List of Authors	ix
Forward	xi
Author's Preface	XV
Chapter 1: Introduction	1
Motivation	
Responding to the Critics	11
The Symbol Grounding Problem	20
Contents of the Book	
Chapter 2: Knowledge Representation	
Overview	
Informal Languages	
Frames	
Description Logic	
Propositional and Predicate Logic	
First-Order Logic	
Higher-Order Logics	
First-Order Logic in SUO-KIF	
SUO-KIF Details	
Conversion to First-Order Logic	
Exercises.	
Chapter 3: Ontologies (in the Broadest Sense)	
Introduction	
WordNet (and Why it's not an Ontology)	
Digression: Ontology Development Pitfalls	
Chapter 4: Suggested Upper Merged Ontology	
Overview	
Validation	
Principles of Construction	
Digression - Open Research	
SUMO History	
SUMO Overview	
SUMO's Eleven Modules	
Lower Level Ontologies	
Ontological Issues	
Ontology Code Management	
SUMO Details and Examples	
Semiotics Content	
Exercises	
Chapter 5: SUMO and the WordNet Mappings	
Overview	
Interpreting Language	
Global WordNet	
The Interlingual Index.	
Arabic and Filipino Wordnets	
Chapter 6: Knowledge Engineering Tools	
Introduction	
Language Generation	
Browsing and Display	
Analysis and Debugging	182

Inference	184
Higher-Order Logic	192
Mapping, Merging and Translation	194
Working with Sigma and SUMO	
Example Application	
Browsing and Editing	201
Sigma Tutorial	202
Exercises	214
Chapter 7: Using SUMO for Inference	215
Overview	217
Inference	218
Example Inference	220
Proof Presentation	222
Resolution Theorem Proving Example	223
Normalization Algorithm	230
Refutation Algorithm	232
Chapter 8: Controlled English to Logic Translation	235
Introduction	237
Simple Parsing and Interpretation	239
Issues in Translation	241
CELT Components	248
Chapter 9: An Application: Extending SUMO with Wikipedia	249
Introduction	251
Related Work	251
General Comparison of the Knowledge Sources	253
Integration of Entities	
Integrating Factual Knowledge	262
Semantics of Terms in Ontologies	266
Conclusion	267
Summary and Conclusions	269
Answers to the Exercises	271
Acknowledgments	275
References	279
Index	297