In 1NF, we identify the following.

- Remove the repeating groups.
- Primary key (OrderID + CustomerID+ProductID)
- All functional dependencies (partial and transitive)
    - Partial dependencies (PD)
        - OrderID -- > OrderDate
        - CustomerID -- > CustomerName, CustomerState
        - ProductID -- > ProductName
    - Full dependency
        - OrderID + CustomerID + ProductID -- > Qty
    - Transitive dependency
        - There is no Transitive dependency.
- Relation schema in 1NF
    - OrderCustomerProuduct (OrderID, OrderDate, CustomerID, CustomerName, CustomerState, ProductID, ProductName, Qty)

OrderID	Order Date	CustomerID	Customer Name	Customer State	ProductID	Product Name	Qty
101	01/11	20	Julia Cortez	NY	4	Mouse	10
101	01/11	30	Mark Harris	LA	3	iPad	15
102	02/11	20	Julia Cortez	NY	2	Disk	10
102	02/11	30	Mark Harris	LA	4	Mouse	18
103	04/12	40	Kelly Pat	IL	5	Watch	15

In 2NF, we identify the following.

- Remove all partial dependencies to form new relations.
    - PD1: OrderID -- > OrderDate
        - New relation becomes =>
            - Order (**OrderID**, OrderDate)
    - PD2: CustomerID -- > CustomerName, CustomerState
        - New relation becomes =>
            - Customer (**CustomerID**, CustomerName, CustomerState)
    - PD3: ProductID -- > ProductName
        - New relation becomes =>
            - Product (**ProductID**, ProductName)
    - Full dependency forms a new relation.
        - OrderID + CustomerID + ProductID -- > Qty

        - New relation becomes =>
            - OrderCustomerProduct (OrderID, CustomerID, ProductID, Qty)
    - Transitive dependency
        - There is no Transitive dependency.

Relation schemas in 2NF:

- Order (**OrderID**, OrderDate)
- Customer (**CustomerID**, CustomerName, CustomerState)
- Product (**ProductID**, ProductName)
- OrderCustomerProduct (**OrderID, CustomerID, ProductID**, Qty)

Tables in 2NF showing data.

Table name: Order
Primary key: OrderID
Foreign key Nome

OrderID	Order Date
101	01/11
102	02/11
103	03/11

Table name: Customer
Primary key: CustomerID
Foreign key: Nome

CustomerID	Customer Name	Customer State
20	Julia Cortez	NY
30	Mark Harris	LA
40	Kelly Pat	IL

Table name: Product

Primary key: ProductID
Foreign key: Nome

ProductID	Product Name
2	Disk
3	iPad

4	Mouse
5	Watch

Table name: OrderCustomerProduct
Primary key: OrderID + CustomerID + ProductID
Foreign keys: OrderID, CustomerID, ProductID

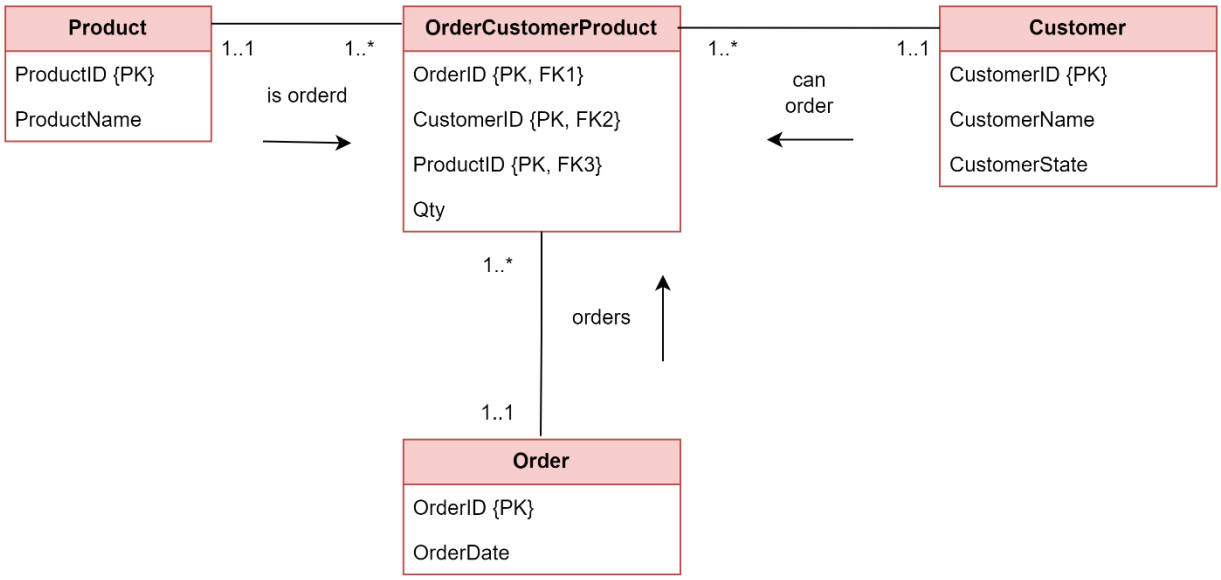
OrderID	**CustomerID**	**ProductID**	**Qty**
101	20	4	10
101	30	3	15
102	20	2	10
102	30	4	18
103	40	5	15

In 3NF.

- Since each attribute is dependent on the key in each table, and there are no transitive dependencies, all the tables are automatically in 3NF. Additionally, there are no violations of BCNF.

Normalized ERD.

Detailed ERD that fully represents the normalized relation schemas


Product
ProductID {PK}
ProductName
1..1
1..*
is orderd
OrderCustomerProduct
OrderID {PK, FK1}
CustomerID {PK, FK2}
ProductID {PK, FK3}
Qty
1..*
can
order
1..1
Customer
CustomerID {PK}
CustomerName
CustomerState
1..*
orders
1..1
Order
OrderID {PK}
OrderDate