INDEX

Α

a command, sed, 79-80 Actions, awk, 107-08 Addressing, and sed, 66 Algol, 3 alias command bash, 646 tcsh, 876-77 Aliases: bash, 646-47 C shell, 2-4, 6, 345-47 alias loop, 347 creating, 346 deleting, 346-47 listing, 345-46 creating, 646-47, 876-77 defined, 646, 875 deleting, 647, 877-78 Korn shell, 2, 4, 6, 453-55, 491-92 creating, 454 listing, 453-54 removing, 455 tracked aliases, 453, 455 listing, 646, 875-76 looping, 878 tcsh, 875-78, 939 Alias loop, 878 allexport option, set command, 435-38 Ampersand (&): awk, 109 Bash shell, 627-28 Bourne shell, 223 C shell, 351 Korn shell, 457 and quotes, 240 sed, 70 and tcsh job control, 879-80 -a option, set command, 323 ARGC variable: awk, 144 nawk, 177-80 argv, 394-95 ARGV array, 177 ARGV variable, awk, 144 Arithmetic: awk, 135-38, 184-86

integer (int) function, 184-85 rand function, 185 random number generator, 185-86 srand function, 185-86 Bash shell: evaluating expressions, 740 arithmetic expressions, 689 floating point, 733 integer, 729-33 Bourne shell, 257-59 expr command, 257-58 floating point, 258-59 integer, 257-58 C shell, 389-91 floating point arithmetic, 390-91 operators, 389-90 shortcut operations, 389 Korn shell, 508-13 integer type, 509 let command, 511-13 listing integers, 511 typeset command, 508 using different bases, 510-11 Arithmetic operators, awk, 135-38 Arrays: awk, 171-77 Bash shell, 691-93 C shell, 370-73 creating from a string, 373 shift command, 371–72 Korn shell, 554-56 creating with the set command, 556 TC shell, 910-14 Assignment operators, awk, 139 Associative arrays: awk, 171-80 field values, using as array subscripts, 174-75 multidimensional arrays (nawk), 176-77 special for loop, 172-73 split function, 175-76 strings, using as array subscripts, 173-74 subscripts for, 171-77

171 - 72Korn shell, 555 Asterisk (*), 35 awk. 109 Bash shell, 650-51 Bourne shell, 223 and filename substitution, 224 C shell, 351, 352 egrep, 59 Korn shell, 457, 459-60 metacharacter, 885-86 sed 69 AT&T shell. See Bourne shell. at command, 953 autolist variable, tcsh, 863-64 awk, 1, 31, 38, 93-211, 954 actions, 107-08, 113-16 arithmetic functions, 184-86 arithmetic operators, 135-38 integer (int) function, 184-85 rand function, 185 random number generator, 185-86 srand function, 185-86 arrays, 171-80 assignment operators, 139 associative arrays, 171-77 multidimensional arrays, 176-77 special for loop, 172-73 split function, 175-76 subscripts for, 171-77 using field values as array subscripts, 174-75 using strings as array subscripts, 173-74 using variables as array indexes, 171 - 72built-in functions, 180-84 arithmetic functions, 184-86 string functions, 180-84 user-defined functions (nawk), 186 - 88command line arguments (nawk), 177-80, 206-07 ARGC, 177-80 ARGV, 177

variables, using as array indexes,

1003

awk (cont.): commands. from within a file, 101-02 in a script file, 111 comparison expressions, 125-30 compound patterns, 128-29 computation, 127-28 conditional expressions, 126-27 data validation program, 129-30 range patterns, 129 relational operators, 125-26 conditional operator, 138-39 conditional statements, 165-67 if/else else if statements, 166-67 if/else statements, 165-66 if statements, 165 control functions, 209 defined, 93 equality testing, 131-32 exit statement, 170 fields, 104-06 separators, 105-06 fixed fields, 194-96 bundling/unbundling files, 196-97 empty fields, 194-95 generating form letters, 198-201 multiline records, 197-98 numbers with \$/commas/other characters, 195-96 -f option, 101 format of, 94-96 input from commands, 95-96 input from files, 94-95 formatting output, 96-101 OFMT variable, 98 printf function, 98-101, 161-62 print function, 96-98 form letters, generating, 198-201 FS variable, 105 function of, 93 getline function, 147-49, 207-08 input field separators, 119-22 interaction with the shell, 201-02 logical NOT operator, 135 logical operators, 134 loops, 168-69 break statement, 169 continue statement, 169 for loop, 168-69 loop control, 169 while loop, 168 match operator (tilde), 110 next statement, 170 NF variable, 104 patterns, 106-07, 112-13 program control statements, 170 range operator, 138 records, 102-03 \$0 variable, 102-03 NR variable, 103 record separator, 102 regular expressions, 108-10 metacharacters, 109 in pattern and action combinations, 116-19 relational operators, 132-34

review, 112-22, 131-39, 188-92, 202 - 10scripting, 122 string functions, 180-84, 202-06 gsub function, 180-81 index function, 181 length function, 181 match function, 182-83 split function, 183 sprintf function, 183-84 sub function, 180-81 substr function, 182 user-defined functions (nawk), 186-88, 210 versions of, 93 awk arrays: associative arrays, 171-79 subscripts for, 171-77 multidimensional arrays (nawk), 176-77 special for loop, 172-73 split function, 175-76 using field values as array subscripts, 174-75 using strings as array subscripts, 173-74 using variables as array indexes, 171-72 awk programming, 141-211 awk script with BEGIN and END, 159-60 BEGIN variables, 145-46, 157-58 END patterns, 146 files, closing, 150-51 numeric and string constants, 141-42 initialization and type coercion, 141-42 pipes, 149-51, 162-63 closing, 150-51, 163 redirection, 146-49, 162 input redirection, 147-49 output redirection, 146-47 system function, 150-51 user-defined variables, 142-45 assignment operators, 142 at the command line, 143 built-in variables, 144-45, 153-57 decrement operators, 143 said, 151-52 fields variables, 143-44 increment operators, 143, 151-52 post-increment operator, 143 pre-increment operator, 143 -v option (nawk), 143 variables, 141-46 Awk Programming Language, The (Aho/Kernighan/Weinberger), 129-30, 196, 198

В

Background command, *tcsh*, 881–82 Background jobs, 339 and ampersand, 348 bash, 627–28, 786 and loops, 786 and suspend key sequence, 348 *tcsh*, 845, 879–81 Backquotes, and *tcsh* command substitution, 918–21

Backslash (\): Bash shell, 683-84 Bourne shell, 240-41 C shell, 379 Korn shell, 457, 485-86 in metacharacter, 654-55 and guotes, 240-41, 683-84, 921-22 backslash_quote variable, tcsh, 921-22 Bang, 638, 851-54, 923 banner command, 954 basename command, 954-55 bash, 599-600 BASH ENV (ENV) variable, 723, 996 .bash_history file, 632, 633 .bash_login file, 602-603 .bash logout file, 610 .bash_profile file, 601-02, 663, 693 *bashrc* file, 603, 605–07, 646 BASH_VERSION variable, 599 batch command, 953 bc command, 955 bdiff command, 955 beepcmd alias, tcsh, 875 BEGIN patterns, 145-46, 157-60 bg command, 349-50, 881-82 bgnice option, set command, 438 Binary numbers, and bash, 729 /bin/csh, 5, 332 Binding keys and bash, 610 keybinding characters, 859-60 and tcsh, 858-62 bindkey command, tcsh, 855, 858-62 /bin/ksh. 5, 434 /bin/login, 5, 11-12, 16, 332, 601, 830 /bin/sh, 5 Bash shell, 599-827 aliases, 646-47 arrays, 691-93 command line: components of, 626 editing, 641-45 and eval command, 810-12 exit status, 625-26 and getopts command, 804-10 order of processing, 622 parsing, 810-12 shortcuts, 631-58 substitution, 686-89 commands. See also specific commands. auto-completion of, 631-32 background vs. foreground, 627-28 built-in, 623, 624, 714-16, 818-21 conditional, 626-27, 739-63 editing, 638, 641-45 exit status, 625-26, 739-40 grouped, 626 history file, 632–45 order of processing, 622 reexecuting, 638 contrasted with other shells, 599, 989-98 debugging, 802-04 and directory stack, 647-49 editors, 641-45 environment, 602-10 environment variables, 663-81

