

Cambridge University Press

978-0-521-58386-2 - Information Flow: The Logic of Distributed Systems

Jon Barwise and Jerry Seligman

Table of Contents

[More information](#)

Contents

Preface	<i>page</i> xi
Part I: Introduction	1
1 Information Flow: A Review	3
1.1 The Worldly Commerce of Information	3
1.2 Regularity in Distributed Systems	7
1.3 Information and Knowledge	10
1.4 The Grammar of Information Flow	12
1.5 Approaches to Information	14
1.6 Summary	24
2 Information Channels: An Overview	26
2.1 Classifications and Infomorphisms	26
2.2 Information Channels	34
2.3 Local Logics	37
2.4 Exceptions	42
2.5 State Spaces	46
3 A Simple Distributed System	50
3.1 The Static Case	54
3.2 The Dynamic Case	62
Part II: Channel Theory	67
4 Classifications and Infomorphisms	69
4.1 Classifications	69

Cambridge University Press

978-0-521-58386-2 - Information Flow: The Logic of Distributed Systems

Jon Barwise and Jerry Seligman

Table of Contents

[More information](#)

<i>Contents</i>	vii
4.2 Infomorphisms	72
4.3 Information Channels Defined	75
4.4 Type-Token Duality	78
5 Operations on Classifications	81
5.1 Sums of Classifications	81
5.2 Invariants and Quotients	84
6 Distributed Systems	89
6.1 The Xerox Principle	89
6.2 Distributed Systems to Channels	91
7 Boolean Operations and Classifications	98
7.1 Boolean Operations on Classifications	98
7.2 Boolean Operations in Classifications	100
7.3 Boolean Classifications	100
8 State Spaces	103
8.1 State Spaces and Projections	103
8.2 Projections and Products	105
8.3 Subspaces	107
8.4 Event Classifications	108
8.5 State Spaces from Classifications	110
8.6 Back to Boole	111
8.7 State-Space Systems	114
9 Regular Theories	117
9.1 Theories	117
9.2 Finite Cut and Global Cut	125
9.3 The Theory of a State Space	126
9.4 Theory Interpretations	128
9.5 Representing Regular Theories	129
10 Operations on Theories	132
10.1 Sums of Theories	132
10.2 A Partial Order on Theories	133
10.3 Quotients of Theories	134
10.4 Moving Theories	135
10.5 Families of Theories	136

Cambridge University Press

978-0-521-58386-2 - Information Flow: The Logic of Distributed Systems

Jon Barwise and Jerry Seligman

Table of Contents

[More information](#)

viii

Contents

11 Boolean Operations and Theories	138
11.1 Boolean Operations on Theories	138
11.2 Boolean Operations in Theories	141
11.3 Boolean Inference in State Spaces	147
12 Local Logics	149
12.1 Local Logics Defined	149
12.2 Soundness and Completeness	152
12.3 Logic Infomorphisms	154
12.4 Operations on Logics	156
12.5 Boolean Operations and Logics	162
13 Reasoning at a Distance	165
13.1 Moving Logics	165
13.2 Images of Logics	166
13.3 Inverse Images of Logics	167
13.4 More About Moving Logics	171
14 Representing Local Logics	174
14.1 Idealization	174
14.2 Channel Infomorphisms	178
15 Distributed Logics	182
15.1 Information Systems	182
15.2 File Copying: An Example	184
15.3 The Distributed Logic of a Distributed System	189
15.4 Distributing a Logic Along a Channel	190
15.5 The Distributed Logic of a State-Space System	191
16 Logics and State Spaces	195
16.1 Subspaces of State Spaces	195
16.2 From Local Logics to State Spaces	198
Part III: Explorations	201
17 Speech Acts	203
17.1 Truth-Conditional Semantics and Speech Acts	203
17.2 Austin's Model	204
17.3 Austin's Four Speech Acts	205

Cambridge University Press

978-0-521-58386-2 - Information Flow: The Logic of Distributed Systems

Jon Barwise and Jerry Seligman

Table of Contents

[More information](#)

	<i>Contents</i>	ix
18 Vagueness	211	
18.1 Height Classifications	212	
18.2 Information Flow	215	
18.3 An Intensional Logic	216	
18.4 The Sorites Paradox	217	
19 Commonsense Reasoning	221	
19.1 The Dimension of a State Space	223	
19.2 Nonmonotonicity	225	
19.3 The Frame Problem	233	
19.4 Conclusions	233	
20 Representation	235	
20.1 Modeling Representational Systems	235	
20.2 Imperfect Representations	237	
20.3 Shimojima's Thesis	238	
21 Quantum Logic	243	
21.1 The Theory of a Manual	244	
21.2 A Comparison with Quantum Logic	248	
Answers to Selected Exercises	256	
Bibliography	268	
Glossary of Notation	270	
Index of Definitions	272	
Index of Names	274	