

Preface	xxiii
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
 Chapter 1 NeXTSTEP Components	 1
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
 Chapter 2 OOP and Objective-C	 7
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
Chapter 3 Object-Oriented Design.....	53
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

Chapter 4 The Application Kit.....	99
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
Chapter 5 ProjectBuilder and InterfaceBuilder.....	123
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
Chapter 6 Processing Events	149
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
Chapter 7 Drawing With PostScript	209
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
Chapter 8 Customizing NeXTSTEP Applications	279
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
Chapter 10 Implementing On-Line Help.....	411
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
Appendix A A NeXTSTEP Tutorial	431
Appendix B Tools of the Trade	447
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
Appendix C Common NeXTSTEP Mistakes	483
C.1 Runtime Errors	483
C.2 Warnings.....	486
Appendix D Debugging	491
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
Appendix E Resources.....	523
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
Appendix F Porting to NeXTSTEP/Intel	575
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 Data594

Index 597

