



Academic Year: 2022-2023

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Class:	T. Y. B.Tech (Computer Engineering)
Course:	Processor Organization and Architecture (POA)
Course Code:	DJ19CEL502
Experiment No.:	05

AIM: Assembly program for 16-bit addition/subtraction using direct, Immediate & register addressing mode.

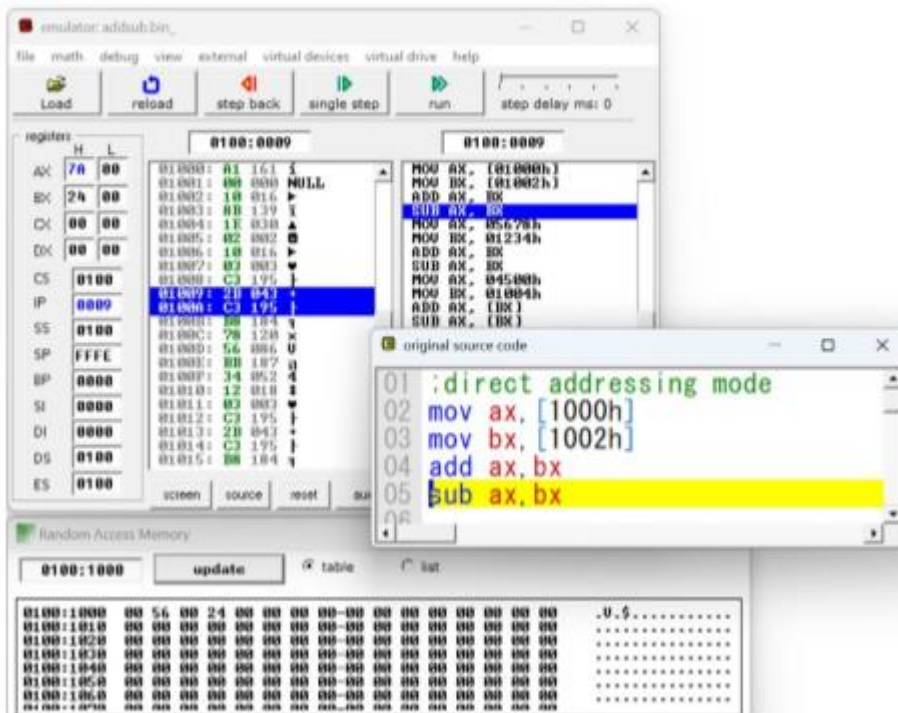
ADDITION:

CODE:

```
org 1000h
mov ax,[1000h]
mov bx,[1002h]
add ax,bx
mov ax,1234h
mov bx,0005h
add ax,bx
mov ax,1234h
mov bx,1000h
add ax,[bx]
```

OUTPUT:

ADDITION-DIRECT:





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ADDITION-IMMEDIATE:

simulator: addsubsim

file math debug view external virtual devices virtual drive help

Load reload step back single step run step delay ms: 0

registers

	H	L
AX	08	AC
BX	12	34
CX	00	00
DX	00	00
SI	0100	
DI	0100	
ES	0100	

0100:0013 011000: 01 16 1 1
011001: 00 0000 NULL
011002: 10 016
011003: 00 1 39
011004: 1E 030
011005: 02 002
011006: 10 016
011007: 02 003
011008: C3 195
011009: 20 043
01100A: C3 195
01100B: 00 184
01100C: 70 120
01100D: 56 005
01100E: 00 167
01100F: 34 052
011010: 12 018
011011: 03 003
011012: C3 195
011013: 00 184
011014: C3 195
011015: 00 184

0100:0013 011000: 01 16 1 1
011001: 00 0000 NULL
011002: 10 016
011003: 00 1 39
011004: 1E 030
011005: 02 002
011006: 10 016
011007: 02 003
011008: C3 195
011009: 20 043
01100A: C3 195
01100B: 00 184
01100C: 70 120
01100D: 56 005
01100E: 00 167
01100F: 34 052
011010: 12 018
011011: 03 003
011012: C3 195
011013: 00 184
011014: C3 195
011015: 00 184

original source code

```
07: immediate addressing mode
08: mov ax, 5678h
09: mov bx, 1234h
10: add ax, bx
11: sub ax, bx
```

Random Access Memory

0100:1000 update table list

Address	Hex	ASCII
0100:1000	00 56 00 24 00 00 00 00 00 00 00 00 00 00 00 00	.U.....
0100:1010	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0100:1020	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0100:1030	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0100:1040	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0100:1050	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0100:1060	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....

