Langara College

# Department of Computing Science & Information Systems

# CPSC1181 – Object-oriented Computing

###### **Lab1: Java Essentials**

**Objectives:**

* Create Java projects and packages
* Use Javadoc to create Java documentation
* Review on the Java essentials
* Work on variables, conditions, loops, methods, and arrays

**Notes on Installing Java and Eclipse to your computers**

1. Go to the following site to download Java and install it

<https://www.oracle.com/ca-en/java/technologies/downloads/>

1. Set the path so that you can run the Java compiler **javac** and run your Java class.

In order to set the path, you need to edit your Environment Variables. The steps shown below is for **Windows 10**. For other OS, the steps may be different.

* + - 1. Right-click **This PC**, then **Properties**.
      2. Click **Advanced** **system settings**.
      3. Click the **Environment Variables…** button.
      4. In the Environment Variables dialog box, go to the top section called User variables.
      5. If you already have a variable called **Path**, select the line for Path and then click the **Edit** button. Add a new line and then copy and paste the JDK bin path to this new line, which is like the following

C:\Program Files\Java\jdk-19\bin

Click **Move Up** until this new item reaches the top line.

* + - 1. If you do not have a Path variable, then click the **New** button, Type Path in the Variable name field, and copy and paste the path given above to the **Variable value** field. Click OK.
      2. Click OK to close the Environment Variables dialog box.
      3. Click OK to close the System Properties window.

1. Go to the following site to download Eclipse and install it

<https://www.eclipse.org/downloads/>

**Problems [35 marks]**

**Instructions:**

1. Create a folder named **LabProjects** to store all the lab files for this course
2. Open Eclipse and make **LabProjects** as the workspace.
3. Inside Eclipse, create a project named **Lab1** to store all the files for this lab. Make sure uncheck **Create module-info.java file**.
4. Add Javadoc comments and regular comments to your code

**Problem 1: [10 marks] Find denominations (**filename: **FindDenominations.java)**

1. Inside Eclips, right-click project Lab1->New->Class to add a new class
2. Enter lab1 as the package name
3. Enter FindDenominations as the class name
4. Leave the modifiers as public and none
5. Check **public static void main(String[] args)** and **Generate comments**
6. Click Finish
7. Write code that asks the user to enter an amount of money from 0 to 99 cents. The program then calculates and displays the number of coins from each denomination: quarters (25 cents), dimes (10 cents), nickels (5 cents), and cents.
8. Click Run to run the program.

For example, if the user enters 93, your program should display

There are 3 quarters, 1 dimes, 1 nickels, and 3 cents in 93 cents

**Problem 2: [10 marks] Shopping Receipt (**filename: **ShoppingReceipt.java)**

1. Add another new class to the project **Lab1** and name the new class as **ShoppingReceipt**
2. Write a program that asks the user to enter a shopping item name, unit price and the quantity of the item, and then calculates and displays the subtotal (which is the unit price times the quantity but every third piece gets half price), GST (5% of the subtotal), PST (7% of the subtotal), and the total which is the subtotal plus GST plus PST. Keep two decimals for all the calculated values.

A sample run is given below:

Enter the item name: Cap

Enter the item price: 20.5

Enter the quantity: 7

Your Receipt

Item name: Cap

Quantity: 7

Item price: $ 20.50

Subtotal: $ 123.00

GST (5%): $ 6.15

PST (7%): $ 8.61

Total: $ 137.76

**Problem 3: [15 marks] Find the smallest value of each row of a 2D array**

(filename: **FindSmallestValues.java**)

1. Add another new class to the project **Lab1** and name the new class as **FindSmallestValues**
2. Write a method with the following header to return an array of integer values which are the smallest values of each row of a 2D array of integer values

public static int[] smallestValues(int[][] num)

For example, if the 2D array passed to the method is:

8 5 2 6 6

3 6 5 4 5

7 5 4 5 0

8 8 5 1 6

The method returns an array of integers which are the smallest values from each row as follows:

2

3

0

1

1. In the main method, create a 2D array of integer values with the array size 4 by 5 and invoke the method to find and display the smallest values from each row of the 2D array.

Generate the values of the 2D array using the Math.random() method with the range from 0 to 9.

**What to hand in**

1. Click Project->Generate Javadoc… to geneate the Javadoc documents for all the java files inside Lab1->src->lab1. Leave all the other selections unchanged.
2. Zip the folder **Lab1** and upload it to D2L.

**When to hand in**

By 11:59pm, Wednesday, January 11, 2023.