/home/protik/Desktop/Computer-Architecture-Homeworks/vector_multiplication.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Edit Execute

vector_multiplication.asm

```
1  .data
2
3  vector_a:    .word 15, 4, 19, 5, 2, 3, 4, 8, 5, 7, 11, 12, 3, 6, 5, 1
4  vector_b:    .word 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16
5  n:           .word 16
6
7  .text
8
9  main:
10     # Load the address of vector_a, vector_b, and n into registers
11     la $s0, vector_a
12     la $s1, vector_b
13     lw $t0, n
14
15     # Initialize variables for dot product and loop counter
16     li $t1, 0    # Dot product sum
17     li $t2, 0    # Loop counter
18     li $t3, 0    # Offset value
19
20 outer_loop:
21     # Load elements a[i] and b[i]
22     lw $s2, 0($s0)  # Load a[i] into $s2
23     lw $s3, 0($s1)  # Load b[i] into $s3
24     li $s4, 0       # multiplication (sum) accumulator
25
26 multiply_loop:
27     # implement multiplication using add
28     beq $s3, 0, end_multiply_loop          # stop the loop whenever s3 = 0
29
30     add $s4, $s4, $s2                      # we continue adding s2 to itself
31     subi $s3, $s3, 1                       # continue subtracting 1 from s3
32
33     j multiply_loop
34
35 end_multiply_loop:
36     # update dot product sum
37     add $t1, $t1, $s4
38
39     # Update loop counter and pointers
40     addi $t2, $t2, 1    # Increment loop counter
41     addi $s0, $s0, 4    # Move to the next element in vector a
```

Line: 5 Column: 21 Show Line Numbers

Mars Messages Run I/O

```
814
-- program is finished running --
```

Clear

Registers Coproc 1 Coproc 0

Name	Number	Value
$zero	0	0x00000000
$at	1	0x00000000
$v0	2	0x0000000a
$v1	3	0x00000000
$a0	4	0x0000032e
$a1	5	0x00000000
$a2	6	0x00000000
$a3	7	0x00000000
$t0	8	0x00000010
$t1	9	0x0000032e
$t2	10	0x00000010
$t3	11	0x00000000
$t4	12	0x00000000
$t5	13	0x00000000
$t6	14	0x00000000
$t7	15	0x00000000
$s0	16	0x10010040
$s1	17	0x10010080
$s2	18	0x00000001
$s3	19	0x00000000
$s4	20	0x00000010
$s5	21	0x00000000
$s6	22	0x00000000
$s7	23	0x00000000
$t8	24	0x00000000
$t9	25	0x00000000
$k0	26	0x00000000
$k1	27	0x00000000
$gp	28	0x10008000
$sp	29	0x7fffeffc
$fp	30	0x00000000
$ra	31	0x00000000
pc		0x00400070
hi		0x00000000
lo		0x00000000