Decision tables


Book Review


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The literature on simulation is full of descriptive accounts of applied problems which have been successfully solved only when a digital computer has been used to simulate the real system. It also abounds with detailed technical articles on the generation of pseudo-random numbers and the efficient use of these to produce random variates from different probability distributions. But apart from descriptions of several specific computer simulation languages comparatively little has been written on how to simulate.

This book is an attempt to fill the gap by developing a “methodology for planning, designing, and carrying out simulation experiments”. Chapter 1 presents an interesting account of simulation and its relationship to the scientific method from a philosopher’s viewpoint, marred only by an unnecessary attempt to classify simulation models. In Chapter 2 a nine-step procedure for planning simulation experiments is proposed and discussed. The procedure suggested is admitted to be arbitrary, but does provide a suitable framework for the remaining chapters of the book which, the authors claim, place “particular emphasis on those aspects of computer simulation which are not treated in existing textbooks”. Unfortunately the book does not fully substantiate this claim, though much credit is due to the authors for attempting to systematize some vague but important areas of simulation design and analysis.

Chapter 3 is concerned with the generation and testing of sequences of pseudo-random numbers. It gives a particularly good account of congruential methods and includes a brief but useful appendix on elementary number theory. Chapter 4 presents the usual methods of generating stochastic variates, viz. inverse transformation, rejection and the method of mixtures. Methods for sampling from all the standard distributions follow, each being preceded by a laboured description, which must surely be unnecessary since in the preface the authors assume some knowledge of mathematical statistics in their readers. FORTRAN subroutines are given for the generation procedures presented. It is unfortunate that so little is included on generating correlated variates.

For those who believe that simulation techniques were invented by, and exist to solve the problems of, frustrated queueing theorists, examples are given in Chapters 5 and 6 of simulation models applied to queueing, inventory and scheduling systems, and to the firm, industry, and the national economy as a whole. Several useful exercises for the reader are given at the end of both these chapters, although most assume a working knowledge of FORTRAN. The authors’ preoccupation with FORTRAN throughout the book is, perhaps, the feature most likely to irritate ALGOL proponents. This is particularly true of the inevitable chapter on simulation languages which follows. The reviewer found this the most disappointing chapter in the book. In spite of detailed descriptions of several languages (all American in origin) no critical comparison is made; and whereas GPSS II is described in 30 pages (reprinted verbatim from the IBM Systems Journal), GSP, ESP and CSL are together dismissed in a single page.

Chapters 8 and 9 discuss the problem of verification and design of simulation experiments respectively. The former is in the nature of a philosophical diversion and is too brief to be really useful. Design of experiments receives more attention but the chapter is in effect little more than a valuable literature survey of the area.

The references and bibliography which follow each chapter are one of the strong points of the book; even if the reader may sometimes be disappointed in the content of a section, he is never ignorant of where to look for further guidance. This book is ambitious in its aim and in several respects falls short of achieving it. It is nevertheless a worthwhile addition to the potential simulator’s bookshelf. J. C. Wilkinson