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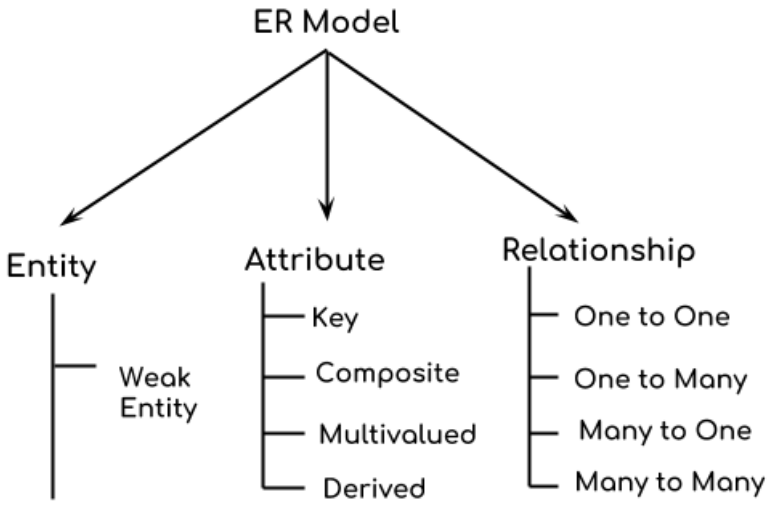
## Ans to the Que No 1(A)

Entity Relationship Diagram (ER Diagram)

An ER diagram shows the relationship among entity sets. An entity set is a group of similar entities and these entities can have attributes. In terms of DBMS, an entity is a table or attribute of a table in database, so by showing relationship among tables and their attributes, ER diagram shows the complete logical structure of a database.




As shown in the above diagram, an ER diagram has three main components:
1. Entity
2. Attribute
3. Relationship

## Ans to the Que No 1(B)

The process of moving from an abstract data model to the implementation of the database proceeds in two final design phases. In the **logical-design phase**, the designer maps the high-level conceptual schema onto the implementation data model of the database system that will be used. The designer uses the resulting system-specific database schema in the subsequent **physical-design phase**, in which the physical features of the database are specified. These features include the form of file organization and the internal storage structures.
The process of moving from an abstract data model to the implementation of the database proceeds in two final design phases.

- In the logical-design phase, the designer maps the high-level conceptual schema onto the implementation data model of the database system that will be used. The implementation data model is typically the relational data model, and this step typically consists of mapping the conceptual

schema defined using the entity-relationship model into a relation schema.

- Finally, the designer uses the resulting system-specific database schema

in the subsequent physical-design phase, in which the physical features of the database are specified. These features include the form of file organization and choice of index structures.

## Ans to the Que No 1(C)

**Four ER Diagram**

- Key Attribute.
- Composite Attribute.
- Multivalued Attribute.
- Derived Attribute.

Key Attribute: Key attribute uniquely identifies an entity from an entity set. It underlines the text of a key attribute.

Composite Attribute: An attribute that is composed of several other attributes is known as a composite attribute.

Multivalued Attribute: Some attributes can possess over one value; those attributes are called multivalued attributes.

Derived Attribute: An attribute that can be derived from other attributes of the entity is known as a derived attribute.

## Ans to the Que No 2(A)

The ER data model employs three basic concepts:

- entity sets,
- relationship sets,
- attributes.

### Entry Sets:

An entity set is a collection of similar types of entities. An entity set may contain entities with attribute sharing similar values. For example, a student's set may contain all the students of a school; likewise, a Teachers set may contain all the teachers of a school from all faculties

**Relationship Sets:**

A set of relationships of similar type is called a relationship set. Like entities, a relationship too can have attributes. These attributes are called descriptive attributes.

**Attributes:**

Entities are represented by means of their properties, called attributes. All attributes have values. For example, a student entity may have name, class, and age as attributes.

There exists a domain or range of values that can be assigned to attributes. For example, a student's name cannot be a numeric value. It has to be alphabetic. A student's age cannot be negative, etc.

## Ans to the Que No 2(B)

A mapping constraint is a data constraint that expresses the number of entities to which another entity can be related via a relationship set.

It is most useful in describing the relationship sets that involve more than two entity sets.

