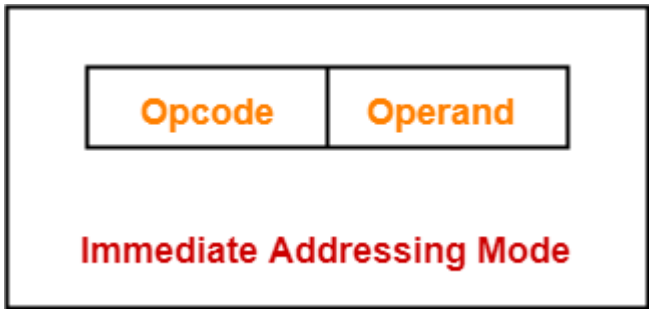
Addressing Mode

1. Immediate Addressing Mode-

In this addressing mode,

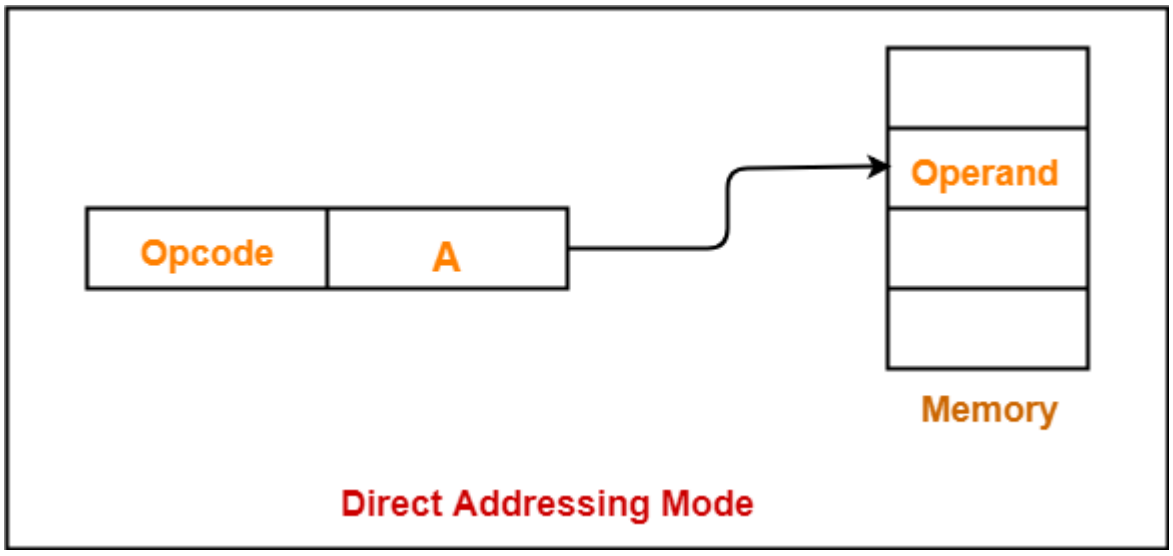
- The operand is specified in the instruction explicitly.
- Instead of address field, an operand field is present that contains the operand.



2. Direct Addressing Mode-

In this addressing mode,

- The address field of the instruction contains the effective address of the operand.
- Only one reference to memory is required to fetch the operand.
- It is also called as **absolute addressing mode**.



