Addressing Modes of 8086

Why study addressing modes?

Addressing modes help us to understand the types of operands and the way they are accessed while executing an instruction.

Types of addressing mode in 8086

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. Base plus index addressing mode

1: Immediate addressing mode

- In this type of mode, immediate data is part of instruction and appears in the form of successive byte or bytes

MOV AX,10AB$_H$

10 AB$_H$

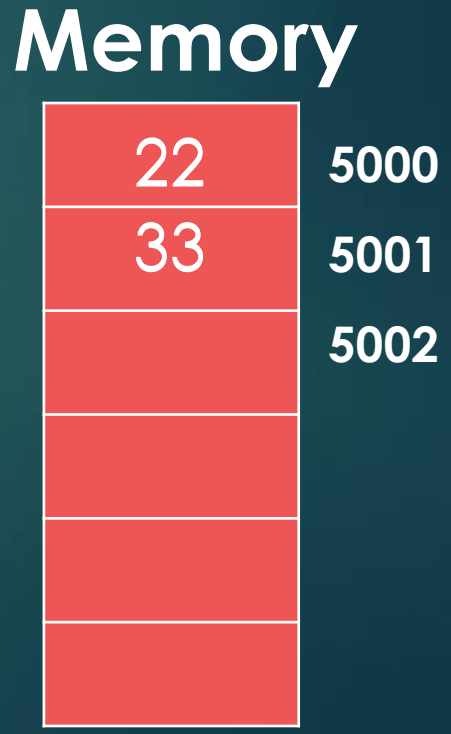
AX

2: Direct addressing mode

- In this type of addressing mode a 16-bit memory address is directly specified in the instruction as a part of it.

MOV AX,[5000H]

AX

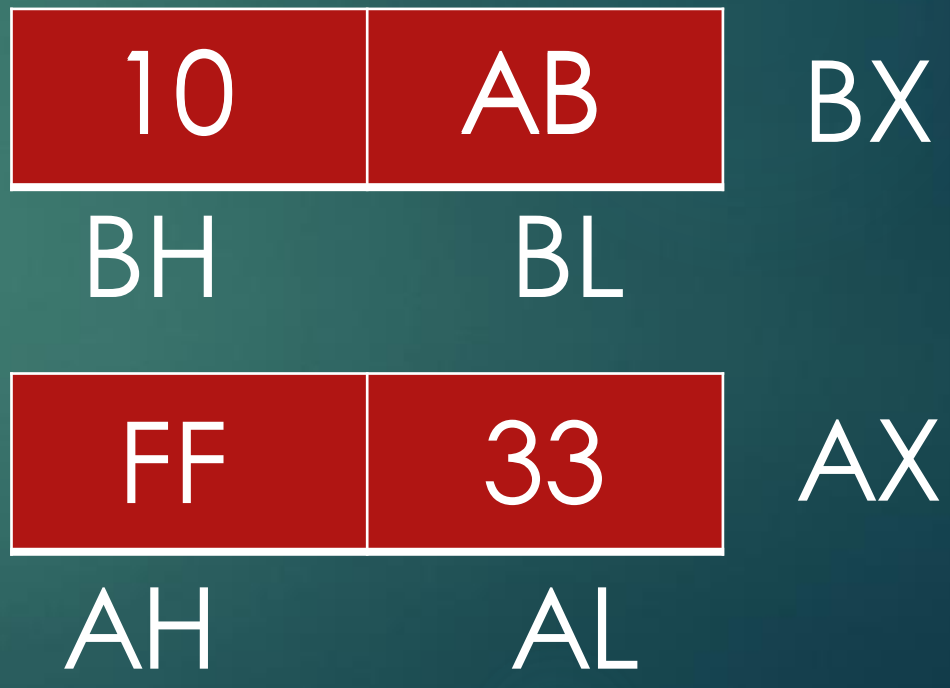


3: Register addressing mode

- Here, the data is stored in the register and it can be a 8-bit or 16-bit register.
- All the registers, except IP, may be used in this mode.

