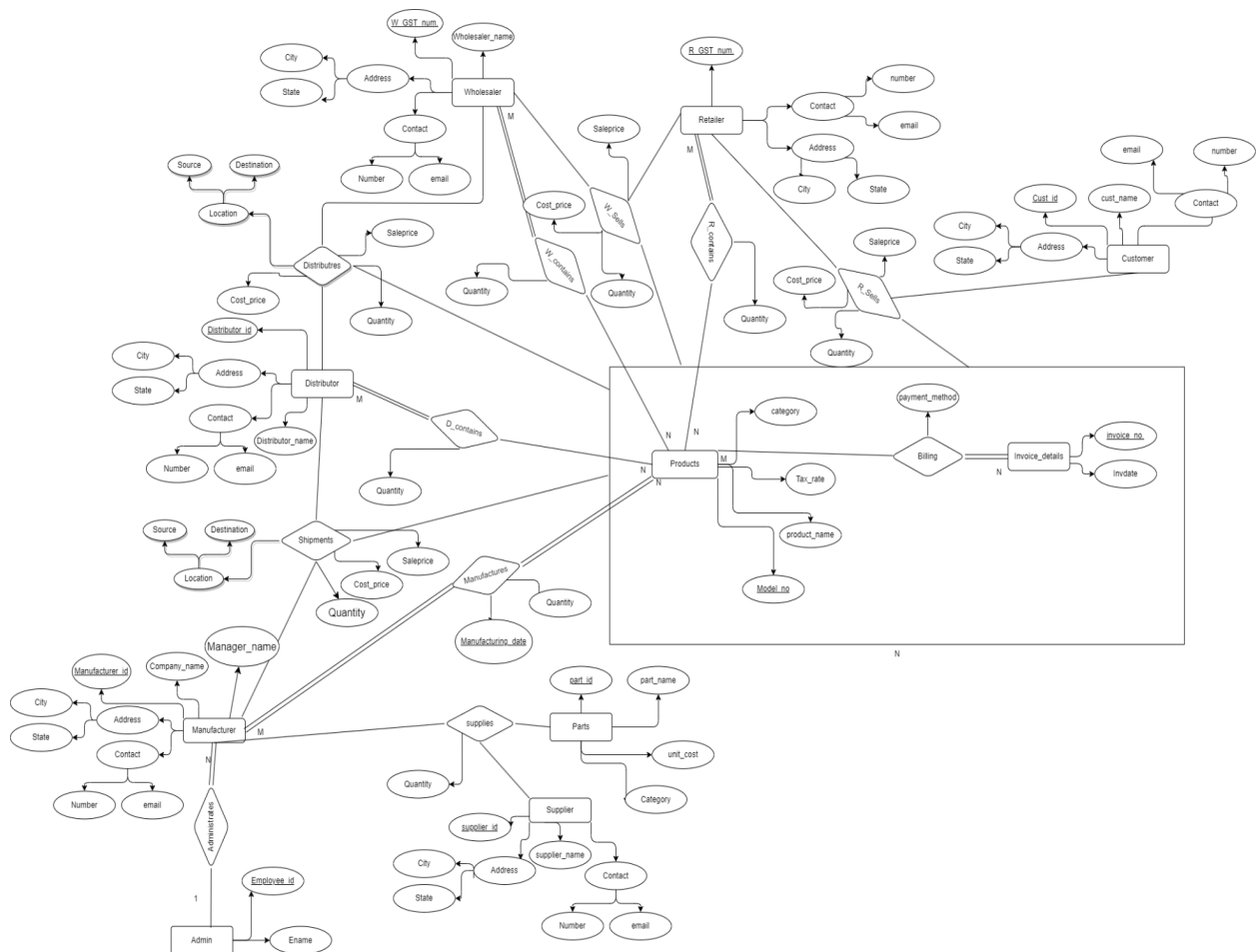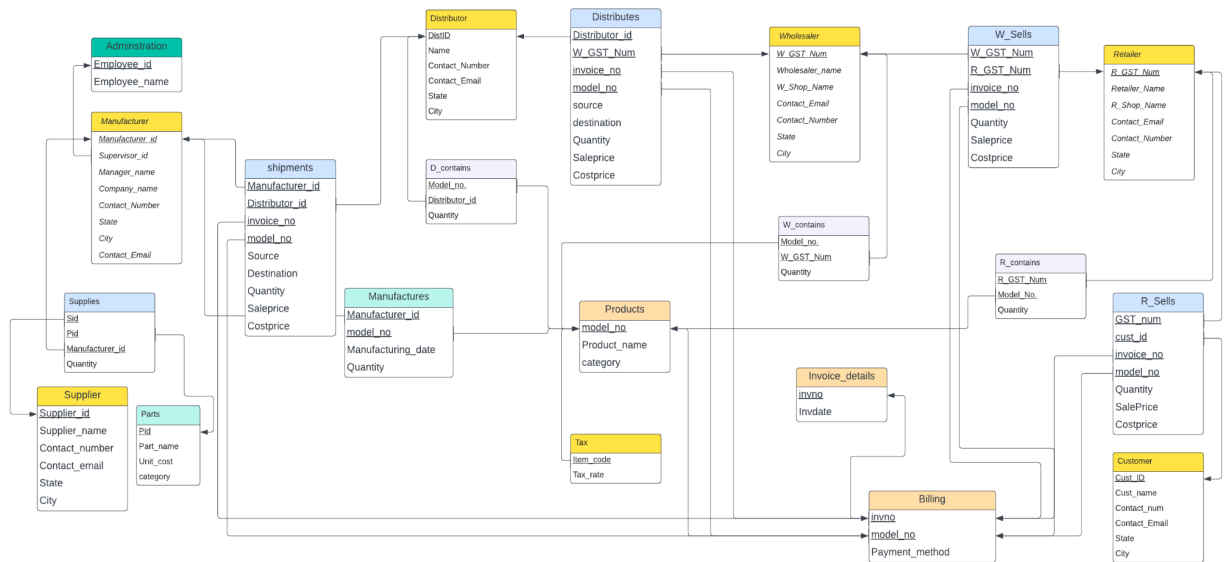# Group 8
SUPPLY CHAIN MANAGEMENT

