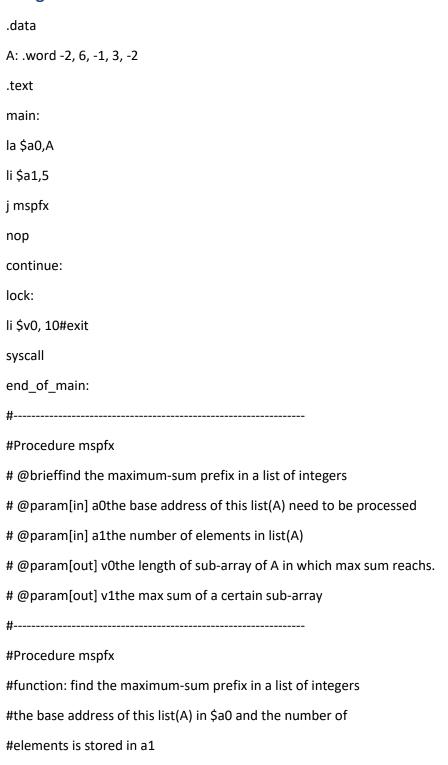
Laboratory Exercise 6

Assignment 1



```
mspfx:
addi $v0,$zero,0#initialize length in $v0 to 0
addi $v1,$zero,0#initialize max sum in $v1to 0
addi $t0,$zero,0#initialize index i in $t0 to 0
addi $t1,$zero,0#initialize running sum in $t1 to 0
loop:
add $t2,$t0,$t0#put 2i in $t2
add $t2,$t2,$t2#put 4i in $t2
add $t3,$t2,$a0#put 4i+A (address of A[i]) in $t3
lw $t4,0($t3)#load A[i] from mem(t3) into $t4
add $t1,$t1,$t4#add A[i] to running sum in $t1
slt $t5,$v1,$t1#set $t5 to 1 if max sum < new sum
bne $t5,$zero,mdfy #if max sum is less, modify results
j test#done?
mdfy:
addi $v0,$t0,1#new max-sum prefix has length i+1
addi $v1,$t1,0#new max sum is the running sum
test:
addi $t0,$t0,1#advance the index i
slt $t5,$t0,$a1#set $t5 to 1 if i<n
bne $t5,$zero,loop#repeat if i<n
done:
j continue
mspfx_end:
```

Kết quả:

Registers Coproc 1	Coproc 0	
Name	Number	Value
\$zero	0	0
\$at	1	268500992
\$v0	2	10
\$v1	3	6
\$a0	4	268500992
\$al	5	5
\$a2	6	0
\$a3	7	0
\$t0	8	5
\$t1	9	4
\$t2	10	16
\$t3	11	268501008
\$t4	12	-2
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$80	16	0
\$sl	17	0
\$s2	18	0
\$83	19	0
\$84	20	0
\$85	21	0
\$86	22	0
\$87	23	0
\$t8	24	0
\$t9	25	0
\$k0	26	0
\$kl	27	0
\$gp	28	268468224
\$sp	29	2147479548
\$fp	30	0
\$ra	31	0
pc		4194332
hi		0
10		0

Assignment 2

Sắp xếp theo tăng dần

.data

A: .word 7, -2, 5, 1, 5,6,7,3,6,8,8,59,5

Aend: .word

.text

main:

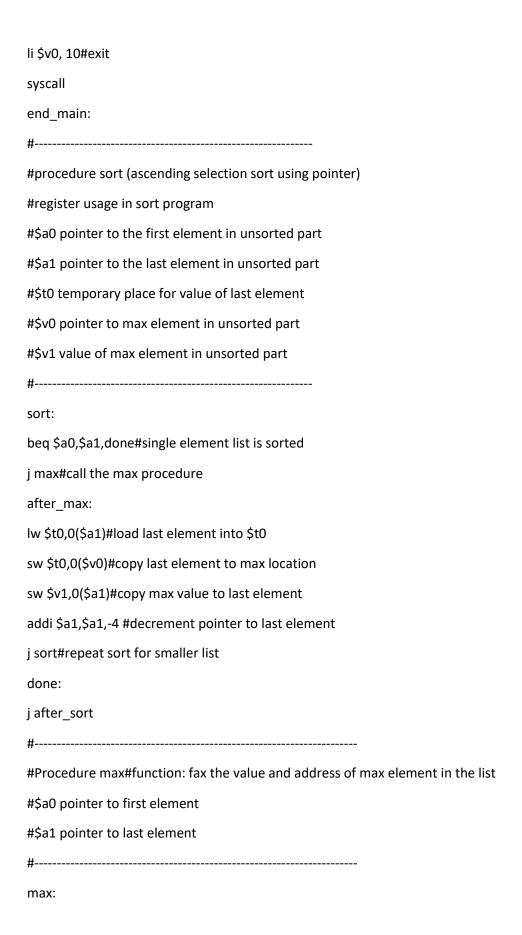
la \$a0,A #\$a0 = Address(A[0])

la \$a1,Aend

addi \$a1,\$a1,-4 #\$a1 = Address(A[n-1])

