Báo cáo thực hành KTMT tuần 3

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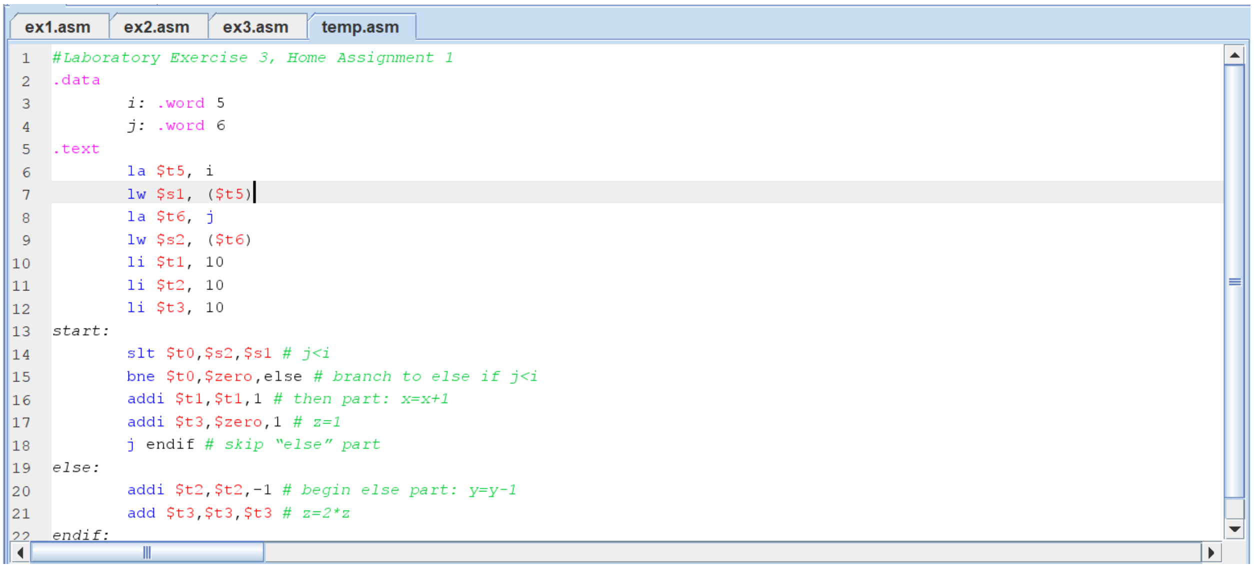
Exercise 1

Đặt x, y, z = 10

i=5, j=6



```
#Laboratory Exercise 3, Home Assignment 1
.data
        i: .word 5
        j: .word 6
.text
        la $t5, i
        lw $s1, ($t5)
        la $t6, j
        lw $s2, ($t6)
        li $t1, 10
        li $t2, 10
        li $t3, 10
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:
```

Thanh ghi $t0 chứ giá trị của câu lệnh slt có giá trị bằng 0.

Các thanh ghi $t1 thay đổi từ 0x0000000a sang 0x0000000b

$t2 thay đổi từ 0x0000000a sang 0x00000001

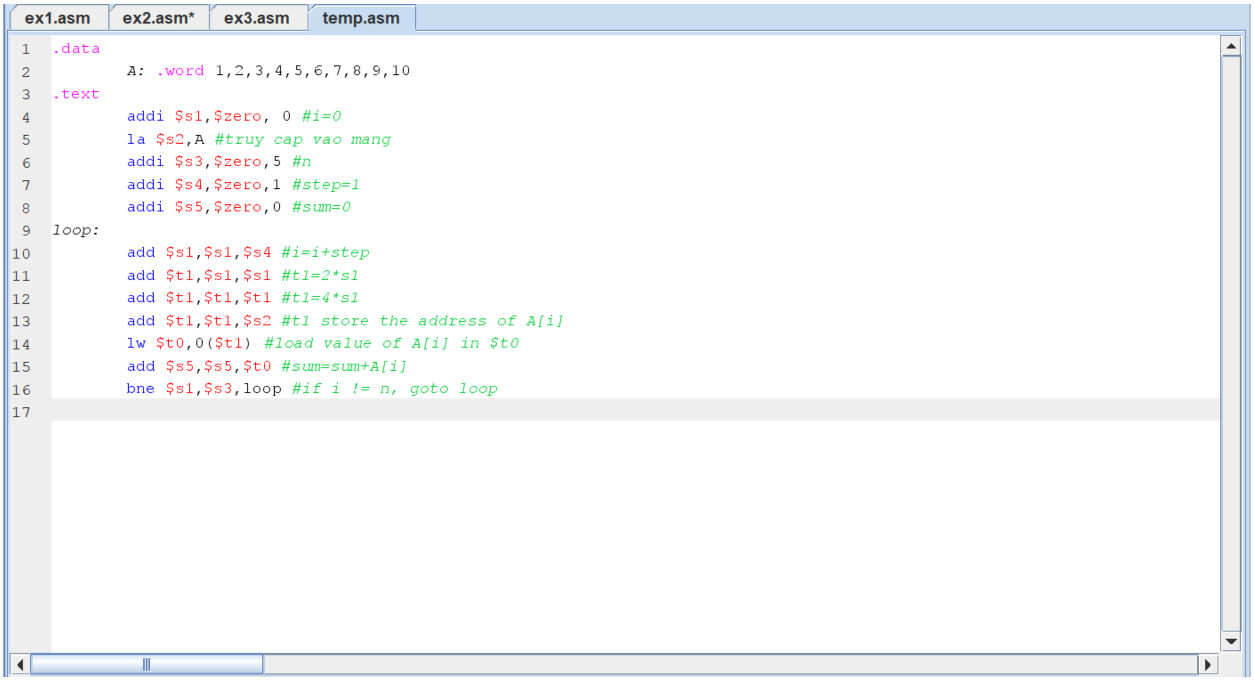
Thanh ghi pc tăng 0x00000004 sau mỗi lệnh

⇨ Kết quả thực thi đúng với lí thuyết.

