

Index

SYMBOLS

+ (addition operator), 236
 [a-z] (alphabet inside brackets), 153
 <> (angle brackets), 113, 310
 * (asterisk), 111, 151
 @ (at sign), 360
 \ (backslash), 146, 153
 \> (backslash, greater than sign), 146
 \< (backslash, less than sign), 146
 {} (braces), 173
 ^ [] (caret before bracketed sequence), 152
 :! (colon, exclamation point), 143
 {} (curly bracket notation), 258–259
 / (division operator), 236
 \$ (dollar sign), 152–153, 306
 .. (double dot), 86
 “ (double quotes), 310
 = (equal sign), 360
 / (forward slash), 54, 55–56
 > (greater than sign), 244–245
 # (hashmark character), 227–228, 306
 - (hyphen), 69
 < (less than sign), 244–245
 * (multiplication operator), 236
 [0-9] (numbers inside brackets), 154
 . (period or dot), 62, 86, 150, 310
 += (plus, equal sign), 360
 ? (question mark), 111, 153
 ?= (question mark, equal sign), 360

#! (shebang), 182–183, 230
 [] (square brackets), 111, 150
 [^] (square brackets with caret between), 151
 - (subtraction operator), 236
 ~ (tilde), 86, 127
 | (vertical line character), 114, 245

A

absolute path, 56, 85–86

access control

commands, scheduling (crontab), 208
 group accounts, 30
 one-time scheduling execution (at command),
 211
 services, 223–224
 user accounts, 30

accidental deletion, recovering from (restore command), 338–340

accounts

commands, listed, 40–41
 group, 30, 38
 managing (useradd command), 41–43
 removing unneeded, 221–222
 root, 29
 system, 30
 user, 30

acknowledgment number, 284

action, 270

addition operator (+), 236

address

- absolute and relative paths, 57
- IP, 21
- network, 286–287
- quitting at encounter, 172

Address Resolution Protocol (ARP), 285

administrative access, limiting

- password prompting (`sudo` command), 218–221
- root user ID (UID 0), 217–218
- switch user (`su` command), 218

administrative tools

- Mac OS X, 378–379
- shell scripting, 88–89, 263–266
- user account information file (`/etc/passwd`), 31–34
- Windows, 394–395

Administrator account, Microsoft Windows, 390

Adobe Photoshop, 396

Advshell, 93

aging passwords, 34–37

AIX kernel, 11

aliases

- environment customizing, 101
- permission to create, 219

alphabet inside brackets ([a-z]), 153

Amanda backup suite, 341

angle brackets (<>), 113, 310

answering TCP/IP request, 295–296

Apple. See also Mac OS 9; Mac OS X

- archive, 397
- Mac history, 371

Apple Developer Connection, 343

Apple key, 379

Applications folder, Mac OS X, 374–375

archives, downloadable programs, 346

ARCserver backup suite, 341

arguments

- commands, 106
- repeating (`echo` command), 59–60

Arkia backup suite, 341

ARP (Address Resolution Protocol), 285

arrays

- associative, in Perl, 306
- declaring, 258
- dereferencing, 258–259
- described, 257–258
- traversing, in Perl (`foreach` loop), 312
- values, removing, 259–260
- variables, 90

arrow keys, 128

ash shell

- described, 89
- run control files, 94, 95

assets, assessing, 214

asterisk (*), 111, 151

at sign (@), 360

AT&T System V, 2

attacks. See security

attributes, process, 188–189

AT&T's Bell Laboratories, 1

automation programming. See Perl programming

avail column, directory, 75

available shell, finding, 92

AWK program

- data, transforming into formatted report, 173–174
- described, 167
- extracting data parts, 174–175
- file, using, 176–178
- network roundtrip, timing, 300–302
- patterns, working with, 175–176

B

background programs, running, 196–197

backslash (\), 146, 153

backslash, greater than sign (\>), 146

backslash, less than sign (\<), 146

backups

- `bzip2` compression, 331–333
- copy in/out command (`cpio`), 333–335
- database, 385
- deciding what to cover, 322

described, 321–322
 distributed copies of files and backup (`rdist`), 340
 entire file system (`dump` command), 335–338
 full, differential, and incremental, 323–324
 GNU zip compression (`gzip`), 329–331, 332–333
 media types, 323
 portable archive exchange (`pax`), 340
 remote file synchronization (`rsync`), 340
 scheduling, 324–325
 storing, 325
 suites, 341
 tape archives, creating (`tar` command), 326–328, 332–333
 validating or recovering from accidental deletion (`restore` command), 338–340
 verifying, 325

Bacula backup suite, 341**bash (Bourne Again SHell)**

Bourne scripts, running, 89
 described, 5, 89–90
 kill command, 190
 multiple lines, editing, 170
 options, available, 101–102
 PATH variable, appending, 85
 prompt, customizing, 82–83
 run control files, 94, 96–98
 scripting, 240
 variables, 99–100, 231

Be Inc., 371**beginning of file, viewing (head command), 72****BeOS, 371****Berkeley Software Distribution. See BSD****binary files**

administrative (`sbin` directory), 56
 directory (`bin` directory), 55
 type, showing (`file` command), 60

Bochs program, 397**boot directory, 55****boot messages, viewing, 12****boot process, 9–13, 374****bootstrapping, 9–10****BootX loader, 385–386****Bourne, Steve (Bourne shell author), 88****Bourne Again SHell. See bash****Bourne shell (sh)**

command prompt, 81–82
 described, 5, 88–89
 PATH variable, appending, 85
 run control files, 94
 scripting, 240

braces ({}), 173**BSD (Berkeley Software Distribution)**

build-from-source package systems, 368
 building and installing software (`pmake` command), 354
 described, 2, 3
 log files, 269
 Nvt text editor, 147
 open source licensing, 344–345
 ps tool, 184
 top command, 192

buffer, yanking and pasting text, 140**bug fixes, 346****build, software**

sample, 355–357
 source code, beginning, 352–354
 troubleshooting, 367

bzip2 compression, 331–333**C****C shells (csh)**

aliases, 101
 described, 5, 91–92
 options, available, 102
 run control files, 94
 scripting, 240

capacity column, directory, 75**capital letters, variable written in, 231****caret before bracketed sequence (^ []), 152****case statement, 237–239****case-sensitivity, file names and, 57**

c : **directory, Microsoft Windows, 389–390**

CDs

- backup media, 323
- mounting, 77–79
- running KNOPPIX distribution from, 6–8

change directory command (cd), 58–59

changing

- default shell, 87–88
- group names, 43
- shell temporarily, 87

characters

- changing, 137–139
- deleting, 136–137
- printing count of (*wc* command), 165–166
- single, regular expressions matching, 155
- wildcards matching, 111–112

