

# OPERATION ON 8BIT DATA

Experiment No 1

Date:

Roll No: S077

Aim: To perform arithmetic operation on 8 bit data

Theory:

Under arithmetic operation 8086 provides addition, subtraction, Multiplication and Division. These all operations are performed on the operand (data)

] Addition

ADD - Add byte or word.

- This instruction adds a number from source and puts the result to specific destination.

Program 1: Addition of two 8-bit numbers

→ Algorithm:

Step 1 Initialize the data segment

Step 2 Get the first number in AX register

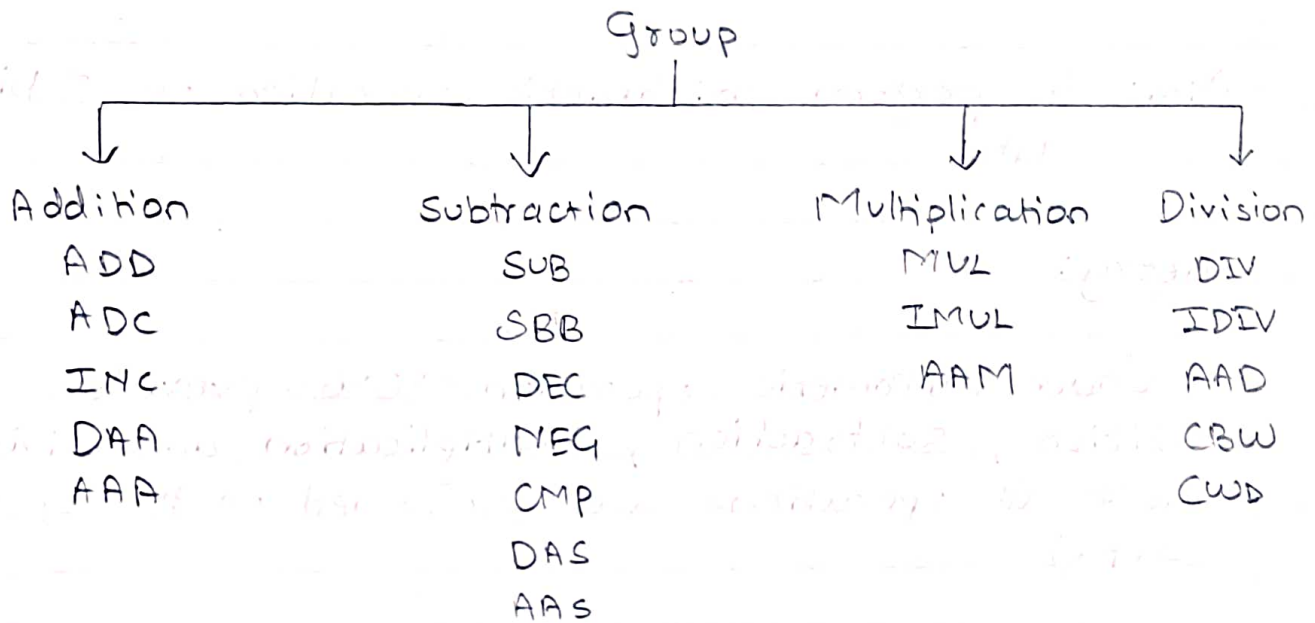
Step 3 Get the second number in BX register

Step 4 Add two numbers

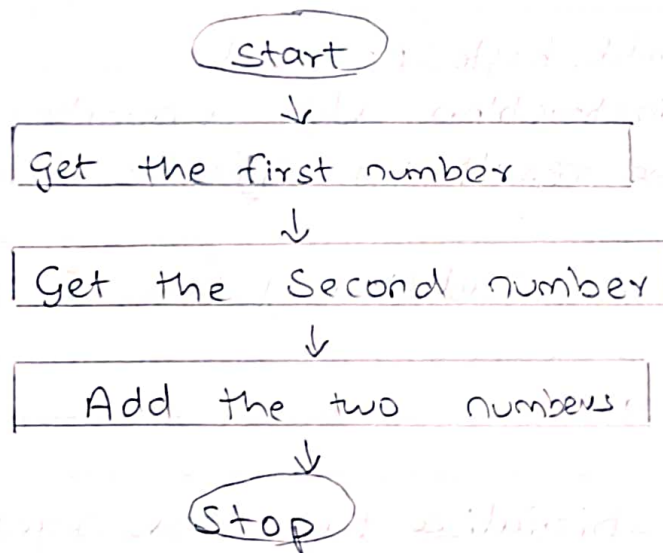
Step 5 Stop

## Arithmetic

Arithmetic instructions



Flowchart :



