BÁO CÁO TUẦN 3

Bài 1:

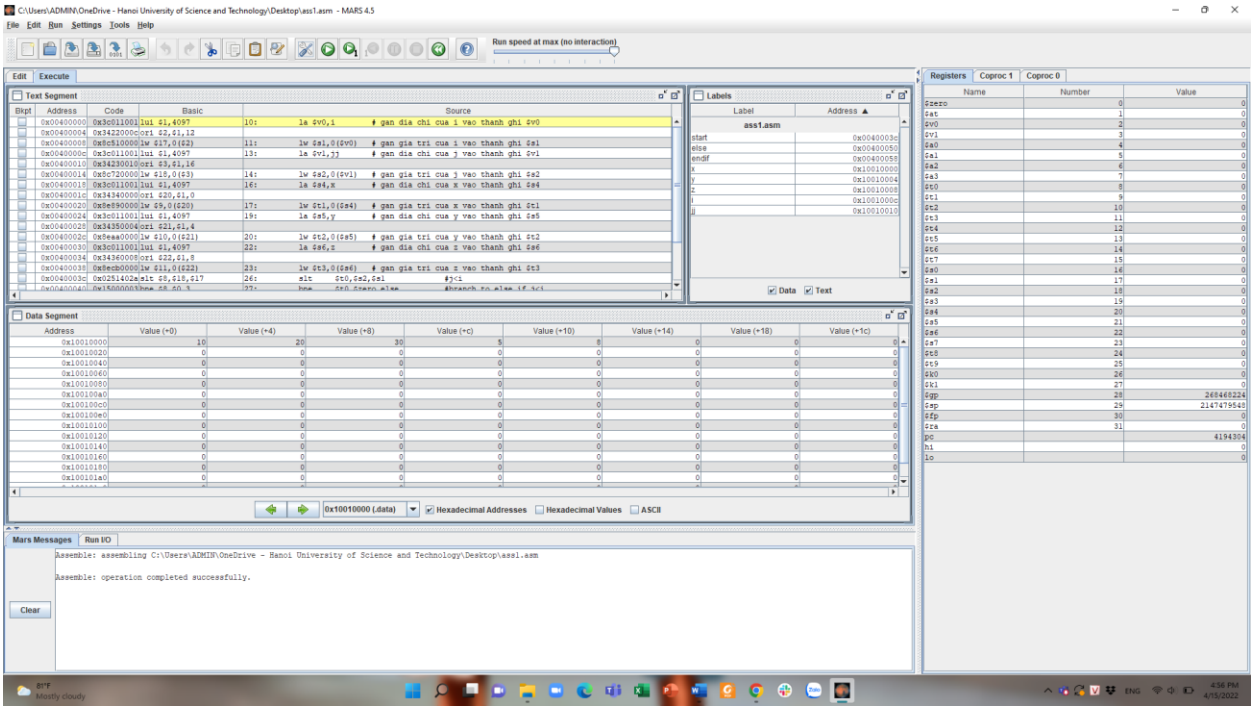
- Data segment:

```
.data
x:      .word 10        #khoi tao gia tri cho x
y:      .word 20        #khoi tao gia tri cho y
z:      .word 30        #khoi tao gia tri cho z
i:      .word 5         #khoi tao gia tri cho i
jj:     .word 8         #khoi tao gia tri cho jj
```

- Text segment:

```
.text
        la $v0,i        # gan dia chi cua i vao thanh ghi $v0
        lw $s1,0($v0)   # gan gia tri cua i vao thanh ghi $s1

        la $v1,jj       # gan dia chi cua j vao thanh ghi $v1
        lw $s2,0($v1)   # gan gia tri cua j vao thanh ghi $s2

        la $s4,x        # gan dia chi cua x vao thanh ghi $s4
        lw $t1,0($s4)   # gan gia tri cua x vao thanh ghi $t1

        la $s5,y        # gan dia chi cua y vao thanh ghi $s5
        lw $t2,0($s5)   # gan gia tri cua y vao thanh ghi $t2

        la $s6,z        # gan dia chi cua z vao thanh ghi $s6
        lw $t3,0($s6)   # gan gia tri cua z vao thanh ghi $t3

start:
        slt     $t0,$s2,$s1             #j<i
        bne     $t0,$zero,else          #branch to else if j<i
        addi    $t1,$t1,1               #then part: x=x+1
        addi    $t3,$zero,1             #z=1
        j       endif                   #skip "else" part
else:   addi    $t2,$t2,-1              #begin else part: y=y-1
        add     $t3,$t3,$t3             #z=2*z
endif:
```

- Giải thích:
  + Khởi tạo giá trị cho x,y,z,i,jj



+ Vì i<jj nên giá trị thanh ghi $t0 =0 nên ở dòng lệnh bne không nhảy đến else mà sẽ thực hiện 2 dòng lệnh sau bne là x=x+1 và z=1.

Bài 2:

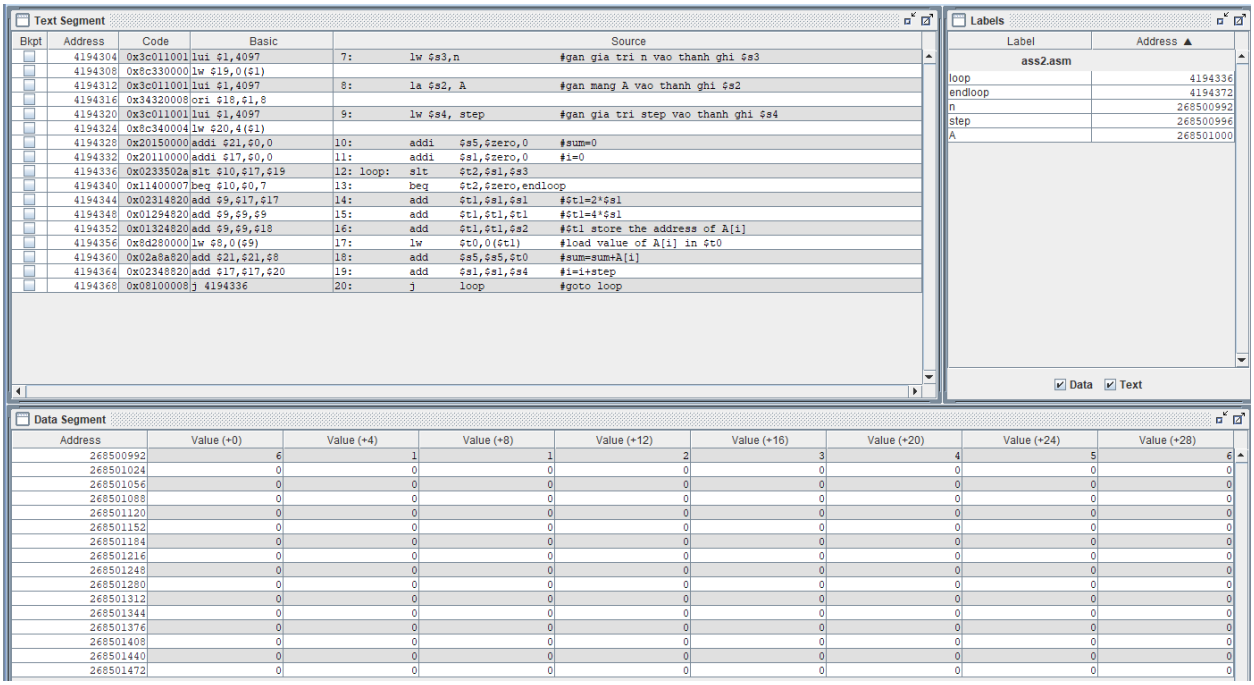
- Data segment

```
.data
n:      .word 6                         #khoi tao gia tri n=6
step:   .word 1                         #khoi tao gia tri step =1
A:      .word 1,2,3,4,5,6       #khoi tao mang A
```

- Text segment

```
.text
        lw $s3,n                    #gan gia tri n vao thanh ghi $s3
        la $s2, A                   #gan mang A vao thanh ghi $s2
        lw $s4, step                #gan gia tri step vao thanh ghi $s4
        addi    $s5,$zero,0         #sum=0
        addi    $s1,$zero,0         #i=0
loop:   slt     $t2,$s1,$s3
        beq     $t2,$zero,endloop
        add     $t1,$s1,$s1         #$t1=2*$s1
        add     $t1,$t1,$t1         #$t1=4*$s1
        add     $t1,$t1,$s2         #$t1 store the address of A[i]
        lw      $t0,0($t1)          #load value of A[i] in $t0
        add     $s5,$s5,$t0         #sum=sum+A[i]
        add     $s1,$s1,$s4         #i=i+step
        j       loop                #goto loop
endloop:
```

- Result:



Text Segment

Bkpt	Address	Code	Basic	Source
	4194304	0x3c011001	lui $1,4097	7: lw $s3,n #gan gia tri n vao thanh ghi $s3
	4194308	0x8c330000	lw $19,0($1)	
	4194312	0x3c011001	lui $1,4097	8: la $s2, A #gan mang A vao thanh ghi $s2
	4194316	0x34320008	ori $18,$1,8	
	4194320	0x3c011001	lui $1,4097	9: lw $s4, step #gan gia tri step vao thanh ghi $s4
	4194324	0x8c340004	lw $20,4($1)	
	4194328	0x20150000	addi $21,$0,0	10: addi $s5,$zero,0 #sum=0
	4194332	0x20110000	addi $17,$0,0	11: addi $s1,$zero,0 #i=0
	4194336	0x0233502a	slt $10,$17,$19	12: loop: slt $t2,$s1,$s3
	4194340	0x11400007	beq $10,$0,7	13: beq $t2,$zero,endloop
	4194344	0x02314820	add $9,$17,$17	14: add $t1,$s1,$s1 #$t1=2*$s1
	4194348	0x01294820	add $9,$9,$9	15: add $t1,$t1,$t1 #$t1=4*$s1
	4194352	0x01324820	add $9,$9,$18	16: add $t1,$t1,$s2 #$t1 store the address of A[i]
	4194356	0x8d280000	lw $8,0($9)	17: lw $t0,0($t1) #load value of A[i] in $t0
	4194360	0x02a8a820	add $21,$21,$8	18: add $s5,$s5,$t0 #sum=sum+A[i]
	4194364	0x02348820	add $17,$17,$20	19: add $s1,$s1,$s4 #i=i+step
	4194368	0x08100008	j 4194336	20: j loop #goto loop

Labels

Label	Address ▲
ass2.asm	
loop	4194336
endloop	4194372
n	268500992
step	268500996
A	268501000

Data Text

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	6	1	1	2	3	4	5	6
268501024	0	0	0	0	0	0	0	0
268501056	0	0	0	0	0	0	0	0
268501088	0	0	0	0	0	0	0	0
268501120	0	0	0	0	0	0	0	0
268501152	0	0	0	0	0	0	0	0
268501184	0	0	0	0	0	0	0	0
268501216	0	0	0	0	0	0	0	0
268501248	0	0	0	0	0	0	0	0
268501280	0	0	0	0	0	0	0	0
268501312	0	0	0	0	0	0	0	0
268501344	0	0	0	0	0	0	0	0
268501376	0	0	0	0	0	0	0	0
268501408	0	0	0	0	0	0	0	0
268501440	0	0	0	0	0	0	0	0
268501472	0	0	0	0	0	0	0	0

