



# Punjab University College of Information Technology

Database Systems - Project

**E-commerce System Design**

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E-commerce (electronic commerce) is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the internet. These business transactions occur either as business-to-business, business-to-consumer, consumer-to-consumer or consumer-to-business. The terms e-commerce and e-business are often used interchangeably. The term e-tail is also sometimes used in reference to that make up online retail shopping.

## **How does e-commerce work?**

E-commerce is powered by the internet, where customers can access an online store to browse through, and place orders for products or services via their own devices.

As the order is placed, the customer's web will communicate back and forth with the hosting the online store website. Data pertaining to the order will then be relayed to a central computer known as then forwarded to databases that manage inventory levels, a merchant system that manages payment information (using applications such as PayPal), and a bank computer -- before circling back to the order manager. This is to make sure that store inventory and customer funds are sufficient for the order to be processed. After the order is validated, the order manager will notify the store's web server, which will then display a message notifying the customer that their order has been successfully processed. The order manager will then send order data to the warehouse or fulfillment department, in order for the product or service to be successfully dispatched to the customer. At this point tangible and/or digital products may be shipped to a customer, or access to a service may be granted.

Platforms that host e-commerce transactions may include online marketplaces that sellers simply sign up for, such as Amazon.com; software as a service tools that allow customers to 'rent' online store infrastructures; or tools for companies to use in-house development to manage.

## **Types of E-commerce**

### **Business-to-business (B2B):**

E-commerce of products, services or information between businesses rather than between businesses and consumers. Examples include online directories and product and supply exchange websites that allow businesses to search for products, services and information and to initiate transactions through e-procurement interfaces.

In 2017, Forrester Research predicted that the market will top \$1.1 trillion in the U.S. by 2021, accounting for 13% of all B2B sales in the nation.

### **Business-to-consumer (B2C):**

Is the retail part of e-commerce on the internet? It is when businesses sell products, services or information directly to consumers. The term was popular during the late 1990s, when online retailers and sellers of goods were a novelty.

Today, there are innumerable virtual stores and malls on the internet selling all types of consumer goods. The most recognized example of these sites is Amazon, which dominates the B2C market.

## **Problem with previous System:**

- Before e commerce users have to do shopping in manual fashion
- Physical existence was necessary
- It was very difficult to take records of all the activities that happen on daily basis
- User was not able to do shopping remotely

