

The 8086 processor addressing mode and programming concept

Prepared by
Afifa Hoque

Addressing Mode

- The term addressing modes refers to **the way in which the operand of an instruction is specified**. The addressing mode specifies a rule for interpreting or modifying the address field of the instruction before the operand is actually executed.

Addressing mode of 8086 microprocessor

- **Register mode** – In this type of addressing mode both the operands are registers.

Example:

MOV AX, BX

XOR AX, DX

ADD AL, BL

- **Immediate mode** – In this type of addressing mode the source operand is a 8 bit or 16 bit data. Destination operand can never be immediate data.

Example:

MOV AX, 2000

MOV CL, 0A

ADD AL, 45

AND AX, 0000

(cont.)

- **Displacement or direct mode** – In this type of addressing mode the effective address is directly given in the instruction as displacement.

Example:

```
MOV AX, [DISP]
```

```
MOV AX, [0500]
```

- **Register indirect mode** – In this addressing mode the effective address is in SI, DI or BX.

Example:

```
MOV AX, [DI]
```

```
ADD AL, [BX]
```

```
MOV AX, [SI]
```

(cont.)

- **Based indexed mode** – In this the effective address is sum of base register and index register.

Base **register**: BX, BP

Index register: SI, DI

The physical memory address is calculated according to the base register.

Example:

```
MOV AL, [BP+SI]
```

```
MOV AX, [BX+DI]
```

- **Indexed mode** – In this type of addressing mode the effective address is sum of index register and displacement.

Example:

```
MOV AX, [SI+2000]
```

```
MOV AL, [DI+3000]
```

(cont.)

- **Based mode** – In this the effective address is the sum of base register and displacement.

Example:

```
MOV AL, [BP+ 0100]
```

- **Based indexed displacement mode** – In this type of addressing mode the effective address is the sum of index register, base register and displacement.

Example:

```
MOV AL, [SI+BP+2000]
```

-

(cont.)

String mode – This addressing mode is related to string instructions. In this the value of SI and DI are auto incremented and decremented depending upon the value of directional flag.

Example:

```
MOVS B
```

```
MOVS W
```

Input/Output mode – This addressing mode is related with input output operations.

Example:

```
IN A, 45
```

```
OUT A, 50
```