

Name - Yash Lakhtariya
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Branch - CBA Batch - 51
M&A Practical 5

Aim : Exercise for jump instruction.

Exercise :

1. Multiply 2's complement of 02H with 09H and store result into 3000H (LSB) and 3001H (MSB).

```
MVI A,02H
CMA
ADI 01H

MOV B,A
MVI C,09H
MVI D,00H
MVI E,00H

LOOP:
MOV A,D
ADD B
MOV D,A

MOV A,E
ACI 00H
MOV E,A

DCR C
JNZ LOOP

LXI H,3000H
MOV M,D
INX H
```

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MOV M, E

HLT

8085 Simulator

File Edit Tools Settings Simulation Subroutine View Load Sample Program Help

Editor Assembler Registers Memory Devices

Assembler

Address	Label	Mnemonics	Hexco...	Bytes	M-Cyc...	T-Stat...
0000		MVI A,02	3E	2	2	7
0001			02			
0002		CMA	2F	1	1	4
0003		ADI 01	C6	2	2	7
0004			01			
0005		MOV B,A	47	1	1	4
0006		MVI C,09	0E	2	2	7
0007			09			
0008		MVI D,00	16	2	2	7
0009			00			
000A		MVI E,00	1E	2	2	7
000B			00			
000C	LOOP	MOV A,D	7A	1	1	4
000D		ADD B	80	1	1	4
000E		MOV D,A	57	1	1	4
000F		MOV A,E	7B	1	1	4
0010		ACI 00	CE	2	2	7
0011			00			
0012		MOV E,A	5F	1	1	4

Memory Editor

Memory Range: 0000 --- FFFF

Memory Address	Value
0000	3E
0001	02
0002	2F
0003	C6
0004	01
0005	47
0006	0E
0007	09
0008	16
000A	1E
000C	7A
000D	80
000E	57
000F	7B
0010	CE
0012	5F
0013	00
0014	C2
0015	0C
0017	21
0019	30
001A	72
001B	23
001C	73
001D	76
3000	EE
3001	08

Simulate

Start From → 0000

Run all At a Time Step By Step

☐ Show entire memory content
☒ Show only loaded memory location
☐ Store directly to specified memory location

Created by : Jubin Mitra

8:41:54 PM 3.7 k 0.0 b

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Name: Yash Lakhtariya

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subject: M&A Practical 5

Code: MVI A, 02H // load 02H in A
CMA // 1's complement of A
ADI 02H // 2's complement of 02 in A
MOV B, A // store A's contents in B
MVI C, 09H // load 09H in C
MVI D, 00H // clear D (for LSB)
MVI E, 00H // clear E (for MSB)

LOOP:

MOV A, D // load from D to A
ADD B // add B to A
MOV D, A // update D (LSB)
MOV A, E // copy from E to A
ACI 00H // increment if carry
MOV E, A // update E (MSB)
DCR C // decrement counter
JNZ LOOP // repeat till counter is zero

LXI H, 3000H // load 3000H in HL pair
MOV M, D // store LSB in HL pointer
INX H // increment HL
MOV M, E // store MSB in HL pointer
HLT // end execution

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Address	Label	Mnemonics	Hex	Bytes	Cycles	T-states
0000		MVI A, 02	3F	2	2	7
0001			02			
0002		CMA	2F	1	1	4
0003		ADI 01	CG	2	2	7
0004			01			
0005		MOV B, A	47	1	1	4
0006		MVI C, 09	0E	2	2	7
0007			09			
0008		MVI D, 00	16	2	2	7
0009			00			
000A		MVI E, 00	1E	2	2	7
000B			00			
000C	LOOP	MOV A, D	7A	1	1	4
000D		ADD B	80	1	1	4
000E		MOV D, A	57	1	1	4
000F		MOV A, E	7B	1	1	4
0010		ACI 00	CE	2	2	7
0011			00			
0012		MOV E, A	5F	1	1	4
0013		DCR C	0B	1	1	4
0014		JNZ LOOP	C2	3	3	10
0015			0C			
0016			00			
0017		LXI H, 3000	21	3	3	10
0018			00			
0019			30			
001A		MOV M, D	72	1	2	7
001B		INX H	23	1	1	6
001C		MOV M, E	73	1	2	7
001D		HIT	76	1	2	5