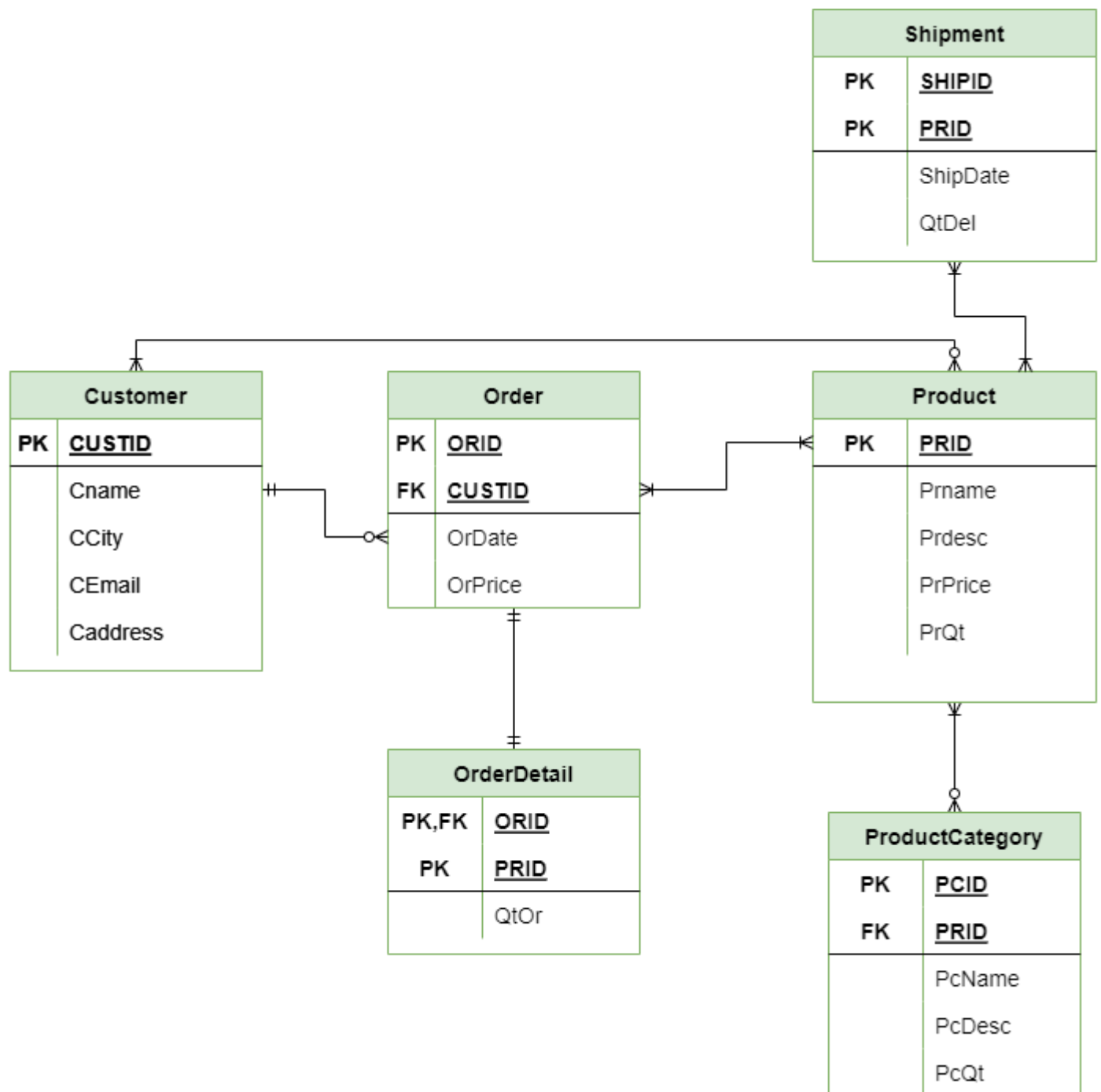
## **Entity – Relationship Diagram of E Commerce system**

The following Entity-Relationship Diagram (ERD) represents the relationships of different entities in this database system with respect to their attributes and primary key as well as foreign keys. It also represents the 1:1, 1: M and M: N relationships within e commerce system.

### **• CONNECTIVITY TABLE:**

<b>Entity</b>	<b>Relationships</b>	<b>Connectivity</b>	<b>Entity</b>
<b>Customer</b>	<b>Has</b>	<b>1:M</b>	<b>Order</b>
<b>Order</b>	<b>Has</b>	<b>1:1</b>	<b>OrderDetail</b>
<b>OrderDetail</b>	<b>Has</b>	<b>1:1</b>	<b>Order</b>
<b>Shipment</b>	<b>Has</b>	<b>1:M</b>	<b>Product</b>
<b>Product</b>	<b>Has</b>	<b>0:M</b>	<b>ProductCategory</b>
<b>ProductCategory</b>	<b>Has</b>	<b>1:M</b>	<b>Product</b>

## Entity – Relationship Diagram:



# **Relational Schema with Normalization:**

In our system, if a customer comes again then that customer will come single time.

## **First Normal Form:**

The tables are in **1NF** because

- Each table cell contains a single value.
- Each record is unique.

## **Second Normal Form:**

The tables are in **2NF** because

- The tables are already in **1NF**
- The tables don't contain partial dependency

## **Third Normal Form:**

The tables are in **3NF** because

- The tables are in **2NF**
- The tables don't contain any transitive dependency

Table: Customer			
Attribute	Data Type	Size	Constraints
CUSTID	NUMBER	10	Primary Key
Cname	VARCHAR2	13	
CCity	VARCHAR2	5	
CEmail	VARCHAR2	20	NOT NULL
Caddress	VARCHAR2	20	

Table: Orders			
Attribute	Data Type	Size	Constraints
ORID	NUMBER	10	Primary Key
CUSTID	NUMBER	10	Foreign Key, NOT NULL
OrDate	DATE		
OrPrice	Number	10	

Table: OrderDetail			
Attribute	Data Type	Size	Constraints
ORID	NUMBER	10	Primary Key, Foreign Key
PRID	NUMBER	10	Primary Key
QtOr	NUMBER	10	NOT NULL