checking. See monitoring

checksum, 284

child process, killing (SIGCHLD signal), 192

Class A Network, 286

Class B Network, 286

Class C Network, 286

colon, exclamation point (:!), 143

command line

- logging in, 17–20
- options, checking (*getopts*), 253–254
- processes, stopping, 189
- prompt, customizing (*PS1* variable), 81–83
- system shutdown, 25

command line interpreter. See shell

command mode, vi, 128

command output

- sending files to backup (*cpio*), 333–335
- splitting to multiple locations (*tee* command), 165

command substitution, 246

command-line interface

- Mac OS X, 379–382
- multi-shell, creating, 96
- Unix history, 4

commands

- accounts and groups, 40–41
- default behavior, 106
- described, 105

directory contents, listing (*ls* command), 115–116

help from man (manual) pages, 25–27

information, finding, 108–110

input and output redirection, 112–113

ls, 106–108

Macintosh equivalent commands, 380–382

metacharacters altering, 111–112

navigating file system, 57–58

pipes, 114

running from vi editor, 143

sed editor, most useful listed, 171–172

substitution, 114–115

superuser, delegating (*sudo*), 46–47

Windows (Microsoft), compared, 391–394

commands, file

content, breaking into single-screen chunks (*more* and *less* commands), 117

content, outputting (*cat* command), 116–117

creating new or moving content (*cp* command), 118

deleting (*rm* command), 118

groups, 120

length, determining (*wc* command), 118–119

moving (*mv* command), 117

quotas, maintaining, 122–124

system, navigating (*cd* command), 116

timestamp, updating (*touch* command), 118

username versus UID, 119

commands, file permissions

default (*umask* command), 121

executable files, 122

list, reading, 121

types, 120

comments

crontab file, 205

described, 33

Perl scripting, 304–305

shell scripting, 227–229

writing, 41

comparison operators, 235–236

compilation

GNU tools, 363–364

precompiled software packages, 367–369

Comprehensive Perl Archive Network (CPAN)

modules, 279

compressed files

creating (gzip and bzip2), 329–333

extracting, 351

configure script, 352–354

configuring

syslogd utility, 271–274

system clock, 199

content, file

breaking into single-screen chunks (more and less commands), 117

outputting (cat command), 116–117

tarfile, 326, 327

conversion. *See* Mac OS X; Windows**Copeland, 371**

copy in/out command (cpio), 333–335

copying

backup files (cpio command), 333–335

files (cp command), 72

lines (yy command), 139–140, 141

logwatch Perl script, 277

word portion (yw command), 140

count

looping with, Perl code (while and do...while), 311–312

of newlines, characters, or words, printing (wc command), 165–166

words on specified line, 177

CPAN (Comprehensive Perl Archive Network)

modules, 279

Crack password discovery program, 216**creating**

directories (mkdir command), 74

files, 72–74

files (cp command), 118

group accounts, 43

links, 64–67

tarfile, 326

user accounts, 41–43, 45

cron routine execution

access, controlling (crontab), 208

output, managing, 207–208

scheduling commands, 202–205

crontab file, documenting, 205

Crossover Office tool, 409

csh. *See* C shells

curly bracket notation ({}), 258–259

current location, file system (pwd command), 58

cursor, positioning, 129

customizing environment

aliases, 101

bash variables, 99–100

command prompt (PS1 variable), 81–83

libraries, dynamic shared, 102–103

options, 101–102

path, 83–86

tcsh variables, 99

variables, 246–247

viewing variables, 98–99

Z shell variables on Red Hat Linux, 100

Cygwin, 397–409

D

daemons, 11, 186

Darwin, 3

data

backups, importance of, 321–322

extracting, 174–175

full, differential, and incremental backups, 323–324

identifying, 214

loss and manipulation, 215

restoring, 325

transforming into formatted report, 173–174

transporting, 283–284

user entry, identifying, 228

variable manipulation functions (chomp, join, and split), 307–308

database backup and restoration, 385

date

current, showing, 82

password aging, 36

daylight saving time, 199–200

debugging

Perl scripts, 318–320

shell scripts, 265–266

declaring arrays, 258

defaults

- command behavior, 106
- file permissions (`umask` command), 121

deleting

- array values, 259–260
- characters, 136–137
- directories, 74
- file system (`umount`), 79
- files (`rm` command), 73–74, 118
- groups, 43
- programs, 222
- recovering files (`restore` command), 338–340
- text lines, 171
- user accounts, 45, 221–222

dereferencing arrays, 258–259

Desktop folder, Mac OS X, 376

destination, TCP header, 284

detecting files with shell scripting, 255–256

devices

- directory (`dev`), 56
- as files, 54
- identifying, 9
- Microsoft Windows, 390
- types, showing (`file` command), 60

DHCP (Dynamic Host Configuration Protocol), 291–292

differential backup, 323–324

digital signature, obtaining, 349–350

directory

- backup, scheduling, 203
- change command (`cd`), 58–59
- contents, listing (`ls` command), 61–62, 115–116
- deleting (`rm` command), 73
- escape sequences, 82
- executable files, list of (`PATH` environment variable), 84–85
- finding files (`find` command), 161–163
- Mac OS X, 386
- making and removing, 74
- moving to (`cd` command), 58–59

- Perl functions, 310
- scripts, storing, 230
- services, NetInfo and, 382–386
- structure, 54–55
- tarfiles, saving, 327
- Windows, 389–390

disabling services, 223

disk space (`du` command), 76

disk-oriented file system, 53

displaying process lineage, 191–192

distributed copies of files and backup (`rdist`), 340

division operator (`/`), 236

DNS (Domain Name System)

- TCP/IP, 289
- testing (`nslookup`, `dig`, and `host`), 293–294

documenting

- `crontab` file, 205
- described, 33
- Perl scripting, 304–305
- shell scripting, 227–229
- writing, 41

documents, scheduling backup of, 203–205

Documents folder, Mac OS X, 376

dollar sign (`$`), 152–153, 306

domain names, 288–289

DOS (Microsoft)