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2. Multiply 03H with 05H and store result into 3000H (LSB) and 3001H (MSB)

```
MVI B,03H
MVI C,05H
MVI D,00H
MVI E,00H

LOOP:
MOV A,D
ADD B
MOV D,A

MOV A,E
ACI 00H
MOV E,A
DCR C
JNZ LOOP

LXI H,3000H
MOV M,D
INX H
MOV M,E

HLT
```

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8085 Simulator

File Edit Tools Settings Simulation Subroutine View Load Sample Program Help

Editor Assembler Registers Memory Devices

Assembler

Address	Label	Mnemonics	Hexa...	Bytes	M-Cyc...	T-Stat...
0000		MVI B,03	06	2	2	7
0001			03			
0002		MVI C,05	0E	2	2	7
0003			05			
0004		MVI D,00	16	2	2	7
0005			00			
0006		MVI E,00	1E	2	2	7
0007			00			
0008	LOOP	MOV A,D	7A	1	1	4
0009		ADD B	80	1	1	4
000A		MOV D,A	57	1	1	4
000B		MOV A,E	7B	1	1	4
000C		ACI 00	CE	2	2	7
000D			00			
000E		MOV E,A	5F	1	1	4
000F		DCR C	0D	1	1	4
0010		JNZ LOOP	C2	3	3	10
0011			08			
0012			00			

Memory Editor

Memory Range: 0000 ---- FFFF

Memory Address	Value
0000	06
0001	03
0002	0E
0003	05
0004	16
0005	00
0006	1E
0007	7A
0008	80
0009	57
000A	7B
000B	CE
000C	5F
000D	00
000E	C2
000F	08
0010	21
0011	30
0012	72
0013	23
0014	73
0015	76
0016	0F
0017	
0018	
0019	
001A	
001B	
001C	
001D	
001E	
001F	
0020	
0021	
0022	
0023	
0024	
0025	
0026	
0027	
0028	
0029	
002A	
002B	
002C	
002D	
002E	
002F	
0030	
0031	
0032	
0033	
0034	
0035	
0036	
0037	
0038	
0039	
003A	
003B	
003C	
003D	
003E	
003F	
0040	
0041	
0042	
0043	
0044	
0045	
0046	
0047	
0048	
0049	
004A	
004B	
004C	
004D	
004E	
004F	
0050	
0051	
0052	
0053	
0054	
0055	
0056	
0057	
0058	
0059	
005A	
005B	
005C	
005D	
005E	
005F	
0060	
0061	
0062	
0063	
0064	
0065	
0066	
0067	
0068	
0069	
006A	
006B	
006C	
006D	
006E	
006F	
0070	
0071	
0072	
0073	
0074	
0075	
0076	
0077	
0078	
0079	
007A	
007B	
007C	
007D	
007E	
007F	
0080	
0081	
0082	
0083	
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0085	
0086	
0087	
0088	
0089	
008A	
008B	
008C	
008D	
008E	
008F	
0090	
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0097	
0098	
0099	
009A	
009B	
009C	
009D	
009E	
009F	
00A0	
00A1	
00A2	
00A3	
00A4	
00A5	
00A6	
00A7	
00A8	
00A9	
00AA	
00AB	
00AC	
00AD	
00AE	
00AF	
00B0	
00B1	
00B2	
00B3	
00B4	
00B5	
00B6	
00B7	
00B8	
00B9	
00BA	
00BB	
00BC	
00BD	
00BE	
00BF	
00C0	
00C1	
00C2	
00C3	
00C4	
00C5	
00C6	
00C7	
00C8	
00C9	
00CA	
00CB	
00CC	
00CD	
00CE	
00CF	
00D0	
00D1	
00D2	
00D3	
00D4	
00D5	
00D6	
00D7	
00D8	
00D9	
00DA	
00DB	
00DC	
00DD	
00DE	
00DF	
00E0	
00E1	
00E2	
00E3	
00E4	
00E5	
00E6	
00E7	
00E8	
00E9	
00EA	
00EB	
00EC	
00ED	
00EE	
00EF	
00F0	
00F1	
00F2	
00F3	
00F4	
00F5	
00F6	
00F7	
00F8	
00F9	
00FA	
00FB	
00FC	
00FD	
00FE	
00FF	

Simulate

Start From → 0000

Run all At a Time Step By Step

☐ Show entire memory content
☒ Show only loaded memory location
☐ Store directly to specified memory location

