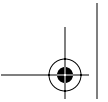
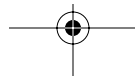
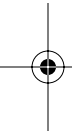


# Contents at a Glance

<i>Introduction</i> .....	xix
Chapter 1 • A Guided Tour of the Command Line .....	1
Chapter 2 • Using Terminal .....	9
Interlude 1 • Command Syntax .....	35
Chapter 3 • Getting Help while in Terminal .....	41
Interlude 2 • Names and Paths .....	50
Chapter 4 • Navigating the File System .....	57
Interlude 3 • Redirecting Input and Output .....	88
Chapter 5 • Working with Files and Directories .....	97
Interlude 4 • Cloning Your Mac OS X Startup Volume .....	24
Chapter 6 • Saving Time on the Command Line .....	129
Interlude 5 • The Versatile <i>open</i> Command .....	154
Chapter 7 • Finding Files, Directories, and Everything Else .....	161
Interlude 6 • Wildcards and Globbing .....	192
Chapter 8 • Viewing Files .....	199
Chapter 9 • Editing Text .....	211
Chapter 10 • Printing .....	245
Chapter 11 • Compressing, Decompressing, and Archiving Files .....	261
Chapter 12 • Working with Users, Groups, and Permissions .....	277
Interlude 7 • Using <i>sudo</i> .....	306
Chapter 13 • Using the Network .....	319



Chapter 14 • Managing Programs and Processes .....	361
Chapter 15 • System Maintenance from the Command Line .....	375
Interlude 8 • Using the Developer Tools .....	394
Chapter 16 • Configuring the Shell .....	401
Interlude 9 • Automating Commands .....	418
Appendix A • Further Reading .....	425
<i>Index</i> .....	427



# See What's on the Command Line

Command	Page
<i>alias</i> . . . . .	416
<i>apropos</i> . . . . .	42
<i>bless</i> . . . . .	387
<i>bzip2</i> . . . . .	266
<i>bunzip2</i> . . . . .	266
<i>cancel</i> . . . . .	254
<i>cat</i> . . . . .	202
<i>cd</i> . . . . .	82
<i>chmod</i> . . . . .	302
<i>chown</i> . . . . .	298
<i>cp</i> . . . . .	102
<i>CpMac</i> . . . . .	395
<i>curl</i> . . . . .	333
<i>df</i> . . . . .	380
<i>diff</i> . . . . .	219
<i>dirs</i> . . . . .	86
<i>diskutil</i> . . . . .	384
<i>ditto</i> . . . . .	123
<i>du</i> . . . . .	379
<i>emacs</i> . . . . .	243
<i>file</i> . . . . .	201
<i>find</i> . . . . .	179
<i>finger</i> . . . . .	352
<i>fmt</i> . . . . .	222
<i>fsck</i> . . . . .	385
<i>ftp</i> . . . . .	340
<i>GetFileInfo</i> . . . . .	399
<i>grep</i> . . . . .	191
<i>groups</i> . . . . .	288
<i>gzip</i> . . . . .	265
<i>gunzip</i> . . . . .	265
<i>bdiutil</i> . . . . .	274
<i>head</i> . . . . .	205
<i>history</i> . . . . .	150
<i>id</i> . . . . .	289
<i>ifconfig</i> . . . . .	342
<i>installer</i> . . . . .	390
<i>ipfw</i> . . . . .	359
<i>kill</i> . . . . .	373
<i>less</i> . . . . .	208
<i>ln</i> . . . . .	118
<i>locate</i> . . . . .	168

