3. E/R Model.

(Marks:-18)

1) E/R Diagram: - OR E/R Model:-

Ans.

- E/R Diagram show the relation & relationship among the entity.
- Where **E= Entity.**
  R= Relationship.
  - ✓ In E/R diagram three major components:-
    1. **Entity**
    2. **Attributes.**
    3. **Relationship.**

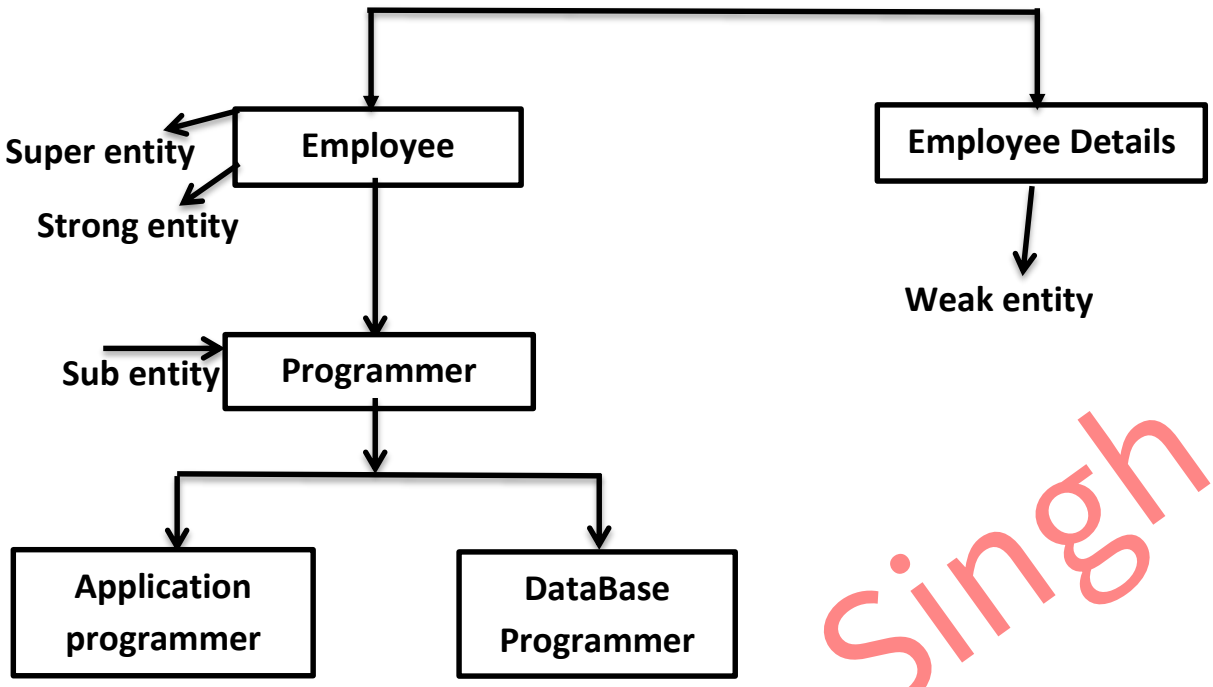
1. **<u>Entity</u> :-**

In DBMS an entity is something there which certain attributes.

An entities is simple a person, place, even, things, for which wish to collect the data.

Ex. In university environment faculties, members, courses, students.

- ❖ There are four types of entities:-
  - i. **Super entity.**
  - ii. **Sub entity.**
  - iii. **Strong entity.**
  - iv. **Weak entity.**



i. **Super entity** :-

An entity which is main things of E/R-diagram is called super entity.

ii. **Sub entity** :-

An entity which is part of super entity is called sub entity.

iii. **Strong entity** :-

An entity which is independent entity means it is not dependent on other entity is called strong entity.

iv. **Weak entity** :-

An entity which is dependent on another entity is called weak entity.

