PRESSMAN, I. (1970). A Mathematical Formulation of the Peak-Load Pricing Problem, *Bell J. Econ. and Mgmt. Sci.*, Vol. 1 No. 2, pp. 304-312.
SHAFTEL, T. L. and ZMUD, R. W. (1974). Allocation of Computer Resources Through Flexible Pricing, *The Computer Journal*, Vol. 17 No. 4, pp. 306-312.
SHARPE, W. F. (1969). *The Economics of Computers*, Columbia University Press, New York.
SMIDT, S. (1968). Flexible Pricing of Computer Services, *Management Science*, Vol. 14 No. 10, pp. 518-600.
STEINER, P. O. (1957). Peak Loads and Efficient Pricing, *Quarterly Journal of Economics*, Vol. 71, pp. 585-610.
WILLIAMSON, O. E. (1966). Peak Load Pricing and Optimal Capacity Under Indivisibility Constraint, *American Economic Review*, Vol. 56, pp. 810-827.

Book reviews

Introduction to Computer Data Processing Second Edition by Margaret S. Wu, 1979; 521 pages. (*Harcourt Brace Jovanovich*, £10·35)

This is a typically large (521 pages), well produced and substantial American text book. The artwork and pictures are of a high quality but the 'pop art' cover and chapter openings do not help a book which is supposed to give a reasonable overall view of the computer and its applications. Another unusual feature is confining the material to only half the page, irrespective of whether there is any artwork present or not.

The book has been designed for an introductory data processing course without specifying the sort of course or level of student. It is primarily based on the old batch mainframe approach and covers various aspects of these fairly comprehensively. However, for the ever-increasing numbers who never come across this stage in the development of computers, the book does not contribute very much, particularly as it still has a chapter on punched card procedures. A basic aim was focusing on 'the fundamental concepts of computing' but it has 124 pages describing various programming languages and techniques such as flowcharting. The book has some useful illustrations and diagrams but, apart from this, I feel that there are many more suitable text books available covering this field.

A. A. MOELWYN-HUGHES (Leicester)

Computer System Reliability by Roy Longbottom, 1980; 321 pages. (*John Wiley*, £11·50)

How did the Reviews Editor know that the system for which I am responsible was not performing as it should? That I was critical of its reliability or rather the lack of it! It was thus timely to be asked to review a book on computer system reliability.

The book is a thorough and detailed account of factors which impinge upon unit and system reliability and thus upon methods of calculating and predicting reliability figures and serviceability ratios. It is not until the end of Chapter 11 that the writer addresses 'quality of service from a user's point of view', where he rightly states that the user requires some estimate of what to expect and thus a basis of complaining if service levels are unacceptable. The writer appears not to distinguish the manager of the computer facility from the end user of the service that is provided. It is the reviewer's experience that certainly for an online system end users can be relatively tolerant of a system having an apparently low serviceability ratio provided that the number and frequency of interruptions to service are minimised. As a manager, I have observed a relatively high (acceptable?) serviceability ratio when the end users are complaining of frequent interruptions to the service. Thus end users of a service appear to look for consistency, apparently either consistently good or consistently bad, provided it is predictable! The book makes no attempt to analyse the psychology of the end user; however, it does an excellent job of discussing the nature of computer systems and analysing their performances. It commences with a discussion of 'failures', proceeds through 'reliability variations over time', 'quality assurance', 'environment' and 'software', all as factors impinging upon a total system. The author is then in a position to discuss in separate chapters 'fault symptoms', 'down time and maintenance', 'serviceability', 'maintainability' and 'reliability calculations'. Roy Longbottom is head of the large scientific systems branch of the Central Computer Agency and has been able to draw upon considerable experience and statistics of a wide range of processors, systems and components to illustrate his text in tabular and graphical form.

The author rightly spends time defining terminology as interpreted by the manufacturer and as seen and experienced by the user. He clearly distinguishes time to repair a fault from investigation times undertaken by the manufacturer and incidents observed by the user. We all know of the time and trouble caused by intermittent faults and their investigation as against the relatively short time lost to diagnosis and repair once a fault has become solid. The user of course is only too conscious of time lost to system dumps and analysis to aid engineering or software investigation and then time to recover the operational situation following an incident. The author rightly contrasts down time seen by the user as against that reported by a manufacturer. This text is very useful to any reader, be he designer, manufacturer, service engineer or user, to get a clear understanding of records he may wish to keep and methods of analysis and report. Indeed, the author dedicates two chapters to practical reliability and serviceability calculations and an appendix gives a program for a programmable calculator.

The other main content of the book is a detailed discussion on acceptance trials with particular emphasis on procedures followed by the CCA. Also reported are the procedures advised by the General Service Administration (GSA) of the American Government. An appendix details a set of exerciser programs written in FORTRAN which have been used as part of acceptance trials.

The book requires detailed reading and study to understand all that it has to say, requiring time which is recommended as a worthwhile investment. If, as a result, users and manufacturers have a better mutual understanding of reliability and serviceability leading to users demanding, and manufacturers achieving, better performance figures, then the author will have done the industry a service.

A. H. WISE (Leicester)

Fundamentals of Fortran Programming, Second Edition, by R. C. Nickerson, 1980; 450 pages. (*Prentice-Hall* £7·75 paper)

This is an extraordinarily thorough introduction to FORTRAN and to programming aimed at students in a wide range of disciplines. The language described is based on the 1966 standard but many common extensions and some FORTRAN 77 features are also covered, always carefully delineated by 'some versions have . . .'. Good program structure is discussed but not pushed too hard.

The material is said to have been class-tested at San Francisco State University and the author seems to have anticipated almost every possible question from students. This completeness makes the text suitable for self-teaching but also makes it remarkably slow; by page 82 only simple READ, WRITE and FORMAT have been covered. Arrays come in at page 278 and subprograms at page 358. The author sticks to his title by not getting as far as unformatted input/output or more esoteric things like EXTERNAL, COMPLEX or P formats, or FORTRAN 77 facilities like direct-access input/output and he omits some commonly used statements, possibly on the grounds that their use may be considered poor practice, such as alternate returns, ENTRY, ASSIGN and EQUIVALENCE. The fundamentals however get exhaustive treatment.

D. T. MUXWORTHY (Edinburgh)