SNS COLLEGE OF TECHNOLOGY

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

23ECT221 - MICROPROCESSORS AND MICROCONTROLLERS

II YEAR/ IV SEMESTER

UNIT I - 8085 AND 8086 MICROPROCESSOR

TOPIC – 8085 Addressing Modes

OUTLINE

Addressing Modes of 8085

- To perform any operation, we have to give the corresponding instructions to the microprocessor.
- In each instruction, programmer has to specify 3 things:
  - Operation to be performed.
  - Address of source of data.
  - Address of destination of result.

Addressing Modes of 8085

- The method by which the address of source of data or the address of destination of result is given in the instruction is called Addressing Modes.
- The term addressing mode refers to the way in which the operand of the instruction is specified.

Why use addressing modes in 8085 microprocessor ?

- **Flexibility:** Addressing modes provide a flexible way to access data and instructions in memory. depending on the type of data being accessed, the size of the data, and other factors.
- **Memory optimization:** Addressing modes can help to optimize the use of memory resources by allowing data and instructions to be accessed in the most efficient way possible.

- **Performance optimization:** Addressing modes can also help to optimize the performance of the microprocessor by reducing the number of memory accesses needed to fetch data or instructions.
- **Reduced code size:** Addressing modes can help to reduce the size of code needed to perform a particular task. By using addressing modes programmers can write more compact and efficient code.

ADDRESSING MODES

Every instruction of a program has to operate on a data. The method of specifying the data to be operated by the instruction is called Addressing.

Addressing mode is the way the microprocessor identifies the operands for the instruction.

The 8085 has the following addressing modes.

- Immediate addressing mode
- Direct addressing mode
- Register addressing mode
- Register indirect addressing mode
- Implicit addressing mode

Immediate Addressing Mode

In immediate addressing mode, the data (Operand) is specified within the instruction itself.

Examples :

MVI A, 18 H

ADI 09 H

LXI H, 50AB H

MVI A, l8 M

Accumulator

18 → 

Move the data l8H to the Accumulator

Direct Addressing Mode

In direct addressing mode, the address of the data (operand) is specified in the instruction itself.

Examples :

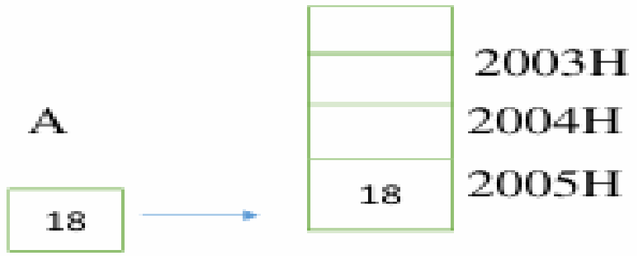
STA 2005 H

OUT 05 H

LDA 4100 H

STA 2005 H

Memory Location



Store the content of the accumulator in the memory location 2005 H. 2005 H is it memory address where the data is to be stored. It is given in the instruction itself.

Register Addressing Mode

In register addressing mode, the instruction specifies the name of the register in which the data is available.

The opcode specifies the address of the register in addition to the, operation to be performed.

Examples

MOV A, B

ANA B

SUB H

MOV A,B

A B

Move the content of register B to A

Register Indirect Addressing Mode

In register addressing mode, the instruction specifies the name of the register in which the data is available.

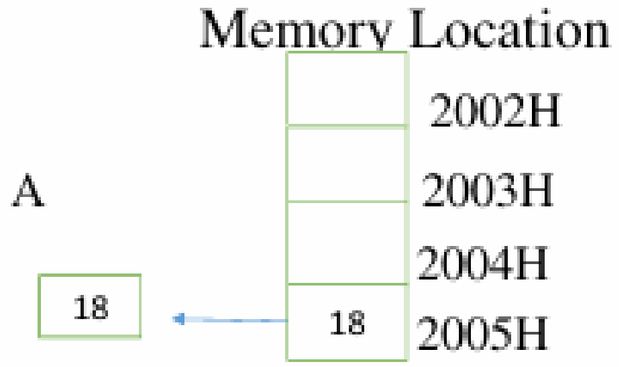
Examples

MOV A, M

SUB M

DCR M

MOV A,M



Implicit addressing Mode

Some instruction operate on the content of the accumulator. Such instruction do not requires the address of operand.

Example

CMA

RAL

RAR

8085 Addressing mode

Type	Instruction
Direct	STA 2005H
Register	MOV A,B
Register Indirect	MOV A,M
Immediate	MVIA,18H
Implicit	CMA

Types of Addressing Modes

1. Direct Addressing Mode
2. Register Addressing Mode
3. Register Indirect Addressing Mode
4. Immediate Addressing Mode
5. Implicit Addressing Mode

Direct Addressing Mode

- In this mode, the address of the operand is given in the instruction itself.

LDA 2500 H	Load the contents of memory location 2500 H in accumulator.

- LDA is the operation.
- 2500 H is the address of source.
- Accumulator is the destination.

- **Direct addressing**: Direct addressing is used when the address of the operand is directly specified in the instruction. This addressing mode is used for simple operations where the operand is stored in a specific memory location, and the address does not need to be calculated or manipulated in any way.

Register Addressing Mode

- In this mode, the operand is in general purpose register.

MOV A, B	Move the contents of register B to A.

- MOV is the operation.
- B is the source of data.
- A is the destination.

- **Register addressing**: Register addressing is used when the operand is stored in a register, rather than in memory. This addressing mode is useful for performing fast arithmetic or logic operations on small amounts of data.

Register Indirect Addressing Mode

- In this mode, the address of operand is specified by a register pair.

MOV A, M	Move data from memory location specified by H-L pair to accumulator.

- MOV is the operation.
- M is the memory location specified by H-L register pair.
- A is the destination.

Immediate Addressing Mode

- In this mode, the operand is specified within the instruction itself.

MVI A, 05 H	Move 05 H in accumulator.

- MVI is the operation.
- 05 H is the immediate data (source).
- A is the destination.

- **Immediate addressing:** Immediate addressing is used when the operand is specified directly in the instruction, rather than being stored in memory. This addressing mode is useful for performing simple arithmetic or logic operations on constants or literals.

Implicit Addressing Mode

- If address of source of data as well as address of destination of result is fixed, then there is no need to give any operand along with the instruction.

CMA	Complement accumulator.

- CMA is the operation.
- A is the source.
- A is the destination.

Challenges associated with addressing modes in the 8085 microprocessor

- Limited addressing range
- Complex instruction set
- Limited addressing modes
- Stack management
- Performance considerations
- Memory management

Advantages of Addressing Modes in 8085 Microprocessor

- Versatility
- Efficient memory usage
- Easy to use
- Improved performance

Disadvantages of Addressing Modes in 8085 Microprocessor

- Complexity
- Debugging difficulties
- Limitations

THANK YOU