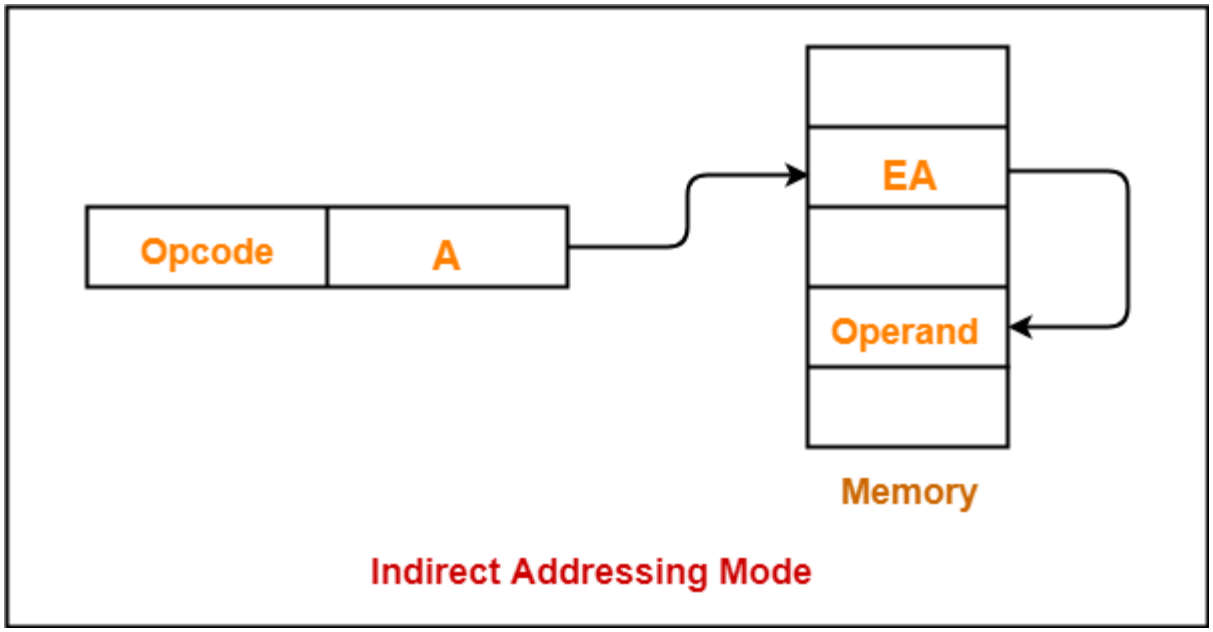
- Example: ADD X will increment the value stored in the accumulator by the value stored at memory location X.

$$AC \leftarrow AC + [X]$$

3. Indirect Addressing Mode-

In this addressing mode,

- The address field of the instruction specifies the address of memory location that contains the effective address of the operand.
- Two references to memory are required to fetch the operand.



Example-

- ADD X will increment the value stored in the accumulator by the value stored at memory location specified by X.

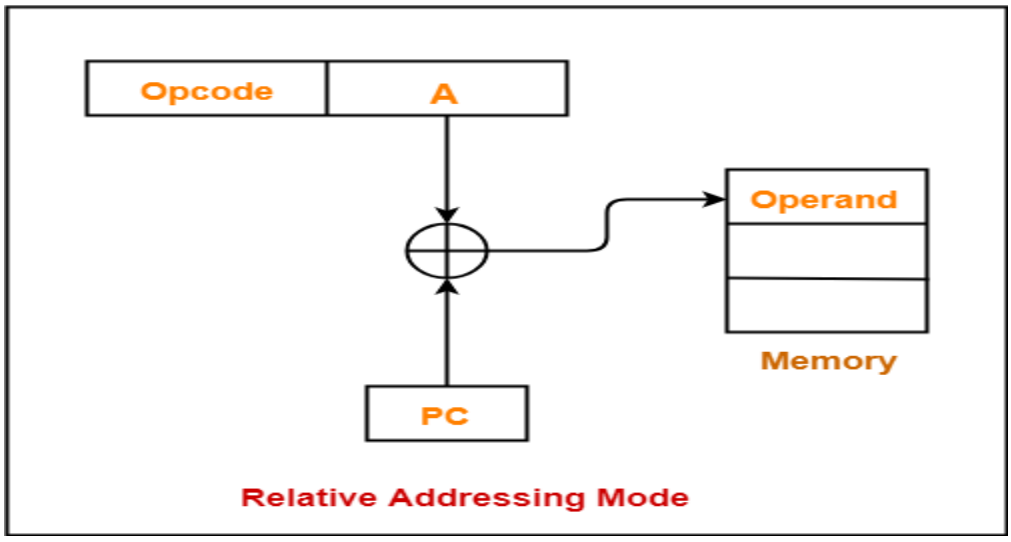
$$AC \leftarrow AC + [[X]]$$

4. Relative Addressing Mode-

In this addressing mode,

- Effective address of the operand is obtained by adding the content of program counter with the address part of the instruction.

