

HOMEWORK #5 SARAH MENTEL

Question 3 Before

C:\Users\sarah\OneDrive\Desktop\CS331\hw5Code_mentel.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Edit Execute

Text Segment

Block	Address	Code	Basic	Source
	0x00400000	0x20110014	addi \$t7,\$0,0x00000014	\$t: addi \$t1, \$0, 20
	0x00400004	0x2012001e	addi \$t8,\$0,0x0000001e	\$t: addi \$t2, \$0, 30
	0x00400008	0x2228ff0d	addi \$t9,\$t7,0xfffffff0	\$t: addi \$t0, \$t1, -5
	0x0040000c	0x02288020	add \$t6,\$t7,\$8	\$t: add \$a0, \$t1, \$t0

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
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

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	0x00000000
\$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
\$k0	26	0x00000000
\$k1	27	0x00000000
\$fp	28	0x10000000
\$gp	29	0x00000000
\$tp	30	0x00000000
\$ra	31	0x00000000
\$pc		0x00400000
\$hi		0x00000000
\$lo		0x00000000

0x10010000 (data) Hexadecimal Addresses Hexadecimal Values ASCII

Question 3 After

C:\Users\sarah\OneDrive\Desktop\CS331\hw5Code_mentel.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Edit Execute

Text Segment

Block	Address	Code	Basic	Source
	0x00400000	0x20110014	addi \$t7,\$0,0x00000014	\$t: addi \$t1, \$0, 20
	0x00400004	0x2012001e	addi \$t8,\$0,0x0000001e	\$t: addi \$t2, \$0, 30
	0x00400008	0x2228ff0d	addi \$t9,\$t7,0xfffffff0	\$t: addi \$t0, \$t1, -5
	0x0040000c	0x02288020	add \$t6,\$t7,\$8	\$t: add \$a0, \$t1, \$t0

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
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

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	0x00000000
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000023
\$s1	17	0x00000014
\$s2	18	0x0000001e
\$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
\$fp	28	0x10000000
\$gp	29	0x00000000
\$tp	30	0x00000000
\$ra	31	0x00000000
\$pc		0x00400000
\$hi		0x00000000
\$lo		0x00000000

0x10010000 (data) Hexadecimal Addresses Hexadecimal Values ASCII

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) --

Question 4 I) Before

C:\Users\sarah\OneDrive\Desktop\CS331\hw5code_mental.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	0x20100014	addi \$t6,\$0,0x00000014	13: addi \$a0, \$0, 20
	0x00400004	0x2011001e	addi \$t7,\$0,0x0000001e	14: addi \$a1, \$0, 30
	0x00400008	0x21100001	beq \$t6,\$t7,0x00000001	17: beq \$a0, \$a1, target
	0x0040000c	0x02118020	add \$t6,\$t6,\$t7	18: add \$a0, \$a0, \$a1
	0x00400010	0x02118022	sub \$t6,\$t6,\$t7	20: sub \$a0, \$a0, \$a1

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
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

Go: running hw5code_mental.asm

Go: execution terminated by null instruction.

Clear

Assembly: assembling C:\Users\sarah\OneDrive\Desktop\CS331\hw5code_mental.asm

Assembly: operation completed successfully.

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	0x00000000
\$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
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10000000
\$sp	29	0x7ffffc00
\$fp	30	0x00000000
\$ra	31	0x00000000
\$pc		0x00400008
\$hi		0x00000000
\$lo		0x00000000

I) After

C:\Users\sarah\OneDrive\Desktop\CS331\hw5code_mental.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	0x20100014	addi \$t6,\$0,0x00000014	13: addi \$a0, \$0, 20
	0x00400004	0x2011001e	addi \$t7,\$0,0x0000001e	14: addi \$a1, \$0, 30
	0x00400008	0x21100001	beq \$t6,\$t7,0x00000001	17: beq \$a0, \$a1, target
	0x0040000c	0x02118020	add \$t6,\$t6,\$t7	18: add \$a0, \$a0, \$a1
	0x00400010	0x02118022	sub \$t6,\$t6,\$t7	20: sub \$a0, \$a0, \$a1

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
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

Go: running hw5code_mental.asm

Go: execution terminated by null instruction.

Clear

Assembly: assembling C:\Users\sarah\OneDrive\Desktop\CS331\hw5code_mental.asm

Assembly: operation completed successfully.

