

EP_06 - Arthur Gonçalves de Moraes

Parte 1)

- 1) a
- 2) b
- 3) a
- 4) c
- 5) d
- 6) c
- 7) d
- 8) d
- 9) b
- 10) a
- 11) b
- 12) d
- 13) a
- 14) c
- 15) a
- 16) d
- 17) a
- 18) a

Parte 2)

1)

The screenshot shows the MARS 4.5 assembly editor interface. The assembly code in the editor window is:

```
mips1.asm
1 .text
2 # $s0 = a, $s1 = b, $s2 = c, $s3 = d
3 ori $s0, $zero, 2
4 ori $s1, $zero, 3
5 ori $s2, $zero, 4
6 ori $s3, $zero, 5
7
8 add $t0, $s0, $s1
9 add $t1, $s2, $s3
10 sub $t0, $t0, $t1
11
12 sub $t1, $s0, $s1
13 add $t1, $t1, $t0
14
15 and $s1, $s1, $zero
16 sub $s1, $t0, $t1
```

The Registers window shows the following register values:

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	0xffffffff
\$t1	9	0xfffffffffb
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000002
\$s1	17	0x00000001
\$s2	18	0x00000004
\$s3	19	0x00000005
\$s4	20	0x00000000
\$s5	21	0x00000000
\$s6	22	0x00000000
\$s7	23	0x00000000
\$t8	24	0x00000000
\$t9	25	0x00000000
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10000000
\$sp	29	0xfffffeff
\$fp	30	0x00000000
\$ra	31	0x00000000
pc		0x0000002c
hi		0x00000000
lo		0x00000000

The Mars Messages window shows the message: "program is finished running (dropped off bottom)".

C:\Users\gdemo\OneDrive\Área de Trabalho\Homework\AC2\EP_06\mips1.asm - MARS 4.5

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	0xffffffff
\$t1	9	0xfffffeeb
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000002
\$s1	17	0x00000001
\$s2	18	0x00000004
\$s3	19	0x00000005
\$s4	20	0x00000000
\$s5	21	0x00000000
\$s6	22	0x00000000
\$t7	23	0x00000000
\$s8	24	0x00000000
\$t9	25	0x00000000
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10000000
\$sp	29	0xffffffff
\$fp	30	0x00000000
\$ra	31	0x00000000
pc		0x0400002c
hi		0x00000000
lo		0x00000000

Text Segment

Bkpt	Address	Code	Basic	Source
0x00400000	0x00000000	.text	314, 50, 0x00000002	8: ori \$a0, \$zero, 2
0x00400004	0x00000004	.text	517, 50, 0x00000003	4: ori \$s1, \$zero, 3
0x00400008	0x00000008	.text	518, 50, 0x00000004	5: ori \$s2, \$zero, 4
0x0040000c	0x0000000c	.text	519, 50, 0x00000005	6: ori \$s3, \$zero, 5
0x00400010	0x00000010	.text	0x2114020add \$s0, \$s1, \$s2	8: add \$t0, \$s0, \$s1
0x00400014	0x00000014	.text	0x2534820add \$s0, \$s1, \$s3	9: add \$t1, \$s0, \$s3
0x00400018	0x00000018	.text	0x01094022sub \$s0, \$s1, \$s2	10: sub \$t0, \$s0, \$s2
0x0040001c	0x0000001c	.text	0x02114822sub \$s0, \$s1, \$s3	11: sub \$t1, \$s0, \$s3
0x00400020	0x00000020	.text	0x01284820add \$s0, \$s1, \$s0	12: add \$t0, \$s1, \$s0
0x00400024	0x00000024	.text	0x02208824and \$t1, \$s1, \$s0	13: and \$t1, \$s1, \$s0
0x00400028	0x00000028	.text	0x01968822sub \$t1, \$s1, \$s0	14: sub \$t1, \$s1, \$s0

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
0x10010100	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010120	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000

Mars Messages

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

Run I/O

Registers

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	20
\$t1	9	0
\$t2	10	0
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$s0	16	1
\$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		4194328
hi		0
lo		0

Mars Messages

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

Run I/O

2)

C:\Users\gdemo\OneDrive\Área de Trabalho\Homework\AC2\EP_06\mips1.asm - MARS 4.5

Registers

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	20
\$t1	9	0
\$t2	10	0
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$s0	16	1
\$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		4194328
hi		0
lo		0

Text Segment

Bkpt	Address	Code	Basic	Source
1	0x00000000	.text	1: .text	1: # \$s0 = x, \$s1 = y
2	0x00000004	.text	2: ori \$s0, \$zero, 1	2: add \$t0, \$s0, \$s0
3	0x00000008	.text	3: add \$t0, \$s0, \$s0	3: add \$t0, \$s0, \$s0
4	0x0000000c	.text	4: add \$t0, \$s0, \$s0	4: add \$t0, \$s0, \$s0
5	0x00000010	.text	5: add \$t0, \$s0, \$s0	5: add \$t0, \$s0, \$s0
6	0x00000014	.text	6: add \$t0, \$s0, \$s0	6: add \$t0, \$s0, \$s0
7	0x00000018	.text	7: addi \$t0, \$t0, 15	7: addi \$t0, \$t0, 15
8	0x00000020	.text	8: or \$s1, \$t0, \$zero	8: or \$s1, \$t0, \$zero
9	0x00000024	.text	9:	9:
10	0x00000028	.text	10:	10:
11	0x0000002c	.text	11:	11:

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
0x10010100	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010120	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000

Mars Messages

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

Run I/O

C:\Users\gdemo\OneDrive\Área de Trabalho\Homework\AC2\EP_06\mips1.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
	0x00040000	0x02100001	add \$t0, \$zero, \$t1	
	0x00040004	0x02104020	add \$t0, \$t1, \$t0	4: add \$t0, \$t1, \$t0
	0x00040008	0x02104020	add \$t0, \$t0, \$t0	5: add \$t0, \$t0, \$t0
	0x0004000C	0x02104020	add \$t0, \$t0, \$t0	6: add \$t0, \$t0, \$t0
	0x00040010	0x02108000	addi \$t0, \$t0, 15	7: addi \$t0, \$t0, 15
	0x00040014	0x01008825	or \$t1, \$t0, \$zero	8: or \$t1, \$t0, \$zero

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

0x10010000 (.data) Hexadecimal Addresses Hexadecimal Values ASCII

Mars Messages Run I/O

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

Clear

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	20
\$t1	9	0
\$t2	10	0
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$t0	16	1
\$t1	17	20
\$t2	18	0
\$t3	19	0
\$t4	20	0
\$t5	21	0
\$t6	22	0
\$t7	23	0
\$s8	24	0
\$t9	25	0
\$k0	26	0
\$k1	27	0
\$gp	28	269468224
\$sp	29	2147479548
\$fp	30	0
\$ra	31	0
pc		4194328
hi		0
lo		0

Windows Taskbar: File Explorer, File Manager, Task View, Taskbar settings, Taskbar icons, Taskbar search, Taskbar pinned items, Taskbar notifications, Taskbar status bar.

System tray: Battery, Network, Volume, ENG, 17:24, 06/06/2024.

3)

C:\Users\gdemo\OneDrive\Área de Trabalho\Homework\AC2\EP_06\mips1.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Edit Execute

mips1.asm

```
1 .text
2 # $s0 = x, $s1 = y, $s2 = z
3 ori $s0, $zero, 3
4 ori $s1, $zero, 4
5
6 add $t0, $s0, $s0
7 add $t0, $t0, $t0
8 add $t0, $t0, $t0
9 add $t0, $t0, $t0
10 sub $t0, $t0, $s0
11
12 add $t1, $s1, $s1
13 add $t1, $t1, $t1
14 add $t1, $t1, $t1
15 add $t1, $t1, $t1
16 add $t1, $t1, $t1
17 add $t1, $t1, $t1
18 add $t1, $t1, $s1
19 add $t1, $t1, $s1
20 add $t1, $t1, $s1
21
22 add $t2, $t0, $t1
23 add $t2, $t2, $t2
24 add $t2, $t2, $t2
25
26 add $s2, $zero, $t2
27
28
```

Line: 26 Column: 20 Show Line Numbers

Mars Messages Run I/O

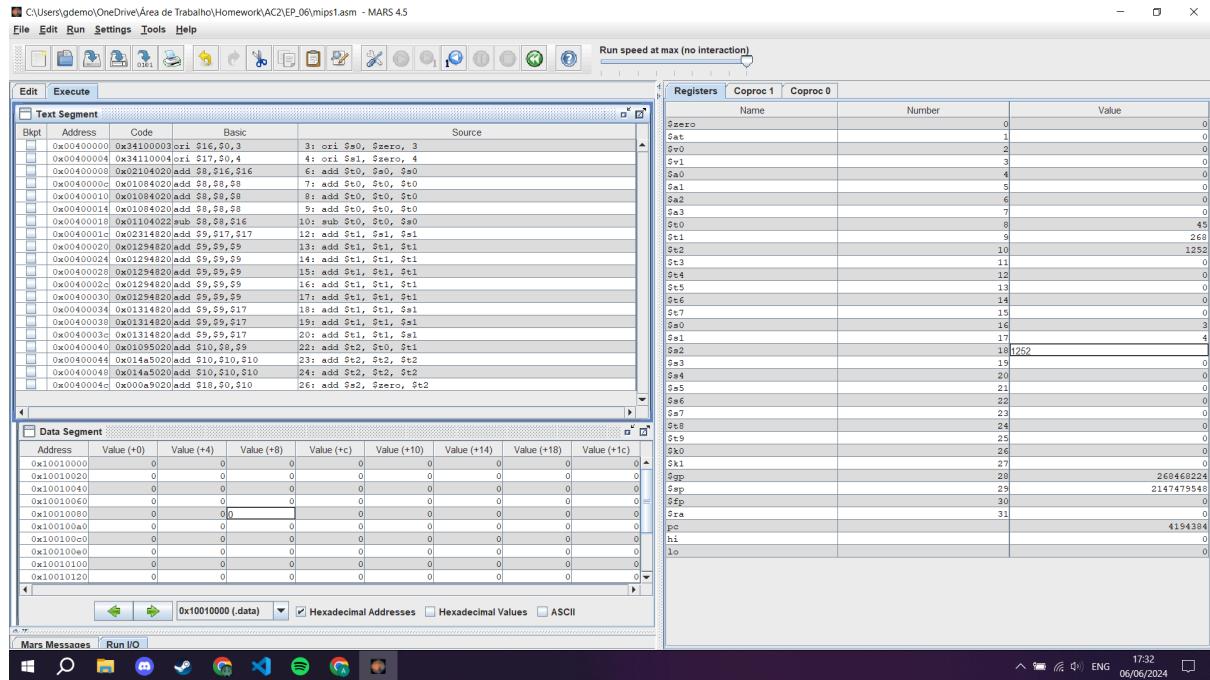
```
-- program is finished running (dropped off bottom) --
-- program is finished running (dropped off bottom) --
```

