

Contents

Preface	vii
About this Book.....	vii
How this Book Came to Exist.....	vii
Suggested Reading Plan.....	viii
Chapters	viii
Source Code Conventions	x
Text Conventions	xi
Caveats	xii
Acknowledgments.....	xii
1 An Introduction To Motif	1
“Mechanism, not Policy”	1
Enter Motif	2
The Layers of X.....	3
2 The Widget	5
What Is a Widget?.....	5
An Introduction to Object-Oriented Programming	5
Widgets as Objects.....	7
The Motif Class Tree	7
Widget Instance Tree	10
3 Widget Resources	11
What Are Resources?	11
Resource Tables.....	12
A Short Note on Resource Naming Conventions	13
Resource Files	13
The Naming of Widgets	13
Format of a Resource Specification	16
Sample Resource File.....	17
Setting Resources by Class	19
Resolution of Wildcarded Widget Names.....	19
The Resource not Set.....	20
Commenting the Resource File	20

	How Many Resource Files Could One Program Use?	21
	Setting Resources from the Command Line	22
	Setting Resources Programmatically	23
	"Hard Wiring" Resource Values	25
	Getting Resources Programmatically	26
4	Writing A Motif Program	27
	The <i>Widget</i> Data Type	27
	Stages in the Life of a Motif Program	27
	A Program Template	32
	Header Files	34
	Compilation of a Motif Program	35
	A Short Note About Program Size	36
	What About Standard I/O?	37
5	<i>XmLabel</i>	39
	Overview	39
	<i>XmLabel</i> Inheritance	39
	<i>XmLabel</i> Resources	40
	Using <i>XmLabel</i> : "Hello, World!"	42
	Setting a Label's Font	44
	The <i>XmString</i> Data Type	48
	Setting <i>labelString</i> Programmatically	51
	Using <i>XmLabel</i> with Pictures	53
6	Managers	57
	Overview	57
	Inheritance	57
	Constraints: An Overview	59
	Management Revisited	59
	Measurement: The <i>unitType</i> Resource	63
	<i>XmBulletinBoard</i>	65
	<i>XmBulletinBoard</i> Examples	68
	<i>XmRowColumn</i>	73
	<i>XmRowColumn</i> Examples	80
	<i>XmPanedWindow</i>	87
	<i>XmPanedWindow</i> Example: Three Labels and a Paned Window	91
	<i>XmForm</i>	92
	<i>XmForm</i> Examples	100
7	Buttons	107
	Overview	107
	Inheritance	108
	<i>XmPushButton</i>	108
	<i>XmPushButton</i> Example: Press Here	112
	<i>XmArrowButton</i>	114
	<i>XmArrowButton</i> Example	115
	<i>XmToggleButton</i>	117
	<i>XmToggleButton</i> Examples	122

8	Events and Callbacks	125
	Overview	125
	Handling X Events	127
	Event Handler Example: Mouse Tracker	135
	Callbacks	142
	Button Callbacks	145
	<i>XmPushButton</i> Callback Example: Press Here	146
	Actions	148
	Translations	151
	Action/Translation Example: Multibutton Pushbutton	159
	<i>XmPushButton</i> Default Translations	162
9	Keyboard Input	165
	Overview	165
	Input Focus	165
	Keyboard Events	166
	Traversal	167
	Traversal Example: Three Tab Groups	169
	<i>XmText</i>	172
	<i>XmText</i> Resources	173
	<i>XmText</i> Callbacks	179
	<i>XmText</i> Default Translations	182
	<i>XmText</i> Convenience Functions	185
	<i>XmText</i> Example: Memo Pad	190
	<i>XmText</i> Example: Entry Fields	192
	Scrolled Text	197
	Creating a Scrolled Text "Widget"	198
	Scrolled Text Resources	199
	Scrolled Text Example: File Browser	200
10	Scrollbars	205
	Overview	205
	Scrollbar Components and Terminology	205
	<i>XmScrolledWindow</i>	207
	<i>XmScrolledWindow</i> Resources	208
	Creating and Initializing a Scrolled Window	211
	<i>XmScrolledWindow</i> Example: Scrolling Row-Column	212
	<i>XmScrollBar</i>	215
	<i>XmScrollBar</i> Resources	216
	<i>XmScrollBar</i> Callbacks	219
	Getting and Setting a Scrollbar's Values Programmatically	221
	<i>XmScrollBar</i> Example	221
	<i>XmScale</i>	224
	<i>XmScale</i> Resources	225
	<i>XmScale</i> Callbacks	228
	Getting and Setting a Scale's Value Programmatically	228
	<i>XmScale</i> Example	229