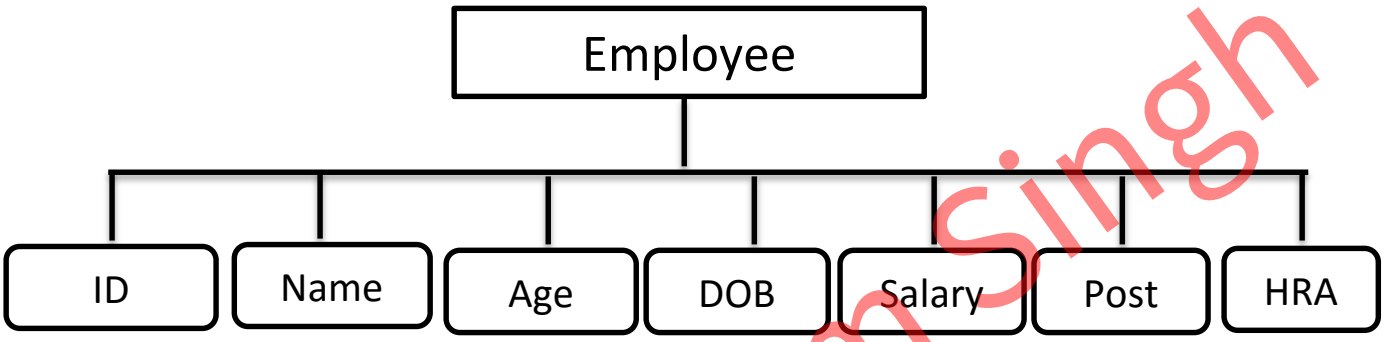
2. **Attribute**:-

Each entities has certain characterizers known as attribute.

Or

Attribute is value or properties of an entity.

Ex.



~ In about ex. employee is an entity & attribute is ID, Name, Age, DOB, Salary, Post, HRA etc.

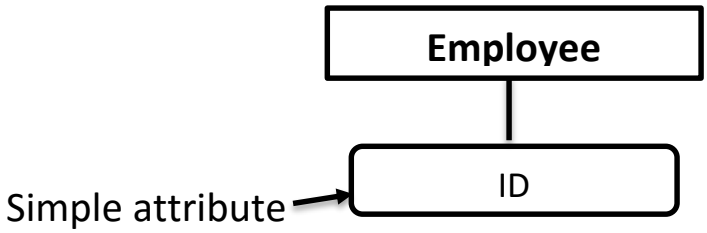
✓ There are six types of attribute:-

i. **Simple attribute.**
ii. **Composite attribute.**
iii. **Multi value attribute.**
iv. **Single value attribute.**
v. **Base attribute.**
vi. **Derived attribute.**

i. **Simple attribute**:-

Simple attribute can't be future broken down or sub derived.

Ex.

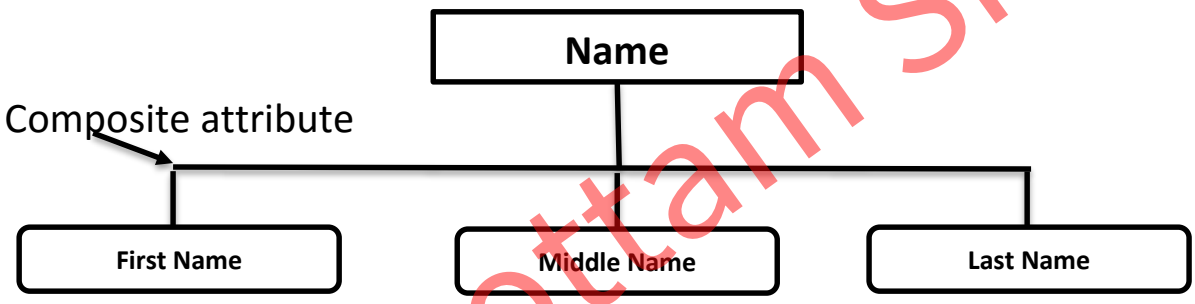


In about ex. we can't be derived ID attribute so ID is simple attribute.

ii. <u>Composite attribute</u>:-

More than one value of single attribute so single attribute known as composite attribute.

Ex.



