NORMALIZATION

Consider the following tables:

PRODUCT:

Product_id	Product_name	Unit_price	Category_id
1	Mysore_sandal	750	2
2	colgate	40	1

Primary key is product_id.The above table is in 1NF,2NF,3NF,BCNF.No need to normalize this table

CATEGORY:

Category_id	Category_name
1	Tooth_paste
2	soap

Primary key is category_id.The above table is in 1NF,2NF,3NF,BCNF.No need to normalize this table

PURCHASE:

Customer_id	Product_id	Sales_repr_id	No_of_units	Date_of_purchase	Categpry_id	Location_id	state
101	2	202	4	26-10-2020	1	456	bihar
102	1	201	5	27-05-2020	2	654	kashmir

The candidate key for the above table is :

Customer_id product_id sales_repr_id no_of_units date_of_purchase

The functional dependencies are:

(1)Product_id->category_id

(2)Customer_id->location_id

(3)Location_id->state

The above table is in 1NF

(1) And (2) are partial dependencies and therefore the above table is not in 2 NF

So,divide the table as following three tables:

Product_id	Category_id

Customer_id	Location_id	state

Product_id	Customer_id	Sales_repr_id	No_of_units	Date_of_purchase

Now all the tables are in 2 NF.

The second table is not in 3NF

As customer_id->location_id and location_id->state.There is transitive dependency.So again splitting the tables we get

Customer_id	Location_id

Location_id	state

Now,the tables above are in 1NF,2 NF,3NF and BCNF

CUSTOMER:

Customer_id	Name	dob	gender	Mobile_no	Location_id
1	apoorva	25-10-1999	female	9987787878,9123654842	456
2	srikar	3-11-2004	male	9876543212	654

The above table is not in 1NF.So on modifying,we get

customer_id	Name	dob	gender	Mobile_no	Location_id
1	apoorva	25-10-1999	female	9987787878	456
1	apoorva	25-10-1999	female	9123654842	456
2	srikar	3-11-2004	male	9876543212	654

Now,the table is in 1NF,2NF,3NF and BCNF

This follows the same for sales_representative_table.

LOCATION:

Location_id	Location_name	state

This follows 1NF,2NF but not 3NF

Because

Location_id->location_name

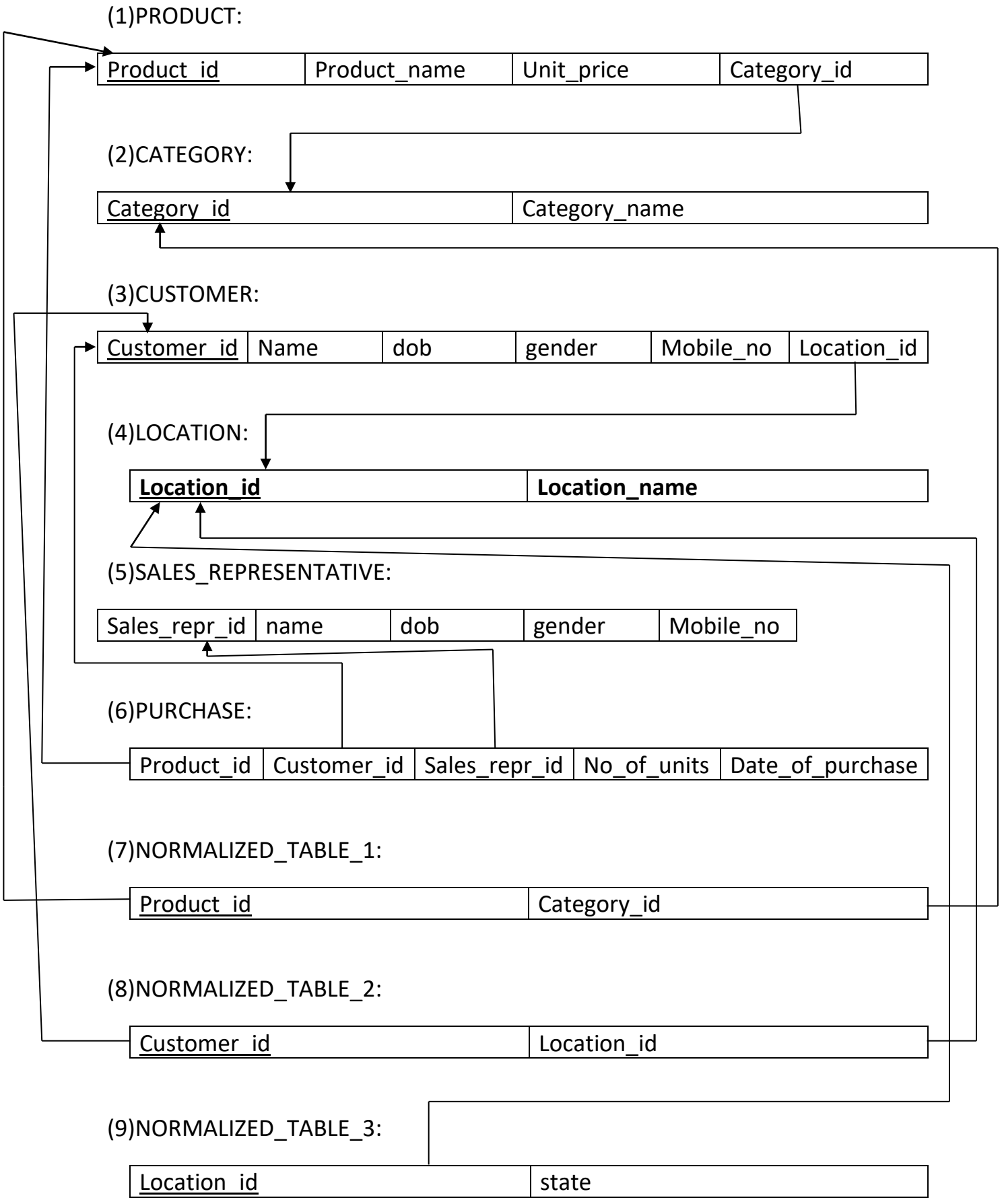
Location_name->state which is a transitive dependency. So

Location_id	Location_name

Location_id	state

Now all the tables follow normalization

After normalization ,the total number of tables formed are 9.They are:


(1)PRODUCT:
Product_id
Product_name
Unit_price
Category_id
(2)CATEGORY:
Category_id
Category_name
(3)CUSTOMER:
Customer_id
Name
dob
gender
Mobile_no
Location_id
(4)LOCATION:
Location_id
Location_name
(5)SALES_REPRESENTATIVE:
Sales_repr_id
name
dob
gender
Mobile_no
(6)PURCHASE:
Product_id
Customer_id
Sales_repr_id
No_of_units
Date_of_purchase
(7)NORMALIZED_TABLE_1:
Product_id
Category_id
(8)NORMALIZED_TABLE_2:
Customer_id
Location_id
(9)NORMALIZED_TABLE_3:
Location_id
state