11	The Motif “Look”	233
	Overview.....	233
	Components of a Motif Client.....	233
	<i>XmMainWindow</i>	235
	<i>XmMainWindow</i> Resources.....	235
	<i>XmMainWindow</i> Convenience Functions.....	237
	<i>XmSeparator</i>	238
	<i>XmSeparator</i> Resources.....	239
	<i>XmSeparator</i> Example.....	241
	<i>XmFrame</i>	243
	<i>XmFrame</i> Resources.....	244
	<i>XmFrame</i> Example: Labels in Frames.....	246
	The New Standard Program Template.....	248
	The Text Editor: A Sample Application.....	254
12	Menus	261
	Overview.....	261
	<i>XmCascadeButton</i>	261
	<i>XmCascadeButton</i> Resources.....	262
	<i>XmCascadeButton</i> Callbacks.....	263
	<i>XmRowColumn</i> Menu Resources.....	264
	<i>XmRowColumn</i> Callbacks.....	266
	The Menu Bar.....	267
	The Standard Motif Menu Bar.....	269
	Menu Bar Example: Adding a Menu Bar to the Editor.....	272
	<i>XmMenuShell</i> and a Menu Pane’s Instance Tree.....	276
	Pull-Down Menus.....	276
	Pull-Down Example: Adding Pull-Down Menus to the Editor.....	278
	Mnemonics.....	282
	Menu Accelerators.....	285
	Cascading Pull-Downs.....	287
	Cascading Pull-Down Example.....	288
	Pop-Up Menus.....	289
	Pop-Up Menu Example: Color Selection Menu.....	290
	Option Menus.....	294
	<i>XmRowColumn</i> Resources Specific to Option Menus.....	295
	Option Menu Example: Font Family and Size.....	297
	Menu Summary.....	300
13	Dialogs	305
	Overview.....	305
	Dialog Modality.....	305
	Dialog Design and Components.....	306
	<i>XmDialogShell</i>	307
	<i>XmDialogShell</i> Resources.....	308
	Dialog Management and Unmanagement.....	310
	<i>XmBulletinBoard</i> Dialog Resources.....	310
	Building and Using a Dialog.....	313
	Bulletin Board Dialog Example: Find.....	314
	Message Boxes.....	325
	<i>XmMessageBox</i>	327
	<i>XmMessageBox</i> Resources.....	328
	<i>XmMessageBox</i> Convenience Functions.....	330

<i>XmMessageBox</i> Example: "Can't Find" Alert.....	331
Grabbing and Assigning Input Focus	334

14 Lists 337

Overview	337
<i>XmList</i>	337
<i>XmList</i> Resources	339
<i>XmList</i> Callbacks	342
<i>XmList</i> Convenience Functions	344
<i>XmList</i> Example: E-Mail Address Selection	347
Scrolled List	351
Scrolled List Resources	352
Scrolled List Example: Scrolling E-Mail Addresses	353
<i>XmSelectionBox</i>	354
<i>XmSelectionBox</i> Resources	355
<i>XmSelectionBox</i> Callbacks	359
Creating and Using a Selection Box	360
Accessing a Selection Box's Children	360
<i>XmSelectionBox</i> Example: E-Mail Addresses	361
<i>XmFileSelectionBox</i>	363
<i>XmFileSelectionBox</i> Resources	365
Creating and Using <i>XmFileSelectionBox</i>	366
<i>XmFileSelectionBox</i> Example: Open/Save As	368
<i>XmCommand</i>	379
<i>XmCommand</i> Resources	380
<i>XmCommand</i> Convenience Functions	382
<i>XmCommand</i> Example	384