<i>lp</i> . . . . .	251
<i>lpq</i> . . . . .	253
<i>ls</i> . . . . .	74
<i>man</i> . . . . .	47
<i>mkdir</i> . . . . .	106
<i>mount</i> . . . . .	322
<i>mv</i> . . . . .	105
<i>MvMac</i> . . . . .	396
<i>netstat</i> . . . . .	345
<i>nidump</i> . . . . .	292
<i>niload</i> . . . . .	286
<i>nireport</i> . . . . .	291
<i>nslookup</i> . . . . .	349
<i>open</i> . . . . .	159
<i>osascript</i> . . . . .	423
<i>periodic</i> . . . . .	388
<i>pico</i> . . . . .	232
<i>ping</i> . . . . .	347
<i>popd</i> . . . . .	86
<i>ps</i> . . . . .	371
<i>pushd</i> . . . . .	86
<i>pwd</i> . . . . .	61
<i>rm</i> . . . . .	111
<i>rmdir</i> . . . . .	107
<i>rsync</i> . . . . .	331
<i>scp</i> . . . . .	328
<i>sed</i> . . . . .	225
<i>softwareupdate</i> . . . . .	392
<i>sort</i> . . . . .	215
<i>ssh</i> . . . . .	324
<i>stroke</i> . . . . .	354
<i>sudo</i> . . . . .	312
<i>system_profiler</i> . . . . .	377
<i>tail</i> . . . . .	206
<i>tar</i> . . . . .	269
<i>tee</i> . . . . .	95
<i>telnet</i> . . . . .	325
<i>top</i> . . . . .	368
<i>tr</i> . . . . .	220
<i>traceroute</i> . . . . .	350
<i>unalias</i> . . . . .	416
<i>uniq</i> . . . . .	217
<i>vi</i> . . . . .	240
<i>we</i> . . . . .	213
<i>whatis</i> . . . . .	42
<i>whois</i> . . . . .	351

# Contents

<i>Introduction</i> .....	xix
<b>Chapter 1 • A Guided Tour of the Command Line</b> .....	<b>1</b>
Opening Terminal .....	1
Typing Your First Command .....	3
Reading Directory Contents .....	4
Creating a New Directory .....	5
Creating a New File .....	6
Writing Text to a File .....	6
Deleting Files and Directories .....	7
Summing Up .....	8
<b>Chapter 2 • Using Terminal</b> .....	<b>9</b>
What Is Terminal? .....	9
The Next Level of Interaction: The Shell .....	10
How the Shell Processes Commands .....	11
Setting Up Terminal .....	12
Customizing Terminal Settings .....	13
Shell Settings .....	14
Process Settings .....	15
Emulation Settings .....	16
Buffer Settings .....	17
Display Settings .....	19
Color Settings .....	22
Window Settings .....	23
Keyboard Settings .....	24
Terminal Preferences .....	24
Working with Terminal Windows .....	26
Opening New Windows .....	26
Running Individual Commands .....	26
Working with Multiple Windows .....	27
The File Menu .....	29
The Edit Menu .....	31
The Scrollback Menu .....	31
The Font Menu .....	32
Using <i>.term</i> Files .....	32
Saving <i>.term</i> Files .....	32
Opening <i>.term</i> Files .....	32
Using <i>.term</i> Files to Run Commands .....	33
Using a Different Terminal .....	34
iTerm .....	34
GLTerm .....	34
Summing Up .....	34

**Interlude 1 • Command Syntax . . . . . 35**

- Commands That Function Alone . . . . . 35
- Commands That Require Arguments . . . . . 36
- Commands That Include Options . . . . . 36
- Commands That Include Options and Arguments . . . . . 37

**Chapter 3 • Getting Help while in Terminal. . . . . 41**

- Finding Out What a Command Does with *whatis* . . . . . 41
- Using man Pages . . . . . 43
  - Reading man Pages . . . . . 44
  - Moving through man Pages . . . . . 45
  - Finding Text in man Pages . . . . . 46
- Summing Up . . . . . 49

**Interlude 2 • Names and Paths . . . . . 50**

- File and Directory Names . . . . . 50
- Absolute and Relative Paths . . . . . 53

**Chapter 4 • Navigating the File System . . . . . 57**

- About the Mac OS X File System . . . . . 58
  - Finding Your Way Around . . . . . 59
- Finding Where You Are with *pwd* . . . . . 60
  - Using *pwd* to Resolve Symbolic Links . . . . . 62
  - Listing Directory Contents with *ls* . . . . . 62
  - Viewing Long Information . . . . . 65
  - More Options for *ls* . . . . . 68
- Changing Directories with *cd* . . . . . 75
  - Using the Finder to Save Time in Terminal . . . . . 77
  - Navigation Shortcuts . . . . . 77
  - Jumping Around the File System with *pushd* and *popd* . . . . . 83
  - Silencing *pushd* and *popd* . . . . . 85
- Summing Up . . . . . 87

