

Howard E. James

Senior Technical Staff Bulletin

STS 3-57
31 May 1967

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Items cited in the Bulletin are available for retention or loan from the Technical Information Service. Request sheet is attached for your convenience in ordering.



THE INDUSTRY, GENERAL

DATA PROCESSING TRENDS--SPRING 1967. Electronic News,
April 17, 1967, Section Two.

What's going on in hardware and software with short feature stories on RCA, Burroughs, CDC, teleprocessing, display, compatibility and modularity, etc.

The Quest and the Covenant: HOW TO TRANSLATE IDEAS INTO GOVERNMENT RESEARCH CONTRACTS by Harold Wooster, Air Force Office of Scientific Research. in Computers and Automation, May 1967. p. 37-43.

A practical how-to-do it paper which touches on all of the major agencies contracting to the computing industry. Worthwhile reading and a source of reference for the uninitiated in the world of government contracts.

SYSTEMS PROGRAMMING

COMPUTER PROGRAM MAINTENANCE by W. G. R. Stevens, Urwick Diebold, Ltd. in Data Systems, May 1967, p. 42-43.

The author states that even though most installations have defined standards for programming and systems documentation which are sometimes even followed in practice, the standards for program modification are neglected. This article outlines the methods and standards developed by Urwick Diebold for program modification and maintenance.

DECISION TABLES, AN INTRODUCTION, by Ned Chapin in DPMA Quarterly, April 1967, vol. 3, no. 3, p. 2-23.

A step-by step explanation of the use of decision tables in systems analysis, documentation and computer programming. Fully illustrated.

Computer Usage Company's George Trimble and Jill Arbuckle are cited in the article for their early (1957) work on the development of decision tables.

SYSTEMS PROGRAMMING (cont'd)

DOS/360 and TOS/360. IBM Systems Journal vol. 6,
no. 1, 1967. Contents :

FUNCTION AND DESIGN OF DOS/360 AND TOS/360.
G. Bender, D. N. Freeman, and J. D. Smith.

DATA MANAGEMENT CONCEPTS FOR DOS/360 AND TOS/360.
A. R. Cenfetelli.

INTERNAL DATA MANAGEMENT TECHNIQUES FOR DOS/360.
D. H. Ricour and V. Mei.

TIS has a limited number of copies available for on-demand dissemination. For those offices wanting to order copies for mass distribution to personnel, order Form No. 321-0009 from your IBM Sales office. The cost is seventy-five cents per copy. (See "Real-Time Systems in Perspective" p. 4 this Bulletin for another paper published in this issue of IBM Systems Journal.)

THE FUNCTIONAL STRUCTURE OF OS/360, IBM Systems Journal, vol. 5, no. 1, 1966. Contents :

Part I. INTRODUCTORY SURVEY. G. H. Mealy, p. 3-11. A brief outline of the structural elements of OS/360 is given in preparation for the subsequent sections on control-program functions. Emphasis is placed on the functional scope of the system, on the motivating objectives and basic design concepts, and on the design approach to modularity.

Part II. JOB AND TASK MANAGEMENT. B. I. Witt, p. 12-29. Discussion of the control-program functions most closely related to job and task management. Emphasized are design features that facilitate diversity in application environments as well as those that support multitask operation.

Part III. DATA MANAGEMENT. W. A. Clark, p. 30-50. Concepts underlying the data-management capabilities of OS/360 are introduced; distinctive features of the access methods, catalog, and relevant system macroinstructions are discussed. To illustrate the way in which the control program adapts to actual input/output requirements, a read operation is examined in considerable detail.

SYSTEMS PROGRAMMING

THE FUNCTIONAL STRUCTURE OF OS/360. (cont'd)

This important issue of the IBM Systems Journal is cited again in the TIS Bulletin for those persons who may not yet have a copy in their personal library. Order Form No. 321-0005 from your IBM Sales office.

THE DESIGN OF MULTIPLE ACCESS COMPUTER SYSTEMS by M. V. Wilkes. in Computer Journal, May 1967, vol. 10, no. 1, p. 1-9.

The paper, written from the point of view of the software programmer, contains a discussion of some of the problems encountered in the design of a large-scale multiple-access computer system. Security of the system and protection against unauthorized users are discussed.

STACK AUTOMATA AND COMPILING. Seymour Ginsburg, SDC, Sheila A. Greibach, and Michael A. Harrison. AD 628 205 November 1965. CFSTI. \$3.00 hard copy.

