REVIEWS AND DESCRIPTIONS OF TABLES AND BOOKS

The numbers in brackets are assigned according to the revised indexing system printed in Volume 28, Number 128, October 1974, pages 1191–1194.

5 [9].—HARVEY J. HINDIN, *Tables of m-ary Partitions,* State University of New York, Empire State College, Old Westbury, New York, 1976, 3 introductory pages and 25 sheets of computer output deposited in the UMT file.

The function tabulated here is $t_m(n)$, defined for any positive integer m by

$$\sum_{n=0}^{\infty} t_m(n)x^n = \prod_{k=0}^{\infty} (1 - x^{m^k})^{-1}.$$

The recurrence formula

$$t_m(n) = t_m(n-1) + t_m(n/m),$$

where $t_m(n/m)$ is understood to be zero if m does not divide n, was used to tabulate the function, and also allows compression of the table by omission of values for which $t_m(n/m) = 0$. The values given are for $3 \leqslant m \leqslant 11$ and corresponding values of n (determined by the FORTRAN programming) ranging from 4478 for $m = 3$ to 4674 for $m = 11$. The author's purpose in compiling the tables was as an aid in demonstrating known congruences involving $t_m(n)$, and in searching for new ones. An article elucidating these is in the course of preparation by the author.

M. N.

6 [9].—MORRIS NEWMAN, *The Number of Subgroups of the Classical Modular Group of Index N,* National Bureau of Standards, 1976, 6 sheets of computer output deposited in the UMT file.

For $N = 1(1)100$ there was listed in [1] a table of $M(N)$, the number of subgroups of the classical modular group of index N. The undersigned noted that $M(N)$ is odd, in this range of N, only for $N = 1, 2, 5, 10, 13, 26, 29, 58$ and 61. He boldly predicted that $M(122)$ would be odd also. The definitive conjecture was given by Charles R. Johnson: $M(N)$ is odd if and only if $N = 2^n - 3$ or $N = 2(2^n - 3)$ for $n = 2, 3, 4, \ldots$. Newman's extended table deposited here lists $M(N)$ for $N = 1(1)255$, and $M(N)$ is odd in the extension only for $N = 122, 125, 250, 253$. While Johnson's conjecture is probably true, its group-theoretic meaning remains a complete mystery.

D. S.

1. MORRIS NEWMAN, "Asymptotic formulas related to free products of cyclic groups," *Math. Comp.*, v. 30, 1976, pp. 838–846.

7 [10].—ARTHUR GILL, *Applied Algebra for the Computer Sciences,* Prentice-Hall, Inc., Englewood Cliffs, N. J., 1976, xv + 432 pp., 23.5 cm. Price \$16.50.

There is by now a countless set of textbooks which attempt to teach applied algebra to the computer scientist. I think this is one of the better written members of the set, but none of them satisfies me. Most of these books, including this one, attempt to cover all the topics mentioned in the ACM Curriculum 68, Course B3. At Cornell, we have never found that these topics fit together meaningfully. What often happens is that the student sees in a very superficial way a number of mathematical ideas that are not directly applicable in computer science and which are far better presented in a mathematics course. In this book by Professor Gill, the first three chapters on sets, relations and functions, could just as well be the first three chapters of any mathematics text, while Chapters 6 (Lattice and Boolean Algebras), 9 (Groups), and 10 (Rings and Fields) could be from any good book on modern algebra. To me this is an indication that the topics do not fit in computer science.

Another symptom of the incompatibility of these topics in a computing curriculum is the rather weak computing motivation provided for studying them. For instance, groups are said to be important for "error detecting and correcting codes, various aspects of automata theory and many important enumeration problems". But in fact, most computer scientists never see error correcting codes; the group theory aspect of automata theory is highly specialized and this book does not discuss the relevant enumeration problems. In some of the chapters, notably Chapter 3 on functions, this defect of motivation is overcome by providing good exercises; but in most chapters it is not overcome by anything.

Some of these mathematical topics could be presented in a computer science course. For example, one could discuss the problems associated with representing sets and manipulating them in a computer. Likewise one should mention algorithms, rules and computability in a computer science oriented discussion of functions. Also, a modern textbook at this level should mention the P and NP classification of combinatorial problems.

Other topics in the book, such as induction, recursion, graphs, automata and logic, that are not covered in ordinary mathematics courses could form the core of a reasonable undergraduate computer science course with substantial mathematical content. Professor Gill covers these topics "mathematically" well, but I would have expanded them considerably at the expense of his purely mathematical sections (on groups, lattices, rings and fields). Even for these computing oriented subjects, much of the most compelling motivation is left out. I would prefer to see automata related to pattern matching problems and other programming issues as well as to computer hardware. In Chapter 12 on graphs, I think there should be far more attention to *algorithms* on graphs and an analysis of their complexity. Only three are given, none of which is recursive.

In summary, I think the book has the wrong emphasis for computer science, which is partly the fault of the Curriculum 68 guidelines. If one can accept that the topics go together, then it is more a mathematics textbook than a computer science text. As such it is presented in a clean and pure mathematical style, a style so light on motivation that the level of presentation is appropriate only for college juniors and above, as the author intends. Yet even as a mathematics text, the topics are so disjointed that they represent only the pieces, not the pattern of modern mathematics.

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