

## HOME ASSIGNMENT-3

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Q) A company maintains a sales Database with the following unnormalized relation: sales (sale\_id, customer\_name, customer\_phone, product\_id, product\_name, category, unit\_price, quantity, sales\_date, region\_manager, manager\_contact). You are asked to analyze and normalize this schema based on the following business rules: Each product\_id, uniquely identifies a product\_name and category.

- Identify all functional dependencies present in above relation.
- Identify the candidate keys.
- Decompose the relation step by step into 3NF, clearly stating the reasons for each decompositions.
- Check wheather your final 3NF tables are in BCNF, if not, further decompose them into BCNF withu satisfaction.
- Draw a diagram or tabular representation of the final normalised schema.

A) a) functional dependencies:-

sale\_id  $\rightarrow$  {customer\_name, customer\_phone, product\_id, quantity, sales\_date, region\_manager, manager\_contact}

product\_name, category}

2) product\_id  $\rightarrow$  {product\_name, category, unit\_price}

3) region\_manager  $\rightarrow$  {manager\_contact}

4) Customer\_name  $\rightarrow$  customer\_phone (multivalued dependencies)

b) Candidate Key:-

• {sale\_id} is the only guaranteed candidate key.

c) Step by Step to 3NF:-

1) Extract products:- products(product\_id, "PK", product\_name, category, unit\_price)

2) Extract Manager:- managers (manager\_id, manager\_name, manager\_contact),

3) Extract customer\_phones:- customer(customer\_id, customer\_name)

customer\_phones (customer\_id, FK, customer\_phone)

4) Final Sales:-

Sales(sale\_id, customer\_id, product\_id, manager\_id, quantity, sales\_data, sale\_price)



d) BCNF checks:-

All the are in 3NF satisfied and also checked.

f) Final Schema:-

<u>Table</u>	<u>Attributes</u>
Customers	- customer_id (customer_name.
Customer phone	- customer_id, customer_phone, (customer_id), customer_name.
products	- product_id, product_name, category, unit=cost.
managers	- manager_id, manager_name, manager_contact.
Sales	- sale_id, customer_id, product_id, manager_id, quantity, sales_date.

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