Not only computing – also art

JOHN LANSDOWN

Operating systems 1

Over the past month or so I have been able to check for myself the legendary properties of Bell Labs' famous UNIX operating system (or, rather, the XENIX version of it issued for smaller machines by Microsoft/Logica). It is all that people say it is - both from the point of view of qualities and of defects.

I think it's worthwhile to subdivide operating systems into two classes: passive and active. Passive systems (which include the majority) are those which allow you to use the computer facilities in the manner that the designers deemed to be desirable. The best of these are easy to use and comprehensive, are well-regulated and contain many provisions for protecting the whole from inexperienced or stupid use.

UNIX/XENIX falls into the category of active systems. These allow you to to do just about anything and, in their raw state, offer very little protection and an enormous range of facilities.

It follows that good passive systems, with their clear and user-friendly messages, are better for naive or casual users who just want to use the machine for editing and running their programs, whilst active systems are better for those who know their way around and wish to tailor their facilities to suit their special needs.

UNIX is especially good for doing this and consists essentially of a large number of small programs and functions which can be linked together to do remarkable things with minimum effort on the part of the user. For example, with just a single line of commands, it is possible to search a set of programs for those which call a particular group of subroutines, order the resulting lists alphabetically, and print the output on the line printer as a five-column list divided into numbered pages. Most systems would require the user to write a fairly substantial program to achieve this end.

In order to allow such extensive and flexible tailoring by chaining together programs and functions, UNIX is pretty sparse on messages - often you only know that a thing has been done because it doesn't tell you that it couldn't do it. But it is enormously powerful and versatile, and everyone who is interested in the future of computing should try and get some hands-on experience of its facilities. Perhaps next time I'll say something about my attempts in programming in C, the language in which UNIX is written.

Operating systems 2

When neurosurgeons operate on the deep structures of the brain in order to relieve pain or to control various movement disorders, they often consult an atlas which shows maps of the various parts. Such an atlas is *A Stereotaxic Atlas of the Human Thalamus and Adjacent Structures* by J. Andrew and E. S. Watkins and the maps in it have been derived from the painstaking and long-term study of brain slices 1 mm apart. Due to the variability of the human brain and the difficulty in visually distinguishing the different areas, the atlas can only show the probability densities rather than the parts themselves but this allows the surgeons to work out the likelihood that, at a given location, a particular body would be encountered.

Of course, the maps only indicate the structures in one plane and, as the probes that the neurosurgeons use are usually put in at an angle, it is unlikely that the probabilities can be deduced without some considerable calculation.

Last year, Dr Tom Koeze of the Neurosurgical Labs at London Hospital approached me to see whether it would be feasible to computerise the 'Andrew and Watkins' Atlas, and my colleague, Eddy Yip, and I devised a system to do this which produces a coloured picture of the density maps in the plane of the electrodes. This is done using a Tektronix 4052 desktop computer connected to a 4027 colour display. The system has been in use on all appropriate operations for about nine months now and, as manual calculations have still been used in parallel, has shown itself to be accurate and useful. Unfortunately, I cannot show you an illustration of the output as we cannot reproduce colour - a monochrome picture would be too confusing.

Of good character

For reasons which needn't concern us here, we used the Tektronix 4027 colour display in order to exploit its character graphics capabilities - something we'd done before for other applications. Despite its general limitations, character graphics often has two advantages over conventional raster graphics - speed and limited storage needs. Although the 4027 uses rather different techniques to those usually employed, these two advantages are the ones which appeal to designers of some personal computers which can thus offer limited graphics capabilities.

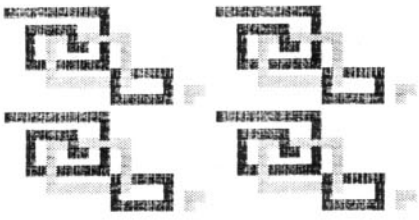

Figure 1

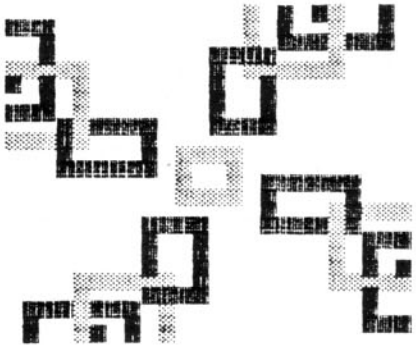

Figure 2

Peter Strachan of the School of Mathematics at Robert Gordon's Institute, Aberdeen, has been experimenting with the very restricted graphics offered by the Pet. His main interest has been to introduce art students to the use and potential of the microcomputer by giving them an easy-to-use program on a machine which is widely available. His program is not meant to produce works of art but to make students aware of the possibilities as well as show the way in which the use of simple mathematical transformations can produce interesting patterns (Figures 1 and 2). His description of the system will be published in a future issue of *PAGE* under the title 'Three Symmetries'.