

Quando o programa é carregado em quais posições de memória os dados foram armazenados?

0x10010000 0x10010004 0x10010008 0x1001000C

## Programa 9

The screenshot shows the MARS 4.5 IDE with the assembly code for Program 9. The Text Segment displays the following instructions:

```
0x00400000: ori $9, $0, 0x000001001 11: ori $t1, $zero, 0x1001 # $t1 = $zero | 0x1001 = 0x000001001
0x00400004: ori $11, $9, 0x000000010 12: sll $t1, $t1, 16 # $t1 = $t1 << 16 = 0x10010000
0x00400008: lw $f1, 0 ($t1) 15: lw $a1, 0 ($t1) # $a1 = MEM[0x10010000] = 15
0x0040000c: lw $f2, 4 ($t1) 16: lw $a2, 4 ($t1) # $a2 = MEM[0x10010004] = 25
0x00400010: lw $f3, 8 ($t1) 17: lw $a3, 8 ($t1) # $a3 = MEM[0x10010008] = 13
0x00400014: lw $f4, 12 ($t1) 18: lw $a4, 12 ($t1) # $a4 = MEM[0x1001000c] = 17
0x00400018: add $21, $f1, $f2 21: add $a5, $a1, $a2 # $a5 = 15 + 25 = 40
0x0040001c: add $21, $f1, $f3 22: add $a5, $a5, $a3 # $a5 = 40 + 13 = 53
0x00400020: add $21, $f1, $f4 23: add $a5, $a5, $a4 # $a5 = 53 + 17 = 70
0x00400024: sw $21, 0x000000010 ($9) 26: sw $a5, 16 ($t1) # MEM[0x10010010] = 70
```

The Data Segment shows memory addresses from 0x10010000 to 0x10010140. The Registers window on the right shows the state of registers, with \$a5 highlighted at 0x00000046.

## Programa 10

The screenshot shows the MARS 4.5 IDE with the assembly code for Program 10. The Text Segment displays the following instructions:

```
0x00400004: ori $11, $9, 0x000000010 12: sll $t1, $t1, 16 # $t1 = $t1 << 16 = 0x10...
0x00400008: lw $f1, 0 ($t1) 15: lw $a1, 0 ($t1) # $a1 = MEM[0x10010000] = x ...
0x0040000c: lw $f2, 4 ($t1) 16: lw $a2, 4 ($t1) # $a2 = MEM[0x10010004] = z ...
0x00400010: ori $11, $10, 0x000000007 19: sll $t2, $a1, 7 # $t2 = x << 7 = 128x
0x00400014: sub $10, $10, $f1 20: sub $t2, $t2, $a1 # $t2 = 128x - x = 127x
0x00400018: sll $11, $11, 6 23: sll $t3, $a2, 6 # $t3 = z << 6 = 64z
0x0040001c: add $11, $11, $f2 24: add $t3, $t3, $a2 # $t3 = 64z + z = 65z
0x00400020: sub $10, $10, $f1 27: sub $t2, $t2, $t3 # $t2 = 127x - 65z = 62x
0x00400024: addi $19, $10, 0x0000... 28: addi $a3, $t2, 1 # $a3 = 127x - 65z + 1
0x00400028: sw $19, 0x00000008 ($9) 31: sw $a3, 8 ($t1) # MEM[0x10010010] = MEM[y] = 127x...
```

The Data Segment shows memory addresses from 0x10010000 to 0x10010140. The Registers window on the right shows the state of registers, with \$a5 highlighted at 0x000000b5.

## Programa 11

C:\Users\1137910\Downloads\Relatório9 - LAC\mps3.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Edit Execute

Text Segment

Bkpt	Address	Code	Basic	Source
	0x00400000	0x34091001	ori \$9,\$0,0x00001001	10: ori \$t1, \$zero, 0x1001 # \$t1 = \$zero   0x1001 = 0x00...
	0x00400004	0x00094c00	sll \$9,\$9,0x00000010	11: sll \$t1, \$t1, 16 # \$t1 = \$t1 << 16 = 0x10...
	0x00400008	0x8d310004	lw \$17,0x00000004(\$9)	14: lw \$s1, 0 (\$t1) # \$s1 = MEM[0x10010000] = x ...
	0x0040000c	0x8d320004	lw \$18,0x00000004(\$9)	15: lw \$s2, 4 (\$t1) # \$s2 = MEM[0x10010004] = z ...
	0x00400010	0x340a0004	ori \$10,\$0,0x00000004	18: ori \$t2, \$zero, 0x0004 # \$t2 = 0x00000004
	0x00400014	0x00a54000	sll \$10,\$10,0x00000010	19: sll \$t2, \$t2, 16 # \$t2 = \$t2 << 16 = 0x00...
	0x00400018	0x354a93e0	ori \$10,\$10,0x000093e0	20: ori \$t2, \$t2, 0x93E0 # \$t2 = \$t2   0x93E0 = 0x00...
	0x0040001c	0x01515020	add \$10,\$10,\$17	22: add \$t2, \$t2, \$s1 # \$t2 = \$t2 + x = 3000...
	0x00400020	0x01529822	sub \$19,\$10,\$18	23: sub \$s3, \$t2, \$s2 # \$t2 = \$t2 - z = 4000...
	0x00400024	0xad330008	sw \$19,0x00000008(\$9)	25: sw \$s3, 8 (\$t1) # MEM[0x10010008] = y ...