Created by : Jubin Mitra

9:09:32 PM

0.0 b 3.0 k

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Code : MVI B, 03H // load 03H in B
MVI C, 05H // load 05H in C
MVI D, 00H // clear D (to store LSB)
MVI E, 02H // clear E (to store MSB)

LOOP :

MOV A, D // copy from D to A
ADD B // add B
MOV D, A // update D (LSB)
MOV A, E // load MSB (E) to A
ACI 00H // increment if carry
MOV E, A // update E (MSB)
DCR C // decrement counter
JNZ LOOP // repeat till counter is zero


LXI H, 3000H // load 3000H in HL pair
MOV M, D // copy from D (LSB) to HL pointer
INX H // increment HL
MOV M, E // copy E (MSB) to HL pointer
HLT // end execution

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<div><div>OL 3741</div><div><div>PAGE NO. DATE</div></div></div>						
Address	Label	Mnemonics	Hex	Bytes	Micyles	T-states
0000		MVI B, 03	06	2	2	7
0001			03			
0002		MVI C, 05	0E	2	2	7
0003			05			
0004		MVI D, 00	16	2	2	7
0005			00			
0006		MVI E, 00	1E	2	2	7
0007			00			
0008	LOOP	MOV A, D	7A	1	1	4
0009		ADD B	80	1	1	4
000A		MOV D, A	57	1	1	4
000B		MOV A, E	7B	1	1	4
000C		ACI 00	CF	2	2	7
000D			00			
000E		MOV E, A	5F	1	1	4
000F		DCR C	0D	1	1	4
0010		JNZ LOOP	C2	3	3	10
0011			08			
0012			00			
0013		LXI H, 3000	21	3	3	10
0014			00			
0015			30			
0016		MOV M, D	72	1	2	7
0017		INX H	23	1	1	6
0018		MOV M, E	73	1	2	7
0019		HLT	76	1	2	5
0						

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3. Add two 16 bit numbers with DAD instruction and store it at 3000H with SHLD instruction.

```
MVI B,11H  
MVI C,11H  
MVI H,23H  
MVI L,20H  
  
DAD B  
SHLD 3000H  
  
HLT
```

The screenshot displays the 8085 Simulator interface. The main window is divided into several sections:

- Assembler Window:** Shows the assembly code being entered. The code is as follows:

Address	Label	Mnemonics	Hexco...	Bytes	M-Cyc...	T-Stat...
0000		MVI B,11	06	2	2	7
0001			11			
0002		MVI C,11	0E	2	2	7
0003			11			
0004		MVI H,23	26	2	2	7
0005			23			
0006		MVI L,20	2E	2	2	7
0007			20			
0008		DAD B	09	1	3	10
0009		SHLD 3000	22	3	5	16
000A			00			
000B			30			
000C		HLT	76	1	2	5
- Memory Editor Window:** Shows the memory contents. The memory range is 0000 to FFFF. The loaded memory is as follows:

Memory Address	Value
0000	06
0001	11
0002	0E
0003	11
0004	26
0005	23
0006	2E
0007	20
0008	09
0009	22
000A	30
000B	76
3000	31
3001	34
- Simulate Window:** Contains a 'Start From' field set to 0000 and two buttons: 'Run all At a Time' and 'Step By Step'.

The status bar at the bottom shows the time as 9:48:23 PM and the system tray icons.

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Code : MVI B, 11H // load 11H in B
MVI C, 11H // load 11H in C
MVI H, 23H // load 23H in H
MVI L, 20H // load 20H in L
DAD B // add
SHLD 3000H
HLT

Address	Mnemonics	Hex	Bytes	M-cycles	Flags
0000	MVI B, 11	06	2	2	7
0001		11			
0002	MVI C, 11	0E	2	2	7
0003		11			
0004	MVI H, 23	26	2	2	7
0005		23			
0006	MVI L, 20	2E	2	2	7
0007		20			
0008	DAD B	09	1	3	10
0009	SHLD 3000	22	3	5	16
000A		00			
000B		30			
000C	HLT	76	1	2	5

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4. Write a program to separate even numbers from the given list of 15 numbers starting from 2500H and store them from 2600H.

```
        MVI B,A0
        MVI C,0F
        LXI H,2500

DENTRY:    MOV M,B
            INR B
            INX H
            DCR C
            JNZ DENTRY
            LXI H,2500
            LXI D,2600
            MVI C,0F

MAIN:      MOV A,M
            ANI 01
            JNZ ODD
            MOV A,M
            STAX D
            INX D

ODD:      INX H
            DCR C
            JNZ MAIN
            HLT
```


