

How Computers Turn Numbers Into Letters and Symbols

KS4 COMPUTER SCIENCE

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Computers Only Understand Numbers

Here's something surprising: computers can't actually see letters, symbols, or pictures the way you do. Inside a computer, everything is stored as **numbers**—specifically, strings of **1s and 0s** (called **binary**). So how does your screen show you an 'A' or a '?' when you type? The answer is a clever code called **ASCII** (pronounced 'ask-ee').

Think of it like a secret alphabet spy code. Just as spies might write 'A=1, B=2, C=3', computers use ASCII to say 'the number 65 means the letter A, the number 66 means the letter B', and so on.

What Is ASCII?

ASCII stands for **American Standard Code for Information Interchange**. It's basically a massive rulebook that says which number represents which character. For example, the number **65** always means a capital 'A', the number **66** means a capital 'B', and the number **32** means a space.

There are **128 basic ASCII codes**, covering uppercase letters, lowercase letters, numbers, punctuation marks, and special symbols. Every single time you press a key on your keyboard, that physical action gets converted into a number. Then the computer looks up that number in the ASCII table and displays the matching character on your screen.

Think of it like a restaurant menu code. A restaurant might have Menu Item 5 = pizza, Menu Item 7 = salad. When someone orders 'Item 5', the kitchen knows to make pizza. With ASCII, the computer is the kitchen, the number is the order, and the letter or symbol is the finished meal.

How It Works in Real Life

When you type the letter 'H', here's what happens behind the scenes: your keyboard sends the **number 72** to your computer. The computer's software checks the ASCII table and sees '72 = H'. Then it tells your screen to light up the pixels that look like the letter 'H'. All of this happens instantly—in milliseconds—so it feels like magic!

This same system works for symbols too. The number **33** is an exclamation mark (!), the number **63** is a question mark (?), and the number **64** is the 'at' symbol (@).

Why Does This Matter?

ASCII is the foundation of how computers communicate with humans. Without this simple number-to-letter translation, there would be no way for computers to display readable text. It's one of the most important building blocks in computing, and it's been in use since the **1960s**. Modern computers use expanded versions of ASCII (like **Unicode**) to support hundreds of languages and thousands of symbols, but the basic idea remains the same: numbers in, letters out.