A Project Report On

E-Commerce Product Management System

COURSE CODE: CSE 212

COURSE TITLE: Database System

Section : B2

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Table & Content

Chapter One: Introduction

1.1 Digital shopping's rapid growth has impacted how companies work and how customers make choices. Online platforms are required to maintain an organized and effective managed product catalogue in order to attract clients. Online platforms create a positive shopping experience in today's online market. A product catalogue is more than just a list of goods. It is a foundation of an online store. It's a base where arranged goods into categories gives important data so that customers can easily get that item.

1.2 As the number of goods added, traditional methods for controlling companies information such as worksheets update become useless. Incorrect stock levels and trouble updating prices across various systems are only a few of the challenges that the businesses usually face. These challenges can end up in lower revenue, unhappy customers and poor operations. A strong DBMS can manage massive amounts of project data, support fast update will need to solve these challenges.

1.3 By supplying a centrally organized and trustful database to store and manage all product's data. The e-commerce product catalogue management system tries to solve these problems. User will find it simple to add new product, update about the product and check stock levels in real time. Customers able to view the full product information.

1.4 Furthermore, this system is designed with scalability in mind, meaning it can grow as the business and product catalog expand. It will utilize features of relational databases such as primary keys, foreign keys, normalization, views, triggers, and stored procedures to maintain data integrity and automate certain processes, such as updating stock quantities after an order is placed. By using a well -designed database, the system ensures that data remains consistent, accurate, and easily accessible.

Chapter Two: Background Study

2.1 In the world, the global retail of e-commerce has been changed due to the growth of e-commerce. The global retail are enables to connect companies with customers at anytime from anywhere. Online markets like Daraz, Amazon, Alibaba etc. has shown that the importance of manage and organized data. A Database System offers an organized method of storing, organizing and managing data about goods. It also managing data about clints, suppliers, payments and orders

2.2 Before 1960, businesses often relied on manual record keeping spreadsheets to maintain the product data of contemporary database system. As the number of products was added, those method were to failures, incorrect results and also has growing problems. Operational challenges and a negative customer-experiences out by problem like out of stock, late of updating product details.

2.3 A DBMS gives solution of these problems by suppling:

- Data structure by using table and links.
- Stability by avoiding and applying rules.
- Ability to manage rising and massive data sets.
- Protection of data by login and restricted limited use.
- Programming with activities, stored in memory and actions

2.4 Product name, id, prices, cetegories, supply and data of supplier are all the parts of catalogue. The catalogue is managed by DBMS. The owner of the website can use the catalogue to add new goods, update the stock looks. And can sales the trends. Customer can reply on it.

For example:

- When a customer - places an order, the DBMS updates the inventory levels, records the order details, and ensures the transaction is processed securely.

Major companies invest heavily in database systems to maintain their operations:

- To manage billion of goods and offer real time instant stock updates, Amazon deploys large database
- To improve finding and choice quickness, the website uses SQL database with caching system.
- Daraz applies analytics and database – based solutions to rapidly manage promotions.

2.5

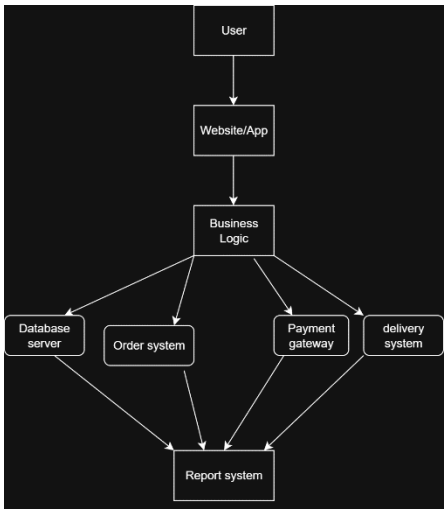
Since it applies useful database design ideas like ER diagram to find and manage data, we are working an e-commerce product catalogue management system as our project.

- Normalization for better efficiency and database redundant function.
- Foreign and primary keys to maintain table relations.
- SQL queries for handling and locating data.

