Binary Numbering System

3 min

Numbers have been represented in a variety of different methods throughout history. For example, if you look at the face of some clocks, you may see that six o'clock is designated by VI, the Roman Numeral for 6.

The most successful system of numbering is called the decimal system, from the Latin root **dec-** meaning *set of ten* or *having a base of ten*.

Although the exact origins of this system are unknown, it is clear that it began with counting on our fingers and later evolved into substituting the Hindu-Arab characters of 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 for fingers in order to perform larger operations.

In the decimal system, each digit can be represented by a multiple of a power of ten and added together with the other digits. Let's look at the number 305.

Starting at the right and moving left, the first column is the ones digit. The digit in this place value is 5.

5 times 10^0 = 5

The next digit, in the ten's column, is 0.

0 times 10^1 = 0

Finally, the 3 is in the hundred's column:

3 times 10^2 = 300

By adding each column together, we get our total value:

5 + 0 + 300 = 305.

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The binary system is very similar to the decimal system except it uses a base of two and only two digits, 0 and 1. With the provided table we can use the same technique to evaluate 100110001, which is 305 in binary. Try it out.

In binary, the digit that is farthest to the right is called the *Least Significant Bit* (LSB) and the left-most digit is called the *Most Significant Bit* (MSB).

Instructions

Take a look at the visualization to the right to see the numbers 1-10 converted to binary.

Decimal	Binary
1	1
2	10
3	11
4	100
5	101
6	110
7	111
8	1000
9	1001
10	1010