

Foreword	p. ix
Preface	p. xxiii
Foundations	p. 1
Introduction	p. 3
The Art of Language Design	p. 5
The Programming Language Spectrum	p. 8
Why Study Programming Languages?	p. 11
Compilation and Interpretation	p. 13
Programming Environments	p. 21
An Overview of Compilation	p. 22
Summary and Concluding Remarks	p. 31
Exercises	p. 32
Explorations	p. 33
Bibliographic Notes	p. 35
Programming Language Syntax	p. 37
Specifying Syntax	p. 38
Scanning	p. 46
Parsing	p. 61
Theoretical Foundations	p. 94
Summary and Concluding Remarks	p. 95
Exercises	p. 96
Explorations	p. 101
Bibliographic Notes	p. 101
Names, Scopes, and Bindings	p. 103
The Notion of Binding Time	p. 104
Object Lifetime and Storage Management	p. 106
Scope Rules	p. 114
Implementing Scope	p. 135
The Binding of Referencing Environments	p. 136
Binding Within a Scope	p. 142
Separate Compilation	p. 149
Summary and Concluding Remarks	p. 149
Exercises	p. 151
Explorations	p. 157
Bibliographic Notes	p. 158
Semantic Analysis	p. 161
The Role of the Semantic Analyzer	p. 162
Attribute Grammars	p. 166
Evaluating Attributes	p. 168
Action Routines	p. 179
Space Management for Attributes	p. 181

Decorating a Syntax Tree	p. 182
Summary and Concluding Remarks	p. 187
Exercises	p. 189
Explorations	p. 193
Bibliographic Notes	p. 194
Target Machine Architecture	p. 195
The Memory Hierarchy	p. 196
Data Representation	p. 199
Instruction Set Architecture	p. 201
Architecture and Implementation	p. 204
Compiling for Modern Processors	p. 210
Summary and Concluding Remarks	p. 221
Exercises	p. 223
Explorations	p. 226
Bibliographic Notes	p. 227
Core Issues in Language Design	p. 231
Control Flow	p. 233
Expression Evaluation	p. 234
Structured and Unstructured Flow	p. 254
Sequencing	p. 260
Selection	p. 261
Iteration	p. 270
Recursion	p. 287
Nondeterminacy	p. 295
Summary and Concluding Remarks	p. 296
Exercises	p. 298
Explorations	p. 304
Bibliographic Notes	p. 305
Data Types	p. 307
Type Systems	p. 308
Type Checking	p. 321
Records (Structures) and Variants (Unions)	p. 336
Arrays	p. 349
Strings	p. 366
Sets	p. 367
Pointers and Recursive Types	p. 369
Lists	p. 389
Files and Input/Output	p. 392
Equality Testing and Assignment	p. 393
Summary and Concluding Remarks	p. 395
Exercises	p. 398

Explorations	p. 404
Bibliographic Notes	p. 405
Subroutines and Control Abstraction	p. 407
Review of Stack Layout	p. 408
Calling Sequences	p. 410
Parameter Passing	p. 417
Generic Subroutines and Modules	p. 434
Exception Handling	p. 441
Coroutines	p. 453
Summary and Concluding Remarks	p. 459
Exercises	p. 460
Explorations	p. 466
Bibliographic Notes	p. 467
Data Abstraction and Object Orientation	p. 469
Object-Oriented Programming	p. 471
Encapsulation and Inheritance	p. 481
Initialization and Finalization	p. 489
Dynamic Method Binding	p. 497
Multiple Inheritance	p. 511
Object-Oriented Programming Revisited	p. 512
Summary and Concluding Remarks	p. 513
Exercises	p. 515
Explorations	p. 517
Bibliographic Notes	p. 518
Alternative Programming Models	p. 521
Functional Languages	p. 523
Historical Origins	p. 524
Functional Programming Concepts	p. 526
A Review/Overview of Scheme	p. 528
Evaluation Order Revisited	p. 539
Higher-Order Functions	p. 545
Theoretical Foundations	p. 549
Functional Programming in Perspective	p. 549
Summary and Concluding Remarks	p. 552
Exercises	p. 552
Explorations	p. 557
Bibliographic Notes	p. 558
Logic Languages	p. 559
Logic Programming Concepts	p. 560
Prolog	p. 561
Theoretical Foundations	p. 579

Logic Programming in Perspective	p. 579
Summary and Concluding Remarks	p. 583
Exercises	p. 584
Explorations	p. 586
Bibliographic Notes	p. 587
Concurrency	p. 589
Background and Motivation	p. 590
Concurrent Programming Fundamentals	p. 601
Shared Memory	p. 619
Message Passing	p. 642
Summary and Concluding Remarks	p. 660
Exercises	p. 662
Explorations	p. 668
Bibliographic Notes	p. 669
Scripting Languages	p. 671
What Is a Scripting Language?	p. 672
Problem Domains	p. 677
Scripting the World Wide Web	p. 701
Innovative Features	p. 722
Summary and Concluding Remarks	p. 748
Exercises	p. 750
Explorations	p. 755
Bibliographic Notes	p. 756
A Closer Look at Implementation	p. 759
Building a Runnable Program	p. 761
Back-End Compiler Structure	p. 761
Intermediate Forms	p. 766
Code Generation	p. 769
Address Space Organization	p. 775
Assembly	p. 776
Linking	p. 781
Dynamic Linking	p. 784
Summary and Concluding Remarks	p. 786
Exercises	p. 787
Explorations	p. 789
Bibliographic Notes	p. 790
Code Improvement	p. 791
Phases of Code Improvement	
Peephole Optimization	
Redundancy Elimination in Basic Blocks	
Global Redundancy and Data Flow Analysis	

Loop Improvement I	
Instruction Scheduling	
Loop Improvement II	
Register Allocation	
Summary and Concluding Remarks	
Exercises	
Explorations	
Bibliographic Notes	
Programming Languages Mentioned	p. 793
Language Design and Language Implementation	p. 803
Numbered Examples	p. 807
Bibliography	p. 819
Index	p. 837
Table of Contents provided by Blackwell's Book Services and R.R. Bowker. Used with permission.	