# MAWLANA BHASHANI SCIENCE AND TECHNOLOGY UNIVERSITY

SANTOSH, TANGAIL-1902

DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY

**Course Title:** Microprocessor and Embedded System Lab

**Course Code:** ICT-2204

**Experiment Name:** Problem Solving with Assembly Language - I

## Lab Report No: 02

| Submitted By | Submitted To |
|---|---|
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Date of Performance: 20/11/2024

Date of Submission: 27/11/24

## Experiment no: 02

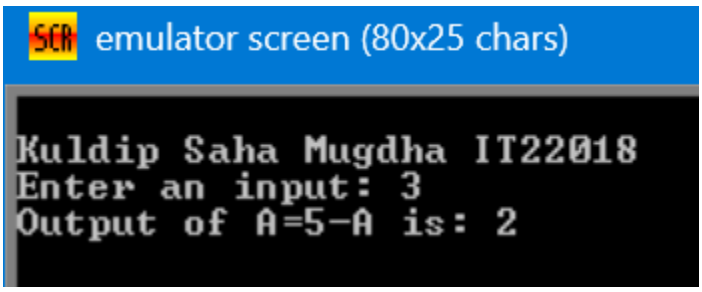
**Experiment name:** Problem Solving with Assembly Language – I.

**Program 1:** A program that takes an input A and computes A = 5 – A

**Code:**

```
.model small
.stack 100h
.data
msg db 0ah,0dh, "Kuldip Saha Mugdha IT22018$"
msg1 db 0ah,0dh, "Output of A=5-A is: $"
msg2 db 0ah,0dh, "Enter an input: $"
.code
main proc
    mov ax, @data
    mov ds, ax

    mov ah,9
    lea dx,msg
    int 21h

    mov ah,9
    lea dx,msg2
    int 21h

    mov ah, 1
    int 21h
    mov bl,al
    sub bl,48

    mov al, 5
    sub al, bl
    add al,48
    mov bh,al

    mov ah,9
    lea dx,msg1
    int 21h

    mov ah,2
    mov dl,bh
    int 21h

    mov ah, 4Ch
    int 21h

main endp
end main
```

**Output:**



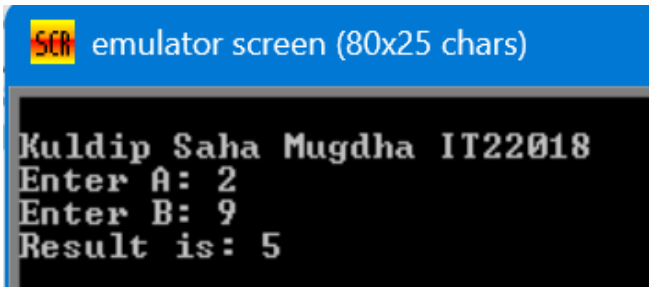

The program successfully updates the value of A to 5 - A.

**Program 2:** A program that takes two inputs A and B and computes A = B - 2A

**Code:**

```
.model small
.stack 100h
.data
m db 0ah,0dh,"Kuldip Saha Mugdha IT22018$"
m1 db 0ah,0dh,"Enter A: $"
m2 db 0ah,0dh,"Enter B: $"
m3 db 0ah,0dh,"Result is: $"
.code
main proc
    mov ax, @data
    mov ds, ax

    mov ah,9
    lea dx,m
    int 21h
    lea dx,m1
    int 21h

    mov ah, 1
    int 21h
    mov bl,al
    sub bl,48

    mov ah,9
    lea dx,m2
    int 21h

    mov ah, 1
    int 21h
    sub al,48

    add bl,bl
    sub al,bl

    add al,48
    mov bh,al

    mov ah,9
    lea dx,m3
    int 21h

    mov ah,2
    mov dl,bh
    int 21h

    mov ah, 4Ch
    int 21h

main endp
end main
```

**Output:**



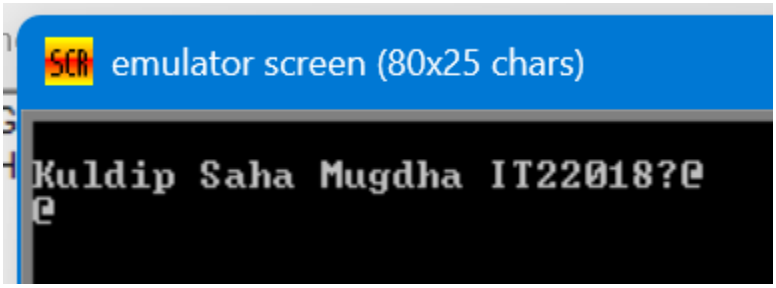

The program calculates A = B - 2A and stores the updated value in A.

