

Index

% (percent sign), 116, 119
 ** (exponentiation operator), 110
 * (multiplication operator), 110
 + (addition operator), 110
 + (character string concatenation operator), 129–130
 + (plus sign), 33
 <= (Less than or equal to), 180
 <> (Not equal to), 180
 < (Less than), 180
 = (assignment operator), 109
 = (Equal to), 180
 >= (Greater than or equal to), 180
 > (Greater than), 180
 - (subtraction operator), 110
 / (division operator), 110
 / (separator characters), 156
 // (double slashes), 40, 46, 470–471, 517

A

A (Alphanumeric shift), 283
 (A) operation extender, 389, 449
 Abends
 defined, 377, 496
 diagnosing, 496–497
 See also Runtime errors
 %Abs (Absolute value) function, 116, 120
 Access points, 52
 Activation groups, 354
 Addition, 113
 Addur (Add Duration) operation, 516
 Algorithms, 10, 35
 Alt (Alternating format) keyword, 215
 Alternating format, 215, 235
 And operation, 182, 183
 APIs, 332–334
 defined, 332
 QCMDEXC, 333, 337
 QUSCMDLN, 332–333, 337
 Application programming interfaces. *See* APIs
 Arguments, 140, 167, 250
 defined, 320
 in parentheses, 24
 Arithmetic operations, 110–116
 date, 162–163
 half adjusting, 114
 numeric overflow, 112
 operation extender, 114
 result field sizes, 113–114
 rounding, 114–116
 rules of precedence, 110

truncation, 112
 Arithmetic operators, 110, 111
 Array data structures, 229–230
 defined, 229
 runtime arrays, 229
 subfields, 229–230
 uses, 230
 Arrays, 208–234, 240
 alternating format, 215
 calculations with, 218–219
 capabilities, 207
 compile time, 210–211, 463
 defined, 208
 elements, 208
 elements, sorting, 223–224
 elements, summing, 224
 indexing and, 218
 multidimensional, 229
 name specification, 234
 overlaid, 231
 portions, setting/getting, 224–228
 preruntime, 211–212
 printing, 234
 related, defining, 215–216
 representations, 208
 runtime, 209, 212–215
 using, 232–234
 AS/400, 3
 ASCII, 60
 Assignment
 character, 125–129
 date, 159–162
 initial value, 87–89
 operation, 109
 operator (=), 109
 Asterisk fill, 44

B

Batch processing, 485
 defined, 2, 35, 281
 programs, running, 35
 Begsr (Begin subroutine) operation, 193, 201
 Binary data type, 56, 58, 83
 Binary search, 224
 Bind-by-copy, 345, 363
 Bind-by-reference, 347, 364
 Binder language
 commands, 365
 defined, 365
 updating, 368
 using, 365–366, 467
 Binding
 directories, 361, 364, 466–467
 modules, 12
 programs, 12, 346

service programs, 364
 single entry point program, 364
 static, 345
 Bits
 defined, 1
 high-order, 57
 low-order, 57
 Blank lines, 41
 BLINK keyword, 296
 Boolean data type, 84
 Breakpoints, 502
 conditional, 502
 setting, 506
 Built-in functions (BIFs). *See* Functions

C

CA (Command Attention) keyword, 284, 289–290
 Calculation specifications, 34–38, 46, 444–454
 built-in functions, 444–448
 defined, 19, 34
 edit codes, 449
 fixed-format, 39, 453
 free-format, 36, 444
 logic, 34
 operation code extenders, 449
 operation codes, 444–448, 453–454
 status codes, 450–452
 subroutines, 193
 Calculations
 with arrays, 218–219
 fixed-format, 507–517
 output errors, 500
 CALL command, 42
 Call interface
 defining, 321
 information, 320
 prototype definition, 321
 prototyping, 320–322
 Callp (Call a Prototyped Procedure or Program) operation, 319, 337
 coding, 322
 format, 322
 Calls, 319–320, 322
 advantages, 332
 dynamic, 345, 347
 flow control, 320
 procedures, 351
 subprocedure, 351
 Case logic, 183
 Case sensitivity, 23
 CF (Command Function) keyword, 284, 289–290
 Chain (Random Retrieval from a File) operation, 254–255, 273
 defined, 254
 format, 254
 use example, 254–255