Bash shell (cont.): evaluating expressions: arithmetic expressions, 689 test command, 740-46 filename substitution, 650-58 file test operators, 756 floating point arithmetic, 733 functions, 693-97, 788-96 and globbing, 650-58 help feature, 714, 715 history of, 599-600 initialization files, 602-10 input, 697-703, 726-29 integers, 729-33 invocation options, 707-09 I/O redirection: exec command and, 699-703 here document and, 706-707 subshells and, 784-86 job control, 628-30 loops: basic types, 763-73 break command, 780-81 IFS and loops, 787-88 I/O redirection and subshells. 784-86 for menu creation, 763-68 nested loops, 782-84 running in background, 786 select command, 773-77 metacharacters, 649-50 options: debugging, 803 processing command line, 804-10 set command, 610-13, 709-11, 815-16 shell invocation, 707-09, 812-14 shopt command, 613-15, 711-13, 817-18 output, 697-703, 784-86 and pipes, 704-05, 786 and POSIX standards, 599 and printf command, 670-72 positional parameters, 678-80 prompts, 600, 615-18, 773-75 quoting, 681-86 backslash, 683-84 double quotes, 685-86 single quotes, 684-85 special metacharacters requiring quotes, 682 shell script creation, 723-25 file testing, 756-58 starting, 600-01, 812 trapping signals, 797-802 variables. environment variables, 663-81, 723 local variables, 660-62 modifying, 672-76 naming conventions, 659 null values in, 750-51 printing values of, 669-70 read-only, 662 setting, 659-60, 663 special, 678-81 unsetting, 669 versions, 599-600

wildcards, 649-50, 656-57, 760 Bourne shell, 2-4, 213-330 arithmetic, 257-59 expr command, 257-58 floating point arithmetic, 258-59 integers, 257-58 built-in commands, 323-24 case command, 277-80 command line, 220-23 arguments, 259-64 commands in the background, 222-23 conditional execution of commands, 222 exit status, 221 grouping commands at, 222 multiple commands at, 221 substitution, 243 conditional expressions, 264-77 checking for null values, 270-71 exit command and the ? variable, 268-70 file testing, 274-75 if command, 266-68 if/elif/else command, 273-74 if/else command, 271-73 null command, 275-77 test command, 265-66 testing exit status, 264-65 environment, 214-20 dot command, 220 /etc/profile file, 214-16 hash command, 219-20 initialization files, 214 primary prompt, 217 .profile file, 216-17 prompts, 217-18 search path, 218-19 secondary prompt, 217-18 environment variables, 229-31 eval command, 320-21 filename substitution, 224-27 asterisk, 224 escaping metacharacters, 226-27 square brackets, 225-26 functions, 6, 243-45, 301-07 defining, 243-45 and dot command, 305-07 function arguments, and return value, 303-04 listing/unsetting, 245 storing, 305-07 traps in, 311-12 unsetting, 302 getopts function, 314-20 here document: and creating menus, 279-80 and redirecting input, 252-53 history of, 3-4 I/O redirection, 245-50 exec command and, 247-50 operators, 245 local variables, 227-29 loops, 280-301 \$* and \$@ variables in wordlists, 283-84 break command, 291-92

continue command 292-93 exec command, 298-300 for command, 280-83 IFS and loops, 300-01 I/O redirection and subshells, 295-97 looping control commands, 289-95 nested loops, 294-95 piping loop output to a UNIX command, 297-98 shift command, 289-91 until command, 287-89 while command, 284-87 metacharacters, 223 parsing the command line, 320-21 and pipes, 250-51 positional parameters, 259-64 how \$* and \$@ differ, 262-64 set command, 260-62 programming with, 253-330 quoting, 240-42 backslash, 240-41 double quotes, 242 single quotes, 241-42 special metacharacters requiring quotes, 240 set command, 322-23 shell invocation options, 321 shell script creation, 253-55 comments, 254 executable statements and Bourne shell constructs, 254 first line, 253 making the script executable, 254 read command, 255-57 scripting session, 254-55 starting, 213-14 trapping signals, 308-14 debugging, 312-14 ignoring signals, 310 listing traps, 310-11 resetting signals, 309 traps in functions, 311-12 variables, 227-39 environment variables, 229-31 local variables, 227-29 wildcards, 223 Bourne, Stephen, 3 Brackets. See Square brackets ([]). break command: Bash shell, 780-81 Bourne shell, 291-92 Korn shell, 546-47 and loops, 417-19 break statement, awk, 169 Built-in commands, 6 Bash shell, 623, 624, 714-16, 818-21 Bourne shell, 323-24 C shell, 423-27 Korn shell, 582-86 TC shell, 928-48 Built-in variables, tcsh, 940-48 builtin command, bash, 623, 624 builtins command, tcsh, 928-29 Bundling and unbundling files, 196-97

С

cal. 955-56 Calculations. See Arithmetic. Caret (^), 32, 33 awk, 109 in bash history command, 638 egrep, 58 sed, 69 Caret inside square brackets, 37 egrep, 59 sed. 69 case command: Bash shell, 760-63 here document and, 762-63 Bourne shell, 277-80 here document and, 279-80 Korn shell, 532-34 here document, 533-34 Case modifiers, tcsh, 917-18 cat command, 706-07, 956 cd command, 15 CDPATH variable, Korn shell, 469 Child shell, 663 chmod command, 724, 956-57 changing permissions with, 13-14 chown command, 215-21, 957 file descriptors, 16 home directory, 15 pipes, 19-21 redirection, 16-18 variables, 16 chsh command, 3 clear command, 436, 957 cmp command, 957 COLUMNS variable: bash, 773 Korn shell, 469 Comma, in sed, 76-77 command command, bash, 623 Command grouping, C shell, 338-39 Command line: Bash shell: components of, 621-28 editing, 641-44 and eval command, 810-12 exit status, 625-26 and getopts command, 804-10 order of processing, 622-24 parsing, 810-12 shortcuts, 631-58 substitution, 686-89 Bourne shell, 220-23 commands in the background, 222 - 23conditional execution of commands, 222 exit status, 221, 264-65 grouping commands, 222 multiple commands at, 221 parsing, 320-21 C shell, 337-45 command grouping, 338-39 commands in the background, 339-40 conditional execution of commands, 339 exit status, 337-38

