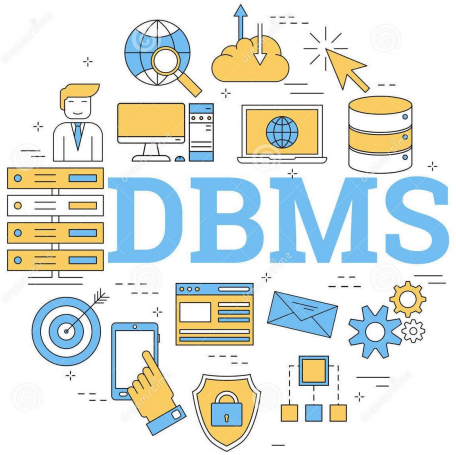
SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

Department of Information Technology



19CST202 – Database Management System

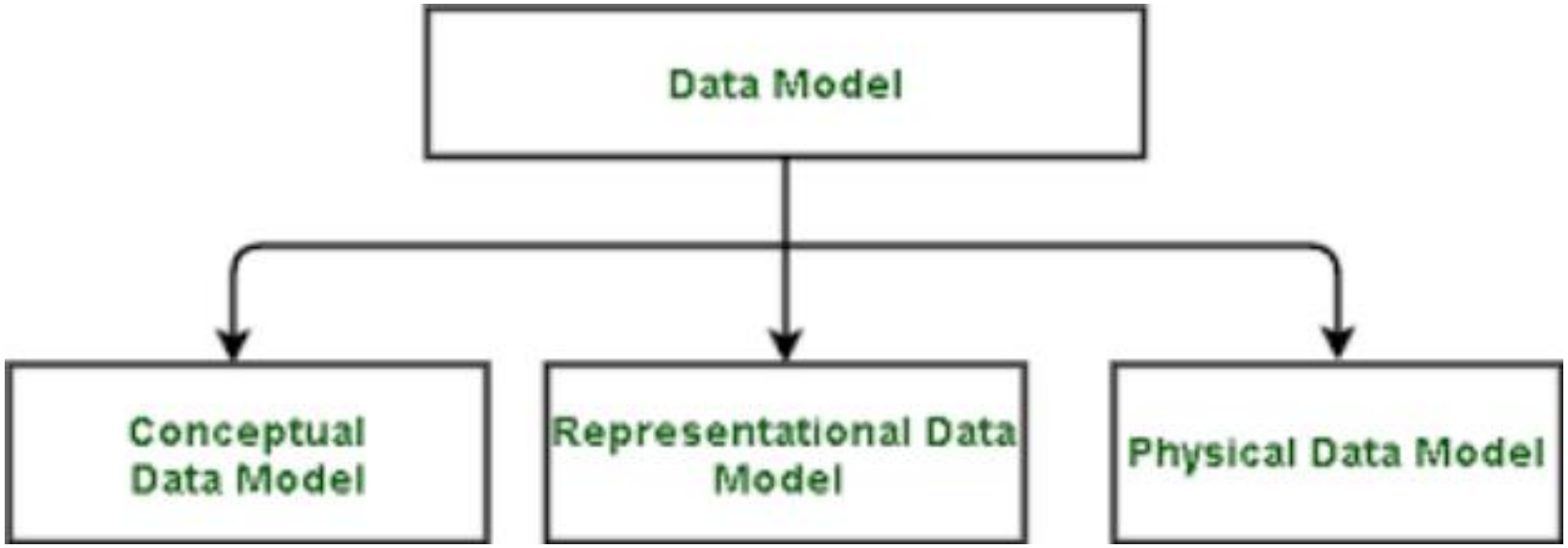
II B.Tech. AIML/ IV SEMESTER

UNIT I : INTRODUCTION

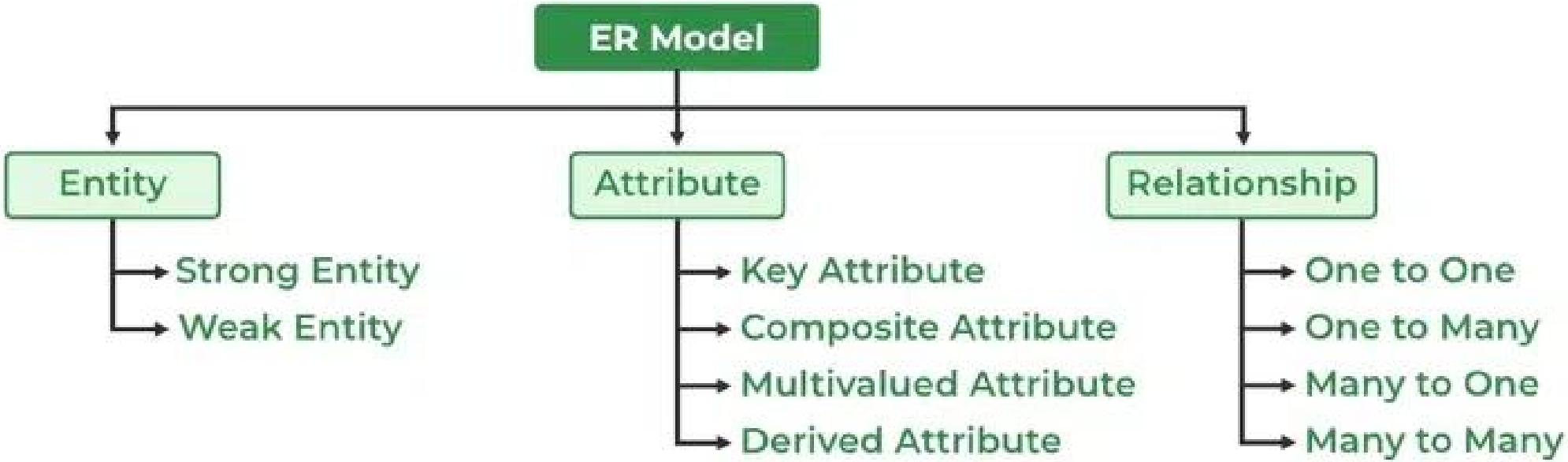
Topic 5 : Entities, entity types, attributes, relationships, relationship types

