2.1 INSTRUCTION FORMAT OF 8085

The 8085 have 74 basic instructions and 246 total instructions. The instruction set of 8085 is defined by the manufacturer Intel Corporation. Each instruction of 8085 has 1 byte opcode. With 8 bit binary code, we can generate 256 different binary codes. In this, 246 codes have been used for opcodes.
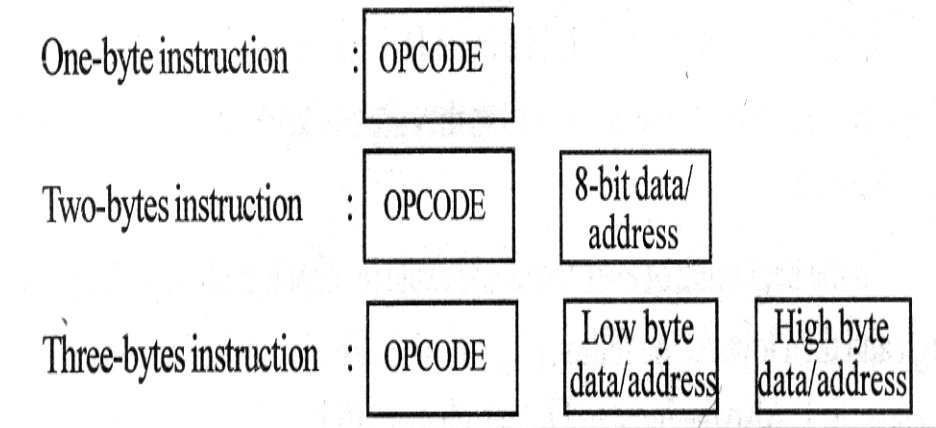

Figure 2.1.1 Instruction Format of 8085

[Source: "Microprocessor Architecture Programming and Application" by R.S. Gaonkar, page-131]

The size of 8085 instructions can be 1 byte, 2 bytes or 3 bytes.

- The 1-byte instruction has an opcode alone.
- The 2 bytes instruction has an opcode followed by an eight-bit address or data.
- The 3 bytes instruction has an opcode followed by 16 bit address or data. While storing the 3 bytes instruction in memory, the sequence of storage is, opcode first followed by low byte of address or data and then high byte of address or data.

ADDRESSING MODES

Every instruction of a program has to operate on a data. The method of specifying the data to be operated by the instruction is called Addressing. The 8085 has the following 5 different types of addressing.

1. Immediate Addressing
2. Direct Addressing
3. Register Addressing
4. Register Indirect Addressing
5. Implied Addressing

Immediate Addressing

In immediate addressing mode, the data is specified in the instruction itself. The data will be apart of the program instruction. All instructions that have 'I' in their mnemonics are of Immediate addressing type.

Eg. MVI B, 3EH - Move the data 3EH given in the instruction to B register.

Direct Addressing

In direct addressing mode, the address of the data is specified in the instruction. The data will be in memory. In this addressing mode, the program instructions and data can be stored in different memory blocks. This type of addressing can be identified by 16-bit address present in the instruction.

Eg. LDA 1050H - Load the data available in memory location 1050H in accumulator.

Register Addressing

In register addressing mode, the instruction specifies the name of the register in which the data is available. This type of addressing can be identified by register names (such as 'A', 'B', …) in the instruction.

Eg. MOV A, B -Move the content of B register to A register.

Register Indirect Addressing

In register indirect addressing mode, the instruction specifies the name of the register in which the address of the data is available. Here the data will be in memory and the address will be in the register pair. This type of addressing can be identified by letter 'M' present in the instruction.

Eg. MOV A, M - The memory data addressed by HL pair is moved to A register.

Implied Addressing

In implied addressing mode, the instruction itself specifies the type of operation and location of data to be operated. This type of instruction does not have any address, register name, immediate data specified along with it.

Eg. CMA - Complement the content of accumulator.