15 Using Xlib With Motif 387

Overview	387
The X Server	387
Color in a Digital World	389
The Standard Xlib Parameters	391
The Graphics Context	393
<i>XmDrawingArea</i>	401
<i>XmDrawingArea</i> Resources	402
<i>XmDrawingArea</i> Callbacks	403
<i>XmDrawingArea</i> Example: Doodle	406

16 Resources Revisited 427

Overview	427
Program Instance Names	427
Command-Line Options	432
Resource Converters	436
Writing a Converter	444
Quarks	452
Using Converters Outside the Resource Manager	455
The Conversion Cache	459
Application Resources	460

17	Interclient Communication	467
	Overview	467
	File I/O	467
	Timeouts	474
	Background Processing: WorkProcs	478
	Sending Events Between Clients	482
	Atoms	485
	Window Properties	487
	Window Manager Protocols	493
	Selection	502
	The Clipboard	513
	Example: Adding Cut, Copy, and Paste to the Text Editor	521
	XmText Direct Clipboard Interface	530

Appendix A:		
	ISO Latin 1 Character Set	533

Appendix B:		
	Widget Class Summary	535
	Overview	535
	ApplicationShell	535
	Composite	536
	Constraint	536
	Core	537
	OverrideShell	538
	Shell	538
	TopLevelShell	539
	TransientShell	539
	VendorShell	539
	WMShell	540
	XmArrowButton	541
	XmBulletinBoard	542
	XmCascadeButton	543
	XmCommand	543
	XmDialogShell	544
	XmDrawingArea	544
	XmDrawnButton	545
	XmFileSelectionBox	545
	XmForm	546
	XmFrame	547
	XmLabel	547
	XmList	548
	XmMainWindow	549
	XmManager	549
	XmMenuShell	550
	XmMessageBox	550
	XmPanedWindow	551
	XmPrimitive	552
	XmPushButton	553
	XmRowColumn	554
	XmScale	555

<i>XmScrollBar</i>	556
<i>XmScrolledWindow</i>	557
<i>XmSelectionBox</i>	558
<i>XmSeparator</i>	559
<i>XmText</i>	560
<i>XmToggleButton</i>	561

Appendix C:

X Event Reference 563

Overview	563
Event Types	563
Event Masks	565
<i>XEvent</i>	567
<i>XAnyEvent</i>	570
<i>ButtonPress, ButtonRelease</i>	571
<i>CirculateNotify</i>	573
<i>CirculateRequest</i>	574
<i>ClientMessage</i>	575
<i>ColormapNotify</i>	577
<i>ConfigureNotify</i>	578
<i>ConfigureRequest</i>	580
<i>CreateNotify</i>	583
<i>DestroyNotify</i>	584
<i>EnterNotify, LeaveNotify</i>	585
<i>Expose</i>	588
<i>FocusIn, FocusOut</i>	589
<i>GraphicsExpose, NoExpose</i>	592
<i>GravityNotify</i>	594
<i>KeymapNotify</i>	595
<i>KeyPress, KeyRelease</i>	596
<i>MapNotify, UnmapNotify</i>	598
<i>MappingNotify</i>	600
<i>MapRequest</i>	601
<i>MotionNotify</i>	602
<i>PropertyNotify</i>	605
<i>ReparentNotify</i>	606
<i>ResizeRequest</i>	607
<i>SelectionClear</i>	608
<i>SelectionNotify</i>	609
<i>SelectionRequest</i>	611
<i>VisibilityNotify</i>	613

Appendix D:

Changes In X And Motif 615

Overview	615
From Motif 1.0 to 1.1	615
From X11 Release 3 to Release 4	618
From X11 Release 4 to Release 5	622

Appendix E:	
Where To Go For More Information	625
Overview	625
Documentation	625
Mailing Lists/NetNews	627
The FAQs	628
Getting X and Motif Software	628
Getting This Book's Sample Programs.....	629
 Glossary	 631
 Index	 655