

Bits And Bytes

The computer understands nothing but numbers — but they're numbers with an unfamiliar look about them

The words 'bits' and 'bytes' are used whenever computers are written about. They are terms that describe the way computers store and use numbers.

They do this quite differently from the way that people do. We represent numbers with 10 different symbols (0 through to 9) and manipulate them in multiples of 10. (This is known as a 'base' of 10). Computers, on the other hand, and for all their mathematical wizardry, use only two numbers — zero and one. Bits and bytes are ways of representing combinations of these two numbers.

A bit is the smallest piece of information a computer can handle. It is the computer's way of representing the two numbers zero and one. A group of eight bits is called a byte; a byte allows the computer to represent quite large numbers.

First, let's look at bits, what they are, and why they are called 'bits'. Computers are electronic devices and, consequently, everything they do is done ultimately with electrical signals. A single

electrical signal can either be 'on' or it can be 'off'; it is this principle that allows ordinary electrical signals to represent numbers.

The illustration shows a piece of wood with a hole in it, which can be filled with a peg. Even though it is a single hole, it can represent two numbers and is an excellent analogy for the way a computer works. Either the hole has no peg in it — in which case it represents a zero — or it does have a peg in it, and this represents a one. A single board can thus symbolise a zero or a one.

In a computer, the same effect is achieved with an electrical signal: when it is off, it represents a zero; when it is on, it represents a one. A single wire, or a one-hole board, can therefore be used to represent two states: no peg or with a peg; absent or present; off or on; 0 or 1.

This smallest piece of information is called a bit. The word itself suggests its small size and represents two possible states. The word is derived from **BI**nary **di**gi**T**. Thought of in another way, a bit can

Bits And Bytes

A bit (binary digit) is the smallest unit of mathematical information a computer can handle. Here, a board with just a single hole can represent either zero or one depending on whether it has a peg in it or not. A computer does the same thing with an electrical signal that is either off (to represent 0) or on (to represent 1). If the board has two holes, there are four possible combinations of holes and pegs. If eight holes are used there are 256 different combinations and these are all shown in the table. Computers use groups of eight bits and such a group is called a byte. Each byte can represent a number ranging from 0 to 255

TONY LODGE