Purpose of Database System - Views of data – Data models, Database Management system - Three-schema architecture of DBMS, Components of DBMS. Entity –Relationship Model - Conceptual data modeling - motivation, entities, entity types, attributes, relationships, relationship types, E/R diagram notations, Examples

Recap


Data Model
Conceptual Data Model
Representational Data Model
Physical Data Model

Component of ER Model



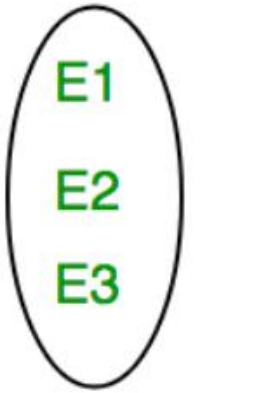
Entity

- An Entity may be an object with a physical existence – a particular person, car, house, or employee or
- it may be an object with a conceptual existence – a company, a job, or a university course.

Entity Type

Entity set

- An Entity is an object of Entity Type and a set of all entities is called an entity set.
- For Example, E1 is an entity having Entity Type Student and the set of all students is called Entity Set.
- In ER diagram, Entity Type is represented as:



Entity Set

Entity Type

Two Types

- Strong Entity
- Weak Entity

Strong Entity

- A Strong Entity is a type of entity that has a key Attribute.
- Strong Entity does not depend on other Entity in the Schema.
- It has a primary key, that helps in identifying it uniquely
- It is represented by a **rectangle**

Entity Type

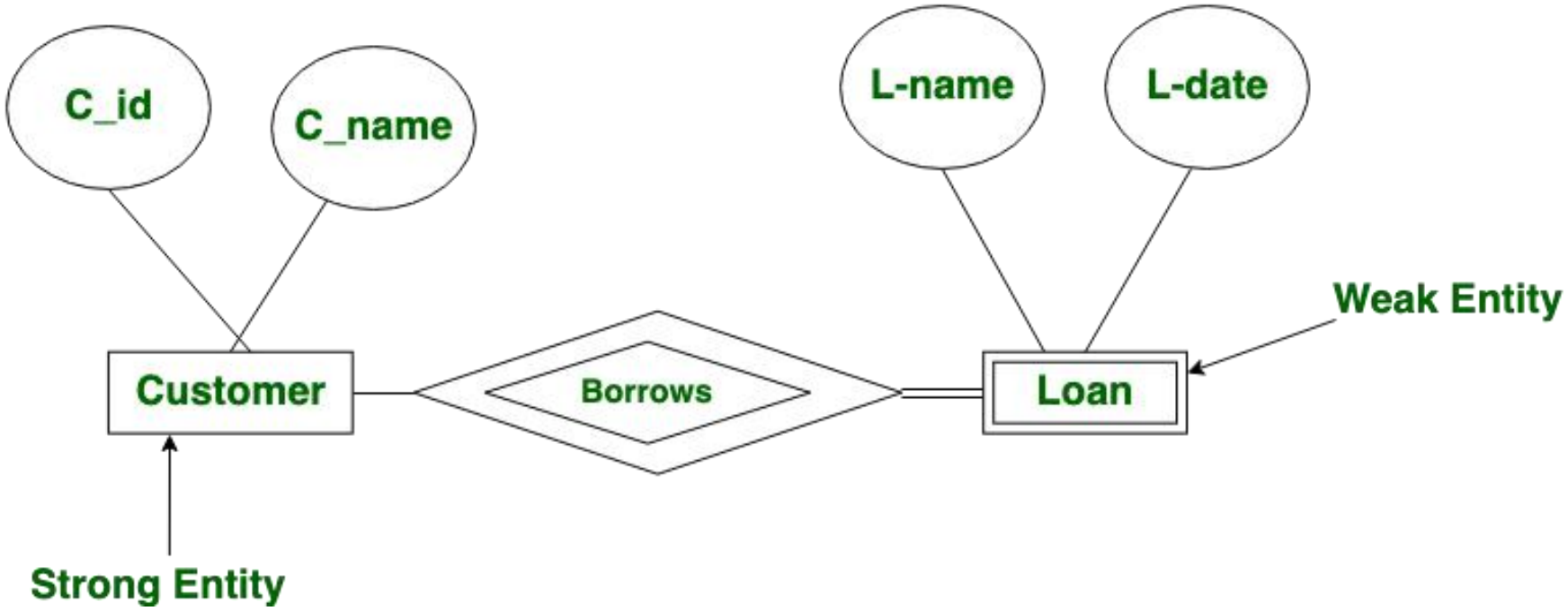
Two Types

- Strong Entity
- Weak Entity

Weak Entity

- An Entity type has a key attribute that uniquely identifies each entity in the entity set.
- But some entity type exists for which key attributes can't be defined.

