
بسم الله الرحمن الرحيم

In the Name of

Allah

The Most Merciful and Compassionate the most gracious and beneficent, Whose help and guidance we always solicit at every step, at every moment.

Database System Concepts

Chapter No 04 Relationships

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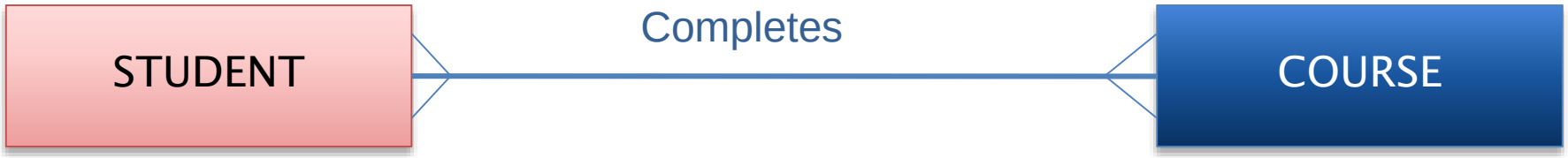
Relationship

- A **meaningful association** among entity types.
- Relationship is the association among the instance of one or more entity types.
- Relationship are the glue that holds together the various component of E-R model.
- **Example**
  - STUDENT **Completes** COURSE

Relationship

- **Graphical Representation**
  - Denoted by Line labeled with the name of relationship

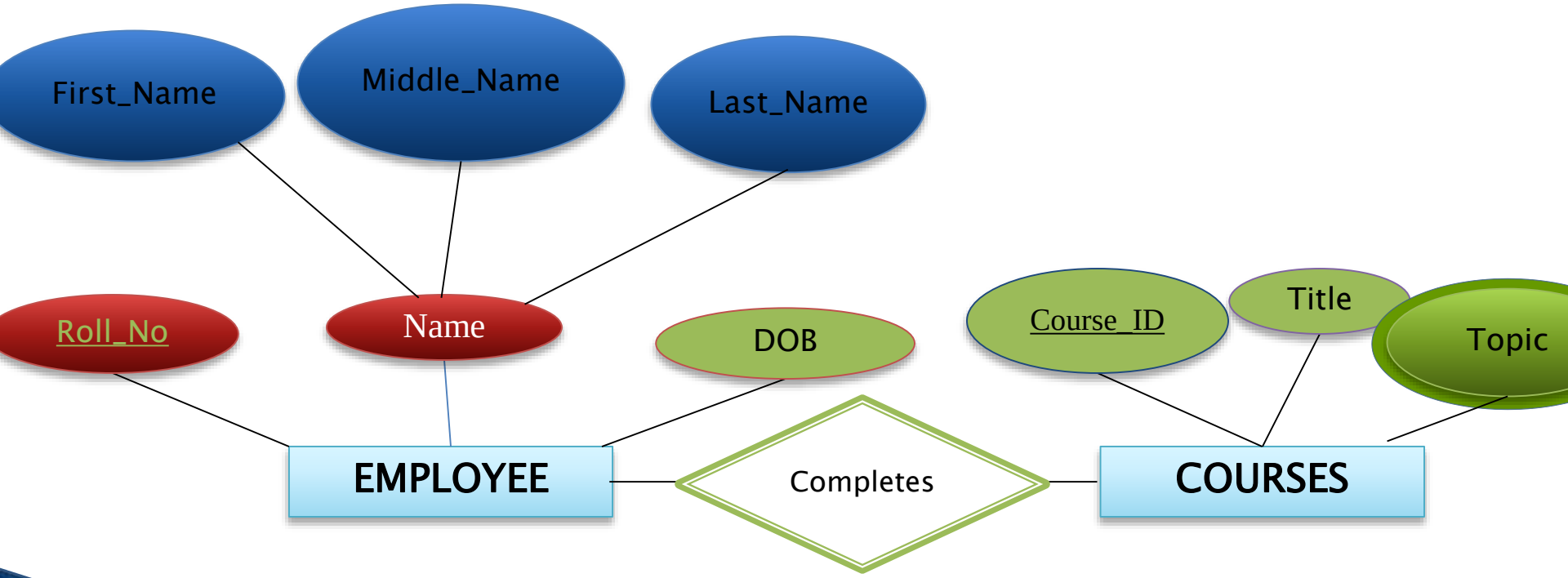


Relationship

- **Graphical Representation**
  - Denoted by Line labeled with the name of relationship