Korn shell 441-53 commands in the background, 444 command line editing, 447-49 conditional execution of commands, 443-44 exit status, 442-43 multiple commands and command grouping, 443 order of processing commands, 441-42 TC shell, 842-75 arguments/switches, 947-48 components of, 842 editing, 855-62 exit status, 842-43 shortcuts, 846-75 Command line arguments: Bash shell, 709, 734-39 Bourne shell, 259-64 C shell, 394-95 Korn shell, 513-16 Command line history: Bash shell, 641, 710 C shell, 340-45 displaying, 341-42 reexecuting commands, 343-45 saving, 341 setting, 340-41 Korn shell, 444-51 Command substitution: Bash shell, 686-89 Bourne shell, 243 C shell, 375-78 and wordlists, 376-78 Korn shell, 487-89 TC shell, 918-21 Commands. See also specific commands. Bash shell, 714-16, 815-21 emacs editor, 643-44, 857 nesting in bash, 686, 751, 782-84 TC shell, 928-48 vi editor, 642-43, 856 Comments, script: purpose of, 724 use of pound sign (#) in, 723 Comparison expressions, awk, 125-30 complete command, tcsh, 866-71 complete variable, tcsh, 865-66 Completion, tcsh: mechanism, 862-71 word types, 868-69 Compound patterns, awk, 128-29 compress command, 957-58 Computation. See Arithmetic. Computation within patterns, awk, 127-28 Conditional commands: awk, 126-27, 165-67 Bash shell, 626-27, 739-63 Bourne shell, 264-77 checking for null values, 270-71 exit command and the ? variable, 268-70 file testing, 274-75 if command, 266-68 if/elif/else command, 273-74 if/else command, 271-73

null command, 275-77 test command, 265-66 testing exit status, 264-65 C shell, 339, 395-412 Korn shell, 443-44 TC shell, 844-45 Conditional operator, awk, 138-39 Conditionals, evaluating commands within, 404 - 05Conditional statements, awk, 165-67 iflelse else if statements, 166-67 if/else statements, 165-66 if statements, 165 continue command: awk. 169 Bash shell, 781-82 Bourne shell, 292-93 C shell, 420-21 Korn shell, 547-48 and loops, 420-21 Coprocesses, Korn shell, 570-72 correct variable, vi editor, 874-75 cp command, 958 cpio command, 958-59 cron command, 959 crypt command, 959 csh command, options to, 391-94 .cshdirs file, 831 cshrc file 831 C shell, 2, 3, 331-432 aliases, 6, 345-47 alias loop, 347 creating, 346 deleting, 346-47 listing, 345-46 arithmetic, 389-91 floating point arithmetic, 390-91 operators, 389 shortcut operations, 389 arrays, 370-73 creating from a string, 373 shift command, 371-72 built-in commands, 423-27 command line, 337-45 command grouping, 338-39 commands in the background, 339-40 conditional execution of commands, 339 exit status, 337-38 command line arguments, 394-95 positional parameters and argv, 394-95 command line history, 340-45 displaying, 341-42 reexecuting commands, 343-45 saving, 341 setting, 340-41 command substitution, 375-78 and wordlists, 376-78 csh command, options to, 391-94 debugging scripts, 391-94 environment, 332-37 .cshrc file, 332-33 hashstat command, 335 initialization files, 332 .login file, 333-34

C shell, environment (cont.): primary prompt, 336-37 rehash command, 335 search path, 335 secondary prompt, 336-37 shell prompts, 336-37 source command, 336 filename substitution, 351-52 shell metacharacters and, 352 flow control and conditional constructs. 395-412 associativity, 396-98 comparison operators, 396 debugging expressions, 400-01 evaluating commands within conditionals, 404-05 exiting from a shell script, 403 exit status and the status variable, 402-03 file testing, 406-08 goto, 405-06 if/else if statements, 401-02 if/else statements, 399-400 if statement, 398, 401 logical operators, 396 nesting conditionals, 408-09 nesting switches, 411-12 precedence, 396-98 switch command, 409-11 testing expressions, 396 using the status variable in a script, 403-04 history of, 3 interrupt handling, 421-22 job control, 347-50 ampersand and background jobs, 348 bg command, 349-50 fg command, 349-50 jobs command, 349 suspend key sequence and background jobs, 348 loops, 412-21 break command, 417-19 continue command, 420-21 foreach loop, 412-15 nested loops, 419-20 repeat command, 416-17, 419-20 shift command, 417 while loop, 415-16 metacharacters, 337, 350-56, 378 asterisk, 352 curly braces, 354 escaping, 354-55 expanding, 352-56 filec variable, 355-56 filename substitution, 351-52 question mark, 352-53 square brackets, 353-54 tilde expansion, 355 turning off with noglob, 356 pipes, 356-65 programming with, 385-427 quoting, 378-84 backslash, 379 double quotes, 380-81 quoting game, 381

with the :q modifier, 382-84 single quotes, 379-80 steps to successful quoting, 381-82 variables, 382 with the :x modifier, 384 reading user input, 387-88 creating a wordlist from the input string, 388 \$< variable, 387-88 redirection, 356-65 appending output to an existing file, 360 here document, 358-60 noclobber variable, 363-65 redirecting input, 357-58 redirecting output, 360 redirecting output and error, 361-62 redirection metacharacters, 357 separating output and errors, 362-63 setuid scripts, 422 shell script creation, 385-87 comments, 385 example scripting session, 386-87 first line, 385 making the script executable, 385-86 special variables, 373-75 pathname variable modifiers, 374-75 starting, 331-32 storing scripts, 423 variables, 365-73 arrays, 370-73 built-in local variables, 368 curly braces, 366 environment variables, 368-70 local variables, 366-67 set command, 367-68 shift command, 371-72 See also special variables. C shell script, 23-25 .cshrc file, 332-33 Curly braces ({ }): in bash commands, 653-54 C shell, 351, 354, 366 in tcsh commands, 887-88, 904-05 cut command, 959-60 cwdcmd alias, tcsh, 875

D

Dash, 36 Data-validation program, awk, 129-30 date command, 960 d command, sed, 72-73 Debugging: Bash shell, 802-04 Bourne shell, 312-14 C shell. 391-94 Korn shell, 573-75 TC shell, 948 declare command, bash: and arrays, 691-92 contrasted with typeset command, 659-60 and environment variables, 663-65 and functions, 697, 788 and integer arithmetic, 729-33

options, 660 and read-only variables, 662 DEC PDP-10, 829 Decrement operators, awk, 143, 151-52 Defining functions, Korn shell, 490-91 diff command, 960 Directory stack: and bash, 647-49 manipulating, 647-49, 871-73 and tcsh, 871-73 variables, 872 dirs command, bash, 647 disown command, bash, 630 Division. See Arithmetic. Dollar sign (\$), 34 awk, 109 Bash shell, 601, 615-16 Bourne shell, 223 C shell, 350 egrep, 58 Korn shell, 457 as metacharacter, 899 prompt, 615-16 and quotes, 240 sed, 69 in tcsh array names, 910 in tcsh variables, 899, 912 Dot (.), 34 awk, 109 sed, 69 dot command: Bash shell, 621, 789, 793-96 Bourne shell, 220 and functions, 305-07 Korn shell, 440-41 Double quotes: Bash shell, 685-86 Bourne shell, 242 C shell, 380-81 Korn shell, 475 TC shell, 924-25 du command, 961 dup system call, 21

Ε

echo command, 233-34, 961 bash, 669-70 tcsh, 900-02 Echoing, 391-94, 400-01 echo_style variable, tcsh, 900, 901-02 e command, sed, 77-78 Editing commands, and Korn shell, 450-51 editor, 4 Editors: bash built-in. 641 emacs. and bash, 641, 643-44 commands, 643-44, 857 and spelling correction, 874-75 and tcsh, 855, 857 tcsh built-in, 855-62 vi: and bash, 641, 642-43 commands, 642-43, 856 and spelling correction, 874-75 and tcsh, 855-56