Strong and Weak Entity



Attribute

- Attributes are the properties that define the entity type.
- For example, Roll_No, Name, DOB, Age, Address, and Mobile_No are the attributes that define entity type Student. In ER diagram, the attribute is represented by an oval.

Attribute

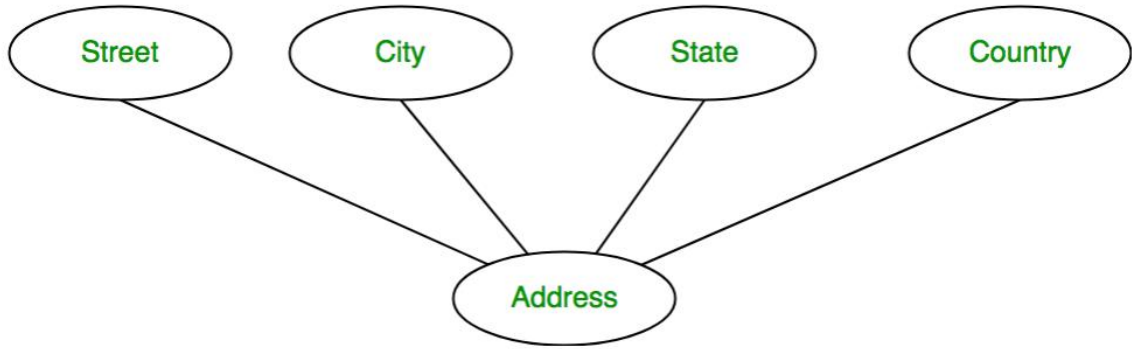
1. Key Attribute

- The attribute which uniquely identifies each entity in the entity set is called the key attribute.
- For example, Roll_No will be unique for each student.
- In ER diagram, the key attribute is represented by an oval with underlying lines.

Attribute

2. Composite Attribute

- An attribute composed of many other attributes is called a composite attribute.
- For example, the Address attribute of the student Entity type consists of Street, City, State, and Country.
- In ER diagram, the composite attribute is represented by an oval comprising of ovals.



Attribute

2. Multivalued Attribute

- An attribute consisting of more than one value for a given entity.
- For example, Phone_No (can be more than one for a given student).
- In ER diagram, a multivalued attribute is represented by a double oval.