- remote login via telnet, 23
- Windows interface, 391–394

dot or period (`.`), 62, 86, 150, 310

double dot (`..`), 86

double quotes (`"`), 310

`do...while` loop, Perl programming, 312

downloading files

- file size, checking, 347
- mechanics, 347–348
- tarball, 346–347

`du` command, 76

DVDs, 323

Dynamic Host Configuration Protocol (DHCP), 291–292

E**eavesdropping, 215**

ed line editor, 167

Elvis text editor, 146**Emacs text editor, 110****encryption**

described, 21

password, 34–37, 41

ssh versus telnet, 23

end of file, viewing (tail command), 72**environment, customizing**

aliases, 101

bash variables, 99–100

command prompt (PS1 variable), 81–83

libraries, dynamic shared, 102–103

options, 101–102

path, 83–86

tosh variables, 99

variables, 246–247

viewing variables, 98–99

Z shell variables on Red Hat Linux, 100

epoch

clock, setting, 200

defined, 36

equal sign (=), 360**error messages**

configure steps, 367

files, opening with vi, 128

make process, 361

redirecting, 113

executable files

commands, file permissions, 122

discerning (file command), 182

single set (END block), 178

execute permission, 68, 70, 120**exit status, previous command (? variable),
232–233****exiting and saving text files, 133–134****extracting**

data, 174–175

source code, 351

tarfile backups, 328

F**facility, 270****file system**

backing up entire (dump command), 335–338

checking (fsck command), 76–77

commands navigating (cd command), 116

creating, modifying, and removing files, 72–74

described, 53–54

directory structure, 54–55

file types, listed, 63

links, 63–67

Mac OS X structure, 373, 386

management basics, 74–77

mounting and unmounting, 77–79

names, case-sensitivity and, 57

navigating, 57–62

paths, 56–57, 86

permissions, 68–71

process (/proc), 194–195

root directories, basic, 55–56

Unix, 5

viewing files, 71–72

File Transfer Protocol. See FTP**files**

AWK program, 176–178

compressing (gzip and bzip2), 329–333

content, moving (cp command), 118

denoting (-f argument), 170–171

detecting with shell scripting, 255–256

in directory structure (find command), 161–163

distributed copies (rdist), 340

exiting and saving with vi editor, 133–134

finding with resource-heavy command, 60

interactive login session, recording (script
command), 165

Microsoft Office, transferring all, 112

moving within with vi editor, 128–132

names, finding by (which and whereis
commands), 59–60newlines, characters, or words, printing count of
(wc command), 165–166

remote synchronization (rsync), 340

files (continued)

- retrieving from FTP or SMTP server, 160
- searching with vi editor, 133
- shell scripts handling, 255–257
- size, checking during download, 347
- sorting output of command or file in specified order (`sort` command), 163–165
- splitting command output to multiple locations (`tee` command), 165
- system logging, 269–270
- temporary, cleaning up (`trap`), 256–257
- types, 60, 63

finding files

- directory (`find` command), 161–163
- by name (`which` and `whereis` commands), 59–60
- with resource-heavy command, 60

finding information about commands, 108–110

Fink program, 368

fireproof safe, 325

firewall

- implementing built-in, 224
- shell scripts, network administration, 300

firmware, 9

flags, 108

flat files, 384

floppy diskettes, 323

flow control, shell scripting

- case statement, 237–239
- comparison operators, 235–236
- if-then statement, 233–234
- multiple conditions, 237
- test command, 234–235
- until statement, 240
- while statement, 239–240

foreground process, suspending, 197

forked file structure, Mac OS X, 386

formatting, text

- data, transforming into report, 173–174
- editor, choosing, 125

forward slash (/). See root directory

Free Software Foundation

- archive site, 346, 396
- info page help documents (`info` command), 110
- licensing, 345

FreeBSD

- DHCP, 292
- source codes, checking integrity, 349
- system library files, 102

Freshmeat archive, 346, 396

FrontPage (Microsoft), 396

FTP (File Transfer Protocol)

- described, 155–160, 286
- firewalls, 300
- remote system login, 20
- source code, downloading, 347

full backup, 323–324

full path name, 84

functions, Perl programming

- file system access functions (`open`, `close`, `opendir`, `readdir`, and `closedir`), 308–310
- limited scope variable functions (`my` and `local` operators), 310–311

G

game shells, 92–93

Gassée, Jean-Louis (Be Inc. founder), 371

GCC (GNU Compiler Collection), 363–364

GCOS (General Comprehensive Operating System) field, 33, 41

GE (General Electric), 1

general information Web sites, 423

generic run control files, 96

Gentoo Linux, 368

GID (group ID)

- setting, 33, 38
- transferring files, 120

GMT (Greenwich Mean Time), 199

GNU Compiler Collection (GCC), 363–364

GNU (GNU's Not Unix) Project

- history, 3
- info page help documents (`info` command), 110
- libraries, 102
- source code compilation tools, 363–364
- tarfile creation scripts, 328
- zip compression (`gzip`), 329–331, 332–333

GNUPG (Gnu Privacy Guard), 225

GPL (GNU General Public License), 3, 345

graphical user interface. See **GUI**

greater than sign (>), 244–245

Greenwich Mean Time (GMT), 199

group ID. See **GID**

grouping multiple commands with braces, 173

groups

account information (`/etc/passwd` file), 31–34

accounts, 29–30, 30

adding, 41

commands, listed, 40–41

encrypted password entries and aging, local users (`/etc/shadow` file), 34–37

file ownership, 120

information (`/etc/group` file), 37–38, 47–50

Linux, 45

Mac OS X, 39–40, 44–45

managing (`groupadd`, `groupmod`, and `groupdel` commands), 43

membership, listing (`groups` command), 49–50

Solaris, 46

GUI (graphical user interface)

administration tools, starting, 45

Linux, 45

logging in, 14–17

Mac OS X user management, 44–45

Solaris, 46

Unix history, 4

H

hacking password discovery programs, 216–217

halt command, 25

hard drive

backups, 323

Mac OS X folders, 373

organization, 53–54

hard links, 63

hardware

clock, 199, 201

failure, 215

identifying, 214

kernel, 4

off-site backups, 325

hashmark character (#), 227–228, 306

header, TCP, 284

“Hello World” exercises

Perl programming, 303–305

shell script, creating simple, 183

help

command, 25–27

info pages (`info` command), 109–110

keyword searches, 27–28

keywords to related files (`apropos` command), 110

sections, commonly used, 27

vi editor (`man vi` command), 141–142

heterogeneous environments, wildcards in, 112

hiding files or directories, 62

home directory

described (`home`), 56, 59

files, listing, 56, 86

location, 33–34

Mac OS X, 376–377

user, adding, 41

hostnames

current machine escape sequence, 83

Linux login, 18

TCP/IP, 288–289

HR (human resources) group permissions, 30

HTTP (Hypertext Transfer Protocol), 285, 297

hyphen (-), 69

I

iBiblio archive, 346

IBM Tivoli Storage Manager backup suite, 341

ICMP (Internet Control Message Protocol), 284–285, 293

IDs, process, 181–182, 188–189

IEEE (Institute for Electrical and Electronics Engineers) standard 1003, 3

if...else commands, 312, 315

if-then statement, 233–234

IGMP (Internet Group Management Protocol), 285

IIS (Microsoft), 396

incremental backup, 323–324

info pages (`info` command), 109–110

information

- about accounts (`/etc/passwd` file), 31–34
- commands, finding, 108–110
- group (`/etc/group` file), 37–38
- shell scripting, 264
- user and group commands, 47–50

