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ECE 427: Microcomputer Architecture Lab

Experiment #4

Task 3: Decimal to Hexadecimal Conversion

Performed: 10/8/2013

Submitted: 10/15/2013

Objective:

- Write a program that reads a 2 digit decimal number, converts it to hex and then displays the result (in hex) on the screen.

Word Description:

In this lab, I was able to convert a number, entered by a user in ASCII code, to its decimal form, convert the decimal form to a hexadecimal form, and then convert the hex form into ASCII to print a hexadecimal number to the screen.

Task #3: *Decimal to Hexadecimal Conversion*

Code & Screenshots:

```
; You may customize this and other start-up templates;
; The location of this template is c:\emu8086\inc\0_com_template.txt

org 100h

.data
   ASC_INP DB 3,?,3 DUP(0)
   DECIMAL DB 3,?,3 DUP(0) ;ACTUALLY STORED BACKWARDS, BUT STILL WORKS
   ASC_OUT DB ' -> ',2 DUP(0),'$'
.code

MOV AX,@DATA
MOV DS,AX

;CLEAR THE SCREEN
MOV AX,0600H
MOV BH,07
MOV CX,0
MOV DX,184FH
INT 10H

;GET THE DATA
MOV AX,0A00H
MOV DX,OFFSET ASC_INP
INT 21H

;CONVERT ASCII TO BCD
MOV BX, OFFSET ASC_INP
MOV DI, OFFSET DECIMAL
MOV AX,[BX+2]
XCHG AH,AL
AND AX,0F0FH
MOV [DI], AX

;MULT AH by 10
    MOV CX,9
    MOV DL,AH
MULT:   ADD AH,DL
    LOOP MULT

;NOW SUM
```

```
ADD AL,AH

;NOW SPLIT
MOV AH,AL
AND AL,0FH
AND AH,0F0H
SHR AH,4
XCHG AH,AL

;CONVERT TO ASCII
    ADD AL,30H
    CMP AL,3AH
    JB  NEXT
    ADD AL,07H

NEXT:   ADD AH,30H
    CMP AH,3AH
    JB  DONE
    ADD AH,07H
DONE:   MOV BX,OFFSET ASC_OUT
    ADD BX,4

;STORE VALUE
    MOV [BX],AX

;PRINT VALUE
    MOV AH,09
    MOV DX,OFFSET ASC_OUT
    INT 21H

ret
```
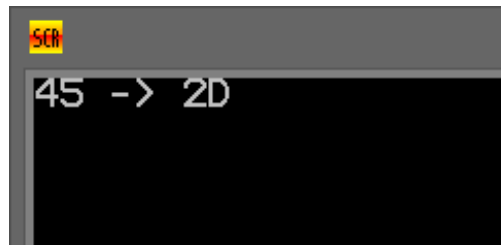
Task #3: *Decimal to Hexadecimal Conversion*

Data Set 1:

Data Set 2:

Conclusion & Comments:

   In this lab, we were able convert a number from decimal form to hexadecimal form using an 80x86 assembly program. This lab allowed us to gain practical experience not only with this form of conversion, but also allowed us to gain more experience with interrupts. It also allowed us to gain more experience with reading data from the screen, and printing data to the screen, and provided the opportunity to delve deeper into ASCII Conversion Tables, and converting from a HEX value into 0-9,A-F format.