EDITOR variable: Bash shell, 644 Korn shell, 436, 469 Effective group identification (EGID), 12 Effective user identification (EUID), 12 egrep, 31, 38, 58-62, 961-62 examples, 59-61 regular expression metacharacters, 58 - 59asterisk, 59 caret, 58 caret with square brackets, 59 dollar sign, 58 square brackets, 59 review of. 61-62 elif command, bash, 753-55, 760 else command, bash, 753-55, 760 emacs built-in editor: Bash shell, 641, 643-44 commands, 643-44, 857 Korn shell, 447, 449-50 and spelling correction, 874-75 TC shell, 855, 857 emacs option, set command, 438 Empty fields, 194-95 enable command, bash, 623, 624 enchance setting, tcsh complete variable, 865-66 END patterns, 146, 158-60 env command, tcsh, 909 ENV file, 435, 436-37 Environment: Bourne shell, 214-20 C shell, 332-37 Korn shell, 434-38 Environment variables: Bash shell, 602, 663-81 Bourne shell, 229-33 echo command, 233-34 listing set variables, 231-32 positional parameters, 237-38 setting, 229 unsetting variables, 233 variable expansion modifiers, 234-37 C shell, 368-70 printing, 369-70 Korn shell, 468-71 setting, 468-69 special, 469-71 TC shell, 837, 907-10 ENV variable, Korn shell, 436-37, 469 -e option, set command, 323 ERRNO variable, Korn shell, 469 Error handling, for tcsh, 894-97 Error messages, sed, 68-70 esac command, bash, 760 /etc/motd file, 434 letc/passwd, 12 /etc/profile file, 12-13, 214-16, 434-35 eval command: Bash shell, 810-12 Bourne shell, 320-21 ex, 31 Exclamation point (!): C shell, 350

TC shell, in history command, 851, 854-55, 923, 924 erec command. and loons. Bourne shell, 298-300 Korn shell, 552-53 and redirection: Bash shell, 699-703 Bourne shell, 247-50 Korn shell, 495 exec system calls, 9, 15 Executable programs, 6 exit command: Bash shell, 748-50, 788 Bourne shell, 268-70 Korn shell, 529-31 exit statement, awk, 170 Exit status: Bash shell, 625-26, 739-40 Bourne shell, 221, 264-65 C shell, 337-38 and grep, 47-48 Korn shell, 442-43, 516-18 TC shell, 842-43 exit system call, 9-10 Expansion order, bash, 690 export command, bash, 663, 694-95, 788, 789 expr command, 962 Bourne shell, 257-58

F

fast grep, 62 fc command, 451, 634-37, 644-45 FCEDIT variable: Bash shell, 644-45 Korn shell, 450-51, 469 fg command, 349-50, 881-82 fgrep, 962–63 Fields, 104-06 awk, 104-06 field separators, 105-06 changing at the command line, 105 input field separator, 105 output field separator, 96, 106 using more than one, 105 and bash loops, 787-88 Field values, using as array subscripts, 174-75 Field variables, awk, 143-44 fignore variable, tcsh, 864-65 file, 963 File creation mask, 12-13 filec variable, 355-56 File descriptors, 16 Filename expansion, Korn shell, 452-53 Filename substitution: Bash shell, 650-58 Bourne shell, 224-27 asterisk, 224 escaping metacharacters, 226-27 square brackets, 225-26 C shell. 351-52 shell metacharacters and, 352 escaping metacharacters, 226-27

Korn shell, 459-65 asterisk, 459-60 escaping, 462 new ksh metacharacters, 463-64 noglob variable, 465 question mark, 460-61 regular expression wildcards, 464 square brackets, 461-62 tilde and hyphen expansion, 462-63 TC shell, 885-89 FILENAME variable, awk, 144 Files. See also specific files. and directory stack, 647-49, 871-73 shell initialization bash, 602 tcsh, 832-36 File testing, 406-08 Bash shell, 756-58 Bourne shell, 274-75 C shell, 406-08 Korn shell, 521, 522-23 test command and, 407-08 find command 963-64 finger command, 964 fi statement, bash, 745-48, 751 fix command, bash, 634-37 Fixed (fast) grep, 62 Fixed fields, awk, 194-96 Flag arguments, tcsh, 947-48 Floating point arithmetic: Bash shell, 733 Bourne shell, 258-59 C shell, 390-91 Flow control: C shell, 395-412 Korn shell, 518-32 fmt command, 964-65 FNR variable, awk, 144 fold command, 965 -f option, set command, 323 for command: Bash shell, 763-68 Bourne shell, 280-83 Korn shell, 534-36 foreach loop, 412-15 Foreground command, tcsh, 881-82 Foreground processing, bash, 627-28 fork system calls, 8-9, 15 for loop, awk, 168-69 Format specifiers, printf command: bash. 671 tcsh. 903 Form letters, generating with awk, 198-201 Fox, Brian, 599 FPATH variable, Korn shell, 470 FS variable, awk, 105, 144 ftp, 965 function keyword, bash, 693-96 Functions, 6 awk: arithmetic functions, 184-86 built-in functions, 180-84 control functions, 209 string functions, 180-84, 202-06 user-defined functions (nawk), 186-88, 210

Functions (cont.): Bash shell, 693-97, 788-96 defining, 693, 788 Bourne shell, 243-45, 301-07 and dot command, 305-07 function arguments and return value, 303-04 storing, 305-07 traps in, 311-12 unsetting, 245, 302 exporting, 789 Korn shell, 6, 489-93, 556-63 and aliases, 491-92 autoloaded functions, 561-63 defining, 490-91, 557 exported functions, 559-61 listing, 492, 558 local variables and the return value, 558-59 typeset command and function options, 558-59, 561-63 unsetting, 492-93, 558 listing, 697 passing arguments to, 790 recursive, 789 rules for using, 788-89 storing, 793-96 unsetting, 697, 789 using traps in, 801-02

G

getline function, awk, 147-49 getopts, 965 Bash shell, 804–10 Bourne shell, 314-20 contrasted with ls command, 804 Korn shell, 575-81 variables, 808-10 getty process: bash, 601 tcsh, 830 Global variables, 663, 899, 907 Globbing, 351, 650-58 defined, 650 extended, 657-58 metacharacters used for, 650-56 turning off, 656 gmacs option, set command, 438 gnu awk (gawk), 93 goto, 405-06 Greater than-ampersand (>&), C shell, 351 Greater than-exclamation point (>!), C shell, 351 Greater than sign (>): C shell, 351 and quotes, 240 grep, 1, 31, 38, 43-63, 443, 965-66 commands, review of, 57-58 egrep, 58-62 examples, 59-61 regular expression metacharacters, 58-59 review of, 61-62 examples with regular expressions, 48-53 and exit status, 47-48

fixed (fast) grep, 62 how it works, 44-47 input, 44 meaning of, 43-44 options, 47, 54-58 -c option, 56 -i option, 55, 57 LOGNAME variable, 57 -l option, 56, 58 -n option, 55, 58 -s option, 57 -v option, 55, 57 -w option, 56, 57 with pipes, 54 regular expression metacharacters, 46 See also egrep: fgrep. Group identifications (GID), 12 groups command. 966 gsub function, awk, 180-81