initialization process (`init`), 11–12, 181

inode

- described, 63
- size errors, detecting, 77

input, checking with Perl programming, 313–317

input, redirecting

- commands, 112–113
- shell scripting, 244–245

insert mode, vi text editor

- defined, 128
- entering, 134–135, 140–141

installation, software, 365–367. See also build, software

Institute for Electrical and Electronics Engineers (IEEE) standard 1003, 3

interactive mode

- login session, recording (`script` command), 165
- restore command, 339–340

interface configuration (`netstat -i`), 294–295

Internet Control Message Protocol (ICMP), 284–285

Internet Explorer (Microsoft), 396

Internet Group Management Protocol (IGMP), 285

invoking shell, 89, 230

IP (Internet Protocol)

- address, defined, 21
- described, 284
- DNS services, finding, 289
- routing, 286–287, 288

J

job control, 196–197

Jobs, Steve (Apple founder), 371

John the Ripper password discovery program, 216–217

K

Kbackup suite, 341

kernel

- configurations, retrieving (`/proc` file system), 194–195
- directory (`kernel`), 56
- loading, 9–11
- login, viewing, 18
- process attributes, reporting, 188
- Unix, 4

keyboard input

- reading, 232
- redirecting, 244

keyword searches, help

- document-related files (`apropos` command), 110
- man (manual) pages, 27–28

Knoppix, 6–8, 397

Korn, David (Korn shell creator), 5

Korn shell (`ksh`)

- described, 5, 90
- options, available, 102
- run control files, 94
- scripting, 240

L

latency, shell script measuring, 300–302

LaTeX text formatter, 125

length, measuring file (`wc` command), 118–119

less than sign (`<`), 244–245

level, 270

library files

- creating (`libtool`), 363
- directory (`lib`), 56
- information about (`pkg-config`), 363
- nonstandard locations (`LD_LIBRARY_PATH`), 103
- shell functions, 252
- verbose information, printing (`LD_DEBUG`), 103

Library folder, Mac OS X, 375, 377

licensing

- open source, 344–345
- Unix/Linux versions, 3

limited-time accounts, 37**lineage, displaying process, 191–192****lines of code**

- changing, 137–139
- first or last 10, viewing, 72
- new, creating, 82
- separator, specifying, 177
- sequence beginning, 151–152
- unused, marked as, 127

lines of text

- copying with vi editor (`yy` command), 139–140, 141
- deleting, 137
- joining two (`j` command), 139
- moving around files, 128–129
- multiple, processing, 172
- pasting (`p` paste command), 139–140
- processing multiple, 172
- single, processing, 172
- words, counting, 177

links

- file system, 63–67
- symbolic, 366

Linux. See also Red Hat Linux

- account information file (`/etc/passwd`), 31
- booting messages, 13
- build-from-source package systems, 368
- building and installing software (GNU `make` command), 354
- command line login, 17–19
- executable files, discerning (`file` command), 182
- group information file (`/etc/group`), 37
- GUI, 45
- history, 2, 3
- kernel, 10–11
- log files, 269
- `ls` command output, 106–107
- password file (`/etc/shadow`), 34
- process configurations, retrieving (`/proc` file system), 195
- process tree, sample, 191–192
- reports and log rotation, 206–207
- running processes, listing (`ps` tool), 183, 184

- system clock, synchronizing (`hwclock`), 201
- system processes, running, 186

Linux Software Map archive, 346**Linuxberg archive, 346****listing**

- accounts belonging to group, 38
- delegated commands, 47
- directory contents (`ls` command), 61–62
- file permissions, 121
- home directory files, 86
- mounted system elements, 78
- source code directory contents, 352
- tarfile contents, 327
- variables defined in any shell, 98
- who is logged in (`who` command), 47

log file

- `cron` output, 208
- data, transforming into report, 173–176
- initialization, 12
- rotation, scheduling, 206–207
- script changes, 228

logger system utility, 275**logging in**

- auto Mac OS X, setting, 45
- command line, 17–20
- described, 13
- GUI, 14–17
- ID, user, 32, 36
- interactive session, recording (`script` command), 165
- remote system, 20–23
- shell display, 24, 34
- user accounts, switching, 46–47

logging out, 24**logwatch system log monitoring software, 277–278****LoneTar backup suite, 341****ls command, 106–108, 245****Lynx Web browser and FTP client, 357–359****M****Mac OS 9**

- folders, 373, 376
- Mac OS X versus, 372–373

Mac OS X

- administration, 378–379
- Applications folder, 374–375
- command-line interface, 379–382
- directory services and NetInfo, 382–386
- executable files, discerning (`file` command), 182
- file system, 373, 386
- GUI users and groups, 44–45
- history, 3, 371–372
- home directory, 376–377
- initialization process, 11–12
- Library folder, 375
- log files, 269
- login screens, 15–17
- Mac OS 9 folders, 376
- Perl interpreter, finding, 304
- permanent folders, 374
- preference files, 379
- `ps` tool, 184
- root user account, 387–388
- RPM packages, 368
- running processes, listing (`ps` tool), 184
- SFTP, 155–157
- software, building, 343, 359
- System folder, 375
- system processes, running, 187–188
- `top` command, 193
- users and groups, 39–40, 44–45, 375

magazines, 423

magnetic tape, 323

maintenance issues

- file system quotas, 122–124
- source code installation techniques, 365–367

`make` **command, 354–355, 359**

makefile

- development tools, 362–363
- syntax, 360–362

managing

- accounts (`useradd` command), 41–43
- file system, 74–77
- groups (`groupadd`, `groupmod`, and `groupdel` command), 43

- memory, 4
- output from `cron`, 207–208

Mandrakelinux

- GUI administration tool, starting, 45
- login, 14, 18

manual pages (`man` command), 109

MaraDNS package, 349–350

Massachusetts Institute of Technology (MIT), 1

matching characters, wildcards, 111–112

mathematics

- in Perl, 306–307
- shell, 236

media backup types, 323, 325

memory, 4

messages

- boot, viewing, 12
- discarding, 280
- error, redirecting, 113
- incorrect password, 16
- Linux booting, 13
- password, time to change, 36
- Perl warnings, turning on, 317
- `syslogd`, 270, 274–275
- system popping up in text file, 142

metacharacters

- commands, 111–112
- described, 150–154
- replacing text, 146

Microsoft FrontPage, 396

Microsoft IIS, 396

Microsoft Money, 396

Microsoft Office

- comparable Unix programs, 396
- files, transferring all, 112

Microsoft Outlook, 396

Microsoft Virtual PC, 397

Microsoft Windows

- administrative tools, 29, 394–395
- commands, compared, 391–394
- programs, 395–397
- remote login via telnet, 23
- structure, 389–391
- within Unix, 409
- Unix within, 397–409

