4. Writing a 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

Program 8085 in Assembly language to add two 8-bit numbers 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
   - Example

```
  10011001   (99H) A
+ 00111001   (39H) D
  11010010   (D2H) C
```

3. Algorithm

1. Get two numbers
2. Add them
3. Store result
4. Stop

Translation to 8085 operations

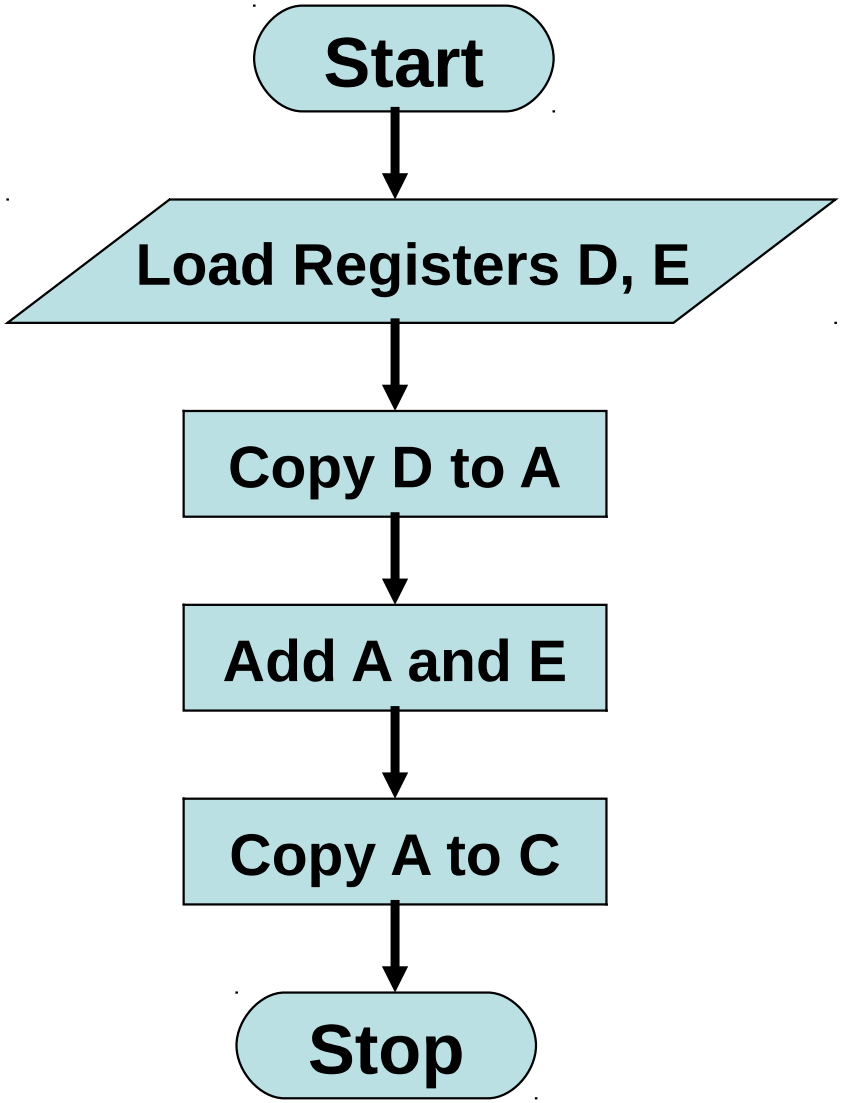
- Load 1st no. in register D
- Load 2nd no. in register E

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

- Copy A to register C

- Stop processing

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	
a) Load 1st no. in register D	MVI D, 2H
b) Load 2nd no. in register E	MVI E, 3H
2. Add them	
a) Copy register D to A	MOV A, D
b) Add register E to A	ADD E
3. Store result	
a) Copy A to register C	MOV C, A
4. Stop	
a) Stop processing	HLT

Program 8085 in Assembly language to add two 8-bit numbers. Result can be more than 8-bits.

