DBMS MINI PROJECT

ONLINE SHOP FOR SHOES

Team Name: Project Sandal
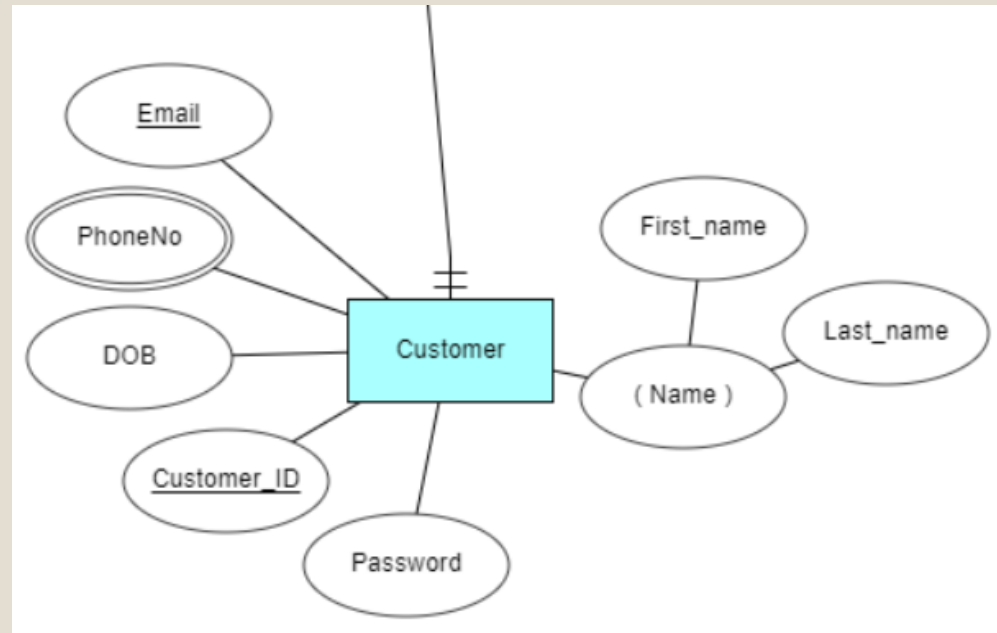
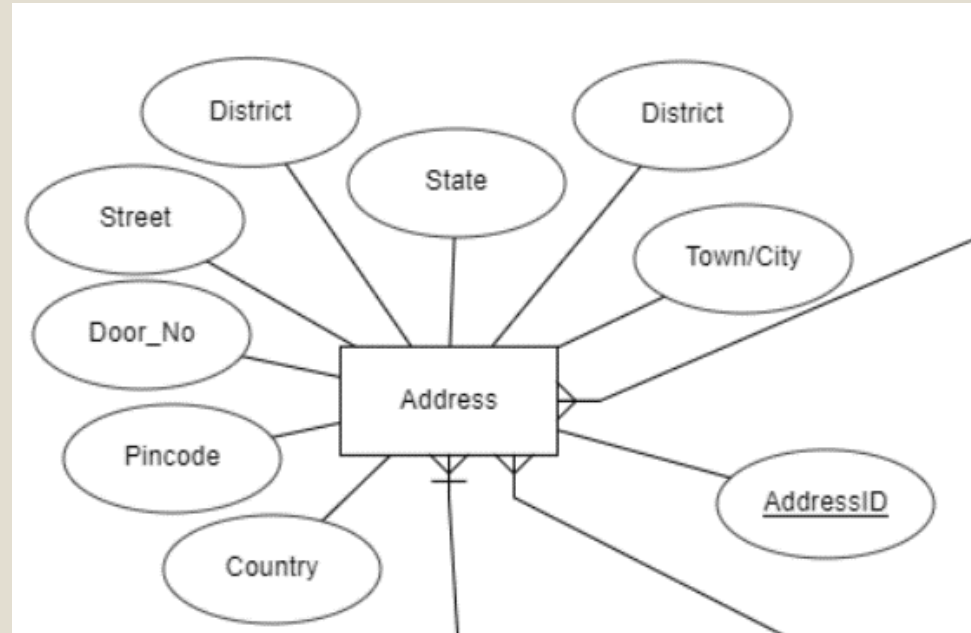| Group Members		
S No.	Name	Roll No.
1	Jayannthan P T	205001049
2	Kishaanth S	205001054
3	Koushik Viswanath S	205001055