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	0x00000000
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000000
\$s1	17	0x00000014
\$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	0x10000000
\$sp	29	0x7ffffc00
\$fp	30	0x00000000
\$ra	31	0x00000000
\$pc		0x00400008
\$hi		0x00000000
\$lo		0x00000000

II) Before

C:\Users\sarah\OneDrive\Desktop\CS371\hw5code_mental.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	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	0x00000000
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$n0	16	0x00000000
\$n1	17	0x00000000
\$n2	18	0x00000000
\$n3	19	0x00000000
\$n4	20	0x00000000
\$n5	21	0x00000000
\$n6	22	0x00000000
\$n7	23	0x00000000
\$t8	24	0x00000000
\$t9	25	0x00000000
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10008000
\$fp	29	0xffffffff
\$sp	30	0x00000000
\$ra	31	0x00000000
\$pc		0x00400000
\$hi		0x00000000
\$lo		0x00000000

Text Segment

Bxpt	Address	Code	Basic	Source
	0x00400000	0x20100014	addi \$t6,\$0,0x00000014	l3: addi \$n0, \$0, 20
	0x00400004	0x2011001e	addi \$t7,\$0,0x0000001e	l4: addi \$n1, \$0, 30
	0x00400008	0x0230402a	slti \$5,\$t7,\$t6	23: slti \$t0, \$n1, \$n0
	0x0040000c	0x11000001	bneq \$5,\$0,0x00000001	24: bneq \$t0, \$0, target
	0x00400010	0x0231ffff	addi \$t7,\$t7,0xffff...	25: addi \$n1, \$n1, -1
	0x00400014	0x22210001	addi \$t6,\$t6,0x0000...	27: addi \$n0, \$n0, 1

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
0x10010004	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010008	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x1001000c	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010010	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010014	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010018	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x1001001c	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010020	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000

Mars Messages Run IO

II) After

C:\Users\sarah\OneDrive\Desktop\CS371\hw5code_mental.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	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	0x00000000
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$n0	16	0x00000020
\$n1	17	0xffffffff
\$n2	18	0x00000000
\$n3	19	0x00000000
\$n4	20	0x00000000
\$n5	21	0x00000000
\$n6	22	0x00000000
\$n7	23	0x00000000
\$t8	24	0x00000000
\$t9	25	0x00000000
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10008000
\$fp	29	0xffffffff
\$sp	30	0x00000000
\$ra	31	0x00400014
\$pc		0x00000000
\$hi		0x00000000
\$lo		0x00000000

Text Segment

Bxpt	Address	Code	Basic	Source
	0x00400000	0x20100014	addi \$t6,\$0,0x00000014	l3: addi \$n0, \$0, 20
	0x00400004	0x2011001e	addi \$t7,\$0,0x0000001e	l4: addi \$n1, \$0, 30
	0x00400008	0x0230402a	slti \$5,\$t7,\$t6	23: slti \$t0, \$n1, \$n0
	0x0040000c	0x11000001	bneq \$5,\$0,0x00000001	24: bneq \$t0, \$0, target
	0x00400010	0x0231ffff	addi \$t7,\$t7,0xffff...	25: addi \$n1, \$n1, -1
	0x00400014	0x22210001	addi \$t6,\$t6,0x0000...	27: addi \$n0, \$n0, 1

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
0x10010004	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010008	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x1001000c	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010010	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010014	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010018	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x1001001c	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010020	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) --

III) Before

C:\Users\sarah\OneDrive\Desktop\CS331\hw5Code_mental.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Edit Execute

Text Segment

Offset	Address	Code	Basic	Source
0x00400000	0x20100014	addi \$16,\$0,0x00000014	13: addi \$a0, \$0, 20	
0x00400004	0x2011001e	addi \$17,\$0,0x0000001e	14: addi \$a1, \$0, 30	
0x00400008	0x0211402a	sllt \$s,\$16,\$17	30: sllt \$t0, \$a0, \$a1	
0x0040000c	0x11000001	beq \$s,\$0,0x00000001	31: beq \$t0, \$0, target	
0x00400010	0x00008820	add \$17,\$0,\$0	32: add \$a1, \$0, \$0	
0x00400014	0x00008020	add \$16,\$0,\$0	34: add \$a0, \$0, \$0	

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
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

Registers Coproc 1 Coproc 0

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	0x00000000
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$t8	16	0x00000000
\$t9	17	0x00000000
\$s0	18	0x00000000
\$s1	19	0x00000000
\$s2	20	0x00000000
\$s3	21	0x00000000
\$s4	22	0x00000000
\$s5	23	0x00000000
\$s6	24	0x00000000
\$s7	25	0x00000000
\$s8	26	0x00000000
\$s9	27	0x00000000
\$fp	28	0x00000000
\$sp	29	0x7ffffeff
\$gp	30	0x00000000
\$ra	31	0x00000000
\$pc		0x00000000
\$hi		0x00000000
\$lo		0x00000000

Mars Messages Run IO

so: running hw5Code_mental.asm

III) After

C:\Users\sarah\OneDrive\Desktop\CS331\hw5Code_mental.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Edit Execute

