Base 2, "binary". Place values = powers of 2. 2 digits, 0, 1.

"binary digits" = bits.

8 4 2 1	
0 0 0 0	= 0
0 0 0 1	= 1
0 0 1 0	= 2
0 0 1 1	= 3
0 1 0 0	= 4
0 1 0 1	= 5
0 1 1 0	⋮
0 1 1 1	
1 0 0 0	
1 0 0 1	
1 0 1 0	
1 0 1 1	
1 1 0 0	
1 1 0 1	
1 1 1 0	
1 1 1 1	

---

8 bits = 1 byte

4 bits = 1 nybble

1 kilobyte = 1024 bytes $2^{10} = 1024$.

1 megabyte (MB) = 2^{20} bytes (photo)

1 gigabyte (GB) = 2^{30} bytes (video)

1 terabyte (TB) = 2^{40} bytes (HD)

1 petabyte (PB) = 2^{50}

1 exabyte (EB) = 2^{60}

1 zettabyte (ZB) = 2^{70} ← internet

Negative numbers?

- Use first bit to represent positive/negative
- Rest of bits for size.
- [Actually use 2's complement.]

Text?

- Each character has a numeric code. Write the numbers in sequence.

Hexadecimal

Hexadecimal = base 16.

16 digits: 0 – 9, a – f.

eg. $a3f_{16} = a \times 16^2 + 3 \times 16 + f$

$= 10 \times 16^2 + 3 \times 16 + 15 = \ldots$

Each hexadecimal digit corresponds to exactly 4 bits.

Images

Pixel ("picture element")

→ each one = 3 lights red + green + blue.

each one can be 0 (off) to 255 (fully on)

ie. 8 bits (1 byte) per colour.

→ 24 bits = 1 pixel.

image = sequence of colours.

video = sequence of images.

Audio