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Binary: Leibniz invents the language of computers

Video transcript: original clip

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The world we know today is only possible because of the digital code that underpins it.

Computer programming has created a second industrial revolution in modern business, and the pace of change is relentless.

Until very recently, none of this was possible. So where did it all start?

Over 300 years ago, a mathematician called Leibniz came up with a simple idea. Instead of using the familiar ten digits – nought to nine – he devised a method using two digits – nought and one.

This is Leibniz's first sketch of how the system would work. He converted numbers to strings of noughts and ones, or binary digits.

He imagined a calculator where binary digits were represented by small cubes. The machine would contain many holes, which could either be open or closed.

If the cube couldn't fall through, this would represent a nought. But if a hole was opened, a cube would have fallen into the mechanism below, and this would represent a one.

In binary, this sequence – one, nought, nought, one – would represent the number nine.

It might seem long-winded using four digits when one will do, but binary is a great match for computers, which are basically a huge collection of very fast on and off switches with electrons and silicon taking the place of cubes and gravity.

It would take another 125 years for binary to picked up as a way to control machines. And, as is often the case, it was commerce that drove forward the next big step in the story of code.

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