



## LECTURE 6

# INSTRUCTION SET OF 8085 MICROPROCESSOR

BY:

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## WRITING AN ASSEMBLY LANGUAGE PROGRAM:

- Steps to write a program:
  - ❖ Analyze the **problem**.
  - ❖ Develop program Logic.
  - ❖ Write an **Algorithm**.
  - ❖ Make a **Flowchart**.
  - ❖ Write program Instructions using **Assembly language** of 8085.

**Example 1: Program 8085 in Assembly language to add two 8-bit numbers (99H), (39H) and store 8-bit result in register C.**

1. Analyze the problem.  
Addition of two 8-bit numbers to be done.
2. Program Logic  
Add two numbers.  
Store result in register C.

$$\begin{array}{r}
 10011001 \text{ (99H) } \mathbf{A} \\
 + 00111001 \text{ (39H) } \mathbf{D} \\
 \hline
 11010010 \text{ (D2H) } \mathbf{C}
 \end{array}$$



### 3. Algorithm

1. Get two numbers.

- Load 1st no. in register D
- Load 2nd no. in register E

2. Add them.

- Copy register D to A
- Add register E to A

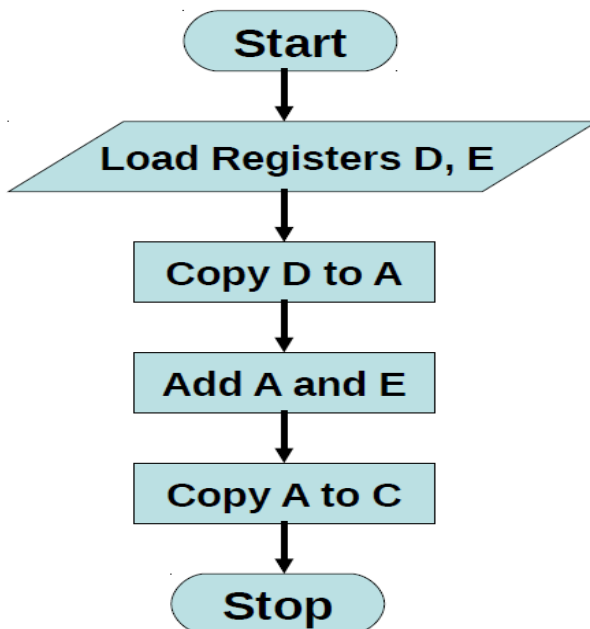
3. Store result

Copy A to register C

4. Stop

- Stop processing

4. Make a flowchart



- Load 1st no. in register D
- Load 2nd no. in register E

- Copy register D to A
- Add register E to A

Copy A to register C

- Stop processing



## 5. Assembly language program

### 1. Get two numbers.

- Load 1st no. in register D.
- Load 2nd no. in register E.

```
MVI D, 99H
MVI E, 39H
```

### 2. Add them.

- Copy register D to A.
- Add register E to A.

```
MOV A, D
ADD E
```

### 3. Store result.

Copy A to register C.

```
MOV C, A
```

### 4. Stop.

- Stop processing.

```
HLT
```

**Example 2: Program 8085 in Assembly language to add two 8-bit numbers (99H), (99H). Result can be more than 8-bits.**

### 1. Analyze the problem.

Addition of two 8-bit numbers to be done.

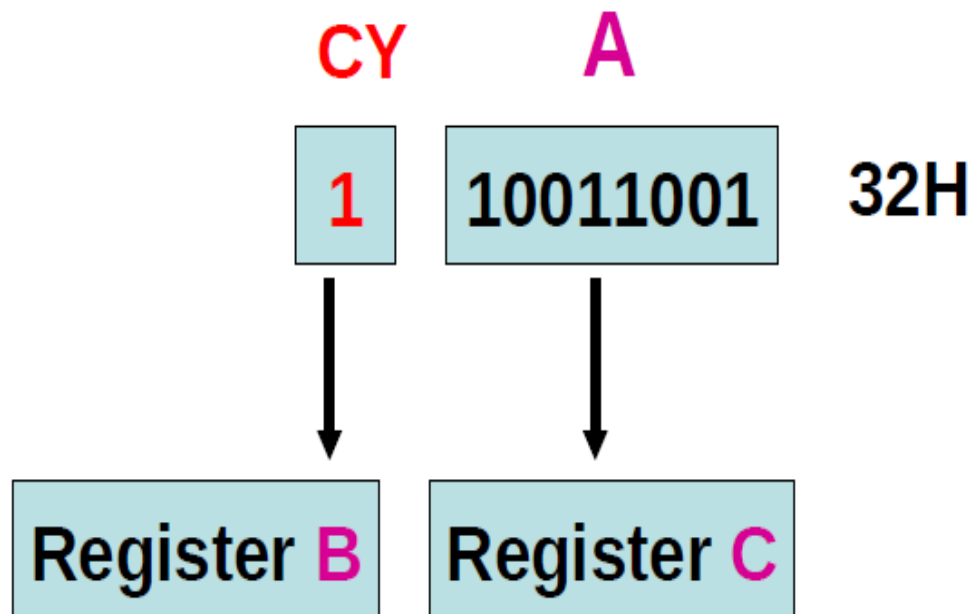


## 2. Program Logic

- Result of addition of two 8-bit numbers can be 9-bit

$$\begin{array}{r}
 10011001 \text{ (99H) } A \\
 +10011001 \text{ (99H) } B \\
 \hline
 100110010 \text{ (132H)}
 \end{array}$$

- The 9th bit in the result is called CARRY bit.
- Storing result in Register memory





### 3. Algorithm

1. Load two numbers in registers D, E
2. Add them.
3. Store 8 bit result in C.
4. Check CARRY flag
5. if the carry flag  
- Store carry in B register
6. Stop.

