

Exercício Prático 05

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Parte 1

1. A
2. B
3. A
6. C
7. D
8. D
9. D
10. D
11. C
12. A

Parte 2

- 1.

```

# Exemplo 1:
# a -> $s0
# b -> $s1
# c -> $s2
# d -> $s3
# x -> $s4
# y -> $s5

.text
.globl main

main:
addi $s0, $zero, 2      #a=2
addi $s1, $zero, 3      #b=3
addi $s2, $zero, 4      #c=4
addi $s3, $zero, 5      #d=5
add $t0, $s0, $s1       #t0 = a+b
add $t1, $s2, $s3       #t1 = c+d
sub $s4, $t0, $t1       #x = (a+b) - (c+d)
add $t2, $s1, $s2       #t2 = b+c
sub $s5, $s0, $t2       #y = a-(b+c)
sub $s1, $s4, $s5       #b = x-y

```

Text Segment

| Bkpt | Address | Code | Basic | Source |
|--------------------------|------------|------------|----------------------|--------------------|
| <input type="checkbox"/> | 0x00400000 | 0x20100002 | addi \$s0, \$zero, 2 | #a=2 |
| <input type="checkbox"/> | 0x00400004 | 0x20110003 | addi \$s1, \$zero, 3 | #b=3 |
| <input type="checkbox"/> | 0x00400008 | 0x20120004 | addi \$s2, \$zero, 4 | #c=4 |
| <input type="checkbox"/> | 0x0040000c | 0x20130005 | addi \$s3, \$zero, 5 | #d=5 |
| <input type="checkbox"/> | 0x00400010 | 0x02114020 | add \$s4, \$s0, \$s1 | #t0 = a+b |
| <input type="checkbox"/> | 0x00400014 | 0x02534020 | add \$t1, \$s2, \$s3 | #t1 = c+d |
| <input type="checkbox"/> | 0x00400018 | 0x0109a022 | sub \$s4, \$t0, \$t1 | #x = (a+b) - (c+d) |
| <input type="checkbox"/> | 0x0040001c | 0x02325020 | add \$t2, \$s1, \$s2 | #t2 = b+c |
| <input type="checkbox"/> | 0x00400020 | 0x020aa822 | sub \$s5, \$s0, \$t2 | #y = a-(b+c) |
| <input type="checkbox"/> | 0x00400024 | 0x02958822 | sub \$s1, \$s4, \$s5 | #b = x-y |

Data Segment

| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| 0x10010000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100c0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100e0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Mars Messages

Run I/O

Clear

-- program is finished running (dropped off bottom) --

| Name | Number | Value |
|--------|--------|------------|
| \$zero | 0 | 0 |
| \$a5 | 1 | 0 |
| \$v0 | 2 | 0 |
| \$v1 | 3 | 0 |
| \$a0 | 4 | 0 |
| \$a1 | 5 | 0 |
| \$a2 | 6 | 0 |
| \$a3 | 7 | 0 |
| \$t0 | 8 | 5 |
| \$t1 | 9 | 9 |
| \$t2 | 10 | 7 |
| \$t3 | 11 | 0 |
| \$t4 | 12 | 0 |
| \$t5 | 13 | 0 |
| \$t6 | 14 | 0 |
| \$t7 | 15 | 0 |
| \$a0 | 16 | 2 |
| \$s1 | 17 | 1 |
| \$s2 | 18 | 4 |
| \$s3 | 19 | 5 |
| \$s4 | 20 | -4 |
| \$s5 | 21 | -5 |
| \$s6 | 22 | 0 |
| \$s7 | 23 | 0 |
| \$t8 | 24 | 0 |
| \$t9 | 25 | 0 |
| \$k0 | 26 | 0 |
| \$k1 | 27 | 0 |
| \$gp | 28 | 269468224 |
| \$sp | 29 | 2147479548 |
| \$fp | 30 | 0 |
| \$ra | 31 | 0 |
| pc | | 4194344 |
| hi | | 0 |
| lo | | 0 |

2.

```

# Programa 2:
# x -> $s0
# y -> $s1

.text
.globl main

main:
addi $s0, $zero, 1      #x = 1
add  $s0, $s0, $s0      #x = 2*x
add  $s0, $s0, $s0      #x = 4*x
add  $s0, $s0, 1        #x = 5*x
addi $s1, $s0, 15       #y = 5*x + 15

```

| Text Segment | | | | |
|--------------------------|------------|------------|--------------------|---------------------------------------|
| Bkpt | Address | Code | Basic | Source |
| <input type="checkbox"/> | 0x00400000 | 0x20100001 | addi \$16,\$0,1 | 9: addi \$s0, \$zero, 1 #x = 1 |
| <input type="checkbox"/> | 0x00400004 | 0x02108020 | add \$16,\$16,\$16 | 10: add \$s0, \$s0, \$s0 #x = 2*x |
| <input type="checkbox"/> | 0x00400008 | 0x02108020 | add \$16,\$16,\$16 | 11: add \$s0, \$s0, \$s0 #x = 4*x |
| <input type="checkbox"/> | 0x0040000c | 0x22100001 | addi \$16,\$16,1 | 12: add \$s0, \$s0, 1 #x = 5*x |
| <input type="checkbox"/> | 0x00400010 | 0x2211000f | addi \$17,\$16,15 | 13: addi \$s1, \$s0, 15 #y = 5*x + 15 |

| Data Segment | | | | | | | | |
|--------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
| 0x10010000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010008 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x1001000c | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010010 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010014 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010018 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x1001001c | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010024 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010028 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x1001002c | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010030 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010034 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010038 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x1001003c | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010044 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010048 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x1001004c | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010050 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010054 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010058 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x1001005c | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010064 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010068 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x1001006c | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010070 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010074 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010078 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x1001007c | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010084 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010088 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x1001008c | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010090 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010094 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010098 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x1001009c | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100ac | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100b0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100b4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100b8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100bc | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100c0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100c4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100c8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100cc | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100d0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100d4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100d8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100dc | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100e0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100e4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100e8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100ec | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100f0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100f4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100f8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100fc | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Name | Number | Value |
|-------------|-----------|------------|
| \$zero | 0 | 0 |
| \$at | 1 | 0 |
| \$v0 | 2 | 0 |
| \$v1 | 3 | 0 |
| \$a0 | 4 | 0 |
| \$a1 | 5 | 0 |
| \$a2 | 6 | 0 |
| \$a3 | 7 | 0 |
| \$t0 | 8 | 0 |
| \$t1 | 9 | 0 |
| \$t2 | 10 | 0 |
| \$t3 | 11 | 0 |
| \$t4 | 12 | 0 |
| \$t5 | 13 | 0 |
| \$t6 | 14 | 0 |
| \$t7 | 15 | 0 |
| \$s0 | 16 | 5 |
| \$s1 | 17 | 20 |
| \$s2 | 18 | 0 |
| \$s3 | 19 | 0 |
| \$s4 | 20 | 0 |
| \$s5 | 21 | 0 |
| \$s6 | 22 | 0 |
| \$s7 | 23 | 0 |
| \$s8 | 24 | 0 |
| \$s9 | 25 | 0 |
| \$k0 | 26 | 0 |
| \$k1 | 27 | 0 |
| \$gp | 28 | 268468224 |
| \$sp | 29 | 2147479548 |
| \$fp | 30 | 0 |
| \$ra | 31 | 0 |
| pc | | 4194324 |

3.

```

# Programa 3:
# x -> $s0
# y -> $s1
# z -> $s2

.text
.globl main

main:
addi $t0, $zero, 3      #t0 = 3
addi $t1, $zero, 4      #t1 = 4
add  $s0, $t0, $t0      #x = 2*(t0)
add  $s0, $s0, $s0      #x = 4*x
add  $s0, $s0, $s0      #x = 8*x
add  $s0, $s0, $s0      #x = 16*x
sub  $s0, $s0, $t0      #x = 16*x - t0 = 16x - x = 15x

add  $s1, $t1, $t1      #y = 2*(t1)
add  $s1, $s1, $s1      #y = 4*y

```

| Text Segment | | | | | | | |
|--------------|------------|------------|--------------------|--------------------------|--------|--------|------------|
| Bkpt | Address | Code | Basic | Source | Name | Number | Value |
| | 0x00400000 | 0x20080003 | addi \$t0,\$zero,3 | 10: addi \$t0, \$zero, 3 | \$zero | 0 | 0 |
| | 0x00400004 | 0x20090004 | addi \$t1,\$zero,4 | 11: addi \$t1, \$zero, 4 | \$t0 | 1 | 0 |
| | 0x00400008 | 0x01080020 | add \$s0,\$t0,\$t0 | 12: add \$s0, \$t0, \$t0 | \$t1 | 2 | 0 |
| | 0x0040000c | 0x02108020 | add \$s0,\$s0,\$s0 | 13: add \$s0, \$s0, \$s0 | \$v1 | 3 | 0 |
| | 0x00400010 | 0x02108020 | add \$s0,\$s0,\$s0 | 14: add \$s0, \$s0, \$s0 | \$a0 | 4 | 0 |
| | 0x00400014 | 0x02108020 | add \$s0,\$s0,\$s0 | 15: add \$s0, \$s0, \$s0 | \$a1 | 5 | 0 |
| | 0x00400018 | 0x02080022 | sub \$s0,\$s0,\$t0 | 16: sub \$s0, \$s0, \$t0 | \$a2 | 6 | 0 |
| | 0x0040001c | 0x01298020 | add \$t1,\$t1,\$t1 | 17: add \$t1, \$t1, \$t1 | \$a3 | 7 | 0 |
| | 0x00400020 | 0x02318820 | add \$t1,\$t1,\$t1 | 18: add \$t1, \$t1, \$t1 | \$t0 | 8 | 3 |
| | 0x00400024 | 0x02318820 | add \$t1,\$t1,\$t1 | 19: add \$t1, \$t1, \$t1 | \$t1 | 9 | 4 |
| | 0x00400028 | 0x02318820 | add \$t1,\$t1,\$t1 | 20: add \$t1, \$t1, \$t1 | \$t2 | 10 | 0 |
| | 0x0040002c | 0x02318820 | add \$t1,\$t1,\$t1 | 21: add \$t1, \$t1, \$t1 | \$t3 | 11 | 0 |
| | 0x00400030 | 0x02318820 | add \$t1,\$t1,\$t1 | 22: add \$t1, \$t1, \$t1 | \$t4 | 12 | 0 |
| | 0x00400034 | 0x02298820 | add \$t1,\$t1,\$t1 | 23: add \$t1, \$t1, \$t1 | \$t5 | 13 | 0 |
| | 0x00400038 | 0x02298820 | add \$t1,\$t1,\$t1 | 24: add \$t1, \$t1, \$t1 | \$t6 | 14 | 0 |
| | 0x0040003c | 0x02298820 | add \$t1,\$t1,\$t1 | 25: add \$t1, \$t1, \$t1 | \$t7 | 15 | 0 |
| | 0x00400040 | 0x02309020 | add \$t1,\$t1,\$t1 | 26: add \$t1, \$t1, \$t1 | \$s0 | 16 | 45 |
| | 0x00400044 | 0x02529020 | add \$t1,\$t1,\$t1 | 27: add \$t1, \$t1, \$t1 | \$s1 | 17 | 260 |
| | 0x00400048 | 0x02529020 | add \$t1,\$t1,\$t1 | 28: add \$t1, \$t1, \$t1 | \$s2 | 18 | 1252 |
| | | | | | \$s3 | 19 | 0 |
| | | | | | \$s4 | 20 | 0 |
| | | | | | \$s5 | 21 | 0 |
| | | | | | \$s6 | 22 | 0 |
| | | | | | \$s7 | 23 | 0 |
| | | | | | \$t8 | 24 | 0 |
| | | | | | \$t9 | 25 | 0 |
| | | | | | \$k0 | 26 | 0 |
| | | | | | \$k1 | 27 | 0 |
| | | | | | \$gp | 28 | 269468224 |
| | | | | | \$sp | 29 | 2147479548 |
| | | | | | \$fp | 30 | 0 |
| | | | | | \$ra | 31 | 0 |
| | | | | | \$pc | | 4194380 |
| | | | | | \$hi | | 0 |
| | | | | | \$lo | | 0 |

| Data Segment | | | | | | | | |
|--------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| Address | Value (*0) | Value (*4) | Value (*8) | Value (*c) | Value (*10) | Value (*14) | Value (*18) | Value (*1c) |
| 0x10010000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

4.

```

# Programa 4:
# x -> $s0
# y -> $s1
# z -> $s2

.text
.globl main

main:
addi $t0, $zero, 3      #t0 = 3
addi $t1, $zero, 4      #t1 = 4
sll  $s0, $t0, 4         #x = 16*(t0)
sub  $s0, $s0, $t0       #x = 16x - x

sll  $s1, $t1, 6         #y = 64*(t1)
add  $s1, $s1, $t1       #y = 65y
add  $s1, $s1, $t1       #y = 66y
add  $s1, $s1, $t1       #y = 67y

add  $s2, $s1, $s0       #z = 15x + 67y
sll  $s2, $s2, 2         #z = 4z

