Course Title: Microprocessors and Assembly Language Lab

Lab # 03

Understanding 8086 String Display and Advanced 8086 I/O Instructions for using Loop in Assembly Language Program.

Objective:

To understand 8086 string display and conditional JUMP instructions using Assembly Language Program in EMU8086.

Theory:

- **String Display Instruction**

  At first define the string to be displayed under DATA SEGMENT:

  .DATA
  test_string DB 'My first string', 0Dh, 0Ah, '$'

  Then, display the string in the command prompt as:

  MOV AH, 9
  LEA DX, test_string
  INT 21h

- **Loop**

The LOOP instruction is a combination of a decrement of CX (i.e., count register) and a conditional jump. In the 8086, LOOP decrements CX and if CX is not equal to zero, it jumps to the address indicated by the label. If CX becomes a 0, next sequential instruction executes.

Example for Loop: *Count-controlled LOOP to display a row of 50 stars (*).*

```
org 100h
.DATA          ; Data segment starts
.CODE          ; Code segment starts
MAIN PROC
        mov ax, @DATA
        mov ds, ax
        xor cx, cx  ; reset the CX register
        mov cx, 50
        mov ah, 2
        mov dl, '*'
        top:    int 21h
                loop top
        mov ah, 4ch
        int 21h
MAIN ENDP
END MAIN
RET
```

Tasks to do:

1. Write an assembly language program that asks the user to enter a line of text (until a newline or carriage return occurs). On the next line, display the capital letter that entered first alphabetically and the one that comes last. If no capital letters are entered, then display "No capital letters".
2. Write an assembly language program that asks the user to enter a line of text (until a newline or carriage return occurs). On the next line, display the small letter that entered first alphabetically and the one that comes last. If no small letters are entered, then display "No small letters".
3. You may do both the task 1 and 2 in a single program.

Sample Input / Output:

Input: *Type a line of text:* We are IUT Students
Output: W
S
e
s