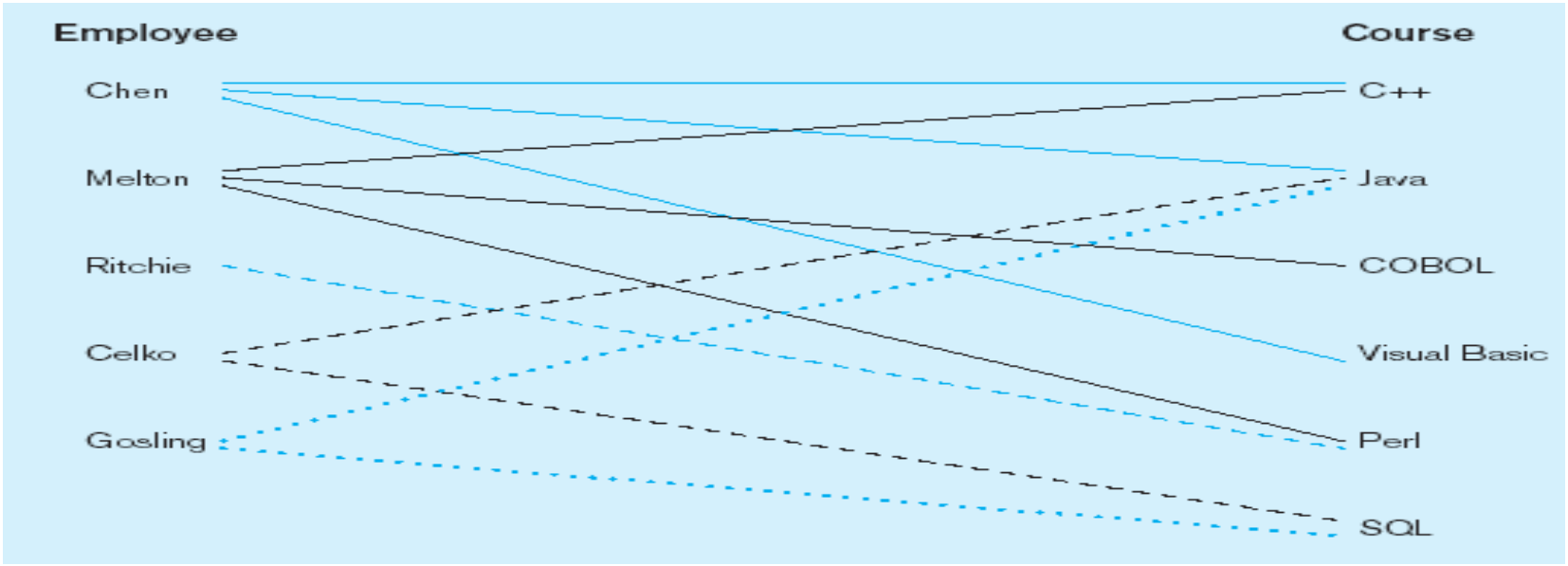
Relationship

- **Graphical Representation**
  - Old Method: Diamond symbol is used for relationship



Relationship

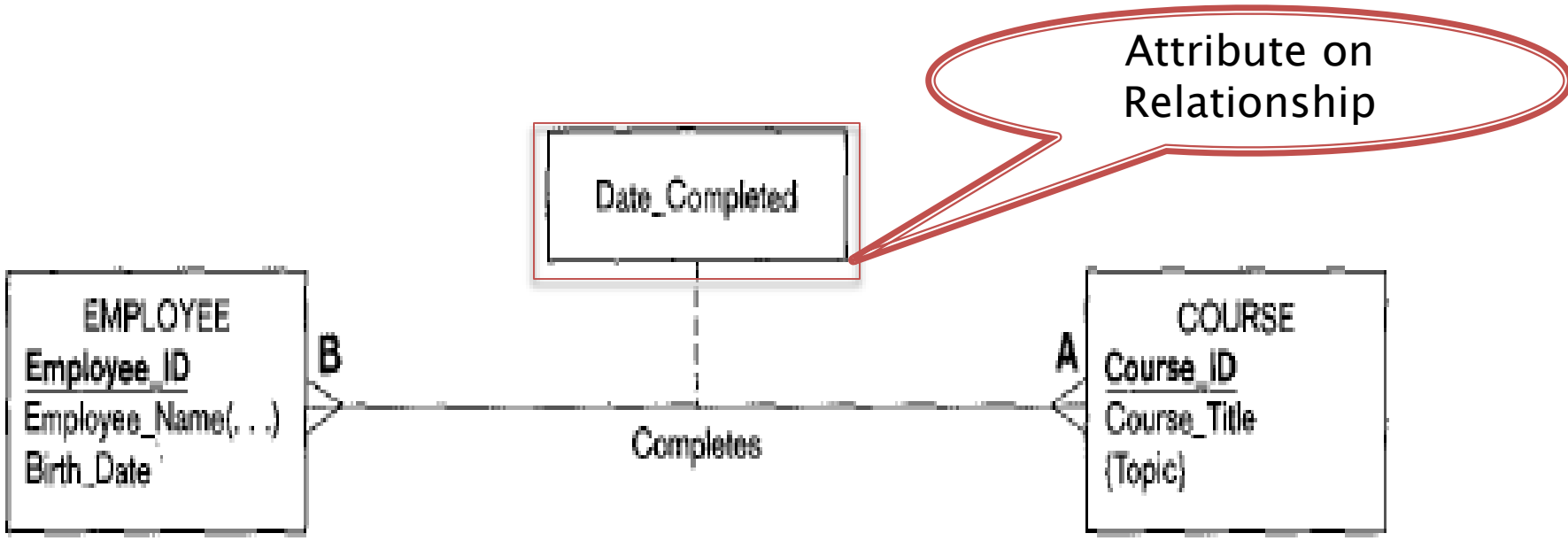
- **Relationship Instance**
  - Association between entity instances which includes one occurrence from each **participating entity type**.



Each line represents a relationship instance between one EMPLOYEE and one COURSE.