Exercise 2

Mảng A = {1,2,3,4,5,6,7,8,9,10}

TH1: n=5



```
.data
	A: .word 1,2,3,4,5,6,7,8,9,10
.text
	addi $s1,$zero, 0 #i=0
	la $s2,A #truy cap vao mang
	addi $s3,$zero,5 #n
	addi $s4,$zero,1 #step=1
	addi $s5,$zero,0 #sum=0
loop:
	add $s1,$s1,$s4 #i=i+step
	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]
	bne $s1,$s3,loop #if i != n, goto loop
```

Trong vòng lặp đầu tiên:

Thanh ghi $s1 thay đổi là 0x00000001

Thanh ghi $t1 lấy địa chỉ của A[1] là 0x10010004

Thanh ghi $t0 chứa giá trị A[1] là 0x00000002

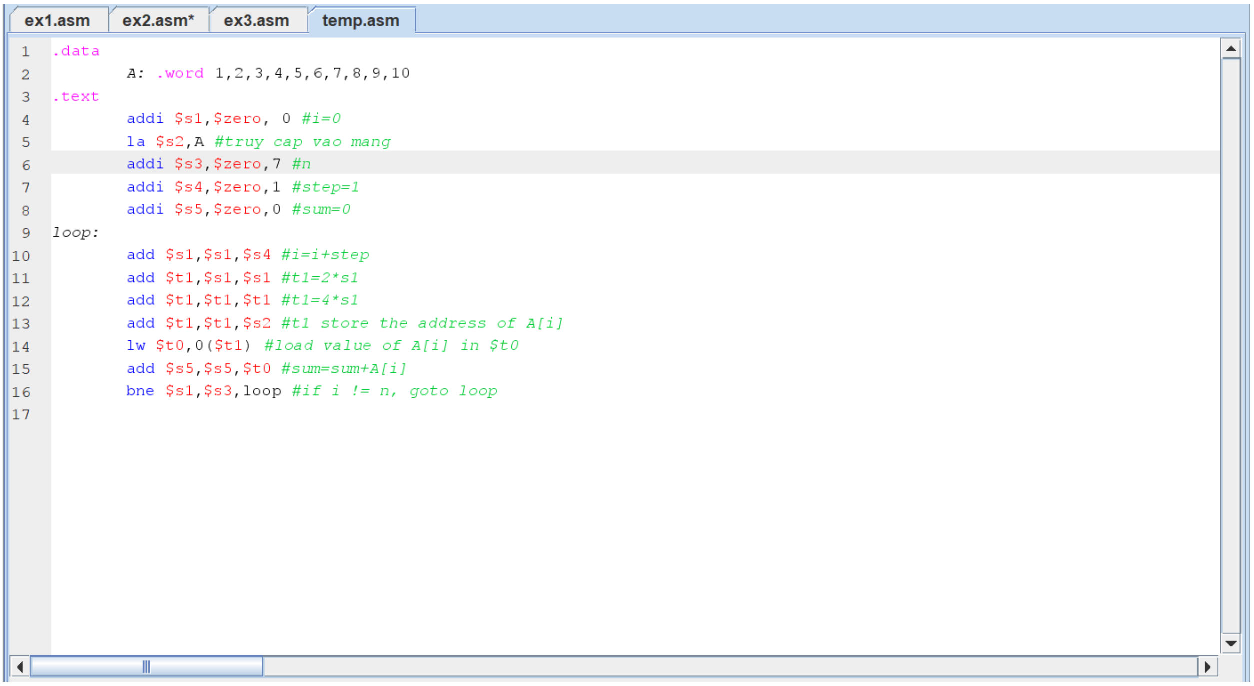
Thanh ghi $s5 thay đổi là 0x00000002

Các vòng lặp sau tương tự. Sau 5 vòng lặp, $s1 có giá trị là 5, bằng với n nên kết thúc vòng lặp

Sau vòng lặp, thanh ghi $s5 bằng 0x00000014

⇨ Kết quả đúng

TH2: n=7



```
.data
        A: .word 1,2,3,4,5,6,7,8,9,10
.text
        addi $s1,$zero, 0 #i=0
        la $s2,A #truy cap vao mang
        addi $s3,$zero,7 #n
        addi $s4,$zero,1 #step=1
        addi $s5,$zero,0 #sum=0
loop:
        add $s1,$s1,$s4 #i=i+step
        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]
        bne $s1,$s3,loop #if i != n, goto loop
```

Tương tự như n=5, chương trình thực hiện 7 vòng lặp

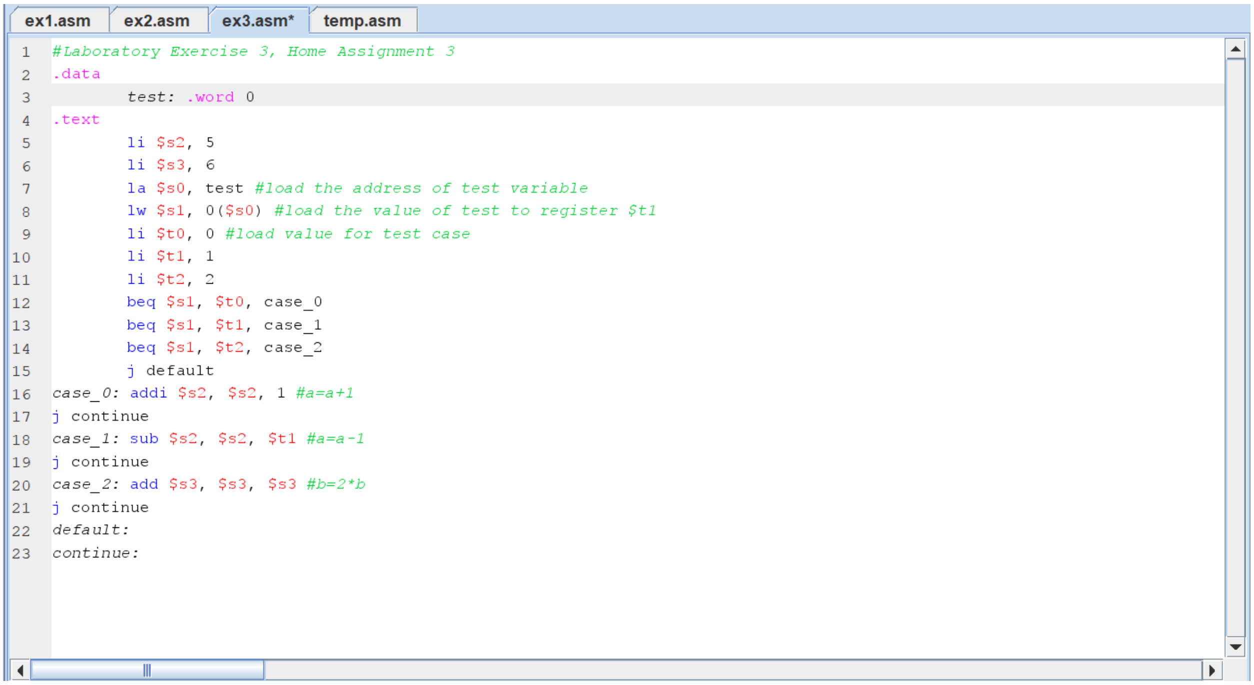
Sau vòng lặp $s5 có giá trị là 0x00000023

