34 – Processor Instruction Set and Addressing Modes

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An instruction set is a collection of binary codes describing instructions that a specific processor can understand.

The addressing mode is also set in each instruction. Although there are many different possible addressing modes that each processor may support, two of the most common are:

- Immediate addressing: the operand is the datum.
- Direct addressing: the operand is the address of the datum. (like a pointer in C)

From the specification,

A simple model will be used in which the addressing mode will be incorporated into the bits allocated to the opcode so the latter defines both the basic machine operation and the addressing mode. Students will not be expected to define opcode, only interpret opcodes in the given context of a question.

For example, 4 bits have been allocated to the opcode (3 bits for basic machine operation, eg ADD, and 1 bit for the addressing mode). 4 bits have been allocated to the operand, making the instruction, opcode + operand, 8 bits in length. In this example, 16 different opcodes are possible ($2^4 = 16$).