

Floating-Point Numbers: All Together Now!

Once all the parts of the floating-point number are obtained, converting it to decimal is just a matter of applying the following formula:

Example:

$$1 \times 2 \times 1 \times 2^{-127} \times 1.01 = 2.5$$

Notice that the Mantissa actually represents a fraction, instead of an integer!
In addition to representing real numbers, the IEEE 754 representation can also indicate...

the set of numbers known as denormalized numbers (including zero),

$$1 \times 2 \times 0 \times 2^{-126} = 0$$

If this is all zeroes, the float is zero!

positive or negative infinity,

$$1 \times 1 \times 0 = \pm \infty$$

and even when something is not a number! This is called NaN.

$$1 \times 1 \times \neq 0 = \text{NaN}$$

NaNs aren't comparable, but they can be different!