Table: Product			
Attribute	Data Type	Size	Constraints
PRID	NUMBER	10	Primary Key
Prname	VARCHAR2	13	NOT NULL
PrDesc	VARCHAR2	30	
PrPrice	NUMBER	20	NOT NULL
PrQt	NUMBER	10	NOT NULL

Table: Product Category			
Attribute	Data Type	Size	Constraints
PCID	NUMBER	10	Primary Key
PRID	NUMBER	10	Foreign Key
PcName	VARCHAR2	13	NOT NULL
PcDesc	VARCHAR2	20	
PcQt	NUMBER	20	

Table: Shipment			
Attribute	Data Type	Size	Constraints
SHIPID	NUMBER	10	Primary Key
PRID	VARCHAR2	13	Primary Key
ShipDate	DATE		
QtDel	NUMBER	20	NOT NULL

## SQL Statements For Table Creation:

### Customer Table:

```
Create Table Customer (
  CUSTID NUMBER(10),
  Cname VARCHAR2(13),
  CCity VARCHAR2(5),
  CEmail VARCHAR2(20) NOT NULL,
  CONSTRAINT Cust_Primary Primary Key(CUSTID)
)
```

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable
CUSTOMER	CUSTID	NUMBER	-	10	0	1	-
	CNAME	VARCHAR2	13	-	-	-	✓
	CCITY	VARCHAR2	5	-	-	-	✓
	CEMAIL	VARCHAR2	20	-	-	-	-



### Product Table:

Create Table Product (  
PRID NUMBER(10),  
Prname VARCHAR2(13) NOT NULL,  
PrDec VARCHAR2(30),  
PrPrice NUMBER(20) NOT NULL,  
PrQt NUMBER(10) NOT NULL,  
CONSTRAINT Pr\_pk Primary Key(PRID)  
)

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
PRODUCT	PRID	NUMBER	-	10	0	1	-	-	-
	PRNAME	VARCHAR2	13	-	-	-	-	-	-
	PRDEC	VARCHAR2	30	-	-	-	✓	-	-
	PRPRICE	NUMBER	-	20	0	-	-	-	-
	PRQT	NUMBER	-	10	0	-	-	-	-

### Order Detail Table:

Create Table OrderDetail(  
ORID NUMBER(10) references Product(PRID),  
PRID NUMBER(10),  
QtOr NUMBER(10) NOT NULL,  
Constraint ord\_pk primary key (ORID,PRID)  
)

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
ORDERDETAIL	ORID	NUMBER	-	10	0	1	-	-	-
	PRID	NUMBER	-	10	0	2	-	-	-
	QTOR	NUMBER	-	10	0	-	-	-	-

### Order Table:

Create Table Orders(  
ORID NUMBER(10) Primary Key,  
CUSTID NUMBER(10) NOT NULL,

OrDate DATE,

OrPrice NUMBER(10),

Constraint Ors\_FK Foreign KEY(CUSTID) references Customer(CUSTID)

)

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
ORDERS	ORID	NUMBER	-	10	0	1	-	-	-
	CUSTID	NUMBER	-	10	0	-	-	-	-
	ORDATE	DATE	7	-	-	-	✓	-	-
	ORPRICE	NUMBER	-	10	0	-	✓	-	-

### **Product Category:**

Create Table ProductCategory (

PCID NUMBER(10) Primary Key,

PRID NUMBER(13) references Product(PRID),

PcName VARCHAR2(13) NOT NULL,

PcDesc VARCHAR2(20),

PcQt NUMBER(20)

)

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
PRODUCTCATEGORY	PCID	NUMBER	-	10	0	1	-	-	-
	PRID	NUMBER	-	13	0	-	✓	-	-
	PCNAME	VARCHAR2	13	-	-	-	-	-	-
	PCDESC	VARCHAR2	20	-	-	-	✓	-	-
	PCQT	NUMBER	-	20	0	-	✓	-	-

