coherent analytical tool for various types of analysis. It can be used to control and measure day-to-day operations environment on the one hand and forecast the effect of alterations to configurations on the other. It also provides a reasonable initial basis for system evaluation and isolation of those areas which may require further investigation with the aid of appropriate monitors.

The model has already been used to assist management of a centre in the selection of computer equipment for both batch processing and time sharing services. It has also been used at existing installations to determine stream levels that result in a minimum mean elapsed time of jobs and predict the effect of configuration changes such as direct access storage and memory upgrades. In these applications, techniques derived from the model have been of useful practical assistance.

The turnaround model proposed here requires, of course, considerable refinement. Obviously, also, introduction of optimisation techniques would considerably enhance the value of results derived from the model. The author hopes, however, that this description of the model and its application at some existing installations will be of assistance to others faced with the all too familiar problems of computer centre managers.

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Book reviews

Computer Data Structures, by J. L. Pfaltz, 1977; 446 pages. (*McGraw-Hill*, £14·60)

Data Structures and Programming Techniques, by H. H. Maurer, 1977; 228 pages. (*Prentice-Hall*, £10·85)

It can be argued that detailed consideration of data structure is an 'academic' subject, which has little to do with the reality of day-to-day commercial data processing. Pursuit of such an argument tends to rob programming practitioners of some useful tools. Anyone involved in the specification or design of processes to handle large quantities of related data should spare some effort to study suitable texts and to work through suitable examples. Programmers will recognise that the efficiency, clarity and complexity of any program purporting to solve any given problem depends to a large extent upon the selected data structure. Indeed there is a popular view that the ability to describe formally the data structures involved is a necessary prerequisite to the solution of any such problem.

Both of these books begin by introducing their own formal notation, based upon graph theory and set theory respectively. All necessary manipulations are described and demonstrated in a simple way to enable the reader to practise and understand the notation used. Beyond this point the two books differ in both style and emphasis.

Maurer's text, which has been extremely effectively translated from the German by Camille Price, has a more theoretical approach. Most of the structures described are assumed to exist within the knowledge of the reader. The book formally defines each structure and illustrates its properties by means of a mathematical analysis. An example PL/I program is given to illustrate a process to manipulate the structure; this technique represents solutions in search of problems!

Computer Data Structures has a better approach. After the essential notational introduction, abstract structures are introduced as necessary to solve particular problems. Several possible computer representations of each abstract structure are given, with a detailed description of the merits of each. Using formal graph theory, techniques for describing the nature and efficiency of data structures are developed. The problem areas covered include interactive graphics, dynamic storage allocation, virtual memories and file structures. Throughout the text procedures are defined in an obvious ALGOL-like language, but can easily be realised in FORTRAN, PL/I or other languages; necessary guidance is given to enable those processes which are essentially recursive to be implemented non-recursively.

Clearly, I personally favour the book by Pfaltz, as being more suitable for both students and practitioners of computer science. In general its diagrams are better and more meaningful, the worked examples are more helpful and the 'excercises for the reader' more likely to stimulate one into actually trying them out.

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Computing in Clinical Laboratories, edited by F. Siemazko, 1978; 302 pages. (*Pitman Medical*, £10)

The proceedings of the second international conference on computing in clinical laboratories was held in Birmingham in September 1977 and the papers presented are now available in hardback form. The book is subdivided into sections on system design and implementation, microprocessors, cost effectiveness, experience of input/output devices, interfacing and remote processing, computer assisted choice and use of laboratory results and, finally, recent advances in numeric techniques.

Nowadays, no book can cover completely as extensive a subject as clinical laboratory computing. However, most of the basic issues are explored in the 33 papers from centres across Europe and beyond and most papers list references to enable the topic to be explored in more detail. I particularly appreciated the growing interest in the analysis and use of laboratory data. The utilisation of the standard techniques of data analysis to explore the meaning of the enormous volume of material produced by automated laboratory systems is crucial to improvements in system design and use; as well as trend analysis and discriminate analysis, the appearance of payoff matrices, utility functions and especially decision trees augurs well for future developments in the exploration of investigation strategies and medical decision making.

In addition to the data analysis, about a quarter of the book is devoted to the exploration of the implications of microprocessor technology for laboratory computing. This is a rapidly developing area. Microprocessors are likely to be included in most items of analytical equipment and a balance needs to be struck between the integral processing capacity of the laboratory equipment and the data processing activity of the total laboratory (or hospital) system. The evaluation of cost effectiveness of laboratory computing continues to be explored but this still presents difficulties in the absence of serious evaluation of laboratory information within the medical system.

The book provides a useful exploration of the present state of laboratory computing.

BARRY BARBER (London)