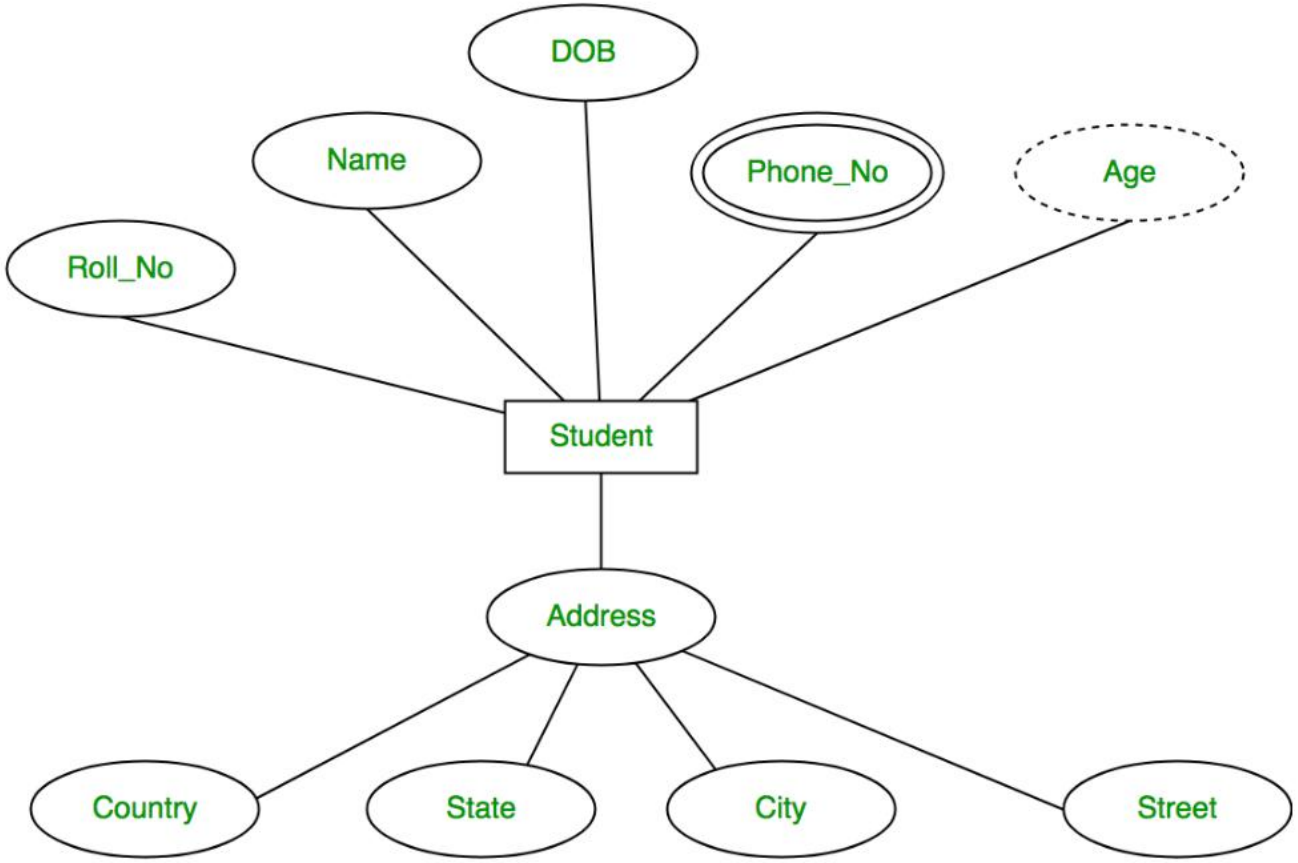
Attribute

2. Derived Attribute

- An attribute that can be derived from other attributes of the entity type is known as a derived attribute.
- e.g.; Age (can be derived from DOB). In ER diagram, the derived attribute is represented by a dashed oval.

Attribute

Complete Entity Type Student with its Attributes

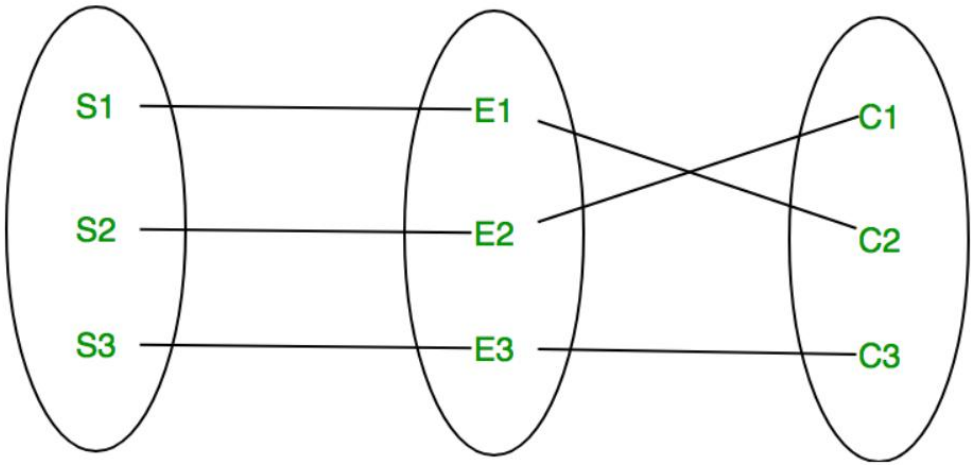


Relationship Type and Relationship Set

- A **Relationship Type** represents the association between entity types.
- For example, 'Enrolled in' is a relationship type that exists between entity type Student and Course.
- In ER diagram, the relationship type is represented by a diamond and connecting the entities with lines.

Relationship Type and Relationship Set

- A set of relationships of the same type is known as a **relationship set**.
- The following relationship set depicts S1 as enrolled in C2, S2 as enrolled in C1, and S3 as registered in C3.

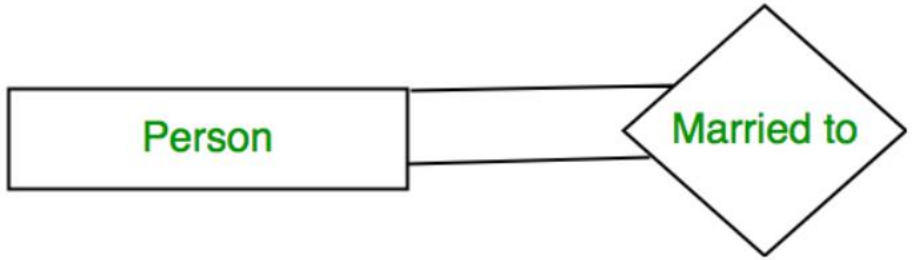


Degree of a Relationship Set

The number of different entity sets participating in a relationship set is called the **degree of a relationship set.**

1. **Unary Relationship:** When there is only ONE entity set participating in a relation, the relationship is called a unary relationship.

For example, one person is married to only one person.



