WASHINGTON STATE UNIVERSITY

CptS260: Introduction to Computer Architecture

Fall 2020

Homework 4

Due: Wednesday 10/16/2020 @ 11.59 pm
School of Electrical and Computer Engineering

What and how to submit: *Please submit your zipped folder to blackboard by the due date. Your submission package should include your program code for the problem, as well as a report (in pdf or doc format) addressing questions in each problem.*

Coding Problem 1:
In this program, you are asked to write a program in assembly which works as a simple calculator. The program will get two integer numbers, and based on the requested operation, the result should be shown to the user.

a. The program should print a meaningful phrase for each input, and the result.
   i. "Enter the first number"
   ii. "Enter the second number"
   iii. "Enter the operation type"
   iv. "The result is"

b. The user should enter 0, 1, and 2 to tell the program the types of operation add, sub, and multiply, respectively.

c. How many registers do you need to implement this program?

d. What system calls do you need to write this program?

1.
   A. Program has all those labels
   B. Program has those inputs
   C. I used the $v0, $a0, $t0, $t1, $t2, and J registers
   D. I needed the add, sub, mul for computation, the li, la, move, beq, and sys call for the rest of the program.

Coding Problem 2:

In this program, you should define an array of 10 elements in your data segment with these values:

$$A = \{11, 12, -10, 13, 9, 12, 14, 15, -20, 0\}$$

a. Write a function which finds the maximum value of this array.

b. Write another function which calculates the summation of this array.

c. Call these functions in your main program, and print the outputs of these functions to the user
   i. "The maximum is 15"
   ii. "The summation is 56"

d. What is the address that has been used by the simulator for this array?

NOTE: You can find system calls codes in QtSIMP Help or you can find at this address: http://www.tfinley.net/notes/cps104/mips.html

A. The program should do that
B. The program should do that
C. Those functions are called in the main:
D. The address that QtSpim is telling me that was used is the 1000284 to 1000304