

Assignment 2 - Java
ESS 201 Programming II
International Institute of Information Technology – Bangalore
(Submission: Domjudge by 13 Nov 23:59:59)

Problem Statement:

"ShopEase" is expanding its eCommerce platform and now wants to incorporate different customer types and product categories. You, as a junior developer, have been assigned to enhance the Customer Management Module using inheritance. The module should have specialized classes for customer types and product categories, leveraging inheritance for shared properties and behaviors.

Requirements:

- **Customer Inheritance**
 - Create a **base class** Customer that holds all common properties and methods (from Assignment 1).
 - Derive two subclasses:
 - **RegularCustomer**: Represents standard customers with no special privileges.
 - **PremiumCustomer**: Represents customers who receive discounts on total purchases.
 - **Discount Feature**: Implement a discount feature within PremiumCustomer, where a certain percentage (e.g., 10%) is applied to the total price of their cart.
- **Product Inheritance**
 - Create a **base class** Product that includes common attributes such as itemId, name, price, and quantity.
 - Derive subclasses:
 - **Electronics**: Specific to electronic items; include an additional field for warranty period.

- **Fashion:** Specific to fashion items; include an additional field for size (e.g., S, M, L).
 - **Stock Management:** Add a method in Product or the appropriate subclass that reduces stock quantity upon adding to the cart and prevents out-of-stock items from being added.
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- **Updated Classes and Methods**
 - Extend your program to support these new features with modifications to `Helper.java` and `Main.java`.
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- **Input Format**

The commands in the input format below allow for adding different customer types and product categories, managing shopping carts, and viewing customer details. The commands are:

 - ADD_ELECTRONICS itemId name price quantity warranty: Adds an electronics item with a specified warranty period(months).
 - ADD_FASHION itemId name price quantity size: Adds a fashion item with a specified size(XXL,XL,L,M,S).
 - ADD_REGULAR_CUSTOMER customerId name email address: Adds a regular customer without any discount privileges.
 - ADD_PREMIUM_CUSTOMER customerId name email address: Adds a premium customer with discount privileges.
 - ADD_TO_CART customerId itemId: Adds a specified item from the inventory to the customer's shopping cart.
 - VIEW_CART customerId: Displays all items currently in the specified customer's cart.
 - TOTAL_PRICE customerId: Shows the total cost of all items in the specified customer's cart, applying discounts for premium customers.

- VIEW_CUSTOMER customerId: Displays the customer's name, address, and type (Regular or Premium).
 - EXIT: Ends the program.
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- **Output Format**
 - **Adding Products**
 - Command: ADD_ELECTRONICS or ADD_FASHION
 - Output Format:
Electronics Item added: <itemId> <itemName>
Fashion Item added: <itemId> <itemName>
 - Example:
Electronics Item added: 201 Laptop
Fashion Item added: 301 Jacket
 - **Adding Customers**
 - Command: ADD_REGULAR_CUSTOMER or ADD_PREMIUM_CUSTOMER
 - Output Format:
Regular Customer added: <customerId> <customerName>
Premium Customer added: <customerId> <customerName>
 - Example:
Regular Customer added: C001 Rahul Verma
Premium Customer added: C002 Priya Sharma
 - **Adding Items to Cart**
 - Command: ADD_TO_CART
 - Output Format:
Item <itemId> added to <customerId>'s cart
 - Example:
Item 201 added to C001's cart
 - **Viewing Cart**
 - Command: VIEW_CART

- Output Format:
Items in Cart for <customerId>:
<itemId> <itemName> <price> <quantity> [additional details]
- Details:
 - For Electronics: Show warranty in months as "<warranty> months warranty)".
 - For Fashion: Show size as "(Size: <size>)".
- Example:
Items in Cart for C001:
201 Laptop 55000.0 1 (12 months warranty)

Items in Cart for C003:

301 Jacket 2500.0 1 (Size: M)

302 Shoes 4000.0 1 (Size: L)

- **Calculating Total Price**

- Command: TOTAL_PRICE
- Output Format:
 - For Regular customers:
Total Price for <customerId>: <totalPrice>
 - For Premium customers (10% discount applied):
Total Price for <customerId> (with discount):
<totalPriceWithDiscount> Total Price for <customerId> (with
discount): <totalPriceWithDiscount>
- Example:
 - Total Price for C001: 55000.0
 - Total Price for C002 (with discount): 27000.0

