



DATABASE MANAGEMENT SYSTEM

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2015 – 2016

Points to Cover

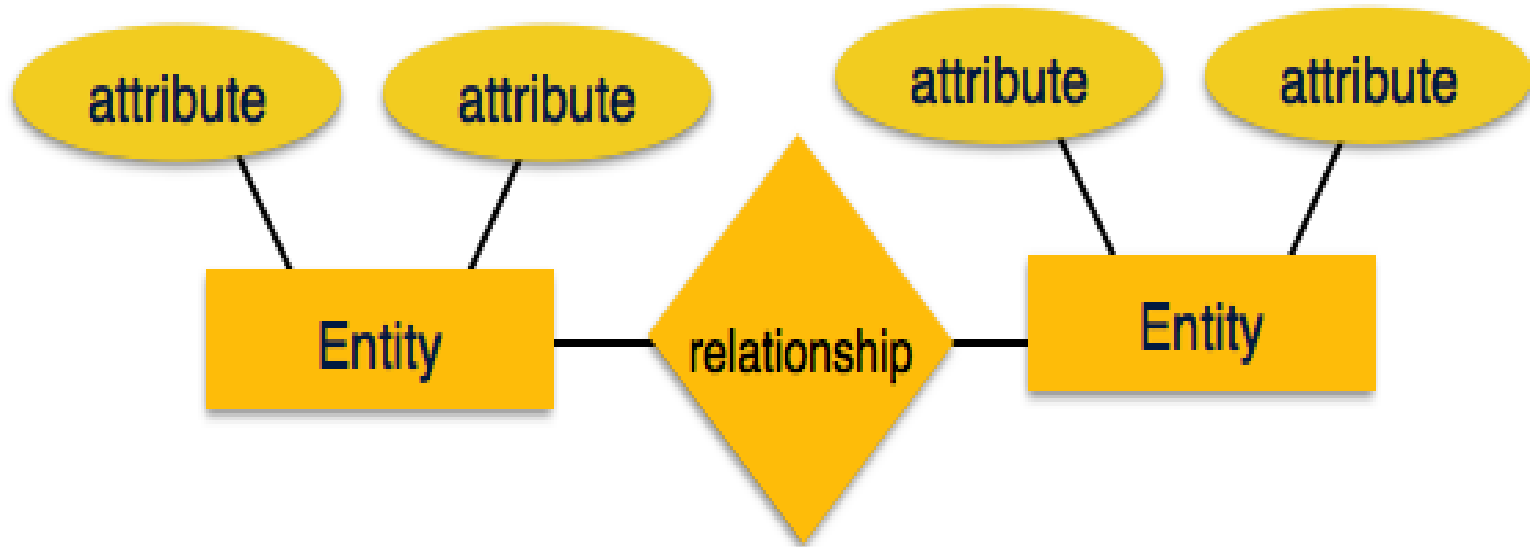
- Entity-Relationship Model
 - ❖ Entity
 - ❖ Relationship
- Relational Model
- Entity-Relationship Model - Basic Concepts
- Attributes
- Types of Attributes
- Primary key
- Mapping Cardinalities

Entity-Relationship Model

- Entity-Relationship (ER) Model is based on the notion of real-world entities and relationships among them.
- ER Model is based on –
 - ❑ **Entities** and their *attributes*.
 - ❑ **Relationships** among entities.

These concepts are explained below.

Entity-Relationship Model



- Example, in a school database, a student is considered as an **entity**. Student has various **attributes** like **name**, **age**, **class**, **address**, etc.

Entities

- **Entities** are represented by means of rectangles. Rectangles are named with the entity set they represent.