MIT (Massachusetts Institute of Technology), 1**modifying**

- files, 72–74
- group accounts, 43

Money (Microsoft), 396**monitor, 244****monitoring**

- services, 223–224
- system clock (`date` command), 200
- system logging, 276–280

mounting file system, 77–79**Movies/Music/Pictures folder, Mac OS X, 377****moving**

- all files with specified extension, 112
- to directory (`cd` command), 58–59
- files to another location without copying (`mv` command), 72–73
- within files with `vi` editor, 128–132

MS-DOS

- remote login via telnet, 23
- Windows interface, 391–394

MULTICS (Multiplexed Operating and Computing System), 1**multiple commands**

- editing (`-e` option), 169–170
- grouping with braces, 173

multiple conditions, flow control, 237**multiple events, complex scheduling, 206****multiple lines of text, 172****multiplication operator (*), 236****N****nadvsh (New Adventure Shell), 93****names**

- file or directory, changing (`mv` command), 73
- file system case-sensitivity, 57
- finding files by (`which` and `whereis` commands), 59–60
- group, 38, 43

nameserver, 289**navigating file system**

- commands, listed, 57–58
- current location, showing (`pwd` command), 58

- directory, moving to (`cd` command), 58–59
- directory contents, listing (`ls` command), 61–62
- names, finding files by (`which` and `whereis` commands), 59–60
- resource-heavy `find` command, 60
- type of file (`file` command), 60

Nessus vulnerability scanner, 224**nested functions, 249–250****NetBSD system**

- downloaded source files, checking, 349
- executable files, discerning (`file` command), 182
- process attributes, reporting, 188
- running processes, listing (`ps` tool), 183–184

NetInfo

- current database, viewing, 39–40
- database backup and restoration, 385
- described, 382–384
- `nidump` and `nload`, 384–385
- system startup, 385–386

netmasks, 286–287**network**

- backup, 323
- card, assigning IP address to, 292
- connection, identifying, 214
- file system, 53
- request, configuring, 290–291
- roundtrip, timing (`awk`), 300–302
- TCP/IP address, 286–287

network connection

- DNS testing (`nslookup`, `dig`, and `host`), 293–294
- interface configuration (`netstat -i`), 294–295
- watching for incoming (`inetd` daemon), 296–297

Network File Services (NFS), 219, 238–239**Network Time Protocol (NTP), 201–202****New Adventure Shell (nadvsh), 93****newline**

- described, 82
- printing count of (`wc` command), 165–166

news Web sites, addresses listed, 423**NeXT software, 371–372****NeXTStep, 382**

NFS (Network File Services), 219, 238–239

`nidump`, 384–385

`niload`, 384–385

NMAP port scanning tool, 225

Notepad, 396

notes files, 344

NTP (Network Time Protocol), 201–202

numbers inside brackets ([0-9]), 154

numeric values, testing, 316

Nvi text editor, 147

NVRAM, 9

O

Office (Microsoft)

comparable Unix programs, 396

files, transferring all, 112

one-time scheduling execution (at command), 211

open source licensing

BSD, 344–345

GPL, 345

OpenBSD, 349

operators

arithmetic in shells, 236

Perl programming, 306–307

order, sorting output in specified (sort command), 163–165

OS 9. See Mac OS 9

OS X. See Mac OS X

Outlook (Microsoft), 396

output

argument, influencing, 107–108

commands, sending files to backup (`cpio`), 333–335

file content (`cat` command), 116–117

as input for another command, 114–115

managing from `cron`, 207–208

redirection, 112–113, 244–245

sorting in specified (`sort` command), 163–165

splitting to multiple locations (`tee` command), 165

output formatting language. See AWK program ownership, file, 120

P

packets, 283–284

parameters, passing shell functions to, 248–249

parent directory, 86

parent processes, 192

partition, 53–54

password

administrative, prompting (`sudo` command), 218–221

described, 216

discovery programs, 216–217

encrypted entries and aging, local users (/etc/shadow file), 34–37, 41

file, creating in Mac OS X, 384

file entry field, 32–33

forgotten, 19

group, 38

login, 15–16, 19

new account, setting, 42

remote login, 22, 157

system accounts, 221

pastng lines of text (p paste command), 139–140

patch and diff source code, 364–365

patches

activating, 222

open source projects, 346

path

absolute and relative, 56–57

full path name and, 84

navigating file system, 86

`PATH` environment variable, 84–85

relative and absolute, 85–86

`PATH` environment variable, 84–85

patterns, 175–176

`pax` (portable archive exchange), 340

`PKSH` (Public Domain Korn shell), 5, 94

performance, tracking (`traceroute`), 298–299

period or dot (.), 62, 86, 150, 310

Perl (Practical Extraction and Report Language)

programming

advantages, 305

array, traversing (`foreach` loop), 312

- data variable manipulation functions `chomp`,
`join`, and `split`, 307–308
- described, 303
- `do...while` loop, 312
- file system access functions (`open`, `close`,
`opendir`, `readdir`, and `closedir`),
308–310
- “Hello World” exercise, 303–305
- `if...else` commands, 312
- input, checking, 313–317
- limited scope variable functions (`my` and `local`
operators), 310–311
- operators, 306–307
- `print` function, 307
- shells, 92, 94
- troubleshooting scripts, 317–320
- variables, 306
- `while` loop, 311–312
- permanent folders, Mac OS X, 374**
- permissions**
 - file system, listed, 68–69
 - group accounts, 30, 38
 - scripts, security and, 261
 - specifying set, 70–71
 - symbolic mode, changing, 69–70
- PGP program, 396**
- Photoshop (Adobe), 396**
- PID (process ID)**
 - described, 181–182
 - `kill` command, 189
- `ping` **network test, 293**
- pipes**
 - commands, 114
 - `cron` output, 207–208
 - output, 245
- `pskill` **command, 191**
- PKZIP, 396**
- plus, equal sign (+=), 360**
- portable archive exchange (pax), 340**
- ports, TCP destination and source, 284**
- POSIX (Portable Operating Systems Interface)**
 - standard, 3
- `poweroff` **command, 25**
- Practical Extraction and Report Language**
 - programming. See Perl programming**
- precompiled software packages, 367–369**
- preference files, Mac OS X, 379**
- prerequisite, building software with, 357–359**
- printing**
 - count of newlines, characters, or words
(`wc` command), 165–166
 - Perl programming, 307
 - sequences (`grep` command), 160–161
 - verbose library file information (`LD_DEBUG`), 103
- process**
 - attributes, 188–189
 - background and foreground, managing, 196–197
 - described, 181–182
 - directory (`proc`), 56
 - file system (`/proc`), 194–195
 - kernel controlling, 4
 - lineage, displaying, 191–192
 - run level grouping, 11
 - running, checking (`ps` process status command),
183–185
 - states, checking running, 185
 - stopping (`kill` command), 189–191
 - system, 185–188
 - `top` command, 192–194
 - zombie, 192
- process ID (PID)**
 - described, 181–182
 - `kill` command, 189
- program**
 - execute permission, 68, 70, 120
 - info page help documents (`info` command),
109–110
 - invoking, 84
 - logging (`syslogd`), 270
 - running in background, 196–197
 - running with enhanced capabilities (`SETUID` and
`SETGID`), 195–196
 - security, 224–225
 - timing with system clock, 199–202
 - Windows (Microsoft), 395–397
- programming. See Perl programming**
- programs, executable. See commands**
- prompt, customizing, 82–83, 97**
- Public Domain Korn shell (PDKSH), 5, 94**
- Public folder, Mac OS X, 377**

