

TRABALHO PRÁTICO 6

Aluno: João Madeira Carneiro Braga de Freitas

Matrícula: 800854

Parte 1 - Responda:

- 1) A
- 2) C
- 3) A
- 4) C
- 5) D
- 6) C
- 7) A
- 8) D
- 9) A
- 10) A
- 11) B
- 12) D
- 13) C
- 14) C
- 15) B
- 16) C
- 17) A
- 18) A

Programas:

1)

```
ori $s0, $zero, 2 # a = 2
ori $s1, $zero, 3 # b = 3
ori $s2, $zero, 4 # c = 4
ori $s3, $zero, 5 # d = 5

add $t0, $s0, $s1 # t0 = a + b
add $t1, $s2, $s3 # t1 = c + d

sub $t3, $t0, $t1 # t2 = t0 - t1
```

The screenshot displays the Mars MIPS simulator interface. The main window shows the assembly code for the program, with the following instructions:

```
ori $s0, $zero, 2 # a = 2
ori $s1, $zero, 3 # b = 3
ori $s2, $zero, 4 # c = 4
ori $s3, $zero, 5 # d = 5

add $t0, $s0, $s1 # t0 = a + b
add $t1, $s2, $s3 # t1 = c + d

sub $t3, $t0, $t1 # t2 = t0 - t1
```

The simulator also shows the memory layout, including the Text Segment and Data Segment. The Text Segment contains the instructions, and the Data Segment contains the variables \$s0, \$s1, \$s2, \$s3, \$t0, \$t1, and \$t3. The registers \$s0 through \$s3 are initialized to 2, 3, 4, and 5 respectively. The registers \$t0 and \$t1 are initialized to 5 and 7 respectively. The register \$t3 is initialized to 0.

The simulator also shows the execution status, indicating that the program is finished running (dropped off bottom).

2)

```

1 ori $s0, $zero, 1
2
3 # 5x = x + x + x + x + x
4
5 add $t0, $s0, $s0
6 add $t0, $t0, $s0
7 add $t0, $t0, $s0
8 add $t0, $t0, $s0
9
10 addi $s1, $t0, 15
11

```

C:\Users\User\Estudios\TP-9\mpc2.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Execute

Offset	Address	Code	Basic	Source
0x00400000	0x00400000	ori	\$s0, \$zero, 1	
0x00400004	0x00400004	add	\$t0, \$s0, \$s0	
0x00400008	0x00400008	add	\$t0, \$t0, \$s0	
0x0040000c	0x0040000c	add	\$t0, \$t0, \$s0	
0x00400010	0x00400010	add	\$t0, \$t0, \$s0	
0x00400014	0x00400014	addi	\$s1, \$t0, 15	

Labels

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
\$a0	8	0
\$t1	9	0
\$t2	10	0
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$a0	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
\$t0	26	0
\$t1	27	0
\$s0	28	268465924
\$s0	29	2147479543
\$s0	30	0
\$ra	31	0
\$PC		4194328
\$10		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
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

Mars Messages Run IO

Clear

program is finished running (dropped off bottom) --

program is finished running (dropped off bottom) --

```

1  lui $a0, $zero, 2 # x = 3
2  ori $a1, $zero, 4# y = 4
3
4  # 20x
5  add $a0, $a0, $a0
6  add $a0, $a0, $a0
7  add $a0, $a0, $a0
8  add $a0, $a0, $a0
9  add $a0, $a0, $a0
10 add $a0, $a0, $a0
11 add $a0, $a0, $a0
12 add $a0, $a0, $a0
13 add $a0, $a0, $a0
14 add $a0, $a0, $a0
15 add $a0, $a0, $a0
16 add $a0, $a0, $a0
17 add $a0, $a0, $a0
18 add $a0, $a0, $a0
19
20 # 67y
21 add $a1, $a1, $a1
22 add $a1, $a1, $a1
23 add $a1, $a1, $a1
24 add $a1, $a1, $a1
25 add $a1, $a1, $a1
26 add $a1, $a1, $a1
27 add $a1, $a1, $a1
28 add $a1, $a1, $a1
29 add $a1, $a1, $a1
30 add $a1, $a1, $a1
31 add $a1, $a1, $a1
32 add $a1, $a1, $a1
33 add $a1, $a1, $a1
34 add $a1, $a1, $a1
35 add $a1, $a1, $a1
36 add $a1, $a1, $a1
37 add $a1, $a1, $a1
38 add $a1, $a1, $a1
39 add $a1, $a1, $a1
40 add $a1, $a1, $a1
41 add $a1, $a1, $a1
42 add $a1, $a1, $a1

```

[illegible]

```
# 15x + 67y
add $t2, $t0, $t1

# (15x + 67y) * 4
add $s2, $t2, $t2
add $s2, $s2, $t2
add $s2, $s2, $t2
```

[illegible]

4)

```

1  ori $s0, $zero, 3 # x = 3
2  ori $s1, $zero, 4 # y = 4
3
4  # 15x = 8x + 4x + 2x + x
5
6  sll $t0, $s0, 3 # 8x
7  sll $t1, $s0, 2 # 4x
8  sll $t2, $s0, 1 # 2x
9  add $s2, $t0, $t1 # 8x+4x = 12x
10 add $s2, $s2, $t2 # 12x+ 2x = 14x
11 add $s2, $s2, $s0 # 14x + x = 15x
12
13 # 67y = 64y + 2y + y
14 sll $t0, $s1, 6 # 64y
15 sll $t1, $s1, 1 # 2y
16 add $s3, $t0, $t1 # 66y = 64y + 2y
17 add $s3, $s3, $s1 # 67y = 66y + y
18
19 add $t2, $s2, $s3 # t2 = 15x + 67y
20 sll $s4, $t2, 2 # s4 = t2*4
21
22

```

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Run speed at max (no interaction)

Text Segment

Byte	Address	Code	Basic	Source
0x04000000	0x34100000	ori	\$s0, \$zero, 3	# x = 3
0x04000004	0x34100004	ori	\$s1, \$zero, 4	# y = 4
0x04000008	0x00104000	sll	\$t0, \$s0, 3	# 8x
0x0400000c	0x00104004	sll	\$t1, \$s0, 2	# 4x
0x04000010	0x00104008	sll	\$t2, \$s0, 1	# 2x
0x04000014	0x01098020	add	\$s2, \$t0, \$t1	# 8x+4x = 12x
0x04000018	0x02009020	add	\$s2, \$s2, \$t2	# 12x+ 2x = 14x
0x0400001c	0x02009020	add	\$s2, \$s2, \$s0	# 14x + x = 15x
0x04000020	0x00114000	sll	\$t0, \$s1, 6	# 64y
0x04000024	0x00114004	sll	\$t1, \$s1, 1	# 2y
0x04000028	0x01098020	add	\$s3, \$t0, \$t1	# 66y = 64y + 2y
0x0400002c	0x02019020	add	\$s3, \$s3, \$s1	# 67y = 66y + y
0x04000030	0x02035020	add	\$t2, \$s2, \$s3	# t2 = 15x + 67y
0x04000034	0x000a0000	sll	\$s4, \$t2, 2	# s4 = t2*4

