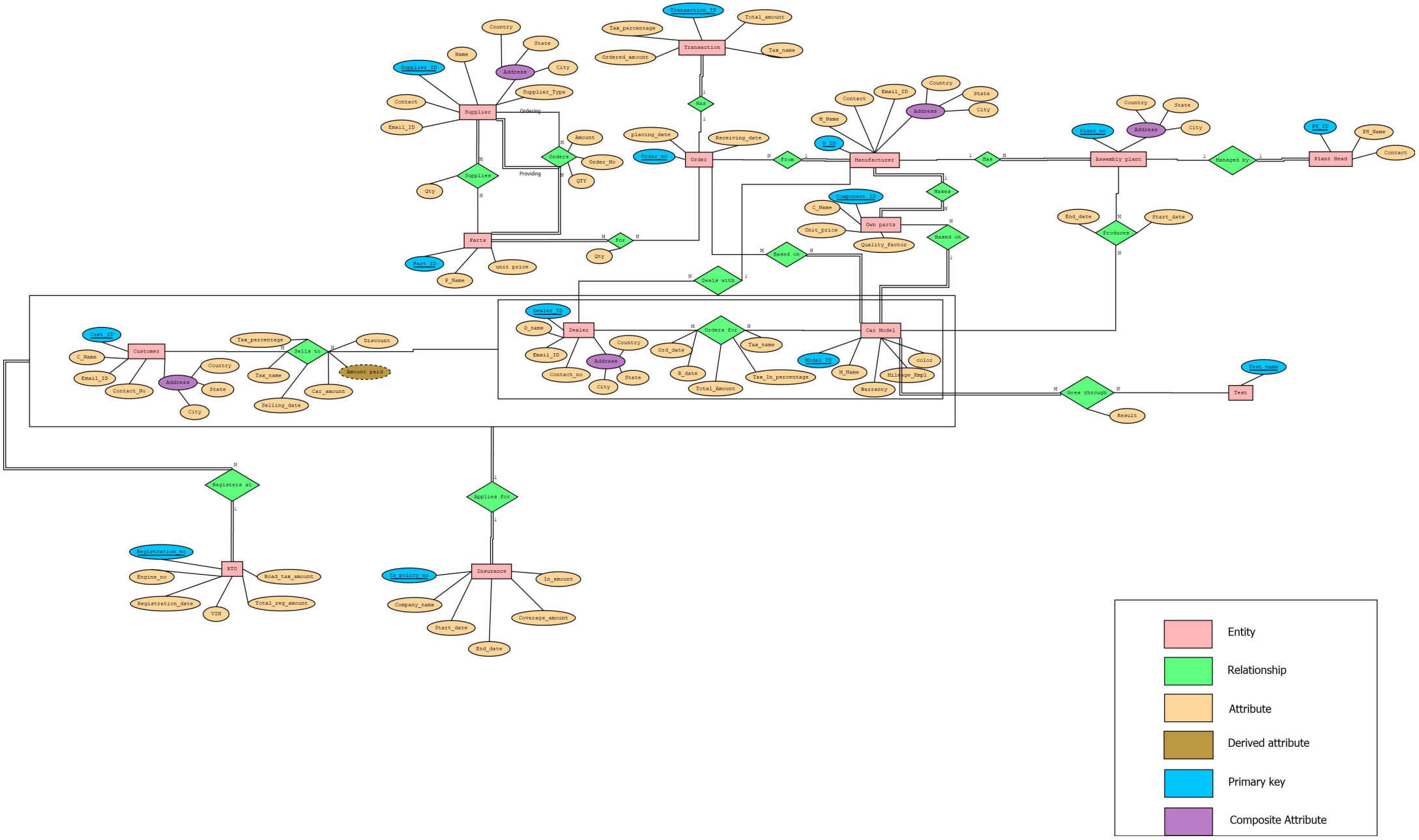
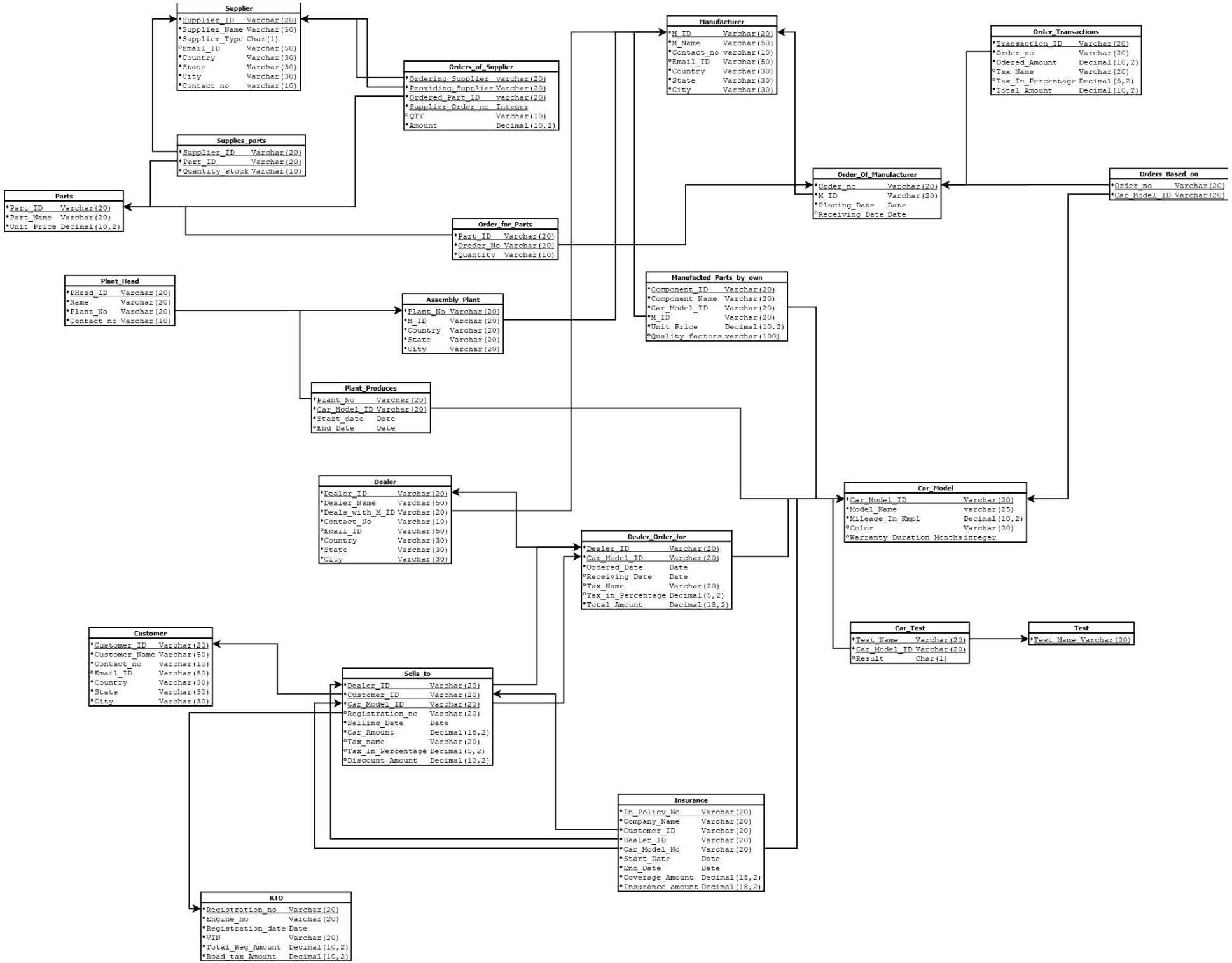

