

CS 221 Pointers and Arrays Evaluation Assignment

Lily Larsen

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1.

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

```
1  .data
2  sep: .asciiz ", "
3
4  .text
5  .globl main
6
7  main:                # Test code
8      li $a0 1
9      li $s0 10
10 loopmain:
11     jal fib
12     move $s1 $a0
13     move $a0 $v0
14     li $v0 1
15     syscall
16     la $a0 sep
17     li $v0 4
18     syscall
19     move $a0 $s1
20     addi $a0 $a0 1
21     ble $a0 $s0 loopmain
22     li $v0 10
23     syscall
24
25 fib:                # # Begin of answer
26     li $t0 0        # int a = 0;
27     li $t1 1        # int b = 1;
28     li $v0 0        # int c = 0;
29     li $t3 1        # int i = 0;
30 loop:
31     add $v0 $t0 $t1  # c = a + b;
32     move $t0 $t1    # a = b;
33     move $t1 $v0    # b = c;
34     addi $t3 $t3 1  # i = i + 1;
35     blt $t3 $a0 loop # if (int i < n)
36     jr $ra          # goto loop
```

2.

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

```
1  .data
2  array:
3      .word    1
4      .word    2
5      .word    3
6      .word    4
7      .word    5
8  sep: .asciiz ", "
9
10 .text
11 .globl main
12
13 main: # testing stuff :)
14     la $a0 array
15     li $a1 5
16     li $t0 3
17     li $t1 5
18     li $t2 4
19
20     li $t3 0 # begin problem
21     li $s0 0
22     li $s1 0
23     li $s2 0
24     li $s3 0
25     ble $t0 $t1 swap
26     move $t4 $t1
27     move $t1 $t0
28     move $t0 $t4
29 swap:
30     ble $t1 $t2 loop
31     move $t4 $t1
32     move $t1 $t2
33     move $t2 $t4
34 loop:
35     mul $t4 $t3 4
36     add $t4 $a0 $t4
37     lw $t4 ($t4)
38     ble $t0 $t4 greater
39     addi $s0 $s0 1
40     j end
41 greater:
42     blt $t4 $t2 middle
43     addi $s3 $s3 1
44     j end
45 middle:
46     blt $t4 $t1 lowermiddle
47     addi $s1 $s1 1
48     j end
49 lowermiddle:
50     addi $s2 $s2 1
51 end:
52     addi $t3 $t3 1
53     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>

```
1  .data
2  array1:
3      .word    1
4      .word    2
5      .word    3
6      .word    4
7      .word    5
8  array2:
9      .word    6
10     .word    7
11     .word    8
12     .word    9
13     .word   10
14
15  sep: .asciiz ", "
16  nl:  .asciiz "\n"
17
18  .text
19  .globl main
20
21  main:
22      la $a0 array1 # testing stuff
23      la $a1 array2
24      la $a2 5
25
26      li $t0 0      # begin problem
27  loop:
28      mul $t1 $t0 4
29      add $t2 $a0 $t1
30      add $t1 $a1 $t1
31      lw $t3 ($t2)
32      lw $t4 ($t1)
33      sw $t3 ($t1)
34      sw $t4 ($t2)
35      addi $t0 $t0 1
36      blt $t0 $a2 loop
37
38      li $t0 0      # more testing stuff
39  printloop1:
40      mul $t1 $t0 4
41      add $t1 $a0 $t1
42      lw $t1 ($t1)
43      move $t2 $a0
44      li $v0 1
45      move $a0 $t1
46      syscall
47      li $v0 4
48      la $a0 sep
49      syscall
50      move $a0 $t2
51      addi $t0 $t0 1
52      blt $t0 $a2 printloop1
53      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>

```
1  .data
2  node4:
3      .word 0
4      .half 8
5      .align 2
6
7  node3:
8      .word node4
9      .half 6
10     .align 2
11
12  node2:
13     .word node3
14     .half 10
15     .align 2
16
17  node1:
18     .word node2
19     .half 15
20     .align 2
21
22  .text
23  .globl main
24
25  main:
26      la $a0 node1 # for testing :)
27
28      li $v0 0
29  loop:
30      lw $t1 ($a0)
31      addi $a0 $a0 4
32      lh $t2 ($a0)
33      add $v0 $v0 $t2
34      move $a0 $t1
35      bne $a0 0 loop
36
37      move $a0 $v0
38      li $v0 1 # then some testing stuff :)
39      syscall
40      li $v0 10
41      syscall
```