Vivekanand Education Society's
Institute of Technology
Approved by AICTE & Affiliated to University of Mumbai

Artificial Intelligence and Data Science Department.

MP / Even Sem 2021-22 / Experiment 3.

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EXPERIMENT - 3.

AIM: Assembly programming for 8-bit and 16-bit addition and subtraction based on arithmetic instruction.

THEORY:

EQUIPMENT REQUIRED:

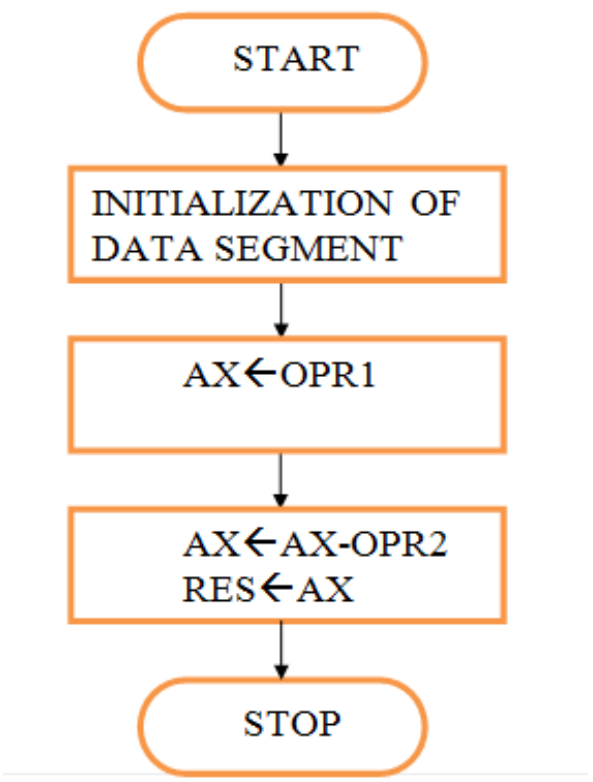
1. TASM Software
2. PC with DOS and Debug program

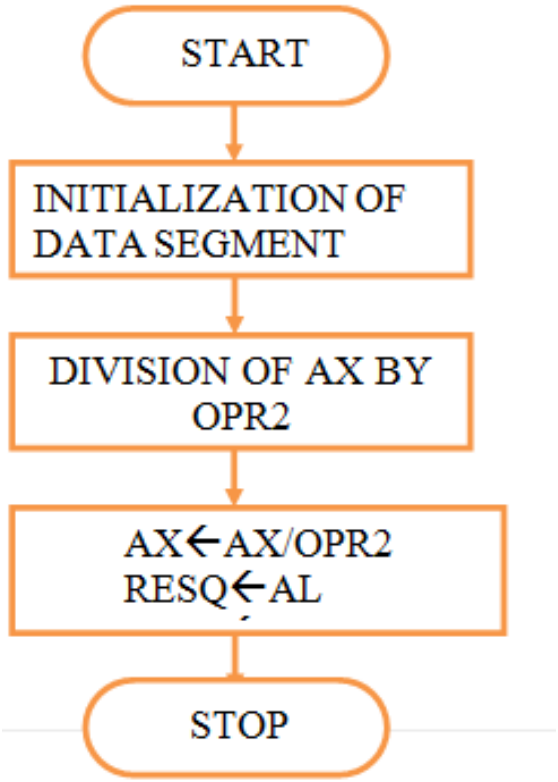
ALGORITHM:

1. Define the values in the data segment as per the addressing mode.
2. Initialize the data segment register with data segment address
3. Load the words as per the addressing mode and perform addition/ subtraction/ multiplication/ division and store the sum/ difference/ product/ quotient-remainder to the result address.
4. Terminate the program

Flow Chart:

Multiplication, Division respectively :





PROGRAMS (using register addressing mode):

A. 16 BIT MULTIPLICATION

```
1                       assume cs:code,ds:data
2
3 0000                  data segment
4 0000 4444             n1 dw 4444h
5 0002 4567             n2 dw 4567h
6 0004 ????????         n3 dd ?
7 0008                  data ends
8
9 0000                  code segment
10
11 0000                 start:
12 0000 B8 0000s        mov ax,data
13 0003 8E D8           mov ds,ax
14
15 0005 A1 0000r        mov ax,n1
16 0008 8B 1E 0002r     mov bx,n2
17 000C F7 E3           mul bx
18 000E BE 0004r        lea si,n3
```

```
19 0011 89 04          mov [si],ax
20 0013 89 54 02       mov [si+2],dx
21
22 0016 CC             int 3
23
24 0017                code ends
25                     end start
```

B. WORD BY BYTE DIVISION

```
1                      assume cs:code,ds:data
2
3 0000                 data segment
4 0000 0444            n1 dw 0444h
5 0002 45              n2 db 45h
6 0003 ????            n3 dw ?
7 0005                 data ends
8
9 0000                 code segment
10
11 0000                start:
12 0000 B8 0000s       mov ax,data
13 0003 8E D8          mov ds,ax
14
15 0005 A1 0000r       mov ax,n1
16 0008 8A 1E 0002r    mov bl,n2
17 000C F6 F3          div bl
18
19 000E A3 0003r       mov n3,ax
20 0011 BE 0003r       lea si,n3
21
22 0014 CC             int 3
23
24 0015 code ends
25 end start
```

RESULT:

A. C. 16 BIT MULTIPLICATION

AX= CB5C & SI=0004 ; D 0000 0005 44 44 67 45 5C CB

B. WORD BY BYTE DIVISION

AX= 390F & SI=0003 ; D 0000 0004 44 04 45 0F 39
