Addressing modes in 8085 microprocessor

The way of specifying data to be operated by an instruction is called addressing mode.

Opcode is an instruction that tells processor what to do with the variable or data written besides it. Each opcode is 1 byte

Operand is a variable that stores data(and data can be a memory address or any data that we want to process).

So, if operand(data) is 8 bit long then instruction will be 2 byte long.

Few Basic Instructions:

1.MOV: - This instruction is used to copy the data from one place to another.

Eg: -

MOV Rd, Rs (This instruction copies the content of Rs to Rd)

MOV M, Rs (This instruction copies the content of register Rs to memory location pointed by HL Register)

MOV Rd, M (This instruction copies the content of memory location pointed by the HL register to the register Rd.)

2.MVI: - move immediate date to a register or memory location.

Eg: -

MVI Rd, #30H (30h is stored in register Rd)

MVI M, #30H(30h is stored in memory location pointed by HL Reg)

3.LDA: - Load accumulator. (this instruction copies the data from a given 16 bit address to the accumulator)

Eg: -

LDA 3000H (content of memory location 3000h is copied in accumulator)

4.LDAX(Load accumulator indirect): - The contents of the designated register pair point to a memory location. This instruction copies the contents of that memory location into the accumulator. The contents of either the register pair or the memory location are not altered.

Eg: -

LDAX B (Loads the content from the memory address holding by BC register pair to the accumulator)

5.LXI(Load register pair immediate): - The instruction loads 16-bit data in the register pair designated in the operand.

Eg: -

LXI H, 2034H (2034H is stored in HL pair so that it act as memory pointer)

LXI H, XYZ (address of level XYZ is copied in HL pair)

Types of addressing modes –

In 8085 microprocessor there are 5 types of addressing modes:

1. **Immediate Addressing Mode –**
   In immediate addressing mode the source operand is always data. If the data is 8-bit, then the instruction will be of 2 bytes, if the data is of 16-bit then the instruction will be of 3 bytes.

   Examples:

   MVI B 45 (move the data 45H immediately to register B)

   LXI H 3050 (load the H-L pair with the operand 3050H immediately)

   JMP address (jump to the operand address immediately)

2. **Register Addressing Mode –**
   In register addressing mode, the data to be operated is available inside the register(s) and register(s) is(are) operands. Therefore the operation is performed within various registers of the microprocessor.

   Examples:

   MOV A, B (move the contents of register B to register A)

   ADD B (add contents of registers A and B and store the result in register A)

   INR A (increment the contents of register A by one)

3 Direct Addressing Mode –

In direct addressing mode, the data to be operated is available inside a memory location and that memory location is directly specified as an operand. The operand is directly available in the instruction itself.

Examples:

LDA 2050 (load the contents of memory location into accumulator A)

4 Register Indirect Addressing Mode –

In register indirect addressing mode, the data to be operated is available inside a memory location and that memory location is indirectly specified by a register pair.

Examples:

MOV A, M (move the contents of the memory location pointed by the H-L pair to the accumulator)

LDAX B (move contents of B-C register to the accumulator)

5 Implied/Implicit Addressing Mode –

In implied/implicit addressing mode the operand is hidden and the data to be operated is available in the instruction itself.

Examples:

CMA (finds and stores the 1's complement of the contains of accumulator A in A)

RRC (rotate accumulator A right by one bit)
RLC (rotate accumulator A left by one bit)