Text Segment

Offset	Address	Code	Basic	Source
0x00400000	0x20100014	addi \$16,\$0,0x00000014	13: addi \$a0, \$0, 20	
0x00400004	0x2011001e	addi \$17,\$0,0x0000001e	14: addi \$a1, \$0, 30	
0x00400008	0x0211402a	sllt \$s,\$16,\$17	30: sllt \$t0, \$a0, \$a1	
0x0040000c	0x11000001	beq \$s,\$0,0x00000001	31: beq \$t0, \$0, target	
0x00400010	0x00008820	add \$17,\$0,\$0	32: add \$a1, \$0, \$0	
0x00400014	0x00008020	add \$16,\$0,\$0	34: add \$a0, \$0, \$0	

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
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

Registers Coproc 1 Coproc 0

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	0x00000001
\$t1	9	0x00000000
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$t8	16	0x00000000
\$t9	17	0x00000000
\$s0	18	0x00000000
\$s1	19	0x00000000
\$s2	20	0x00000000
\$s3	21	0x00000000
\$s4	22	0x00000000
\$s5	23	0x00000000
\$s6	24	0x00000000
\$s7	25	0x00000000
\$s8	26	0x00000000
\$s9	27	0x00000000
\$fp	28	0x00000000
\$sp	29	0x7ffffeff
\$gp	30	0x00000000
\$ra	31	0x00000000
\$pc		0x00000018
\$hi		0x00000000
\$lo		0x00000000

Mars Messages Run IO

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

Clear

Question 5 Before

C:\Users\sarah\OneDrive\Desktop\hw5_mentel\hw5code_mentel.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	0x3c100000	lui \$16, 0x00000000	39: lui \$a0, 0x0000
	0x00400004	0x3c100000	ori \$16, \$16, 0x00000000	40: ori \$a0, \$a0, 0x0000
	0x00400008	0xae900020	lw \$9, 0x00000000(\$16)	42: lw \$t1, 32(\$a0) #load A[8]
	0x0040000c	0x2009000b	addi \$9, \$0, 0x0000000b	43: addi \$t1, \$0, 11 #assign 11 to A[8]
	0x00400010	0xae900020	sw \$9, 0x00000000(\$16)	44: sw \$t1, 32(\$a0) #store value
	0x00400014	0x5fa00110	lw \$10, 0x00000010(\$16)	46: lw \$t2, 16(\$a0) #load A[4]
	0x00400018	0xae900110	sw \$9, 0x00000010(\$16)	47: sw \$t2, 16(\$a0) #store A[8] in A[4]

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
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

Assemble: assembling C:\Users\sarah\OneDrive\Desktop\hw5_mentel\hw5code_mentel.asm

Assemble: operation completed successfully.

Registers Coproc 1 Coproc 0

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	0x00000000
\$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
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10008000
\$sp	29	0x7ffffcfc
\$fp	30	0x00000000
\$pc	31	0x00000000
\$n		0x00400000
\$lo		0x00000000

After

C:\Users\sarah\OneDrive\Desktop\hw5_mentel\hw5code_mentel.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	0x3c100000	lui \$16, 0x00000000	39: lui \$a0, 0x0000
	0x00400004	0x3c100000	ori \$16, \$16, 0x00000000	40: ori \$a0, \$a0, 0x0000
	0x00400008	0xae900020	lw \$9, 0x00000000(\$16)	42: lw \$t1, 32(\$a0) #load A[8]
	0x0040000c	0x2009000b	addi \$9, \$0, 0x0000000b	43: addi \$t1, \$0, 11 #assign 11 to A[8]
	0x00400010	0xae900020	sw \$9, 0x00000000(\$16)	44: sw \$t1, 32(\$a0) #store value
	0x00400014	0x5fa00110	lw \$10, 0x00000010(\$16)	46: lw \$t2, 16(\$a0) #load A[4]
	0x00400018	0xae900110	sw \$9, 0x00000010(\$16)	47: sw \$t2, 16(\$a0) #store A[8] in A[4]

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
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

Assemble: assembling C:\Users\sarah\OneDrive\Desktop\hw5_mentel\hw5code_mentel.asm

Assemble: operation completed successfully.

Go: running hw5code_mentel.asm

Error in C:\Users\sarah\OneDrive\Desktop\hw5_mentel\hw5code_mentel.asm line 42: Runtime exception at 0x00400008: address out of range 0x00000000

Go: execution terminated with errors.

Clear

Registers Coproc 1 Coproc 0

Name	Number	Value
\$8 (\$addr)	8	0x00000000
\$12 (\$status)	12	0x00000011
\$13 (\$cause)	13	0x00000012
\$14 (\$epc)	14	0x00400000