**CSC 225 - Computer Architecture/Assembly Language**

**Assignment #3**

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Part I - Directions: 19 Points (1 Point each: Using Appendix A, translate each of the following Pseudocode expressions into MIPS assembly language – (a) through (s) on pages 22 and 23.

Part II – Directions: 6 Points - Page 23 – Per the instructions, please show your work!

1. t3 = t4 + t5 – t6;

add $t4, $t4, $t5 # t4 + t5

sub $t4, $t4, $t6 # (t4+t5) – t6

li $t3, $t4 # t3 = t4

1. s3 = t2 / (s1 – 54321);

sub $s1, $s1, 54321 # s1 – 54321

div $t2, $s1 # t2 / (s1 -54321)

mflo $s3 # s3 = t2 / s1

1. sp = sp – 16;

sub sp, sp, 16 # sp = sp – 16;

1. cout << t3;

li $t3, 1 # System call code for print\_int

syscall # Prints integer onto stdout (the screen).

1. cin >> t0;

li $t0, 5 # system call code for read\_int

syscall # reads input value and places it in $t0

1. a0 = &array;

la $a0, &array # Loads $a0 with a pointer to the address of &array

1. t8 = Mem(a0);

la $t8, $a0 # Loads $t8 with a pointer to the address of the $a0 array

1. Mem(a0+ 16) = 32768;

li $t0, 32768 # $t0 = 32768 $t0 = temporary variable.

lw $t0, 16($a0) # $t0 = MEM[$a0+16]

1. cout << “Hello World”;

Hw: .asciiz “Hello World” # Hw is a label for the string “Hello World”

li $v0, 4 # System call code for Print String

la $a0, Hw # loads address of Hw into $a0

syscall # prints the string attached to Hw

1. If (t0 < 0) then t7 = 0 – t0 else t7 = t0;

bgez $t0, else # If (t0 < 0), branch to else

sub $t7, $zero, $t0 # t7= 0 – $t0

b next # branch around the else code to the next code

else: la $t7, $t0 # t7 = t0

next:

1. while ( t0 != 0) { s1 = s1 + t0; t2 = t2 + 4; t0 = Mem(t2) };

while:

beq $t0, $zero, done # if ($t0 = 0), branch to done

add $s1, $s1, $t0 # $s1 = $s1 + $t0

addi $t2, $t2, 4 # $t2 = $t2 + 4

la $t0, $t2 # Loads $t0 with a pointer to the address of $t2

b while # branch to while

done: # next part of code, when $t0 = 0

1. for ( t1 = 99; t1 > 0; t1=t1 -1) v0 = v0 + t1;

li $t1, 99 # $t1 = 99

loop:

add $v0, $v0, $t1 # v0 = v0 + t1

addi $t1, $t1, -1 # t1=t1 -1

bgtz $t1, loop # if ($t1 > 0), branch to loop

1. t0 = 2147483647 – 2147483648;

li $t1, 2147483647 # $t1 = 2147483647

li $t2, 2147483648 # $t1 = 2147483648

sub $t0, $t1, $t2 # $t0 = $t1 - $t2

1. s0 = -1 \* s0;

mult -1, $s0 # -1 \* s0

mflo $s0 # $s0 = Lower 32-bits of the product

1. s1 = s1 \* a0;

mult $s1, $a0 # s1 \* a0

mflo $s1 # s1 = (s1 \* a0)

1. s2 = srt(s0\*s0 + 56) / a3;

mult $s0, $s0 # $s0 \* $s0

mflo $t0 # $t0 = $s0 \* $s0

addi $t0, 56 # $t0 + 56

multi $t0, $t0 # $t0 \* $t0

mflo $t0 # $t0 = $t0 \* $t0

div $t0, $a3 # $t0 / $a3

mflo $s2 # $s2 = $t0 / $a3

1. s3 = s1 – s2 / s3;

div $s2, $s3 # $s2 / $s3

mflo $t0 # $t0 = $s2 / $s3

sub $s3, $s1, $t0 # $s3 = $s1 - $t0

1. s4 = s4 \* 8;

mult $s4, 8 # s4 \* 8

mflo $s4 # s4 = s4 \* 8

1. s5 = 7 \* s5;

mult $s5, 7 # 7 \* s5

mflo $s5 # s5 = 7 \* s5

The assignment should be completed using and submitted in either a .rtf, .doc, or .pdf. Type the question, and then the answer.

When you have finished the assignment, please upload the answers to the Assignment #3 Dropbox on D2L.

Spelling and grammar will count! ½ Point Per Error