Group Members:-

- Kirtan Mevada (202101012)
- Yashowardhan Bhagat (202101031)
- Divyam Thacker (202101068)
- Mayank Gour (202101072)

Entity Relationship Diagram

Relation Schema

Administration
- Employee_id
- Employee_name

Manufacturer
- Manufacturer_id
- Supervisor_id
- Manager_name
- Company_name
- Contact_Number
- State
- City
- Contact_Email

Supplies
- Sid
- Pid
- Manufacturer_id
- Quantity

Supplier
- Supplier_id
- Supplier_name
- Contact_number
- Contact_email
- State
- City

Parts
- Pid
- Part_name
- Unit_cost
- category

shipments
- Manufacturer_id
- Distributor_id
- invoice_no
- model_no
- Source
- Destination
- Quantity
- Saleprice
- Costprice

Manufactures
- Manufacturer_id
- model_no
- Manufacturing_date
- Quantity

Distributor
- DistID
- Name
- Contact_Number
- Contact_Email
- State
- City

Distributes
- Distributor_id
- W_GST_Num
- invoice_no
- model_no
- source
- destination
- Quantity
- Saleprice
- Costprice

D_contains
- Model_no.
- Distributor_id
- Quantity

Products
- model_no
- Product_name
- category

Tax
- Item_code
- Tax_rate

Invoice_details
- invno
- Invdate

Wholesaler
- W_GST_Num
- Wholesaler_name
- W_Shop_Name
- Contact_Email
- Contact_Number
- State
- City

W_contains
- Model_no.
- W_GST_Num
- Quantity

Billing
- invno
- model_no
- Payment_method

W_Sells
- W_GST_Num
- R_GST_Num
- invoice_no
- model_no
- Quantity
- Saleprice
- Costprice

Retailer
- R_GST_Num
- Retailer_Name
- R_Shop_Name
- Contact_Email
- Contact_Number
- State
- City

R_contains
- R_GST_Num
- Model_No.
- Quantity

R_Sells
- GST_num
- cust_id
- invoice_no
- model_no
- Quantity
- SalePrice
- Costprice

Customer
- Cust_ID
- Cust_name
- Contact_num
- Contact_Email
- State
- City

Minimal Database for all relational tables with reasons Proving it BCNF:-

BCNF Explanation:- If the LHS of all the Functional Dependencies (FD) is a candidate Key then we can say that the relation is a BCNF.

1) **Administration:-**

Employee_id -> Ename.

It contains only one Fd

Here Employee_id is a candidate key therefore Admin relation is a BCNF.

