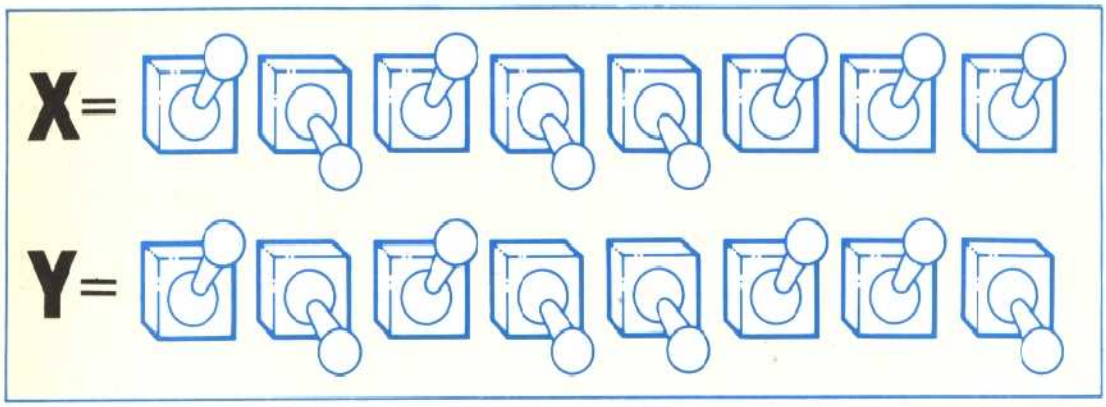


A Code For Letters And Numbers

A group of eight switches allows 256 unique combinations of on and off. This is more than enough for an individual code (using nothing more than ones and zeros) for each of the letters, numerals and special signs on a computer's typewriter-like keyboard. The illustration shows how the letters X and Y are represented inside the computer using the ASCII code

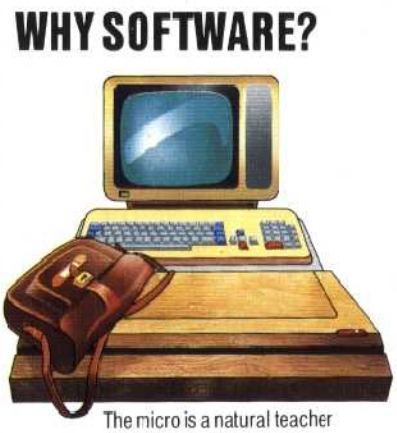
But once those first essential programs are made, everything becomes easier. You can now put new numbers into the computer's memory by typing them in. This process is called machine code programming and we'll be talking more about it in the future. But machine code programming is rather difficult and tedious and so some ingenious programmers have written programs (in machine code) that will translate English words like PRINT, BEEP, LOAD and LIST into machine code instructions that the computer can use. All but the most sophisticated home microcomputers have such a program built into them; as a result you can program them in a simple computer language called BASIC, rather than in streams of numbers. But every time you use BASIC (even if it is only the word LOAD to load up Missile Command) remember that the product of hours of programmers' work is already there inside the computer working for you.

With computer languages like BASIC it is quite easy to write programs to do useful or amusing things, and to be blissfully unaware of all the frantic and complex activity that goes on inside the machine merely to detect that you've typed the letter 'A'. For instance, it is a simple matter to write a program that will store away the names of the capitals in the world and produce to someone's query "What is the capital of Afghanistan?", the answer "Kabul". In other words the electronic brain knows only what you tell it in the first place; it can't discover things for itself.

If this is the case, why are computers so useful? Because they can store vast quantities of information, and they can manipulate it much better than people can. And, of course, putting the information there in the first place needn't always be done by *you*. You might buy a program, written by someone else, with all the world's capitals stored on it; in this case the computer is acting like an electronic reference book. Alternatively, you might buy a program that works upon information that you have typed into it: a 'word processor' that lets you type, correct and redraft documents and letters for instance, or a 'database' program that will let you catalogue a huge library of books and find out answers to questions like "What books do I have by George Bernard Shaw published in London before 1926?" in a few seconds.

The fact that the poor dumb computer understands only numbers is in practice a strength rather than a weakness. If computers actually dealt with the objects that interest us, say words or colours, they would be many times more complex even than they are now, and you would need a different sort of computer to handle each kind of job. How exactly would you store GREEN in a computer's memory anyway? But once the principle is grasped that the computer does not need to 'understand' what it is dealing with, in the way that a person does, then one kind of computer can deal with almost anything. All that is necessary is that a programmer should be able to describe the problem in a way that can ultimately be reduced to

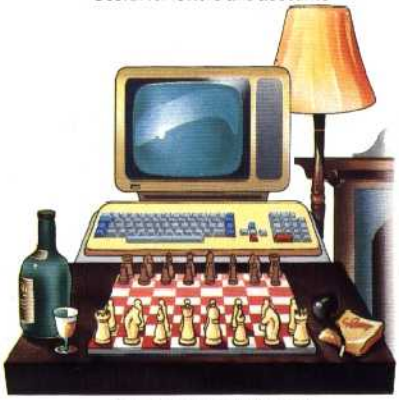
WHY SOFTWARE?



The micro is a natural teacher

Useful for letters and accounts

Computers were invented for science



Games and entertainment

A computer is a versatile machine and can assume many roles. Software focuses its power. The same machine can be used by the businessman with business software, the technologist using statistics software, or for entertainment by supplying the computer with games software. It is the software that determines what the computer does

TONY LODGE