Degree of a Relationship Set

2. Binary Relationship

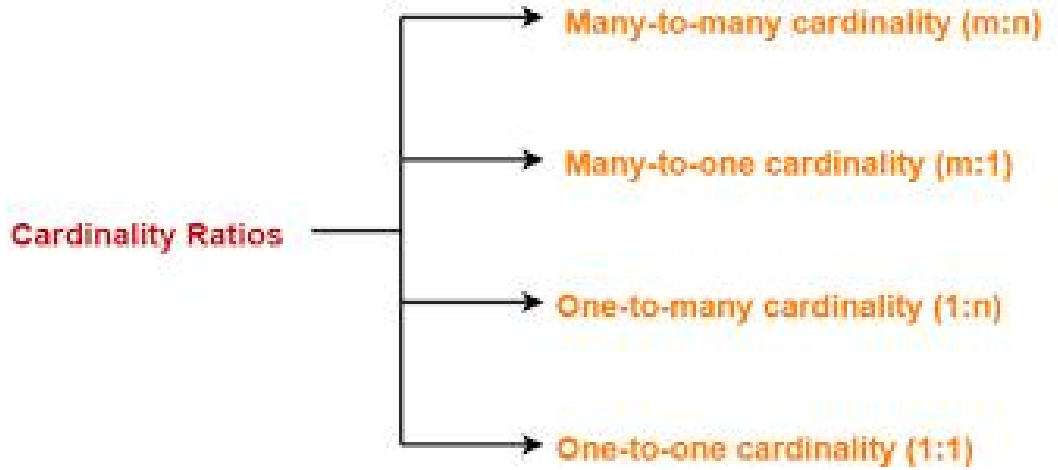
When there are TWO entities set participating in a relationship, the relationship is called a binary relationship.

For example, a Student is enrolled in a Course.

3. n-ary Relationship: When there are n entities set participating in a relation, the relationship is called an n-ary relationship.

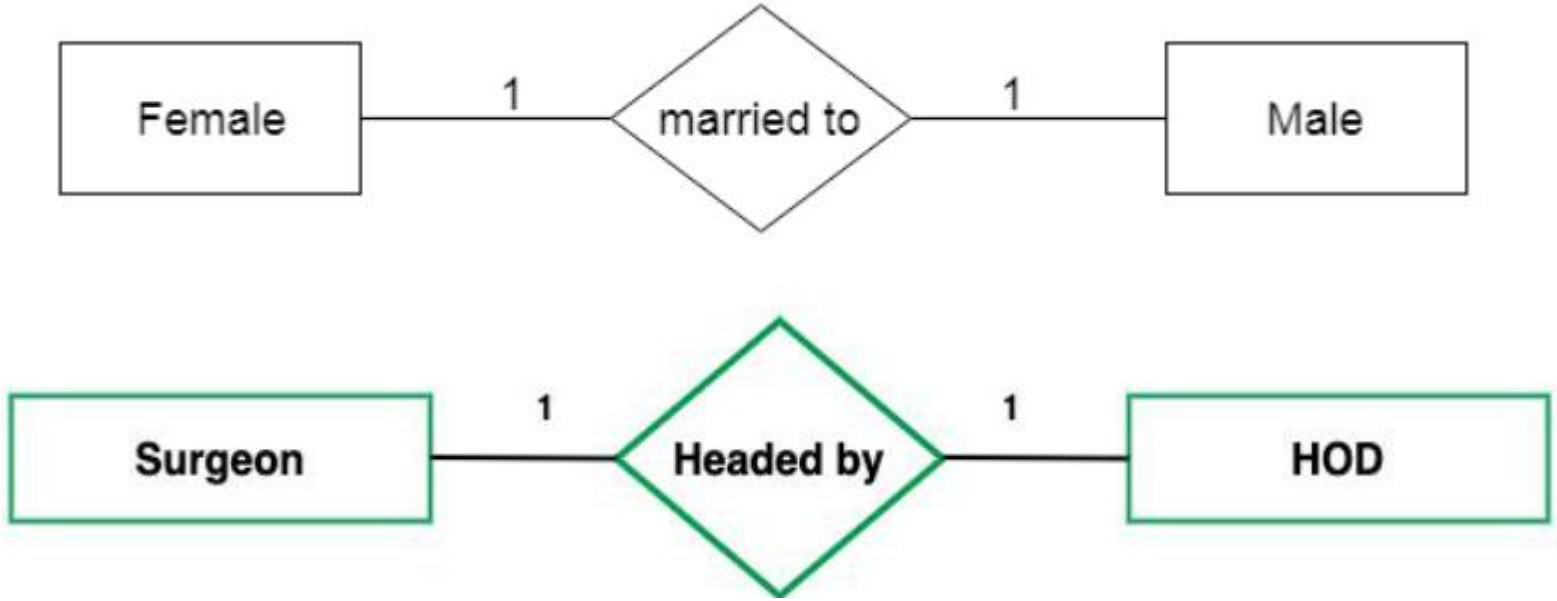
Cardinality

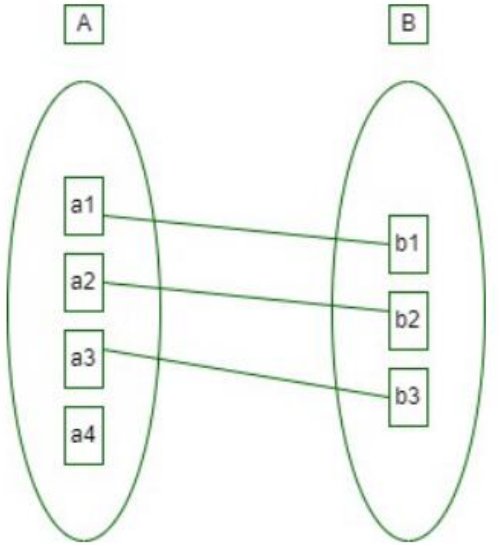
- The number of times an entity of an entity set participates in a relationship set is known as **cardinality.**
- Cardinality can be of different types:



Cardinality

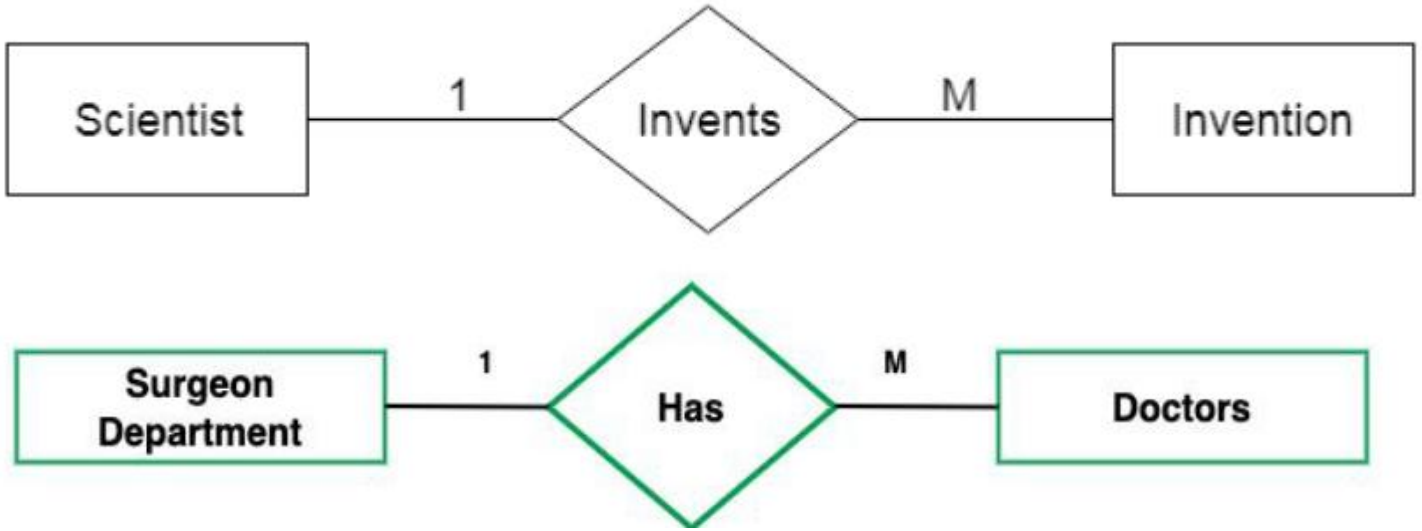
When only one instance of an entity is associated with the relationship, then it is known as one to one relationship.

