Book Reviews

Minicomputer Systems: Organization and Programming (PDP-11)—Richard H. Eckhouse, Jr. (Englewood Cliffs, NJ: Prentice-Hall, 1975, 343 pp.). *Reviewed by Martha E. Sloan, Department of Electrical Engineering, Michigan Technical University, Houghton, MI 49931.*

Minicomputer Systems is a catching title for a book, combining, as it does, two "relevant" terms. This book is the second with this title published by Prentice-Hall. The first, *Minicomputer Systems*, by Cay Weitzman [1] deserves its title; it is a thorough treatment of the structure, implementation, and applications of a wide variety of minicomputers and peripheral equipment. Unfortunately, the title is a misnomer for Eckhouse's book, which is more appropriately described by its secondary title, *Organization and Programming (PDP-11)*. It deals with the PDP-11 from a computer scientist's viewpoint but says little about systems.

The book is meant for readers who are familiar with Fortran; some, though not many, programs are described in Fortran. The author intends for it to "serve as an educational stepping stone to more advanced topics in computer science." Towards this end, he extends topics to their most general forms. Thus this is not a primer for those who wish to get a PDP-11 and use it. It is a text for those who wish to understand and to use the PDP-11 as a stepping stone in their progress toward knowledge of computer science. As such it contrasts with Korn's *Minicomputers for Engineers and Scientists* [2], a much more practical work, and with the better minicomputer manuals, a category that includes no DEC PDP-11 manuals.

The organization of the book is straightforward. The first chapter discusses computer fundamentals: organization, number representation, and logic. The second treats programming fundamentals: flowcharts, coding, assemblers, and addressing, in some generality using a hypothetical, simplified PDP-11-like computer. The third chapter details the structure of the PDP-11. Chapters 4 through 6 expand on programming and data structures. Chapter 7 discusses editors, loaders, macroassemblers, and debugging. The last two chapters treat operating systems, including a detailed discussion with a complete listing of a Modest Multiprogramming System written by Eckhouse. The book also contains seven appendices ranging from practical exposition of binary and octal numbers to a table of powers of 2 that is useful mostly for readers who lack a calculator with y^x function. Most chapters have a set of well-selected exercises and recent references.

The level of the text is appropriate for strong college students. Its depth and its computer science orientation are shown by its abstract treatment of topics and its introduction of advanced topics. For example, Eckhouse discusses negative radices, such the radix of -3, in his introductory section on number representation. His discussion of recursion is based on the classic example of calculating N factorial. The most practical chapter is Chapter 6, on input–output programming, with excellent material on the nature and handling of teletypes, disks, and tapes.

The execution of the book could be improved. The number of mistakes suggests hasty printing and proofreading, such as in the program for N factorial on p. 105. Formatting of figures and programs is also a problem. For example, the program segment showing the basic steps of the JSR instruction on p. 97 is misaligned. Figure 4.11 showing coroutine interaction needs to have the correspondence of the steps with the parts of the figure clarified and to have the apparently stray numbers and arrows removed or explained.

Minicomputer Systems is a natural for computer organization and assembly language courses based on the PDP-11. In its exclusive orientation to that minicomputer, it contrasts with Gear's *Computer Organization and Programming* [3] and Stone's and Sieworek's *Introduction to Computer Organization and Data Structures: PDP-11 Education* [4], both of which also cover the IBM 370. It is perhaps most comparable to Stone and Sieworek with more detail on the PDP-11, especially on operating systems, but less on data structures.

REFERENCES

[1] C. Weitzman, *Minicomputer Systems* Englewood Cliffs, N.J.: Prentice-Hall, 1974.
[2] G. A. Korn, *Minicomputers for Engineers and Scientists.* New York: McGraw-Hill, 1973.
[3] C. W. Gear, *Computer Organization and Programming*, 2nd edition. New York: McGraw-Hill, 1974.
[4] H. S. Stone and D. P. Sieworek, *Introduction to Computer Organization and Data Structures: PDP-11 Edition.* New York: McGraw-Hill, 1975.

Identification Techniques—R. C. Desai and C. S. Lalwani (Bombay and New Delhi: Tata McGraw-Hill, 1972, 320 pp.). *Reviewed by Vimal Singh, Department of Electrical Engineering, Motilal Nehru Regional Engineering College, Allahabad, India.*

This book, containing eight chapters, introduces the reader to some identification problems and their solutions. Chapter 1 (9 pp.) emphasizes the need of identification for adaptive control systems. Chapter 2 (38 pp.) is a brief introduction to statistical and optimization fundamentals which are required for the understanding of the identification techniques discussed in subsequent chapters. Chapter 3 (15 pp.) describes the classical parameter-tracking methods (parameter perturbation, test-signal perturbation, and parameter-tracking using normal input–output record), where identification is shown to be an integrated part of the overall adaptive control scheme.

The various impulse response identification methods (deconvolution and correlation techniques, matched filter identification, functional identification, and identification using orthogonal sinusoidal functions), most of which aim at the solution of the well-known Wiener–Hopf equation, are discussed in Chapter 4 (66 pp.). Estimation methods (such as Kalman's filter, the Bayesian approach, and maximum likelihood estimation) which employ *a priori* statistics are described in Chapter 5 (31 pp.). Parameter estimation without *a priori* statistics is considered in Chapter 6 (62 pp.) where several approaches (quasi-linearization, steepest gradient, sensitivity functions, and invariant imbedding) for the solution of the TPBVP (which is actually an equivalent version of the original least squares estimation problem, through variational theory) are described.

Chapter 7 (70 pp.) is devoted to techniques of estimating distributed parameters, including the method of Tzafestas and Nightingale among other methods, and Chapter 8 (24 pp.) presents some miscellaneous techniques.

The book contains an appropriate number of references which are distributed chapterwise. Illustrative examples are given at necessary points.

Being self-contained, concise, and fairly understandable, this book is worth reading for a quick attainment of the basic background in the subject of identification. Other available books can subsequently be referred for a more complete study, if desired.

Zuverlässigkeit von Systemen: Band 2, Toleranzanalyse linearer stetiger Systeme (Reliability of Systems: Vol. 2, Tolerance Analysis of Linear Lumped Systems)—K. Reinschke (Berlin: VEB Verlag Technik, 1974, 226 pp.). *Reviewed by K. Géher, Technical University, Budapest, Hungary.*

There are numerous effects which cause deviations between the calculated and measured parameters of systems. Investigation of these deviations are treated by the method of tolerance analysis. The prediction of tolerances is closely connected with the reliability of systems. The solution of the tolerance problem has great practical importance in engineering design and has many open questions for further research.

This book covers results published prior to 1972 and leans heavily on the author's extensive work in the field. It discusses the basic concepts and some important applications quite well and includes