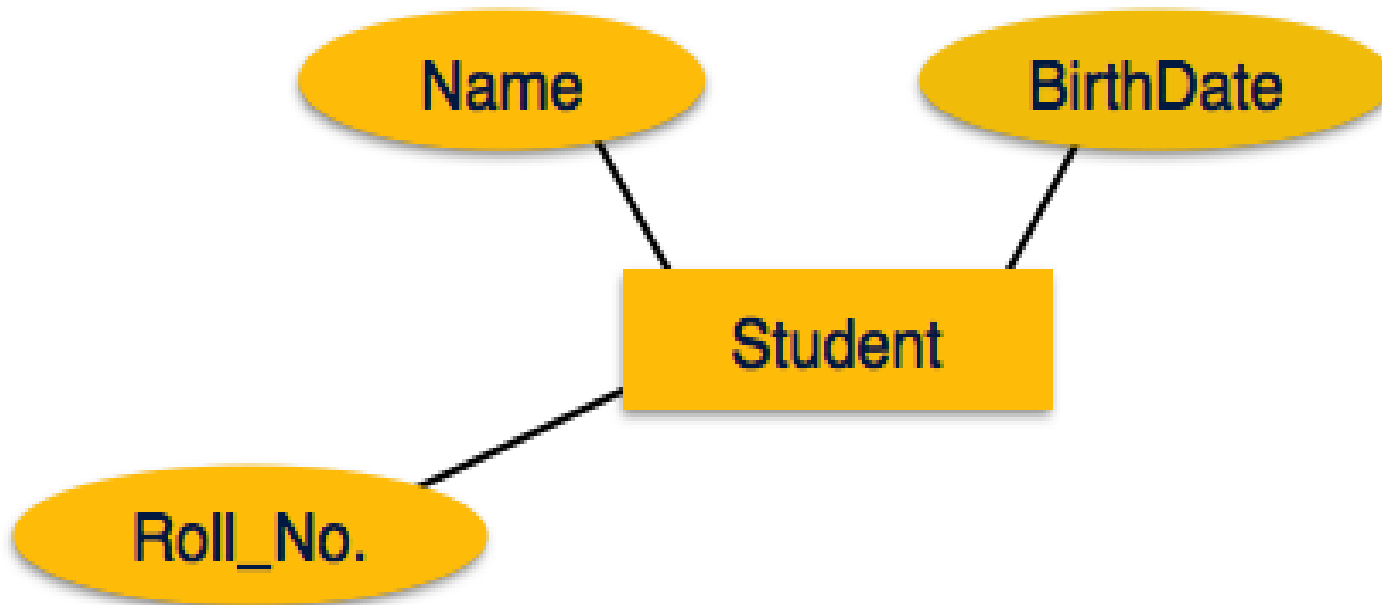
Student

Teacher

Projects

Attributes

- **Attributes** are represented by means of ellipses. Every ellipse represents one attribute and is directly connected to its entity (rectangle).



Types of Attributes

Simple attribute – Simple attributes are atomic values, which cannot be divided further. For example, a student's **phone number** is an atomic value of 10 digits.

Composite attribute – Composite attributes are made of more than one simple attribute. For example, a student's complete name may have **first_name second_name and last_name**.

Primary key

- The primary key of a relational table **uniquely identifies each record** in the table.

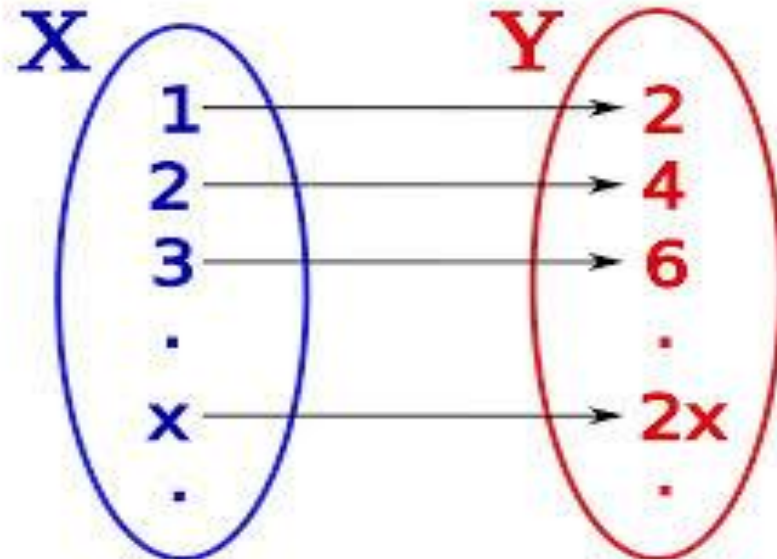
Customer ID	Forename	Surname
1	Simon	Jones
2	Emma	Price
3	Laura	Jones
4	Jonathan	Hale
5	Emma	Smith

