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Class: SE(B)

Batch – B3

Assignment No. 8

Problem Statement: Write x86 ALP to find the factorial of a given integer number on command line using recursion. Explicit Stack Manipulation is expected in the code.

**Code:**

section .data

nummsg db "\*\*\*Program to find factorial of a given number\*\*\*",10

db "Enter the number::"

nummsg\_len equ $-nummsg

resmsg db "Factorial is::"

resmsg\_len equ $-resmsg

thankmsg db 10,"Thanks"

thankmsg\_len equ $-thankmsg

zerofact db "00000001"

zerofact\_len equ $-zerofact

section .bss

dispbuff resb 16

result resb 4

num resb 1

num1 resb 1

numascii resb 3

%macro display 2

mov rax,01

mov rdi,01

mov rsi,%1

mov rdx,%2

syscall

%endmacro

%macro accept 2

mov rax,00

mov rdi,00

mov rsi,%1

mov rdx,%2

syscall

%endmacro

section .text

global \_start

\_start:

display nummsg, nummsg\_len

accept numascii, 3

call packnum8\_proc

mov [num], bl

display resmsg, resmsg\_len

mov al, [num]

cmp al, 0h

jbe endfact

mov bl, [num]

call proc\_fact

mov rbx, rax

call disp64\_proc

jmp exit

endfact: display zerofact, zerofact\_len

exit:

display thankmsg, thankmsg\_len

mov rax, 60

mov rdi, 00

syscall

proc\_fact:

cmp bl, 1

jne do\_calculation

mov ax, 1

ret

do\_calculation:

push rbx

dec bl

call proc\_fact

pop rbx

mul bl

ret

disp64\_proc:

mov rdi, dispbuff

mov rcx, 16

dispup1:

rol rbx, 4

mov dl, bl

and dl, 0fh

add dl, 30h

cmp dl, 39h

jbe dispskip1

add dl, 07h

dispskip1:

mov [rdi], dl

inc rdi

loop dispup1

display dispbuff, 16

ret

packnum8\_proc:

mov bl,0

mov ecx,2

mov esi,numascii

up1:

rol bl,4

mov al,[esi]

sub al, 30H

cmp al, 09H

jbe skip1

sub al, 07h

skip1:

add bl,al

inc esi

loop up1

ret

**Output:**

hl-5@hl5-OptiPlex-390:~$ nasm -f elf64 factorial.asm

hl-5@hl5-OptiPlex-390:~$ ld -o factorial factorial.o

hl-5@hl5-OptiPlex-390:~$ ./factorial

\*\*\*Program to find factorial of a given number\*\*\*

Enter the number::04

Factorial is::0000000000000018

Thankshl-5@hl5-OptiPlex-390:~$