### **Shipment Table:**

Create Table Shipment (

SHIPID NUMBER(10) ,

PRID VARCHAR2(13),

ShipDate DATE,

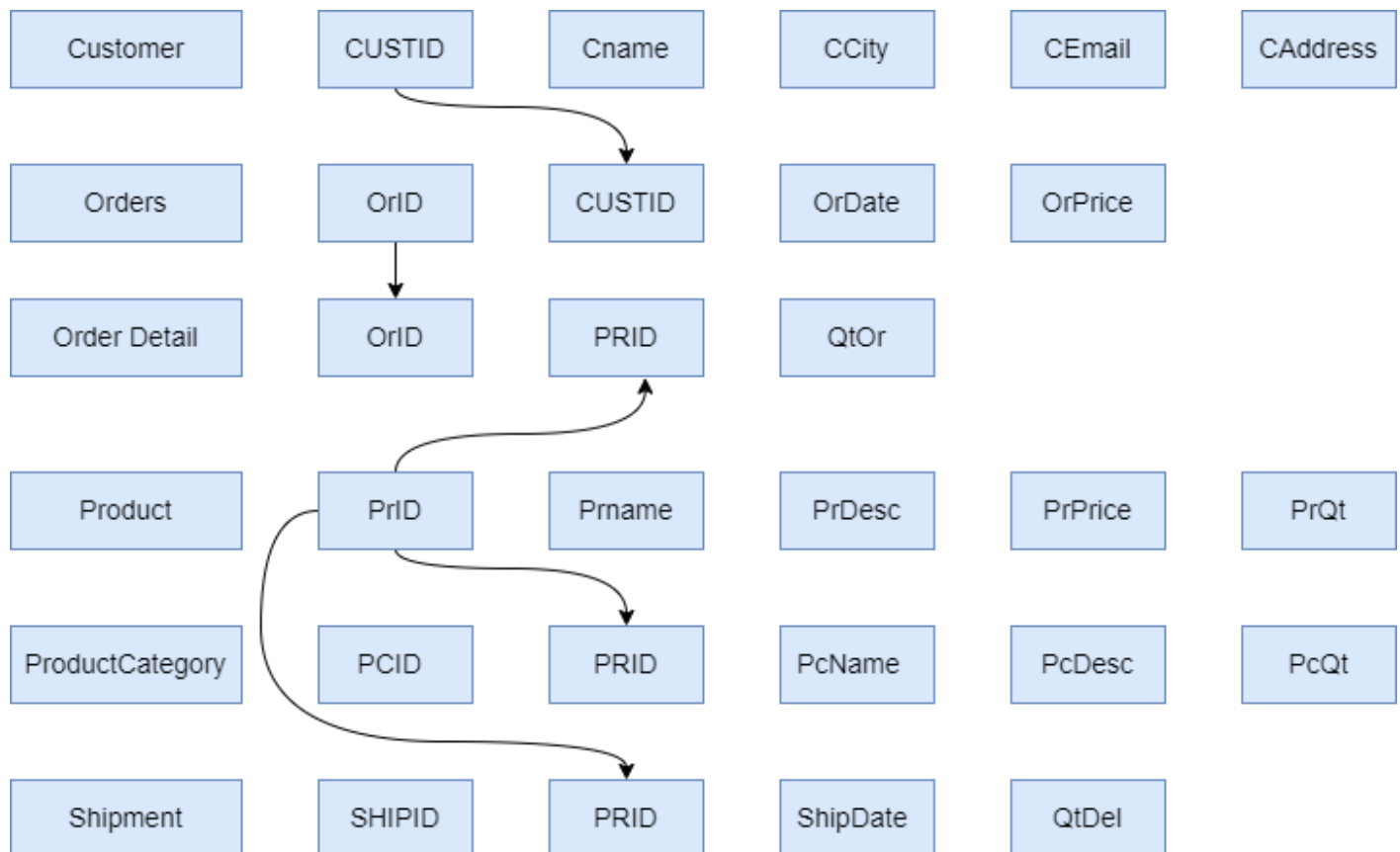
QtDel NUMBER(20) NOT NULL,

Constraint ship\_pk primary key (SHIPID,PRID)

)

Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
SHIPMENT	SHIPID	NUMBER	-	10	0	1	-	-	-
	PRID	VARCHAR2	13	-	-	2	-	-	-
	SHIPDATE	DATE	7	-	-	-	✓	-	-
	QTDEL	NUMBER	-	20	0	-	-	-	-

