CS 221 Assembly Basics Evaluation Assignment

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1.

https://github.com/Id405/cs-221-eval-assignments/blob/main/eval-5/1.s

```
.data
sep: .asciiz ", "

.text
.globl main

main:                   # Test code
    li $a0 1
    li $s0 10
loopmain:
    jal fib
    move $s1 $a0
    move $a0 $v0
    li $v0 1
    syscall
    la $a0 sep
    li $v0 4
    syscall
    move $a0 $s1
    addi $a0 $a0 1
    ble $a0 $s0 loopmain
    li $v0 10
    syscall

fib:                    #   # Begin of answer
    li $t0 0            #   int a = 0;
    li $t1 1            #   int b = 1;
    li $v0 0            #   int c = 0;
    li $t3 1            #   int i = 0;
loop:
    add $v0 $t0 $t1     #   c = a + b;
    move $t0 $t1        #   a = b;
    move $t1 $v0        #   b = c;
    addi $t3 $t3 1      #   i = i + 1;
    blt $t3 $a0 loop    #   if (int i < n)
    jr $ra              #     goto loop
```

2.

https://github.com/Id405/cs-221-eval-assignments/blob/main/eval-5/2.s

```
.data
array:
    .word    1
    .word    2
    .word    3
    .word    4
    .word    5
sep: .asciiz ", "

.text
.globl main

main: # testing stuff :)
    la $a0 array
    li $a1 5
    li $t0 3
    li $t1 5
    li $t2 4

    li $t3 0 # begin problem
    li $s0 0
    li $s1 0
    li $s2 0
    li $s3 0
    ble $t0 $t1 swap
    move $t4 $t1
    move $t1 $t0
    move $t0 $t4
swap:
    ble $t1 $t2 loop
    move $t4 $t1
    move $t1 $t2
    move $t2 $t4
loop:
    mul $t4 $t3 4
    add $t4 $a0 $t4
    lw $t4 ($t4)
    ble $t0 $t4 greater
    addi $s0 $s0 1
    j end
greater:
    blt $t4 $t2 middle
    addi $s3 $s3 1
    j end
middle:
    blt $t4 $t1 lowermiddle
    addi $s1 $s1 1
    j end
lowermiddle:
    addi $s2 $s2 1
end:
    addi $t3 $t3 1
    blt $t3 $a1 loop
```

```
54
55      li $v0 1 # then some more testing stuff
56      move $a0 $s0
57      syscall
58
59      li $v0 4
60      la $a0 sep
61      syscall
62
63      li $v0 1
64      move $a0 $s1
65      syscall
66
67      li $v0 4
68      la $a0 sep
69      syscall
70
71      li $v0 1
72      move $a0 $s2
73      syscall
74
75      li $v0 4
76      la $a0 sep
77      syscall
78
79      li $v0 1
80      move $a0 $s3
81      syscall
82
83      li $v0 10
84      syscall
```

3.

https://github.com/Id405/cs-221-eval-assignments/blob/main/eval-5/3.s

```
.data
array1:
    .word    1
    .word    2
    .word    3
    .word    4
    .word    5
array2:
    .word    6
    .word    7
    .word    8
    .word    9
    .word    10

sep: .asciiz ", "
nl: .asciiz "\n"

.text
.globl main

main:
    la $a0 array1 # testing stuff
    la $a1 array2
    la $a2 5

    li $t0 0      # begin problem
loop:
    mul $t1 $t0 4
    add $t2 $a0 $t1
    add $t1 $a1 $t1
    lw $t3 ($t2)
    lw $t4 ($t1)
    sw $t3 ($t1)
    sw $t4 ($t2)
    addi $t0 $t0 1
    blt $t0 $a2 loop

    li $t0 0      # more testing stuff
printloop1:
    mul $t1 $t0 4
    add $t1 $a0 $t1
    lw $t1 ($t1)
    move $t2 $a0
    li $v0 1
    move $a0 $t1
    syscall
    li $v0 4
    la $a0 sep
    syscall
    move $a0 $t2
    addi $t0 $t0 1
    blt $t0 $a2 printloop1
    li $v0 4
```

```
54      la $a0 nl
55      syscall
56      li $t0 0
57  printloop2:
58      mul $t1 $t0 4
59      add $t1 $a1 $t1
60      lw $t1 ($t1)
61      move $t2 $a0
62      li $v0 1
63      move $a0 $t1
64      syscall
65      li $v0 4
66      la $a0 sep
67      syscall
68      move $a0 $t2
69      addi $t0 $t0 1
70      blt $t0 $a2 printloop2
71      li $v0 10
72      syscall
```

4.

https://github.com/Id405/cs-221-eval-assignments/blob/main/eval-5/4.s

```
.data
node4:
    .word 0
    .half 8
    .align 2

node3:
    .word node4
    .half 6
    .align 2

node2:
    .word node3
    .half 10
    .align 2

node1:
    .word node2
    .half 15
    .align 2

.text
.globl main

main:
    la $a0 node1 # for testing :)

    li $v0 0
loop:
    lw $t1 ($a0)
    addi $a0 $a0 4
    lh $t2 ($a0)
    add $v0 $v0 $t2
    move $a0 $t1
    bne $a0 0 loop

        move $a0 $v0
    li $v0 1 # then some testing stuff :)
    syscall
    li $v0 10
    syscall
```