Output: C:\> tasm Filename.asm

C:\> tlink Filename.obj

C:\> Filename

04

→ Program

Comments

· model small

· data

a db 02H

b db 02H

· code

Mov ax, @data

; Initialize data section

Mov ds, ax

Mov al, a

; Load number 1 in al

Mov bl, b

; Load number 2 in bl

Mov ch, 02H

; 3037 logic

Mov cl, 04H

Mov bh, al

I2: rol bh, cl

mov dl, bh

and dl, 0FH

cmp dl, 09H

jbe I4

add dl, 07H

I4: add dl, 30H

Mov ah, 02H

int 21H

dec ch

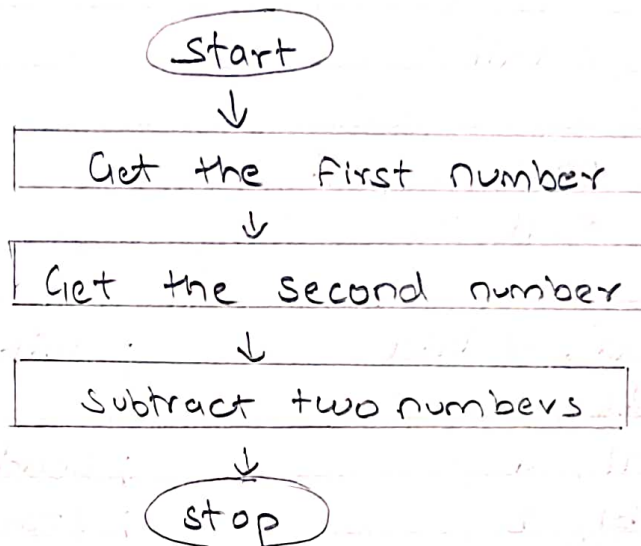
jnz I2

Mov ah, 4CH

int 21H

end

→ flowchart



→ Output

C:\> tasm Filename.asm

C:\> Elink Filename.obj

C:\> Filename

06

## 2] Subtraction

SUB - Sub byte or word

- This instruction subtract a number from source to number from destination and puts the result to specific destination

→ Mnemonic : SUB Destination, Source  
SUB Operand 1, Operand 2

Program 1: Subtraction of two 8 bit number

→ Algorithm

Step 1: Initialize the data segment

Step 2: Get the first number in AL register

Step 3: Get the second number in BL register

Step 4: Subtract the two numbers

Step 5: Display the result

Step 6: Stop.

→ • model small

• data

a db 02H

b db 02H

• code

Mov ax, @data

Mov ds, ax



```

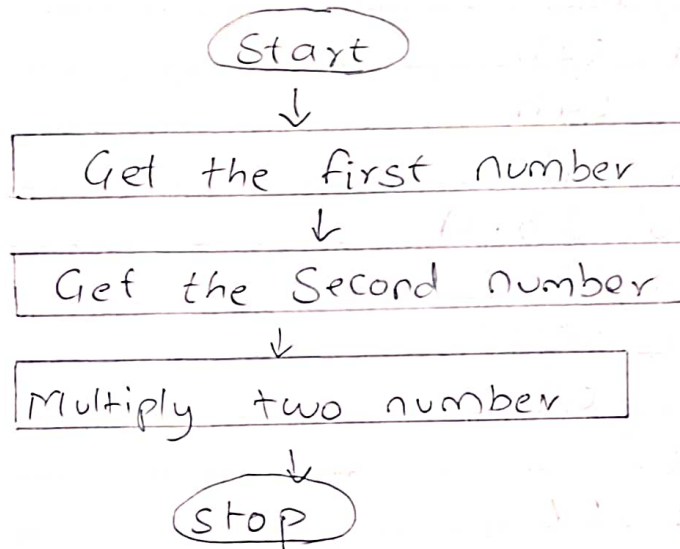
Mov al, a
Mov bl, b
Sub al, bl
Mov ch, 02h
Mov cl, 04h
Mov bh, al
J2: rol bh, cl
Mov dl, bh
And dl, 0FH
Cmp dl, 09
Jbe 14
Add dl, 07
J4: add dl, 30H
Mov ah, 02h
int 21H
dec ch
jnz J2
Mov ah, 4CH
int 21H
end

