

<b>Preface .....</b>	<b>xxiii</b>
Audience .....	xxiv
Prerequisites .....	xxiv
Hardware and Software.....	xxv
Interface Tools: To Use or Not? .....	xxvi
Organization.....	xxvii
Conventions .....	xxix
Tools Used to Create This Book .....	xxx
Obtaining the Source Code .....	xxxi
Author’s Biography.....	xxxi
Contacting the Author.....	xxxi
Acknowledgments.....	xxxii
<b>Chapter 1 NeXTSTEP Components .....</b>	<b>1</b>
1.1 Mach and UNIX.....	2
1.2 The Window Server .....	3
1.3 The Application Kit .....	4
1.4 Objective-C .....	5
1.5 The Workspace Manager .....	5
1.6 ProjectBuilder .....	5
1.7 InterfaceBuilder .....	6
1.8 Summary .....	6
<b>Chapter 2 OOP and Objective-C .....</b>	<b>7</b>
2.1 Goals .....	7
2.2 Object-Oriented Programming.....	8
2.2.1 Encapsulation.....	9
2.2.2 Classes.....	10
2.2.3 Instances.....	10
2.2.4 Subclasses .....	13
2.2.5 Messages .....	17
2.2.6 Polymorphism .....	18
2.3 Objective-C .....	21
2.3.1 Support for Abstract Data Types.....	23
2.3.2 Messages .....	24
2.3.3 Naming Conventions.....	25

2.3.4 Objective-C Comments .....	26
2.4 A Sample Objective-C Application .....	27
2.4.1 Defining Classes.....	31
2.4.2 Class Methods and Instance Methods.....	35
2.4.3 Messaging Mechanisms .....	36
2.4.4 Methods and Functions .....	40
2.4.5 Self and Super .....	41
2.4.6 Instantiating Classes.....	44
2.4.7 Initializing Instances .....	45
2.4.8 Freeing Objects .....	46
2.5 Suggestions .....	50
2.5.1 Printing the Indices of the List's Contents.....	50
2.5.2 Freeing the List and its Contents .....	51
2.6 Summary .....	51
<b>Chapter 3 Object-Oriented Design.....</b>	<b>53</b>
3.1 Goals .....	53
3.2 Methodology .....	54
3.2.1 Identifying the Objects.....	55
3.2.2 Determining What Each Object Does.....	57
3.2.3 Identifying the Relationships Between the Objects .....	59
3.2.4 Modeling the Flow of the Application.....	60
3.3 Designing ShapeArea.....	61
3.4 Tools and Techniques.....	62
3.4.1 CRC Cards .....	62
3.4.2 Class Summary Tables .....	66
3.4.3 Message Diagrams .....	68
3.4.4 Hierarchy Graphs .....	70
3.5 Implementing ShapeArea.....	70
3.5.1 Implementation Pass I.....	72
3.5.2 Implementation Pass II .....	80
3.5.3 Implementation Pass III .....	89
3.6 Common Pitfalls in OOD.....	94
3.7 Suggestions .....	96
3.8 Summary .....	96

<b>Chapter 4 The Application Kit.....</b>	<b>99</b>
4.1 Goals .....	99
4.2 The Application Kit Classes .....	99
4.3 The Common Classes .....	102
4.4 A NeXTSTEP Application vs. an Objective-C Application.....	103
4.5 A Minimal NeXTSTEP Application.....	104
4.5.1 Design .....	105
4.5.2 Implementation Pass I: Displaying a Window .....	111
4.5.3 Implementation Pass II: Adding a Quit Menu Option .....	117
4.6 Suggestions .....	121
4.7 Summary .....	121
<b>Chapter 5 ProjectBuilder and InterfaceBuilder.....</b>	<b>123</b>
5.1 Goals .....	124
5.2 The Development Cycle.....	124
5.2.1 Starting a Project.....	126
5.2.2 Adding the Objects .....	133
5.2.3 Inspecting the Objects.....	134
5.2.4 Making the Connections .....	138
5.2.5 Testing the Interface.....	141
5.2.6 Compiling the Application.....	142
5.2.7 Launching the Application.....	144
5.2.8 Decomposing a NeXTSTEP Application .....	146
5.3 Summary .....	148
<b>Chapter 6 Processing Events .....</b>	<b>149</b>
6.1 Goals .....	149
6.2 Event-Driven Programming .....	150
6.3 The Target-Action Paradigm.....	153
6.3.1 The Button Class.....	154
6.3.2 The Slider Class .....	161
6.3.3 The TextField Class .....	165
6.3.4 The Form Class .....	168
6.4 The Delegation Paradigm.....	172
6.5 Designing Money.....	180
6.6 Implementing Money.....	186

