

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

An Accessing Model, W. H. Burge and A. G. Konheim, *Journal of the Association for Computing Machinery* **18**, No. 3, 400-404 (July, 1971). A model of a storage system involving a disk and a buffer is analyzed under two access disciplines. The average stationary access rate is calculated for each discipline.

Computer Graphics Speeds Multi-color Mapmaking, D. R. Thompson and P. J. Min, *Engineering Graphics* **11**, No. 8, 14-15 (August, 1971). Described is a system that uses an optical scanner/plotter, a computer, and a display unit to produce color separation negatives for multicolor maps. The system reduces map generation time from months to as little as one day, and makes possible rapid updating of maps.

A Context-Free Language and Enumeration Problems on Infinite Trees and Digraphs, W. Kuich, *Journal of Combinatorial Theory* **10**, No. 2, 135-142 (April 1971). There are given: an infinite tree T_r , an infinite digraph D_r , and a context-free grammar G_r . Then the relations between four problems are investigated: in T_r , counting subtrees containing k edges (one of them fixed); in D_r , counting paths of length $2rk + 1$; in the language generated by G_r , counting the words of length $2rk + 1$; and in T_2 , counting the subtrees satisfying a certain condition.

Mathematical Modeling for Transportation Planning, H. M. Horowitz, *Logistics Review* **7**, No. 31, 29-35, (Spring, 1971). The system described addresses the complex problem of the allocation of vehicle resources to transportation networks and the scheduling of cargo and passengers on these vehicles. This paper primarily addresses itself to a discussion of the techniques used in creating the transportation planning models.

Data Graphs and Addressing Schemes, A. L. Rosenberg, *Journal of Computer and System Sciences* **5**, No. 3, 193-238 (June, 1971). A data graph is obtained from a data structure by masking out the specific data items at the nodes of the structure and concentrating only on the linkages in the structure. This factoring operation is done implicitly when one refers to "tree structures" or "arrays" as generic objects. Structural uniformities in data graphs can often be exploited to facilitate and systematize the accessing of nodes in the graph and the implementation of the graph in a computer. This paper presents a model for data graphs which can be used to study such uniformities. The main results reported algebraically characterize, in terms of structural uniformities, those classes of data graphs which can be implemented by "relative addressing" and by "relocatable realizations."

Abstracts

Rapport d'évaluation d'ALGOL 68 (An Evaluation of ALGOL 68), J. C. Boussard (Université de Grenoble) and J. J. Duby editors, J. Andre (Control Data France), H. Bekic, M. Berthaud, S. Brehinier (CERCI, Paris), M. Griffiths (Université de Grenoble), P. Jorrand, C.H.A. Koster (Mathematisch Centrum, Amsterdam), M. Nicholas (Université de Paris), J. C. Paillard (Université de Nancy), D. Pecoud (Université de Paris), M. Sintzoff, and P. Wodon (MBLE, Brussels). *Revue Française d'Informatique et de Recherche Operationnelle* 5, No. B-1, 15-106 (February, 1971). This is the report of an unsponsored commission that was formed to provide an objective evaluation of ALGOL 68 and its practical use in programming. Objectivity is achieved through a variety of opinions within the following ten chapter topics: 1. Introduction (goal and plan); 2. Description of the language; 3. Program structure; 4. Givens and their manipulations; 5. Calculations; 6. Input/output; 7. Environment; 8. Compilation; 9. Program writing; 10. Conclusions. (In French)

Roster of Programming Languages, 1971, J. E. Sammet, *Computers and Automation* 20, No. 68, 6-13 (June 30, 1971). This paper presents a descriptive list of currently existing higher level languages developed or reported in the United States which have been implemented on at least one computer and are believed to be in use in the United States.

Social Implications of the Computer, H. H. Goldstine, *Annals of the New York Academy of Sciences* 184, 201-205 (June 7, 1971). Reasoning from examples of a wide range of computer capabilities, the author concludes that a new discipline of social engineering should be undertaken in one of our great universities. Results should be disseminated and applied by a high-level government agency in order that society might benefit from social engineering as it does from the traditional forms of engineering. Key examples cited are: 1. the desirability of a national data center; 2. full-scale problem solutions, e.g., weather forecasting; 3. simulation as a technique for studying social problems; 4. computers as an intellectual tool comparable to a library; and 5. deductive and inductive reasoning, e.g., geometry theorem proving, and chess and checkers.

A Time-Shared System for Multiple Independent Laboratories, J. Birnbaum, *IEEE Transactions on Nuclear Science* NS-18, No. 1, 287-291 (February, 1971). A new approach to computer-based data acquisition and control for multiple, diverse, and remote laboratories is described. Modular techniques are used in the programming system, as well as in the input-output and instrument interfacing facilities. The system is designed to achieve some of the benefits of multiprocessing systems, but at lower cost and with higher system efficiency. Ease of use is stressed throughout, and language processors developed to help achieve that goal are described. An example of initial use is presented.

Traffic Control: From Hand Signals to Computers, D. C. Gazis, *Proceedings of the IEEE* 59, No. 7, 1090-1099 (July, 1971). An overview is given of current applications of computers to traffic control. It includes a discussion of types of hardware and control strategies used in computerized systems developed for the control of urban street networks, as well as critical traffic links such as freeways and tunnels. Some remarks are made concerning possible future development in the use of computers for better management of traffic facilities.