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

L. GORNEY
Queueing Theory: A Problem Solving Approach
Petrocelii, New York and Princeton, distributed by Van Nostrand Reinhold, 1982. 184 pp. £17.00.

This book is a disgrace. It is far worse than any textbook that I have ever seen.

We learn on page 142 that if customers arrive exactly 10 minutes apart and it takes exactly 5 minutes to serve each of them then there is a 50% chance of a customer having to join a queue. This is nonsense. If, instead, the customers were to arrive according to a Poisson process at a rate of one every 10 minutes (in which case they will sometimes arrive at intervals of less than 5 minutes) then we learn on page 136 that there is never any waiting in a queue. These are not isolated examples. I have noted hundreds of others.

RODNEY COLEMAN
London

K. L. CLARK AND S. A. TARNLUND (EDITORS)
Logic Programming
Academic Press, London, 1982. 366 pp. £16.80.

This book is a collection of papers in the field of Logic Programming, most of them taken from the proceedings of an International Workshop held in 1980. It is not suitable as an introduction to the field, but contains much material of value to those with the background of, for example, Kowalski's book, 'Logic for Problem Solving', or Clocksin's and Mellish's 'Programming in Prolog'.

The papers are diverse in subject matter: some survey applications of Logic Programming; others deal with implementation techniques or with the mathematical theory. Some papers concentrate on the popular Prolog language, whilst others point the way to new languages which generalize Prolog by providing alternative search strategies, or by allowing concurrent execution of goals and clauses. This diversity is the source both of the book's strengths and of its weaknesses.

Among the strengths are some good survey papers, which will increase the appeal of the book to a wide audience. Bruynooghe's excellent paper on the run-time structures of Prolog implementations provides a useful overview for users of the language, who might be reluctant to tackle a lengthier and more specialized treatment. The paper of Santare-Toth and Szeredi on 'Prolog Applications in Hungary' gives an impressive catalogue of advanced projects, and the papers on other logic programming languages, including IC-PROLOG, LOGLISP and QLOG, provide a timely reminder that Prolog is not the last word.

The book, however, tends towards disjointedness: it is difficult to identify a pervasive theme, and the papers sometimes overlap, whilst at other times seeming to leave gaps uncovered. Although the editors have grouped the papers into sections, this grouping sometimes seems arbitrary. I would have liked to see a more extensive editorial introduction and summary for each section than the single paragraph at the start of the book. Another weakness is the inconsistency of notation among the papers: basic definitions are repeated with distracting regularity, and the terminology differs from one paper to the next.

The book is reproduced from camera-ready typescript, but this is well done, and the text is uniformly clear and legible. A comprehensive bibliography and index enhance the value of a useful collection of papers.

J. M. SPIVEY
Oxford

H. J. SCHNEIDER AND A. I. WASSERMAN
Automated Tools for Information Systems Design
North-Holland, Amsterdam, 1982. 259 pp. $39.50.

This collection of papers resulting from the work of IFIP Technical Committee TC 8.1, represents a worthwhile contribution to the emerging techniques for analysis, specification and evaluation of information systems.

The papers range over techniques for supporting structured analysis, tools for data analysis and design, as well as some useful contributions on application development systems.

For the researcher, the book represents a broad survey of current development approaches and contains a wealth of references to earlier work. For the practitioner it will provide a worthwhile introduction to the directions in which systems development methodology is going.

PETER HAINE
Coventry

J. L. ENCARNACAO, O. F. F. TORRES AND E. A. WARMAN (EDITORS)
CAD/CAM as a Basis for the Development of Technology in Developing Nations
North-Holland, Amsterdam, 1982. 437 pp. $76.50.

This book is the proceedings of the IFIP WG 5.2 Working Conference held in Sao Paulo, Brazil, 21–23 October, 1981. Part I consists of conference papers commencing with the Key Address on the Reality of Computer Aided Design by J. Vlietstra and followed by seven sessions on Principles and Techniques, Graphics Standards, CAD in Civil Engineering, CAD in Mechanical Engineering, CAD for Digital Systems Design, CAD/CAM Practice and Promotion, and CAD/CAM and Technology Transfer. Part II consists of Tutorials on Computer Graphics, Survey of CAD/CAM Training and Educational Aspects, CAD/CAM Systems, and Economic Aspects of CAD/CAM.

