

ĐẠI HỌC BÁCH KHOA HÀ NỘI
TRƯỜNG CÔNG NGHỆ THÔNG TIN VÀ TRUYỀN THÔNG



BÁO CÁO MÔN HỌC
THỰC HÀNH KIẾN TRÚC MÁY TÍNH

ĐỀ BÀI

MID TERM

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Assignment 4.....	Lỗi! Thẻ đánh dấu không được xác định.

Assignment 1

3 cạnh của tam giác luôn phải thỏa mãn điều kiện là tổng của 2 cạnh luôn \geq cạnh còn lại

Ta sử dụng lệnh blt để kiểm tra

Thuật toán :

if(a+b<c) return 0;

if(b+c<a) return 0;

if(c+a <b) return 0;

return 1;

```
.data
str_a: .asciiz "Nhap Gia Tri Canh a: "
str_b: .asciiz "Nhap Gia Tri Canh b: "
str_c: .asciiz "Nhap Gia Tri Canh c: "
yes:   .asciiz "Dung, day la ba canh cua tam giac"
no:    .asciiz "Sai, Day 0 la ba canh cua tam giac."
err:   .asciiz "ERROR: Gia tri canh tam giac >0!!"

.text
main:  # Main program code here

      li    $v0, 4                #input canh a
      la    $a0, str_a
      syscall

      li    $v0, 5
      syscall

      add $t0, $zero, $v0

      ble $t0, $zero, edge_err # if a <=0 jump to edge_err

      li    $v0, 4                #input canh b
      la    $a0, str_b
      syscall

      li    $v0, 5
```

```

    syscall
    add $t1, $zero, $v0
    ble $t1, $zero, edge_err # if b <=0 jump to edge_err

    li    $v0, 4             #input canh c
    la    $a0, str_c
    syscall
    li    $v0, 5
    syscall
    add $t2, $zero, $v0
    ble $t2, $zero, edge_err # if c <=0 jump to edge_err
    #if a+b < c jump toi no_triangle
    add $a1,$t0,$t1
    blt $a1,$t2,no_triangle
    #if b+c <a jump toi no_triangle
    add $a1,$t1,$t2
    blt $a1,$t0,no_triangle
    #if c+a <b jump to no_triangle
    add $a1,$t2,$t0
    blt $a1,$t1,no_triangle

    j yes_triangle # neu thoa man thi jump toi yes_triangle
no_triangle:    #in ra thong bao ko phai 3 canh tam giac
    li $v0,4
    la $a0,no
    syscall
    j end
yes_triangle:    #in ra thong bao day la 3 canh cua tam giac
    li $v0,4
    la $a0,yes
    syscall
    j end
edge_err:    #in ra thong bao canh phai >0
    li $v0, 4
    la $a0,err
    syscall
    j end
end:    #ket thuc chuong trinh

```

```
li $v0,10
```

```
syscall
```

TH1: Thỏa mãn điều kiện 3 cạnh tam giác:

C:\Users\buusa\OneDrive\Desktop\vnps1.asm - MARS 4.5

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Registers Coproc 1 Coproc 0

Name	Number	Value
\$8 (vaddr)	8	0
\$12 (status)	12	65297
\$13 (cause)	13	0
\$14 (epc)	14	0

Text Segment

Bkpt	Address	Code	Basic	Source
	4194304	0x24020004	addiu \$2,\$0,4	12: li \$v0, 4 #input canh a
	4194308	0x3c011001	lui \$1,4097	13: la \$a0, str a
	4194312	0x34240000	ori \$4,\$1,0	
	4194316	0x0000000c	syscall	14: syscall
	4194320	0x24020005	addiu \$2,\$0,5	15: li \$v0, 5
	4194324	0x0000000c	syscall	16: syscall
	4194328	0x00024020	add \$8,\$0,\$2	17: add \$t0, \$zero, \$v0
	4194332	0x0008082a	slt \$1,\$0,\$8	18: ble \$t0, \$zero, edge err # if a <=0 jump to edge err
	4194336	0x10200026	beq \$1,\$0,\$8	

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	1885431886	1634289440	1769100320	1851867936	979443816	1749942304	1193308257	1411408233
268501024	1126197618	543714913	2112098	1885431886	1634289440	1769100320	1851867936	979574888
268501056	1967390752	539780974	544825700	1646289260	1633886305	1663068270	1948279157	1730178401
268501088	6513001	745103699	2036417568	1814048800	1633820769	1851876128	1969430632	1635000417
268501120	1768366189	3040097	1330795077	1193294418	1948279145	1663068530	543714913	544039284
268501152	1667328359	556808760	33	0	0	0	0	0

