MP Practical- 5

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Experiment no 5

Aim: Write X86 ALP to convert 4digit Hex number into its equivalent BCD number HEX to BCD. Display appropriate message to prompt the user while accepting the input & Displaying the result.

Theory: Memory model direction: The directives instruct the assembler as to how large various segment & what sort of segmentation register will be required

Segment Directives: The directive indicate to assembler the order in which to load segment when it encounter one of these directive, it interpret all subsequent instruction as belonging to the indicated segment.

New directive used: →

1) .Model
2) .STACK
3) .DATA
4) .CODE
5. .OFFSET - It inform the assembler to determine the offset / displacement of a named data item.
6. PTR - assign a specific types of variable / label.

Algorithm:

1) Define variable on data segment.
2) Display message on screen ENTER 4 DIGIT HEX NO.
3) Accept BCD No. from user.
4) Transfer 0AH as a divisor in one of the register.
5) Divide the no. by 0AH.
6) PUSH reminder in one of the register.
7) Increament count 1
8) Repeat till BCD NO. is not zero go to step 5.
9) POP the content of Reminder
10) Display result by calling display procedure
11) Decrement count -1, till count is not zero repeat step 9 else go to step 12.
12) Stop.

Conclusion: Thus we successfully converted HEX numbered to BCE using Assembly code.

Code:

```
global _start

_start:

section .text

; macro for system call for write
%macro disp 2
        mov rax,1
        mov rdi,1
        mov rsi,%1
        mov rdx,%2
        syscall
%endmacro

; macro for system call for read

%macro accept 2
        mov rax,0
        mov rdi,0
        mov rsi,%1
        mov rdx,%2
        syscall
%endmacro


;---------First Choice Hex to BCD----------------
```

```
ch1:
        ; accept numbers
        disp msg1,len1
        accept num,02
        call convert
        mov [no.1],al
        accept num,03
        call convert
        mov [no.2],al
        disp msg2,len2

        ; Form ax as input
        mov ah,[no.1]
        mov al,[no.2]

        ;Point esi to predefined array in .data
        mov esi,array1

; Hex to BCD conversion
l5:
        mov dx,0000h
        mov bx,[esi]
        div bx
        mov [rem],dx
        mov [t1],al
        push rsi
        call disp_proc
        pop rsi
        inc esi
```

```
        inc esi
        mov ax,[rem]
        dec byte[cnt]
jnz l5

        disp msg,len



;To exit program.
ch3:
        mov rax,60
        mov rdi,0
        syscall



        ;CONVERT procedure
convert:
        mov esi,num
        mov al,[esi]
        cmp al,39h
        jle l1
                sub al,07h
        l1: sub al,30h
        rol al,04h      ;to swap number

        mov bl,al

        inc esi
```

```
        mov al,[esi]
        cmp al,39h
        jle l2
                sub al,07h
        l2: sub al,30h

        add al,bl
        mov [t1],al
ret


        ;CONVERT2 procedure
convert2:
        mov al,[num]
        cmp al,39h
        jle l8
        sub al,07h
l8:sub al,30h
ret

                                                                        ;DISPLAY
procedure
disp_proc:
                                                                ;for unt's place
        mov al,[t1]
        cmp al,09h
        jle l4
  add al,07h
l4:add al,30h
        mov [t2],al
```

```
        disp t2,1
ret

                                                ;DISPLAY@ procedure
display2:

        mov rsi,charans+3
        mov rcx,04h

l12: mov rdx,0
        mov rbx,10h
    div rbx
        cmp dl,09h
        jle l3
        add dl,07h
                l3:add dl,30h
                mov [rsi],dl
                dec rsi
    dec rcx
jnz l12

   mov rax,1
   mov rdi,1
   mov rsi,charans
   mov rdx,4
   syscall

ret
```

```
section .data
        msg: db "",10
        len: equ $-msg
        msg1: db "Enter Hex number : ",10
        len1: equ $-msg1
        msg2: db "BCD equivalent is : ",10
        len2: equ $-msg2
        msg3: db "#####MENU#####",10
                db "1.Hex to BCD.",10
                db "2.BCD to Hex.",10
                db "3.Exit.",10
        len3: equ $-msg3
        msg4: db "Enter your choice : ",10
        len4: equ $-msg4
        msg5: db "Enter BCD number : ",10
        len5: equ $-msg5
        msg6: db "Hex equivalent is : ",10
        len6: equ $-msg6

        array1 dw 2710h,03E8h,0064h,000Ah,0001h
        cnt db 5
        cnt2 db 5

section .bss
        num resb 03
        no.1 resb 02
        no.2 resb 02
        t1 resb 03
        t2 resb 03
```

t3 resb 03

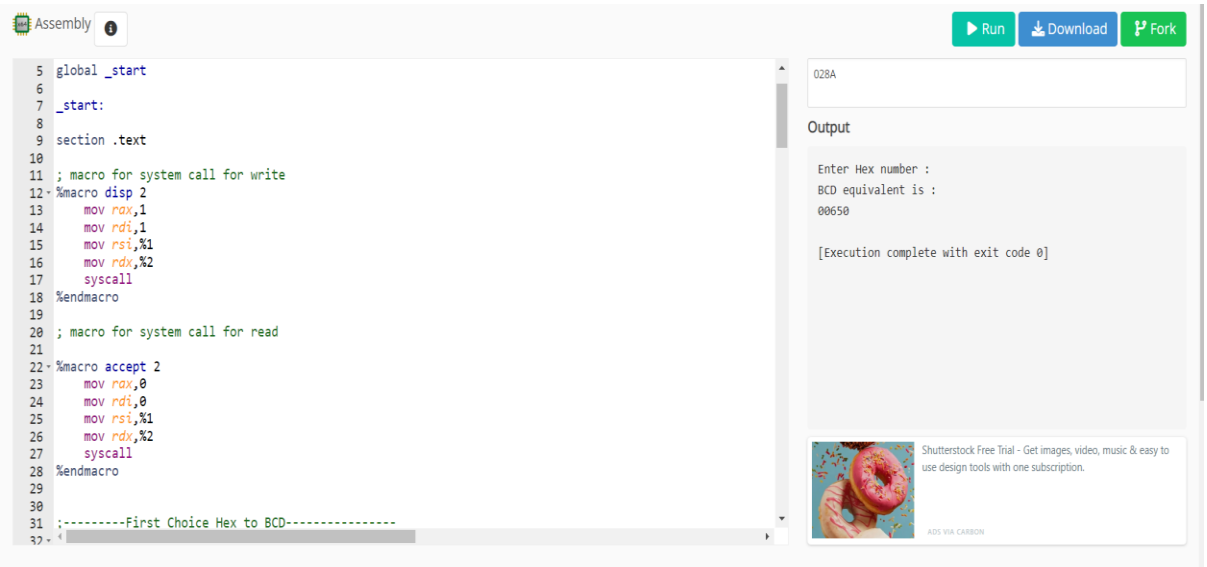
rem resw 02

result resw 03

choice resb 03

charans resb 08

Output:



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Batch- B2