Registers Coproc 1 Coproc 0

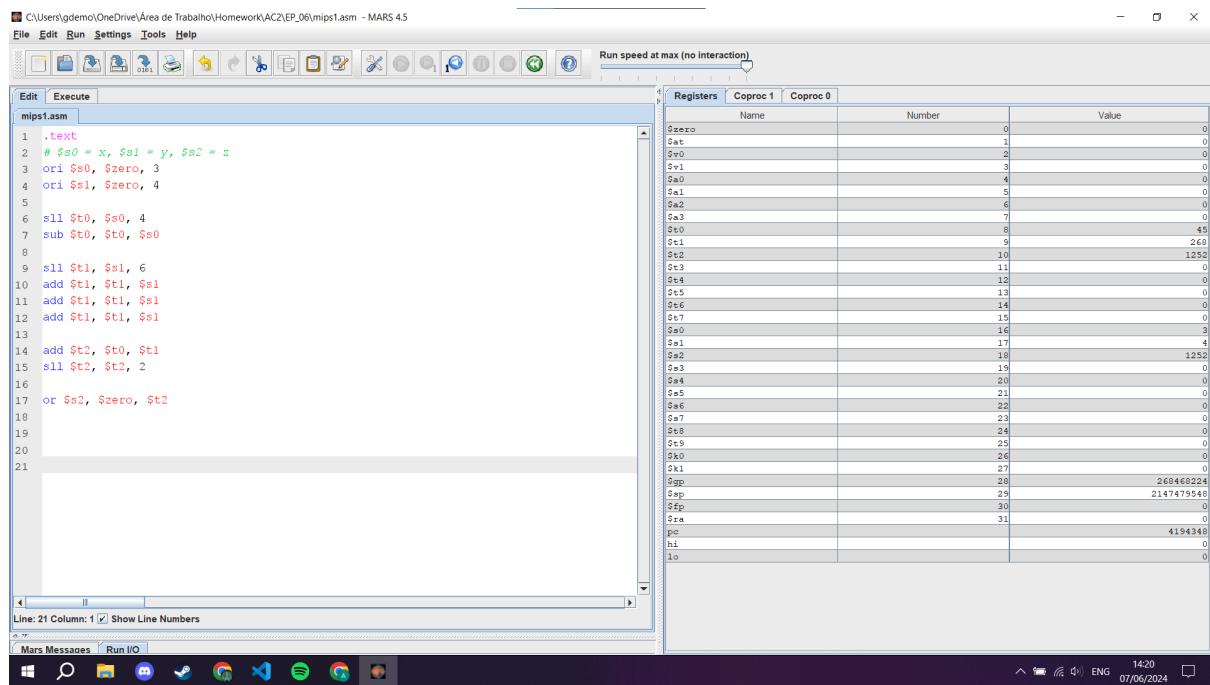
Name	Number	Value
\$zero	0	0
\$at	1	0
\$v0	2	0
\$v1	3	0
\$a0	4	0
\$a1	5	0
\$a2	6	0
\$a3	7	0
\$t0	8	45
\$t1	9	268
\$t2	10	1252
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$s0	16	3
\$s1	17	4
\$s2	18	1252
\$s3	19	0
\$s4	20	0
\$s5	21	0
\$s6	22	0
\$s7	23	0
\$s8	24	0
\$t9	25	0
\$k0	26	0
\$k1	27	0
\$gp	28	269468224
\$sp	29	2147479548
\$fp	30	0
\$ra	31	0
pc		4194384
hi		0
lo		0

Windows Taskbar: File Explorer, File Manager, Task View, Taskbar settings, Taskbar icons, Taskbar search, Taskbar pinned items, Taskbar notifications, Taskbar status bar.

System tray: Battery, Network, Volume, ENG, 17:32, 06/06/2024.



4)



The screenshot shows the MARS 4.5 assembly editor interface. The top menu bar includes File, Edit, Run, Settings, Tools, and Help. A toolbar with various icons is located above the main window. The main area is divided into two panes: the Text Segment pane on the left and the Registers pane on the right.

Text Segment

Bkpt	Address	Code	Basic	Source
	0x00400000	0x34100000	or \$16,\$0, \$0, 3	3: ori \$s0, \$zero, 3
	0x00400004	0x34110004	ori \$17,\$0, 4	4: ori \$s1, \$zero, 4
	0x00400008	0x34120004	ori \$18,\$0, 4	6: ori \$s2, \$zero, 4
	0x0040000c	0x00110025	add \$s0,\$s1,\$s2	7: add \$s0,\$s1,\$s2
	0x00400010	0x00114580	mul \$s0,\$s1,\$s2	9: sll \$s1, \$s1, 6
	0x00400014	0x00114820	add \$s0,\$s1,\$s2	10: add \$s1, \$s1, \$s2
	0x00400018	0x001314820	add \$s0,\$s1,\$s2	11: add \$s1, \$s1, \$s2
	0x0040001c	0x01314820	add \$s0,\$s1,\$s2	12: add \$s1, \$s1, \$s2
	0x00400020	0x01095020	add \$t0,\$s0,\$s0	14: add \$s2, \$t0, \$s0
	0x00400024	0x0000a080	mul \$t0,\$s0,\$s0	15: sll \$s2, \$t0, 2
	0x00400028	0x0000a025	or \$s2,\$zero,\$t2	17: or \$s2, \$zero, \$t2

Registers

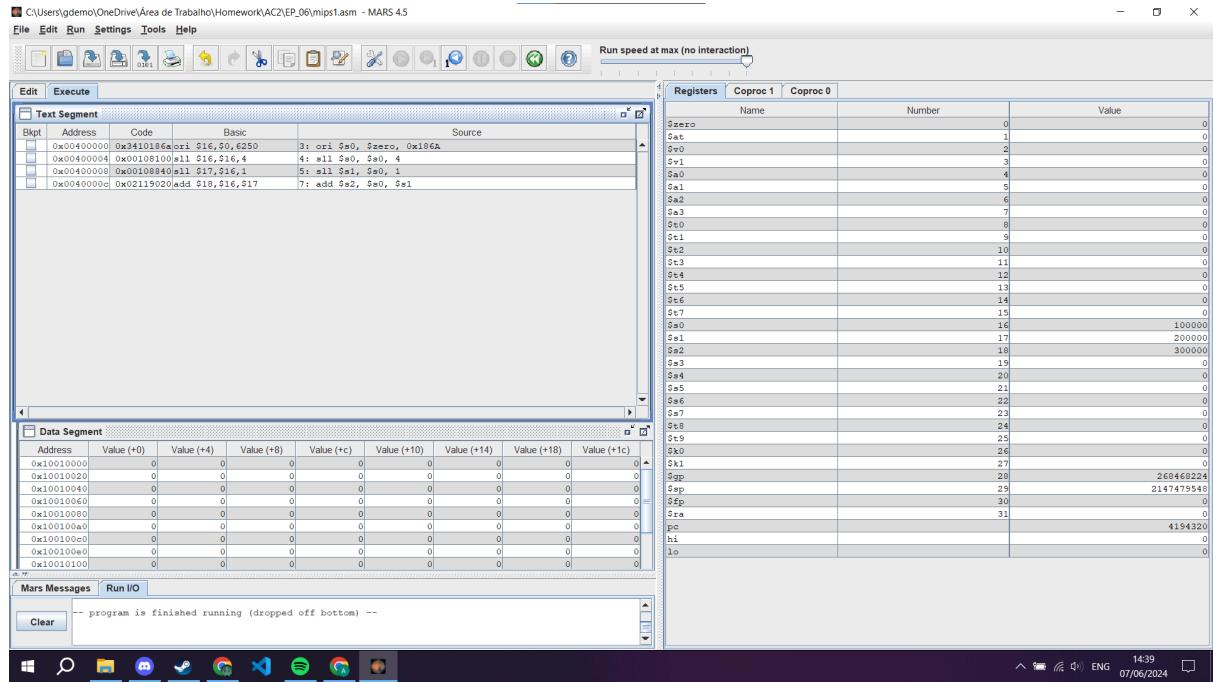
Name	Number	Value
\$zero	0	0
\$s0	1	0
\$s1	2	0
\$s2	3	0
\$s0	4	0
\$s1	5	0
\$s2	6	0
\$s0	7	0
\$s1	8	45
\$s2	9	268
\$s2	10	1252
\$s3	11	0
\$s4	12	0
\$s5	13	0
\$s6	14	0
\$t7	15	0
\$s0	16	3
\$s1	17	4
\$s2	18	1252
\$s3	19	0
\$s4	20	0
\$s5	21	0
\$s6	22	0
\$t7	23	0
\$s8	24	0
\$s9	25	0
\$s0	26	0
\$s1	27	0
\$s2	28	26846224
\$s3	29	2147479548
\$EP	30	0
\$ra	31	4194348
pc		1
hi		0
lo		0

