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Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai – 400058-India
Department of Computer Engineering

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Experiment No.	1

AIM:	To implement various Arithmetic Operations through Assembly Language Programming for microprocessor 8086 (MASM)
Program 1	
PROBLEM STATEMENT :	To perform 8 -bit addition of two numbers.
PROGRAM:	<pre>data segment a db 05h b db 03h c dw ? data ends code segment assume cs:code,ds:data start: mov ax,data mov ds,ax mov al,a mov bl,b add al,bl mov c,ax int 3 code ends end start</pre>
RESULT:	

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Program 2

PROBLEM STATEMENT :

To perform 8- bit subtraction of two numbers.

PROGRAM:

```
data segment
a db 05h
b db 02h
c dw ?
data ends

code segment
assume cs:code,ds:data
start:
mov ax,data
mov ds,ax
mov al,a
mov bl,b
add al,bl
mov c,ax
int 3
code ends
```

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	end start
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RESULT:

```

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip: 0, Program: DEBUG
C:\>debug SUB.exe
-d 076A:0000
076A:0000 05 02 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
076A:0010 B8 6A 07 8E D8 A0 00 00-8A 1E 01 00 2A C3 A3 02 .j.....*...
076A:0020 00 CC 00 EB 2A 00 EB 27-00 EB 24 00 EB 21 00 EB ....*...'$.!..
076A:0030 1E 00 EB 1B 00 EB 18 00-EB 15 00 EB 12 00 EB 0F .....
076A:0040 00 EB 0C 00 EB 09 00 EB-06 00 EB 03 00 EB 00 00 .....
076A:0050 FA 1E 2E 8E 1E 00 00 A3-7A 13 55 8B EC 8B 46 0A .....z.U...F.
076A:0060 25 FF BC A3 78 13 8C C0-87 46 04 5D 2D D3 12 51 %...x...F.l-..Q
076A:0070 B1 03 F6 F1 59 C1 E0 02-89 26 76 13 8C 16 74 13 ....Y....&v...t.
-g
AX=0703 BX=0002 CX=0022 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=076A ES=075A SS=0769 CS=076B IP=0011  NU UP EI PL NZ NA PE NC
076B:0011 CC          INT      3
-d 076A:0000
076A:0000 05 02 03 07 00 00 00 00 00-00 00 00 00 00 00 00 .....
076A:0010 B8 6A 07 8E D8 A0 00 00-8A 1E 01 00 2A C3 A3 02 .j.....*...
076A:0020 00 CC 00 EB 2A 00 EB 27-00 EB 24 00 EB 21 00 EB ....*...'$.!..
076A:0030 1E 00 EB 1B 00 EB 18 00-EB 15 00 EB 12 00 EB 0F .....
076A:0040 00 EB 0C 00 EB 09 00 EB-06 00 EB 03 00 EB 00 00 .....
076A:0050 FA 1E 2E 8E 1E 00 00 A3-7A 13 55 8B EC 8B 46 0A .....z.U...F.
076A:0060 25 FF BC A3 78 13 8C C0-87 46 04 5D 2D D3 12 51 %...x...F.l-..Q
076A:0070 B1 03 F6 F1 59 C1 E0 02-89 26 76 13 8C 16 74 13 ....Y....&v...t.

```

Program 3	
PROBLEM STATEMENT:	To perform 16-bit addition of two numbers.
PROGRAM:	<pre> data segment a db 0202h b db 0804h c dw ? data ends code segment assume cs:code,ds:data start: mov ax,data mov ds,ax </pre>

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	<pre> mov ax,a mov bx,b add ax,bx mov c,ax int 3 code ends end start </pre>
--	---

RESULT:

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG

```

C:\>debug hexa.exe
-d 076A:0000
076A:0000 02 02 08 04 00 00 00 00-00 00 00 00 00 00 00 00 .....
076A:0010 BB 6A 07 8E D8 A1 00 00-8B 1E 02 00 03 C3 A3 04 .j.....
076A:0020 00 CC 00 E8 2A 00 E8 27-00 E8 24 00 E8 21 00 E8 ....*...'$.!..
076A:0030 1E 00 E8 1B 00 E8 18 00-E8 15 00 E8 12 00 E8 0F .....
076A:0040 00 E8 0C 00 E8 09 00 E8-06 00 E8 03 00 E8 00 00 .....
076A:0050 FA 1E 2E 8E 1E 00 00 A3-7A 13 55 8B EC 8B 46 0A .....z.U...F.
076A:0060 25 FF BC A3 78 13 8C C0-87 46 04 5D 2D D3 12 51 %...x...F.l-..Q
076A:0070 B1 03 F6 F1 59 C1 E0 02-89 26 76 13 8C 16 74 13 ....Y....&v...t.

