MICROPROCESSOR LABORATORY

ASSIGNMENT NO. 6

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Assignment No. 6

Program :

```
%macro disp 2
   mov rax,1
   mov rdi,1
   mov rsi,%1
   mov rdx,%2
   syscall
%endmacro

section .data

   rmodemsg db 10,"Processor is in Real Mode"
   rmsg_len:equ $-rmodemsg

   pmodemsg db 10,"Processor is in Protected Mode"
   pmsg_len:equ $-pmodemsg

   gdtmsg db 10,"GDT Contents are :: "
   gmsg_len:equ $-gdtmsg

   ldtmsg db 10,"LDT Contents are :: "
   lmsg_len:equ $-ldtmsg

   idtmsg db 10,"IDT Contents are :: "
   imsg_len:equ $-idtmsg
```

```
    trmsg db 10,"Task Register Contents are :: "
    tmsg_len:equ $-trmsg

    mswmsg db 10,"Machine Status Word :: "
    mmsg_len:equ $-mswmsg

    promsg db 10,"Processor Information :: "
    promsg_len:equ $-promsg

    colmsg db ':'

    newline db 10

section .bss
    gdt resd 1
        resw 1
    ldt resw 1
    idt resd 1
        resw 1
    tr resw 1
    cr0_data resd 1
    dnum_buff resb 04

section .text
global _start:
_start:
```

```
    smsw eax
    mov [cr0_data],eax
    bt eax,0
    jc prmode
    disp rmodemsg,rmsg_len
    jmp nxt1

prmode:disp pmodemsg,pmsg_len

nxt1:sgdt[gdt]
     sldt[ldt]
     sidt[idt]
     str[tr]

     disp gdtmsg,gmsg_len

     mov bx,[gdt+4]
     call disp_num

     mov bx,[gdt+2]
     call disp_num

     disp colmsg,1

     mov bx,[gdt]
     call disp_num

     disp ldtmsg,lmsg_len
```

```
mov bx,[ldt]
call disp_num

disp idtmsg,imsg_len

mov bx,[idt+4]
call disp_num

mov bx,[idt+2]
call disp_num

disp colmsg,1

mov bx,[idt]
call disp_num

disp trmsg,tmsg_len

mov bx,[tr]
call disp_num

disp mswmsg,mmsg_len

mov bx,[cr0_data+2]
call disp_num

mov bx,[cr0_data]
call disp_num
```

```
    disp newline,1

    disp promsg,promsg_len

    mov eax,00h
    call disp_num
    cpuid
    call disp_num

exit: mov eax,01
     mov ebx,00
     int 80h

disp_num:
   mov esi,dnum_buff
   mov ecx,04
up1:rol bx,4
   mov dl,bl
   and dl,0fh
   add dl,30h
   cmp dl,39h
   jbe skip1
   add dl,07h
skip1:mov [esi],dl
     inc esi
     loop up1
disp dnum_buff,4
```

ret

Code Input Output Run Save

```
%macro disp 2
    mov rax,1
    mov rdi,1
    mov rsi,%1
    mov rdx,%2
    syscall
%endmacro

section .data

    rmodemsg db 10,"Processor is in Real Mode"
    rmsg_len:equ $-rmodemsg

    pmodemsg db 10,"Processor is in Protected Mode"
    pmsg_len:equ $-pmodemsg

    gdtmsg db 10,"GDT Contents are :: "
    gmsg_len:equ $-gdtmsg

    ldtmsg db 10,"LDT Contents are :: "
```

Code Input Output Run Save

```
    lmsg_len:equ $-ldtmsg

    idtmsg db 10,"IDT Contents are :: "
    imsg_len:equ $-idtmsg

    trmsg db 10,"Task Register Contents are :: "
    tmsg_len:equ $-trmsg

    mswmsg db 10,"Machine Status Word :: "
    mmsg_len:equ $-mswmsg

    promsg db 10,"Processor Information :: "
    promsg_len:equ $-promsg

    colmsg db ':'

    newline db 10

section .bss
    gdt resd 1
```

Code Input Output Run Save

```
41          resw 1
42      ldt resw 1
43      idt resd 1
44          resw 1
45      tr resw 1
46      cr0_data resd 1
47      dnum_buff resb 04
48
49  section .text
50  global _start:
51  _start:
52
53      smsw eax
54      mov [cr0_data],eax
55      bt eax,0
56      jc prmode
57      disp rmodemsg,rmsg_len
58      jmp nxt1
59
60  prmode:disp pmodemsg,pmsg_len
```

Code Input Output Run Save

```
61
62  nxt1:sgdt[gdt]
63       sldt[ldt]
64       sidt[idt]
65       str[tr]
66
67       disp gdtmsg,gmsg_len
68
69       mov bx,[gdt+4]
70       call disp_num
71
72       mov bx,[gdt+2]
73       call disp_num
74
75       disp colmsg,1
76
77       mov bx,[gdt]
78       call disp_num
79
80       disp ldtmsg,lmsg_len
```