- %Char (Convert to character data) function, 139, 146, 170–171
 defined, 170
 format, 170
 use examples, 170–171
 Character expressions, 131
 Character fields, 27
 Character literals, 86
 Character strings
 built-in functions, 131–142
 concatenation operator, 129–130
 declaring with named constant, 469
 processing, 469–470
 scanning, 136–137, 146
 variable-length fields and, 470
 Character values
 concatenation, 129–131
 converting to, 139
 relational comparisons, 180
 replacing, 134
 variable-length, 131
 Character variables
 checking, 385–386
 fixed-length, 142, 146
 variable-length, 142
 Characters
 assignment, 125–129
 content examination, 136–138
 conversion, 135–136
 inspection, 137–138
 searching, 136–137
 separator, 156
%Check (Check characters) function, 137–138, 146, 384
 defined, 137
 format, 137, 146
 use examples, 138
 CHECK keyword, 294
 Check protection, 44
%Checkr (Check reverse) function, 138, 146
 CHGPF (Change Physical File) command, 65
 Close (Close Files) operation, 265, 266, 273
 CODE Designer, 66, 281, 486–488
 defined, 486
 display file design, 487
 functions, 486
 opening source members with, 486
 printer file design, 487
 Code reusability, 2
 Collating sequences, 60
 Collections, 54
 Combined files, 286
 Commands
 defined, 5
 See also specific commands
 Comments, 470–472
 for clarification, 471
 for code organization, 472
 defined, 40
 double slashes (//), 40, 470–471, 517
 fixed-format, 40
 “marker line,” 472
 right-hand, 472
 Common User Access (CUA), 305, 306
 COMP keyword, 63
 defined, 293
 format, 293
 relational operators, 293
 Compile job results, 483–484
 Compile time arrays, 210–211
 avoiding, 463
 defined, 210
 definition of, 210
 element coding, 210
 uses, 211
 See also Arrays
 Compile units. *See Source members*
 Compilers, 14
 cross reference listing, 495
 defined, 1
 directives, 357, 459
 RPG IV, 4
 Compiling
 defined, 12, 495
 programs, 12, 346
 source members, 483–484
 Composite keys, 56
 defined, 255
 operation codes, 255
 partial, 256–257
 use example, 256
 using, 255–258
 Compound arithmetic/assignment operators, 111
 Concatenation
 character values, 129–131
 defined, 129
 expressions, 129
 keys. *See Composite keys*
 Conditional breakpoints, 502
 Conditioning indicators, 295–297, 511–512
 Const keyword, 330
 Constants
 defined, 32
 defining, 89–90
 end position, 33
 figurative, 87
 named, 89–90, 103
 Continuation
 characters, 131
 lines, 34
 Control break logic, 194–200
 multiple-level, 199–200
 overview, 194–195
 problem, 195
 pseudocode, 196
 See also Top down design
 Control specifications. *See Header (Control) specifications*
 /Copy directives, 357–358, 468
 CRTBNDDIR (Create Binding Directory) command, 361
 CRTBNDRPG (Create Bound RPG Program) command, 12, 42, 354, 492
 CRTDSPF (Create Display File) command, 281
 CRTDTAARA (Create Data Area) command, 334
 CRTLTF (Create Logical File) command, 65
 CRTPF (Create Physical File) command, 65, 70
 CRTPGM (Create Program) command, 12, 345, 492
 in binding single entry point program, 364
 binding value directory, 361
 CRTPRTF (Create Printer File) command, 66, 70
 CTRPGMOD (Create RPG Module) command, 12, 345, 358, 362
 CRTSRVPGM (Create Service Program) command, 363
 **Ctdata record, 210
 Ctdata (Compile time data) keyword, 210
 Currency
 output editing, 44–45
 symbols, 9
 CVTRPGSRC (Convert RPG Source) command, 520, 521

