VIETNAM NATIONAL UNIVERSITY HO CHI MINH CITY

ECONOMICS AND LAW UNIVERSITY

MANAGEMENT INFORMATION FACULTY

PROJECT REPORT

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SUBJECT: Database

TEAM: BDF

CLASS: K19406C

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INTRODUCTION

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Chapter 1: INTRODUCTION ABOUT BUSINESS MODEL

1.1. Business model

BDF is an e-commerce trading platform based in Vietnam, owned by BDF Technology Company. BPF prodives a marketspace for a customer-to-customer relationship and business-to-customer relationship.

In our e-commerce trading platform, customers can be sellers and sellers can be customers. BDF guarantees benefits for members by terms of service, privacy policy, delivery - receiving policy, dispute settlement/complaints handling process.

Our mission is to build and develop a safe and convenient sales channel. BDF is an intermediary that helps suppliers expand their sales range at low cost. Moreover, we help customers to shop more quickly and conveniently with many options.

Our value:

- Server: “Customer is god”
- Flexibility: “Flexible in all cases”
- Development: “Learn, learn more, learn forever”
- Commitment: “Accept all recommends”

1.2. Data Flow Diagram

1.2.1. Fulfillment process

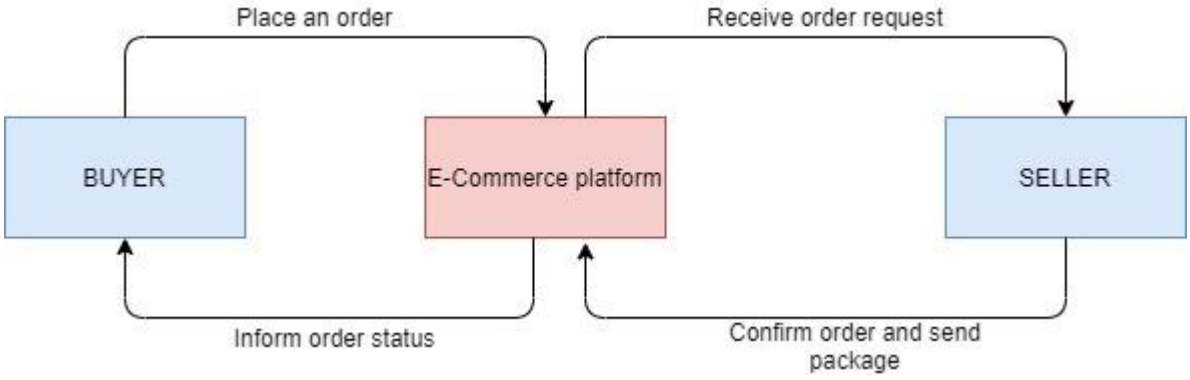

Figure 1 – Fulfillment DFD level 0

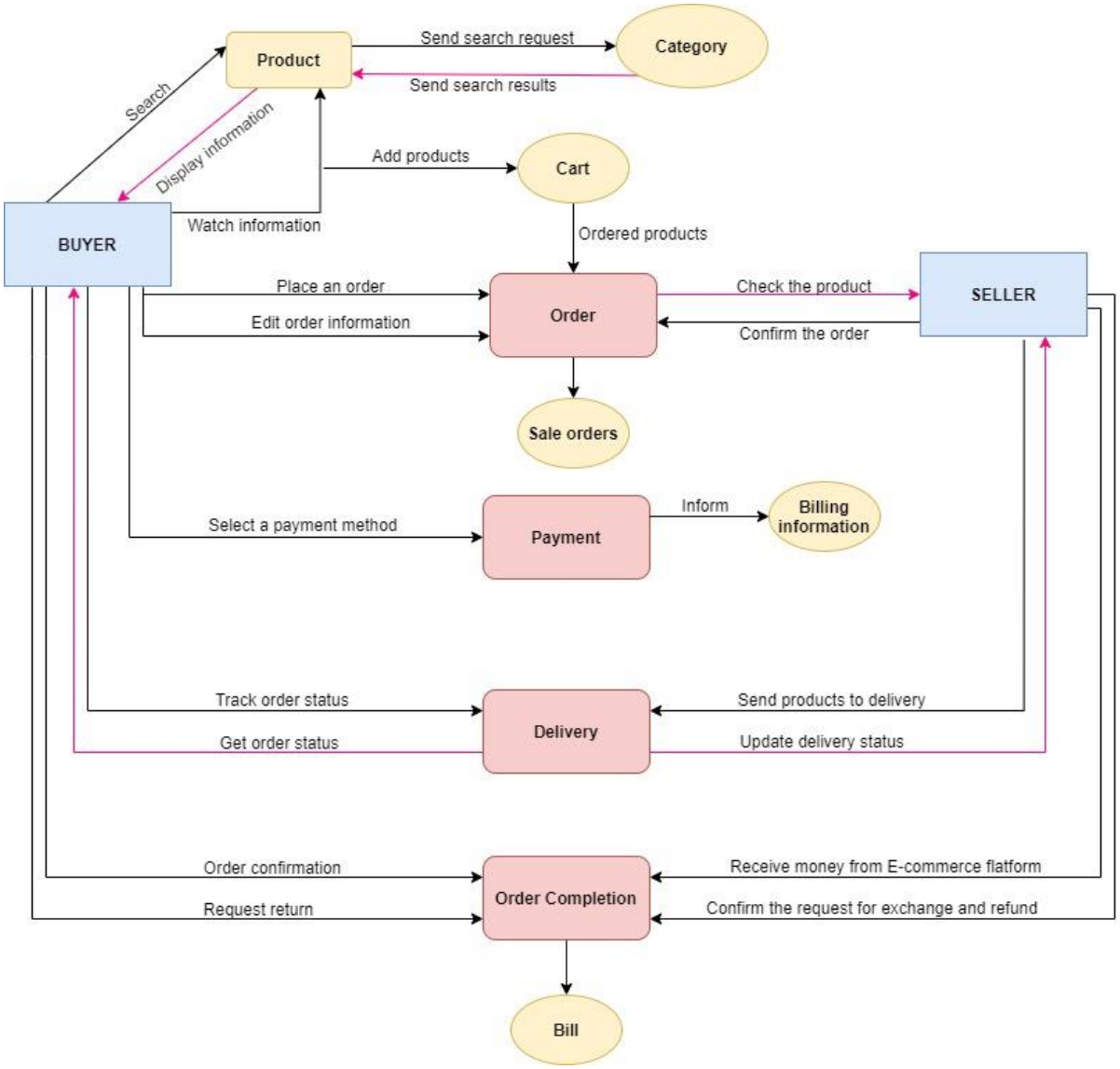

Figure 2 - Fulfilment DFD level 1

Fulfilment process explanation

- Search:

When the customer searches, the request to retrieve products from the catalog will be shown the results. After viewing product information, customers will put the product in their cart → place an order

- Order:

Buyer makes an order → the system sends order information to the seller → the seller checks the status of the goods and confirms the order → before the confirmation time, the buyer can cancel the order.