2) **Manufacturer:-**

(We have assumed that there is a single Contact number and Contact email for a given manufacturer)

Manager_id ->Manager_name

Manager_id -> Supervisor_id

Manager_id -> Company_name

Manager_id -> State

Manager_id -> city

Manager_id ->Contact_number

Manager_id ->Contact_email

Here Manager_id is a Candidate key therefore the relation is BCNF.

3) **Shipments:-**

{Manufacturer_id, Distributor_id, Invoice_no.,Model_no. } -> Quantity

{Manufacturer_id, Distributor_id, Invoice_no.,Model_no. } ->Source

{Manufacturer_id, Distributor_id, Invoice_no.,Model_no. } -> Destination

{Manufacturer_id, Distributor_id, Invoice_no.,Model_no. } -> Sale_price

{Manufacturer_id, Distributor_id, Invoice_no.,Model_no. } -> Cost_Price

Here {Manufacturer_id, Distributor_id, Invoice_no.,Model_no. } is a candidate key, and only candidate key is on LHS, therefore this table is BCNF.

4) Distributor:-

DistID -> Name

DistID -> Contact_Number

DistID -> Contact_Email

DistID -> State

DistID -> City

Here DistId is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

5) Distributes:-

{ Distributor_id, W_GST_Num , Inv_no., Model_no. } -> Quantity

{ Distributor_id, W_GST_Num , Inv_no., Model_no. } -> Source

{ Distributor_id, W_GST_Num , Inv_no., Model_no. } -> Destination

{ Distributor_id, W_GST_Num , Inv_no., Model_no. } ->Costprice

{ Distributor_id, W_GST_Num , Inv_no., Model_no. } ->Saleprice

Here { Distributor_id, W_GST_Num , Inv_no., Model_no. } is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

6) Wholesaler:-

W_GST_Num -> Wholesaler_name

W_GST_Num -> W_Shop_Name

W_GST_Num -> Contact_Number

W_GST_Num -> Contact_Email

W_GST_Num -> State

W_GST_Num -> City

Here W_GST_Num is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

7) W_Sells:-

{ R_GST_Num, W_GST_Num , Inv_no., Model_no. } -> Quantity

{ R_GST_Num, W_GST_Num , Inv_no., Model_no. } ->Costprice

{ R_GST_Num, W_GST_Num , Inv_no., Model_no. } ->Saleprice

Here { R_GST_Num, W_GST_Num , Inv_no., Model_no. } is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

8) R_Sells:-

{ R_GST_Num, W_GST_Num , Inv_no., Model_no. } -> Quantity

Here { R_GST_Num, W_GST_Num , Inv_no., Model_no. } is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

9)Retailer:-

R_GST_Num -> Retailer_Name

R_GST_Num -> R_Shop_Name

R_GST_Num -> State

R_GST_Num -> City

R_GST_Num -> Contact_Number

R_GST_Num -> Contact_Email

Here R_GST_Num is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

10) Customer:-

Cust_ID -> Cust_Name

Cust_ID -> State

Cust_ID -> City

Cust_ID -> Contact_Number

Cust_ID -> Contact_Email

Here Cust_id is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

11)invoice details:-

Inv_no. -> Invdate

Here Inv_no. is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

12)Tax:-

Item_code -> Tax_rate

Here item_code is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

13)Billing:-

{Invno., Model_no. } -> Payment_method

Here {Invno., Model_no. } is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

14) Products:-

Model_No -> Prod_Name

Model_No -> Category

Here Model_No   is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

15)Supplies:-

{Sid, Pid, Manufacturer_id} -> Quantity

Here {Sid, Pid, Manufacturer_id} is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

16)Parts:-

Pid -> part_name

Pid -> Unit_cost

Pid-> Category

 Here Pid is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

17) Supplier:-

Supplier_id -> Supplier_name

Supplier_id -> city

Supplier_id -> Contact_Number

Supplier_id -> Contact_Email

Supplier_id -> State

  Here Supplier_id is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

18) Manufacturers:-

{Manufacturer_id, Model_no., Manufacturing_date}->Quantity

 Here {Manufacturer_id, Model_no.,Manufacturing_date} is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

19) D_contains:-

{Model_no., Distributor_id}->Quantity

Here {Model_no., Distributor_id} is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

20) W_contains:-

{Model_no., W_GST_Num}->Quantity

Here {Model_no., W_GST_Num} is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.

21) R_contains:-

 {Model_no., R_GST_Num}->Quantity

Here {Model_no., R_GST_Num} is a candidate key, and only candidate key is on LHS, therefore This table is BCNF.