Simple primary key



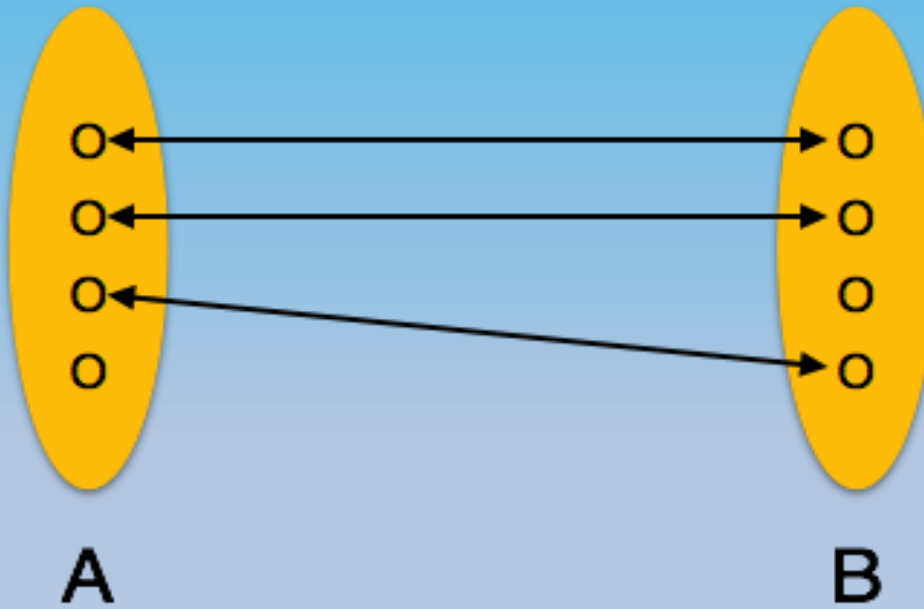
Mapping Cardinalities

- **Cardinality** defines the number of entities in one entity set, which can be associated with the number of entities of other set via relationship set.



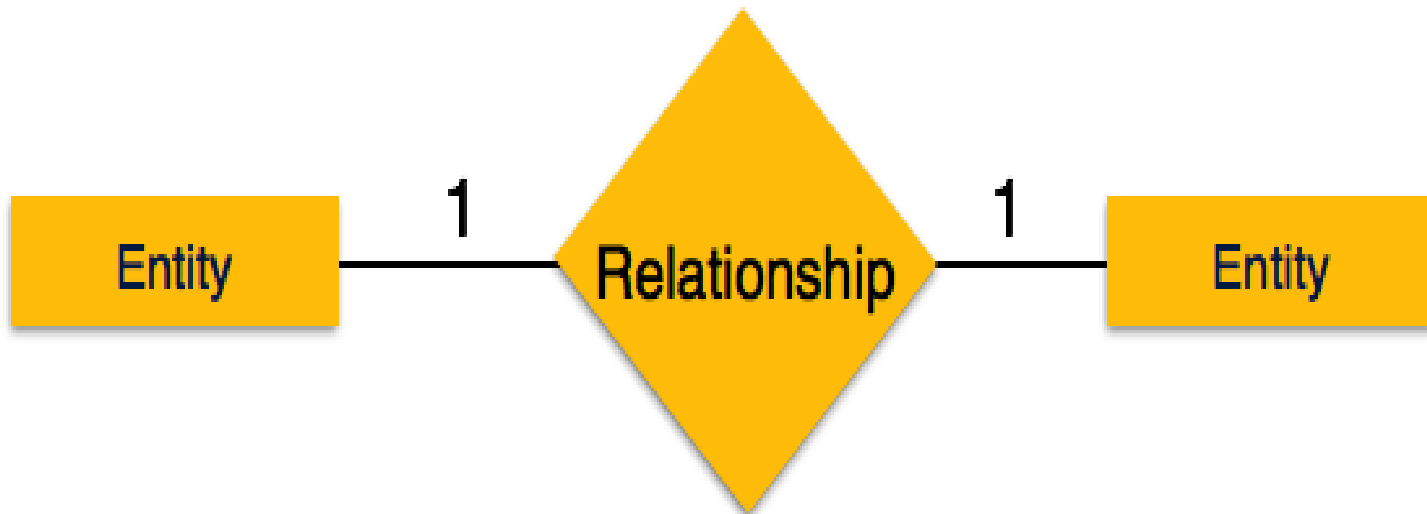
Mapping Cardinalities

- **One-to-one** – One entity from entity set **A** can be associated with at most one entity of entity set **B** and vice versa.