## Bachman Diagram:



# Dummy Data:

## CUSTOMER:

INSERT INTO CUSTOMER VALUES(1, 'Sami Ullah', 'LHR', 'samiullah@gmail.com','Street 9')

INSERT INTO CUSTOMER VALUES(2, 'John', 'KAR', 'John@gmail.com','Street 10');

INSERT INTO CUSTOMER VALUES(3, 'babu', 'PESH', 'babu@gmail.com','Street 11');

INSERT INTO CUSTOMER VALUES(4, 'osama', 'SRG', 'osama@gmail.com','Street 12');

CUSTID	CNAME	CCITY	CEMAIL	CADDRESS
3	babu	PESH	babu@gmail.com	Street 11
1	Sami Ullah	LHR	samiullah@gmail.com	Street 9
2	John	KAR	John@gmail.com	Street 10
4	osama	SRG	osama@gmail.com	Street 12

## Product:

insert into product values(1, 'EGG', 'This is egg product', 12,100)

insert into product values(2, 'Water', 'This is water product', 100,100)

insert into product values(3, 'Cocal Cola', 'This is coca cola product', 100,100)

insert into product values(4, 'Wheat 20KG', 'This is Wheat of 20kg weight', 10,1000)

PRID	PRNAME	PRDEC	PRPRICE	PRQT
1	EGG	This is egg product	12	100
2	Water	This is water product	100	100
3	Cocal Cola	This is coca cola product	100	100
4	Wheat 20KG	This is Wheat of 20kg weight	10	1000

## Product Category:

insert into productcategory values(2, 1, 'NOT SOFTDRINK', 'NOT SOFT DRINK', 20)

insert into productcategory values(3, 2, 'Soft Drink', 'SOFT DRINK', 20)

PCID	PRID	PCNAME	PCDESC	PCQT
2	1	NOT SOFTDRINK	NOT SOFT DRINK	20
3	2	Soft Drink	SOFT DRINK	20

## Orders:

insert into orders values(4,4,to\_char(sysdate,'mm dd yy'),5000)

insert into orders values(1,1,to\_char(sysdate,'mm dd yy'),300)

insert into orders values(2,3,to\_char(sysdate,'mm dd yy'),1300)

ORID	CUSTID	ORDATE	ORPRICE
4	4	06/19/0022	5000
1	1	06/19/0022	300
2	3	06/19/0022	1300

## Order Detail:

insert into orderdetail values(1,1,10)

insert into orderdetail values(2,3,20)

insert into orderdetail values(3,2,10)

insert into orderdetail values(4,4,5)

ORID	PRID	QTOR
1	1	10
2	3	20
3	2	10
4	4	5

### Shipment:

insert into shipment values (1,1,to\_char(sysdate,'mm dd yy'),10)

insert into shipment values (2,2,to\_char(sysdate,'mm dd yy'),20)

insert into shipment values (3,3,to\_char(sysdate,'mm dd yy'),10)

insert into shipment values (4,4,to\_char(sysdate,'mm dd yy'),5)

SHIPID	PRID	SHIPDATE	QTDEL
3	3	06/19/0022	10
2	2	06/19/0022	20
4	4	06/19/0022	5
1	1	06/19/0022	10

## Reports with select statements:

1- It will give us details of all customers

**select \* from customer**

2- It will give us detail of a specific customer having specific id

**select \* from customer where CUSTID = :Id**

3- It will give us details of all orders table

**Select \* from orders**

4- It will give us details of a specific orders table

**Select \* from orders where orid=:id**

5- It will give us details of all order details table

**Select \* from orderdetail**

6- It will give us details of all product table

**Select \* from product**

7- It will give us details of a product from a product table

**Select \* from product where prid= :id**

8- It will give us details of all shipment table

**Select \* from shipment**

9- It will give us details of a specific shipment from shipment table

**Select \* from shipment where shipid = :id**

10- It will give details of a particular shipment item and product details like which product was shipped

**select \* from shipment join product on shipment.prid = product.prid  
where shipment.prid=:id**

11- It will give us the detail of all the orders created by all customers

**select \* from orders, customer where orders.custid = customer.custid**

12- It will give details of the order create by a particular customer

**select \* from orders join customer on customer.custid = orders.custid  
where customer.custid = :id**