

## Normalisation:

- 1) It is a process of decomposing relations with anomalies(defects) to produce smaller, **well-structured** relations
- 2) Also prevents unnecessary duplication of data
- 3) What is well-structured relations:
  - 1) Which contains minimal data redundancy and allows users to insert, update and delete rows without causing any sort of data inconsistencies
- 4) Types of Anomalies:
  - 1) Insertion:
    - 1) Adding new rows forces user to create duplicate data
  - 2) Deletion:
    - 1) Deleting rows may cause a loss of data that would be needed for other future rows
  - 3) Modification/Updation:
    - 1) Changing data in a row forces changes to other rows because of duplication
- 5) Issues with Data Redundancy:
  - 1) It takes up extra space
  - 2) It leads to insertion, deletion and updation anomaly
  - 3) Solution: Normalisation
- 6) **Functional Dependency:**
  - 1) 2-NF and 3-NF are based on this
  - 2) Describes Relationships between attribute
  - 3) If each value of A is associated with exactly one value of B
  - 4) Denoted by  $A \rightarrow B$  : {B is functionally dependent on A}

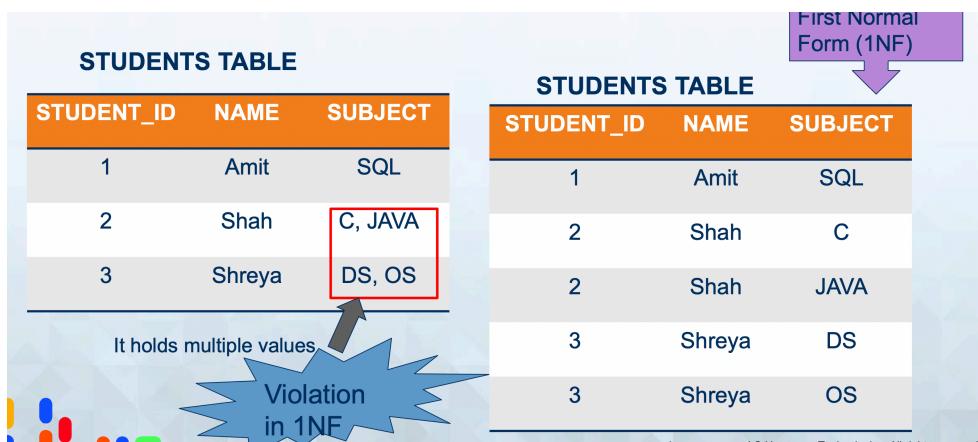
## Normalisation Forms:

### Un-Normalized Table:

Student_id	Name	Branch	Hod	Office_tel	Subject	Marks	Teacher	Examname	Totalmarks
1	Amit	CSE	Mr. X	23347	SQL	40	Mr. Ram	Practicals	40
2	Shah	CSE	Mr. X	23347	C, JAVA	60,65	Mr.John, Mr. Kent	Theory exam	70
3	Shreya	CSE	Mr. X	23347	DS, OS	45,40	Mr. Sam, Mr.John	Sessions	50
4	Dheena	CSE	Mr. X	23347	JAVA	60	Mr.Kent	Theory exam	70

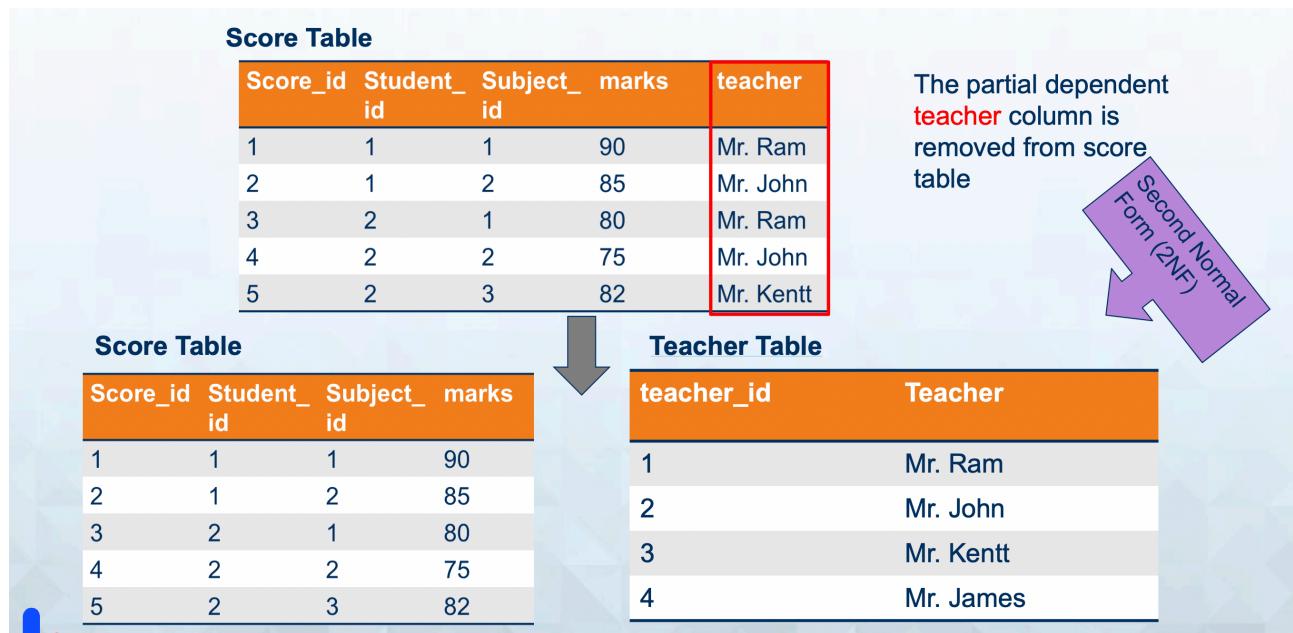
### a) 1-NF:

- a) Rules:
  - a) No multi-valued attributes
  - b) Every Value in a cell should be atomic



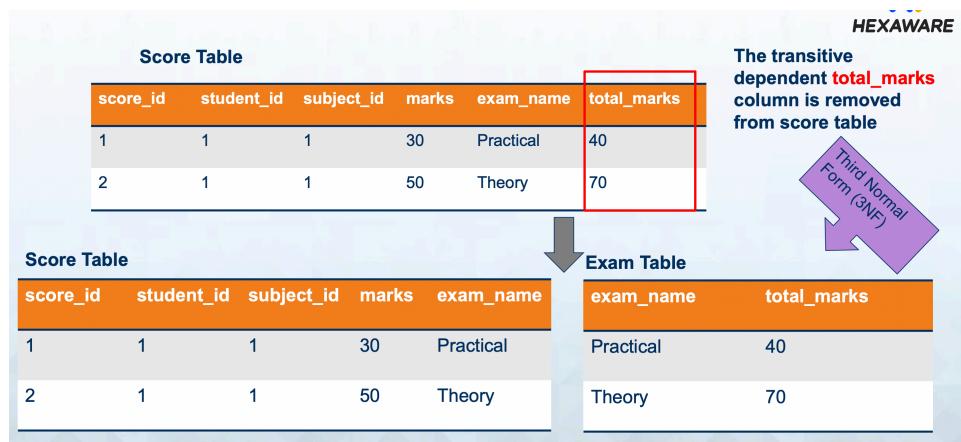
b) 2-NF:

- a) Rules:
  - a) It should be in 1-NF
  - b) No Partial Dependencies
    - a) When a non-key attribute is functionally dependent on part of candidate key.



c) 3-NF:

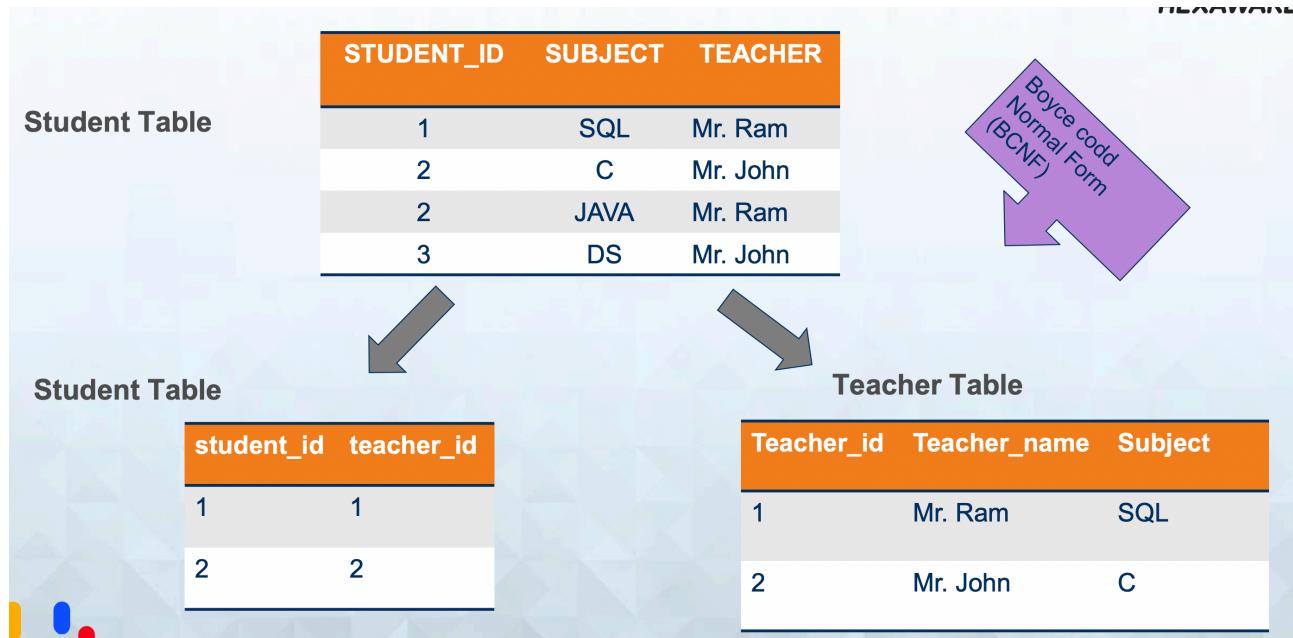
- a) Rules:
  - a) It should be in 2-NF
  - b) There should be no transitive functional dependencies
    - a) Transitive Dependency:
      - a)  $A \rightarrow B, B \rightarrow C$  then if  $A \rightarrow C \rightarrow$  transitive dependency
      - b) To bring it in 3-NF we will remove the Dependency i.e. C



d) BCNF(Boyce-Codd-Normal-Form):

a) Rules:

- a) It should be in 3-NF
- b) For any dependency A->B, A should be super key



c)

**NOTES:**

- 1) Normalisation is not removing redundancy, but reducing it.