Code Input Output Run Save

```
81       mov bx,[ldt]
82       call disp_num
83
84       disp idtmsg,imsg_len
85
86       mov bx,[idt+4]
87       call disp_num
88
89       mov bx,[idt+2]
90       call disp_num
91
92       disp colmsg,1
93
94       mov bx,[idt]
95       call disp_num
96
97       disp trmsg,tmsg_len
98
99       mov bx,[tr]
100      call disp_num
```

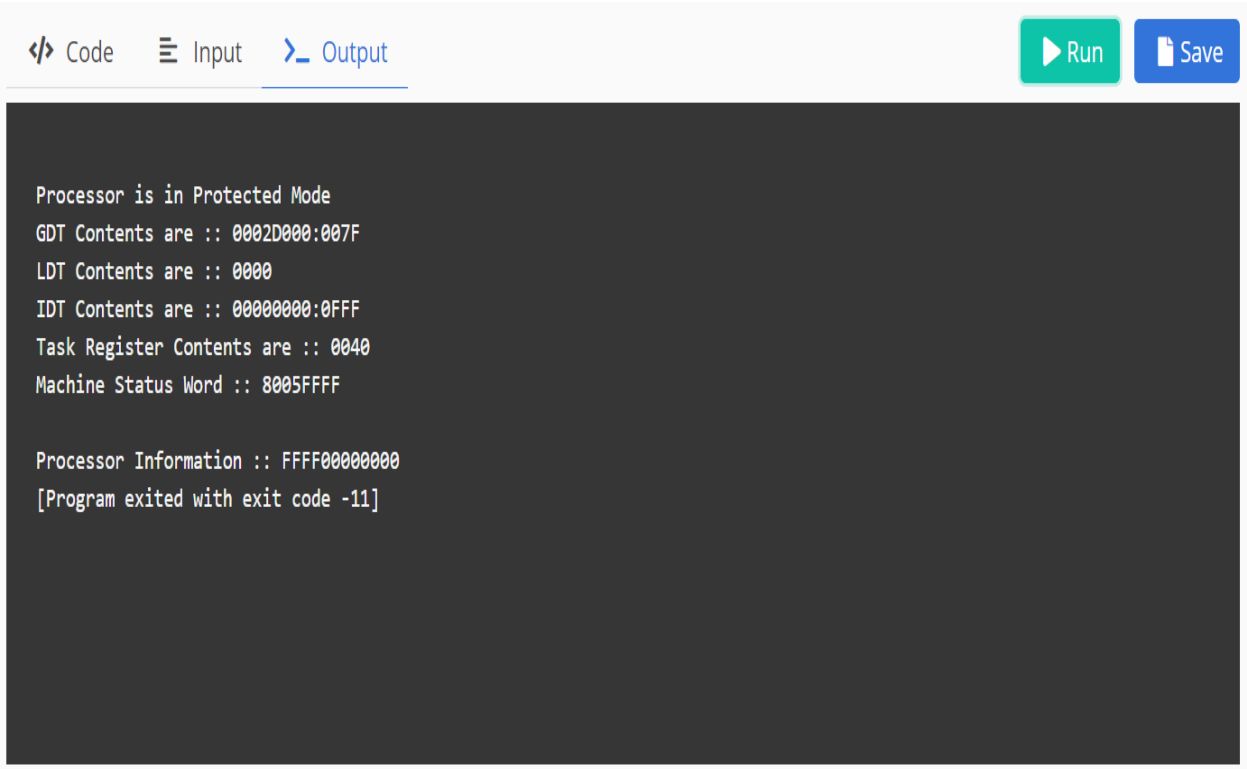
Code Input Output Run Save

```
101
102      disp mswmsg,mmsg_len
103
104      mov bx,[cr0_data+2]
105      call disp_num
106
107      mov bx,[cr0_data]
108      call disp_num
109
110      disp newline,1
111
112      disp promsg,promsg_len
113
114      mov eax,00h
115      call disp_num
116      cpuid
117      call disp_num
118
119  exit: mov eax,01
120        mov ebx,00
```

Code Input Output Run Save

```
118
119  exit: mov eax,01
120        mov ebx,00
121        int 80h
122
123  disp_num:
124      mov esi,dnum_buff
125      mov ecx,04
126  up1:rol bx,4
127      mov dl,bl
128      and dl,0fh
129      add dl,30h
130      cmp dl,39h
131      jbe skip1
132      add dl,07h
133  skip1:mov [esi],dl
134        inc esi
135        loop up1
136  disp dnum_buff,4
137  ret
```

Output :


Code
Input
Output
Run
Save
Processor is in Protected Mode
GDT Contents are :: 0002D000:007F
LDT Contents are :: 0000
IDT Contents are :: 00000000:0FFF
Task Register Contents are :: 0040
Machine Status Word :: 8005FFFF
Processor Information :: FFFF00000000
[Program exited with exit code -11]