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

Abstracts

Analysis of exception data in a staging hierarchy, D. P. Gaver and P. A. W. Lewis (Naval Postgraduate School, Monterey, CA) and G. S. Shedler (RES San Jose, CA), *IBM Journal of Research and Development* **18,** No. 5, 423–435 (September 1974). Program address trace data is used in analyzing a demand-paged computer system with a three-level staging hierarchy of pages and blocks. The authors' primary objective is to explore the resulting data both graphically and numerically, using methods that may be useful when other traces become available. The process of exceptions is represented graphically, with unexpected results in one particular case. Such an approach, combining data-analysis procedures with probability modeling, should prove useful in understanding program behavior and will aid in the rational design of complex computer systems.

Computer-assisted test construction, Gerald Lippey, Ed. (DPD San Jose, CA) Educational Technology Publications, New Jersey (1974), 244 pp. This book, prepared primarily for educators who are interested in taking advantage of computers to aid in providing tests and exercises, grew out of an IBM-sponsored symposium. The editor's 25 page overview covers such things as "item banking," which refers to the storage of questions in machine-readable form. "Item generation" is accomplished by developing a set of rules which, when carried out by the computer, will result in a complete question. If the algorithm depends on a random variable, then the specific item produced, though belonging to a known domain, is unknown until it has been generated. "Item attributes" can be stored for such purposes as choosing a question, interpreting test results, identifying items likely to require revision, and relating questions to pertinent remedial materials. Potential benefits, feasability and acceptance, and prospects for further evolution are covered. The remaining papers, contributed by authors involved in public education, contain more detailed descriptions of supported functions, examine various design approaches and system objectives, and include examples drawn from existing systems. A bibliography is included.

OS data processing with review of OS/VS, H. Carroll (SDD Poughkeepsie, NY), John Wiley & Sons, Inc., New York, New York (1974), 280 pp. An understanding of the operating system and its facilities is necessary for efficient and effective programming. After a brief history of data processing and an introduction to System/370 hardware, the author begins an investigation into the workings of OS/360 by describing a small COBOL program. This program is taken step by step into execution; each step leads to new areas of study. Link-edit leads to a description of load modules, execution to a discussion of buffer management. The inquiry proceeds this way through task management, dynamic program management, and the input-output supervisor. A 20-page description of the IBM virtual storage operating systems is included as a chapter. Later chapters include job management, data management, teleprocessing, and miscellaneous topics such as utilities and system generation.

The scientific process and the computer, D. L. Streeter (RES Yorktown Heights, NY), John Wiley & Sons, Inc., New York, New York (1974), 468 pp. The use of computer services in support of scientific activity is described, including technological, governmental, and industrial utilizations not always thought of as "scientific." Section one presents an introduction to both the scientific method and to the supporting roles played by computers. Section two, current usage, illustrates the 10 phases of the scientific method with case studies using current general purpose computing systems. The 25 case studies are presented from the user's viewpoint. Lessons from each study are discussed and generalizations from these particular experiences are considered.

Section three, issues of management, offers methods for planning and controlling the delivery of computer services. Chapter topics include setting objectives, quantifying the value of services, and centralization versus dispersion of facilities. A chapter on evaluation techniques includes studies of management reports and of performance prediction using simulation. Another chapter, control, presents pricing as a way of controlling the demand for computer services and scheduling as a way of accommodating user requests. The final chapter discusses the quality of the man-system interface. Each segment of the book contains extensive references. A bibliography is included.

Superswitch for tomorrow's computer, J. Matisoo (RES Yorktown Heights, NY), *New Scientist* **61,** No. 880, 71–74 (January 10, 1974). Devices capable of switching thousands of times faster than any previous devices are being tested. This paper describes experiments with switches based on the cryogenic Josephson junction. These devices have switching speeds in the 10 picosecond range, while modern transistor circuits have switching times of the order of one nanosecond. Heat dissipation problems are drastically reduced, holding out the possibility of closer packing. Problems include a lack of knowledge of how to make effective use of these switches and the difficulty of reproducing them on a large scale.