Relationship

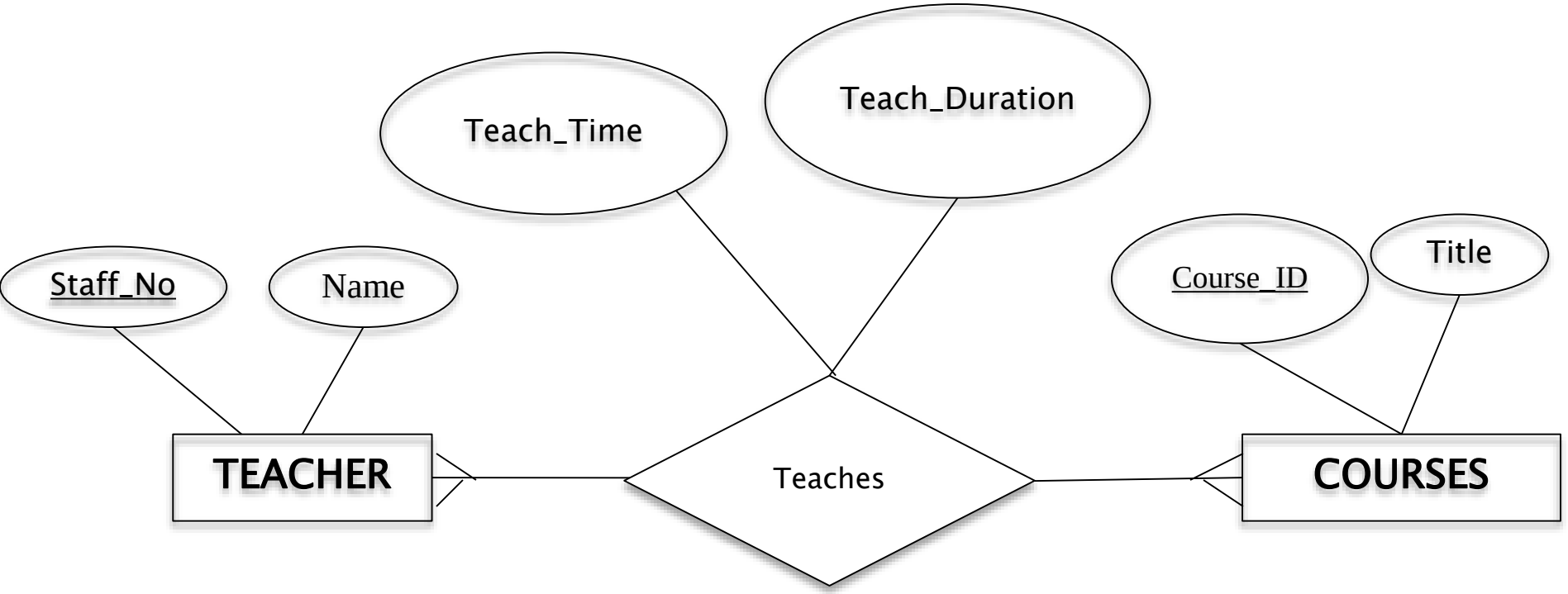
- **Attribute on Relationship**
  - Attributes that are associated with a relationship



Each Instance of Relationship Completes, there is a value for Date_Completed

Relationship

- **Attribute on Relationship**



Teacher teaches Data structure at 10 am for 2 hours

Relationship

- **Associative Entity**
  - An entity type that associates the instances of one or more entity types and contain attributes that are belonging to the relationship between those entity instances.

Relationship

No relationship name mentioned

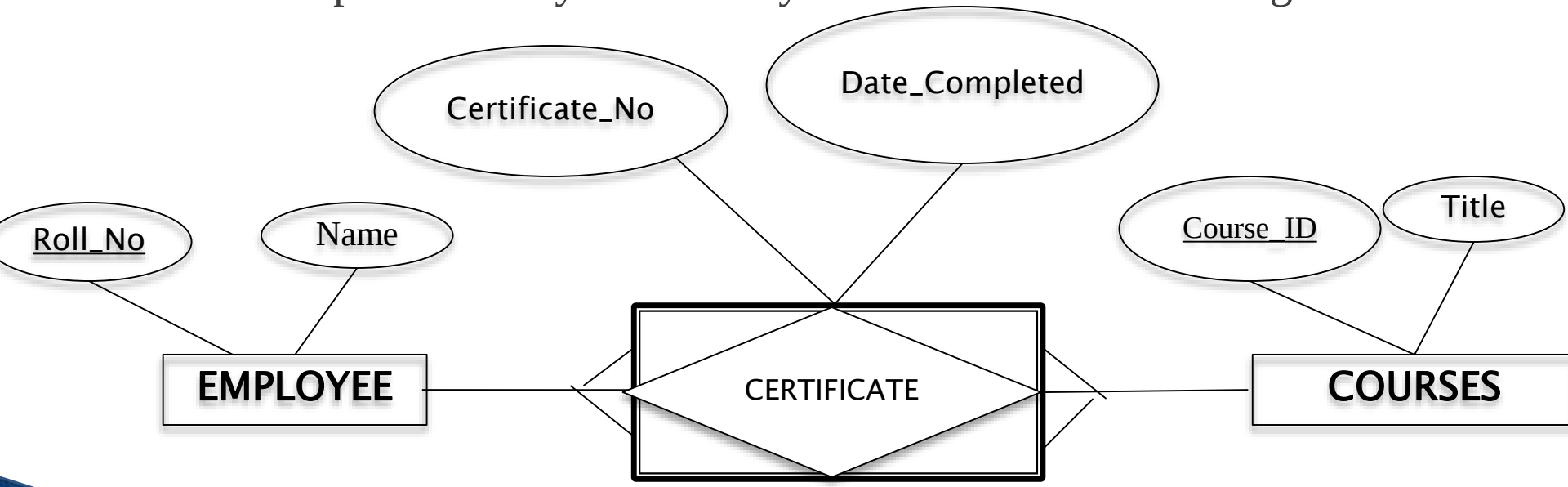
Associative entity is like a relationship with an attribute, but it is also considered to be an entity .

Relationship

- **Associative Entity**
- When should a relationship with attributes can be an associative entity?
  - Associative entity exist only when all the participating entity type has many to many relationship.
  - The associative entity has meaning which are independent of the other entities
  - Associative entity has its own identifier and other attributes

Relationship

- **Associative Entity**
  - **Graphical Representation**
  - Old Method
    - Represented by diamond symbol enclosed in a rectangle



Relationship

Degree of Relationship

- The number of entity types that participate in a relationship are called degree of relationship.
- The most commonly used relationship in E-R Model are **Unary, Binary and Ternary** relationship.

