# Normalization in DBMS

Normalization is the process of organizing the data in the database. Normalization is used to minimize the redundancy from a relation or set of relations. It is also used to eliminate undesirable characteristics like insertion, update and Delete Anomalies.

Normalization breaks the larger table into smaller and links them using relationships.

Normal form is used to reduce redundancy from the database table.

## Advantages of Normalization

(i) Eliminates data Redundancy.
(ii) Ensures data Integrity using key constraints like primary key and foreign keys.
(iii) Reduce functional dependencies.
(iv) Improves performance by avoiding unnecessary redundant data.
(v) Reduces the chances of occurrence of data anomalies
(vi) facilitates data integration.
(vii) simplifies table structure.

## Disadvantages

(i) proper implementation of normalization requires expert knowledge of database design and the normalization process.
(ii) careless data decomposition may lead to data loss.
(iii) Time Consuming process to decompose into higher normalization forms.

## Un-normalized Table

| Teacher_Name | T_Subjects | T_Age | T_Address |
|---|---|---|---|
| RAM | math, physics | 26 | pokhara |
| shyam | English | 28 | kailali |
| Hari | Nepali | 29 | ktm |

## 1Nf:

→ All the attribute values should be an atomic.
→ No repeating groups in the table

| Teacher_Name | T_Subjects | T_Age | T_Address |
|---|---|---|---|
| RAM | math | 26 | pokhara |
| RAM | physics | 26 | pokhara |
| shyam | English | 28 | kailali |
| Hari | Nepali | 29 | ktm |

## 2nf:

→ Remove partial dependencies.
→ Table should be in 1Nf
→ Introduce primary key & foreign key to remove functional dependency.

| T_ID | teacher Name | Age | Address |
|---|---|---|---|
| 1 ~~RAM~~ | RAM | 26 | Pokhara |
| 2 ~~Shyam~~ | shyam | 28 | kailali |
| 3 ~~Hari~~ | Hari | 29 | ktm |

| T_ID | T_Subjects |
|---|---|
| 1 | math |
| 2 | physics |
| 3 | English |
| | Nepali |

exist transitive functional dependency.

# 3NF

→ Tables should be in 2NF.

→ Remove transitive dependencies.

| T_id | T_subjects |
|---|---|
| 1 | math |
| 1 | physics |
| 2 | English |
| 3 | Nepali |

| subjects_ID | T_subjects |
|---|---|
| math | i |
| Physics | ii |
| English | iii |
| Nepali | iv |