

3.3. TYPES OF 8085 INSTRUCTIONS

The programmer has to remember the instructions of microprocessor in the form of mnemonics. To execute any instruction, the programmer has to translate each mnemonic into equivalent two digit Hexcode (8 bit code). Depending upon the number of bytes required to express each mnemonic completely in the form of Hexcodes, the instructions of microprocessor are divided into three types. Each instruction has opcode and operand.

Opcode and Operand. An instruction is a command given to the computer to perform a specified task on the given data. Each instruction contains two parts ; operation code (opcode) and operand. The first part of the instruction specifies the task to be performed by the computer and is called the *operation code* or opcode. The second part of the instruction is the data to be operated on and is called the *operand*. The second part called the operand given in the instruction may be of various types such as 8 bit data or 16 bit data, internal registers of microprocessors, 8 bit or 16 bit address, or some memory location. When the operand is a register, it is understood that the data is the contents of the register. For example, in the instruction MOV C, A which means that move the contents of A register to the C register. MOV is the Opcode for the operation move and C, A is the operand which means that the data are the contents of Register C and Register A.

1. One/Single Byte Instruction (SBI). Any instruction of microprocessor in which number is not given as operand in the instruction, can be completely expressed by one byte of code or two digit hexacode, such instruction code is called as *single byte instruction* e.g.,

(i) MOV A, B

With this instruction the contents of register B is transferred to register A. Opcode of this instruction is 78 H. This opcode specifies the operation to be performed by the registers which contains operands (data). In this instruction opcode is 78 H

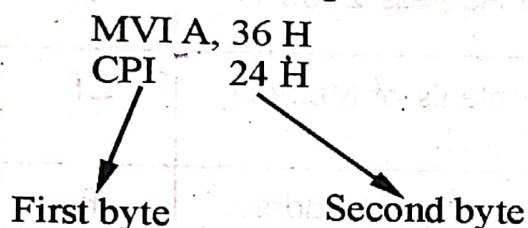
whose binary equivalent is $(01111000)_2$.

First two bits 01 represents the Move operation, next three bits 111 represents registers 'A' and last three bits are the code of Register 'B'.

- (ii) ADD C
- (iii) LDAX B

2. Two/Double Byte Instruction (DBI). If 8 bit number is given as operand in the instruction then to express such instruction completely, we need two 8 bit codes. Hence such instructions are called *double byte instructions*.

- (a) The first byte will be instruction op-code
- (b) The second byte will be 8 bit numbers given in the instruction e.g.,



3. Three/Triple Byte Instruction (TBI). If 16 bit number is given as operand in the instruction, then to express such instruction completely, we need three 8 bit code. Hence such instructions are called *Three/Triple byte instruction*.

- (a) The first byte will be 8 bit instruction op-code.
- (b) The second byte will be 8 LSB's of 16 bit number.
- (c) The third byte will be 8 MSB's of 16 bit number.

e.g., LXI H, 1536 H

This instruction is stored as (21 H, 36 H, 15 H)

where 21 H is Opcode of LXI H*

36 H is 8 LSB's of 16 bit number

15 H is 8 MSB's of 16 bit number.

3.4. INSTRUCTION SET OF MICROPROCESSOR 8085

Microprocessor 8085 can perform maximum 256 different operations. For executing any operation using microprocessor we have to give the corresponding instruction to microprocessor. Depending upon the type of operation performed by the instruction, the different instructions of microprocessor are divided into following types :

1. Data transfer instructions
2. Arithmetic instructions
3. Logical instructions
4. Stack instructions
5. Branching instructions
6. Machine control instructions
7. Input and output instruction.