## Binary format | Part B

When people count, they often use their fingers. Since we have 10 fingers, we count in tens. This is called a decimal system from decima – ten.

Computers have no fingers, they just have switches. Let's consider one switch – it only has two positions – on or off, which we can call one and zero.

So, we need a number system that relies only on one finger but in two possible positions.

We use the so-called decimal system, otherwise known as "base 10"for that. The reason why it is called that is right here on the screen.

Here is number 25, it is a sum of 20 and 5.

Let's write it again.

2 5

But let me number the digits, starting from the right, I will write zero under the five and 1 under the 2. Like so.

This zero and this one represent how many times I have to multiply the top number by 10. 20 is 2 x 10 to the power of 1, that's our one, 5 doesn't have a ten, so that's our zero. This zero and this one represent how many times I have to multiply the top row numbers by 10. So 20 is 2 x 10 to the power of 1, that's our one, 5 doesn't have a ten, so that's our zero. Shall we try this with 134?

1 3 4

Underneath we write

2 1 0

I take a hundred, multiply by 10 to the power of 2, add 3 multiplied by 10 to the power of 1 and the zero on the right tells me not even to bother multiplying 4 by 10, just by, 1 because as we know any number to the power of zero equals 1.

Since computers, as we know, don't have 10 fingers, they use a binary system, called "base 2". Which has 0 and 1. Have a look at the following number 1 1.

This is not our regular 11 this is binary 1 1.

We write it out with enough spacing.

1 1

And then we number the numbers, so to speak but this time it's the degrees of two that we are numbering.

We will take the left 1 and multiply it by 2 to the power of 1, which is just 2 and then we add the right 1 multiplied by 2 to the power of zero which would be 1. So, we get 2 plus 1 and that equals 3. Therefore, binary 1 1 equals decimal 3.