

*The Definitive Guides
to the X Window System*

Volume Three

X Window System User's Guide

for Version 11

By Valerie Quercia
and Tim O'Reilly

O'Reilly & Associates, Inc.

Doc 7345

X Window System User's Guide

BIBLIOTHEQUE DU CERIST

Doc 7345/3

The X Window System Series

The books in the X Window System series from O'Reilly and Associates are becoming the standard manuals for X. They are based in part on the original MIT X Window System documentation, but go far beyond it in comprehensiveness and ease of use. Over 20 computer vendors recommend or license volumes in the series. In short, these are the definitive guides to the X Window System.

Volume 1, Xlib Programming Manual

A complete guide to programming with the X library (Xlib), the lowest level of programming interface to X. 659 pages, \$34.95—or sold as a set with the *Xlib Reference Manual* for \$60.00.

Volume 2, Xlib Reference Manual

A complete programmer's reference for Xlib. 723 pages, \$34.95—or sold as a set with the *Xlib Programming Manual* for \$60.00.

Volume 3, X Window System User's Guide

Describes window system concepts and the most common client applications available for X. For experienced users, later chapters explain customizing the X environment and include an alternate *.uwmrc* file. 576 pages, \$26.95

Other volumes soon to be available

Two volumes on X Toolkit programming are being developed. Volumes 4 and 5, *X Toolkit Intrinsics Programming Manual*, and *X Toolkit Intrinsics Reference Manual*, will be available in the Fall of 1989.

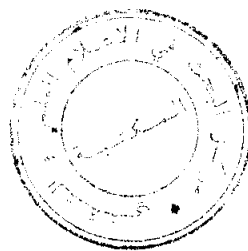
Nutshell Handbooks

Nutshell Handbooks are concise, down-to-earth books on a variety of UNIX programs and topics, for beginning and experienced users.

For orders or a free catalog of all our books, please contact us

O'Reilly & Associates, Inc.

Creators and publishers of Nutshell Handbooks
632 Petaluma Avenue • Sebastopol CA 95472
email: uunet!ora!nuts • 1-800-338-NUTS



Volume Three

X Window System User's Guide

*for Version 11 of the
X Window System*

by Valerie Quercia and Tim O'Reilly

O'Reilly & Associates, Inc.

Copyright © 1988, 1989 O'Reilly & Associates, Inc.

All Rights Reserved

The X Window System is a trademark of the Massachusetts Institute of Technology.

UNIX is a registered trademark of AT&T.

Sun-3 and SunView are trademarks of Sun Microsystems, Inc.

NEWS is a trademark of the Sony Corporation.

X Display Station is a trademark of Visual Technology Incorporated.

NCD16 is a trademark of Network Computing Devices, Inc.

PostScript is a registered trademark of Adobe Systems Inc.

Macintosh is a trademark of McIntosh Laboratory, Inc. licensed to

Apple Computer, Inc.

Gumby is a copyright of Prema Toy Company, Inc.

Small Print

Portions of this manual, especially the reference pages in Part Three, are based on reference materials provided on the X11 R3 tape, which are copyright © 1985, 1986, 1987, 1988 the Massachusetts Institute of Technology, Cambridge, Massachusetts, and Digital Equipment Corporation, Maynard, Massachusetts.

We've used this material under the terms of its copyright, which grants free use, subject to the following conditions:

"Permission to use, copy, modify and distribute this documentation (*i.e., the original MIT and Digital material*) for any purpose and without fee is hereby granted, provided that the above copyright notice appears in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the name of MIT or Digital not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission. MIT and Digital make no representations about the suitability of the software described herein for any purpose. It is provided 'as is' without expressed or implied warranty."

Note, however, that those portions of this document that are based on the original X11 documentation and other source material have been significantly revised, and that all such revisions are copyright © 1987, 1988 O'Reilly & Associates, Inc. Inasmuch as the proprietary revisions can't be separated from the freely copyable MIT source material, the net result is that copying of this document is not allowed. Sorry for the doublespeak!