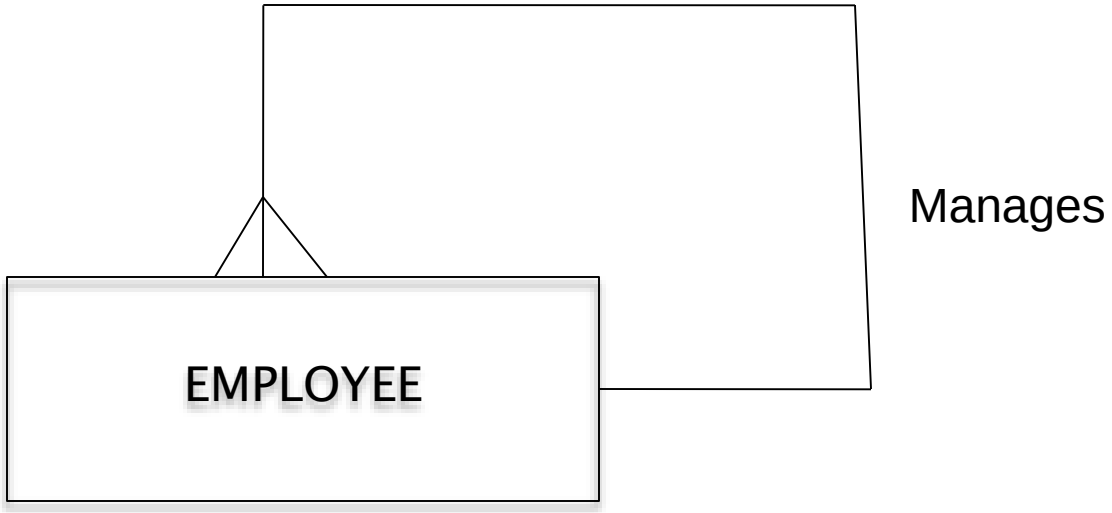
Relationship

Unary Relationship

- A relationship among the instances of single entity type
- Unary relationship are also called recursive relationship

Relationship

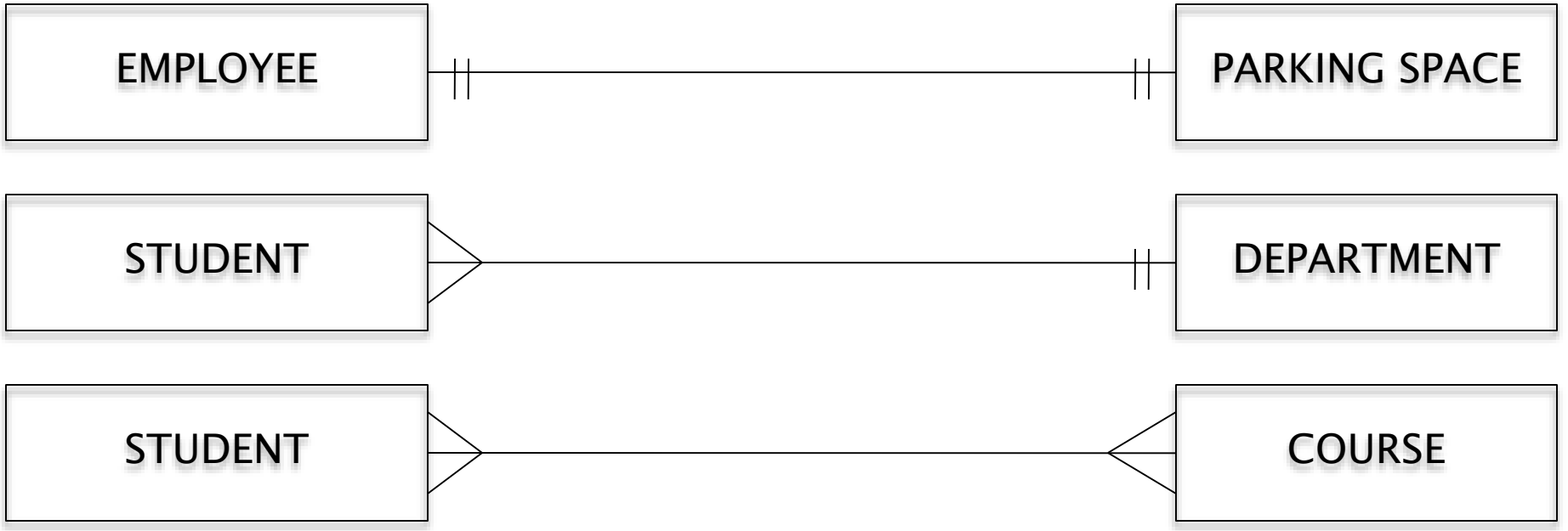
Unary Relationship



Relationship

Binary Relationship

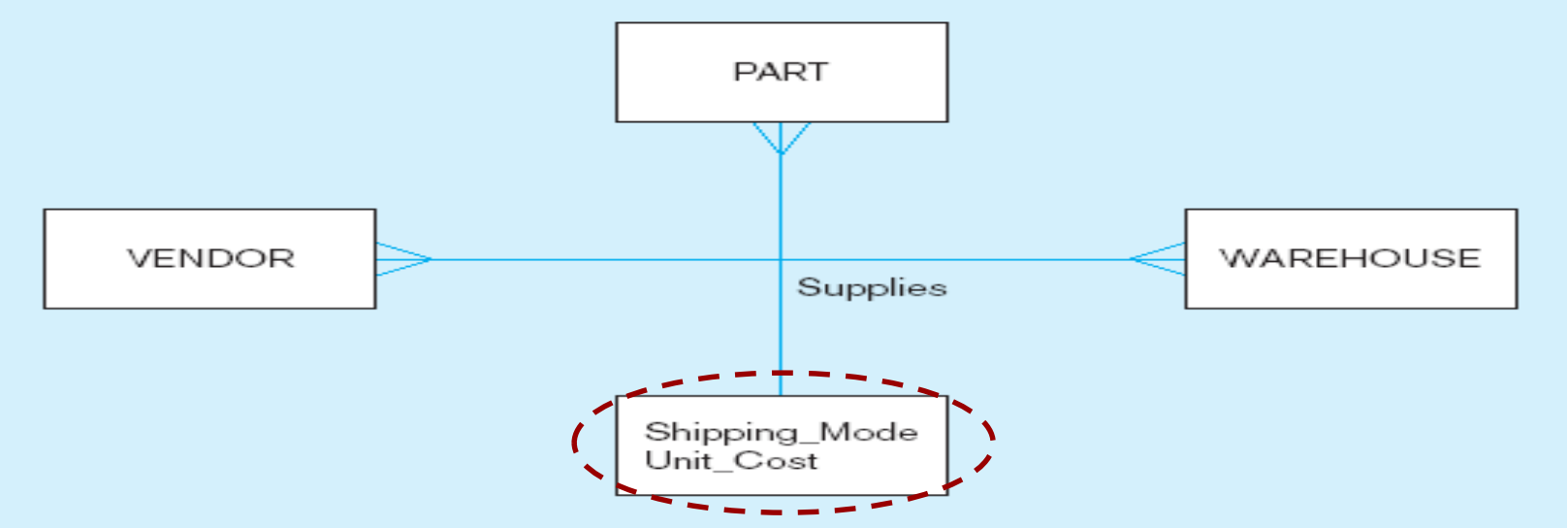
- A relationship among the instances of two entity types



