APPLICATIONS AND EXPERIMENTS	
Automatic dictionary and machine-readable text	Galli, 6, 3, 192
Interactive graphics in data processing Algorithm to generate spline-like curves Modeling in three dimensions Crystal structure analysis Retrieval of geometric information Analysis and display of physics data Neutron cross-section evaluation Cam design on a graphics console Implementation and usage Algorithm for empty freight car allocation Trajectory control programs Real-time Stenotype transcription Interactive flight program simulator Interactive aeronautical charting Interactive scheduling system A computer graphics system	Ahuja, 7, 3/4, 206 Appel, 7, 3/4, 310 Okaya, 7, 3/4, 322 Jacobsen, 7, 3/4, 331 McGee, 7, 3/4, 342 Creasy, 7, 3/4, 365 Day, 7, 3/4, 373 White, 8, 2, 147 Quarles, 9, 1, 12 Newitt, 9, 1, 24 Jacobs, 9, 2, 145 Luetje, 9, 3, 219 Brewer, 10, 1, 62 Belady, 10, 2, 143
Real-time traffic flow optimization Large-scale interactive administrative system	Black, 10, 3, 217 Hanssmann, 10, 4, 305
COMPILERS AND ASSEMBLERS	
Code-generation for large-language compilers Compiler assignment of data items to registers	Elson, 9, 3, 167 Day, 9, 4, 281
COMPUTER SYSTEMS AND ANALYSIS	
Design characteristics of the 9020 system Microprogram control in System/360 Structural aspects of the System/360 Model 85 General organization The cache Extension to floating-point architecture Hierarchical control programs Auxiliary processing system for array calculations	Blakeney, 6, 2, 80 Tucker, 6, 4, 222 Conti, 7, 1, 2 Liptay, 7, 1, 15 Padegs, 7, 1, 22 Keefe, 7, 2, 123 Ruggiero, 8, 2, 118
DATA STRUCTURES	
Principles of interactive systems A multilevel modeling structure Associative data structures for PL/I Implementing interactive applications Hierarchical structure for data management Real-time Stenotype transcription Authorization in shared files A computer graphics system	Johnson, 7, 3/4, 147 Baskin, 7, 3/4, 218 Symonds, 7, 3/4, 229 Chen, 7, 3/4, 257 Henry, 8, 1, 2 Newitt, 9, 1, 24 Friedman, 9, 4, 258 Belady, 10, 2, 143
GRAPHICS IN DATA PROCESSING	
Principles of interactive systems Aspects of display technology Geometry for construction and display An algorithm for generating spline-like curves A multilevel modeling structure Auxiliary-storage associative data structure for PL/I A subroutine package for FORTRAN System for implementing interactive applications Conversational job control A conversational display capability A language for three-dimensional geometry Modeling in three dimensions Crystal structure analysis Retrieval of geometrically structured information Analysis and display of physics data	Johnson, 7, 3/4, 147 Appel, 7, 3/4, 176 Ahuja, 7, 3/4, 188 Ahuja, 7, 3/4, 206 Baskin, 7, 3/4, 218 Symonds, 7, 3/4, 229 Rully, 7, 3/4, 248 Chen, 7, 3/4, 257 Brown, 7, 3/4, 271 Gagliano, 7, 3/4, 281 Comba, 7, 3/4, 292 Appel, 7, 3/4, 310 Okaya, 7, 3/4, 322 Jacobsen, 7, 3/4, 331 McGee, 7, 3/4, 342

Five-year subject index

334 SUBJECT INDEX IBM SYST J

Neutron cross-section evaluation Cam design on a graphics console Implementation and usage Interactive flight program simulator Interactive aeronautical charting A computer graphics system Creasy, 7, 3/4, 355 Lafuente, 7, 3/4, 365 Day, 7, 3/4, 373 Jacobs, 9, 2, 145 Luetje, 9, 3, 219 Belady, 10, 2, 143

LANGUAGES

Graphics subroutine package for FORTRAN DISPLAYTRAN for conversational graphics A language for three-dimensional geometry Problem formulation using APL Code-generation for large-language compilers Automatic generation of test cases Formal description of programming languages

Rully, 7, 3/4, 248 Gagliano, 7, 3/4, 281 Comba, 7, 3/4, 292 Kolsky, 8, 3, 204 Elson, 9, 3, 167 Hanford, 9, 4, 242 Neuhold, 10, 2, 86

MANAGEMENT INFORMATION SYSTEMS

Interactive scheduling system
Large-scale interactive administrative system
Modeling for computer center planning

Brewer, 10, 1, 62 Wimbrow, 10, 4, 260 Hanssmann, 10, 305

MANUFACTURING PLANNING AND CONTROL

An economic lot-sizing technique
The part-period algorithm (PPA)
Mathematical analysis of PPA
Multi-item economic lot-sizing
Determining economic sampling plans
Programming for economic lot-sizes

DeMatteis, 7, 1, 30 Mendoza, 7, 1, 39 Pierce, 7, 1, 47 Stacy, 8, 3, 220 Gorenstein, 10, 3, 232

MATHEMATICAL METHODS AND PROGRAMS

Calculation of critical paths for large networks
Coding for error control
Pseudo-random number generator for System/360
Internal sorting with minimal comparing
Determining economic sampling plans
A model of floating buffering
Compiler assignment of data items to registers
FORTRAN extended-precision library
Programming for economic lot-sizes

Montalbano, 6, 3, 163 Tang, 8, 2, 48 Lewis, 8, 2, 136 Woodrum, 8, 3, 189 Stacy, 8, 3, 220 Woodrum, 9, 2, 118 Day, 9, 4, 281 Kuki, 10, 1, 39 Gorenstein, 10, 3, 232