```

### 3] Multiplication

- This instruction multiplies an unsigned byte from source with an byte in AL register or an unsigned word from source with an unsigned word in AX.

→ flowchart



→ Output

C:\> tasm filename.asm

C:\> zlink filename.obj

C:\> filename

04



- when a byte is multiplied by contents of AL, the result is stored in AX.
- The MSB of result is stored in AH register and the LSB of result is stored in AL register.

Program : Multiplication of two 8bits number

→ Algorithm :

- Step 1 : Initialize the data segment
- Step 2 : Store first number in a1 register
- Step 3 : Store Second number in b1 register
- Step 4 : Multiply two number
- Step 5 : Display result
- Step 6 : Stop

→ • model small

• data

a db 02H

b db 02H

• Code

mov ax, @data

mov ds, ax

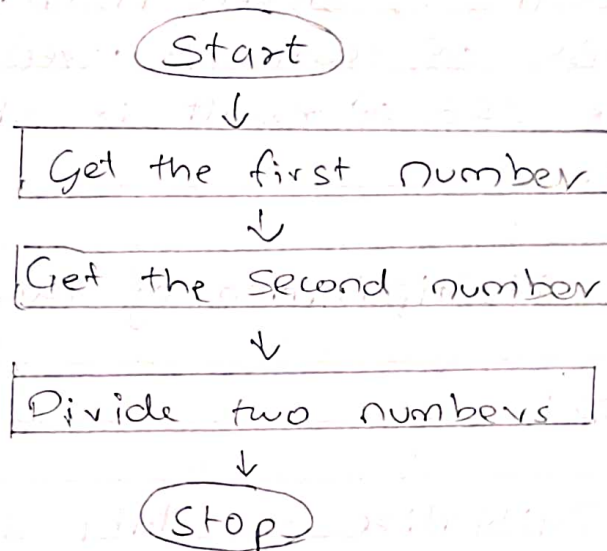
mov ax, 0000H

mov al, a

mov bl, b

mul bl

→ Flowchart



```

Mov ch, 02H
Mov cl, 04H
Mov bh, al
I2: not bh, cl
Mov dl, bh
And dl, 0FH
Cmp dl, 09
jbe I4
Add dl, 07H
I4: add al, 30H
Mov ah, 02H
int 21H
dec ch
jnz I2
Mov ah, 4ch 4ch
int 21H
end

```

#### 4] Division

- This instruction divides an unsigned byte from source with an byte in the AL register or an unsigned word from source with an unsigned word in AX.
- When a byte is divided the result is stored in AX.

→ output

C:\> tasm filename.asm

C:\> tlink filename.obj

C:\> filename

04

→ Mnemonic : Div multiplier

Program : Division of 8bit numbers

→ Algorithm

Step 1: Initialise the data segment

Step 2: Store first number in al register

Step 3: Store second number in bl register

Step 4: Divide the two numbers

Step 5: Display result

Step 6: Stop

→ .Model small

• data

a al 08H

b bl 02H

• code

Mov ax, @data

Mov ds, ax

Mov ax, 0000H

Mov al, a

Mov bl, b

div bl

Mov ch, 02H

Mov cl, 04H

mov bh, al

```
I2: rol bh, al
    mov dl, bh
    and dl, 0FH
    cmp dl, 09
    jbe I4
    add dl, 07H
I4: add dl, 30H
    mov ah, 02H
    int 21H
    dec ch
    jnz I2
    mov ah, 4ch
    int 21H
end
```

Conclusion: Hence, we performed arithmetic operation on 8 bit data.