DISCRETE-EVENT SIMULATION:
MODELING, PROGRAMMING, AND ANALYSIS
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Features

The book describes the fundamentals of discrete-event simulation from the perspective of today's highly interactive PC and workstation environments. It focuses on modeling, programming, input-data preparation, output-data analysis and presentation of results. It's features include:

a. Detailed account of alternative modeling and programming methods. Compares point-and-click environments that merge these two into a single on-screen activity with the alternative of first modeling simulation logic and then converting it to executable code.

b. Description of the principal concepts of delay systems, the generic setting for most discrete-event simulations. Includes a discussion of system processes such as waiting time, number waiting, and resource utilization, and an account of how to convert sample-path data collected on these processes into sample averages that characterize system performance.

c. Describes how to assess statistical accuracy of sample averages and illustrates the concepts using LABATCH.2, an automated run-time output analyzer, written in C, FORTRAN, and SIMSCRIPT II.5 and easily accessible via the Internet.

d. For presentation of results, describes ways of assessing credibility of output-data-based distinctions made among performance averages corresponding to models run with different values for input parameters, different operating logic, or both.

e. Describes input-distribution fitting principles when either data or only expert opinions are available. In particular, discusses fitting when data suggest slower than exponential right-tail convergence.

f. Analysis of how computing time grows with problem size as a function of number of servers and number of stations.

g. Examples carried forward throughout the book illustrate how different concepts apply. In addition to illustrating examples with Arena and SIMSCRIPT II.5, the book describes all concepts in a format that allows other simulation software systems to be used to solve exercises.

h. Provides students with the full range of challenges encountered in a simulation study by carrying the same problem exercises through chapters on modeling, programming, statistical output analysis, and making sense of the output for presentation.

i. Each chapter ends with a "lesson learned" section that summarizes important points of the chapter.

j. Instructor's solutions manual available from the publisher for selected exercises.

k. Web page devoted to information about book at

$$\text{http://www.or.unc.edu/}\sim\text{gfish/desnews.pdf} \ .$$

Intended Audience

The book is intended for an introductory course on discrete-event simulation for graduate students and advanced undergraduates in the mathematical and engineering sciences, particularly, operations research, industrial engineering, operations management (business), computer science, telecommunications engineering, and transportation engineering. It is also intended as a handy reference for professionals in these fields who wish to broaden their knowledge of discrete-event simulation.

Benefits

The reader can expect to come away with a considerably heightened sense of what it takes to perform a discrete-event simulation and to produce results that weave a scientifically defensible account of the sample-based findings.