MICROPROGRAMMING

Microprogram control in System/360

Tucker, 6, 4, 222

MULTIPROCESSING SYSTEMS

Application-oriented multiprocessing system (the 9020)

Introduction
Design characteristics
Control program
Error analysis program
Diagnostic monitor
Intended application programs

Keeley, 6, 2, 78 Blakeney, 6, 2, 80 Devereaux, 6, 2, 95 Lancto, 6, 2, 103 Suda, 6, 2, 116 Seward, 6, 2, 124

OPERATING SYSTEMS

DOS/360 and TOS/360

Function and design Data management concepts Internal data management for DOS/360 Bender, 6, 1, 2 Cenfetelli, 6, 1, 22 Ricour, 6, 1, 38

Gemini real-time operating system Avoiding deadlock in multitasking systems Statistics gathering and simulation for Apollo Conversational job control Auxiliary processing system for array calculations On-line inquiry under small operating system A heuristic approach to task dispatching A virtual machine time-sharing system	Mueller, 6, 3, 150 Havender, 7, 1, 74 Stanley, 7, 2, 85 Brown, 7, 3/4, 271 Ruggiero, 8, 2, 118 Darga, 9, 1, 2 Ryder, 9, 3, 189 Meyer, 9, 3, 199	
PROGRAMMING NOTATION AND DOCUMENTATION		
Automatic generation of test cases Formal description of programming languages	Hanford, 9, 4, 242 Neuhold, 10, 2, 86	
QUEUING		
Message turnaround time Single-server queuing in computing systems Analysis of the machine interference model	Hauth, 7, 2, 103 Chang, 9, 1, 36 Ferdinand, 10, 2, 129	
REAL-TIME SYSTEMS AND ANALYSIS		
Real-time systems in perspective Application-oriented multiprocessing system (the 9020) Introduction Design characteristics Control program Error analysis program Diagnostic monitor Intended application programs Gemini real-time operating system Statistics gathering and simulation for Apollo Time-sharing scheduler strategies Trajectory control programs Time-sharing performance criteria and measurement Real-time traffic flow optimization Large-scale interactive administrative system	Aron, 6, 1, 49 Keeley, 6, 2, 78 Blakeney, 6, 2, 80 Devereaux, 6, 2, 95 Lancto, 6, 2, 103 Suda, 6, 2, 116 Seward, 6, 2, 124 Mueller, 6, 3, 150 Stanley, 7, 2, 85 Hellerman, 8, 2, 94 Quarles, 9, 1, 12 Bard, 10, 3, 193 Black, 10, 3, 217 Wimbrow, 10, 4, 260	
RELIABILITY		
Application of formal logic	Allen, 10 , 1, 2	
SIMULATION		
Two continuous modeling programs GPSS/360—Improved general purpose simulator Three-value design verification system Simulating operating systems Trace-driven system modeling Interactive flight program simulator Model of paging system performance	Brennan, 6, 4, 242 Gould, 8, 1, 16 Jephson, 8, 3, 178 Seaman, 8, 4, 264 Cheng, 8, 4, 280 Jacobs, 9, 2, 145 Shedler, 10, 2, 113	
SORTING AND MERGING		
Internal sorting with minimal comparing A model of floating buffering Guided bibliography to sorting	Woodrum, 8 , 3, 189 Woodrum, 9 , 2, 118 Lorin, 10 , 3, 244	

STATISTICAL METHODS AND PROGRAMS

Pseudo-random number generator for System/360
A model of floating buffering
Analysis of free-storage algorithms

Lewis, **8**, 2, 136
Woodrum, **9**, 2, 118
Margolin, **10**, 4, 283

336 SUBJECT INDEX IBM SYST J

STORAGE SYSTEMS

Structural aspects of System/360 Model 85
General organization
The cache
Time-sharing scheduler strategies
Evaluation techniques for storage hierarchies
A virtual machine time-sharing system
Program restructuring for virtual memory
Analysis of free-storage algorithms

Conti, 7, 1, 2 Liptay, 7, 1, 15 Hellerman, 8, 2, 94 Mattson, 9, 2, 78 Meyer, 9, 3, 199 Hatfield, 10, 3, 168 Margolin, 10, 4, 283

SYSTEM DESIGN AND EVALUATION

Redundancy in a parallel algorithm Coding for error control Time-sharing scheduler strategies Three-value design verification system A perspective on system evaluation Simulating operating systems Trace-driven modeling Using monitor output Measurement of operational statistics A synthetic job for measuring system performance Effects of storage contention Evaluation techniques for storage hierarchies Model of paging system performance Time-sharing performance criteria and measurement Large-scale interactive administrative system Analysis of free-storage algorithms Modeling for computer center planning

Shedler, 6, 3, 142 Tang, 8, 1, 48 Hellerman, 8, 2, 94 Jephson, 8, 3, 178 Drummond, 8, 4, 252 Seaman, 8, 4, 264 Cheng, 8, 4, 280 Bonner, 8, 4, 290 Stanley, 8, 4, 299 Buchholz, 8, 4, 309 Skinner, 8, 4, 319 Mattson, 9, 2, 78 Shedler, 10, 2, 113 Bard, 10, 3, 193 Wimbrow, 10, 4, 260 Margolin, 10, 4, 283 Hanssmann, 10, 4, 305

TELEPROCESSING

Conventions for data communication Message turnaround time Teleprocessing using standard equipment Eisenbies, 6, 4, 267 Hauth, 7, 2, 103 Wade, 8, 1, 23

NO. 4 · 1971 SUBJECT INDEX 337