Q

question mark (?), 111, 153

question mark, equal sign (=), 360

Quicken, 396

quitting

FTP session, 160

sed editor, 172

vi editor with prompt for saves, 133

vi editor without saving changes, 141

quotas, maintaining file system, 122–124

R

RAM (random access memory), 4

RARP (Reverse Address Resolution Protocol), 285

read permission, 68, 70, 120

reading

file and appending after line address, 172

file permissions, 121

README files, 344, 347

Read-Only Memory (ROM), 9, 13

rebooting system, 25

recording interactive login session (script command), 165

recursion shell functions, 249–250

Recycle Bin, 390–391

Red Hat Linux

bash run control files, 95–96, 97–98

commenting script, 228–229

GUI administration tool, starting, 45

logwatch, 277–279

NFS service script, 238–239

scheduling backups, 206

Z shell variables, 100

redirection

input and output for individual actions, 112–113

operators, 244–245

Perl functions, 310

pipng, 114

regular expressions

described, 149–150

searching for everything but named string, 161

single character, matching, 155

relative path, 56–57, 85–86

remote administration, Linux, 45

remote files

directory (export), 56

synchronization (rsync), 340

remote system login

methods, listed, 20–21

password, incorrect, 19

ssh, 21–22

telnet, 23

removing. See deleting

repeating arguments (echo command), 59–60

replacing text (:s/ command), 143–146

reports

data, transforming into, 173–174

kernel process attributes, 188

Linux, scheduling, 206–207

processes for all users, 185

request

answering, 295–296

TCP/IP, sending, 293–295

resource-heavy find command, 60

restoring database, 385

restricting

access to services, 223–224

programs, 222

shells, 261–263

retrieving files, remote FTP or SFTP servers, 160

Reverse Address Resolution Protocol (RARP), 285

RIP (routing information protocol), 286–287, 288

ROM (Read-Only Memory), 9, 13

root directory, 54, 55–56

root user account

backup commands, 326

commands, delegating (sudo), 46–47

described, 29

ID (UID 0) administrative access, 119, 217–218

Mac OS X, 387–388

system, obliterating, 73–74

system shutdown, 24–25

rotating system logs, 275–276

roundtrip, network, 300–302

routing information protocol (RIP), 286–287, 288

routing TCP/IP, 286–287**RPM (RPM Package Manager)**

- logwatch, 277–278
- software, installing, 367–369

run control files

- ash shell, 95
- bash, 96–98
- generic, 96
- listed, 94
- Red Hat Linux with bash, 95–98

run level, 11**running process**

- in background, 196–197
- checking (`ps` process status command), 183–185
- with enhanced capabilities, 195–196
- replacing (`exec` command), 181

S**Saint vulnerability scanner, 225****Sakoman, Steve (Be Inc. founder), 371****saving**

- files with `vi` editor, 133–134
- quitting `vi` editor without, 141

scheduling

- access, controlling, 208
- backups, 324–325
- complex, building, 206
- `cron` routine execution, 202–205
- `crontab` file, documenting, 205
- one-time execution (`at` command), 209–211
- output, managing from `cron`, 207–208
- reports and log rotation on Linux, 206–207

scope, shell functions, 250–252**scripting. See shell scripting****scripting, network administration**

- firewalls, 300
- latency (`awk`), 300–302
- performance, tracking (`traceroute`), 298–299

scripting, shell

- arrays, 257–260
- attacks, 260–261
- Bourne shell, advantages of, 88–89

- choosing shell, 240–241
- command substitution, 246
- commenting and documenting, 227–229
- environment and shell variables, 246–247
- exit status, previous command (? variable), 232–233
- file handling, 255–257
- flow control, 233–240
- input and output redirection, 244–245
- invoking shell, 230
- keyboard input, reading, 232
- network latency checking, 300–302
- portable `configure` tool (`autoconf`), 362
- security, 260–263
- signals and traps, 254–255
- special variables, listed, 232
- syntax, 182–183
- system administration, 263–266
- uses, 243–244
- variables, 231

scripts

- Apple, 373
- source code, 362–363
- system shutdown, 25

scrolling, text, 129**searching**

- files with `vi` editor, 133
- for sequences and printing results (`grep` command), 160–161

Secure File Transfer Protocol (SFTP)

- described, 155–160
- remote system login, 20

Secure SHell (ssh) remote system login, 20, 21–22**security**

- access to services, monitoring and restricting, 223–224
- accounts, removing unneeded, 221–222
- administrative access, limiting, 217–221
- assets, assessing, 214
- basic principles, 213
- firewalls, 224, 300
- library location (`LD_LIBRARY_PATH`), 103
- passwords, 216–217

security (continued)

- patches and bug fixes, 346
- patching, restricting or removing programs, 222
- potential problems, 214–215
- programs, 224–225
- services, disabling unneeded, 223
- shell scripting, 260–263
- taint mode, Perl scripts, 314
- viruses, downloading in source code, 348–349
- Web sites, addresses listed, 422

sed editor

- commands, most useful listed, 171–172
- described, 168–169
- files, denoting (`-f` argument), 170–171
- lines, processing multiple, 172
- multiple commands, grouping with braces, 173
- multiple editing commands (`-e` option), 169–170
- single-line, processing, 172

segments, data, 283–284

selector, 270

sentences

- deleting, 137
- moving among, 129

sequence number, TCP, 284

sequences, searching and printing results

(`grep` command), 160–161

services

- access, monitoring and restricting, 223–224
- disabling unneeded, 223
- Mac OS X, 386
- security issues, 214, 215