Relationship

Ternary Relationship

- A relationship among the instances of three entity types

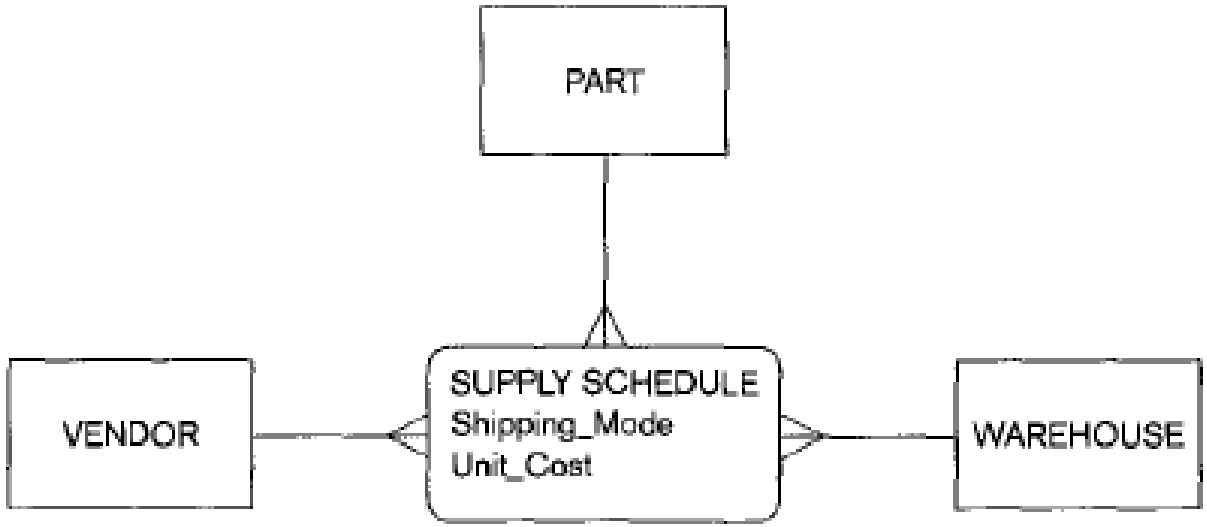


a relationship can have attributes of its own

Relationship

Ternary Relationship

- Good approach is to convert all the ternary relationship to associative entities.



Labeled line are not used for relationship. Why?

Relationship

Structural Constraints

- The constraint placed on entity types that participate in a relationship.
- The main type of constraint on a relationship is **Multiplicity.**

Relationship

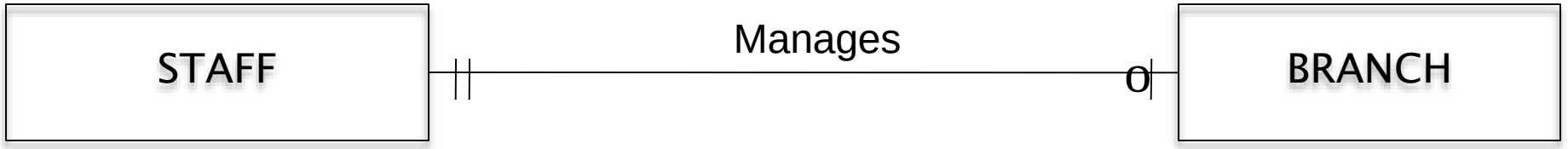
Structural Constraints

- **Multiplicity**
- Single occurrence of entity type may relate to possible occurrences of an associated entity type through a particular relationship.

Relationship

Multiplicity

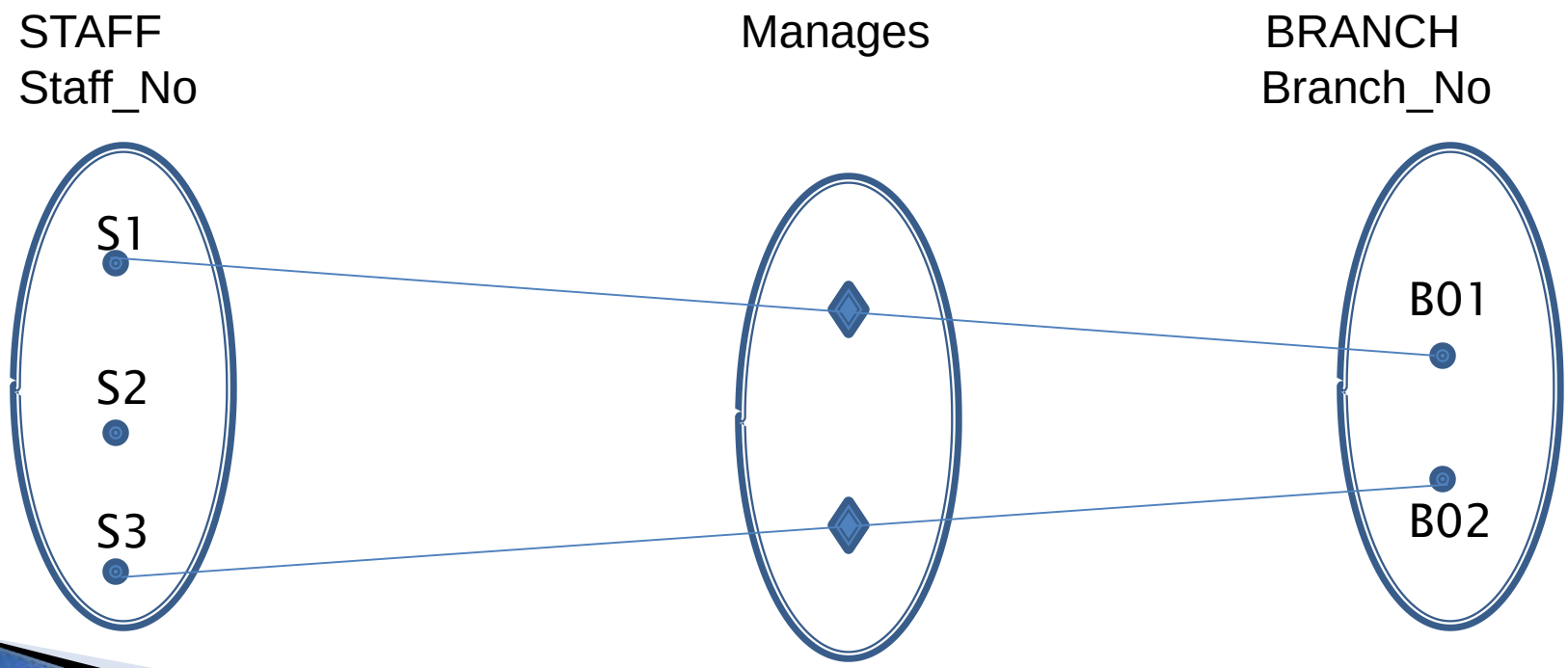
- **One-to-One Relationship**
- If for each instance of entity type A there exist a single instance of entity type B.
- Relationship are abbreviated as 1:1 or One-to-One