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

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
\$a4	8	264
\$t1	9	0
\$t2	10	312
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$s0	16	3
\$s1	17	4
\$s2	18	45
\$s3	19	200
\$s4	20	1252
\$s5	21	0
\$s6	22	0
\$s7	23	0
\$s8	24	0
\$s9	25	0
\$a0	26	0
\$a1	27	0
\$v0	28	268469224
\$v1	29	2147479540
\$s0	30	0
\$s1	31	0
\$t1	32	4194860
\$t2	33	0
\$t3	34	0
\$t4	35	0
\$t5	36	0
\$t6	37	0
\$t7	38	0
\$s0	39	0
\$s1	40	0
\$s2	41	0
\$s3	42	0
\$s4	43	0
\$s5	44	0
\$s6	45	0
\$s7	46	0
\$s8	47	0
\$s9	48	0
\$a0	49	0
\$a1	50	0
\$a2	51	0
\$a3	52	0
\$a4	53	0
\$a5	54	0
\$a6	55	0
\$a7	56	0
\$a8	57	0
\$a9	58	0
\$a10	59	0
\$a11	60	0
\$a12	61	0
\$a13	62	0
\$a14	63	0
\$a15	64	0
\$a16	65	0
\$a17	66	0
\$a18	67	0
\$a19	68	0
\$a20	69	0
\$a21	70	0
\$a22	71	0
\$a23	72	0
\$a24	73	0
\$a25	74	0
\$a26	75	0
\$a27	76	0
\$a28	77	0
\$a29	78	0
\$a30	79	0
\$a31	80	0
\$a32	81	0
\$a33	82	0
\$a34	83	0
\$a35	84	0
\$a36	85	0
\$a37	86	0
\$a38	87	0
\$a39	88	0
\$a40	89	0
\$a41	90	0
\$a42	91	0
\$a43	92	0
\$a44	93	0
\$a45	94	0
\$a46	95	0
\$a47	96	0
\$a48	97	0
\$a49	98	0
\$a50	99	0
\$a51	100	0
\$a52	101	0
\$a53	102	0
\$a54	103	0
\$a55	104	0
\$a56	105	0
\$a57	106	0
\$a58	107	0
\$a59	108	0
\$a60	109	0
\$a61	110	0
\$a62	111	0
\$a63	112	0
\$a64	113	0
\$a65	114	0
\$a66	115	0
\$a67	116	0
\$a68	117	0
\$a69	118	0
\$a70	119	0
\$a71	120	0
\$a72	121	0
\$a73	122	0
\$a74	123	0
\$a75	124	0
\$a76	125	0
\$a77	126	0
\$a78	127	0
\$a79	128	0
\$a80	129	0
\$a81	130	0
\$a82	131	0
\$a83	132	0
\$a84	133	0
\$a85	134	0
\$a86	135	0
\$a87	136	0
\$a88	137	0
\$a89	138	0
\$a90	139	0
\$a91	140	0
\$a92	141	0
\$a93	142	0
\$a94	143	0
\$a95	144	0
\$a96	145	0
\$a97	146	0
\$a98	147	0
\$a99	148	0
\$a100	149	0
\$a101	150	0
\$a102	151	0
\$a103	152	0
\$a104	153	0
\$a105	154	0
\$a106	155	0
\$a107	156	0
\$a108	157	0
\$a109	158	0
\$a110	159	0
\$a111	160	0
\$a112	161	0
\$a113	162	0
\$a114	163	0
\$a115	164	0
\$a116	165	0
\$a117	166	0
\$a118	167	0
\$a119	168	0
\$a120	169	0
\$a121	170	0
\$a122	171	0
\$a123	172	0
\$a124	173	0
\$a125	174	0
\$a126	175	0
\$a127	176	0
\$a128	177	0
\$a129	178	0
\$a130	179	0
\$a131	180	0
\$a132	181	0
\$a133	182	0
\$a134	183	0
\$a135	184	0
\$a136	185	0
\$a137	186	0
\$a138	187	0
\$a139	188	0
\$a140	189	0
\$a141	190	0
\$a142	191	0
\$a143	192	0
\$a144	193	0
\$a145	194	0
\$a146	195	0
\$a147	196	0
\$a148	197	0
\$a149	198	0
\$a150	199	0
\$a151	200	0
\$a152	201	0
\$a153	202	0
\$a154	203	0
\$a155	204	0
\$a156	205	0
\$a157	206	0
\$a158	207	0
\$a159	208	0
\$a160	209	0
\$a161	210	0
\$a162	211	0
\$a163	212	0
\$a164	213	0
\$a165	214	0
\$a166	215	0
\$a167	216	0
\$a168	217	0
\$a169	218	0
\$a170	219	0
\$a171	220	0
\$a172	221	0
\$a173	222	0
\$a174	223	0
\$a175	224	0
\$a176	225	0
\$a177	226	0
\$a178	227	0
\$a179	228	0
\$a180	229	0
\$a181	230	0
\$a182	231	0
\$a183	232	0
\$a184	233	0
\$a185	234	0
\$a186	235	0
\$a187	236	0
\$a188	237	0
\$a189	238	0
\$a190	239	0
\$a191	240	0
\$a192	241	0
\$a193	242	0
\$a194	243	0
\$a195	244	0
\$a196	245	0
\$a197	246	0
\$a198	247	0
\$a199	248	0
\$a200	249	0
\$a201	250	0
\$a202	251	0
\$a203	252	0
\$a204	253	0
\$a205	254	0
\$a206	255	0

Mars Messages

Run IO

Clear

program is finished running (dropped off bottom) --

program is finished running (dropped off bottom) --

program is finished running (dropped off bottom) --

5)

```
1 ori $t0, $zero, 50000 # 0xFFFF Máximo
2
3 sll $s0, $t0, 1
4 sll $s1, $t0, 2
5
6 add $s2, $s0, $s1
7
```

C:\Users\User\Estudios\TP-6\mips5.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Text Segment

Byte	Address	Code	Basic	Source
0x00400000	0x34000000	ori	\$t0, 50000	\$t0, 50000 # 0xFFFF Máximo
0x00400004	0x00000000	sll	\$s0, \$t0, 1	\$s0, \$t0, 1
0x00400008	0x00000000	sll	\$s1, \$t0, 2	\$s1, \$t0, 2
0x0040000C	0x02119020	add	\$s2, \$s0, \$s1	\$s2, \$s0, \$s1

Labels

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

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	50000
\$t1	9	0
\$t2	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	300000
\$s3	19	0
\$s4	20	0
\$s5	21	0
\$s6	22	0
\$s7	23	0
\$s8	24	0
\$s9	25	0
\$s10	26	0
\$s11	27	0
\$gp	28	268468224
\$fp	29	2147479544
\$sp	30	0
\$ra	31	0
\$pc		4194320
\$hi		0
\$lo		0

Mars Messages

Run IO

Clear

program is finished running (dropped off bottom) --

program is finished running (dropped off bottom) --

program is finished running (dropped off bottom) --

6)

```

1  ori $t0, $zero, 0x7FFF
2  sll $t0, $t0, 16
3  ori $s0, $t0, 0xFFFF
4
5  ori $t1, $zero, 37500
6  sll $s1, $t1, 3
7
8  sll $t2, $s1, 2
9
10 sub $s2, $s0, $t2
11

```

The screenshot displays the MARS MIPS simulator interface. The main window shows the assembly code from the previous block. Below the code, the 'Text Segment' table lists the instructions with their addresses, codes, basic forms, and sources. To the right, the 'Registers' table shows the current values of MIPS registers. At the bottom, the 'Data Segment' table shows memory values at various addresses. The 'Mars Messages' window at the bottom left shows the program execution status.