"Compilation consists of two parts, recognition and translation. A mathematical model is presented which embodies the salient features of many modern compiling techniques. The model, called the stack automaton, has the desirable feature of being deterministic in nature. This deterministic device is generalized to a non-deterministic device (nondeterministic stack automation) and particular instances of this more general device noted. Sets accepted by nondeterministic stack automata are recursive. Each set accepted by a deterministic linear bounded automation is accepted by some nonerasing stack automaton. Each context sensitive language is accepted by some (deterministic) stack automaton,"

ONE-WAY STACK AUTOMATA. Seymour Ginsburg, Sheila A. Greibach, and Michael A. Harrison. in Journal of the Association for Computing Machinery, April 1967, vol. 14, no. 2, p. 389-418.

The theory and mathematical model of "stack automation" presented in the above report is followed in this paper by a discussion of the case when the stack automation reads the input tape from left to right only, as in a single

SYSTEMS PROGRAMMING

ONE-WAY STACK AUTOMATA. (cont'd)

pass compiler. This device, a generalization of the pushdown automation, is called a "one-way stack automation." Of special interest are the sets of words recognized by one-way stack automata.

TRANSLATION BETWEEN COMPUTER PROGRAMS. A bibliography of pamphlets, manuals, and articles prepared by Ascher Opler. May 1967. Mimeo, 3 p. (This is an update of the Translation bibliography announced in the February STS Bulletin. Copies of the revised bibliography have been sent to all who requested the original version.)

The bibliography covers material devoted to translation between computer programs at either an assembly language level or at a machine language level. It does not cover translation between higher level languages, disassemble, decompilation nor program conversion aids.

REAL-TIME

REAL-TIME SYSTEMS IN PERSPECTIVE. J. D. Aron. in IBM Systems Journal, vol. 6, no. 1, 1967 p. 49-67. (See p. 2 this Bulletin for ordering instructions.)

The paper is a general survey of real-time systems. It includes the more important characteristics of these systems and disusses the relevant features of typical applications. The point of view taken is a functional one; that the distinguishing properties of most real-time systems stem directly from the distinctive needs of five different classes of applications: control, command and management information, time-shared computing, remote batch computing, and data acquisition.

PROGRAMMING REAL-TIME COMPUTER SYSTEMS. James Martin. Prentice-Hall, 1965. 386 p. \$12.00.

The state-of-the art has evolved since the preparation of this book. However, the principles and background of real-time programming presented here remain valid and useful. Recommended for office libraries.

SYSTEMS PROGRAMMING

NETWORK FOR REAL-TIME PROGRAMMING, by C. S. E. Phillips. in Computer Journal, May 1967, vol. 10, no. 1, p. 46-52.

The method described has been used for an experimental computer controlled radar, but may be of general interest. It uses a special kind of network analogous to a circuit diagram. The program is broken down into manageable subunits which facilitate programming.

LANGUAGES

COBOL

Copies of the new proposed USASI COBOL STANDARDS have just been received by TIS.

They were distributed as an issue of SICPLAN Notices (vol. 2, no. 4, April 1967) and are being sent to the regular SICPLAN mailing list and the regular recipients of the COBOL Information Bulletin.

Additional copies of the proposed COBOL STANDARDS are available at \$3.00 each from : SICPLAN, c/o ACM, 211 East 43rd Street., New York, New York 10017. Make checks payable to : Association for Computing Machinery. (For additional information on SICPLAN Notices see p. 6, this Bulletin.)

The last issue of the TIS Senior Technical Staff Bulletin cited an article "COMPARING COBOLS" in the January issue of Data and Control Systems. A future article was promised by the author on comparisons according to the effectiveness of the resulting object program as determined by compiling and running benchmark programs on several computers. In answer to inquiries from requesters for the second article, it has not yet been published.

PL/I

A USER'S EXPERIENCE WITH PL/I by A. E. Chapman. in PL/I Bulletin No. 3, March 1967. March 1967. p. 7-18.

The author has little to say about compiler problems or the language, but instead concentrates

LANGUAGES

PL/I

A USER'S EXPERIENCE WITH PL/I (cont'd)

on the present implementation of the PL/I and attempts to show why much of the current unhappiness stems from the implementation not the language. The implementation of the language and its interface with OS/360 are described in detail. Eleven pointers on how to speed up a PL/I program are included in the paper.