Entity Relational Model

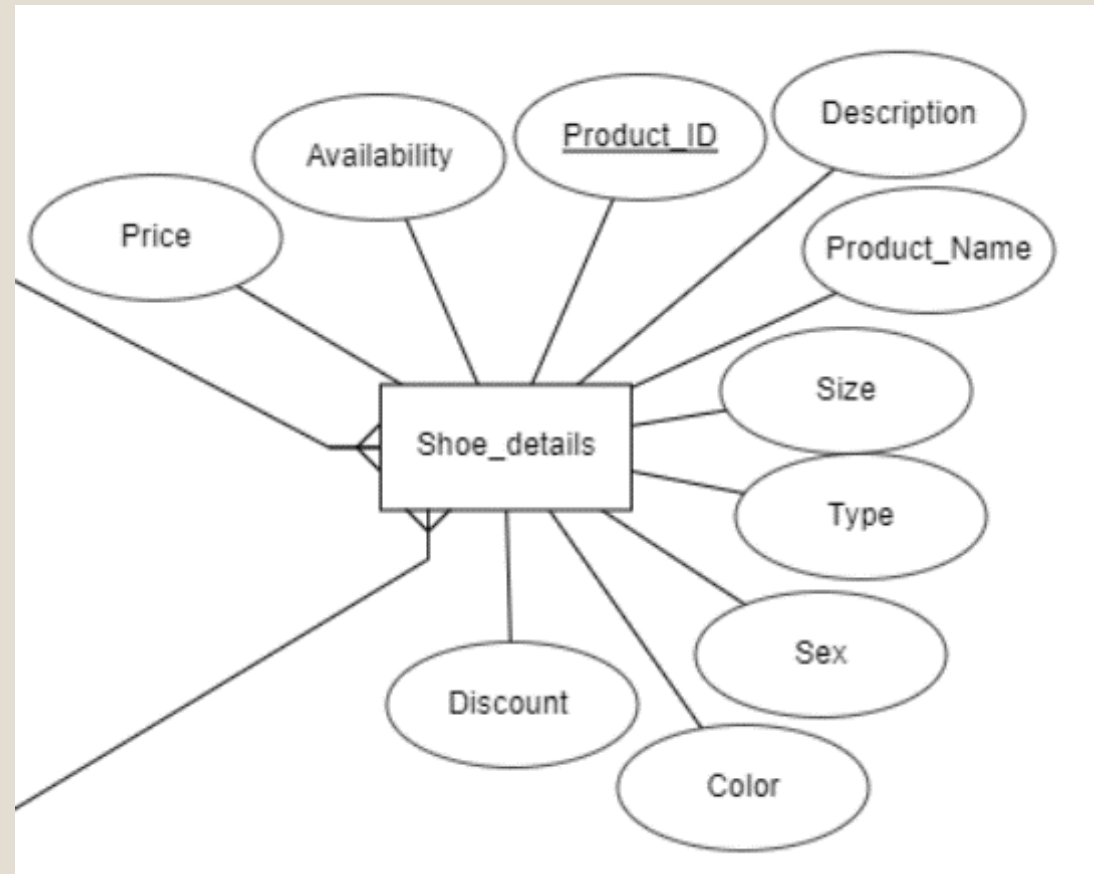# Entity Relational Model Customer Entity