The book is well presented and has a great deal of information related to CAD and CAM of interest, both to the specialist in this field, and to those peripherally interested. Much of the material will be valuable for reference purposes to the CAD/CAM specialist, but there must be some question over the relevance of much of the material to the development of technology in developing nations.

The first 17 papers make virtually no reference to developing nations. In section 6, however, the developing nations theme is explored and indeed the risks of introducing high technology too quickly is appraised.

The final session on CAD/CAM and Technology Transfer is mainly concerned with the transfer of technology to companies rather than from nation to nation. The two papers emanate from France and Finland and therefore give valuable contrasting views of that problem.

Overall, the book creates an impression of excellent technical presentations on a wide range of subjects, but missing the fundamental theme of the conference. Part of the problem is that really only the newly industrialized nations amongst developing countries have as yet a significant place for CAD/CAM applications. Seven of the speakers come from Brazil (the host nation), one from Mexico, three from the United States and 17 from Europe. One would have hoped to have on this subject speakers from the less developed countries describing the problems that they are experiencing. Perhaps their absence indicates that the CAD/CAM is not a *basis* for the development of technology in developing nations, but is a consequence of that development arising for other reasons.

J. L. BOGOD
London

P. CALINGAERT
Operating System Elements—A User Perspective
Prentice-Hall, Englewood Cliffs, New Jersey, 1982. 240 pp. £17.95.

The author emphasizes resource management as the central function, and takes pains to distinguish management policies from the mechanisms used to implement them. The focus is on principles rather than on example systems, the approach is descriptive rather than analytic and practical rather than formal. This book is designed for third and fourth year undergraduates who wish to know what an operating system does rather than how to design one. Any other reader who knows something of hardware structure and is familiar with queues and stacks, and with reading ALGOL, will find this book helpful. Queueing theory is left entirely to the short description of books for further study that follows each chapter. These cover European and American sources up to 1980. Most chapters are followed by a set of exercises to stimulate deeper thought on the material. The book does not cover computer networks because communication subsystems need to be studied first. Their influence on control programs makes this essential.

The book is well produced and clearly laid out and is strongly recommended. Unfortunately its price will tend to discourage students from purchasing their own copy.

P. GILES
Stirling

R. E. BERRY
Programming Language Translation
Ellis Horwood, Chichester, 1982. 175 pp. £15.00, £6.50 paper.

This is a pleasant little book, which I enjoyed reading. Its title might mislead people into thinking that it is about translating from one high-level language to another, but in fact it is about translating from high-level to low-level, i.e. compiling.

The first six chapters (lexical analysis, syntax definition and syntax analysis, symbol tables—structure and access, the run time environment, semantic processing, run time support) are concerned mainly with the high-level side of the fence; the next three (assemblers, macros, loaders) more with the low-level side. The final two (Pascal S compiler, Pascal S interpreter) are the real meat of the book, describing a compiler in detail with a complete listing of it, written in Pascal (but not in the Pascal S subset which it compiles).

Considerable prior knowledge of both computing in general, and Pascal in particular, are taken for granted, and detailed knowledge of the Pascal S compiler is also assumed before you reach it, particularly in the exercises at the end of each of the first eight chapters. For this reason it is rather a difficult book to read, as the King of Hearts' algorithm ('Begin at the beginning, and go on till you come to the end: then stop') certainly will not do, but no other order is suggested. Probably the only answer is to read it several times.

The Pascal S syntax is given in diagrammatic form, but with too many errors in the diagrams. Other misprints are not too bad: ('relativizer' is a nasty enough word without misprinting it 'relavitizer' though). The printing is unfortunate in that the typefaces of both the main text and the Pascal listings have virtually identical renderings of letter l and figure 1. In some places, I was actually misled by this and it is nasty even where not misleading.