Data Segment

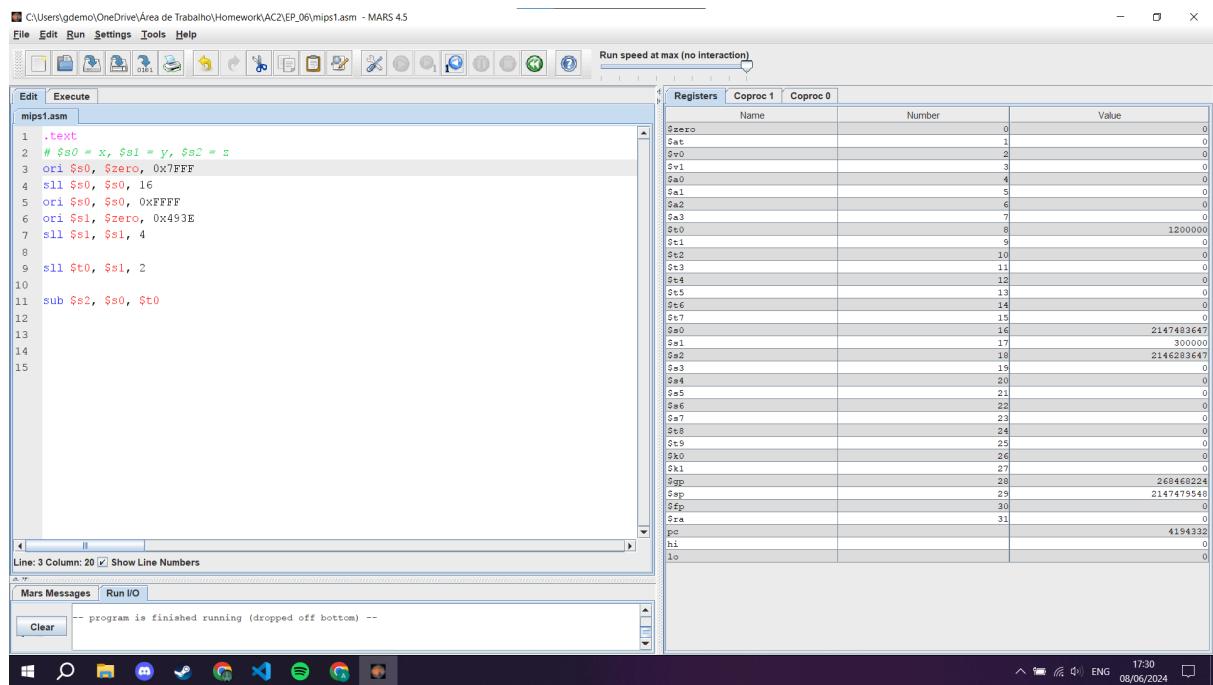
Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x10010100	0	0	0	0	0	0	0	0
0x100101020	0	0	0	0	0	0	0	0
0x100101040	0	0	0	0	0	0	0	0
0x100101060	0	0	0	0	0	0	0	0
0x100101080	0	0	0	0	0	0	0	0
0x1001010a0	0	0	0	0	0	0	0	0
0x1001010c0	0	0	0	0	0	0	0	0
0x1001010e0	0	0	0	0	0	0	0	0
0x100101100	0	0	0	0	0	0	0	0
0x100101120	0	0	0	0	0	0	0	0

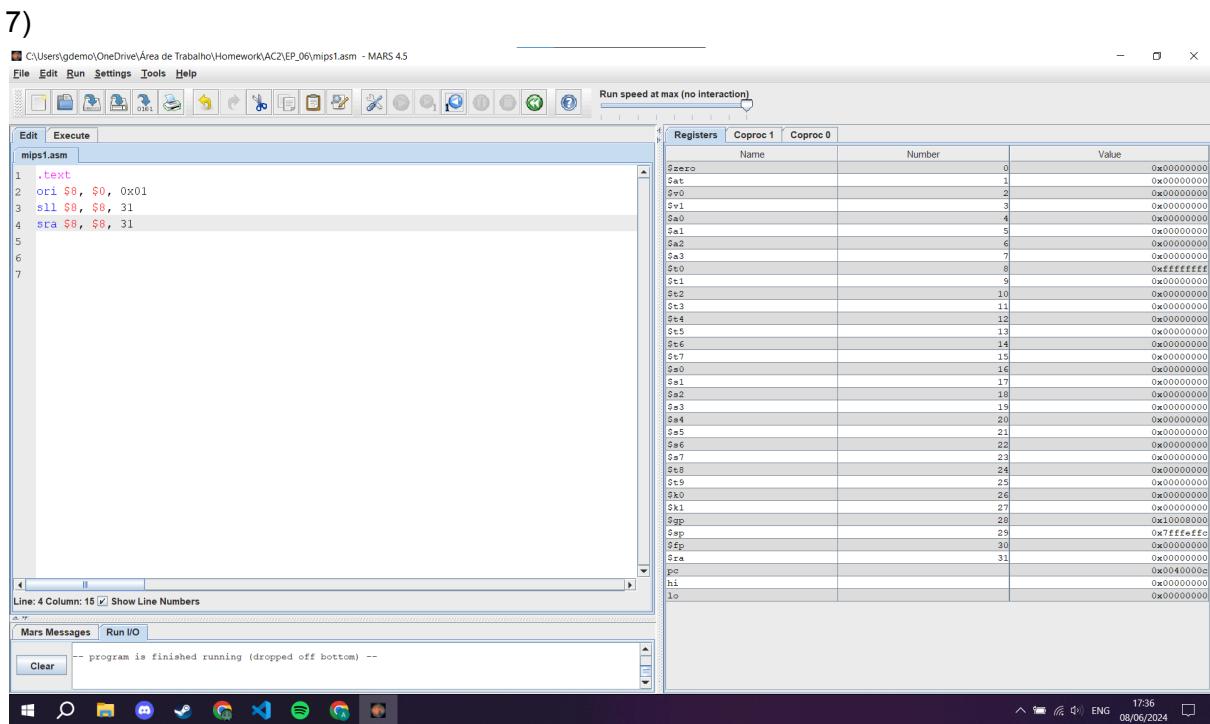
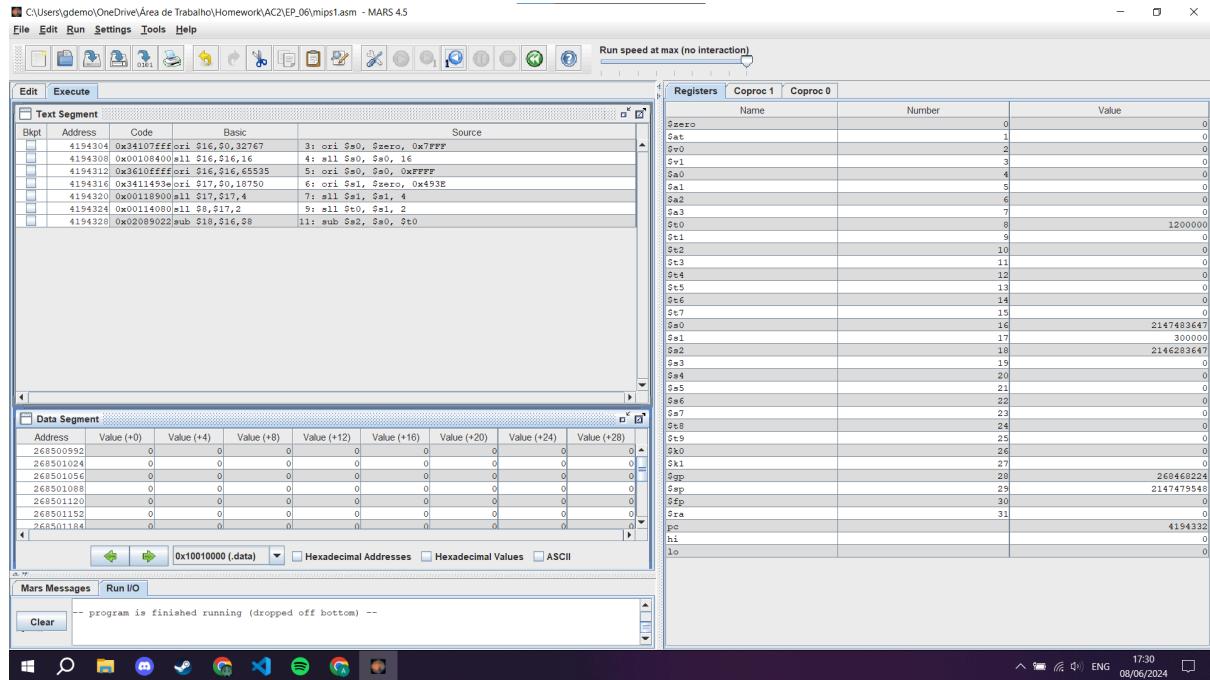
At the bottom, there are buttons for Run speed at max (no interaction), and checkboxes for 0x10010000 (.data), Hexadecimal Addresses, Hexadecimal Values, and ASCII.

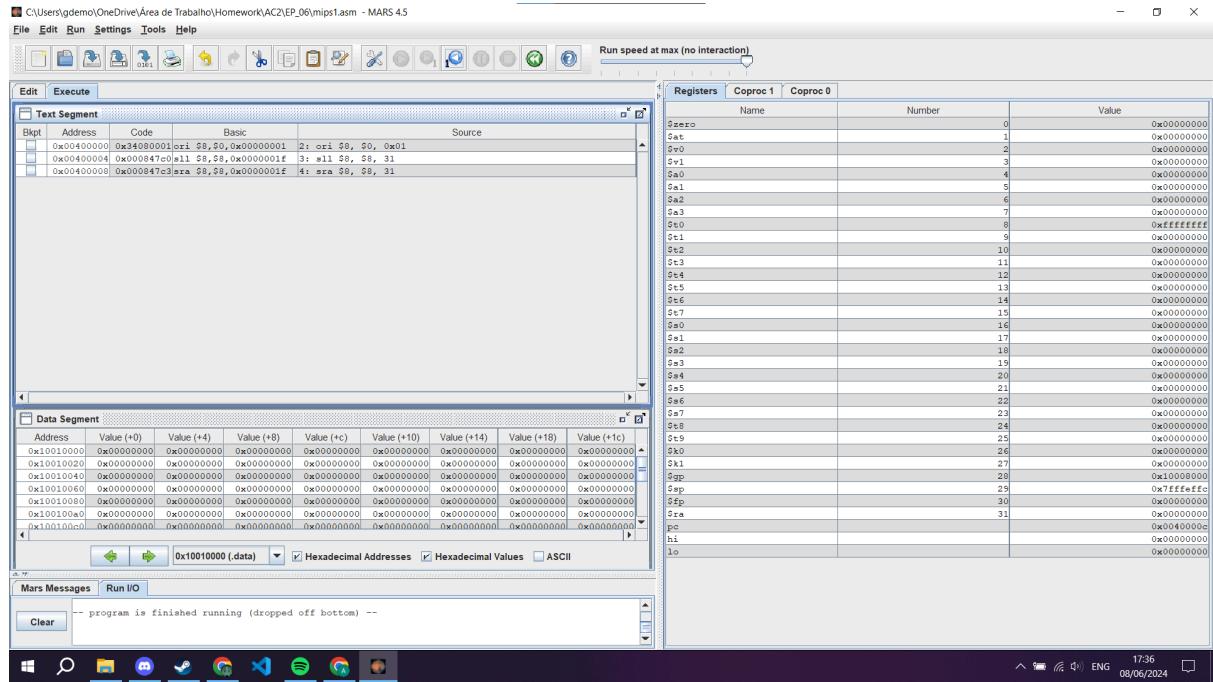
5)