D

- Data
 attributes, 27–28
 character, 125–153
 conversion functions, 117–119, 166–171
 date-related, 155–157
 defining, 461–464
 formats, 73
 initial value assignment, 87–89
 item name indentation, 462
 moving, 512–515
 naming conventions, 461–462
 numeric, 56–59
 properties, determining, 143–145
 redundancy, 51
 RPG III, 519–520
 shared, 467–468
 validation, 292, 298
 Data areas, 334–336
 creating, 334
 data structures, 334–336
 defined, 5, 334
 local (LDA), 334, 337
 retrieving, 335
 unlocking, 335
 writing, 335

- Data Definition Language (DDL), 54
 Data Description Specifications (DDS), 54–55
 automatic generation, 281
 date definition, 156–157
 defined, 54
 display files, 281
 editing in, 68–69
 keywords, 54
 line position in, 68–69
 in printer file definition, 66
 Data dictionary, 71
 Data errors
 date and time, 385–386
 decimal, 383
 finding, 382–386
 numeric conversion, 383–384
 Data File Utility (DFU), 65
 Data Manipulation Language (DML), 54
 Data structures, 91–97, 104
 array, 229–230
 data area, 334–336
 defined, 91
 defining, 91–97
 externally described, 95–96
 file information, 388
 indicator, 288–289
 initializing, 93
 LIKE keyword, 98, 99
 Likeds keyword, 98, 99, 229, 230
 LIKEREC keyword, 98, 99–100
 multiple occurrence, avoiding, 463
 overlapping subfields, 93–95
 program status (PSDS), 390
 qualified, 97, 463–464
 result, 250
 runtime arrays and, 212–215
 subfields, 91–92, 462–463
 Data types, 28
 binary, 56, 58, 83
 Boolean, 84
 date, 84
 duration, 162
 floating point, 56, 58, 83
 incompatible, 181
 indicator, 84–85
 numeric, 82–84
 packed decimal, 56, 57, 82
 parameter, 324
 time, 84
 timestamp, 84
 zoned decimal, 56, 57, 82
 %Date (Convert to date) function, 166–168
 arguments, 167
 defined, 166
 external formats, 167–168
 format, 166
 result format, 167
 Date fields
 native, 59, 72
 numeric fields versus, 28
 storage, 59
 Date formats, 157–159
 Control (H) specification, 434
 *DMY format, 158
 fixed-format processing, 516–517
 *ISO format, 59, 157, 158, 167
 list, 158
 *MDY format, 158
 DATE keyword, 68, 294
 Date(s), 32
 arithmetic, 162–163
 assignment, 159–162
 built-in functions, 164–171
 conversion functions, 139–141
 data type, 84
 defining in Input specifications, 155–156
 defining with DDS, 156–157
 defining with Definition specifications, 157
 errors, 385–386
 extracting, 165–166
 job, 88
 runtime errors and, 162
 storage, 59
 working with, 155–177
 DATFMT keyword, 68, 156–157
 %Days function, 162
 DBCS (Double Byte Character Set), 85
 Debugging, 501–506
 breakpoints, 502
 commands, 503–504
 defined, 11
 service entry point, 504, 505
 stepping, 502
 with STRDBG, 502–504
 views, specifying, 501–502
 with WDSC, 504–506
 %Dec (Convert to packed decimal format)
 function, 117, 118, 120
 defined, 171
 format, 171
 use examples, 171
 %Dech (Convert to packed decimal format with half adjust)
 function, 117, 118, 120
 Decimal data errors, 383
 %Decpos (Number of decimal positions) function, 145, 146
 Definition specifications, 79–108, 437–438
 columns, 437–438
 constants, 89–90
 data items defined by, 79
 data structures, 91–97
 date definition, 157
 defined, 19, 79
 initial values, 87–89
 keywords, 438–440
 organizing, 104
 preruntime arrays, 211
 standalone variables, 80–87
 using in programs, 100–103
 Delete (Delete Record) operation, 261–262, 273
 defined, 261
 format, 261
 use examples, 261–262
 Desk checking, 498
 Detail lines, 29, 33
 %Diff (Difference) function, 164–165, 172
 defined, 164
 durations, 164
 Dim keyword, 216, 230
 Display attributes, 292
 Display files, 281–289, 306
 coding, 281
 defined, 281
 definitions, 281
 designing with CODE Designer, 487
 features, 286
 indicator data structure, 288–289
 record format, 282
 screen I/O, 287–288
 See also Interactive applications
 %Div (Divide) function, 117, 120
 Division, 114
 *DMY date format, 158
 Documentation
 comments, 40
 external, 11
 internal, 11, 39–41
 parameter usage, 321
 program overview, 40
 Dou (Do Until) operation, 188–189, 201
 defined, 188
 flow chart, 189
 Dow (Do While) operation, 188, 201
 defined, 188
 flowchart, 189
 DSPATR (Display Attribute) keyword, 292
 DSPLIBL (Display Library List) command, 479
 DSPPGM (Display Program) command, 362
 DSPSRVPGM (Display Service Program) command, 365
 Dump (Program Dump) operation, 389
 Dump, program, 389
 Durations
 adding, 516
 defined, 162
 list of, 164
 subtracting, 516
 use examples, 164–165
 Dynamic program calls, 345

