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 3NF, This is in BCNF.

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

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

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 3NF, This table is in BCNF.

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

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

  This table is not in 3NF, Since Delivery charges(non prime attribute can be determined from non prime attribute(Amount) and It is not in 2NF, since there are partial dependencies on primary key.

  So we divide it into two tables

  ORDERS(OrderID,CustomerID,ShipperID,Placed_date, Promised_date,Amount,Delivery Charges)

  CONTAINS (OrderID, ProductID, QuantityOrdered)

  The resultant tables are in 2NF.

5. SHIPPER (ShipperID, ShipperName,PhoneNumber)
   - ShipperID -> ShipperName
   - ShipperID -> PhoneNumber

     This table is in 3NF, This table is in BCNF

6. ADMIN (AdminEmail, Password)
   - AdminEmail -> Password

     This table is in 3NF, This table is in BCNF

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

- ProductID ->Min_Temp

  This table is in 3NF, This table is in BCNF

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

     This table is in 3NF, This table is in BCNF

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

     This table is in 3NF, This table is in BCNF

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

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

      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)