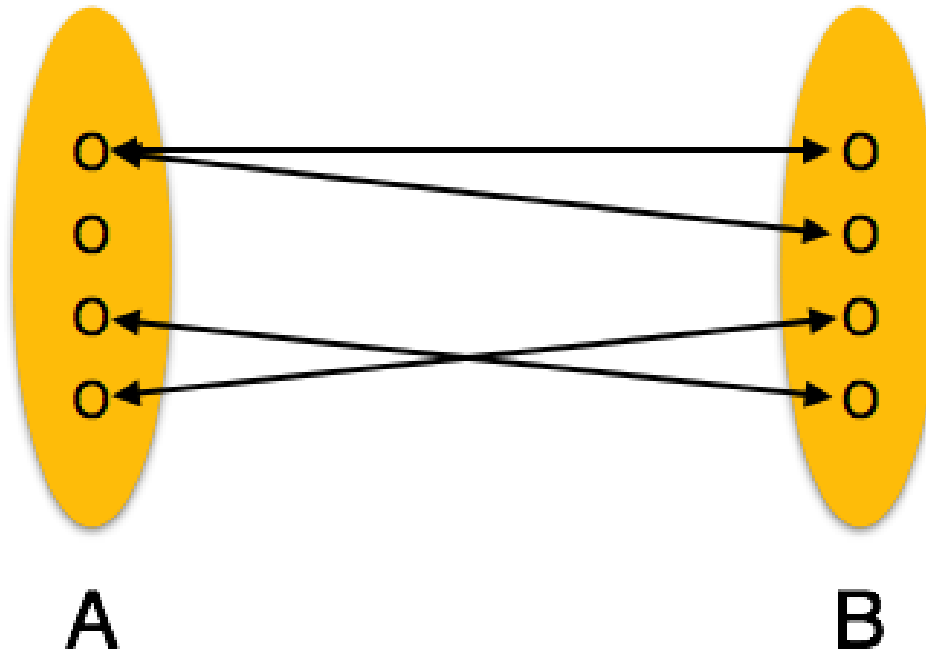
Mapping Cardinalities

- **One-to-one** – When only one instance of an entity is associated with the relationship, it is marked as '**1:1**'.



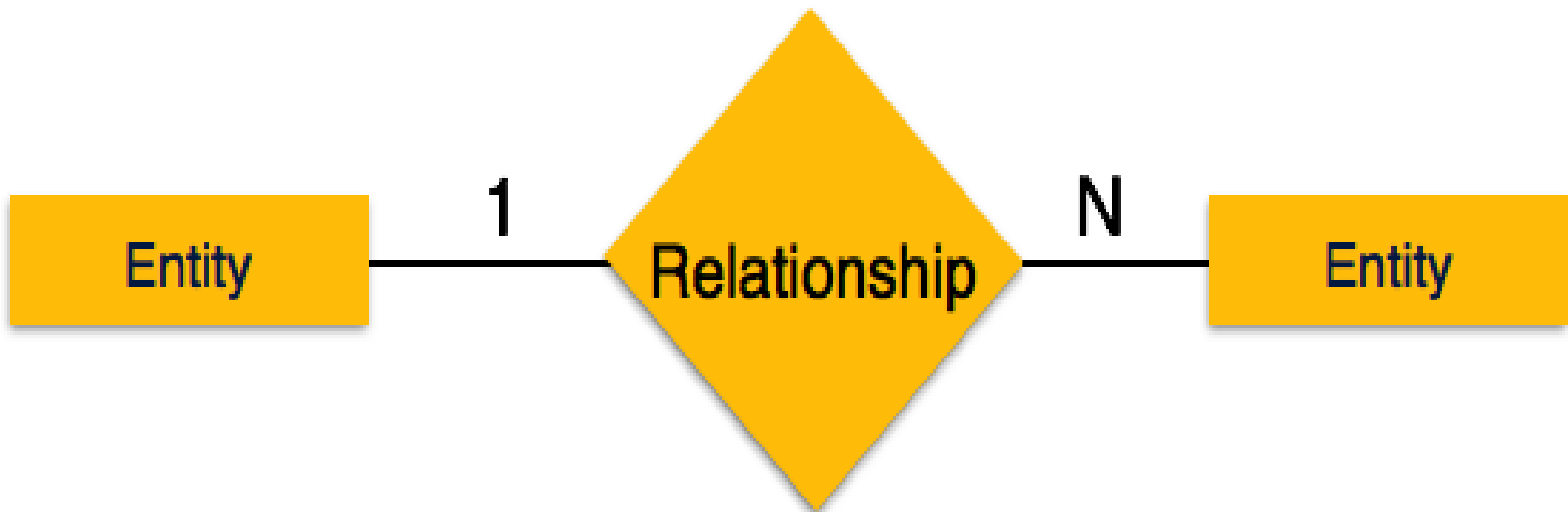
Mapping Cardinalities

- **One-to-many** – One entity from entity set **A** can be associated with **more than one** entities of entity set **B** however an entity from entity set **B**, can be associated with **at most one** entity.