MOV AL,BLH

MOV AX,BXH



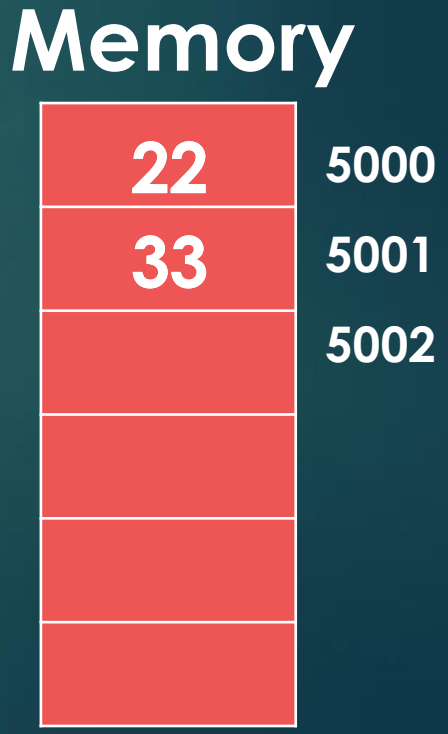
4: Register Indirect addressing mode

- The address of the memory location which contains data or operand is determined in a indirect way, using the offset register.

MOV AX,[BX]

AX

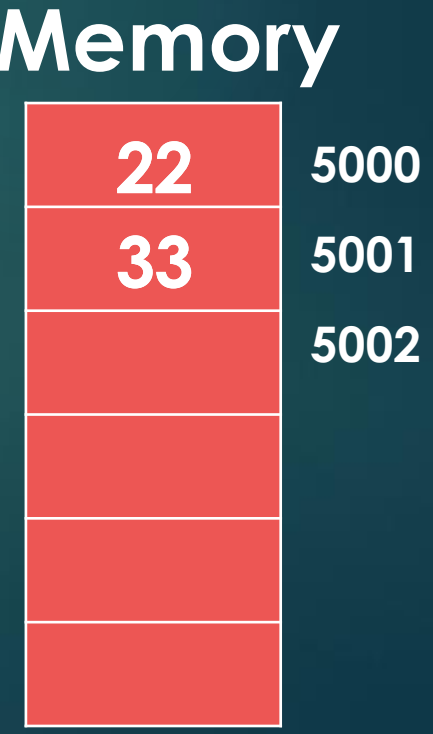
BX



5: Indexed addressing mode

- In this addressing mode, offset of the operand is stored in one of the index registers.
- DS is the default segment for index register SI and DI.

MOV AX,[SI]



6: Register relative addressing mode

- In this mode, the data is available at an effective address formed by adding an 8-bit or 16-bit displacement with the content of any one of the registers BX, BP, SI and DI in the default (either DS or ES) segment.

MOV AX, 50H[BX]