Although there are references throughout the text to a bibliography, I came to the conclusion during my reading that the bibliography itself has been accidentally omitted. I finally came across it, nestling at the end of Chapter 9, but there is no indication anywhere else of where or how to find it.

Why is it that Pacal books so often give reserved words underlining, as here, or boldface, as if it were Algol? There are those, including myself, who believe that a language ought to distinguish such words from identifiers, and those who believe it to be disadvantageous. Whoever is right about this, the fact is that Pascal does not do it, and it is misleading (or unfair to Pascal) to pretend that it has this advantage (or disadvantage) when it does not.

I. D. HILL
Harrow

Announcements

9–12 JULY 1984
1984 National Computer Conference, Las Vegas Convention Center, Las Vegas, Nevada. The Twelfth Annual NCC has as its theme 'Enhancing Creativity' and will be chaired by Russel K. Brown, financial and management consultant. The Conference Program will focus on the changes in office, factory and home caused by the widespread availability of computing resources through cost reduction, ease of use and data communications and also on the latest technological developments responsible for these changes.
Further information may be obtained from:
Ann-Marie Bartels, telephone: 703-558-3613

20–22 FEBRUARY 1984
Fifth Annual Office Automation Conference, Los Angeles Convention Center, Los Angeles, California. The Conference theme is 'Office Automation and You' and it will comprise 45 sessions designed to be of interest to managers and administrators, technology managers and planners, users, consultants, analysts and implementors, and product designers and developers.

In addition to the Conference Program, a series of half and full-day Professional Development Seminars will be presented. These seminars will provide in-depth coverage of topics such as designing integrated systems, communications, integrating word and data processing, and personal computers.
Further information may be obtained from:
Ann-Marie Bartels, telephone: 703-558-3613

IFIP, the International Federation for Information Processing, has a Working Group on Computer Message Systems (IFIP WG6.5). A subgroup has been established to study the applications of computer message systems ('electronic mail', etc.) in assisting people with communication impairments (blindness, deafness, physical disabilities, etc.).

The subgroup has as goals: to promote contacts between people working in this area with different kinds of disabilities, and in different countries; also to examine the standards for interconnection of different devices and systems in order to promote international compatibility of interfaces. The subgroup also hopes to publish a low-cost newsletter in order to further these goals.

Organizations and individuals working in this area are invited to add their names to a mailing list for the prospective newsletter, and to supply descriptions of work in progress that relate to the focus of computer message systems for the communication impaired.

Any further information which may be helpful for instance notice of other resources available, or which could help avoid unnecessary duplication of effort is welcomed.
Contributions should be sent to:
Julian Davies, Department of Computer Sciences, Engineering and Mathematical Sciences Building, University of Western Ontario, London, Canada N6A 5B9.

For an anthology, I should welcome contributions of humor in the sciences, historic and contemporary, especially computer-related science. The ordinary man's disquiet about computers has sometimes been expressed in contrived jokes which bring the resented superiority of the expert down to earth. How are jokes changing with the spread of personal minicomputers?

I should welcome anecdotes, biographical notes, witty accounts, cartoons, parodies, verse, self-deception and hoaxes. Especially sought are items which, while humorous, also have value in the history of a science, providing insight into changing attitudes or illuminating personalities. Please identify fully the sources of contributions.
Contributions should be sent to:
Robert J. Weber, 104 Davey Laboratory, University Park, Pennsylvania 16802, USA.

25–28 JUNE 1984
Fourth Latin American Conference in Computer Science, Santiago, Chile. Authors are invited to submit papers for this conference which is sponsored by the University of Chile. Suggested topics include Algorithms, Data Structures, Distributed Systems, Software Engineering, Performance Evaluation, Data Bases, Office Automation, Security, Data Communications, Computers and Education.

Four copies of the full paper (10 pages maximum) written in English, Spanish or Portuguese should be sent before 30 January 1984 to the Program Committee Chairman, Gaston Gonnet, Department of Computer Science, University of Waterloo, Ontario N2L 3G1, Canada.