Registers | Coproc 1 | Coproc 0

Name	Number	Value
$zero	0	0
$at	1	268500992
$v0	2	0
$v1	3	0
$a0	4	0
$a1	5	0
$a2	6	0
$a3	7	0
$t0	8	6
$t1	9	268501020
$t2	10	0
$t3	11	0
$t4	12	0
$t5	13	0
$t6	14	0
$t7	15	0
$s0	16	0
$s1	17	6
$s2	18	268501000
$s3	19	6
$s4	20	1
$s5	21	21
$s6	22	0
$s7	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		4194372
hi		0
lo		0

Nhận xét:

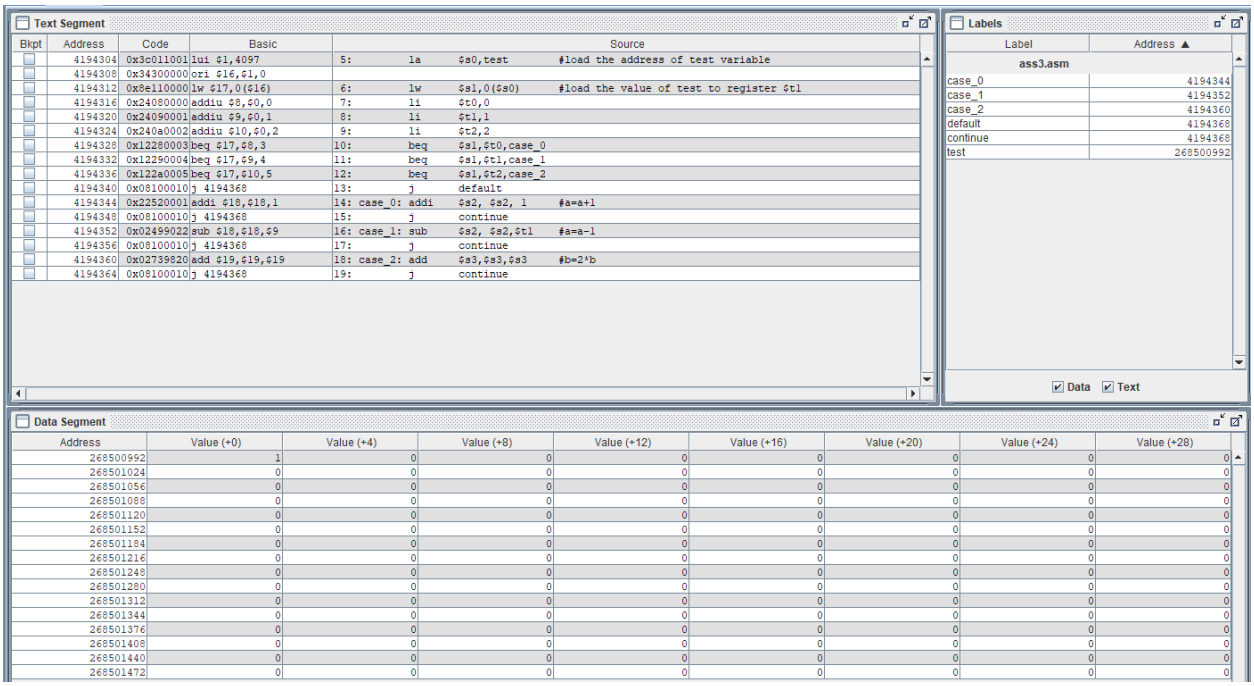
- Khi khởi tạo giá trị của các biến ban đầu là n = 6, A[] = [1,2,3,4,5,6], step = 1, i = 0 và sum = 0, chương trình chạy qua các phần tử của mảng A[1], A[2], A[3] và đọc giá trị vào thanh ghi $t0 rồi cộng tổng vào thanh ghi chứa sum là $s5.
- Giá trị của thanh ghi lưu địa chỉ phần tử A[i] cũng thay đổi theo từng step.
- Sau khi chạy xong, kết quả của thanh ghi $s5 = 21 đúng như kết quả tính tay.

Bài 3:

- Code

```
#Laboratory Exercise 3, Assigment 3
.data
test: .word 1
.text
        la      $s0,test        #load the address of test variable
        lw      $s1,0($s0)      #load the value of test to register $t1
        li      $t0,0
        li      $t1,1
        li      $t2,2
        beq     $s1,$t0,case_0
        beq     $s1,$t1,case_1
        beq     $s1,$t2,case_2
        j       default
case_0: addi    $s2, $s2, 1     #a=a+1
        j       continue
case_1: sub     $s2, $s2,$t1    #a=a-1
        j       continue
case_2: add     $s3,$s3,$s3     #b=2*b
        j       continue
default:
continue:
```

- Result:



Text Segment

Bkpt	Address	Code	Basic	Source
	4194304	0x3c011001	lui $1,4097	5: la $s0,test #load the address of test variable
	4194308	0x34300000	ori $16,$1,0	
	4194312	0x8e110000	lw $17,0($16)	6: lw $s1,0($s0) #load the value of test to register $t1
	4194316	0x24080000	addiu $8,$0,0	7: li $t0,0
	4194320	0x24090001	addiu $9,$0,1	8: li $t1,1
	4194324	0x240a0002	addiu $10,$0,2	9: li $t2,2
	4194328	0x12280003	beq $17,$8,3	10: beq $s1,$t0,case_0
	4194332	0x12290004	beq $17,$9,4	11: beq $s1,$t1,case_1
	4194336	0x122a0005	beq $17,$10,5	12: beq $s1,$t2,case_2
	4194340	0x08100010	j 4194368	13: j default
	4194344	0x22520001	addi $18,$18,1	14: case_0: addi $s2, $s2, 1 #a=a+1
	4194348	0x08100010	j 4194368	15: j continue
	4194352	0x02499022	sub $18,$18,$9	16: case_1: sub $s2, $s2,$t1 #a=a-1
	4194356	0x08100010	j 4194368	17: j continue
	4194360	0x02739820	add $19,$19,$19	18: case_2: add $s3,$s3,$s3 #b=2*b
	4194364	0x08100010	j 4194368	19: j continue

Labels

Label	Address ▲
ass3.asm	
case_0	4194344
case_1	4194352
case_2	4194360
default	4194368
continue	4194368
test	268500992

Data Text

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	1	0	0	0	0	0	0	0
268501024	0	0	0	0	0	0	0	0
268501056	0	0	0	0	0	0	0	0
268501088	0	0	0	0	0	0	0	0
268501120	0	0	0	0	0	0	0	0
268501152	0	0	0	0	0	0	0	0
268501184	0	0	0	0	0	0	0	0
268501216	0	0	0	0	0	0	0	0
268501248	0	0	0	0	0	0	0	0
268501280	0	0	0	0	0	0	0	0
268501312	0	0	0	0	0	0	0	0
268501344	0	0	0	0	0	0	0	0
268501376	0	0	0	0	0	0	0	0
268501408	0	0	0	0	0	0	0	0
268501440	0	0	0	0	0	0	0	0
268501472	0	0	0	0	0	0	0	0

Registers | Coproc 1 | Coproc 0

Name	Number	Value
$zero	0	0
$at	1	268500992
$v0	2	0
$v1	3	0
$a0	4	0
$a1	5	0
$a2	6	0
$a3	7	0
$t0	8	0
$t1	9	1
$t2	10	2
$t3	11	0
$t4	12	0
$t5	13	0
$t6	14	0
$t7	15	0
$s0	16	268500992
$s1	17	1
$s2	18	-1
$s3	19	0
$s4	20	0
$s5	21	0
$s6	22	0
$s7	23	0
$t8	24	0
$t9	25	0
$k0	26	0
$k1	27	0
$gp	28	268468224
$sp	29	2147479548
$fp	30	0
$ra	31	0
pc		4194368
hi		0
lo		0

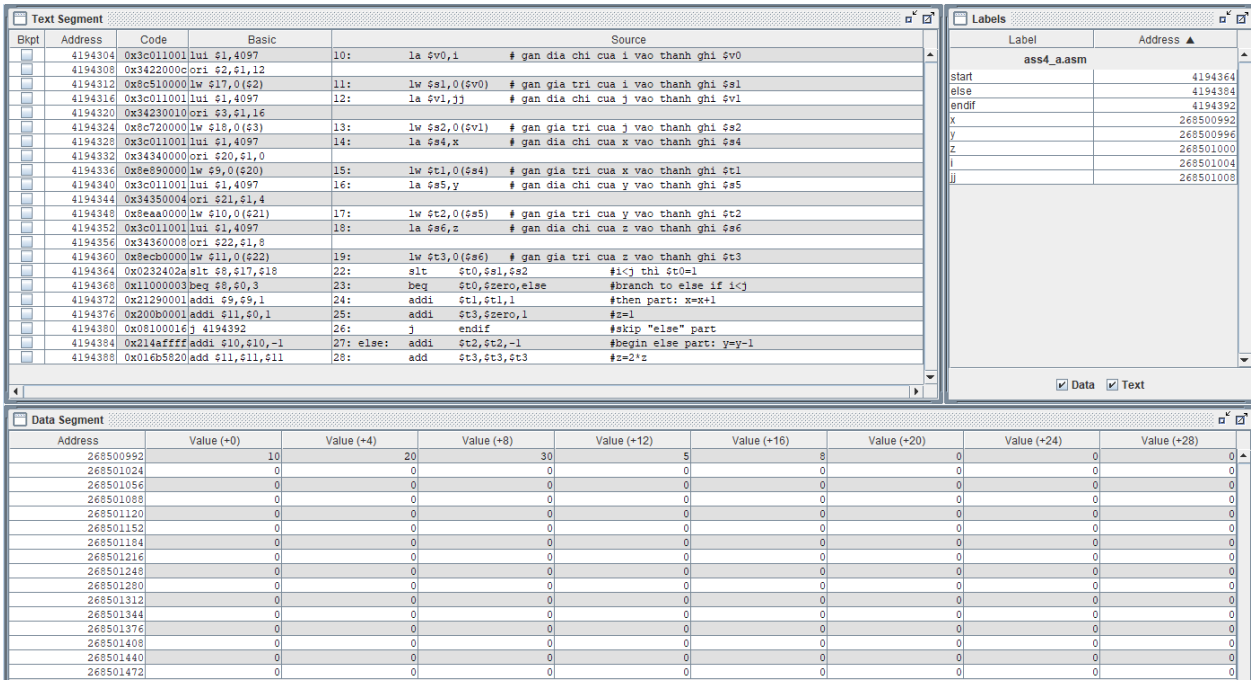
Bài 4:

a. i<j

Code:

```
#Laboratory Exercise 3, Assignment 4, i<j
.data
x:      .word 10          #khoi tao gia tri cho x
y:      .word 20          #khoi tao gia tri cho y
z:      .word 30          #khoi tao gia tri cho z
i:      .word 5           #khoi tao gia tri cho i
jj:     .word 8           #khoi tao gia tri cho jj

.text
        la $v0,i          # gan dia chi cua i vao thanh ghi $v0
        lw $s1,0($v0)     # gan gia tri cua i vao thanh ghi $s1
        la $v1,jj         # gan dia chi cua j vao thanh ghi $v1
        lw $s2,0($v1)     # gan gia tri cua j vao thanh ghi $s2
        la $s4,x          # gan dia chi cua x vao thanh ghi $s4
        lw $t1,0($s4)     # gan gia tri cua x vao thanh ghi $t1
        la $s5,y          # gan dia chi cua y vao thanh ghi $s5
        lw $t2,0($s5)     # gan gia tri cua y vao thanh ghi $t2
        la $s6,z          # gan dia chi cua z vao thanh ghi $s6
        lw $t3,0($s6)     # gan gia tri cua z vao thanh ghi $t3

start:
        slt     $t0,$s1,$s2             #i<j thì $t0=1
        beq     $t0,$zero,else          #branch to else if i<j
        addi    $t1,$t1,1               #then part: x=x+1
        addi    $t3,$zero,1             #z=1
        j       endif                   #skip "else" part
else:   addi    $t2,$t2,-1              #begin else part: y=y-1
        add     $t3,$t3,$t3             #z=2*z
endif:
```