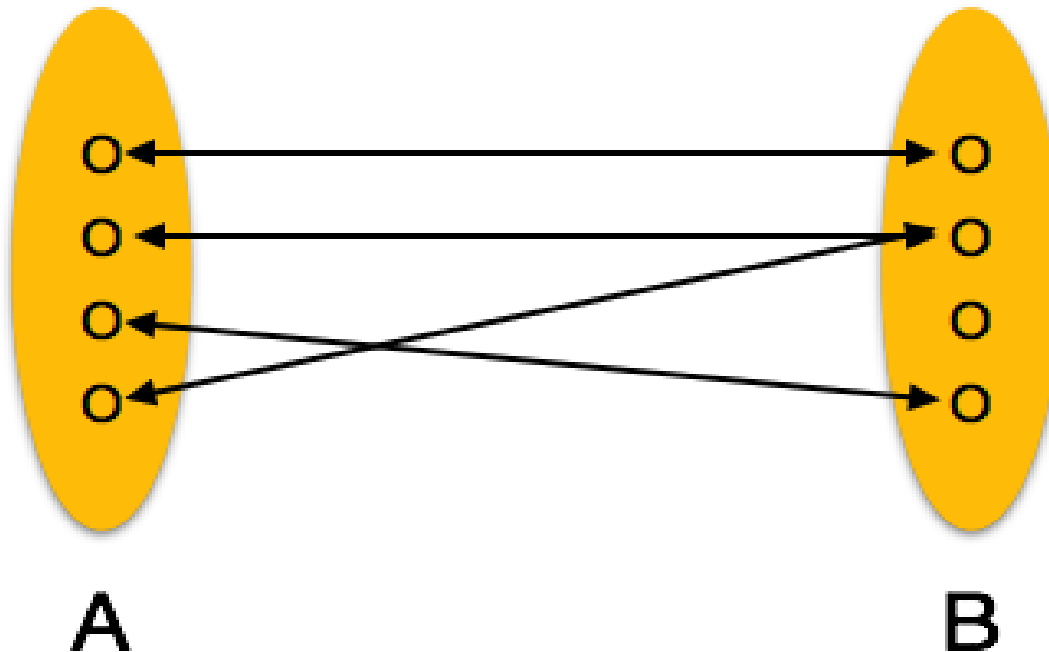
Mapping Cardinalities

- **One-to-many** – When more than one instance of an entity is associated with a relationship, it is marked as '**1:N**'.



