Book Reviews

T. WINOGRAD
Language as a Cognitive Process
Addison Wesley, London, 1982. 640 pp. £14.50.

HAL did it superbly, but only in 2001; most of today's machines are dumb, and those that are not might as well be. Communication with computer systems in everyday English is inevitable but not imminent, and it forms an absorbing subject for research.

Winograd's book offers a valuable account of that part of the problem which relates to the analysis and processing of syntax. A second volume dealing with 'meaning' is to follow, and there is a clear hint of a third to bring the discussion up to date, and to enter into the ultimate and forbidding question of what more has to be done to 'understand' English statements *after* we have succeeded in analysing their structure and decoding the meanings of the words they contain.

The book is, of course, well written and well produced but, although its theme is of universal importance it is one of highly specialized concern, and few BCS members are likely to want or need to study it in the depth and detail that this post-graduate text-cum-reference book provides.

MURRAY LAVER
Sidmouth

T. M. R. ELLIS
A Structured Approach to Fortran 77 Programming
Addison Wesley, London, 1982. 350 pp. £8.95.

The essential features of Fortran have been available in abundance since the late 1950s. The language has been extraordinarily successful. It has proved to be simple, universal and portable. Many volumes have been written on programming in Fortran, but strangely none have managed to do justice to the language.

Many teachers used McCracken's early book but that was big, bad and ugly. This reviewer used to recommend Calderbank's book because it had three outstanding qualities—it was simple, small and cheap.

Fortunately the advent of Fortran 77 made all the old volumes obsolete. Balfour and Marwick were amongst the first to exploit the new market, but whilst their book did set an improved standard they clearly had little faith in the language. Other volumes have followed and shown some improvement but such improvements have been marginal.

Thus it is with hope and anticipation (but a growing sense of pending disappointment) that each new volume of Fortran 77 is examined. T. M. R. Ellis is well known for his video-course on Fortran 77. This has met with considerable success and is backed by a respectable text on the subject, but this latest offering of Ellis's is intended to be self-sufficient and is aimed at 'those with little or no previous computing experience and endeavours to teach the reader how to plan and write good, well-structured programs'.

On first inspection the book is very encouraging. Ellis dismisses hardware, machine code and assembler, etc., in five pages. The book is neatly laid out, professionally produced and free from unnecessary frills. It is a comprehensive work, and this perhaps is its undoing though the fault lies mainly with the language rather than the author.

Fortran 77 is a large language and the reader may be forgiven if he feels a little weary by the time he has struggled to the end of the book. Ellis has tended to make his explanations a little over-complicated however. His examples generally are rather long with the result that he has felt the need to economize on the annotation of the code. Furthermore as each new concept is introduced it is given an extensive and comprehensive treatment. As a result essentially simple and fundamental concepts such as Subroutines and COMMON are considered for the first time almost at the very end of the book, and treated comprehensively they are indeed complicated, with the result that the language as explained looks a little fearsome.

At £9 the book may be a little slow to sell and it still leaves room for a shorter volume covering only the essential features of Fortran 77, concentrating on good programming practice, style and structure instead and costing only half the price. Nonetheless Ellis is to be congratulated on his product, which has now become this reviewer's recommended text for Fortran 77.

D. L. FISHER
Leicester

A. S. PHILIPPAKIS AND L. J. KAZMIER
Advanced Cobol
McGraw-Hill, Maidenhead, Berks, 1982. 611 pp. £18.95.

It is surely an indictment of the ordinary run of Cobol texts that a book like this can be given such a title. In fact, the book starts from scratch, and its treatment of many language features which might reasonably be called 'advanced' is cursory and not always accurate. Instead of the Advanced Cobol promised, there are long digressions into related areas which are sometimes less than helpful—the only check digit system presented, for example, is one which fails to detect certain transpositions of adjacent digits. There are several naïve chapters on program design and structured programming, including a delightful example showing how a straightforward case of two overlapping loops can be 'converted to structured form' by the introduction of three flags!