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x10010000	0x000186a0	0x00030d40	0x00030d40	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

Mars Messages Run I/O

Clear

Registers

Name	Number	Value
\$zero	0	0x00000000
\$at	1	0x00000000
\$v0	2	0x00000000
\$v1	3	0x00000000
\$a0	4	0x00000000
\$a1	5	0x00000000
\$a2	6	0x00000000
\$a3	7	0x00000000
\$t0	8	0x00000000
\$t1	9	0x10010000
\$t2	10	0x00061a80
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000000
\$s1	17	0x000186a0
\$s2	18	0x00030d40
\$s3	19	0x00030d40
\$s4	20	0x00000000
\$s5	21	0x00000000
\$s6	22	0x00000000
\$s7	23	0x00000000
\$s8	24	0x00000000
\$s9	25	0x00000000
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10008000
\$sp	29	0x7ffffeffc
\$fp	30	0x00000000
\$ra	31	0x00000000
pc		0x00400028
hi		0x00000000
lo		0x00000000

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## Programa 12

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File Edit Run Settings Tools Help

Run speed at max (no interaction)

Edit Execute

Text Segment

Bkpt	Address	Code	Basic	Source
	0x00400000	0x34091001	ori \$9,\$0,0x00001001	9: ori \$t1, \$zero, 0x1001 # \$t1 = \$zero   0x1001 = 0x00001001
	0x00400004	0x00094c00	sll \$9,\$9,0x00000010	10: sll \$t1, \$t1, 16 # \$t1 = \$t1 << 16 = 0x10010000
	0x00400008	0x8d4a0000	lw \$10,0x00000000(\$9)	12: lw \$t2, 12 (\$t1) # \$t2 = MEM[\$t1] = \$pp_k
	0x0040000c	0x8d4a0000	lw \$10,0x00000000(\$10)	13: lw \$t2, 0 (\$t2) # \$t2 = MEM[\$t2] = \$pp_k
	0x00400010	0x8d4a0000	lw \$10,0x00000000(\$10)	14: lw \$t2, 0 (\$t2) # \$t2 = MEM[\$t2] = \$k
	0x00400014	0x8d4a0000	lw \$9,0x00000000(\$10)	15: lw \$t1, 0 (\$t2) # \$t1 = MEM[\$t2] = k = 4
	0x00400018	0x00094840	sll \$9,\$9,0x00000001	17: sll \$t1, \$t1, 1 # \$t1 = \$t1 << 1 = 2k = 8
	0x0040001c	0xad490000	sw \$9,0x00000000(\$10)	19: sw \$t1, 0 (\$t2) # MEM[\$k] = \$t1 = 2k = 8

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x10010000	0x00000008	0x10010000	0x10010004	0x10010008	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
0x10010100	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010120	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010140	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000

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Clear

Registers

Name	Number	Value
\$zero	0	0x00000000
\$at	1	0x00000000
\$v0	2	0x00000000
\$v1	3	0x00000000
\$a0	4	0x00000000
\$a1	5	0x00000000
\$a2	6	0x00000000
\$a3	7	0x00000000
\$t0	8	0x00000000
\$t1	9	0x10010000
\$t2	10	0x10010000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000000
\$s1	17	0x00000000
\$s2	18	0x00000000
\$s3	19	0x00000000
\$s4	20	0x00000000
\$s5	21	0x00000000
\$s6	22	0x00000000
\$s7	23	0x00000000
\$s8	24	0x00000000
\$s9	25	0x00000000
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10008000
\$sp	29	0x7ffffeffc
\$fp	30	0x00000000
\$ra	31	0x00000000
pc		0x00400028
hi		0x00000000
lo		0x00000000

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