```

| Text Segment | | | | | Data Segment | | | | |
|--------------|------------|------------|----------------------|---|--------------|------------|------------|------------|------------|
| Bkpt | Address | Code | Basic | Source | Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) |
| | 0x00400000 | 0x00000003 | addi \$t0, \$zero, 3 | 10: addi \$t0, \$zero, 3 #t0 = 3 | 0x10010000 | 0 | 0 | 0 | 0 |
| | 0x00400004 | 0x00000004 | addi \$t1, \$zero, 4 | 11: addi \$t1, \$zero, 4 #t1 = 4 | 0x10010020 | 0 | 0 | 0 | 0 |
| | 0x00400008 | 0x0000000c | sll \$s0, \$t0, 4 | 12: sll \$s0, \$t0, 4 #x = 16*(t0) | 0x10010040 | 0 | 0 | 0 | 0 |
| | 0x0040000c | 0x0000000c | sub \$s0, \$s0, \$t0 | 13: sub \$s0, \$s0, \$t0 #x = 16x - x | 0x10010060 | 0 | 0 | 0 | 0 |
| | 0x00400010 | 0x00000006 | sll \$s1, \$t1, 6 | 15: sll \$s1, \$t1, 6 #y = 64*(t1) | 0x10010080 | 0 | 0 | 0 | 0 |
| | 0x00400014 | 0x00000006 | add \$s1, \$s1, \$t1 | 16: add \$s1, \$s1, \$t1 #y = 65y | 0x100100a0 | 0 | 0 | 0 | 0 |
| | 0x00400018 | 0x00000006 | add \$s1, \$s1, \$t1 | 17: add \$s1, \$s1, \$t1 #y = 66y | 0x100100c0 | 0 | 0 | 0 | 0 |
| | 0x0040001c | 0x00000006 | add \$s1, \$s1, \$t1 | 18: add \$s1, \$s1, \$t1 #y = 67y | 0x100100e0 | 0 | 0 | 0 | 0 |
| | 0x00400020 | 0x0000000c | add \$s2, \$s1, \$s0 | 20: add \$s2, \$s1, \$s0 #z = 15x + 67y | 0x10010100 | 0 | 0 | 0 | 0 |
| | 0x00400024 | 0x00000002 | sll \$s2, \$s2, 2 | 21: sll \$s2, \$s2, 2 #z = 4z | | | | | |

| Name | Number | Value |
|--------|--------|-----------|
| \$zero | 0 | 0 |
| \$at | 1 | 0 |
| \$v0 | 2 | 0 |
| \$v1 | 3 | 0 |
| \$a0 | 4 | 0 |
| \$a1 | 5 | 0 |
| \$a2 | 6 | 0 |
| \$a3 | 7 | 0 |
| \$t0 | 8 | 3 |
| \$t1 | 9 | 4 |
| \$t2 | 10 | 0 |
| \$t3 | 11 | 0 |
| \$t4 | 12 | 0 |
| \$t5 | 13 | 0 |
| \$t6 | 14 | 0 |
| \$t7 | 15 | 0 |
| \$s0 | 16 | 45 |
| \$s1 | 17 | 268 |
| \$s2 | 18 | 1252 |
| \$s3 | 19 | 0 |
| \$s4 | 20 | 0 |
| \$s5 | 21 | 0 |
| \$s6 | 22 | 0 |
| \$s7 | 23 | 0 |
| \$t8 | 24 | 0 |
| \$t9 | 25 | 0 |
| \$k0 | 26 | 0 |
| \$k1 | 27 | 0 |
| \$gp | 28 | 268469224 |

5.

```

# Programa 5:
# x -> $s0
# y -> $s1
# z -> $s2

.text
.globl main

main:
addi $s0, $zero, 0x1    #x = 0x1
sll  $s0, $s0, 16       #x = 0x1000
ori  $s0, $s0, 0x86A0   #x = 0x186a0 = 100mil

addi $s1, $zero, 0x3    #y = 0x3
sll  $s1, $s1, 16       #y = 0x3000
ori  $s1, $s1, 0x0d40   #y = 0x30d40 = 200mil

add  $s2, $s0, $s1      #z = x+y

```

| Text Segment | | | | | | Name | | | |
|--------------|------------|------------|--------------------------|--|--------|------------|--------|--|--|
| Bkpt | Address | Code | Basic | Source | Number | Value | | | |
| | 0x00400000 | 0x20100001 | addi \$16,\$0,0x00000001 | 10: addi \$s0, \$zero, 0x1 #x = 0x1 | 0 | 0x00000000 | \$zero | | |
| | 0x00400004 | 0x00108400 | sll \$16,\$16,0x00000010 | 11: sll \$s0, \$s0, 16 #x = 0x1000 | 1 | 0x00000000 | \$at | | |
| | 0x00400008 | 0x361086a0 | ori \$16,\$16,0x000086a0 | 12: ori \$s0, \$s0, 0x86A0 #x = 0x186a0 = 100mil | 2 | 0x00000000 | \$v0 | | |
| | 0x0040000c | 0x20110003 | addi \$17,\$0,0x00000003 | 14: addi \$s1, \$zero, 0x3 #y = 0x3 | 3 | 0x00000000 | \$v1 | | |
| | 0x00400010 | 0x00118c00 | sll \$17,\$17,0x00000010 | 15: sll \$s1, \$s1, 16 #y = 0x3000 | 4 | 0x00000000 | \$a0 | | |
| | 0x00400014 | 0x36310d40 | ori \$17,\$17,0x00000d40 | 16: ori \$s1, \$s1, 0x0d40 #y = 0x30d40 = 200mil | 5 | 0x00000000 | \$a1 | | |
| | 0x00400018 | 0x02119020 | add \$18,\$16,\$17 | 18: add \$s2, \$s0, \$s1 #z = x+y | 6 | 0x00000000 | \$a2 | | |
| | | | | | 7 | 0x00000000 | \$a3 | | |
| | | | | | 8 | 0x00000000 | \$t0 | | |
| | | | | | 9 | 0x00000000 | \$t1 | | |
| | | | | | 10 | 0x00000000 | \$t2 | | |
| | | | | | 11 | 0x00000000 | \$t3 | | |
| | | | | | 12 | 0x00000000 | \$t4 | | |
| | | | | | 13 | 0x00000000 | \$t5 | | |
| | | | | | 14 | 0x00000000 | \$t6 | | |
| | | | | | 15 | 0x00000000 | \$t7 | | |
| | | | | | 16 | 0x000186a0 | \$s0 | | |
| | | | | | 17 | 0x00030d40 | \$s1 | | |
| | | | | | 18 | 0x000493e8 | \$s2 | | |
| | | | | | 19 | 0x00000000 | \$s3 | | |
| | | | | | 20 | 0x00000000 | \$s4 | | |
| | | | | | 21 | 0x00000000 | \$s5 | | |
| | | | | | 22 | 0x00000000 | \$s6 | | |
| | | | | | 23 | 0x00000000 | \$s7 | | |
| | | | | | 24 | 0x00000000 | \$t8 | | |
| | | | | | 25 | 0x00000000 | \$t9 | | |
| | | | | | 26 | 0x00000000 | \$k0 | | |
| | | | | | 27 | 0x00000000 | \$k1 | | |
| | | | | | 28 | 0x10008000 | \$gp | | |
| | | | | | 29 | 0x7fffffc0 | \$tp | | |
| | | | | | 30 | 0x00000000 | \$fp | | |
| | | | | | 31 | 0x00000000 | \$ra | | |
| | | | | | | 0x0040001c | pc | | |

6.

```

# Programa 6:
# x -> $s0
# y -> $s1
# z -> $s2

.text
.globl main

main:
addi $s0, $zero, 0x7    #x = 0x7
sll  $s0, $s0, 16       #x = 0x7000
ori  $s0, $s0, 0xFFFF   #x = 0x1ffff = maior n° possivel

```

Text Segment

| Byte | Address | Code | Basic | Source |
|------|------------|------------|---------------------|--|
| | 0x00400000 | 0x20100007 | addi \$t6,\$0,7 | 10: addi \$s0, \$zero, 0x7 #x = 0x7 |
| | 0x00400004 | 0x00109400 | sll \$t6,\$t6,16 | 11: sll \$s0, \$s0, 16 #x = 0x7000 |
| | 0x00400008 | 0x3610ffff | ori \$t6,\$t6,65535 | 12: ori \$s0, \$s0, 0xffff #x = 0xffff = maior n* possivel |
| | 0x0040000c | 0x20110004 | addi \$t7,\$0,4 | 14: addi \$s1, \$zero, 0x4 #y = 0x4 |
| | 0x00400010 | 0x00118c00 | sll \$t7,\$t7,16 | 15: sll \$s1, \$s1, 16 #y = 0x4000 |
| | 0x00400014 | 0x363193e0 | ori \$t7,\$t7,37856 | 16: ori \$s1, \$s1, 0x93e0 = 300mil |
| | 0x00400018 | 0x00118880 | sll \$t7,\$t7,2 | 17: sll \$s1, \$s1, 2 #y = 4y |
| | 0x0040001c | 0x02119022 | sub \$t8,\$t6,\$t7 | 19: sub \$s2, \$s0, \$s1 #z = x-y |

Data Segment

| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| 0x10010000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100c0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100e0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

0x10010000 (.data)

☒ Hexadecimal Addresses
 ☐ Hexadecimal Values
 ☐ ASCII

Mars Messages

Run IO

| Name | Number | Value |
|--------|--------|------------|
| \$zero | 0 | 0 |
| \$at | 1 | 0 |
| \$v0 | 2 | 0 |
| \$v1 | 3 | 0 |
| \$a0 | 4 | 0 |
| \$a1 | 5 | 0 |
| \$a2 | 6 | 0 |
| \$a3 | 7 | 0 |
| \$t0 | 8 | 0 |
| \$t1 | 9 | 0 |
| \$t2 | 10 | 0 |
| \$t3 | 11 | 0 |
| \$t4 | 12 | 0 |
| \$t5 | 13 | 0 |
| \$t6 | 14 | 0 |
| \$t7 | 15 | 0 |
| \$s0 | 16 | 524287 |
| \$s1 | 17 | 1200000 |
| \$s2 | 18 | -675713 |
| \$s3 | 19 | 0 |
| \$s4 | 20 | 0 |
| \$s5 | 21 | 0 |
| \$s6 | 22 | 0 |
| \$s7 | 23 | 0 |
| \$t8 | 24 | 0 |
| \$t9 | 25 | 0 |
| \$k0 | 26 | 0 |
| \$k1 | 27 | 0 |
| \$gp | 28 | 268468224 |
| \$sp | 29 | 2147479540 |
| \$fp | 30 | 0 |
| \$ra | 31 | 0 |
| pc | | 4194336 |

7.

```
1 ori $0, $0, 0x01
2 sll $0, $0, 31
3 ora $0, $0, 31
```

Text Segment

| Byte | Address | Code | Basic | Source |
|------|------------|------------|------------------|-----------------------|
| | 0x00400000 | 0x34080003 | ori \$9,\$0,0x01 | 1: ori \$9, \$0, 0x01 |
| | 0x00400004 | 0x00947c01 | sll \$9,\$9,31 | 2: sll \$9, \$9, 31 |
| | 0x00400008 | 0x00097c03 | ora \$9,\$9,31 | 3: ora \$9, \$9, 31 |

Data Segment

| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| 0x10010000 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100c0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100e0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010100 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010140 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010160 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010180 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100101a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100101c0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100101e0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

0x10010000 (.data)

☒ Hexadecimal Addresses
 ☐ Hexadecimal Values
 ☐ ASCII

Mars Messages

Run IO

| Name | Number | Value |
|--------|--------|------------|
| \$zero | 0 | 0 |
| \$at | 1 | 0 |
| \$v0 | 2 | 0 |
| \$v1 | 3 | 0 |
| \$a0 | 4 | 0 |
| \$a1 | 5 | 0 |
| \$a2 | 6 | 0 |
| \$a3 | 7 | 0 |
| \$s0 | 16 | 0 |
| \$s1 | 17 | 0 |
| \$s2 | 18 | 0 |
| \$s3 | 19 | 0 |
| \$s4 | 20 | 0 |
| \$s5 | 21 | 0 |
| \$s6 | 22 | 0 |
| \$s7 | 23 | 0 |
| \$t8 | 24 | 0 |
| \$t9 | 25 | 0 |
| \$k0 | 26 | 0 |
| \$k1 | 27 | 0 |
| \$gp | 28 | 268468224 |
| \$sp | 29 | 2147479540 |
| \$fp | 30 | 0 |
| \$ra | 31 | 0 |
| pc | | 4194336 |
| \$lo | | 0 |

8.

```
1 # Programa 8:
2 # $8 -> $s0
3 # $9 -> $s1
4 # $10 -> $s2
5 # $11 -> $s3
6
7 .text
8 .globl main
9
10 main:
11 addi $s0, $zero, 0x1234 # $8 = 0x1234
12 sll $s0, $s0, 16 # $8 = 0x12340000
```

```

14
15 srl $s1, $s0, 24      #$9 = 0x12
16
17 srl $s2, $s0, 16      #$10 = 0x1234
18 andi $s2, $s2, 0xFF   #$10 = 0x34
19
20 srl $s3, $s0, 8       #$10 = 0x123456
21 andi $s3, $s3, 0xFF   #$10 = 0x56
22
23 andi $s4, $s0, 0xFF   #$11 = 0x78

