

**Lesson:**

**3 NF**

# List of content :

1. What is 3NF ?
2. Example

## What is 3NF ?

A relation is in third normal form, if:

- it is in second normal form and
- there is no transitive dependency for non-prime attributes

Confusing ?

Let us understand this in simple terms.

Look at these tables:

**Table 1:**

**Table 2:**

Here, both the tables satisfy the condition of 1NF since all the cells have atomic/single values and both tables have primary key.

For the table to be in 2NF, it should not have any partial functional dependency which is true here. Hence, it is in 2NF.

Look at the Table 1, did you observe that Customer\_name column has repeating values ? Therefore, it may be concluded that it is still in the structure where its form can be improved further.

For this, we need to move this table to 3NF which means there should be no transitive dependency.

Are you wondering what transitive dependency is?

It is an indirect dependency.

Let us try to understand the concept of transitive dependency with the help of an example.

Rohan's father works for an organization ABC and earns his monthly compensation. He gives some of it to Rohan as his pocket money. Hence, in a way we can say that Rohan will get his pocket money only if his father is being paid by ABC and Rohan is indirectly dependent on ABC. If the organization stops the monthly compensation of father, Rohan will stop receiving pocket money.

This indirect dependency is known as transitive dependency.

Cut to the definition of 3NF, for a table to be in 3NF there should be no transitive dependency.

Let us analyse the tables now:

**Table 1:**

**Table 2:**

Here, Car\_Num\_Plate is the primary key

- Car\_Name is directly dependent on Car\_Num\_Plate
- Owner\_Id directly depends on Car\_Num\_Plate
- Owner\_name, however, does not depend on Car\_Num\_Plate. It depends on Owner\_id which in turn depends on Car\_Num\_Plate.

Hence, relationship between the Owner\_name and Car\_Num\_Plate is indirect or in other words, they have transitive dependency which means the tables are still not in 3NF.

Also, Customer\_id directly depends on Car\_Num\_Plate but Customer\_Name depends on Customer\_id which in turn depends on Car\_Num\_Plate. This condition again concludes that table is not in 3NF.

Therefore, both the tables are not in 3NF as both show transitive dependency.

To bring them to 3NF, identify columns that have transitive dependencies and break those columns to create new tables which show no transitive dependencies.