## 510 GER 2nd ed.

## CONTENT

	Page
Chapter 1 Logic, Induction, and Recursion	1
1.1 Statements and Quantifiers	1
1.2 Propositional Logic and Predicate Logic	25
1.3 Proof techniques	39
1.4 Recursion and Recurrence Relations	59
Chapter 2 Sets and Combinatorics	71
2.1 Sets	71
2.2 Counting	92
2.3 Permutations and Combinations	98
2.4 The Binomial Theorem	104
Chapter 3 Relations, Functions, and Matrices	111
3.1 Relations	111
3.2 Functions	131
3.3 Matrices	149
Chapter 4 Graphs and Trees	157
4.1 Graph Terminology and applications	157
4.2 Computer Representations of Graphs	168
4.3 Graph Algorithms	180
4.4 Algorithms for Traversing Graphs	197
Chapter 5 Structures and Simulations	209
5.1 Structures-Simulation I	210
5.2 Morphisms-Simulation II	223
Chapter 6 Boolean Algebra and Computer Logic	237
6.1 Logic Networks	237
6.2 Minimization	262
Chapter 7 Algebraic Structures	281
7.1 Semigroups, Monoids, and Groups-Simulation I	281
7.2 Substructures	297
7.3 Morphisms-Simulation II	306
7.4 Homomorphism Theorems	319
7.5 Quotient Groups	326
Chapter 8 Coding Theory	339
8.1 Encoding	339
8.2 Decoding	359

Chapter 9 Finite-State Machines	369
9.1 Machines-Simulation I	369
9.2 Morphisms-Simulation II	386
9.3 Machines as Recognizers	399
Chapter 10 Machine Design and Construction	419
10.1 Machine Minimization	419
10.2 Building Machines	432
10.3 Parallel and Serial Decompositions	440
10.4 Cascade Decompositions	455
Chapter 11 Computability	467
11.1 Turing Machines-Simulation I	467
11.2 The Universal Turing Machine-Simulation II-and Unsolvability	486
11.3 Computational Complexity	496
Chapter 12 Formal Languages	505
12.1 Classes of Languages	505
12.2 Language Recognizers	519
Answers to Practice Problems	533
Answers to Selected Exercises	563
Index	607