Relationship

Multiplicity

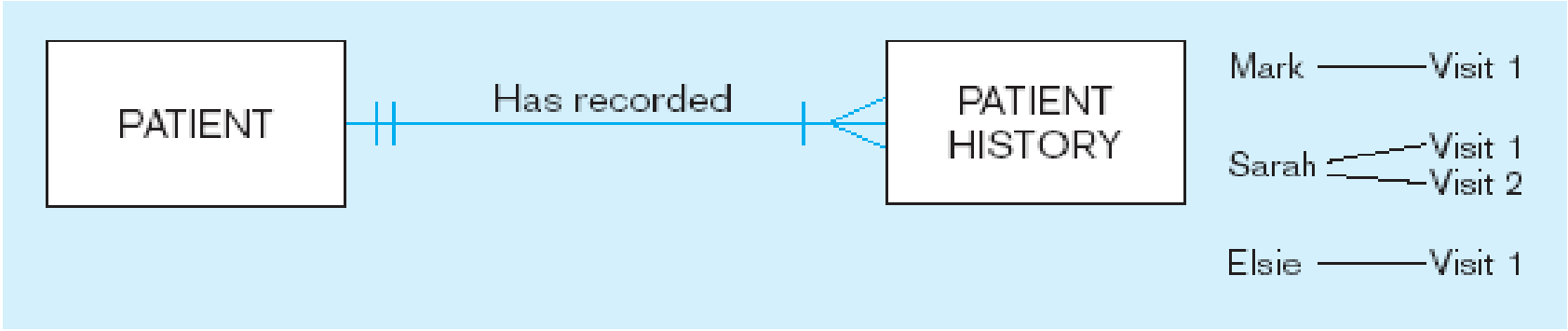
- **One-to-One Relationship**



Relationship

Multiplicity

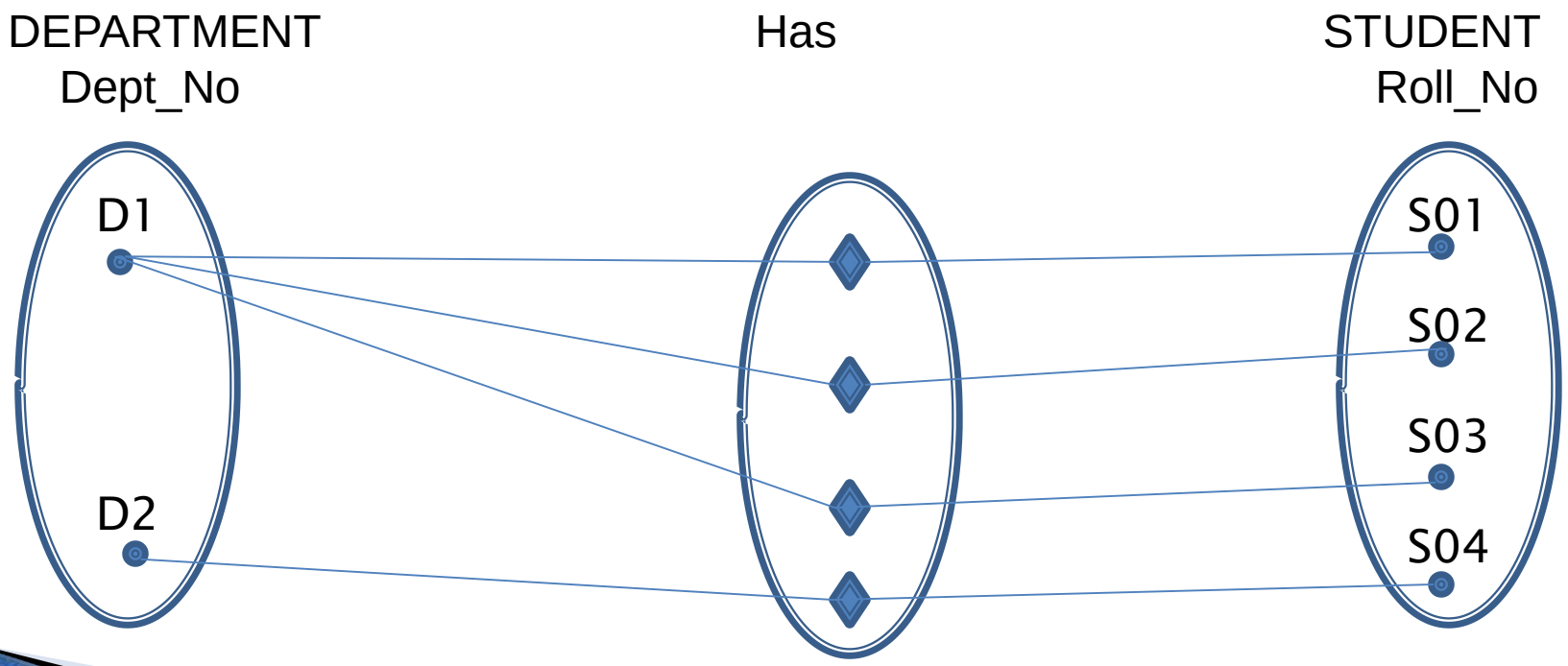
- **One-to-Many (1:*) Relationship**
- If for each instance of entity type A there exist many instances of entity type B.
- Relationship are abbreviated as 1:* or One-to-Many