At a basic level, treatment of the non-sequential file organizations is grossly inadequate. On indexed files, more pages are given to methods of implementation than to the Cobol language facilities, and alternate record keys are scarcely mentioned. The scant attention given to Cobol relative files is overshadowed by considerations of hashing methods and overflow handling.

Errors and infelicities are certainly not lacking but, even if all of these were corrected, I still wouldn't recommend this book.

J. INGLIS
London

ERIC V. DENARDO
Dynamic Programming—Models & Applications
Prentice-Hall, Hemel Hempstead, 1982. 227 pp. £20.00.

Sequential decision-making is a common activity and dynamic programming provides solutions to a large class of problems. This monograph, provides an integrated conceptual framework which embraces a significant part of all operational research activity. Within this synthesis, critical path networks inventory capital, markov decision processes emerge as special cases. This standpoint serves to integrate material that often appears as isolated separate, apparently unconnected chapters in the text books.

The monograph is intended for operations analysts with some knowledge of mathematics and probability theory. Furthermore it is configured for both for those requiring an overview of the subject as well as for those wishing to become expert. The author has devised a reading flow plan which allows the more advanced material to be skipped initially. This volume deals with decision sequences with a finite planning horizon but a second monograph is being prepared which will deal with indefinite and infinite planning horizons.

The monograph is definitely a working text and it is copiously supplied with problems. Computers hover in the background as practical work-horses and they are referred to at intervals regarding the relative merits of differing approaches to problem solving. There is an interesting supplement on data structures and the bibliography contains 132 references to the development of the subject and for further reading.

This monograph is well produced and deceptively slim for the material covered. It provides a good basis for a course or for private study.

B. BARBER
London

S. SCHOEMAKER (EDITOR)
Computer Networks and Simulation II
North Holland, Amsterdam, 1982. 326 pp. $55.75.

Most of the independent contributions in this second volume on computer networks are well supplied with explanatory diagrams and references up to 1981, but a book of this advanced

nature is necessarily fairly heavy reading. It is highly recommended to those who wish to keep up to date with modern developments in communications technology. It is not full of mathematical statistics of the theory of models but has a very practical approach to achieving the objective of creating efficient and effective networks.

Part 1 on Protocols deals with the logical and physical structure of interlocutors passing messages and commands up and down and sideways in a system of hierarchial levels. Eight techniques are applied to the specification and analysis of protocols. After a review paper on the art of Simulation, which gives sources for following up the topic, Part 2 discusses applications to network design, to packet switching, to protocol layers, to the X 21 interface—which revealed possible deadlocks, to flow control in very large networks with two hierarchial levels, to provide quantitative results for telephone networks, and to procurement and acceptance testing of large computer systems for the UK Government. Part 3 describes systems for electronic mail, Delphi techniques, word processing, graphics, and modelling or gaming. These are discussed as elements within conferencing facilities, OSI and international networks. An index to the topics covered would have been a valuable addition to a very useful text.

PHILIP GILES
Stirling

MARIJA J. NORUSIS
SPSS Introductory Guide
McGraw-Hill, Maidenhead, Berks, 1982. 173 pp. £8.75.

SPSS (The Statistical Package for the Social Sciences) is the most widely available set of computer programs for the statistical analysis of data in the world. It is in use in nearly all University Computer Centres, not only in the UK but in very many other countries. It has a manual which is a somewhat forbidding prospect for the new user. This book is exactly what its title suggests and is a very good and readable introduction to statistical computing with SPSS. It is very dependent on version 9 of SPSS being available, and while it uses the package SPSS GRAPHICS for illustration it does not give any guide to its use. It gives a clear discussion of the techniques of statistics used, from elementary descriptive statistics to multiple linear regression. Each chapter has a different example of real data with interesting titles such as 'Selling canary crunch to Junior', 'Skirts and Beards'. The topics covered include all of the most frequently needed analyses with discussion not only of the methodology and means of obtaining a given output, but also clear description of the interpretation of the output and the important assumptions made.

