**Assignment number: 2**

**Subject: MICROPROCESSOR LAB**

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Class: ***SECOND YEAR ENGINEERING***

Division: ***B***

Roll no: ***222008***

Batch: ***B1***

**PROBLEM STATEMENT:**

Write X86/64 ALP to perform multiplication of two 8-bit hexadecimal numbers. Use successive addition and add and shift method. (use of 64-bit registers is expected)

**Code:**

%macro scall 4

mov rax,%1

mov rdi,%2

mov rsi,%3

mov rdx,%4

syscall

%endmacro

;-----------------------------------------------------------------------------

section .data

m1 db "Enter first number :",0xa

l1 equ $-m1

m2 db "Enter second number :",0xa

l2 equ $-m2

m3 db "The result is :",0xa

l3 equ $-m3

new db "",10

newl equ $-new

m4 db "Enter 1.Successive Addition",0xa

db "Enter 2.Add and Shift method",0xa

db "Enter choice :",0xa

l4 equ $-m4

m5 db "The Multiplication is:-",0xA

l5 equ $-m5

;------------------------------------------------------------------------------

section .bss

choice resb 2

num1 resb 9

num2 resb 9

res resb 17

char\_ans resb 17

;------------------------------------------------------------------------------

section .text

global \_start

\_start:

;---------------------------Accepting the values---------------------

scall 1,1,m1,l1

scall 0,0,num1,9

mov rsi,num1 ;accept 1st number

call accept\_proc

mov [num1],rbx

scall 1,1,m2,l2

scall 0,0,num2,9

mov rsi,num2 ;accept second number

call accept\_proc

mov [num2],rbx

scall 1,1,m4,l4 ;display the menu

scall 0,0,choice,2 ;get choice

mov al,byte[choice] ;choice 1

cmp al,31h

je op1

mov al,byte[choice] ;choice 2

cmp al,32h

je op2

;--------------------------exit-----------------------------------

exit:

mov rax,60

mov rdi,0

syscall

;----------------- selected choice-------------------------

op1: call succ

mov qword[res],rdx

scall 1,1,m5,l5 ;call succesive addition

call display\_proc ;display result for succesive addition

scall 1,1,new,newl

jmp exit

op2:

call shiftadd

mov qword[res],rdx

call display\_proc ;display result for shift addition

scall 1,1,new,newl

jmp exit

;---------------------------successive addition---------------------

succ:

mov rax,[num1]

mov rbx,[num2]

mov rdx,0

back1:

add rdx,rax

dec rbx

jnz back1

ret

;-----------------------shift Addition------------------------------

shiftadd:

mov rax,qword[num1]

mov rbx,qword[num2]

mov rcx,64

mov rdx,0

loo1:

shl rdx,1

rol rax,1

jnc n1

add rdx,rbx

n1:

dec rcx

jnz loo1

ret

;----------------------Accepting procedure-------------------------------

accept\_proc:

mov rbx,0

mov rax,0

mov rcx,8

back:

rol rbx,04

mov al,[rsi]

cmp al,39h

jbe next

sub al,07h

next:

sub al,30h

add rbx,rax

inc rsi

dec rcx

jnz back

ret

;---------------------------Display Procedure---------------------------

display\_proc:

mov rdx,[res]

mov rsi, char\_ans

mov rcx,16

up3:

rol rdx,04

mov al,dl

and al,0Fh

cmp al,09h

jbe next2

add al,07h

next2:

add al,30h

mov [rsi],al

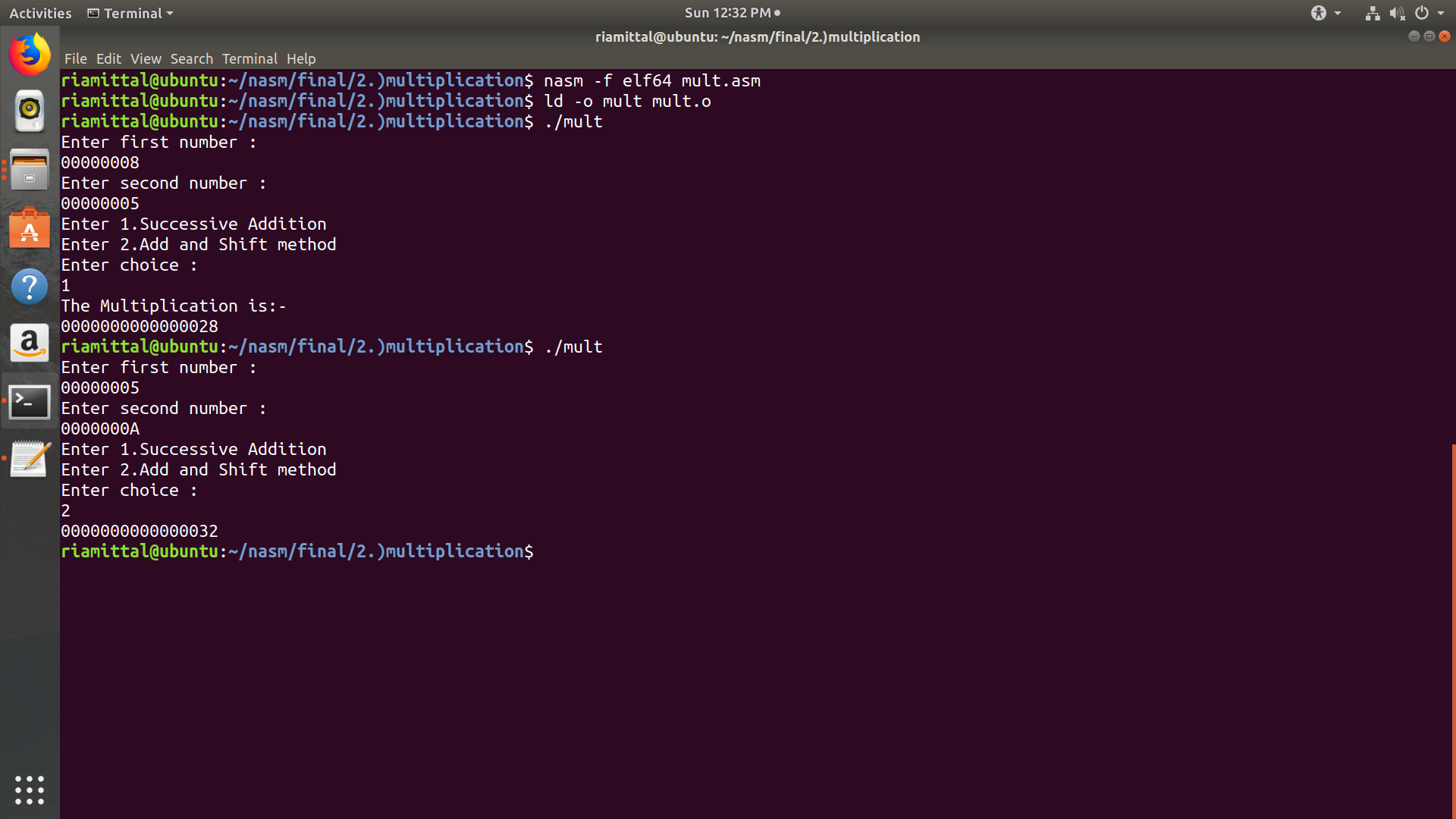
inc rsi

dec rcx

jnz up3

scall 1,1,char\_ans,16

ret

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