After 11 months of experience with the language, in a variety of modes, the author concludes that the language, as it now stands is, in his opinion, a success. "What is complicated to program in COBOL (i. e., took 5086 lines of source code) was extremely easy in PL/I (i. e., 943 lines of source code). It took just as long to convert the program from 7010 COBOL to 360 COBOL as it did to write the PL/I version". However, this user concludes that the implementation must be greatly improved so that certain self imposed restrictions can be removed or the language will not be at all acceptable.

A PL/I REFORMATTER, by Maragaret S. Schneider.
in PL/I Bulletin No. 3, March 1967. p. 5-7.

The purpose of the reformatter is to accept any PL/I program and rewrite it in a canonical form.

The PL/I BULLETIN, source of the above two items, is no longer distributed separately. It is circulated as a part of the new unified programming language bulletin-ACM. SICPLAN NOTICES. CUDC analysts interested in keeping up with developments in languages should get on the mailing list to receive this excellent publication. Christopher J. Shaw, chairman of the ACM Special Interest Committee on Programming Languages is the editor. Send your request to him at System Development Corporation, 2500 Colorado Avenue., Santa Monica, California 90406.

(SICPLAN NOTICES previously cited in TIS STS Bulletin March 1967)

LANGUAGES

PL/I (cont'd)

PL/I CONVERTER. Eric Weiss. McGraw-Hill, 1966.
116 p. \$3.95.

The book was written to retrain FORTRAN programmers for the use of PL/I. It highlights the similarities between the two languages and also gives the reader a starting point for the use of the full-power of PL/I. (Prepublication notice of PL/I CONVERTER was given in TIS STS Bulletin Nov. 1966.)

APPLICATIONS

ASTRONAUTICS AND AERONAUTICS

AEROSPACE COMPUTERS : THE THIRD GENERATION.

The April issue of Astronautics and Aeronautics (published by the American Institute of Aeronautics and Astronautics) has five articles on the operations and design of computers in the aerospace field. They give an overview of the man-computer advances for current aerospace problem-solving practice.

1. Keeping the Upper Hand in the Man-Computer Partnership, by Barry Boehm, The RAND Corporation.

Disregarding the non-descriptive title, this is a good summary article of aerospace computer technology. It covers the important features of all of the other articles in this series.
2. Flight-Computer Hardware Trends, by Ramon L. Alonso, MIT and Glenn C. Banda, IBM.
3. Mission Influences on Advanced Computers, by Gene Vacca, NASA, Philip L. Phipps, UNIVAC, Thomas A. Burke, NASA.
4. The Computer Downstairs, by H. R. J. Grosch, General Electric. Managing the diversified computing facility.
5. On-Line Systems and Man-Computer Graphics, by S. H. Chasen, Lockheed-Georgia and R. N. Seitz, NASA.

APPLICATIONS (cont'd)

BEHAVIORAL SCIENCE

LEGISLATIVE DISTRICTING BY COMPUTER SIMULATION, by James D. Thoreson, Texas Instruments and John M. Liittschwager, University of Iowa, in Behavioral Science, May 1967, vol 12, no. 3, p. 237-247.

RECENT DEVELOPMENTS IN THE PSYCHIATRIC CASE HISTORY EVENT SYSTEM, by Bernice T. Eiderson, et al, Reiss-Davis Child Center, Los Angeles. in Behavioral Science, May 1967, vol. 12, no. 3, p. 254-267.

The Psychiatric Case History Event System, a generalized information processing system for conversion of case history data into computer acceptable form for retrieval and analysis, has been implemented on a large scale. This paper presents the details of processing of data from transcription to output.

These articles from the current issue of Behavioral Science are listed not for their particular significance, but rather to introduce the journal to those who may not be familiar with it. Behavioral Science is an interdisciplinary bimonthly publication. It is cosponsored by the Institute of Management Science and the Fund for the Behavioral Sciences. In addition to articles on general theories, it contains a section on Computers in Behavioral Science, and one on Computer Program abstracts. (Indexed in Computing Reviews)

TIS subscribes to Behavioral Science and will furnish you sample copies to evaluate for an office subscription. The subscription price is \$10.00 per year to individuals. Send subscriptions to Behavioral Science, Mental Health Research Institute, The University of Michigan, Ann Arbor, Michigan 48104.