**Interlude 3 • Redirecting Input and Output . . . . . 88**

- Redirecting Output . . . . . 88
- Redirecting Input . . . . . 89
- Redirecting Input and Output . . . . . 90
- Redirecting Error Messages . . . . . 91
- Using Pipes . . . . . 92
- Redirecting Output to Two Places with *tee* . . . . . 94

**Chapter 5 • Working with Files and Directories . . . . . 97**

- Copying Files with *cp* . . . . . 99
  - Using Wildcards to Copy Files . . . . . 99
  - Copying a File and Changing Its Name . . . . . 101
- Copying Directories with *cp* . . . . . 102

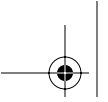
Moving Files and Directories with <i>mv</i> . . . . .	104
Creating Directories with <i>mkdir</i> . . . . .	105
Removing Directories with <i>rmdir</i> . . . . .	107
Removing Files with <i>rm</i> . . . . .	108
A Safer Way to Remove Files . . . . .	108
Getting More Feedback with <i>rm</i> . . . . .	109
Removing Directories with <i>rm</i> . . . . .	110
Aliases and Links . . . . .	112
Creating Symbolic Links with <i>ln</i> . . . . .	113
Copying Directories with <i>ditto</i> . . . . .	119
Copying Applications with <i>ditto</i> . . . . .	120
Backing Up Your Files with <i>ditto</i> . . . . .	121
Summing Up . . . . .	123
<b>Interlude 4 • Cloning Your Mac OS X Startup Volume . . . . .</b>	<b>124</b>
Considerations for Cloning a Mac OS X Startup Volume . . . . .	124
Preparing to Clone a Mac OS X Startup Volume . . . . .	125
Cloning a Mac OS X Startup Volume with <i>ditto</i> . . . . .	125
<b>Chapter 6 • Saving Time on the Command Line . . . . .</b>	<b>129</b>
Using Filename Completion . . . . .	130
Capitals Count . . . . .	131
Going Further with Filename Completion . . . . .	132
Using Multiple Completions for Files . . . . .	132
Refreshing Your Completion Memory . . . . .	134
Using Command Completion . . . . .	136
Using Command History . . . . .	138
Modifying Commands from the History . . . . .	140
Editing Commands from the History . . . . .	140
Displaying the Command History . . . . .	143
Running a Specific Command from the History . . . . .	144
Command History with <i>bash</i> . . . . .	144
Setting the Command History Variable . . . . .	147
Clearing the Command History . . . . .	148
Keyboard Shortcuts in Terminal . . . . .	150
Arrow Key Shortcuts . . . . .	150
Other Editing Shortcuts . . . . .	151
Summing Up . . . . .	153
<b>Interlude 5 • The Versatile <i>open</i> Command . . . . .</b>	<b>154</b>
Opening Directories with <i>open</i> . . . . .	154
Opening Applications with <i>open</i> . . . . .	155
Opening Files with <i>open</i> . . . . .	156
Opening Files with a Specific Application . . . . .	157
Opening URLs with <i>open</i> . . . . .	158

