

ER Diagrams Recap

Rectangles represent entity sets

Diamonds represent relationship sets.

Ellipses represent attributes.

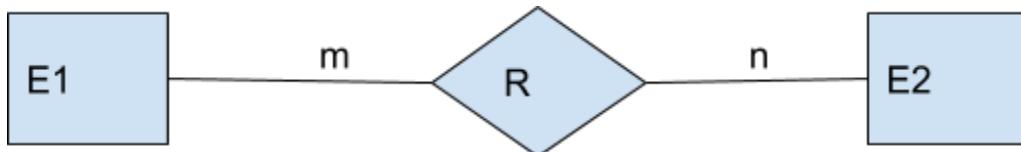
Underline indicates primary key attributes.

Constraints in the ER Diagram

Cardinality Constraints

Cardinality constraints is also referred to as cardinality ratio.

The cardinality ratio on R is the number of entities of E2 that can be associate with E1 through the relationship R.



There are 4 possible relationships:

1:1 one to one

1:N one to many

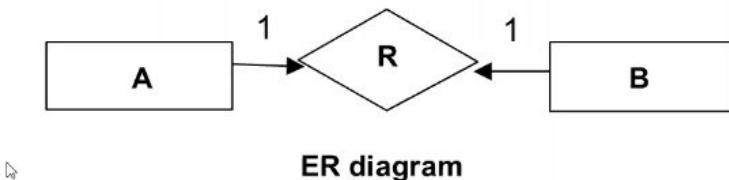
N:1 many to one

M:N many to many

1:1 Relationship: An entity in A is associated with at most one entity in B and vice versa.

Example: Driver to Driver's license. Each driver can only have one driver's license and each driver's license can only be associated with one driver.

More examples: one CEO for one company; person and social security number



We **must** add arrows to both sides in the diagram.

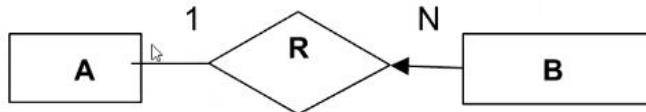
It is not necessary to have the 1s on top of the arrows.

1:N Relationship: An entity in A is associated with any number of entities in B. An entity in B is associated with at most one entity in A.

Example: Biological mother to amount of her children; Each child can only have one mother. Each mom can have multiple children. This is a 1:many relationship. Academic advisor to

students; store: items each store can have multiple items but each item can only be stored in one store.

This is not a symmetric relationship.

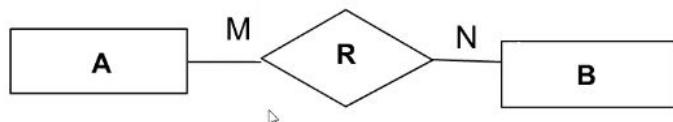


The link between relationship and side B must be arrowed.

Don't draw the diagram incorrectly

M:N Relationship: An entity in A is associated with any number of entities in B and vice versa.

Example: student to course. Each student can register many courses and each course can have many students enrolled; Actor to movie is another example.



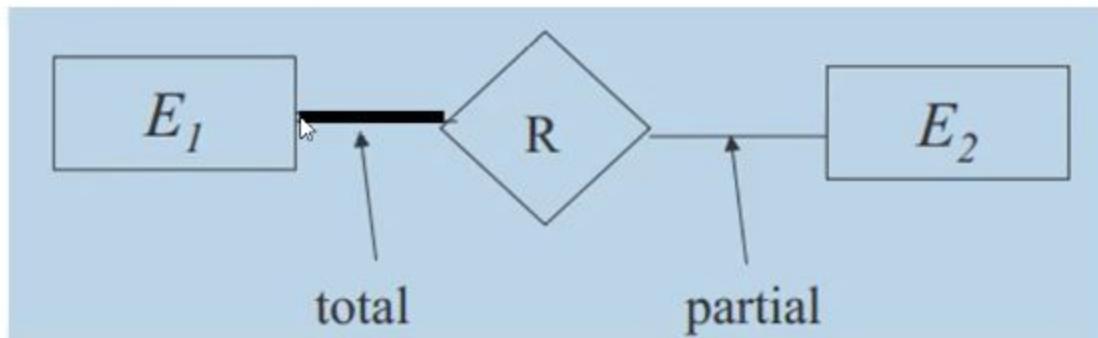
Do not need arrows or anything. No special treatment!

Participation Constraints

An entity set E may participate in a relation either totally or partially.