```

| Text Segment | | | | | | | |
|--------------|------------|------------|---------------------------|---|--------|--------|------------|
| Bkpt | Address | Code | Basic | Source | Name | Number | Value |
| | 0x00400000 | 0x20101234 | addi \$t6,\$s0,0x00001234 | 10: addi \$s0, \$zero, 0x1234 #t8 = 0x1234 | \$zero | 0 | 0x00000000 |
| | 0x00400004 | 0x00108400 | sll \$t6,\$t6,0x00000010 | 11: sll \$s0, \$s0, 16 #t8 = 0x12340000 | \$at | 1 | 0x00000000 |
| | 0x00400008 | 0x36105678 | ori \$t6,\$t6,0x00005678 | 12: ori \$s0, \$s0, 0x5678 #t8 = 0x12345678 | \$v0 | 2 | 0x00000000 |
| | 0x0040000c | 0x00108e02 | srl \$t7,\$t6,0x00000018 | 14: srl \$s1, \$s0, 24 #t9 = 0x12 | \$v1 | 3 | 0x00000000 |
| | 0x00400010 | 0x00108402 | srl \$t8,\$t6,0x00000010 | 16: srl \$s2, \$s0, 16 #t10 = 0x1234 | \$a0 | 4 | 0x00000000 |
| | 0x00400014 | 0x325200ff | andi \$t8,\$t8,0x000000ff | 17: andi \$s2, \$s2, 0xFF #t10 = 0x34 | \$a1 | 5 | 0x00000000 |
| | 0x00400018 | 0x00108e02 | srl \$t9,\$t6,0x00000008 | 18: srl \$s3, \$s0, 8 #t10 = 0x123456 | \$a2 | 6 | 0x00000000 |
| | 0x0040001c | 0x327300ff | andi \$t9,\$t9,0x000000ff | 20: andi \$s3, \$s3, 0xFF #t10 = 0x56 | \$a3 | 7 | 0x00000000 |
| | 0x00400020 | 0x321400ff | andi \$t0,\$t0,0x000000ff | 22: andi \$s4, \$s0, 0xFF #t11 = 0x78 | \$a0 | 8 | 0x00000000 |
| | | | | | \$t1 | 9 | 0x00000000 |
| | | | | | \$t2 | 10 | 0x00000000 |
| | | | | | \$t3 | 11 | 0x00000000 |
| | | | | | \$t4 | 12 | 0x00000000 |
| | | | | | \$t5 | 13 | 0x00000000 |
| | | | | | \$t6 | 14 | 0x00000000 |
| | | | | | \$t7 | 15 | 0x00000000 |
| | | | | | \$a0 | 16 | 0x12345678 |
| | | | | | \$a1 | 17 | 0x00000012 |
| | | | | | \$a2 | 18 | 0x00000034 |
| | | | | | \$a3 | 19 | 0x00000056 |
| | | | | | \$s4 | 20 | 0x00000078 |
| | | | | | \$a5 | 21 | 0x00000000 |
| | | | | | \$a6 | 22 | 0x00000000 |
| | | | | | \$a7 | 23 | 0x00000000 |
| | | | | | \$t8 | 24 | 0x00000000 |
| | | | | | \$t9 | 25 | 0x00000000 |
| | | | | | \$t0 | 26 | 0x00000000 |
| | | | | | \$t1 | 27 | 0x00000000 |
| | | | | | \$gp | 28 | 0x10008000 |
| | | | | | \$ra | 29 | 0x00000000 |

| Data Segment | | | | | | | | |
|--------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
| 0x10010000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x10010020 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x10010040 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x10010060 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x10010080 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x100100a0 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x100100c0 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x100100e0 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |

9.

```

1  # Programa 9
2  # s0 -> soma
3
4  .text
5  .globl main
6
7  main:
8  ori $t0, $zero, 0x1001
9  sll $t0, $t0, 16      # t0 = 10010000
10 lw $t1, 0 ($t0)      # t1 = MEM[0] = 15
11 lw $t2, 4 ($t0)      # t2 = MEM[4] = 25
12 lw $t3, 8 ($t0)      # t3 = MEM[8] = 13

```



```

13 lw $t4, 12 ($t0)           # t4 = MEM[12] = 17
14 add $t5, $t1, $t2          # t5 = 15 + 25
15 add $t6, $t3, $t4          # t6 = 13 + 17
16 add $s0, $t5, $t6          # s0 = soma
17 sw $s0, 16($t0)            # MEM[16] = s0
18
19 .data
20 x1: .word 15
21 x2: .word 25
22 x3: .word 13
23 x4: .word 17
24 soma: .word -1

```

EditExecute

Text Segment

| Bkpt | Address | Code | Basic | Source |
|------|------------|------------|--------------------------|---|
| | 0x00400000 | 0x340b1001 | ori \$t0, \$zero, 0x1001 | 7: ori \$t0, \$zero, 0x1001 |
| | 0x00400004 | 0x0004a100 | sll \$t0, \$t0, 16 | 8: sll \$t0, \$t0, 16 # t0 = 10010000 |
| | 0x00400008 | 0xb8d09000 | lw \$t1, 0(\$t0) | 9: lw \$t1, 0(\$t0) # t1 = MEM[0] = 15 |
| | 0x0040000c | 0xb8d0a004 | lw \$t2, 4(\$t0) | 10: lw \$t2, 4(\$t0) # t2 = MEM[4] = 25 |
| | 0x00400010 | 0xb8d0b008 | lw \$t3, 8(\$t0) | 11: lw \$t3, 8(\$t0) # t3 = MEM[8] = 13 |
| | 0x00400014 | 0xb8d0c00c | lw \$t4, 12(\$t0) | 12: lw \$t4, 12(\$t0) # t4 = MEM[12] = 17 |
| | 0x00400018 | 0x012a6820 | add \$t5, \$t1, \$t2 | 13: add \$t5, \$t1, \$t2 # t5 = 15 + 25 |
| | 0x0040001c | 0x016c7020 | add \$t6, \$t3, \$t4 | 14: add \$t6, \$t3, \$t4 # t6 = 13 + 17 |
| | 0x00400020 | 0x01ae8020 | add \$s0, \$t5, \$t6 | 15: add \$s0, \$t5, \$t6 # s0 = soma |
| | 0x00400024 | 0xad100010 | sw \$s0, 16(\$t0) | 16: sw \$s0, 16(\$t0) # MEM[16] = s0 |

Data Segment

| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| 0x10010000 | 15 | 25 | 13 | 17 | 70 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100c0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100e0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

0x0010000 (.data)

☒Hexadecimal Addresses☐Hexadecimal Values☐ASCII

Registers

Coproc 1

Coproc 0

| Name | Number | Value |
|--------|--------|-----------|
| \$zero | 0 | 0 |
| \$at | 1 | 0 |
| \$v0 | 2 | 0 |
| \$v1 | 3 | 0 |
| \$a0 | 4 | 0 |
| \$a1 | 5 | 0 |
| \$a2 | 6 | 0 |
| \$a3 | 7 | 0 |
| \$t0 | 8 | 268500992 |
| \$t1 | 9 | 15 |
| \$t2 | 10 | 25 |
| \$t3 | 11 | 13 |
| \$t4 | 12 | 17 |
| \$t5 | 13 | 40 |
| \$t6 | 14 | 30 |
| \$t7 | 15 | 0 |
| \$s0 | 16 | 70 |
| \$s1 | 17 | 0 |
| \$s2 | 18 | 0 |
| \$s3 | 19 | 0 |
| \$s4 | 20 | 0 |
| \$s5 | 21 | 0 |
| \$s6 | 22 | 0 |
| \$s7 | 23 | 0 |
| \$s8 | 24 | 0 |
| \$s9 | 25 | 0 |
| \$k0 | 26 | 0 |
| \$k1 | 27 | 0 |
| \$gp | 28 | 268468224 |
| \$fp | 29 | 214747954 |

More Messages

Run ID

10.

```

1  # Programa 10
2  # x -> s0
3  # z -> s1
4  # y -> s2
5
6  .text
7  .globl main
8
9  main:
10 ori $t0, $zero, 0x1001
11 sll $t0, $t0, 16           # t0 = 10010000
12 lw $t1, 0($t0)            # t1 = MEM[0] = 5
13 sll $s0, $t1, 7           # x = 128*x

```

```

14 sub $s0, $s0, $t1      # x = 127*x
15 lw $t2, 4($t0)         # t2 = MEM[4] = 7
16 sll $s1, $t2, 6        # z = 64*z
17 add $s1, $s1, $t2      # z = 65*z
18 sub $s2, $s0, $s1      # y = 127*x - 65*z
19 addi $s2, $s2, 1       # y = y+1
20 sw $s2, 8($t0)         # MEM[8] = y
21
22
23 .data
24 x: .word 5
25 z: .word 7
26 y: .word 0

```

| Text Segment | | | | | | Name | | | Number | | | Value | | |
|--------------------------|------------|------------|--------------------|------------------------|--------------------|--------|----|-----------|--------|--|--|-------|--|--|
| Byte | Address | Code | Basic | Source | | | | | | | | | | |
| <input type="checkbox"/> | 0x00400004 | 0x00084400 | sll \$s,\$s,16 | 11: sll \$t0,\$t0,16 | # t0 = 10010000 | \$zero | 0 | | 0 | | | | | |
| <input type="checkbox"/> | 0x00400008 | 0x8d090000 | lw \$s9,0(\$s8) | 12: lw \$t1,0(\$t0) | # t1 = MEM[0] = 5 | \$t0 | 1 | | 0 | | | | | |
| <input type="checkbox"/> | 0x0040000c | 0x000991c0 | sll \$t6,\$s9,7 | 13: sll \$s0,\$t1,7 | # x = 128*x | \$v0 | 2 | | 0 | | | | | |
| <input type="checkbox"/> | 0x00400010 | 0x02098022 | sub \$t6,\$t6,\$s9 | 14: sub \$s0,\$s0,\$t1 | # x = 127*x | \$a1 | 5 | | 0 | | | | | |
| <input type="checkbox"/> | 0x00400014 | 0x8d0a0004 | lw \$t0,4(\$s8) | 15: lw \$t2,4(\$t0) | # t2 = MEM[4] = 7 | \$a2 | 6 | | 0 | | | | | |
| <input type="checkbox"/> | 0x00400018 | 0x000a8980 | sll \$t7,\$t0,6 | 16: sll \$s1,\$t2,6 | # z = 64*z | \$a3 | 7 | | 0 | | | | | |
| <input type="checkbox"/> | 0x0040001c | 0x022a8820 | add \$t7,\$t7,\$t0 | 17: add \$s1,\$s1,\$t2 | # z = 65*z | \$t0 | 8 | 268500992 | | | | | | |
| <input type="checkbox"/> | 0x00400020 | 0x02119022 | sub \$t8,\$t6,\$t7 | 18: sub \$s2,\$s0,\$s1 | # y = 127*x - 65*z | \$t1 | 9 | 5 | | | | | | |
| <input type="checkbox"/> | 0x00400024 | 0x22520001 | addi \$t8,\$t8,1 | 19: addi \$s2,\$s2,1 | # y = y+1 | \$t2 | 10 | 7 | | | | | | |
| <input type="checkbox"/> | 0x00400028 | 0xad120008 | sw \$t8,8(\$s8) | 20: sw \$s2,8(\$t0) | # MEM[8] = y | \$t3 | 11 | 0 | | | | | | |
| | | | | | | \$t4 | 12 | 0 | | | | | | |
| | | | | | | \$t5 | 13 | 0 | | | | | | |
| | | | | | | \$t6 | 14 | 0 | | | | | | |
| | | | | | | \$t7 | 15 | 0 | | | | | | |
| | | | | | | \$a0 | 16 | 635 | | | | | | |
| | | | | | | \$a1 | 17 | 455 | | | | | | |
| | | | | | | \$a2 | 18 | 181 | | | | | | |
| | | | | | | \$a3 | 19 | 0 | | | | | | |
| | | | | | | \$a4 | 20 | 0 | | | | | | |
| | | | | | | \$a5 | 21 | 0 | | | | | | |
| | | | | | | \$a6 | 22 | 0 | | | | | | |
| | | | | | | \$a7 | 23 | 0 | | | | | | |
| | | | | | | \$a8 | 24 | 0 | | | | | | |

| Data Segment | | | | | | | | |
|--------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
| 0x10010000 | 5 | 7 | 181 | 0 | 0 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100c0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100e0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

11.

```

1  # Programa 11
2  # x -> s0
3  # z -> s1
4  # y -> s2
5
6  .text
7  .globl main
8
9  main:
10 ori $t0, $zero, 0x1001
11 sll $t0, $t0, 16      # t0 = 10010000
12 lw $t1, 0($t0)       # t1 = MEM[0] = 100.000

```

```

13 lw $t2, 4($t0)           # t2 = MEM[4] = 200.000
14 sub $t3, $t1, $t2        # t3 = x - z
15 ori $t4, $zero, 0x4
16 sll $t4, $t4, 16
17 ori $t4, $t4, 0x93e0      # t4 = 300.000
18 add $s2, $t3, $t4         # y = x - z + 300.000
19 sw $s2, 8($t0)           # MEM[8] = y
20
21 .data
22 x: .word 100000
23 z: .word 200000
24 y: .word 0

```

| Text Segment | | | | | | | |
|--------------|------------|---------------------|------------------------------|-------------------------|--------|--------|-----------|
| Offset | Address | Code | Basic | Source | Name | Number | Value |
| 0x00400000 | 0x34081001 | ori \$9,\$0,4097 | 10: ori \$t0, \$zero, 0x1001 | | \$zero | 0 | 0 |
| 0x00400004 | 0x00094400 | sll \$9,\$0,16 | 11: sll \$t0, \$t0, 16 | # t0 = 10010000 | \$at | 1 | 0 |
| 0x00400008 | 0x8d090000 | lw \$9,0(\$9) | 12: lw \$t1, 0(\$t0) | # t1 = MEM[0] = 100.000 | \$v0 | 2 | 0 |
| 0x0040000c | 0x8d0a0004 | lw \$9,4(\$9) | 13: lw \$t2, 4(\$t0) | # t2 = MEM[4] = 200.000 | \$v1 | 3 | 0 |
| 0x00400010 | 0x012a5822 | sub \$11,\$9,\$10 | 14: sub \$t3, \$t1, \$t2 | # t3 = x - z | \$a0 | 4 | 0 |
| 0x00400014 | 0x340c0004 | ori \$12,\$0,4 | 15: ori \$t4, \$zero, 0x4 | | \$a1 | 5 | 0 |
| 0x00400018 | 0x000c6400 | sll \$12,\$12,16 | 16: sll \$t4, \$t4, 16 | | \$a2 | 6 | 0 |
| 0x0040001c | 0x358c93e0 | ori \$12,\$12,37856 | 17: ori \$t4, \$t4, 0x93e0 | # t4 = 300.000 | \$a3 | 7 | 0 |
| 0x00400020 | 0x016c9020 | add \$18,\$11,\$12 | 18: add \$s2, \$t3, \$t4 | # y = x - z + 300.000 | \$t0 | 8 | 268500992 |
| 0x00400024 | 0xad120008 | sw \$18,8(\$9) | 19: sw \$s2, 8(\$t0) | # MEM[8] = y | \$t1 | 9 | 100000 |
| | | | | | \$t2 | 10 | 200000 |
| | | | | | \$t3 | 11 | -100000 |
| | | | | | \$t4 | 12 | 300000 |
| | | | | | \$t5 | 13 | 0 |
| | | | | | \$t6 | 14 | 0 |
| | | | | | \$t7 | 15 | 0 |
| | | | | | \$a0 | 16 | 0 |
| | | | | | \$a1 | 17 | 0 |
| | | | | | \$a2 | 18 | 200000 |
| | | | | | \$a3 | 19 | 0 |
| | | | | | \$a4 | 20 | 0 |
| | | | | | \$a5 | 21 | 0 |
| | | | | | \$a6 | 22 | 0 |
| | | | | | \$a7 | 23 | 0 |
| | | | | | \$t8 | 24 | 0 |
| | | | | | \$t9 | 25 | 0 |
| | | | | | \$t0 | 26 | 0 |
| | | | | | \$t1 | 27 | 0 |
| | | | | | \$gp | 28 | 268468224 |

| Data Segment | | | | | | | | |
|--------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
| 0x10010000 | 100000 | 200000 | 200000 | 0 | 0 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100c0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100e0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

