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 2.

YASH SARANG.
47 / D6AD.

EXPERIMENT - 2.

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

THEORY:

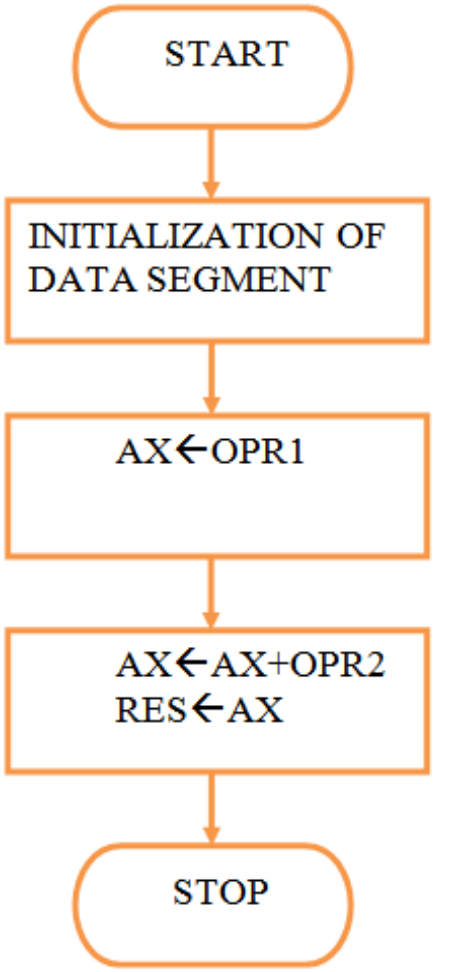
EQUIPMENT REQUIRED:

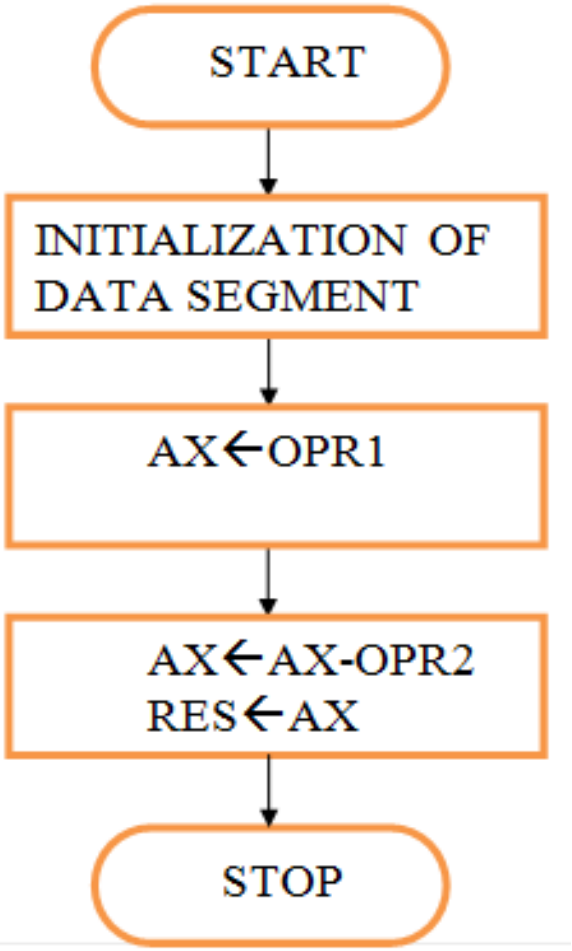
1. TASM Software
2. PC with DOS and Debug program

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:





PROGRAMS (using register addressing mode):

A. 16 BIT ADDITION

```
1                       assume cs:code,ds:data
2
3       0000            data segment
4       0000 1243       n1 dw 1243h
5       0002 4567       n2 dw 4567h
6       0004 ????       n3 dw ?
7       0006            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 03 C3          add ax,bx
18      000E A3 0004r       mov n3,ax
19      0011 BE 0004r       lea si,n3
20      0014 CC int 3
21
22      0015                code ends
23                          end start
```

B. 16 BIT SUBTRACTION

```
1                           assume cs:code,ds:data
2
3 0000                      data segment
4 0000 FFFF                 n1 dw 0ffffh
5 0002 4567                 n2 dw 4567h
6 0004 ????                 n3 dw ?
7 0006                      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 2B C3               sub ax,bx
18 000E A3 0004r            mov n3,ax
19 0011 BE 0004r            lea si,n3
20 0014 CC                  int 3
21
22 0015                     code ends
23                          end start
```

RESULT:

A. 16 BIT ADDITION

AX= 57AA & SI=0004 ; D 0004 0005 AA 57

B. 16 BIT SUBTRACTION

AX= BA98 & SI=0004 ; D 0004 0005 98 BA