Result:



Text Segment

Bkpt	Address	Code	Basic	Source
	4194304	0x3c011001	lui $1,4097	10: la $v0,i # gan dia chi cua i vao thanh ghi $v0
	4194308	0x3422000c	ori $2,$1,12	
	4194312	0x8c510000	lw $17,0($2)	11: lw $s1,0($v0) # gan gia tri cua i vao thanh ghi $s1
	4194316	0x3c011001	lui $1,4097	12: la $v1,jj # gan dia chi cua j vao thanh ghi $v1
	4194320	0x34230010	ori $3,$1,16	
	4194324	0x8c720000	lw $18,0($3)	13: lw $s2,0($v1) # gan gia tri cua j vao thanh ghi $s2
	4194328	0x3c011001	lui $1,4097	14: la $s4,x # gan dia chi cua x vao thanh ghi $s4
	4194332	0x34340000	ori $20,$1,0	
	4194336	0x8e890000	lw $9,0($20)	15: lw $t1,0($s4) # gan gia tri cua x vao thanh ghi $t1
	4194340	0x3c011001	lui $1,4097	16: la $s5,y # gan dia chi cua y vao thanh ghi $s5
	4194344	0x34350004	ori $21,$1,4	
	4194348	0x8eaa0000	lw $10,0($21)	17: lw $t2,0($s5) # gan gia tri cua y vao thanh ghi $t2
	4194352	0x3c011001	lui $1,4097	18: la $s6,z # gan dia chi cua z vao thanh ghi $s6
	4194356	0x34360008	ori $22,$1,8	
	4194360	0x8ecb0000	lw $11,0($22)	19: lw $t3,0($s6) # gan gia tri cua z vao thanh ghi $t3
	4194364	0x0232402a	slt $8,$17,$18	22: slt $t0,$s1,$s2 #i<j thi $t0=1
	4194368	0x11000003	beq $8,$0,3	23: beq $t0,$zero,else #branch to else if i<j
	4194372	0x21290001	addi $9,$9,1	24: addi $t1,$t1,1 #then part: x=x+1
	4194376	0x200b0001	addi $11,$0,1	25: addi $t3,$zero,1 #z=1
	4194380	0x08100016	j 4194392	26: j endif #skip "else" part
	4194384	0x214affff	addi $10,$10,-1	27: else: addi $t2,$t2,-1 #begin else part: y=y-1
	4194388	0x016b5820	add $11,$11,$11	28: add $t3,$t3,$t3 #z=2*z

Labels

Label	Address ▲
ass4_a.asm	
start	4194364
else	4194384
endif	4194392
x	268500992
y	268500996
z	268501000
i	268501004
jj	268501008

☑ Data ☑ Text

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	10	20	30	5	8	0	0	0
268501024	0	0	0	0	0	0	0	0
268501056	0	0	0	0	0	0	0	0
268501088	0	0	0	0	0	0	0	0
268501120	0	0	0	0	0	0	0	0
268501152	0	0	0	0	0	0	0	0
268501184	0	0	0	0	0	0	0	0
268501216	0	0	0	0	0	0	0	0
268501248	0	0	0	0	0	0	0	0
268501280	0	0	0	0	0	0	0	0
268501312	0	0	0	0	0	0	0	0
268501344	0	0	0	0	0	0	0	0
268501376	0	0	0	0	0	0	0	0
268501408	0	0	0	0	0	0	0	0
268501440	0	0	0	0	0	0	0	0
268501472	0	0	0	0	0	0	0	0

Registers | Coproc 1 | Coproc 0

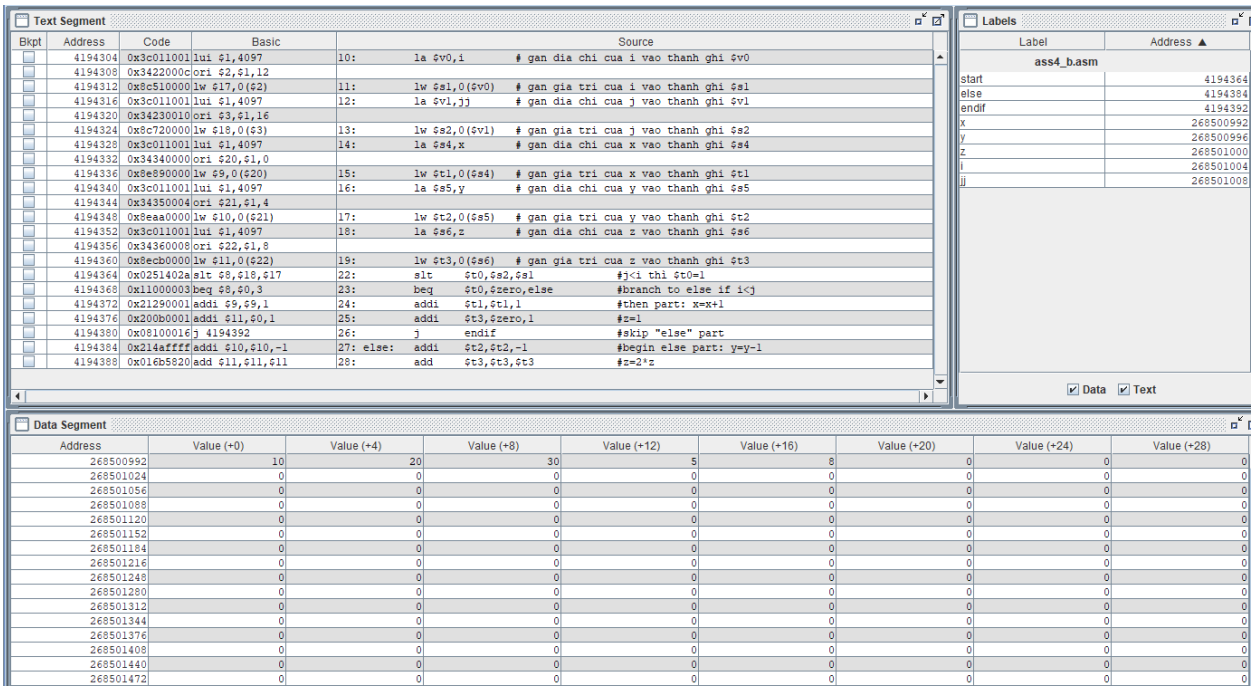
Name	Number	Value
$zero	0	0
$at	1	268500992
$v0	2	268501004
$v1	3	268501008
$a0	4	0
$a1	5	0
$a2	6	0
$a3	7	0
$t0	8	1
$t1	9	11
$t2	10	20
$t3	11	1
$t4	12	0
$t5	13	0
$t6	14	0
$t7	15	0
$s0	16	0
$s1	17	5
$s2	18	8
$s3	19	0
$s4	20	268500992
$s5	21	268500996
$s6	22	268501000
$s7	23	0
$t8	24	0
$t9	25	0
$k0	26	0
$k1	27	0
$gp	28	268468224
$sp	29	2147479548
$fp	30	0
$ra	31	0
pc		4194392
hi		0
lo		0

b. i>=j

Code:

```
#Laboratory Exercise 3, Assignment 4, i>=j
.data
x:      .word 10        #khoi tao gia tri cho x
y:      .word 20        #khoi tao gia tri cho y
z:      .word 30        #khoi tao gia tri cho z
i:      .word 5         #khoi tao gia tri cho i
jj:     .word 8         #khoi tao gia tri cho jj

.text
        la $v0,i        # gan dia chi cua i vao thanh ghi $v0
        lw $s1,0($v0)   # gan gia tri cua i vao thanh ghi $s1
        la $v1,jj       # gan dia chi cua j vao thanh ghi $v1
        lw $s2,0($v1)   # gan gia tri cua j vao thanh ghi $s2
        la $s4,x        # gan dia chi cua x vao thanh ghi $s4
        lw $t1,0($s4)   # gan gia tri cua x vao thanh ghi $t1
        la $s5,y        # gan dia chi cua y vao thanh ghi $s5
        lw $t2,0($s5)   # gan gia tri cua y vao thanh ghi $t2
        la $s6,z        # gan dia chi cua z vao thanh ghi $s6
        lw $t3,0($s6)   # gan gia tri cua z vao thanh ghi $t3

start:
        slt     $t0,$s2,$s1             #j<i thì $t0=1
        beq     $t0,$zero,else          #branch to else if i<j
        addi    $t1,$t1,1               #then part: x=x+1
        addi    $t3,$zero,1             #z=1
        j       endif                   #skip "else" part
else:   addi    $t2,$t2,-1              #begin else part: y=y-1
        add     $t3,$t3,$t3             #z=2*z
endif:
```

Result:



Text Segment

Bkpt	Address	Code	Basic	Source
	4194304	0x3c011001	lui $1,4097	10: la $v0,i # gan dia chi cua i vao thanh ghi $v0
	4194308	0x3422000c	ori $2,$1,12	
	4194312	0x8c510000	lw $17,0($2)	11: lw $s1,0($v0) # gan gia tri cua i vao thanh ghi $s1
	4194316	0x3c011001	lui $1,4097	12: la $v1,jj # gan dia chi cua j vao thanh ghi $v1
	4194320	0x34230010	ori $3,$1,16	
	4194324	0x8c720000	lw $18,0($3)	13: lw $s2,0($v1) # gan gia tri cua j vao thanh ghi $s2
	4194328	0x3c011001	lui $1,4097	14: la $s4,x # gan dia chi cua x vao thanh ghi $s4
	4194332	0x34340000	ori $20,$1,0	
	4194336	0x8e890000	lw $9,0($20)	15: lw $t1,0($s4) # gan gia tri cua x vao thanh ghi $t1
	4194340	0x3c011001	lui $1,4097	16: la $s5,y # gan dia chi cua y vao thanh ghi $s5
	4194344	0x34350004	ori $21,$1,4	
	4194348	0x8eaa0000	lw $10,0($21)	17: lw $t2,0($s5) # gan gia tri cua y vao thanh ghi $t2
	4194352	0x3c011001	lui $1,4097	18: la $s6,z # gan dia chi cua z vao thanh ghi $s6
	4194356	0x34360008	ori $22,$1,8	
	4194360	0x8ecb0000	lw $11,0($22)	19: lw $t3,0($s6) # gan gia tri cua z vao thanh ghi $t3
	4194364	0x0251402a	slt $8,$18,$17	22: slt $t0,$s2,$s1 #j<i thi $t0=1
	4194368	0x11000003	beq $8,$0,3	23: beq $t0,$zero,else #branch to else if i<j
	4194372	0x21290001	addi $9,$9,1	24: addi $t1,$t1,1 #then part: x=x+1
	4194376	0x200b0001	addi $11,$0,1	25: addi $t3,$zero,1 #z=1
	4194380	0x08100016	j 4194392	26: j endif #skip "else" part
	4194384	0x214affff	addi $10,$10,-1	27: else: addi $t2,$t2,-1 #begin else part: y=y-1
	4194388	0x016b5820	add $11,$11,$11	28: add $t3,$t3,$t3 #z=2*z