In about ex. we declare name into three parts attribute so name is Composite attribute.

iii. <u>Multi value attribute</u>:-

In an attribute which has multiple value so that kind of attribute are known as multi value attribute.

Ex.

~ Phone number of employee is multi value attribute because phone has two or more value.

iv. <u>Single value attribute</u>:-

If attribute has single than those kinds of attribute known as single attribute.

Ex.

~ Date of birth is single value attribute because it has only single value.

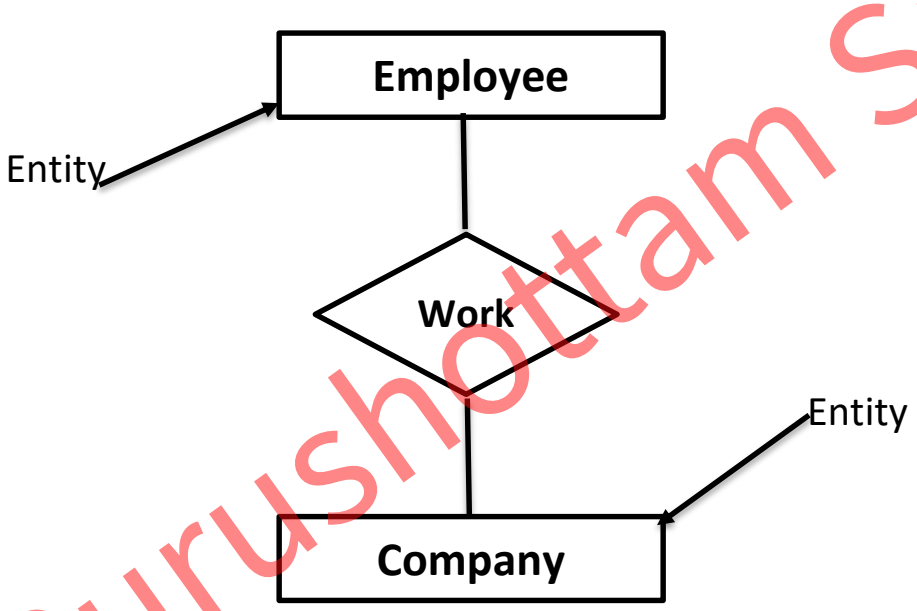
iv. **Base attribute:-**

Date is base of attribute because we can calculate age of employee with the help of date of birth.

v. **Derived attribute:-**

Age is a derived attribute because we can declare age depend on employee date of birth.

3. Relationship :-

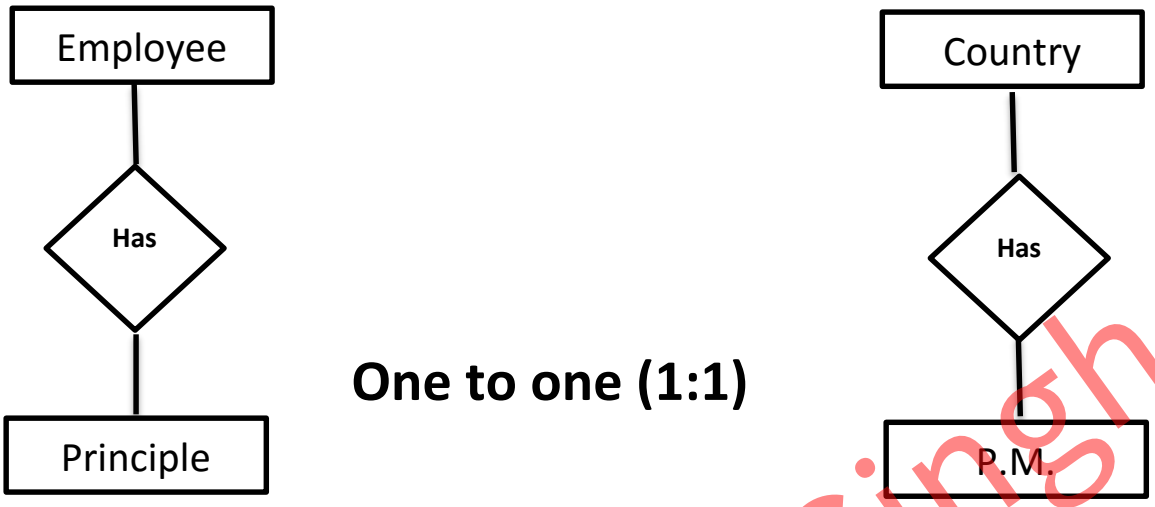


Relationship is associated or link between two entities.

