Practical10

```
section .data

   msg db "ALP to multiply two 8 bit hex numbers", 10
   msg_len equ $ - msg
   opr1 db "multiplicand : "
   opr1_len equ $ - opr1
   opr2 db 10, "multiplier : "
   opr2_len equ $ - opr2
   menu db 10, 10, 13, "1. Successive Addition Method", 10
       db "2. Add and shift method", 10
       db "3. Exit", 10

       db 10, "Enter your choice (1/2/3): "
   menu_len equ $ - menu
   alert db 10, "WRONG CHOICE"
   alert_len equ $ - alert
   res db 10, "The product is : "
   res_len equ $ - res
   msg_end db 10, "End of ALP"
   msg_end_len equ $ - msg_end
section .bss

   multiplier resb 1 ; variable after ASCII to Hex
   multiplicand resb 1 ; variable after ASCII to Hex
   num resb 03 ; variable before ASCII to Hex
   result resb 04 ; for display procedure
   choice resb 2 ; for choice of user
   product resw 1 ; to store the product
%macro IO 4

   mov rax, %1

   mov rdi, %2

   mov rsi, %3


   mov rdx, %4
   syscall
%endmacro
section .text
   global _start

_start:

   xor rax, rax
   xor rbx, rbx
   xor rcx, rcx
   xor rdx, rdx
   IO 1, 1, msg, msg_len

   IO 0, 0, num, 3

   IO 1, 1, opr1, opr1_len

   IO 1, 1, num, 2 ; to access the data without enter char
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```
    call convert
    mov [multiplicand], bl
    IO 0, 0, num, 3
    IO 1, 1, opr2, opr2_len

    IO 1, 1, num, 2

    call convert

    mov [multiplier], bl

    IO 1, 1, menu, menu_len

    IO 0, 0, choice, 2

    IO 1, 1, choice, 2

    cmp byte[choice], 31h
    jne case2
    call successive_addition
    jmp endOfProgram
case2:

    cmp byte[choice], 32h


    jne case3

    call add_shift

    jmp endOfProgram
case3:
    cmp byte[choice], 33h
    je endOfProgram
    IO 1, 1, alert, alert_len
endOfProgram:
    IO 1, 1, msg_end, msg_end_len

    mov rax, 60

    mov rdi, 0
    syscall
convert: ;; for ASCII to Hex conversion