**Program 3:** A program that shows a question mark (?), takes an input and prints the input text on a new line.

**Code:**

```
.model small
.stack 100h
.data
m db 0ah,0dh,"Kuldip Saha Mugdha IT22018$"
.code
main proc
    mov ax, @data
    mov ds, ax

    mov ah,9
    lea dx,m
    int 21h

    mov ah,2
    mov dl,'?'
    int 21h

    mov ah,1
    int 21h
    mov bl,al

    mov ah,2
    mov dl,0ah
    int 21h
    mov dl,0dh
    int 21h

    mov dl,bl
    int 21h

    mov ah, 4Ch
    int 21h

main endp
end main
```

**Output:**

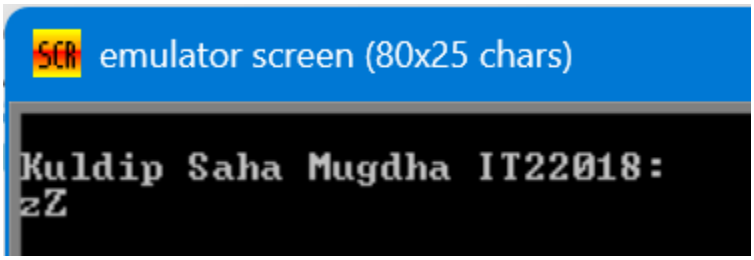


**Program 4:** A program that takes a lowercase letter and prints it in uppercase.

**Code:**

```
.model small
.stack 100h
.data
m db 0ah,0dh,"Kuldip Saha Mugdha IT22018: $"
.code
main proc
    mov ax, @data
    mov ds, ax

    mov ah,9
    lea dx,m
    int 21h

    mov ah,2
    mov dl,0ah
    int 21h
    mov dl,0dh
    int 21h

    mov ah,1
    int 21h
    mov bl,al
    sub bl,32

    mov ah,2
    mov dl,bl
    int 21h

    mov ah, 4Ch
    int 21h

main endp
end main
```

**Output:**



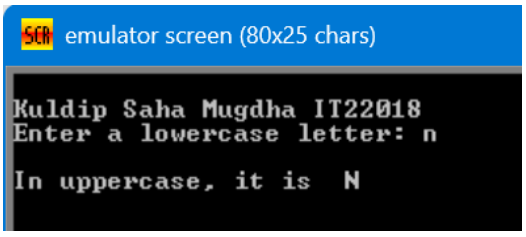

The program successfully converts lowercase characters to uppercase.

**Program 5:** Show a message: 'Enter a lowercase letter.' Then, on the next line, display the message: ‘In uppercase, it is ...’

**Code:**

```
.model small
.stack 100h
.data
m db 0ah,0dh,"Kuldip Saha Mugdha IT22018 $"
m1 db 0ah,0dh,"Enter a lowercase letter: $"
m2 db 0ah,0dh,"In uppercase, it is  $"
.code
main proc
    mov ax, @data
    mov ds, ax

    mov ah,9
    lea dx,m
    int 21h
    lea dx,m1
    int 21h

    mov ah,1
    int 21h
    mov bl,al
    sub bl,32

    mov ah,2
    mov dl,0ah
    int 21h
    mov dl,0dh
    int 21h

    mov ah,9
    lea dx,m2
    int 21h

    mov ah,2
    mov dl,bl
    int 21h

    mov ah, 4Ch
    int 21h

main endp
end main
```

**Output:**




The program successfully converts lowercase characters to uppercase with massage.

**Conclusion:** This lab provided hands-on experience with basic assembly operations. The tasks demonstrated the use of arithmetic, input/output, and character manipulation, enhancing our understanding of low-level programming. Future improvements may include more complex operations or the integration of loops and conditional branches for extended functionality.