How to Count in Binary

Binary is the fundamental communication block of computers, but it's used to represent more than just text and images. It's used in many aspects of computing, like computer networking, what you'll learn about in a later course. It's important that you understand how computers count in binary. We've shown you simple look up tables that you can use like the ASCII binary table. But as an IT support specialist whether you're working on networking or security, you'll need to know how binary works, so let's get started. You'll probably need a trusty pen and paper, a calculator and some good old fashioned brainpower to help you in this video. The binary system is how our computers count using 1s and 0s, but humans don't count like that. When you were a child you may have counted using ten fingers on your hand, that innate counting system is called the decimal form or base ten system. In the decimal system there are ten possible numbers you can use ranging from 0 to 9. When we count binary which only uses 0 and 1, we convert it to a system that we can understand, decimal. 330, 250 to 44 million, they're all decimal numbers. We use the decimal system to help us figure out what bits our computer can use. We can represent any number in existence just by using bits. That's right, we can represent this number just using ones and zeros, so how does that work? Let's consider these numbers, 128, 64, 32, 16, 8, 4, 2 and 1, what patterns do you see? Hopefully you'll see that each number is a double of the previous number going right to left, what happens if you add them all up? You get 255, that's kind of weird, I thought we could have 256 values for a byte. Well, we do, the 0 is counted as a value, so the maximum decibel number you can have is 255. What do you think the number is represented here? See where the 1s and the 0s are represented? Remember, if our computers use the 1 then the value was on, if it sees a 0 then the value was off. If you add these numbers up you'll get a decimal value. If you guess 10, then you're right, good job, if you didn't get it, that's okay too, take another look. The 2 and 8 are on and if we add them up we get 10. Let's look at our ASCII binary table again, the letter h in binary is 01101000. Now let's look at an ASCII to decimal table. The letter h and decimal is 104. Now let's try our conversion chart again, 64+32+8=104. Look at that, the math checks out. Now we're cooking, wow, we've gone over all the essentials of the basic building blocks of computing and machine language.

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