For binary relationship set R on an entity set A and B, there are four possible mapping cardinalities. These are as follows:

One to one (1:1)

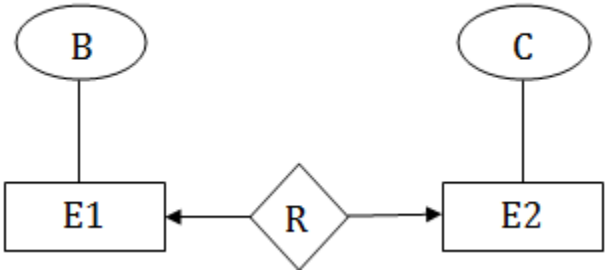
One to many (1:M)

Many to one (M:1)

Many to many (M:M)

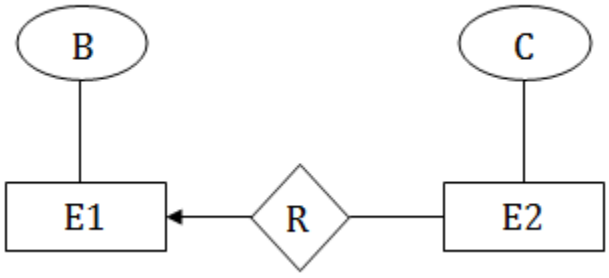
**One-to-one**

In one-to-one mapping, an entity in E1 is associated with at most one entity in E2, and an entity in E2 is associated with at most one entity in E1.



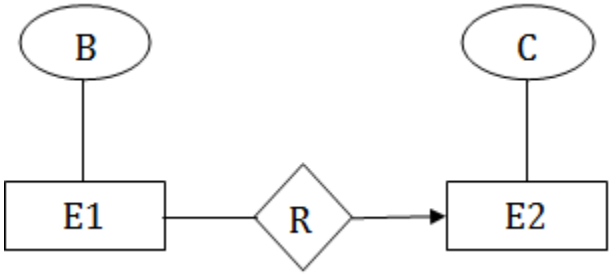
**One-to-many**

In one-to-many mapping, an entity in E1 is associated with any number of entities in E2, and an entity in E2 is associated with at most one entity in E1.



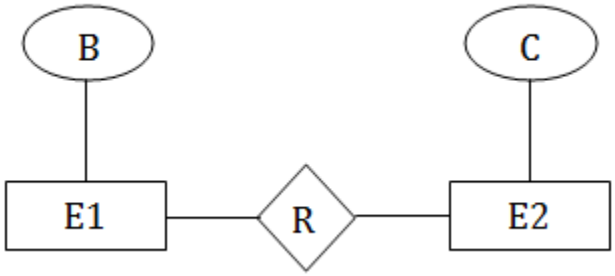

**Many-to-one**

In one-to-many mapping, an entity in E1 is associated with at most one entity in E2, and an entity in E2 is associated with any number of entities in E1.




**Many-to-many**

In many-to-many mapping, an entity in E1 is associated with any number of entities in E2, and an entity in E2 is associated with any number of entities in E1.



## Ans to the Que No 3(A)

**Normalization :**

Normalization is a database design technique that reduces data redundancy and eliminates undesirable characteristics like Insertion, Update and Deletion Anomalies. Normalization rules divides larger tables into smaller tables and links them using relationships. The purpose of Normalization in SQL is to eliminate redundant (repetitive) data and ensure data is stored logically.

