

Computer Organisation & Architecture Assignment No. 3

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Batch: C3

Roll No: 199

Problem Statement:

Write an ALP for Multiplication using successive addition and Add and shift method.

Source Code:

```
%macro READ 02
mov rax,00
mov rdi,00
mov rsi,%1
mov rdx,%2
syscall
%endmacro
```

```
%macro WRITE 02
mov rax,01
mov rdi,01
mov rsi,%1
mov rdx,%2
syscall
%endmacro
```

```
Section .data
menu db 10,"1.Successive Addition",10
db "2.Shift Add",10
db "3.Exit",10
db "Enter your choice: ",10
menulen equ $-menu
```

```
msg1 db "Enter any two numbers",10
len1 equ $-msg1
msg2 db "The addition of Numbers is",10
len2 equ $-msg2
```

```
msg3 db "Invalid choice!!!",10
len3 equ $-msg3
```

```
section .bss
m resq 1
n resq 1
ans resq 1
charbuff resb 17
actl resq 1
choice resb 2
a resq 1
b resq 1
q resq 1
N resq 1
```

```
section .text
global _start
_start:
WRITE msg1,len1
READ charbuff, 17 ; 64bit= 16 digit and 1 enter
call accept
;convert ascii to hex
mov [m], rbx
READ charbuff, 17
call accept
mov [n], rbx
```

```
printmenu:
WRITE menu, menulen
READ choice, 2
cmp byte[choice],31H ;fetch 1 byte and check with choice 1
je succadd
cmp byte[choice],32H ;fetch 1 byte and check with choice 2
je shiftnadd
cmp byte[choice],33H ;fetch 1 byte and check with choice 3
je exit
WRITE msg3, len3
jmp printmenu
```

```
succadd:
mov rcx,[n] ;n will update
mov rbx,00; ;initial rbx store 0
```

```
up:
add rbx,[m]
```

dec rcx

**jnz up
mov [ans],rbx
WRITE msg2,len2
mov rbx,[ans]
call display
jmp printmenu**

**shiftnadd:
mov qword[a],00H
mov rbx,[m]
mov [b],rbx
mov rbx,[n]
mov [q],rbx
mov byte[N],64**

**up3:
mov rbx,[q]
and rbx,01H
jz shiftaq
mov rbx,[b]
add[a],rbx
shiftaq:
shr qword[q],01H
mov rbx,[a]
and rbx,01H
jz shifta
mov rbx,01H
ror rbx,01H
or qword[q],rbx**

**shifta:
shr qword[a],01H
dec byte[N]
jnz up3
WRITE msg2,len2
mov rbx,[a]
call display
mov rbx,[q]
call display
jmp printmenu**

**exit:
mov rax,60**

```
mov rdi,00  
syscall
```

```
accept:  
dec rax  
mov [actl], rax  
mov rbx, 00  
mov rsi, charbuff
```

```
up2:  
shl rbx, 04h  
mov rdx, 00h  
mov dl, byte[rsi]  
cmp dl, 39h  
jbe sub30  
sub dl, 07h
```

```
sub30:  
sub dl, 30h  
add rbx, rdx  
inc rsi  
dec qword[actl]  
jnz up2  
ret
```

```
display:  
mov rsi, charbuff  
mov rcx, 16
```

```
up1:  
rol rbx, 04h  
mov dl, bl  
and dl, 0fh  
cmp dl, 09h  
jbe add30  
add dl, 07h
```

```
add30:  
add dl, 30h  
mov byte[rsi], dl  
inc rsi  
dec rcx  
jnz up1  
WRITE charbuff,16  
ret
```



```
Linux (Running) - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities Terminal
Apr 24 21:41
akash@akash-VirtualBox: -

Enter your choice:
4
The Quotient of Division is:
00000000000002The Remainder of Division is:
00000000000000
1. Addition Of Numbers
2. Subtraction of Numbers
3. Multiplication of Numbers
4. Division of Numbers
5. Exit
Enter your choice:
5
akash@akash-VirtualBox:~$ nasm -f elf64 ass2.asm
akash@akash-VirtualBox:~$ ls
ass1.asm  ass1.o  ass2.asm  ass2.o  Desktop  Documents  Downloads  Music  Pictures  Public  run  snap  Templates  Videos
akash@akash-VirtualBox:~$ ld -o run ass2.o
akash@akash-VirtualBox:~$ ./run
Enter any two numbers
50
25
1.Successive Addition
2.Shift Add
3.Exit
Enter your choice:
1
The addition of Numbers is
0000000000000090
1.Successive Addition
2.Shift Add
3.Exit
Enter your choice:
2
The addition of Numbers is
00000000000000000000000000000000000090
1.Successive Addition
2.Shift Add
3.Exit
Enter your choice:
3
akash@akash-VirtualBox:~$
```