

Q: 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?

$$4 \text{ bits} \\ =$$

b) How many instructions can the CPU support?

$$2^8 = 256 \\ =$$

Q=Q3 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?

$$9+25 = 34 \text{ bits} //$$

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^{10} is about 1M)

$$2^{25} = 2^{20} \times 2^5 = 32 \text{ M.} //$$

Q=Q3 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?

$$6+12 = 18 \text{ bits} //$$

b) How many different instructions can it have?

$$2^6 = 64 //$$

c) What is the maximum size that it can address?

(hint - assume that 2^{10} is about 4k)

$$2^{12} = 4k //$$

