## Contents

Pr	eface		v
1.	Intro	duction, Marvin L. Minsky	1
	1.1	Survey 1	
	1.2	Organization of the Book 3	
	1.3	Artificial Intelligence and its Cybernetic Background 6	
	1.4	The Period between 1955 and 1962 8	
		Formality 11	
		Generality 13	
		Learning 13	
	1.8	Knowledge 17	
	1.9	Grammar, Syntax, and Parsing Programs 20	
	1.10	Machine Translation of Languages 24	
	1.11	How Much Semantic? 25	
	1.12	Relevance and Structure 26	
	1.13	Practical Problems of Mechanizing Large Models 27	
2.	SIR:	A Computer Program for Semantic Information Retrieval,	33
	Bertram Raphael		
	2.1	Introduction 33	
	2.2	Semantic Information Retrieval Systems 37	
	23	Representations for Semantic Information 48	
	2.4	SIR Treatment of Restricted Natural Language 38	
	2.5	Rehavior and Operation of SIR 64	
	2.6	Formalization and Generalization of SIR 90	
	27	Conclusions 110	
3. Natural Language Input for a Computer Problem-Solving		ral Language Input for a Computer Problem-Solving System,	146
	Daniel G. Bobrow		
	3.1	Introduction 146	

	3.2	Semantic Generation and Analysis of Discourse 155			
	3.3	Programming Formalisms and Language Manipulation 16/	170		
	3.4	Transformation of English to the STUDENT Deductive Model	172		
	3.5	Storage of Global Information 195			
	3.6	Solution of Simultaneous Equations 197			
	3.7	Conclusion 201	227		
4.	Sema	ntic Memory, M. Ross Quillian	221		
	4.1	The Role of Semantic Memory 227			
	4.2	The Memory Model 234			
	4.3	Use of the Memory Model in a Simulation Program 246			
	4.4	The Memory Model as Basis for a Theory of How People			
		Comprehend Language 256	50		
	4.5	Some Final Implications and Relations to Linguistic Theory 2	39		
5.		ogram for the Solution of Geometric-Analogy Intelligence Test	271		
	Ques	tions, Thomas G. Evans	271		
	5.1	Introduction 271			
	5.2	The Complete Solution Process: Two Examples 288			
	5.3	Analogy: Part 1 297			
	5.4	Analogy: Part 2 317			
	5.5	Results and Discussion 327			
	5.6	Conclusions 341	354		
6.	A De	eductive Question-Answering System, Fischer Black	334		
	6.1	Introduction 354			
	6.2	Statement, Question, and Answer 357			
	6.3	Deduction 363			
	6.4	Stopping Endless Deduction 371			
	6.5	Avoiding Endless Deduction 378			
	6.6	Examples 384			
	6.7	Efficiency 391	403		
7		rams with Common Sense, John McCarthy	403		
	7.1	The Advice Taker 403			
	7.2	Situation, Actions, and Causal Laws 410	419		
8		riptive Languages and Problem Solving, Marvin L. Minsky	417		
	8.1	Introduction 419			
	8.2	The Need for Analysis 420			
	8.3	Conclusion 423	125		
9	. Mat	ter, Mind, and Models, Marvin L. Minsky	425		
	9.1	Introduction 425			
	9.2	Knowledge and Models 425			
	9.3	Models of Models 426			
	9.4	Dimorphism of our World Models 427			
	9.5	The Central Argument: Belief in Dualism 428			
	9.6	Heuristic Value of Quasi-Separate Models 428			
	9.7	Interpreters 430			
	9.8	Free Will 431			
_	9.9	Conclusion 431	433		
	Subject index				
1	Name Index 437				