Relationship

Multiplicity

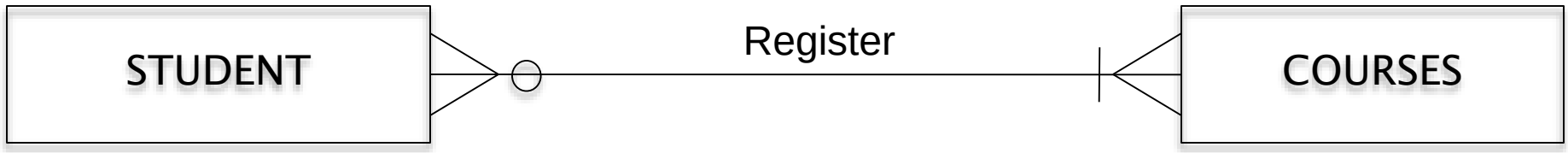
- **One-to-Many Relationship**



Relationship

Multiplicity

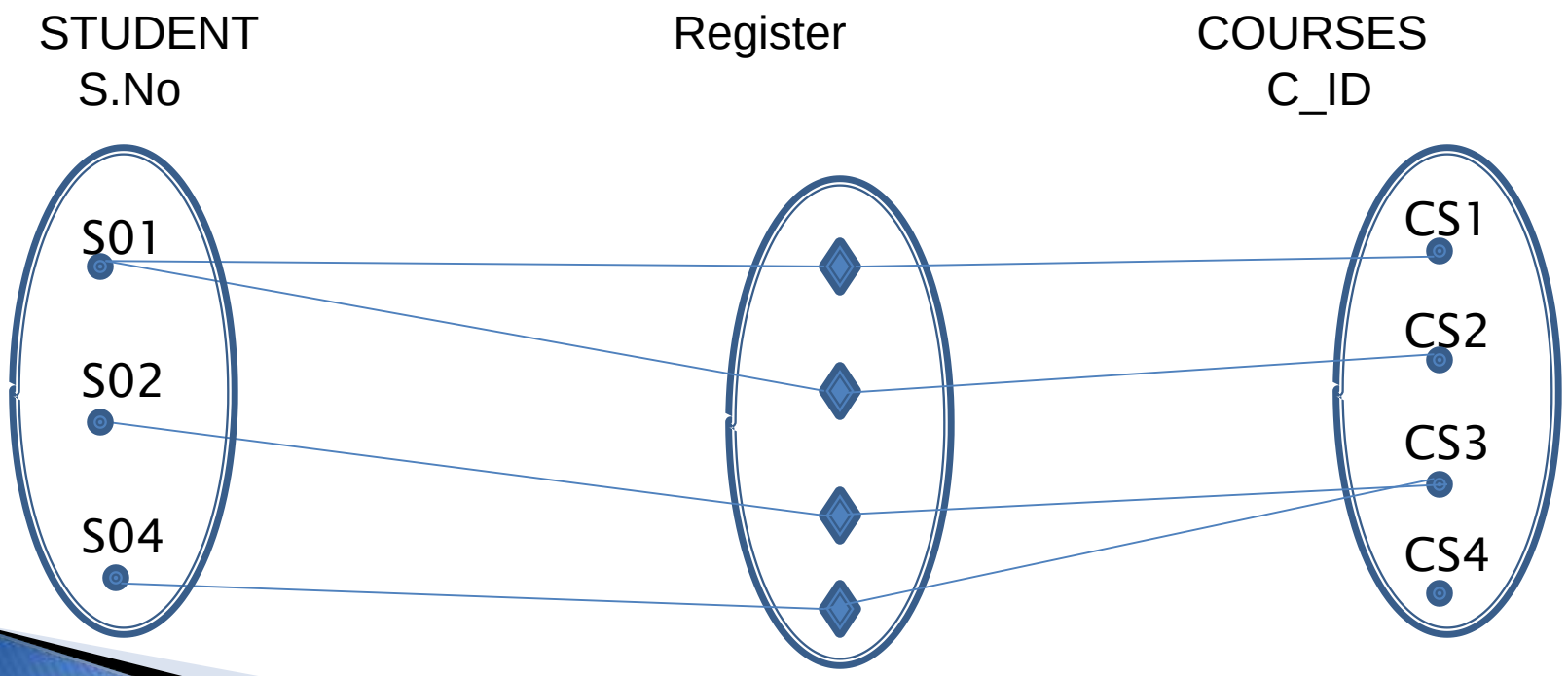
- **Many-to-Many (*:*) Relationship**
- If for each instance of entity type A there exist many instances of entity type B and vise versa.
- Relationship are abbreviated as *:* or Many-to-Many



Relationship

Multiplicity

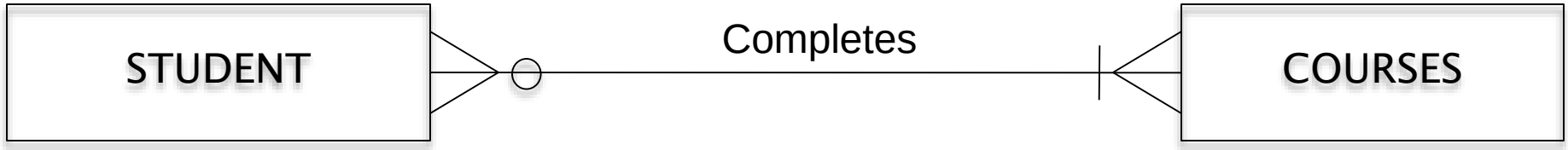
- **Many-to-Many Relationship**



Relationship

Cardinality Constraints

- The number of instance of an entity type that can be associated with each instance of another entity type is called cardinality constraints.



