AHSANULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

Department of Computer Science and Engineering
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Assignment No: 02

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Question 01: Write a program that will prompt the user to enter a hex digit character(0-F), display it on the next line in decimal and ask the user if he or she wants to do it again. If the user types "Y", the program repeats. If the user types "N" the program terminates. If the user enters an illegal character, prompt the user to try again.

Solution:

```
.MODEL SMALL
.STACK 100H

.DATA
A DB "ENTER A HEX DIGIT (0-F): $"
B DB "THE DECIMAL OF YOUR HEX DIGIT IS: $"
C DB "DO YOU WANT TO DO IT AGAIN? (Y/N): $"
D DB "TRY AGAIN! $"

.CODE
MAIN PROC
 MOV AX, @DATA
 MOV DS, AX

START:
 CALL NEWLINE
 MOV AH, 9
 LEA DX, A
 INT 21H

 ; Input char
 MOV AH, 1
 INT 21H

 ; Convert to uppercase if lowercase
 CMP AL, 'a'
 JB CHECK_DIGIT
 CMP AL, 'f'
 JA INVALID
```

```asm
    SUB AL, 32 ; convert 'a'-'f' to 'A'-'F'
CHECK_DIGIT:
 CMP AL, '0'
 JB INVALID
 CMP AL, '9'
 JBE IS_NUM
 CMP AL, 'A'
 JB INVALID
 CMP AL, 'F'
 JBE IS_ALPHA
JMP INVALID

IS_NUM:
 SUB AL, '0'
 JMP PRINT

IS_ALPHA:
 SUB AL, 'A'
 ADD AL, 10

PRINT:
 MOV BL, AL
 CALL NEWLINE
MOV AH, 9
 LEA DX, B
 INT 21H

 ; Display decimal
CMP BL, 9
 JBE SINGLE
 MOV DL, '1'
 MOV AH, 2
 INT 21H
 MOV AL, BL
 SUB AL, 10
 ADD AL, '0'
 JMP OUT
```

```asm
SINGLE:
 MOV AL, BL
 ADD AL, '0'
OUT:
 MOV DL, AL
 MOV AH, 2
 INT 21H
 JMP ASK

 INVALID:
 CALL NEWLINE
 MOV AH, 9
 LEA DX, D
 INT 21H

 ASK:
 CALL NEWLINE
 MOV AH, 9
 LEA DX, C
 INT 21H
 MOV AH, 1
 INT 21H
 CMP AL, 'Y'
 JE START
 CMP AL, 'y'
 JE START

 ; Exit
 MOV AX, 4C00H
 INT 21H

MAIN ENDP

; Subroutine for newline
NEWLINE PROC
 MOV AH, 2
 MOV DL, 13
```

```
 INT 21H
 MOV DL, 10
 INT 21H
 RET
NEWLINE ENDP
END MAIN
```

Question 02: Write a program to read two capital letters and display them on the next

line in alphabetical order.

Solution:
```
.MODEL SMALL
.STACK 100H
.DATA
MSG1 DB 'ENTER 1ST ALPHABET: $'
MSG2 DB 'ENTER 2ND ALPHABET: $'
MSG3 DB 'FIRST : $'
MSG4 DB 'SECOND: $'
A DB ?
B DB ?
.CODE
MAIN PROC
 MOV AX, @DATA
 MOV DS, AX

 ; Input A
 MOV AH, 9
 LEA DX, MSG1
 INT 21H
 MOV AH, 1
 INT 21H
 MOV A, AL
```

```asm
; Newline
MOV AH, 2
MOV DL, 13
INT 21H
MOV DL, 10
INT 21H
; Input B
MOV AH, 9
LEA DX, MSG2
INT 21H
MOV AH, 1
INT 21H
MOV B, AL

; Newline
MOV AH, 2
MOV DL, 13
INT 21H
MOV DL, 10
INT 21H

; Compare and display in order
MOV AL, A
CMP AL, B
JG SWAP

; A is smaller
LEA DX, MSG3
MOV AH, 9
INT 21H
MOV DL, A
MOV AH, 2
INT 21H

MOV DL, 13
INT 21H
MOV DL, 10
INT 21H
```

```
    LEA DX, MSG4
    MOV AH, 9
    INT 21H
    MOV DL, B
    MOV AH, 2
    INT 21H
    JMP ENDPRG
SWAP:
    ; B is smaller
LEA DX, MSG3   MOV
AH, 9
    INT 21H
    MOV DL, B
    MOV AH, 2
    INT 21H

    MOV DL, 13
INT 21H
    MOV DL, 10
INT 21H

    LEA DX, MSG4
MOV AH, 9
    INT 21H
    MOV DL, A
    MOV AH, 2
    INT 21H

ENDPRG:
    MOV AH, 4CH
INT 21H
MAIN ENDP
END MAIN
```