Inst	Address	Code	Basic	Source
ori	0x00400000	0x34087fff	ori \$t0, \$zero, 0x7fff	
sll	0x00400004	0x00054400	sll \$t0, \$t0, 16	
ori	0x00400008	0x3502ffff	ori \$s0, \$t0, 0xffff	
ori	0x0040000c	0x3409927c	ori \$t1, \$zero, 37500	
sll	0x00400010	0x00058800	sll \$s1, \$t1, 3	
sll	0x00400014	0x00058000	sll \$t2, \$s1, 2	
sub	0x00400018	0x002a902d	sub \$s2, \$s0, \$t2	

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	2147418112
\$t1	9	37500
\$t2	10	1200000
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$s0	16	2147433647
\$s1	17	800000
\$s2	18	2146203647
\$s3	19	0
\$s4	20	0
\$s5	21	0
\$s6	22	0
\$s7	23	0
\$s8	24	0
\$s9	25	0
\$t0	26	0
\$t1	27	0
\$fp	28	268469224
\$gp	29	2147479545
\$sp	30	0
\$ra	31	0
\$pc		4194332
\$1		0
\$10		0

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

Mars Messages: Run I/O

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

Clear

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

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

7)

```
1 ori $8, $0, 0x01
2
3 sll $t0, $t0, 31
4 sra $t0, $t0, 31
5
6
```

CHUsersUserEstudios\TP-5\programa7.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Execute

Text Segment

Expr	Address	Code	Basic	Source
	0x00400000	0x00400000	ori \$8, \$0, 0x01	
	0x00400004	0x000847c0	sll \$t0, \$t0, 31	3: sll \$t0, \$t0, 31
	0x00400008	0x000847c0	sra \$t0, \$t0, 31	4: sra \$t0, \$t0, 31

Labels

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

Mars Messages Run I/O

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	-1
\$t1	9	0
\$t2	10	0
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	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
\$s8	24	0
\$s9	25	0
\$k0	26	0
\$k1	27	0
\$gp	28	268469224
\$sp	29	2147475140
\$fp	30	0
\$ra	31	0
\$PC		4194316
\$0		0

8)

```
1 ori $8, $0, 0x1234
2 sll $8, $8, 16
3 ori $8, $8, 0x5678
4
5 # $9 = 0x12
6 srl $9, $8, 24
7
8 # $10 = 0x34
9 sll $10, $8, 8
10 srl $10, $10, 24
11
12 # $11 = 0x56
13 sll $11, $8, 16
14 srl $11, $11, 24
15
16 # $12 = 0x78
17 sll $12, $8, 24
18 srl $12, $12, 24
19
```

Execute [Run the current program]

Text Segment

Offset	Address	Code	Basic	Source
0x00400000	0x3481234	ori \$8, \$0, 0x1234	1: ori \$8, \$0, 0x1234	
0x00400004	0x0004400	sll \$8, \$8, 16	2: sll \$8, \$8, 16	
0x00400008	0x3565678	ori \$8, \$8, 0x5678	3: ori \$8, \$8, 0x5678	
0x0040000c	0x0004402	srl \$9, \$8, 24	6: srl \$9, \$8, 24	
0x00400010	0x0008500	sll \$10, \$8, 8	9: sll \$10, \$8, 8	
0x00400014	0x0004402	srl \$10, \$10, 24	10: srl \$10, \$10, 24	
0x00400018	0x0008502	sll \$11, \$8, 16	13: sll \$11, \$8, 16	
0x0040001c	0x0004402	srl \$11, \$11, 24	14: srl \$11, \$11, 24	
0x00400020	0x0008502	sll \$12, \$8, 24	17: sll \$12, \$8, 24	
0x00400024	0x0004402	srl \$12, \$12, 24	18: srl \$12, \$12, 24	

Labels

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

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
\$a0	8	305418896
\$t1	9	0
\$t2	10	52
\$t3	11	56
\$t4	12	120
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$t8	16	0
\$t9	17	0
\$s2	18	0
\$s3	19	0
\$s4	20	0
\$s5	21	0
\$s6	22	0
\$s7	23	0
\$s8	24	0
\$t13	25	0
\$t0	26	0
\$t11	27	0
\$s0	28	268469328
\$s9	29	2147479545
\$t4	31	0
\$PC		4194384
\$1		0
\$10		0

Mars Messages

Run IO

program is finished running (dropped off bottom) --

Clear

program is finished running (dropped off bottom) --

program is finished running (dropped off bottom) --

9)

```

1 .data
2 x1: .word 15
3 x2: .word 25
4 x3: .word 13
5 x4: .word 17
6 soma: .word -1
7
8 .text
9
10 lui $t0, 0x1001
11
12 lw $s0, 0($t0)
13 lw $s1, 4($t0)
14 lw $s2, 8($t0)
15 lw $s3, 12($t0)
16
17 add $s4, $s0, $s1
18 add $s4, $s4, $s2
19 add $s4, $s4, $s3
20
21 sw $s4, 16($t0)
22

```

The screenshot shows the MARS MIPS assembler simulator interface. The main window displays the assembly code from the previous block. Below the code, there are several panels:

- Text Segment:** A table showing the assembly code with columns for Address, Code, Basic, and Source. The code is loaded into memory starting at address 0x00400000.
- Labels:** A table showing the labels defined in the code, including x1, x2, x3, x4, and soma, with their corresponding memory addresses.
- Registers:** A table showing the values of the MIPS registers. The registers are organized into three columns: Name, Number, and Value. The registers are numbered 0 to 31.
- Data Segment:** A table showing the values of the data segment. The data is organized into columns for Address, Value (+0), Value (+4), Value (+8), Value (+c), Value (+10), Value (+14), Value (+18), and Value (+1c). The data is loaded into memory starting at address 0x00100000.
- Mars Messages:** A panel at the bottom showing the status of the simulation. It displays the message "program is finished running (dropped off bottom)" three times.

10)

```

1 |.data
2 x: .word 5
3 z: .word 7
4 y: .word 0 # esse valor deverá ser sobrescrito após a execução do programa.
5
6 .text
7 lui $t0, 0x1001
8 lw $s0, 0($t0) # x
9 lw $s1, 4($t0) # y
10
11 #127x, 65z
12
13 sll $t1, $s0, 7
14 sub $t1, $t1, $s0
15
16 sll $t2, $s1, 6
17 add $t2, $t2, $s1
18
19 sub $t3, $t1, $t2
20 addi $t3, $t3, 1
21
22 sw $t3, 8($t0)

```

The screenshot shows the MARS MIPS simulator interface. The main window displays the assembly code from the previous block. Below the code, there are several panels:

- Text Segment:** A table showing the assembly code with columns for Address, Code, Basic, and Source. The code is loaded at address 0x00400000.
- Labels:** A table showing labels and their addresses. The label 'mips10.asm' is at address 0x00400000.
- Registers:** A table showing the state of MIPS registers. The registers are organized into Coprocessor 1 and Coprocessor 0 sections. The values are as follows:

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	268509992
\$t1	9	435
\$t2	10	456
\$t3	11	181
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$s0	16	5
\$s1	17	7
\$s2	18	0
\$s3	19	0
\$s4	20	0
\$s5	21	0
\$s6	22	0
\$s7	23	0
\$t8	24	0
\$t9	25	0
\$s8	26	0
\$t1	27	0
\$s9	28	268509992
\$fp	29	2147475648
\$gp	30	0
\$ra	31	0
\$pc		4194344
\$hi		0
\$lo		0
- Data Segment:** A table showing the state of the data segment. The segment is organized into columns for Address, Value (+0), Value (+4), Value (+8), Value (+c), Value (+10), Value (+14), Value (+18), and Value (+1c). The values are as follows:

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
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
- Mars Messages:** A panel showing messages from the simulator. The messages are:
 - program is finished running (dropped off bottom) --
 - program is finished running (dropped off bottom) --
 - program is finished running (dropped off bottom) --

11)

```

1 |.data
2 |x: .word 100000
3 |z: .word 200000
4 |y: .word 0 # esse valor deverá ser sobrescrito após a execução do programa.
5
6 |.text
7 |lui $t0, 0x1001
8
9 |lw $s0, 0($t0)
10 |lw $s1, 4($t0)
11
12 |sub $t1, $s0, $s1
13
14 |ori $t2, $zero, 37500
15 |sll $t2, $t2, 3
16
17 |add $t3, $t1, $t2
18
19 |sw $t3, 8($t0)
20

```

The screenshot displays the MARS MIPS simulator interface. The main window shows the assembly code from the previous block. Below the code editor, there are several panels:

- Labels:** A table showing labels and their addresses. The label 'mips1.asm' is at address 0x10010000.
- Registers:** A table showing the state of MIPS registers. The 'Registers' tab is selected, showing registers \$zero through \$31. The values for \$s0, \$s1, and \$t3 are non-zero, while others are zero.
- Data Segment:** A table showing the memory layout. It includes addresses, values, and offsets. The value at address 0x10010000 is 100000, and at 0x10010004 is 200000.
- Mars Messages:** A log showing the execution status. It indicates that the program is finished running.

The status bar at the bottom shows the current instruction being executed: '0x10010000 (.data)'.

12)

```

1  .data
2  x: .word 10
3  p: .word 0
4  pp: .word 0
5  ppp: .word 0
6
7  .text
8  lui $t0, 0x1001 # endereço do inteiro
9  addi $t1, $t0, 4
10 addi $t2, $t0, 8
11 addi $t3, $t0, 12
12
13 sw $t0, 4($t0)
14 sw $t1, 8($t0)
15 sw $t2, 12($t0)
16
17
18 lw $t1, 0($t3)
19 lw $t1, 0($t1)
20 lw $t1, 0($t1)
21 lw $t1, 0($t1)
22
23 sll $t1, $t1, 1
24
25 lw $t2, 0($t3)
26 lw $t2, 0($t2)
27 lw $t2, 0($t2)
28 sw $t1, 0($t2)
29

```

C:\Users\User\Estudos\TP-6\mips12.asm - MARS 4.5
 File Edit Run Settings Tools Help

Run speed at max (no interaction)

Edit F8 Esc/Alt

Text Segment

Offset	Address	Code	Basic	Source
0x00400000	0x00801001	lui \$t0, 0x00001001	8: lui \$t0, 0x1001 # endereço do inteiro	
0x00400004	0x21000004	addi \$t1, \$t0, 4	9: addi \$t1, \$t0, 4	
0x00400008	0x21000008	addi \$t2, \$t0, 8	10: addi \$t2, \$t0, 8	
0x0040000c	0x2100000c	addi \$t3, \$t0, 12	11: addi \$t3, \$t0, 12	
0x00400010	0xad000004	sw \$t0, 4(\$t0)	13: sw \$t0, 4(\$t0)	
0x00400014	0xad000008	sw \$t1, 8(\$t0)	14: sw \$t1, 8(\$t0)	
0x00400018	0xad00000c	sw \$t2, 12(\$t0)	15: sw \$t2, 12(\$t0)	
0x0040001c	0x00000000	lw \$t1, 0(\$t3)	18: lw \$t1, 0(\$t3)	
0x00400020	0x00000000	lw \$t1, 0(\$t1)	19: lw \$t1, 0(\$t1)	
0x00400024	0x00000000	lw \$t1, 0(\$t1)	20: lw \$t1, 0(\$t1)	
0x00400028	0x00000000	lw \$t1, 0(\$t1)	21: lw \$t1, 0(\$t1)	
0x0040002c	0x00000001	sll \$t1, \$t1, 1	23: sll \$t1, \$t1, 1	
0x00400030	0x00000000	lw \$t2, 0(\$t3)	25: lw \$t2, 0(\$t3)	
0x00400034	0x00000000	lw \$t2, 0(\$t2)	26: lw \$t2, 0(\$t2)	
0x00400038	0x00000000	lw \$t2, 0(\$t2)	27: lw \$t2, 0(\$t2)	
0x0040003c	0xad000000	sw \$t1, 0(\$t2)	28: sw \$t1, 0(\$t2)	

Labels

Label	Address
mips12.asm	0x00400000
x	0x00400004
p	0x00400008
pp	0x0040000c
ppp	0x00400010

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	0x00000001
\$t2	10	0x00000000
\$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
\$t8	26	0x00000000
\$t9	27	0x00000000
\$d0	28	0x00000000
\$d1	29	0x7ffffcfc
\$d2	30	0x00000000
\$ra	31	0x00000000
\$l0		0x00000000
\$l1		0x00000000
\$l2		0x00000000

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+C)	Value (+10)	Value (+14)	Value (+18)	Value (+1C)
0x10010000	0x00000014	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
0x10010140	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010160	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010180	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x100101A0	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000

MARS Messages Run IO

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

13)

```

1 |.data
2 |A: .word -100
3
4 |.text
5 |ori $t0, $zero, 1
6
7 |lui $t1, 0x1001
8
9 |lw $t3, 0($t1)
10
11 |srl $t2, $t3, 31
12
13 |beq $t0, $t2, negativo
14 |j escrita
15
16 |negativo:
17 |sub $t3, $zero, $t3
18
19 |escrita:
20 |sw $t3 0($t1)
21

```

C:\Users\User\Escudo\TP-0\mips13.asm - MARS 4.5
 File Edit Run Settings Tools Help
 Run speed at max (no interaction)

Text Segment
 Addr Address Code Basic Source
 0x00400000 0x34080001 ori \$t0,\$zero,1 \$t0: ori \$t0, \$zero, 1
 0x00400004 0x3c091001 lui \$t1,0x1001 \$t1: lui \$t1, 0x1001
 0x00400008 0xad2b0000 lw \$t3,0(\$t1) \$t3: lw \$t3, 0(\$t1)
 0x0040000c 0x000b57c0 srl \$t2,\$t3,31 \$t2: srl \$t2, \$t3, 31
 0x00400010 0x110a0001 beq \$t0,\$t2,negativo \$t0: beq \$t0, \$t2, negativo
 0x00400014 0x01100007 j \$t0,\$t2,escrita \$t0: j \$t0,\$t2, escrita
 0x00400018 0x000b57c0 sub \$t3,\$zero,\$t3 \$t3: sub \$t3, \$zero, \$t3
 0x0040001c 0xad2b0000 sw \$t3,0(\$t1) \$t3: sw \$t3 0(\$t1)