=> Order

- Payment:

Customers choose the payment method → The system updates the order input method.

- Shipment:

The seller performs the packaging and shipping process, updates the system → the buyer tracks the status of his or her goods through order information on the system.

- Order confirmation:

When the buyer receives the goods, the payment → the carrier will update the order status → the customer confirms or sends a return request → the seller receives the money from the e-commerce platform or confirms the request for return.

1.2.2. Customer service process

Figure 3 - Customer service DFD level 0

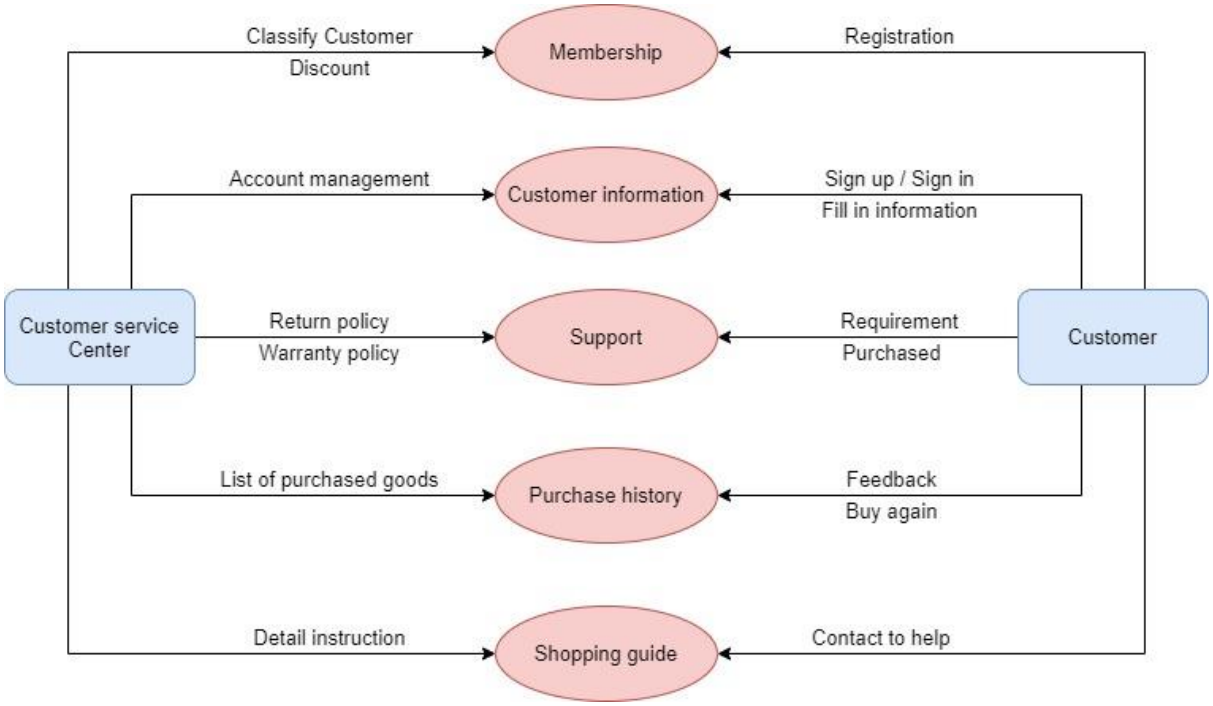

Figure 4 - Customer service DFD level 1

Customer service process explanation

- Membership

A customer service center will classify potential customers under the following terms: (1) the customer is usually a customer who joins the e-commerce platform within the past six months; (2) the Silver customer is the customer whose total value of the purchased order reaches 3 billion VND → will receive a discount of 9% on one order after that within one year; (3) the Gold customer is the customer whose total value of the purchased order reaches 7 billion VND → the customer will receive a discount of 10% for one order after that within 1.5 years. The customer service center will continuously update customer information to classify membership in the most accurate way.

The client manipulates the registration business to become a membership.

- Customer information

The customer service center will manage the customer's account including full name, gender, age, phone number, email, payment information,...

The customer will register and fill in all the information to create an account: Full name, gender, age, phone number, email, payment information, username, login password,... Or login will include username and password.

- Support

The customer service center will support customers with two policies that are returned and return goods and warranty for the goods.

Return goods: the system will automatically guide you in detail in the process of returning goods if the customer has a need. The customer has the right to request a refund or exchange of goods if the goods are received in contravention of the will and still within the shop's goods return period, if there is a reasonable reason and confirmed by the seller.

Goods warranty: also has an automated system to store products and their warranty period. The customer will receive a warranty for the product purchased.

- Service

There will be two main types of services in customer care: the Purchase History and the Purchase Order.

- Purchase History: The customer service center will store and display a list of customer history of purchases and complete payment orders. Customers rely on purchase history to perform feedback or choose to buy back certain goods.
- Purchase Order: The customer service center will store, display and update the latest information from customers' orders. Customers rely on it to check the information on the order (name, phone number, address, money, order number,…) to avoid errors.