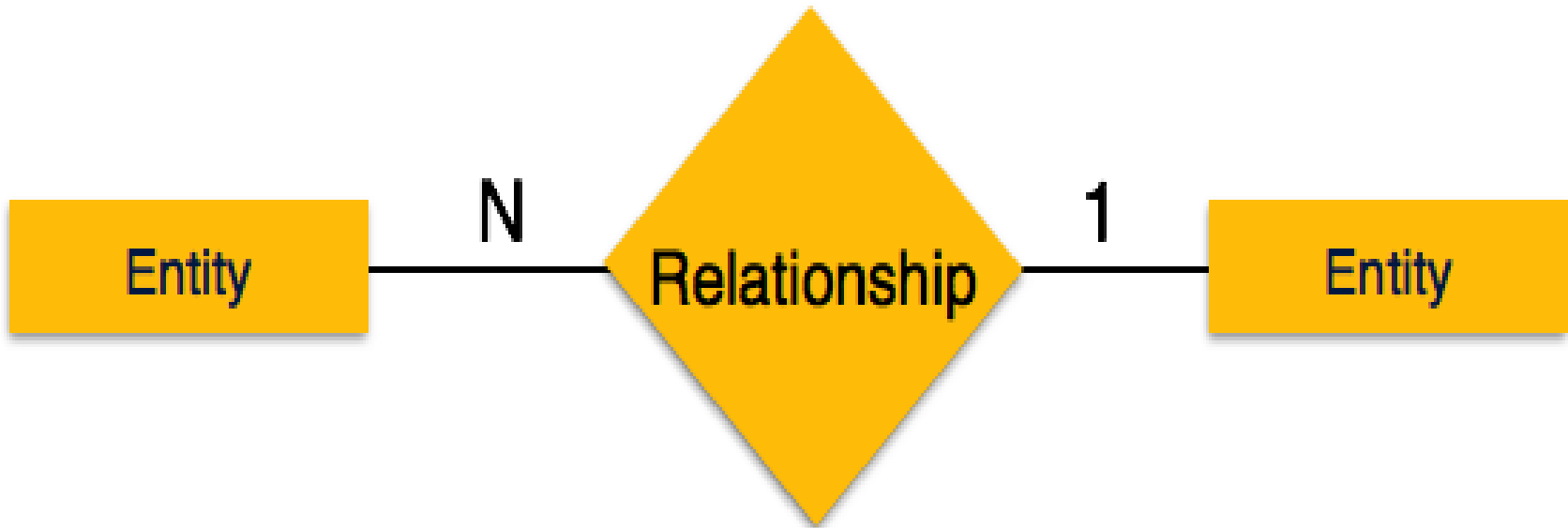
Mapping Cardinalities

- **Many-to-one** – More than one entities from entity set **A** can be associated with **at most one** entity of entity set **B**, however an entity from entity set **B** can be associated with more than one entity from entity set **A**.



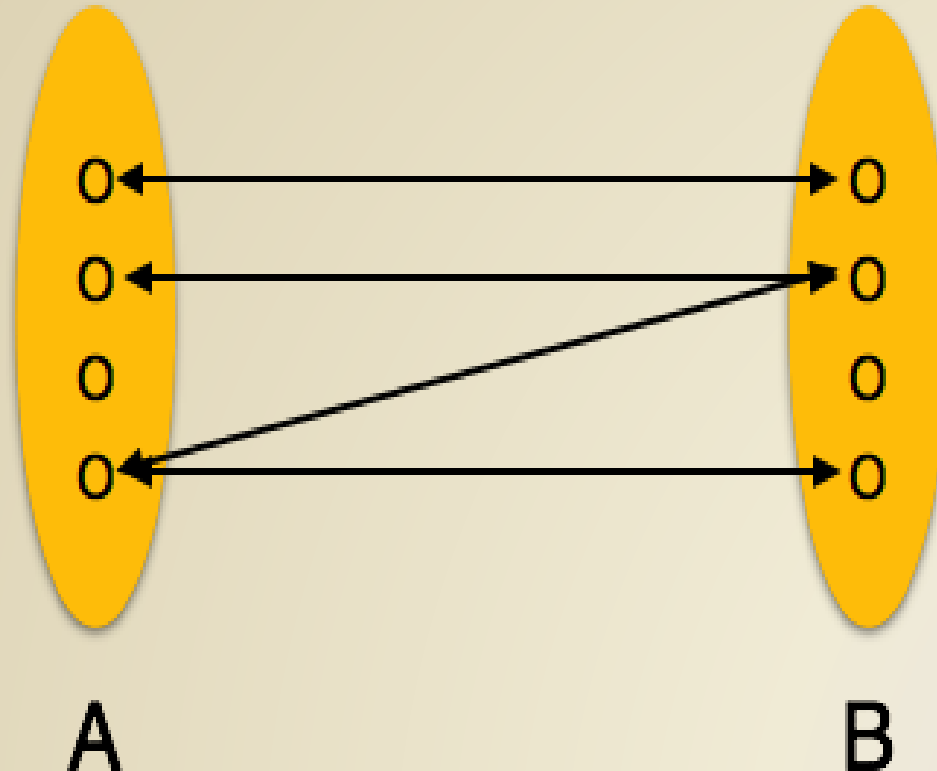
Mapping Cardinalities

- **Many-to-one** – When more than one instance of entity is associated with the relationship, it is marked as '**N:1**'.