Transaction_ID
Total_amount
Tax_percentage
Transaction
Tax_name
Ordered_amount
Has
Country
State
Name
Address
City
Supplier_ID
Supplier_Type
Contact
Supplier
Ordering
Email_ID
Amount
placing_date
Receiving_date
Orders
Order_No
Order_No
Order
From
Manufacturer
Has
Assembly plant
Managed by
Plant Head
PH_ID
PH_Name
Contact
Plant_No
Qty
QTY
Supplies
Providing
M_ID
M_Name
Email_ID
Contact
Address
Country
State
City
Makes
Component_ID
C_Name
Own parts
Unit_price
Quality_factor
Based on
End_date
Start_date
Produces
Parts
For
Qty
Part_ID
P_Name
unit price
Based on
Deals with
Dealer_ID
D_name
Dealer
Email_ID
Contact_no
Country
Address
City
State
Orders for
Ord_date
R_date
Total_Amount
Tax_name
Tax_In_percentage
Car Model
Model_ID
M_Name
Warranty
Mileage_Kmpl
color
Goes through
Result
Test_name
Test
Cust_ID
C_Name
Email_ID
Customer
Address
Contact_No
Country
State
City
Tax_percentage
Sells to
Tax_name
Selling_date
Discount
Amount paid
Car_amount
Registers at
Applies for
Registration_no
RTO
Engine_no
Registration_date
VIN
Road_tax_amount
Total_reg_amount
In_policy_no
Insurance
Company_name
Start_date
End_date
In_amount
Coverage_amount
Entity
Relationship
Attribute
Derived attribute
Primary key
Composite Attribute