Chapter 2: ENTITY RELATIONSHIP DIAGRAM

2.1. Entity Relationship Diagram

2.1.1. Fulfilment Process

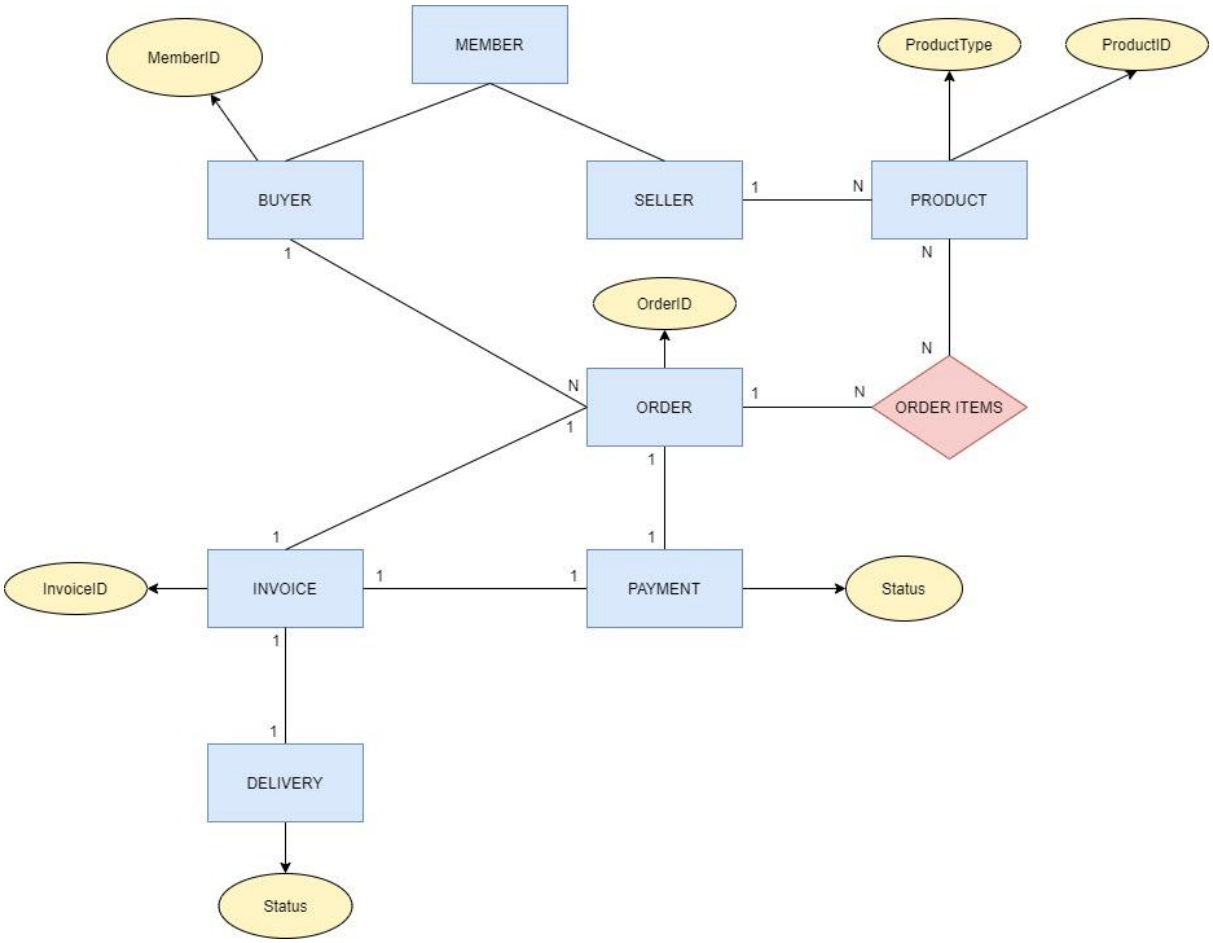

Figure 5 – ERD of Fulfillment Process

2.1.2. Customer Service Process

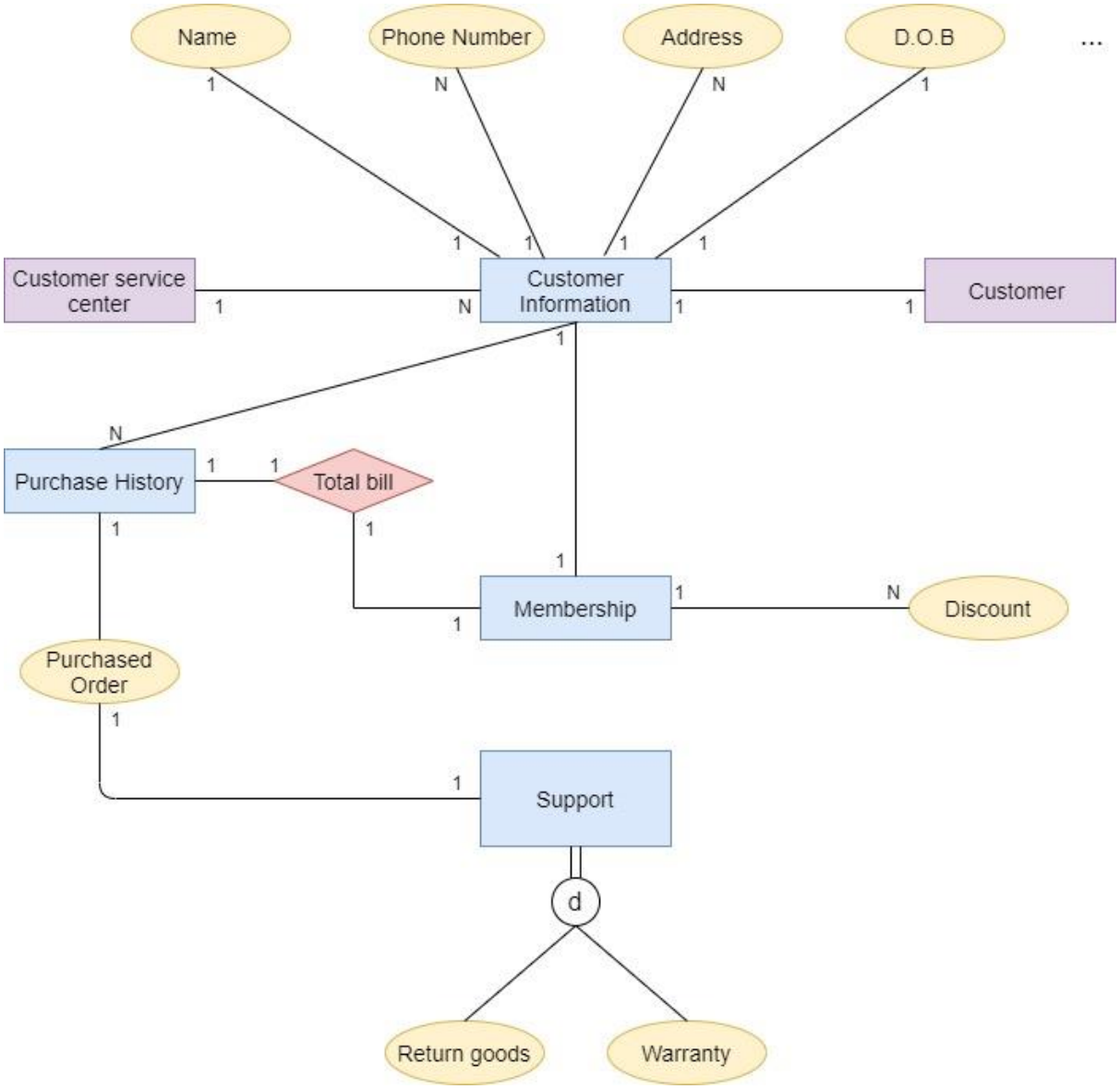

Figure 6 – ERD of Customer Service Process

2.2. Explain relationship

2.2.1. Fulfillment Process

- **SELLER - PRODUCT (1-N)**

The relationship between SELLER and PRODUCT is one to many, which means that each SELLER has multiple PRODUCT and each PRODUCT only belongs to one SELLER

- **PRODUCT - ORDER ITEMS (1-N)**

The relationship between PRODUCT and ORDER ITEMS is one to many, which means that each PRODUCT has multiple ORDER ITEMS and each ORDER ITEMS only belong to one PRODUCT

- **ORDER - ORDER ITEMS (1-N)**

The relationship between ORDER and ORDER ITEMS is one to many, which means that each ORDER has multiple ORDER ITEMS and each ORDER ITEMS only belongs to one ORDER

