

CASE STUDY: Online Shopping Cart System

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1. Implement the Product Class

Define the 'Product' class with attributes and methods to handle product details and stock quantity updates.

```
import java.util.ArrayList;
```

```
import java.util.List;
```

```
import java.time.LocalDateTime;
```

```
public class Product {
```

```
    private String productId;
```

```
    private String name;
```

```
    private double price;
```

```
    private int stockQuantity;
```

```
    public Product(String productId, String name, double price, int  
stockQuantity) {
```

```
        this.productId = productId;
```

```
        this.name = name;
```

```
        this.price = price;
```

```
        this.stockQuantity = stockQuantity;
```

```
    }
```



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```
public String getProductId() {  
    return productId;  
}
```

```
public String getName() {  
    return name;  
}
```

```
public double getPrice() {  
    return price;  
}
```

```
public int getStockQuantity() {  
    return stockQuantity;  
}
```

```
public void updateStockQuantity(int quantity) {  
    this.stockQuantity += quantity;  
}  
}
```

2. Implement the Customer Class

Define the Customer class with attributes and methods to manage the shopping cart.

```
public class Customer {  
    private String customerId;
```



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```
private String name;
private String email;
private List<Product> cart;

public Customer(String customerId, String name, String email)
{
    this.customerId = customerId;
    this.name = name;
    this.email = email;
    this.cart = new ArrayList<>();
}

public String getCustomerId() {
    return customerId;
}

public String getName() {
    return name;
}

public String getEmail() {
    return email;
}

public void addToCart(Product product) {
```



```
    cart.add(product);  
}
```

```
public void removeFromCart(Product product) {  
    cart.remove(product);  
}
```

```
public void viewCart() {  
    System.out.println("Cart Contents:");  
    for (Product product : cart) {  
        System.out.println(product.getName() + " - $" +  
product.getPrice());  
    }  
}
```

```
public Order checkout() {  
    double totalAmount = 0;  
    for (Product product : cart) {  
        totalAmount += product.getPrice();  
    }  
    Order order = new Order("ORDER" +  
System.currentTimeMillis(), this, new ArrayList<>(cart),  
totalAmount, LocalDateTime.now());  
    cart.clear();  
    return order;  
}
```



```
}
```

3. Implement the Order Class

Define the Order class with attributes and methods to handle order details and calculate the total amount.

```
public class Order {  
    private String orderId;  
    private Customer customer;  
    private List<Product> products;  
    private double totalAmount;  
    private LocalDateTime orderDate;  
  
    public Order(String orderId, Customer customer,  
List<Product> products, double totalAmount, LocalDateTime  
orderDate) {  
        this.orderId = orderId;  
        this.customer = customer;  
        this.products = products;  
        this.totalAmount = totalAmount;  
        this.orderDate = orderDate;  
    }  
  
    public String getOrderId() {  
        return orderId;  
    }  
  
    public Customer getCustomer() {
```



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```
        return customer;
    }

    public List<Product> getProducts() {
        return products;
    }

    public double getTotalAmount() {
        return totalAmount;
    }

    public LocalDateTime getOrderDate() {
        return orderDate;
    }

    public void calculateTotalAmount() {
        totalAmount = 0;
        for (Product product : products) {
            totalAmount += product.getPrice();
        }
    }
}
```

4. Implement the Inventory Class

Define the Inventory class with attributes and methods to manage product inventory.



```
public class Inventory {  
    private List<Product> products;  
  
    public Inventory() {  
        this.products = new ArrayList<>();  
    }  
  
    public void addProduct(Product product) {  
        products.add(product);  
    }  
  
    public Product getProductById(String productId) {for  
        (Product product : products) {  
            if (product.getId().equals(productId)) {return  
                product;  
            }  
        }  
        return null;  
    }  
  
    public void updateProductStock(String productId, int quantity)  
{  
        Product product = getProductById(productId);  
        if (product != null) {  
            product.updateStockQuantity(quantity);  
        }  
    }  
}
```



```
    }  
}  
}
```

5. Develop a Main Class to Test the System

Create instances of Product, Customer, and Inventory. Add products to the inventory, simulate adding products to the customer's cart, view the cart, and checkout.

```
public class Main {  
    public static void main(String[] args) {  
        // Create Inventory  
        Inventory inventory = new Inventory();  
  
        // Create Products  
        Product product1 = new Product("P001", "Laptop", 1000.00,  
10);  
        Product product2 = new Product("P002", "Smartphone",  
500.00, 20);  
  
        // Add Products to Inventory  
        inventory.addProduct(product1);  
        inventory.addProduct(product2);  
  