Supplier
Supplier_ID Varchar(20)
Supplier_Name Varchar(50)
Supplier_Type Char(1)
Email_ID Varchar(50)
Country Varchar(30)
State Varchar(30)
City Varchar(30)
Contact no varchar(10)
Orders_of_Supplier
Ordering_Supplier varchar(20)
Providing_Supplier Varchar(20)
Ordered_Part_ID varchar(20)
Supplier_Order_no Integer
QTY Varchar(10)
Amount Decimal(10,2)
Manufacturer
M_ID Varchar(20)
M_Name Varchar(50)
Contact_no varchar(10)
Email_ID Varchar(50)
Country Varchar(30)
State Varchar(30)
City Varchar(30)
Order_Transactions
Transaction_ID Varchar(20)
Order_no Varchar(20)
Odered_Amount Decimal(10,2)
Tax_Name Varchar(20)
Tax_In_Percentage Decimal(5,2)
Total_Amount Decimal(10,2)
Supplies_parts
Supplier_ID Varchar(20)
Part_ID Varchar(20)
Quantity_stock Varchar(10)
Order_Of_Manufacturer
Order_no Varchar(20)
M_ID Varchar(20)
Placing_Date Date
Receiving_Date Date
Orders_Based_on
Order_no Varchar(20)
Car_Model_ID Varchar(20)
Parts
Part_ID Varchar(20)
Part_Name Varchar(20)
Unit_Price Decimal(10,2)
Order_for_Parts
Part_ID Varchar(20)
Oreder_No Varchar(20)
Quantity Varchar(10)
Plant_Head
PHead_ID Varchar(20)
Name Varchar(20)
Plant_No Varchar(20)
Contact no Varchar(10)
Assembly_Plant
Plant_No Varchar(20)
M_ID Varchar(20)
Country Varchar(20)
State Varchar(20)
City Varchar(20)
Manufacted_Parts_by_own
Component_ID Varchar(20)
Component_Name Varchar(20)
Car_Model_ID Varchar(20)
M_ID Varchar(20)
Unit_Price Decimal(10,2)
Quality_factors varchar(100)
Plant_Produces
Plant_No Varchar(20)
Car_Model_ID Varchar(20)
Start_date Date
End_Date Date
Dealer
Dealer_ID Varchar(20)
Dealer_Name Varchar(50)
Deals_with_M_ID Varchar(20)
Contact_No Varchar(10)
Email_ID Varchar(50)
Country Varchar(30)
State Varchar(30)
City Varchar(30)
Car_Model
Car_Model_ID Varchar(20)
Model_Name varchar(25)
Mileage_In_Kmpl Decimal(10,2)
Color Varchar(20)
Warranty_Duration_Months integer
Dealer_Order_for
Dealer_ID Varchar(20)
Car_Model_ID Varchar(20)
Ordered_Date Date
Receiving_Date Date
Tax_Name Varchar(20)
Tax_in_Percentage Decimal(5,2)
Total_Amount Decimal(18,2)
Car_Test
Test_Name Varchar(20)
Car_Model_ID Varchar(20)
Result Char(1)
Test
Test_Name Varchar(20)
Customer
Customer_ID Varchar(20)
Customer_Name Varchar(50)
Contact_no varchar(10)
Email_ID Varchar(50)
Country Varchar(30)
State Varchar(30)
City Varchar(30)
Sells_to
Dealer_ID Varchar(20)
Customer_ID Varchar(20)
Car_Model_ID Varchar(20)
Registration_no Varchar(20)
Selling_Date Date
Car_Amount Decimal(18,2)
Tax_name Varchar(20)
Tax_In_Percentage Decimal(5,2)
Discount_Amount Decimal(10,2)
Insurance
In_Policy_No Varchar(20)
Company_Name Varchar(20)
Customer_ID Varchar(20)
Dealer_ID Varchar(20)
Car_Model_No Varchar(20)
Start_Date Date
End_Date Date
Coverage_Amount Decimal(18,2)
Insurance_amount Decimal(18,2)
RTO
Registration_no Varchar(20)
Engine_no Varchar(20)
Registration_date Date
VIN Varchar(20)
Total_Reg_Amount Decimal(10,2)
Road_tax Amount Decimal(10,2)

