AND, OR, and NOT: The Building Blocks of Computing

KS4 COMPUTER SCIENCE Ages 10-14 ⏰ 3 min read

What Are Logic Gates?

Computers don't think like humans do. Instead, they use **logic gates**—simple rules that help them make decisions based on information they receive. The three most important logic gates are **AND**, **OR**, and **NOT**. These are the building blocks that allow computers to process information, run programs, and even play games.

Each logic gate takes in information (called **inputs**) and produces a result (called an **output**). Think of them like traffic lights or yes/no questions that computers ask thousands of times every second.

The AND Gate

The **AND gate** only produces a **true** result when *both* inputs are true. If either input is false, the output is false.

Think of it like: You can only go to the park if **AND** you've finished your homework AND the weather is sunny. If either one is missing, you don't go!

Example: A video game character can only jump if the player presses the jump button **AND** the character is on the ground. If one of these conditions isn't true, the jump won't happen.

The OR Gate

The **OR gate** produces a **true** result when *at least one* input is true. Only if both inputs are false does the output become false.

Think of it like: You can have a snack if you've been good **OR** it's your birthday. You only need one of these things to be true!

Example: A security alarm goes off if someone opens a door **OR** breaks a window. Either one triggers the alarm.

The NOT Gate

The **NOT gate** is the simplest. It simply flips the input—if something is true, NOT makes it false, and if something is false, NOT makes it true.

Think of it like: A light switch with NOT flips the light on to off, or off to on. It's the complete opposite!

Example: If your battery is **NOT** fully charged, a warning message appears on your phone.

How They Work Together

Computers combine these three gates in millions of different ways to create complex programs. Every app you use, every game you play, and every search you do relies on these simple true/false decisions happening incredibly fast. Without AND, OR, and NOT, modern computing simply wouldn't exist!