Labels
 Label Address
 mips13.asm
 negativo 0x00400018
 escrita 0x0040001c
 A 0x10010000

Data Segment
 Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
 0x10010000 100 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

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 1
 \$t1 9 268500992
 \$t2 10 31
 \$t3 11 100
 \$t4 12 0
 \$t5 13 0
 \$t6 14 0
 \$t7 15 0
 \$t8 16 0
 \$t9 17 0
 \$s0 18 0
 \$s1 19 0
 \$s2 20 0
 \$s3 21 0
 \$s4 22 0
 \$s5 23 0
 \$s6 24 0
 \$s7 25 0
 \$s8 26 0
 \$s9 27 0
 \$gp 28 268468024
 \$sp 29 2147475640
 \$fp 30 0
 \$ra 31 4194396
 hi 0
 lo 0

MARS Messages Run IO
 -- program is finished running (dropped off bottom) --
 Clear
 -- program is finished running (dropped off bottom) --
 -- program is finished running (dropped off bottom) --

14)

```
1 .data
2 A: .word 22
3
4 .text
5 lui $t0, 0x1001
6
7 lw $t1, 0($t0)
8
9 ori $t2, $zero, 1
10
11 and $t3, $t1, $t2
12
13 sw $t3, 4($t0)
14
15
16
17
```

CHUser\src\Entodo\TP-0\mpc14.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Execute

Text Segment

Expr	Address	Code	Basic	Source
	0x00400000	0x3081001	lui \$t0, 0x1001	
	0x00400004	0x3090000	lw \$t1, 0(\$t0)	
	0x00400008	0x3090000	ori \$t2, \$zero, 1	
	0x0040000C	0x01a5504	and \$t3, \$t1, \$t2	
	0x00400010	0x3090004	sw \$t3, 4(\$t0)	

Labels

Label	Address
A	0x10010000

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x10010000	22	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

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	268500992
\$t1	9	22
\$t2	10	1
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	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
\$s8	24	0
\$s9	25	0
\$s0	26	0
\$t0	27	0
\$s0	28	268466224
\$s0	29	2147475145
\$f0	30	0
\$f1	31	0
\$f2		4194324
\$f3		0

Mars Messages

Run I/O

Clear

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

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

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

15)

```

1 .text
2 ori $t0, $zero, 100
3 ori $t1, $zero, 0
4 ori $t6, $zero, 1
5 lui $t5, 0x1001
6 add $t7, $zero, $t5
7
8 loop:
9 beq $t0, $zero, parte2
10 sll $t3, $t1, 1
11 add $t2, $t2, $t6
12 sw $t2, 0($t7)
13
14 addi $t7, $t7, 4
15 sub $t0, $t0, $t6
16 add $t1, $t1, $t6
17 j loop
18
19 parte2:
20 ori $t0, $zero, 100
21 ori $t2, $zero, 0
22 soma:
23 beq $t0, $zero, fim
24 lw $t1, 0($t5)
25 add $t2, $t1, $t2
26
27 addi $t5, $t5, 4
28 sub $t0, $t0, $t6
29 j soma
30
31 fim:
32

```

C:\Users\User\Documents\TP-0\proj15.asm - MARS 4.5
 File Edit Run Settings Tools Help
 Run speed at max (no interaction)

Text Segment
 Address Code Basic Source
 0x00400000 0x34000064 ori \$t0,\$zero,100 2i ori \$t0, \$zero, 100
 0x00400004 0x34000000 ori \$t1,\$zero,0 3i ori \$t1, \$zero, 0
 0x00400008 0x34000001 ori \$t6,\$zero,1 4i ori \$t6, \$zero, 1
 0x0040000c 0x34000010 lui \$t5,0x1001 5i lui \$t5, 0x1001
 0x00400010 0x00007f20 add \$t7,\$zero,\$t5 6i add \$t7, \$zero, \$t5
 0x00400014 0x11000007 beq \$t0,0,7 8i beq \$t0,\$zero, parte2
 0x00400018 0x00005040 sll \$t3,\$t1,1 10i sll \$t3, \$t1, 1
 0x0040001c 0x714e5020 add \$t2,\$t2,\$t6 11i add \$t2, \$t2, \$t6
 0x00400020 0x00000000 sw \$t2,0(\$t7) 12i sw \$t2, 0(\$t7)
 0x00400024 0x214ef004 addi \$t7,\$t7,4 14i addi \$t7, \$t7, 4
 0x00400028 0x001e4024 sub \$t0,\$t0,\$t6 15i sub \$t0, \$t0, \$t6
 0x0040002c 0x001e4024 add \$t1,\$t1,\$t6 16i add \$t1, \$t1, \$t6
 0x00400030 0x00210000 j 0x00400014 17i j loop
 0x00400034 0x34000064 ori \$t0,\$zero,100 20i ori \$t0, \$zero, 100
 0x00400038 0x34000000 ori \$t2,\$zero,0 21i ori \$t2, \$zero, 0
 0x0040003c 0x11000000 beq \$t0,0,5 23i beq \$t0, \$zero, fim
 0x00400040 0x00000000 loop: 24i lw \$t1, 0(\$t5)

Data Segment
 Address Value (+0) Value (+4) Value (+8) Value (+c) Value (+10) Value (+14) Value (+18) Value (+1c)
 0x10010000 1 5 9 13 17 21 25 29 33
 0x10010020 17 19 21 23 25 27 29 31 33
 0x10010040 33 35 37 39 41 43 45 47 49
 0x10010060 49 51 53 55 57 59 61 63 65
 0x10010080 65 67 69 71 73 75 77 79 81
 0x100100a0 81 83 85 87 89 91 93 95 97
 0x100100c0 97 99 101 103 105 107 109 111 113
 0x100100e0 113 115 117 119 121 123 125 127 129
 0x10010100 129 131 133 135 137 139 141 143 145
 0x10010120 145 147 149 151 153 155 157 159 161
 0x10010140 161 163 165 167 169 171 173 175 177
 0x10010160 177 179 181 183 185 187 189 191 193
 0x10010180 193 195 197 199 201 203 205 207 209
 0x100101a0 209 211 213 215 217 219 221 223 225

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 0
 \$t1 9 199
 \$t2 10 10000
 \$t3 11 0
 \$t4 12 0
 \$t5 13 265501392
 \$t6 14 1
 \$t7 15 265501392
 \$t8 16 0
 \$t9 17 0
 \$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 265469224
 \$t21 29 2147475440
 \$t22 30 0
 \$t23 31 4194388
 \$t24 32 0
 \$t25 33 0