Normalization:

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1. **Supplier**

   Supplier{Supplier_ID, Supplier_Name, Supplier_Type, Email_ID, Contact_no, Country, State, City}

Minimal FD set Supplier_ID → { Supplier_Name, Supplier_Type, Email_ID, Contact_no, Country, State, City}
$\{Supplier\_ID\}^+$ = Supplier(Supplier_ID, Supplier_Name, Supplier_Type, Email_ID, Contact_no, Country, State, City) Hence, Supplier_ID is the key.
BCNF For every minimal FD that holds on relation Supplier, Supplier_ID is its key. **Therefore, Supplier is in BCNF.**

2. **Parts**

   Parts{Part_ID, Part_Name, Unit_price}

Minimal FD set Part_ID → {Part_Name, Unit_price}
$\{Part\_ID\}^+$ = Parts(Part_ID, Part_Name, Unit_price) Hence, Part_ID is the key.
BCNF For every minimal FD that holds on relation Parts, Part_ID is its key. **Therefore, Parts is in BCNF.**

3. **Supplies_parts**

Supplies_Parts{Supplier_ID, Part_ID, Quantity_Stock}

Minimal FD set {Supplier_ID, Part_ID} → {Quantity_Stock}
$\{Supplier\_ID, Part\_ID\}^+$ = Supplies_Parts(Supplier_ID, Part_ID, Quantity_Stock) Hence, {Supplier_ID, Part_ID} is the key.
BCNF For every minimal FD that holds on relation Parts, {Supplier_ID, Part_ID} is its key. **Therefore, Supplies_Parts is in BCNF.**

4. Orders_of_supplier

Orders_of_supplier{Ordering_supplier, Providing_supplier, Ordered_part_ID, Supplier_order_no, Qty, Amount}

Minimal FD set {Ordering_supplier, Providing_supplier, Ordered_part_ID, Supplier_order_no} → {Qty, Amount}
$\{Ordering\_supplier, Providing\_supplier, Ordered\_part\_ID, Supplier\_order\_no\}^+$ = Orders_of_supplier(Ordering_supplier, Providing_supplier, Ordered_part_ID, Supplier_order_no, Qty, Amount) Hence,{Ordering_supplier, Providing_supplier, Ordered_part_ID, Supplier_order_no} is the key.
BCNF For every minimal FD that holds on relation Orders_of_supplier, {Ordering_supplier, Providing_supplier, Ordered_part_ID, Supplier_order_no} is its key. **Therefore, Orders_of_supplier is in BCNF.**

5. Manufacturer

Manufacturer{M_ID, M_Name, Email_ID, Contact_no, Country, State, City}

Minimal FD set M_ID → {M_Name, Email_ID, Contact_no, Country, State, City}
{M_ID}$^+$ = Manufacturer(M_ID, M_Name, Email_ID, Contact_no, Country, State, City) Hence, M_ID is the key.
BCNF For every minimal FD that holds on relation Manufacturer, M_ID is its key. **Therefore, Manufacturer is in BCNF.**

6. Order_of_manufacturer

Order_of_manufacturer{Order_no, M_ID, Placing_Date, Receiving_Date}

Minimal FD set Order_no → {M_ID, Placing_Date, Receiving_Date}
{Order_no}$^+$ = Order_of_manufacturer(Order_no, M_ID, Placing_Date, Receiving_Date) Hence ,Order_no is the key.
BCNF For every minimal FD that holds on relation Order_of_Manufacturer, Order_no is its key. **Therefore, Order_of_manufacturer is in BCNF.**

7. Order_for_parts

Order_for_parts{Part_ID, Order_no , Quantity}

Minimal FD set {Part_ID, Order_no} → {Quantity}
{Part_ID, Order_no}$^+$ = Order_for_parts(Part_ID, Order_no , Quantity)

Hence,{Part_ID, Order_no} is the key.