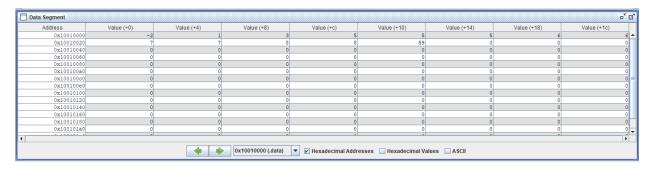
j sort #sort

after_sort:



addi \$v0,\$a0,0 #init max pointer to first element
lw \$v1,0(\$v0) #init max value to first value
addi \$t0,\$a0,0 #init next pointer to first
loop:
beq \$t0,\$a1,ret #if next=last, return
addi \$t0,\$t0,4 #advance to next element
lw \$t1,0(\$t0) #load next element into \$t1
slt \$t2,\$t1,\$v1 #(next)<(max) ?
bne \$t2,\$zero,loop#if (next)<(max), repeat
addi \$v0,\$t0,0#next element is new max element
addi \$v1,\$t1,0#next value is new max value
j loop#change completed; now repeat
ret:
j after_max

Kết quả:



Registers Cop	oc 1 Coproc 0	
Name	Number	Value
\$zero	0	0
\$at	1	268500992
\$v0	2	10
\$vl	3	
\$a0	4	268500992
\$al	5	
\$a2	6	0
\$a3	7	
\$t0	8	
\$t1	9	-2
\$t2	10	1
\$t3	11	
\$t4	12	. 0
\$t5	13	
\$t6	14	
\$t7	15	0
\$80	16	
\$sl	17	0
\$s2	18	0
\$83	19	0
\$84	20	0
\$85	21	. 0
\$86	22	
\$87	23	
\$t8	24	
\$t9	25	0
\$k0	26	
\$kl	27	
\$gp	28	268468224
\$sp	29	2147479548
\$fp	30	0
\$ra	31	
рс		4194336
hi		0
10		0

Sắp xếp theo giảm dần

.data

A: .word 7, -2, 5, 1, 5,6,7,3,6,8,8,59,5

Aend: .word

.text

main:

Ia \$a0,A #\$a0 = Address(A[0])

la \$a1,Aend

addi \$a1,\$a1,-4 #\$a1 = Address(A[n-1])

j sort #sort

after_sort:

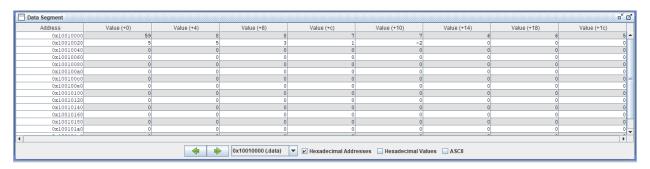
li \$v0, 10#exit

syscall
end_main:
#
#procedure sort (ascending selection sort using pointer)
#register usage in sort program
#\$a0 pointer to the first element in unsorted part
#\$a1 pointer to the last element in unsorted part
#\$t0 temporary place for value of last element
#\$v0 pointer to max element in unsorted part
#\$v1 value of max element in unsorted part
#
sort:
beq \$a0,\$a1,done#single element list is sorted
j min#call the min procedure
after_min:
lw \$t0,0(\$a1)#load last element into \$t0
sw \$t0,0(\$v0)#copy last element to min location
sw \$v1,0(\$a1)#copy max value to last element
addi \$a1,\$a1,-4 #decrement pointer to last element
j sort#repeat sort for smaller list
done:
j after_sort
#
#Procedure max#function: fax the value and address of min element in the list
#\$a0 pointer to first element
#\$a1 pointer to last element
#
min:
addi \$v0,\$a0,0 #init min pointer to first element

lw \$v1,0(\$v0) #init min value to first value addi \$t0,\$a0,0 #init next pointer to first loop:
beq \$t0,\$a1,ret #if next=last, return addi \$t0,\$t0,4 #advance to next element lw \$t1,0(\$t0) #load next element into \$t1 slt \$t2,\$v1,\$t1 #(next)>(min) ?
bne \$t2,\$zero,loop#if (next)>(min), repeat addi \$v0,\$t0,0#next element is new min element addi \$v1,\$t1,0#next value is new min value j loop#change completed; now repeat ret:

Kết quả:

j after_min



Registers Coproc 1	Coproc 0	
Name	Number	Value
\$zero	0	0
\$at	1	. 268500992
\$v0	2	10
\$vl	3	8
\$a0	4	268500992
\$al	5	268500992
\$a2	6	0
\$a3	7	
\$t0	8	8
\$tl	9	8
\$t2	10	
\$t3	11	
\$t4	12	0
\$t5	13	0
\$t6	14	
\$t7	15	0
\$80	16	0
\$sl	17	
\$s2	18	0
\$83	19	0
\$84	20	0
\$85	21	. 0
\$86	22	
\$87	23	
\$t8	24	0
\$t9	25	0
\$k0	26	
\$kl	27	
\$gp	28	268468224
\$sp	29	2147479548
\$fp	30	0
\$ra	31	. 0
рс		4194336
hi		0
10		0