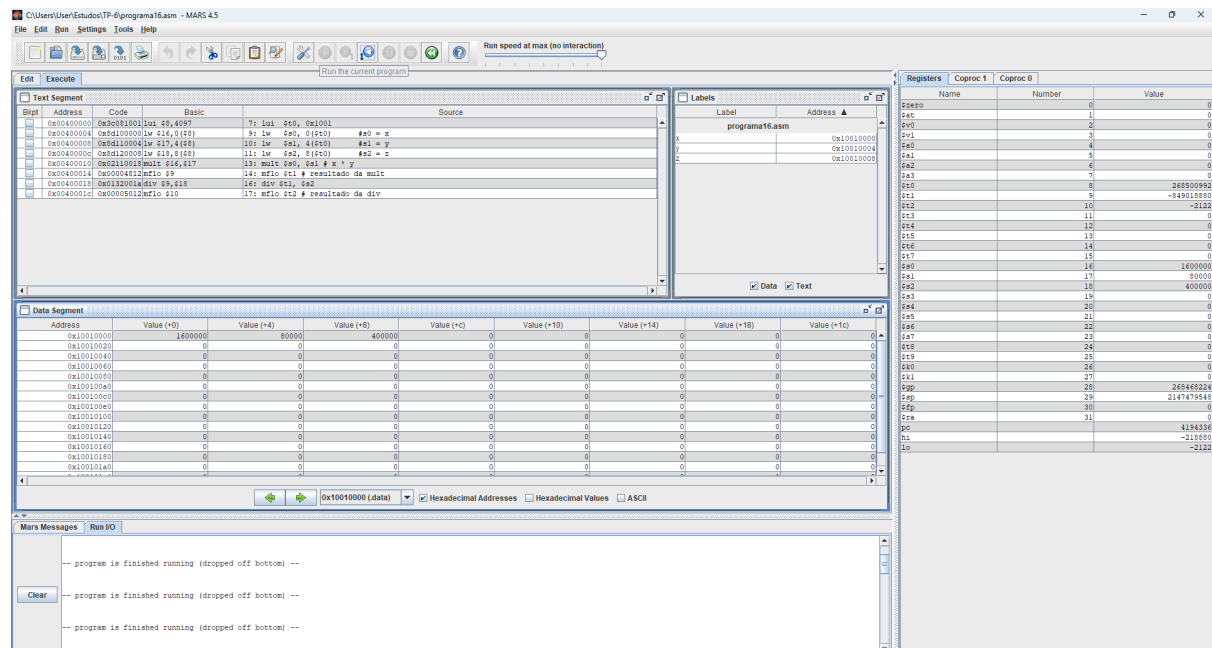
MARS Messages Run I/O
 Clear
 -- program is finished running (dropped off bottom) --
 -- program is finished running (dropped off bottom) --
 -- program is finished running (dropped off bottom) --

16)

```

1  .data
2  x: .word 0x186A00
3  y: .word 0x13880
4  z: .word 0x61A80
5
6  .text
7  lui $t0, 0x1001
8
9  lw $s0, 0($t0)      #s0 = x
10 lw $s1, 4($t0)      #s1 = y
11 lw $s2, 8($t0)      #s2 = z
12
13 mult $s0, $s1 # x * y
14 mflo $t1 # resultado da mult
15
16 div $t1, $s2
17 mflo $t2 # resultado da div
18

```



17)

```

1  .data
2  x: .word 10
3  y: .word 200
4
5  .text
6
7  lui $t0, 0x1001
8  lw $t1, 0($t0)
9  lw $t2, 4($t0)
10 ori $t3, $zero, 1
11
12 loop:
13 beq $t2, $zero, fim
14 sub $t2, $t2, $t3
15 add $t4, $t4, $t1
16 j loop
17 fim:
18 sw $t4, 8($t0)
19

```

CHUsers\UserEstudios\TP-0\mips17.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Execute

Text Segment

Offset	Address	Code	Basic	Source
0x00400000	0x3081001	lui	\$t0, 0x1001	
0x00400004	0x5000000	lw	\$t1, 0(\$t0)	
0x00400008	0x5000004	lw	\$t2, 4(\$t0)	
0x0040000c	0x3400001	ori	\$t3, \$zero, 1	
0x00400010	0x1140000	beq	\$t2, \$zero, fim	
0x00400014	0x0100002	sub	\$t2, \$t2, \$t3	
0x00400018	0x0100004	add	\$t4, \$t4, \$t1	
0x0040001c	0x0100004	j	loop	
0x00400020	0x0100008	sw	\$t4, 8(\$t0)	

Labels

Label	Address
loop	0x00400010
fin	0x00400020
y	0x00100004

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	268500992
\$t1	9	10
\$t2	10	0
\$t3	11	1
\$t4	12	200
\$t5	13	0
\$t6	14	0
\$t7	15	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
\$s8	24	0
\$s9	25	0
\$s0	26	0
\$k1	27	0
\$gp	28	268460928
\$fp	29	2147475548
\$sp	30	0
\$ra	31	0
\$pc		4194240
\$t1		0
\$t2		0

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x10010000	10	0	200	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

Mars Messages

Run IO

Clear

program is finished running (dropped off bottom) --

program is finished running (dropped off bottom) --

program is finished running (dropped off bottom) --

18)

```

1  .data
2  x: .word 2
3  y: .word 3
4
5  .text
6  lui $t0, 0x1001
7  lw $t1, 0($t0) # t1 = X
8  lw $t2, 4($t0) # t2 = Y
9  ori $t3, $zero, 1 # t3 = 1
10 or $t5, $zero, $t1 # t5 = X
11 or $t7, $zero, $t1 # t7 = X
12 addi $t6, $t2, -1 # t6 = Y - 1
13
14
15 beq $t2, $zero, exp_0 # Caso o expoente for 0, go to exp_0
16 beq $t6, $zero, loop_2 # Caso o expoente for 1, go to loop_2. Porque não entraria no loop_1, porque t6 = 0
17
18 loop_1:
19 beq $t6, $zero, fim # Repetir (y-1) vezes
20 or $t4, $zero, $zero # t4 = 0 - importante a partir do segundo loop_1
21
22 loop_2:
23 beq $t5, $zero, controle # repetir x vezes e then go to controle
24 sub $t5, $t5, $t3 # t5 = t5 - 1
25 add $t4, $t4, $t1 # t4 = t4 + t1 (resultado)
26 beq $t2, $t3, fim # Se t2 = 1 sair
27 j loop_2
28
29 controle:
30 or $t5, $zero, $t7 # t5 = X
31 or $t1, $zero, $t4 # t1 = t4
32 sub $t6, $t6, $t3 # t6 = t6 - 1
33 j loop_1
34
35
36 exp_0:
37 ori $t4, $zero, 1 # resultado = 1
38
39 fim:
40 sw $t4, 8($t0) # Escrever o resultado
41

```

Users\Estudos\TP-0\mpis18asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Execute