EARTH SCIENCES

GEOLOGICAL DATA PROCESSING : USING FORTRAN IV. F. G. Smith. Harper and Row, 1966. 284 p. \$14.00.

Written for practicing geoscientists, the book stresses computer programming, data analysis, and kinds of mathematical operations used in machine computation. The effective presentation of the material makes it applicable to the broad spectrum of data processing and useful for programmers.

APPLICATIONS

GOVERNMENT

PUBLIC AUTOMATION, published by the Public Administration Service, is a monthly newsletter reporting on automated systems in government. It contains news of computer operations in government at all levels and includes a monthly feature length insert "Output" dealing with specific problem areas in government automation. Recent "Output" topics: Computer Models for Institutional Planning and Control; Harnessing ADP for Hospitals.

TIS subscribes to PUBLIC AUTOMATION and will furnish you sample copies to evaluate for an office subscription. The subscription price is \$15.00 per year. Order from : Public Automated Systems Service, 1313 East 60th Street, Chicago, Ill. 60637. You may want to recommend it to customers who are unfamiliar with the Public Administration Service, its activities and publications.

The books : AUTOMATED DATA PROCESSING IN STATE GOVERNMENT, and ADP IN MUNICIPAL GOVERNMENT, cited in previous TIS Bulletins and mailed to requesting offices, were prepared by PAS.

MARKETING

THE COMPUTER IN MARKETING. Sales Management, 630 Third Avenue, New York, New York. (n. d.) \$5.00.

A collection of articles published in Sales Management, the marketing magazine, during the past two years. Case histories and descriptions of computer applications are presented for the following topics : Sales Forecasting, Sales Analysis, Test Marketing, Advertising, The Field Sales Manager, Marketing Management, Input-Output : What it is, how to use it, what it will do.

INFORMATION STORAGE AND RETRIEVAL

THE ANALYSIS OF INFORMATION SYSTEMS : A PROGRAMMER'S INTRODUCTION TO INFORMATION RETRIEVAL. Charles T. Meadow, IBM-Federal Systems Division, Wiley, 1967. 301 p. \$11.50.

APPLICATIONS

INFORMATION STORAGE AND RETRIEVAL (cont'd)

The intent of the book is to supply the background needed for participation in the analysis and design of information handling systems. It attempts to bring programmers into the library and information files environments. Contents : The language of information retrieval. The creation of index records. The organization of files. The storage and measurement of structural information. The organization of file sets. Basic file processes. File maintenance.

INFORMATION STORAGE AND RETRIEVAL : TOOLS, ELEMENTS, THEORIES. Joseph Becker and Robert Hayes. Wiley, 1963. \$11.95.

This text is concerned with all aspects of information storage and retrieval systems and the elements and tools that may be used in implementation.

For a good background in the information sciences, use should be made of the above two books and the "ANNUAL REVIEW OF INFORMATION SCIENCE AND TECHNOLOGY", vol. 1, Wiley, 1966. (cited in TIS STS Bulletin October 1966)

MEDICINE

Proceedings of the 7th IBM Medical Symposium held at Poughkeepsie, New York, October 25-28, 1965. Order from IBM, Form no. 320-0940. (Released early 1967)

Many computer application topics are covered including clinical trials, patient monitoring psychiatric interviewing, behavior prediction, etc. (The Proceedings of the 6th IBM Medical Symposium, Form No. 320-0918, was cited in the March STS Bulletin)

APPLICATIONS

MEDICINE (cont'd)

HEALTH CARE IN A CHANGING ENVIRONMENT. SDC Magazine,
March 1967, vol. 10, no. 3.

The issue is devoted to a good overview of the problems facing the nation's health systems and recounts SDC's Project MEDIC.

For free copies of this issue of the SDC Magazine or to get on the mailing list to receive the monthly issues, write to :

System Development Corporation,
2500 Colorado Avenue
Santa Monica, California 90406.
attn : Corporate Publications, Room 1822.

COMPUTER GRAPHICS

COMPUTER GRAPHICS : UTILITY/PRODUCTION/ART, Fred Gruenberger, editor, Academic Press, 1967. 225 p. \$12.00.

Thirteen papers presented at a Graphics Symposium jointly sponsored by Informatics, Inc. and the University of California at Los Angeles.

One of the papers "Computer Graphics-Software Design" by F. V. Wagner and J. LaHood, Informatics, is tutorial and describes general principles of design based upon current good practice.