- ⇨ Kết quả đúng

Exercise 3

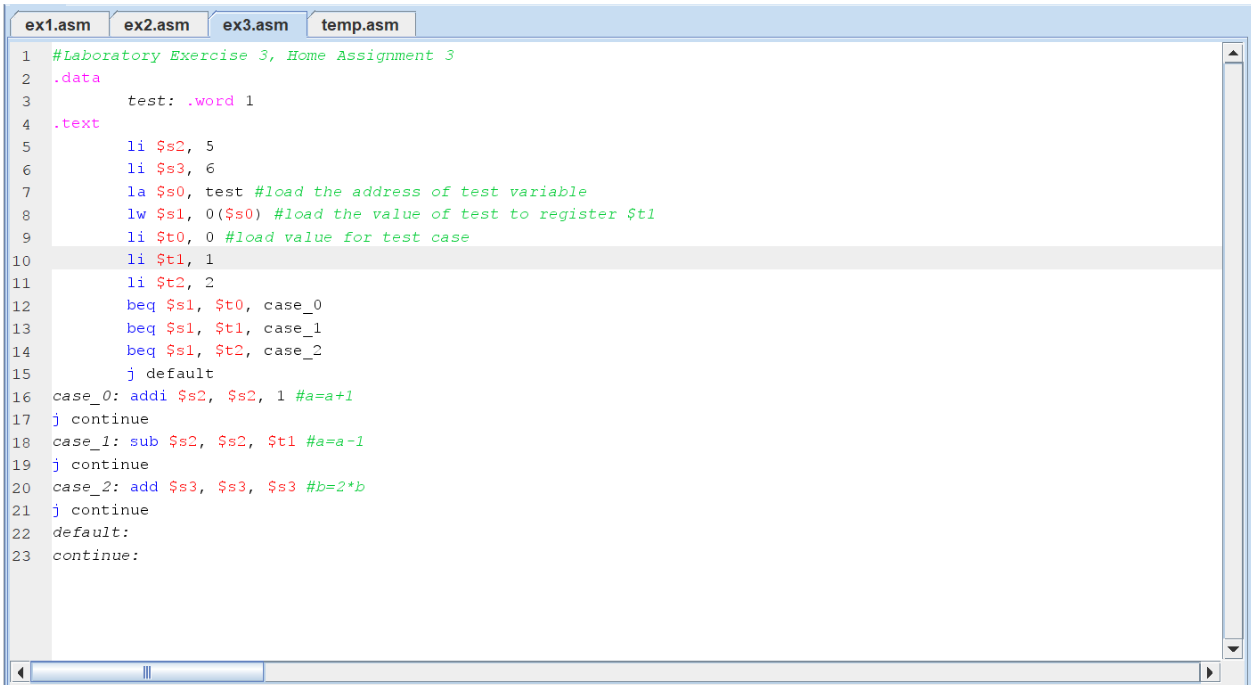
Đặt a=5, b=6

TH1: test=0, sau chương trình a=0x00000006



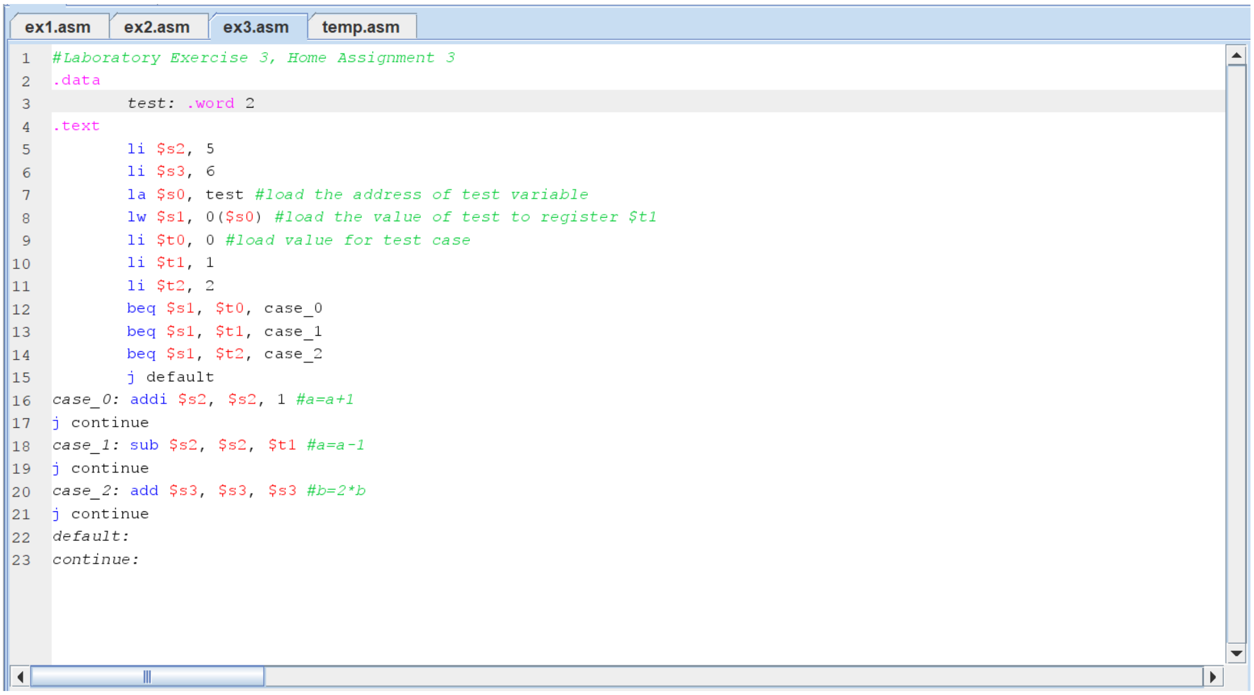
```
#Laboratory Exercise 3, Home Assignment 3
.data
        test: .word 0
.text
        li $s2, 5
        li $s3, 6
        la $s0, test #load the address of test variable
        lw $s1, 0($s0) #load the value of test to register $t1
        li $t0, 0 #load value for test case
        li $t1, 1
        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:
```

