Normalisation Proof

1.) Customers (CustID,CustName,Type,ExpiryDate,Phone_No, Email)

FDs: CustID -> {CustName,Type,ExpiryDate,Phone_No,Email}
Email -> {CustID,CustName,Type,ExpiryDate, Phone_No}
Phone_No -> {CustID,CustName,Type,ExpiryDate,Email}

Key: CustID,Email,Phone_No

BCNF: Yes

2.) CustAddress (AddressID,CustID,Pincode,State,City, Landmark,FlatNo,Category)

FDs: AddressID -> {CustID,Pincode,State,City,Landmark,FlatNo, Category}
Pincode -> {State,City}

Key: AddressID

The above relation is not in BCNF currently, as there is a Transitive Dependency: Pincode -> {State, City}

After decomposing the relation,

CustAddress(CustID,Pincode,Landmark,FlatNo,Category**)**
Cities (Pincode,State,City**)**

BCNF: Yes

3.) Orders (OrderID,AgentID,CustID,Discount,DeliveryFee, Notes,Amount,Method,TransactionID,OrderDate, Timestamp,Status,AddressID,Rating)

FDs: OrderID -> { AgentID,CustID,Discount,DeliveryFee, Notes,Amount,Method,TransactionID,OrderDate, Timestamp,Status ,AddressID,Rating}

Key: OrderID

BCNF: Yes

4.) OrderDetails (OrderID,ProdID,Quantity,Price)

FDs: {OrderID,ProdID} -> { Quantity,Price }

Key: {OrderID,ProdID}

BCNF: Yes

5.) Suppliers (SupplierID,Name,Pincode,State,City, Location)

FDs: SupplierID -> {Pincode,State,City,Location,Name}
Pincode -> {State,City}

Key: SupplierID

The above relation is not in BCNF currently, as there is a Transitive Dependency: Pincode -> {State, City}

After decomposing the relation,

Suppliers (SupplierID,Pincode,Name,Location**)**
Cities (Pincode,State,City**)**

BCNF: Yes

6.) SupplyOrders (SupplyOrderID,WarehouseID,SupplierID,SupplyDate)

FDs: SupplyOrderID ->
{WarehouseID,SupplierID,SupplyDate}

Key: SupplyOrderID

BCNF: Yes

7.) SupplyOrderDetails (SupplyOrderID,ProdID,Quantity,Price,Total)

FDs: {SupplyOrderID,ProdID} -> {Quantity,Price,Total}

Key: {SupplyOrderID,ProdID}

BCNF: Yes

8.) Products (ProdID,ProdName,SubCategoryID,Brand,Description, Price,Shelf_life,Size)

FDs: ProdID ->
{ProdName,SubCategoryID,Brand,Description,
Price,Shelf_life,Size}

Key: ProdID

BCNF: Yes

9.) Categories (CategoryID,CatName)

FDs: CategoryID -> CatName

Key: CategoryID

BCNF: Yes

10.) SubCategories (SubCategoryID,CategoryID,SubName)

FDs: SubCategoryID -> {CategoryID,SubName}

Key: SubCategoryID

BCNF: Yes

11.) Warehouses (WarehouseID, Name, Address, Pincode, City, State)

FDs: WarehouseID ->
{ Name, Address, Pincode, City, State}
Pincode -> {City,State}

Key: WarehouseID

The above relation is not in BCNF currently, as there is a Transitive Dependency: Pincode -> {State, City}

After decomposing the relation,
Warehouses (WarehouseID, Name, Address, Pincode**)**

Cities (Pincode, City, State**)**

BCNF: Yes

12.) Cart (CartID, CustID, No_Products, Total)

FDs: CartID -> {CustID, No_Products, Total}

Key: CartID

BCNF: Yes

13.) CartDetails (CartID, ProdID, Quantity, Sub_Total)

FDs: {CartID, ProdID} -> {Quantity, Sub_Total}

Key: { CartID, ProdID }

BCNF: Yes

14.) Inventory (InventoryID, WarehouseID, ProdID, Cost, Quantity, Min_Quantity, SupplyOrderID)

FDs: InventoryID -> {WarehouseID,ProdID,SupplyOrderID,Min_Quantity}

SupplyOrderID -> {Cost}

Key: InventoryID

The above relation is not in BCNF currently, as there is a Transitive Dependency: SupplyOrderID -> {Quantity,Cost}

After decomposing the relation,

Inventory(InventoryID, WarehouseID, ProdID, SupplyOrderID, Min_Quantity**)**

SupplyOrderDetails(SupplyOrderID ,Cost**)**

BCNF: Yes

15.) HelpAgents (HelpAgentID,Name,Phone_No,Email,Rating,Earnings)

FDs: HelpAgentID -> {Name,Phone_No,Email,Rating,Earnings}
Email -> {HelpAgentID,Name,Phone_No,Rating,Earnings}
Phone_No -> {HelpAgentID,Name,Email,Rating,Earnings}

Key: HelpAgentID,Email,Phone_No

BCNF: Yes

16.) DeliveryAgents (DelAgentID,Name,Phone_No,Email,No_Deliveries, Rating,Earnings)

FDs:

DelAgentID -> {Name,Phone_No,Email,Rating,Earnings,No_Deliveries}

Email -> {DelAgentID,Name,Phone_No,Rating,Earnings,No_Deliveries}

Phone_No -> {DelAgentID,Name,Email,Rating,Earnings,No_Deliveries}

Key: AgentID,Email,Phone_No

BCNF: Yes

17.) Complaints (TicketNo,CustID,OrderID,Type,AgentID,Refund, Description,Rating)

FDs:

TicketNo ->
{CustID,OrderID,Type,AgentID,Refund,Description,Rating}

Key: TicketNo

BCNF: Yes

18.) RefundDetails
(RefundID,Amount,TransactionID,TicketNo,Date)

FDs: RefundID -> {Amount,TransactionID,TicketNo,Date}
TransactionID -> {RefundID,Amount,TicketNo,Date}

Key: RefundID,TransactionID

BCNF: Yes