- There are four types of entities:-

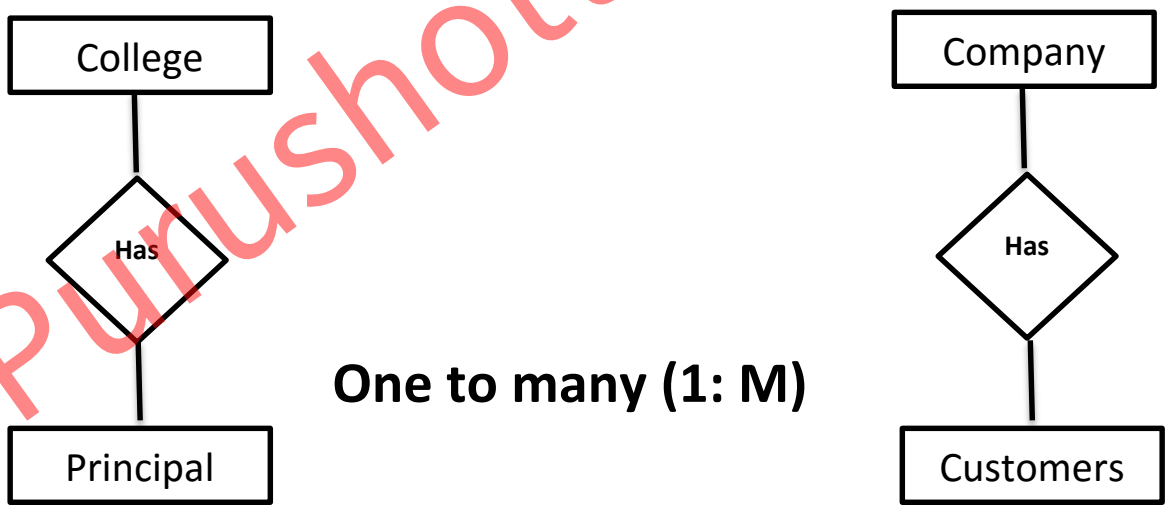
i. **One to one [1:1] relationship.**
ii. **One to many [1: M] relationship.**
iii. **Many to one [M: 1] relationship.**
iv. **Many to many [M: M] relationship.**

i. **<u>One to one [1:1] relationship</u>:-**



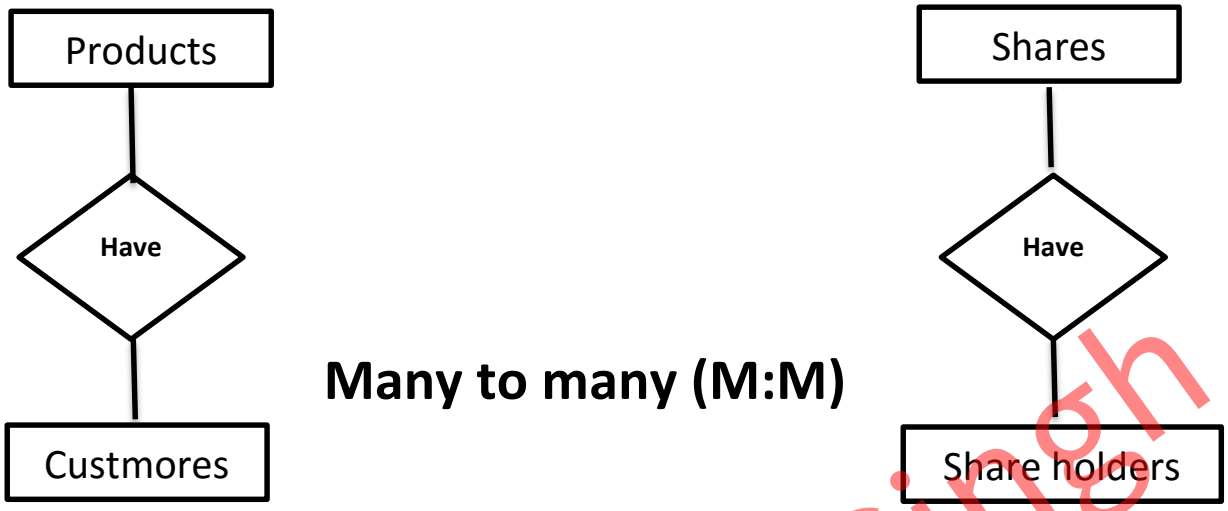
~ In about ex. represent one to one (1:1) relationship between employee-principal or country-P.M.

