8.12 Lab Assignment 6

Start Assignment

Due Nov 15, 2021 by 11:59pm **Points** 95 **Submitting** a file upload
File Types asm and s **Available** after Nov 3, 2021 at 12am

Purpose: Use nested loop programming logic with an array of integers.

Program

A nested loop is a loop inside another loop.

Nested looping is often used to perform certain tasks that involve arrays.

For this array:

```
Array: .word 29, 106, 18, 2, 55, 21, 17, 13, 9999, 1024, 13, 2, 5, 23, 51,
2021, 111, 89, 89, 91, 861, 1234, 5004
```

Write a program using two nested looping structures to do the following two tasks:

(1) Nested looping structure #1: sort the array elements using a sort algorithm that has nested looping

(2) Nested looping structure #2: calculate and save in two separate registers these sums:

- calculate the sum of the 5 largest array elements and save this sum in register $t9
- calculate the sum of the 4 largest array elements and save this sum in register $t8

When calculating these sums, use nested looping. The structure of the nested looping should work this way:

High Level Language Pseudocode for structure of the nested looping

```
for (i = 0;  i < 2; i++ {
      for (x = 5; x > 3;  x—) {
            calculate the sum of the x largest array elements and save the sum temporarily in register $s9
            if x == 5 then move the sum from $s9 to $t9
            if x == 4 then move the sum from $s9 to $t8
       }
}
```

When you write the programming logic of your program, please use and modify the programming logic of the two programs given at the bottom of this lab. **Be sure to integrate both programs' nested looping logic into the program you write for this lab in order to receive a grade for this lab.**

Use The MIPS Technical Document To See The MIPS Assembly Language instructions (https://ccsf.instructure.com/courses/47907/files/7405493/download?download_frd=1) . You may wish to download the document and refer to it as you are writing the program.

Write comments in your program that state your name, the programming logic, and any details you feel you'd like to explain that state about how you are using the assembly language instructions.

This program is to be saved in its own file, with a .asm or a .s file extension. You may only use a .asm or .s file extension (MIPS assembly language programs are named using these files extensions). Once your program is working correctly, submit the program file to this assignment to receive a grade for your program.

Programs To Be Used

Below is the source code of two programs that have logic you need to use in your program.

One program implements the bubblesort algorithm to sort an array of integers: **arraybubblesort.asm (https://ccsf.instructure.com/courses/47907/files/7649271/download?download_frd=1)**

Another program takes and array of five integers and displays the integers in a triangle pattern. The triangle pattern displays the integers of the array such that the integers are displayed in rows of five total integers, then four total integers, then three total integers, then two total integers, and then finally one single integer. This program has programming logic that should be modified to provide the sum of 5 array elements as well as the sum of 4 array elements: **arraynumberstriangle.asm (https://ccsf.instructure.com/courses/47907/files/7649272/download?download_frd=1)**