MICROPROCESSOR LABORATORY

Assignment No. 3

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Assignment No. 3

Program :

```
%macro read_or_print 4

mov Rax, %1

mov Rdi, %2

mov Rsi, %3

mov Rdx, %4

syscall

%endmacro


%macro exit 0

mov rax,60

mov rdi,0

syscall

%endmacro


section .data

array db 00h,10h,20h,30h,40h,50h,60h,70h

msg1 db 10,13,"The smallest element in the array is : ",10,13

msglen1 equ $-msg1

msg2 db 10,13,"The largest element in the array is : ",10,13

msglen2 equ $-msg2
```

```asm
section .bss
cnt resb 1
result resb 16


section .text
global _start
_start:


;Smallest Number
mov byte[cnt],08
mov rsi, array
mov al,0
up0:cmp al,[rsi]
    jl skip0
    xchg al,[rsi]
skip0:inc rsi
      dec byte[cnt]
      jnz up0


call display1


;Largest Number
mov byte[cnt],08
mov rsi,array
mov al,0
up1:cmp al,[rsi]
    jg skip1
```

```asm
        xchg al,[rsi]

skip1:inc rsi

        dec byte[cnt]

        jnz up1


        call display2

        exit


display1:

mov rsi,result+15

mov rcx,16

loop2:mov rdx,0

        mov rbx,16

        div rbx

        cmp dl,09h

        jbe skip2

        add dl,07h

skip2:add dl,30h

        mov [rsi],dl

        dec rsi

        dec rcx

        jnz loop2

read_or_print 1,1,msg1,msglen1

read_or_print 1,1,result,16

ret
```

```asm
display2:

mov rsi,result+15

mov rcx,16

loop3:mov rdx,0

       mov rbx,16

       div rbx

       cmp dl,09h

       jbe skip3

       add dl,07h

skip3:add dl,30h

       mov [rsi],dl

       dec rsi

       dec rcx

       jnz loop3

read_or_print 1,1,msg2,msglen2

read_or_print 1,1,result,16

ret
```

```asm
 1  %macro read_or_print 4
 2  mov Rax, %1
 3  mov Rdi, %2
 4  mov Rsi, %3
 5  mov Rdx, %4
 6  syscall
 7  %endmacro
 8
 9  %macro exit 0
10  mov rax,60
11  mov rdi,0
12  syscall
13  %endmacro
14
15  section .data
16  array db 00h,10h,20h,30h,40h,50h,60h,70h
17  msg1 db 10,13,"The smallest element in the array is : ",10,13
18  msglen1 equ $-msg1
19  msg2 db 10,13,"The largest element in the array is : ",10,13
20  msglen2 equ $-msg2
```

```asm
21
22  section .bss
23  cnt resb 1
24  result resb 16
25
26  section .text
27  global _start
28  _start:
29
30  ;Smallest Number
31  mov byte[cnt],08
32  mov rsi, array
33  mov al,0
34  up0:cmp al,[rsi]
35      jl skip0
36      xchg al,[rsi]
37  skip0:inc rsi
38      dec byte[cnt]
39      jnz up0
40
```

```asm
41  call display1
42
43  ;Largest Number
44  mov byte[cnt],08
45  mov rsi,array
46  mov al,0
47  up1:cmp al,[rsi]
48      jg skip1
49      xchg al,[rsi]
50  skip1:inc rsi
51      dec byte[cnt]
52      jnz up1
53
54  call display2
55  exit
56
57  display1:
58  mov rsi,result+15
59  mov rcx,16
60  loop2:mov rdx,0
```

```asm
61      mov rbx,16
62      div rbx
63      cmp dl,09h
64      jbe skip2
65      add dl,07h
66  skip2:add dl,30h
67      mov [rsi],dl
68      dec rsi
69      dec rcx
70      jnz loop2
71  read_or_print 1,1,msg1,msglen1
72  read_or_print 1,1,result,16
73  ret
74
75  display2:
76  mov rsi,result+15
77  mov rcx,16
78  loop3:mov rdx,0
79      mov rbx,16
80      div rbx
```

```
72   read_or_print 1,1,result,16
73   ret
74
75   display2:
76   mov rsi,result+15
77   mov rcx,16
78 ▾ loop3:mov rdx,0
79         mov rbx,16
80         div rbx
81         cmp dL,09h
82         jbe skip3
83         add dL,07h
84 ▾ skip3:add dL,30h
85         mov [rsi],dL
86         dec rsi
87         dec rcx
88         jnz loop3
89   read_or_print 1,1,msg2,msglen2
90   read_or_print 1,1,result,16
91   ret
```

Output :

```
The smallest element in the array is :
0000000000000000
The largest element in the array is :
0000000000000070
[Program exited with exit code 0]
```