E

(E) operation code extender, 377–382, 391, 449
EBCDIC (Extended Binary Coded Decimal Interchange Code), 57, 60, 180
Edit codes, 33–34, 43–45, 449
 defined, 33
 editing with, 139–141
 effects, duplicating, 45
 list, 43–44
 X, 44
 Y, 33, 44
 Z, 33, 44
 zero suppression, 43
Edit words, 45
 coding, 45
 defined, 45
 editing with, 141
%Edit (Edit with an edit code) function, 139–141, 146
 arguments, 140
 defined, 139
 format, 139–140
 result value, 140
 use examples, 140–141
Editing
 in DDS, 68–69
 with edit codes, 139–141
 with edit words, 141
 output, 42–45
 source members, 480–482
Editors, 14
 defined, 11
 LPEX, 11, 476, 478, 481–482
%Editw (Edit with an edit word) function, 141, 146
EDTCDE (Edit Code) keyword, 68, 69
 defined, 291
 format, 291
EDTWRD (Edit Word) keyword, 68
 defined, 291
 format, 291
%Elem (Number of elements) function, 217, 241
Else operation, 184–185, 201
Elseif operation, 185–186, 201
Embedded SQL, 268–269
 directives, 459
 uses, 268
ENDDBG (End Debug) command, 502
Enddo (End Do Group) operation, 37, 193, 201
 defined, 37
 syntax, 201
Endif (End If Group) operation, 38, 201
Endmon (End a Monitor Group) operation, 380, 391
End-of-file, 35
ENDPGMEXP (End Program Export List) command, 365, 366

Endsr (End subroutine), 193, 201
Entry modules, 346
%Eof function, 253, 273, 412
EQ (equal to) operator, 63
%Equal function, 251, 253, 273
ERRMSG (Error Message) keyword, 294, 296
%Error (Return Error Condition) function, 378–379, 391
Errors
 data, 382–386
 date, 385–386
 decimal, 383
 handling, 377–395
 logic, 11, 496–500
 numeric conversion, 383–384
 numeric overflow, 112
 operation code, 377–382
 output, 498–500
 runtime, 496–498
 syntax, 11, 495–496
 time, 385–386
Eval (Evaluate Expression) operation, 109, 119, 120, 146
 in character assignment, 125
 in date assignment, 172
 defined, 38
 precision, improving, 115–116
 using, 110–116
Eval-corr (Assign corresponding subfields) operation, 127–128, 146
 assignment expression, 127
 defined, 127
 equivalent expressions, 128
 processes, 128
Evalr (Evaluate Expression, right adjust) operation, 126–127, 146
Except (Calculation Time Output) operation, 259, 273
 defined, 37
 use example, 259
 in writing new records, 259
Exception lines, 30
Exception names, 30
Exclusive locks, 335
Exfmt operation, 287, 306
EXPORT (Export a Program Symbol) command, 365, 366
Export keyword, 360, 468
Exsr (Execute Subroutine) operation, 193–194, 201
Extended Factor 2, 509
External documentation, 11
Externally described data structures, 95–96
Externally described files, 51–77
 benefits, 51
 defined, 51
 field description entry, 441, 455
 Input specification, 441
 Output specification, 455

overflow indicators, 69
 printer, 66–70, 73
 programming with, 65–66
 record identifier entry, 441, 455
EXTNAME keyword, 96
Extpgm keyword, 321
Extract (Extract from Date/Time/Timestamp) operation, 516, 517

