

Cambridge University Press 978-0-521-78451-1 - Introduction to Lattices and Order, Second Edition B. A. Davey and H. A. Priestley Table of Contents More information

Contents

	Preface to the second edition	viii
	Preface to the first edition	х
1.	Ordered sets	1
	Ordered sets	1
	Examples from social science and computer science	5
	Diagrams: the art of drawing ordered sets	10
	Constructing and de-constructing ordered sets	14
	Down-sets and up-sets	20
	Maps between ordered sets	23
	Exercises	25
2.	Lattices and complete lattices	33
	Lattices as ordered sets	33
	Lattices as algebraic structures	39
	Sublattices, products and homomorphisms	41
	Ideals and filters	44
	Complete lattices and ∩-structures	46
	Chain conditions and completeness	50
	Join-irreducible elements	53
	Exercises	56
3.	Formal concept analysis	65
	Contexts and their concepts	65
	The fundamental theorem of concept lattices	70
	From theory to practice	74
	Exercises	79
4.	Modular, distributive and Boolean lattices	85
	Lattices satisfying additional identities	85
	The M_3 - N_5 Theorem	88
	Boolean lattices and Boolean algebras	93
	Boolean terms and disjunctive normal form	96
	Exercises	104



Cambridge University Press 978-0-521-78451-1 - Introduction to Lattices and Order, Second Edition B. A. Davey and H. A. Priestley Table of Contents More information

vi *Contents*

5.	Representation: the finite case	112
	Building blocks for lattices	112
	Finite Boolean algebras are powerset algebras	114
	Finite distributive lattices are down-set lattices	116
	Finite distributive lattices and finite ordered sets in	
	partnership	119
	Exercises	124
6.	Congruences	130
	Introducing congruences	130
	Congruences and diagrams	134
	The lattice of congruences of a lattice	137
	Exercises	140
7.	Complete lattices and Galois connections	145
	Closure operators	145
	Complete lattices coming from algebra: algebraic lattices	148
	Galois connections	155
	Completions	165
	Exercises	169
8.	CPOs and fixpoint theorems	175
	CPOs	175
	CPOs of partial maps	180
	Fixpoint theorems	182
	Calculating with fixpoints	189
	Exercises	193
9.	Domains and information systems	201
	Domains for computing	201
	Domains re-modelled: information systems	204
	Using fixpoint theorems to solve domain equations	221
	Exercises	223
10.	Maximality principles	228
	Do maximal elements exist? – Zorn's Lemma and the	
	Axiom of Choice	228
	Prime and maximal ideals	232
	Powerset algebras and down-set lattices revisited	237



Cambridge University Press 978-0-521-78451-1 - Introduction to Lattices and Order, Second Edition B. A. Davey and H. A. Priestley Table of Contents More information

Contents	vii
Exercises	244
11. Representation: the general case	247
Stone's representation theorem for Boolean algebras	247
Meet LINDA: the Lindenbaum algebra	252
Priestley's representation theorem for distributive lattices	256
Distributive lattices and Priestley spaces in partnership	261
Exercises	267
Appendix A: a topological toolkit	275
Appendix B: further reading	280
Notation index	286
Index	289