A

ALGOL

Nowadays, the home computer user has available a reasonably large range of programming languages, but in the days when computing was restricted to mainframes, there were really only three universal languages: FORTRAN, ALGOL and COBOL. While the first was really for engineers, and the last for business applications, it was ALGOL (*ALGO*rithmic *L*anguage) that was favoured by most scientists, mathematicians, and those who studied computer science. Indeed, ALGOL remains one of the most popular languages in universities. However, it has not proved popular with microcomputer users and is available on only a limited number of low-cost machines, perhaps the best example being the Research Machines 380Z.

ALGOL's strengths lie in its ability to handle procedures, making it a highly structured language like PASCAL; and it also features a large vocabulary of pre-defined scientific and mathematical functions. Oddly, the original specification of the language made no provision for input or output (there was no equivalent to BASIC's INPUT and PRINT), with the result that programs had to be extensively re-written from machine to machine.

ALGORITHM

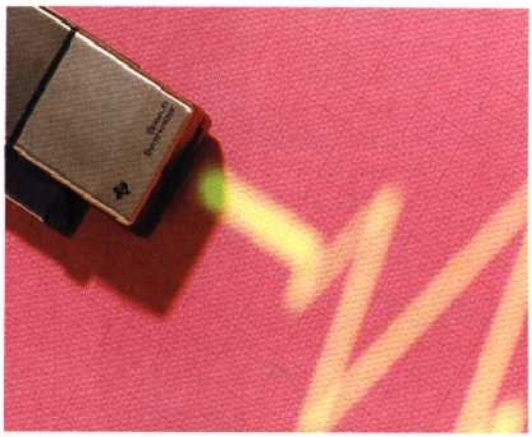
An algorithm is a method or procedure for solving a particular problem. Algorithms therefore exist outside the world of computing, but their main application is now in programming. Sometimes, writing a program simply consists of expressing a well-known algorithm (to find the square root of a number, for example) in the required programming language. More often, however, the greater part of writing a program consists of developing an algorithm for solving a new type of problem. What is the algorithm, for example, to find your way out of a maze, or to create a realistic-looking descent of an aircraft onto a runway?

With many mathematical and statistical problems, finding an algorithm is easy, but it is important to find the *best* algorithm. Two algorithms may produce the same result, but one may be more economical in memory usage, while the other is faster. One classic example is the inversion of a matrix, essentially the extensive manipulation of the data in a numeric array variable. Students learn about matrices using small arrays (say 3 × 3) and for which there is a particularly easy algorithm. But the same algorithm applied to a 15 × 15 array (not large in mathematical terms) would take something like 15 million years to complete, using the fastest available hardware! Yet a different algorithm could finish the task in a matter of seconds.

ALLOPHONES

Allophones are concerned with verbal communication and, hence, are important in the field of speech synthesis. The single sound elements that help us distinguish one word from another are called phonemes. In English, for example, the words 'pat' and 'mat' are differentiated by the phonemes 'p' and 'm'. Phonemes occur in subtly different variants called allophones; thus the slightly different vowel sounds in 'pat' and 'pad' are allophones of the phoneme 'a'. Speech generated from allophones sounds artificial but is relatively easy to program. To make things even easier, some speech synthesis units come with a program that will accept plain English from the keyboard and then translate it into the allophones required. It will, though, sometimes make mistakes on a word like 'row', which has two separate pronunciations very dependent on context. The method of speech synthesis that makes use of phonemes and allophones is known as synthesis by rule.

The other method is synthesis by analysis, in which the computer digitises words spoken by a human into a microphone, analyses the data for frequency and other characteristics, and then stores the words in condensed form. When the words are recreated by the reverse process, the resulting quality is very high, and it is even possible to identify the original speaker. The drawback is that the size of the vocabulary is limited by the memory capacity.



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ALPHANUMERIC

Alpha means letters of the alphabet, and numeric refers to the digits 0 to 9, so alphanumeric is really a technical way of saying 'letters and numbers'. In practice, the term also covers punctuation signs and some of the more abstract symbols found on a computer's keyboard. What the term does not cover is graphics symbols and the various non-printable characters that some computers feature, such as 'carriage return', 'sound bell' and 'clear screen'. The word alphanumeric used in a description of the operation of a software package may be a special feature or it may be a severe restriction. A stock control program that allowed alphanumeric codes for each product (as distinct from purely numeric) would fall into the former category, while a printer with only an alphanumeric character set would mean that your program listings wouldn't include any graphics characters.