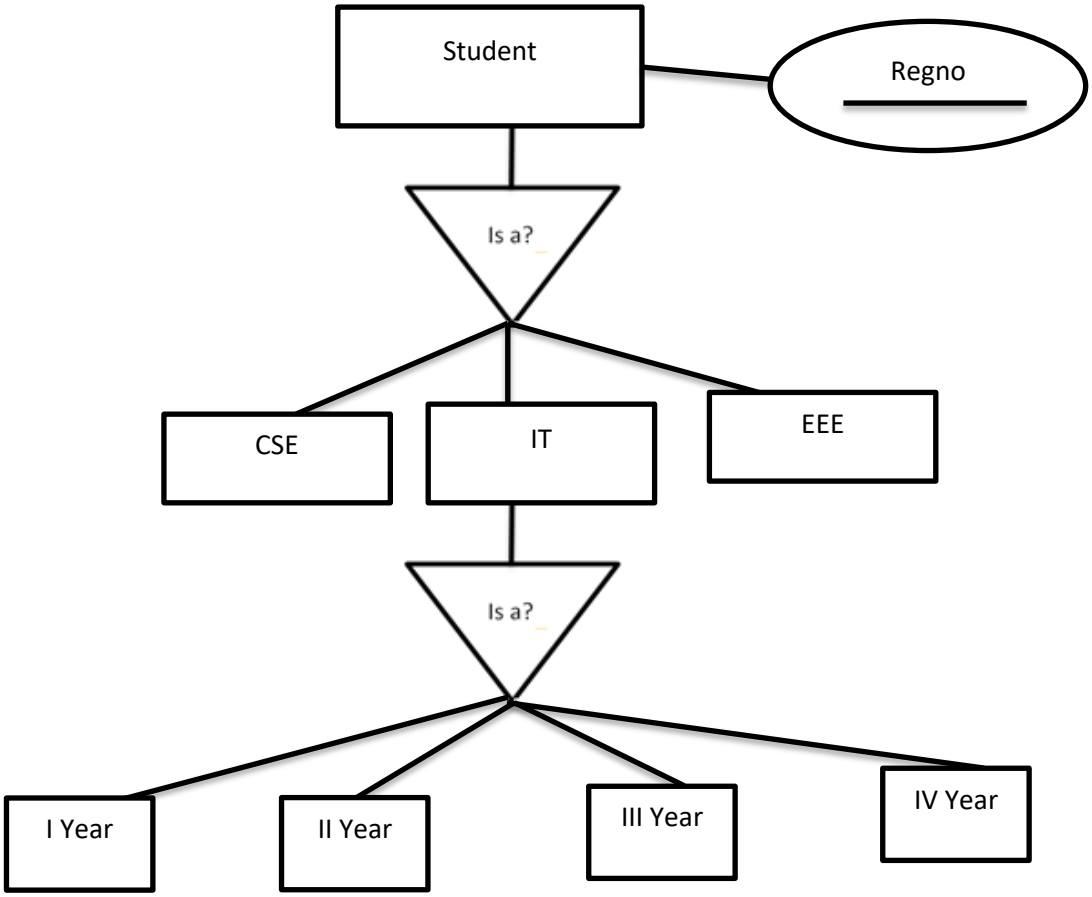
Features of ER Diagram

1. Specialization & Generalization

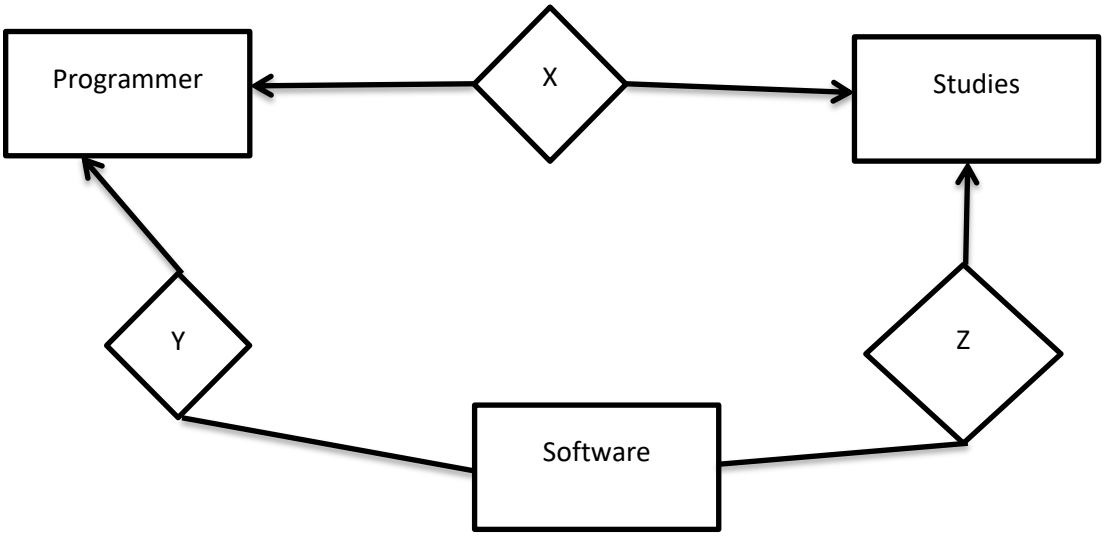
   Specialization: categories high level entity set to low level entity sets

   Generalization: includes attribute inheritance from high level entity set to low level entity sets