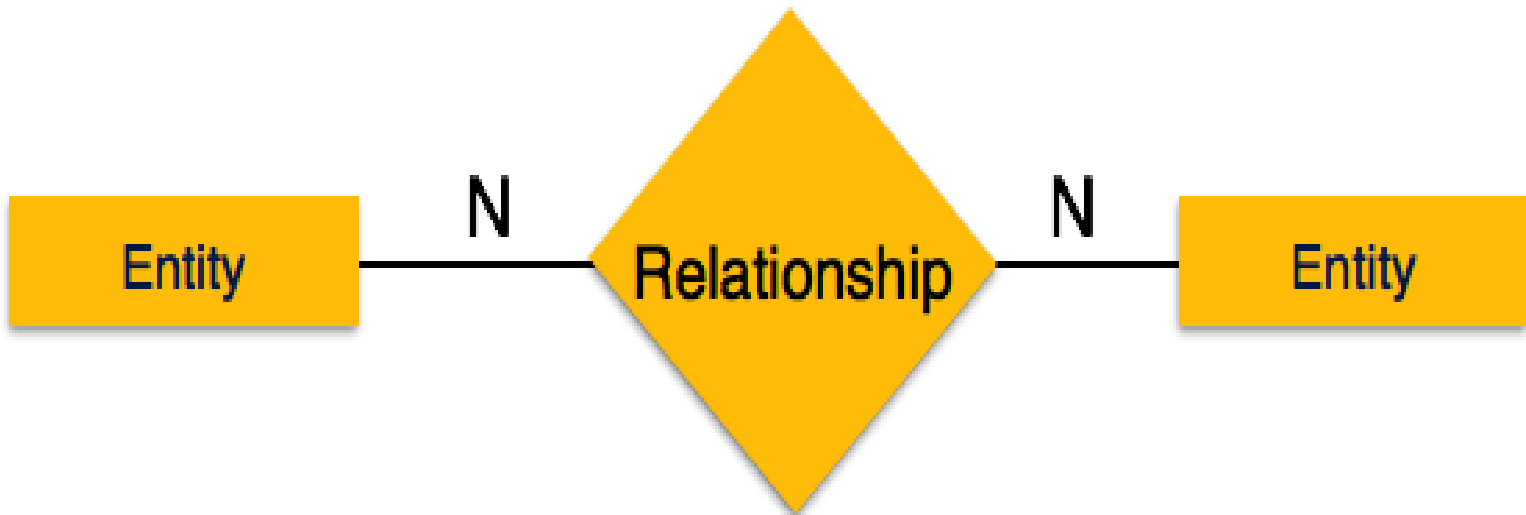
Mapping Cardinalities

- **Many-to-many** – One entity from **A** can be associated with more than one entity from **B** and vice versa.



Mapping Cardinalities

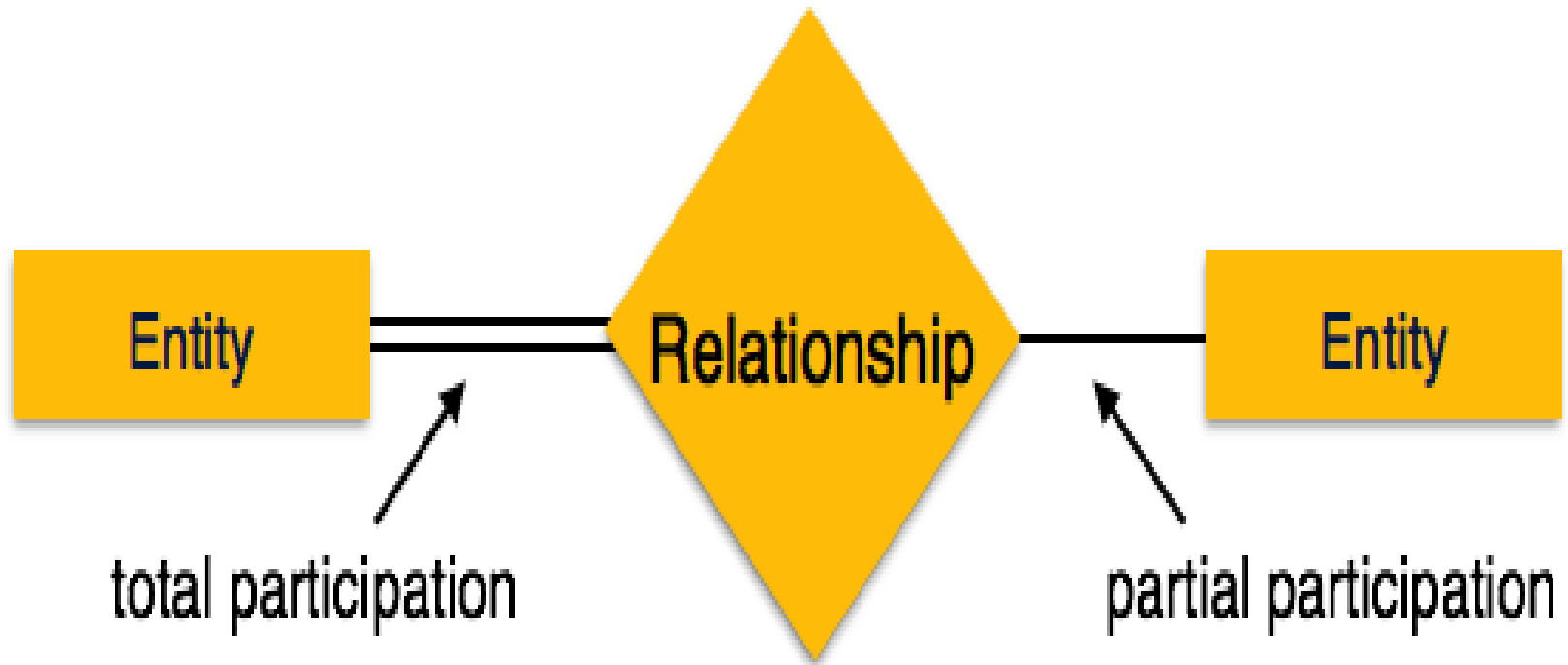
- **Many-to-many** – The following image reflects this concept, it is marked as '**N:N**'.



