Here are some terminologies relating to computing hardware, etc.

1 Metric prefixes

Some of these prefix names may be familiar, but here we give more extensive listings than most people are familiar with and even more than are likely to appear in typical computer science usage. The range in which typical usages occur is from Peta down to nano or pico.

A further note is that the terminologies are classicly used for powers of 10, but most quantities in computer science are measured in terms of powers of 2. Since $2^{10} = 1024$, which is close to 10^3, computer scientists typically use these prefixes to represent the nearby powers of 2, at least with reference to big things like bytes of memory.

For big things:

Power of 10	In CS, may be	Place-value name	Metric prefix	metric abbrev.
10^3	2^{10}	thousands	kilo	k
10^6	2^{20}	millions	mega	M
10^9	2^{30}	billions	giga	G
10^{12}	2^{40}	trillions	tera	T
10^{15}	2^{50}	quadrillions	peta	P
10^{18}	2^{60}	quintillions	exa	E
10^{21}	2^{70}	sextillions	zeta	Z
10^{24}	2^{80}	septillions	yotta	Y

For small things:

Power of 10	In CS, may be	Place-value name	Metric prefix	metric abbrev.
10^{-3}	2^{-10}	thousandths	milli	m
10^{-6}	2^{-20}	millionths	micro	μ
10^{-9}	2^{-30}	billionths	nano	n
10^{-12}	2^{-40}	trillionths	pico	p
10^{-15}	2^{-50}	quadrillionths	femto	f
10^{-18}	2^{-60}	quintillionths	atto	a
10^{-21}	2^{-70}	sextillionths	zepto	z
10^{-24}	2^{-80}	septillionths	yocto	y

2 Bits, bytes, nibbles, and pixels

Information in computers is essentially stored as sequences of 0's and 1's. For numbers, this is referred to as a *binary* or base two representation, whereas our usual number system is base ten. We will learn more about binary numbers later, but for now, we just want to be aware that numbers can be represented with the two digits 0 and 1 in base two rather than the digits 0 through 9 that we use in base ten.

The term *bit* refers to one binary digit, i.e., a 0 or a 1. Since a bit can have just two values, it is enough to represent one small piece of information, e.g., a "yes" or "no" to some question.

Typically, bits are organized into larger chunks that encode more information. For example, 8 bits are enough to represent the numbers from 0 to 255. A collection of 8 bits is referred to as a *byte*. Occasionally, computer scientists also like to refer to chunks of 4 bits; the term for this is a *nibble*.

Bits may be abbreviated as "b" and bytes as "B"; for example "6GB" would mean six gigabytes (see metric prefixes below).

The term "pixel" comes from "picture element". It is a single tiny dot on a computer monitor. Color displays, generally specify an amount of red, an amount of green, and an amount of blue for each pixel, with the amount of each color expressed as a number from 0 to 255. The range from 0 to 255 is exactly what can be represented with one byte. (Again, we will learn more later about representing numbers in binary, but the 256 values we want to represent can be done with one byte, because there are 8 bits in a bit, and $256 = 2^8$.)

Based on our discussion so far, we can see that 3 bytes of storage are required to represent one pixel. So if you have, for example, a 2 megapixel camera, the pictures it takes will require 6 megabytes if stored in a naive fashion. In reality, the storage requirement is generally several times less than this, because pictures are typically stored in a format such as JPEG that does image compression. Instead of just listing the three color values for every pixel in the image, more sophisticated coding techniques are used. For example, if a corner of the image containing 100 pixels is a background of a solid color, we could just note the boundaries of that region and that all the pixels are of the same color instead of listing that color 100 times. JPEG images are actually only an approximation of the original picture, but it is generally possible to reduce the storage requirement greatly without doing anything that the human eye will notice.

3 Other terms you may see in computer ads

A limited selection is included here.

- **OS:** Operating System
- **HD:** High definition (in reference to monitors)
- **RAM:** Random-access memory. Refers to the working memory in the computer that primarlily determines the speed with which you can run complex applications manipulating a lot of data. Often, you will see specific varieties mentionend such as SDRAM (xynchronous dyanamic), DDR (double data rate), etc.
- **MHz:** Megahertz (i.e., millions of cycles per second). You may see this as a rating of how fast the memory or the central processor can operate. Usually, a higher clock rate means being able to do things more quickly, but it is not an extremely reliable indicator; it just measures the frequency of executing elementary steps, but some processors utilize less powerful elementary operations than others.
- **RPM:** Revolutions per minute. Along with the number of bytes of storage, this is the other main measure for disk drives. The RPM gives some idea of how fast information can be read/written on the disk drive. (Some drives may also make reference to a RAID level, which refers to a method of using multiple disks for increased speed and/or redundancy (backup).)
- **USB:** Universal serial bus. The most common mechanism for connecting peripherals like cameras and phones to your computer. There are different versions, e.g., 2.0, 3.0, each allowing for faster data transfers if both the computer and peripheral support it.