6.7 Walking Through the Code .....	196
6.8 Suggestions .....	197
6.8.1 Adding Another Menu Option .....	197
6.8.2 Setting a Window's Minimum Size .....	198
6.8.3 Autosizing .....	203
6.9 Troubleshooting .....	205
6.10 Summary .....	207
<b>Chapter 7 Drawing With PostScript .....</b>	<b>209</b>
7.1 Goals .....	209
7.2 The View Class .....	209
7.2.1 Creating a View .....	210
7.2.2 Adding Subviews .....	213
7.2.3 Displaying the Views .....	214
7.3 Mouse Events .....	218
7.4 Converting Coordinates .....	220
7.5 PostScript .....	222
7.5.1 PostScript Primer .....	224
7.5.2 PostScript Special Effects .....	229
7.5.3 Interfacing to Objective-C Using Single Operators .....	232
7.5.4 Interfacing to Objective-C Using pswraps .....	234
7.6 Instance Drawing .....	237
7.7 Designing Shapes .....	241
7.8 Implementing Shapes .....	252
7.9 Walking Through the Code .....	269
7.10 Suggestions .....	274
7.10.1 Adding Support for Printing .....	274
7.10.2 Drawing Shadows .....	274
7.10.3 Adding a Triangle Class .....	275
7.10.4 Detecting Mouse Clicks .....	275
7.11 Troubleshooting .....	276
7.12 Summary .....	278
<b>Chapter 8 Customizing NeXTSTEP Applications .....</b>	<b>279</b>
8.1 Goals .....	279
8.2 The Defaults Database .....	279
8.2.1 Reading Defaults with dread .....	280

- 8.2.2 Registering Defaults.....281
- 8.2.3 Writing Defaults with dwrite .....288
- 8.3 Using Multiple .nib Files .....289
  - 8.3.1 Setting the File’s Owner .....290
  - 8.3.2 Initializing Outlets .....292
- 8.4 Redesigning Money: Adding a Preferences Panel.....296
- 8.5 Implementing Money.....309
- 8.6 Examining the Code.....324
- 8.7 Suggestions .....333
  - 8.7.1 Implementing the Quit Prompt .....333
  - 8.7.2 Adding Support for Significant Figures .....333
  - 8.7.3 Implementing Dynamic Conversion Rates .....334
  - 8.7.4 Adding an Info Panel .....334
- 8.8 Troubleshooting .....334
- 8.9 Summary .....336

**Chapter 9 Processing Text ..... 337**

- 9.1 Goals .....337
- 9.2 Creating the Text.....338
- 9.3 Selecting the Text.....339
- 9.4 Cutting and Pasting the Text .....341
- 9.5 Setting the First Responder.....343
- 9.6 Scrolling the Text.....345
- 9.7 Saving the Text.....350
  - 9.7.1 Using the SavePanel.....351
  - 9.7.2 Writing the Text to a File .....354
- 9.8 Loading the Text .....357
  - 9.8.1 Using the OpenPanel.....357
  - 9.8.2 Loading the Text From a File.....361
- 9.9 Adding a Text Delegate.....362
- 9.10 Designing Words.....364
- 9.11 Implementing Words.....374
- 9.12 Walking Through the Code .....387
- 9.13 Suggestions .....397
  - 9.13.1 Enabling the Menu Options .....398
  - 9.13.2 Updating the OpenPanel and SavePanel.....398

