Books

Operating Systems: A Systematic View, William S. Davis, Addison-Wesley Publishing Company, Inc., Reading, MA, 1987. 539 pp. (ISBN 0-201-11185-3).

This book begins with the question "What Is an Operating System?" The author, Professor of Systems Analysis at Miami University in Oxford, Ohio, attempts to answer that question by first describing the basic system resources beginning with hardware. He then adds additional material in a clear, logical, easy-to-understand manner, so that in the last of five sections he is able to give the reader an understanding of virtual machines, networks and distributed systems, and database systems.

This easy-to-read book is an introductory text intended for an audience with only a reasonable understanding of basic computer concepts and some programming experience in at least one compiler language. The author presents a methodical, pragmatic approach to operating systems rather than a theoretical approach. Instead of describing a generic operating system, the author gives a quick introduction to the MS-DOS, UNIX®, IBM DOS/VSE, and IBM System/360 OS/VS1 and OS/VS2 operating systems.

To reinforce understanding of the material, each chapter ends with a summary and a set of exercises. The text is enhanced by a large number of clear illustrations which are especially helpful in demonstrating sequences.

Leo J. Kwiatkowski

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System Simulation—Programming Styles and Languages, Wolfgang Kreutzer, International Computer Science Series, Addison-Wesley Publishing Company, Inc., Reading, MA, 1986. 366 pp. (ISBN 0-201-12914-0).

In general, a simulation study consists of a programmed representation of some model combined with some suitable experimental designs for its exploration. Most simulation textbooks tend to concentrate on the statistical aspects of simulation. This textbook offers an interesting alternative, as its main topic is the art of simulation programming. Initially, some general aspects of simulation modeling are discussed. The author suggests that graphical symbol systems, pseudocodes, and specialized programming languages all have their place in a simulator's toolbox. PASCAL is chosen as a programming tool to illustrate programming techniques, mainly on the basis of its current popularity. This language is by no means an ideal general-purpose language for simulation (but then, which one is?), although it does offer flexible, safe control and data structures, which encourages good coding styles.

Four different modeling styles are discussed in detail: Monte Carlo methods, and continuous, discrete-event, and combined simulation. The characteristics of each modeling style are explored, and examples of PASCAL programs illustrate matters extensively, using a toolbox of procedures and functions that are provided in the appendices. Although the examples are introduced *ad hoc* and are perhaps occasionally too detailed, they clearly help the reader understand the differences in modeling styles and underwrite the need for more specialized modeling languages.

The main section of the book is devoted to a discussion of the available simulation programming systems. The author gives a fairly comprehensive treatment of the history and family lines of the various simulation programming languages. Four levels of simulation software are distinguished, ranging from relatively low-level to extremely high-level systems: general-purpose programming languages (FORTRAN, PL/I, PASCAL, etc.), procedure-oriented simulation software (GASP, SIMSCRIPT, SIMULA, etc.), modeling with descriptive scenarios (DYNAMO, SLAM, GPSS, etc.) and modeling with model generators and declarative systems (DRAFT, SCERT, CASE, etc.). The implementation of these systems varies from procedure libraries to language interpreters and (pre)-compilers. Although the treatment of simulation programming languages is fairly complete, some major recent additions such as SIMAN, TESS, and PROSIM are lacking and should have been incorporated.

The author claims not to believe in the merit of some universal language, for it is a cognitive tool that should be appropriate for the specific task to which it is put. On the other hand, object-oriented programming is clearly being favored by the author as having the best potential for describing complex systems in a well-structured and natural way. In this context, considerable attention is given to programming using SIMULA and DEMOS. The author also believes that interactive programming environments using window-based graphics running on personal workstations (e.g., SMALLTALK) will become increasingly significant. It is suggested that extensions to expert systems (for example, tools hosted by PROLOG) have a lot of potential as well.

A separate chapter is devoted to simulation problems for each of the four programming styles. Just like the examples that are listed throughout the textbook, the simulation problems are all taken from the imaginary realm of DreamWorld (myths and legends), which makes for an interesting environment to simulate. The problems can be solved using the PASCAL toolboxes provided, or any other simulation system the reader is familiar with. Some solutions to the problems are provided in the appendices. Also listed in the appendices is an annotated bibliography of textbooks on simulation methodology.

The famous philosopher Wittgenstein once said, "The limits of my language are the limits of my world." This saying is still true today, and the choice of world view, programming style, and language to model a particular project is never an easy one. This book tries to lay a foundation for awareness of the available tools and techniques, and their characteristics, strengths, and weaknesses. If your primary interest in simulation is generating numeric information to measure a system's performance, this book could be useful as a complement to the statistical textbooks on simulation. However, if programming methodology and the comparison of programming languages are important to you, you should definitely become familiar with the contents of this book.

Arie Lagerwaard

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