# Summary Informatic Systems

## Binary Code

The binary code is a numeral system which system base is 2 and its symbols are 0 and 1.

Each digit of a binary number is called bit and it is the smallest unit of information, in other words, it is the least that can be represented.

This system is based on the use of only two digits, 0 and 1, unlike the decimal system that uses ten (0, 1, 2, 3, 4, 5, 6, 7, 8, 9). This is because computers only know these two numerical values resulting from the detection or not of some potential, of a number of volts. Thus, a computer knows there's a 0 when the potential measured in an inner member has a value close to 0 volts. Otherwise, it detects a 1.

In electrical terms, the potential could be assimilated to the strength in which the electric current passes through a wire. In general, values of 1 usually correspond to potential around 3 or 5 volts.

### How to convert a decimal number into a binary number

In general, to convert a decimal number into another base, we have to perform successive divisions of the number by the base. At the end, we have to get the remainders and the last quotient and sorted them in the opposite direction.

In numbers with fractional part, the process is the same for the integer part, but the fractional part is calculated multiplying by 2 successively and to take the integer part (in this case in right order).

### How to convert a binary number into a decimal number

In this case the process is very easy. As explained above, a decimal number can be represented as additions of powers of ten. The process involves four steps:

1. To write the binary number figures multiplied by 2.

2. To write a plus sign (+) between each of products.

3. To write an exponent in each 2, starting from zero and from the last number of the integer part (on the far right if there is not fractional part) and increasing it one by one to the left and decreasing to the right.

4. To perform the operation

### Maximum number of values to represent

One of the typical questions when handling a binary number is to know what is the maximum decimal value that can be represented by a certain bits number. The answer is easy: 2^n, where n is the bit number. For instance, **with 4 bits we can represent 16 values, from 0 to 15 (0000-1111)**.

Measured = Medido.

Thus = Por lo tanto.

Data set = Conjunto de datos.