SETGID, 195–196

setting system clock (date command), 200

SETUID, 195–196

SFTP (Secure File Transfer Protocol)

- described, 155–160
- remote system login, 20

sh. See Bourne shell

shebang (#!), 182–183, 230

shell

- ash shell, 89
- available, 92
- bash, 89–90

- Bourne shell, 88–89

- C shells, 91–92

- changing default, 87–88

- changing temporarily, 87

- current, configuring, 82

- described, 5

- display, logging in, 24

- game shells, 92–93

- job control, 196–197

- Korn shell, 90

- multiple lines, editing, 170

- Perl shells, 92

- reasons for choosing, 86–87

- run control files, 93–98

- user's login, 34

- variables, 246–247

- zsh, 90–91

shell functions

- command-line options, checking validity (`getopts`), 253–254

- described, 247–248

- libraries, 252

- nested functions and recursion, 249–250

- parameters, passing to, 248–249

- returning values, 249

- scope, 250–252

shell scripting

- arrays, 257–260

- attacks, 260–261

- Bourne shell, advantages of, 88–89

- choosing shell, 240–241

- command substitution, 246

- commenting and documenting, 227–229

- environment and shell variables, 246–247

- exit status, previous command (`?` variable), 232–233

- file handling, 255–257

- flow control, 233–240

- input and output redirection, 244–245

- invoking shell, 230

- keyboard input, reading, 232

- network latency checking, 300–302

- portable `configure` tool (`autoconf`), 362

- security, 260–263

- signals and traps, 254–255
- special variables, listed, 232
- syntax, 182–183
- system administration, 263–266
- uses, 243–244
- variables, 231
- shell scripts, network administration**
 - firewalls, 300
 - latency (`awk`), 300–302
 - performance, tracking (`traceroute`), 298–299
- shutdown command, 25**
- shutting power off, 24**
- signals**
 - shell scripting, 254–255
 - stopping processes, 190
 - suspending processes, 197
- Simple Mail Transfer Protocol (SMTP), 286**
- single character, regular expressions matching, 155**
- single line of text, processing, 172**
- Single Unix Specification (SUS) standard, 3**
- single-screen chunks, breaking file content into (more and less commands), 117**
- Sites folder, Mac OS X, 377**
- sleep tool, 196**
- SMTP (Simple Mail Transfer Protocol), 286**
- Snort network intrusion detection tool, 225**
- soft links, 63–64**
- software**
 - choosing, 346
 - Web sites, addresses listed, 422–423
- software, installing. See source code**
- Solaris**
 - account information file (`/etc/passwd`), 32
 - administration tool, 46
 - boot process, 9–10
 - group information file (`/etc/group`), 38
 - kernel, 11
 - log files, 269
 - login screen, 15
 - password file (`/etc/shadow`), 35
 - process configurations, retrieving (`/proc` file system), 194
 - process states, 185
 - `ps` tool, 184
 - stopping processes (`killall` command), 191
 - system initialization, 12
 - system processes, running, 186–187
 - `top` command, 192–193
- sorting output in specified order (sort command), 163–165**
- source code**
 - beginning build, 352–354
 - building software, sample, 355–357
 - choosing software, 346
 - described, 2, 343–344
 - downloading files, 346–348
 - extracting, 351
 - GNU compilation tools, 363–364
 - maintenance, installation techniques for better, 365–367
 - `make` command, 354–355, 359
 - `makefile` syntax, 360–362
 - open source licensing, 344–345
 - of operating system, 2
 - `patch` and `diff`, 364–365
 - precompiled software packages versus, 367–369
 - prerequisite, building software with, 357–359
 - scripts and `makefile` development tools, 362–363
 - troubleshooting build, 367
 - verifying, 348–350
- source port, 284**
- Sourceforge archive, 396**
- space, text, 128**
- special file system, 53**
- special variables, listed, 232**
- spelling mistakes, correcting with substitution command, 143–146**
- square brackets ([]), 111, 150**
- square brackets with asterisk between ([*]), 151**
- ssh (Secure SHell) remote system login, 20, 21–22**
- Stallman, Richard (GNU Project engineer), 3**
- standard error (STERR), 244**
- standard in (STDIN), 244**
- standard out (STDOUT), 244**

starting

- process, 182
- vi editor, 126–128

states, checking running, 185

status, file system backups, 337

stopping

- process, 189–191
- shell jobs, 197

storing backups, 325

stream editor (*sed*), 168–173

strings, 161. *See also* regular expressions

subdirectory

- backup, scheduling, 203
- scripts, 261

subnetworks, TCP/IP, 286–287

subshell, 115

substitution

- commands, 114–115
- sed* text editor, 168–169

subtraction operator (-), 236

suites, backup, 341

SunFreeware archive, 397

superuser. *See* root user account

SUS (Single Unix Specification) standard, 3

SUSE Linux distribution tool, 45

swap, 4

swatch system log monitoring software, 279–280

switch user (*su* command), 218

symbolic mode, changing permissions (*chmod* command), 69–70

synchronizing

- Linux system clock (*hwclock*), 201
- NTP system clock, 201–202
- remote file (*rsync*), 340

syslogd utility

- configuration file, 271–274
- described, 270
- logger system utility, 275
- messages, viewing, 274–275

system

- administration with shell scripting, 263–266
- configuration files (*etc* directory), 56
- mounted files, listing, 78–79

system accounts, 30

system clock

- checking and setting (*date* command), 200
- configuring, 199
- Linux, synchronizing (*hwclock*), 201
- NTP, synchronizing system with, 201–202

System folder, Mac OS X, 375

system logging

- files, 269–270
- monitoring, 276–280
- rotating logs, 275–276
- syslogd* utility, 270–275

system process, 185–188

system shutdown

- command line, 25
- privilege, 24
- shutting power off versus, 24

system startup

- described, 9–13
- NetInfo, 385–386

System V distribution

- log files, 269
- process states, 185
- ps* tool, 184, 185
- stopping processes (*killall* command), 191

T

table of contents, tarfile, 326

taint mode, Perl scripts, 314

tape archives, creating (*tar* command), 326–328, 332–333

tarball, 346–347

tarfile, 326

target argument

- described, 107
- make process, 361
- multiple required, 108

task, shell scripting, 265

TCP (Transmission Control Protocol), 283–284

tcpd (TC Wrappers Daemon), 223–224

TCP/IP (Transmission Control Protocol/Internet Protocol)