```

g

```

AX=060A BX=0408 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 02 02 08 04 0A 06 00 00-00 00 00 00 00 00 00 00 .....
076A:0010 BB 6A 07 8E D8 A1 00 00-8B 1E 02 00 03 C3 A3 04 .j.....
076A:0020 00 CC 00 E8 2A 00 E8 27-00 E8 24 00 E8 21 00 E8 ....*...'$.!..
076A:0030 1E 00 E8 1B 00 E8 18 00-E8 15 00 E8 12 00 E8 0F .....
076A:0040 00 E8 0C 00 E8 09 00 E8-06 00 E8 03 00 E8 00 00 .....
076A:0050 FA 1E 2E 8E 1E 00 00 A3-7A 13 55 8B EC 8B 46 0A .....z.U...F.
076A:0060 25 FF BC A3 78 13 8C C0-87 46 04 5D 2D D3 12 51 %...x...F.l-..Q
076A:0070 B1 03 F6 F1 59 C1 E0 02-89 26 76 13 8C 16 74 13 ....Y....&v...t.

```

Program 4

PROBLEM STATEMENT:	To perform 32-bit addition of two numbers.
PROGRAM:	<pre> data segment abc dd 78563412h def dd F0DEBC98H ghi dw ? data ends code segment assume cs:code, ds:data </pre>

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```
start:
mov ax, data
mov ds, ax
mov dl, 00h
mov ax, word ptr abc
mov bx, word ptr def
add ax, bx
mov word ptr ghi, ax
mov ax, word ptr abc+2
mov bx, word ptr def+2
adc ax, bx
code ends
end start
```

RESULT:

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DEBUG
C:\>debug bit32.exe
-d 076A:0000
076A:0000  7B 56 34 12 F0 DE BC 9A-00 00 00 00 00 00 00 00  xU4.....
076A:0010  B8 6A 07 8E D8 B2 00 A1-00 00 8B 1E 04 00 03 C3  .j.....
076A:0020  A3 0B 00 A1 02 00 8B 1E-06 00 13 C3 A3 0A 00 73  .....s
076A:0030  02 FE C2 8B 16 0C 00 CC-E8 15 00 E8 12 00 E8 0F  .....
076A:0040  00 E8 0C 00 E8 09 00 E8-06 00 E8 03 00 E8 00 00  .....
076A:0050  FA 1E 2E 8E 1E 00 00 A3-7A 13 55 8B EC 8B 46 0A  .....z.U...F.
076A:0060  25 FF BC A3 78 13 8C C0-87 46 04 5D 2D D3 12 51  %...x...F.l-..Q
076A:0070  B1 03 F6 F1 59 C1 E0 02-89 26 76 13 8C 16 74 13  ....Y....&v...t.
-g
AX=ACF1 BX=9ABC CX=0038 DX=0000 SP=0000 BP=0000 SI=0000 DI=0000
DS=076A ES=075A SS=0769 CS=076B IP=0027  NU UP EI NG NZ AC PO NC
076B:0027 CC          INT      3
-d 076A:0000
076A:0000  7B 56 34 12 F0 DE BC 9A-68 35 F1 AC 00 00 00 00  xU4.....h5.....
076A:0010  B8 6A 07 8E D8 B2 00 A1-00 00 8B 1E 04 00 03 C3  .j.....
076A:0020  A3 0B 00 A1 02 00 8B 1E-06 00 13 C3 A3 0A 00 73  .....s
076A:0030  02 FE C2 8B 16 0C 00 CC-E8 15 00 E8 12 00 E8 0F  .....
076A:0040  00 E8 0C 00 E8 09 00 E8-06 00 E8 03 00 E8 00 00  .....
076A:0050  FA 1E 2E 8E 1E 00 00 A3-7A 13 55 8B EC 8B 46 0A  .....z.U...F.
076A:0060  25 FF BC A3 78 13 8C C0-87 46 04 5D 2D D3 12 51  %...x...F.l-..Q
076A:0070  B1 03 F6 F1 59 C1 E0 02-89 26 76 13 8C 16 74 13  ....Y....&v...t.
```

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CONCLUSION:	In this experiment, I got acquainted with the basics of 8086 assembly language programming and solved various arithmetic operations.
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