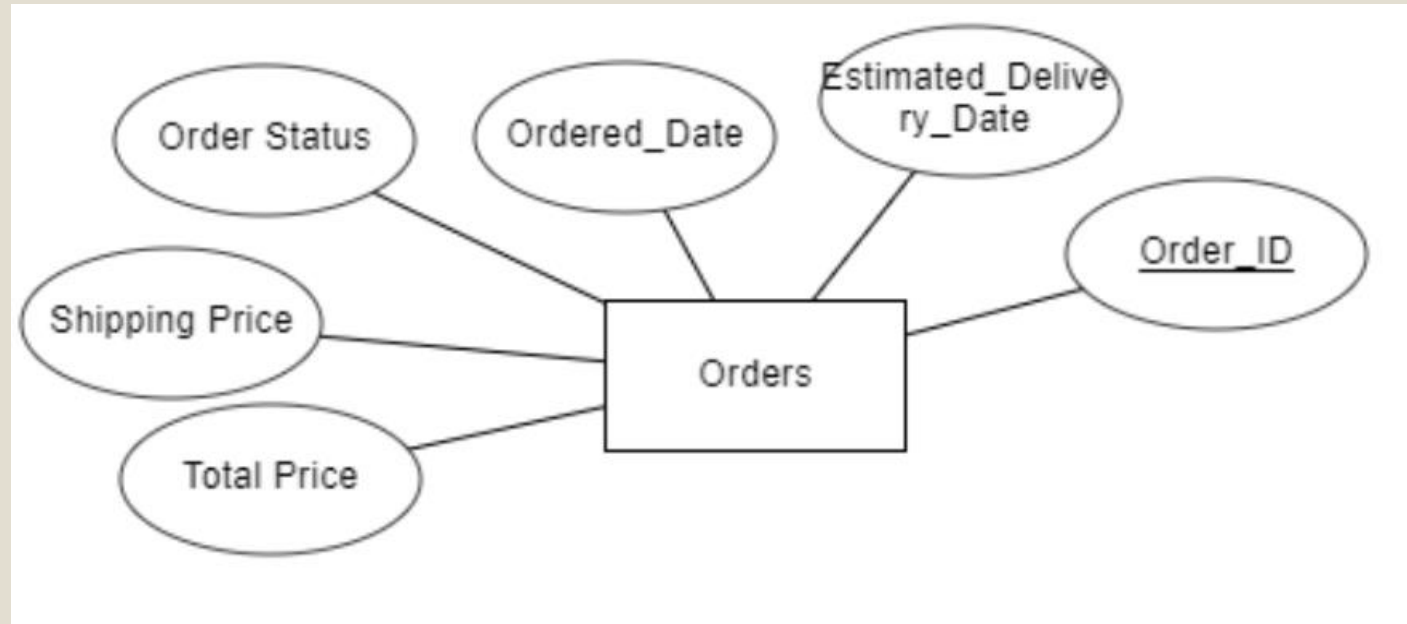# Entity Relational Model
Address Entity

Entity Relational Model
Shoe Details Entity

Entity Relational Model
Order Entity
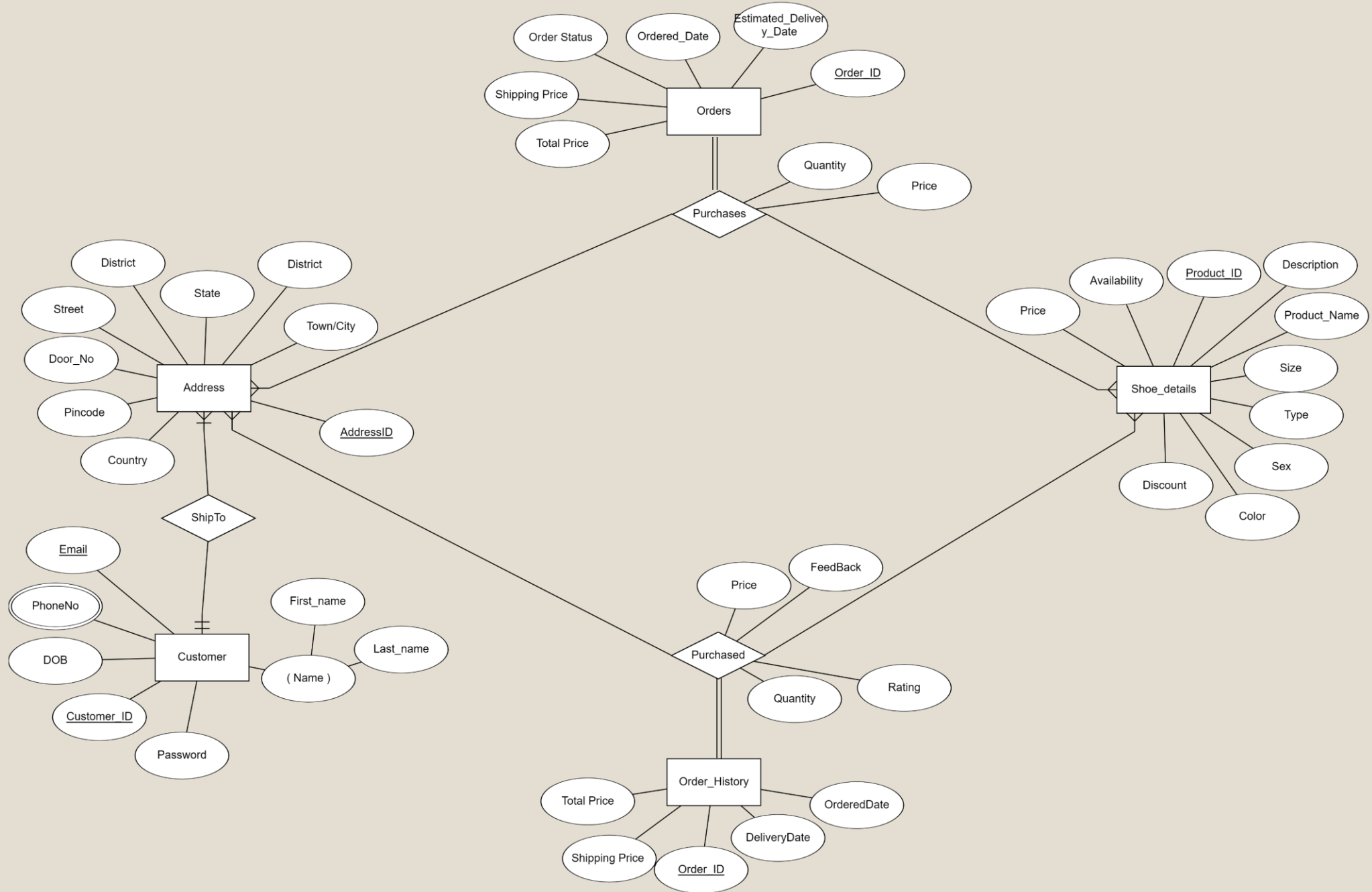
Entity Relational Model
Order History Entity
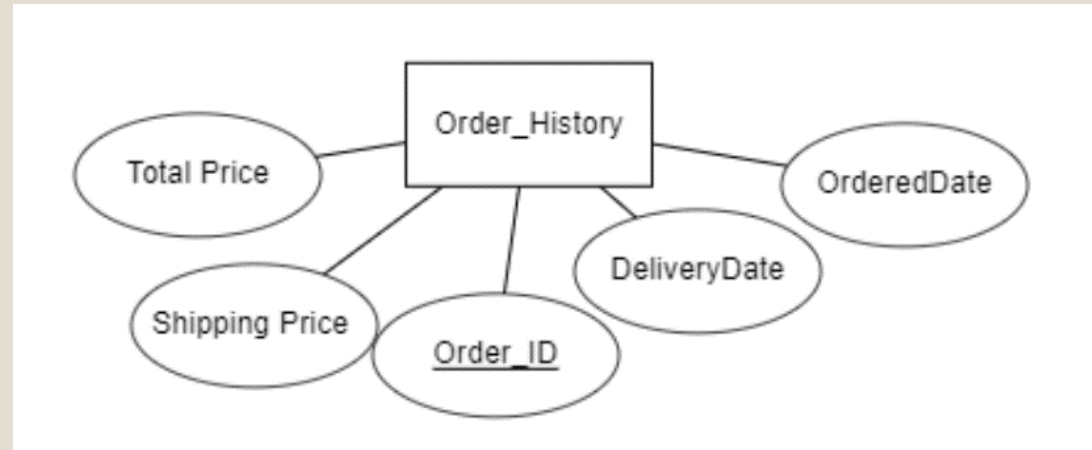
Entity Relational Model
With Relations

