Course Title: Microprocessor and Assembly Language Lab (CSE-3812)

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Lab # 03

Understanding 8086 String Display and Conditional JUMP Instructions using Assembly Language in EMU8086.

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

- **Conditional Control Transfer Instruction**

Conditional jumps transfer control to another address depending on the values of the flags in the flag register..

The jump condition often provided by the CMP instruction:

CMP *destination, source*

Condition	Instruction	Condition	Instruction
Jump if zero flag ZF=1	**JZ *zero***	Jump if zero flag ZF=0	**JNZ *notzero***
Jump if greater	**JG *greater***	Jump if greater than or equal	**JGE *notless***
Jump if less	**JL *less***	Jump if less than or equal	**JLE *notgreater***
Jump if Below	**JB *smaller***	Jump if carry flag CF=1	**JC *carry***

Assembly Language Program Example:

```
org 100h

START:      mov cl, 03h

LABEL_JNZ:  dec cl
            jnz LABEL_JNZ
            mov bl, 04h
            mov al, 04h

LABEL_JZ:   dec al
            dec bl
            xor bl, al
            jz LABEL_JZ
            mov bl, 02h
            mov al, 06h

LABEL_JG:       dec al
            cmp al, bl
            jg LABEL_JG
            mov bl, 06h
            mov al, 00h

LABEL_JL:   inc al
            cmp al, bl
            jl LABEL_JL

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 DUET Students
Output: W
S
e
s