

ER Diagram, Chen Notation

An Entity-Relationship diagram (or ER diagram) is a graphical representation that can be used to design the data structures of an organization or business area. The ER diagram thus, sets the constraints for storing data in the database structure created from the ER diagram. The ER model sets rules for classifying the entities of the business environment, for defining the relationships among these entities, and defines what type of attributes are stored for entities and relationships.

There are several ER diagram representations. Although there is no standard for an ER diagram notation, some of them are widely used. In this description, we will describe the Chen notation. The Chen notation is the original notation developed by Peter Chen in 1976 and yet one of the most widely used notations.

The ER diagram does not show the stored entities or relationships. What it shows are entity sets (or entity types), relationship sets (or relationship types) and the attribute types of these. The graphical representations of these are the following:

1. Entity set: A rectangle is used to represent an entity set (person, place, object, event, or concept in the user environment). Types:

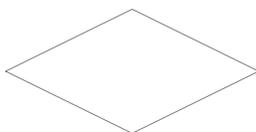


Entity Set

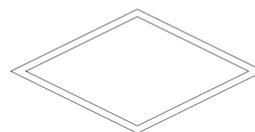


Weak Entity Set

2. Relationship set: Diamonds represent the relationship sets defined among two or more entity sets. Types:



Relationship Set



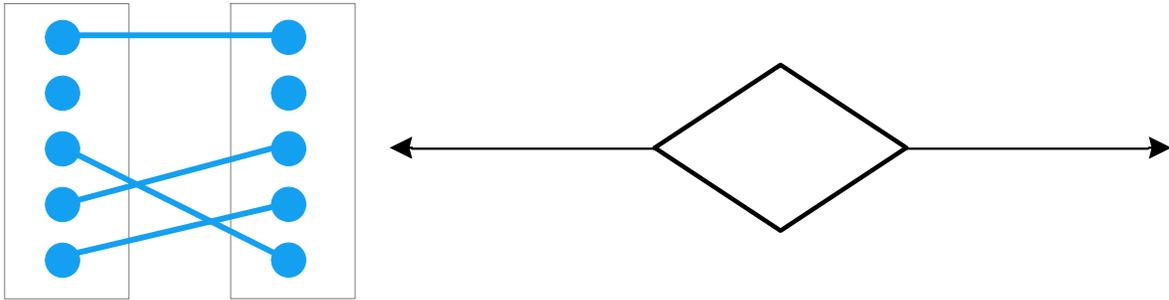
Determining Relationship Set

3. Relationship cardinality: The number of instances of entity B that can (or must) be associated with each instance of entity A.

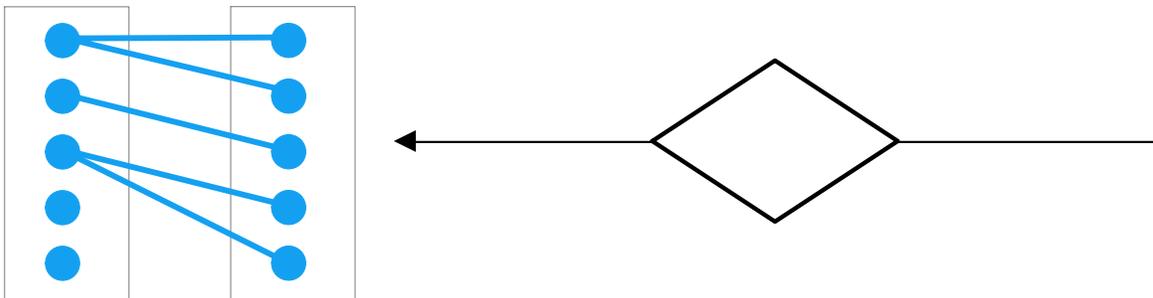
A relationship where two entities are participating is called a binary relationship.

Cardinalities of binary relationships sets: *The cardinality of a relationship set represents the maximum number of entities of an entity set that can be assigned by the relationship set to a single entity of the other entity set.*

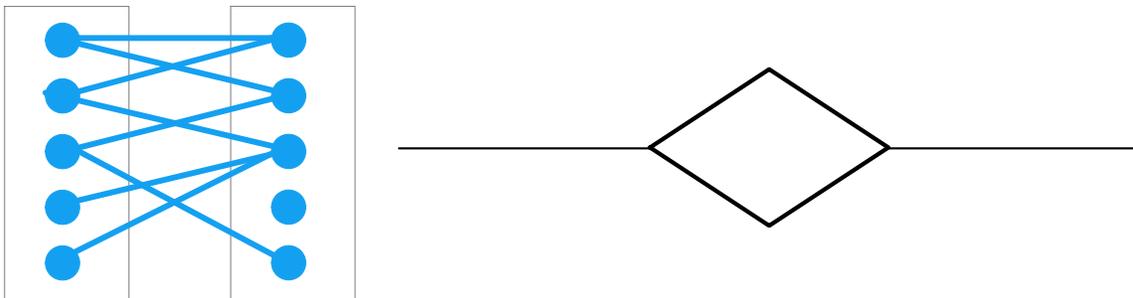
One-to-One (1:1) relationship set: Each entity of both sets can be connected to at most one entity of each other.



One-to-Many (1: N) relationship set: Each entity of the second entity set can be connected to at most one entity of the first entity set. Each entity of the first entity set can be connected to an arbitrary number of entities of the second entity set.



Many-to-Many (M: N) relationship set: Each entity of both entity sets can be connected to an arbitrary number of entities of each the other entity set.



4. Attribute type: Each entity set has a set of attribute types associated with it. An attribute type is a property that each entity can be described with, in the given entity set.



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