**Normalization of Database**

Database Normalization is a technique of organizing the data in the database. Normalization is a systematic approach of decomposing tables to eliminate data redundancy and undesirable characteristics like Insertion, Update and Deletion Anomalies. It is a multi-step process that puts data into tabular form by removing duplicated data from the relation tables.

Normalization is used for mainly two purposes,

* Eliminating redundant (useless) data.
* Ensuring data dependencies make sense i.e. data is logically stored.

**Normalization rule**

Normalization rule are divided into following normal form.

* First Normal Form
* Second Normal Form
* Third Normal Form

**First Normal Form (1NF)**

* As per First Normal Form, no two Rows of data must contain repeating group of information i.e. each set of column must have a unique value, such that multiple columns cannot be used to fetch the same row. Each table should be organized into rows, and each row should have a primary key that distinguishes it as unique.
* The **Primary key** is usually a single column, but sometimes more than one column can be combined to create a single primary key. For example consider a table which is not in First normal form.

**Second Normal Form (2NF)**

As per the Second Normal Form there must not be any partial dependency of any column on primary key. It means that for a table that has concatenated primary key, each column in the table that is not part of the primary key must depend upon the entire concatenated key for its existence. If any column depends only on one part of the concatenated key, then the table fails **Second normal form**.

**Third Normal Form (3NF)**

**Third Normal form** applies that every non-prime attribute of table must be dependent on primary key, or we can say that, there should not be the case that a non-prime attribute is determined by another non-prime attribute. So this *transitive functional dependency* should be removed from the table and also the table must be in **Second Normal form**. For example, consider a table with following fields.