- answering request, 295–296
- ARP, 285

- DHCP, 291–292
 - DNS, 289
 - domain and host names, 288–289
 - FTP, 286
 - HTTP, 285
 - ICMP, 284–285
 - IGMP, 285
 - IP routing, 284, 286–287, 288
 - network address, subnetworks, netmasks, and routing, 286–287
 - network request, configuring, 290–291
 - RARP, 285
 - request, sending, 293–295
 - RIP, 286–287, 288
 - SMTP, 286
 - subnetworks, 286–287
 - UDP, 285
 - watching for incoming network connections (`inetd` daemon), 296–297
 - TCPWrappers code, 345**
 - TCSH (TENEX C shell)**
 - described, 5
 - options available, 102
 - run control files, 94
 - variables, customizing environment, 99
 - telephone number, metacharacter matching, 155**
 - `telnet`, **20, 23, 396**
 - templates, makefile (automake), 362**
 - temporary files**
 - cleaning up (`trap`), 256–257
 - directory holding between boots (`tmp`), 56
 - mounting (`mnt`), 56, 77
 - security issues, 261
 - TENEX C shell. See TCSH**
 - terms, substituting, 101**
 - `test` **command, 234–235**
 - testing**
 - conditions (`if ... else` commands), 312
 - DNS (`nslookup`, `dig`, and `host`), 293–294
 - text**
 - copying with `vi` editor (`yy` command), 139–140, 141
 - deleting, 137
 - joining two (`j` command), 139
 - moving around files, 128–129
 - multiple, processing, 172
 - pasting (`p` paste command), 139–140
 - processing multiple, 172
 - replacing (`:s/` command), 143–146
 - single, processing, 172
 - word portion, copying (`yw` command), 140
 - words, counting, 177
 - text, patterns of. See regular expressions**
 - text editor, Emacs, 110**
 - text editor, full streams. See sed editor**
 - text files**
 - system logs, 275
 - type, showing (`file` command), 60
 - theft, hardware, 215**
 - tilde (~), 86, 127**
 - time**
 - current, showing, 82
 - sleep tool, 196
 - timestamp, updating (touch command), 118**
 - timing programs, 199–202**
 - TLD (top-level domain), 289**
 - `top` **command process, 192–194**
 - Torvalds, Linus (Linux creator), 3**
 - tracking network performance (traceroute), 298–299**
 - Transmission Control Protocol (TCP), 283–284**
 - Transmission Control Protocol/Internet Protocol. See TCP/IP**
 - traps, shell scripting, 254–255**
 - trigger events, logging, 279–280**
 - Tripwire file integrity checker, 224**
 - Trojan horse, 348–349**
 - troubleshooting**
 - build, 367
 - Perl scripts, 317–320
 - Tucows archive, 346**
- ## U
- UDP (User Datagram Protocol), 285**
 - UID (user ID)**
 - adding, 41
 - current escape sequence, 83
 - file location, 33

undo commands, text editing, 142

UNICS (Uniplexed Operating and Computing System), 1

Universal Time (UTC), 199–200

Unix

- compared to Windows (Microsoft), 389–391
- file system, 5
- history, 1
- kernel, 4, 10
- KNOPPIX distribution, running from CD-ROM, 6–8
- shells, 5
- utilities, 6
- versions, 2–3
- within Windows (Microsoft), 397–409, 409

until statement, shell scripting flow control, 240

updating

- backup files, 328
- file timestamp (`touch` command), 118

User Datagram Protocol (UDP), 285

user ID. See UID

username

- current, escape sequence, 83
- file entry field, 32
- login, 15–16, 19
- remote login, authenticating, 157
- UID versus, 119

users

- accounts, 29–30, 30
- currently logged in, listing (`who` command), 47–48
- encrypted password entries and aging, local users (`/etc/shadow` file), 34–37
- error, data loss from, 215
- group information (`/etc/group` file), 37–38
- information about accounts (`/etc/passwd` file), 31–34
- information commands, 47–50
- Linux, 45
- logging into another account, 46–47
- Mac OS X, 39–40, 44–45
- permissions, 120
- processes, reporting for all, 185
- Solaris, 46

Users directory, Mac OS X, 375

UTC (Universal Time), 199–200

utilities, 6. See also `syslogd` utility

U/Win, 397

V

validating backups (`restore` command), 338–340

variable-length file directory (`var`), 56

variables

- makefile syntax, 360
- Perl programming, 306, 315
- shell scripting, 231
- viewing, 98–99

vendors Web sites, addresses listed, 422

verifying

- backups, 325
- source code, 348–350

Veritas NetBackup suite, 341

versions

- Unix, 2–3
- vi editor, 146–147

vertical line character (`|`), 114, 245

vi text editor

- changing characters, words, or lines, 137–139
- commands, running, 143
- copying lines (`yy` command), 139–140, 141
- deleting characters, 136–137
- described, 125
- exiting and saving files, 133–134
- help (`man vi` command), 141–142
- insert mode, entering, 134–135, 140–141
- joining two lines (`j` command), 139
- moving within files, 128–132
- pasting lines (`p` command), 139–140
- quitting without saving changes, 141
- searching files, 133
- starting, 126–128
- text, replacing (`:s/` command), 143–146
- versions, 146–147
- word portion, copying (`yw` command), 140

viewing

- files, 71–72
- variables, 98–99

Vile (Vi Like Emacs) text editor, 147

Vim (Vi IMproved) text editor, 146

virtual file system, 53

virtual memory, 4

Virtual PC (Microsoft), 397

viruses

data loss from, 215

source code, checking, 348–350

VMWare, 397, 409

W

watching for incoming network connections

(`inetd` daemon), 296–297

Web browser

downloading source code with, 347

listed, 396

Lynx, installing, 357–359

Web server, Mac OS X, 377

Web sites, addresses listed

basics, 421

fun stuff, 424

history, 421

magazines, 423

news and general information, 423

security, 422

software, 422–423

vendors, 422

while loop

Perl programming, 311–312

shell scripting, 239–240

wildcards

described, 111

metacharacters versus, 150

Winamp, 396

window

size, checking, 97

TCP, 284

Windows (Microsoft)

administrative tools, 29, 394–395

commands, compared, 391–394

programs, 395–397

remote login via telnet, 23

structure, 389–391

within Unix, 409

Unix within, 397–409

Wine tool, 409

Winzip software, 396

WordPad software, 396

words

beginning or ending characters, matching, 146

changing, 137–139

counting on specified line, 177

moving among, 129

portion, copying (`\yw` command), 140

printing count of (`wc` command), 165–166

write permission, 68, 70, 120

WS FTP program, 396

X

Xcode Tools, 343

Y

Y2K problem, 200

Z

Z shell (zsh)

described, 90–91

options available, 102

run control files, 94

variables, 100

Zip drives, 323

Zoidberg Perl-based shell, 92

zombie process, 192

