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Theorem; 3.4 Dual of Dilworth's Theorem; 3.5 Generalizations of Dilworth's Theorem; 3.6 Algorithmic Perspective of Dilworth's Theorem; 3.7 Application: Hall's Marriage Theorem; 3.8 Application: Bipartite Matching; 3.9 Online Decomposition of posets 3.10 A Lower Bound on Online Chain Partition 3.11 Problems; 3.12 Bibliographic Remarks; Chapter 4: Merging Algorithms; 4.1 Introduction; 4.2 Algorithm to Merge Chains in Vector Clock Representation; 4.3 An Upper Bound for Detecting an Antichain of Size; 4.4 A Lower Bound for Detecting an Antichain of Size; 4.5 An Incremental Algorithm for Optimal Chain Decomposition; 4.6 Problems; 4.7 Bibliographic Remarks; Chapter 5: Lattices; 5.1 Introduction; 5.2 Sublattices; 5.3 Lattices as Algebraic Structures; 5.4 Bounding The Size of The Cover Relation of a Lattice 5.5 Join-Irreducible Elements Revisited 5.6 Problems; 5.7 Bibliographic Remarks; Chapter 6: Lattice Completion; 6.1 INTRODUCTION; 6.2 COMPLETE LATTICES; 6.3 CLOSURE OPERATORS; 6.4 TOPPED - STRUCTURES; 6.5 DEDEKIND-MACNEILLE COMPLETION; 6.6 STRUCTURE OF DEDEKIND-MACNEILLE COMPLETION OF A POSET; 6.7 AN INCREMENTAL ALGORITHM FOR LATTICE COMPLETION; 6.8 BREADTH FIRST SEARCH ENUMERATION OF NORMAL CUTS; 6.9 DEPTH FIRST SEARCH ENUMERATION OF NORMAL CUTS; 6.10 APPLICATION: FINDING THE MEET AND JOIN OF EVENTS; 6.11 APPLICATION: DETECTING GLOBAL PREDICATES IN DISTRIBUTED SYSTEMS 6.12 APPLICATION: DATA MINING 6.13 PROBLEMS; 6.14 BIBLIOGRAPHIC REMARKS; Chapter 7: Morphisms; 7.1 INTRODUCTION; 7.2 LATTICE HOMOMORPHISM; 7.3 LATTICE ISOMORPHISM; 7.4 LATTICE CONGRUENCES; 7.5 QUOTIENT LATTICE; 7.6 LATTICE HOMOMORPHISM AND CONGRUENCE; 7.7 PROPERTIES OF LATTICE CONGRUENCE BLOCKS; 7.8 APPLICATION: MODEL CHECKING ON REDUCED LATTICES; 7.9 PROBLEMS; 7.10 BIBLIOGRAPHIC REMARKS; Chapter 8: Modular Lattices; 8.1 INTRODUCTION; 8.2 MODULAR LATTICE; 8.3 CHARACTERIZATION OF MODULAR LATTICES; 8.4 PROBLEMS; 8.5 BIBLIOGRAPHIC REMARKS; Chapter 9: Distributive Lattices; 9.1 INTRODUCTION 9.2 FORBIDDEN SUBLATTICES

## Sommario/riassunto

A computational perspective on partial order and lattice theory, focusing on algorithms and their applications This book provides a uniform treatment of the theory and applications of lattice theory. The applications covered include tracking dependency in distributed systems, combinatorics, detecting global predicates in distributed systems, set families, and integer partitions. The book presents algorithmic proofs of theorems whenever possible. These proofs are written in the calculational style advocated by Dijkstra, with arguments explicitly spelled out step by step. The author's intent