   If specialization is included in ER diagram generalization is also included

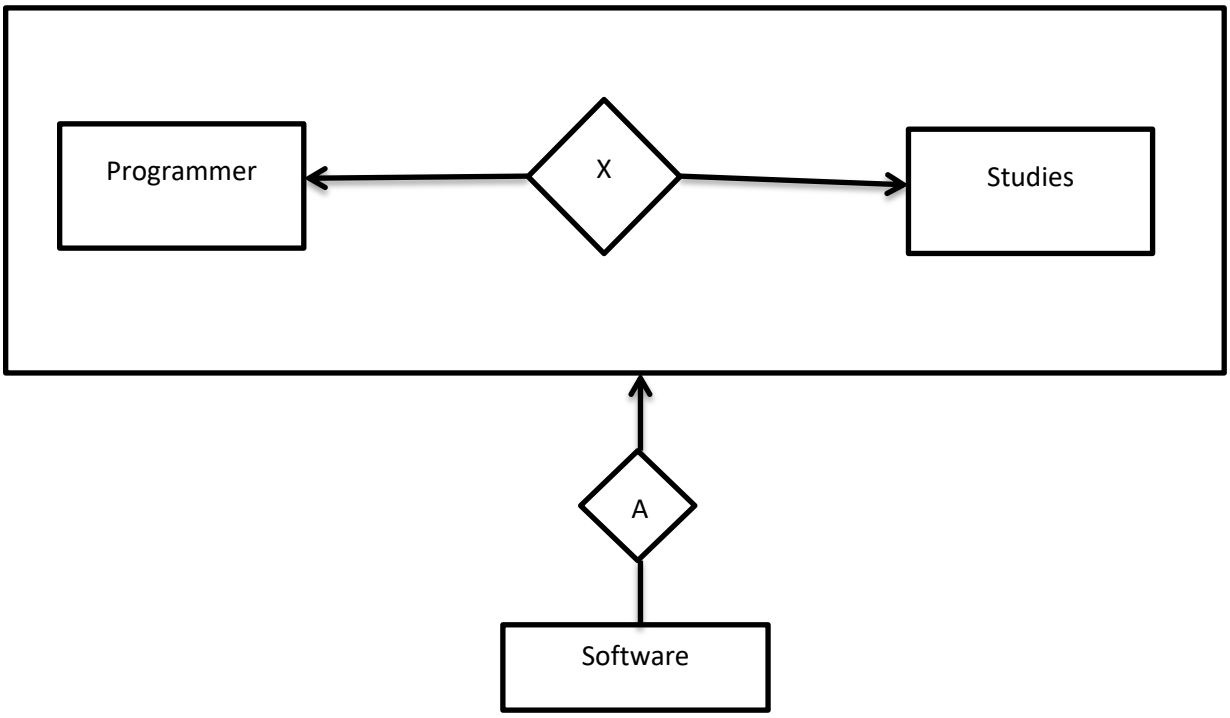


2. Aggregation : Establishes a relation between an entity set and a relationship set (or between two relationship sets)

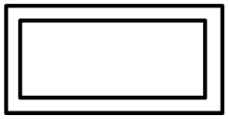


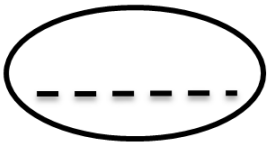
Steps involved in including aggregation in ER diagram:

1. Aggregate all entity sets involved in a relationship set to which a relationship is to be established (using rectangle; rectangle represents an entity set)
2. Now establish relationship between aggregated entity set obtained from step1 and an entity set

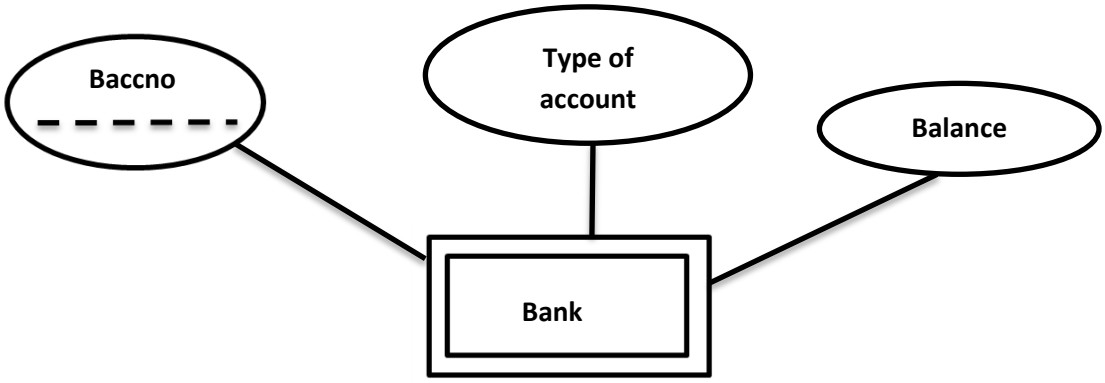


Weak Entity Set: An entity set in which an entity may or may not be identified is called Weak Entity Set. Key used in weak entity set is called Weak Primary Key.

Weak Entity Set is denoted by 

Weak Primary Key is denoted by 

Ex:



Limitations for Weak Entity Set to get included in ER Diagram:

1. Weak Entity Set must get related with Strong Entity Set
2. Kind of mapping from Strong Entity Set to Weak Entity Set must be one to many mapping
3. Kind of participation of Weak Entity Set is “Total Participation” in ER Diagram

Ex: