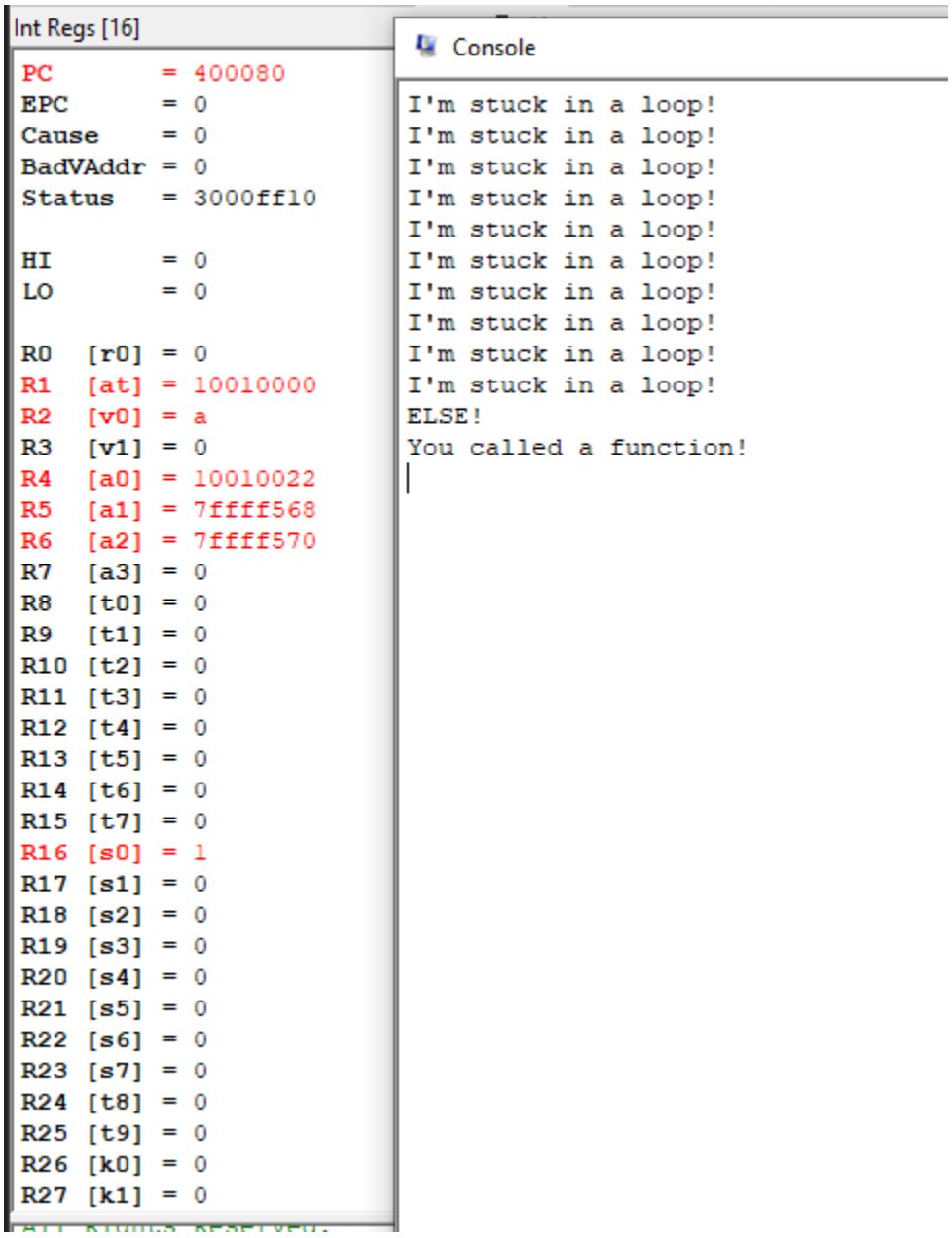
Lab 11

1. jump.s

a.



2. Psudocode
    a. Define variables
    b. Assign variables to array
    c. Start loop
    d. Assign current array element to $s5
    e. Add $s5 to the sum ($s2)
    f. Iterate the count variable + 1
    g. Iterate array to get ready for next element
    h. Compares the count variable to the length variable
        i. If the count is greater than or equal to, stop
        ii. If the count is less than, loop again
    i. Print out label for Sum
    j. Print out sum value
    k. Print out new line
    l. Print out label for average
    m. Calculate average
    n. Print out average
    o. Close file

3. Assembly Code
    a.

```
# Program header
# arrAvg.s
# Performs the average of an array
# Zach Healy

# data secion
.data
    arr:    .word 13, 15, 17, 19, 22, 43, 45, 87, 99, 199
    len:    .word 10
    sum:    .word 0
    avg:    .word 0
    sLab:   .asciiz "Sum: "
    aLab:   .asciiz "Average: "
    nLine:  .asciiz "\n"
```

b.

```
# code section
.text
.globl main

main:
    la $s1, arr #arr
    li $s2, 0 #sum
    lw $s3, len #Length
    li $s4, 0   #i = 0
    Loop:
        lw $s5, 0($s1) #Loads the array[i]
        add $s2, $s2, $s5 #Calculate sum

        add $s4, $s4, 1 #Iterate I
        add $s1, $s1, 4
        blt $s4, $s3, Loop

    sw $s2, sum

    #print out sum label
    li $v0, 4
    la $a0, sLab
    syscall

    #print out sum
    li $v0, 1
    move $a0, $s2 #moves s2 to a0 for printing
    syscall

    #print out new line
    li $v0, 4
    la $a0, nLine
    syscall

    #print out average label
    li $v0, 4
    la $a0, aLab
    syscall

    #print out average
    li $v0, 1
    div $a0, $s2, $s3
    mflo $a0
    syscall

#ends code
    li $v0, 10
    syscall
```

4. Output

a.