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Project Report

Description:

This project is designed to create a simple shopping cart system for an e-commerce platform using object-oriented programming. It includes managing both digital and physical products, applying discounts, and handling the cart and checkout process. The system supports product types, like digital and physical, and includes different discount types, such as percentage or fixed amount discounts.

Overview:

The project enables users to add products to a cart, apply discounts, and perform a checkout. It is structured around several classes:

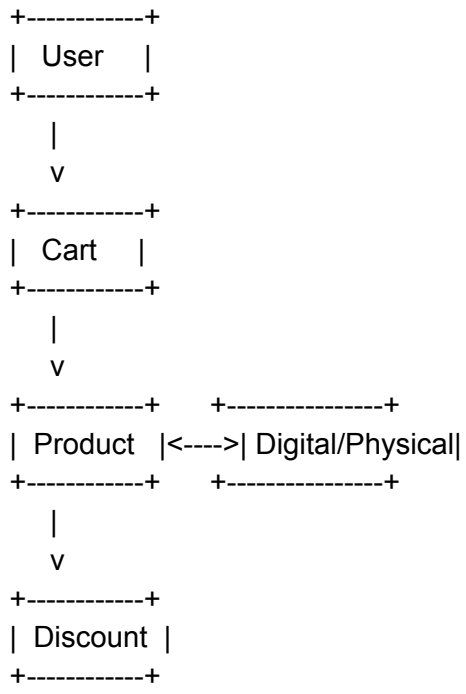
1. ***Product Class**: A base class for products.*
2. ***DigitalProduct** and **PhysicalProduct Classes**: These inherit from `Product` and handle digital and physical product-specific details.*
3. ***Cart Class**: Manages the products in a user's cart and calculates the total.*
4. ***User Class**: Represents an e-commerce user who can add items to their cart and perform checkout.*
5. ***Discount Class**: Abstract class for discounts. Subclasses include `PercentageDiscount` and `FixedAmountDiscount`.*

Structure

The code is broken into modular classes:

- ***Product****: Base class for products with attributes like price and quantity.*
- ***DigitalProduct*** *and* ***PhysicalProduct****: Specializations of* `Product` *for digital and physical products.*
- ***Cart****: Manages the cart's content, calculates totals, and applies discounts.*
- ***User****: Simplifies cart operations for users, letting them add/remove products and checkout.*
- ***Discount****: Abstract class for discounts with* `PercentageDiscount` *and* `FixedAmountDiscount` *to apply discounts to the cart.*

Simple Flowchart



Instructions:

1. ***Creating Products**:*
    - *Create `DigitalProduct` or `PhysicalProduct` instances with necessary attributes like price, quantity, size, and weight.*
2. ***Adding Products to Cart**:*
    - *Users can add products to their cart using the `add_to_cart()` method.*
3. ***Applying Discounts**:*
    - *Apply a discount by creating an instance of either `PercentageDiscount` or `FixedAmountDiscount`.*
4. ***Checkout**:*
    - *The `checkout()` method calculates the total, applies the discount, and clears the cart.*

Testing Example

1. *Create two `DigitalProduct` and three `PhysicalProduct` instances.*
2. *Create two `User` instances and add digital products to user1's cart and physical products to user2's cart.*
3. *Apply a 10% `PercentageDiscount` to user1's cart and a $50 `FixedAmountDiscount` to user2's cart.*
4. *Perform checkout for both users and display their final totals.*

```python
# Test the classes

# Creating products
digital_product = DigitalProduct(1, "E-book", 15.0, 1, 5, "http://downloadlink.com")
physical_product = PhysicalProduct(2, "Laptop", 1000.0, 2, 2.5, "15x10x1 inches", 20.0)

# Creating a user and adding products to the cart
user = User(1, "John Doe")
user.add_to_cart(digital_product)
user.add_to_cart(physical_product)

# Viewing the cart
print("Cart Contents:")
for product_info in user.cart.view_cart():
    print(product_info)

# Applying discount
percentage_discount = PercentageDiscount(10)  # 10% discount
total_with_discount = user.checkout(percentage_discount)
print(f"Total after discount: {total_with_discount}")

# Re-adding products for fixed amount discount test
user.add_to_cart(digital_product)
user.add_to_cart(physical_product)
fixed_discount = FixedAmountDiscount(50)  # Fixed $50 discount
total_with_fixed_discount = user.checkout(fixed_discount)
print(f"Total after fixed discount: {total_with_fixed_discount}")

# Create products
digital1 = DigitalProduct(1, "E-book", 15.0, 1, 5, "http://download.com")
digital2 = DigitalProduct(2, "Software", 50.0, 2, 50, "http://software.com")
physical1 = PhysicalProduct(3, "Laptop", 1000.0, 2, 2.5, "15x10x1", 20.0)
physical2 = PhysicalProduct(4, "Phone", 500.0, 1, 0.3, "6x3x0.5", 10.0)
physical3 = PhysicalProduct(5, "Tablet", 300.0, 3, 0.5, "8x5x0.5", 15.0)
```

```python
# Create users and add products to their carts
user1 = User(1, "John")
user2 = User(2, "Jane")
user1.add_to_cart(digital1)
user1.add_to_cart(digital2)
user2.add_to_cart(physical1)
user2.add_to_cart(physical2)
user2.add_to_cart(physical3)

# Apply discounts and checkout
percentage_discount = PercentageDiscount(10)
fixed_discount = FixedAmountDiscount(50)

user1_total = user1.checkout(percentage_discount)
user2_total = user2.checkout(fixed_discount)

print(f"User 1 Total: {user1_total}")
print(f"User 2 Total: {user2_total}")
```

Shell

```
>>> %Run inventoryjjm.py

  Cart Contents:
  ID: 1, Name: E-book, Price: 15.0, Quantity: 1, File Size: 5MB, Download Link: http://downloadlink.com
  ID: 2, Name: Laptop, Price: 1000.0, Quantity: 2, Weight: 2.5kg, Dimensions: 15x10x1 inches, Shipping Cost: 20.0
  Total after discount: 1813.5
  Total after fixed discount: 1965.0
  User 1 Total: 103.5
  User 2 Total: 3350.0
```

Conclusion:

This project demonstrates how to build a simple, object-oriented shopping cart system. By organizing the system into modular classes, it is easy to manage products, carts, and discounts. Users can interact with the system simply and effectively.

***Challenges**: Managing different product types and discounts required careful design to ensure correct calculations.*

***Limitations**: The system can be extended with more advanced features, such as quantity updates and more complex discount structures.*