While every precaution has been taken in the preparation of this book, we assume no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

Printing History

Sept. 1988: First Edition

July 1989: Second Edition. Revised to reflect Release 3.

ISBN 0-937175-36-6

Table of Contents

	Page
Preface	xvii
Assumptions	xvii
Organization	xviii
Licensing Information	xx
Acknowledgements	xx
Font and Character Conventions	xxi
 PART ONE: Using X	 1
 1 An Introduction to the X Window System	 3
Anatomy of an X Display	5
X Architecture Overview	11
The X Display Server	12
Clients	12
The Window Manager	12
The xterm Terminal Emulator	13
The Display Manager	13
Other X Clients	14
Customizing Clients	14
 2 Getting Started	 15
If X is Being Started Automatically	17
Starting X Manually	20
Starting the First xterm Window	21
Bringing Up the Window Manager	21
Starting a Second xterm Window	22
Exiting from an xterm Window	24
Special Keys	24
Starting Other Clients	25
Running a Client on Another Machine	26
Where to Go From Here	28

3 Using the Window Manager	29
Starting the Window Manager	32
The WindowOps Menu	32
Creating New Terminal Windows	33
Refreshing the Screen	36
Redrawing a Window	36
Moving Windows and Icons	36
Resizing Windows	37
Shuffling the Window Stack: Raise, Lower, CircUp, CircDown	39
Raising Windows (bringing in front of others)	39
Lowering Windows (sending behind others)	40
Circulating Windows	40
Displaying Windows as Icons	41
Changing Keyboard Focus	43
Freezing and UnFreezing the Server	43
Restarting the Window Manager	44
Removing a Window	44
Exiting the Window Manager	45
Button Control of Window Manager Functions	45
Using uwm to Place Other Clients	46
The Preferences Menu	46
Customizing uwm	47
 4 The xterm Terminal Emulator	 49
xterm Menus	52
The xterm Menu	53
Modes Menu	55
Tektronix Menu	56
Using the Scrollbar	57
Copying and Pasting Text Selections	59
Selecting Text to Copy	59
Pasting Text Selections	61
Manipulating Text Selections	63
Copying and Pasting between Release 2 and 3 Clients: xcutsel	64
Saving Multiple Selections: xclipboard	66
The resize Client	67
Running a Program in a Temporary xterm Window	68
 5 Font Specification	 69
Release 2 vs. Release 3 Fonts	71
Font Specification in Release 2	72
Font Specification in Release 3	73
New Font Naming Convention	74

The fonts.dir Files	76
Specifying Fonts on the Command Line	77
Font Name Wildcarding	77
Font Name Aliasing	79
Making the Server Aware of Aliases	81
More about xfd	81
 6 Graphics Utilities	 83
Creating Icons and Other Bitmaps	85
Bitmap Editing Commands	87
Pointer Commands	88
Bitmap Command Boxes	88
Acting on the Entire Grid: Clear All, Set All, Invert All	88
Acting on an Area: Clear Area, Set Area, Invert Area	90
Copy Area, Move Area, Overlay Area	91
Drawing: Line, Circle, Filled Circle	92
Filling in a Shape: Flood Fill	93
Hot Spots: Set Hot Spot, Clear Hot Spot	93
Saving and Quitting: Write Output, Quit	93
Creating a Bitmap from a Cursor	95
Magnifying Portions of the Screen: xmag	97
Quitting xmag	99
What xmag Shows You	99
Dynamically Choosing a Different Source Area	100
 7 Other Clients	 101
Desk Accessories	103
xclock	104
xcalc	105
Terminating the calculator	106
xbiff	106
xload	107
xman	108
Printing Utilities: xwd, xpr, xdpr	111
Killing a Client Window with xkill	113
Problems with Killing a Client	114
Window and Display Information Clients	116
Displaying Information about a Window: xwininfo	116
Listing the Window Tree: xlswins	118
Generating Information about the Display: xdpinfo	120
User-contributed Clients	120
X Toolkit Applications	121
Dialog Boxes	121
Scrollbars	122