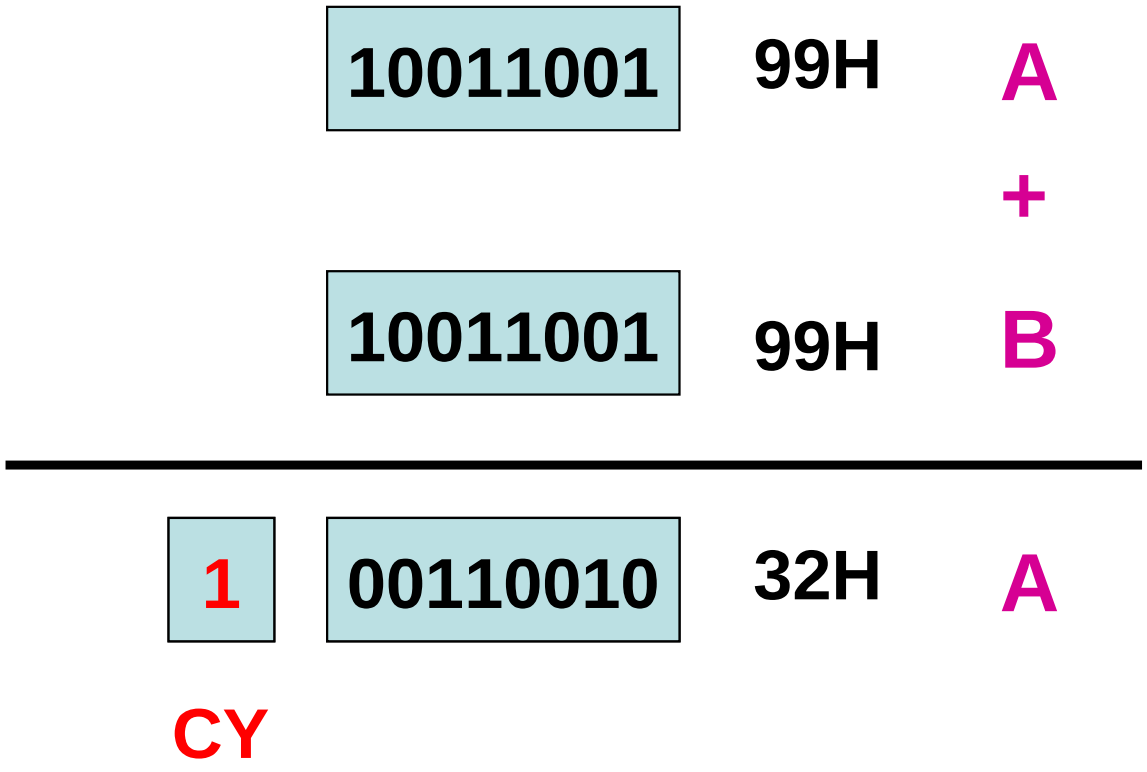
1. Analyze the problem
   - Result of addition of two 8-bit numbers can be 9-bit
   - Example