- **INVOICE - ORDER (1-1)**

The relationship between INVOICE and ORDER is one to one, which means that one INVOICE has one ORDER and ORDER belongs to one INVOICE

- **INVOICE - DELIVERY (1-1)**

The relationship between INVOICE and DELIVERY is one to one, which means that one INVOICE has one DELIVERY and DELIVERY belongs to one INVOICE

- **BUYER - PAYMENT (1-N)**

The relationship between BUYER AND PAYMENT is one to many, which means that one BUYER has many PAYMENT and each PAYMENT only belongs to one BUYER

- **BUYER - ORDER (1-N)**

The relationship between BUYER and ORDER is one to many, which means that each BUYER has multiple ORDER and each ORDER only belongs to one BUYER

- **PAYMENT - INVOICE (1-1)**

The relationship between INVOICE and PAYMENT is one to one, which means that one INVOICE has one PAYMENT and PAYMENT belongs to one INVOICE

2.2.2. Customer service process

- **CUSTOMER SERVICE CENTER - CUSTOMER INFORMATION (1-N)**

The relationship between CUSTOMER SERVICE CENTER and CUSTOMER INFORMATION is one to many, which means that each CUSTOMER SERVICE CENTER has multiple CUSTOMER INFORMATION and each CUSTOMER INFORMATION only belongs to one CUSTOMER SERVICE CENTER

- **CUSTOMER INFORMATION - CUSTOMER (1-1)**

The relationship between CUSTOMER INFORMATION and CUSTOMER is one to one, which means that one CUSTOMER INFORMATION has one CUSTOMER and CUSTOMER belongs to one CUSTOMER INFORMATION

- **CUSTOMER INFORMATION - NAME (1-1)**

The relationship between CUSTOMER INFORMATION and NAME is one to one, which means that one CUSTOMER INFORMATION has one NAME and NAME belongs to one CUSTOMER INFORMATION

- **CUSTOMER INFORMATION - PHONE (1-N)**

The relationship between CUSTOMER INFORMATION and PHONE is one to many, which means that each CUSTOMER INFORMATION has multiple PHONE NUMBER and each CUSTOMER INFORMATION only belongs to one PHONE

- **CUSTOMER INFORMATION - ADDRESS (1-N)**

The relationship between CUSTOMER INFORMATION and ADDRESS is one to many, which means that each CUSTOMER INFORMATION has multiple PHONE ADDRESS and each CUSTOMER INFORMATION only belongs to one ADDRESS

- **CUSTOMER INFORMATION - D.O.B (1-1)**

The relationship between CUSTOMER INFORMATION and D.O.B is one to one, which means that one CUSTOMER INFORMATION has one D.O.B and D.O.B belongs to one CUSTOMER INFORMATION

- **CUSTOMER INFORMATION - MEMBERSHIP (1-1)**

The relationship between CUSTOMER INFORMATION and CUSTOMER is one to one, which means that one CUSTOMER INFORMATION has one

MEMBERSHIP and MEMBERSHIP belongs to one CUSTOMER INFORMATION

- **CUSTOMER INFORMATION - PURCHASE HISTORY (1-N)**

The relationship between CUSTOMER INFORMATION and PURCHASE HISTORY is one to many, which means that each CUSTOMER INFORMATION has multiple PURCHASE HISTORY and each CUSTOMER INFORMATION only belongs to one PURCHASE HISTORY

- **PURCHASE HISTORY - TOTAL BILL (1-1)**

The relationship between PURCHASE HISTORY and TOTAL BILL is one to one, which means that one PURCHASE HISTORY has one TOTAL BILL and TOTAL BILL belongs to one PURCHASE HISTORY

- **TOTAL BILL - MEMBERSHIP (1-1)**

The relationship between TOTAL BILL and CUSTOMER is one to one, which means that one TOTAL BILL has one MEMBERSHIP and MEMBERSHIP belongs to one TOTAL BILL

- **MEMBERSHIP - DISCOUNT (1-N)**

The relationship between MEMBERSHIP and DISCOUNT is one to many, which means that each MEMBERSHIP has multiple DISCOUNT and each MEMBERSHIP only belongs to one DISCOUNT

- **PURCHASE HISTORY - PURCHASED ORDER (1-N)**

The relationship between PURCHASE HISTORY and DISCOUNT is one to many, which means that each PURCHASE HISTORY has multiple PURCHASED ORDER and each PURCHASE HISTORY only belongs to one PURCHASED ORDER

- **PURCHASE ORDER - SUPPORT (1-1)**

The relationship between PURCHASE ORDER and SUPPORT is one to one, which means that one PURCHASED ORDER has one SUPPORT and SUPPORT belongs to one PURCHASED ORDER