Entity Relational Model
TO
Relational Schema

Entity Relational Model TO Relational Schema
Customer Relation

Customer					
Customer_ID	First_Name	Last_Name	DOB	Email	Password

Customer-Phone	
Customer_ID	Phone_Number

Entity Relational Model TO Relational Schema
Customer Relation

Customer

Customer_ID	First_Name	Last_Name	DOB	Email	Password

Primary Key: Customer_ID
Functional Dependencies:
- Customer_ID -> First_Name, Last_Name, DOB, Email, Password

Customer-Phone

Customer_ID	Phone_Number

Primary Key: Customer_ID, Phone_Number

Entity Relational Model TO Relational Schema
Address Relation

Address								
AddressID	Customer_ID	Door_No	Street	Town/City	District	State	Country	Pincode

Entity Relational Model TO Relational Schema
Address Relation

Address

AddressID	Customer_ID	Door_No	Street	Town/City	District	State	Country	Pincode

Primary Key: AddressID, Customer_ID
Functional Dependencies:
- AddressID -> Door_No,Street,Town/City,District,State,Country,Pincode

Entity Relational Model TO Relational Schema
Shoe Details Relation
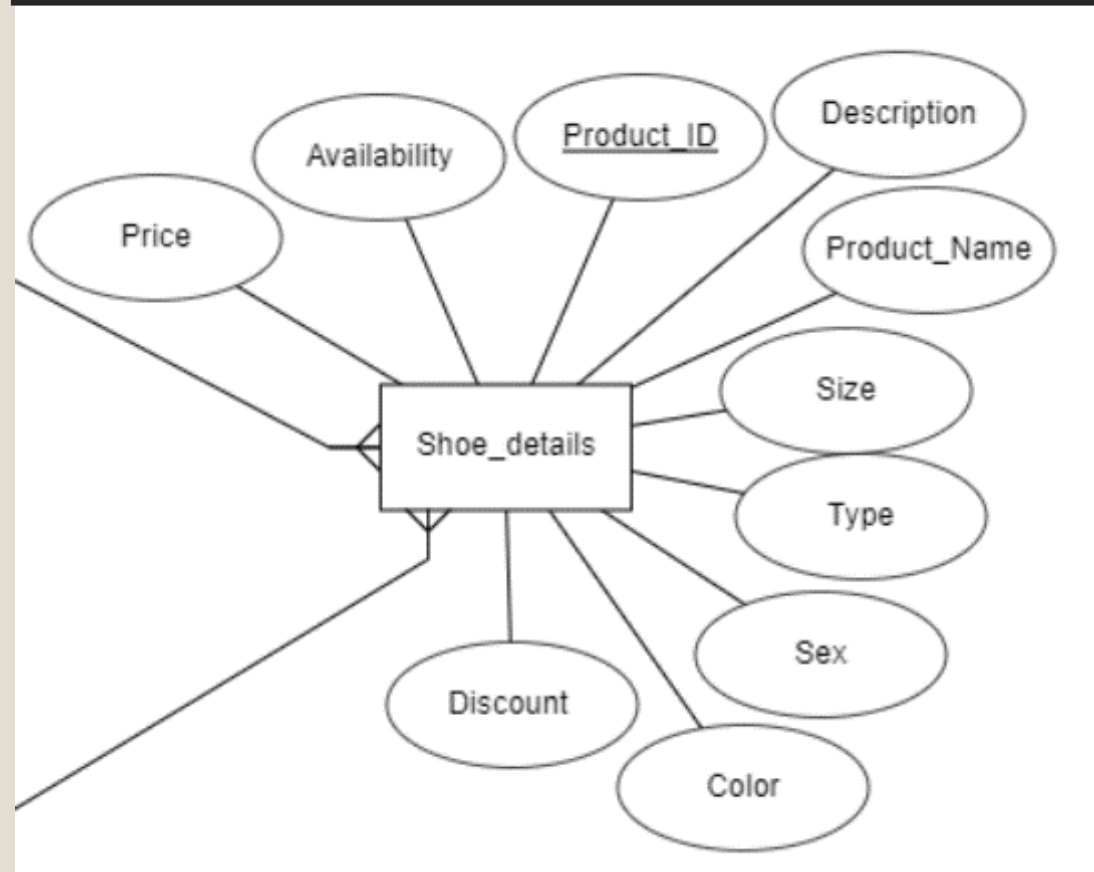
Shoe_Details

Product_ID	Product_Name	Description	Size	Type	Sex	Color	Availability	Price	Discount

Entity Relational Model TO Relational Schema
Shoe Details Relation

Shoe_Details									
Product_ID	Product_Name	Description	Size	Type	Sex	Color	Availability	Price	Discount

Primary Key: Product_ID
Functional Dependencies:
- Product_ID -> Product_Name, Description, Size, Type, Sex, Color, Availability, Price, Discount
- Product_ Name -> Type, Sex

