

COURSE: UCS1502 - MICROPROCESSORS AND INTERFACING

Addressing modes of 8086

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This presentation covers

- Addressing modes of 8086

Learning Outcome of this module

- To understand various addressing modes of 8086



Do you know ??

- What is addressing mode ?
- What are the different addressing modes of 8086 ?

Addressing modes of 8086

Different ways of representing source operands in instructions are known as addressing modes. There are 8 different addressing modes in 8086.

1. Immediate addressing mode:

Data operand is a part of the instruction itself.

Eg:

MOV AX, 543FH

MOV CH, 00H

2. Direct addressing mode :

The address of the memory location is written directly in the instruction.

MOV AX, [5000]

Physical address calculation for above instruction is $10H \times DS + 5000H$

Eg: if DS = 1000, DS: Offset = 1000:5000

Physical address = $10H \times 1000 + 5000 = 10000 + 5000 = 15000H$

Addressing modes of 8086

3. Register addressing mode:

In this, operands are mentioned in registers.

MOV AX, BX

MOV CH, AH

4. Register indirect addressing mode:

This addressing mode allows data to be addressed at any memory location through an offset address held in any of the following registers: BP, BX, DI & SI.

MOV AX, [BX]

Physical address calculation for above instruction is $10H \times DS + BX$

Eg: if $DS = 1000$, $BX = 2000$

Physical address = $10H \times 1000 + 2000 = 10000 + 2000 = 12000H$

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5. Indexed addressing mode:

Here offset of the operand is stored in one of the index registers. DS is the default segment for SI, and ES is the default segment for DI.

MOV AX, [SI]

Physical address = $10H \times DS + SI$

6. Register relative addressing mode:

In this, data is available at an effective address formed by adding an 8 bit or 16-bit displacement value with content of any one of the registers BX, BP, SI, DI.

MOV AX, [BX+04]

MOV AX, [BX+5000]

Physical address calculation for above instruction is $10H \times DS + BX + 5000$

Eg: if DS = 1000, BX= 2000

Physical address = $10H \times 1000 + 2000 + 5000 = 10000 + 7000 = 17000H$

Addressing modes of 8086

7. Based Indexed addressing mode:

The effective address of data is formed by adding content of base register BX or BP to the content of index register.

MOV AX, [BX+SI]

Physical address = $10H \times DS + BX + SI$

8. Relative Based Indexed addressing mode:

In this addressing mode, the operand's offset is computed by adding the base register contents, an index registers contents and 8 or 16-bit displacement.

MOV AX, [BX+SI+5000]

Physical address calculation for above instruction is $10H \times DS + BX + SI + 5000$

Eg: if DS = 1000, BX= 2000 and SI = 3000

Physical address = $10H \times 1000 + 2000 + 3000 + 5000 = 1A000H$

Summary

1. Immediate addressing mode
2. Direct addressing mode
3. Register addressing mode
4. Register indirect addressing mode
5. Indexed addressing mode
6. Register relative addressing mode
7. Based Indexed addressing mode
8. Relative Based Indexed addressing mode

References

- Douglas V. Hall, “Microprocessors and Interfacing, Programming and Hardware”, Second Edition, TMH, 2012.

Thank you