

Báo cáo thực hành KTMT tuần 3

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Assignment 1

Đặt x, y, z đều bằng 5

Trường hợp 1: $I=2, J=3$ ($I < J$)

.data

I: .word 2

J: .word 3

.text

la \$t8, I

la \$t9, J

lw \$s1, 0(\$t8)

lw \$s2, 0(\$t9)

addi \$t1, \$zero, 5

addi \$t2, \$zero, 5

addi \$t3, \$zero, 5

start:

slt \$t0, \$s2, \$s1 # j < i, thanh ghi \$s2 chua gia tri j, thanh ghi \$s1 chua gia tri 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:

- ⇒ Các thanh ghi như slt thay đổi có giá trị là 0, các thanh ghi chứa giá trị x, y, z thay đổi, thanh ghi pc thay đổi
- ⇒ Kết quả thực thi đúng với lý thuyết

Trường hợp 2: $I=3, j=2$ ($I > J$)

.data

I: .word 3

J: .word 2

.text

la \$t8, I

la \$t9, J

lw \$s1, 0(\$t8)

lw \$s2, 0(\$t9)

addi \$t1, \$zero, 5

addi \$t2, \$zero, 5

addi \$t3, \$zero, 5

start:

slt \$t0, \$s2, \$s1 # $j < i$, thanh ghi \$s2 chứa giá trị j, thanh ghi \$s1 chứa giá trị 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:

- ⇒ Các thanh ghi như slt thay đổi có giá trị là 1, các thanh ghi chứa giá trị x, y, z thay đổi, thanh ghi pc thay đổi

⇒ Kết quả thực thi đúng với lý thuyết

Trường hợp 3: $I=J=3$ ($I=J$)

.data

I: .word 3

J: .word 3

.text

la \$t8, I

la \$t9, J

lw \$s1, 0(\$t8)

lw \$s2, 0(\$t9)

addi \$t1, \$zero, 5

addi \$t2, \$zero, 5

addi \$t3, \$zero, 5

start:

slt \$t0,\$s2,\$s1 # j<i, thanh ghi \$s2 chua gia tri j, thanh ghi \$s1 chua gia tri 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:

⇒ Các thanh ghi như slt thay đổi có giá trị là 0, các thanh ghi chứa giá trị x, y, z thay đổi, thanh ghi pc thay đổi

⇒ Kết quả thực thi đúng với lý thuyết

Assignment 2

Mảng A có 10 phần tử:

#Laboratory 3, Home Assignment 2

.data

A: .word 1,2,3,4,5,6,7,8,9,10

.text

```
addi $s3, $zero, 10    #tao so phan tu cua mang
addi $s4, $zero, 1      #tao buoc nhay
la    $s2, A            #Truy nhap thanh ghi $s2 vao dia chi A
addi $s5, $zero, 0      #sum = 0
addi $s1, $zero, 0      #i = 0
loop:
    slt $t2, $s1, $s3    # $t2 = i < n? 1 : 0
    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:

- ⇒ Tổng được lưu ở thanh ghi \$s5
- ⇒ Khi thực thi xong, giá trị của thanh ghi \$s5 là 0x00000037
- ⇒ Kết quả trên đúng với lý thuyết

Assginment 3

Đặt $a = b = 5$

Nếu $\text{test} = 0$, $a = 0x6$

Nếu $\text{test} = 1$, $a = 0x4$

Nếu test = 2, b = 0xa

=> Kết quả đúng với lý thuyết

Code:

#Laboratory Exercise 3, Home Assignment 3

.data

test: .word 1

.text

addi \$s2,\$zero,5

addi \$s3,\$zero,5

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:

```

Assgniment 4

a. $I < J$

```

.data
I: .word 4
J: .word 3
.text
la    $t8, I
la    $t9, J
lw    $s1, 0($t8)
lw    $s2, 0($t9)
addi  $t1, $zero, 5
addi  $t2, $zero, 5
addi  $t3, $zero, 5
start:
slt   $t0,$s1,$s2 # i<j, thang ghi $s2 chua gia tri j, thanh ghi $s1 chua gia
tri i
addi  $s4,$zero,1 #s4 la thanh bien 1
bne   $t0,$s4,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:

```

b. $I \geq J$

```

.data
I: .word 4
J: .word 3

.text
la    $t8, I
la    $t9, J
lw    $s1, 0($t8)
lw    $s2, 0($t9)
addi  $t1, $zero, 5
addi  $t2, $zero, 5
addi  $t3, $zero, 5

start:
slt   $t0,$s2,$s1 # j<i, thanh ghi $s2 chua gia tri j, thanh ghi $s1 chua gia
tri 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:

```

c. $I+J \leq 0$

```
.data
I: .word 4
J: .word 3
.text
la    $t8, I
la    $t9, J
lw    $s1, 0($t8)
lw    $s2, 0($t9)
addi  $t1, $zero, 5
addi  $t2, $zero, 5
addi  $t3, $zero, 5
adj    $t7, $s1, $s2    #Thanh $t7 la tong cua I va J
start:
slt    $t0, $zero, $t7    #  $I+J > 0$ 
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:
```

d. $I+J > m+n$

```
.data
I: .word 3
```



```

J: .word 3
.text
la    $t8, I
la    $t9, J
lw    $s1, 0($t8)
lw    $s2, 0($t9)
addi  $t1, $zero, 5
addi  $t2, $zero, 5
addi  $t3, $zero, 5
addi  $t4, $zero, 8    #m
addi  $t5, $zero, 7    #n
add   $t6, $t4, $t5    #m+n
add   $t7, $s1, $s2
start:
slt   $t0, $t6, $t7
addi  $s4, $zero, $1
bne   $t0, $s4, 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:

```

Assginment 5

a. $i < n$

#Laboratory 3, Home Assignment 2

.data

A: .word 1,2,3,4,5,6,7,8,9,10

.text

```
addi $s3, $zero, 10    #tao so phan tu cua mang
addi $s4, $zero, 1      #tao buoc nhay
la    $s2, A            #Truy nhap thanh ghi $s2 vao dia chi A
addi $s5, $zero, 0      #sum = 0
addi $s1, $zero, 0      #i = 0
```

loop:

```
slt   $t2, $s1, $s3     # $t2 = i < n? 1 : 0
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:

b. $i \leq n$

#Laboratory 3, Home Assignment 2

.data

A: .word 1,2,3,4,5,6,7,8,9,10

.text

```
addi $s3, $zero, 10    #tao so phan tu cua mang
addi $s4, $zero, 1      #tao buoc nhay
la    $s2, A            #Truy nhap thanh ghi $s2 vao dia chi A
```

```

    addi $s5, $zero, 0    #sum = 0
    addi $s1, $zero, 0    #i = 0
loop:
    slt  $t2, $s3, $s1    # $t2 = n < i? 1 : 0
    bne  $t2, $zero, endloop    #Neu $t2 = 1 thi 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:

```

c. $\text{sum} \geq 0$

.data

A: .word 1,2,3,-7,5,6,7,8,9,10

.text

```

    addi $s3, $zero, 10
    addi $s4, $zero, 1
    la $s2, A
    addi $s5, $zero, 0    #sum = 0
    addi $s1, $zero, 0    #i = 0
loop:
    bltz $s5, endloop     # endloop if sum < 0
    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:

d. a[i]==0

.data

A: .word 1,2,3,0,5,6,7,8,9,10

.text

addi \$s3, \$zero, 10	
addi \$s4, \$zero, 1	
la \$s2,A	
addi \$s5, \$zero, 0	#sum = 0
addi \$s1, \$zero, 0	#i = 0

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
beqz \$t0, endloop	# endloop if A[i] == 0
add \$s5,\$s5,\$t0	#sum=sum+A[i]

```

        add $s1,$s1,$s4      #i=i+step

    j loop #goto loop

endloop:

```

Assginment 6

#Laboratory 3, Home Assignment 6

.data

A: .word 1,2,3,4,5,6,-7,3,-5,1

.text

```

    addi $s3, $zero, 10      #tao so phan tu cua mang
    addi $s4, $zero, 1       #tao buoc nhay
    la    $s2, A              #Truy nhap thanh ghi $s2 vao dia chi A
    addi $s5, $zero, 0       #gt = 0
    addi $s6, $zero, 0       #dia chi = 0
    addi $s1, $zero, 0       #i = 0

loop:
    slt   $t2, $s1, $s3      # $t2 = i < n? 1 : 0
    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
    slt   $t4, $t0, $zero    #Kiem tra tri tuyet doi
    beq   $t4, $zero, duong
    sub   $t0,$zero,$t0      #Thuc hien khi A[i] la so am
    duong:
        slt   $t5, $s5, $t0   # $s5 chua gia tri max

```

```

    beq  $t5, $zero, sai    #Neu |a[i]| <= max thi nhay qua nhan "sai"
    add  $s5, $zero, $t0    #max = |a[i]|
    add  $s6, $zero, $s1    #Cap nhat vi tri moi
    j     cont
sai:
    addi $s5, $s5, 0
    addi $s6, $s6, 0
    j     cont
cont:
    add  $s1, $s1, $s4 #i=i+step
    j     loop          #goto loop

```

endloop:

TH1: A: 1 2 -3 4 5 6 7 8 -9 -10

\$zero	0	0x00000000
\$at	1	0x10010000
\$v0	2	0x00000000
\$v1	3	0x00000000
\$a0	4	0x00000000
\$a1	5	0x00000000
\$a2	6	0x00000000
\$a3	7	0x00000000
\$t0	8	0x0000000a
\$t1	9	0x10010024
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000001
\$t5	13	0x00000001
\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000000
\$s1	17	0x0000000a
\$s2	18	0x10010000
\$s3	19	0x0000000a
\$s4	20	0x00000001
\$s5	21	0x0000000a
\$s6	22	0x00000009
\$s7	23	0x00000000
\$t8	24	0x00000000
\$t9	25	0x00000000
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10008000
\$sp	29	0x7ffffc
\$fp	30	0x00000000
\$ra	31	0x00000000

TH2: A: -5 5 3 6 4 3 -7 4 -2 6

\$zero	0	0x00000000
\$at	1	0x10010000
\$v0	2	0x00000000
\$v1	3	0x00000000
\$a0	4	0x00000000
\$a1	5	0x00000000
\$a2	6	0x00000000
\$a3	7	0x00000000
\$t0	8	0x00000006
\$t1	9	0x10010024
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000000
\$s1	17	0x0000000a
\$s2	18	0x10010000
\$s3	19	0x0000000a
\$s4	20	0x00000001
\$s5	21	0x00000007
\$s6	22	0x00000006
\$s7	23	0x00000000
\$t8	24	0x00000000
\$t9	25	0x00000000
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10008000
\$sp	29	0x7fffeffc
\$fp	30	0x00000000
..

TH3: A: 3 6 -8 2 9 -6 5 3 -1 4

\$zero	0	0x00000000
\$at	1	0x10010000
\$v0	2	0x00000000
\$v1	3	0x00000000
\$a0	4	0x00000000
\$a1	5	0x00000000
\$a2	6	0x00000000
\$a3	7	0x00000000
\$t0	8	0x00000004
\$t1	9	0x10010024
\$t2	10	0x00000000
\$t3	11	0x00000000
\$t4	12	0x00000000
\$t5	13	0x00000000
\$t6	14	0x00000000
\$t7	15	0x00000000
\$s0	16	0x00000000
\$s1	17	0x0000000a
\$s2	18	0x10010000
\$s3	19	0x0000000a
\$s4	20	0x00000001
\$s5	21	0x00000009
\$s6	22	0x00000004
\$s7	23	0x00000000
\$t8	24	0x00000000
\$t9	25	0x00000000
\$k0	26	0x00000000
\$k1	27	0x00000000
\$gp	28	0x10008000
\$sp	29	0x7ffffc
\$fp	30	0x00000000
\$ra	31	0x00000000

Thanh ghi \$s5 chứa max

Thanh ghi \$s6 chứa kết quả vị trí cần tìm của đề bài