MICROPROCESSOR ASSIGNMENTS

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PROBLEM STATEMENT :

Write X86/64 ALP to switch from real mode to protected mode and display the values of GDTR, LDTR, IDTR, TR and MSW Registers.

CODE :

%macro scall 4

mov rax, %1

mov rdi, %2

mov rsi, %3

mov rdx, %4

syscall

%endmacro

section .data

pm\_msg db "PROTECTED MODE IS NOT ENABLED", 10

pm\_msgl equ $-pm\_msg

pm\_msg1 db "ALREADY IN PROTECTED MODE", 10

pm\_msg1l equ $-pm\_msg1

gdtr\_msg db 10, "GDTR CONTENTS ARE :- "

gdtr\_msgl equ $-gdtr\_msg

ldtr\_msg db 10, "LDTR CONTENTS ARE :- "

ldtr\_msgl equ $-ldtr\_msg

idtr\_msg db 10, "IDTR CONTENTS ARE :- "

idtr\_msgl equ $-idtr\_msg

tr\_msg db 10, "TR CONTENTS ARE :- "

tr\_msgl equ $-tr\_msg

colon db ":"

colon\_l equ $-colon

e db 10

el equ $-e

section .bss

gdtr resb 10

idtr resb 10

ldtr resb 10

tr resb 10

buff resb 10

section .txt

global \_start

\_start :

smsw eax

bt eax, 31

jc l1

scall 1, 1, pm\_msg, pm\_msgl

l1 : scall 1, 1, pm\_msg1, pm\_msg1l

sgdt [gdtr]

sidt [idtr]

sldt [ldtr]

;----gdtr contents----

scall 1, 1, gdtr\_msg, gdtr\_msgl

mov bx, [gdtr + 4]

call display

scall 1, 1, buff, 10

scall 1, 1, colon, colon\_l

mov bx, [gdtr + 2]

call display

scall 1, 1, buff, 10

scall 1, 1, colon, colon\_l

mov bx, [gdtr]

call display

scall 1, 1, buff, 10

;----idtr contents----

scall 1, 1, idtr\_msg, idtr\_msgl

mov bx, [idtr + 4]

call display

scall 1, 1, buff, 10

scall 1, 1, colon, colon\_l

mov bx, [idtr + 2]

call display

scall 1, 1, buff, 10

scall 1, 1, colon, colon\_l

mov bx, [idtr]

call display

scall 1, 1, buff, 10

;----ldtr contents----

scall 1, 1, ldtr\_msg, ldtr\_msgl

mov bx, [ldtr]

call display

scall 1, 1, buff, 10

;----exit----

scall 1, 1, e, el

mov rax, 60

mov rdi, 0

syscall

display :

mov rsi, buff

mov rcx, 4

mov rdx, 0

bck : rol bx, 4

mov dl, bl

and dl, 0fh

cmp dl, 09

jbe lx1

add dl, 7h

lx1 : add dl, 30h

mov [rsi], dl

inc rsi

dec rcx

jnz bck

ret

OUTPUT :