н

h and g commands, sed, 83-86 hash command: Bash shell, 620 Bourne shell, 219-20 hashstat command: C shell, 335 TC shell, 838 Hash table, tcsh, 837-38 help command, bash, 623, 714, 715 here document, 252-53, 279-80, 358-60, 498, 533-34 Bash shell, 706-07 and case command, 762-63 Korn shell, 498-500 and redirecting input, 252-53 TC shell, 891-93 Hexadecimal numbers, and bash, 729, 731 HISTEDIT variable, 470 HISTFILE variable, 444, 470 HISTFILESIZE variable, bash, 632, 633 history command, 445-51 bash, 632-33, 634, 638-41 tcsh. 846-55 .history file, tcsh, 846-47, 850-55 history list, tcsh, 846-48 history variable, tcsh, 847-48 HISTSIZE variable, 436, 444, 470 Holding buffer, 83 Home directory, 15 HOME variable, 5, 229, 230, 470, 663 -h option, set command, 323 HOSTNAME variable, 436 HP-UX. 829 Hyphen expansion, bash, 655-56

I

i command, sed, 80 id command, 966 if command, bash, 739, 745–51, 760 iffeliffelse statements: Bash shell, 753–55 Bourne shell, 273–74 Korn shell, 527–29 iffelse and elseif statements, awk, 166–67 iflelse statements: awk, 165-66 Bash shell, 739, 751-53 Bourne shell, 271-73 C shell, 399-400 Korn shell, 527 if statements, 398-99, 401 IFS variable, 230 Korn shell, 470 and loops, 787-88 ignoreeof option, set command, 438 Increment operators, awk, 143, 151-52 Inheritance, 11-22 chmod, 13-14 chown, 15-22 file creation mask, 12-13 ownership, 12 Initialization files: Bash shell, 602-10 Bourne shell, 214-17 C shell, 332-35 Korn shell, 434-35 TC shell, 831-36 inittab, 332, 434 Input field separators, 105, 119-22 .inputrc file, bash, 610 Integer arithmetic, bash, 729-33 Internal field separator (IFS), and loops, 300-01, 787-88 Interrupt handling, C shell, 421-22 Invocation options: Bash shell, 707-09 Bourne shell, 322 Korn shell, 587 I/O redirection, 16-18 Bash shell, 697-703, 784-86 Bourne shell, 295-97 Korn shell, 549 and loops, 784-86 TC shell, 890-99

J

Job control: Bash shell, 628-30 C shell. 347-50 ampersand and background jobs, 348 bg command, 349-50 fg command, 349-50 jobs command, 349 suspend key sequence and background jobs, 348 Korn shell, 455-56 TC shell, 878-83 jobs command, 349 bash, 628-30 tcsh, 880-81 Joy, Bill, 3 jsh command, 966

Κ

Kernel, 1 system calls, 6 Key bindings: and bash, 610 keybinding characters, 859–60 and tcsh, 858–62

Kevboard, customizing, 610 kill commands, 22 and bash, 628-30, 797 -k option, set command, 323 Korn, David, 2, 3 Korn shell, 2, 3, 433-597 aliases, 6, 453-55 creating, 454 listing, 453-54 removing, 455 tracked aliases, 455 arithmetic, 508-13 integer type, 509 let command, 511-13 listing integers, 511 and typeset command, 508 using different bases, 510-11 arrays, 554-56 creating with the set command, 556 associative arrays, 555 built-in commands, 582-86 case command, 532-34 and here document, 533-34 command line, 441-44 commands in the background, 444 conditional execution of commands, 443-44 exit status, 442-43 multiple commands and command grouping, 443 order of processing commands, 441-42 command line arguments, 513-16 command line history, 444-51 command line editing, 447-48 emacs comands, 449-50 FCEDIT and editing commands, 450-51 history command/redisplay commands, 445-46 reexecuting commands with the r commands, 446-47 vi built-in editor, 448-49 command substitution, 487-89 coprocesses, 570-72 creating a shell script, 501-04 comments, 501 executable statements and Korn shell constructs, 501 first line, 501 making a script executable, 502 naming and storing scripts, 501-02 scripting session, 503-04 using a script as an argument to ksh, 503 debugging, 573-75 environment, 434-38 ENV file, 435, 436-37 /etc/profile file, 434-35 initialization files, 434 .profile, 434, 435-36 set -o options, 437-38 exit status, testing, 516-18 filename expansion, 452-53 filename substitution, 459-65 asterisk, 459-60

escaping, 462 new ksh metacharacters, 463-64 noglob variable, 465 question mark, 460-61 regular expression wildcards, 464 square brackets, 461-62 tilde and hyphen expansion, 462-63 flow control and conditional constructs, 518 - 32exit command, 529-31 file testing, 521, 522-23 if command, 523-24 if/elif/else command, 527-29 if/else command, 527 let command and testing numbers, 526-27 logical operators, 521 new-style Korn test, 525-26 new test command, 519-21 new test flags, 522 null command, 531-32 old-style Bourne test, 525, 526 old test command, 518-19 functions, 5-6, 489-93, 556-63 and aliases, 491-92 autoloaded functions, 561-63 defining, 490-91, 557 exported functions, 559-61 listing, 492, 558 local variables and the return value. 558-59 typeset command and function options, 561-63 unsetting, 492-93, 558 getopts: processing command line options with, 575-81 sample scripts, 577-81 here document and redirecting input, 498-500 history of, 3 invocation arguments, 587 job control, 455-56 loops, 534-54 \$* and \$@ variables in wordlists, 536-37 break command, 546-47 continue command, 547-48 exec command and, 552-53 for command, 534-36 IFS (internal field separator) and, 553-54 I/O redirection and, 549 looping commands, 545 nested loops, 548-49 piping loop output to a UNIX command, 551 redirecting loop output to a file, 550-51 running loops in the background, 551-52 select command and menus, 541-45 shift command, 545-46 until command, 540-41 while command, 537-40 metacharacters, 457-59

Index

pipes, 497-98 positional parameters, 513-16 and set command, 514-16 privileged scripts, 582 programming with, 501-87 prompts, 439-40 primary prompt, 439 secondary prompt, 439 quotes, 485-87 backslash, 485-86 double quotes, 47 single quotes, 486 read command, 504-08 file descriptors, 506-07 format, 504 options, 505 reading through files, 507-08 redirection, 493-96 and the child shell, 495-96 and exec command, 495 restricted shells, 582 revisions to, 3 search path, 440-41 dot command (.), 440-41 security, 582 starting up, 433-34 time command, 500 TMOUT variable, 500-01 trap command, 563-69 ignoring signals, 565 listing traps, 565-68 pseudo/fake signals, 564-65 resetting signals, 565 traps and functions, 568-69 variables, 465-85 environment variables, 468-71 escape sequences, 475-76 listing set variables, 471-73 local variables, 465-67 positional parameters, 482-84 printing the values of variables. 474-75 typeset command, 481-82 unsetting variables, 473 variable expansion substrings, 479 - 80variable expressions and modifiers, 476-79 wildcards, 459-65 Korn shell script, 26-27 ksh program, 434 .kshrc file, 434-37

L

length function, *awk*, 181 Less than sign (<): C shell, 351 and quotes, 240 *let* command: contrasted with *declare* command, 729 contrasted with *test* command, 740 and Korn shell, 511–13 operators, 745 purpose of, 732–33 *line* command, 966 *LINENO* variable, Korn shell, 470

