**Object Oriented Programming**

**Class Assignment 3**

**Total Marks: 20** **Deadline: 03-01-25: till 11:59 PM**

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| **CLO No.** | **Course Learning Outcome (CLO)** | **Taxonomy Level** | **Mapping to PLO** |
| **CLO 2** | Identify the objects & their relationships to build object-oriented solution. | C3 | 3 |
| **CLO 3** | Apply object-oriented principles to address coding problems of small to moderate complexity. | C3 | 4 |

Task 1:

You are tasked with developing an **Online Shopping System** using Java and the concept of **inheritance**. The system should support different types of products and customers, along with their specific functionalities.

**Requirements:**

1. **Define a base class Product**
   * Represent a generic product with attributes such as **name, price**, and **quantity**.
   * Include appropriate methods to set and retrieve these attributes.
2. **Create derived classes from the Product class**
   * Define specific types of products, such as **Electronics**, **Clothing**, and **Books**.
   * Each derived class should inherit attributes and methods from the **Product** class and add additional specific attributes and functionalities.  
     For example:
     + The **Electronics** class should include an additional attribute **brand** and a method to calculate warranty coverage.
3. **Define a base class Customer**
   * Represent a generic customer with attributes such as **name,** **email**, and **address**.
   * Include appropriate methods to set and retrieve these attributes.
4. **Create derived classes from the Customer class**
   * Define different types of customers, such as **RegularCustomer** and **PremiumCustomer**.
   * Each derived class should inherit attributes and methods from the **Customer** class and add additional specific attributes and functionalities.  
     For example:
     + The **PremiumCustomer** class should include an additional attribute **loyaltyPoints** and methods to calculate discounts based on loyalty.
5. **Develop a class ShoppingCart**
   * Represent a customer's shopping cart with a suitable data structure (**e.g.,** **ArrayList**) to store selected products.
   * Include methods to:
     + Add and remove products
     + Calculate the total price
     + Generate an order summary.
6. **Create its UML diagram.**
7. **Implement a main method**
   * Simulate an online shopping experience by:
     + Allowing users to create different types of products
     + Add products to the shopping cart
     + Select a customer type
     + Perform operations like adding/removing products, calculating discounts, and generating a final order summary.