Langara College

# Department of Computing Science & Information Systems

# CPSC1150 – Program Design

###### **Lab7: Java Methods and Top-down Design**

**Objectives:**

* Solving problems
* Refinement and top-down design
* Top-down and bottom-up implementations
* Method abstraction

**Instructions [45 marks]:**

1. Create a folder named **Lab7** to store all the files from this lab
2. Create an external documentation file (filename: **Lab7Ext.docx**) to store the summary, algorithm(s), and sample input and output for each problem.
3. All your programs must have good internal and external documentations

**Problem 1: [5 marks] Count number of vowels in a sentence**

(filename: **CountVowels.java**)

Write a method that returns the number of vowels (a, e, i, o, u. including both uppercase and lowercase) in a given sentence. In the main method, ask the user to enter a sentence, call the method above, and display the result.

You must design the algorithms for both the user-defined method and the main method.

**Problem2 [40 marks] Calculating the number of days passed and finding the next day**

(filename: CalculateDates.java)

Write a program that accepts a date as input, for example:

Day: **28**

Month: **2**

Year: **2017**

The program must do the followings:

* Given the date, compute and print how many days have passed in that year.
* Compute and print the date corresponding to the next day.

For example, *for the input given above*

*The output should be:*

58 days have passed since the beginning of the year.

The next day is March 1, 2017

**Another example:**

*If the input are:*

Day: **31**

Month: **12**

Year: **2015**

*The output should be:*

364 days have passed since the beginning of the year.

The next day is January 1, 2016

***Notes:***

Your program should create and use the following or similar methods:

* **isInputValid** (return true if all the input values are valid, otherwise return false)
* **getMonthName**
* **isLeapYear**
* **getDaysInMonth**
* **calculateTotalDaysPassed**
* **printNextDay**

You can also have other methods if necessary. Your program must be tested for many different dates, for example Feb. 28th of a leap year, Feb. 28th of a non-leap year, Dec. 31st of a year, etc.

**What to hand in**

**Zip the folder** which contains the documentation file and all the Java source files from this lab and **submit the zipped folder to D2L**.

**When to hand in**

By 10:29 am, Monday, Mar 8, 2021