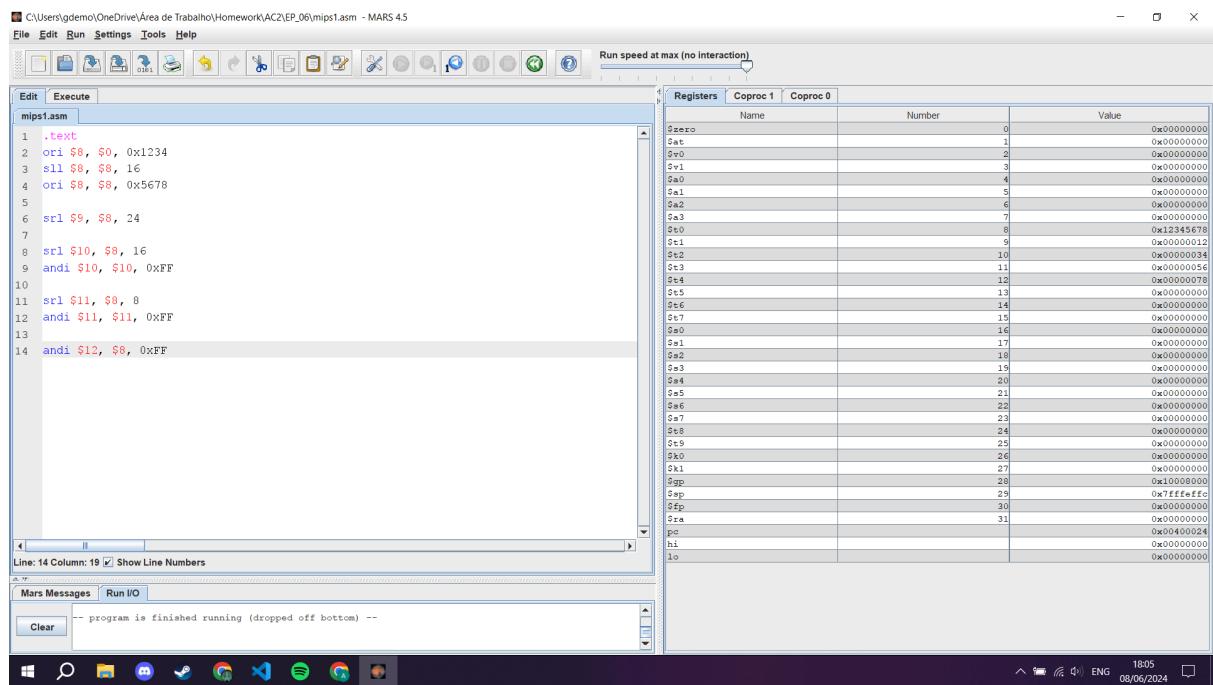
6)







8)



The screenshot shows the MARS 4.5 assembly debugger interface with the following panes:

- Text Segment**: Displays assembly code with columns for Bkpt, Address, Code, Base, and Source.
- Registers**: Shows the state of registers S0 to S31, PC, hi, and lo.
- Data Segment**: Displays memory starting at address 0x10010000.
- Mars Messages**: Displays the message "program is finished running (dropped off bottom)".

Toolbar icons include: File, Edit, Run, Settings, Tools, Help; Run speed at max (no interaction); and various assembly and memory manipulation tools.

9)

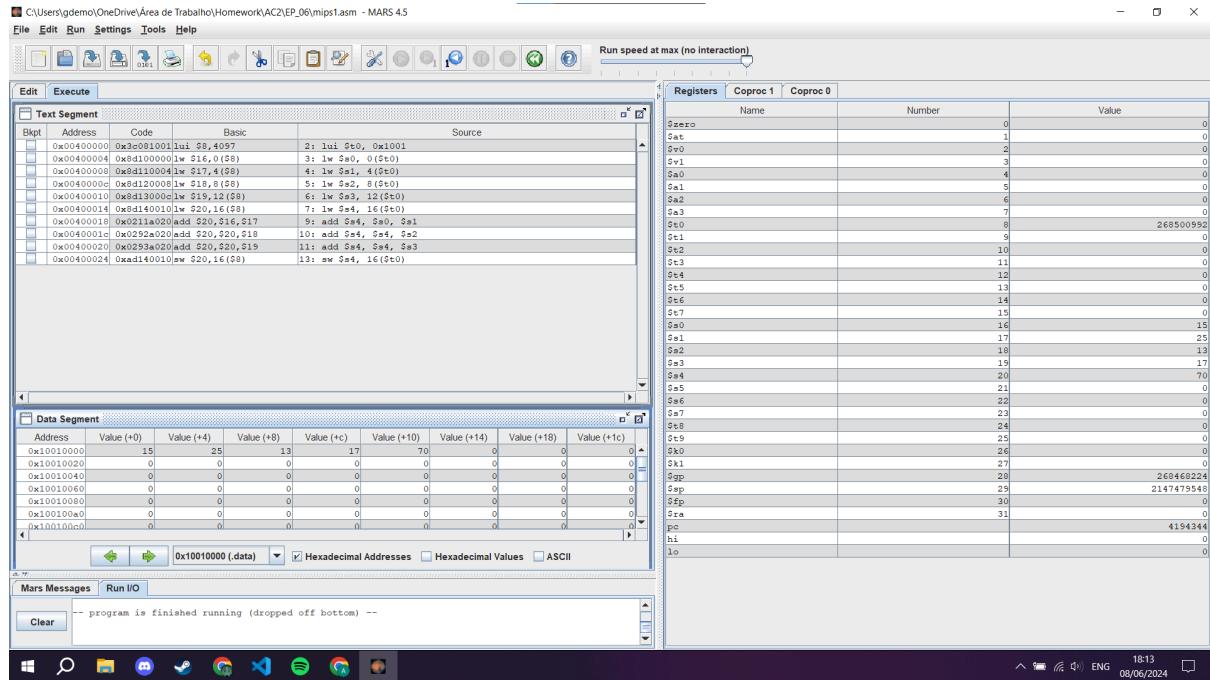
The screenshot shows the MARS 4.5 assembly debugger interface. The top menu bar includes File, Edit, Run, Settings, Tools, and Help. The title bar indicates the file is "mips1.asm - MARS 4.5". The left pane displays the assembly code:

```
.text
1 lui $t0, 0x1000
2 lw $s0, 0($t0)
3 lw $s1, 4($t0)
4 lw $s2, 8($t0)
5 lw $s3, 12($t0)
6 lw $s4, 16($t0)
7
8
9 add $s4, $s0, $s1
10 add $s4, $s4, $s2
11 add $s4, $s4, $s3
12
13 sw $s4, 16($t0)
14
15 .data
16 x1: .word 15
17 x2: .word 25
18 x3: .word 13
19 x4: .word 17
20 soma: .word -|
```

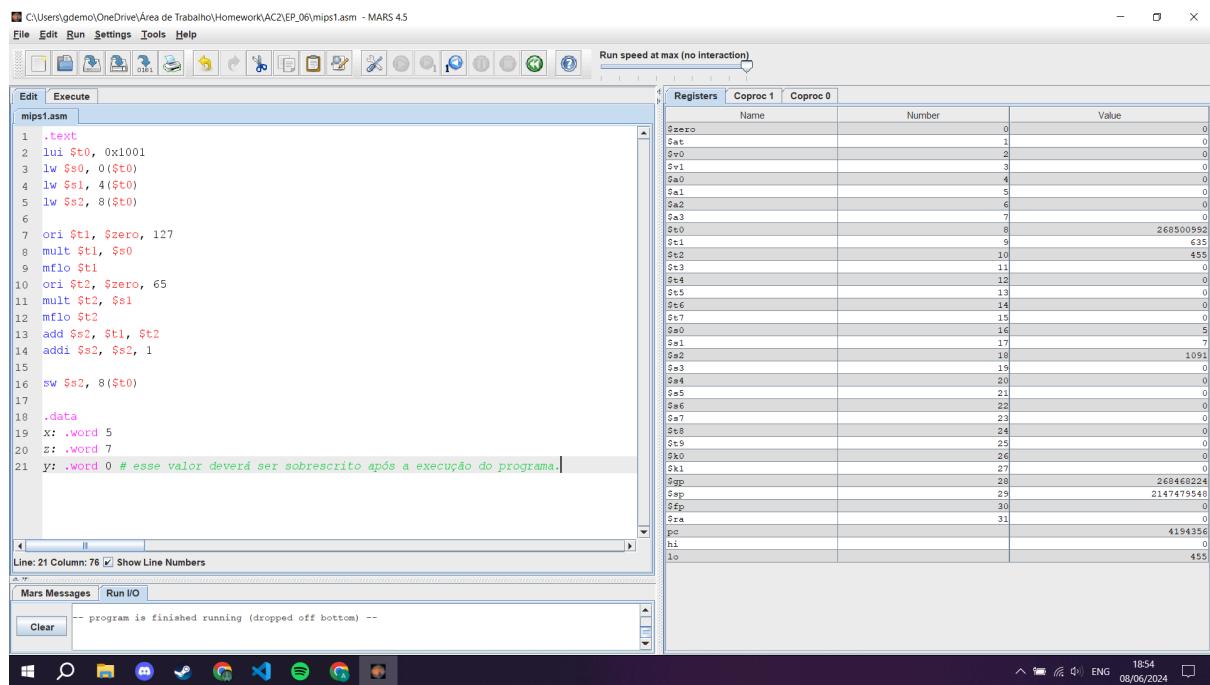
The right pane shows the Registers window with three tabs: Registers, Coproc 1, and Coproc 0. The Registers tab lists the following registers with their current values:

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	268500592
\$t1	9	0
\$t2	10	0
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$s0	16	15
\$s1	17	25
\$s2	18	13
\$s3	19	17
\$s4	20	70
\$s5	21	0
\$s6	22	0
\$s7	23	0
\$s8	24	0
\$s9	25	0
\$k0	26	0
\$k1	27	0
\$gp	28	26846824
\$sp	29	2147419549
\$fp	30	0
\$ra	31	0
pi		419344
hi		0
lo		0

The bottom pane shows the Mars Messages window with the message: "-- program is finished running (dropped off bottom) --". The status bar at the bottom right shows the date as 08/06/2024 and the time as 18:12.



10)



The screenshot shows the Mars 4.5 assembly debugger interface. The top menu bar includes File, Edit, Run, Settings, Tools, and Help. The main window features two primary panes: the Text Segment pane on the left and the Registers pane on the right.

