

CAO LAB EXP-2

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Class: SE-IT

Batch: C

Aim: Implement various Arithmetic Operations through Assembly Language Programming for microprocessor 8086 (MASM).

Problem 1: Addition of 2 16-bit hexadecimal numbers

CODE:

data segment

a dw 1234h

b dw 5678h

c dw ?

data ends

code segment

assume cs:code,ds:data

start:

mov ax,data

mov ds,ax //moving data into code segment

mov ax,a //moving the 1st number into ax register

mov bx,b //moving the 2nd number into bx register

add ax,bx //adding the two numbers

mov c,ax //moving the addition into c

int 3

code ends

end start

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
076B:001F 7403 JZ 0024
-d 076a:0000
076A:0000 34 12 78 56 00 00 00 00-00 00 00 00 00 00 00 00 4.xU.....
076A:0010 B8 6A 07 8E D8 A1 00 00-8B 1E 02 00 03 C3 A3 04 .j.....
076A:0020 00 CC 83 C4 04 50 E8 9F-0E 83 C4 04 3D FF FF 74 ....P.....=.t
076A:0030 03 E9 11 01 B8 2F 00 50-8B 46 FC 8B 56 FE 05 0C ..../.P.F..U...
076A:0040 00 52 50 E8 EA 48 83 C4-04 50 E8 7B 0E 83 C4 04 .RP..H...P.f....
076A:0050 3D FF FF 74 03 E9 ED 00-C4 5E FC 26 8A 47 0C 2A =.t.....^.&.G.*
076A:0060 E4 40 50 8B C3 BC C2 05-0C 00 52 50 E8 C1 48 83 .@P.....RP..H.
076A:0070 C4 04 50 8D 86 FA FE 50-E8 17 73 83 C4 06 8B B6 ..P....P..s.....
-g
AX=6BAC BX=5678 CX=0022 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=076A ES=075A SS=0769 CS=076B IP=0011 NU UP EI PL NZ NA PE NC
076B:0011 CC INT 3
-d 076a:0000
076A:0000 34 12 78 56 AC 68 00 00-00 00 00 00 00 00 00 00 4.xU.h.....
076A:0010 B8 6A 07 8E D8 A1 00 00-8B 1E 02 00 03 C3 A3 04 .j.....
076A:0020 00 CC 83 C4 04 50 E8 9F-0E 83 C4 04 3D FF FF 74 ....P.....=.t
076A:0030 03 E9 11 01 B8 2F 00 50-8B 46 FC 8B 56 FE 05 0C ..../.P.F..U...
076A:0040 00 52 50 E8 EA 48 83 C4-04 50 E8 7B 0E 83 C4 04 .RP..H...P.f....
076A:0050 3D FF FF 74 03 E9 ED 00-C4 5E FC 26 8A 47 0C 2A =.t.....^.&.G.*
076A:0060 E4 40 50 8B C3 BC C2 05-0C 00 52 50 E8 C1 48 83 .@P.....RP..H.
076A:0070 C4 04 50 8D 86 FA FE 50-E8 17 73 83 C4 06 8B B6 ..P....P..s.....

```

Problem 2: Subtraction of 2 16-bit hexadecimal numbers

CODE:

data segment

a dw 5678h

b dw 1234h

c dw ?

data ends

code segment

assume cs:code,ds:data

start:

mov ax,data

mov ds,ax //moving data into code segment

mov ax,a //moving the 1st number into ax register

mov bx,b //moving the 2nd number into bx register

sub ax,bx //subtracting the two numbers

mov c,ax //moving the addition into c

int 3

code ends

end start

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
076B:001F 7403 JZ 0024
-d
076B:0000 B8 6A 07 8E D8 A1 00 00-BB 1E 02 00 2B C3 A3 04 .j.....+...
076B:0010 00 CC 83 C4 04 50 E8 9F-0E 83 C4 04 3D FF FF 74 .....P.....=.t
076B:0020 03 E9 11 01 B8 2F 00 50-8B 46 FC 8B 56 FE 05 0C ...../.P.F..U...
076B:0030 00 52 50 E8 EA 48 83 C4-04 50 E8 7B 0E 83 C4 04 .RP..H...P.{...
076B:0040 3D FF FF 74 03 E9 ED 00-C4 5E FC 26 8A 47 0C 2A =..t.....^.&.G.*
076B:0050 E4 40 50 8B C3 8C C2 05-0C 00 52 50 E8 C1 48 83 .@P.....RP..H.
076B:0060 C4 04 50 8D 86 FA FE 50-E8 17 73 83 C4 06 8B B6 ..P....P..s....
076B:0070 FA FE 81 E6 FF 00 C6 82-FB FE 00 2B C0 50 8D 86 .....+..P..
-g
AX=4444 BX=1234 CX=0022 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=076A ES=075A SS=0769 CS=076B IP=0011 NU UP EI PL NZ NA PE NC
076B:0011 CC INT 3
-d 076A:0000
076A:0000 78 56 34 12 44 44 00 00-00 00 00 00 00 00 00 00 xU4.DD.....
076A:0010 B8 6A 07 8E D8 A1 00 00-8B 1E 02 00 2B C3 A3 04 .j.....+...
076A:0020 00 CC 83 C4 04 50 E8 9F-0E 83 C4 04 3D FF FF 74 .....P.....=.t
076A:0030 03 E9 11 01 B8 2F 00 50-8B 46 FC 8B 56 FE 05 0C ...../.P.F..U...
076A:0040 00 52 50 E8 EA 48 83 C4-04 50 E8 7B 0E 83 C4 04 .RP..H...P.{...
076A:0050 3D FF FF 74 03 E9 ED 00-C4 5E FC 26 8A 47 0C 2A =..t.....^.&.G.*
076A:0060 E4 40 50 8B C3 8C C2 05-0C 00 52 50 E8 C1 48 83 .@P.....RP..H.
076A:0070 C4 04 50 8D 86 FA FE 50-E8 17 73 83 C4 06 8B B6 ..P....P..s....