F

Factors, 36
Field description entries
 defined, 25
 form, 26
 Input specification, 26–28, 441, 443
 Output specification, 31–34, 455, 457
Field reference files, 71–72
 creating, 71
 defined, 71
 uniformity/consistency, 72
Field-level entries, 32
Field-level keywords, 291–297
 CHECK, 294
 COMP, 293
 DATE, 294
 defined, 54, 291
 DSPATR, 292
 EDTCDE, 291
 EDTWRD, 291
 ERRMSG, 294, 296
 RANGE, 293
 TIME, 294
 VALUES, 293
 See also Keywords
%Fields (Fields to update) function, 263–264, 273
 defined, 263
 specification, 263
Fields
 character, 27, 56
 data dictionary, 71
 date, 28, 59
 defined, 5
 end position, 33
 key, 52
 location, 26
 name of, 27, 32
 numeric, 6, 27, 56–59
 omit, 64
 select, 64
 subfile, 412
 variable-length, 470
 work, 509–510
Figurative constants, 87
 assigning character values with, 129
 assigning date values with, 161–162

- assigning values with, 110
defined, 87
File access, 249
File information data structure, 388
File maintenance
 defined, 297
 interactive, 297–304
File specifications, 22–24, 46
 coding, 22
 columns, 435–436
 defined, 19, 22
 Device, 24
 File Designation, 23
 File Format, 23–24
 File Name, 23
 File Type, 23
 keywords, 24, 436–437
 layout, 23
 Record Length, 24
File-level keywords, 289–290
 CA, 289–290
 CF, 289–290
 defined, 54, 289
 INDARA, 285
 MSGLOC, 290
 PRINT, 290, 296
 UNIQUE, 55
 VLDCMDKEY, 290
 See also Keywords
Files
 closing, 265–266
 combined, 286
 database, creating, 64–65
 defined, 5, 6
 designation, 23
 externally described, 51–77
 field reference, 71–72
 format, 23–24
 full procedural, 23
 input, 23, 249–258
 locking, 264, 264–265
 logical, 5, 52–54, 61–64
 master, 6
 names, 23, 25, 30
 opening, 265
 output, 23, 258–260
 physical, 5, 11, 52–54, 55–60, 72
 printer, 66–70
 program-described, 51, 442–443
 transaction, 6
 type of, 23
 update, 260–264, 267
 See also Records
Fixed currency symbol, 9, 44
Fixed logic cycle, 4
Fixed-format
 Calculation specification, 39, 453, 507–517
 calculations, 507–517
 comments, 40
 date processing, 516–517
 defined, 20
 Fixed-length character variables, 142, 146
 %Float (Convert to floating point format) function, 118, 120
 Floating dollar sign, 9, 44
 Floating point data type, 56, 83
 Flowcharts, 10
 For operation, 189–191, 201
 defined, 190
 format, 190
 as leading decision loop, 191
 specifications, 190
 use examples, 190–191
 %Found function, 251, 254–255, 273
 Free-format, 4, 20
 Calculation specification, 36, 444
 mixed-case source, 465–466
 syntax, 464–466
 F-specs. *See* File specifications
Full procedural files, 23, 251
Functions, 116–120
 %Abs, 116, 120
 Calculation specification, 444–448
 %Char, 139, 146, 170–171, 172
 %Check, 137–138, 146, 384
 %Checkr, 138, 146
 data conversion, 117–119
 %Date, 166–168, 172
 %Days, 162, 172
 %Dec, 117, 118, 120, 171, 172
 %Dech, 117, 118, 120
 %Decpos, 145, 146
 defined, 37
 %Dif, 164–165, 172
 %Div, 117, 120
 %Editc, 139–141, 146
 %Editw, 141, 146
 %Elem, 217, 241
 %Eof, 253, 273, 412
 %Equal, 251, 253, 273
 %Error, 378–379, 391
 %Fields, 263–264, 273
 %Float, 118, 120
 %Found, 251, 254–255, 273
 %Hours, 162, 172
 %Int, 117, 120
 %Inth, 117, 120
 %Kds, 257–258, 273
 %Len, 143–144, 146
 %Lookup, 219–223, 240, 241
 %Minutes, 162, 172
 %Months, 162, 172
 %Mseconds, 162, 172
 %Open, 266, 273
 passing values to, 120
 %Rem, 117, 120
 %Replace, 134, 146
 %Scan, 136–137, 146
 %Seconds, 162, 172
 %Size, 143, 146, 217, 241
 %Sqrt, 117, 120
 %Status, 379–380, 391
 %Subarr, 224–228, 241
 %Subdt, 165–166
 %Subst, 133–134, 146
 %Time, 168–169, 172
 %Timestamp, 169–170, 172
 %Tlookup, 236–238
 %Trim, 131–132, 146
 %Uns, 118, 120
 %Unsh, 118, 120
 %Xfoot, 224, 241
 %Xlate, 135–136, 146
 %Years, 162, 172