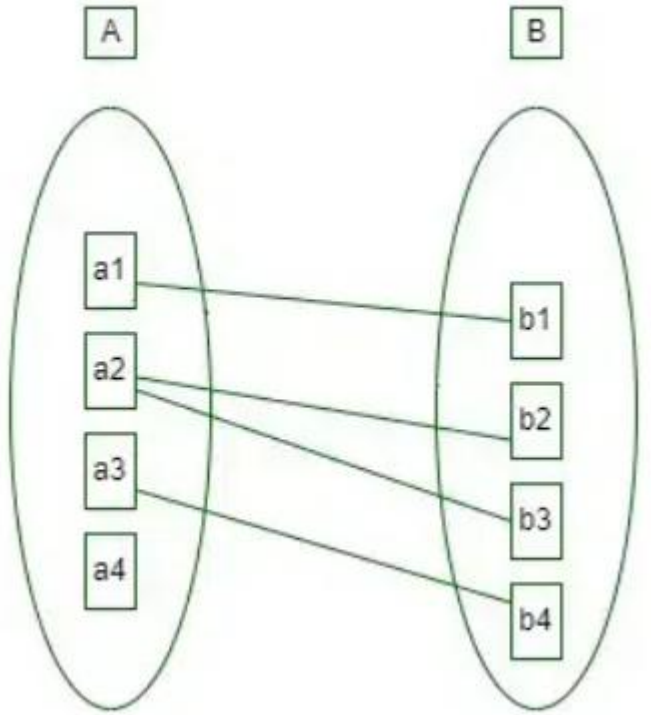




Cardinality

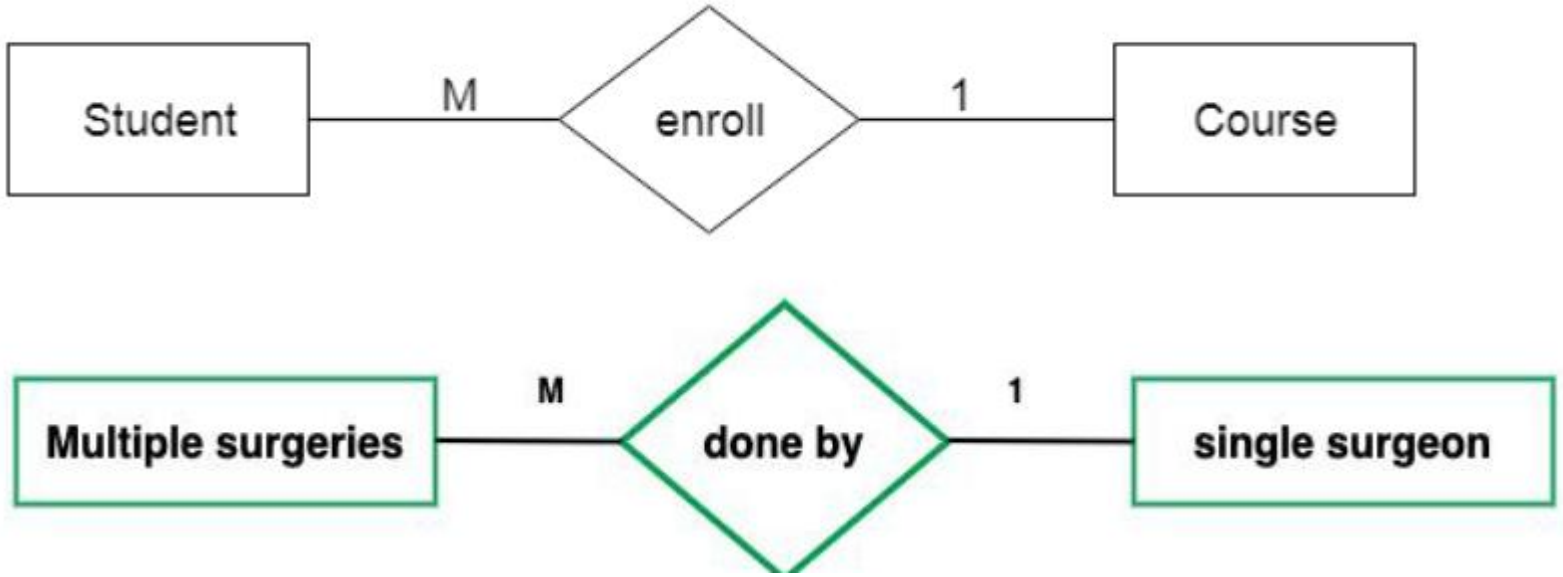
When only one instance of the entity on the left, and more than one instance of an entity on the right associates with the relationship then this is known as a **one-to-many relationship.**

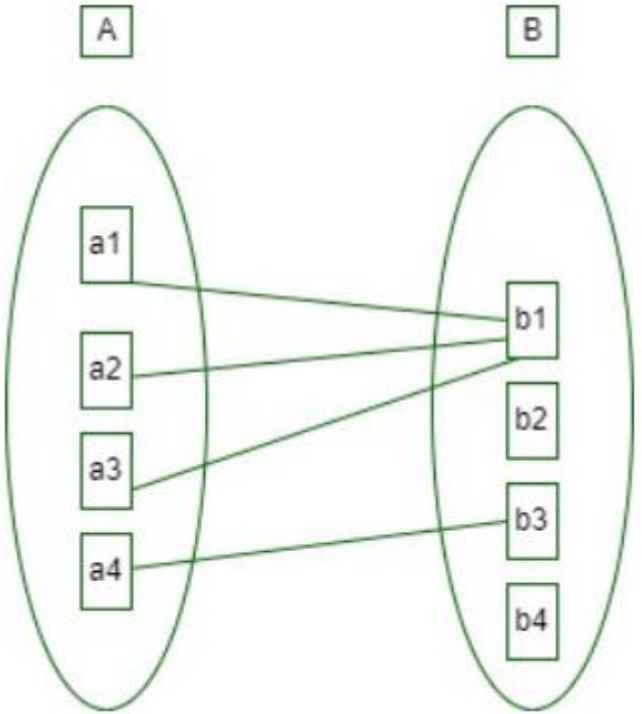




Cardinality

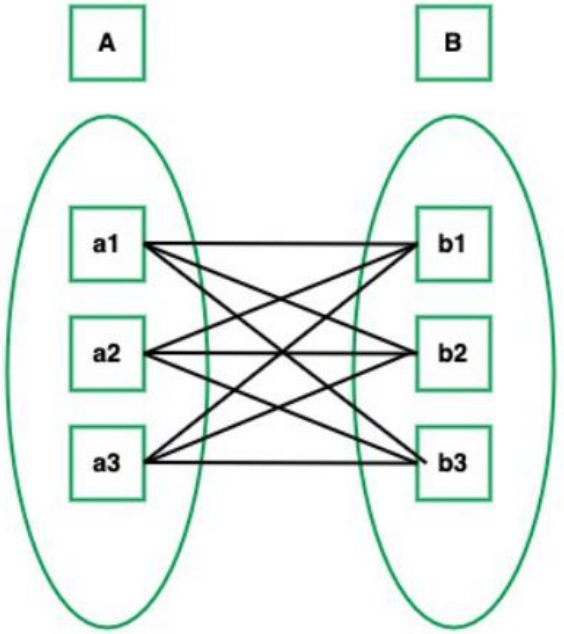
When more than one instance of the entity on the left, and only one instance of an entity on the right associates with the relationship then it is known as a **many-to-one relationship.**





Cardinality

When more than one instance of the entity on the left, and more than one instance of an entity on the right associates with the relationship then it is known as a **many-to-many relationship.**