Chapter 3: LOGICAL MODEL

3.1. Relation Schema

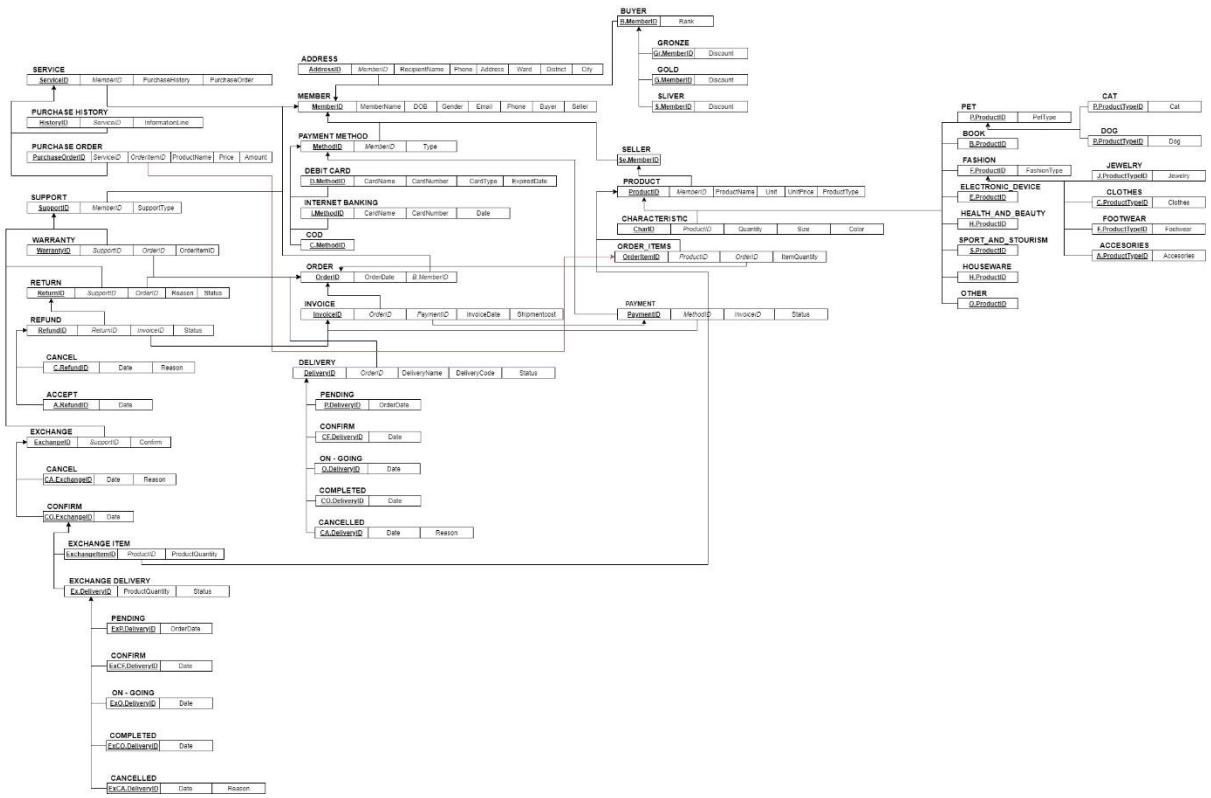

Figure 7 – Relation Schema

[https://drive.google.com/file/d/1PM7V1ly0vZu-jSrhyZRgyN2Aq7Y_nt2X/view?usp=sharing]

3.2. Logical Model

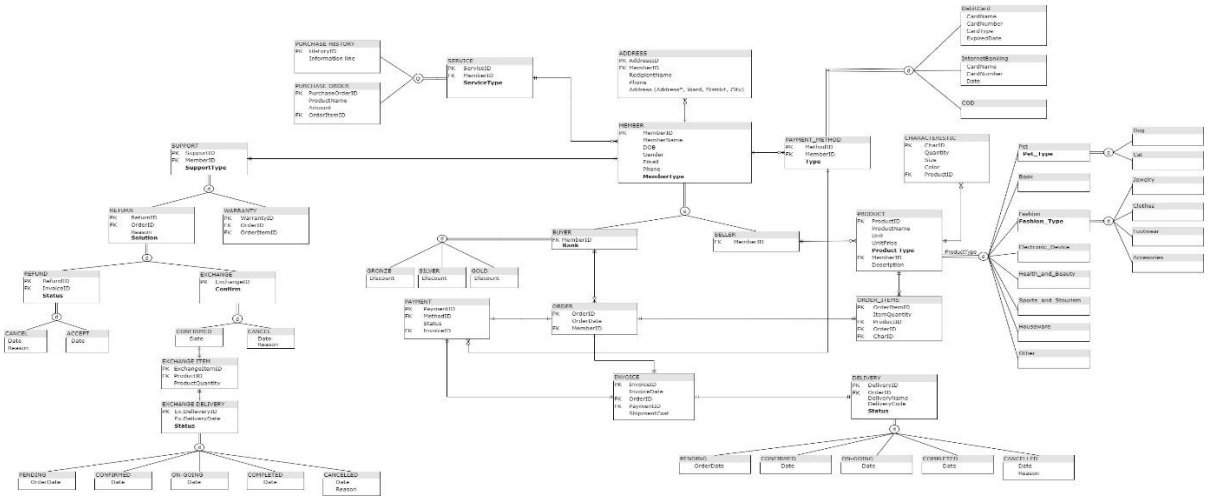

Figure 8 – Logical Model

[https://drive.google.com/file/d/1nZsRgNJWin5liqcderBRSbY9vXjRiteA/view?usp=sharing]

Chapter 4: PHYSICAL MODEL

4.1. Physical Model

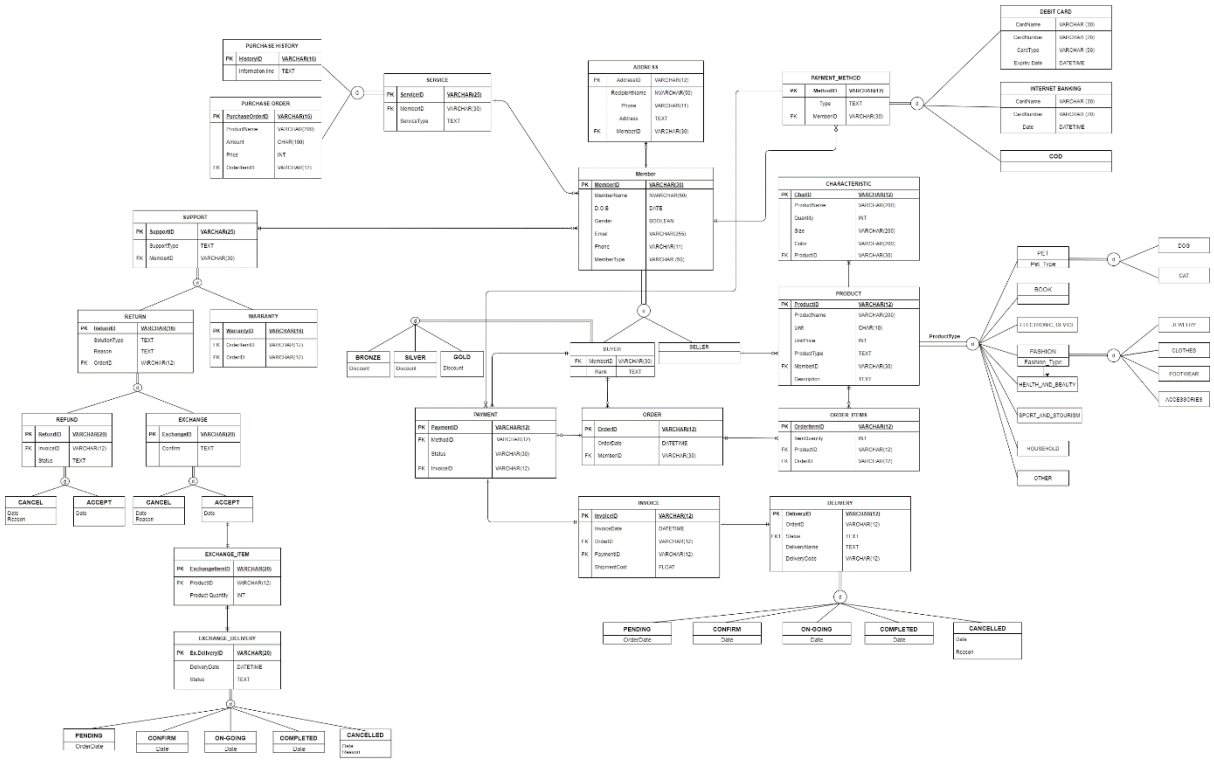

Figure 9 – Physical Model

[https://drive.google.com/file/d/1lVw8zTbVg1-kPyO6JGEQh-9n6ZFgctdU/view?usp=sharing]

4.2. Defining Data

	MEMBER			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	MemberID	VARCHAR(30)	☐	Membership number when registering an account
	Member Name	NVARCHAR(50)	☐	
	D.O.B	DATE	☐	Day of birth of Member
	Gender	BOOLEAN	☑	Comprising Male, Female and Other (null)
	Email	VARCHAR(255)	☑	
	Phone	VARCHAR(10)	☐	A phone number is only linked to the account
	MemberType	TEXT	☐	Gold, Silver, Bronze