G

- GE (greater than or equal to) operator, 63
Global scope, 352–353
Global variables, 347, 351
Graphical user interfaces (GUIs), 332
Groups
 activation, 354
 code indentation, 464–465
 monitor, 380–381
 nested, 184–186
GT (greater than) operator, 63

H

- Half adjusting, 114
Header (Control) specifications, 22, 432–434
 columns, 432
 date formats, 434
 defined, 19
 keywords, 22, 432–433
 layout, 22
 time formats, 434
Hexadecimal notation, 58
Hierarchical decomposition, 192
High-level languages (HLLs), 1
High-order bits, 57
*Hival, 110, 161
*HMS time format, 158
%Hours function, 162

I

- iOS, 4
 built-in record locking, 272
 database file approach, 51

defined, 3
 object architecture, 14
 SQL and, 54
I/O
 file functions, qualifying, 469
 operations, 260–264, 272
 screen, 287–288
If operation, 181–186, 201
 with And operator, 182, 183
 defined, 37–38, 181
 with Elseif operation, 185–186
 format, 181
 logic, 500
 nested, 184–186
 with Or operator, 182, 183
ILE RPG Language Reference, 388
Import keyword, 360, 468
In (Retrieve a Data Area) operation, 335, 337
INDARA keyword, 285
Indds keyword, 288, 289
Indentation, 38, 464–465
Indexes
 array, 218
 defined, 218
Indicator data structure
 defined, 288
 using, 288–289
Indicator data type, 84–85
Indicators, 468–469
 conditioning, 295–297, 511–512
 defined, 2
 interactive file maintenance and, 302
Last Record, 38
 numbered, eliminating, 468
 overflow, 24, 69, 198
 in relational comparisons, 181
 resulting, 510–511
Infinite loops, 497–498
INFSR subroutine, 386–388
 adding, 386
 defined, 386
 limitations, 387
 return point, 387
Initial values
 assigning, 87–89
 automatic, 88
Initialization
 data structures, 93
 standalone variables, 87
 variable-length variables, 142
Input files
 composite keys, 255–258
 defined, 23
 full procedural, 23
 operations for, 249–258
 random access operations, 254–255
 sequential access operations, 249–254

See also Files
Input specifications, 25–28, 46, 441–443
 Data Attributes, 27–28
 Data Type, 28
 date definition, 155–156
 Decimal Positions, 27
 defined, 19, 25
 field description entries, 25, 26–28, 441, 443
 Field Location, 26
 Field Name, 27
 File Name, 25
 layout, 25
 record identification entries, 25–26, 441, 442
 Sequence, 26
%Int (Convert to signed integer format) function, 117, 120
Integrated development environments (IDEs), 11
Integrated Language Environment (ILE), 332
 defined, 3, 368
 programs, 354
 programs, updating, 361–362
Interactive applications, 281–317
 DDS keywords, 289–297
 defined, 2, 281
 display files, 281–289
 file maintenance, 297–304
 print key, 290
 screen design, 305
 validation, 297, 298
 writing, 281–317
Interactive file maintenance, 297–304
 indicators and, 302
 pseudocode, 301–302
 updates, 297
Internal documentation, 39–41
 blank lines, 41
 comments, 40
 defined, 11
 program overview, 40
See also Documentation
%Inth (Convert to signed integer format with half adjust) function, 117, 120
Inz keyword, 88, 92, 214
iSeries Navigator, 65
***ISO date format**, 59, 157, 158, 167
Iter operation, 192, 201
Iteration, 179
Iterative operations, 188–191
 Dou, 188–189
 Dow, 188
 For, 189–191

