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ADDRESSING MODES OF 8085

Addressing Modes are the different ways by which the µP address (specifies) the operands in an instruction. 8085 supports the following Addressing Modes:

1) Immediate Addressing Mode

In this mode, the **Data** is specified **in** the **Instruction** itself.

```
Eg:   MVI A, 35H      ; Move immediately the value 35 into the Accumulator.
                      ; i.e. A ← 35H
      LXI B, 4000H    ; Move immediately the value 4000 into the register pair BC.
                      ; i.e. BC ← 4000H
```

Advantage:
Programmer can easily **identify** the **operands**.

Disadvantage:
Always more than one byte hence requires **more space**.
The µP requires **two or three machine cycles** to fetch the instruction hence **slow**.

2) Register Addressing Mode

In this mode, the **Data** is specified **in Registers**.

```
Eg:   MOV B, C        ; Move the Contents of C-Register into B-Register.
                      ; i.e. B ← C
      INR B           ; Increments the contents of B-Register.
                      ; i.e. B ← B + 1
```

Advantage:
The µP requires **only one machine cycle** to Fetch the instruction.

Disadvantage:
Operands **cannot** be easily **identified**.

3) Direct Addressing Mode

In this mode, the **Address** of the operand is specified **in** the **Instruction** itself.

```
Eg:   LDA 2000H       ; Loads the Accumulator with the Contents of Location 2000.
                      ; i.e. A ← [2000]
      STA 2000H       ; Stores the Contents of the Accumulator at the Location 2000.
                      ; i.e. [2000] ← A
```

Advantage:
The programmer **can identify** the address of the operand.

Disadvantage:
These are **three byte instructions** hence require three fetch cycles.

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4) Indirect Addressing Mode

In this mode, the **Address** of the operand is specified **in Registers.**
Hence, the instruction indirectly points to the operands.
Even the Memory Pointer "M" can be used as it is pointed by the HL register pair.

```
Eg:   STAX B      ; Stores the contents of the Accumulator at the location
                  ; pointed by the contents of BC pair.
                  ; i.e. [[BC]] ← A.
                  ; So if contents of BC pair = 4000 i.e. [BC] = 4000 then
                  ; [4000] ← A. #Please refer Bharat Sir's Lecture Notes for  this ...
      INR M       ; Increments the contents of the location pointed by HL pair
                  ; (i.e. M) i.e. [[HL]] ← [[HL]] + 1
```

Advantage:
Address of the operand is **not fixed** and hence can be used in a **loop**.
Size of the instruction is **small** as compared to direct addressing mode.

Disadvantage:
Requires initialization of the register pair hence requires atleast one more instruction.

5) Implied Addressing Mode

In this mode, the **Operand** is **implied** in the instruction.
This instruction will work only on that implied operand, and not on any other operand.

```
Eg:   STC         ; Sets the Carry Flag in the Flag register.
                  ; Cy ← 1.
      CMC         ; Complements the Carry Flag in the Flag register.
```

Advantage:
Instructions are generally **only one byte**.

Disadvantage:
Programmer **cannot** easily **identify** the value of the operand.