Load registers D, E

- Copy register D to A
- Add register E to A

Copy A to register C

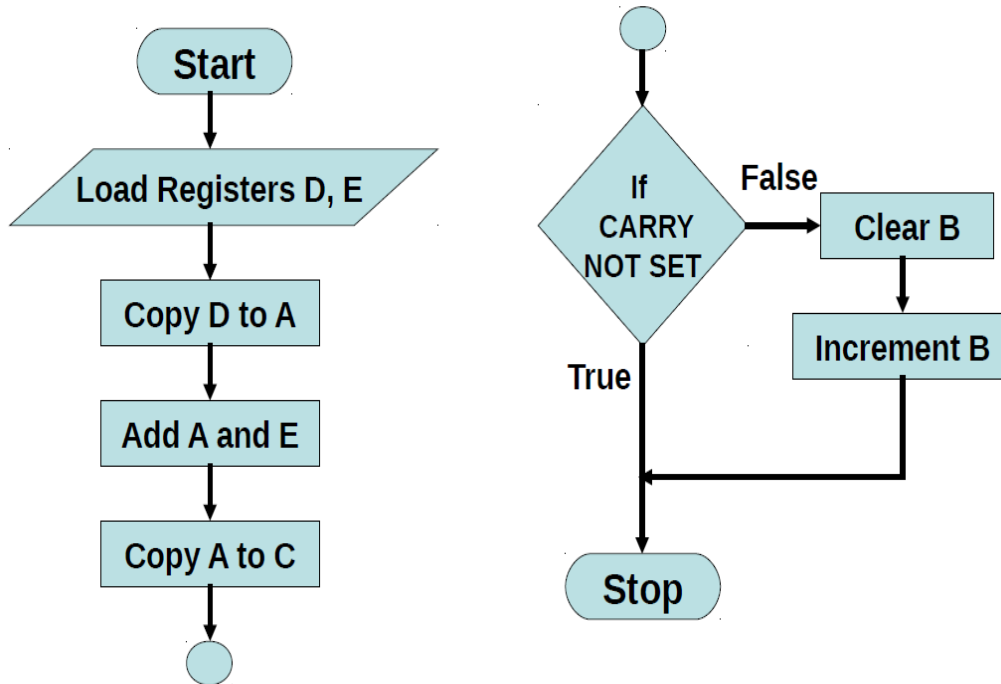
• Use Conditional Jump instructions  
Stop processing

- Clear register B
- Increment B

• Stop processing



#### 4. Make a Flowchart



#### 5. Assembly language program

Load registers D, E
<ul style="list-style-type: none"> <li>• Copy register D to A</li> <li>• Add register E to A</li> </ul>
<ul style="list-style-type: none"> <li>• Copy A to register C</li> </ul>
<ul style="list-style-type: none"> <li>• Use Conditional Jump instructions Stop processing</li> </ul>
<ul style="list-style-type: none"> <li>• Clear register B</li> <li>• Increment B</li> </ul>
<ul style="list-style-type: none"> <li>• Stop processing</li> </ul>

MVI D, 2H MVI E, 3H
MOV A, D ADD E
MOV C, A
JNC END
MVI B, 0H INR B
JNC END



**Example 3:** The following have been executed by an 8085 Microprocessor. Write down the sequence of the process with explain of each step.

Address (Hex)	8085 Instruction
5011	LXI B, 11FF
5013	DCX B
5014	MVI B, 00
5015	DCR B
5016	MVI H, A1
5018	INR H

S            Z            X            AC            X            P            X            CY

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Flag register

**Note:** This example solve in the class





**Example 4: write down the sequence of the instruction (till HLT instruction) if the program begin with the location 1FFH**

Address (Hex)	8085 Instruction
1FF5	XRA
1FF6	LXI
1FF9	PCHL
1FFA	HLT
1FFB	LXI H,2100 H
1FFE	ANI 00
2000	LXI H, FFFF H
2003	INX H
2004	JZ 2100
2100	HLT
2103	LXI H, IFFF H
2103	MOV A,M
2104	INR A
2105	HLT

S	Z	X	AC	X	P	X	CY

Flag register

**Note:** This example solve in the class.



**Example 5:** The following have been executed by an 8085 Microprocessor. Write down the sequence of the process with explain of each step. From which address the next instruction be fetched?

Address (Hex)	8085 Instruction
6010	LXI H, 8A79 H
6013	MOV A, L
6015	ADD H
6016	DAA
6017	MOV H,L
6018	PCHL

S            Z            X            AC            X            P            X            CY

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Flag register

**Note:** This example solve in the class.