     10011001 (99H) A

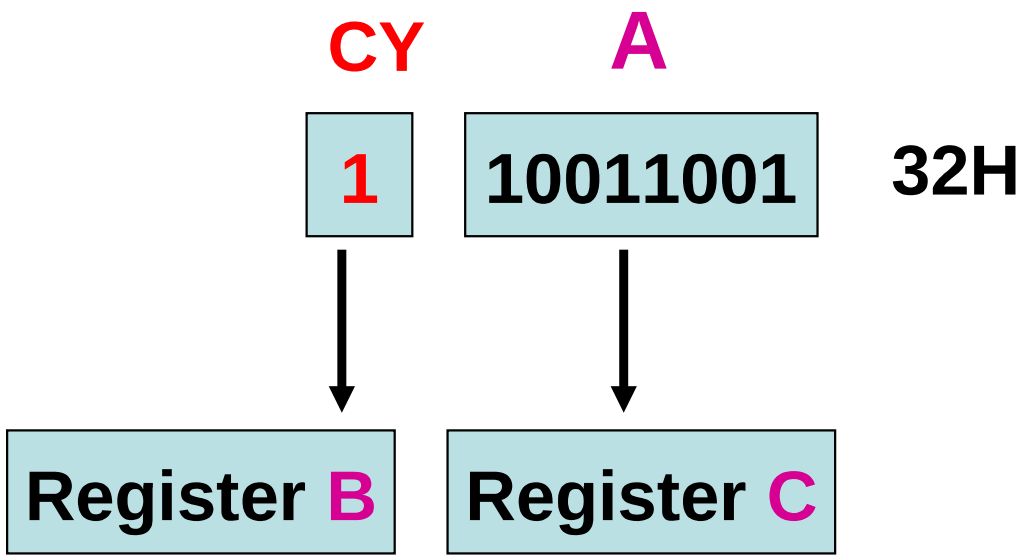
     +10011001 (99H) B

     100110010 (132H)
   - The 9th bit in the result is called CARRY bit.

- How 8085 does it?
  - Adds register A and B
  - Stores 8-bit result in A
  - SETS carry flag (CY) to indicate carry bit



- Storing result in Register memory



Step-1 Copy A to C

Step-2

a) Clear register B

b) Increment B by 1

2. Program Logic

1. Add two numbers
2. Copy 8-bit result in A to C
3. If CARRY is generated
   - Handle it
4. Result is in register pair BC

