

out imposing undue hardship on the reader who wants to refer to particular ones. The level of discussion, however, is somewhat uneven. The short section on Anscombe's asymptotic solution to the problem of finding a confidence interval of specified width for the mean of a normal distribution with unknown variance fails completely. On the other hand, the discussion of stochastic approximation, a subject which has received considerable theoretical attention in the last 15 years and has recently found applications in engineering, is easily understood and well documented.

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Logic for Computation

Logic and Algorithms. With Applications to the Computer and Information Sciences. ROBERT R. KORFHAGE. Wiley, New York, 1966. 206 pp., illus. \$7.95.

This book is a survey of aspects of mathematical logic and the theory of algorithms which are considered by the author to be relevant to computer science. The treatment is extremely informal in nature and emphasizes the semantic rather than the syntactic aspects of formal systems. Proofs are mostly omitted or indicated by example. Approximately one-fourth of the book is devoted to exercises and their solutions. Topics touched upon include set theory, binary vectors, Markov algorithms, Turing machines, single-address digital computers, programming languages, Post languages, phase-structure (context-free) languages, and the history of computing. Covered more extensively are the minimization of Boolean functions with the use of Karnaugh maps and the Quine-McCluskey method, the propositional calculus and Polish notation, algorithms via flow charts, and the first-order predicate calculus.

In general, the author appears to have achieved a good portion of his purpose of bringing some understanding of logic to the nonlogician. The best chapter is the third, which develops the propositional calculus along conventional lines. However, the book is not without its uneven spots. In chapter 1 the definition of a 1-1 mapping in terms of the inverse relation seems overly formal. On the other hand, the term "ordered pair" is vaguely defined as a symbol with "a distinction between

the first and second element." Two axiomatic systems for Boolean algebras are introduced in chapter 2, but their equivalence is not demonstrated and only one of them is used in subsequent discussion. In chapter 6 validity of a first-order sentence is correctly defined, but confusing examples are given which are "valid" only for a particular interpretation and not in the domain under consideration. In chapter 5 flow charts and Markov algorithms fare better than Turing machines. The existence of a universal Turing machine *M* is briefly mentioned and accompanied by the erroneous statement that "feeding the description of *M* itself into *M* leads to unsolvable problems." The unsolvability of the halting problem is mentioned, but not proved. Unfortunately, by not devoting two or three pages to a good informal proof of this important theorem, the author has missed a good opportunity to dispel much of the mystery regarding the nature of unsolvability results.

All in all, I think *Logic and Algorithms* could be used successfully in a sophomore course. The degree of rigor would probably not be adequate for more advanced students.

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Books Received

Advances in Cryogenic Engineering. vol. 12. Proceedings of a conference (Boulder, Colo.), June 1966. K. D. Timmerhaus, Ed. Plenum Press, New York, 1967. 804 pp. Illus. \$25. Eighty-two papers.

Advances in Immunology. vol. 6. F. J. Dixon, Jr. and J. H. Humphrey, Eds. Academic Press, New York, 1967. 589 pp. Illus. \$18.50. Seven papers.

Advances in Machine Tool Design and Research 1966. Proceedings of the 7th International M.T.D.R. Conference (Birmingham, England), September 1966. S. A. Tobias and F. Koenigsberger, Eds. Pergamon, New York, 1967. 708 pp. Illus. \$34. Forty-three papers.

Advances in Organometallic Chemistry. vol. 5. F. G. A. Stone and Robert West, Eds. Academic Press, New York, 1967. 397 pp. Illus. \$16.50. Six papers.

Advances in Plasma Dynamics. Proceedings of the Sixth Biennial Gas Dynamics Symposium (Evanston, Ill.) August 1965. Thomas P. Anderson and Robert W. Springer, Eds. Northwestern Univ. Press, Evanston, Ill., 1967. 341 pp. Illus. \$15. Fourteen papers.

Antibodies to Biologically Active Molecules. Proceedings of the second meeting of the Federation of European Biochemical Societies (Vienna), April 1965. Bernhard Cnader, Ed. Pergamon, New York,

1967. 432 pp. Illus. \$18.50. Thirteen papers.

Applied Naval Architecture. R. Munro-Smith. Elsevier, New York, 1967. 423 pp. Illus. \$14.

ASTM Manual on Quality Control of Materials. Prepared by ASTM Committee E-11 on Quality Control of Materials. American Soc. for Testing and Materials, Philadelphia, 10th printing, 1967. 150 pp. Illus. Paper, \$2.50.

Astrodynamics: Applications and Advanced Topics. Robert M. L. Baker, Jr. Academic Press, New York, 1967. 556 pp. Illus. \$16.50.

Astronomicum Caesareum. Peter Apianus. Edition Leipzig, Leipzig, 1967. Facsimile (limited to 200 numbered copies) of the 1540 (Ingolstadt) edition. 122 pp. Illus. Calif. Commentary in German and English, 108 pp. Illus. 1950 MDN.

A Biologist Remembers. Karl von Frisch. Translated from the German (Berlin, 1957) by Lisbeth Gombrich. Pergamon, New York, 1967. 210 pp. Illus. \$6.

Capital Punishment. Thorsten Sellin, Ed. Harper and Row, New York, 1967. 300 pp. Illus. Paper, \$3.50. Readers in Social Problems Series. Twenty papers.

Carbanions in Synthesis. D. C. Ayres. Oldbourne Press, London; Davey, New York, 1967. 215 pp. Illus. \$10.50. Oldbourne Chemistry Series.

Carbohydrate Chemistry. Eugene A. Davidson. Holt, Rinehart, and Winston, New York, 1967. 447 pp. Illus. \$11.95.

Case Studies in American Industry. Leonard W. Weiss. Wiley, New York, 1967. 377 pp. Illus. Paper, \$2.95; cloth, \$5.95. Introduction to Economics Series.

The Coming of the Space Age: Famous Accounts of Man's Probing of the Universe. Selected and edited by Arthur C. Clarke. Meredith Press, New York, 1967. 315 pp. \$6.95. Thirty-six papers.

Communication System Engineering Handbook. Donald H. Hamsher, Ed. McGraw-Hill, New York, 1967. Unpaged. Illus. \$28.50.

Comprehensive Textbook of Psychiatry. Alfred M. Freedman and Harold I. Kaplan, Eds. Williams and Wilkins, Baltimore, 1967. 1692 pp. Illus. \$24.75.

Computers on Campus. A report to the president on their use and management. John Caffrey and Charles J. Mosmann. American Council on Education, Washington, D.C., 1967. 221 pp. Illus. Paper, \$3.

Constructive Real Analysis. Allen A. Goldstein. Harper and Row, New York, 1967. 192 pp. Illus. \$9.25. Harper's Series in Modern Mathematics.

The Doctor Shortage: An Economic Diagnosis. Rashi Fein. Brookings Institution, Washington, D.C., 1967. 211 pp. Illus. \$6. Studies in Social Economics Series.

The Dolphin Smile: Twenty-nine Centuries of Dolphin Lore. Eleanore Devine and Martha Clark. Macmillan, New York, 1967. 392 pp. Illus. \$7.95.

Domestic Sources of Foreign Policy. A symposium (Princeton, N.J.), March 1965. James N. Rosenau, Ed. Free Press, New York, 1967. 356 pp. Illus. \$7.50. Eleven papers.

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