NORMALIZATION:

"The process of decomposing a large table into a smaller table is known as Normalization".

OR

"Reducing a table to its Normal Form is known as Normalization".

Types of Normalization:

1. First Normal Form (1NF)
2. Second Normal Form (2NF)
3. Third Normal Form (3NF)

1. First Normal Form (1NF):

A table is said to be in 1NF, if the given table satisfies the following conditions:

- The table should not have duplicate or repeated records.
- Each cell should only have a single value.

2. Second Normal Form (2NF):

A Table is said to be in 2NF, if the given table satisfies the following conditions:

- The table should be in 1NF.
- The Table should not have Partial Functional Dependency.

Partial Functional Dependency: Partial Functional Dependency occurs when one Primary key determines some other attribute/attributes.

3. Third Normal Form (3NF):

A Table is said to be in 3NF, if the given table satisfies the following conditions:

- The table should be in 2NF.

- The Table should not have Transitive Functional Dependency.

Transitive Functional Dependency: If Column entry is dependent on any other entry (Value) other than the key of the table, then it is said to have Transitive Functional Dependency.

ER MODEL:

An Entity Relationship (ER) model describes the structure of the database with the help of a diagram, which is known as Entity Relationship (ER) Diagram.

ER Diagram has three components:

1. Entity
2. Attribute
3. Relationship

Connectivity of a Relationship:

Different types of connectivity of a relationship are:

1. One to One (1:1): "Student allotted a project" signifies a one-to-one relationship because only one instance of an entity is related to exactly one instance of another entity type.

2. One to Many (1:M): "A department recruits faculty" is a one-to-many relationship because a department can recruit more than one faculty, but a faculty member is related to only one-department.

3. Many to One (M:1): "Many houses are owned by a person" is a many-to-one relationship because a person can own many houses but a particular house is owned only a person.

4. Many to Many (M:M): "Author writes books" is a many-to-many relationship because an author can write many books and a book can be written by many authors.

ER Diagram for Employee and Department Relationship:

- In this below example, the **"Employee"** entity has three attributes such as **Employee_No, Employee_Name**, and **Salary** with the Key attribute **"Employee No"**.

- The **"Department"** entity has three attributes such as **Department_No, Department_Name**, and **Location** with the Key attribute **"Department No"**.

- **"Work In"** is the relationship between two entities **"Employee"** and **"Department"**.