<b>Chapter 7 • Finding Files, Directories, and Everything Else . . . . .</b>	<b>161</b>
Finding Files in Mac OS X . . . . .	161
Finding Files with <i>locate</i> . . . . .	166
Finding Anything with <i>find</i> . . . . .	170
Finding Files by Name . . . . .	170
Using Wildcards to Find Files . . . . .	171
Finding Files by Type . . . . .	173
Finding Files by Date . . . . .	174
Finding Files by Size . . . . .	175
Finding Files That Belong to a Specific User or Group . . . . .	176
Finding Files That Belong to No User or Group . . . . .	176
Gluing Together Several Options . . . . .	176
Displaying File Information for <i>find</i> Results . . . . .	177
Finding File Contents with <i>grep</i> . . . . .	180
Finding Files with <i>grep</i> . . . . .	181
Searching for Two Strings with <i>grep</i> . . . . .	184
Saving <i>grep</i> Results to a File . . . . .	184
Searching for Character Patterns with <i>grep</i> . . . . .	185
Summing Up . . . . .	191
<b>Interlude 6 • Wildcards and Globbing . . . . .</b>	<b>192</b>
The * Wildcard . . . . .	192
The ? Wildcard . . . . .	193
The [ ] Wildcard . . . . .	193
The { } Characters . . . . .	194
Testing Wildcards . . . . .	195
Escaping Wildcards . . . . .	196
Wildcard Summary . . . . .	197
<b>Chapter 8 • Viewing Files . . . . .</b>	<b>199</b>
Finding Out What Kind of Files You Have with <i>file</i> . . . . .	199
Viewing Files with <i>cat</i> . . . . .	201
Viewing the Beginning of a File with <i>head</i> . . . . .	203
Viewing the End of a File with <i>tail</i> . . . . .	205
Viewing Files with <i>less</i> . . . . .	206
Summing Up . . . . .	210
<b>Chapter 9 • Editing Text . . . . .</b>	<b>211</b>
Counting Words, Lines, and Characters with <i>wc</i> . . . . .	211
Sorting Lines with <i>sort</i> . . . . .	213
Removing Repeated Lines with <i>uniq</i> . . . . .	215
Comparing Files with <i>diff</i> . . . . .	218
Replacing Characters with <i>tr</i> . . . . .	219
Formatting Files with <i>fmt</i> . . . . .	221
Editing Text with <i>sed</i> . . . . .	223
Text Editors . . . . .	225

Editing Text with Pico .....	226
Editing Files with Pico .....	227
Creating Files with Pico .....	231
Editing Text with vi .....	233
A First Taste of vi .....	235
Editing Text Files with vi .....	237
Searching for Text with vi .....	238
Replacing Text with vi .....	241
Editing Text with Emacs .....	242
Summing Up .....	244
<b>Chapter 10 • Printing .....</b>	<b>245</b>
About Printing with Mac OS X .....	245
Printing Files with <i>lp</i> .....	246
Advanced Printing Options with <i>lp</i> .....	247
Checking the Printer Queue with <i>lpq</i> .....	252
Canceling Print Jobs with <i>cancel</i> .....	253
Managing Printers from the Command Line .....	255
Printing from Terminal .....	255
Printing with the <i>lp</i> Command .....	255
Using the Print Menu Item .....	257
Summing Up .....	259
<b>Chapter 11 • Compressing, Decompressing, and Archiving Files .....</b>	<b>261</b>
About Compressed Files .....	261
Compressing Files with <i>gzip</i> .....	262
Decompressing <i>gzip</i> Archives with <i>gunzip</i> .....	264
Compressing Files with <i>bzip2</i> .....	265
Decompressing <i>bzip2</i> Archives .....	266
Creating Archives with <i>tar</i> .....	267
Managing Disk Image Archives with <i>hdiutil</i> .....	270
Mounting and Unmounting Disk Images .....	272
Compressing and Decompressing Disk Images .....	272
Summing Up .....	276
<b>Chapter 12 • Working with Users, Groups, and Permissions .....</b>	<b>277</b>
About Users .....	277
User Account Types .....	278
Creating User Accounts .....	279
Creating User Accounts from the Command Line .....	280
Deleting User Accounts .....	284
About Groups .....	288
Creating Groups .....	289
Adding Users to a Group .....	292
Removing Users from a Group .....	292