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8085 Simulator

File Edit Tools Settings Simulation Subroutine View Load Sample Program Help

Editor Assembler Registers Memory Devices

Assembler

Address	Label	Mnemonics	Hexa...	Bytes	M-Cyc...	T-Stat...
0000		MVI B,A0	06	2	2	7
0001			A0			
0002		MVI C,0F	0E	2	2	7
0003			0F			
0004		LXI H,2500	21	3	3	10
0005			00			
0006			25			
0007	DENT...	MOV M,B	70	1	2	7
0008			04	1	1	4
0009		INX H	23	1	1	6
000A		DCR C	0D	1	1	4
000B		JNZ DENTRY	C2	3	3	10
000C			07			
000D			00			
000E		LXI H,2500	21	3	3	10
000F			00			
0010			25			
0011		LXI D,2600	11	3	3	10
0012			00			

Memory Editor

Memory Range: 0000 ---- FFFF

Memory Address	Value
0010	12
001E	13
001F	23
0020	00
0021	C2
0022	16
0024	76
2500	A0
2501	A1
2502	A2
2503	A3
2504	A4
2505	A5
2506	A6
2507	A7
2508	A8
2509	A9
250A	AA
250B	AB
250C	AC
250D	AD
250E	AE
2600	A0
2601	A2
2602	A4
2603	A6
2604	A8
2605	AA
2606	AC
2607	AE

Simulate

Start From → 0000

Run all At a Time Step By Step

☐ Show entire memory content
☒ Show only loaded memory location
☐ Store directly to specified memory location

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10:02:53 PM

↑ 0.0 b
↓ 0.0 b

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<div><div></div><div>PAGE NO</div><div>DATE</div></div>					
Code: MVI B, 00 // load data in B					
(Code: MVI C, 0FH // load 0FH in C (counter)					
LXI H, 2500H // load 2500H in HL					
DENTRY:					
MOV M, B // copy from B to HL pointer					
INR B // increment data					
INX H // increment addr.					
DCR C // decrement counter					
JNZ DENTRY // repeat till counter is zero					
LXI H, 2500H // load addr-1 in HL pair					
LXI D, 2600H // load addr-2 in DE pair					
MVI C, 0FH // load 0FH (16's) in C					
MAIN:					
MOV A, M // copy from HL pointer to A					
ANI 01H // AND A with 01H					
JNZ ODD // jump if A's contents are odd					
MOV A, M // if even, again load A from M					
STAX D // store A in DE pointer					
INX D // increment DE pair (addr)					
ODD:					
INX H // increment HL pair (addr)					
DCR C // decrement counter					
JNZ MAIN // repeat till counter is zero					
HLT // end execution					
Address	Mnemonics	Hex	Bytes	M-cycles	T-states
0000	MVI B, 00H	06	2	2	7
0001		00			
0002	MVI C, 0F	0E	2	2	7
0003		0F			
0004	LXI H, 2500	21	3	3	10

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Address	Label	Mnemonics	Hex	Bytes	Machine	Instructions
0005			00			
0006			25			
0007	ENTRY	MOV M, B	70	1	2	7
0008		INR B	04	1	1	4
0009		INX H	23	1	1	6
000A		DCR C	0D	1	1	4
000B		JNZ ENTRY	C2	3	3	10
000C			07			
000D			00			
000E		LXI H, 2000	21	3	3	10
000F			00			
0010			25			
0011		LXI D, 2000	41	3	3	10
0012			00			
0013			26			
0014		MVI C, 0F	0E	2	2	7
0015			0F			
0016	MAIN	MOV A, M	7E	1	2	7
0017		ANI 01	EB	2	2	7
0018			01			
0019		JNZ ODD	C2	3	3	10
001A			1F			
001B			00			
001C		MOV A, M	7E	1	2	7
001D		STAX D	12	1	2	7
001E		INX D	13	1	1	6
001F	ODD	INX H	23	1	1	6
0020		DCR C	0D	1	1	4
0021		JNZ MAIN	C2	3	3	10
0022			16			
0023			00			
0024		HLT	76	1	2	5

