

## Normalization

### What is Normalization ?

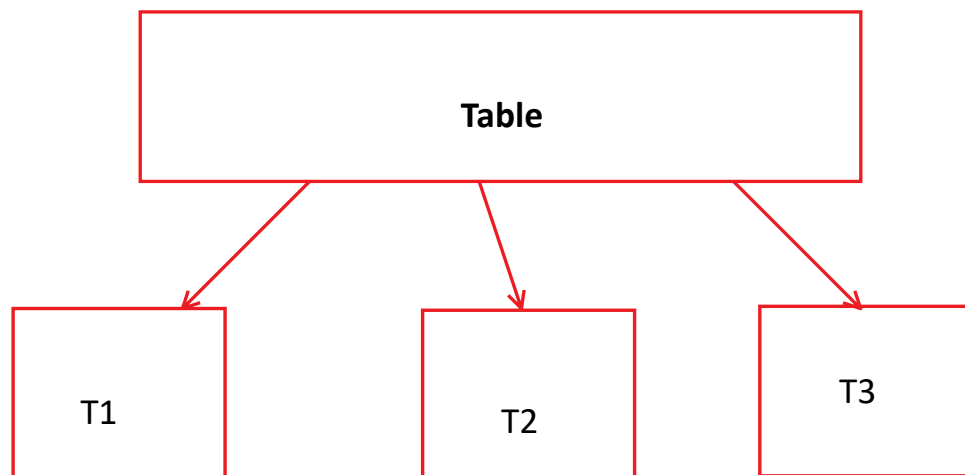
" It is the process of reducing a large table into smaller tables in order to remove redundancies and anomalies by identifying their functional dependencies is known as Normalization . "

Or

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

Or

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



### What is Normal Form ?

**A table without redundancies and anomalies are said to be in Normal Form .**

### Redundancies:

The repetition of unnecessary data.

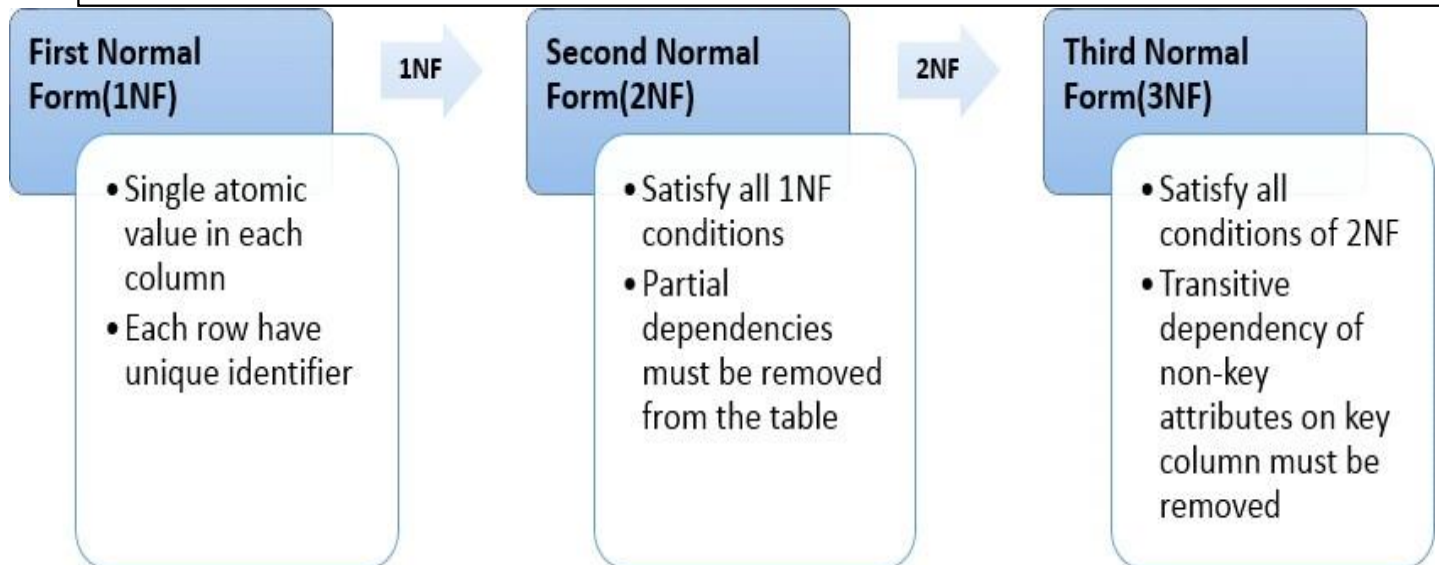
### Anomalies:

The side effect caused due to DML operations (insert, update, delete).

### Levels of Normal Form .

1. **First Normal Form ( 1NF )**
2. **Second Normal Form ( 2NF )**
3. **Third Normal Form ( 3NF )**
4. **Boyce - Codd Normal Form ( BCNF )**

**Note : If any Table / entity is reduced to 3NF , then the table is said to be normalized.**



### 1. First Normal Form ( 1NF ) :

- No duplicates records .
- Multivalued data should not be present .

QSPIDERS

<u>OID</u>	<u>NAME</u>	<u>COURSE</u>
1	A	JAVA
2	B	JAVA , SQL
3	C	MT , SQL
1	A	MT



<u>OID</u>	<u>NAME</u>	<u>C1</u>	<u>C2</u>	<u>C3</u>
1	A	JAVA		MT
2	B	JAVA	SQL	
3	C		SQL	MT

### 2. Second Normal Form ( 2NF )

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

**EMPLOYEE - ( EID , ENAME , SAL , DEPTNO , DNAME , LOC )**

<u>Eid</u>	<u>ename</u>	<u>sal</u>	<u>Deptno</u>	<u>dname</u>	<u>Loc</u>
1	A	100	10	D1	L1
2	B	120	20	D2	L2
3	C	320	10	D1	L1
4	D	251	10	D1	L1

**Eid** - ename , sal

**Deptno** - dname , loc

composite key attribute results in PFD:-

( **Eid , deptno** ) -> ( Ename , Sal , Dname , Loc )

R1 - ( **EID** , ENAME , SAL )

R2 - ( **DEPTNO** , DNAME , LOC )

<u>Eid</u>	<u>ename</u>	<u>sal</u>
1	A	100
2	B	120
3	C	320
4	D	251

<u>Deptno</u>	<u>dname</u>	<u>Loc</u>
10	D1	L1
20	D2	L2

### 3. Third Normal Form ( 3NF )

- Table should be in 2NF .
- Table should not have Transitive Functional Dependency .

*Transitive functional dependency:-*

- Employee - ( **EID** , Ename , Sal , comm , Pin code , state , country )
- **EID** -> ENAME

SAL COMM

**PINCODE** -> STATE

COUNTRY

R1- ( **eid** , ename , comm )

R2- ( **pincode** , state , country )