13.

```

1  # Programa 13:
2  .text
3  .globl main
4
5  main:
6  lui $t0, 0x1001           # t0 = 10010000
7  lw $s0, 0($t0)            # s0 = MEM[0]
8  srl $t1, $s0, 31          # 31 shifts para a direita
9  beq $t1, $zero, fim       # se for positivo (primeiro bit = 0)
10 sub $t1, $zero, $s0       # se não, calcular seu módulo
11 sw $t1, 0($t0)            # MEM[0] = t1
12
13 fim:
14
15 .data
16 a: .word -10

```

| | | | |
|------------|------------|------------------------|--------------------------------------|
| 0x00400000 | 0x3c081001 | lui \$t0, 0x1001 | # t0 = 10010001 |
| 0x00400004 | 0x8d100000 | lw \$s0, 0(\$t0) | # s0 = MEM[0] |
| 0x00400008 | 0x00104fc2 | srl \$t1, \$s0, 31 | # 31 shifts para a direita |
| 0x0040000c | 0x11200002 | beq \$t1, \$zero, fim | # se for positivo (primeiro bit = 0) |
| 0x00400010 | 0x00104822 | sub \$t1, \$zero, \$s0 | # se não, calcular seu módulo |
| 0x00400014 | 0xad090000 | sw \$t1, 0(\$t0) | # MEM[0] = t1 |

| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| 0x10010000 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100c0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100e0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | |
|------|----|-----------|
| \$t0 | 1 | 0 |
| \$t1 | 2 | 0 |
| \$s0 | 3 | 0 |
| \$a0 | 4 | 0 |
| \$a1 | 5 | 0 |
| \$a2 | 6 | 0 |
| \$a3 | 7 | 0 |
| \$t0 | 8 | 268500992 |
| \$t1 | 9 | 10 |
| \$t2 | 10 | 0 |
| \$t3 | 11 | 0 |
| \$t4 | 12 | 0 |
| \$t5 | 13 | 0 |
| \$t6 | 14 | 0 |
| \$t7 | 15 | 0 |
| \$a0 | 16 | -10 |
| \$a1 | 17 | 0 |
| \$a2 | 18 | 0 |
| \$a3 | 19 | 0 |
| \$a4 | 20 | 0 |
| \$a5 | 21 | 0 |
| \$a6 | 22 | 0 |
| \$a7 | 23 | 0 |
| \$t8 | 24 | 0 |
| \$t9 | 25 | 0 |
| \$k0 | 26 | 0 |
| \$k1 | 27 | 0 |

14.

```

1  # Programa 14:
2  .text
3  .globl main
4
5  main:
6  lui $t0, 0x1001          # t0 = 10010001
7  lw $s0, 0($t0)          # s0 = MEM[0]
8  andi $s0, $s0, 1        # guardar só o último bit
9  sw $s0, 0($t0)          # par = 0, impar = 1
10
11 .data
12 a: .word 100100011

```

| | | | |
|------------|------------|--------------------|---------------------------|
| 0x00400000 | 0x3c081001 | lui \$t0, 0x1001 | # t0 = 10010001 |
| 0x00400004 | 0x8d100000 | lw \$s0, 0(\$t0) | # s0 = MEM[0] |
| 0x00400008 | 0x32100001 | andi \$s0, \$s0, 1 | # guardar só o último bit |
| 0x0040000c | 0xad100000 | sw \$s0, 0(\$t0) | # par = 0, impar = 1 |

| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| 0x10010000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100c0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100e0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | |
|--------|----|-----------|
| \$zero | 0 | 0 |
| \$t0 | 1 | 0 |
| \$t1 | 2 | 0 |
| \$t2 | 3 | 0 |
| \$t3 | 4 | 0 |
| \$t4 | 5 | 0 |
| \$t5 | 6 | 0 |
| \$t6 | 7 | 0 |
| \$t7 | 8 | 268500992 |
| \$t8 | 9 | 0 |
| \$t9 | 10 | 0 |
| \$t10 | 11 | 0 |
| \$t11 | 12 | 0 |
| \$t12 | 13 | 0 |
| \$t13 | 14 | 0 |
| \$t14 | 15 | 0 |
| \$s0 | 16 | 1 |
| \$s1 | 17 | 0 |
| \$s2 | 18 | 0 |
| \$s3 | 19 | 0 |
| \$s4 | 20 | 0 |
| \$s5 | 21 | 0 |
| \$s6 | 22 | 0 |
| \$s7 | 23 | 0 |
| \$s8 | 24 | 0 |
| \$s9 | 25 | 0 |
| \$k0 | 26 | 0 |
| \$k1 | 27 | 0 |

15.

```

1  # Programa 15
2  # Vetor de 100 posições
3  # Vetor[i] = 2*i + 1
4  # Soma de todos os elementos
5  # i -> $s0
6  # contador (c)-> $s1
7  # conteudo (vetor) -> $s2
8  # soma -> $s3
9
10 .text
11 lui $t0, 0x1001          # t1 = 0x1001000
12
13 # inicializando as variáveis
14 add $s0, $zero, $zero    # i = 0
15 add $s1, $zero, $zero    # c = 0
16
17 add $t1, $zero, $t0      # t1 = t0
18 add $s3, $zero, $zero    # soma = 0
19
20 loop:
21 addi $s0, $s0, 4         # i = i+4
22 add $s2, $s1, $s1       # vetor = 2*c
23 addi $s2, $s2, 1        # vetor = 2*c + 1
24 sw $s2, 0($t1)          # MEM[t1] = s1
25 add $t1, $s0, $t0       # t1 = endereço + i
26 add $s3, $s3, $s2       # soma = soma + vetor
27 beq $s1, 99, fim        # se c == 99, vai para fim
28 addi $s1, $s1, 1        # c++
29 j loop
30 fim:

```

Text Segment

| Bkpt | Address | Code | Basic |
|--------------------------|------------|------------|----------------------|
| <input type="checkbox"/> | 0x00400004 | 0x00000802 | addi \$t0, \$zero, 2 |
| <input type="checkbox"/> | 0x00400008 | 0x00000802 | addi \$t1, \$zero, 2 |
| <input type="checkbox"/> | 0x0040000c | 0x00000802 | addi \$s0, \$zero, 0 |
| <input type="checkbox"/> | 0x00400010 | 0x00000802 | addi \$s1, \$zero, 0 |
| <input type="checkbox"/> | 0x00400014 | 0x00000802 | addi \$s2, \$zero, 0 |
| <input type="checkbox"/> | 0x00400018 | 0x00000802 | addi \$s3, \$zero, 0 |
| <input type="checkbox"/> | 0x0040001c | 0x00000802 | addi \$t2, \$zero, 0 |
| <input type="checkbox"/> | 0x00400020 | 0x00000802 | addi \$t3, \$zero, 0 |
| <input type="checkbox"/> | 0x00400024 | 0x00000802 | addi \$t4, \$zero, 0 |
| <input type="checkbox"/> | 0x00400028 | 0x00000802 | addi \$t5, \$zero, 0 |
| <input type="checkbox"/> | 0x0040002c | 0x00000802 | addi \$t6, \$zero, 0 |
| <input type="checkbox"/> | 0x00400030 | 0x00000802 | addi \$t7, \$zero, 0 |
| <input type="checkbox"/> | 0x00400034 | 0x00000802 | addi \$t8, \$zero, 0 |

Instruction Statistics, Version 1.0 (Ingo Kofler)

Total: 1003

ALU: 704 (71%)

Jump: 99 (10%)

Branch: 100 (10%)

Memory: 100 (10%)

Other: 0 (0%)

Tool Control: Disconnect from MIPS, Reset, Close

Data Segment

| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| 0x10010000 | 0x00000001 | 0x00000003 | 0x00000005 | 0x00000007 | 0x00000009 | 0x0000000b | 0x0000000d | 0x0000000f |
| 0x10010004 | 0x00000011 | 0x00000013 | 0x00000015 | 0x00000017 | 0x00000019 | 0x0000001b | 0x0000001d | 0x0000001f |
| 0x10010008 | 0x00000021 | 0x00000023 | 0x00000025 | 0x00000027 | 0x00000029 | 0x0000002b | 0x0000002d | 0x0000002f |
| 0x1001000c | 0x00000031 | 0x00000033 | 0x00000035 | 0x00000037 | 0x00000039 | 0x0000003b | 0x0000003d | 0x0000003f |
| 0x10010010 | 0x00000041 | 0x00000043 | 0x00000045 | 0x00000047 | 0x00000049 | 0x0000004b | 0x0000004d | 0x0000004f |
| 0x10010014 | 0x00000051 | 0x00000053 | 0x00000055 | 0x00000057 | 0x00000059 | 0x0000005b | 0x0000005d | 0x0000005f |
| 0x10010018 | 0x00000061 | 0x00000063 | 0x00000065 | 0x00000067 | 0x00000069 | 0x0000006b | 0x0000006d | 0x0000006f |
| 0x1001001c | 0x00000071 | 0x00000073 | 0x00000075 | 0x00000077 | 0x00000079 | 0x0000007b | 0x0000007d | 0x0000007f |
| 0x10010020 | 0x00000081 | 0x00000083 | 0x00000085 | 0x00000087 | 0x00000089 | 0x0000008b | 0x0000008d | 0x0000008f |
| 0x10010024 | 0x00000091 | 0x00000093 | 0x00000095 | 0x00000097 | 0x00000099 | 0x0000009b | 0x0000009d | 0x0000009f |
| 0x10010028 | 0x000000a1 | 0x000000a3 | 0x000000a5 | 0x000000a7 | 0x000000a9 | 0x000000ab | 0x000000ad | 0x000000af |
| 0x1001002c | 0x000000b1 | 0x000000b3 | 0x000000b5 | 0x000000b7 | 0x000000b9 | 0x000000bb | 0x000000bd | 0x000000bf |
| 0x10010030 | 0x000000c1 | 0x000000c3 | 0x000000c5 | 0x000000c7 | 0x000000c9 | 0x000000cb | 0x000000cd | 0x000000cf |
| 0x10010034 | 0x000000d1 | 0x000000d3 | 0x000000d5 | 0x000000d7 | 0x000000d9 | 0x000000db | 0x000000dd | 0x000000df |
| 0x10010038 | 0x000000e1 | 0x000000e3 | 0x000000e5 | 0x000000e7 | 0x000000e9 | 0x000000eb | 0x000000ed | 0x000000ef |
| 0x1001003c | 0x000000f1 | 0x000000f3 | 0x000000f5 | 0x000000f7 | 0x000000f9 | 0x000000fb | 0x000000fd | 0x000000ff |

16.

```
1  # Programa 16
2  # x = 1.600.000 -> $t1
3  # y = 80.000 -> $t2
4  # z = 400.000 -> $t3
5
6  .text
7  lui $t0, 0x1001          # t0 = 0x1001000
8
9  lw $t1, 0($t0)           # t1 = x
10 lw $t2, 4($t0)           # t2 = y
11 lw $t3, 8($t0)           # t3 = z
12
13 ori $t6, $zero, 0x1      # t6 = 100.000
14 sll $t6, $t6, 16
15 ori $t6, $t6, 0x86a0
16
17 div $t1, $t6              # 1.600.000/10.0000

18 mflo $t1
19
20 div $t3, $t6              # 1.600.000/10.0000
21 mflo $t3                  # 400.000/10.000
22
23 mult $t1, $t2             # x*y
24 mflo $t4
25
26 div $t4, $t3              # (x*y)/z
27 mflo $t5
28 sw $t5, 16($t0)          # MEM[16] = resultado
29
30 .data
31 x:  .word 0x186A00        # x = 1600000
32 y:  .word 0x13880        # y = 80000
33 z:  .word 0x61A80        # z = 400000
34 resp: .word 0            # armazenará o resultado final
```

| Bkpt | Address | Code | Basic | Source |
|------|------------|------------|----------------------------|--|
| | 0x00400000 | 0x8d0b0008 | lw \$t1, 0x00000008(\$t0) | 11: lw \$t3, 8(\$t0) # t3 = z |
| | 0x00400010 | 0x340e0001 | ori \$t4, 0, 0x00000001 | 13: ori \$t6, \$zero, 0x1 |
| | 0x00400014 | 0x000e7400 | sll \$t4, \$t4, 0x00000010 | 14: sll \$t6, \$t6, 16 |
| | 0x00400018 | 0x35ce86a0 | ori \$t4, \$t4, 0x000086a0 | 15: ori \$t6, \$t6, 0x86a0 |
| | 0x0040001c | 0x012e001a | div \$s, \$t4 | 17: div \$t1, \$t6 # 1.600.000/10.0000 |
| | 0x00400020 | 0x00004812 | mflo \$9 | 18: mflo \$t1 |
| | 0x00400024 | 0x016e001a | div \$t1, \$t4 | 20: div \$t3, \$t6 # 1.600.000/10.0000 |
| | 0x00400028 | 0x00005812 | mflo \$t1 | 21: mflo \$t3 # 400.000/10.000 |
| | 0x0040002c | 0x012a0018 | mult \$s, \$t0 | 23: mult \$t1, \$t2 # x*y |
| | 0x00400030 | 0x00006012 | mflo \$t2 | 24: mflo \$t4 |
| | 0x00400034 | 0x019b001a | div \$t2, \$t1 | 26: div \$t4, \$t3 # (x*y)/z |
| | 0x00400038 | 0x00006812 | mflo \$t3 | 27: mflo \$t5 |
| | 0x0040003c | 0xad0d0010 | sw \$t3, 0x00000010(\$t0) | 29: sw \$t5, 16(\$t0) |

| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| 0x10010000 | 0x00186a00 | 0x00013880 | 0x00061a80 | 0x00000000 | 0x0004e200 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x10010020 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x10010040 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x10010060 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x10010080 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x100100a0 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x100100c0 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x100100e0 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |
| 0x10010100 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 | 0x00000000 |

| | |
|-------|-------------------------|
| Clear | Reset: reset completed. |
|-------|-------------------------|

| | | |
|------------|----|------------|
| 0x00400000 | 1 | 0x00000000 |
| 0x00400010 | 2 | 0x00000000 |
| 0x00400020 | 3 | 0x00000000 |
| 0x00400030 | 4 | 0x00000000 |
| 0x00400040 | 5 | 0x00000000 |
| 0x00400050 | 6 | 0x00000000 |
| 0x00400060 | 7 | 0x00000000 |
| 0x00400070 | 8 | 0x00000000 |
| 0x00400080 | 9 | 0x00000010 |
| 0x00400090 | 10 | 0x00013880 |
| 0x004000a0 | 11 | 0x00000004 |
| 0x004000b0 | 12 | 0x00138800 |
| 0x004000c0 | 13 | 0x0004e200 |
| 0x004000d0 | 14 | 0x000186a0 |
| 0x004000e0 | 15 | 0x00000000 |
| 0x004000f0 | 16 | 0x00000000 |
| 0x00400100 | 17 | 0x00000000 |
| 0x00400110 | 18 | 0x00000000 |
| 0x00400120 | 19 | 0x00000000 |
| 0x00400130 | 20 | 0x00000000 |
| 0x00400140 | 21 | 0x00000000 |
| 0x00400150 | 22 | 0x00000000 |
| 0x00400160 | 23 | 0x00000000 |
| 0x00400170 | 24 | 0x00000000 |
| 0x00400180 | 25 | 0x00000000 |
| 0x00400190 | 26 | 0x00000000 |
| 0x004001a0 | 27 | 0x00000000 |
| 0x004001b0 | 28 | 0x00000000 |
| 0x004001c0 | 29 | 0x7ffefffc |
| 0x004001d0 | 30 | 0x00000000 |
| 0x004001e0 | 31 | 0x00000000 |
| 0x004001f0 | | 0x00400040 |
| 0x00400200 | | 0x00000000 |
| 0x00400210 | | 0x0004e200 |

17.

```

1  # Programa 17
2  # x -> $s0
3  # y -> $s1
4
5  .text
6  lui $t0, 0x1001          # t0 = 0x1001000
7
8  lw $s0, 0($t0)           # s1 = x
9  lw $s1, 4($t0)           # s2 = y
10
11 add $t1, $zero, $s0      # soma = x
12 addi $t2, $zero, 1
13
14 loop:
15 add $s0, $s0, $t1        # x = x + valorInicial
16 addi $t2, $t2, 1         # se não, t2++
17 beq $t2, $s1, fim        # se t2 == y, então fim
18 j loop
19
20 fim:
21 sw $s0, 8($t0)           #MEM[8] = resultado
22
23 .data
24 x: .word 2
25 y: .word 5
26 k: .word 0

```

| Bkpt | Address | Code | Basic | Source |
|------|------------|------------|------------------------|-------------------------|
| | 0x00400000 | 0x3e091001 | lui \$t0, 0x1001 | # t0 = 0x1001000 |
| | 0x00400004 | 0x8d100000 | lw \$s0, 0(\$t0) | # s1 = x |
| | 0x00400008 | 0x8d100004 | lw \$s1, 4(\$t0) | # s2 = y |
| | 0x0040000c | 0x00104820 | add \$t1, \$zero, \$s0 | # soma = x |
| | 0x00400010 | 0x000a0001 | addi \$t2, \$zero, 1 | |
| | 0x00400014 | 0x02098020 | add \$t6, \$t6, \$s9 | |
| | 0x00400018 | 0x214e0001 | addi \$t0, \$t0, 1 | # x = x + valorInicial |
| | 0x0040001c | 0x11510001 | beq \$t2, \$s1, fim | # se não, t2++ |
| | 0x00400020 | 0x08100005 | j 0x00400014 | # se t2 == y, então fim |
| | 0x00400024 | 0xad100008 | sw \$t6, 8(\$t0) | # MEM[8] = resultado |

| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| 0x10010000 | 2 | 5 | 10 | 0 | 0 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | |
|--------|----|-----------|
| \$zero | 0 | 0 |
| \$at | 1 | 0 |
| \$v0 | 2 | 0 |
| \$v1 | 3 | 0 |
| \$a0 | 4 | 0 |
| \$a1 | 5 | 0 |
| \$a2 | 6 | 0 |
| \$a3 | 7 | 0 |
| \$t0 | 8 | 268500992 |
| \$t1 | 9 | 2 |
| \$t2 | 10 | 5 |
| \$t3 | 11 | 0 |
| \$t4 | 12 | 0 |
| \$t5 | 13 | 0 |
| \$t6 | 14 | 0 |
| \$t7 | 15 | 0 |
| \$a0 | 16 | 10 |
| \$a1 | 17 | 5 |
| \$a2 | 18 | 0 |
| \$a3 | 19 | 0 |
| \$a4 | 20 | 0 |
| \$a5 | 21 | 0 |
| \$a6 | 22 | 0 |
| \$a7 | 23 | 0 |
| \$t8 | 24 | 0 |
| \$t9 | 25 | 0 |
| \$t0 | 26 | 0 |
| \$t1 | 27 | 0 |
| \$gp | 28 | 268468224 |

18.

```

1  # Programa 18
2  # x -> $s0
3  # y -> $s1
4  # aux -> $t3
5
6  .text
7  lui $t0, 0x1001          # t0 = 0x1001000
8  lw $s0, 0($t0)          # s1 = x
9  lw $s1, 4($t0)          # s2 = y
10
11 add $t1, $zero, $s0      # soma = x
12 add $t2, $zero, 1       # contador = 1
13 add $t4, $zero, 1       # contadorExp = 1
14 add $t3, $zero, $s0      # aux = x
15
16 exponencial:
17 loop:

```



```

18  add $s0, $s0, $t1      # x = x + valorInicial
19  addi $t2, $t2, 1       # contador ++
20  beq $t2, $t3, fimMult  # se contador == x, então fim da multiplicação
21  j loop
22
23  fimMult:
24  addi $t4, $t4, 1       # contadorExp ++
25  beq $t4, $s1, fim      # se contadorExp == y, fim
26  j exponencial
27
28  fim:
29  sw $s0, 8($t0)         #MEM[8] = resultado
30
31  .data
32  x: .word 5
33  y: .word 2
34  k: .word 0

```

| Text Segment | | | | Instruction Statistics, Version 1.0 (Ingo Kofler) | | Name Number Value | | |
|--------------|------------|------------|-------------------|---|-------------|-------------------|----|-----------|
| Bkpt | Address | Code | Basic | Total: | 25 | \$zero | 0 | 0 |
| | 0x00400000 | 0x3c081001 | lui \$8,4097 | 7: lui \$t0, 0x1001 | # t0 = 0x10 | \$at | 1 | 0 |
| | 0x00400004 | 0x8d100000 | lw \$16,0(\$8) | 8: lw \$s0, 0(\$t0) | # s1 = x | \$v0 | 2 | 0 |
| | 0x00400008 | 0x8d110004 | lw \$17,4(\$8) | 9: lw \$s1, 4(\$t0) | # s2 = y | \$a0 | 4 | 0 |
| | 0x0040000c | 0x00104620 | add \$9,\$0,\$16 | 11: add \$t1, \$zero, \$s0 | # soma = x | \$a1 | 5 | 0 |
| | 0x00400010 | 0x200a0001 | addi \$10,\$0,1 | 12: add \$t2, \$zero, 1 | # contador | \$a2 | 6 | 0 |
| | 0x00400014 | 0x200c0001 | addi \$12,\$0,1 | 13: add \$t4, \$zero, 1 | # contadorE | \$a3 | 7 | 0 |
| | 0x00400018 | 0x00105820 | add \$11,\$0,\$16 | 14: add \$t3, \$zero, \$s0 | # aux = x | \$t0 | 8 | 268500992 |
| | 0x0040001c | 0x02098020 | add \$16,\$16,\$9 | 18: add \$s0, \$s0, \$t1 | # x = x + v | \$t1 | 9 | 5 |
| | 0x00400020 | 0x214a0001 | addi \$10,\$10,1 | 19: addi \$t2, \$t2, 1 | # contador | \$t2 | 10 | 5 |
| | 0x00400024 | 0x114b0001 | beq \$10,\$11,1 | 20: beq \$t2, \$t3, fimMult | # se contad | \$t3 | 11 | 5 |
| | 0x00400028 | 0x08100007 | j 0x0040001c | 21: j loop | | \$t4 | 12 | 2 |
| | 0x0040002c | 0x218c0001 | addi \$12,\$12,1 | 24: addi \$t4, \$t4, 1 | # contadorE | \$t5 | 13 | 0 |
| | 0x00400030 | 0x11910001 | beq \$12,\$17,1 | 25: beq \$t4, \$s1, fim | # se contad | \$t6 | 14 | 0 |
| | | | | | | \$t7 | 15 | 0 |
| | | | | | | \$s0 | 16 | 25 |
| | | | | | | \$s1 | 17 | 2 |
| | | | | | | \$a2 | 18 | 0 |
| | | | | | | \$a3 | 19 | 0 |
| | | | | | | \$a4 | 20 | 0 |
| | | | | | | \$a5 | 21 | 0 |
| | | | | | | \$a6 | 22 | 0 |
| | | | | | | \$a7 | 23 | 0 |
| | | | | | | \$t8 | 24 | 0 |
| | | | | | | \$t9 | 25 | 0 |
| | | | | | | \$t0 | 26 | 0 |
| | | | | | | \$t1 | 27 | 0 |
| | | | | | | \$gp | 28 | 268468224 |

| Address | Value (+0) | Value (+4) | Value (+8) | Value (+c) | Value (+10) | Value (+14) | Value (+18) | Value (+1c) |
|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| 0x10010000 | 5 | 2 | 25 | 0 | 0 | 0 | 0 | 0 |
| 0x10010020 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010060 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x10010080 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0x100100a0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Parte 3

1. C
2. B
3. A
4. C
5. B
6. A
7. D
8. A

9. A

10. A

Parte 4

19.

```
1  .data
2      num1: .word 12345  # Número 1 armazenado na posição de memória
3      num2: .word 6789   # Número 2 armazenado na posição de memória
4      resultado: .space 8 # Espaço de memória reservado para o resultado
5
6  .text
7  .globl main
8  main:
9      # Carregar os números da memória para $s0 e $s1
10     lw $s0, num1
11     lw $s1, num2
12
13     # Determinar a quantidade de bits significativos de cada número
14     move $t0, $zero
15     move $t1, $zero
16
17     check_bits:
18         srl $t2, $s0, 1
19         beq $t2, $zero, done_check_bits
20         addiu $t0, $t0, 1
21         addiu $t1, $t1, 1
22         sra $s0, $s0, 1
23         j check_bits
24
25     done_check_bits:
26
27     # Multiplicação
28     mult $s0, $s1
29     mfhi $s3 # Parte alta do resultado
30     mflo $s2 # Parte baixa do resultado
31
32     # Verificar se a resposta deve ser apenas em $s2 ou em $s2 e $s3
33     bge $t0, 32, skip
34     bge $t1, 32, skip
35
36     # Se o número de bits significantes for menor que 32, a resposta está apenas em $s2
37     move $t4, $s2
38     j done
```

```

skip:
    # Caso contrário, a resposta está em $s2 e $s3
    move $t4, $s3

done:
    # Armazenar o resultado na posição de memória "resultado"
    sw $t4, resultado

    # Finalizar o programa
    li $v0, 10
    syscall