Entity Relational Model TO Relational Schema
Orders Relation
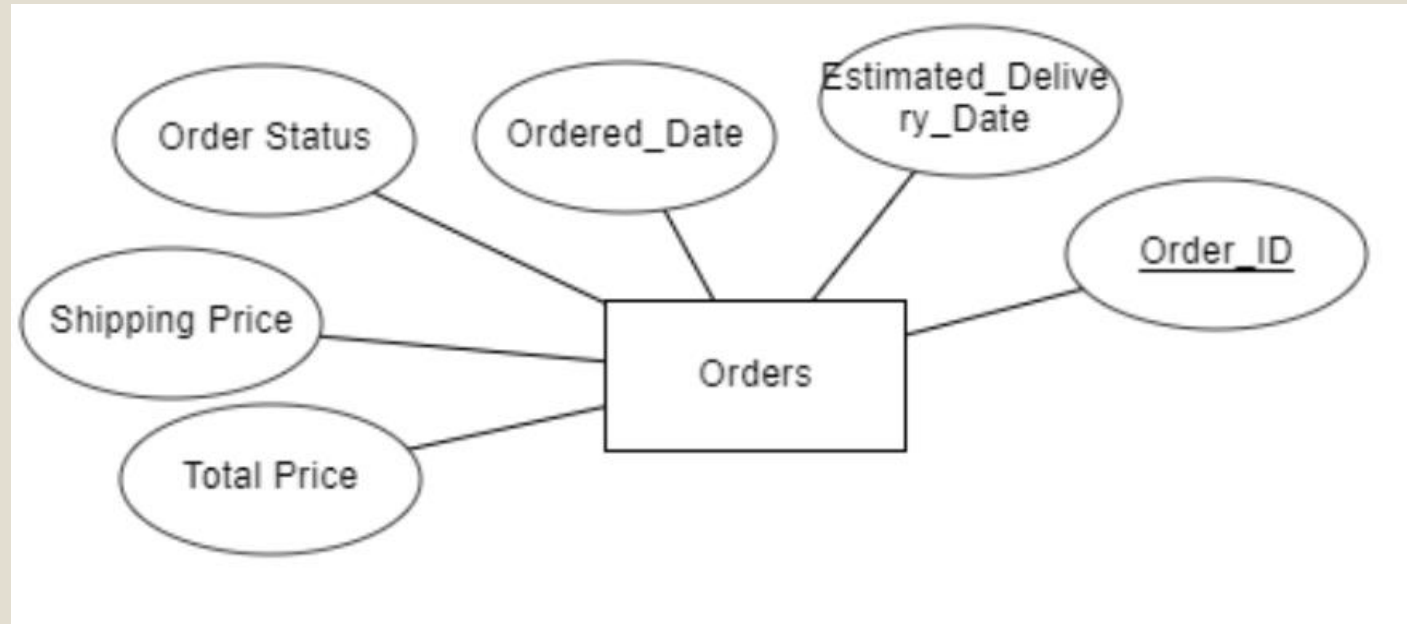
Orders									
OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Estimated Delivery_Date	Total_Price	Shipping_Price	Order_Status

Entity Relational Model TO Relational Schema
Orders Relation

Orders									
OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Estimated Delivery_Date	Total_Price	Shipping_Price	Order_Status

Primary Key: Order_ID, Product_ID
Functional Dependencies:
- Order_ID -> Address_ID, Ordered_Date, Estimated_Delivery_Date, Total_Price, Shipping_Price, Order_Status
- Order_ID, Product_ID -> Quantity, Price

Entity Relational Model TO Relational Schema
Order_History Relation

Orders_History										
OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Delivery_Date	Total_Price	Shipping_Price	Feedback	Rating

Entity Relational Model TO Relational Schema
Order_History Relation

Orders_History										
OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Delivery_Date	Total_Price	Shipping_Price	Feedback	Rating

Primary Key: Order_ID, Product_ID
Functional Dependencies:
- Order_ID, Product_ID -> Quantity, Price, Feedback, Rating
- Order_ID -> Address_ID, Ordered_Date, Delivery_Date, Total_Price, Shipping_Price

Entity Relational Model
TO
Relational Schema

Entity Relational Model TO Relational Schema

Customer

Customer_ID	First_Name	Last_Name	DOB	Email	Password

Customer-Phone

Customer_ID	Phone_Number

Address

AddressID	Customer_ID	Door_No	Street	Town/City	District	State	Country	Pincode

Shoe_Details

Product_ID	Product_Name	Description	Size	Type	Sex	Color	Availability	Price	Discount

Orders

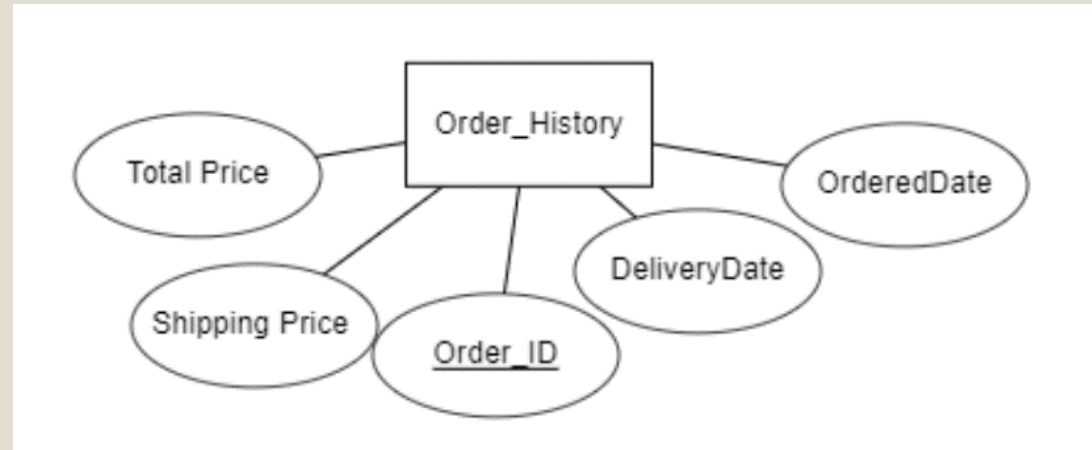| OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Estimated Delivery_Date	Total_Price	Shipping_Price	Order_Status

