



PARSHVANATH CHARITABLE TRUST'S
A.P. SHAH INSTITUTE OF TECHNOLOGY
Department of Computer Science and Engineering
Data Science

Department of Computer Science Engineering Data Science

Academic Year: 2022-23
Class / Branch: S.E.D.S.

Semester: IV
Subject: Microprocessor

Addressing modes of 8086 are as follows:

1. Immediate addressing mode-

In this mode, the operand is specified in the instruction itself. Instructions are longer but the operands are easily identified.

Example:

MOV CL, 12H

This instruction moves 12 immediately into CL register. $CL \leftarrow 12H$

2. Register addressing mode-

In this mode, operands are specified using registers. This addressing mode is normally preferred because the instructions are compact and fastest executing of all instruction forms.

Registers may be used as source operands, destination operands or both.

Example:

MOV AX, BX

This instruction copies the contents of BX register into AX register. $AX \leftarrow BX$

3. Direct memory addressing mode-

In this mode, address of the operand is directly specified in the instruction. Here only the offset address is specified, the segment being indicated by the instruction.

Example:

MOV CL, [4321H]

This instruction moves data from location 4321H in the data segment into CL.

The physical address is calculated as

$DS * 10H + 4321$

Assume $DS = 5000H$

$\therefore PA = 50000 + 4321 = 54321H$



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$\therefore \text{CL} \leftarrow [54321\text{H}]$

4. Register based indirect addressing mode-

In this mode, the effective address of the memory may be taken directly from one of the base register or index register specified by instruction. If register is SI, DI and BX then DS is by default segment register.

If BP is used, then SS is by default segment register.

Example:

MOV CX, [BX]

This instruction moves a word from the address pointed by BX and BX + 1 in data segment into CL and CH respectively.

$\text{CL} \leftarrow \text{DS}: [\text{BX}]$ and $\text{CH} \leftarrow \text{DS}: [\text{BX} + 1]$

Physical address can be calculated as $\text{DS} * 10\text{H} + \text{BX}$.

5. Register relative addressing mode-

In this mode, the operand address is calculated using one of the base registers and an 8 bit or a 16 bit displacement.

Example:

MOV CL, [BX + 04H]

This instruction moves a byte from the address pointed by BX + 4 in data segment to CL.

$\text{CL} \leftarrow \text{DS}: [\text{BX} + 04\text{H}]$

Physical address can be calculated as $\text{DS} * 10\text{H} + \text{BX} + 4\text{H}$.

6. Base indexed addressing mode-

Here, operand address is calculated as base register plus an index register.

Example:

MOV CL, [BX + SI]



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This instruction moves a byte from the address pointed by $BX + SI$ in data segment to CL .

$CL \leftarrow DS: [BX + SI]$

Physical address can be calculated as $DS * 10H + BX + SI$.

Relative based indexed addressing mode-

In this mode, the address of the operand is calculated as the sum of base register, index register and 8 bit or 16 bit displacement.

Example:

$MOV\ CL, [BX + DI + 20]$

This instruction moves a byte from the address pointed by $BX + DI + 20H$ in data segment to CL .

$CL \leftarrow DS: [BX + DI + 20H]$

Physical address can be calculated as $DS * 10H + BX + DI + 20H$.

7. Implied addressing mode-

In this mode, the operands are implied and are hence not specified in the instruction.

Example:

STC

This sets the carry flag.