Table 1. MEMBER

	ADDRESS			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	AddressID	VARCHAR(12)	☐	
	RecipientName	NVARCHAR(50)	☐	
	Phone	VARCHAR(11)	☐	Recipient's phone number
	Address	TEXT	☐	Recipient's address, a composite attribute
FK	MemberID	VARCHAR(30)	☐	ID of buyer

Table 2. ADDRESS

	PAYMENT_METHOD			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	MethodID	VARCHAR(12)	☐	
	Type	TEXT	☐	Including 3 types: Debit card, internet banking and COD
FK	MemberID	VARCHAR(30)	☐	

Table 3. PAYMENT METHOD

	DEBIT CARD			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	D.MethodID	VARCHAR(12)	☐	
	CardName	TEXT	☐	Uppercase, use vietnamese no sign
	CardNumber	INT	☐	
	CardType	Text	☐	
	ExpiredDate	DateTime	☐	month / year expired

Table 4. DEBIT CARD

	COD			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	C.MethodID	VARCHAR(12)	☐	

Table 5. COD

	ORDER			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	OrderID	VARCHAR(12)	☐	The 12-digit number sequence begins with 11
	OrderDate	DATETIME	☐	
	MemberID	VARCHAR(12)	☐	Member ID of buyer

Table 6. ORDER

	INVOICE			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	InvoiceID	VARCHAR(12)	☐	The 12-digit number sequence begins with 10
	InvoiceDate	DATETIME	☐	
FK	OrderID	VARCHAR(12)	☐	
FK	PaymentID	VARCHAR(12)	☐	Payment method of the order
	ShipmentCost	FLOAT	☐	Caculated shipment cost based on address and chosen delivery agency

Table 7. INVOICE

	PAYMENT			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	PaymentID	VARCHAR(12)	☐	The 12-digit number sequence begins with 12
FK	MethodID	VARCHAR(12)	☐	
	Status	TEXT	☐	Indicating whether customer pay for the order
FK	InvoiceID	VARCHAR(12)	☐	

Table 8. PAYMENT

	PRODUCT			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	ProductID	VARCHAR(12)	☐	The 12-digit number sequence begins with any number except 10,11,12,8
	ProductName	VARCHAR(200)	☐	
	Unit	CHAR	☐	Piece, set, gram, arat,...
	UnitPrice	FLOAT	☐	Price of a unit (VNĐ)
	ProductType	TEXT	☐	Each Product Name will belong to a Product Type
	MemberID	VARCHAR(12)	☐	ID of seller
	Description	TEXT	☑	Describing details of product

Table 9. PRODUCT

	ORDER ITEMS			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	OrderItemID	VARCHAR(12)	☐	The 12-digit number sequence begins with any number except 10,11,12,8
	ItemQuantity	INT	☐	
FK	ProductID	VARCHAR(12)	☐	
FK	OrderID	VARCHAR(12)	☐	
FK	CharID	VARCHAR(12)	☐	

Table 10. ORDER ITEMS

	DELIVERY			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	DeliveryID	VARCHAR(12)	☐	The 12-digit number sequence begins with 8 and is genarated by the platform
FK	OrderID	VARCHAR(12)	☐	
	Delivery Date	DATE TIME	☐	
	Status	TEXT	☐	Order status will be updated after each delivery step
	DeliveryName	TEXT	☐	Customer can choose one delivery agency which meet the need of customer
	DeliveryCode	VARCHAR(12)	☐	Code provided by delivery agency

Table 11. DELIVERY

	CHARACTERISTIC			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	CharID	VARCHAR(12)	☐	The 12-digit number sequence begins with any number, except zero number, genarated by the platform
	Quantity	INT	☐	
	Size	VARCHAR(200)	☑	Size is not applied to all products
	Color	VARCHAR(200)	☑	Color is not applied to all products
	ProductID	VARCHAR(12)	☐	A product has one or more characteristics

Table 12. CHARACTERISTIC

	BUYER			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
FK	MemberID	VARCHAR(30)	☐	Membership number when registering an account
	Rank	TEXT	☐	

Table 13. BUYER

	SELLER			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
FK	MemberID	VARCHAR(30)	☐	Membership number when registering an account

Table 14. SELLER

	SERVICE			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	ServiceID	VARCHAR(25)	☐	The 25-digit number sequence begins with 20
FK	MemberID	VARCHAR(30)	☐	Membership number when registering an account
	ServiceType	TEXT	☐	

Table 15. SERVICE

	PURCHASE HISTORY			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	HistoryID	VARCHAR(16)	☐	The 16-digit number sequence begins with 13
	Information line	TEXT	☐	

Table 16. PURCHASE HISTORY

	PURCHASE ORDER			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	PurchaseOrderID	VARCHAR(16)	☐	The 16-digit number sequence begins with 14
FK	OrderItemID	VARCHAR(12)	☐	The 12-digit number sequence begins with any number except 10,11,12,8
	ProductName	VARCHAR(200	☐	
	Amount	CHAR	☐	VNĐ
	Price	INT	☐	

Table 17. PURCHASE ORDER

	SUPPORT			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	SupportID	VARCHAR(25)	☐	The 25-digit number sequence begins with 22
FK	MemberID	VARCHAR(30)	☐	Membership number when registering an account
	SupportType	TEXT	☐	

Table 18. SUPPORT

	RETURN			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	ReturnID	VARCHAR(16)	☐	The 16-digit number sequence begins with 15
FK	OrderID	VARCHAR(12)	☐	The 12-digit number sequence begins with 11
	SolutionType	TEXT	☐	
	Reason	TEXT	☐	

Table 19. RETURN

	WARRANTY			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	WarrantyID	VARCHAR(16)	☐	The 16-digit number sequence begins with 16
FK	OrderID	VARCHAR(12)	☐	The 12-digit number sequence begins with 11
FK	OrderItemID	VARCHAR(12)	☐	The 12-digit number sequence begins with any number except 10,11,12,8

Table 20. WARRANTY

	REFUND			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	RefundID	VARCHAR(20)	☐	The 20-digit number sequence begins with 17
FK	InvoiceID	VARCHAR(12)	☐	The 12-digit number sequence begins with 10
	Status	TEXT	☐	

Table 21. REFUND

	EXCHANGE			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	ExchangeID	VARCHAR(20)	☐	The 20-digit number sequence begins with 18
FK	SupportID	VARCHAR(25)	☐	The 25-digit number sequence begins with 22
	Confirm	TEXT	☐	

Table 22. EXCHANGE

	EXCHANGE_ITEM			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	ExchangeItemID	VARCHAR(20)	☐	The 20-digit number sequence begins with 19
FK	ProductID	VARCHAR(12)	☐	The 12-digit number sequence begins with any number except 10,11,12,8
	Product Quantity	INT	☐	