Orders_History

OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Delivery_Date	Total_Price	Shipping_Price	Feedback	Rating

Relational Schema

Customer

Customer_ID	First_Name	Last_Name	DOB	Email	Password

Customer-Phone

Customer_ID	Phone_Number

Address

AddressID	Customer_ID	Door_No	Street	Town/City	District	State	Country	Pincode

Shoe_Details

Product_ID	Product_Name	Description	Size	Type	Sex	Color	Availability	Price	Discount

Orders

OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Estimated Delivery_Date	Total_Price	Shipping_Price	Order_Status

Orders_History

OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Delivery_Date	Total_Price	Shipping_Price	Feedback	Rating

Relational Schema – Normalization

Relational Schema -Normalization
Customer Relation

Customer

Customer_ID	First_Name	Last_Name	DOB	Email	Password

Functional Dependencies

Customer_ID ➡ First_Name Last_Name DOB Email Password

First, find the minimal cover of the FDs, which includes the FDs
Customer_ID --> First_Name
Customer_ID --> Last_Name
Customer_ID --> DOB
Customer_ID --> Email
Customer_ID --> Password

The table is in 2NF already

Table already in 3NF

Relational Schema -Normalization
Address Relation

Address								
AddressID	Customer_ID	Door_No	Street	Town/City	District	State	Country	Pincode

Functional Dependencies

AddressID ➡ Door_No   Street   Town/City   District   State   Country   Pincode   Customer_ID

First, find the minimal cover of the FDs, which includes the FDs
AddressID --> Door_No
AddressID --> Street
AddressID --> Town/City   The table is in 2NF already
AddressID --> District
AddressID --> State   Table already in 3NF
AddressID --> Country
AddressID --> Pincode
AddressID --> Customer_ID

Relational Schema -Normalization
Shoe Details Relation

Shoe_Details									
Product_ID	Product_Name	Description	Size	Type	Sex	Color	Availability	Price	Discount

First, find the minimal cover of the FDs, which includes the FDs

Product_ID --> Product_Name

Product_ID --> Description

Product_ID --> Sex

Product_ID --> Color

Product_ID --> Availability

Product_ID --> Price

Product_ID --> Discount

Product_Name --> Type

Product_Name --> Size

The table is in 2NF already

Relational Schema -Normalization
Shoe Details Relation

Shoe_Details									
Product_ID	Product_Name	Description	Size	Type	Sex	Color	Availability	Price	Discount

Initially Shoe_Details is the original table with the original functional dependencies.

In each round we check the FDs one by one to see if there is a violation of 3NF (there is a partial or transitive dependency where the RHS includes non-key attributes). If yes, we decompose the table into two.

Round1: checking table Shoe_Details

The table is not in 3NF.

Product_Details = (Product_Name,Type,Size), with FDs:

Product_Name --> Type,Size

Shoe_Details = (Product_ID,Product_Name,Description,Sex,Color,Availability,Price,Discount), with FDs:

Product_ID --> Product_Name,Description,Sex,Color,Availability,Price,Discount

Round2: checking table Product_Details

***** The table is in 3NF already, send it to output *****

Round3: checking table Shoe_Details

***** The table is in 3NF already, send it to output *****

Relational Schema -Normalization
Shoe Details Relation

Shoe_Details

Product_ID	Product_Name	Description	Size	Type	Sex	Color	Availability	Price	Discount

Attributes

Product_ID · Product_Name · Description · Sex · Color · Availability · Price · Discount

Functional Dependencies

Product_ID → Product_Name Description Sex Color Availability Price Discount

Shoe_Details

Product_Details

Attributes

Product_Name · Type · Size

Functional Dependencies

Product_Name → Type Size

Relational Schema -Normalization
Orders Relation

Orders									
OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Estimated Delivery_Date	Total_Price	Shipping_Price	Order_Status

First, find the minimal cover of the FDs, which includes the FDs

Order_ID --> Address_ID

Order_ID --> Ordered_Date

Order_ID --> Estimated_Delivery_Date

Order_ID --> Total_Price   The relation is not in 2NF

Order_ID --> Shipping_Price

Order_ID --> Order_Status

Order_ID,Product_ID --> Quantity

Order_ID,Product_ID --> Price

Relational Schema -Normalization
<u>Orders Relation</u>

Orders

OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Estimated Delivery_Date	Total_Price	Shipping_Price	Order_Status

Initially Orders is the original table:

Round1: checking table Orders

The table is not in 2NF.

The FD [Order_ID --> Address_ID] is a partial dependency (i.e., LHS is a proper subset of some CK), the table is split into:

Orders =
(Order_ID,Address_ID,Ordered_Date,Estimated_Delivery_Date,Total_Price,Shipping_Price,Order_Status), with FDs:

Order_ID --> Address_ID,Ordered_Date,Estimated_Delivery_Date,Total_Price,Shipping_Price,Order_Status

Purchases = (Order_ID,Product_ID,Quantity,Price), with FDs:

Order_ID,Product_ID --> Quantity,Price

Round2: checking table Orders

***** The table is in 2NF already, send it to output *****

Round3: checking table Purchases

***** The table is in 2NF already, send it to output *****

Relational Schema -Normalization
Orders Relation

Orders									
OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Estimated Delivery_Date	Total_Price	Shipping_Price	Order_Status

Orders

Attributes

Order_ID Address_ID   Ordered_Date   Estimated_Delivery_Date   Total_Price   Shipping_Price
Order_Status