**A goal of normalization:**

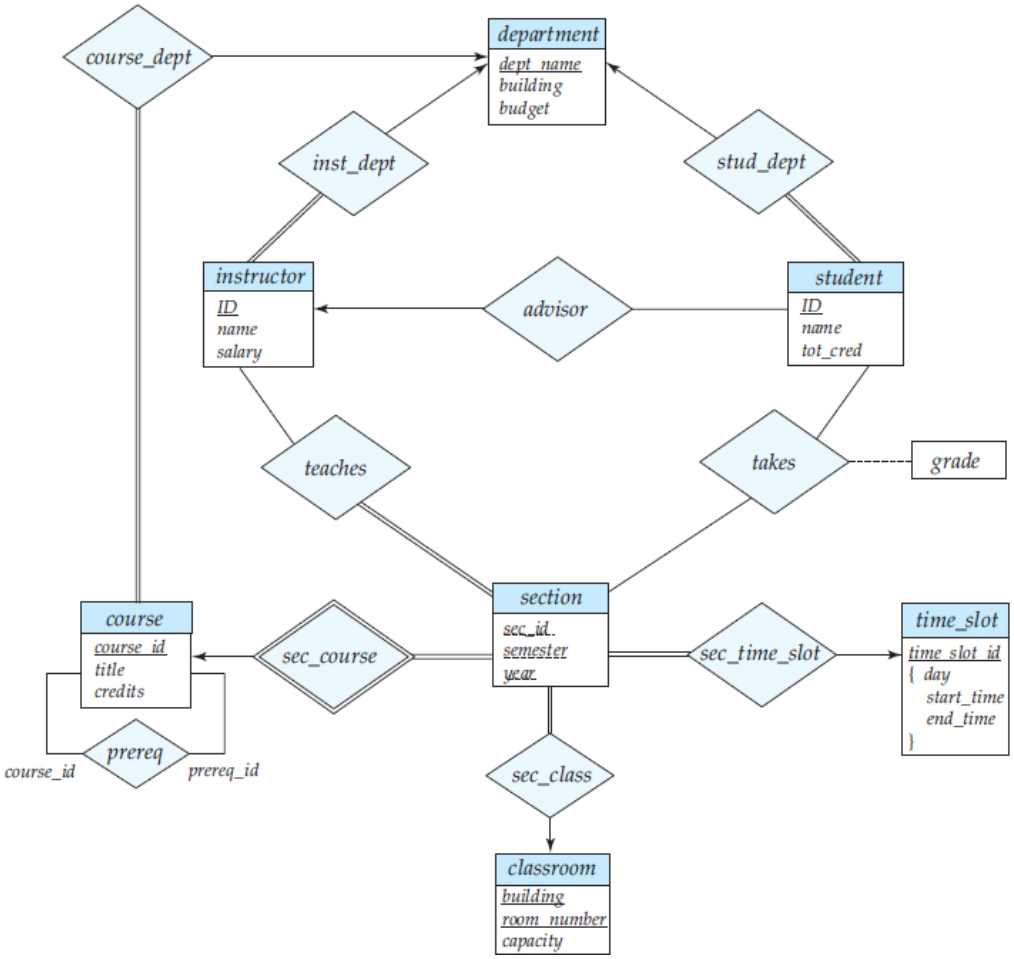
A goal of normalization is to minimize the number of redundancy.

Normalization is the process of removing redundant data from relational tables by decomposing the tables into smaller tables by projection. A relational table is considered to be in the first normal form from the start.

Database Normalization is a technique of organizing the data in the database. Normalization is a systematic approach of decomposing tables to eliminate data redundancy and undesirable characteristics like Insertion, Update and Deletion Anomalies.

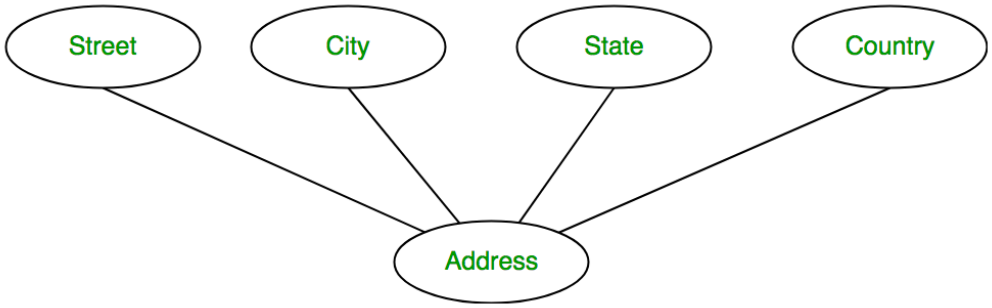
## Ans to the Que No 3(B)

ER Model Diagram for University Database:



## Ans to the Que No 4(A)

**Composite Attribute:**
An attribute composed of many other attribute is called as composite attribute. For example, Address attribute of student Entity type consists of Street, City, State, and Country. In ER diagram, composite attribute is represented by an oval comprising of ovals.




## Ans to the Que No 4(B)

**Schema Diagram for University Database:**