```

Problem 3: Multiplication of 2 numbers

CODE:

data segment

a dw 5h

b dw 4h

c dw ?

data ends

code segment

assume cs:code,ds:data

start:

mov ax,data

mov ds,ax //moving data into code segment

mov ax,a //moving the 1st number into ax register

mov bx,b //moving the 2nd number into bx register

mul ax,bx //multiplying the two numbers

mov c,ax //moving the addition into c

int 3

code ends

end start

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...
076B:0008 8B1E0200    MOV     BX,[0002]
076B:000C F7E0        MUL     AX
076B:000E A30400        MOV     [0004],AX
076B:0011 CC            INT     3
076B:0012 83C404        ADD     SP,+04
076B:0015 50            PUSH    AX
076B:0016 E89F0E        CALL   0EB8
076B:0019 83C404        ADD     SP,+04
076B:001C 3DFFFF        CMP     AX,FFFF
076B:001F 7403        JZ      0024
-g
AX=0019 BX=0004 CX=0022 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=076A ES=075A SS=0769 CS=076B IP=0011  NU UP EI PL NZ NA PO NC
076B:0011 CC            INT     3
-d 076A:0000
076A:0000 05 00 04 00 19 00 00 00-00 00 00 00 00 00 00 00 .....
076A:0010 B8 6A 07 8E D8 A1 00 00-8B 1E 02 00 F7 E0 A3 04 .j.....
076A:0020 00 CC 83 C4 04 50 E8 9F-0E 83 C4 04 3D FF FF 74 ....P.....=.t
076A:0030 03 E9 11 01 B8 2F 00 50-8B 46 FC 8B 56 FE 05 0C ...../.P.F..U...
076A:0040 00 52 50 E8 EA 48 83 C4-04 50 E8 7B 0E 83 C4 04 .RP..H...P.{....
076A:0050 3D FF FF 74 03 E9 ED 00-C4 5E FC 26 8A 47 0C 2A =.t.....^.&.G.*
076A:0060 E4 40 50 8B C3 8C C2 05-0C 00 52 50 E8 C1 48 83 .@P.....RP..H.
076A:0070 C4 04 50 8D 86 FA FE 50-E8 17 73 83 C4 06 8B B6 ..P....P..s.....

```

Result: Hence, we learn to perform different operations on hexadecimal numbers using 8086 microprocessor. Also, we learn to execute and compile the program using different commands.