AX

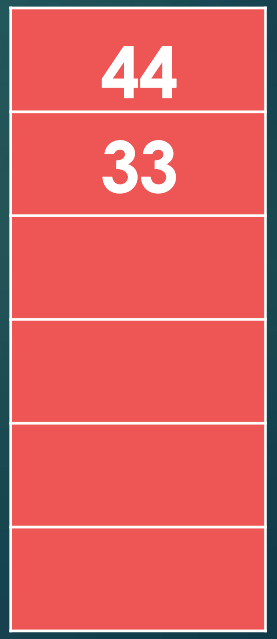
BX

+ 50H = 5050H

Offset

Final Index Address

Memory



5051

5052

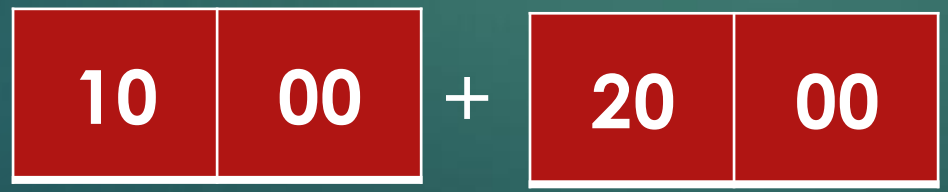
5053

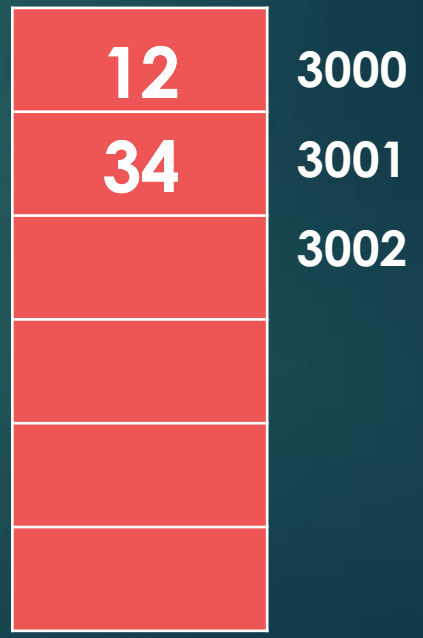
7: Base plus index addressing mode

- In this mode the effective address is formed by adding content of a base register (any one of BX or BP) to the content of an index register (SI or DI).
- Default segment register DS.

MOV AX, [BX] [SI]

AX





8: Base relative plus index addressing mode

- In the effective address is formed by adding an 8 or 16-bit displacement with sum of contents of any one of the base registers (BX or BP) and any one of the index registers, in a default segment.

MOV AX,50H[BX][SI]

AX

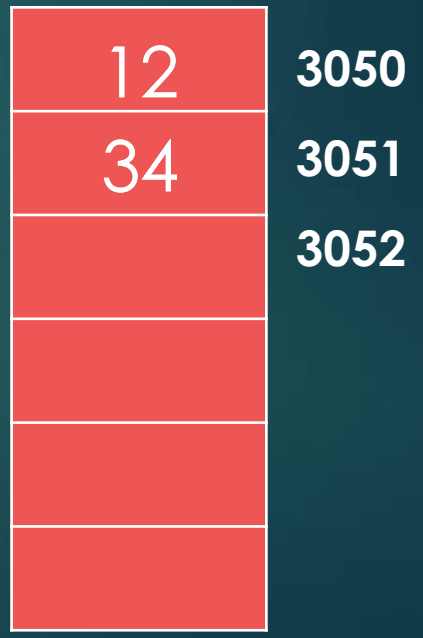
50H +

BX

SI

= 3050H

Final Index Address



Addressing Modes

- ***Register*** - transfers a byte or word from the source register or memory location to the destination register or memory location

  MOV BX, CX

- ***Immediate*** - transfers an immediate byte or word of data into the destination register or memory location

  MOV AX, 3456h

- ***Direct*** - moves a byte or word between a memory location and a register

  MOV AL, [1234h] (1234h is treated as a displacement within data segment)

Addressing Modes(cont.)

- ***Register Indirect*** *(base relative or indexed)* - transfers a byte or word of data between a register and the memory location addressed by an index (DI or SI) or base register (BP or BX)

  MOV AX, [BX]

- ***Base Plus Index*** *(base relative indexed)* - transfers a byte or word of data between a register and the memory location addressed by a base register (BP or BX) plus index (DI or SI) register

  MOV DX, [BX + DI]

Addressing Modes(cont.)

- ***Register Relative*** - transfers a byte or word of data between a register and the memory location addressed by an index (DI or SI) or base register (BP or BX) plus displacement

  MOV AX, [BX + 1000h]

- ***Base Relative Plus Index*** *(base relative indexed)* - transfers a byte or word of data between a register and the memory location addressed by a base register (BP or BX) plus an index register (DI or SI)

  MOV AX, [BX + SI + 100h]