Labels

Label	Address ▲
ass4_b.asm	
start	4194364
else	4194384
endif	4194392
x	268500992
y	268500996
z	268501000
i	268501004
jj	268501008

☑ Data ☑ Text

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	10	20	30	5	8	0	0	0
268501024	0	0	0	0	0	0	0	0
268501056	0	0	0	0	0	0	0	0
268501088	0	0	0	0	0	0	0	0
268501120	0	0	0	0	0	0	0	0
268501152	0	0	0	0	0	0	0	0
268501184	0	0	0	0	0	0	0	0
268501216	0	0	0	0	0	0	0	0
268501248	0	0	0	0	0	0	0	0
268501280	0	0	0	0	0	0	0	0
268501312	0	0	0	0	0	0	0	0
268501344	0	0	0	0	0	0	0	0
268501376	0	0	0	0	0	0	0	0
268501408	0	0	0	0	0	0	0	0
268501440	0	0	0	0	0	0	0	0
268501472	0	0	0	0	0	0	0	0

Registers | Coproc 1 | Coproc 0

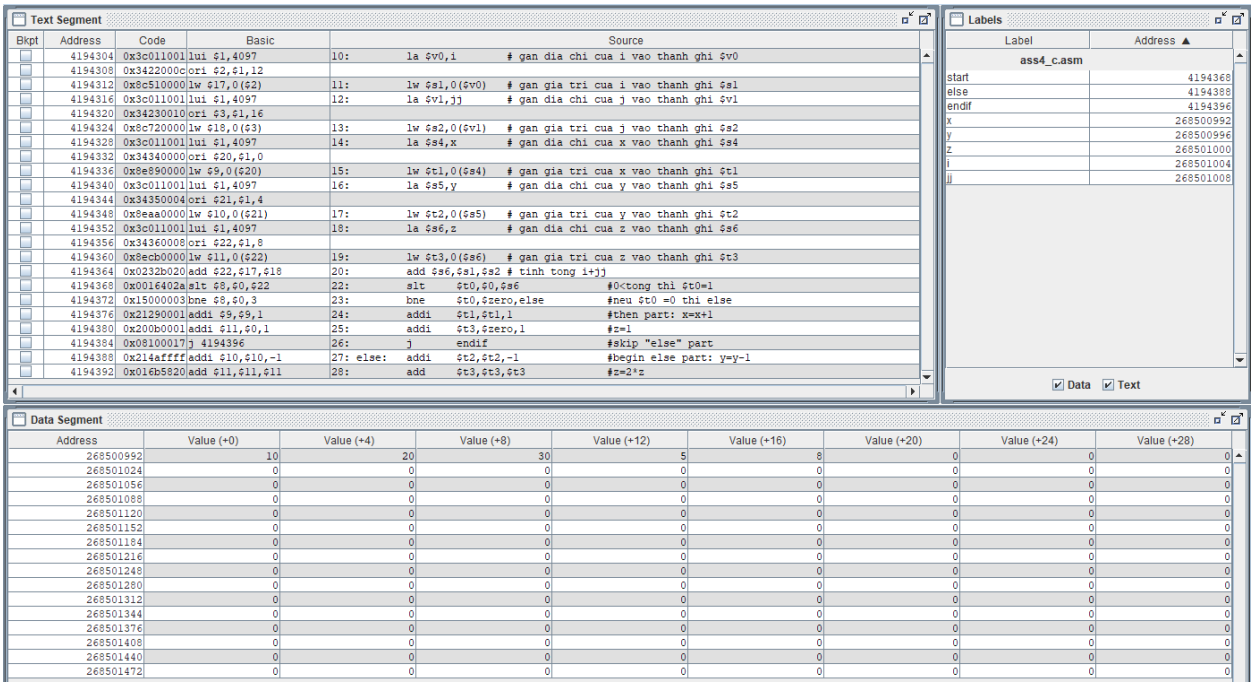
Name	Number	Value
$zero	0	0
$at	1	268500992
$v0	2	268501004
$v1	3	268501008
$a0	4	0
$a1	5	0
$a2	6	0
$a3	7	0
$t0	8	0
$t1	9	10
$t2	10	19
$t3	11	60
$t4	12	0
$t5	13	0
$t6	14	0
$t7	15	0
$s0	16	0
$s1	17	5
$s2	18	8
$s3	19	0
$s4	20	268500992
$s5	21	268500996
$s6	22	268501000
$s7	23	0
$t8	24	0
$t9	25	0
$k0	26	0
$k1	27	0
$gp	28	268468224
$sp	29	2147479548
$fp	30	0
$ra	31	0
pc		4194392
hi		0
lo		0

c. i+j<=0

Code:

```
#Laboratory Exercise 3, Assignment 4, i+j<=0
.data
x:      .word 10        #khoi tao gia tri cho x
y:      .word 20        #khoi tao gia tri cho y
z:      .word 30        #khoi tao gia tri cho z
i:      .word 5         #khoi tao gia tri cho i
jj:     .word 8         #khoi tao gia tri cho jj

.text
        la $v0,i        # gan dia chi cua i vao thanh ghi $v0
        lw $s1,0($v0)   # gan gia tri cua i vao thanh ghi $s1
        la $v1,jj       # gan dia chi cua j vao thanh ghi $v1
        lw $s2,0($v1)   # gan gia tri cua j vao thanh ghi $s2
        la $s4,x        # gan dia chi cua x vao thanh ghi $s4
        lw $t1,0($s4)   # gan gia tri cua x vao thanh ghi $t1
        la $s5,y        # gan dia chi cua y vao thanh ghi $s5
        lw $t2,0($s5)   # gan gia tri cua y vao thanh ghi $t2
        la $s6,z        # gan dia chi cua z vao thanh ghi $s6
        lw $t3,0($s6)   # gan gia tri cua z vao thanh ghi $t3
        add $s6,$s1,$s2 # tinh tong i+jj
start:
        slt     $t0,$0,$s6              #0<tong thì $t0=1
        bne     $t0,$zero,else          #neu $t0 =0 thi else
        addi    $t1,$t1,1               #then part: x=x+1
        addi    $t3,$zero,1             #z=1
        j       endif                   #skip "else" part
else:   addi    $t2,$t2,-1              #begin else part: y=y-1
        add     $t3,$t3,$t3             #z=2*z
endif:
```

Result:



Text Segment

Bkpt	Address	Code	Basic	Source
	4194304	0x3c011001	lui $1,4097	10: la $v0,i # gan dia chi cua i vao thanh ghi $v0
	4194308	0x3422000c	ori $2,$1,12	
	4194312	0x8c510000	lw $17,0($2)	11: lw $s1,0($v0) # gan gia tri cua i vao thanh ghi $s1
	4194316	0x3c011001	lui $1,4097	12: la $v1,jj # gan dia chi cua j vao thanh ghi $v1
	4194320	0x34230010	ori $3,$1,16	
	4194324	0x8c720000	lw $18,0($3)	13: lw $s2,0($v1) # gan gia tri cua j vao thanh ghi $s2
	4194328	0x3c011001	lui $1,4097	14: la $s4,x # gan dia chi cua x vao thanh ghi $s4
	4194332	0x34340000	ori $20,$1,0	
	4194336	0x8e890000	lw $9,0($20)	15: lw $t1,0($s4) # gan gia tri cua x vao thanh ghi $t1
	4194340	0x3c011001	lui $1,4097	16: la $s5,y # gan dia chi cua y vao thanh ghi $s5
	4194344	0x34350004	ori $21,$1,4	
	4194348	0x8eaa0000	lw $10,0($21)	17: lw $t2,0($s5) # gan gia tri cua y vao thanh ghi $t2
	4194352	0x3c011001	lui $1,4097	18: la $s6,z # gan dia chi cua z vao thanh ghi $s6
	4194356	0x34360008	ori $22,$1,8	
	4194360	0x8ecb0000	lw $11,0($22)	19: lw $t3,0($s6) # gan gia tri cua z vao thanh ghi $t3
	4194364	0x0232b020	add $22,$17,$18	20: add $s6,$s1,$s2 # tinh tong i+jj
	4194368	0x0016402a	slt $8,$0,$22	22: slt $t0,$0,$s6 #0<tong thi $t0=1
	4194372	0x15000003	bne $8,$0,3	23: bne $t0,$zero,else #neu $t0 =0 thi else
	4194376	0x21290001	addi $9,$9,1	24: addi $t1,$t1,1 #then part: x=x+1
	4194380	0x200b0001	addi $11,$0,1	25: addi $t3,$zero,1 #z=1
	4194384	0x08100017	j 4194396	26: j endif #skip "else" part
	4194388	0x214affff	addi $10,$10,-1	27: else: addi $t2,$t2,-1 #begin else part: y=y-1
	4194392	0x016b5820	add $11,$11,$11	28: add $t3,$t3,$t3 #z=2*z

Labels

Label	Address ▲
ass4_c.asm	
start	4194368
else	4194388
endif	4194396
x	268500992
y	268500996
z	268501000
i	268501004
jj	268501008

☑ Data ☑ Text

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	10	20	30	5	8	0	0	0
268501024	0	0	0	0	0	0	0	0
268501056	0	0	0	0	0	0	0	0
268501088	0	0	0	0	0	0	0	0
268501120	0	0	0	0	0	0	0	0
268501152	0	0	0	0	0	0	0	0
268501184	0	0	0	0	0	0	0	0
268501216	0	0	0	0	0	0	0	0
268501248	0	0	0	0	0	0	0	0
268501280	0	0	0	0	0	0	0	0
268501312	0	0	0	0	0	0	0	0
268501344	0	0	0	0	0	0	0	0
268501376	0	0	0	0	0	0	0	0
268501408	0	0	0	0	0	0	0	0
268501440	0	0	0	0	0	0	0	0
268501472	0	0	0	0	0	0	0	0

