Tutorial 08

(1) Consider a computer that is used for simple numerical problems. It uses 9 bits for an opcode, and 25 bits for a memory address.

(a) What is the size of its instruction?

$9 + 25 = 34$ bits

(b) How many different instructions can it have?

$2^9 = 512$

(c) What is the maximum memory size that it can address? (Hint: Assume that 2^{20} is about 1M). $2^{25} \rightarrow \underbrace{2^{20}}_{M} \times \underbrace{2^5}_{32} = 32M$

(3) Given a CPU with a 8-bit word, 8 registers and instructions that are exactly 1 word long and which has 2 operands:

(a) How long can the opcode field be in an instruction?

4 bits

(b) How many instructions can the CPU support?

$2^8 = 256$

(4) Consider a computer that is used for simple numerical problems. It uses 6 bits for an opcode, and 12 bits for a memory address.

(a) What is the size of its instruction?

$6 + 12 = 18$ bits

(b) How many different instructions can it have?

$2^6 = 64$

(c) What is the maximum memory size that it can address? (Hint: Assume that 2^{12} is about 4K).

$2^{12} = 4K$