9.13.3 Adding Printing Support .....	398
9.13.4 Saving Part of a Document .....	400
9.13.5 Adding a Preferences Panel .....	400
9.13.6 Opening Files from the Workspace.....	402
9.14 Troubleshooting .....	408
9.15 Summary .....	409
<b>Chapter 10 Implementing On-Line Help.....</b>	<b>411</b>
10.1 Goals .....	411
10.2 The On-Line Help System .....	411
10.3 Using Links .....	413
10.4 Using Markers.....	415
10.5 Adding On-line Help to Words .....	417
10.6 Troubleshooting .....	424
10.7 Suggestions .....	426
10.7.1 Adding the Help Entries to the Index .....	427
10.7.2 Creating More Help Entries .....	427
10.7.3 Adding Graphics to the Help Files.....	427
10.8 Summary .....	427
10.9 Epilogue .....	428
<b>Appendix A A NeXTSTEP Tutorial .....</b>	<b>431</b>
<b>Appendix B Tools of the Trade .....</b>	<b>447</b>
B.1 Edit .....	447
B.1.1 Using the Implicit Expansion Dictionary.....	447
B.1.2 Customizing the Expansion Dictionary.....	449
B.1.3 Contracting and Expanding the Listing.....	452
B.2 Digital Librarian.....	453
B.2.1 Expanding the Search String .....	456
B.2.2 Limitations of Digital Librarian .....	457
B.3 HeaderViewer.....	458
B.3.1 Language Elements .....	459
B.3.2 Using the Find Controls Options panel.....	460
B.3.3 HeaderViewer vs. Digital Librarian .....	463
B.4 Terminal .....	465
B.4.1 Copying Text .....	465

B.4.2 Messaging the Workspace .....	468
B.4.3 Messaging HeaderViewer.....	469
B.4.4 Messaging Digital Librarian.....	470
B.5 The make Utility.....	470
B.5.1 The Makefile .....	470
B.5.2 Removing Files: make clean .....	474
B.5.3 Installing the Application: make install .....	474
B.5.4 Deinstalling the Application: make deinstall .....	475
B.5.5 Makefiles for the Applications .....	476
B.5.6 Error Messages in make .....	480
<b>Appendix C Common NeXTSTEP Mistakes .....</b>	<b>483</b>
C.1 Runtime Errors .....	483
C.2 Warnings.....	486
<b>Appendix D Debugging .....</b>	<b>491</b>
D.1 Tracing the Program.....	491
D.1.1 Tracing a Non-Event Driven Application .....	492
D.1.2 Tracing an Event-Driven Program .....	493
D.1.3 Implicit and Explicit Message Sending .....	498
D.1.4 Reverse-engineering an Application .....	501
D.2 Debugging with gdb.....	504
D.2.1 Compiling for Debugging .....	504
D.2.2 Setting BreakPoints.....	508
D.2.3 Running the Application .....	509
D.2.4 Printing Variables.....	510
D.2.5 Single-Stepping .....	512
D.2.6 Browsing Objects .....	514
D.2.7 Continuing the Execution.....	518
D.2.8 Setting Variables .....	519
D.3 Suggestions .....	521
D.4 Summary .....	521
<b>Appendix E Resources.....</b>	<b>523</b>
E.1 Bundled Documentation and Source Code.....	523
E.2 Books .....	524
E.2.1 NeXTSTEP.....	524

E.2.2 Object-Oriented Design and Technology .....	525
E.2.3 Object-Oriented Programming and Objective-C .....	525
E.2.4 PostScript.....	526
E.2.5 C .....	527
E.2.6 UNIX .....	527
E.2.7 User-Interface Design.....	528
E.2.8 Miscellaneous .....	528
E.3 Magazines and Journals.....	529
E.4 Internet Archives .....	530
E.4.1 Using anonymous ftp.....	531
E.4.2 Using the Mail Server.....	532
E.4.3 Unpacking the Data .....	533
E.5 NeXTAnswers .....	534
E.6 Newsgroups .....	534
E.7 Users Groups .....	535
E.8 Special Interest Groups Mailing Lists .....	571
E.9 Bulletin Boards.....	572
E.10 Associations.....	573
E.11 Conventions .....	573
<b>Appendix F Porting to NeXTSTEP/Intel .....</b>	<b>575</b>
F.1 Hardware Considerations .....	576
F.1.1 The Screen .....	576
F.1.2 The Mouse .....	578
F.1.3 The Keyboard.....	578
F.1.4 Sound .....	580
F.2 Data Representation Considerations .....	580
F.2.1 Datum Size.....	580
F.2.2 Byte Alignment.....	581
F.2.3 Byte Order.....	581
F.2.4 Datum Format .....	582
F.2.5 Argument Passing .....	582
F.2.6 External Data .....	583
F.2.6.1 Reading and Writing Structure Bitfields .....	584
F.2.6.2 Reading Existing Files .....	588

F.2.7 Internal Data.....	593
F.2.8 Memory-mapped Data .....	594
<b>Index .....</b>	<b>597</b>

