Assignment Title:	*CA2-Shopping Cart*
Module Title:	Applied Data Structures and Algorithms
Weighting:	20%
Deadline:	$12^{th} - 30^{th}$ September

Learning Outcome:

By completing this assignment you will practice and master the following skills:
- ✓ *Working with the fundamentals of Java programming*
- ✓ *Use of object-oriented design principles*
- ✓ *Identifying and fixing defects and common issues in code*

Task:

This assignment requires you to apply the knowledge of Java fundamentals and its advanced concepts to build a shopping cart application similar to your online shopping. The online shopping cart is a function present in e-commerce or online shopping. It allows you to search for the products from the product catalog and store your wanted products to the cart and order them if you want. When you click on show cart, the cart displays all the items that you have added with their respective quantity and total price. The user can select the address to deliver the items. Each user can manage addresses such as home address, work address etc. The next step is to pay (proceed to buy), that will show you the net payable amount which includes discounts and taxes. There might be multiple coupons, where the user can apply the coupon to get the discount on selected items. This shopping cart works just like carts that we use when shopping physically.

Based on the above information provided, the first step is to find out the classes, objects and its attributes and behaviours.

You are given the specifications of a shopping cart application which you need to implement. The classes that we identified for you are as follows:

1. *Product* class that has the attributes *product ID, product name, product description, quantity, unit price, manufacturer*.
2. *Shopping Cart* class that has the attributes *product catalog* has list of products and *cart* the list of products that the user has been selected.
3. The operations that will be performed by *shopping cart* are as follows:
   - The *addProductToCatalog(Product product)* will add the product to the shopping cart catalog.
   - The *showCatalog*() method displays all the product (items) from the shopping cart catalog.
   - The *editProduct(Product product)* will update/edit the product in the shopping cart catalog.
   - The *addToCart(Product product)* method, will add the product to the cart.
   - The *removeFromCart(Product product)* method will remove the product (item) from the cart.
   - The *clearCart()* method will remove all the products from the cart.
   - The *showCart()* method will display all the products (items) from the shopping cart. These items have been added by the customer.
   - The *getTotalAmount()* method will return the total amount based on the items in the cart.
   - The *getPayableAmount()* method will return the payable total amount based on the items in the cart.
     - ○ If there are any discount coupons applied, this should also be applied and the discounted price should be calculated. Finally, the tax of 30% should be calculated on the amount and should be returned.

- The *printInvoice*() method will print all the products that are listed in the cart with their names, description, quantity, unit price and total price. And then, show if the coupons have been applied and calculate the discounted price. The tax should also be displayed. At the last, display the total amount that has been paid.

Also, identify and implement the possible/relevant exceptions related to the *Shopping Cart* application.

Extra Credit: You will award extra credit for additional features if implemented apart from the given specifications.

Assessment Criteria

Grading Criteria	Points
Programming Style	5%
Program Logic	20%
Testing	15%
Viva Voce	10%
Total Marks	50%

Please note: The assignment is to be completed as an individual. The submission is to be made via Virtual Learning Environment (*VLE*). Only java source files should be uploaded, no class files. Put all the java files in a zip archive with the following name.

assign1_studentID.zip