TH2: test=1, sau chương trình a=0x00000004



```
#Laboratory Exercise 3, Home Assignment 3
.data
        test: .word 1
.text
        li $s2, 5
        li $s3, 6
        la $s0, test #load the address of test variable
        lw $s1, 0($s0) #load the value of test to register $t1
        li $t0, 0 #load value for test case
        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:
```

TH3: test=2, sau chương trình b=0x0000000c

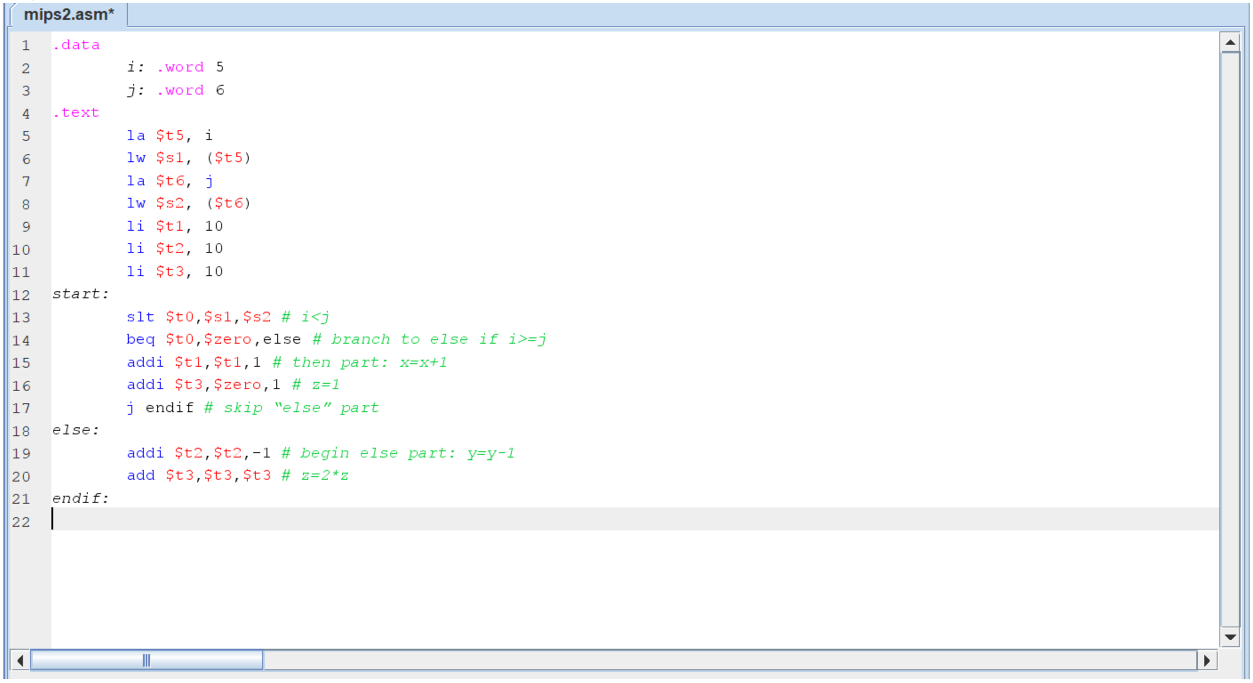


```
#Laboratory Exercise 3, Home Assignment 3
.data
        test: .word 2
.text
        li $s2, 5
        li $s3, 6
        la $s0, test #load the address of test variable
        lw $s1, 0($s0) #load the value of test to register $t1
        li $t0, 0 #load value for test case
        li $t1, 1
        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:
```

