

Binary, Hexadecimal, Decimal

The decimal number: $123 = 1 * 10^2 + 2 * 10^1 + 3 * 10^0$

The hexadecimal number: $0x123 = 1 * 16^2 + 2 * 16^1 + 3 * 16^0 = 291$ in decimal

This hex number: $0xbf42 = 11 * 16^3 + 15 * 16^2 + 4 * 16^1 + 2 * 16^0 = 48962$

Just google Hexidecimal to Decimal converter and you will get numerous online number converters

Hexadecimal (also **base 16**, or **hex**) is a [positional numeral system](#) with a [radix](#), or base, of 16

A hexadecimal number is represented with digits 0 - 9 followed by a - f to represent equivalent of 10, 11 , 12, 13, 14, 15 in base decimal

You might encounter hexadecimal numbers to encode color values. It's also frequently used to show a binary dump of any data because it's more concise than straight binary.

The binary number: $0b1011 = 1 * 2^3 + 0 * 2^2 + 1 * 2^1 + 1 * 2^0 = 11$ in decimal

All calculations in a computer are done in binary. Digital circuit logic depends on a signal being off or on; that is 0 or 1.

You might encounter binary or hexadecimal encoding when dealing with representation of communication protocols between computers and hardware devices.

Bytes, Words, Integers, Unsigned Integers, and Floats

A byte is 8 bits. It is the smallest addressable component of computer memory. Characters encoded using ASCII can be contained in a byte.

A word is the maximum number of bits that can hold a computer address. In the old-fashioned days that was 16 bits. Now-a-days, word size is either 32 or 64 bits but more frequently it's 64 bits. The computer CPU's registers can hold a word and the computer data and address buses can transfer a word at a time.