Text Segment pane:

Bkpt	Address	Code	Basic	Source
	0x00000000	0x3c081000	lui \$t0, 0x1001	
	0x00000004	0x8d100000	lw \$t1, 0(\$t0)	
	0x00000008	0x8d100004	lw \$t1, 4(\$t0)	
	0x0000000c	0x8d100008	lw \$t1, 8(\$t0)	
	0x00000010	0x2400007e	mult \$t0, \$t0, \$t0	
	0x00000014	0x01300015	mult \$t0, \$t0, 127	
	0x00000018	0x00000412	mflo \$t0	
	0x00000020	0x34000401	ori \$t0, \$0, 65	
	0x00000024	0x01510018	mult \$t0, \$t0	
	0x00000028	0x000005012	mflo \$t0	
	0x0000002c	0x22520001	addi \$t0, \$t0, 1	
	0x00000030	0x0ad120000	sw \$t0, 8(\$t0)	

Registers pane:

Registers	Coproc 1	Coproc 0
Name	Number	Value
\$zero	0	0
\$at	1	0
\$t0	2	0
\$v1	3	0
\$a0	4	0
\$a1	5	0
\$a2	6	0
\$a3	7	0
\$t1	8	268500559
\$t2	9	635
\$t3	10	455
\$t4	11	0
\$t5	12	0
\$t6	13	0
\$t7	14	0
\$t8	15	0
\$t9	16	5
\$t10	17	7
\$t11	18	10\$1
\$t12	19	0
\$t13	20	0
\$t14	21	0
\$t15	22	0
\$t16	23	0
\$t17	24	0
\$t18	25	0
\$t19	26	0
\$t20	27	0
\$sp	28	268460224
\$fp	29	2147479548
\$ra	30	0
pc	31	4194356
hi		0
lo		455

Data Segment pane:

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x10010000	5	7	10\$1	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

Mars Messages and **Run I/O** panes are also visible at the bottom of the interface.

11)

The screenshot shows the Mars 4.5 assembly editor interface. The left pane displays the assembly code for `mips1.asm`, which includes sections for text, data, and code. The right pane shows the Registers window with a table of registers and their current values. The bottom pane displays Mars Messages indicating the program has finished running.

mips1.asm

```
1 .text
2 lui $t0, 0x1001
3 lw $s0, 0($t0)
4 lw $s1, 4($t0)
5 lw $s2, 8($t0)
6
7 ori $t1, $zero, 0x493E
8 sll $t1, $t1, 4
9
10 sub $s2, $s0, $s1
11 add $s2, $s2, $t1
12
13 sw $s2, 8($t0)
14
15 .data
16 x: .word 100000
17 z: .word 200000
18 y: .word 0 # esse valor deverá ser sobreescrito após a execução do programa.
```

Registers

Name	Number	Value
\$zero	0	0
\$at	1	0
\$t0	2	0
\$v1	3	0
\$a0	4	0
\$a1	5	0
\$a2	6	0
\$a3	7	0
\$t1	8	268500558
\$s1	9	30000
\$s2	10	0
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$s0	16	100000
\$s1	17	200000
\$s2	18	0
\$s3	19	0
\$s4	20	0
\$s5	21	0
\$s6	22	0
\$s7	23	0
\$s8	24	0
\$s9	25	0
\$s10	26	0
\$k1	27	0
\$sp	28	268468224
\$fp	29	2147479548
\$fp	30	0
\$ra	31	0
pc		4194340
hi		0
lo		0

Line: 18 Column: 76 ✓ Show Line Numbers

Mars Messages: Run IO

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

The screenshot shows the Mars 4.5 assembly debugger interface with the following panes:

- Text Segment**: Displays assembly code and its source. The code includes instructions like `lui $t0, 0x1001`, `lw $t1, 0($t0)`, and `add $t2, $t1, $t0`.
- Registers**: Shows the state of registers \$zero through \$t7.
- Data Segment**: Displays memory starting at address 0x10010000 with values 100000, 200000, 200000, etc.
- Mars Messages**: Displays the message "program is finished running (dropped off bottom)".

12)

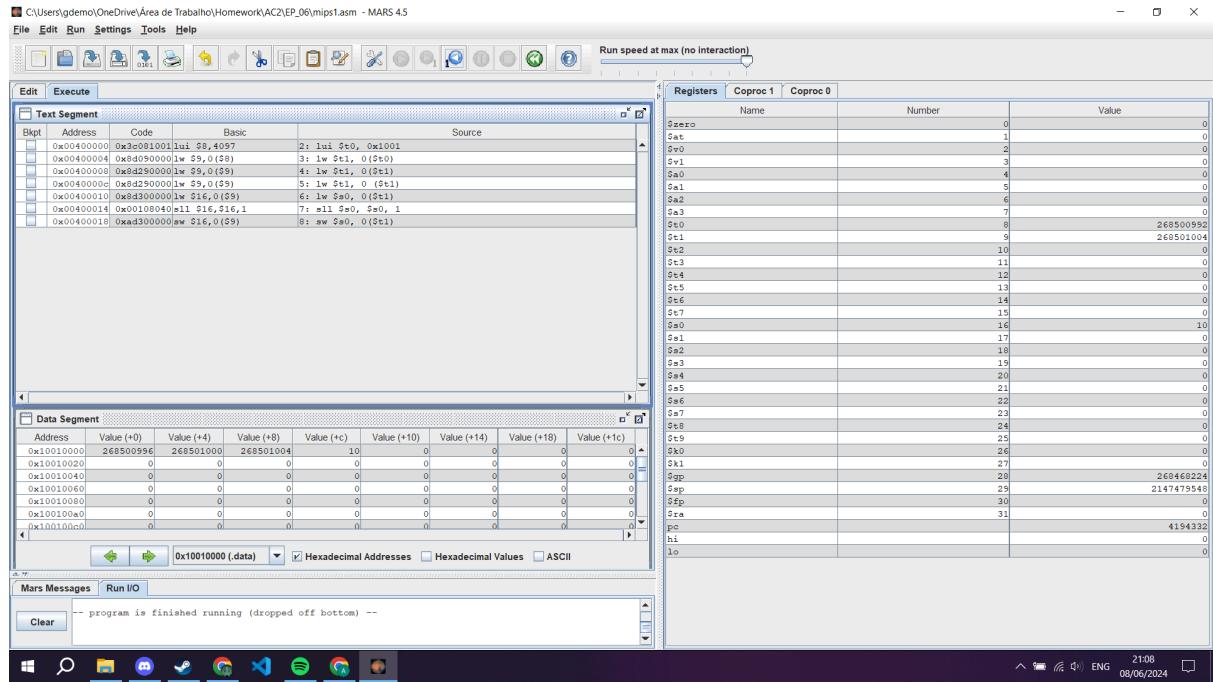
The screenshot shows the MARS 4.5 assembly editor interface. The left pane displays the assembly code for `mips1.asm`, which includes sections for .text, .data, and .bss, containing instructions like `lui`, `lw`, `sw`, and `.word` for memory locations `X1` through `X4`. The right pane shows the Registers window with a table of registers and their current values. The status bar at the bottom indicates the date as 08/06/2024 and the time as 21:08.

Name	Number	Value
\$zero	0	0
\$at	1	0
\$t0	2	0
\$v1	3	0
\$a0	4	0
\$a1	5	0
\$a2	6	0
\$a3	7	0
\$s0	8	26850058
\$s1	9	26850104
\$s2	10	0
\$s3	11	0
\$s4	12	0
\$s5	13	0
\$s6	14	0
\$s7	15	0
\$s8	16	0
\$s9	17	0
\$s10	18	0
\$s11	19	0
\$s12	20	0
\$s13	21	0
\$s14	22	0
\$s15	23	0
\$s16	24	0
\$s17	25	0
\$s18	26	0
\$s19	27	0
\$sp	28	26846824
\$fp	29	2147479548
\$ra	30	0
pc	31	0
hi		419432
lo		0

