very high in this situation. In essence, there are many and better examples than the one used by the author on pages 2 and 3.

Given the book's purpose and intended audience, the probability example on page 7 concerning the lottery engenders more confusion in the reader. The author does not solve this problem in its entirety, and does not address the more difficult probability question. According to the author, one must resort to "the topics of *permutations* and *combinations* in a specialist text" to solve this difficult problem. Why the author brings up this illustration at all, considering that the result is beyond the scope of the text, is unclear.

The definition of "at *random*" on page 8 is wrong. Random does not mean that each result of a statistical experiment is *equally likely.* This error is repeated on page 29, where random is defined a second time.

In the development of probability theory, the author defines the *multiplication* rule before he defines the *addition* rule. This is unusual; books from the noncalculus approach to that of a professional mathematician would define the simpler rule (addition) first. Why on page 9 does the author define conditional probability so early in the development of probability is beyond me as well as probably the great majority of my colleagues in education. The approach to Bayes theorem again is not well written. Although the use of the formula is correct, students can understand this theorem better when teachers use tables to illustrate the calculations, which eventually leads to a clearer understand of the theorem and its applications.

In Chapter 2, a simple introduction to boxplots, histograms, and the like would help the reader understand the concepts associated with analyzing data. The notion of symmetry could be explained, as could normality, skewness, and kurtosis. For example, the author should define the five number solutions for describing boxplots, which could allow the reader to see how data sets differ in both location and dispersion. Nothing like this is developed or well elucidated in this chapter.

In Chapter 3 the author does point out the need to identify the population model for identifying the parameters to be estimated. The geometric distribution is not necessary at this point. The extensive formulas used to describe distributions are not very illuminating at best. The conventional reader would benefit from charts, diagrams, and plots of these distributions with adequate references to useful applications.

Chapter 4 introduces *inferences* about μ and σ, but does not relate this to the discussion of population models in the preceding chapter. Furthermore, there is no explicit definition of degrees of freedom. All of this leaves one to believe that the author is not doing a complete job in these early chapters. I am surprised that an editor did not notice these omissions before publication. Chapter 5 continues the discussion of the Bayes theorem and its approach to inference. The discussion of the controversy on pp. 94–95 is misplaced; the author should have fully illustrated the Bayesian approach first. Then he should have pointed out the differences in the thought process with reference to the "frequentist" approach and the conclusions to be drawn. At that point, the author could discuss the "great debate" among statisticians as to their usefulness.

In the latter half of the book, the author describes the essential topics of regression (linear, nonlinear, and multiple), correlation, scaling, and multivariate methods. Of course, these are essential topics; however, it is doubtful that these discussions would be fruitful for one with no or limited experience with these topics. At best, these chapters are perhaps useful as reference material, but not as learning material. There is no discussion of computer software for the huge computational problems. The author does not warn against the use of simpler presentation software with some statistical algorithms (i.e., EXCEL), which may provide inaccurate and often wrong results. Too often, I have found miscalculations with this software, leading to inappropriate and often false conclusions or decision signals. Finally, better application applications should illustrate the author's essential points.

The reviewer thanks Ernest Kurnow, Professor Emeritus, New York University for helping with this review.

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Probability and Statistics With R, by María Dolores UGARTE, Ana F. MILITINO, and Alan T. ARNHOLT, Boca Raton, FL: Chapman & Hall/CRC, 2008, ISBN 978-1-58488-891-8, 728 pp., $89.95.

R (R Development Core Team 2008) is an independent, open-source, and free implementation of the S programming language that provides an environment for statistical computing and graphics. R allows users to increase its functionality by defining new functions. This has allowed numerous users to contribute packages and libraries to expand the capabilities of R in recent years. For this reason, R not only has received much attention from statisticians and scientists as a tool in research, but also has been used as a teaching media for statistics. This book introduces R as teaching software for probability and statistics and uses R to solve problems in statistical inference and data analysis.

This book covers a wide range of topics in both theoretical and applied statistics, including exploratory data analysis, univariate and multivariate distribution theory, sampling theory and sampling distributions, point and interval estimation, hypothesis testing, nonparametric methods, experimental design, and regression analysis. Each chapter contains numerous examples with detailed steps as well as R codes to illustrate the theories and methodologies. Problems are included in every chapter for practice.

Although the book's title demonstrates that its focus is on R, the authors list both R and S–PLUS (Insightful Corp 2008) commands and clearly note when a command is applicable only in either S–PLUS or R. Therefore, S–PLUS users also should find this book useful. Detailed executable codes and codes to generate the figures in each chapter are available online at *http://www1.appstate.edu/~arnholta/PASWR/front.htm*.

The book begins in Chapter 1, the book starts with a concise introduction of the basics in S that includes an overview of S language and syntax, structure, data manipulation, and user-written functions in R and S–PLUS. Chapter 2 discusses exploratory data analysis and presents some important graphical and quantitative techniques. This chapter provides a good coverage of the commands and syntax in R for graphics.

After studying the first two chapters, a reader should be able to manage the basic techniques in R for data manipulation and graphics that are needed in the subsequent chapters. Chapters 3–5 discuss general probability, random variables, and distribution theories, along with the use of R to compute and display probability mass/density and distribution functions, compute numerical integrations, and generate pseudo–random numbers.

Chapters 6–9 cover topics on statistical inference. Chapter 6 introduces sampling theory, parameters, estimators, and sampling distributions. Chapters 7 and 8 cover point and interval estimation. Chapter 9 discusses hypothesis testing. In these chapters R is used to illustrate the ideas in sampling distributions, obtain point and interval estimators, compute critical values for hypothesis testing, and perform the test procedures.

Chapter 10 continues the discussion on statistical inference by encompassing various nonparametric methods and nonparametric statistical tests, including two-sample problems, goodness-of-fit tests, categorical data analysis, nonparametric bootstrapping, and permutation techniques.

The book's last two chapters are devoted to statistical modeling. Chapter 11 discusses experimental design, and Chapter 12 covers simple and multiple regression analysis. These chapters contain three case studies based on real-world examples that serve as exercises in applying the procedures discussed.

Appendixes covering S commands and random vectors and matrixes are included. It is noteworthy that the appendix on S commands provides a quick reference list of the commands used throughout the book with clear descriptions, which will be valuable for many readers.

Today the capability to manage at least one of the statistical computing environments becomes an essential component in undergraduate and graduate studies in the field of statistical science. This book serves this purpose well by nicely blending mathematical statistics, statistical inference, statistical methods, and computational statistics using S language together. Students or self-learners can learn some basic techniques for using R in statistical analysis on their way to learning about various topics in probability and statistics. This book also could serve as a wonderful stand-alone textbook in probability and statistics if the computational statistics portions are skipped.

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