LINES variable: Bash shell, 773 Korn shell, 470 listjobs variable, tcsh, 880-81 local function, bash, 691, 693 Local variables: Bash shell, 660-62 Bourne shell, 227-29 listing set variables, 232-33 positional parameters, 237-38 scope of, 228-29 setting read-only variables, 229 unsetting variables, 233 variable expansion modifiers, 234-37 C shell, 366-68 echo command, 233-34 Korn shell, 465-67 scope of, 466-67 setting read-only variables, 467-68 setting/referencing, 465-66 Logical NOT operator, 135 Logical operators, awk, 134 login file, 332, 832, 836 login program, 830 Login shell: defined, 5 parsing the command line, 5-6 and system startup, 5 types of commands, 6 logname command, 966 LOGNAME variable, 5, 229, 230, 663 Loops: alias, 878 awk, 168-69 for loop, 168-69 loop control, 169 while loop, 168 Bash shell, 763-88 breaking out of, 778-84 IFS and loops, 300-01, 787-88 I/O redirection and subshells, 784-86 and menu creation, 763-68 and null command, 758 running in background, 786 Bourne shell, 280-301 \$* and \$@ variables in wordlists, 283-84 break command, 291-92 continue command, 292-93 control commands, 289-95 exec command, 298-300 for command, 280-83 IFS and loops, 300-01 I/O redirection and subshells, 295-97 looping control commands, 289-95 nested loops, 294-95 piping loop output to a UNIX command, 297-98 shift command, 289-91 until command, 287-89 while command, 284-87 C shell 412-21 break command, 417-19 continue command, 420-21

foreach loop, 412–15 nested loops, 419–20 repeat command, 416–17, 419–20 shift command, 417 while loop, 415–16 Korn shell, 534–54 I/O redirection and, 549 *lp* command, 966 *lpr* command, 967 *lpstat* command, 967 *ls* command, 967

М

Macros, 610 Magic number, 723 MAILCHECK variable, 230 Korn shell, 470 mail command, 968 MAILPATH variable, 230 Korn shell, 470 MAIL variable, 230 Korn shell, 470 mailx command, 968 Major shells, 2 make command, 968-69 markdirs option, set command, 438 match function, awk, 182-83 Menus, creating, 773-77 mesg, 969 Metacharacters: awk, 109 Bash shell, 649-50 special with quotes, 682 Bourne shell, 223 C shell, 337, 350-56, 378 asterisk, 352 curly braces, 354 escaping, 354-55 expanding, 352-56 filec variable, 355-56 filename substitution, 351-52 question mark, 352-53 square brackets, 353-54 tilde expansion, 355 turning off with noglob, 356 Korn shell, 457-59 TC shell, 884-89 Meta key, 874 mkdir command, 969 Modifiers: bash variable, 672 tcsh case, 914-18 tcsh pathname, 916-17 tcsh quoting, 926-28 monitor option, set command, 438 more command. 969 Multidimensional arrays, nawk, 176-77 Multiline records, awk, 197-98 Multiplication. See Arithmetic. mv command, 969

Ν

nawk, 176–77, 970 n command, sed, 81 Nested loops: Bash shell, 782-84 Bourne shell, 294-95 C shell, 419-20 Korn shell, 548-49 Nesting conditionals, 408-09 Nesting switches, 411–12 New awk, 93 newgrp, 970 Newline, and quotes, 240 news command, 970 next statement, awk, 170 NF variable, awk, 104, 144 nice command, 970 noclobber option, set command, 438 noclobber variable, 363-65, 893, 897-99 noexec option, set command, 438 noglob variable: Bash shell, 656 C shell, 356 Korn shell, 465 TC shell, 889 nohup, 970-71 nolog option, set command, 438 -n option: bash. 802 set command, 323 nonomatch variable, tcsh, 888 -noprofile option, 610 notify option, set command, 438 nounset option, set command, 438 NR variable, awk, 103, 144 n-type completion, tcsh, 866, 871 null command: Bash shell, 758-60 Bourne shell, 275-77 and Korn shell, 531-32 Null values, in bash variables, 750-51 Numeric and string constants, awk, 141-42 initialization and type coercion, 141-42

0

Octal numbers, and bash, 729 od command, 971 OFMT variable, awk, 98, 144 OFS variable, awk, 144 Old awk, 93 OLDPWD variable, Korn shell, 470 -o option, set command, 610–13 OPTARG variable, getopts, 808-10 OPTIND variable, getopts, 808-10 Options: bash declare command, 660 bash set command, 815-16 bash shell invocation, 812-14 bash shopt command, 711-13, 817-18 tcsh bindkey command, 862 tcsh echo command, 900-01 tcsh history command, 846-47 ORS variable, awk, 144 Output field separator, 96, 106 Ownership, 12 effective group identification (EGID), 12 effective user identification ((EUID), 12 group identifications (GID), 12 user identification (UID), 12

D pack command, 971 Parameter expansion, variable, 672-76 Parent shell, 663 Parentheses: C shell, 351 and quotes, 240 passwd command, 971 passwd file, 5, 434 paste command, 971-72 PATH variable Bash shell, 619, 663 Bourne shell, 229-31 Korn shell, 470 TC shell, 837 Pathname modifiers, tcsh, 916-17 Patterns, awk, 106-07 pcat command, 972 p command, sed, 71-72 PDP-10 computer, 829 periodic alias, tcsh, 875 Permission modes, 13-14 Permissions, testing scripts for, 756 pg command, 972 PID. 7, 628 Pipes, 19-21 awk, 149-51, 162-63 closing, 150-51, 163 Bash shell, 704-05, 786 Bourne shell, 250-51 C shell, 356-65 grep with, 54 Korn shell, 497-98 TC shell, 890-99 Pipe system call, 19 Plus sign, awk, 109 popd command: bash. 647-49 and directory stack, 647-49, 871-73 tcsh, 871-73 -p option, bash, 611 Positional parameters: and argv, 394-95 Bash shell, 678-80 purpose of, 678 set command, 735-39 Bourne shell, 259-64 set command, 260-62 C shell, 394-95 Korn shell, 482-84, 513-16 set command, 514-16 POSIX awk, 93 postamble characters, bash, 653 Post-increment operator, awk, 143 Pound sign (#), in script comments, 721 PPID variable, Korn shell, 470 pr. 972-73 preamble characters, bash, 653 precomd alias, tcsh, 875 Pre-increment operator, awk, 143 Primary prompt: Bash shell, 615-16 Bourne shell, 217 C shell, 336 Korn shell, 439 printenv command, tcsh, 909

Printer commands: bash, 670-72 tcsh, 902-04 printexitvalue variable, tcsh, 842-43 printf function: awk, 98-101, 161-62 conversion characters, 98, 100 fields 98 format specifiers, 98, 101 printf modifiers, 98, 100 width of fields, 98 bash, 670-72 tcsh, 902-04 print function: awk, 96-98 escape sequences, 97-98 privileged option, set command, 438 Privileged scripts, Korn shell, 582 Processes, 7-11 creating, 8-11 defined. 7 exec system call, 9 exit system call, 9-11 fork system call, 8 wait system call. 9 Process identification number. See PID. .profile file, 216-17, 434, 435-36, 439, 602, 608, 610 Program control statements, awk, 170 Prompts: Bash shell, 615-21, 773-75 Bourne shell, 217-18 C shell, 336-37 customizing, 616-17, 838-40 Korn shell, 439-40 TC shell, 831, 838-42 PS1 variable, 230, 470, 615 PS2 variable, 230, 439, 470, 615, 617-18 PS3 variable, 470, 773-75 PS4 variable, 470 ps command, 973 p-type completion, tcsh, 866 pushd command: bash, 647-49 and directory stack, 647-49, 871-73 tcsh, 871-73 pwd command, 973 PWD variable, 230, 470 Q

q command, sed, 82 :q modifier, 382-84, 926-27 ONX, 829 Question mark (?): awk, 109 Bash shell, 651-52 Bourne shell, 223 C shell, 351, 352-53 Korn shell, 457, 460-61 metacharacter, 650, 651-52, 884, 886 prompt, 838 variable, 748 Quoting: Bash shell, 681-686 backslash, 681, 683-84 double quotes, 681, 685-86

single quotes, 681, 684-85 Bourne shell, 240-43 combining quotes, 1000 C shell, 378-84 with the :q modifier, 382-84 with the :x modifier, 384 backslash, 379 double quotes, 380-81 quoting game, 381 single quotes, 379-80 steps to successful quoting, 381-82 variables, 382 Korn shell, 485-87 steps for successful, 641-44, 925-26, 999-1002 TC shell, 921-28