    xor rbx, rbx
    xor   rcx,   rcx
    xor   rax,   rax
    mov   rcx,   02
    mov rsi, num
up1:

    rol bl, 04
    mov al, [rsi]
    cmp al, 39h
    jbe p1
    sub al, 07h
    jmp p2
p1:

    sub al, 30h
p2:
    add bl, al ;bl stores the ASCII equivalent (byte) of the multiplicand/multiplier
    inc rsi


    loop up1
    ret
disp: ;for Hex to ASCII conversion
    mov rcx, 4
    mov rdi, result
dup1:
    rol bx, 4
    mov al, bl
    and al, 0fh
    cmp al, 09h
    jbe p3
    add al, 07h
    jmp p4
p3:

    add al, 30h
p4:
    mov [rdi], al
    inc rdi
    loop dup1

    IO 1, 1, result, 4
    ret
successive_addition:
    xor rcx, rcx
    xor rax, rax

    mov word[product], 0
    mov bl, [multiplier]
    mov al, [multiplicand]
next:

    add [product], ax
    dec bl


    jnz next

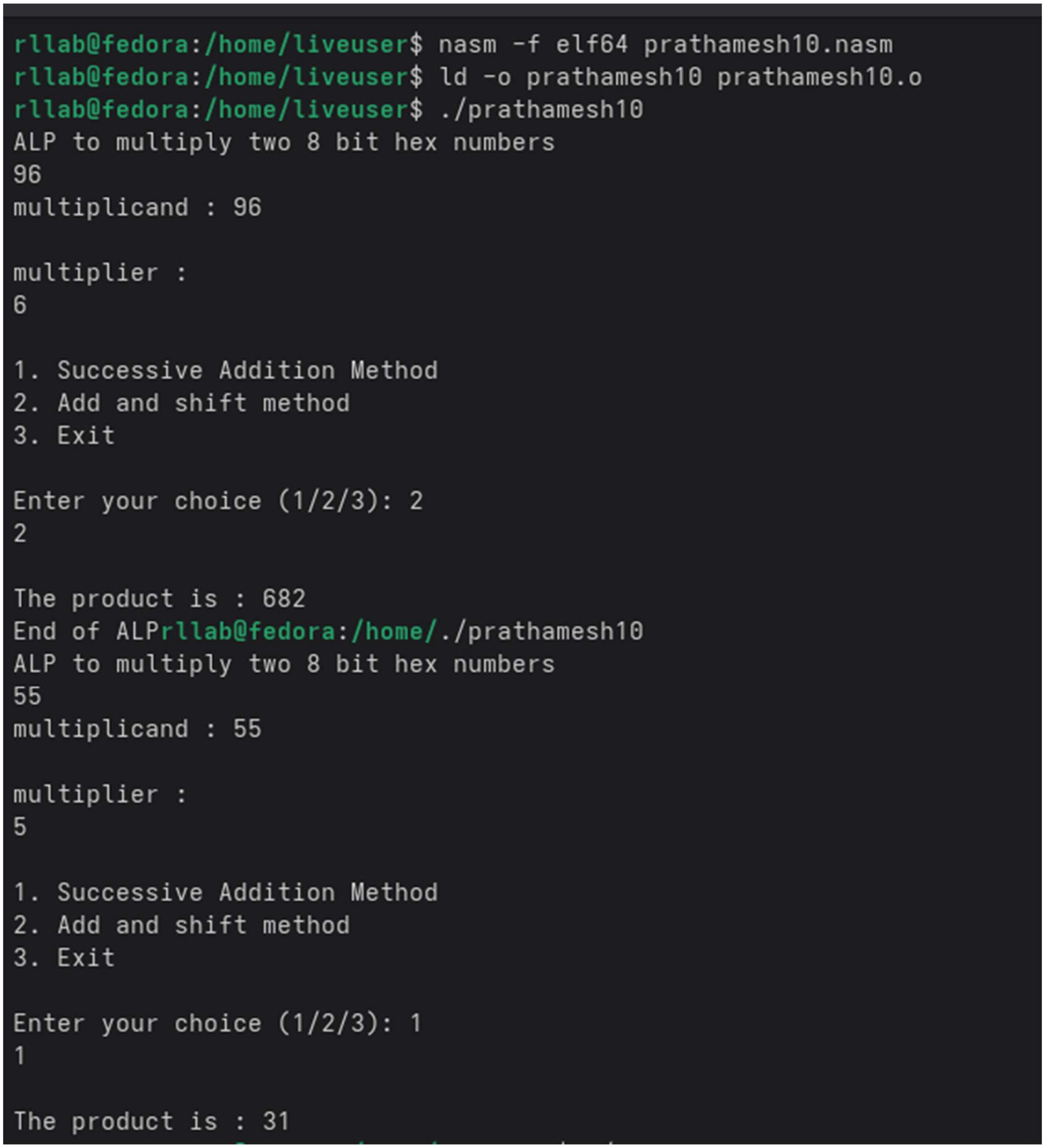
    IO 1, 1, res, res_len
    mov bx, [product]
    call disp
    ret
add_shift:
    mov word[product], 0
    xor rbx, rbx
    xor  rcx,  rcx
    xor rdx, rdx
    xor  rax,  rax
    mov dl, 08
    mov al, [multiplicand]
    mov bl, [multiplier]
p11:

    shr bx, 01
    jnc p
    add cx, ax

p:

    shl ax, 01
    dec dl
    jnz p11
    mov  [product],  rcx
    IO 1, 1, res, res_len
    mov rbx,  [product]
    call disp
    ret
```

OUTPUT:



```
rllab@fedora:/home/liveuser$ nasm -f elf64 prathamesh10.nasm
rllab@fedora:/home/liveuser$ ld -o prathamesh10 prathamesh10.o
rllab@fedora:/home/liveuser$ ./prathamesh10
ALP to multiply two 8 bit hex numbers
96
multiplicand : 96

multiplier :
6

1. Successive Addition Method
2. Add and shift method
3. Exit

Enter your choice (1/2/3): 2
2

The product is : 682
End of ALPrllab@fedora:/home/./prathamesh10
ALP to multiply two 8 bit hex numbers
55
multiplicand : 55

multiplier :
5

1. Successive Addition Method
2. Add and shift method
3. Exit

Enter your choice (1/2/3): 1
1

The product is : 31
```