

IDEA 1: E-commerce Management System:

Explanation: It is designed to facilitate the management of an online retail business

Functionalities:

- Managing product inventory
- Processing customer orders
- Tracking sales
- It will allow the administration of product categories, customer information, and order details, with a focus on ensuring a seamless shopping experience for customers.
- Insights into sales performance and customer trends to help in making informed business decisions.

ER Model:

The system consists of eight tables: Product, Category, Customer, Orders, Sales, Promotion, Seller, and Shipping Company. Each of these tables is equipped with a primary key to ensure data uniqueness and integrity.

- Product: It includes attributes such as
 - Product ID (PID)
 - Product name
 - Price
 - 1- seller can sell products (many to many)
 - 2- Products has category (one to many)
 - 3- Orders includes Products (many to many)
 - 4- Promotion on Products (many to one)
- Category:
 - Category ID (CID)
 - Category name
 - 1- Products has category (one to many)
- Customer:
 - Customer ID (CuID)
 - Customer name
 - Phone number
 - 1-Customer do reviews (many to one)
 - 2- Customer creates orders (many to one)

3- Customer get information about shipping company (one to one)

- Orders:
 - Order ID (OID)
 - Order date
 - Customer ID (CID)
 - Price
 - 1- Orders sent by shipping company (one to many)
 - 2- Customer creates order (many to one)
 - 3- Orders include products (many to one)

- Promotion:
 - Promotion ID
 - Dates
 - Discount rate
 - 1-Seller creates promotion(many to one)
 - 2-Promotion on Products (many to one)

- Saller:
 - Seller ID
 - Seller Name
 - Seller Address
 - 1- Seller sells products(many to many)
 - 2-Seller creates promotion (many to one)
 - 3-Seller deals shipping company(one to many)

- Shipping company:
 - Company ID
 - Company Name
 - Contact Number
 - 1- Seller deals shipping company(many to many)
 - 2- Customer get information about shipping company(one to one)
 - 3- Orders sent by shipping company(one to many)

- Reviews:
 - RID
 - -Rating
 - Comment
- 1-Customer do reviews(many to one)
- 2- Reviews of products(many to one)

Relational Model:

```
CREATE TABLE Product (  
    PID INT PRIMARY KEY,  
    product_name VARCHAR(255),  
    price DECIMAL(10, 2)  
);
```

```
CREATE TABLE Category (  
    CID INT PRIMARY KEY,  
    category_name VARCHAR(255)  
);
```

```
CREATE TABLE Customer (  
    CuID INT PRIMARY KEY,  
    customer_name VARCHAR(40),  
    phone_number VARCHAR(20)  
);
```

```
CREATE TABLE Orders (  
    OID INT PRIMARY KEY,  
    order_date DATE,  
    price INT,  
  
);
```

```
CREATE TABLE Promotion (  
    PromotionID INT PRIMARY KEY,  
    dates DATE,  
    discount_rate DECIMAL(5, 2),  
);
```

```
CREATE TABLE Seller (  
    SellerID INT PRIMARY KEY,
```

```
    seller_name VARCHAR(255),  
    seller_address VARCHAR(255)  
);
```

```
CREATE TABLE ShippingCompany (  
    CompanyID INT PRIMARY KEY,  
    company_name VARCHAR(20),  
    contact_number VARCHAR(20)  
);
```

```
CREATE TABLE Reviews (  
    RID INT PRIMARY KEY,  
    Rating INT,  
    Comment TEXT,  
);
```

```
CREATE TABLE SELLS(  
    SID INT NOT NULL,  
    PID INT,  
    PRIMARY KEY (SID , PID),  
    FOREIGN KEY (SID ) REFERENCES Seller(SID ),  
    FOREIGN KEY (PID) REFERENCES Product(PID)  
);
```

```
CREATE TABLE HAS(  
    PID INT NOT NULL,  
    CID INT,  
    PRIMARY KEY (PID),  
    FOREIGN KEY (PID) REFERENCES Product(PID),  
    FOREIGN KEY (CID) REFERENCES Category(CID)  
);
```

```
CREATE TABLE DO(  
    CuID INT,  
    RID INT NOT NULL,  
    PRIMARY KEY (RID),  
    FOREIGN KEY (CuID) REFERENCES Customer(CuID),  
    FOREIGN KEY (RID) REFERENCES Reviews(RID)  
);
```

```
CREATE TABLE INCLUDES(  
    OID INT NOT NULL,  
    PID INT,  
    PRIMARY KEY (OID, PID),  
    FOREIGN KEY (OID) REFERENCES Orders(OID),  
    FOREIGN KEY (PID) REFERENCES Product(PID)  
);
```

```
CREATE TABLE MAKE(  
    SID INT,  
    PRID INT NOT NULL,  
    PRIMARY KEY (PRID),  
    FOREIGN KEY (SID ) REFERENCES Seller(SID ),  
    FOREIGN KEY (PRID) REFERENCES Promotion(PRID)  
);
```

```
CREATE TABLE DEAL(  
    SID INT NOT NULL,  
    SCID INT,  
    PRIMARY KEY (SID ),  
    FOREIGN KEY (SID ) REFERENCES Seller(SID ),  
    FOREIGN KEY (SCID ) REFERENCES ShippingCompany(SCID)  
);
```

```
CREATE TABLE GET_INFO(  
    CuID INT,  
    SCID INT,  
    Info VARCHAR(255)  
    PRIMARY KEY (CuID, SCID ),  
    FOREIGN KEY (CuID) REFERENCES Customer(CuID),  
    FOREIGN KEY (SCID ) REFERENCES ShippingCompany(SCID )  
);
```

```
CREATE TABLE SENT_BY(  
    OID INT NOT NULL,  
    SCID INT,  
    PRIMARY KEY (OID),  
    FOREIGN KEY (OID) REFERENCES Orders(OID),  
    FOREIGN KEY (SCID ) REFERENCES ShippingCompany(SCID )
```

);

```
CREATE TABLE ON(  
    PRID INT NOT NULL,  
    PID INT,  
    PRIMARY KEY (PRID , PID),  
    FOREIGN KEY (PRID ) REFERENCES Promotion(PRID ),  
    FOREIGN KEY (PID) REFERENCES Product(PID)  
);
```