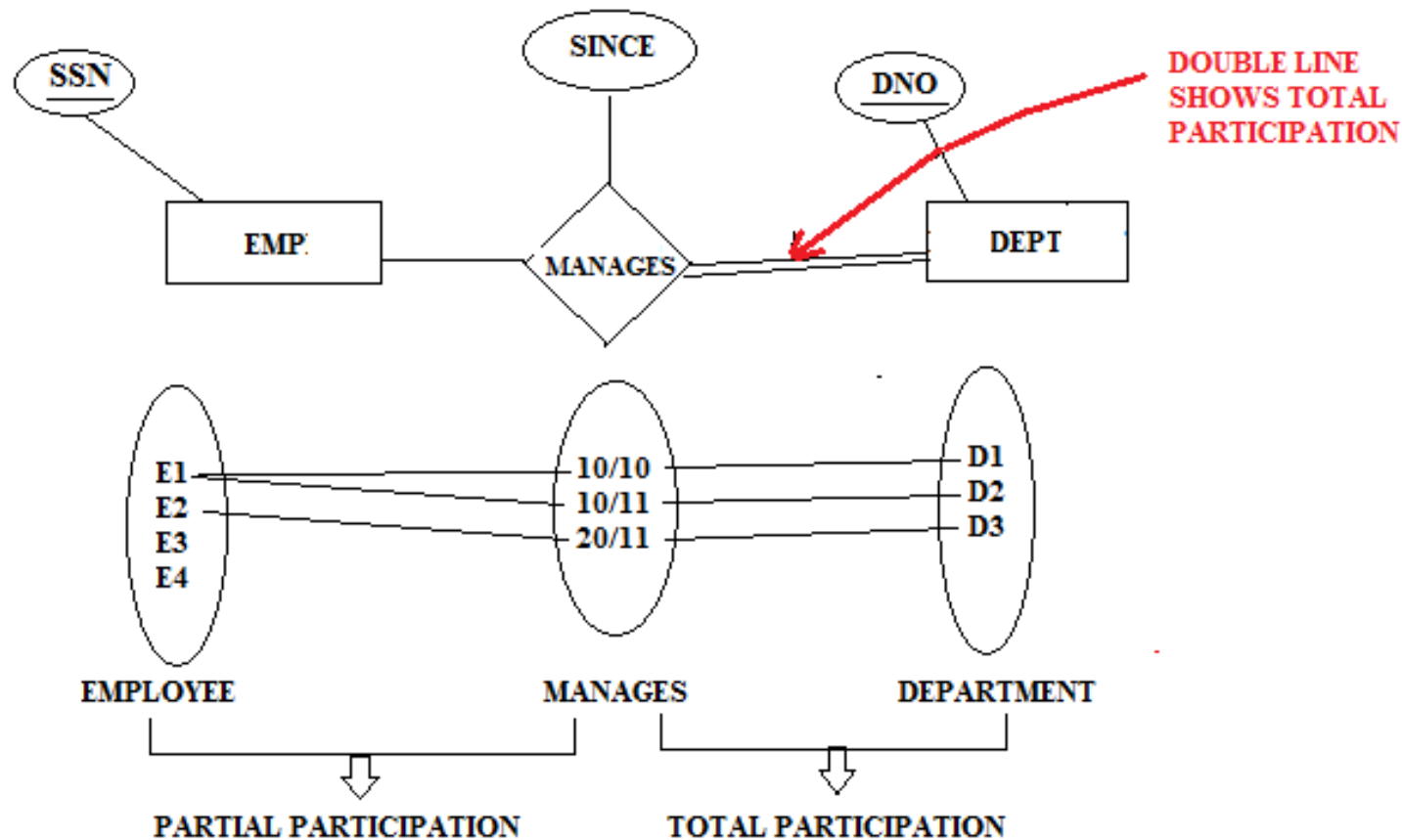
Participation Constraints

- ❖ **Total Participation** – Each entity is involved in the relationship. Total participation is represented by **double lines**.
- ❖ **Partial participation** – Not all entities are involved in the relationship. Partial participation is represented by **single lines**.

Participation Constraints



Participation Constraints





Thank you

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