# Contents

**Preface** vii

**1 Introduction** 1
- 1.1 Purpose · 1
- 1.2 Logic Programming and Language · 1
- 1.3 Programming In Prolog · 3
- 1.4 Overview · 4
- 1.5 Bibliographic Notes · 5

**2 Database Prolog** 9
- 2.1 Databases and Queries · 9
- 2.2 Extending the Query Language · 11
- 2.3 The Logic of Prolog · 14
- 2.4 The Operation of Database Prolog · 18
- 2.5 Recursive Predicate Definitions · 22
- 2.6 Problem Section: Semantic Networks · 26
- 2.7 Context-Free Grammars · 29
- 2.8 Problem Section: Grammars · 37
- 2.9 Bibliographic Notes · 42

**3 Pure Prolog** 45
- 3.1 Prolog Notation Revisited · 45
- 3.2 Terms and Unification · 46
- 3.3 Functions in Prolog and Other Languages · 48
- 3.4 Lists · 52
- 3.5 The Logic and Operation of Prolog Revisited · 62
- 3.6 Problem Section: Terms and Lists · 66
- 3.7 Definite Clause Grammars · 70

3.8 Problem Section: DCGs · 79
3.9 Bibliographic Notes · 87

**4 Further Topics in Natural-Language Analysis** **91**
4.1 Semantic Interpretation · 91
4.2 Extending the Syntactic Coverage · 114
4.3 Problem Section: Grammar Extensions · 129
4.4 Bibliographic Notes · 134

**5 Full Prolog** **137**
5.1 Metalogical Facilities · 137
5.2 A Simple Dialogue Program · 149
5.3 User Interaction · 154
5.4 Bibliographic Notes · 157

**6 Interpreters** **159**
6.1 Prolog in Prolog · 160
6.2 Problem Section: Prolog Interpreters · 165
6.3 Interpreters for DCGs · 167
6.4 Partial Execution and Compilers · 172
6.5 Bottom-Up Parsing · 178
6.6 Tabular Parsing · 185
6.7 Problem Section: DCG Interpreters and Compilers · 207
6.8 Bibliographic Notes · 209

**A Listing of Sample Programs** **211**
A.1 A Note on Programming Style · 211
A.2 The TALK Program · 212
A.3 The DCG Compiler · 224

**Bibliography** **231**

**Name Index** **245**

**Subject Index** **249**