J

Join logical files, 64

K
%Kds (Key data structure) function, 257–258, 273
 defined, 257
 format, 257
 subfields and, 258
 use examples, 257–258
Key fields, 52
Key sequence, 52
Keyboard shift attribute, 283
Keywords
 Alt, 215
 BLINK, 296
 CA, 284, 289–290
 CF, 284, 289–290
 CHECK, 294
 COMP, 63, 293
 Const, 330
 Control specification, 432–433
 Ctdata, 210
 DATE, 68, 294
 DATFMT, 68, 156–157
 Definition specification, 438–440
 Dim, 216, 230
 DSPATR, 292
 EDTCDE, 68, 69, 291
 EDTWRD, 68, 291
 ERRMSG, 294, 296
 Export, 360, 468
 EXTNAM, 96
 Extpgm, 321
 field-level, 54, 291–297
 File specification, 436–437
 file-level, 54, 289–290
 Import, 360, 468
 INDARA, 285
 Indds, 288, 289
 Inz, 88, 92, 214
 LIKE, 98, 99
 Likeds, 98, 99, 229, 230
 LIKEREC, 98, 99–100
 MSGLOC, 290
 Nomain, 356
 one-per-line limit, 464
 Overlay, 94, 95, 231, 402
 PAGEDOWN, 406, 409
 PAGNBR, 68
 Perrcd, 210, 216
 PFILE, 61
 PRINT, 290, 296
 Procedure (P) specification, 458
 Qualified, 97, 229
 RANGE, 63, 293
 record-level, 54, 290–291
 REF, 285
 SFL, 399
 SFLCLR, 400

SFLCTL, 400, 417
 SFLDSP, 400
 SFLDSPCTL, 400
 SFLEND, 406, 409
 SFLPAG, 400, 403
 SFLRCNBR, 406, 409
 SFLSIZ, 400, 401
 SKIPA, 69
 SKIPB, 69
 SPACEA, 69
 SPACEB, 69
 TEXT, 56
 TIME, 294
 Tofile, 212
 UNIQUE, 55
 Usropn, 265
 Value, 359
 VALUES, 62, 63, 293
 VLDCMDKEY, 290

L

Last Record Indicator, 38
 LE (less than or equal to) operator, 63
 Leading decision loops
 defined, 188
 For operation, 191
 Leave operation, 192, 201
 %Len (Get/set length) function, 143–144, 146
 defined, 143
 use examples, 143–144
 value returns, 143

Length notation
 for data structure subfields, 462–463
 defined, 8, 91
 illustrated, 8

Level checking, 66
 Libraries, 5, 14, 54
 LIKE keyword, 98, 99
 Likeds keyword, 98, 99, 229, 230
 LIKEREC keyword, 98, 99–100

List panels, 397

Literals
 character, 86
 numeric, 85–86
 typed, 86
 types, 160–161
 See also Constants

Live Parsing Extensible Editor. *See* LPEX editor

Local data area (LDA), 334, 337

Local procedures
 defined, 348
 using, 348–354

Local scope, 352

Local variables, 348, 353

Locking

exclusive, 335
 file, 264–266
 record, 264–266
 Logic errors, 496–500
 defined, 11
 output, 498–500
 runtime, 496–498
 See also Errors
 Logical files, 52–54, 61–64
 creating, 65
 defined, 5, 52
 dynamic maintenance, 5–6
 join, 64
 keyed on composite, 52
 record selection/omission, 62–64
 records, 53
 simple, 61–62
 uses, 53
 %Lookup (Look up an array element) functions, 219–223, 240
 binary search, 224
 common usage, 219
 defined, 219
 format, 219
 unequal, 222–223
 variations, 219