Registers | Coproc 1 | Coproc 0

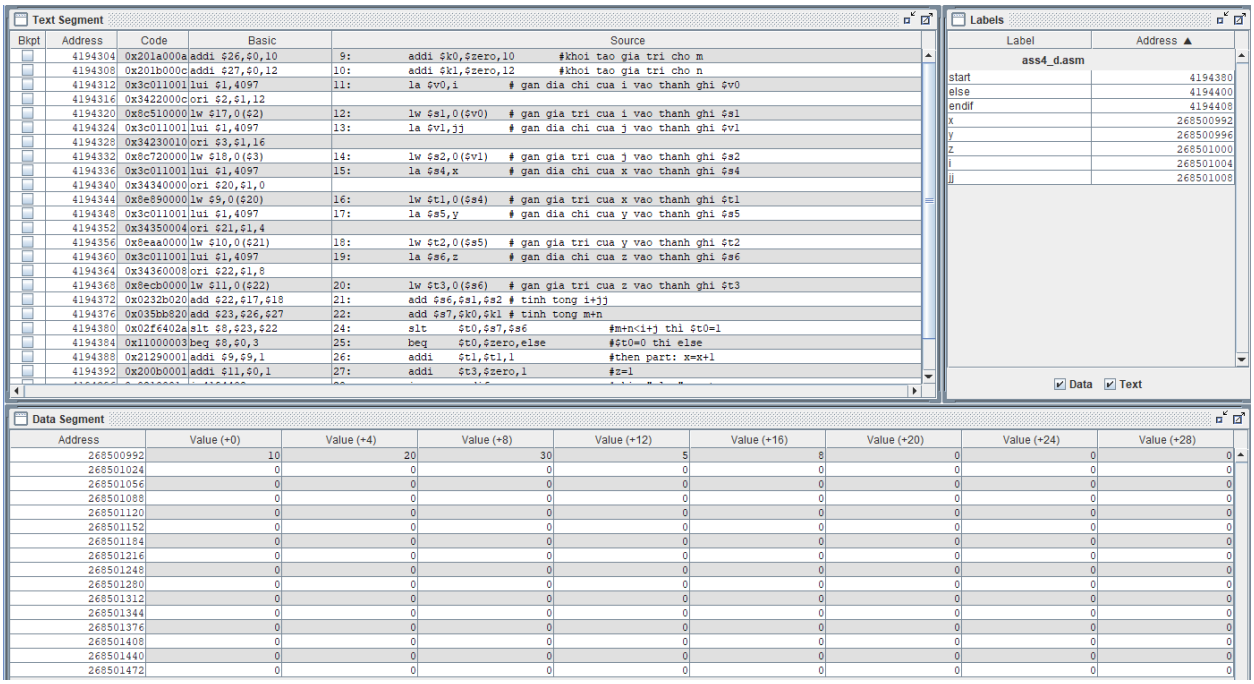
Name	Number	Value
$zero	0	0
$at	1	268500992
$v0	2	268501004
$v1	3	268501008
$a0	4	0
$a1	5	0
$a2	6	0
$a3	7	0
$t0	8	1
$t1	9	10
$t2	10	19
$t3	11	60
$t4	12	0
$t5	13	0
$t6	14	0
$t7	15	0
$s0	16	0
$s1	17	5
$s2	18	8
$s3	19	0
$s4	20	268500992
$s5	21	268500996
$s6	22	13
$s7	23	0
$t8	24	0
$t9	25	0
$k0	26	0
$k1	27	0
$gp	28	268468224
$sp	29	2147479548
$fp	30	0
$ra	31	0
pc		4194396
hi		0
lo		0

d. i+j>m+n

Code:

```
.data
x:      .word 10          #khoi tao gia tri cho x
y:      .word 20          #khoi tao gia tri cho y
z:      .word 30          #khoi tao gia tri cho z
i:      .word 5           #khoi tao gia tri cho i
jj:     .word 8           #khoi tao gia tri cho jj
.text
        addi $k0,$zero,10       #khoi tao gia tri cho m
        addi $k1,$zero,12       #khoi tao gia tri cho n
        la $v0,i          # gan dia chi cua i vao thanh ghi $v0
        lw $s1,0($v0)     # gan gia tri cua i vao thanh ghi $s1
        la $v1,jj         # gan dia chi cua j vao thanh ghi $v1
        lw $s2,0($v1)     # gan gia tri cua j vao thanh ghi $s2
        la $s4,x          # gan dia chi cua x vao thanh ghi $s4
        lw $t1,0($s4)     # gan gia tri cua x vao thanh ghi $t1
        la $s5,y          # gan dia chi cua y vao thanh ghi $s5
        lw $t2,0($s5)     # gan gia tri cua y vao thanh ghi $t2
        la $s6,z          # gan dia chi cua z vao thanh ghi $s6
        lw $t3,0($s6)     # gan gia tri cua z vao thanh ghi $t3
        add $s6,$s1,$s2 # tinh tong i+jj
        add $s7,$k0,$k1 # tinh tong m+n
start:
        slt     $t0,$s7,$s6             #m+n<i+j thì $t0=1
        beq     $t0,$zero,else          #$t0=0 thi else
        addi    $t1,$t1,1               #then part: x=x+1
        addi    $t3,$zero,1             #z=1
        j       endif                   #skip "else" part
else:   addi    $t2,$t2,-1              #begin else part: y=y-1
        add     $t3,$t3,$t3             #z=2*z
endif:
```

Result:



Text Segment

Bkpt	Address	Code	Basic		Source
	4194304	0x201a000a	addi $26,$0,10	9:	addi $k0,$zero,10 #khoi tao gia tri cho m
	4194308	0x201b000c	addi $27,$0,12	10:	addi $k1,$zero,12 #khoi tao gia tri cho n
	4194312	0x3c011001	lui $1,4097	11:	la $v0,i # gan dia chi cua i vao thanh ghi $v0
	4194316	0x3422000c	ori $2,$1,12		
	4194320	0x8c510000	lw $17,0($2)	12:	lw $s1,0($v0) # gan gia tri cua i vao thanh ghi $s1
	4194324	0x3c011001	lui $1,4097	13:	la $v1,jj # gan dia chi cua j vao thanh ghi $v1
	4194328	0x34230010	ori $3,$1,16		
	4194332	0x8c720000	lw $18,0($3)	14:	lw $s2,0($v1) # gan gia tri cua j vao thanh ghi $s2
	4194336	0x3c011001	lui $1,4097	15:	la $s4,x # gan dia chi cua x vao thanh ghi $s4
	4194340	0x34340000	ori $20,$1,0		
	4194344	0x8e890000	lw $9,0($20)	16:	lw $t1,0($s4) # gan gia tri cua x vao thanh ghi $t1
	4194348	0x3c011001	lui $1,4097	17:	la $s5,y # gan dia chi cua y vao thanh ghi $s5
	4194352	0x34350004	ori $21,$1,4		
	4194356	0x8eaa0000	lw $10,0($21)	18:	lw $t2,0($s5) # gan gia tri cua y vao thanh ghi $t2
	4194360	0x3c011001	lui $1,4097	19:	la $s6,z # gan dia chi cua z vao thanh ghi $s6
	4194364	0x34360008	ori $22,$1,8		
	4194368	0x8ecb0000	lw $11,0($22)	20:	lw $t3,0($s6) # gan gia tri cua z vao thanh ghi $t3
	4194372	0x0232b020	add $22,$17,$18	21:	add $s6,$s1,$s2 # tinh tong i+jj
	4194376	0x035bb820	add $23,$26,$27	22:	add $s7,$k0,$k1 # tinh tong m+n
	4194380	0x02f6402a	slt $8,$23,$22	24:	slt $t0,$s7,$s6 #m+n<i+j thi $t0=1
	4194384	0x11000003	beq $8,$0,3	25:	beq $t0,$zero,else #$t0=0 thi else
	4194388	0x21290001	addi $9,$9,1	26:	addi $t1,$t1,1 #then part: x=x+1
	4194392	0x200b0001	addi $11,$0,1	27:	addi $t3,$zero,1 #z=1

Labels

Label	Address ▲
ass4_d.asm	
start	4194380
else	4194400
endif	4194408
x	268500992
y	268500996
z	268501000
i	268501004
jj	268501008

☑ Data ☑ Text

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	10	20	30	5	8	0	0	0
268501024	0	0	0	0	0	0	0	0
268501056	0	0	0	0	0	0	0	0
268501088	0	0	0	0	0	0	0	0
268501120	0	0	0	0	0	0	0	0
268501152	0	0	0	0	0	0	0	0
268501184	0	0	0	0	0	0	0	0
268501216	0	0	0	0	0	0	0	0
268501248	0	0	0	0	0	0	0	0
268501280	0	0	0	0	0	0	0	0
268501312	0	0	0	0	0	0	0	0
268501344	0	0	0	0	0	0	0	0
268501376	0	0	0	0	0	0	0	0
268501408	0	0	0	0	0	0	0	0
268501440	0	0	0	0	0	0	0	0
268501472	0	0	0	0	0	0	0	0

Registers | Coproc 1 | Coproc 0

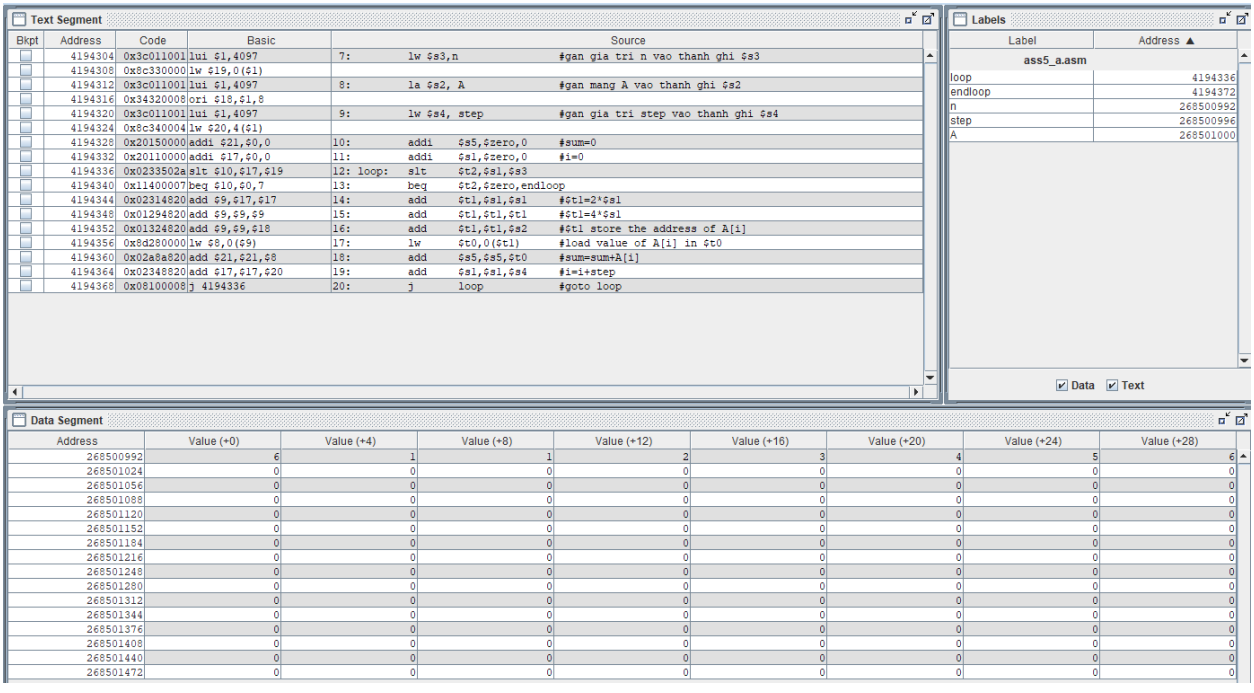
Name	Number	Value
$zero	0	0
$at	1	268500992
$v0	2	268501004
$v1	3	268501008
$a0	4	0
$a1	5	0
$a2	6	0
$a3	7	0
$t0	8	0
$t1	9	10
$t2	10	19
$t3	11	60
$t4	12	0
$t5	13	0
$t6	14	0
$t7	15	0
$s0	16	0
$s1	17	5
$s2	18	8
$s3	19	0
$s4	20	268500992
$s5	21	268500996
$s6	22	13
$s7	23	22
$t8	24	0
$t9	25	0
$k0	26	10
$k1	27	12
$gp	28	268468224
$sp	29	2147479548
$fp	30	0
$ra	31	0
pc		4194408
hi		0
lo		0

