CONTENTS

1	Introductory Remarks on the Nature and Usefulness of Algorithms		
	1.1 The C	The Concept of Algorithms and Their Computer	
		Implementation	1
	1.2	Description of Algorithms in Graphic Form	1
	1.3	Algorithms in Everyday Life	2
	1.4	An Example of an Algorithm Requiring Manipulation of Numbers	2
2	Flow	chart Building Blocks	3
	2.1	The Role of Variables in Formulating Programs	3
	2.2	Distinction Between the Name of a Variable and Its Value	3
	2.3	Distinction Between Two Types of Numeric-Valued Variables	4
	2.4	Computer Representation of Variables	5
	2.5	Substitution Activity	5
	2.6	Decision Activity	7
	2.7	Input Activity	10
	2.8	Output Activity	13
	2.9	Junction Points and Connectors	14
	575 C. 154 E. 15 C. 154 E. 155	Terminal Points	14
		Use of the Building Blocks in a Complete Problem	15
		Program Termination on an End-of-Data Condition	16
	2.13	Problem Set	17
3	Арр	roaches to Algorithm Development and Testing	19
	3.1	Moving from Problem Inception to Computer Implementation	19
	3.2	The Smallest Number Problem	19
			. /

	3.3	An Alternative Solution to the Smallest Number	
		Problem	21
	3.4	Testing Algorithms with Procedure Execution	21
	3.5	Problem Set	23
4	The	Use of Loops in Constructing Algorithms	25
	4.1	The Concept of a Loop	25
	4.2	The Concept of a Loop Index	26
	4.3	Loops Terminating on a Greater-Than Index Condition	29
	4.4	Simplified Representation of Standard Loops	31
	4.5	Problem Set	35
5	Sing	gly-Subscripted Variables	39
	5.1	The Concept of Singly-Subscripted Variables	39
	5.2	Inputting Vectors of Information	40
	5.3	Example Programs Using Singly-Subscripted Variables	46
	5.4	Problem Set	58
6	Dou	bly-Subscripted Variables	69
	6.1	The Concept of Doubly-Subscripted Variables	69
	6.2	Inputting Matrices of Information	70
	6.3	Example Programs Using Doubly-Subscripted Variables	71
	6.4	Problem Set	85
7	Sub	programs	89
	7.1	Subprograms: Their Nature and Usefulness	89
	7.2	Building Blocks for Subprogram Flowcharts	91
	7.3	Calling a Subprogram into Use	93
	7.4	Considerations Involving Correspondence Between	
		Actual and Dummy Arguments	97
	7.5	Subroutine Subprograms and Function Subprograms	101
	7.6	Description of Some Functions Usually Available in	
		Programming Languages	108
	7.7	Case Studies Involving Subprograms	108
	7.8	Problem Set	116
	Epil	ogue	123
	Inde		125