

# PROGRAMMING SYSTEMS AND LANGUAGES

*Edited by SAUL ROSEN  
Professor of Mathematics and Computer Science  
Purdue University*

**McGRAW-HILL BOOK COMPANY**

NEW YORK

ST. LOUIS

SAN FRANCISCO


TORONTO

LONDON

SYDNEY



# CONTENTS

	Page
Preface	v
Acknowledgements	vii
	
Part 1: A Historical Survey	
Introduction	
A. Programming Systems and Languages—A Historical Survey. . . . .	3
Saul Rosen	
B. Programming Systems and Languages— Some Recent Developments . . . . .	23
Saul Rosen	
Part 2: Programming Languages	
Introduction	
A. The Fortran Automatic Coding System. . . . .	29
J. W. Backus, R. J. Beeber, S. Best, R. Gold- berg, L. M. Haibt, H. L. Herrick, R. A. Nelson, D. Sayre, P. B. Sheridan, H. Stern, L. Ziller, R. A. Hughes, and R. Nutt.	
B. The Algol Programming Language . . . . .	48
Saul Rosen	
C. Revised Report on the Algorithmic Language— Algol 60. . . . .	79
Peter Naur (Editor)	
J. W. Backus, F. L. Bauer, J. Green, C. Katz, J. McCarthy, A. J. Perlis, H. Rutishauser, K. Samelson, B. Vauquois, J. H. Wegstein, A. Van Wijngaarden and M. Woodger.	
D. Basic Elements of Cobol 61. . . . .	119
Jean E. Sammet	
E. Highlights of a New Programming Language . . . .	160
G. Radin and H. P. Rogoway	
Part 3: Compiling and Translating	
Introduction	
A. Bounded Context Translation . . . . .	184
R. M. Graham	



	Page
B. Sequential Formula Translation . . . . .	206
F. L. Bauer and K. Samelson	
C. Recursive Programming . . . . .	221
E. W. Dijkstra	
D. The Structure of Yet Another Algol Compiler . . . . .	228
H. Kanner, P. Kosinski, and C. L. Robinson	
E. PUFFT—The Purdue University Fast FORTRAN Translator . . . . .	253
Saul Rosen, R. A. Spurgeon and J. K. Donnelly	
F. Syntax Directed Compiling . . . . .	264
T. E. Cheatham and K. Sattley	
G. A Syntax Directed Compiler for Algol 60 . . . . .	298
E. T. Irons	
H. A Compiler-Building System Developed by Brooker and Morris . . . . .	306
Saul Rosen	
I. A General-Purpose Table-Driven Compiler . . . . .	332
S. Warshall and R. M. Shapiro	
J. The Syntax of Programming Languages— A Survey . . . . .	342
R. W. Floyd	

Part 4: Languages for Processing Lists and Strings  
of Symbols

Introduction

A. An Introduction to Information Processing Language V. . . . .	362
A. Newell and F. M. Tonge	
B. COMIT as an IR Language . . . . .	375
V. H. Yngve	
C. An Introduction to the List Processing Language SLIP . . . . .	393
D. K. Smith	
D. An Introduction to the String Manipulation Language SNOBOL . . . . .	419
E. J. Desautels and D. K. Smith	
E. Recursive Functions of Symbolic Expressions and their Computation by Machine, Part I. . . . .	455
J. McCarthy	
F. An Expression Recognition Routine in LISP 1.5. . . . .	481
L. E. Axsom	



	Page
G. A Comparison of List-Processing Computer Languages . . . . . D. G. Bobrow and B. Raphael	490
 Part 5: Operating Systems	
Introduction	
A. Operating Systems (Excerpts) . . . . . G. H. Mealy	516
B. A Generalized Assembly System (Excerpts) . . . . . G. H. Mealy	535
C. Macroinstruction Extensions of Compiler Languages . . . . . M. D. McIlroy	560
D. The Linking Segment Subprogram Language and Linking Loader . . . . . J. McCarthy, F. J. Corbató and M. M. Daggett	572
E. An Introduction to the CL-II Programming System. . . . . T. E. Cheatham and G. F. Leonard	582
F. IBM Operating System/360 Concepts and Facilities (Excerpts) . . . . .	598
G. The D825 Automatic Operating and Scheduling System . . . . . R. N. Thompson and J. A. Wilkinson	647
H. The Atlas Supervisor . . . . . T. Kilburn, R. B. Payne and D. J. Howarth	661
I. An Experimental Time-Sharing System . . . . . F. J. Corbató, M. M. Daggett and R. C. Daley	683
J. Segmentation and the Design of Multiprogrammed Computer Systems . . . . . J. B. Dennis	699
K. Introduction and Overview of the Multics System. . . . . F. J. Corbató and V. A. Vyssotsky	714
Index . . . . .	731