Bài 5:

a. i<n
Code:

```
#Laboratory Exercise 3, Assigment 5,i<n
.data
n:      .word 6                         #khoi tao gia tri n=6
step:   .word 1                         #khoi tao gia tri step =1
A:      .word 1,2,3,4,5,6       #khoi tao mang A
.text
        lw $s3,n                #gan gia tri n vao thanh ghi $s3
        la $s2, A               #gan mang A vao thanh ghi $s2
        lw $s4, step            #gan gia tri step vao thanh ghi $s4
        addi    $s5,$zero,0     #sum=0
        addi    $s1,$zero,0     #i=0
loop:   slt     $t2,$s1,$s3
        beq     $t2,$zero,endloop
        add     $t1,$s1,$s1     #$t1=2*$s1
        add     $t1,$t1,$t1     #$t1=4*$s1
        add     $t1,$t1,$s2     #$t1 store the address of A[i]
        lw      $t0,0($t1)      #load value of A[i] in $t0
        add     $s5,$s5,$t0     #sum=sum+A[i]
        add     $s1,$s1,$s4     #i=i+step
        j       loop            #goto loop
endloop:
```

Result:



Text Segment

Bkpt	Address	Code	Basic	Source
	4194304	0x3c011001	lui $1,4097	7: lw $s3,n #gan gia tri n vao thanh ghi $s3
	4194308	0x8c330000	lw $19,0($1)	
	4194312	0x3c011001	lui $1,4097	8: la $s2, A #gan mang A vao thanh ghi $s2
	4194316	0x34320008	ori $18,$1,8	
	4194320	0x3c011001	lui $1,4097	9: lw $s4, step #gan gia tri step vao thanh ghi $s4
	4194324	0x8c340004	lw $20,4($1)	
	4194328	0x20150000	addi $21,$0,0	10: addi $s5,$zero,0 #sum=0
	4194332	0x20110000	addi $17,$0,0	11: addi $s1,$zero,0 #i=0
	4194336	0x0233502a	slt $10,$17,$19	12: loop: slt $t2,$s1,$s3
	4194340	0x11400007	beq $10,$0,7	13: beq $t2,$zero,endloop
	4194344	0x02314820	add $9,$17,$17	14: add $t1,$s1,$s1 #$t1=2*$s1
	4194348	0x01294820	add $9,$9,$9	15: add $t1,$t1,$t1 #$t1=4*$s1
	4194352	0x01324820	add $9,$9,$18	16: add $t1,$t1,$s2 #$t1 store the address of A[i]
	4194356	0x8d280000	lw $8,0($9)	17: lw $t0,0($t1) #load value of A[i] in $t0
	4194360	0x02a8a820	add $21,$21,$8	18: add $s5,$s5,$t0 #sum=sum+A[i]
	4194364	0x02348820	add $17,$17,$20	19: add $s1,$s1,$s4 #i=i+step
	4194368	0x08100008	j 4194336	20: j loop #goto loop

Labels

Label	Address
ass5_a.asm	
loop	4194336
endloop	4194372
n	268500992
step	268500996
A	268501000

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	6	1	1	2	3	4	5	6
268501024	0	0	0	0	0	0	0	0
268501056	0	0	0	0	0	0	0	0
268501088	0	0	0	0	0	0	0	0
268501120	0	0	0	0	0	0	0	0
268501152	0	0	0	0	0	0	0	0
268501184	0	0	0	0	0	0	0	0
268501216	0	0	0	0	0	0	0	0
268501248	0	0	0	0	0	0	0	0
268501280	0	0	0	0	0	0	0	0
268501312	0	0	0	0	0	0	0	0
268501344	0	0	0	0	0	0	0	0
268501376	0	0	0	0	0	0	0	0
268501408	0	0	0	0	0	0	0	0
268501440	0	0	0	0	0	0	0	0
268501472	0	0	0	0	0	0	0	0

Registers | Coproc 1 | Coproc 0

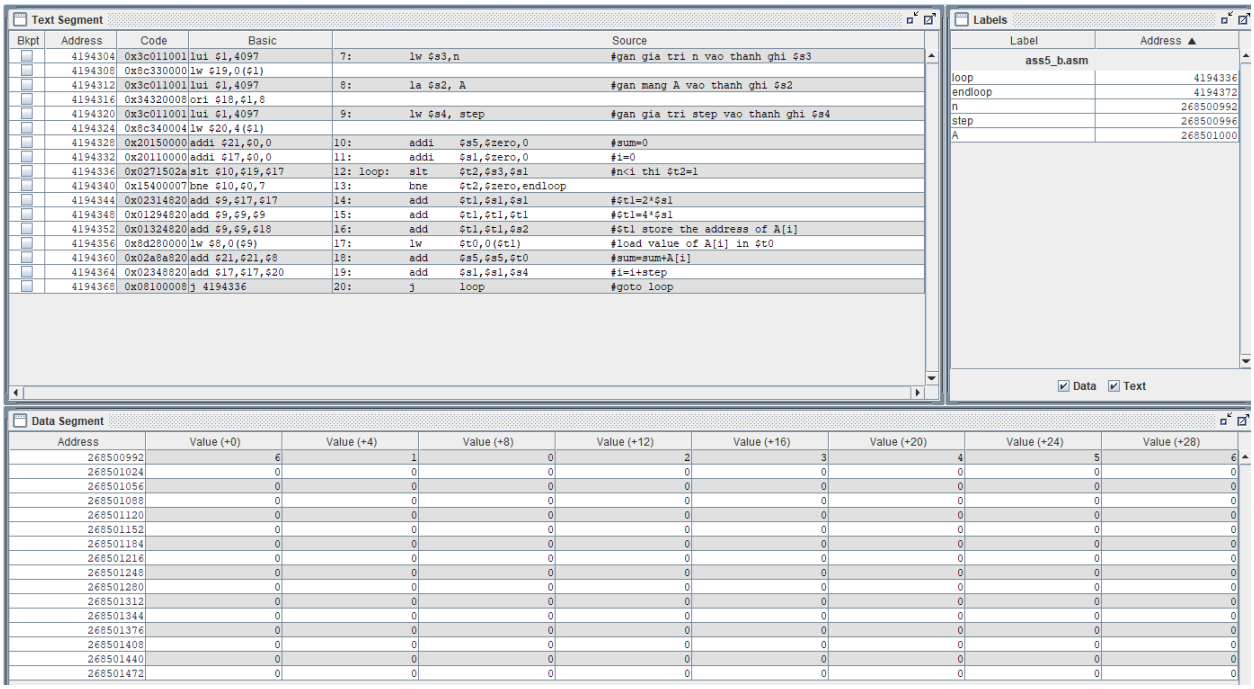
Name	Number	Value
$zero	0	0
$at	1	268500992
$v0	2	0
$v1	3	0
$a0	4	0
$a1	5	0
$a2	6	0
$a3	7	0
$t0	8	6
$t1	9	268501020
$t2	10	0
$t3	11	0
$t4	12	0
$t5	13	0
$t6	14	0
$t7	15	0
$s0	16	0
$s1	17	6
$s2	18	268501000
$s3	19	6
$s4	20	1
$s5	21	21
$s6	22	0
$s7	23	0
$t8	24	0
$t9	25	0
$k0	26	0
$k1	27	0
$gp	28	268468224
$sp	29	2147479548
$fp	30	0
$ra	31	0
pc		4194372
hi		0
lo		0

b. i<=n

Code:

```
#Laboratory Exercise 3, Assigment 5,i<=n
.data
n:      .word 6                         #khoi tao gia tri n=6
step:   .word 1                         #khoi tao gia tri step =1
A:      .word 0,2,3,4,5,6               #khoi tao mang A
.text
        lw $s3,n                        #gan gia tri n vao thanh ghi $s3
        la $s2, A                       #gan mang A vao thanh ghi $s2
        lw $s4, step                    #gan gia tri step vao thanh ghi $s4
        addi    $s5,$zero,0             #sum=0
        addi    $s1,$zero,0             #i=0
loop:   slt     $t2,$s3,$s1             #n<i thi $t2=1
        bne     $t2,$zero,endloop
        add     $t1,$s1,$s1             #$t1=2*$s1
        add     $t1,$t1,$t1             #$t1=4*$s1
        add     $t1,$t1,$s2             #$t1 store the address of A[i]
        lw      $t0,0($t1)              #load value of A[i] in $t0
        add     $s5,$s5,$t0             #sum=sum+A[i]
        add     $s1,$s1,$s4             #i=i+step
        j       loop                    #goto loop
endloop:
```

Result:



Text Segment

Bkpt	Address	Code	Basic				Source
	4194304	0x3c011001	lui $1,4097	7:	lw $s3,n		#gan gia tri n vao thanh ghi $s3
	4194308	0x8c330000	lw $19,0($1)				
	4194312	0x3c011001	lui $1,4097	8:	la $s2, A		#gan mang A vao thanh ghi $s2
	4194316	0x34320008	ori $18,$1,8				
	4194320	0x3c011001	lui $1,4097	9:	lw $s4, step		#gan gia tri step vao thanh ghi $s4
	4194324	0x8c340004	lw $20,4($1)				
	4194328	0x20150000	addi $21,$0,0	10:	addi	$s5,$zero,0	#sum=0
	4194332	0x20110000	addi $17,$0,0	11:	addi	$s1,$zero,0	#i=0
	4194336	0x0271502a	slt $10,$19,$17	12: loop:	slt	$t2,$s3,$s1	#n<i thi $t2=1
	4194340	0x15400007	bne $10,$0,7	13:	bne	$t2,$zero,endloop	
	4194344	0x02314820	add $9,$17,$17	14:	add	$t1,$s1,$s1	#$t1=2*$s1
	4194348	0x01294820	add $9,$9,$9	15:	add	$t1,$t1,$t1	#$t1=4*$s1
	4194352	0x01324820	add $9,$9,$18	16:	add	$t1,$t1,$s2	#$t1 store the address of A[i]
	4194356	0x8d280000	lw $8,0($9)	17:	lw	$t0,0($t1)	#load value of A[i] in $t0
	4194360	0x02a8a820	add $21,$21,$8	18:	add	$s5,$s5,$t0	#sum=sum+A[i]
	4194364	0x02348820	add $17,$17,$20	19:	add	$s1,$s1,$s4	#i=i+step
	4194368	0x08100008	j 4194336	20:	j	loop	#goto loop