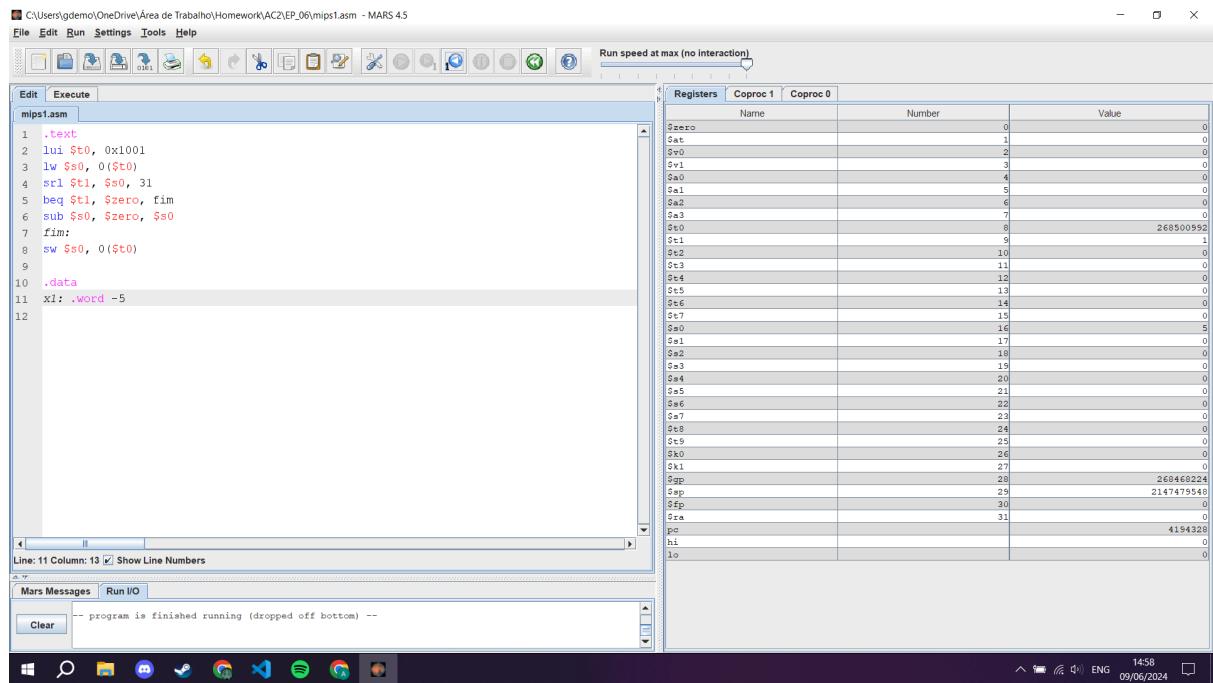
Line: 14 Column: 12 Show Line Numbers

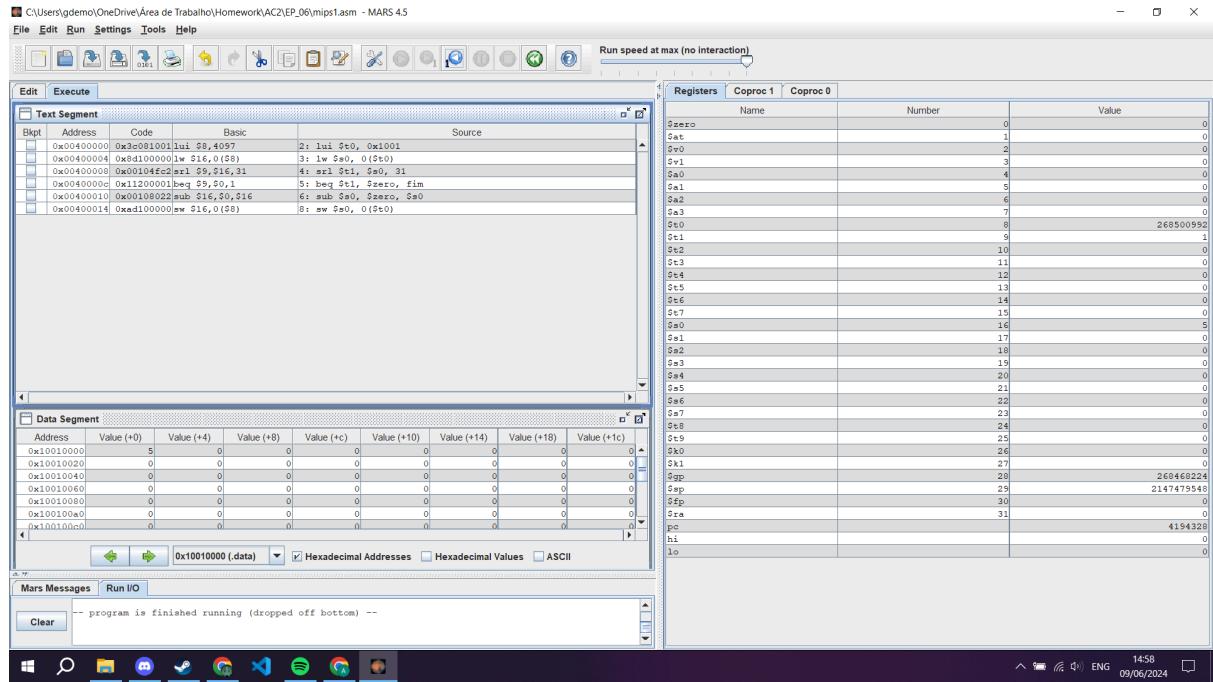
Mars Messages Run I/O

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

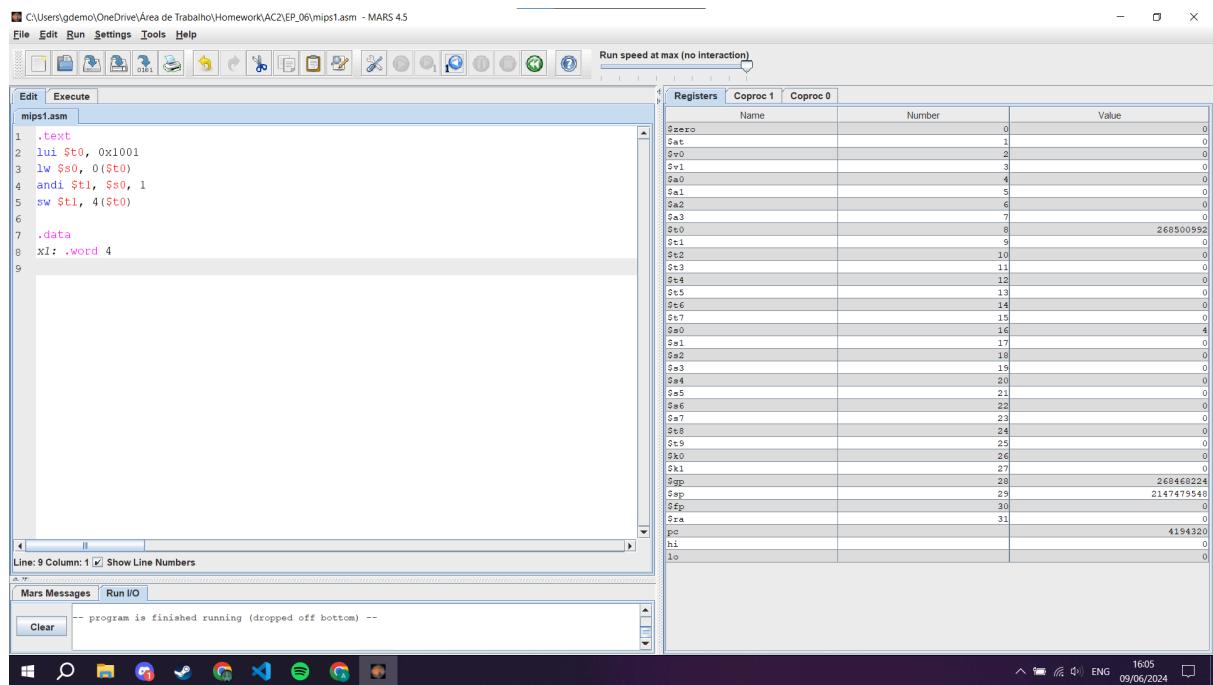


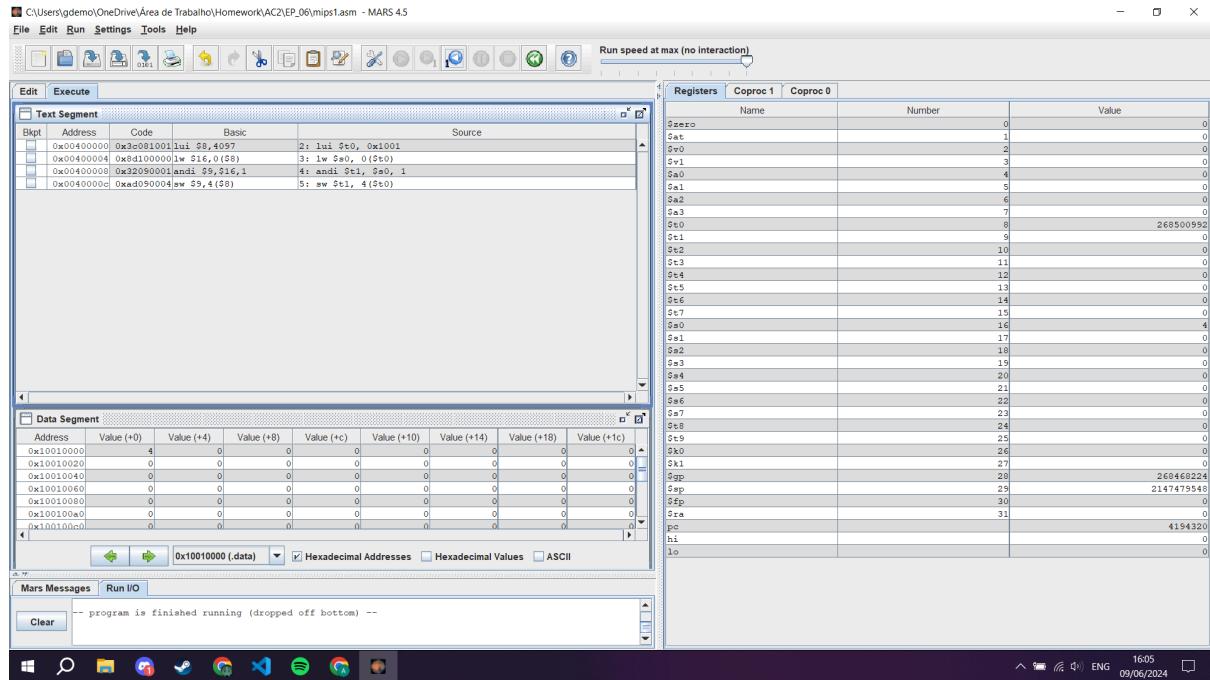
13)