Text Segment

Expr	Address	Code	Basic	Source
lui \$t0, 0x1001	0x00400000	0x00400000	lui \$t0, 0x1001	
lw \$t1, 0(\$t0) # t1 = X	0x00400004	0x00400004	lw \$t1, 0(\$t0) # t1 = X	
lw \$t2, 4(\$t0) # t2 = Y	0x00400008	0x00400008	lw \$t2, 4(\$t0) # t2 = Y	
ori \$t3, \$zero, 1 # t3 = 1	0x0040000c	0x0040000c	ori \$t3, \$zero, 1 # t3 = 1	
or \$t5, \$zero, \$t1 # t5 = X	0x00400010	0x00400010	or \$t5, \$zero, \$t1 # t5 = X	
or \$t7, \$zero, \$t1 # t7 = X	0x00400014	0x00400014	or \$t7, \$zero, \$t1 # t7 = X	
addi \$t6, \$t2, -1 # t6 = Y - 1	0x00400018	0x00400018	addi \$t6, \$t2, -1 # t6 = Y - 1	
beq \$t2, \$zero, exp_0 # Caso o expoente for 0, go to exp_0	0x0040001c	0x0040001c	beq \$t2, \$zero, exp_0 # Caso o expoente for 0, go to exp_0	
beq \$t6, \$zero, loop_2 # Caso o expoente for 1, go to loop_2. Porque não entraria no loop_1, porque t6 = 0	0x00400020	0x00400020	beq \$t6, \$zero, loop_2 # Caso o expoente for 1, go to loop_2. Porque não entraria no loop_1, porque t6 = 0	
loop_1: beq \$t6, \$zero, fim # Repetir (y-1) vezes	0x00400024	0x00400024	loop_1: beq \$t6, \$zero, fim # Repetir (y-1) vezes	
or \$t4, \$zero, \$zero # t4 = 0 - importante a partir do segundo loop_1	0x00400028	0x00400028	or \$t4, \$zero, \$zero # t4 = 0 - importante a partir do segundo loop_1	
loop_2: beq \$t5, \$zero, controle # repetir x vezes e then go to controle	0x0040002c	0x0040002c	loop_2: beq \$t5, \$zero, controle # repetir x vezes e then go to controle	
sub \$t5, \$t5, \$t3 # t5 = t5 - 1	0x00400030	0x00400030	sub \$t5, \$t5, \$t3 # t5 = t5 - 1	
add \$t4, \$t4, \$t1 # t4 = t4 + t1 (resultado)	0x00400034	0x00400034	add \$t4, \$t4, \$t1 # t4 = t4 + t1 (resultado)	
beq \$t2, \$t3, fim # Se t2 = 1 sair	0x00400038	0x00400038	beq \$t2, \$t3, fim # Se t2 = 1 sair	
j loop_2	0x0040003c	0x0040003c	j loop_2	
controle: or \$t5, \$zero, \$t7 # t5 = X	0x00400040	0x00400040	controle: or \$t5, \$zero, \$t7 # t5 = X	
or \$t1, \$zero, \$t4 # t1 = t4	0x00400044	0x00400044	or \$t1, \$zero, \$t4 # t1 = t4	
sub \$t6, \$t6, \$t3 # t6 = t6 - 1	0x00400048	0x00400048	sub \$t6, \$t6, \$t3 # t6 = t6 - 1	
j loop_1	0x0040004c	0x0040004c	j loop_1	
exp_0: ori \$t4, \$zero, 1 # resultado = 1	0x00400050	0x00400050	exp_0: ori \$t4, \$zero, 1 # resultado = 1	
fim: sw \$t4, 8(\$t0) # Escrever o resultado	0x00400054	0x00400054	fim: sw \$t4, 8(\$t0) # Escrever o resultado	

Labels

Label	Address
mpis18.asm	0x00400024
loop_1	0x00400024
loop_2	0x0040002c
controle	0x00400040
exp_0	0x00400050
fin	0x00400054

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
\$a4	8	268449992
\$t0	9	0
\$t1	10	0
\$t2	11	0
\$t3	12	0
\$t4	13	0
\$t5	14	0
\$t6	15	0
\$t7	16	0
\$t8	17	0
\$t9	18	0
\$s0	19	0
\$s1	20	0
\$s2	21	0
\$s3	22	0
\$s4	23	0
\$s5	24	0
\$s6	25	0
\$s7	26	0
\$s8	27	0
\$s9	28	268449992
\$fp	29	2147475440
\$gp	30	0
\$ra	31	4194392
\$hi		0
\$lo		0

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x00100000	0	0	0	0	0	0	0	0
0x00100020	0	0	0	0	0	0	0	0
0x00100040	0	0	0	0	0	0	0	0
0x00100060	0	0	0	0	0	0	0	0
0x00100080	0	0	0	0	0	0	0	0
0x001000a0	0	0	0	0	0	0	0	0
0x001000c0	0	0	0	0	0	0	0	0
0x001000e0	0	0	0	0	0	0	0	0
0x00100100	0	0	0	0	0	0	0	0
0x00100120	0	0	0	0	0	0	0	0
0x00100140	0	0	0	0	0	0	0	0
0x00100160	0	0	0	0	0	0	0	0
0x00100180	0	0	0	0	0	0	0	0
0x001001a0	0	0	0	0	0	0	0	0

Mars Messages Run I/O

program is finished running (dropped off bottom) --

Clear

program is finished running (dropped off bottom) --

program is finished running (dropped off bottom) --

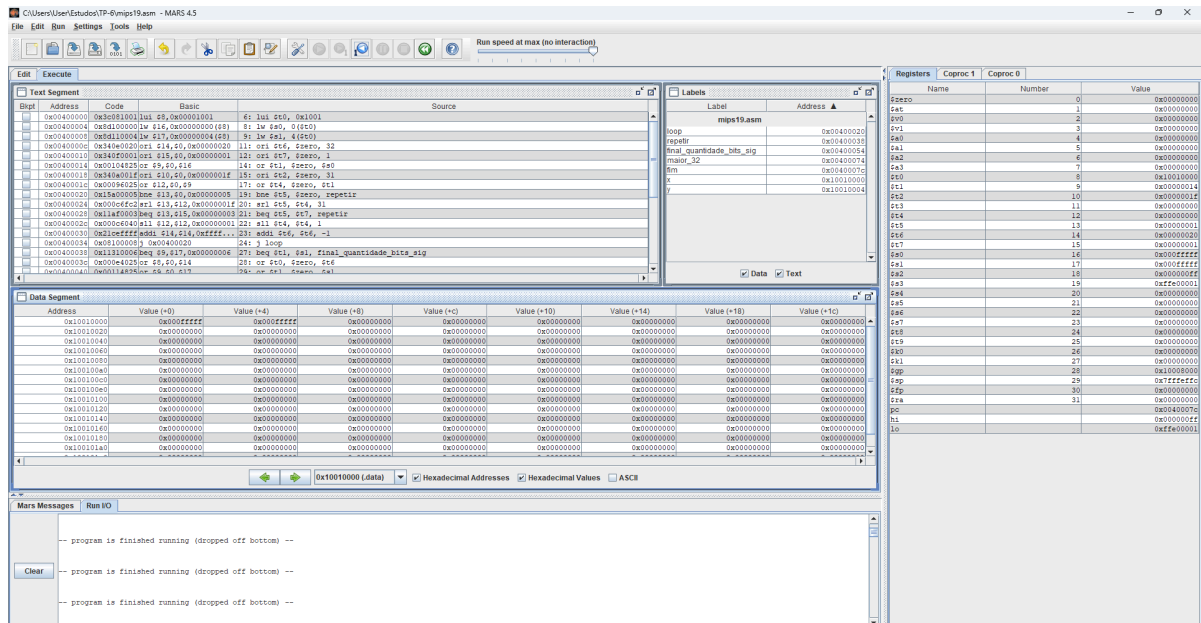
Responda:

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

Continuação Programas

19)

```
1  .data
2  x: .word 0xFFFFF
3  y: .word 0xFFFFF
4
5  .text
6  lui $t0, 0x1001
7
8  lw $s0, 0($t0)
9  lw $s1, 4($t0)
10
11  ori $t6, $zero, 32
12  ori $t7, $zero, 1
13
14  or $t1, $zero, $s0
15  ori $t2, $zero, 31
16
17  or $t4, $zero, $t1
18  loop:
19  bne $t5, $zero, repetir
20  srl $t5, $t4, 31
21  beq $t5, $t7, repetir
22  sll $t4, $t4, 1
23  addi $t6, $t6, -1
24  j loop
25
26  repetir:
27  beq $t1, $s1, final_quantidade_bits_sig
28  or $t0, $zero, $t6
29  or $t1, $zero, $s1
30  or $t4, $zero, $t1
31  or $t5, $zero, $zero
32  ori $t6, $zero, 32
33
34  j loop
35
36  final_quantidade_bits_sig:
37  or $t1, $zero, $t6
38  ori $t6, $zero, 32
39
40
41  mult $s0, $s1
42
43  add $t4, $t0, $t1
44
45  slt $t4, $t4, $t6
46
47  beq $t4, $zero, maior_32
48  mflo $s2
49  j fim
50
51
52  maior_32:
53  mfhi $s2
54  mflo $s3
55
56  fim:
57
```

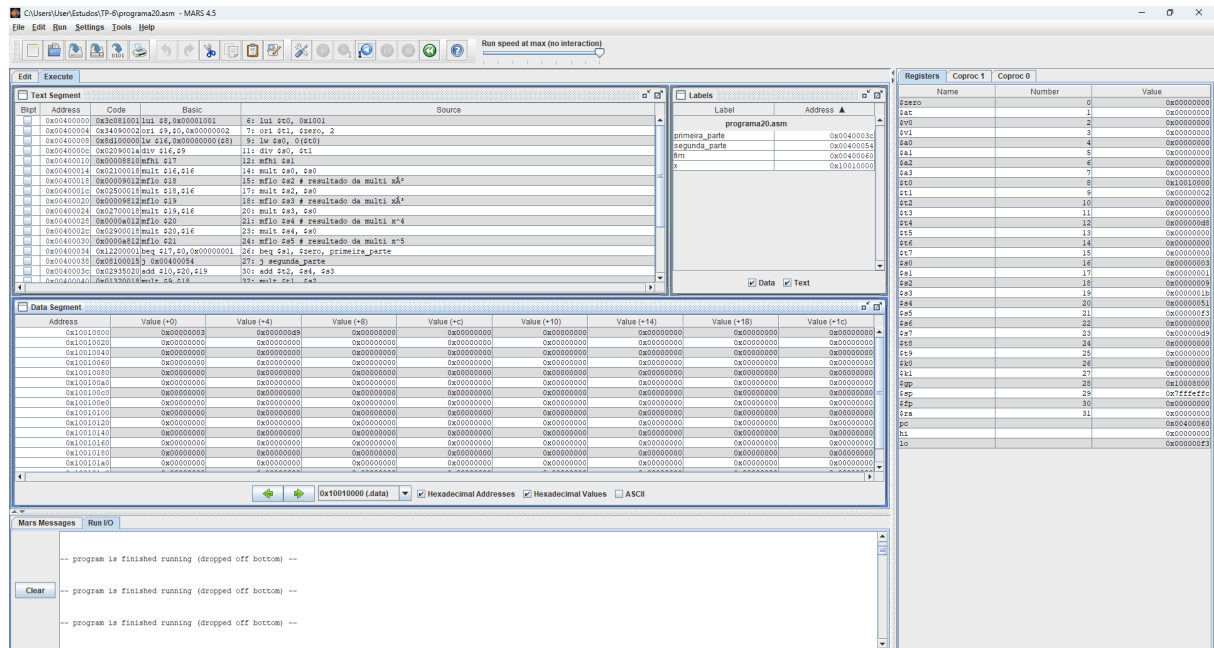


20)

```

1  .data
2  x: .word 3
3
4  .text
5
6  lui $t0, 0x1001
7  ori $t1, $zero, 2
8
9  lw $s0, 0($t0)
10
11 div $s0, $t1
12 mfhi $s1
13
14 mult $s0, $s0
15 mflo $s2 # resultado da multi x^2
16
17 mult $s2, $s0
18 mflo $s3 # resultado da multi x^3
19
20 mult $s3, $s0
21 mflo $s4 # resultado da multi x^4
22
23 mult $s4, $s0
24 mflo $s5 # resultado da multi x^5
25
26 beq $s1, $zero, primeira_parte
27 j segunda_parte
28
29 primeira_parte:
30 add $t2, $s4, $s3
31
32 mult $t1, $s2
33 mflo $s6 # 2*x^2
34
35 sub $t3, $t2, $s6
36 sw $t3, 4($t0)
37 j fim
38
39 segunda_parte:
40 sub $t4, $s5, $s3
41 addi $s7, $t4, 1
42 sw $s7, 4($t0)
43
44 fim:
45

```



21)

```

1  .data
2  x: .word 2
3  .text
4  lui $t0, 0x1001
5  lw $s0, 0($t0) # valor de x
6  mult $s0, $s0
7  mflo $s2 # resultado da multi x^2
8  mult $s2, $s0
9  mflo $s3 # resultado da multi x^3
10 mult $s3, $s0
11 mflo $s4 # resultado da multi x^4
12 mult $s4, $s0
13 mflo $s5 # resultado da multi x^5
14 slt $t1, $s0, $zero
15 beq $t1, $zero, maior
16 j menor
17 maior:
18 addi $t2, $s3, 1
19 sw $t2, 4($t0)
20 j fim
21 menor:
22 addi $t3, $s4, 0xFFFFFFFF
23 sw $t3, 4($t0)
24 fim:
25
26
27

```

Windows application window titled "C:\Users\User\Estudos\TP-6\programa2.asm - MARS 4.5". The interface includes a menu bar (File, Edit, Run, Settings, Tools, Help), a toolbar, and a status bar showing "Run speed at max (no interaction)".

The main window is divided into several panes:

- Text Segment:** Displays assembly code with columns for Bit#, Address, Code, Basic, and Source. The code includes instructions like `lui $t0, 0x1001`, `li $t2, 0x0`, `mult $s0, $s0`, `mflo $s2`, `memor`, `beq $t1, $zero, maior`, `addi $t0, $t0, 0x00000001`, `addi $t1, $t1, 0x00000001`, `sw $t2, 4($t0)`, and `addi $t3, $t4, 0x00000000`.
- Labels:** A table with columns for Label, Address, and Value. It lists labels like `maior`, `memor`, and `t` with their corresponding addresses.
- Registers:** A table with columns for Name, Number, and Value. It lists registers like `$zero`, `$at`, `$v0`, `$v1`, `$a0`, `$a1`, `$a2`, `$a3`, `$t0`, `$t1`, `$t2`, `$t3`, `$t4`, `$t5`, `$t6`, `$t7`, `$s0`, `$s1`, `$s2`, `$s3`, `$s4`, `$s5`, `$s6`, `$s7`, `$s8`, `$s9`, `$t8`, `$t9`, `$fp`, `$gp`, `$ra`, `$pc`, and `$j`.
- Data Segment:** A table with columns for Address and Value. It shows memory locations and their corresponding values, mostly zero.
- Mars Messages / Run IO:** A section for displaying messages and input/output, currently showing "program is finished running (dropped off bottom)".

The bottom status bar includes a dropdown menu for "0x10010000 (data)" and checkboxes for "Hexadecimal Addresses", "Hexadecimal Values", and "ASCII".