**COMP 210 – Data Structures and Analysis (Sec 2)**

**Assignment #1 – Part 3 – Getting Started**

Issue Date: January 14th, 2023. Due Date: January 21st, 11:55pm

**Rules for ALL HWs (in addition to any statements in the syllabus):**

You are encouraged to discuss the homework assignments and study together in groups, but when it comes to formulating/writing/coding solutions you must work alone and independently. If required, you should be able to explain your answer clearly to TAs/LAs. Copying homework solutions from another student, from the Internet, solution sets of friends, or other sources will be considered cheating and treated accordingly.

# Part 3 (4 Points)

In this part you are required to write an additional Java program and answer questions given below. This part will be manually graded and you should provide your responses in the spaces below and then upload this file **as a pdf in Gradescope “Assignment 1 –**

**Part 3”.**

1. In the same package (assn01) create another java class called “Part3”, with a

“main” method that does the following:

* + - Declares a variable short **sh**, which is to be set to the largest short integer.
    - Then calls another static method “method2”.

1. Create “method2” that:

* Declares a (Hex) **int n2 = 0xABC**, and prints out the number as a decimal.
* Calls another static method “method3”.

iii) Create “method3” that:

* Declares an array **a3 = {‘a’, ‘z’}**
* Runs the following statement: **System.out.println(a3[0]+" "+ a3[1]);**

* 1. Provide a copy of your code in the space below (this should not be an image):

public class Part3

{

public static void main(String args[])

{

short sh;

sh = Short.MAX\_VALUE;

//sh is 32767, which is stored in MAX\_VALUE

//from the Short class.

method2();

}

public static void method2()

{

int n2 = 0xABC;

System.out.println(n2);

method3();

}

public static void method3()

{

int[] a3 = new int[]{'a','z'};

System.out.println(a3[0]+" "+a3[1]);

}

}

1. Setup a breakpoint in method3 before it exits, and debug the program to stop at this breakpoint to show the following: The **main**, **method2** and **method3** stacks and their **variables** with full details. (You must capture these images and show the values below).

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application

Description automatically generated

1. What are the contents of the Stack memory? What are the contents of the Heap memory?

**Stack mem:** sh = 32767; n2 = 2748; a3

**Heap mem:** a3[0] = ‘a’; a3[1]=’z’

1. Once the program is fully run, give equations showing how ‘sh’ and ‘n2’ were calculated?

Short type can only store 16 bits, so the max value they can store is 2^15 – 1 or 32767, thus sh = 32767.

0x indicates the following numbers are hexadecimal.

ABC16 = A\*16^2 + B\*16^1 + C\*16^0 = 10\*256 + 11\*16 + 12 = 2748.

1. Explain the values printed when you printed the a3 elements a3[0] and a3[1]. Why do we see numbers instead of characters and what do those numbers mean?

**‘a’ and ‘z’ in ascii are equivalent to 97 and 122 in decimal. Because a3 was defined as an int array, ‘a’ and ‘z’ were converted to their ascii int values and when they are printed we see 97 and 122**