⇨ Kết quả đúng

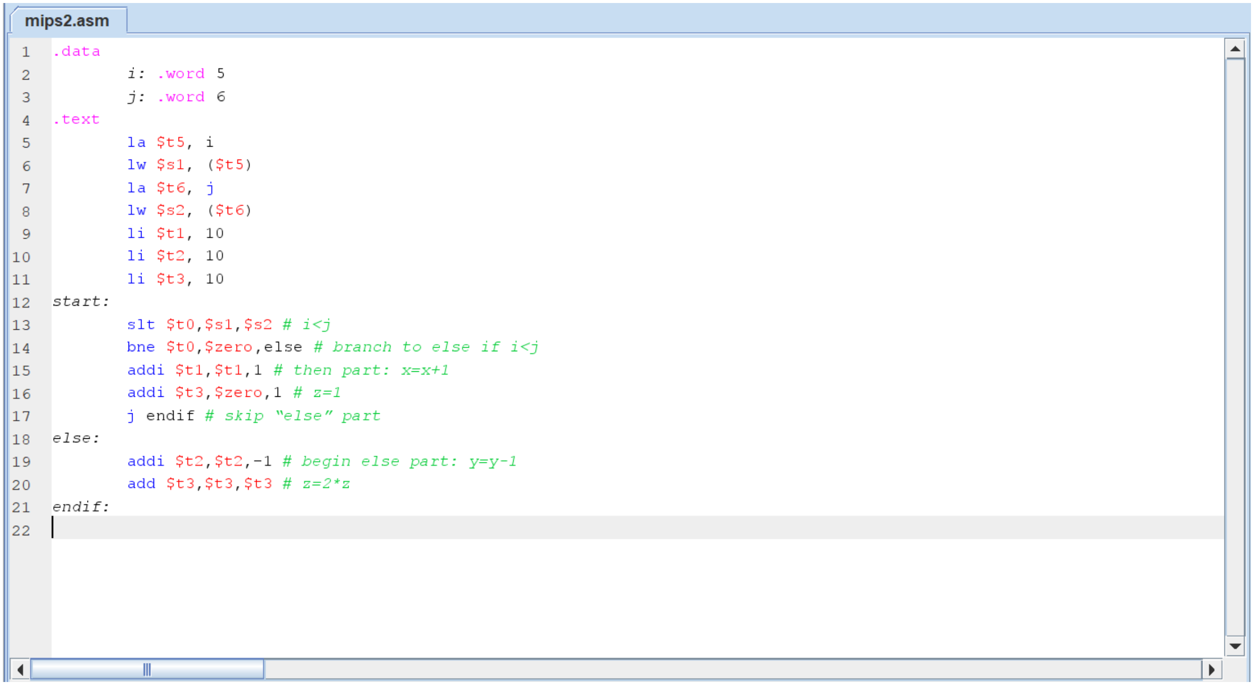
Exercise 4

a. i<j



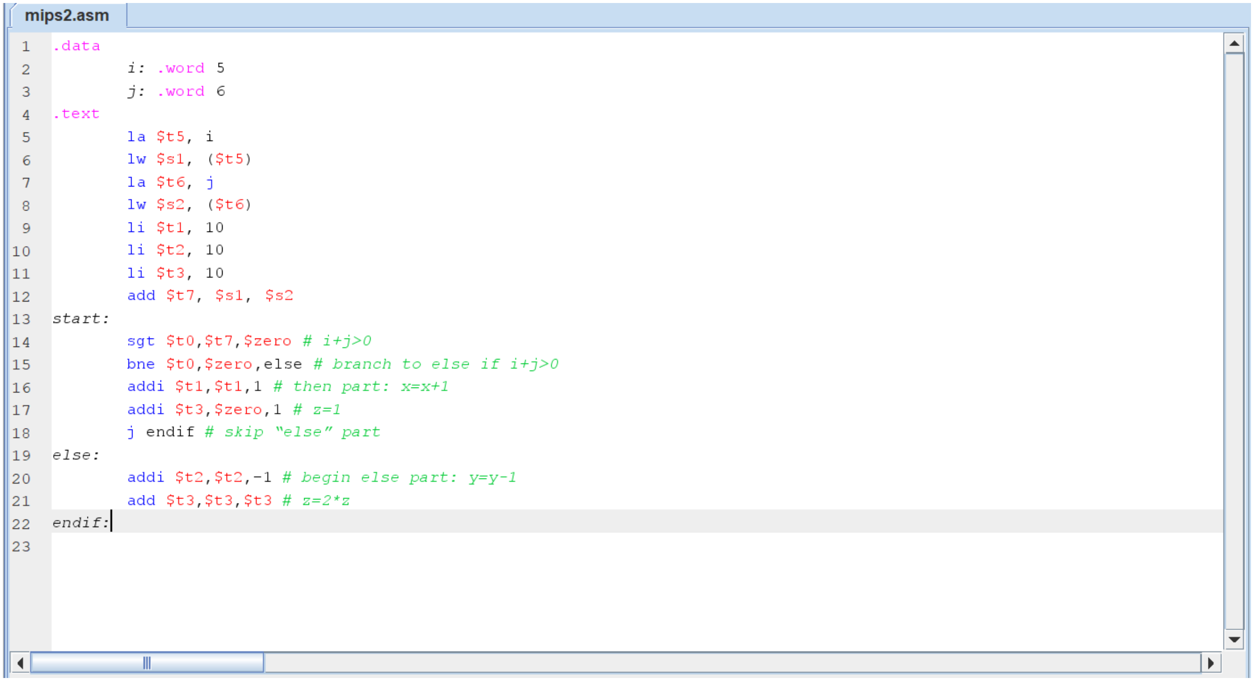
```
.data
        i: .word 5
        j: .word 6
.text
        la $t5, i
        lw $s1, ($t5)
        la $t6, j
        lw $s2, ($t6)
        li $t1, 10
        li $t2, 10
        li $t3, 10
start:
        slt $t0,$s1,$s2 # i<j
        beq $t0,$zero,else # branch to else if i>=j
        addi $t1,$t1,1 # 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:
```

b. i>=j



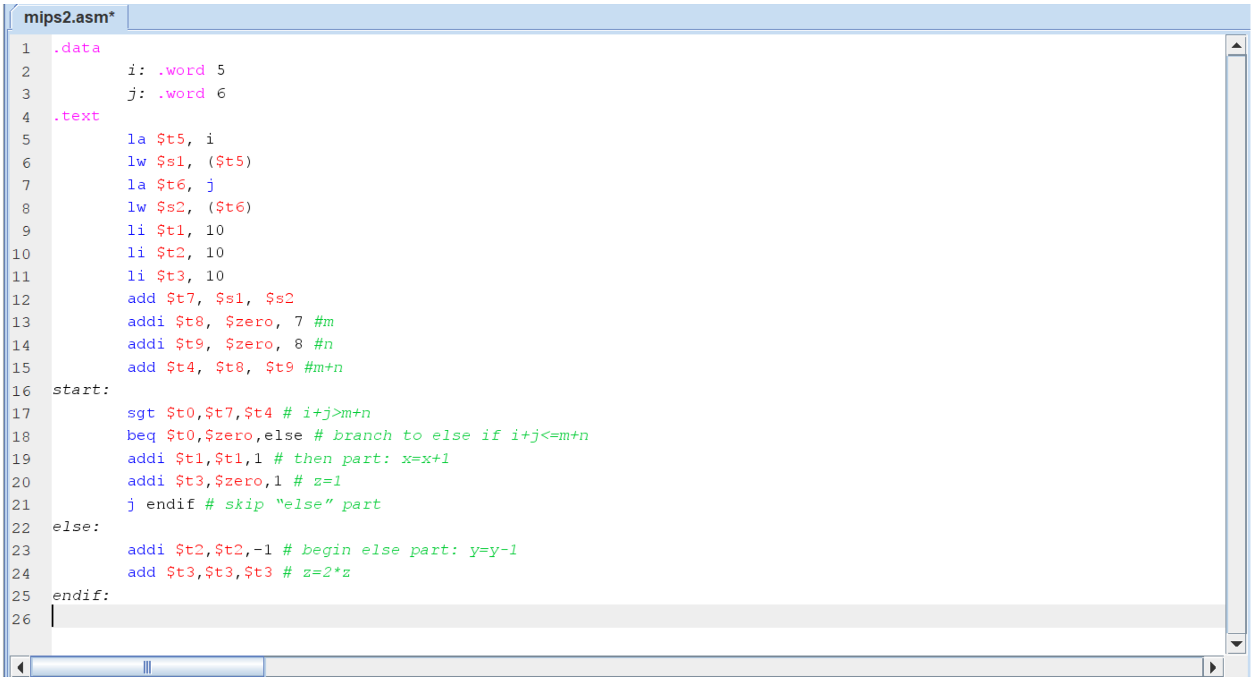
```
.data
        i: .word 5
        j: .word 6
.text
        la $t5, i
        lw $s1, ($t5)
        la $t6, j
        lw $s2, ($t6)
        li $t1, 10
        li $t2, 10
        li $t3, 10
start:
        slt $t0,$s1,$s2 # i<j
        bne $t0,$zero,else # branch to else if i<j
        addi $t1,$t1,1 # 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:
```

c. i+j<=0



```
.data
        i: .word 5
        j: .word 6
.text
        la $t5, i
        lw $s1, ($t5)
        la $t6, j
        lw $s2, ($t6)
        li $t1, 10
        li $t2, 10
        li $t3, 10
        add $t7, $s1, $s2
start:
        sgt $t0,$t7,$zero # i+j>0
        bne $t0,$zero,else # branch to else if i+j>0
        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:
```

