MACHINES INSTRUCTIONS & ADDRESSING MODES
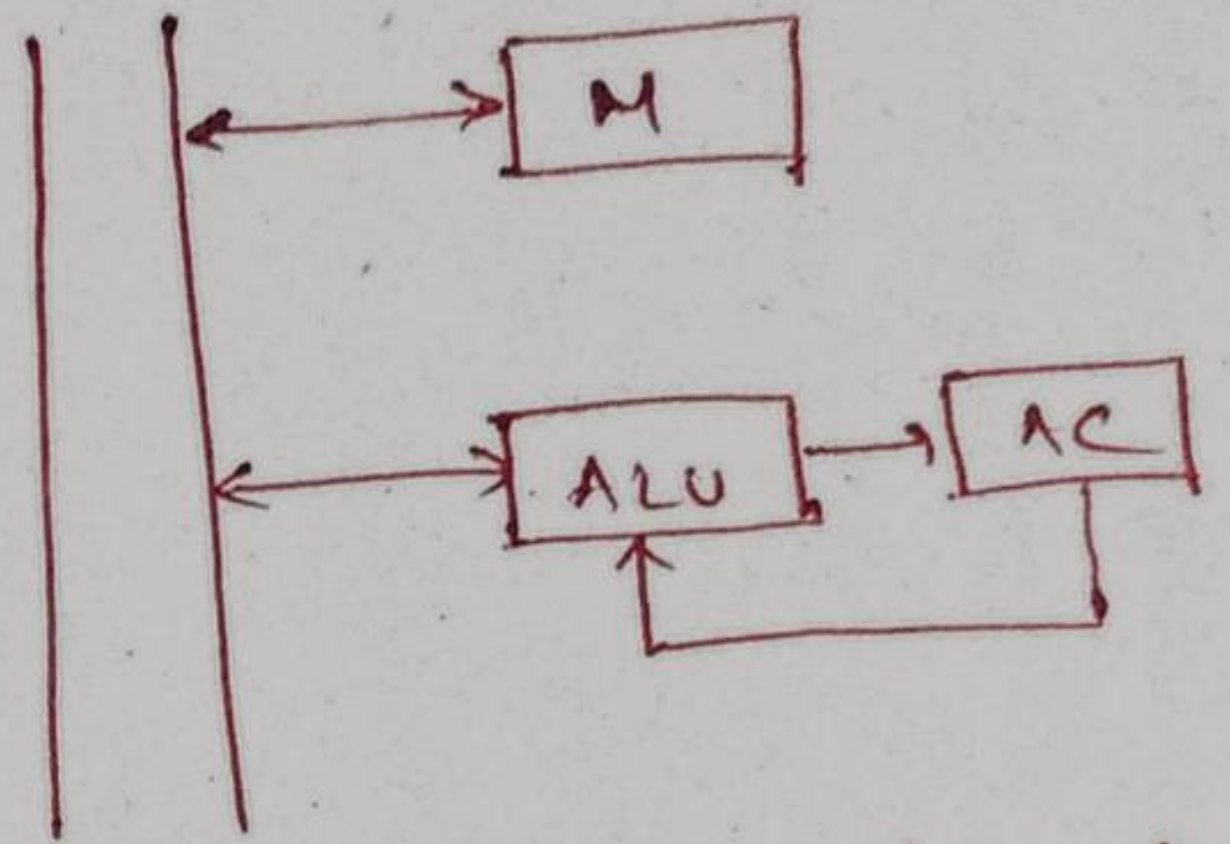
✱ Instruction is read into Instruction register from the memory. Each Instruction is divided into modes, opcodes, and operands.

✱ Types of CPU organisations :-

a) Single accumulator organization →

b) General register organization

c) Stack organisation.

(Single or no address instn.)

LD ◦ 4 , ADD B

• Multiple registers present
• Time gets reduced
• Size gets increased highly
• 2 or 3 address Instruction

• Zero address instruction
• PUSH /POP Instruction

✱ Advantages of address modes :-

a) To give programmers facilities such as pointers, counters for loop control, indexing of data, and program relocation.

b) To reduce the number of bits in the addressing field of the Instruction.