Table 23. EXCHANGE ITEM

	EXCHANGE_DELIVERY			
	ATTRIBUTE	**DATA TYPE**	**ALLOW NULL**	**DESCRIPTION**
PK	Ex.DeliveryID	VARCHAR(20)	☐	The 20-digit number sequence
	DeliveryDate	DATETIME	☐	The 12-digit number sequence begins with any number except 10,11,12,8
	Status	TEXT	☐	

Table 24. EXCHANE DELIVERY

4.3. Data Manipulation Language

CREATE TABLE T_MEMBER

(MemberID VARCHAR(12) NOT NULL,

MemberName NVARCHAR(50),

DOB DATE,

Gender BOOLEAN,

Email VARCHAR(255),
Phone VARCHAR(11),
MemberType VARCHAR(50),
CONSTRAINT Member_PK PRIMARY KEY (MemberID))

CREATE TABLE T_BUYER
(MemberID VARCHAR(12) NOT NULL, Rank TEXT,
CONSTRAINT BUYER_FK PRIMARY KEY (MemberID)
REFERENCES T_MEMBER(MemberID))

CREATE TABLE T_SELLER
(MemberID VARCHAR(12) NOT NULL,
CONSTRAINT BUYER_FK PRIMARY KEY (MemberID)
REFERENCES T_MEMBER(MemberID))

CREATE TABLE T_ADDRESS
(AddressID VARCHAR(12) NOT NULL,
RecipientID NVARCHAR(50),
Phone VARCHAR(11),
Address TEXT, Ward TEXT,
District TEXT, City TEXT,
MemberID VARCHAR(30) NOT NULL,
CONSTRAINT Address_PK PRIMARY KEY (AddressID),
CONSTRAINT Address_FK FOREIGN KEY (MemberID)
REFERENCES T_MEMBER(MemberID))

CREATE TABLE T_PAYMENT_METHOD
(MethodID VARCHAR(12) NOT NULL,
MemberID VARCHAR(12) NOT NULL,
Type TEXT,
CHECK Type IN (‘Debit Card’, Internet Banking’, ‘COD’)

CONSTRAINT Payment_Method_PK PRIMARY KEY (MethodID),
CONSTRAINT Payment_Method_FK FOREIGN KEY (MemberID)
REFERENCES T_MEMBER(MemberID))

CREATE TABLE T_COD
(MethodID VARCHAR(12) NOT NULL)
CREATE TABLE DebitCard
(MethodID VARCHAR(12) NOT NULL,
CardNumber VARCHAR(20) ,
CardName VARCHAR(30) ,
CardType VARCHAR(50),
ExpiredDate DATETIME)

CREATE TABLE T_INTERNET_BANKING
(MethodID VARCHAR(12) NOT NULL,
CardName VARCHAR(30),
CardNumber VARCHAR(20),
Date DATE)

CREATE TABLE T_PRODUCT
(ProductID VARCHAR(12) NOT NULL,
ProductName VARCHAR(200),
Unit CHAR,
UnitPrice FLOAT
ProductType TEXT,
MemberID VARCHAR(12),
Description TEXT)
CONSTRAINT PRODUCT_PK PRIMARY KEY (ProductID)
REFERENCES T_ORDER (MemberID))

CREATE TABLE T_ORDERITEMS

(OrderItemID VARCHAR(12) NOT NULL,
ItemQuantity INT,
CONSTRAINT ORDERITEMS_PK PRIMARY KEY (OrderItemID),
CONSTRAINT ORDERITEMS_FK FOREIGN KEY (ProductID)
REFERENCES T_PRODUCT (ProductID),
CONSTRAINT ORDERITEMS_FK FOREIGN KEY (OrderID)
REFERENCES T_ORDER (OrderID),
CONSTRAINT OREDERITEMS_FK FOREIGN KEY (CharID)
REFERENCES T_CHARTERISTIC (CharID).

CREATE TABLE T_CHARACTERISTIC
(CharID VARCHAR(12) NOT NULL,
Quantity INT,
Size VARCHAR(200) IS NULL,
Color VARCHAR(200) IS NULL,
ProductID VARCHAR(12) ,
CONSTRAINT CHARACTERISTIC_PK PRIMARY KEY (CharID)
REFERENCES T_PRODUCT (ProductID)
CREATE TABLE T_ORDER
(OrderID VARCHAR(12) NOT NULL,
MemberID VARCHAR(12) NOT NULL,
OrderDate DATETIME,
CONSTRAINT ORDER_PK PRIMARY KEY (OrderID)
CONSTRAINT ORDER_FK FOREIGN KEY (MemberID)
REFERENCES T_MEMBER(MemberID));

CREATE TABLE T_INVOICE
(InvoiceID VARCHAR(12) NOT NULL,
OrderID VARCHAR(12) NOT NULL,
PaymentID VARCHAR(12) NOT NULL,
InvoiceDate DATETIME,

ShipmentCost FLOAT,
CONSTRAINT INVOICE_PK PRIMARY KEY (InvoiceID)
CONSTRAINT INVOICE_FK FOREIGN KEY (OrderID)
REFERENCES T_ORDER(OrderID)
CONSTRAINT INVOICE_FK FOREIGN KEY (PaymentID)
REFERENCES T_PAYMENT_METHOD(PaymentID));

CREATE TABLE T_DELIVERY
(DeliveryID VARCHAR(12) NOT NULL,
OrderID VARCHAR(12) NOT NULL,
DeliveryDate DATETIME,
DeliveryName TEXT,
Status TEXT,
DeliveryCode VARCHAR(12),
CONSTRAINT DELIVERY_PK PRIMARY KEY (DeliveryID),
CONSTRAINT INVOICE_FK FOREIGN KEY (OrderID)
REFERENCES T_ORDER(OrderID));

CREATE TABLE T_PAYMENT
(PaymentID VARCHAR(12) NOT NULL,
InvoiceID VARCHAR(12) NOT NULL,
MethodID VARCHAR(12) NOT NULL,
Status TEXT,
CONSTRAINT PAYMENT_PK PRIMARY KEY (PaymentID)
CONSTRAINT PAYMENT_FK FOREIGN KEY (InvoiceID)
REFERENCES T_INVOICE(InvoiceID),
CONSTRAINT PAYMENT_FK FOREIGN KEY (MethodID)
REFERENCES T_PAYMENT_METHOD(MethodID),

CREATE TABLE T_SERVICE
(ServiceID VARCHAR(25) NOT NULL,

MemberID VARCHAR(30),
ServiceType TEXT,
CONSTRAINT SERVICE_PK PRIMARY KEY (ServiceID),
CONSTRAINT SERVICE_FK FOREIGN KEY (MemberID)
REFERENCES T_MEMBER (MemberID));