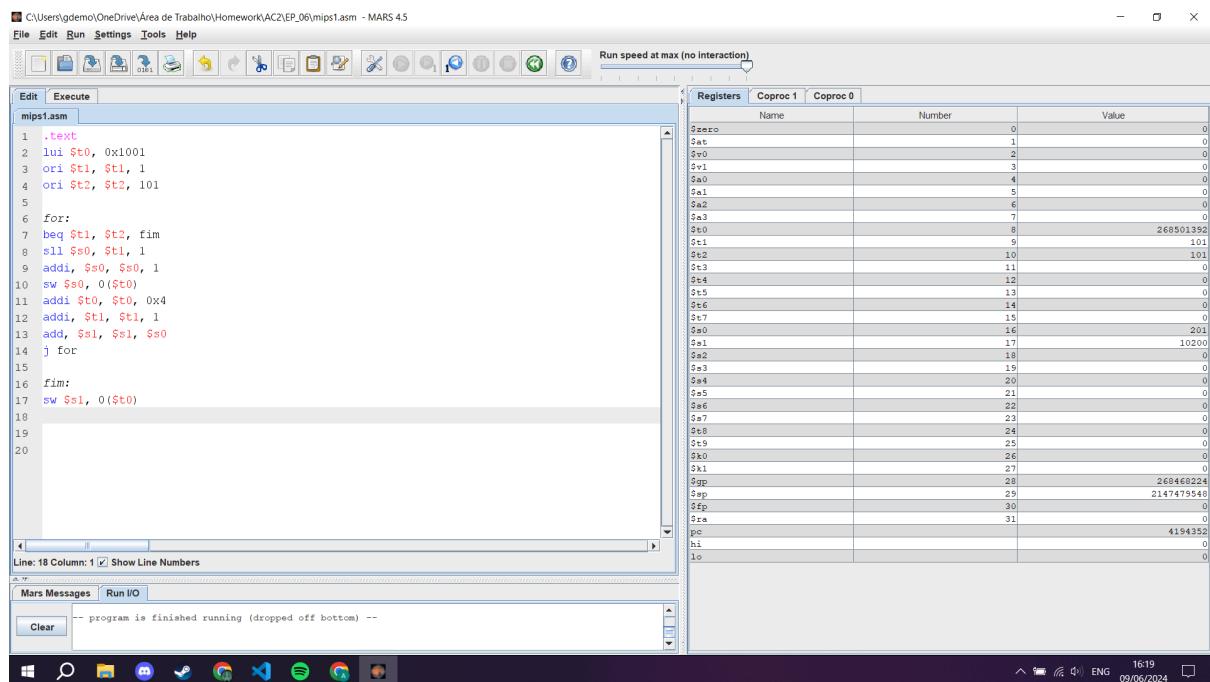


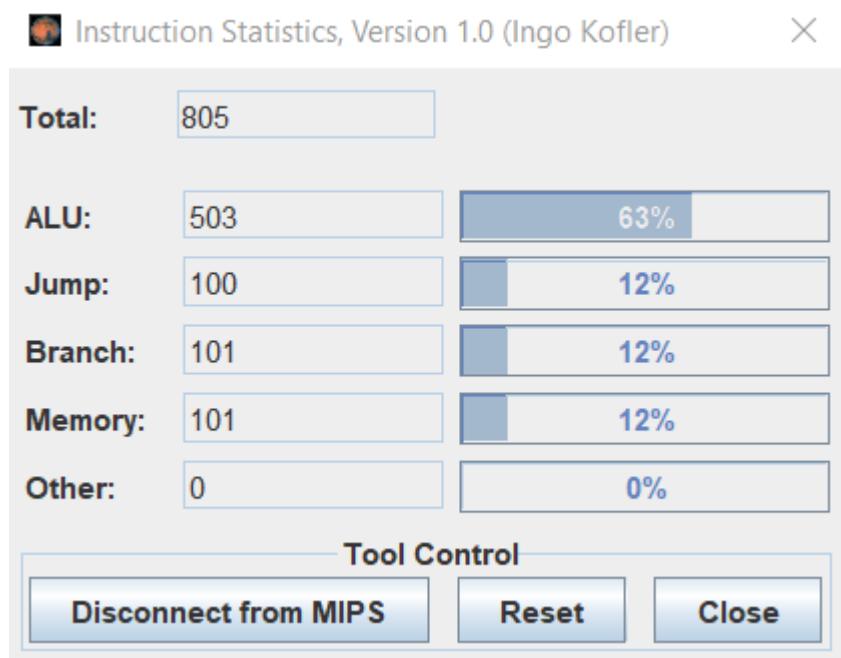
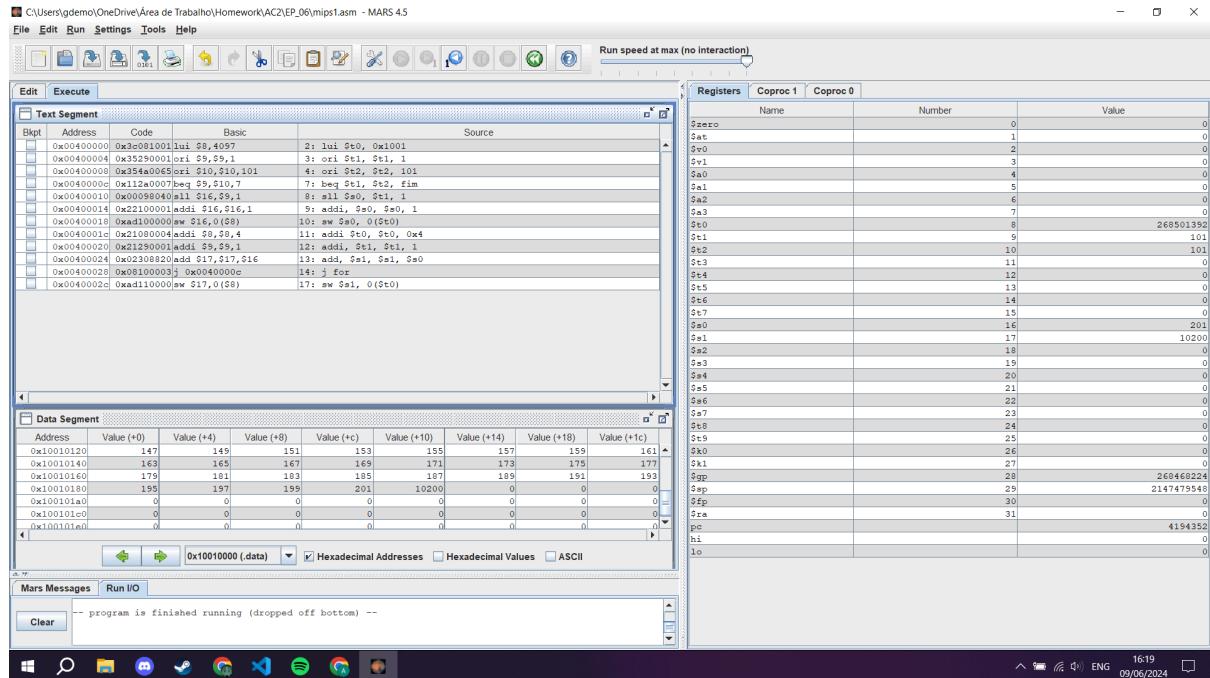
14)





15)





16)

The screenshot shows the MARS 4.5 assembly editor interface. The top menu bar includes File, Edit, Run, Settings, Tools, and Help. A toolbar with various icons is located above the code editor. The code editor window displays the assembly source code:

```
mips1.asm
1 .text
2 ori $s0, $zero, 0x106A
3 sll $s0, $s0, 8
4 ori $s1, $zero, 0x1388
5 sll $s1, $s1, 4
6 ori $s2, $zero, 0x61A8
7 sll $s2, $s2, 4
8
9 div $s0, $s2
10 mflo $s0
11
12 mult $s0, $s1
13 mflo $s3
```

The status bar at the bottom left shows "Line: 7 Column: 16" and "Show Line Numbers". The status bar at the bottom right shows the current time as "17:25".

A message window titled "Mars Messages" at the bottom left says "Clear -- program is finished running (dropped off bottom) --".

The right side of the interface features a "Registers" window showing the state of all 32 general-purpose registers (\$s0-\$s7, \$t0-\$t7, \$a0-\$a7, \$v0-\$v1, \$gp, \$sp, \$fp, \$ra), the PC, HI, LO, and various floating-point registers (\$f0-\$f23). The "Run speed at max (no interaction)" button is also visible.

The screenshot shows the MARS 4.5 assembly editor interface. The top menu bar includes File, Edit, Run, Settings, Tools, and Help. The toolbar contains various icons for file operations and assembly editing. A status bar at the bottom right shows the date and time: 17:25 09/06/2024.

Text Segment

Bkpt	Address	Code	Basic	Source
	0x00400000	0x3410016a	ori \$16,\$0,0x2520	2: ori \$s0, \$zero, 0x186A
	0x00400004	0x00108200	sll \$16,\$16,8	3: sll \$s0, \$s0, 8
	0x00400008	0x3410016a	ori \$16,\$0,0x3000	4: ori \$s1, \$zero, 0x138B
	0x00400012	0x00108200	sll \$16,\$17,1	5: sll \$s1, \$s1, 4
	0x00400016	0x341261aa	orix \$16,\$0,0x25000	6: orix \$s2, \$s0, 0x61A0
	0x0040001A	0x00128100	sll \$18,\$16,4	7: sll \$s2, \$s2, 4
	0x0040001B	0x02120100	div \$16,\$16	8: div \$s0, \$s0
	0x0040001C	0x00008012	mflo \$16	10: mflo \$s0
	0x00400020	0x02110018	mult \$16,\$17	12: mult \$s0, \$s1
	0x00400024	0x00009812	mflo \$19	13: mflo \$s3

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

Mars Messages

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

17)

C:\Users\gdemo\OneDrive\Área de Trabalho\Homework\AC2\EP_06\mips1.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

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	268500592
\$t1	9	0
\$t2	10	0
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$t8	16	4
\$t9	17	0
\$t10	18	24
\$t11	19	0
\$t12	20	0
\$t13	21	0
\$t14	22	0
\$t15	23	0
\$t16	24	0
\$t17	25	0
\$t18	26	0
\$t19	27	0
\$gp	28	268460224
\$sp	29	2147479548
\$fp	30	0
\$ra	31	0
pc		4194336
hi		0
lo		0

Line: 17 Column: 5 Show Line Numbers

Mars Messages Run I/O

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

C:\Users\gdemo\OneDrive\Área de Trabalho\Homework\AC2\EP_06\mips1.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

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	268500592
\$t1	9	0
\$t2	10	0
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$t8	16	4
\$t9	17	0
\$t10	18	24
\$t11	19	0
\$t12	20	0
\$t13	21	0
\$t14	22	0
\$t15	23	0
\$t16	24	0
\$t17	25	0
\$t18	26	0
\$t19	27	0
\$gp	28	268460224
\$sp	29	2147479548
\$fp	30	0
\$ra	31	0
pc		4194336
hi		0
lo		0

Text Segment

Bkpt	Address	Code	Basic	Source
	0x00400000	0x3c081001	lui \$t0, 0x1001	2: lui \$t0, 0x1001
	0x00400004	0x8d100000	lw \$t0, 0(\$t0)	3: lw \$t0, 0(\$t0)
	0x00400008	0x8d110004	lw \$t1, 4(\$t0)	4: lw \$t1, 4(\$t0)
	0x00400012	0x8d100000	lw \$t2, 8(\$t0)	5: lw \$t2, 8(\$t0)
	0x00400016	0x8d280000	add \$t1, \$t2, \$t0	6: add \$t1, \$t2, \$t0
	0x0040001a	0x231fffff	addi \$t1, \$t1, -1	7: addi \$t1, \$t1, -1
	0x0040001e	0x00310000	sw \$t1, 0(\$t0)	8: sw \$t1, 0(\$t0)
	0x00400022	0x00310000	sw \$t1, 4(\$t0)	9: sw \$t1, 4(\$t0)
	0x00400026	0x00310000	sw \$t1, 8(\$t0)	10: sw \$t1, 8(\$t0)
	0x00400030	0xa1210008	sw \$t2, 8(\$t0)	11: sw \$t2, 8(\$t0)
	0x00400034	0xa1210008	sw \$t2, 4(\$t0)	12: sw \$t2, 4(\$t0)
	0x00400038	0xa1210008	sw \$t2, 0(\$t0)	13: sw \$t2, 0(\$t0)

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+c)
0x10010000	4	6	24	0	0	0	0	0
0x10010004	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

Mars Messages Run I/O

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

18)

The screenshot shows the MARS 4.5 assembly editor interface. The left pane displays the assembly code for `mips1.asm`. The right pane shows the Registers window with the following table:

	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	0	
\$t2	10	0	
\$t3	11	0	
\$t4	12	0	
\$t5	13	0	
\$t6	14	0	
\$t7	15	0	
\$w0	16	2	
\$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	
\$s0	26	0	
\$k1	27	0	
\$gp	28	26846822	
\$sp	29	2147479541	
\$fp	30	0	
\$ra	31	0	
\$s		4194344	
hi		0	
lo		0	

The status bar at the bottom shows "Line: 19 Column: 5" and "Show Line Numbers". The Mars Messages window indicates the program has finished running. The system tray shows various icons, and the taskbar includes the Start button, search, file explorer, messaging, and browser.

