

Name: Vinayak Madan Shete

Roll No.: SYCOC303 Course Name: Microprocessor Architecture Lab

Div: C Batch: C4 Course Code: BCE4302

Problem Statement:

Write an X86/64 ALP to count the number of positive and negative numbers from the array.

Input:

```
;=====
;Assignment No.:03
;=====
```

section .data

```
    ano db 10,"Assignment No.: 03",10
        db "Printing no. of positive and negative numbers in an array",10
    ano_len equ $-ano
    arr64 dq 21H,-45H,02H,89H,-09H
    n equ 5
    pmsg db 10,"No. of positive numbers are:"
    pmsg_len equ $-pmsg
    nmsg db 10,"No. of negative numbers are:",
    nmsg_len equ $-nmsg
    newline db 10,10
    newline_len equ $-newline
```

```
;=====
```

section .bss

```
    p_count resq 1
    n_count resq 1
```

```
char_ans resb 16
;=====

%macro print 2
    MOV RAX,1
    MOV RDI,1
    MOV RSI,%1
    MOV RDX,%2
    SYSCALL
%endmacro

%macro exit 0
    MOV RAX,60
    MOV RDI,1
    SYSCALL
%endmacro
;=====

section .text
    global _start
_start:
    print ano,ano_len
    mov rsi,arr64
    mov rcx,n
    mov rbx,0
    mov rdx,0
    next_num:
    mov rax,[rsi]
    Ror rax,1
    jc negative
    positive:
    inc rbx
    jmp next
    negative:
    inc rdx
    next:
```

```
add rsi,8
dec rcx
jnz next_num
```

```
mov [p_count],rbx
mov [n_count],rdx
```

```
print pmsg,pmsg_len
mov rax,[p_count]
call display
print nmsg,nmsg_len
mov rax,[n_count]
call display
```

```
print newline,newline_len
```

```
exit
```

```
;=====
```

```
display:
```

```
mov rbx,10
mov rcx,2
mov rsi,char_ans+1
```

```
back:
```

```
mov rdx,0
```

```
div rbx
```

```
cmp dl,09h
jbe add30
add dl,07h
```

```
add30:
```

```
add dl,30h
```

```
mov [rsi],dl
```

```
dec rsi
```

```
dec rcx
```

```
jnz back
```

```
print char_ans,2
```

```
ret
```

```
;=====
```

Output:

```
administrator@206-4:~/Desktop/MAL programs$ nasm -f elf64 Assignment3.asm
administrator@206-4:~/Desktop/MAL programs$ ld Assignment3.o -o Assignment3
administrator@206-4:~/Desktop/MAL programs$ ./Assignment3
Assignment No.: 03
Printing no. of positive and negative numbers in an array
No. of positive numbers are:03 No. of negative numbers are:02
administrator@206-4:~/Desktop/MAL programs$
```

```
=====
```