BCNF

For every minimal FD that holds on relation Order_for_parts, {Part_ID, Order_no} is its key.

Therefore, Order_for_parts is in BCNF.

8. Order_transactions

Order_transactions{Transaction_ID, Order_no, Ordered_amount, Tax_name, Tax_in_percentage, Total_amount}

Minimal FD set

Transaction_ID → {Order_no, Ordered_amount, Tax_name, Tax_in_percentage, Total_amount}

$\{Transaction\_ID\}^+$ = Order_transactions(Transaction_ID, Order_no, Ordered_amount, Tax_name, Tax_in_percentage, Total_amount)

Hence, Transaction_ID is the key.

BCNF

For every minimal FD that holds on relation Order_transactions, Transaction_ID is its key.

Therefore, Order_transactions is in BCNF.

9. Car_model

Car_model{Car_model_ID, Model_Name, Mileage_in_kmpl, Color, Base_price, Warranty_duration_in_months}

Minimal FD set

Car_model_ID → {Model_Name, Mileage_in_kmpl, Color, Base_price, Warranty_duration_in_months}

$\{Car\_model\_ID\}^+$ = Car_model(Car_model_ID, Model_Name, Mileage_in_kmpl, Color, Base_price, Warranty_duration_in_months)

Hence, Car_model_ID is the key.
BCNF For every minimal FD that holds on relation Car_model, Car_model_ID is its key. **Therefore, Car_model is in BCNF.**

10. Orders_based_on

Orders_based_on{Order_no, Car_Model_ID}

Minimal FD set No minimal FDs.
BCNF Orders_based_on is an all attribute key relation. Therefore, according to the normal form theorem, Orders_based_on is in BCNF.

11. Assembly_plant

Assembly_plant{Plant_no, M_ID, Country, State, City}

Minimal FD set Plant_no → {M_ID, Country, State, City}
$\{Plant\_no\}^+$ = Assembly_plant(Plant_no, M_ID, Country, State, City) Hence, Plant_no is the key.
BCNF For every minimal FD that holds on relation Assembly_plant, Plant_no is its key. **Therefore, Assembly_plant is in BCNF.**

12. Plant_head

Plant_head{Phead_ID, H_Name, Plant_no, Contact_no}

Minimal FD set Phead_ID → {H_Name, Plant_no, Contact_no}
{Phead_ID}$^+$ = Plant_head(Phead_ID, H_Name, Plant_no, Contact_no) Hence, Phead_ID is the key.
BCNF For every minimal FD that holds on relation Plant_head, Phead_ID is its key. **Therefore, Plant_head is in BCNF.**

13. Manufactured_parts_by_own

Manufactured_parts_by_own{Component_ID, Component_Name, Car_model_ID, M_ID, Unit_price, Quality_factors}

Minimal FD set Component_ID → {Component_Name, Car_model_ID, M_ID, Unit_price, Quality_factors}
{Component_ID}$^+$ = Manufactured_parts_by_own{Component_ID, Component_Name, Car_model_ID, M_ID, Unit_price, Quality_factors} Hence, Component_ID is the key.
BCNF For every minimal FD that holds on relation Manufactured_parts_by_own, Component_ID is its key. **Therefore, Manufactured_parts_by_own is in BCNF.**

14. Plant_produces

Plant_produces{Plant_no, Car_model_ID, Start_date, End_date}

Minimal FD set {Plant_no, Car_model_ID} → {Start_date, End_date}
{Plant_no, Car_model_ID}$^+$ = Plant_produces{Plant_no, Car_model_ID, Start_date,

End_date} Hence, {Plant_no, Car_model_ID} is the key.
BCNF For every minimal FD that holds on relation Plant_produces, {Plant_no, Car_model_ID} is its key. **Therefore, Plant_produces is in BCNF.**

15. Dealer

Dealer{Dealer_ID, Dealer_Name, Deals_with_M_ID, Email_ID, Contact_no, Country, State, City}

Minimal FD set Dealer_ID → {Dealer_Name, Deals_with_M_ID, Email_ID, Contact_no, Country, State, City}
$\{Dealer\_ID\}^+$ = Dealer{Dealer_ID, Dealer_Name, Deals_with_M_ID, Email_ID, Contact_no, Country, State, City} Hence, Dealer_ID is the key.
BCNF For every minimal FD that holds on relation Dealer, Dealer_ID is its key. **Therefore, Dealer is in BCNF.**