```

| Text Segment | | | | | n° | | |
|--------------|------------|------------|-----------------------------------|--------|-----------------------------------|--|--|
| Offset | Address | Code | Basic | Source | | | |
| 0 | 0x00400010 | 0x11400004 | beq \$t0, \$zero, done_check_bits | 19: | beq \$t0, \$zero, done_check_bits | | |
| 4 | 0x00400020 | 0x25290001 | addiu \$s0, \$s0, 1 | 20: | addiu \$s0, \$s0, 1 | | |
| 8 | 0x00400024 | 0x25290001 | addiu \$s1, \$s1, 1 | 21: | addiu \$s1, \$s1, 1 | | |
| 12 | 0x00400028 | 0x00100004 | sra \$s0, \$s0, 1 | 22: | sra \$s0, \$s0, 1 | | |
| 16 | 0x0040002c | 0x01000003 | l \$zero, 0(\$s0) | 23: | l \$zero, 0(\$s0) | | |
| 20 | 0x00400030 | 0x02110018 | mult \$s0, \$s1 | 24: | mult \$s0, \$s1 | | |
| 24 | 0x00400034 | 0x00000010 | mfhi \$t4 | 25: | mfhi \$t4 | | |
| 28 | 0x00400038 | 0x00000018 | mflo \$t4 | 26: | mflo \$t4 | | |
| 32 | 0x0040003c | 0x29100020 | bge \$t0, \$t1, skip | 33: | bge \$t0, \$t1, skip | | |
| 36 | 0x00400040 | 0x10200004 | beq \$t0, \$t1, skip | 34: | bge \$t0, \$t1, skip | | |
| 40 | 0x00400044 | 0x10200004 | beq \$t0, \$t1, skip | 35: | bge \$t0, \$t1, skip | | |
| 44 | 0x00400048 | 0x01100018 | addiu \$t4, \$t4, 1 | 36: | addiu \$t4, \$t4, 1 | | |
| 48 | 0x00400050 | 0x00000000 | li \$zero, 0 | 37: | li \$zero, 0 | | |
| 52 | 0x00400054 | 0x00000000 | li \$zero, 0 | 38: | li \$zero, 0 | | |
| 56 | 0x00400058 | 0x00000000 | li \$zero, 0 | 39: | li \$zero, 0 | | |
| 60 | 0x0040005c | 0x00000000 | li \$zero, 0 | 40: | li \$zero, 0 | | |
| 64 | 0x00400060 | 0x00000000 | li \$zero, 0 | 41: | li \$zero, 0 | | |
| 68 | 0x00400064 | 0x00000000 | li \$zero, 0 | 42: | li \$zero, 0 | | |
| 72 | 0x00400068 | 0x00000000 | li \$zero, 0 | 43: | li \$zero, 0 | | |
| 76 | 0x0040006c | 0x00000000 | li \$zero, 0 | 44: | li \$zero, 0 | | |
| 80 | 0x00400070 | 0x00000000 | li \$zero, 0 | 45: | li \$zero, 0 | | |
| 84 | 0x00400074 | 0x00000000 | li \$zero, 0 | 46: | li \$zero, 0 | | |
| 88 | 0x00400078 | 0x00000000 | li \$zero, 0 | 47: | li \$zero, 0 | | |
| 92 | 0x0040007c | 0x00000000 | li \$zero, 0 | 48: | li \$zero, 0 | | |
| 96 | 0x00400080 | 0x00000000 | li \$zero, 0 | 49: | li \$zero, 0 | | |
| 100 | 0x00400084 | 0x00000000 | li \$zero, 0 | 50: | li \$zero, 0 | | |
| 104 | 0x00400088 | 0x00000000 | li \$zero, 0 | 51: | li \$zero, 0 | | |
| 108 | 0x0040008c | 0x00000000 | li \$zero, 0 | 52: | li \$zero, 0 | | |
| 112 | 0x00400090 | 0x00000000 | li \$zero, 0 | 53: | li \$zero, 0 | | |
| 116 | 0x00400094 | 0x00000000 | li \$zero, 0 | 54: | li \$zero, 0 | | |
| 120 | 0x00400098 | 0x00000000 | li \$zero, 0 | 55: | li \$zero, 0 | | |
| 124 | 0x0040009c | 0x00000000 | li \$zero, 0 | 56: | li \$zero, 0 | | |
| 128 | 0x004000a0 | 0x00000000 | li \$zero, 0 | 57: | li \$zero, 0 | | |
| 132 | 0x004000a4 | 0x00000000 | li \$zero, 0 | 58: | li \$zero, 0 | | |
| 136 | 0x004000a8 | 0x00000000 | li \$zero, 0 | 59: | li \$zero, 0 | | |
| 140 | 0x004000ac | 0x00000000 | li \$zero, 0 | 60: | li \$zero, 0 | | |
| 144 | 0x004000b0 | 0x00000000 | li \$zero, 0 | 61: | li \$zero, 0 | | |
| 148 | 0x004000b4 | 0x00000000 | li \$zero, 0 | 62: | li \$zero, 0 | | |
| 152 | 0x004000b8 | 0x00000000 | li \$zero, 0 | 63: | li \$zero, 0 | | |
| 156 | 0x004000bc | 0x00000000 | li \$zero, 0 | 64: | li \$zero, 0 | | |
| 160 | 0x004000c0 | 0x00000000 | li \$zero, 0 | 65: | li \$zero, 0 | | |
| 164 | 0x004000c4 | 0x00000000 | li \$zero, 0 | 66: | li \$zero, 0 | | |
| 168 | 0x004000c8 | 0x00000000 | li \$zero, 0 | 67: | li \$zero, 0 | | |
| 172 | 0x004000cc | 0x00000000 | li \$zero, 0 | 68: | li \$zero, 0 | | |
| 176 | 0x004000d0 | 0x00000000 | li \$zero, 0 | 69: | li \$zero, 0 | | |
| 180 | 0x004000d4 | 0x00000000 | li \$zero, 0 | 70: | li \$zero, 0 | | |
| 184 | 0x004000d8 | 0x00000000 | li \$zero, 0 | 71: | li \$zero, 0 | | |
| 188 | 0x004000dc | 0x00000000 | li \$zero, 0 | 72: | li \$zero, 0 | | |
| 192 | 0x004000e0 | 0x00000000 | li \$zero, 0 | 73: | li \$zero, 0 | | |
| 196 | 0x004000e4 | 0x00000000 | li \$zero, 0 | 74: | li \$zero, 0 | | |
| 200 | 0x004000e8 | 0x00000000 | li \$zero, 0 | 75: | li \$zero, 0 | | |
| 204 | 0x004000ec | 0x00000000 | li \$zero, 0 | 76: | li \$zero, 0 | | |
| 208 | 0x004000f0 | 0x00000000 | li \$zero, 0 | 77: | li \$zero, 0 | | |
| 212 | 0x004000f4 | 0x00000000 | li \$zero, 0 | 78: | li \$zero, 0 | | |
| 216 | 0x004000f8 | 0x00000000 | li \$zero, 0 | 79: | li \$zero, 0 | | |
| 220 | 0x004000fc | 0x00000000 | li \$zero, 0 | 80: | li \$zero, 0 | | |
| 224 | 0x00400100 | 0x00000000 | li \$zero, 0 | 81: | li \$zero, 0 | | |
| 228 | 0x00400104 | 0x00000000 | li \$zero, 0 | 82: | li \$zero, 0 | | |
| 232 | 0x00400108 | 0x00000000 | li \$zero, 0 | 83: | li \$zero, 0 | | |
| 236 | 0x0040010c | 0x00000000 | li \$zero, 0 | 84: | li \$zero, 0 | | |
| 240 | 0x00400110 | 0x00000000 | li \$zero, 0 | 85: | li \$zero, 0 | | |
| 244 | 0x00400114 | 0x00000000 | li \$zero, 0 | 86: | li \$zero, 0 | | |
| 248 | 0x00400118 | 0x00000000 | li \$zero, 0 | 87: | li \$zero, 0 | | |
| 252 | 0x0040011c | 0x00000000 | li \$zero, 0 | 88: | li \$zero, 0 | | |
| 256 | 0x00400120 | 0x00000000 | li \$zero, 0 | 89: | li \$zero, 0 | | |
| 260 | 0x00400124 | 0x00000000 | li \$zero, 0 | 90: | li \$zero, 0 | | |
| 264 | 0x00400128 | 0x00000000 | li \$zero, 0 | 91: | li \$zero, 0 | | |
| 268 | 0x0040012c | 0x00000000 | li \$zero, 0 | 92: | li \$zero, 0 | | |
| 272 | 0x00400130 | 0x00000000 | li \$zero, 0 | 93: | li \$zero, 0 | | |
| 276 | 0x00400134 | 0x00000000 | li \$zero, 0 | 94: | li \$zero, 0 | | |
| 280 | 0x00400138 | 0x00000000 | li \$zero, 0 | 95: | li \$zero, 0 | | |
| 284 | 0x0040013c | 0x00000000 | li \$zero, 0 | 96: | li \$zero, 0 | | |
| 288 | 0x00400140 | 0x00000000 | li \$zero, 0 | 97: | li \$zero, 0 | | |
| 292 | 0x00400144 | 0x00000000 | li \$zero, 0 | 98: | li \$zero, 0 | | |
| 296 | 0x00400148 | 0x00000000 | li \$zero, 0 | 99: | li \$zero, 0 | | |
| 300 | 0x0040014c | 0x00000000 | li \$zero, 0 | 100: | li \$zero, 0 | | |
| 304 | 0x00400150 | 0x00000000 | li \$zero, 0 | 101: | li \$zero, 0 | | |
| 308 | 0x00400154 | 0x00000000 | li \$zero, 0 | 102: | li \$zero, 0 | | |
| 312 | 0x00400158 | 0x00000000 | li \$zero, 0 | 103: | li \$zero, 0 | | |
| 316 | 0x0040015c | 0x00000000 | li \$zero, 0 | 104: | li \$zero, 0 | | |
| 320 | 0x00400160 | 0x00000000 | li \$zero, 0 | 105: | li \$zero, 0 | | |
| 324 | 0x00400164 | 0x00000000 | li \$zero, 0 | 106: | li \$zero, 0 | | |
| 328 | 0x00400168 | 0x00000000 | li \$zero, 0 | 107: | li \$zero, 0 | | |
| 332 | 0x0040016c | 0x00000000 | li \$zero, 0 | 108: | li \$zero, 0 | | |
| 336 | 0x00400170 | 0x00000000 | li \$zero, 0 | 109: | li \$zero, 0 | | |
| 340 | 0x00400174 | 0x00000000 | li \$zero, 0 | 110: | li \$zero, 0 | | |
| 344 | 0x00400178 | 0x00000000 | li \$zero, 0 | 111: | li \$zero, 0 | | |
| 348 | 0x0040017c | 0x00000000 | li \$zero, 0 | 112: | li \$zero, 0 | | |
| 352 | 0x00400180 | 0x00000000 | li \$zero, 0 | 113: | li \$zero, 0 | | |
| 356 | 0x00400184 | 0x00000000 | li \$zero, 0 | 114: | li \$zero, 0 | | |
| 360 | 0x00400188 | 0x00000000 | li \$zero, 0 | 115: | li \$zero, 0 | | |
| 364 | 0x0040018c | 0x00000000 | li \$zero, 0 | 116: | li \$zero, 0 | | |
| 368 | 0x00400190 | 0x00000000 | li \$zero, 0 | 117: | li \$zero, 0 | | |
| 372 | 0x00400194 | 0x00000000 | li \$zero, 0 | 118: | li \$zero, 0 | | |
| 376 | 0x00400198 | 0x00000000 | li \$zero, 0 | 119: | li \$zero, 0 | | |
| 380 | 0x0040019c | 0x00000000 | li \$zero, 0 | 120: | li \$zero, 0 | | |
| 384 | 0x004001a0 | 0x00000000 | li \$zero, 0 | 121: | li \$zero, 0 | | |
| 388 | 0x004001a4 | 0x00000000 | li \$zero, 0 | 122: | li \$zero, 0 | | |
| 392 | 0x004001a8 | 0x00000000 | li \$zero, 0 | 123: | li \$zero, 0 | | |
| 396 | 0x004001ac | 0x00000000 | li \$zero, 0 | 124: | li \$zero, 0 | | |
| 400 | 0x004001b0 | 0x00000000 | li \$zero, 0 | 125: | li \$zero, 0 | | |
| 404 | 0x004001b4 | 0x00000000 | li \$zero, 0 | 126: | li \$zero, 0 | | |
| 408 | 0x004001b8 | 0x00000000 | li \$zero, 0 | 127: | li \$zero, 0 | | |
| 412 | 0x004001bc | 0x00000000 | li \$zero, 0 | 128: | li \$zero, 0 | | |
| 416 | 0x004001c0 | 0x00000000 | li \$zero, 0 | 129: | li \$zero, 0 | | |
| 420 | 0x004001c4 | 0x00000000 | li \$zero, 0 | 130: | li \$zero, 0 | | |
| 424 | 0x004001c8 | 0x00000000 | li \$zero, 0 | 131: | li \$zero, 0 | | |
| 428 | 0x004001cc | 0x00000000 | li \$zero, 0 | 132: | li \$zero, 0 | | |
| 432 | 0x004001d0 | 0x00000000 | li \$zero, 0 | 133: | li \$zero, 0 | | |
| 436 | 0x004001d4 | 0x00000000 | li \$zero, 0 | 134: | li \$zero, 0 | | |
| 440 | 0x004001d8 | 0x00000000 | li \$zero, 0 | 135: | li \$zero, 0 | | |
| 444 | 0x004001dc | 0x00000000 | li \$zero, 0 | 136: | li \$zero, 0 | | |
| 448 | 0x004001e0 | 0x00000000 | li \$zero, 0 | 137: | li \$zero, 0 | | |
| 452 | 0x004001e4 | 0x00000000 | li \$zero, 0 | 138: | li \$zero, 0 | | |
| 456 | 0x004001e8 | 0x00000000 | li \$zero, 0 | 139: | li \$zero, 0 | | |
| 460 | 0x004001ec | 0x00000000 | li \$zero, 0 | 140: | li \$zero, 0 | | |
| 464 | 0x004001f0 | 0x00000000 | li \$zero, 0 | 141: | li \$zero, 0 | | |
| 468 | 0x004001f4 | 0x00000000 | li \$zero, 0 | 142: | li \$zero, 0 | | |
| 472 | 0x004001f8 | 0x00000000 | li \$zero, 0 | 143: | li \$zero, 0 | | |
| 476 | 0x004001fc | 0x00000000 | li \$zero, 0 | 144: | li \$zero, 0 | | |
| 480 | 0x00400200 | 0x00000000 | li \$zero, 0 | 145: | li \$zero, 0 | | |
| 484 | 0x00400204 | 0x00000000 | li \$zero, 0 | 146: | li \$zero, 0 | | |
| 488 | 0x00400208 | 0x00000000 | li \$zero, 0 | 147: | li \$zero, 0 | | |
| 492 | 0x0040020c | 0x00000000 | li \$zero, 0 | 148: | li \$zero, 0 | | |
| 496 | 0x00400210 | 0x00000000 | li \$zero, 0 | 149: | li \$zero, 0 | | |
| 500 | 0x00400214 | 0x00000000 | li \$zero, 0 | 150: | li \$zero, 0 | | |
| 504 | 0x00400218 | 0x00000000 | li \$zero, 0 | 151: | li \$zero, 0 | | |
| 508 | 0x0040021c | 0x00000000 | li \$zero, 0 | 152: | li \$zero, 0 | | |
| 512 | 0x00400220 | 0x00000000 | li \$zero, 0 | 153: | li \$zero, 0 | | |
| 516 | 0x00400224 | 0x00000000 | li \$zero, 0 | 154: | li \$zero, 0 | | |
| 520 | 0x00400228 | 0x00000000 | li \$zero, 0 | 155: | li \$zero, 0 | | |
| 524 | 0x0040022c | 0x00000000 | li \$zero, 0 | 156: | li \$zero, 0 | | |
| 528 | 0x00400230 | 0x00000000 | li \$zero, 0 | 157: | li \$zero, 0 | | |
| 532 | 0x00400234 | 0x00000000 | li \$zero, 0 | 158: | li \$zero, 0 | | |
| 536 | 0x00400238 | 0x00000000 | li \$zero, 0 | 159: | li \$zero, 0 | | |
| 540 | 0x0040023c | 0x00000000 | li \$zero, 0 | 160: | li \$zero, 0 | | |
| 544 | 0x00400240 | 0x00000000 | li \$zero, 0 | 161: | li \$zero, 0 | | |
| 548 | 0x00400244 | 0x00000000 | li \$zero, 0 | 162: | li \$zero, 0 | | |
| 552 | 0x00400248 | 0x00000000 | li \$zero, 0 | 163: | li \$zero, 0 | | |
| 556 | 0x0040024c | 0x00000000 | li \$zero, 0 | 164: | li \$zero, 0 | | |
| 560 | 0x00400250 | 0x00000000 | li \$zero, 0 | 165: | li \$zero, 0 | | |
| 564 | 0x00400254 | 0x00000000 | li \$zero, 0 | 166: | li \$zero, 0 | | |
| 568 | 0x00400258 | 0x00000000 | li \$zero, 0 | 167: | li \$zero, 0 | | |
| 572 | 0x0040025c | 0x00000000 | li \$zero, 0 | 168: | li \$zero, 0 | | |
| 576 | 0x00400260 | 0x00000000 | li \$zero, 0 | 169: | li \$zero, 0 | | |
| 580 | 0x00400264 | 0x00000000 | li \$zero, 0 | 170: | li \$zero, 0 | | |
| 584 | 0x00400268 | 0x00000000 | li \$zero, 0 | 171: | li \$zero, 0 | | |
| 588 | 0x0040026c | 0x00000000 | li \$zero, 0 | 172: | li \$zero, 0 | | |

```

1  #Programa 20
2
3  .data
4      x: .word 2    # Variável x armazenada na posição de memória
5      y: .word 0    # Variável y armazenada na posição de memória
6
7  .text
8  .globl main
9  main:
10     # Carregar o valor de x da memória para o registrador $t0
11     lw $t0, x
12
13     # Verificar se x é par ou ímpar
14     andi $t1, $t0, 1    # Verificar o bit menos significativo de x
15     beq $t1, $zero, even # Se o bit for zero, x é par
16     j odd    # Caso contrário, x é ímpar
17
18 even:
19     # Cálculo de y se x for par:  $y = x^4 + x^3 - 2x^2$ 
20
21     # Cálculo de  $x^2$ 
22     mult $t0, $t0
23     mflo $t2 #  $x^2$  armazenado em $t2
24
25     # Cálculo de  $x^3$ 
26     mult $t0, $t2
27     mflo $t3 #  $x^3$  armazenado em $t3
28
29     # Cálculo de  $x^4$ 
30     mult $t3, $t0
31     mflo $t4 #  $x^4$  armazenado em $t4
32
33     # Cálculo de  $y = x^4 + x^3 - 2x^2$ 
34     sub $t5, $t4, $t3    #  $t5 = x^4 - x^3$ 
35     sub $t6, $t5, $t2    #  $t6 = x^4 - x^3 - x^2$ 
36
37     # Armazenar o resultado em y