Functional Dependencies

Order_ID ➡ Address_ID Ordered_Date Estimated_Delivery_Date Total_Price Shipping_Price
Order_Status

Purchases

Attributes

Order_ID   Product_ID   Quantity   Price

Functional Dependencies

Order_ID Product_ID ➡ Quantity Price

Relational Schema -Normalization Orders Relation

Orders									
OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Estimated Delivery_Date	Total_Price	Shipping_Price	Order_Status

Attributes

Order_ID Address_ID Ordered_Date Estimated_Delivery_Date Total_Price Shipping_Price Order_Status

Orders

Functional Dependencies

Order_ID ➡ Address_ID Ordered_Date Estimated_Delivery_Date Total_Price Shipping_Price Order_Status

Attributes

Order_ID Product_ID Quantity Price

Purchases

Functional Dependencies

Both relations are already in 3NF

Order_ID Product_ID ➡ Quantity Price

Relational Schema -Normalization
Order_History Relation

Orders_History										
OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Delivery_Date	Total_Price	Shipping_Price	Feedback	Rating

First, find the minimal cover of the FDs, which includes the
FDs
Order_ID,Product_ID --> Quantity
Order_ID,Product_ID --> Price
Order_ID,Product_ID --> Feedback
Order_ID,Product_ID --> Rating
Order_ID --> Address_ID
Order_ID --> Ordered_Date
Order_ID --> Delivery_Date
Order_ID --> Total_Price
Order_ID --> Shipping_Price

The relation is not in 2NF

Relational Schema -Normalization
Order_History Relation

Orders_History										
OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Delivery_Date	Total_Price	Shipping_Price	Feedback	Rating

Initially Order_History is the original table:

Round1: checking table Order_History

The table is not in 2NF.

The FD [Order_ID --> Address_ID] is a partial dependency (i.e., LHS is a proper subset of some CK), the table is split into:

Order_History = (Order_ID,Address_ID,Ordered_Date,Delivery_Date,Total_Price,Shipping_Price), with FDs:

Order_ID --> Address_ID,Ordered_Date,Delivery_Date,Total_Price,Shipping_Price

Purchased = (Order_ID,Product_ID,Quantity,Price,Feedback,Rating), with FDs:

Order_ID,Product_ID --> Quantity,Price,Feedback,Rating

Round2: checking table Order_History

***** The table is in 2NF already, send it to output *****

Round3: checking table Order_History

***** The table is in 2NF already, send it to output *****

Relational Schema -Normalization
Order_History Relation

Orders_History										
OrderID	Product_ID	AddressID	Quantity	Price	Ordered_Date	Delivery_Date	Total_Price	Shipping_Price	Feedback	Rating

Attributes

Order_ID   Address_ID   Ordered_Date   Delivery_Date   Total_Price   Shipping_Price

Functional Dependencies

Order_ID → Address_ID   Ordered_Date   Delivery_Date   Total_Price   Shipping_Price

Order_History

Attributes

Order_ID   Product_ID   Quantity   Price   Feedback   Rating
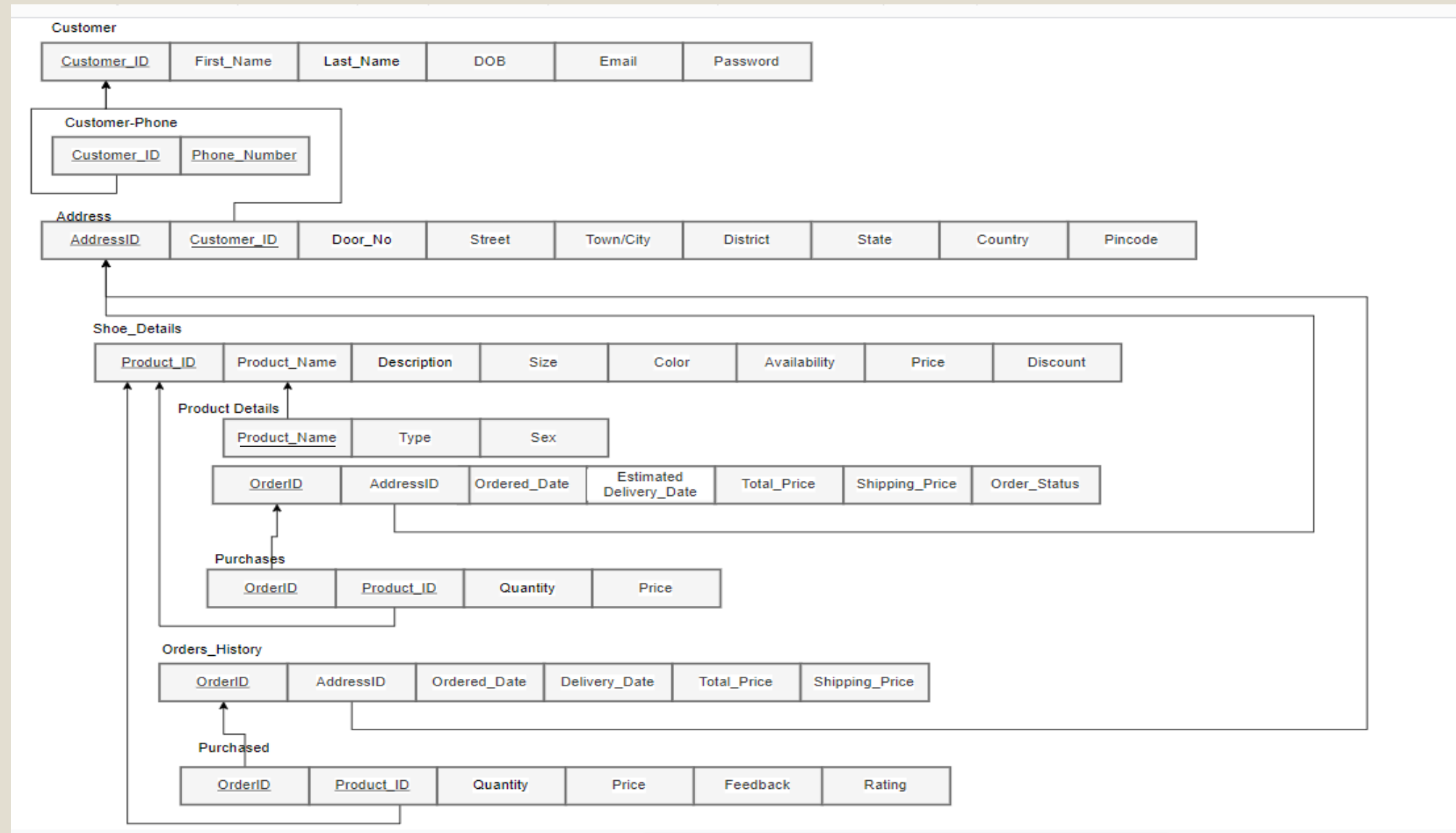
Functional Dependencies

