DBMS PROJECT DELIVERABLE 3

MOUNIKA KUKUDALA-177231
MAYANK KUSHWAHA-177234

1. Initial Relational Schema

- SUPPLIERS (SupplierID, SupplierName, PhoneNumber)
- PRODUCTS (ProductID, SupplierID, ProductName, Price, Quantity)
- CUSTOMERS (CustomerID,UserName, Password, Email, Town,District,State)
- ORDERS (OrderID, CustomerID, ShipperID, ProductID, Placed_date,Promised_date, Amount,Delivery Charges, QuantityOrdered)
- SHIPPER (ShipperID, ShipperName,PhoneNumber)
- ADMIN (AdminEmail, Password)
- AC (ProductID, Capacity, Voltage, Min_Temp)
- TV (ProductID, Size, Resolution, USB_port)
- MOBILE (ProductID, RAM, Battery, Display)
- CART (CustomerID, CartID, TotalAmount, ProductID, Quantity)

2 .NORMAL FORMS

Definitions:

1. 2NF: All non-prime attributes are fully functionally dependent on any primary key on R
2. 3NF: There should not be any case where a non prime attribute is determined by another non prime attribute.
3. BCNF : X->Y implies X is a super key

3.FUNCTIONAL DEPENDENCIES

1. SUPPLIERS (SupplierID, SupplierName, PhoneNumber)
   - SupplierID -> SupplierName
   - SupplierID -> PhoneNumber

   This is in BCNF.

2. PRODUCTS (ProductID, SupplierID, ProductName,Category, Price,Quantity)
   - ProductID,SupplierID -> ProductName
   - ProductID,SupplierID -> Price
   - ProductID,SupplierID -> Quantity
   - ProductID,SupplierID -> Category

This table is not in 2NF, Since non prime attributes are partially dependent on Primary Key(ProductID, SupplierID)

E.g. ProductName is totally dependent on ProductID

So We divide it into two tables:

PRODUCTS (ProductID, ProductName, Price,Category, Quantity)

SUPPLIES (SupplierID, ProductID)

The resultant tables are in BCNF.

3. CUSTOMERS (CustomerID,UserName,Password,Email, Town, District,State)
    - CustomerID->UserName
    - CustomerID->Password
    - CustomerID->Email
    - CustomerID->Town
    - CustomerID->District
    - CustomerID->State

    This table is in BCNF.

4. ORDERS (OrderID, ProductID, CustomerID, ShipperID, Placed_date,Promised_date, Amount,Delivery Charges, QuantityOrdered)
    - OrderID,ProductID -> CustomerID
    - OrderID ,ProductID-> ShipperID
    - OrderID,ProductID ->Placed_date

- OrderID,ProductID->Delivery Charges
- OrderID,ProductID ->Promised_date
- OrderID,ProductID ->Amount
- OrderID, ProductID ->QuantityOrdered

  This table is not in 2NF, since there are partial dependencies on the primary key.

  E.g.promised_date,placed_date,ShipperID,CustomerID,Amount ,DeliveryCharges depend only on orderID

  So we divide it into two tables

  ORDERS(<u>OrderID</u>,CustomerID,ShipperID,Placed_date, Promised_date,Amount,Delivery Charges)

  This table is in 2NF since there's a transitive dependency OrderID->Amount->DeliveryCharges

  CONTAINS (<u>OrderID</u>, <u>ProductID</u>, QuantityOrdered)

  This table is in BCNF.

5. SHIPPER (<u>ShipperID</u>, ShipperName,PhoneNumber)
   - ShipperID -> ShipperName
   - ShipperID -> PhoneNumber

   This table is in BCNF.

6. ADMIN (<u>AdminEmail</u>, Password)
   - AdminEmail -> Password

   This table is in BCNF

7. AC (ProductID, Capacity, Voltage, Min_Temp)
   - ProductID ->Capacity
   - ProductID ->Voltage
   - ProductID ->Min_Temp

   This table is in BCNF

8. TV (ProductID, Size, Resolution, USB_port)
   - ProductID->Size
   - ProductID ->Resolution
   - ProductID ->USB_port

   This table is in BCNF

9. MOBILE(ProductID, RAM, Battery, Display)
   - ProductID -> RAM
   - ProductID -> Battery
   - ProductID -> Display

   This table is in BCNF

10. CART (CustomerID, CartID, TotalAmount, ProductID, Quantity)
    - CartID,ProductID ->CustomerID
    - CartID ,ProductID->TotalAmount
    - CartID,ProductID -> Quantity

      This table is not in 2NF Since there are partial dependencies on the primary key.

      Eg CustomerID and Total Amount is dependent on CartID

So we divide into two tables:

Cart(CustomerID, CartID, TotalAmount)

CartContains(CartID, ProductID, Quantity)

The resultant tables are in BCNF.

4. NORMAL FORM OF RELATIONAL SCHEMA

- ➔ SUPPLIERS (SupplierID, SupplierName, PhoneNumber)
- ➔ PRODUCTS (ProductID, ProductName, Category, Price,Quantity)
- ➔ CUSTOMERS(CustomerID,Password,UserName,PhoneNumber, Email, Town,District, State)
- ➔ ORDERS (OrderID, CustomerID,OrderStatus, ShipperID,placed_date,promised_dateAmount,Delivery_Charges)
- ➔ SHIPPER (ShipperID, ShipperName, PhoneNumber)
- ➔ ADMIN (AdminEmail , Password)
- ➔ CONTAINS (OrderID ,ProductID,QuantityOrdered)
- ➔ SUPPLIES (SupplierID, ProductID)
- ➔ AC (ProductID, Capacity, Voltage, Min_temp)
- ➔ TV (ProductID, Size, Resolution, USB_port)
- ➔ MOBILE (ProductID, RAM, Battery, Display)
- ➔ CART (CustomerID , CartID, TotalAmount)
- ➔ CARTCONTAINS (CartID, ProductID, Quantity)