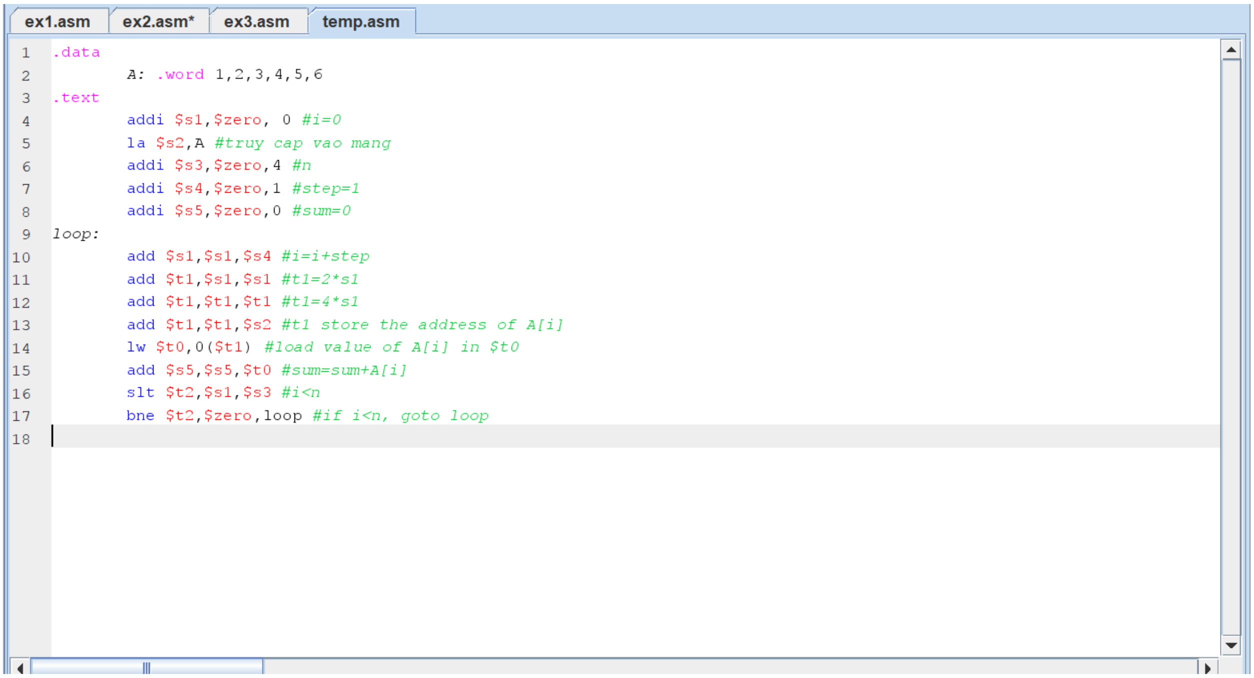
d. i+j>m+n



```
.data
        i: .word 5
        j: .word 6
.text
        la $t5, i
        lw $s1, ($t5)
        la $t6, j
        lw $s2, ($t6)
        li $t1, 10
        li $t2, 10
        li $t3, 10
        add $t7, $s1, $s2
        addi $t8, $zero, 7 #m
        addi $t9, $zero, 8 #n
        add $t4, $t8, $t9 #m+n
start:
        sgt $t0,$t7,$t4 # i+j>m+n
        beq $t0,$zero,else # branch to else if i+j<=m+n
        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:
```