Labels

Label	Address ▲
ass5_b.asm	
loop	4194336
endloop	4194372
n	268500992
step	268500996
A	268501000

Data Text

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	6	1	0	2	3	4	5	6
268501024	0	0	0	0	0	0	0	0
268501056	0	0	0	0	0	0	0	0
268501088	0	0	0	0	0	0	0	0
268501120	0	0	0	0	0	0	0	0
268501152	0	0	0	0	0	0	0	0
268501184	0	0	0	0	0	0	0	0
268501216	0	0	0	0	0	0	0	0
268501248	0	0	0	0	0	0	0	0
268501280	0	0	0	0	0	0	0	0
268501312	0	0	0	0	0	0	0	0
268501344	0	0	0	0	0	0	0	0
268501376	0	0	0	0	0	0	0	0
268501408	0	0	0	0	0	0	0	0
268501440	0	0	0	0	0	0	0	0
268501472	0	0	0	0	0	0	0	0

Registers | Coproc 1 | Coproc 0

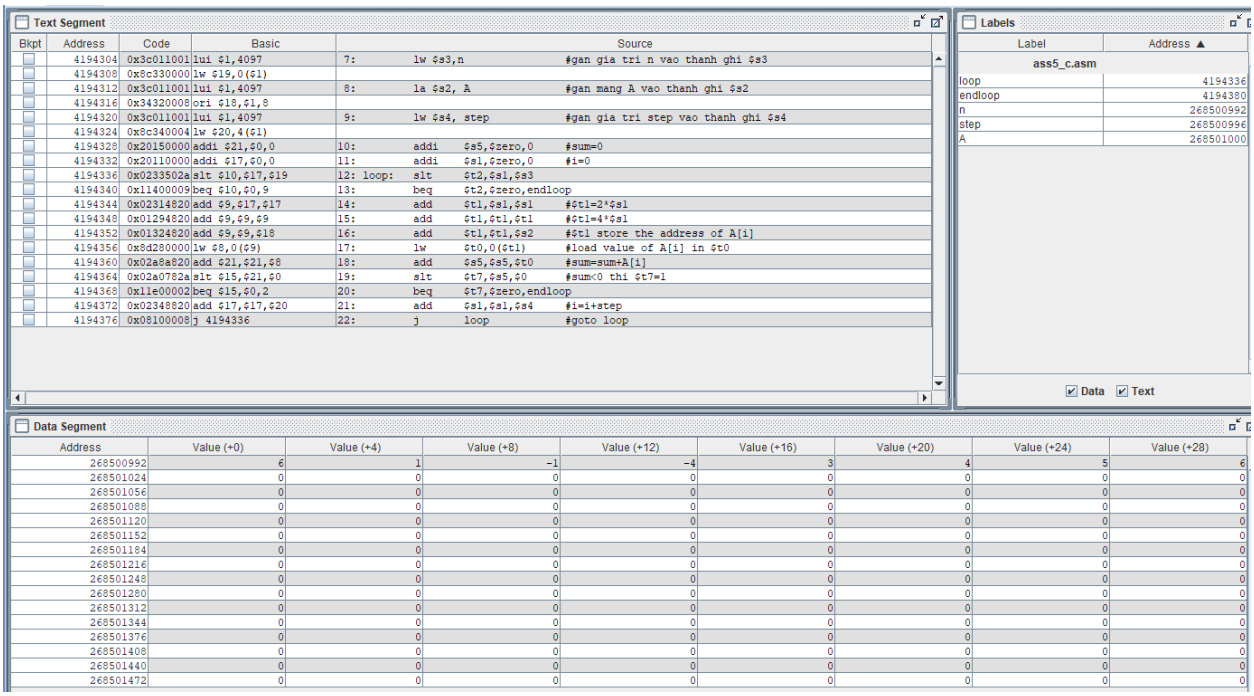
Name	Number	Value
$zero	0	0
$at	1	268500992
$v0	2	0
$v1	3	0
$a0	4	0
$a1	5	0
$a2	6	0
$a3	7	0
$t0	8	0
$t1	9	268501024
$t2	10	1
$t3	11	0
$t4	12	0
$t5	13	0
$t6	14	0
$t7	15	0
$s0	16	0
$s1	17	7
$s2	18	268501000
$s3	19	6
$s4	20	1
$s5	21	20
$s6	22	0
$s7	23	0
$t8	24	0
$t9	25	0
$k0	26	0
$k1	27	0
$gp	28	268468224
$sp	29	2147479548
$fp	30	0
$ra	31	0
pc		4194372
hi		0
lo		0

c. i+j<=0

Code:

```
#Laboratory Exercise 3, Assigment 2, sum>=0
.data
n:      .word 6                 #khoi tao gia tri n=6
step:   .word 1                 #khoi tao gia tri step =1
A:      .word -1,-4,3,4,5,6     #khoi tao mang A
.text
        lw $s3,n                #gan gia tri n vao thanh ghi $s3
        la $s2, A               #gan mang A vao thanh ghi $s2
        lw $s4, step            #gan gia tri step vao thanh ghi $s4
        addi    $s5,$zero,0     #sum=0
        addi    $s1,$zero,0     #i=0
loop:   slt     $t2,$s1,$s3
        beq     $t2,$zero,endloop
        add     $t1,$s1,$s1     #$t1=2*$s1
        add     $t1,$t1,$t1     #$t1=4*$s1
        add     $t1,$t1,$s2     #$t1 store the address of A[i]
        lw      $t0,0($t1)      #load value of A[i] in $t0
        add     $s5,$s5,$t0     #sum=sum+A[i]
        slt     $t7,$s5,$0      #sum<0 thi $t7=1
        beq     $t7,$zero,endloop
        add     $s1,$s1,$s4     #i=i+step
        j       loop            #goto loop
endloop:
```

Result:



Text Segment

Bkpt	Address	Code	Basic	Source
	4194304	0x3c011001	lui $1,4097	7: lw $s3,n #gan gia tri n vao thanh ghi $s3
	4194308	0x8c330000	lw $19,0($1)	
	4194312	0x3c011001	lui $1,4097	8: la $s2, A #gan mang A vao thanh ghi $s2
	4194316	0x34320008	ori $18,$1,8	
	4194320	0x3c011001	lui $1,4097	9: lw $s4, step #gan gia tri step vao thanh ghi $s4
	4194324	0x8c340004	lw $20,4($1)	
	4194328	0x20150000	addi $21,$0,0	10: addi $s5,$zero,0 #sum=0
	4194332	0x20110000	addi $17,$0,0	11: addi $s1,$zero,0 #i=0
	4194336	0x0233502a	slt $10,$17,$19	12: loop: slt $t2,$s1,$s3
	4194340	0x11400009	beq $10,$0,9	13: beq $t2,$zero,endloop
	4194344	0x02314820	add $9,$17,$17	14: add $t1,$s1,$s1 #$t1=2*$s1
	4194348	0x01294820	add $9,$9,$9	15: add $t1,$t1,$t1 #$t1=4*$s1
	4194352	0x01324820	add $9,$9,$18	16: add $t1,$t1,$s2 #$t1 store the address of A[i]
	4194356	0x8d280000	lw $8,0($9)	17: lw $t0,0($t1) #load value of A[i] in $t0
	4194360	0x02a8a820	add $21,$21,$8	18: add $s5,$s5,$t0 #sum=sum+A[i]
	4194364	0x02a0782a	slt $15,$21,$0	19: slt $t7,$s5,$0 #sum<0 thi $t7=1
	4194368	0x11e00002	beq $15,$0,2	20: beq $t7,$zero,endloop
	4194372	0x02348820	add $17,$17,$20	21: add $s1,$s1,$s4 #i=i+step
	4194376	0x08100008	j 4194336	22: j loop #goto loop

Labels

Label	Address ▲
ass5_c.asm	
loop	4194336
endloop	4194380
n	268500992
step	268500996
A	268501000

☑ Data ☑ Text

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	6	1	-1	-4	3	4	5	6
268501024	0	0	0	0	0	0	0	0
268501056	0	0	0	0	0	0	0	0
268501088	0	0	0	0	0	0	0	0
268501120	0	0	0	0	0	0	0	0
268501152	0	0	0	0	0	0	0	0
268501184	0	0	0	0	0	0	0	0
268501216	0	0	0	0	0	0	0	0
268501248	0	0	0	0	0	0	0	0
268501280	0	0	0	0	0	0	0	0
268501312	0	0	0	0	0	0	0	0
268501344	0	0	0	0	0	0	0	0
268501376	0	0	0	0	0	0	0	0
268501408	0	0	0	0	0	0	0	0
268501440	0	0	0	0	0	0	0	0
268501472	0	0	0	0	0	0	0	0

Registers | Coproc 1 | Coproc 0

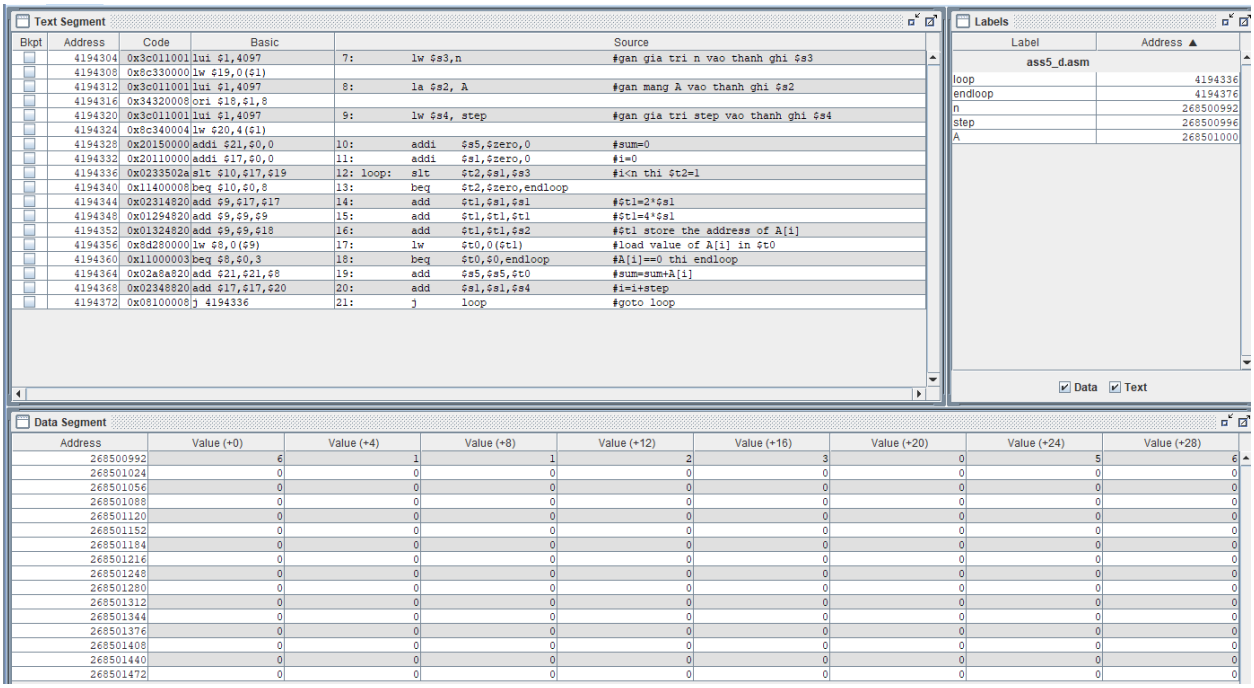
Name	Number	Value
$zero	0	0
$at	1	268500992
$v0	2	0
$v1	3	0
$a0	4	0
$a1	5	0
$a2	6	0
$a3	7	0
$t0	8	4
$t1	9	268501012
$t2	10	1
$t3	11	0
$t4	12	0
$t5	13	0
$t6	14	0
$t7	15	0
$s0	16	0
$s1	17	3
$s2	18	268501000
$s3	19	6
$s4	20	1
$s5	21	2
$s6	22	0
$s7	23	0
$t8	24	0
$t9	25	0
$k0	26	0
$k1	27	0
$gp	28	268468224
$sp	29	2147479548
$fp	30	0
$ra	31	0
pc		4194380
hi		0
lo		0