ii. **<u>One to many [1:M] relationship</u>:-**



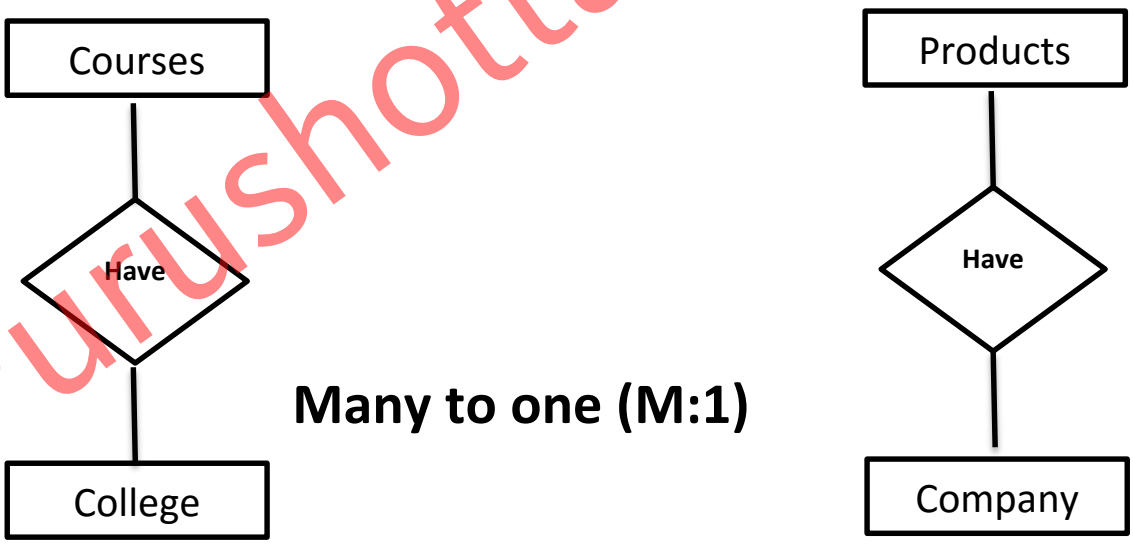
~ In about ex. represent one to many (1:M) relationship between college –principal & company-customers.

iii. **Many to many [M:M] relationship**:-



~ In about ex. represent many to many (M:M) relationship between products-customers & shares-share holders.

iv. **Many to One [M:1] relationship**:-



~ In about ex. represent many to one (M:1) relationship between courses-college & product-company.

2) Normalization……

Ans.

Normalization is process of reduce the redundancy.

Redundancy means we can remove duplicate data from the database is called redundancy.

~ **There are three types of mapping of database:-**

1. Insert.
2. Update.
3. Delete.

1. **<u>Insert</u> :-**

   You can insert the row or column in database with the help of insert we alert the database.

