AP Computer Science Homework 14

Due date: Thursday, March 3, 2016
Instructor: Mr. Alwin Tareen

Part A: Transactions in a Department Store

- Consider a program that keeps track of transactions in a large department store. Two classes are used to handle the two types of transactions that can occur during the sale of an item. The class hierarchy is shown in the following diagram.

- The `Transaction` class represents a general transaction. A general transaction consists of a description of the item, the quantity being purchased, the unit cost of the item, and the total cost of the item. The total cost is calculated in three steps. The first step is to calculate a subtotal by multiplying the unit cost by quantity being purchased. In the second step the subtotal is multiplied by the tax rate to get the total amount of tax. And in the last step the subtotal is added to the tax to get the total cost of the item.
- The `toString` method represents information about the transaction.
- The `Sale` class represents a sale transaction. A sale transaction is a general transaction with an added discount. The discount is calculated as percentage of the total cost of the item before taxes.
- The table below lists several transactions.

Class	Description	Quanitity	Cost	Discount %	Discount	Total Cost
Transaction	shoes	1	70.00			75.775
Transaction	robe	2	40.00			86.60
Sale	shirt	3	20.00	20%	12.00	51.96
Sale	pants	1	20.00	40%	8.00	12.99

- Write the complete class declaration for the class `Sale`. Include all necessary implementations of its constructor and methods. This includes overriding any methods that need to be updated to reflect the behavior of the `Sale` class. The constructor should take four parameters that indicate the description of the item, the quanitity, the cost, and the percentage of the discount (stored as a `double`).
- The output should look like the following:

```
Description      : shoes
Quantity         : 1
Cost             : 70.0
Total Cost       : 75.775
```

```
Description      : robe
Quantity         : 2
Cost             : 40.0
Total Cost       : 86.6

Description      : shirt
Quantity         : 3
Cost             : 20.0
Total Cost       : 51.96
Discount Savings : 12.0

Description      : pants
Quantity         : 1
Cost             : 20.0
Total Cost       : 12.99
Discount Savings : 8.0
```

- You are provided with the files `Transaction.java`, `Sale.java`, `ShoppingTest.java` and `ShoppingJUnitTest.java` to develop this program.
- Write your solution in the `Sale.java` file. Do not alter any of the other files.
- Write your code in the areas indicated by `// YOUR CODE HERE`.
- On your `BlueJ` project window, you should see a button labelled `Run Tests`. Press this button to run the `JUnit` tests.
- You should see a `BlueJ: Test Results` window pop up. If everything is correct, you should see a green bar that indicates that your code has passed the `JUnit` tests. If your program is incorrect, you will see a red bar. You can click on the method name to get more information about the problem. Otherwise, just click on the `Close` button, and you can go ahead and upload this program to `Web-CAT`.

Part B: Submission

- Submit your Java program `Sale.java` by uploading it to the Web-CAT automated grading platform.