Mars Messages Run I/O

Clear

Nhap Gia Tri Canh a: 3
Nhap Gia Tri Canh b: 4
Nhap Gia Tri Canh c: 5
Dung, day la ba canh cua tam giac
-- program is finished running --

3:25 PM 5/20/2022

TH2: Không thỏa mãn điều kiện 3 cạnh tam giác:

CAUsers\buusa\OneDrive\Desktop\mips1.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
4194304	0x24020004	addiu \$2,\$0,4	12: li \$v0, 4	#input canh a
4194308	0x3c011001	lui \$1,4097	13: la \$a0, str a	
4194312	0x34240000	ori \$4,\$1,0		
4194316	0x0000000c	syscall	14: syscall	
4194320	0x24020005	addiu \$2,\$0,5	15: li \$v0, 5	
4194324	0x0000000c	syscall	16: syscall	
4194328	0x00024020	add \$8,\$0,\$2	17: add \$t0, \$zero, \$v0	
4194332	0x0008082a	sllt \$1,\$0,\$8	18: ble \$t0, \$zero, edge err	# if a <=0 jump to edge err
4194336	0x10200026	beq \$1,\$0,\$8		

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	1885431886	1634289440	1769100320	1851867936	979443816	1749942304	1193308257	1411408233
268501024	1126197618	543714913	2112098	1885431886	1634289440	1769100320	1851867936	979574888
268501056	1967390752	539780974	544825700	1646289260	1633886305	1663068270	1948279157	1730178401
268501088	6513001	745103699	2036417568	1814048800	1633820769	1851876128	1969430632	1635000417
268501120	1768366189	3040097	1330795077	1193294418	1948279145	1663068530	543714913	544039284
268501152	1667328359	556809760	33	0	0	0	0	0

0x10010000 (.data) Hexadecimal Addresses Hexadecimal Values ASCII

Mars Messages Run I/O

Nhap Gia Tri Canh a: 4
Nhap Gia Tri Canh b: 1
Nhap Gia Tri Canh c: 1
Sai, Day 0 la ba canh ca tam giac.
-- program is finished running --

3:27 PM 5/20/2022

TH2: Không thỏa mãn điều kiện 3 cạnh tam giác:

CAUsers\buusa\OneDrive\Desktop\mips1.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
4194304	0x24020004	addiu \$2,\$0,4	12: li \$v0, 4	#input canh a
4194308	0x3c011001	lui \$1,4097	13: la \$a0, str a	
4194312	0x34240000	ori \$4,\$1,0		
4194316	0x0000000c	syscall	14: syscall	
4194320	0x24020005	addiu \$2,\$0,5	15: li \$v0, 5	
4194324	0x0000000c	syscall	16: syscall	
4194328	0x00024020	add \$8,\$0,\$2	17: add \$t0, \$zero, \$v0	
4194332	0x0008082a	sllt \$1,\$0,\$8	18: ble \$t0, \$zero, edge err	# if a <=0 jump to edge err
4194336	0x10200026	beq \$1,\$0,\$8		

Data Segment

Address	Value (+0)	Value (+4)	Value (+8)	Value (+12)	Value (+16)	Value (+20)	Value (+24)	Value (+28)
268500992	1885431886	1634289440	1769100320	1851867936	979443816	1749942304	1193308257	1411408233
268501024	1126197618	543714913	2112098	1885431886	1634289440	1769100320	1851867936	979574888
268501056	1967390752	539780974	544825700	1646289260	1633886305	1663068270	1948279157	1730178401
268501088	6513001	745103699	2036417568	1814048800	1633820769	1851876128	1969430632	1635000417
268501120	1768366189	3040097	1330795077	1193294418	1948279145	1663068530	543714913	544039284
268501152	1667328359	556809760	33	0	0	0	0	0

0x10010000 (.data) Hexadecimal Addresses Hexadecimal Values ASCII

Mars Messages Run I/O

Nhap Gia Tri Canh a: 3
Nhap Gia Tri Canh b: -4
ERROR: Gia tri canh tam giac >0!
-- program is finished running --