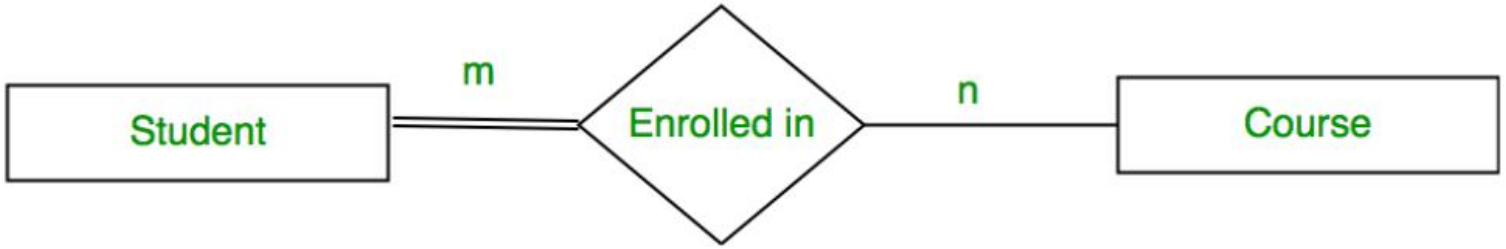


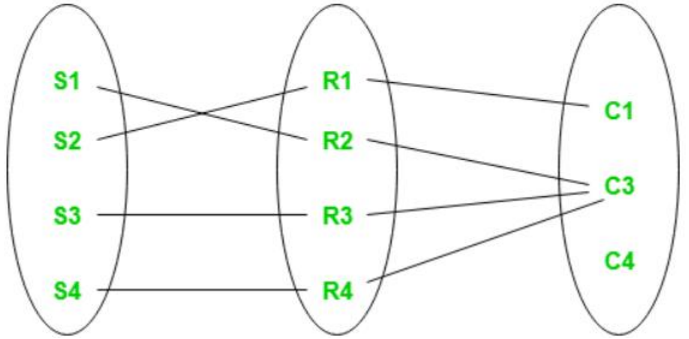
Participation Constraint

Participation Constraint is applied to the entity participating in the relationship set.

1. Total Participation – Each entity in the entity set must participate in the relationship. If each student must enroll in a course, the participation of students will be total. Total participation is shown by a double line in the ER diagram.

2. Partial Participation – The entity in the entity set may or may NOT participate in the relationship. If some courses are not enrolled by any of the students, the participation in the course will be partial.



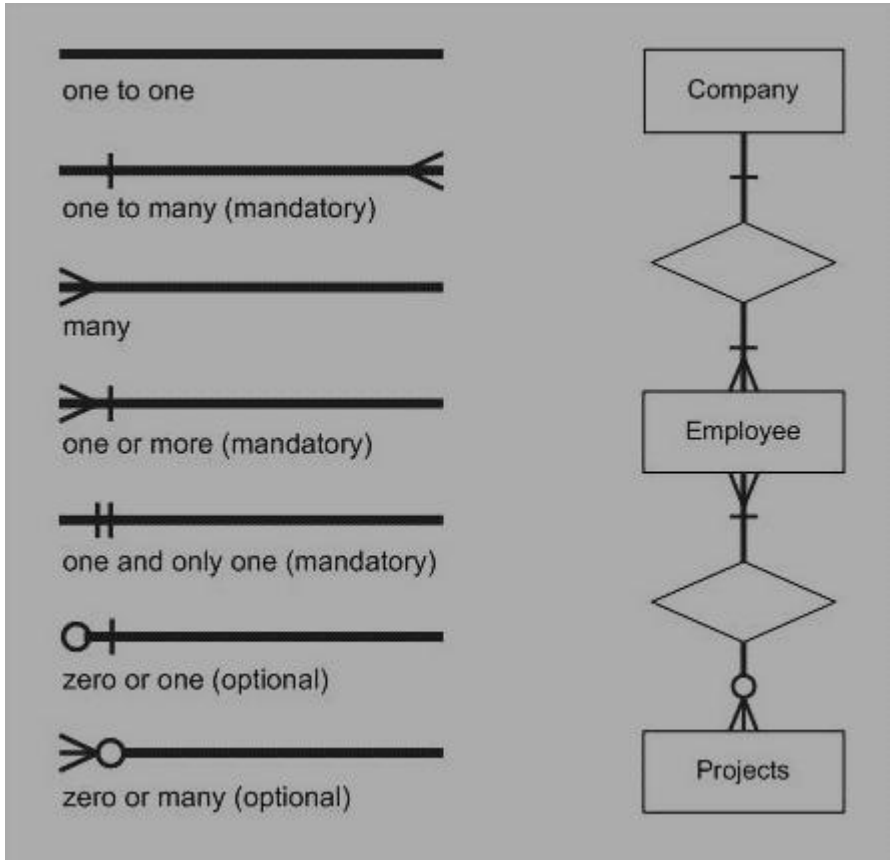


How to Draw ER Diagram?

- The very first step is Identifying all the Entities, and place them in a Rectangle, and labeling them accordingly.
- The next step is to identify the relationship between them and pace them accordingly using the Diamond, and make sure that, Relationships are not connected to each other.
- Attach attributes to the entities properly.
- Remove redundant entities and relationships.
- Add proper colors to highlight the data present in the database.

Notation of ER diagram

- Database can be represented using the notations. In ER diagram, many notations are used to express the cardinality.



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