2.2 Instruction Set of 8085

In this section, the instructions from all groups are explained with the help of examples. Before to discuss these instructions, let us get familiar with the notations used in the explanation of instructions. These are:

Notation	Meaning
M	Memory location pointed by HL register pair
r	8-bit register
rp	16-bit register pair
rs	Source register
rd	Destination register
addr	16-bit address / 8-bit address

2.2.1 Data Transfer Group

1. MVI r, data (8) This instruction directly loads a specified register with an 8-bit data given within the instruction. The register r is an 8-bit general purpose register such as A, B, C, D, E, H and L.

Operation : r ← 8-bit data (byte)

Example :

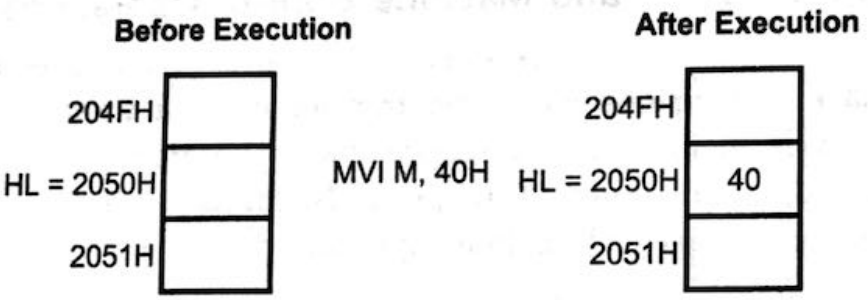
MVI B, 60H ; This instruction will load 60H directly into the B register.

2. MVI M, data (8) This instruction directly loads an 8-bit data given within the instruction into a memory location. The memory location is specified by the contents of HL register pair.

Operation : M ← byte or (HL) ← byte

Example : H = 20H and L = 50H

MVI M, 40H ; This instruction will load 40H into memory whose address is 2050H.



3. MOV rd, rs This instruction copies data from the source register into destination register. The rs and rd are general purpose registers such as A, B, C, D, E, H and L. The contents of the source register remain unchanged after execution of the instruction.

Operation : rd ← rs

Example : A = 20H

MOV B, A ; This instruction will copy the contents of register A (20H) into register B.

4. MOV M, rs This instruction copies data from the source register into memory location pointed by the HL register pair. The rs is an 8-bit general purpose register such as A, B, C, D, E, H and L.

Operation : (HL) ← rs

Example : If HL = 2050H, B = 30H.

MOV M, B ; This instruction will copy the contents of B register (30H) into the memory location whose address is specified by HL (2050H).

5. MOV rd, M This instruction copies data from memory location whose address is specified by HL register pair into destination register. The contents of the memory location remain unchanged. The rd is an 8-bit general purpose register such as A, B, C, D, E, H and L.

Operation : rd ← (HL)

Example : HL = 2050H, contents at 2050H memory location = 40H

MOV C, M ; This instruction will copy the contents of memory location pointed by HL register pair (40H) into the C register.

6. LXI rp, data (16) This instruction loads immediate 16 bit data specified within the instruction into register pair or stack pointer. The rp is 16-bit register pair such as BC, DE, HL or 16-bit stack pointer.

Operation : rp ← data (16)

Example :

LXI B,1020H ; This instruction will load 10H into B register and 20H into C register.

7. STA addr This instruction stores the contents of A register into the memory location whose address is directly specified within the instruction. The contents of A register remain unchanged.

Operation : (addr) ← A

Example : A = 50H

STA 2000H ; This instruction will store the contents of A register (50H) to memory location 2000H.

8. LDA addr This instruction copies the contents of the memory location whose address is given within the instruction into the accumulator. The contents of the memory location remain unchanged.

Operation : A ← (addr)

Example : (2000H) = 30H

LDA 2000H ; This instruction will copy the contents of memory location 2000H i.e. data 30H into the A register

9. SHLD addr This instruction stores the contents of L register in the memory location given within the instruction and contents of H register at address next to it. This instruction is used to store the contents of H and L registers directly into the memory. The contents of the H and L registers remain unchanged.

Operation : (addr) ← L and (addr + 1) ← H

Example : H = 30H, L = 60H

SHLD 2500H ; This instruction will copy the contents of L register at address 2500H and the contents of H register at address 2501H.

10. LHLD addr This instruction copies the contents of the memory location given within the instruction into the L register and the contents of the next memory location into the H register.

Operation : L ← (addr), H ← (addr + 1)

Example : (2500H) = 30H, (2501H) = 60H

LHLD 2500H ; This instruction will copy the contents of memory location 2500H i.e. data 30H into the L register and the contents at memory location 2501H i.e. data 60H into the H register.

11. STAX rp This instruction copies the contents of accumulator into the memory location whose address is specified by the specified register pair. The rp is BC or DE register pair. This register pair is used as a memory pointer. The contents of the accumulator remain unchanged.

Operation : (rp) ← A

Example : BC = 1020H, A = 50H

STAX B ; This instruction will copy the contents of A register (50H) to the memory location specified by BC register pair (1020H).

12. LDAX rp This instruction copies the contents of memory location whose address is specified by the register pair into the accumulator. The rp is BC or DE register pair. The register pair is used as a memory pointer.

Operation : A ← (rp)

Example : DE = 2030H, (2030H) = 80H

LDAX D This instruction will copy the contents of memory location specified by DE register pair (80H) into the accumulator.

13. XCHG This instruction exchanges the contents of the register H with that of D and of L with that of E.

Operation : H ↔ D and L ↔ E

Example : DE = 2040H, HL = 7080H

XCHG ; This instruction will load the data into registers as follows H = 20H, L = 40H, D = 70H and E = 80