CPSC 1061 – Introduction to Programming in Java Lab

Spring 2021

Lab 3 – Due Monday, February 1^{st}, 10:00pm

1 Introduction

In this lab you will practice writing short Java programs with a multitude of elementary programming concepts.

The lab today can be performed in groups of two. Do not just tell each other solutions but always make sure that your lab partner also understands why something does or does not work.

Have fun!

2 Lab Objectives

In this lab, you will practice to:

1. write Java programs with user input
2. use different numerical data types,
3. use numeric operators (including the remainder/modulo), the exponent operation, augmented assignment operators, increment and decrement operators
4. use type casting

3 Main

3.1 General Instructions

At the start of each program, write your name, the name of your lab partner, the course and lab, the date, and a description of what your program does as in the previous lab. In this lab as well as in all following labs, each program needs to have comments, to be clean, and to compile. Furthermore, any input and output should be designed to have appropriate instructions and sentences.

3.2 Distance.java

Write a program that asks the user to enter the coordinates of two points with the coordinates (x_1, y_1) and (x_2, y_2). You can write them as x1, y1, x2, and y2 when the user is prompted for input.

Compute and display the distance between the two points using the following formula:

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \tag{1}$$

3.3 Alarm.java

You look at your mobile phone and it is exactly 11pm. You set an alarm to go off in 55 hours. At what time does the alarm go off?

Write a program that performs that computation for a number of hours that the user chooses and that prints out the result.

3.4 Ants.java

There are between 1 and 10 quadrillion ants on Earth according to estimates, let's go with 5 quadrillion. That's a 5 with 15 zeros. What happens if you save that value as a variable of type int? What type should you use?

Now let's talk about bacteria. Scientists from the University of Georgia estimate that the number of bacteria on earth is about five million trillion trillion. That's a 5 with 30 zeroes.

Write a program that:

1. Saves the number of ants on Earth in a variable of type int and displays the result.
2. Displays the number of ants on Earth using a variable of type long.
3. Displays the number of bacteria on Earth in the most appropriate way.

3.5 Truncate.java

Write a program that asks the user for a floating point number. Truncate that number using explicit casting so that there is only one digit after the 0 and display the result. (Tip: We talked about a way to do this in class.)

3.6 Short.java

Write a program that saves the largest possible value of type short as a variable s. Multiply s by 2 using the augmented assignment operator $*=$ (no space) . Display the result followed by an explanation of why you are getting this result.

3.7 Submit Files

Transfer your java files from the lab machine to your computer/laptop. Create a single zip-file that includes all the java files and submit the zip-file to Canvas.