3:29 PM 5/20/2022

Assignment 2

```
.data
    str1: .asciiz    "Nhap so phan tu cua mang: "
    str2: .asciiz    "Nhap phan tu cua mang:"
    str3: .asciiz    "Mang sau khi duoc sap xep: "

.text
    la    $a0, s1
    li    $v0, 4
    syscall

    li    $v0, 5                # read integer
    syscall

    addi   $s6, $s6, 0x10010000    # s6 -> 0x10010000 = &A : luu dia chi cua bo
nho
    addi   $s5, $s6, 0            # s5 -> 0x10010000 = &A : luu dia chi cua bo nho
    addi   $s0, $v0, 0            # s0 = N
    addi   $t1, $zero, 0          # i = 0
    mul    $s1, $s0, 4            # s1 = 4 * N
    sub    $sp, $sp, $s1          # Khoi tao bo nho stack 4*n byte
    la    $a0, s2
    li    $v0, 4
    syscall

loop_scan:
    slt    $t0, $t1, $s0          # if (i < N)
    beq    $t0, $zero, end_loop_scan

    li    $v0, 5                # read integer
    syscall

    sw     $v0, 0($s5)            # s5[i] = v0

    addi   $t1, $t1, 1            # i++
    addi   $s5, $s5, 4            # s5 -> &A[i]

    j      loop_scan

end_loop_scan:
main:
    addi   $a0, $s6, 0            # a0 = &A[0]
    addi   $a1, $s0, 0            # s1 = N
    jal    sort
```

```

    addi    $t1, $zero, 0          # i = 0
    addi    $s5, $s6, 0           # s5 = s6 -> &A[0]
loop_print:
    slt     $t0, $t1, $s0         # if (i < N)
    beq     $t0, $zero, end_loop_print
    li      $v0, 1                # print integer
    lw      $a0, 0($s5)           # a0 = A[i]
    syscall
    li      $v0, 11               # print character
    addi    $a0, $zero, 44
    syscall
    addi    $t1, $t1, 1           # i++
    addi    $s5, $s5, 4           # s5 -> &A[i]
    j       loop_print
end_loop_print:
end_main:
    j       exit
swap:
    sw      $s0, 0($t9)           # A[j] = A[i] truoc day
    sw      $s1, 0($t8)           # A[i] = A[j] truoc day
    jr      $ra                   # Quay lai va tiep tuc vong lap
sort:
    addi    $sp, $sp, -8          # Khoi tao 2 vung nho 4 byte
    sw      $ra, 4($sp)           # push $ra -> stack
    sw      $s0, 0($sp)           # push $s0 -> stack
    addi    $t1, $zero, 0         # i = 0
    addi    $t2, $zero, 0         # j = 0
    addi    $t8, $a0, 0           # v0 -> &A[0]
loop_i:
    slt     $t0, $t1, $a1         # if (i < n)
    beq     $t0, $zero, end_loop_i
    lw      $s0, 0($t8)           # s0 = A[i]
    bltz    $s0, continue_i       # if (A[i] < 0)
    addi    $t2, $t1, 1           # j = i+1