Chapter Three: Project Design

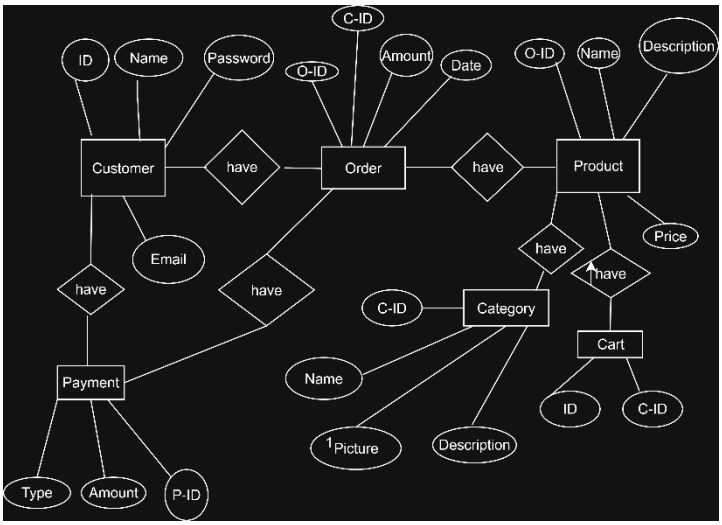
Block Diagram:

A block diagram is a simplified visual representation of a system that shows how different parts are connected and how data flow between them. It uses blocks to represent function and lines to show the relationship. In the following diagram, we made it based on e-commerce product catalog management system. In this diagram we have user, website/app, business logic, database system, order, payment, delivery system. User will see our website/app. And also, can see our business logic. If they like our any product then they order our product.



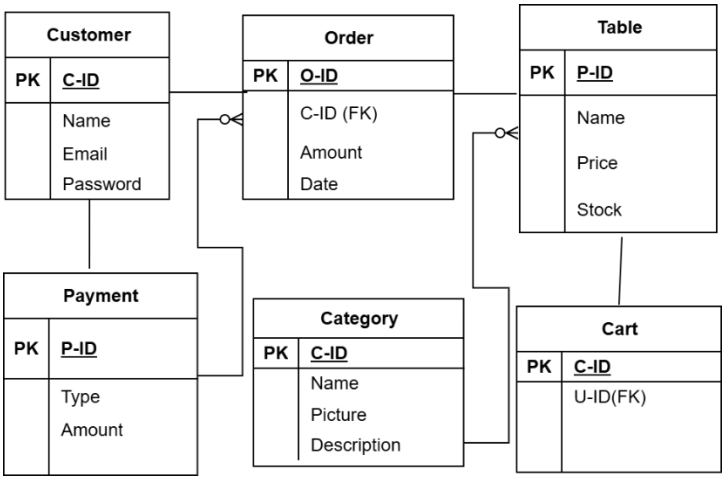
E-R Diagram:

An e-r diagram is a visual representation of a database structure. It shows how data is organized and how different entites are related to each other. In the following diagram, we made this based on e-commerce product catalog management system. In this diagram, a customer can have many orders. An order can include many product . A Product can appear in many order. Each order has one payment.



Schema:

A schema is ablueprint of a database. In the following schema , we made based on e-commerce product catalog management system. In this diagram, we have customer , product, cart,catalog,order and payment table. In the customer table, we have user_id, name, e-mail and password. In the producet table, we have p_id, name, price, stock. In the cart table, we have cart_id, user_id . In the cart table , user_id is a foreign key which refer from customer table. In the category table, we have c_id,name,picture,discription. In the order table, o_id,user_id,amount,order date. In the payment table,p_id, type (card, bikash etc),amount.



Chapter Four: Analysis and Implement

Table:

1.Customer:

```
CREATE TABLE CUSTOMER5(
   user_id INT PRIMARY KEY,
   name VARCHAR2 (100),
   email VARCHAR2(50),
   password VARCHAR2(50)
);
```

```
Table CUSTOMER5 created.

Elapsed: 00:00:00.016
```

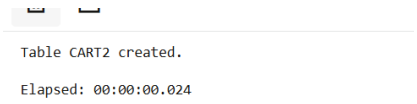
2.Product:

```
CREATE TABLE PRODUCT2(
   p_id INT PRIMARY KEY,
   name VARCHAR(50) ,
   price DECIMAL (10,2),
   description CLOB
);
```

```
Table PRODUCT2 created.

Elapsed: 00:00:00.017
```

