Recall: $4623_{10} = 4000 + 600 + 20 + 3$
$= 4\times10^3 + 6\times10^2 + 2\times10^1 + 3\times10^0$

Base 2 ("binary") uses powers of 2 instead of 10.

e.g. 1101001_2 (6 5 4 3 2 1 0) $= 1\times2^6 + 1\times2^5 + 0\times2^4 + 1\times2^3 + 0\times2^2 + 0\times2^1 + 1\times2^0$
↑ base 2. $= 64 + 32 + 8 + 1$
$= 105_{10}$

A 0 or 1 is called a binary digit or "bit". (b)

8 bits is called one "byte". (B)
8 bits gives $2\cdot2\cdot2\cdot\ldots\cdot2 = 2^8$ possible values, which represent $0 \ldots 2^8-1 = 255$.

1 kibibyte (kB) = 1024 bytes. $= 2^{10}$. (text message)
(kibibyte (KiB))
1 megabyte (MB) $= 2^{20}$ bytes $= 2^{10}$ kB $\approx$ 1 million. (small picture)
1 gigabyte (GB) $= 2^{30}$ bytes (video, game, etc.)
1 terabyte (TB) $= 2^{40}$ bytes (1 hard drive)
1 petabyte (PB) $= 2^{50}$
1 exabyte (EB) $= 2^{60}$ (Google)
1 zettabyte ?

Characters = #'s, text = sequence of characters

Color? 1 "pixel" (picture element) = Red + Green + Blue.
Each of R, G, B is a number 0–255. (1 byte).

Picture = list of pixels.

Animation = sequence of pictures.

Hexadecimal = base 16.

need 16 "digits" 0 .. 9, a .. f.

eg. $3caf_{16} = 3\times16^3 + c\times16^2 + a\times16 + f$

$= 3\times16^3 + 12\times16^2 + 10\times16 + 15$

Each hexadecimal digit = 4 bits.

eg

3 c a f

0011 1100 1010 1111

Hexadecimal = abbreviation for binary