16. Dealer_order_for

Dealer_order_for{Dealer_ID, Car_model_ID, Ordering_date, Receiving_date, Tax_name, Tax_in_Percentage, Total_Amount}

Minimal FD set {Dealer_ID, Car_model_ID} → {Ordering_date, Receiving_date, Tax_name, Tax_in_Percentage, Total_Amount}
$\{Dealer\_ID, Car\_model\_ID\}^+$ = Dealer_order_for{Dealer_ID, Car_model_ID, Ordering_date, Receiving_date, Tax_name, Tax_in_Percentage, Total_Amount}

Hence, {Dealer_ID, Car_model_ID} is the key.
BCNF For every minimal FD that holds on relation Dealer_order_for, {Dealer_ID, Car_model_ID} is its key. **Therefore, Dealer_order_for is in BCNF.**

17. Test

Test{Test_name}

Minimal FD set No minimal FDs.
BCNF Test is an all attribute key relation. Therefore, according to the normal form theorem, Test is in BCNF.

18. Car_test

Car_test{Test_name, Car_model_ID, Result}

Minimal FD set {Test_name, Car_model_ID} → {Result}
{Test_name, Car_model_ID}$^+$ = Car_test{Test_name, Car_model_ID, Result} Hence, {Test_name, Car_model_ID} is the key.
BCNF For every minimal FD that holds on relation Car_test, {Test_name, Car_model_ID} is its key. **Therefore, Car_test is in BCNF.**

19. Customer

Customer{Customer_ID, Customer_Name, Email_ID, Contact_no, Country, State, City}

Minimal FD set Customer_ID → {Customer_Name, Email_ID, Contact_no, Country, State, City}
{Customer_ID}$^+$ = Customer{Customer_ID, Customer_Name, Email_ID, Contact_no, Country, State, City} Hence, Customer_ID is the key.
BCNF For every minimal FD that holds on relation Customer, Customer_ID is its key. **Therefore, Customer is in BCNF.**

20. RTO

RTO{Registration_no, Engine_no, Registration_date, VIN, Total_reg_amount, Road_tax_amount}

Minimal FD set Registration_no → {Engine_no, Registration_date, VIN, Total_reg_amount, Road_tax_amount}
{Registration_no}$^+$ = RTO{Registration_no, Engine_no, Registration_date, VIN, Total_reg_amount, Road_tax_amount} Hence, Registration_no is the key.
BCNF For every minimal FD that holds on relation RTO, Registration_no is its key. **Therefore, RTO is in BCNF.**

21. Sells_to

Sells_to{Dealer_ID, Customer_ID, Car_model_ID, Registration_no, Selling_date, Car_amount, Tax_name, Tax_in_percentage, Discount_amount}

Minimal FD set

{Dealer_ID, Customer_ID, Car_model_ID} → {Registration_no, Selling_date, Car_amount, Tax_name, Tax_in_percentage, Discount_amount}
{Dealer_ID, Customer_ID, Car_model_ID}$^+$ = Sells_to{Dealer_ID, Customer_ID, Car_model_ID, Registration_no, Selling_date, Car_amount, Tax_name, Tax_in_percentage, Discount_amount} Hence,{Dealer_ID, Customer_ID, Car_model_ID} is the key.
BCNF For every minimal FD that holds on relation Sells_to, {Dealer_ID, Customer_ID, Car_model_ID} is its key. **Therefore, Sells_to is in BCNF.**

22. Insurance

Insurance{In_policy_no, Company_name, Dealer_ID, Customer_ID, Car_model_ID, Start_date, End_date, Coverage_amount, Insurance_amount}

Minimal FD set In_policy_no → {Company_name, Dealer_ID, Customer_ID, Car_model_ID, Start_date, End_date, Coverage_amount, Insurance_amount}
{In_policy_no}$^+$ = Insurance{In_policy_no, Company_name, Dealer_ID, Customer_ID, Car_model_ID, Start_date, End_date, Coverage_amount, Insurance_amount} Hence, In_policy_no is the key.
BCNF For every minimal FD that holds on relation Insurance, In_policy_no is its key. **Therefore, Insurance is in BCNF.**