Order_ID   Product_ID → Quantity   Price   Feedback   Rating
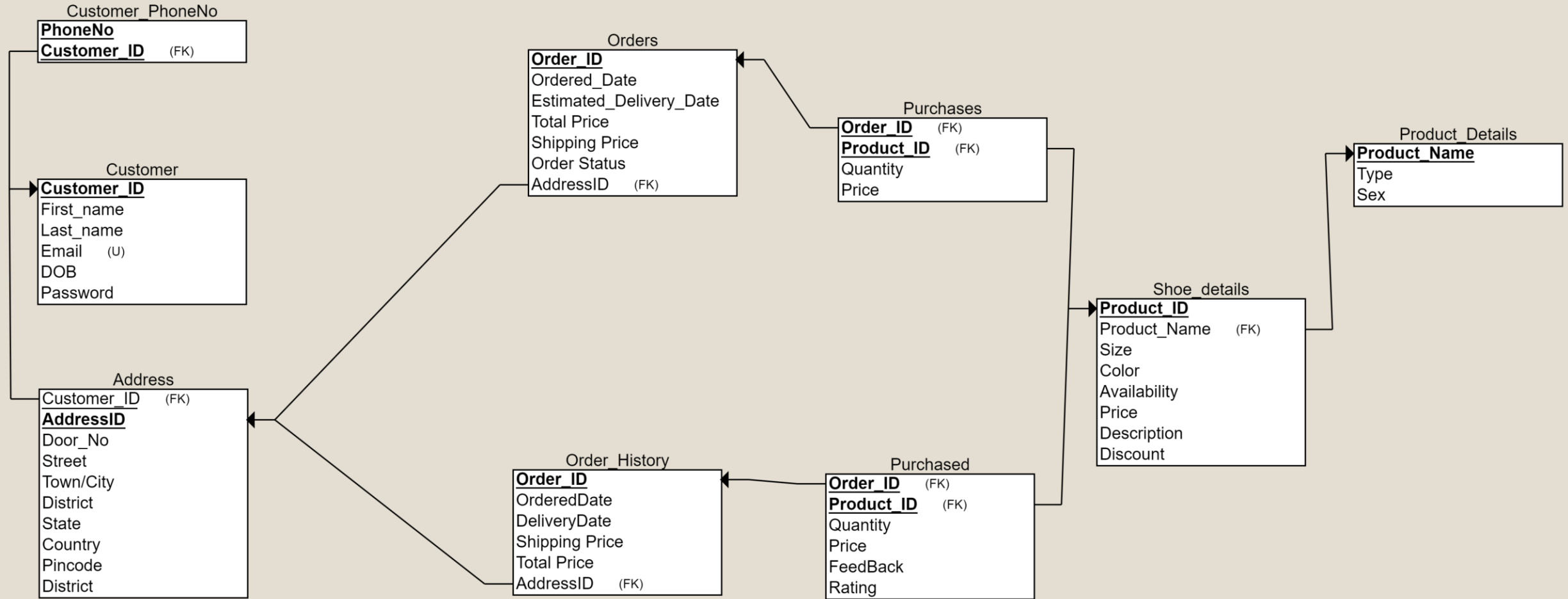
Purchased

Both relations are already in 3NF

Normalized Relational Schema

Normalized Relational Schema

Customer

Customer_ID	First_Name	Last_Name	DOB	Email	Password

Customer-Phone

Customer_ID	Phone_Number

Address

AddressID	Customer_ID	Door_No	Street	Town/City	District	State	Country	Pincode

Shoe_Details

Product_ID	Product_Name	Description	Size	Color	Availability	Price	Discount

Product Details

Product_Name	Type	Sex

OrderID	AddressID	Ordered_Date	Estimated Delivery_Date	Total_Price	Shipping_Price	Order_Status

Purchases

OrderID	Product_ID	Quantity	Price

Orders_History

OrderID	AddressID	Ordered_Date	Delivery_Date	Total_Price	Shipping_Price

Purchased

OrderID	Product_ID	Quantity	Price	Feedback	Rating

Final Relational Schema