```

| Test Segment | | | | | | | | | | Name | | | Number | | | Value | | | | | | | | |
|--------------|------------------------------------|------|--|--------|--|--|--|--|--|----------|--|--|--------|--|--|------------|--|--|--|--|--|--|--|--|
| Bit | Address | Code | Basic | Source | | | | | | | | | | | | | | | | | | | | |
| 0x0400020 | 0x00000012mfl0 c11 | 27: | mfl0 c13 # n*3 armazena em c13 | | | | | | | Zero | | | 0 | | | 0x00000000 | | | | | | | | |
| 0x0400024 | 0x140012mml0 c11, c0 | 30: | mfl0 c13, c10 | | | | | | | Set | | | 1 | | | 0x00000000 | | | | | | | | |
| 0x0400028 | 0x0000012mfl0 c10 | 31: | mfl0 c14 # n*4 armazena em c14 | | | | | | | Two | | | 2 | | | 0x00000000 | | | | | | | | |
| 0x040002c | 0x1404022 mmb c11, c11, c11 | 34: | mmb c15, c16, c13 # 15 = n*3 - 1 | | | | | | | Five | | | 5 | | | 0x00000000 | | | | | | | | |
| 0x0400030 | 0x0140122 mmb c14, c13, c10 | 38: | mmb c16, c15, c12 # 16 = n*4 - n*3 - n*2 | | | | | | | Four | | | 4 | | | 0x00000000 | | | | | | | | |
| 0x0400034 | 0x0101001 lss c1, 0x00001001 | 39: | ss c16, y | | | | | | | Three | | | 3 | | | 0x00000000 | | | | | | | | |
| 0x0400038 | 0x0200004 mw c14, 0x00000004(c1) | | | | | | | | | Eight | | | 8 | | | 0x00000002 | | | | | | | | |
| 0x040003c | 0x0110019 j 0x00000000 | 40: | j done | | | | | | | One | | | 1 | | | 0x00000000 | | | | | | | | |
| 0x0400040 | 0x0100001 mml0 c16, c0 | 46: | mml0 c10, c10 | | | | | | | Ten | | | 10 | | | 0x00000004 | | | | | | | | |
| 0x0400044 | 0x0000012mfl0 c11 | 47: | mfl0 c13 # n*3 armazena em c13 | | | | | | | Three | | | 11 | | | 0x00000000 | | | | | | | | |
| 0x0400048 | 0x0140012 mml0 c11, c0 | 50: | mml0 c13, c10 | | | | | | | Two | | | 12 | | | 0x00000000 | | | | | | | | |
| 0x040004c | 0x0000012mfl0 c15 | 51: | mfl0 c17 # n*5 armazena em c17 | | | | | | | Thirteen | | | 13 | | | 0x00000000 | | | | | | | | |
| 0x0400050 | 0x010001 add c14, c15, 0x0000... | 54: | add c10, c17, c1 # 15 = n*5 - 1 | | | | | | | Fourteen | | | 14 | | | 0x00000004 | | | | | | | | |
| 0x0400054 | 0x0130021 mmb c11, c24, c24, c1 | 55: | mmb c19, c16, c13 # 19 = n*5 + 1 - n*3 | | | | | | | Fifteen | | | 15 | | | 0x00000000 | | | | | | | | |
| 0x0400058 | 0x0101001 lss c1, 0x00001001 | 58: | ss c19, y | | | | | | | Sixteen | | | 16 | | | 0x00000000 | | | | | | | | |
| 0x040005c | 0x0200004 mw c13, 0x00000004(c1) | | | | | | | | | One | | | 17 | | | 0x00000000 | | | | | | | | |
| 0x0400060 | 0x0200004 addl0 c2, c0, 0x00000000 | 62: | ll c10, c10 | | | | | | | Two | | | 18 | | | 0x00000000 | | | | | | | | |
| 0x0400064 | 0x0000000c syscall | 63: | syscall | | | | | | | Three | | | 19 | | | 0x00000000 | | | | | | | | |
| 0x0400068 | 0x0000000c syscall | 64: | syscall | | | | | | | Four | | | 20 | | | 0x00000000 | | | | | | | | |
| Data Segment | | | | | | | | | | Five | | | 21 | | | 0x00000000 | | | | | | | | |
| | | | | | | | | | | Six | | | 22 | | | 0x00000000 | | | | | | | | |
| | | | | | | | | | | Seven | | | 23 | | | 0x00000000 | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |

```

1  .data
2      x: .word 0    # Variável x armazenada na posição de memória
3      y: .word 0    # Variável y armazenada na posição de memória
4
5  .text
6  .globl main
7  main:
8      # Carregar o valor de x da memória para o registrador $t0
9      lw $t0, x
10
11     # Verificar se x > 0
12     blez $t0, negative # Se x <= 0, pular para a condição negativa
13
14 positive:
15     # Cálculo de y se x > 0: y = x^3 + 1
16
17     # Cálculo de x^3
18     mult $t0, $t0
19     mflo $t1 # x^2 armazenado em $t1
20
21     mult $t1, $t0
22     mflo $t2 # x^3 armazenado em $t2
23
24     # Cálculo de y = x^3 + 1
25     addi $t3, $t2, 1 # t3 = x^3 + 1
26
27     # Armazenar o resultado em y
28     sw $t3, y
29
30     j done
31
32 negative:
33     # Cálculo de y se x <= 0: y = x^4 - 1
34
35     # Cálculo de x^4
36     mult $t0, $t0
37     mflo $t4 # x^2 armazenado em $t4
38
39     mflo $t4 # x^2 armazenado em $t4
40
41     mult $t4, $t0
42     mflo $t5 # x^4 armazenado em $t5
43
44     # Cálculo de y = x^4 - 1
45     addi $t6, $t5, -1 # t6 = x^4 - 1
46
47     # Armazenar o resultado em y
48     sw $t6, y
49
50 done:
51     # Finalizar o programa
52     li $v0, 10
53     syscall

