Computer Organization & Architecture (Instruction Set Architecture)

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Addressing Modes

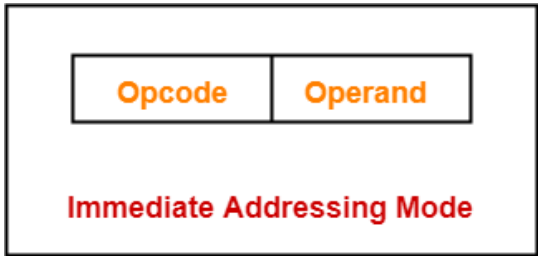
What is Addressing Mode?

Addressing Modes

- Implied Mode:
  - Operand is specified implicitly in the defination of instruction:
  - Zero-address instructions in a stack-organized computer are implied-mode instructions

Addressing Modes

- Immediate Mode:
  - Operand is directly provided as constant specified implicitly in the defination of instruction:



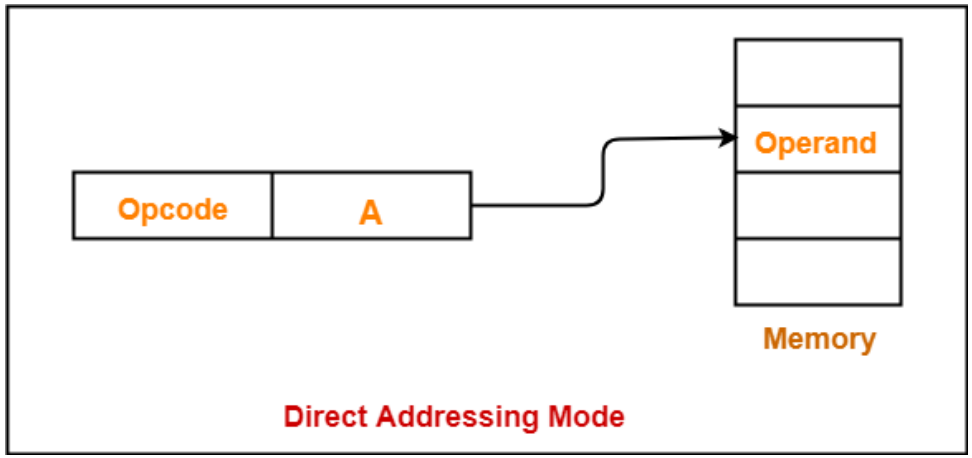
Addressing Modes

Register Addressing Mode:

- The operand is the contents of a processor register; the name of the register is given in the instruction.

Addressing Modes

Direct /Absolute Addressing Mode:



Addressing Modes

Indirect Addressing Mode:

- Register contanins address of operands rather than operand itself

Addressing Modes

Auto Indexed (Increment or Decrement) Mode:

- Special case of register indirect addressing mode

Addressing Modes

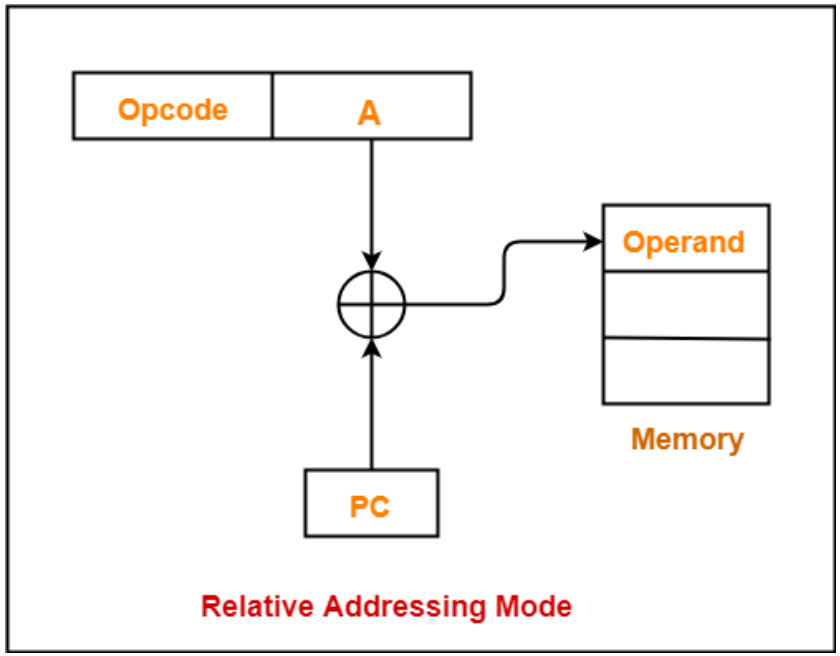
Based on Transfer of control, addressing modes are:

1. PC Relative Addressing Mode
2. Base Register Addressing Mode

Addressing Modes

PC Relative Addressing Mode:

- Used for program control instructions



Addressing Modes

Base Register Addressing Mode:

- Used in program relocation

Addressing Modes

Index Addressing Mode:

- Used to access or implement array efficiently
- Multiple registers are required to implement
- Any element can be accessed without changing the instruction.

Advantages of Addressing Modes

- To give programmers to facilities such as Pointers, counters for loop controls, indexing of data and program relocation.
- To reduce the number bits in the addressing field of the Instruction.