Total: every entity in E is involved in the relationship

Partial: Not all entities in the set are involved in the relationship.



Participation constraints in ER diagram

There is total participation from the employees. They are both total participants for the employee and department example.

"Not every employee manages a department"

This is a partial participation between employees and the "manage" relationship.

Weak Entities

Some entities exist independently. There are **strong** entities.

Some entities depend on other entities (these are **weak** entities).



The LabSession is a strong entity because it can exist without the student entity. Team is a weak entity because without LabSession, it would have no relationship. There is no team without labsession.

Team is weak. LabSession is strong.

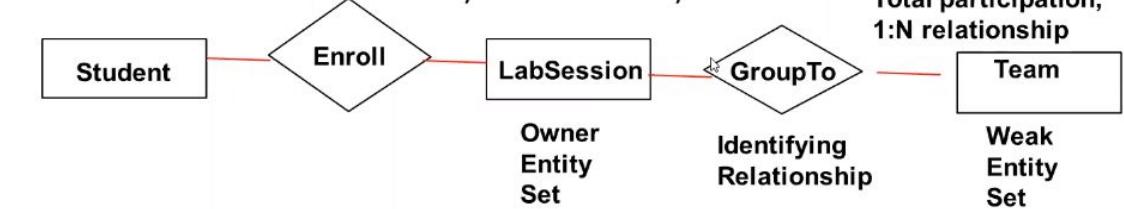
Weak Entity Set: An entity set cannot exist by itself. Its entities owe their existence to some entity in a strong entity set.

Owner entity set: the strong entity

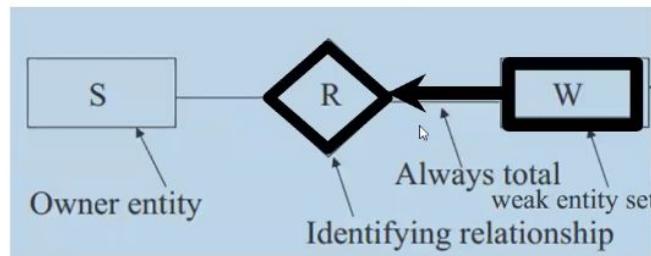
Identifying relationships: the relationship between owner and weak entity sets

Weak Entities must relate to the owner entity set via a **total participation, one to many** relationship set with weak entity set on the "many" side.

- With the weak entity set at the many-side.



- Take ALL four actions below:
 1. Weak entity set W: draw rectangle in **bold line**
 2. Identifying relationship R: draw diamond in **bold line**
 3. Draw a **bold line** connecting R and W (total participation)
 4. Add an arrow on the line that connects R and W, with the arrow pointing to R (one-to-many relationship)

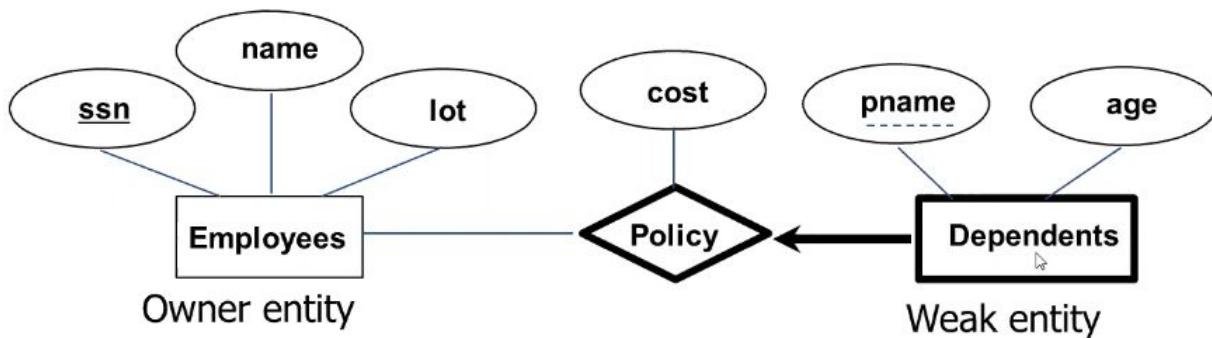


Weak entity set in ER diagram

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Always remember the four steps for when you have an exam!!!

A weak entity set only have a Partial Key!!! This is dashed underline. Key of weak entities:
Key = primary key of the owner entity + partial key of itself.



Dependents could have the same name. Patient A could have a child named Sarah and Patient B could have that as well.

It needs the partial and primary key (in this case the pname and the ssn). This together will give you the key of dependents. Must draw as a dotted line!