Instruction cycle

1) Instruction fetch
2) Instruction decode
3) Effective Add. Calculation
4) operand fetch
5) Execution
6) write back result

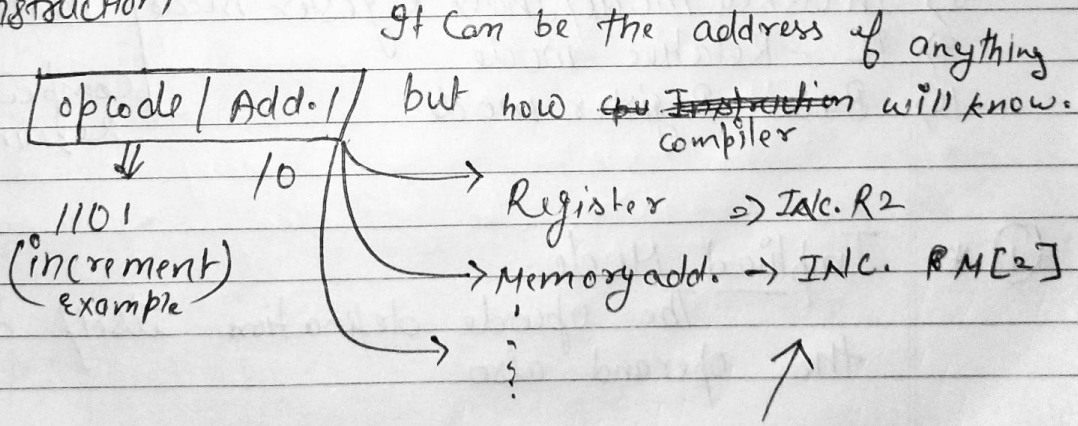
* Fetch and execution cycle
  - Fetch cycle
    - Instruction fetch

  Rest are execution cycle

Note: every type of instruction will not req. all the 6 phases but, instruction fetch, Instruction decode and execution mandatory.

* what is addressing modes and why used? Lecture 10

* Instruction



* How Compliler will know what ~~is~~ its is?

* Compiler will generate a "Mode" and CPU will know what it is.

Opcode	Mode	add.

* It specifies how and from where the operands are obtained for instruction.

* Types of addressing modes

1) Implied mode
2) Immediate mode
3) Direct mode
4) Indirect mode
5) Register mode
6) Register indirect mode

⇒ Non-Computable mode (No any computation is required to Reach the modes)

7) Autoincrement - Autodecrement mode
8) Indexed mode / Index Register mode
9) PC - Relative mode
10) Base Register mode

Computable modes — Computation Required

(1) * Implied Mode

The opcode defination itself defines the operand also

Opcode	Mode	Addr.

↓

operation + operand

Example: INCA (Increment Accumulator)

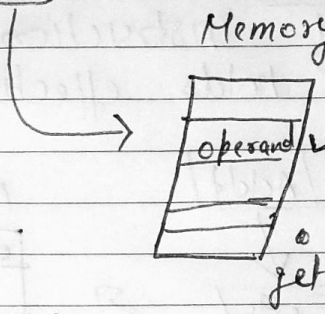
(2) * Immediate Mode → The address field of of instruction specifies the field value.

opcode	Mode	Addl.
		↓
		operand

It used to initilized registers with constant values.

(3) * Direct Mode / Absolute Mode → The address field of instruction specifies the effective address.

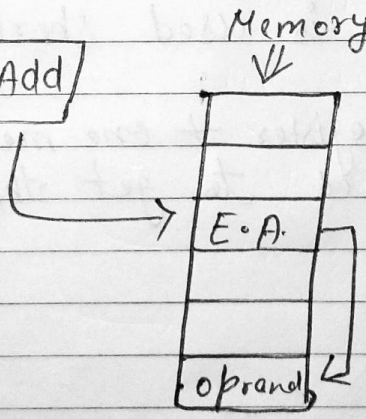
opcode	Mode	Add.



- Best mode to access Memory operand. access
- only one mem^ref. to get the operand.

(4) * Indirect mode → The address field of instruction specifies the address of effective address

opcode	Mode	Add



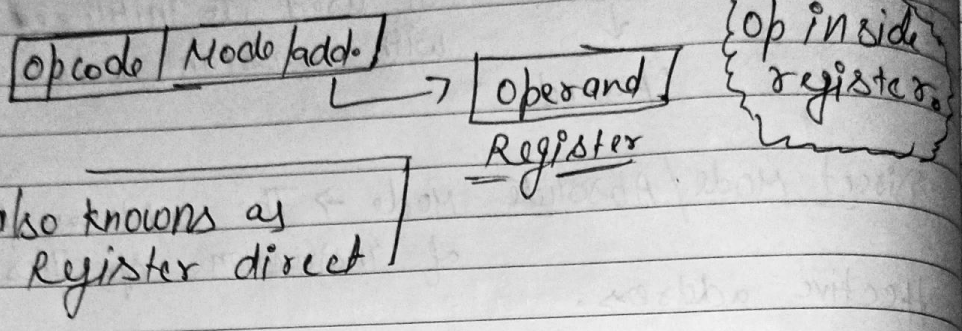
- No. of memory accesses to get the operand = 2.

- Example: pointers

Cout << *p;

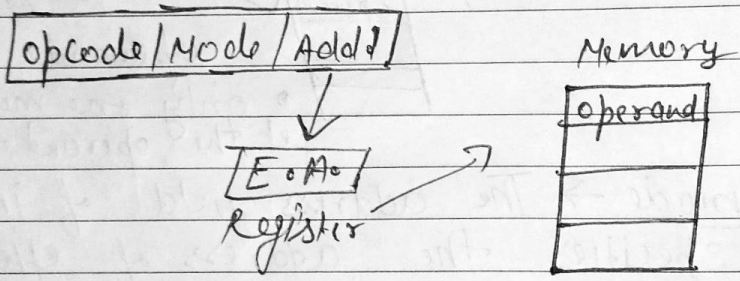
Mode is used to implement pointer.

5 * Register Mode → The address field of instruction specifies a register which holds operand



also knowns as Register direct

6 * Register indirect mode → The address field of instruction specifies reg. which holds effective address



- This mode is used shorten the instruction length.
- One Register + one memory access required to get the operand.