Normalization

* 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 the undesirable characteristics like Insertion, Update and Deletion Anomalies.
* Normalization divides the larger table into the smaller table and links them using relationship.
* The normal form is used to reduce redundancy from the database table.

First Normal Form (1NF)

* A relation will be 1NF if it contains an **atomic value.**
* It states that an attribute of a table cannot hold multiple values. It must hold only single-valued attribute.
* **EMPLOYEE table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **EMP\_ID** | **EMP\_NAME** | **EMP\_PHONE** | **EMP\_STATE** |
| 14 | John | 7272826385, 9064738238 | UP |
| 20 | Harry | 8574783832 | Bihar |
| 12 | Sam | 7390372389, 8589830302 | Punjab |

After ! NF:

|  |  |  |  |
| --- | --- | --- | --- |
| **EMP\_ID** | **EMP\_NAME** | **EMP\_PHONE** | **EMP\_STATE** |
| 14 | John | 7272826385 | UP |
| 14 | John | 9064738238 | UP |
| 20 | Harry | 8574783832 | Bihar |
| 12 | Sam | 7390372389 | Punjab |
| 12 | Sam | 8589830302 | Punjab |

Second Normal Form (2NF)

* In the 2NF, relational must be in 1NF.
* In the second normal form, all non-key attributes are fully functional dependent on the primary key
* **EACHER table**

|  |  |  |
| --- | --- | --- |
| **TEACHER\_ID** | **SUBJECT** | **TEACHER\_AGE** |
| 25 | Chemistry | 30 |
| 25 | Biology | 30 |
| 47 | English | 35 |
| 83 | Math | 38 |
| 83 | Computer | 38 |

* In the given table, non-prime attribute TEACHER\_AGE is dependent on TEACHER\_ID which is a proper subset of a candidate key. That's why it violates the rule for 2NF.
* To convert the given table into 2NF, we decompose it into two tables:
* **TEACHER\_DETAIL table:**

|  |  |
| --- | --- |
| **TEACHER\_ID** | **TEACHER\_AGE** |
| 25 | 30 |
| 47 | 35 |
| 83 | 38 |

* **TEACHER\_SUBJECT table:**

|  |  |
| --- | --- |
| **TEACHER\_ID** | **SUBJECT** |
| 25 | Chemistry |
| 25 | Biology |
| 47 | English |
| 83 | Math |
| 83 | Computer |