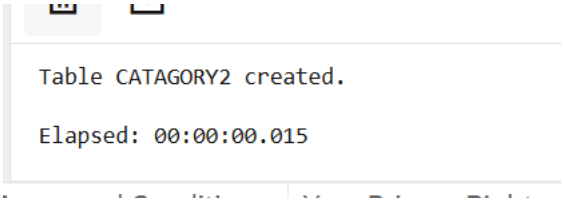
3. Cart:

```
CREATE TABLE cart2(
   cart2_id  INT PRIMARY KEY,
   user_id INT,
   FOREIGN KEY (user_id) REFERENCES CUSTOMER5(user_id)
);
```



4.Catagory:

```
CREATE TABLE catagory2(
   catagory_id INT PRIMARY KEY,
   name VARCHAR(50),
   picture VARCHAR(50),
   stock VARCHAR(50)
);
```



5.Order

```
CREATE TABLE order2(
   order_id INT PRIMARY KEY,
   order_amount DECIMAL(10,2),
   order_date DATE
 );
```

```
Table ORDER2 created.

Elapsed: 00:00:00.014
```

6.Payment

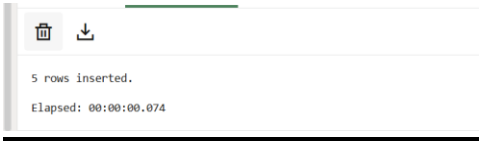
```
CREATE TABLE payment2(
 payment_id INT PRIMARY KEY,
type VARCHAR(50),
Amount DECIMAL (10,2)
);
```

```
Table PAYMENT2 created.

Elapsed: 00:00:00.019
```

Insertion Data into Table:

```
INSERT INTO CUSTOMER5(user_id,name,  email, password)VALUES
(101,'Alice','alice@example.com','pas123'),
(102,'Bob','bob@example.com','pas553'),
(103,'Humu','humu@example.com','pas993'),
(104,'Mahi','mahi@example.com','pas763'),
(105,'Tabarak','tak@example.com','pas00');
```


```
INSERT INTO PRODUCT2(p_id,name,  price,  description)VALUES
(1,'Laptop', 75000.50, 'Gaming Laptop'),
(2,'Smartphone', 25000.00, 'Android Phone'),
(3, 'Headphone', 3000.99, 'Wireless Headphones'),
(4,'Keyboard', 1500.75, 'Mechanical Keyboard'),
(5,'Mouse', 800.50, 'Wireless Mouse');
```



INSERT INTO cart2(cart2_id ,user_id)VALUES

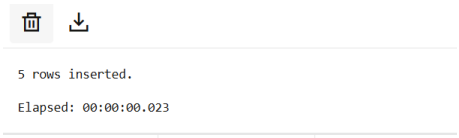
(1,101),

(2,102),

(3,103),

(4,104),

(5,105);



INSERT INTO catagory2(catagory_id ,name, picture,stock)VALUES

(401,'Electronics', 'electronics.jpg', 'Available'),

(402,'Clothing', 'clothing.jpg', 'Limited'),

(403,'Books', 'books.jpg', 'Available'),

(404,'Toys', 'toys.jpg', 'Out of Stock'),

(405, 'Accessories', 'accessories.jpg', 'Available');

INSERT INTO order2(order_id, order_amount, order_date)VALUES

(501,1500.75, TO_DATE('2025-01-15','YYYY-MM-DD')),

(502,750.50, TO_DATE('2025-02-10','YYYY-MM-DD')),

(503, 300.99, TO_DATE('2025-03-05','YYYY-MM-DD')),

(504, 1200.25, TO_DATE('2025-04-22','YYYY-MM-DD')),

(505,2150.00, TO_DATE('2025-05-19','YYYY-MM-DD'));

```
5 rows inserted.

Elapsed: 00:00:00.022
```

INSERT INTO payment2(payment_id ,type ,Amount)VALUES

(901,'Cash', 1000.00),

(902,'Online', 1500.75),

(903,'Bkash', 800.50),

(904, 'Nagad', 1200.20),

(905,'Online', 2500.99);

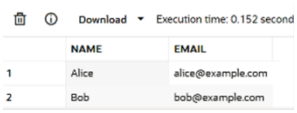
```
5 rows inserted.

Elapsed: 00:00:00.019
```

SQL QUERY:

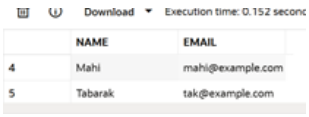
1.View name and email from customer:

SELECT name,email

FROM CUSTOMER5;



	NAME	EMAIL
1	Alice	alice@example.com
2	Bob	bob@example.com



	NAME	EMAIL
4	Mahi	mahi@example.com
5	Tabarak	tak@example.com

2. Update product:

UPDATE PRODUCT2

SET price=2340.67

WHERE p_id= 4;

```
1 row updated.
Elapsed: 00:00:00.004
```

3. Delete from Catalog:

DELETE FROM CATAGORY2

WHERE catagory_id=404;

```
1 row deleted.
Elapsed: 00:00:00.004
```

4. Find the Highest Payment:

SELECT AVG(Amount) AS AveragePaymentAmount

FROM PAYMENT2;

Download Execution time: 0.005 seconds

	AVERAGEPAYMENT
1	1400.488

5.

SELECT name

FROM PRODUCT2

WHERE name LIKE 'S%';

Download Execution time: 0.002 seconds

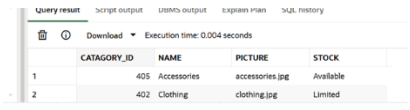
	NAME
1	Smartphone

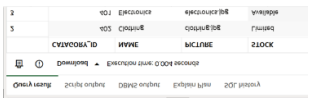
6.

SELECT *

FROM CATAGORY2

ORDER BY name ASC;





7. Find the highest product price:

SELECT MAX(price) AS HighestProductPrice

FROM PRODUCT2;

	HIGHESTPRODUCTP
1	75000.5

8. Find the lowest product price:

SELECT MIN(price) AS LowestProductPrice

FROM PRODUCT2;

	LOWESTPRODUCTP
1	800.5

9. Find amount between 1000 and 5000:

SELECT *

FROM PAYMENT2

WHERE Amount BETWEEN 1000 AND 5000;

	PAYMENT_ID	TYPE	AMOUNT
1	901	Cash	1000
2	902	Online	1500.75
3	904	Nagad	1200.2
4	905	Online	2500.99

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10.Find the total order:

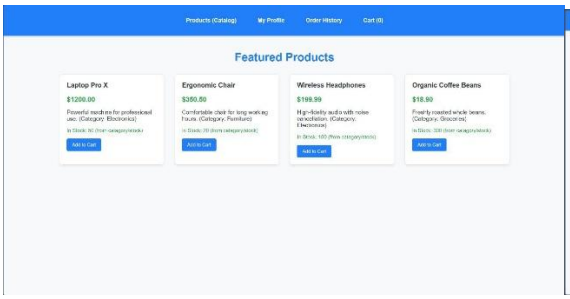
SELECT SUM(order_amount) AS TotalOrderValue

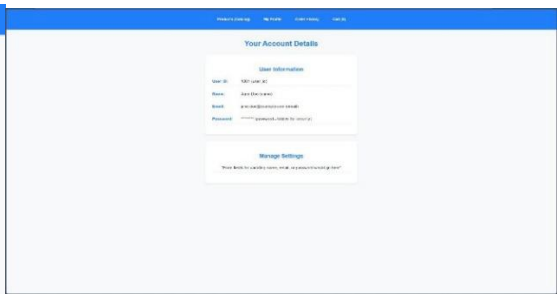
FROM ORDER2;

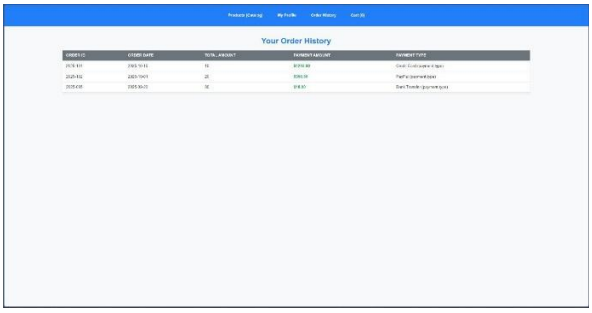
Download Execution time: 0.147 seconds

	TOTALORDERVALUE
1	5902.49

Forntpage Design:







Analysis and Discussion

System Overview

The E-Commerce Product Management System is designed to manage customer information, product details, category, order, payments and carts.