Selecting for Copying and Pasting	123
Vertical Panes	124
Text Editing Widget	124
 PART TWO: Customizing X	 127
 8 Command Line Options	 129
Which Display to Run On	132
Title and Name	133
Window Geometry	133
Border Width	136
Color Specification	137
Color Names	137
Hexadecimal Color Specification	138
The RGB Color Model	138
How Many Colors are Available?	139
Starting a Client Window as an Icon	141
Specifying Fonts on the Command Line	142
Reverse Video	142
 9 Setting Resources	 143
Resource Naming Syntax	146
Syntax of Toolkit Client Resources	147
Tight Bindings and Loose Bindings	148
Instances and Classes	149
Precedence Rules for Resource Specification	150
Some Common Resources	151
Event Translations	152
The Syntax of Event Translations	153
xterm Translations to Use xclipboard	154
How to Set Resources	156
A Sample Resources File	157
Specifying Resources from the Command Line	157
The -xrm Option	158
The -name Option	158
Setting Resources with xrdb	159
Querying the Resource Database	160
Loading New Values into the Resource Database	160
Saving Active Resource Definitions in a File	161
Removing Resource Definitions	161
Other Sources of Resource Definition	162

10 Customizing the Window Manager	163
Setting .uwmrc Variables	167
Button/Key Bindings	168
Function Names	169
Keys	169
Context	170
Mouse Buttons	170
Action	171
Defining Menus	171
Submenus	173
Slip off menus	174
Executing System Commands from a Menu	174
Cut Buffer Strings	175
Color Menus	177
A Complete Revamp of uwm	178
 11 Setup Clients	 181
xset: Setting Display and Keyboard Preferences	183
Keyboard Bell	183
Keyclick Volume	184
Enabling or Disabling Auto-repeat	184
Changing or Rehashing the Font Path	184
Keyboard LEDs	185
Pointer Acceleration	185
Screen Saver	186
Color Definition	187
Help with xset Options	187
xsetroot: Setting Root Window Characteristics	187
Setting Root Window Patterns	188
Foreground, Background Color and Reverse Video	189
Changing the Root Window Pointer	189
xmodmap: Modifier Key and Pointer Customization	190
Keycodes and Keysyms	192
Procedure to Map Modifier Keys	193
Displaying the Current Modifier Key Map	193
Determining the Default Key Mappings	194
Matching Keysyms with Physical Keys Using xev	195
Changing the Map with xmodmap	196
Expressions to Change the Key Map	197
Key Mapping Examples	198
Displaying and Changing the Pointer Map	200
 PART THREE: Client Reference Pages	 203

PART FOUR: Appendices	395
A System Management	397
Including X in Your Search Path	400
Setting the Terminal Type	400
A Startup Shell Script	401
What Should Go in the Script	401
Starting X	405
Starting X with the Display Manager, xdm	405
Getting Started with xdm on a Single Display	405
Setting Up the Configuration File and Other Special Files	406
The Standard Login Session	407
Customizing xdm	408
The Xservers File	409
The Xsession File and .xsession Scripts	410
The Xresources File	411
The Error Log File	411
Xstartup and Xreset	411
Stopping xdm and the Server	411
Starting X with xinit	412
An Older Method of Starting X: /etc/ttys	412
Font Management	414
Access Control	414
Console Messages	415
Log Files	415
Changing the Color Name Database	416
B Standard Cursors	419
C Release 2 Standard Fonts	425
D Release 3 Standard Fonts	479
E xterm Control Sequences	507
F Standard Bitmaps	517

G Translation Table Syntax	521
Event Types and Modifiers	523
Detail Field	525
Modifiers	526
Complex Translation Examples	526
 H Glossary	 529
 Index	 537