



Ahsanullah University of Science & Technology

Department of Computer Science and Engineering

Course No : CSE 2214
Course Title : Assembly Language Programming Sessional
Assignment no : 04

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Question No: 01

Question: Write a program to input an uppercase letter and display its corresponding lowercase letter.

Answer:

```
.MODEL SMALL
```

```
.STACK 100H
```

```
.DATA
```

```
    CR EQU 0DH
```

```
    LF EQU 0AH
```

```
MSG1 DB 'ENTER AN UPPERCASE LETTER:$'
```

```
MSG2 DB 0DH,0AH,'IN LOWERCASE IT IS:'
```

```
CHAR DB ?, '$'
```

```
.CODE
```

```
MAIN PROC
```

```
;initialize DS
```

```
    MOV AX,@DATA
```

```
    MOV DS,AX
```

```
;print user prompt
```

```
LEA DX,MSG1
```

```
MOV AH,9
```

```
INT 21H
```

```
;input a character and convert to lowercase
```

```
MOV AH,1
```

```
INT 21H
```

```
ADD AL,20H
```

```
MOV CHAR,AL
```

```
;display on the next line
```

```
LEA DX,MSG2
```

```
MOV AH,9
```

```
INT 21H
```

```
;DOS exit
```

```
MOV AH,4CH
```

```
INT 21H
```

```
END MAIN
```

Question No: 02

Question: Write a program to read two decimal digits whose sum is less than 10 and display them and their sum in the next line with an appropriate message.

ANSWER:

```
.MODEL SMALL
```

```
.STACK 100H
```

```
.DATA
```

```
MSG1 DW 'ENTER THE FIRST DECIMAL NUMBER: $'
```

```
MSG2 DW 'ENTER THE SECOND DECIMAL NUMBER: $'
```

```
MSG3 DW 'SUM OF THE TWO DIGITS: $'
```

```
.CODE
```

```
MAIN PROC
```

```
    MOV AX,@DATA ;initialize DS
```

```
    MOV DS,AX
```

```
    LEA DX,MSG1 ;display msg1 on screen
```

```
    MOV AH,9
```

```
    INT 21H
```

```
    MOV AH,1 ;take first input
```

INT 21H

MOV BL,AL ;save first digit in BL in ASCII code

SUB BL,30H

MOV AH,2 ;carriage return

MOV DL,0DH

INT 21H

MOV DL,0AH ;line feed

INT 21H

LEA DX,MSG2 ;display msg2 on screen

MOV AH,9

INT 21H

MOV AH,1 ;take second input

INT 21H

MOV BH,AL ;save second digit in BH in ASCII code

SUB BH,30H

MOV AH,2 ;carriage return

MOV DL,0DH

INT 21H

MOV DL,0AH ;line feed

INT 21H

LEA DX,MSG3 ;display msg3 on screen

MOV AH,9

INT 21H

ADD BL,BH ;add first and second digit and store it in BL in decimal

ADD BL,30H ;mov AL,BL

MOV AH,2 ;display the result

MOV DL,BL

INT 21H

MOV AH,4CH ;return docs

INT 21H

MAIN ENDP

END MAIN

Question no:03

Question: Using only MOV, ADD, SUB, INC, DEC and NEG, translate the following high level language assignment statements into assembly language. A, B, and C are word variables.

a. $A = B - A$

b. $A = -(A + 1)$

c. $C = A + B$

d. $B = 3 \times B + 7$

e. $A = B - A - 1$

SOLUTION:

a. $A = B - A$:

```
MOV    AX, B
SUB     AX, A
MOV     A, AX
```

b. $A = -(A + 1)$:

```
MOV     AX, A
INC     AX
NEG     AX
MOV     A, AX
```

c. $C = A + B$:

```
MOV     AX, A
ADD     AX, B
MOV     C, AX
```

d. $B = 3 \times B + 7$:

```
MOV    AX, B
ADD     AX, B
ADD     AX, B
ADD     AX, 7
MOV     B, AX
```

e. $A = B - A - 1$:

```
MOV     AX, B
SUB     AX, A
DEC     AX
MOV     A, AX
```