SPSS is now a much more reliable package in terms of the numerical accuracy of its algorithms than it used to be although there is still room for improvement. This guide will not only serve as an introduction to the package, it could be used for courses in statistics which are oriented to the use of SPSS (some exercises are given in an appendix). A summary of frequently used commands is given which will be of aid to the more experienced SPSS user.

S. EVANS
London

M. J. D. POWELL (EDITOR)
Nonlinear Optimization 1981
Academic Press, London, 1982. 559 pp. £21.20.

In July 1981 an 'Advanced Research Institute' was held in Cambridge, UK, on Nonlinear Programming, to consider the state of development of the subject, to offer opinions on future directions of research, and to publish findings.

Altogether 61 selected participants from 15 countries attended. Seven discussion meetings were held, on Constrained Optimization, Nonlinear Fitting, Linear Constraints, Nonlinear Constraints, Large Nonlinear Problems, The current state of Software, Future Software and Testing. Each consisted of four or five invited papers, followed by discussions.

The invited contributions are here reproduced, along with the discussions. There were also research seminar talks, but only their titles are listed in this volume.

It is in the nature of such gatherings that only those familiar with the subject and its recent developments—i.e. the participants themselves, and their peers—can profit from what is offered. For these the publication is of value, though much of the contents is available in earlier papers. The reproduction of questions and answers in the discussions is only of transient significance.

Your reviewer profited most, in fact, from the list of about 500 references.

S. VAJDA
Sussex

K. G. NICHOLS AND E. J. ZALUSKA
Theory and Practice of Microprocessor
Edward Arnold, London, 1982. 297 pp. £20.00, £9.50 Paper.

This book is about the design and development of digital electronic equipment employing microprocessors. It aims to provide a reader who has little previous experience of computers or digital electronics with a good knowledge of the design of microprocessor based systems. Although it gives some information on programming principles, the book is in no way intended to provide a course in software engineering. The text is thorough and detailed and while not recommended for light reading will, with perseverance, yield a considerable volume of information. The diagrams also deserve careful study to yield maximum information. The greatest benefit will probably be realized by studying the book in conjunction with a real project or a course of practical work. In this respect it would be most suitable as part of an undergraduate course in microprocessor systems design.

The first two chapters which are devoted to computer fundamentals and system components and their implementation, are aimed primarily at the reader with little previous knowledge. The basic ideas and concepts thus established are built upon through the remainder of the book. Two further chapters are devoted to microprocessor architecture, programming and languages. The book then covers the practical subject of development equipment and explains the different types of hardware and software development systems currently available. The remainder of the work includes details of currently available microprocessor types and systems including 8 bit, 16 bit, bit slice and single chip devices.

In short this is a worthwhile book cramming a large amount of detailed information between its covers. It should be useful both as a course in microprocessor system design and as a reference book for microprocessor engineers.

M. HORWOOD
Exeter

ARNOLD VANDOREN
Data Acquisition Systems
Prentice-Hall International, Hemel Hempstead, 1983. 289 pp. £16.45.

In a book of 289 pages covering such topics as sampling theory; signal quantization and recovery; multiplexing; signal conditioning; D to A and A to D converters; plus the errors associated with each of these topics, and two chapters on microprocessors and associated peripheral devices, the author has necessarily had to restrict his coverage of each topic severely.

In most cases this has been successfully accomplished without too much loss of detail. However in certain cases the compression has been taken too far. Convolution is dealt with so briefly that the uninitiated would remain so, and in the section on Fourier analysis and transforms, Laplace transforms are not even mentioned. However the subsequent section dealing with Sampling theory, Aliasing and signal recovery together with the errors involved in these processes are clearly explained.

Operational amplifiers are almost exclusively dealt with as low frequency voltage amplifiers and the instability problems associated with internal phase shifts are hardly mentioned. The section on A to D and D to A converters contains much useful information on the variety of hardware and techniques presently available, and the last two chapters are an excellent introduction to the microprocessor, its instruction set, addressing modes and data storage and retrieval.

As a book associated with a specific lecture course, the author's students would find this excellent reading material, but read on its own it tends to be a little too concise.

J. A. BOWLES
Dorking