- **View Customer**
 - Command: VIEW_CUSTOMER
 - Output Format:
 - Customer Info for <customerId> (<CustomerType>):
 - Name: <customerName>
 - Address: <customerAddress>
 - Example:

Customer Info for C001 (Regular):
Name: Rahul Verma
Address: 12_MG_Road_Delhi

Customer Info for C002 (Premium):
Name: Priya Sharma
Address: 45_SP_Marg_Mumbai
- **Exiting the Program**
 - Command: EXIT
 - Output Format: No output required; the program simply terminates.
- **Error Handling and Output Format**
 - **Duplicate Customer ID**
 - Error Condition: When attempting to add a customer with an ID that already exists.
 - Output Format:

Error: Customer ID <customerId> already exists
 - Example:

Error: Customer ID C001 already exists
 - **Duplicate Item ID**
 - Error Condition: When attempting to add an item with an ID that already exists in the inventory.

- Output Format:
Error: Item ID <itemId> already exists in inventory
 - Example:
Error: Item ID 201 already exists in inventory
- **Customer Not Found**
 - Error Condition: When trying to access a customer (e.g., adding to cart, viewing cart, viewing customer details) with an ID that doesn't exist.
 - Output Format:
Error: Customer ID <customerId> not found
 - Example:
Error: Customer ID C005 not found
 - **Item Not Found**
 - Error Condition: When trying to add an item to a cart or view an item with an ID that doesn't exist in the inventory.
 - Output Format:
Error: Item ID <itemId> not found in inventory
 - Example:
Error: Item ID 305 not found in inventory
 - **Insufficient Stock**
 - Error Condition: When attempting to add an item to a cart but the available quantity is zero or insufficient.
 - Output Format:
Error: Insufficient stock for Item ID <itemId>
 - Example:
Error: Insufficient stock for Item ID 202
 - **Invalid Command Format**

- Error Condition: When the user inputs a command with an incorrect format or missing parameters.
- Output Format:

Error: Invalid command format

Example:

Error: Invalid command format

- **Invalid Price or Quantity**

- Error Condition: When adding an item with a negative price or a non-positive quantity.
- Output Format:

Error: Invalid value.

- Example:

Error: Invalid value.

- **Sample Input**

ADD_ELECTRONICS 201 Laptop 55000 2 12

ADD_ELECTRONICS 202 Smartphone 30000 5 24

ADD_FASHION 301 Jacket 2500 10 M

ADD_FASHION 302 Shoes 4000 3 L

ADD_REGULAR_CUSTOMER C001 "Rahul Verma" rahul.verma@gmail.com
"12_MG_Road_Delhi"

ADD_PREMIUM_CUSTOMER C002 "Priya Sharma" priya.sharma@yahoo.in
"45_SP_Marg_Mumbai"

ADD_PREMIUM_CUSTOMER C003 "Ankit Mehta" ankit.mehta@gmail.com
"25_JLN_Delhi"

ADD_TO_CART C001 201

ADD_TO_CART C002 202

ADD_TO_CART C003 301
ADD_TO_CART C003 302
VIEW_CART C001
VIEW_CART C002
VIEW_CART C003
TOTAL_PRICE C001
TOTAL_PRICE C002
TOTAL_PRICE C003
VIEW_CUSTOMER C001
VIEW_CUSTOMER C002
VIEW_CUSTOMER C003
EXIT

- **Sample Output:**

Electronics Item added: 201 Laptop
Electronics Item added: 202 Smartphone
Fashion Item added: 301 Jacket
Fashion Item added: 302 Shoes
Regular Customer added: C001 Rahul Verma
Premium Customer added: C002 Priya Sharma
Premium Customer added: C003 Ankit Mehta
Item 201 added to C001's cart
Item 202 added to C002's cart
Item 301 added to C003's cart
Item 302 added to C003's cart

Items in Cart for C001:

201 Laptop 55000.0 1 (12 months warranty)

Items in Cart for C002:

202 Smartphone 30000.0 1 (24 months warranty)

Items in Cart for C003:

301 Jacket 2500.0 1 (Size: M)

302 Shoes 4000.0 1 (Size: L)

Total Price for C001: 55000.0

Total Price for C002 (with discount): 27000.0

Total Price for C003 (with discount): 5850.0

Customer Info for C001 (Regular):

Name: Rahul Verma

Address: 12_MG_Road_Delhi

Customer Info for C002 (Premium):

Name: Priya Sharma

Address: 45_SP_Marg_Mumbai

Customer Info for C003 (Premium):

Name: Ankit Mehta

Address: 25_JLN_Delhi