Deleting Groups .....	293
About Permissions .....	293
File Types .....	295
What File Permissions Mean .....	296
Changing the Owner of a File .....	296
Changing Ownership Recursively .....	298
Changing File Permissions .....	298
Changing File Permissions with Symbolic Mode .....	299
Changing File Permissions with Absolute Mode .....	300
Changing Permissions Recursively .....	301
Setting a Directory's Sticky Bit .....	304
Summing Up .....	305
<b>Interlude 7 • Using <i>sudo</i> .....</b>	<b>306</b>
How to Use <i>sudo</i> .....	306
Configuring the <i>/etc/sudoers</i> File .....	313
<b>Chapter 13 • Using the Network .....</b>	<b>319</b>
Local Network Tools .....	319
Connecting to Other Computers .....	320
Logging in to a Remote Computer Securely with <i>ssh</i> .....	322
Logging in to a Remote Computer with <i>telnet</i> .....	325
Copying Files Remotely with <i>scp</i> .....	326
Synchronizing Files and Directories with <i>rsync</i> .....	329
Internet Tools .....	332
Downloading Data from the Internet with <i>curl</i> .....	332
Transferring Files with <i>ftp</i> .....	336
Network Utilities .....	341
Getting Network Information with <i>ifconfig</i> .....	342
Getting Network Status Information with <i>netstat</i> .....	343
Checking Machine Availability with <i>ping</i> .....	346
Checking Domain Information with <i>nslookup</i> .....	347
Following the Trail of Your Packets with <i>traceroute</i> .....	350
Getting Domain Information with <i>whois</i> .....	351
Getting User Information with <i>finger</i> .....	352
Scanning Ports with <i>stroke</i> .....	353
Securing Your Mac with the <i>ipfw</i> Firewall .....	355
Creating Firewall Rules .....	358
Summing Up .....	359
<b>Chapter 14 • Managing Programs and Processes .....</b>	<b>361</b>
Getting System Information with <i>top</i> .....	362
Other Ways to Run <i>top</i> .....	365
Getting System Information with <i>ps</i> .....	368
Shutting Down Processes with <i>kill</i> .....	371
Summing Up .....	374

<b>Chapter 15 • System Maintenance from the Command Line</b> . . . . .	<b>375</b>
Getting System Information . . . . .	375
Getting Hardware Information with <i>system_profiler</i> . . . . .	375
Getting Disk Usage Information with <i>du</i> . . . . .	378
Getting Free Disk Space Information with <i>df</i> . . . . .	379
Managing Disks and Volumes with <i>diskutil</i> . . . . .	380
Getting Disk Info with <i>diskutil</i> . . . . .	381
Getting a List of Mounted Disks with <i>diskutil</i> . . . . .	381
Using <i>diskutil</i> . . . . .	382
Repairing Disk Problems with <i>fsck</i> . . . . .	384
Blessing a System Folder with <i> bless</i> . . . . .	386
Running Periodic Maintenance Routines with <i>periodic</i> . . . . .	387
Updating and Installing Software . . . . .	389
Installing Software with <i>installer</i> . . . . .	389
Updating Mac OS X with <i>softwareupdate</i> . . . . .	391
Summing Up . . . . .	393
<b>Interlude 8 • Using the Developer Tools</b> . . . . .	<b>394</b>
Command-Line Developer Tools . . . . .	394
Copying Files with <i>CpMac</i> . . . . .	395
Moving Files with <i>MvMac</i> . . . . .	396
Getting File Info with <i>GetFileInfo</i> . . . . .	397
Setting File Info with <i>SetFile</i> . . . . .	398
<b>Chapter 16 • Configuring the Shell</b> . . . . .	<b>401</b>
Working with the Shell . . . . .	401
The <i>bash</i> Shell Startup Process . . . . .	402
The <i>bash</i> Shell Shutdown Process . . . . .	404
The <i>tcsh</i> Shell Startup Process . . . . .	404
The <i>tcsh</i> Shell Shutdown Process . . . . .	405
Configuring the Shell . . . . .	406
Setting Environment Variables for <i>bash</i> . . . . .	406
Setting Environment Variables for <i>tcsh</i> . . . . .	410
Setting Shell Variables . . . . .	412
Setting Shell Aliases . . . . .	414
Summing Up . . . . .	417
<b>Interlude 9 • Automating Commands</b> . . . . .	<b>418</b>
Automating Command Execution with <i>cron</i> . . . . .	418
Combining Commands . . . . .	420
Creating Double-Clickable Command Files . . . . .	421
Automating Commands with AppleScript . . . . .	422
About Shell Scripting . . . . .	423



**Appendix A • Further Reading ..... 425**

Mac OS X ..... 425

General Unix Books ..... 425

Shell Scripting ..... 426

Books on Specific Unix Tools ..... 426

*Index* ..... 427