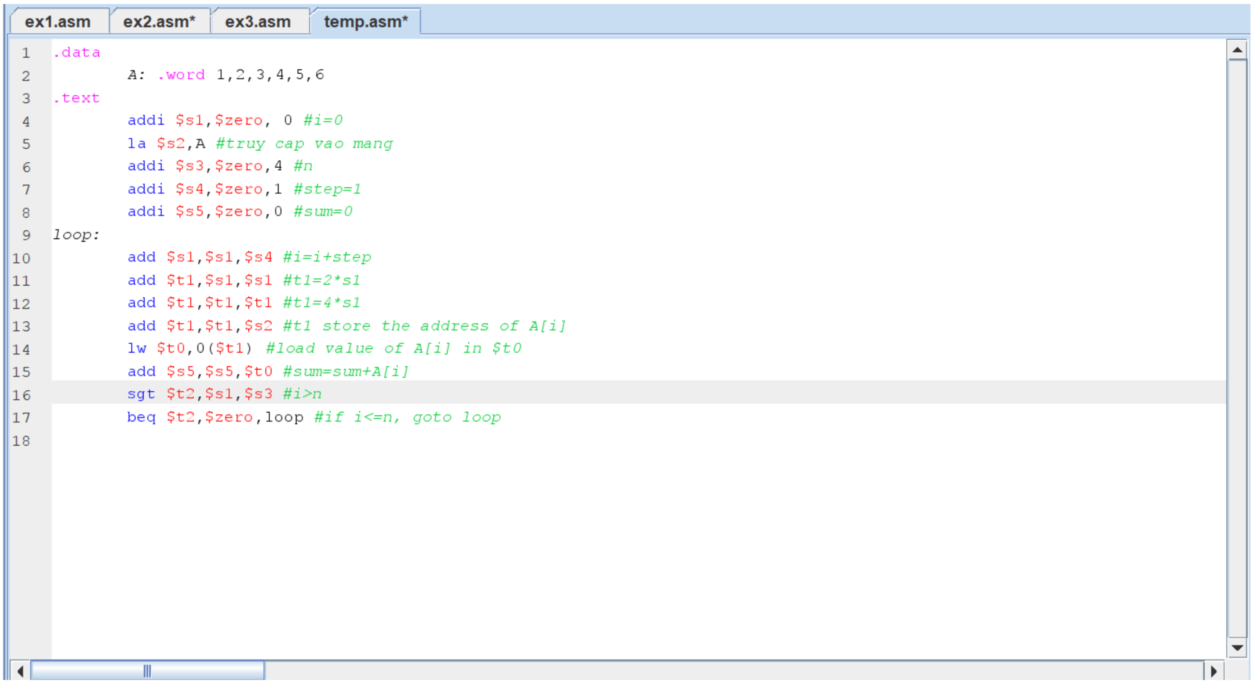
Exercise 5

a. i<n



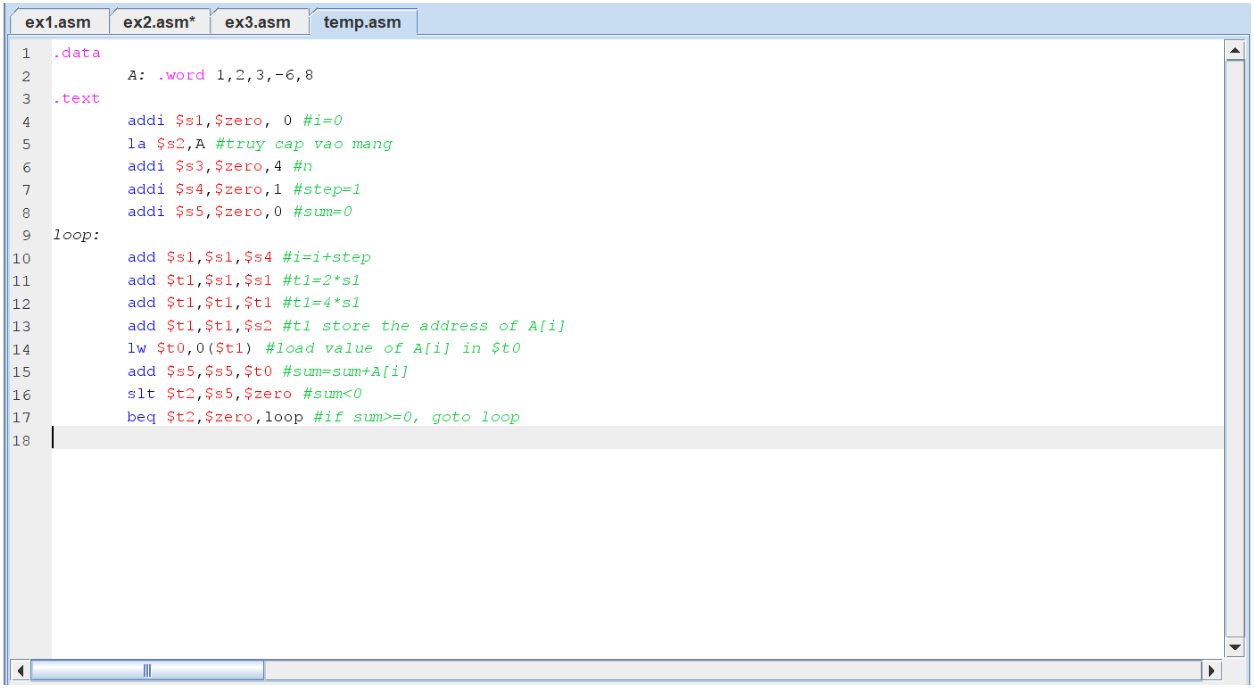
```
.data
        A: .word 1,2,3,4,5,6
.text
        addi $s1,$zero, 0 #i=0
        la $s2,A #truy cap vao mang
        addi $s3,$zero,4 #n
        addi $s4,$zero,1 #step=1
        addi $s5,$zero,0 #sum=0
loop:
        add $s1,$s1,$s4 #i=i+step
        add $t1,$s1,$s1 #t1=2*s1
        add $t1,$t1,$t1 #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 $t2,$s1,$s3 #i<n
        bne $t2,$zero,loop #if i<n, goto loop
```

b. i<=n



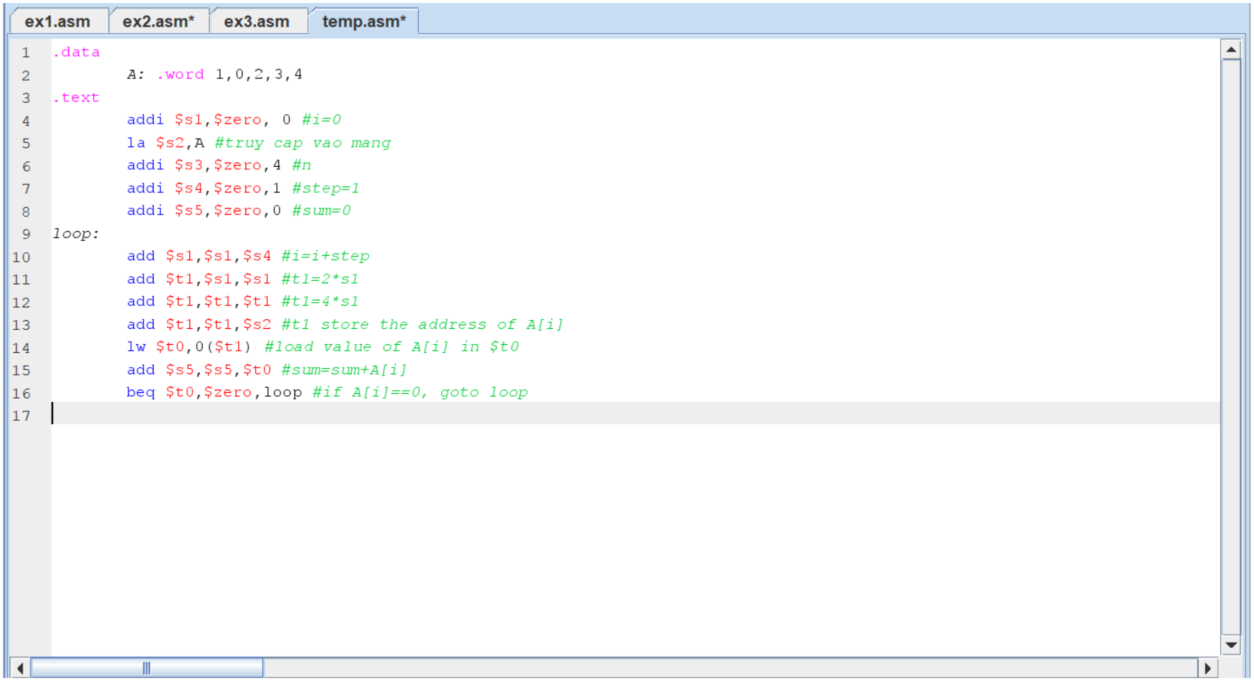
```
.data
        A: .word 1,2,3,4,5,6
.text
        addi $s1,$zero, 0 #i=0
        la $s2,A #truy cap vao mang
        addi $s3,$zero,4 #n
        addi $s4,$zero,1 #step=1
        addi $s5,$zero,0 #sum=0
loop:
        add $s1,$s1,$s4 #i=i+step
        add $t1,$s1,$s1 #t1=2*s1
        add $t1,$t1,$t1 #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]
        sgt $t2,$s1,$s3 #i>n
        beq $t2,$zero,loop #if i<=n, goto loop
```

c. sum>=0, Khởi tạo mảng A = {1,2,3,-6,8}



```
.data
        A: .word 1,2,3,-6,8
.text
        addi $s1,$zero, 0 #i=0
        la $s2,A #truy cap vao mang
        addi $s3,$zero,4 #n
        addi $s4,$zero,1 #step=1
        addi $s5,$zero,0 #sum=0
loop:
        add $s1,$s1,$s4 #i=i+step
        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 $t2,$s5,$zero #sum<0
        beq $t2,$zero,loop #if sum>=0, goto loop
```