d. i+j>m+n

Code:

```
#Laboratory Exercise 3, Assigment 2,A[i]==0
.data
n:      .word 6                         #khoi tao gia tri n=6
step:   .word 1                         #khoi tao gia tri step =1
A:      .word 1,2,3,0,5,6               #khoi tao mang A
.text
        lw $s3,n                        #gan gia tri n vao thanh ghi $s3
        la $s2, A                       #gan mang A vao thanh ghi $s2
        lw $s4, step                    #gan gia tri step vao thanh ghi $s4
        addi    $s5,$zero,0             #sum=0
        addi    $s1,$zero,0             #i=0
loop:   slt     $t2,$s1,$s3             #i<n thi $t2=1
        beq     $t2,$zero,endloop
        add     $t1,$s1,$s1             #$t1=2*$s1
        add     $t1,$t1,$t1             #$t1=4*$s1
        add     $t1,$t1,$s2             #$t1 store the address of A[i]
        lw      $t0,0($t1)              #load value of A[i] in $t0
        beq     $t0,$0,endloop          #A[i]==0 thi endloop
        add     $s5,$s5,$t0             #sum=sum+A[i]
        add     $s1,$s1,$s4             #i=i+step
        j       loop                    #goto loop
endloop:
```

Result:



Text Segment

Bkpt	Address	Code	Basic			Source
	4194304	0x3c011001	lui $1,4097	7:	lw $s3,n	#gan gia tri n vao thanh ghi $s3
	4194308	0x8c330000	lw $19,0($1)			
	4194312	0x3c011001	lui $1,4097	8:	la $s2, A	#gan mang A vao thanh ghi $s2
	4194316	0x34320008	ori $18,$1,8			
	4194320	0x3c011001	lui $1,4097	9:	lw $s4, step	#gan gia tri step vao thanh ghi $s4
	4194324	0x8c340004	lw $20,4($1)			
	4194328	0x20150000	addi $21,$0,0	10:	addi $s5,$zero,0	#sum=0
	4194332	0x20110000	addi $17,$0,0	11:	addi $s1,$zero,0	#i=0
	4194336	0x0233502a	slt $10,$17,$19	12: loop:	slt $t2,$s1,$s3	#i<n thi $t2=1
	4194340	0x11400008	beq $10,$0,8	13:	beq $t2,$zero,endloop	
	4194344	0x02314820	add $9,$17,$17	14:	add $t1,$s1,$s1	#$t1=2*$s1
	4194348	0x01294820	add $9,$9,$9	15:	add $t1,$t1,$t1	#$t1=4*$s1
	4194352	0x01324820	add $9,$9,$18	16:	add $t1,$t1,$s2	#$t1 store the address of A[i]
	4194356	0x8d280000	lw $8,0($9)	17:	lw $t0,0($t1)	#load value of A[i] in $t0
	4194360	0x11000003	beq $8,$0,3	18:	beq $t0,$0,endloop	#A[i]==0 thi endloop
	4194364	0x02a8a820	add $21,$21,$8	19:	add $s5,$s5,$t0	#sum=sum+A[i]
	4194368	0x02348820	add $17,$17,$20	20:	add $s1,$s1,$s4	#i=i+step
	4194372	0x08100008	j 4194336	21:	j loop	#goto loop

Labels

Label	Address ▲
ass5_d.asm	
loop	4194336
endloop	4194376
n	268500992
step	268500996
A	268501000

Data Text

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	6	1	1	2	3	0	5	6
268501024	0	0	0	0	0	0	0	0
268501056	0	0	0	0	0	0	0	0
268501088	0	0	0	0	0	0	0	0
268501120	0	0	0	0	0	0	0	0
268501152	0	0	0	0	0	0	0	0
268501184	0	0	0	0	0	0	0	0
268501216	0	0	0	0	0	0	0	0
268501248	0	0	0	0	0	0	0	0
268501280	0	0	0	0	0	0	0	0
268501312	0	0	0	0	0	0	0	0
268501344	0	0	0	0	0	0	0	0
268501376	0	0	0	0	0	0	0	0
268501408	0	0	0	0	0	0	0	0
268501440	0	0	0	0	0	0	0	0
268501472	0	0	0	0	0	0	0	0

Registers | Coproc 1 | Coproc 0

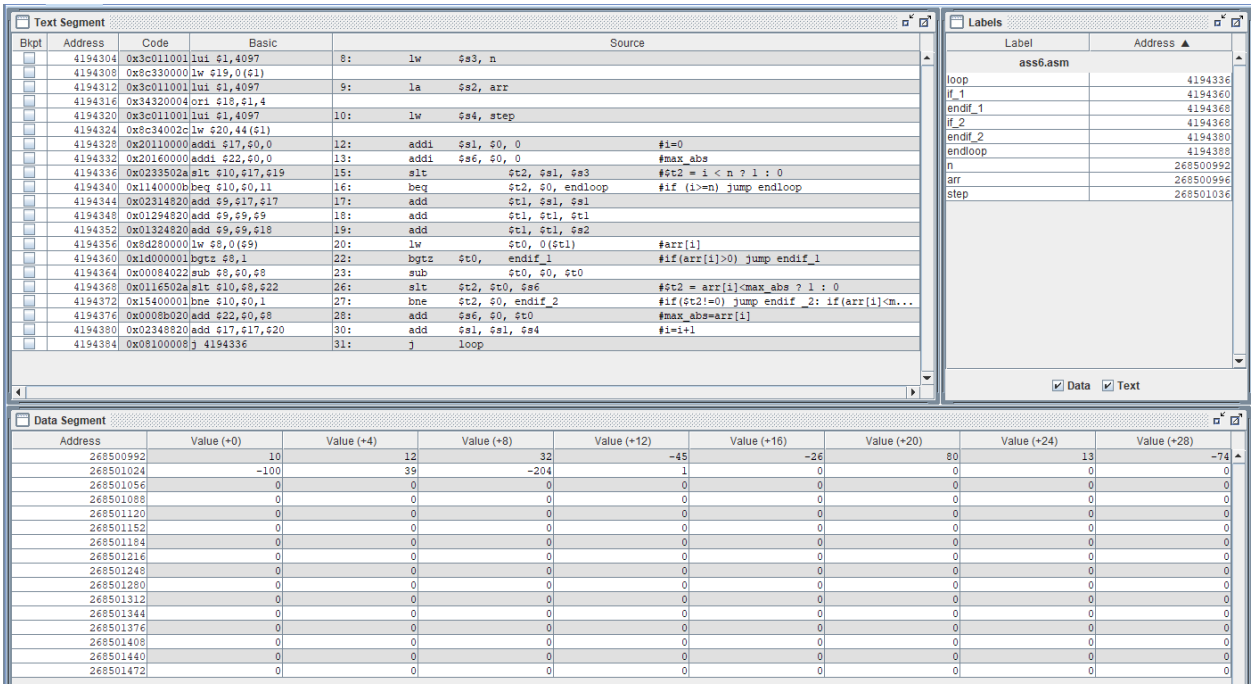
Name	Number	Value
$zero	0	0
$at	1	268500992
$v0	2	0
$v1	3	0
$a0	4	0
$a1	5	0
$a2	6	0
$a3	7	0
$t0	8	0
$t1	9	268501012
$t2	10	1
$t3	11	0
$t4	12	0
$t5	13	0
$t6	14	0
$t7	15	0
$s0	16	0
$s1	17	3
$s2	18	268501000
$s3	19	6
$s4	20	1
$s5	21	6
$s6	22	0
$s7	23	0
$t8	24	0
$t9	25	0
$k0	26	0
$k1	27	0
$gp	28	268468224
$sp	29	2147479548
$fp	30	0
$ra	31	0
pc		4194376
hi		0
lo		0

Bài 6:

Code

```
#Laboratory Exercise 3, Assgiment 6
.data
n:              .word   10
arr:            .word   12,32,-45,-26,80,13,-74,-100,39,-204
step:           .word   1
.text
        #load
        lw      $s3, n
        la      $s2, arr
        lw      $s4, step
        #work
        addi    $s1, $0, 0                      #i=0
        addi    $s6, $0, 0                      #max_abs
loop:
        slt             $t2, $s1, $s3           #$t2 = i < n ? 1 : 0
        beq             $t2, $0, endloop        #if (i>=n) jump endloop
        add             $t1, $s1, $s1
        add             $t1, $t1, $t1
        add             $t1, $t1, $s2
        lw              $t0, 0($t1)             #arr[i]
if_1:
        bgtz    $t0,    endif_1                 #if(arr[i]>0) jump endif_1
        sub             $t0, $0, $t0
endif_1:
if_2:
        slt     $t2, $t0, $s6                   #$t2 = arr[i]<max_abs ? 1 : 0
        bne     $t2, $0, endif_2                #if($t2!=0) jump endif _2: if(arr[i]<max_abs) jump endif_2
        add     $s6, $0, $t0                    #max_abs=arr[i]
endif_2:
        add     $s1, $s1, $s4                   #i=i+1
        j       loop
endloop:
```

Result



Registers | Coproc 1 | Coproc 0

Name	Number	Value
$zero	0	0
$at	1	268500992
$v0	2	0
$v1	3	0
$a0	4	0
$a1	5	0
$a2	6	0
$a3	7	0
$t0	8	204
$t1	9	268501032
$t2	10	0
$t3	11	0
$t4	12	0
$t5	13	0
$t6	14	0
$t7	15	0
$s0	16	0
$s1	17	10
$s2	18	268500996
$s3	19	10
$s4	20	1
$s5	21	0
$s6	22	204
$s7	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		4194388
hi		0
lo		0