Effective Address
= Content of Program Counter + Address part of the instruction



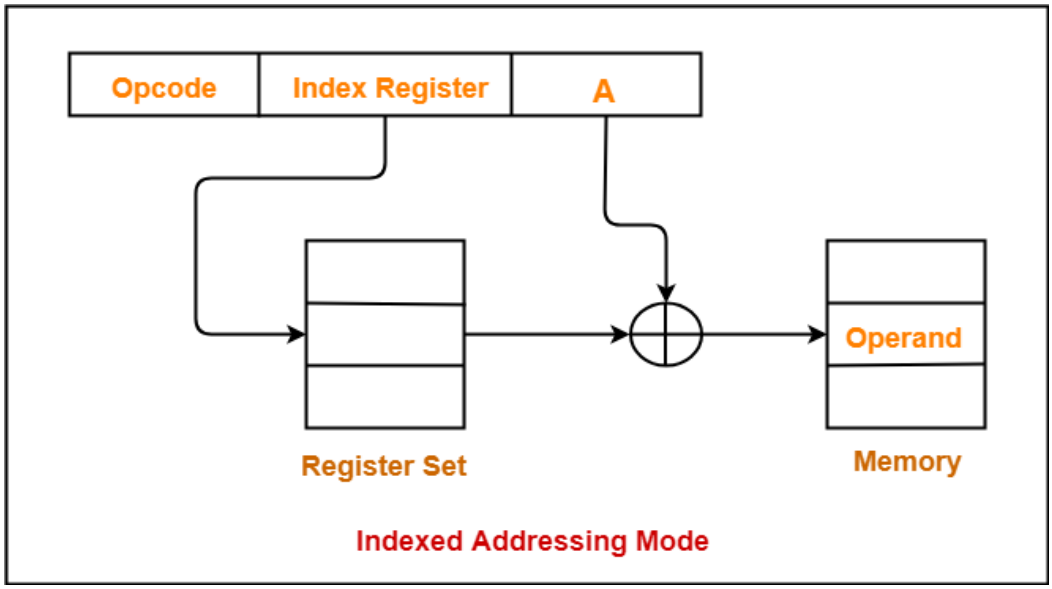
5. Indexed Addressing Mode-

In this addressing mode,

Effective address of the operand is obtained by adding the content of index register with the address part of the instruction.

Effective Address

= Content of Index Register + Address part of the instruction

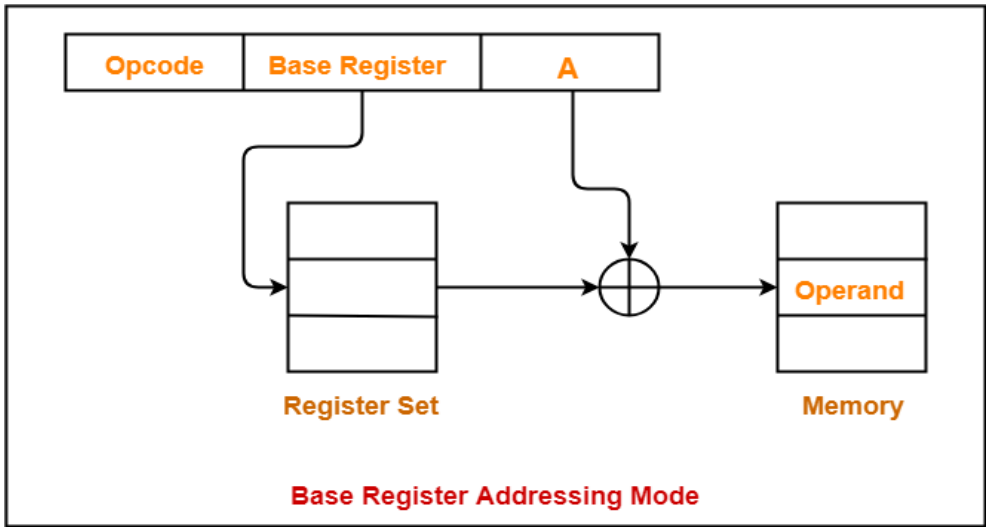


6. Base Register Addressing Mode-

n this addressing mode,

- Effective address of the operand is obtained by adding the content of base register with the address part of the instruction.