Assignment 3

Tăng dần

.data

A: .word 7, -2, 5, 1, 5,6,7,3,6,8,8,59,5

Aend: .word

.text

main:

la \$a0,A #\$a0 = Address(A[0])

la \$a1,Aend

j sort #sort

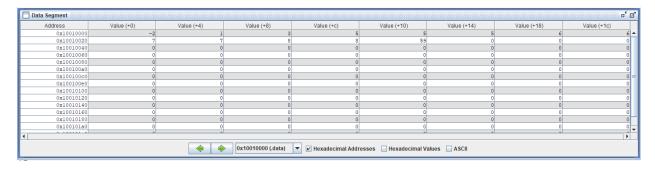
after_sort:

li \$v0, 10#exit

```
syscall
end_main:
sort:
addi $a1,$a1,-4 #$a1 = Address(A[n-1])
beq $a0,$a1,after_sort#single element list is sorted
addi $t0,$a0,0 #init next pointer to first
loop:
beq $t0,$a1,sort
lw $t1,0($t0) # $t1 = a(i)
lw $t2,4($t0) # $t2 = a(i+1)
slt $t3,$t2,$t1 #(i+1)<(i) ?
beq $t3,$zero,next#if (i)<=(i+1), repeat
sw $t1,4($t0) # a(i+1)= $t1
sw $t2,0($t0) # a(i)= $t2
j loop
next:
addi $t0,$t0,4 #advance to next element
```

Kết quả:

j loop



\$zero \$at \$v0 \$v1	е	N	lumber	Value
\$at \$v0				
\$v0		0		0
		1		268500992
\$v1		2		10
7 7 -			3	0
\$a0			4	268500992
\$al			5	268500992
\$a2			6	0
\$a3			7	0
\$t0			8	268500996
\$t1			9	-2
\$t2			10	1
\$t3			11	0
\$t4			12	0
\$t5			13	0
\$t6			14	0
\$t7			15	
\$80			16	0
\$s1			17	0
\$82			18	0
\$83			19	0
\$84			20	0
\$85			21	0
\$86			22	0
\$87			23	0
\$t8			24	0
\$t9			25	0
\$k0			26	0
\$k1		27		0
\$gp			28	268468224
\$sp		29		
\$fp		30		
\$ra		31		0
pc				4194332
hi				0
10				0

Giảm dần

.data

A: .word 7, -2, 5, 1, 5,6,7,3,6,8,8,59,5

Aend: .word

.text

main:

la \$a0,A #\$a0 = Address(A[0])

la \$a1,Aend

j sort #sort

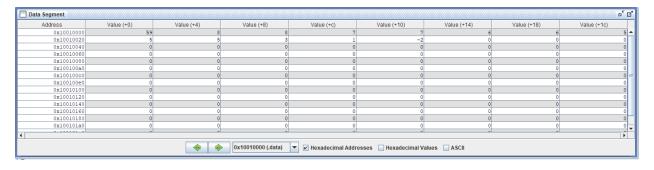
after_sort:

li \$v0, 10#exit

syscall

```
end_main:
sort:
addi a1,a1,-4 \#a1 = Address(A[n-1])
beq $a0,$a1,after_sort#single element list is sorted
addi $t0,$a0,0 #init next pointer to first
loop:
beq $t0,$a1,sort
lw $t1,0($t0) #$t1 = a(i)
lw $t2,4($t0) #$t2 = a(i+1)
slt $t3,$t1,$t2 #(i)<(i+1) ?
beq $t3,$zero,next#if (i+1)<=(i), repeat
sw $t1,4($t0) # a(i+1)= $t1
sw $t2,0($t0) # a(i) = $t2
j loop
next:
addi $t0,$t0,4 #advance to next element
j loop
```

Kết quả:



Registers Coproc 1	Coproc 0	
Name	Number	Value
\$zero	0	0
\$at	1	268500992
\$v0	2	10
\$v1	3	0
\$a0	4	268500992
\$al	5	268500992
\$a2	6	0
\$a3	7	0
\$t0	8	268500996
\$t1	9	59
\$t2	10	8
\$t3	11	0
\$t4	12	0
\$t5	13	0
\$t6	14	0
\$t7	15	0
\$80	16	0
\$sl	17	0
\$82	18	0
\$83	19	0
\$84	20	0
\$85	21	0
\$86	22	0
\$87	23	0
\$t8	24	0
\$t9	25	0
\$k0	26	0
\$kl	27	0
\$gp	28	268468224
\$sp	29	2147479548
\$fp	30	0
\$ra	31	0
pc		4194332
hi		0
10		0