

Listed are abstracts from recent papers and books by IBM authors. Inquiries should be directed to the publications and publishers cited.

Computers and the space program, R. Ashany, Ed., *IBM Journal of Research and Development* 20, No. 1 (January 1976). (G322-0086). Digital data processing has made significant contributions to the space program. The nine papers in this issue illustrate the breadth of space-related technology and the variety of related problems that can be studied by means of digital computation, as well as the depths to which the subtleties of those problems can be explored. The editor selected these papers to achieve diversity of content and to provide some insight into and understanding of the functional capabilities and implementation methods of digital data processing in aerospace applications, rather than to establish the rigorous mathematic foundations of design criteria.

Identification number design, W. N. Holmes (IBM Systems Development Institute, Canberra, Australia), *The Computer Journal* 18, No. 2, 102-107 (May 1975). In data processing, items of administration or commerce such as customers or spare parts are each represented by a unique identification number. The design of such numbers is a common and important task. Using a hypothetical case study, this paper illustrates aspects of identification number design. These aspects include choice of valid digits, handling of invalid digits, length of numbers, redundancy for error avoidance and detection, representations and structuring, and procedures for use.

Mathematical construct for program reorganization, D. P. Pazel (RES Yorktown Hts., NY), *IBM Journal of Research and Development* 19, No. 6, 575-581 (November 1975). A mathematical formalism is described through which a program is given a symbolic representation, and, with the application of several basic formulas, may be transformed into an equivalent representation giving rise to a reorganized program. Examples are given in which programs are simplified (e.g., code is reduced) or reorganized into a structured form. In effect, a mathematics is described that applies to programs in much the same manner as Boolean algebra applies to switching circuits.

Recursive programming techniques, W. H. Burge (RES Yorktown Hts., NY), Addison-Wesley, Reading, Massachusetts (1975). This book describes a particular method of programming that uses a programming language based on the notation of the lambda calculus. Examples of applications of this method explain and illustrate lambda-calculus. The volume is intended as an introduction to programming technique and as an undergraduate or graduate text to supplement computer science courses. 277pp. This is the fifth volume in the Systems Programming Series.

Specifying queries as relational expressions: the SQUARE data sublanguage, R. F. Boyce, D. D. Chamberlin, W. F. King (RES San Jose, CA), and M. M. Hammer (M.I.T., Cambridge, MA), *Communications of the ACM* 18, No. 11, 621-628 (November 1975). This paper presents a data sublanguage called SQUARE, which is based on the relational model introduced by Codd. SQUARE is intended for use in ad hoc, intensive problem solving by noncomputer scientists. Facilities for query, insertion, deletion, and update on tabular data bases are described.

Abstracts