

26[Z].—JAMES T. CULBERTSON, *Mathematics and Logic for Digital Devices*, D. van Nostrand Co., New Jersey, 1958, x + 224 p., 23 cm. Price \$4.85.

This text is intended for students with a background of college algebra who plan to enter the computer field. As the author points out in his first sentences, it “presents neither a course in programming computers nor a mathematical analysis of computing mechanisms. Preliminary to these things, it provides a course in some mathematics which the student will find useful later”. Specifically, the material covered includes some combinatorics and probability, Boolean algebra and propositional calculus, with applications to switching circuits. These topics are covered by a text written in a highly readable colloquial style, plentifully illustrated by examples and by the tremendous total of 1262 numbered exercises. (The latter are “dressed-up”, provided with continuity and some attempt at humor in a manner which the reviewer finds slightly repellent—but this is a matter of taste. The device does have the merit of permitting problems which are essentially identical to appear in radically different formulations.)

The unifying concept of the first part of the text is that of the neuron model. Various successive refinements of the receptor-central-effector system are introduced, leading to adders and other complicated input-output systems. Chapter I is introductory, presenting the summation and product notations and the ideas of an algorithm and iterative approximation. Unfortunately, two of the five examples of the summation notation are incorrect, and there is no clear distinction between an algorithm and an iteration. After correctly defining the former as concluding in a finite number of steps, the author introduces “Newton’s algorithm” for the square root, which is an example of the iteration process. Further, he states the completely false result that $B = \frac{1}{2}(A + N/A)$ is always a better approximation to \sqrt{N} than A . These points will illustrate that statements in the text must be carefully watched; accuracy has frequently been sacrificed to simplicity of statement.

Chapters II and III present the basic facts about combinations, permutations, and elementary frequency probability. Chapter IV is an excellent elementary account of arithmetic in various radix systems and of conversion from one system to another. The various mechanical procedures, such as subtraction by complementation and division by subtraction, are considered in detail. Except for minor matters of choice of language, this chapter may be highly recommended.

The second portion of the book deals with logic. The larger part of Chapter V is an exposition of the syllogistic logic in its full mediaeval pattern, including even the vowel notation of the scholastics, and omitting only the traditional mnemonics, Barbara, Darii, etc. The reviewer finds this portion of the book utterly astounding. It is as if one were to come across a long commentary on *De Rarum Natura* in a text on modern atomic physics. Neither mathematicians nor computer engineers use syllogisms; what purpose can this chapter serve? The latter portion discusses relations, omitting reflexivity and giving much more stringent definitions of one-many and many-one than customary.

The final three chapters develop successively Boolean algebra, the propositional calculus, and the model of the latter in terms of switching circuits. The reduction to normal form and initial simplification are well presented. Too much reliance is placed on checking by means of Venn diagrams. The student is not adequately

warned that, while a Venn diagram illustration of Boolean inequalities is always available, equality in a particular Venn diagram does not necessarily imply general equality.

In summary, the text covers matters of algebra, arithmetic, and logic that students should know before taking advanced courses in logical programming or component design. It may be recommended as a text or for collateral reading if the instructor will warn the student of possible pitfalls and inaccuracies.

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27[Z].—DEPT. OF THE ARMY, *Catalog of Commercially Available Automatic Data Processing Systems*, Department of the Army Pamphlet No. 1-250-4, 1958, 107 p., 26 cm.

This pamphlet is an excellent compilation and description of automatic data processing systems which are commercially available as of July, 1959. It contains the descriptions of twenty-five digital data processing systems ranging in size from the Bendix G15D and the Royal McBee LGP30 to the UNIVAC 1105 and the DATAmatic 1000. A photograph is included with each computer description.

This compilation is subdivided into categories entitled, respectively, General Description, System Components, Programming, Personnel Requirements, and Site Preparation.

The systems component category describes a typical computer configuration consisting of central processor, arithmetic unit, input-output control, high speed memory, magnetic tape units, paper tape units, card readers and punches, and high speed printers. This category lists some pertinent characteristics such as word length, numeric characters per word, timing, pulse repetition rate, size of memory, checking, and error correcting features. A rather complete list of specifications and characteristics of input and output media is included. The instruction word structure is also presented.

The personnel requirements category recommends a programming and operating complement of personnel but excludes maintenance personnel. Manufacturer's training of operators and programmers is discussed, with an option of training at the manufacturer's premises or at the installation site.

The over-all floor space, floor loading, and air conditioning requirements are also given in the site preparation category.

However, the major contributions of this pamphlet are the tables of cost, power requirements, and physical characteristics of each unit. These tables also present rental, purchase, and maintenance costs.

This reviewer considers this pamphlet an excellent guide to all computer users who require a ready reference in the field.

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