R

rand function, awk, 185 Ramey, Chet, 599 Random number generator, awk, 185-86 rand function, 185 srand function, 185-86 RANDOM variable, Korn shell, 471 Range operator, awk, 138 Range patterns, awk, 129 r command. and Korn shell, 446-47 sed, 78 rcp, 973-74 read command: Bash shell, 726-29 Bourne shell, 255-57 Korn shell, 504-08 file descriptors, 506-07 format, 504 options, 505 reading through files, 507-08 reader command, tcsh, 890 Readline library: purpose of, 610 read-only command, bash, 691 Read-only variables, 906 Records, awk, 102-03 \$0 variable, 102-03 NR variable, 103 record separator, 102 Recursive functions, 789 Redirection, 16-18 awk, 146-49 getline function, 147-49 input redirection, 147-49 output redirection, 146-47 Bash shell, 697-703, 784-86 Bourne shell, 245-50 exec command and, 247-50 operators, 245 C shell, 356-65 appending output to an existing file, 360 here document, 358-60 noclobber variable, 363-65 redirecting input, 357-58 redirecting output, 360 redirecting output and error, 361-62 redirection metacharacters, 357

Redirection, C shell (cont.): separating output and errors, 362-63 Korn shell, 493-96 and the child shell, 495-96 and exec command, 495 TC shell. 890-99 Regular expression metacharacters, 31-42 asterisk, 35 caret. 33 caret inside square brackets, 37 combining, 37-42 dash. 36 dollar sign, 34 dot, 34 egrep, 58-59 grep, 46 sed, 69-70 square brackets, 35-36 Regular expressions, 29-42 awk, 108-10 definition of, 29-31 example of, 29-31 metacharacters, 31-42 rehash command: C shell, 335 TC shell, 837-38 Relational operators, awk, 125-26, 132-34 repeat command, 416-17 REPLY variable: Bash shell, 726, 773 Korn shell, 471 Restricted Korn shells, 582 return command, bash, 788, 790 RLENGTH variable, awk, 144 rlogin command, 974 rm command, 974 rmdir command, 974 -r option, jobs command, 630 rsh command, 975 RSTART variable, awk, 144 RS variable, awk, 144 ruptime command, 975 rwho command, 975

S

savehist variable, tcsh, 846, 848 sched command, tcsh, 882-83 s command, sed, 73-76 script command, 975-76 Script files, 1 Scripting, awk, 122 Scripts, 4 executing commands from, 22-27 samples of: Bourne shell, 25-26 C shell, 23-25 Korn shell, 26-27 Search path: Bourne shell, 218-19 C shell, 335 Korn shell, 440-41 TC shell, 837-38 Search path variable, 4 Secondary prompt: Bash shell, 617-18 Bourne shell, 217-18 C shell, 336-37

Korn shell, 439-40 Security, Korn shell, 582 sed, 1, 31, 38, 65-92, 976 addressing, 66 appending (a command), 79-80 comma, 76-77 commands, 66-68 defined, 65 deleting (d command), 72-73 error messages, 68-70 examples, 70-87 holding buffer, 83 holding and exchanging (h and xcommands), 87 holding and getting (h and g commands), 83-86 how it works, 65-66 inserting (i command), 80 multiple edits (e command), 77-78 next (n command), 81 options, 68 -n option, 71 printing (p command), 71-72 quit (*a* command), 82 range of selected lines, 76-77 reading from files (r command), 78 regular expression metacharacters, 69-70 sed script, 87-91 defined, 87-88 examples, 88-90 review of, 90-91 substitution flags, 67 substitution (s command), 73-76 transform (y command), 81-82 writing to files (w command), 79 select command, 541-45, 773-77 Semicolon (:): Bash shell, 626, 646 Bourne shell, 223 C shell, 351 Korn shell, 457 and quotes, 240 set command: Bash shell, 610-13 and debugging, 802 options, 610-13, 709-11, 814-16 and positional parameters, 735-39 Bourne shell, 322-23 C shell, 367-68 Korn shell, 437-38, 556 and positional parameters, 514-16 -o options, 437-38 TC shell, 906-07 setenv command, tcsh, 909 setgid program, 12 setuid program, 12 setuid scripts, C shell, 422 Shell options command. See shopt command. Shell prompts, C shell, 336-37 Shells: history of, 3-4 responsibilities of, 4-5 uses of, 4 Shell scripts, 1, 4 Bash shell, 723-25 Bourne shell, 253-55

comments 253 executable statements and Bourne shell constructs, 254 first line, 253 making the script executable, 254 scripting session, 254-55 C shell, 385-87 comments, 385 example scripting session, 386-87 first line, 385 making the script executable, 385-86 debugging, 802-04 exiting from, 403 file testing, 756-58 Korn shell, 501-04 comments, 501 executable statements and Korn shell constructs, 501 first line, 501 making a script executable, 502 naming and storing scripts, 501-02 scripting session, 503-04 using a script as an argument to ksh, 503 TC shell, initialization files, 831-36 SHELL variable, 5, 229, 230, 663 Korn shell, 471 Shell wildcards. See Wildcards. shift command: Bash shell, 778-80 Bourne shell, 289-91 Korn shell, 545-46 and loops, 417 TC shell, 912-13 shopt command, bash: contrasted with set command, 613 and globbing, 656 options, 613-15, 817-18 Signals, 22 defined, 308, 797 ignoring, 798 numbers associated with standard, 798 resetting, 800 trapping, 797-802 Single quotes: Bash shell, 684-85 Bourne shell, 241-42 C shell, 379-80 Korn shell, 486 size command, 976 sleep command, 976-77 Solaris, 829 -s option, jobs command, 630 sort command, 977-78 Source code, tcsh, 829 source command: Bash shell, 789, 793-96 Bourne shell, 621 C shell, 336 TC shell, 838 Space/tab, and quotes, 240 Special variables: Bourne shell, 240 C shell, 373-75 pathname variable modifiers, 374-75 spell command, 978