MODES

1) Implied mode : Separate operand is not provided and is present within the instruction.

Ex: INCA

2) Immediate mode : Immediately load a constant value into register.

Ex: MVI B, 05H ; LD 05H

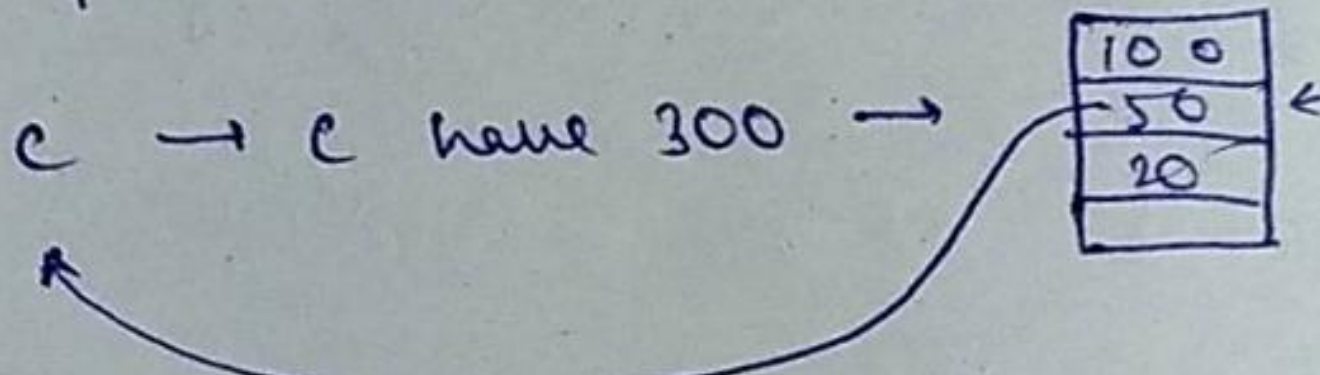3) Register Mode: Only register number is provided and no operand. Execution is fast.

Ex: ADD C.

4) Register Indirect Mode: Register will contain the address where the operand is present.
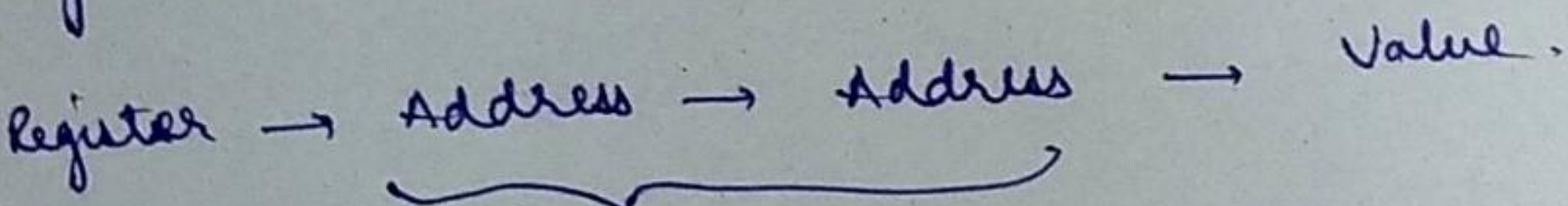
Ex: ADD C → C have 300 →

5) Auto Increment or : Same as register indirect mode, but
   Decrement   after execution the register value gets incremented or decremented.

6) Direct Addressing Mode: This is also called absolute AM.
   The address of memory is directly provided

7) Indirect Addressing Mode:

Register → Address → Address → Value.

* 2 memory access / Time high.
* We can use pointers.

8) RELATIVE AM : we specify in terms of program counter, how many memory address do wee need to ascend or descend.

9) Indexed AM : Used when CPU have lot of registers. Here each register is given a single value.

Ex: Store index of array in index register

10) Base register mode : A base address of storage block is stored separately and an offset is used to denote anything in that block.