

Lesson:

3 NF



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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:

Car_Num_Plate	Date_of_trans	Cust_Id	Cust_Name
KA51MK1234	12/01/2020	13452	Sachin
KA51MK5436	18/01/2020	13452	Sachin
KA51MK3421	12/01/2020	45621	Rahul
KA51MK6534	14/01/2020	45621	Rahul
KA51MK3789	15/01/2020	45621	Rahul

Table 2:

Car_Num_Plate	Car_Name	Owner_id	Owner_name
KA51MK1234	Swift	O_76	Dev
KA51MK5436	Thar	O_78	Irfan
KA51MK3421	BMW	O_54	Rohit
KA51MK6534	HondaCity	O_65	Shikhar
KA51MK3789	Swift	O_86	Irfan

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

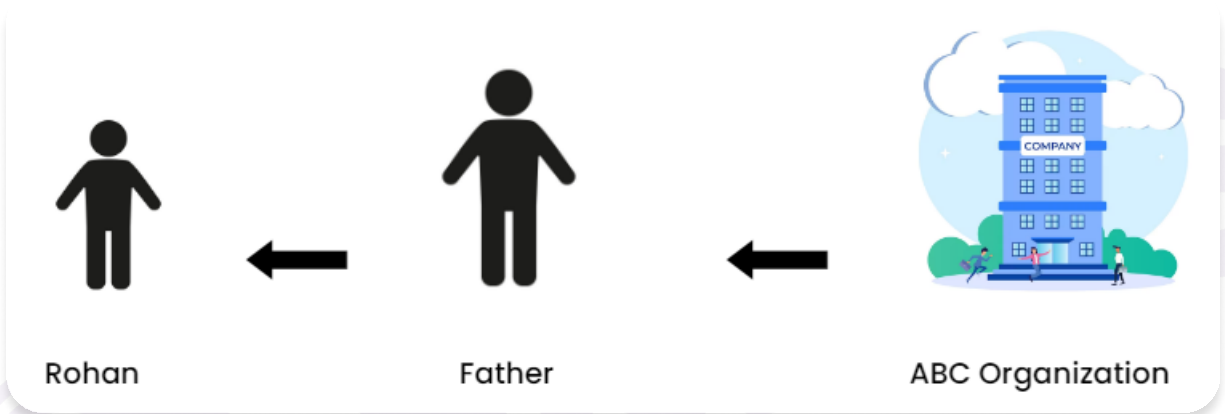
For the table to be in 2NF, it should not have any partial functional dependency which is true here. Hence, it is in 2NF.

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:

Car_Num_Plate	Date_of_trans	Cust_Id	Cust_Name
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Table 2:

Car_Num_Plate	Car_Name	Owner_id	Owner_name
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KA51MK3789	Swift	O_86	Irfan

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.