The screenshot shows the MARS 4.5 assembly debugger interface with the following panes:

- Text Segment**: Displays assembly code with columns for Blkpt, Address, Code, Basic, and Source. The source column shows the assembly mnemonics and their corresponding opcodes.
- Registers**: Shows the state of general-purpose registers (\$r0-\$r31) and floating-point registers (\$f0-\$f31). The value for \$r0 is 268909595.
- Data Segment**: Displays memory starting at address 0x10010000, showing values for various memory locations.
- Mars Messages**: Displays the message "program is finished running (dropped off bottom)".

RESPONDA:

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

9) A

10) A

Implemente os programas a seguir no MIPS/MARS

19)

The screenshot shows the MARS 4.5 assembly editor interface. The left pane displays the assembly code for `mips1.asm`. The right pane shows the Registers window with columns for Name, Number, and Value. The Value column for register \$t0 contains the decimal value `26850052`, which corresponds to the binary value `1010000000000000` shown in the screenshot.

```
mips1.asm
. text
  la    $t0, 0x1000
  lw    $t0, 0($t0)
  lw    $t1, 4($t0)
  lw    $t1, 4($t0)
  srl   $t1, $t0, 1
  add   $t2, $t0, $t1
  j     forS0
forS1:
  beq  $t2, $zero, confer
  wri  $t2, $t2, 1
  add   $t2, $t2, 1
  j     forS1
confer:
  add   $t5, $t4, $t3
  sll   $t6, $t5, 32
  beq  $t6, $zero, major
  mult  $t0, $t1
  mult  $t0, $t1
  mult  $t0, $t2
  j     sum
major:
  mult  $t0, $t1
  mfhi $t3
  mflo $t2
  j     sum
sum:
  fmi:
  j     done
done:
  .data
  .text: x: 3
```

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	26850052
\$t1	9	0
\$t2	10	0
\$t3	11	2
\$t4	12	2
\$t5	13	4
\$t6	14	1
\$t7	15	0
\$t8	16	3
\$t9	17	2
\$t10	18	6
\$t11	19	0
\$t12	20	0
\$t13	21	0
\$t14	22	0
\$t15	23	0
\$t16	24	0
\$t17	25	0
\$t18	26	0
\$t19	27	0
\$gp	28	268468224
\$sp	29	2147479548
\$fp	30	0
\$ra	31	0
\$t20		4194352
\$t21		0
\$t22		6

The screenshot shows the MARS 4.5 assembly editor interface. The top menu bar includes File, Edit, Run, Settings, Tools, and Help. The title bar displays the file path C:\Users\gdemo\OneDrive\Área de Trabalho\Homework\AC2\EP_06.mips1.asm - MARS 4.5. The main window has several tabs: Segments, Registers, Coproc 1, and Coproc 0. The Registers tab is currently selected, showing a table with columns for Name, Number, and Value. The Coproc 1 and Coproc 0 tabs are empty. Below the registers is a table for memory segments, showing fields for Bkpt, Address, Code, Basic, and Source. The code area contains assembly instructions for a program, including various arithmetic and control flow operations. At the bottom, there are buttons for navigating between memory, registers, and stack, along with dropdown menus for address and value formats (Hexadecimal, Decimal, ASCII). The status bar at the bottom right shows the date and time: 09/06/2024 20:27.

20)

C:\Users\gdemo\OneDrive\Área de Trabalho\Homework\AC2\EP_06\mips1.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Registers Coproc 1 Coproc 0

Name	Number	Value
\$zero	0	0
\$at	1	0
\$v0	2	0
\$t1	3	0
\$a0	4	0
\$a1	5	0
\$a2	6	0
\$a3	7	0
\$t0	8	268500592
\$t1	9	0
\$t2	10	24
\$t3	11	8
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$a0	16	2
\$a1	17	16
\$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
\$gp	28	268468224
\$sp	29	2147479548
\$fp	30	0
\$ra	31	0
pc		4194416
hi		0
lo		16

Line: 26 Column: 9 Show Line Numbers

Mars Messages Run I/O

21:11 09/06/2024

C:\Users\gdemo\OneDrive\Área de Trabalho\Homework\AC2\EP_06\mips1.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Registers Coproc 1 Coproc 0

Name	Number	Value
\$zero	0	0
\$at	1	0
\$v0	2	0
\$t1	3	0
\$a0	4	0
\$a1	5	0
\$a2	6	0
\$a3	7	0
\$t0	8	268500592
\$t1	9	0
\$t2	10	24
\$t3	11	8
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$t8	16	0
\$t9	17	2
\$t10	18	0
\$t11	19	0
\$t12	20	0
\$t13	21	0
\$t14	22	0
\$t15	23	0
\$t16	24	0
\$t17	25	0
\$t18	26	0
\$t19	27	0
\$t20	28	268468224
\$t21	29	2147479548
\$t22	30	0
\$t23	31	0
pc		4194416
hi		0
lo		16

Text Segment

Bkpt	Address	Code	Basic	Source
	0x00400000	0x3c000001lui \$t0,4097	2: lui \$t0, 0x1001	
	0x00400004	0x3c000001lui \$t1,4097	3: lui \$t1, 0x1001	
	0x00400008	0x28000001smi \$t0,\$t1,516,1	5: smi \$t0, \$t1, 1	
	0x0040000c	0x11200000cbeq \$t0,5,50,12	7: beq \$t0, \$zero, par	
	0x00400010	0x02100018mult \$t0,\$t1,516	8: mult \$t0, \$t1, 516	
	0x00400014	0x000005012mflo \$t0	9: mflo \$t0	
	0x00400018	0x01500018mult \$t0,\$t1,516	10: mult \$t2, \$a0	
	0x0040001c	0x000005012mflo \$t0	11: mflo \$t2	
	0x00400020	0x000005825or \$t1,\$t0,\$t0	12: or \$t3, \$zero, \$t2	
	0x00400024	0x01500018mult \$t0,\$t1,516	13: mult \$t2, \$a0	
	0x00400028	0x000005012mflo \$t0	14: mflo \$t2	
	0x00400032	0x01500018mult \$t0,\$t1,516	15: mult \$t2, \$t2, \$a0	
	0x00400036	0x000005012mflo \$t0	16: mflo \$t2	
	0x00400040	0x02100018addi \$t1,\$t0,1	17: add \$t2, \$t2, \$t3	
	0x00400044	0x01510001lui \$t1,510,511	18: addi \$t1, \$t2, 1	
	0x00400048	0x000005012mflo \$t0	19: j fim	
	0x0040004c	0x02100018mult \$t1,\$t1,516	20: mult \$t0, \$a0	
	0x00400050	0x000006025or \$t2,\$t0,\$t0	21: or \$t4, \$zero, \$t2	
	0x00400054	0x01500018mult \$t1,\$t1,516	22: mult \$t2, \$a0	
	0x00400058	0x000005012mflo \$t0	23: mflo \$t2	
	0x00400062	0x01500018mult \$t0,\$t1,516	24: mult \$t2, \$t2, \$a0	
	0x00400066	0x000005012mflo \$t0	25: mflo \$t2	
	0x00400070	0x01500018mult \$t0,\$t1,516	26: mult \$t2, \$t2, \$a0	
	0x00400074	0x000005012mflo \$t0	27: mflo \$t2	
	0x00400078	0x000005825or \$t1,\$t0,\$t0	28: or \$t3, \$zero, \$t2	

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

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x10010000	2	16	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

0x10010000-0x10010120

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File Edit Run Settings Tools Help

Run speed at max (no interaction)

Registers Coproc 1 Coproc 0

Name	Number	Value
\$zero	0	0
\$at	1	0
\$v0	2	0
\$r1	3	0
\$a0	4	0
\$a1	5	0
\$a2	6	0
\$a3	7	0
\$t0	8	268500952
\$t1	9	1
\$t2	10	-8
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$s0	16	-2
\$s1	17	-7
\$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		4194376
hi		-1
lo		-8

Line: 28 Column: 6 Show Line Numbers

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File Edit Run Settings Tools Help

Run speed at max (no interaction)

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	268500952
\$t1	9	1
\$t2	10	-8
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$s0	16	-2
\$s1	17	-7
\$s2	18	0
\$s3	19	0
\$s4	20	0
\$s5	21	0
\$s6	22	0
\$s7	23	0
\$k0	24	0
\$k1	25	0
\$gp	26	0
\$sp	27	0
\$fp	28	268468224
\$ra	29	2147479548
pc	30	0
hi	31	0
lo		-8

Text Segment

Bkpt	Address	Code	Basic	Source
	0x00400000	0x3a000000lui \$t0, 0x1001	2: lui \$t0, 0x1001	
	0x00400004	0x3a000000lw \$t0, 0(\$t0)	3: lw \$t0, 0(\$t0)	
	0x00400008	0x0080492aabs \$s0, \$t0, 0	5: abs \$s0, \$t0, 0	
	0x0040000c	0x11200006beg \$s0, \$t0, 6	7: beg \$s0, \$t0, 6	
	0x00400010	0x02100018mult \$s1, \$t0	8: mult \$s1, \$t0	
	0x00400014	0x000005012mflo \$t0	9: mflo \$t0	
	0x00400018	0x001500018mult \$t0, \$t0	10: mult \$t0, \$t0	
	0x0040001c	0x000005012mflo \$t0	11: mflo \$t0	
	0x00400020	0x21510001addi \$t7, \$t0, 1	12: addi \$t7, \$t0, 1	
	0x00400024	0x00100011j \$0x0400044	13: j \$0x0400044	
	0x00400028	0x001500018mult \$t0, \$t0	14: mult \$t0, \$t0	
	0x00400032	0x000005012mflo \$t0	15: mflo \$t0	
	0x00400036	0x001500018mult \$t0, \$t0	16: mult \$t0, \$t0	
	0x00400040	0x2151fffffaddi \$t7, \$t0, -1	17: addi \$t7, \$t0, -1	
	0x00400044	0xdad110004lw \$t7, 4(\$t0)	18: lw \$t7, 4(\$t0)	

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

0x10010000	-2	-7	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

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