```

| Text Segment | | | | | Name | | | | |
|--------------|------------|----------------------|---------------------------|--------|--------|--------|------------|--|--|
| Offset | Address | Code | Basic | Source | Offset | Number | Value | | |
| 0x00400004 | 0x00400004 | lw \$t0, 0(\$t0) | 12: lw \$t0, 0(\$t0) | | \$zero | 0 | 0x00000000 | | |
| 0x00400008 | 0x00400008 | bltz \$t0, neg | 13: bltz \$t0, neg | | cat | 1 | 0x00000000 | | |
| 0x0040000c | 0x0040000c | mult \$t0, \$t0 | 18: mult \$t0, \$t0 | | \$v0 | 2 | 0x00000000 | | |
| 0x00400010 | 0x00400010 | mfhi \$t1 | 19: mfhi \$t1 | | \$v1 | 3 | 0x00000000 | | |
| 0x00400014 | 0x00400014 | mflo \$t2 | 21: mflo \$t2 | | \$a1 | 4 | 0x00000000 | | |
| 0x00400018 | 0x00400018 | sw \$t2, 0(\$t0) | 22: sw \$t2, 0(\$t0) | | \$a2 | 5 | 0x00000000 | | |
| 0x0040001c | 0x0040001c | addi \$t3, \$t2, 1 | 25: addi \$t3, \$t2, 1 | | \$a3 | 6 | 0x00000000 | | |
| 0x00400020 | 0x00400020 | sw \$t3, 4(\$t0) | 27: sw \$t3, 4(\$t0) | | \$a4 | 7 | 0x00000000 | | |
| 0x00400024 | 0x00400024 | addi \$t4, \$t3, 1 | 29: addi \$t4, \$t3, 1 | | \$a5 | 8 | 0x00000000 | | |
| 0x00400028 | 0x00400028 | sw \$t4, 8(\$t0) | 31: sw \$t4, 8(\$t0) | | \$a6 | 9 | 0x00000000 | | |
| 0x0040002c | 0x0040002c | addi \$t5, \$t4, 1 | 33: addi \$t5, \$t4, 1 | | \$a7 | 10 | 0x00000000 | | |
| 0x00400030 | 0x00400030 | sw \$t5, 12(\$t0) | 35: sw \$t5, 12(\$t0) | | \$a8 | 11 | 0x00000000 | | |
| 0x00400034 | 0x00400034 | addi \$t6, \$t5, 1 | 37: addi \$t6, \$t5, 1 | | \$a9 | 12 | 0x00000000 | | |
| 0x00400038 | 0x00400038 | sw \$t6, 16(\$t0) | 39: sw \$t6, 16(\$t0) | | \$t0 | 13 | 0x00000000 | | |
| 0x0040003c | 0x0040003c | addi \$t7, \$t6, 1 | 41: addi \$t7, \$t6, 1 | | \$t1 | 14 | 0x00000000 | | |
| 0x00400040 | 0x00400040 | sw \$t7, 20(\$t0) | 43: sw \$t7, 20(\$t0) | | \$t2 | 15 | 0x00000000 | | |
| 0x00400044 | 0x00400044 | addi \$t8, \$t7, 1 | 45: addi \$t8, \$t7, 1 | | \$t3 | 16 | 0x00000000 | | |
| 0x00400048 | 0x00400048 | sw \$t8, 24(\$t0) | 47: sw \$t8, 24(\$t0) | | \$t4 | 17 | 0x00000000 | | |
| 0x0040004c | 0x0040004c | addi \$t9, \$t8, 1 | 49: addi \$t9, \$t8, 1 | | \$t5 | 18 | 0x00000000 | | |
| 0x00400050 | 0x00400050 | sw \$t9, 28(\$t0) | 51: sw \$t9, 28(\$t0) | | \$t6 | 19 | 0x00000000 | | |
| 0x00400054 | 0x00400054 | addi \$t10, \$t9, 1 | 53: addi \$t10, \$t9, 1 | | \$t7 | 20 | 0x00000000 | | |
| 0x00400058 | 0x00400058 | sw \$t10, 32(\$t0) | 55: sw \$t10, 32(\$t0) | | \$t8 | 21 | 0x00000000 | | |
| 0x0040005c | 0x0040005c | addi \$t11, \$t10, 1 | 57: addi \$t11, \$t10, 1 | | \$t9 | 22 | 0x00000000 | | |
| 0x00400060 | 0x00400060 | sw \$t11, 36(\$t0) | 59: sw \$t11, 36(\$t0) | | \$t10 | 23 | 0x00000000 | | |
| 0x00400064 | 0x00400064 | addi \$t12, \$t11, 1 | 61: addi \$t12, \$t11, 1 | | \$t11 | 24 | 0x00000000 | | |
| 0x00400068 | 0x00400068 | sw \$t12, 40(\$t0) | 63: sw \$t12, 40(\$t0) | | \$t12 | 25 | 0x00000000 | | |
| 0x0040006c | 0x0040006c | addi \$t13, \$t12, 1 | 65: addi \$t13, \$t12, 1 | | \$t13 | 26 | 0x00000000 | | |
| 0x00400070 | 0x00400070 | sw \$t13, 44(\$t0) | 67: sw \$t13, 44(\$t0) | | \$t14 | 27 | 0x00000000 | | |
| 0x00400074 | 0x00400074 | addi \$t14, \$t13, 1 | 69: addi \$t14, \$t13, 1 | | \$t15 | 28 | 0x00000000 | | |
| 0x00400078 | 0x00400078 | sw \$t14, 48(\$t0) | 71: sw \$t14, 48(\$t0) | | \$t16 | 29 | 0x00000000 | | |
| 0x0040007c | 0x0040007c | addi \$t15, \$t14, 1 | 73: addi \$t15, \$t14, 1 | | \$t17 | 30 | 0x00000000 | | |
| 0x00400080 | 0x00400080 | sw \$t15, 52(\$t0) | 75: sw \$t15, 52(\$t0) | | \$t18 | 31 | 0x00000000 | | |
| 0x00400084 | 0x00400084 | addi \$t16, \$t15, 1 | 77: addi \$t16, \$t15, 1 | | \$t19 | 32 | 0x00000000 | | |
| 0x00400088 | 0x00400088 | sw \$t16, 56(\$t0) | 79: sw \$t16, 56(\$t0) | | \$t20 | 33 | 0x00000000 | | |
| 0x0040008c | 0x0040008c | addi \$t17, \$t16, 1 | 81: addi \$t17, \$t16, 1 | | \$t21 | 34 | 0x00000000 | | |
| 0x00400090 | 0x00400090 | sw \$t17, 60(\$t0) | 83: sw \$t17, 60(\$t0) | | \$t22 | 35 | 0x00000000 | | |
| 0x00400094 | 0x00400094 | addi \$t18, \$t17, 1 | 85: addi \$t18, \$t17, 1 | | \$t23 | 36 | 0x00000000 | | |
| 0x00400098 | 0x00400098 | sw \$t18, 64(\$t0) | 87: sw \$t18, 64(\$t0) | | \$t24 | 37 | 0x00000000 | | |
| 0x0040009c | 0x0040009c | addi \$t19, \$t18, 1 | 89: addi \$t19, \$t18, 1 | | \$t25 | 38 | 0x00000000 | | |
| 0x004000a0 | 0x004000a0 | sw \$t19, 68(\$t0) | 91: sw \$t19, 68(\$t0) | | \$t26 | 39 | 0x00000000 | | |
| 0x004000a4 | 0x004000a4 | addi \$t20, \$t19, 1 | 93: addi \$t20, \$t19, 1 | | \$t27 | 40 | 0x00000000 | | |
| 0x004000a8 | 0x004000a8 | sw \$t20, 72(\$t0) | 95: sw \$t20, 72(\$t0) | | \$t28 | 41 | 0x00000000 | | |
| 0x004000ac | 0x004000ac | addi \$t21, \$t20, 1 | 97: addi \$t21, \$t20, 1 | | \$t29 | 42 | 0x00000000 | | |
| 0x004000b0 | 0x004000b0 | sw \$t21, 76(\$t0) | 99: sw \$t21, 76(\$t0) | | \$t30 | 43 | 0x00000000 | | |
| 0x004000b4 | 0x004000b4 | addi \$t22, \$t21, 1 | 101: addi \$t22, \$t21, 1 | | \$t31 | 44 | 0x00000000 | | |
| 0x004000b8 | 0x004000b8 | sw \$t22, 80(\$t0) | 103: sw \$t22, 80(\$t0) | | \$t32 | 45 | 0x00000000 | | |
| 0x004000bc | 0x004000bc | addi \$t23, \$t22, 1 | 105: addi \$t23, \$t22, 1 | | \$t33 | 46 | 0x00000000 | | |
| 0x004000c0 | 0x004000c0 | sw \$t23, 84(\$t0) | 107: sw \$t23, 84(\$t0) | | \$t34 | 47 | 0x00000000 | | |
| 0x004000c4 | 0x004000c4 | addi \$t24, \$t23, 1 | 109: addi \$t24, \$t23, 1 | | \$t35 | 48 | 0x00000000 | | |
| 0x004000c8 | 0x004000c8 | sw \$t24, 88(\$t0) | 111: sw \$t24, 88(\$t0) | | \$t36 | 49 | 0x00000000 | | |
| 0x004000cc | 0x004000cc | addi \$t25, \$t24, 1 | 113: addi \$t25, \$t24, 1 | | \$t37 | 50 | 0x00000000 | | |
| 0x004000d0 | 0x004000d0 | sw \$t25, 92(\$t0) | 115: sw \$t25, 92(\$t0) | | \$t38 | 51 | 0x00000000 | | |
| 0x004000d4 | 0x004000d4 | addi \$t26, \$t25, 1 | 117: addi \$t26, \$t25, 1 | | \$t39 | 52 | 0x00000000 | | |
| 0x004000d8 | 0x004000d8 | sw \$t26, 96(\$t0) | 119: sw \$t26, 96(\$t0) | | \$t40 | 53 | 0x00000000 | | |
| 0x004000dc | 0x004000dc | addi \$t27, \$t26, 1 | 121: addi \$t27, \$t26, 1 | | \$t41 | 54 | 0x00000000 | | |
| 0x004000e0 | 0x004000e0 | sw \$t27, 100(\$t0) | 123: sw \$t27, 100(\$t0) | | \$t42 | 55 | 0x00000000 | | |
| 0x004000e4 | 0x004000e4 | addi \$t28, \$t27, 1 | 125: addi \$t28, \$t27, 1 | | \$t43 | 56 | 0x00000000 | | |
| 0x004000e8 | 0x004000e8 | sw \$t28, 104(\$t0) | 127: sw \$t28, 104(\$t0) | | \$t44 | 57 | 0x00000000 | | |
| 0x004000ec | 0x004000ec | addi \$t29, \$t28, 1 | 129: addi \$t29, \$t28, 1 | | \$t45 | 58 | 0x00000000 | | |
| 0x004000f0 | 0x004000f0 | sw \$t29, 108(\$t0) | 131: sw \$t29, 108(\$t0) | | \$t46 | 59 | 0x00000000 | | |
| 0x004000f4 | 0x004000f4 | addi \$t30, \$t29, 1 | 133: addi \$t30, \$t29, 1 | | \$t47 | 60 | 0x00000000 | | |
| 0x004000f8 | 0x004000f8 | sw \$t30, 112(\$t0) | 135: sw \$t30, 112(\$t0) | | \$t48 | 61 | 0x00000000 | | |
| 0x004000fc | 0x004000fc | addi \$t31, \$t30, 1 | 137: addi \$t31, \$t30, 1 | | \$t49 | 62 | 0x00000000 | | |
| 0x00400100 | 0x00400100 | sw \$t31, 116(\$t0) | 139: sw \$t31, 116(\$t0) | | \$t50 | 63 | 0x00000000 | | |
| 0x00400104 | 0x00400104 | addi \$t32, \$t31, 1 | 141: addi \$t32, \$t31, 1 | | \$t51 | 64 | 0x00000000 | | |
| 0x00400108 | 0x00400108 | sw \$t32, 120(\$t0) | 143: sw \$t32, 120(\$t0) | | \$t52 | 65 | 0x00000000 | | |
| 0x0040010c | 0x0040010c | addi \$t33, \$t32, 1 | 145: addi \$t33, \$t32, 1 | | \$t53 | 66 | 0x00000000 | | |
| 0x00400110 | 0x00400110 | sw \$t33, 124(\$t0) | 147: sw \$t33, 124(\$t0) | | \$t54 | 67 | 0x00000000 | | |
| 0x00400114 | 0x00400114 | addi \$t34, \$t33, 1 | 149: addi \$t34, \$t33, 1 | | \$t55 | 68 | 0x00000000 | | |
| 0x00400118 | 0x00400118 | sw \$t34, 128(\$t0) | 151: sw \$t34, 128(\$t0) | | \$t56 | 69 | 0x00000000 | | |
| 0x0040011c | 0x0040011c | addi \$t35, \$t34, 1 | 153: addi \$t35, \$t34, 1 | | \$t57 | 70 | 0x00000000 | | |
| 0x00400120 | 0x00400120 | sw \$t35, 132(\$t0) | 155: sw \$t35, 132(\$t0) | | \$t58 | 71 | 0x00000000 | | |
| 0x00400124 | 0x00400124 | addi \$t36, \$t35, 1 | 157: addi \$t36, \$t35, 1 | | \$t59 | 72 | 0x00000000 | | |
| 0x00400128 | 0x00400128 | sw \$t36, 136(\$t0) | 159: sw \$t36, 136(\$t0) | | \$t60 | 73 | 0x00000000 | | |
| 0x0040012c | 0x0040012c | addi \$t37, \$t36, 1 | 161: addi \$t37, \$t36, 1 | | \$t61 | 74 | 0x00000000 | | |
| 0x00400130 | 0x00400130 | sw \$t37, 140(\$t0) | 163: sw \$t37, 140(\$t0) | | \$t62 | 75 | 0x00000000 | | |
| 0x00400134 | 0x00400134 | addi \$t38, \$t37, 1 | 165: addi \$t38, \$t37, 1 | | \$t63 | 76 | 0x00000000 | | |
| 0x00400138 | 0x00400138 | sw \$t38, 144(\$t0) | 167: sw \$t38, 144(\$t0) | | \$t64 | 77 | 0x00000000 | | |
| 0x0040013c | 0x0040013c | addi \$t39, \$t38, 1 | 169: addi \$t39, \$t38, 1 | | \$t65 | 78 | 0x00000000 | | |
| 0x00400140 | 0x00400140 | sw \$t39, 148(\$t0) | 171: sw \$t39, 148(\$t0) | | \$t66 | 79 | 0x00000000 | | |
| 0x00400144 | 0x00400144 | addi \$t40, \$t39, 1 | 173: addi \$t40, \$t39, 1 | | \$t67 | 80 | 0x00000000 | | |
| 0x00400148 | 0x00400148 | sw \$t40, 152(\$t0) | 175: sw \$t40, 152(\$t0) | | \$t68 | 81 | 0x00000000 | | |
| 0x0040014c | 0x0040014c | addi \$t41, \$t40, 1 | 177: addi \$t41, \$t40, 1 | | \$t69 | 82 | 0x00000000 | | |
| 0x00400150 | 0x00400150 | sw \$t41, 156(\$t0) | 179: sw \$t41, 156(\$t0) | | \$t70 | 83 | 0x00000000 | | |
| 0x00400154 | 0x00400154 | addi \$t42, \$t41, 1 | 181: addi \$t42, \$t41, 1 | | \$t71 | 84 | 0x00000000 | | |
| 0x00400158 | 0x00400158 | sw \$t42, 160(\$t0) | 183: sw \$t42, 160(\$t0) | | \$t72 | 85 | 0x00000000 | | |
| 0x0040015c | 0x0040015c | addi \$t43, \$t42, 1 | 185: addi \$t43, \$t42, 1 | | \$t73 | 86 | 0x00000000 | | |
| 0x00400160 | 0x00400160 | sw \$t43, 164(\$t0) | 187: sw \$t43, 164(\$t0) | | \$t74 | 87 | 0x00000000 | | |
| 0x00400164 | 0x00400164 | addi \$t44, \$t43, 1 | 189: addi \$t44, \$t43, 1 | | \$t75 | 88 | 0x00000000 | | |
| 0x00400168 | 0x00400168 | sw \$t44, 168(\$t0) | 191: sw \$t44, 168(\$t0) | | \$t76 | 89 | 0x00000000 | | |
| 0x0040016c | 0x0040016c | addi \$t45, \$t44, 1 | 193: addi \$t45, \$t44, 1 | | \$t77 | 90 | 0x00000000 | | |
| 0x00400170 | 0x00400170 | sw \$t45, 172(\$t0) | 195: sw \$t45, 172(\$t0) | | \$t78 | 91 | 0x00000000 | | |
| 0x00400174 | 0x00400174 | addi \$t46, \$t45, 1 | 197: addi \$t46, \$t45, 1 | | \$t79 | 92 | 0x00000000 | | |
| 0x00400178 | 0x00400178 | sw \$t46, 176(\$t0) | 199: sw \$t46, 176(\$t0) | | \$t80 | 93 | 0x00000000 | | |
| 0x0040017c | 0x0040017c | addi \$t47, \$t46, 1 | 201: addi \$t47, \$t46, 1 | | \$t81 | 94 | 0x00000000 | | |
| 0x00400180 | 0x00400180 | sw \$t47, 180(\$t0) | 203: sw \$t47, 180(\$t0) | | \$t82 | 95 | 0x00000000 | | |
| 0x00400184 | 0x00400184 | addi \$t48, \$t47, 1 | 205: addi \$t48, \$t47, 1 | | \$t83 | 96 | 0x00000000 | | |
| 0x00400188 | 0x00400188 | sw \$t48, 184(\$t0) | 207: sw \$t48, 184(\$t0) | | \$t84 | 97 | 0x00000000 | | |
| 0x0040018c | 0x0040018c | addi \$t49, \$t48, 1 | 209: addi \$t49, \$t48, 1 | | \$t85 | 98 | 0x00000000 | | |
| 0x00400190 | 0x00400190 | sw \$t49, 188(\$t0) | 211: sw \$t49, 188(\$t0) | | \$t86 | 99 | 0x00000000 | | |
| 0x00400194 | 0x00400194 | addi \$t50, \$t49, 1 | 213: addi \$t50, \$t49, 1 | | \$t87 | 100 | 0x00000000 | | |
| 0x00400198 | 0x00400198 | sw \$t50, 192(\$t0) | 215: sw \$t50, 192(\$t0) | | \$t88 | 101 | 0x00000000 | | |
| 0x0040019c | 0x0040019c | addi \$t51, \$t50, 1 | 217: addi \$t51, \$t50, 1 | | \$t89 | 102 | 0x00000000 | | |
| 0x004001a0 | 0x004001a0 | sw \$t51, 196(\$t0) | 219: sw \$t51, 196(\$t0) | | \$t90 | 103 | 0x00000000 | | |
| 0x004001a4 | 0x004001a4 | addi \$t52, \$t51, 1 | 221: addi \$t52, \$t51 | | | | | | |