```



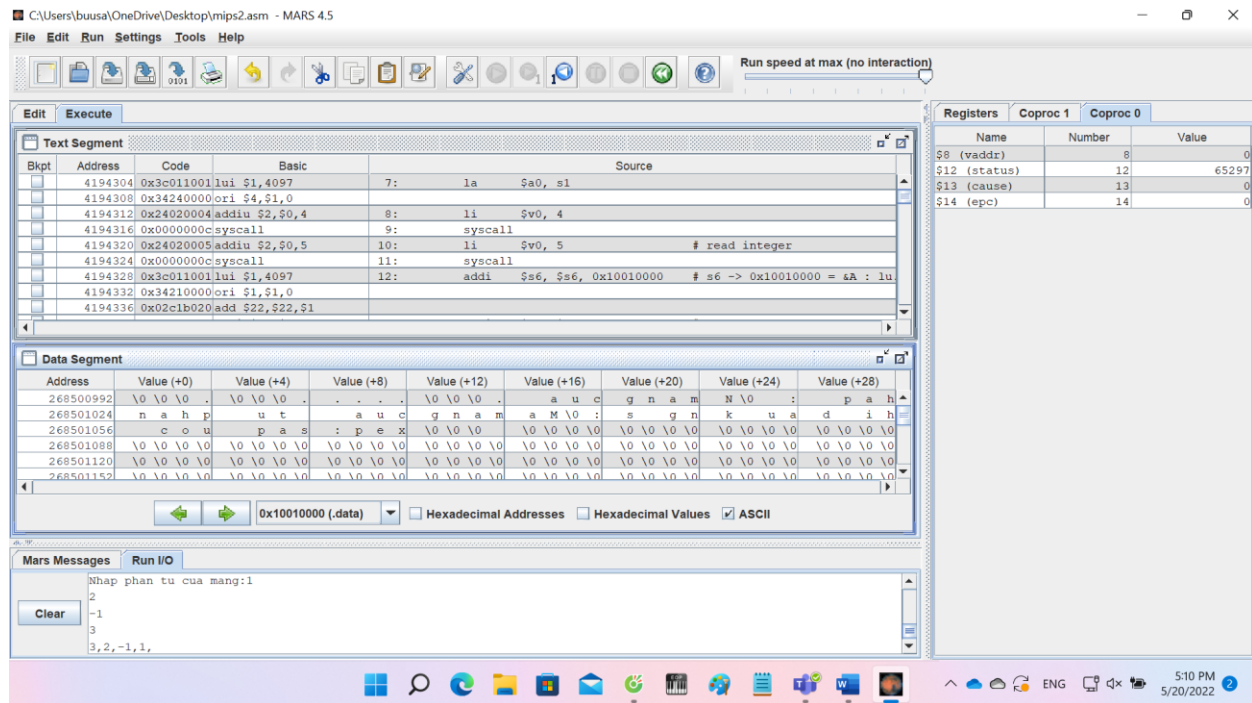
```

        addi    $t9, $t8, 4          # v1 -> A[i+1]
loop_j:
        slt     $t0, $t2, $a1        #if (j < n)
        beq     $t0, $zero, end_loop_j

        lw      $s1, 0($t9)          # s1 = A[j]
        bltz    $s1, continue_j      # if (s1 < 0) -> continue_j

        slt     $t0, $s1, $s0        # if (A[i] > A[j]) -> swap
        bne     $t0, $zero, continue_j
        jal     swap
continue_j:
        addi    $t2, $t2, 1          # j++
        addi    $t9, $t9, 4          # t9 -> &A[j]
        lw      $s0, 0($t8)          # s0 = A[i]
        j       loop_j
end_loop_j:
continue_i:
        addi    $t1, $t1, 1          # i++
        addi    $t8, $t8, 4          # t8 -> &A[i]
        j       loop_i
end_loop_i:
        lw      $s0, 0($sp)
        lw      $ra, 4($sp)
        jr      $ra
end_sort:
exit:

```



ASSIGNMENT 3:

```
int n=0;

for(int i=0;i<strlen(arr);i++)
{
    if(B[i]==0)
        for(int j=0;j<strlen(arr);j++)
            if((B[j]==0) &&(arr[i]==arr[j]) && (j!=i))
            {
                B[j]=1;
            }
    n--;
    n++;
    B[i]=1;
}
```

.data

string: .space 50 #Khai bao chuoi co do dai 50

Message1: .asciiz "Nhap xau:" #khai bao chuoi ky tu "Nhap xau:" voi nhan Message1

Message2: .asciiz "So ky tu khac nhau:" #tuong tu

arr: .word 0:100

.text

main:

get_string:

li \$v0, 54 #gan thanh ghi v0 = 54 : hien hop thoai nhap chuoi

la \$a0, Message1 #load dia chi bien Message1 vao thanh ghi a0

la \$a1, string #load dia chi bien string vao thanh ghi a1

la \$a2, 100 #khai bao a2 = 100

syscall #goi ham syscall voi v0 = 54 -> hien hop thoai nhap chuoi

get_length:

la \$a0,string# \$a0=address(string[0])

la \$a1 ,arr

add \$v1,\$zero,\$zero# \$v1= length =0

add \$t0,\$zero,\$zero# \$t0=i=0

add \$s0,\$zero,\$zero# \$s0=j=0

add \$t6,\$zero,\$zero# \$t6=n=0

check_char:

add \$t1,\$a0,\$t0 # \$t1=\$a0+\$t0
 #=address(string[i])

lb \$t3, 0(\$t1) #t3 = string[i]

beq \$t3, \$zero,end_get_length

addi \$v1,\$v1,1 #v1 = length++

addi \$t0,\$t0,1 #t0 = i++

j check_char #jump to check_char

end_get_length:

addi \$v1,\$v1, -1

add \$t0,\$zero,\$zero# \$t0=i=0

loop:

add \$t1,\$a1,\$t0 # \$t1=\$a0+\$t0
=address(arr[i])

lb \$t3, 0(\$t1) #t3 = arr[i]

beqz \$t3,loop2

addi \$t0,\$t0,1 #t0 = i++

blt \$s0,\$v1,loop

loop:

add \$t4,\$a1,\$s0 # \$t1=\$a0+\$s0
=address(arr[j])

lb \$t5, 0(\$t4) #t3 = arr[j]

addi \$s0,\$s0,1 #t0 = j++

beqz

blt \$s0,\$v1,loop

return n;

}