Main Modules and Their Functions

1. Customer Module

Purpose: Handles all customer-related information

Function:

User will able to create their account with unique name, user-id, email and password. They also able to reset/ change their personal information and the password.

2. **Category Module**

Purpose: Organizes products into categories for easy navigation.

Function:

Store category name, image, and description.

Helps link products to their respective types.

3. **Product Module**

Purpose: Manages details of products available in the system.

Functions:

Each product should entry the details about the product. Here

details such as p_id, name, price, description. Link each product to one category (Many-to-One relationship)

4. Cart Module

Purpose: Manages temporary shopping cart data for each customer.

Functions:

Customer can add product by the cart from the catalog.

This module shows all the contents of the cart. It shows that product details, price, quantities.

5. Order Module

Purpose: Handles order placement and tracking.

Functions:

We will able to see the list of order which punched by the customers.

6. Payment Module

Purpose: Manages payment information for each order.

Functions:

Customer can payment after the order. They can pay by cash or online payment. After payment, system will show us payment reports.

Functional Analysis

Each module interacts through foreign key relationships:

A Customer can have multiple Orders and Carts.

Each Order has one Payment.

Discussion

The database successfully models real-world e-commerce operations using relational design. Through normalization and relationships, it prevents data duplication while maintaining efficiency in querying. For example, linking Payment to Order allows simple reporting on revenue, and connecting Product to Category improves product organization. The design supports both administrative operations (managing inventory, prices, and orders) and user-level operations (browsing, adding to cart, and payment). Future improvements may include adding login authentication, discount management, and delivery tracking.

Chapter Five: Conclusion

CEP Mapping:

Our project is a solution to a complex engineering problem because it can't be resolved without in depth engineering knowledge. There is no obvious solution to and requires some amount of abstract thinking depending on the Database model. It also involves a diverse group of stakeholders with widely varying needs.

K's	Attributes	How K's are addressed though our project	CO	PO
K3	Engineering Fundamentals	Our Project involves a systematic formulation of engineering fundamentals like programming code, designing and problem solving.	CO1, CO2, CO3	PO1, PO2
K5	Engineering Design	We've made Entity-Relationship (ER) Diagram and Schema Diagram which are part of Engineering design.	CO3, CO4	PO3, PO2

K6	**Engineering Practice**	**We've implemented our design in Oracle. We created tables, inserted data with DDL and ran queries with DML. We've used Oracle workbench software as a tool for implementing our design.**	**CO1, CO2, CO5**	**PO1**
P1	**Depth of knowledge required**	**The project requires us to study one of the fundamentals of engineering which is Database Management System design (K3). It also requires designing ER and Schema diagram(k5) and implementing the design (K6).**	**CO3, CO4 CO5**	**PO2, PO7**
P3	**Depth of analysis required**	**The designing and implementation differ for various kinds of businesses, so some amount of abstract thinking is necessary to formulate and analyze suitable models.**	**CO3, CO5**	**PO3**

P7	**Interdependence**	**Our database has some subproblems or** **sections. Some of the tables are related to** **orders and shipment of customers, some** **of the table are related to inventory and** **storing, some of the tables are related to** **employees and supervisors of different** **administration.**	**CO3,** **CO4** **CO5**	**PO2,** **PO7**

A's	**Attributes**	**How A's are addressed though though are** **project**	**CO**	**PO**
A1	**Range of** **resources**	**We needed various kinds of resources for** **this project such as Developers (US),** **Servicers and HDD Storage System** **(Laptop /Desktop), information about**	**CO1**	**P05**

		customers and trade licenses.		
A5	**Familiarity**	**We had to get familiar with trade,** **economics and business operations besides** **engineering knowledge.**	**CO8,** **C09**	**P011**

Future Work:

- Use AI algorithms to suggest products and project management tools based on user preferences and behavior
- Reduce manual tasks in order processing, tracking, and returns
- As the market is getting bigger day by day, the technical structure of e-commerce platforms in Bangladesh will get more advanced in the near future

As indicated by market analysts, this growing market will not only improve the economic structure of Bangladesh but also bring changes in e-commerce technology, infrastructures, lifestyle and service industry of Bangladesh. With all the possibilities and ever-growing fast pace improvement Bangladesh is set to be the next Asian tiger of the e-commerce industry.

Chapter Six: Reference

YouTube, different types of websites.