        // Create Customer  
        Customer customer = new Customer("C001", "John Doe",  
"john.doe@example.com");
```



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```
// Add Products to Customer's Cart
customer.addToCart(product1);
customer.addToCart(product2);

// View Cart Contents
customer.viewCart();

// Checkout
Order order = customer.checkout();

// Print Order Details
System.out.println("Order ID: " + order.getId());
System.out.println("Customer: " +
order.getCustomer().getName());
System.out.println("Order Date: " + order.getOrderDate());
System.out.println("Total Amount: $" +
order.getTotalAmount());

// Update Inventory Stock
inventory.updateProductStock("P001", -1);
inventory.updateProductStock("P002", -1);

// Print Updated Stock
System.out.println("Updated Stock for P001: " +
product1.getStockQuantity());
System.out.println("Updated Stock for P002: " +
```



```
product2.getStockQuantity());  
    }  
}
```

FULL JAVA CODE

```
import java.time.LocalDateTime;  
import java.util.ArrayList;  
import java.util.List;
```

// Product Class

```
class Product {  
    private String productId;  
    private String name;  
    private double price;  
    private int stockQuantity;  
  
    public Product(String productId, String name, double price, int  
stockQuantity) {  
        this.productId = productId;  
        this.name = name;  
        this.price = price;  
        this.stockQuantity = stockQuantity;  
    }  
  
    public String getProductId() {  
        return productId;  
    }  
}
```



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```
}

public String getName() {
    return name;
}

public double getPrice() {
    return price;
}

public int getStockQuantity() {
    return stockQuantity;
}

public void updateStockQuantity(int quantity) {
    this.stockQuantity += quantity;
}
}
```

// Customer Class

```
class Customer {
    private String customerId;
    private String name;
    private String email;
    private List<Product> cart;
```



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```
public Customer(String customerId, String name, String email)
{
    this.customerId = customerId;
    this.name = name;
    this.email = email;
    this.cart = new ArrayList<>();
}
```

```
public void addToCart(Product product) {
    cart.add(product);
}
```

```
public void removeFromCart(Product product) {
    cart.remove(product);
}
```

```
public List<Product> viewCart() {
    return cart;
}
```

```
public Order checkout() {
    double totalAmount = 0;
    for (Product product : cart) {
        totalAmount += product.getPrice();
    }
}
```



```
    }  
    Order order = new Order("ORD" +  
System.currentTimeMillis(), this, new ArrayList<>(cart),  
totalAmount);  
    cart.clear(); // Clear cart after checkout  
    return order;  
}  
}
```

// Order Class

```
class Order {  
    private String orderId;  
    private Customer customer;  
    private List<Product> products;  
    private double totalAmount;  
    private LocalDateTime orderDate;  
  
    public Order(String orderId, Customer customer,  
List<Product> products, double totalAmount) {  
        this.orderId = orderId;  
        this.customer = customer;  
        this.products = products;  
        this.totalAmount = totalAmount;  
        this.orderDate = LocalDateTime.now();  
    }  
}
```



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```
public String getOrderId() {  
    return orderId;  
}
```

```
public Customer getCustomer() {  
    return customer;  
}
```

```
public List<Product> getProducts() {  
    return products;  
}
```

```
public double getTotalAmount() {  
    return totalAmount;  
}
```

```
public LocalDateTime getOrderDate() {  
    return orderDate;  
}
```

```
public double calculateTotalAmount() {  
    return totalAmount;  
}  
}
```



// Inventory Class

class Inventory {

private List<Product> products;

public Inventory() {

 this.products = new ArrayList<>();

}

public void addProduct(Product product) {

 products.add(product);

}

public Product getProductById(String productId) {for

 (Product product : products) {

 if (product.getId().equals(productId)) {return

 product;

 }

}

return null;

}

public void updateProductStock(String productId, int quantity)
{

 Product product = getProductById(productId);

 if (product != null) {



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```
        product.updateStockQuantity(quantity);
    }
}
}
```

// Main Class

```
public class Main {
    public static void main(String[] args) {
        // Create Inventory
        Inventory inventory = new Inventory();

        // Add Products to Inventory
        Product product1 = new Product("P001", "Laptop", 999.99,
10);
        Product product2 = new Product("P002", "Headphones",
29.99, 50);
        inventory.addProduct(product1);
        inventory.addProduct(product2);

        // Create Customer
        Customer customer = new Customer("C001", "Alice",
"alice@example.com");

        // Add Products to Cart
        customer.addToCart(product1);
        customer.addToCart(product2);
    }
}
```



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```
// View Cart
System.out.println("Cart Contents:");
for (Product product : customer.viewCart()) {
    System.out.println(product.getName() + " - $" +
product.getPrice());
}

// Checkout
Order order = customer.checkout();
System.out.println("\nOrder Summary:");
System.out.println("Order ID: " + order.getOrderld());
System.out.println("Total Amount: $" +
order.calculateTotalAmount());
System.out.println("Order Date: " + order.getOrderDate());
}
}
```

OUTPUT



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Output

```
java -cp /tmp/Cmwz6Mrasl/Main
```

Cart Contents:

Laptop - \$999.99

Headphones - \$29.99

Order Summary:

Order ID: ORD1721664882882

Total Amount: \$1029.98

Order Date: 2024-07-22T16:14:42.917588

=== Code Execution Successful ===



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