COMPUTER-GRAPHICS IN COMMUNICATION. William A Fetter, Mc Graw-Hill, 1965. 110 p. \$4.50.

The monograph was written for the Course Content Development Study in Engineering Graphics supported by the National Science Foundation and directed to those preparing for engineering and graphics professions. The volume does not give instructions on how to program but it does present effectively the many engineering tasks applicable to computer graphics.

COMPUTER GRAPHICS (cont'd)

ON-LINE COMPUTING : TIME-SHARED MAN-COMPUTER SYSTEMS.
Walter J. Karplus, editor. Mc Graw-Hill, 1967.
336 p. \$14.50.

The volume evolved from a lecture series at the University of California. It is not a general survey of the large subject areas indicated by the title, but rather presents "in-depth analysis" of the topics listed below. On-Line Computing was used as the text for the recent two-week short course "Interactive Time-Sharing Systems; Hardware and Software" held at the University of California, Los Angeles.

Part I On-Line Systems

Systems Analysis and Design...R. E. Fagen
Graphic Data Input-Output
Equipment.....C. L. Hardway
The Economics of On-line
Systems.....W. F. Bauer
Psychological and
Psychological Considerations.E. E. David, Jr.

Part II Applications

Solving Mathematical Problems.B. E. Fried
Solving Design Problems in
Graphic Dialogue.....D. B. Parker
Computing in a Strategic
Command System Environment..W. L. Wilkinson
A Theory for File Organization.R. M. Hayes
Sociological Considerations...L. Fein

Appendix : Complete User's Manual for an
On-Line System. G. J. Culler.

MISCELLANEOUS PUBLICATIONS AND ANNOUNCEMENTS

WHERE TO ORDER BOOKS

Taylor-Carlisle's Book Store, 115 East 23rd Street, New York, New York 10010 provides fast and accurate service for books of all publishers shipped anywhere in the country. They specialize in technical and business publications and give a 10% discount on most titles.

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MISCELLANEOUS PUBLICATIONS AND ANNOUNCEMENTS

WHERE TO ORDER BOOKS (cont'd)

TIS and several CUDC offices use Taylor-Carlisle as their resource for book purchases.

DATA PROCESSING MAGAZINE was formerly distributed to applicants on a controlled free circulation basis. In the event you have not been receiving recent copies, it is because they are now charging for subscriptions (\$8.50 per year) and you may not have received notification of their policy change. We're enclosing subscription cards with each manager's copy of this Bulletin. Send subscription to : Circulation Department, Data Processing Magazine, 134 Thirteenth Street, Philadelphia, Pa 19107.

JOURNAL OF COMPUTER AND SYSTEMS SCIENCES, vol 1, no . 1, April 1967. Academic Press.

Sample copies of the first issue of this new quartaly journal are available from Academic Press, 111 Fifth Avenue, New York, New York 10003. The subscription price is \$12.00 for personal subscriptions.

The journal is devoted to publishing original research papers in computer science and systems science with emphasis on the relevant mathematical theory and its applications.

FAST ANNOUNCEMENTS. Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia.

Early announcements of selected new reports (AD reports) resulting from government sponsored research and development projects are available for selected topical categories, e. g. , mathematics, data processing, information technology, human factors engineering.

A list of available categories and a subscription order form (\$5.00 for the Fast Announcement Service which includes as many categories as you request) are included with each manager's copy of this Bulletin. Contact TIS for additional information and order forms.

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MISCELLANEOUS PUBLICATIONS AND ANNOUNCEMENTS (cont'd)

DATA COMMUNICATIONS GLOSSARY. IBM Form No. C20-1666.

General communication terms used by the communications industry are included in the glossary as well as data communication terms used by IBM and the communications companies.

YOUR CAREER IN COMPUTER PROGRAMMING. I. J. Seligsohn. Julian Messner, Inc., New York, a subsidiary of Simon and Schuster, 1967. \$3.95. 215 p. 33 photograph illustrations.

If you weren't already a computer programmer, you'd probably want to become one after reading this well written "people" oriented book. The book is sprinkled with personal, real-life stories of how people became acquainted with computer programming and how they have advanced.

Martin Hopkins, CUDC, Mount Kisco, is featured in the book.

Computer Usage Development Corporation

TECHNICAL INFORMATION SERVICE

TO: Eleanor Crouse-TIS-Mt Kisco

FROM: _____ CUDC Office: _____ DATE _____

SUBJECT: Request for items announced in
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