CREATE TABLE T_PURCHASE_HISTORY
(HistoryID VARCHAR(16) NOT NULL,
ServiceID VARCHAR(25),
InformationLine TEXT,
CONSTRAINT PURCHASE HISTORY_PK PRIMARY KEY (HistoryID),
CONSTRAINT PURCHASE HISTORY_FK FOREIGN KEY (ServiceID)
REFERENCES T_SERVICE (ServiceID)),

CREATE TABLE T_PURCHASE_ORDER
((PurchaseOrderID VARCHAR(16) NOT NULL,
ServiceID VARCHAR(25),
OrderItemID VARCHAR(12),
ProductName VARCHAR(200),
Amount VARCHAR(100),
Price INT,
CONSTRAINT PURCHASE ORDER_PK PRIMARY KEY (PurchaseOrderID),
CONSTRAINT PURCHASE ORDER_FK FOREIGN KEY (ServiceID)
REFERENCES T_SERVICE (ServiceID)),
CONSTRAINT PURCHASE ORDER_FK FOREIGN KEY (OrderItemID)
REFERENCES T_ORDERITEMS (OrderItemID)),

CREATE TABLE T_SUPPORT

(SupportID VARCHAR(25) NOT NULL,

MemberID VARCHAR(30),

SupportType TEXT,

CONSTRAINT SUPPORT_PK PRIMARY KEY (SupportID),

CONSTRAINT SUPPORT_FK FOREIGN KEY (MemberID)

REFERENCES T_MEMBER (MemberID));

CREATE TABLE T_RETURN

(ReturnID VARCHAR(20) NOT NULL,

SupportID VARCHAR(25),

InvoiceID VARCHAR(12),

Status TEXT,

CONSTRAINT RETURN_PK PRIMARY KEY (ReturnID),

CONSTRAINT RETURN_FK FOREIGN KEY (SupportID)

REFERENCES T_SUPPORT (SupportID));

CONSTRAINT RETURN_FK FOREIGN KEY (InvoiceID)

REFERENCES T_INVOICE (InvoiceID));

CREATE TABLE T_REFUND

(RefundID VARCHAR(20),

InvoiceID VARCHAR(12),

Status TEXT,

CONSTRAINT DEFUND_PK PRIMARY KEY (RefundID),

CONSTRAINT DEFUND_FK FOREIGN KEY (InvoiceID)

REFERENCES T_INVOICE (InvoiceID));

CREATE TABLE T_WARRANTY

(WarrantyID VARCHAR(16),

OrderItemID VARCHAR(12),

CONSTRAINT WARRANTY_PK PRIMARY KEY (WarrantyID),
CONSTRAINT WARRANTY_FK FOREIGN KEY (OrderID)
REFERENCES T_ORDER (OrderID),
CONSTRAINT WARRANTY_FK FOREIGN KEY (OrderItemID)
REFERENCES T_ORDER_ITEM (OrderItemID));

CREATE TABLE T_EXCHANGE
(ExchangeID VARCHAR(20) NOT NULL,
SupportID VARCHAR(25) NOT NULL,
Confirm TEXT,
CONSTRAINT EXCHANGE_PK PRIMARY KEY (ExchangeID),
CONSTRAINT EXCHANGE_FK FOREIGN KEY (SupportID)
REFERENCES T_SUPPORT (SupportID));

CREATE TABLE T_EXCHANGE_ITEM
(ExchangeItemID VARCHAR(20) NOT NULL,
ProductID VARCHAR(12),
ProductQuantity INT,
CONSTRAINT EXCHANGE_ITEM_PK PRIMARY KEY (ExchangeItemID),
CONSTRAINT EXCHANGE_ITEM_FK FOREIGN KEY (ProductID)
REFERENCES T_PRODUCT (ProductID));

CREATE TABLE T_EXCHANGE_DELIVERY
(ExDelivery VARCHAR(20) NOT NULL,
DeliveryDate DATETIME,
Status TEXT)
CONSTRAINT EXCHANGE_DELIVERY_PK PRIMARY KEY (ExDeliveryID));

Chapter 5: QUERIES

5.1. Total order of a customer

```
SELECT MemberID, COUNT(OrderID) as 'SumofOrder'
FROM ORDER
```

5.2. Total order value of a customer

```
SELECT ORDER.OrderID, ORDER.MemberID,
SUM(ORDERITEMS.ItemQuantity * PRODUCT.UnitPrice) as 'Total Order Value'
FROM ORDER_ITEMS
INNER JOIN ORDER ON ORDER.OrderID = ORDERITEMS.OrderID
INNER JOIN PRODUCT ON PRODUCT.ProductID = ORDER_ITEMS.ProductID
GROUP BY ORDER.OrderID, ORDER.MemberID
```

5.3. Monthly sales report for each seller

```
SELECT MemberID, MONTH( InvoiceDate) as month, SUM( Quantity * UnitPrice ) as 'Total Sale'
FROM INVOICE
INNER JOIN PRODUCT
ON INVOICE.MemberID= PRODUCT.MemberID
GROUPBY MONTH (InvoiceDate)
```

5.4. Statistics of customers reaching gold, silver, and bronze grades

```
SELECT Rank, COUNT(MemberID) as 'Total Member'
FROM MEMBER INNER JOIN BUYER
ON MEMBER.MemberID=BUYER.MemberID
ORDER BY BUYER.Rank
```

5.5. Number of successful orders of buyers

```
SELECT MemberID, COUNT(OrderID) as OrderQuantity
FROM ORDER
INNER JOIN DELIVERY ON ORDER.OrderID = DELIVERY.OrderID
```

```
WHERE Status = ‘Completed’
```

5.6. Number of canceled orders of sellers and buyers

```
SELECT MemberID, Count(OrderID), DeliveryID
FROM Member INNER JOIN Delivery ON Member.OrderID = Delivery.OrderID
WHERE Status.Delivery = ‘Cancelled’
```

5.7. Retrieve invoice information

```
SELECT InvoiceID, MemberID, OrderID, InvoiceDate
(Quantity*Unit Price) AS Price, ProductName
FROM Invoice
INNER JOIN Product ON Invoice.MemberID = Product.MemberID
```

5.8. Statistics of the top 50 sellers with the highest sales in the month

```
SELECT TOP(100) m.MemberName,
SUM(SELECT SUM(Quantity*Unit Price)
FROM ORDER_ITEMS GROUP BY OrderID) AS ‘Total income’
FROM MEMBER m JOIN ORDER o ON m.MemberID = o.MemberID
WHERE d.OrderID = (SELECT OrderID FROM DELIVERY
WHERE Status = ‘COMPLETED’)
GROUP BY m.MemberID
ORDER BY ‘Total income’ DESC
```

5.9. Number of returned orders

```
SELECT m.MemberName,
COUNT(s.OrderID) As ‘Number of return orders’
FROM MEMBER m JOIN SUPPORT s ON m.MemberID =
s.MemberID
WHERE s.SupportType = ‘Return’
GROUP BY m.MemberID
```

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