Spelling correction: emacs editor, 874 tcsh, 838, 874-75 and vi editor, 874 split command, 978 split function, awk, 175-76, 183 sprintf function, 96, 183-84 Square brackets ([]), 36 Bash shell, 652-53 C shell, 351, 353-54 egrep, 59 and filename substitution, 225-26 Korn shell, 461-62 and quotes, 240 sed. 69 TC shell, 884, 886-87 srand function, awk, 185-86 Stack, directory: and bash, 647-49 manipulating, 647-49, 871-73 and tcsh, 871-73 variables, 872 Startup: Bash shell, 600–02, 812 Bourne shell, 213-14 C shell, 331-32 Korn shell, 433-34 TC shell, 830-31 Status variable, 403-04, 842 stderr, 5, 16, 332, 356, 434, 493, 697, 830, 894 stdin, 5, 16, 332, 356, 434, 493, 697, 830 stdout, 5, 16, 332, 356, 434, 493, 697, 830, 894-97 Storing scripts, and C shell, 423 Streams, 493 Streamlined editor. See sed. String functions, awk, 180-84, 202-06 gsub function, 180-81 index function, 181 length function, 181 match function, 182-83 split function, 183 sprintf function, 183-84 sub function, 180-81 substr function, 182 Strings, using as array subscripts, 173-74 strings command, 978-79 stty command, 979 sub function, awk, 180-81 Subscripts for associative arrays, 171-77 SUBSEP variable, awk, 144, 176 Subshells, 11 Substitution: command. bash, 686-89 tcsh, 918-21 filename: bash, 650-58 tcsh. 885-89 Substitution characters, history command, 638 substr function, awk, 182 Subtraction. See Arithmetic. su command, 979 sum command, 979 Suspend key sequence, tcsh, 880

switch command, 409–11 Switches, tcsh command line, 947–48 switch statements, nesting, 411–12 sync command, 979 System calls, 7 system function, awk, 150–51 System startup, and login shell, 5–6

Т

tabs command, 979 tail command, 979-80 talk command, 980 tar command, 980 TC shell (tcsh), 829-951 arrays, 910-14 binding keys, 858-62 built-in commands, 928-48 case modifiers, 917-18 command line, 842-78 conditional executing, 844-45 exit status, 842 grouping, 843-44 running in the background, 845 shortcuts, 846-78 aliases, 875-78 completions, 862-71 and directory stack, 871-75 editors, 855-62 history list/file, 846-55 switches, 947-48 command substitution, 918-21 completion mechanism, 862-71 contrasted with other shells, 989-98 derivation of name, 829 error handling, 894-96 filename substitution, 885-89 history of, 829 initialization files, 832-36 input, 891-93 job control, 878-83 lab exercises, 948-51 metacharacters, 884-89 operators, redirection, 890 options: bindkey command, 855, 858-62 echo command, 900-02 output, 893-99 pathname modifiers, 916-17 pipes, 890-99 prompts, 831, 838-42 quoting, 921-28 redirection, 890-99 search path, 837-38 source code, 829 spelling correction, 838, 874-75 starting, 830-31 tutorial, 829 variables, 899-910, 914-18 built-in, 940-48 environment, 837, 899, 907-10 local, 899, 905-07 pathname, 916-17 printing values of, 900-05 quoting, 926-28 read-only, 906 special, 914-18 versions, 829-30

tcsh. See TC shell. .tcshrc file, 831, 832, 834 tee command, 981 telnet command, 981 TENEX, 829 test command. 981 Bash shell, 740-45 Bourne shell, 265-66 contrasted with let command, 740 C shell, 396, 406-08 Korn shell, 518-21 new. 519-21 old, 518-19 and null values, 750-51 operators, 744 purpose of, 740 testing exit status with, 740-45 Testing exit status: Bash shell, 740-42 Bourne shell, 264-65 C shell, 337-38, 402-03 Korn shell, 516-18 Tilde (~): awk, 110 for bash filename expansion, 655-56 time command, 981 Korn shell, 500 timex command, 981-82 TMOUT variable, Korn shell, 471, 500-01 Tokens, 3, 5 TOP-10s, 829 -t option, set command, 323 touch command, 982 tput command, 982 trackall option, set command, 438 Tracked aliases, and Korn shell, 455 trap command, 437 Bash shell, 797-802 Bourne shell, 308-14 Korn shell 563-69 tr command, 983 true command, 983 tsort command, 984 ttv command, 984 typeset command: Bash shell, 659 Korn shell, 481-82, 561-63

U

umask command, 12, 984 unalias command: bash. 647 tcsh, 877 uname command, 984-85 uncompress command, 957, 985 uniq command, 985 units command 985-86 UNIX shells, 1-28 and command execution, 6 definition of, 1 environment/inheritance, 11-22 chmod, 13-14 chown, 13 file creation mask, 12 ownership, 12 function of, 1 history of, 3-4

Index

UNIX shells (cont.): login shell, and system startup, 5-6 major shells, 2 and processes, 7-11 creating, 8-11 defined, 7 exec system call, 9 exit system call, 9-11 fork system call, 8 wait system call, 9 responsibilities of, 4-5 scripts, 1-4 Bourne shell script, 25-26 comparison of, 23 C shell script, 23-25 defined, 22-23 executing commands from, 22-27 Korn shell script, 26-27 and signals, 22 uses of, 4 UNIX toolbox, 29-42 regular expressions, 29-37 definition, 29-31 example, 29-31 metacharacters, 31-37 UNIX utilities, 599 unpack command, 986 unset command, bash, 669, 691, 696 until command: Bash shell, 771-73 Bourne shell, 287-89 Korn shell, 540-41 -u option, set command, 323 User-defined variables, awk, 142-45 User identification (UID), 12 USER variable, 5 uucp command, 986 uuencode command, 986

۷

Variable expansion of substrings, *bash*, 676–78 Variable modifiers, *bash*, 672 Variables: *awk*, 141–46 numeric constants, 141–42 string constrants, 141–42 user-defined variables, 142–45 Bash shell, 659–716 environment variables, 602, 663–68 local variables, 660–62

special, 678-81 Bourne shell, 227-39 environment variables, 229-31 local variables, 227-29 C shell, 365-73 arrays, 370-73 built-in local variables, 368 curly braces, 366 environment variables, 368-70 local variables, 366-67 set command, 367-68 shift command, 371-72 special variables, 373-75 global, 663, 899, 907 Korn shell, 465-85 environment variables, 468-71 escape sequences, 475-76 listing set variables, 471-73 local variables, 465-67 positional parameters, 482-84 printing the values of variables, 474-75 typeset command, 481-82 unsetting variables, 473 variable expansion substrings, 479-80 variable expressions and modifiers, 476-79 positional parameters, 237-38 read-only, 906 special variables, 239 TC shell, 899-910 directory stack, 872 environment varibles, 837, 907-10 local variables, 905-07 using as array indexes, 171-72 variable expansion modifiers, 234-37 verbose option, 438, 802 -version option, bash, 600 vi command, 31 Bash shell, 641, 642-43 commands, 642-43, 856 Korn shell, 448-49 and spelling correction, 874 TC shell, 855-56 vi option, set command, 438 VISUAL variable, Korn shell, 471 -v option: csh command, 391–94 set command, 323, 802

W

wait system call. 9 wc command, 987 w command, sed, 79 what command 987 whereis command, 987 which command, 987 while command: Bash shell, 768-71 Bourne shell, 284-87 C shell, 415-16 Korn shell, 537-40 while loop, awk, 168 who command, 20, 987 Wildcards: Bash shell, 649-50, 656-57 Bourne shell, 223 Korn shell, 459-65 TC shell, 884 Windows NT, 829 Wordlists, and tcsh command substitution, 919-21 Word types, tcsh completion, 868-69 Working directory, 15 write command, 987

Х

xargs command, 988 :x modifier, 384, 926, 928 -x option: bash, 802 csh command, 391–94, 400–01 set command, 323 xtrace option, set command, 438

Υ

y command, sed, 81-82

Ζ

zcat command, 988 zcat compress command, 957–58