ADDITION-REGISTER INDIRECT

simulator: addsubsim

file math debug view external virtual devices virtual drive help

Load reload step back single step run step delay ms: 0

registers

	H	L
AX	45	67
BX	18	04
CX	00	00
DX	00	00
SI	0100	
DI	0100	
ES	0100	

0100:0013 011000: 01 16 1 1
011001: 00 0000 NULL
011002: 10 016
011003: 00 1 39
011004: 1E 030
011005: 02 002
011006: 10 016
011007: 02 003
011008: C3 195
011009: 20 043
01100A: C3 195
01100B: 00 184
01100C: 70 120
01100D: 56 005
01100E: 00 167
01100F: 34 052
011010: 12 018
011011: 03 003
011012: C3 195
011013: 00 184
011014: C3 195
011015: 00 184

0100:0013 011000: 01 16 1 1
011001: 00 0000 NULL
011002: 10 016
011003: 00 1 39
011004: 1E 030
011005: 02 002
011006: 10 016
011007: 02 003
011008: C3 195
011009: 20 043
01100A: C3 195
01100B: 00 184
01100C: 70 120
01100D: 56 005
01100E: 00 167
01100F: 34 052
011010: 12 018
011011: 03 003
011012: C3 195
011013: 00 184
011014: C3 195
011015: 00 184

original source code

```
13: register indirect addressing r
14: mov ax, 4500h
15: mov bx, 1004h
16: add ax, [bx]
17: sub ax, [bx]
```

Random Access Memory

0100:1000 update table list

Address	Hex	ASCII
0100:1000	00 56 00 24 67 00 00 00 00 00 00 00 00 00 00 00	.U.....
0100:1010	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0100:1020	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0100:1030	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0100:1040	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	.....
0100:1050	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0100:1060	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00



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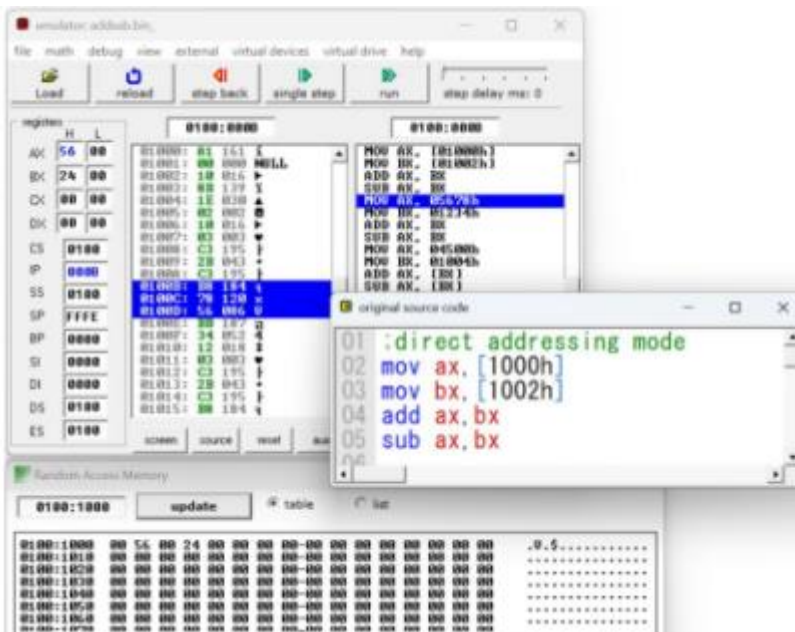
SUBTRACTION:

CODE:

```
org 1000h
mov ax,[1000h]
mov bx,[1002h]
sub ax,bx
mov ax,1234h
mov bx,0005h
sub ax,bx
mov ax,1234h
mov bx,1000h
sub ax,[bx]
```

OUTPUT:

SUBTRACTION-DIRECT





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SUBTRACTION-IMMEDIATE:

The screenshot shows a 8086 simulator window titled 'simulator: addsub.bny'. The 'registers' panel on the left shows the AX register at 07 AD. The 'original source code' window displays the following assembly code:

```
07 ;immediate addressing mode
08 mov ax,5678h
09 mov bx,1234h
10 add ax,bx
11 mov bx,00ffh
12 sub ax,bx
```

The main window shows the instruction list with '0101:0018: 00 00 00 00' selected. The 'Random Access Memory' panel at the bottom shows memory addresses from 0100:1000 to 0100:100F.

SUBTRACTION-REGISTER INDIRECT:

The screenshot shows the same 8086 simulator window. The 'registers' panel shows the AX register at 05 67. The 'original source code' window displays the following assembly code:

```
13
14 ;register indirect addressing r
15 mov ax,4500h
16 mov bx,1004h
17 add ax,[bx]
18 sub ax,[bx]
```

The main window shows the instruction list with '0100:0022: 00 00 00 00' selected. The 'Random Access Memory' panel at the bottom shows memory addresses from 0100:1000 to 0100:100F.