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5. Write a program to find a maximum of two given 8-bit number stored at 2050H and 2051H. Store the largest value at 3050H.

```
LXI H, 2050H
```

```
MVI A, 20H
```

```
MOV M, A
```

```
LXI H, 2051H
```

```
MVI A, 30H
```

```
MOV M, A
```

```
//-----
```

```
LXI H, 2050H
```

```
MOV A, M
```

```
LXI H, 2051H
```

```
MOV B, M
```

```
CMP B
```

```
JNC ABIG
```

```
MOV C, B
```

```
JMP EXITLOOP
```

```
ABIG:
```

```
MOV C, A
```

```
EXITLOOP:
```

```
LXI H, 3050H
```

```
MOV M, C
```

```
HLT
```

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8085 Simulator

File Edit Tools Settings Simulation Subroutine View Load Sample Program Help

Editor Assembler Registers Memory Devices

Assembler

Address	Label	Mnemonics	Hexco...	Bytes	M-Cyc...	T-Stat...
0000		LXI H,2050	21	3	3	10
0001			50			
0002			20			
0003		MVI A,20	3E	2	2	7
0004			20			
0005		MOV M,A	77	1	2	7
0006		LXI H,2051	21	3	3	10
0007			51			
0008			20			
0009		MVI A,30	3E	2	2	7
000A			30			
000B		MOV M,A	77	1	2	7
000C		LXI H,2050	21	3	3	10
000D			50			
000E			20			
000F		MOV A,M	7E	1	2	7
0010		LXI H,2051	21	3	3	10
0011			51			
0012			20			

Simulate

Start From → 0000

Run all At a Time Step By Step

Memory Editor

Memory Range: 0000 ---- FFFF

Memory Address	Value
0012	20
0013	46
0014	88
0015	D2
0016	1C
0018	48
0019	C3
001A	1D
001C	4F
001D	21
001E	50
001F	30
0020	71
0021	76
2050	20
2051	30
3050	30

☐ Show entire memory content
☒ Show only loaded memory location
☐ Store directly to specified memory location

Created by : Jubin Mitra

9:49:22 PM

0.0 b 0.0 b

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<div><div></div><div>PAGE NO</div><div>DATE</div></div>						
Code :						
LXI H, 2050H // load 2050H in HL pairs						
MVI A, 20H // load 20H in A						
MOV M, A // store A in HL pointer						
LXI H, 2051H // load 2051H in HL pairs						
MVI A, 30H // copy A with 30H pointer						
MOV M, A // copy A in HL pointer						
LXI H, 2050H // load 2050H in HL pairs						
MOV A, M // copy from HL pointer to A						
LXI H, 2051H // load 2051H in HL pairs						
MOV B, M // copy from HL pointer to B						
CMP B // compare A with B						
JNC ABIG // jump if not carry						
MOV C, B // copy from B to C (Answer)						
JMP EXITLOOP // unconditionally jump						
ABIG :						
MOV C, A // if A > B, load A in C						
EXIT LOOP :						
LXI H, 3050H // load 3050H in HL pairs						
MOV M, C // copy from C to HL pointer						
HLT // end execution						
Address	Mnemonics	Hex	Bytes	M-cycles	T-states	
0000	LXI H, 2050	21	3	3	10	
0001		50				
0002		20				
0003	MVI A, 20	3E	2	2	7	
0004		20				
0005	MOV M, A	77	1	2	8	
0006	LXI H, 2051	21	3	3	10	
0007		51				

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				PAGE NO.		DATE	
Address	Label	Mnemonics	Hex	Bytes	Bytes	Bytes	Bytes
0008			20				
0009		MVI A, 30	3E	2	2	7	
000A			30				
000B		MOV M, A	77	1	2	7	
000C		LXI H, 2050	21	3	3	10	
000D			50				
000E			20				
000F		MOV A, M	7E	1	2	7	
0010		LXI H, 2051	21	3	3	10	
0011			51				
0012			20				
0013		MOV B, M	46	1	2	7	
0014		CMP B	B8	1	1	4	
0015		JNC ABIG	D2	3	3	10	
0016			1C				
0017			00				
0018		MOV C, B	48	1	1	4	
0019		JMP EXITLOOP	C3	3	3	10	
001A			10				
001B			00				
001C	ABIG	MOV C, A	4F	1	1	4	
001D	EXITLOOP	LXI H, 3050	21	3	3	10	
001E			50				
001F			30				
0020		MOV M, C	71	1	2	7	
0021		HLT	76	1	2	5	