Computer Organisation & Architecture Assignment No. 2

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Batch: C3

Roll No: 199

Problem Statement:

Write an ALP to convert a 64-bit Hex number into its equivalent BCD number and a 64-bit BCD number into its equivalent HEX number.

Source Code:

```
%macro WRITE 02
mov rax,01
mov rdi,01
mov rsi,%1
mov rdx,%2
syscall
%endmacro
%macro READ 02
mov rax,00
mov rdi,00
mov rsi,%1
mov rdx,%2
syscall
%endmacro
section .data
msg1 db "Enter BCD no ", 10
len1 equ $-msg1
msg2 db "Hex Equivalent", 10
len2 equ $-msg2
msg3 db "Enter HEX no ", 10
len3 equ $-msg3
msg4 db "BCD equivalent", 10
len4 equ $-msg4
menu db 10,"1.BCD to HEX", 10
```

```
db "2.HEX to BCD", 10
db "3.exit", 10
db "Enter your choice" , 10
menulen equ $-menu
msg5 db "Wrong Choice", 10
len5 equ $-msg5
section .bss
char_buff resb 17
actl resq 1
ans resq 1
cnt resb 1
x resb 1
choice resb 2
section .text
global _start
_start: WRITE menu, menulen
READ choice, 2
cmp byte[choice], 31H
je bcdtohex
cmp byte[choice], 32H
je hextobcd
cmp byte[choice], 33H
je exit
WRITE msg5, len5
jmp _start
bcdtohex: WRITE msg1, len1
READ char_buff, 17
dec rax
mov [actl], rax
mov rax, 00H
mov rsi, char_buff
mov rbx, 0AH
up: mul rbx
mov rdx, 00H
mov dl, byte[rsi]
sub dl, 30H
add rax, rdx
inc rsi
dec qword[actl]
jnz up
mov[ans], rax
WRITE msg2, len2
hi:mov rbx,[ans]
call display
jmp _start
```

```
hextobcd: WRITE msg3, len3
READ char_buff, 17
call accept
mov byte[cnt], 00
mov rax, rbx
up1: mov rdx, 00H
mov rbx, 0AH
div rbx
push rdx
inc byte[cnt]
cmp rax, 00
jne up1
WRITE msg4, len4
up2: pop rdx
add dl, 30H
mov byte[x],dl
WRITE x, 01
dec byte[cnt]
jnz up2
jmp _start
exit:mov rax, 60
mov rdi, 00
syscall
display:
mov rsi, char_buff
mov rcx, 16
above: 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 above
WRITE char_buff, 17
RET
accept: dec rax
mov [actl],rax
mov rbx, 00H
mov rsi, char_buff
up4: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 up4
ret
```

- **Output Screen:**

```
mohanish@mohanish-hp-pavilion:~$ gedit Assignmentasm
mohanish@mohanish-hp-pavilion:~$ gedit Assignment.asm
mohanish@mohanish-hp-pavilion:~$ nasm -f elf64 Assignment.asm
mohanish@mohanish-hp-pavilion:~$ ld -o ass Assignment.o
mohanish@mohanish-hp-pavilion:~$ ./ass

1.BCD to HEX
2.HEX to BCD
3.exit
Enter your choice
^[[F
Wrong Choice

1.BCD to HEX
2.HEX to BCD
3.exit
Enter your choice
Wrong Choice

1.BCD to HEX
2.HEX to BCD
3.exit
Enter your choice
```

```
1.BCD to HEX
2.HEX to BCD
3.exit
Enter your choice
1
Enter BCD no
1234
Hex Equivalent
00000000000004D2
1.BCD to HEX
2.HEX to BCD
3.exit
Enter your choice
2
Enter HEX no
4D2
BCD equivalent
1234
1.BCD to HEX
2.HEX to BCD
3.exit
Enter your choice
3
```