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Basic Computer Organisation and Design

Instruction codes

Before discussing

① → Programs

A program is a set of instructions that specify the operations, operands and the sequence by which processing has to occur.

② → Computer instruction:-

A computer instruction is a binary code that specifies a sequence of microoperations for the computer.

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- The computer reads each instruction from memory and places it in a control register.
- The control then interprets the binary code of the instruction and proceeds to execute it by issuing a sequence of microoperations.

Instruction Code:-

• An instruction code is a group of bits that instruct the computer to perform a specific operation.

Here, group of bits in form of binary

• Example

ADD 457

It means ADD is an instruction code with address
457

→ OPERATION CODE (Opcode)

- The operation code of an instruction is a group of bits that define such operations as add, subtract, multiply, shift, and complement.

↓
[ADD 457]

unique Binary
code is assigned
to every Opcode

from above Example

↑
opcode

ADD is an operation code &

457 is an address of the operand in memory

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- The number of bits required for the operation code of an instruction depends on the total number of operations available in the computer.

• The operation code must consist of at least n bits for a given 2^n (or less) distinct operations.