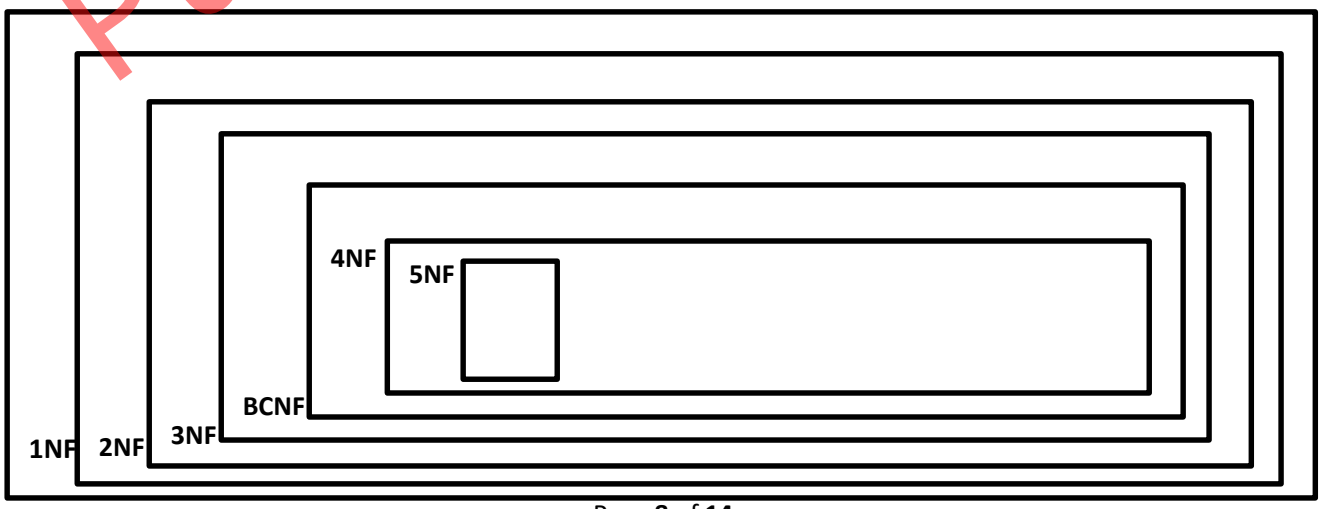
2. **<u>Update</u> :-**

   You can update the row or column in database with the help of update we alert the database.

3. **<u>Delete</u> :-**

   You can delete the row or column in database with the help of delete we alert the database.

<u>Diagram of Normal Form</u>:-



- **There are six types of the NF [Normal Form]:-**
  1. **1st NF [1st Normal Form]**
  2. **2nd NF [2nd Normal Form]**
  3. **3rd NF [3rd Normal Form]**
  4. **BCNF [Boyce codd Normal Form]**
  5. **4th NF [4th Normal Form]**
  6. **5th NF [5th Normal Form]**

1. 1st NF [1st Normal Form] :-

- 1st NF for initialization step to convert your database into Normalization.
- 1st Normal Form is shortly in 1NF.
- 1st NF is also called flat file.

Rules of 1st NF:-

- In relation each and every attribute depends on automatic value.

Order No.	Order Date.	Item Code.	Item Name.	Quantity.	Price.
1456	25/07/2009	001	Pen	20	50
1456	25/07/2009	002	Pencil	20	40
1456	25/07/2009	003	Book	10	150
1600	08/09/2009	002	Pencil	20	40
1640	15/10/2009	001	Pen	20	50

~ The about table is already in 1st NF.

~ In a table order no. or Item code are automatic value each and every attribute which are store in relation that are depend on automatic value.

2. 2nd NF [2nd Normal Form]:-

2nd NF is the improvement of 1st NF.

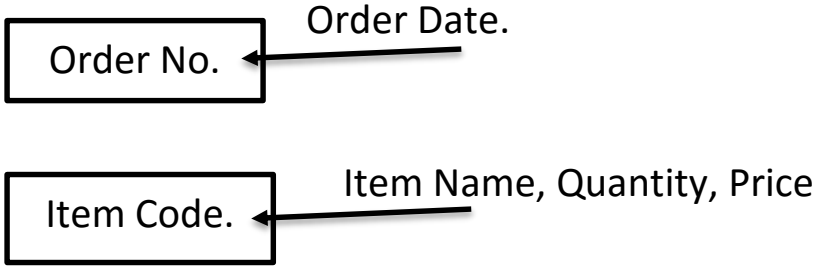
Rules of 2nd NF:-

- In relation all non-key attribute depend on primary key.

