Langara College

# Department of Computing Science & Information Systems

# CPSC1150 – Program Design

###### **Lab3: Selection Statements**

**Objectives:**

* Solving problems
* Writing algorithms
* Implementing algorithms with logic expressions and if-else statements

**Problems [25 marks]**

**Instructions:**

1. Create a folder named **Lab3** to store all the files from this lab
2. Create a single external documentation file (filename: **Lab3Ext.docx**) to store the summary, algorithm(s), and sample input and output for all the problems below.
3. All of your programs must have good internal and external documentations.

**Problem 1: [10 marks] Validating triangle** (filename: **ValidatingTriangle.java**)

Design an algorithm and then write a program that reads three edges for a triangle and determines whether the input is valid. The input is valid if the sum of any two edges is greater than the third edge. Get the input from the **console** and display the output on the **console**. Here are some sample runs from this program:

Enter the first edge length: 2

Enter the second edge length: 2

Enter the third edge length: 3

Can edges 2.0, 2.0, and 3.0 form a triangle? true

Enter the first edge length: 1

Enter the second edge length: 1

Enter the third edge length: 2

Can edges 1.0, 1.0, and 2.0 form a triangle? false

**Problem 2: [15 marks] Check a person’s body mass index**

(filename: **CheckBMI.java**)

The Body Mass Index (BMI) is often used by scientists and physicians to determine whether a person is underweight or overweight. The formula for calculating BMI is:

bmi = weight / height2

Design an algorithm and then write a program that gets a person’s weight (kg) and height (m) from the **console**. If the weight or the height is not positive, display an appropriate error message on the console before exiting the program. Otherwise the program calculates and checks a person’s BMI. If the person’s BMI is below 20, display “You are underweight”, else if it is above 25, display “You are overweight”, else display “Your BMI is normal”. Display the person’s BMI (keep two decimals) and the status message on the **console**.

**Problem 3: [10 marks] Sort three numbers (**filename: **SortThreeNumbers.java)**

Design an algorithm and then write a program that gets three integers from the user and display the integers from smallest to largest.

**What to hand in**

Zip the folder **Lab3** which contains all the Java source files and the external documentation file from this lab and upload the zip file to BrightSpace.

**When to hand in**

By 10:29 am, Tuesday, February 2, 2021.