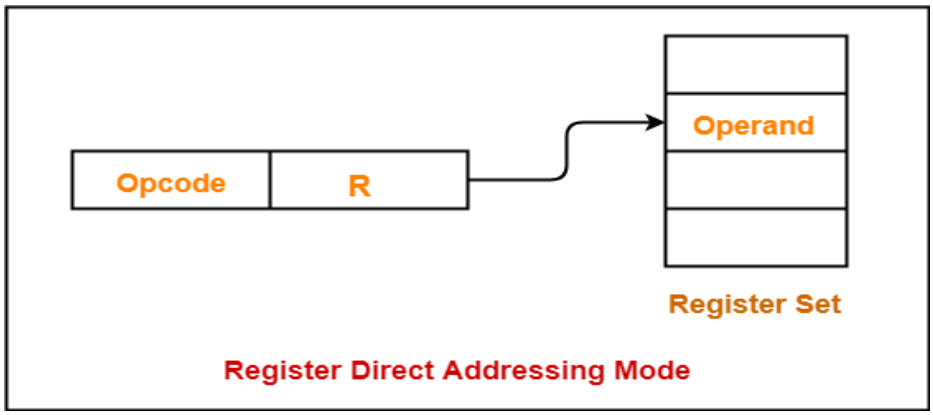
Effective Address
= Content of Base Register + Address part of the instruction



7. Register Direct Addressing Mode-

In this addressing mode,

- The operand is contained in a register set.
- The address field of the instruction refers to a CPU register that contains the operand.
- No reference to memory is required to fetch the operand.



Example-

- ADD R will increment the value stored in the accumulator by the content of register R.

$$AC \leftarrow AC + [R]$$

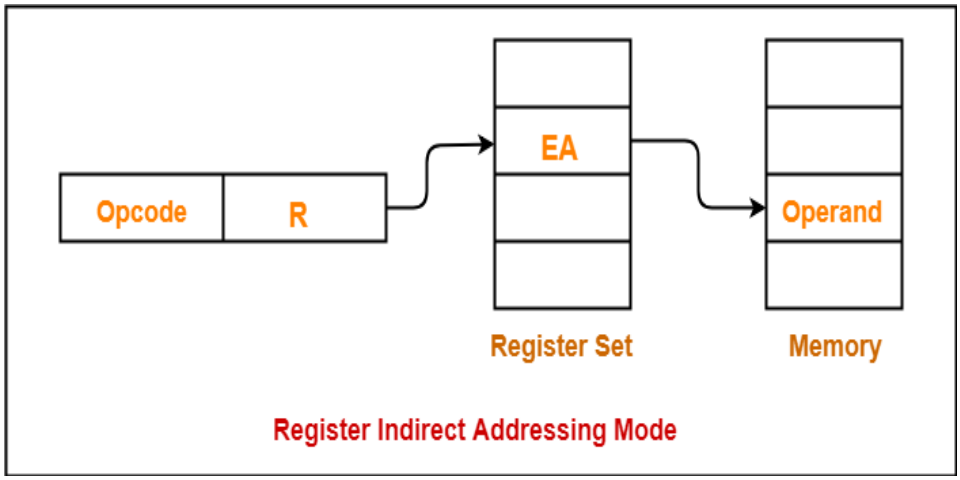
It is interesting to note-

- This addressing mode is similar to direct addressing mode.
- The only difference is address field of the instruction refers to a CPU register instead of main memory.

8. Register Indirect Addressing Mode-

In this addressing mode,

- The address field of the instruction refers to a CPU register that contains the effective address of the operand.
- Only one reference to memory is required to fetch the operand.



Example-

- ADD R will increment the value stored in the accumulator by the content of memory location specified in register R.

$$AC \leftarrow AC + [[R]]$$

NOTE-

It is interesting to note-

- This addressing mode is similar to indirect addressing mode.
- The only difference is address field of the instruction refers to a CPU register.