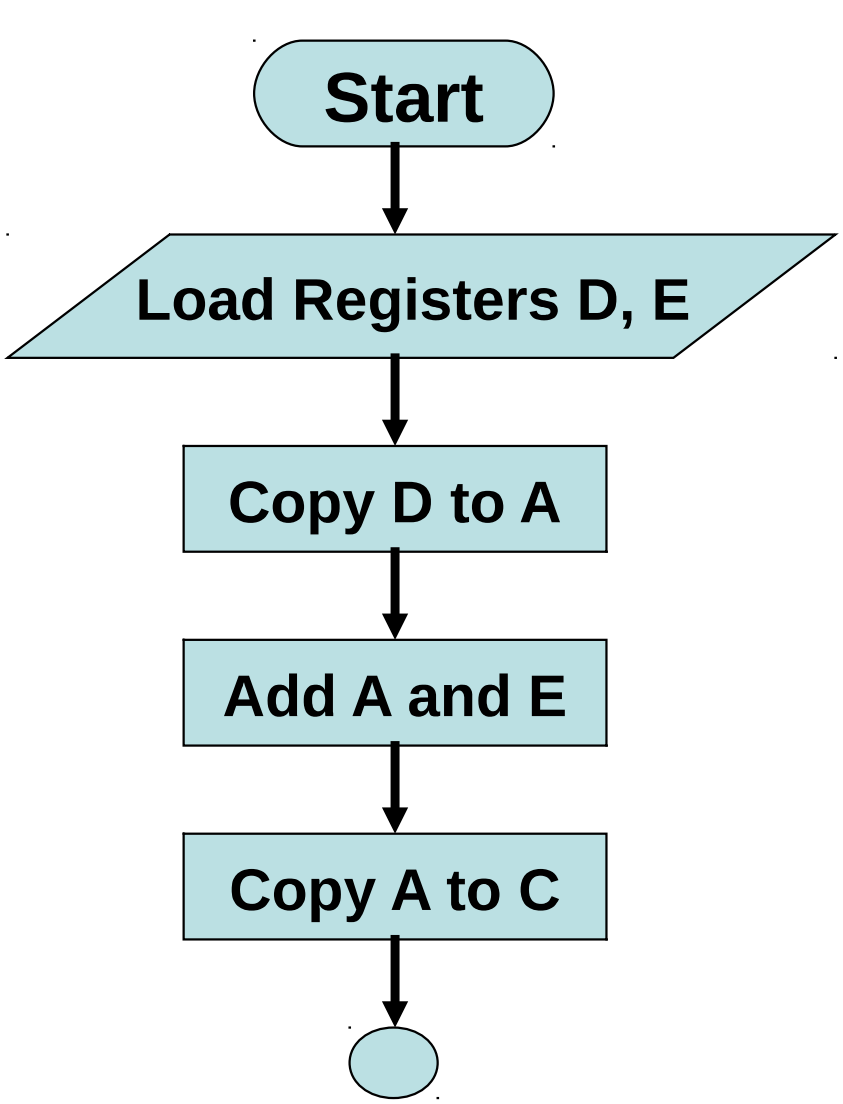
3. Algorithm

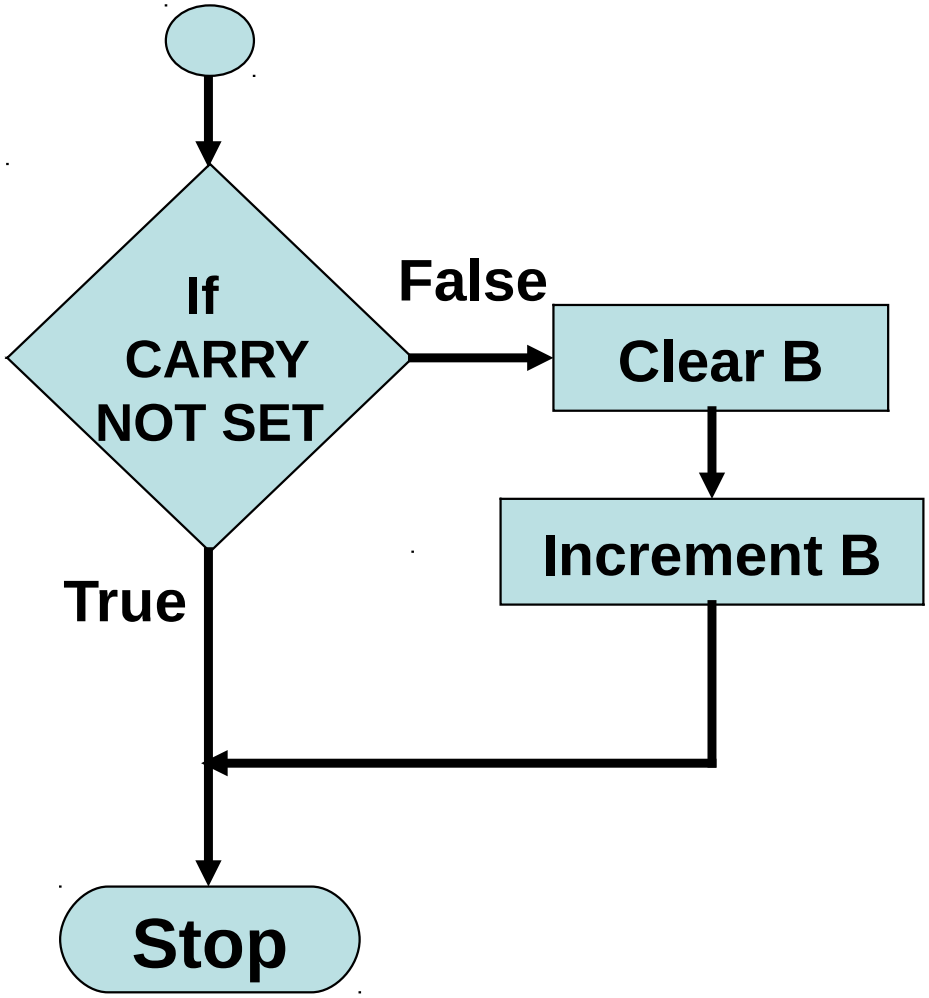
1. Load two numbers in registers D, E
2. Add them
3. Store 8 bit result in C
4. Check CARRY flag
5. If CARRY flag is SET
   - Store CARRY in register B
6. Stop

Translation to 8085 operations

- Load registers D, E
- Copy register D to A
- Add register E to A
- Copy A to register C
- Use Conditional Jump instructions
- Clear register B
- Increment B
- Stop processing

4. Make a Flowchart





5. Assembly Language Program

- Load registers D, E

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

- Copy A to register C

- Use Conditional Jump instructions

- Clear register B
- Increment B

- Stop processing

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