Each student completes one or more then one courses but for each course there may or may not exist student who complete the course.

Relationship

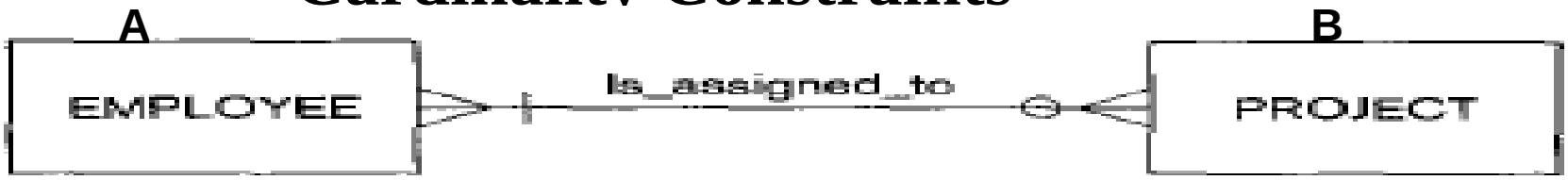
Cardinality Constraints

- **Minimum Cardinality**
- Minimum number of instances of entity B that may be associated with each instance of entity A.

The minimum no of instances of entity type B are "0". When minimum number of instance of entity is zero we say that entity type is optional participant.

Relationship

Cardinalitv Constraints



If the minimum cardinality is zero, participation is optional

If the minimum cardinality is one, participation is mandatory

Relationship

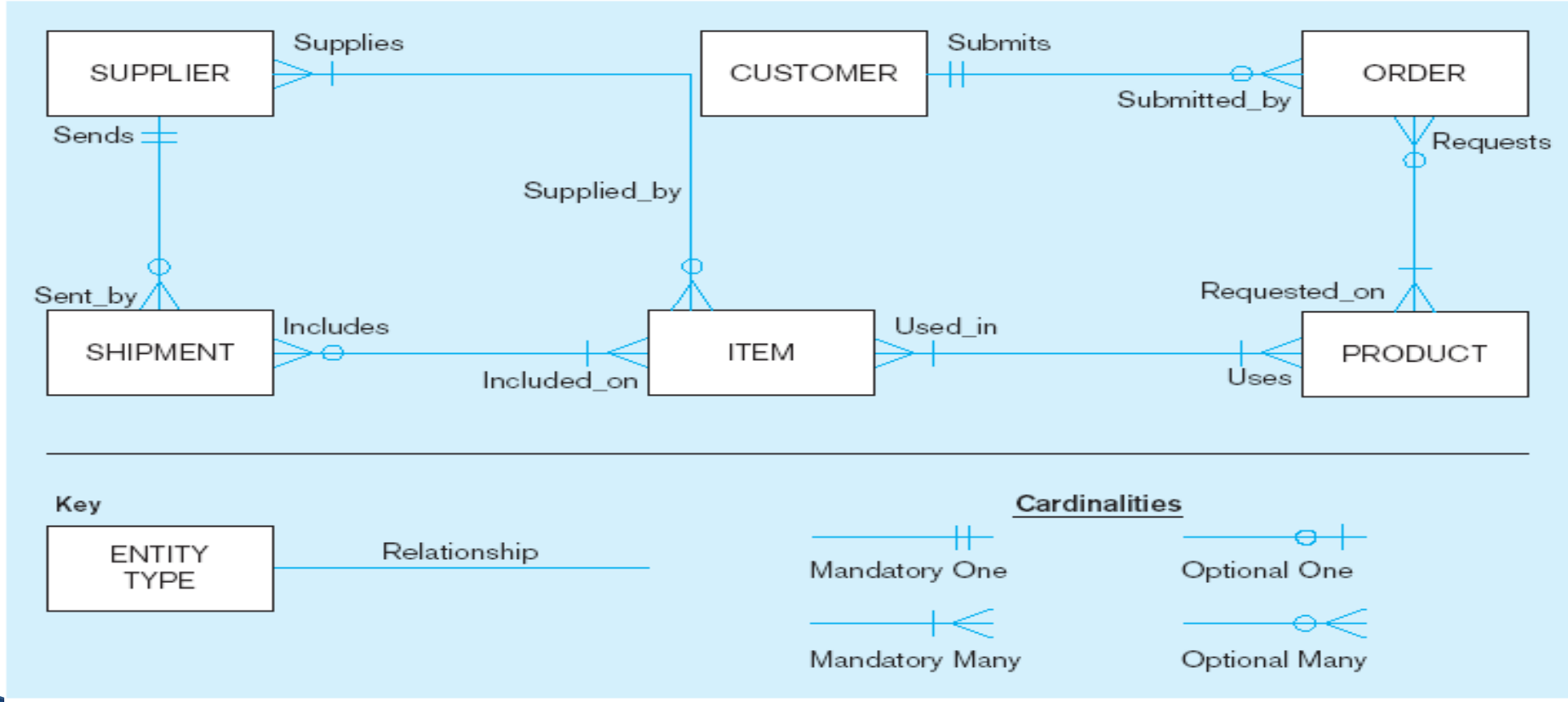
Cardinality Constraints

- **Maximum Cardinality**
- Maximum number of instances of entity B that may be associated with each instance of entity A.

The maximum no of instances of entity type B are unspecified but "many" and greater than one.

Relationship

Cardinality Constraints



Thanks

Questions?