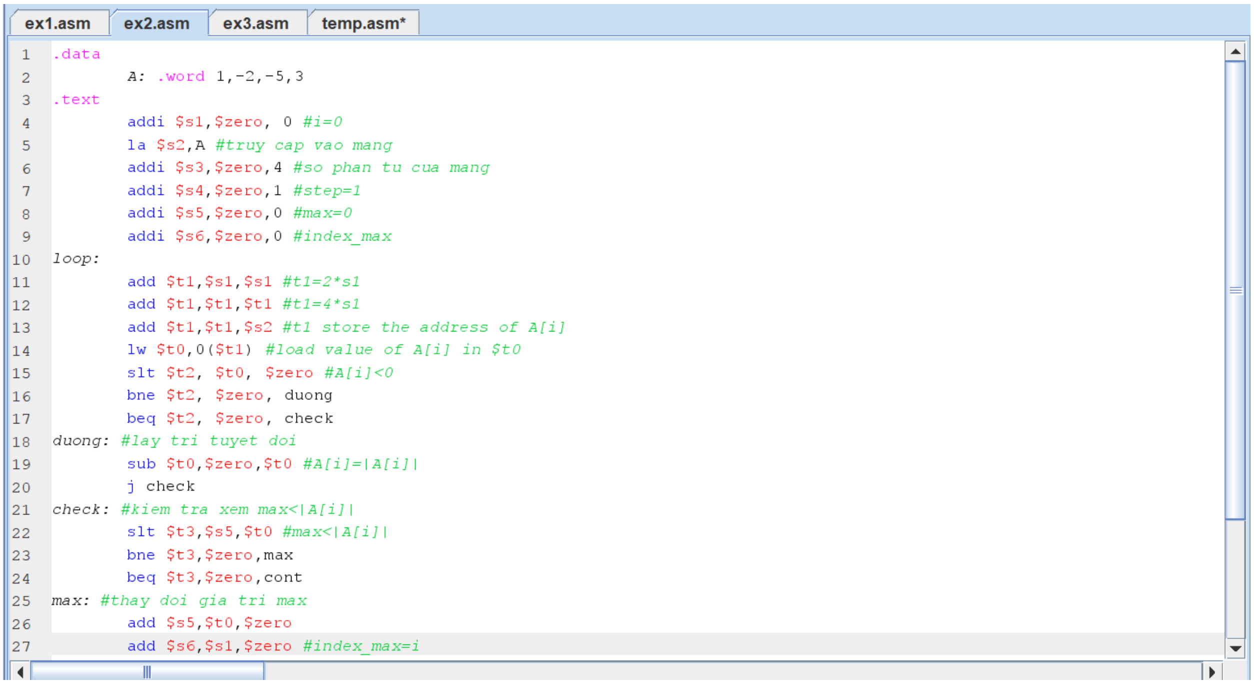
d. A[i]==0, Khởi tạo mảng A = {1,0,2,3,4}



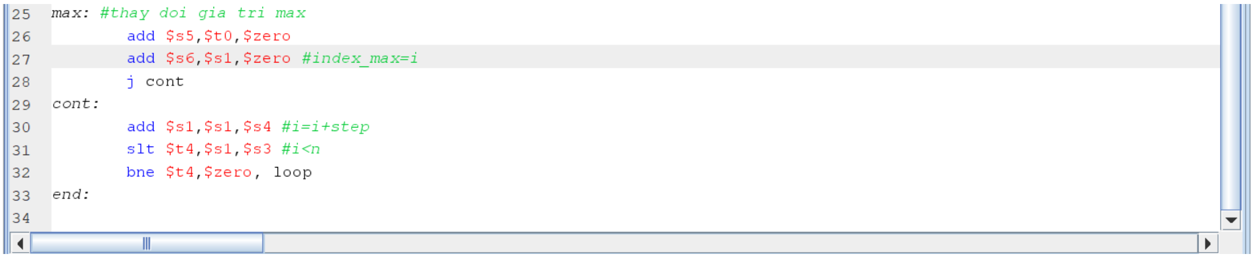
```
.data
        A: .word 1,0,2,3,4
.text
        addi $s1,$zero, 0 #i=0
        la $s2,A #truy cap vao mang
        addi $s3,$zero,4 #n
        addi $s4,$zero,1 #step=1
        addi $s5,$zero,0 #sum=0
loop:
        add $s1,$s1,$s4 #i=i+step
        add $t1,$s1,$s1 #t1=2*s1
        add $t1,$t1,$t1 #t1=4*s1
        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]
        beq $t0,$zero,loop #if A[i]==0, goto loop
```

Exercise 6

Khởi tạo mảng A={1,-2,-5,3}



```
.data
        A: .word 1,-2,-5,3
.text
        addi $s1,$zero, 0 #i=0
        la $s2,A #truy cap vao mang
        addi $s3,$zero,4 #so phan tu cua mang
        addi $s4,$zero,1 #step=1
        addi $s5,$zero,0 #max=0
        addi $s6,$zero,0 #index_max
loop:
        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
        slt $t2, $t0, $zero #A[i]<0
        bne $t2, $zero, duong
        beq $t2, $zero, check
duong: #lay tri tuyet doi
        sub $t0,$zero,$t0 #A[i]=|A[i]|
        j check
check: #kiem tra xem max<|A[i]|
        slt $t3,$s5,$t0 #max<|A[i]|
        bne $t3,$zero,max
        beq $t3,$zero,cont
max: #thay doi gia tri max
        add $s5,$t0,$zero
        add $s6,$s1,$zero #index_max=i
```



```
max: #thay doi gia tri max
        add $s5,$t0,$zero
        add $s6,$s1,$zero #index_max=i
        j cont
cont:
        add $s1,$s1,$s4 #i=i+step
        slt $t4,$s1,$s3 #i<n
        bne $t4,$zero, loop
end:
```

Kết quả thu được là max = 5, index_max = 2