Table no.(1)

Order No.	Order Date.	Item Code.	Item Name.	Quantity.	Price.
1456	25/07/2009	001	Pen	20	50
1456	25/07/2009	002	Pencil	20	40
1456	25/07/2009	003	Book	10	150
1600	08/09/2009	002	Pencil	20	40
1640	15/10/2009	001	Pen	20	50

■ **Draw the dependency diagram figure on table (1).**



■ **Draw the dependency diagram figure on table (2).**

Order No.	Order Date.
1456	25/07/2009
1600	08/09/2009
1640	15/10/2009

Primary key

■ **Draw the dependency diagram figure on table (3).**

Item Code.	Item Name.	Quantity.
001	Pen	20
002	Pencil	20
003	Book	10

Primary key

■ **Draw the relation table (4).**

Order No.	Item Code.	Price.
1456	001	50
1456	002	40
1456	003	150

Order No.	Item Code.	Price.
1600	002	40
1640	002	50

~ About table are in 2nd NF form table & order no. is primary & all other attribute depend on primary key.

~ Item code is primary key & all other attribute another primary key.

~ In 4th table has no primary key because it is relation table.

~ In about relationship sissified all condition of 2nd NF.

3. 3rd NF[3rd Normal Form]:-

- 3rd NF is improvement of 2nd NF.

Rules of 3rd NF:-

- In relation all non-key attribute are functionally depend on:-
  1. **Primary Key.**
  2. **Mutual independent.**

1. **Primary Key :-**

Having unique value in any giving row. Can't contain null values.

2. **Mutual independent :-**

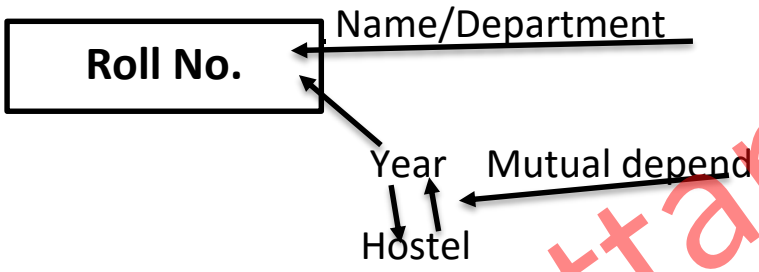
Key attribute can't be depend all each other.

~ 3rd NF will be needed were an attribute relation aren't functionally depend on primary key & mutual depend.

Table:-1

Roll No.	Name.	Department	Year	Hostel
1.	Mul	Maths	1	Ganga
2.	Yash	Science	1	Ganga
3.	Meet	Gujarati	2	Kaveri
4.	Monika	Hindi	2	Kaveri
5.	Surbhi	English	3	Narmda

Dependency Figure:-



~ In about ex. relationship roll no. is primary key & all other attribute depend on roll no.

~ Table-1 you can see 1st year students stay in Ganga hostel.

~ Table-1 you can see 2nd year students stay in Kaveri hostel.

~ Table-1 you can see 3rd year students stay in Narmda hostel.

~ This mutual depend between year & hostel for the convert database into 3rd NF we have remove this.

- **Mutual independent :-**

  For converting table into 3rd NF we derived table into 2 part.

- **Student master table:-(2)**

Roll No.	Name.	Department	Year
1.	Mul	Maths	1
2.	Yash	Science	1
3.	Meet	Gujarati	2
4.	Monika	Hindi	2
5.	Surbhi	English	3

- **Hostel master table:-(3)**

Hostel	Year
Ganga	1.
Kaveri	2.
Narmda	3.

~ In about ex. table two or three we remove mutual depend between hostel & year & all known as key attribute are functionally depend or primary key.

❖ **Demoralization**:-

Demoralization is process of attend to optimize the read performance of a database by adding redundancy data or by grouping data.

❖ **Meta-Data**:-

Data about data is called Meta-data.

"The End"