

From Bash to Z Shell: Conquering the Command Line

Copyright © 2005 by Oliver Kiddle, Jerry Peek, and Peter Stephenson

All rights reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage or retrieval system, without the prior written permission of the copyright owner and the publisher.

ISBN (pbk): 1-59059-376-6

Printed and bound in the United States of America 9 8 7 6 5 4 3 2 1

Trademarked names may appear in this book. Rather than use a trademark symbol with every occurrence of a trademarked name, we use the names only in an editorial fashion and to the benefit of the trademark owner, with no intention of infringement of the trademark.

Lead Editor: Jason Gilmore

Technical Reviewers: Bart Schaefer and Ed Schaefer

Editorial Board: Steve Anglin, Dan Appleman, Ewan Buckingham, Gary Cornell, Tony Davis, John Franklin, Jason Gilmore, Chris Mills, Dominic Shakeshaft, Jim Sumser

Project Manager: Beth Christmas

Copy Edit Manager: Nicole LeClerc

Copy Editor: Liz Welch

Production Manager: Kari Brooks-Copony

Production Editor: Laura Cheu

Compositor: Susan Glinert

Proofreader: Linda Seifert

Indexer: Kevin Broccoli

Artist: Kinetic Publishing Services, LLC

Cover Designer: Kurt Krames

Manufacturing Manager: Tom Debolski

Distributed to the book trade in the United States by Springer-Verlag New York, Inc., 233 Spring Street, 6th Floor, New York, NY 10013, and outside the United States by Springer-Verlag GmbH & Co. KG, Tiergartenstr. 17, 69112 Heidelberg, Germany.

In the United States: phone 1-800-SPRINGER, fax 201-348-4505, e-mail orders@springer-ny.com, or visit <http://www.springer-ny.com>. Outside the United States: fax +49 6221 345229, e-mail orders@springer.de, or visit <http://www.springer.de>.

For information on translations, please contact Apress directly at 2560 Ninth Street, Suite 219, Berkeley, CA 94710. Phone 510-549-5930, fax 510-549-5939, e-mail info@apress.com, or visit <http://www.apress.com>.

The information in this book is distributed on an “as is” basis, without warranty. Although every precaution has been taken in the preparation of this work, neither the author(s) nor Apress shall have any liability to any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the information contained in this work.

Contents

About the Authorsxi
About the Technical Reviewersxiii
Acknowledgmentsxv
Prefacexvii

PART 1 ■■■ Introducing the Shell

■ CHAPTER 1	Introduction to Shells	3
	What's a Shell?	3
	Getting Started	6
	Simple Commands	7
	Command Lines	8
	Shell Types and Versions	14
	The Filesystem: Directories, Pathnames	15
	Where the Commands Are Located	17
	Relative Pathnames and Your Current Directory	18
	Building Pathnames with Wildcards	20
	Expansion and Substitution	21
	Building Pathnames by Completion	22
	Command-Line Editing	24
	Command History	24
	More Unix Programs	26
	Summary	26
■ CHAPTER 2	Using Shell Features Together	27
	Writing Output to Files: Redirection	28
	Using Programs Together: Pipes	32
	Joining Forces	34
	Editing Data, Continuing Command Lines	36
	Command Substitution	38
	for and foreach Loops	39

More About for Loops	41
Building Our Script	43
Making a Script File	46
Running the Script	47
Programs and the Path	49
Using the Results (via Aliases and Functions)	51
Summary	52

■ CHAPTER 3 **More Shell Features** 53

Passing Info to Processes with Environment Variables	53
Starting and Stopping Processes: Signals, Job Control	56
Control Shell Interpretation with Quoting	62
Quick Directory Changes with cdpath	65
Summary	66

PART 2 ■ ■ ■ **Using bash and zsh**

■ CHAPTER 4 **Entering and Editing the Command Line** 71

Terminals and Shells	71
The Command Line	76
Line Editing Basics	76
Beyond Keystrokes: Commands and Bindings	87
Options for Editing	98
Multiline Editing and the zsh Editor Stack	99
Keyboard Macros	101
Other Tips on Terminals	102
Summary	106

■ CHAPTER 5 **Starting the Shell** 107

Starting Shells	107
Startup Files, Login and Interactive Shells	108
Shell Options	113
Getting Started with Cygwin	118
Summary	121

CHAPTER 6	More About Shell History	123
	Setting Up Variables	123
	“Bang” History: The Use of Exclamation Marks	124
	More Options for Manipulating History	133
	A Few More History Tricks	137
	Summary	139
CHAPTER 7	Prompts	141
	Basic Prompting	141
	Prompts in bash	143
	Prompts in zsh	150
	Checking for Mail and Idle Terminals	162
	Summary	165
CHAPTER 8	Files and Directories	167
	Types of Files	167
	Finding Commands and Files	173
	Managing Directories with the Shell	178
	More Argument Handling: Braces	185
	Redirection	187
	Here-Documents and Here-Strings	190
	Summary	195
CHAPTER 9	Pattern Matching	197
	Basic Globbing	197
	Internationalization and Locales	206
	Globbing in Bash	208
	Globbing in Zsh	211
	Glob Qualifiers in Zsh	220
	Globbing Flags in Zsh	228
	Summary	229

CHAPTER 10	Completion	231
	Getting Started with Completion	232
	Listing and Formatting Possible Matches	235
	Types of Completion	242
	Controlling Matching	248
	Reducing the Number of Matches	251
	Automatically Added Suffixes	257
	Exact Ambiguous Matches	259
	Summary	260
CHAPTER 11	Jobs and Processes	261
	Mastering Job Control	261
	High-Power Command Substitutions	266
	Resource Limits	271
	Lying About the Program Name	274
	Summary	275

PART 3 ■■■ Extending the Shell

CHAPTER 12	Variables	279
	Arrays	280
	Variable Attributes	289
	Numeric Variables and Arithmetic	290
	Complex Variable Expansions	293
	Associative Arrays	300
	Variable Indirection	303
	Summary	306
CHAPTER 13	Scripting and Functions	307
	Programming with the Shell	308
	Input and Output	322
	Propagating Functions	333
	Traps and Special Functions	335
	Defining New Globbing Qualifiers	338
	Debugging Scripts	343
	Summary	345

CHAPTER 14	Writing Editor Commands	347
	Widgets and Functions	347
	Simple Recipe for a Widget	348
	Making Widgets Behave Naturally	352
	Case Study 1: Multiple Tasks in Widgets	355
	Case Study 2: Overriding Widgets	357
	Case Study 3: Locating Command-Line Arguments	359
	Case Study 4: Chaining Widgets Together	360
	Approximate Matching	361
	An Example Widget: Correcting Spelling	362
	Input and Output Within Widgets	364
	Summary	368
CHAPTER 15	Writing Completion Functions	371
	Completions	371
	Helper Functions	382
	Handling Styles	392
	Making Full Use of Tags	395
	Tags, Labels, and Descriptions	400
	Prefixes and Suffixes	403
	Stand-alone Completion Widgets	405
	Summary	408
	And Finally...	408
APPENDIX A	Unix Programs	409
APPENDIX B	External Resources	415
	bash	415
	zsh	415
	General	416
APPENDIX C	Glossary	417
INDEX		425