Loops
 code indentation, 464–465
 early exits and, 192
 For, 188–191
 indication, 35
 infinite, 497–498
 leading decision, 188, 191
 output errors, 499–500
 trailing decision, 188
 While, 35–36
 *Loval, 110, 161
 Low-order bits, 57
 LPEX editor, 11, 476, 478
 code entry prompts, 481
 defined, 478
 editing features, 482
 function access, 481
 LT (less than) operator, 63

M

Maintenance, program, 11
 “Marker line” comments, 472
 Master files, 6
 Maximum digits rule, 116
 *MDY date format, 158
 %Minutes function, 162
 Mixed-case source, 465–466
 Modular programming, 2, 192, 319–320, 466–467
 binder language, 467

binding directories, 466–467
 defined, 319
 with procedures, 466
 return values, 466
 service programs, 467
 using, 331–332
 *MODULE objects, 475, 496
 Modules
 binding, 12
 creating, 345
 entry, 346
 independence, 192
 Monitor (Begin a Monitor Group) operation, 380, 391
 Monitor groups, 380–381
 Move operation, 512, 513, 514
 Movea (Move Array) operation, 512, 514–515
 Movel (Move Left) operation, 512
 Moving data, 512–515
 %Mseconds function, 162
 MSGLOC (Message Location) keyword, 290
 Multiple entry point programs, 347
 Multiple-level control break logic, 199–200
 coding, 199
 pseudocode, 199–200
 See also Control break logic
 Multiple-module programs
 concept, 354
 creating, 358–359
 Multiplication, 113

N

(N) operation code extender, 264, 265
 Named constants, 89–90, 103
 converting to character value, 139
 declaring, 462
 defined, 89
 defining, 89
 maximum length, 90
 standalone variables versus, 89
 string declaration with, 469
 use of, 90

Names

array, 234
 exception, 30
 field, 27
 file, 23, 25
 special characters, 27
 standalone variable, 80–81
 NE (not equal to) operator, 63
 Nested If groups, 184–186
 NG (not greater than) operator, 63
 NL (not less than) operator, 63
 Nomain keyword, 356
 Nomain procedures, 354–359

Numeric conversion errors, 383–384

Numeric fields

binary, 56

checking, 385–386

date fields versus, 28

decimal places, 6

decimal position entry, 27

definition, 55

floating point, 56, 58

packed decimal, 56

storing, 56–59

subfields, 92

zoned decimal, 56

Numeric literals, 85–86

contents, 85

converting to character value, 139

defined, 85

floating point format, 85–86

Numeric overflow error, 112

O

Object code, 12

Objects

defined, 5

program module, 12

types, 5

Omit fields, 64

Omit specifications, 62

On-error (On Error) operation, 380, 391

%Open (Return open file condition) function, 266, 273

Open (Open a File) operation, 265, 273

Operand values, 36

Operation code extenders, 449

(A), 389, 449

(E), 377–382, 391, 449

(N), 264, 265, 449

(P), 512, 513

Operation codes, 444–448, 453–454

fixed format, 453–454

functions over, 473

obsolete, eliminating, 473

Operations, 36–38

Addur, 516

Begsr, 193, 201

Callp, 319, 322, 337

Chain, 254–255, 273

Close, 265, 266, 273

Delete, 261–262, 273

Dou, 188–189, 201

Dow, 37, 188, 201

Dump, 389, 391

Else, 184–185, 201

Elseif, 185–186, 201

Enddo, 37, 201

Endif, 38, 201

Endmon, 380, 391

Endsr, 193, 201

Eval, 109, 119, 120, 125–126

Eval-corr, 127–128

Evalr, 126–127

Except, 37, 259, 273

Exfmt, 287, 306

Exsr, 193–194, 201

Extrct, 516, 517

For, 189–191, 201

If, 37–38, 181–186, 201

In, 335, 337

input file, 249–258

Iter, 192, 201

iterative, 188–191

Leave, 192, 201

Monitor, 380, 391

Move, 512, 513, 514

Movea, 512, 514–515

Movel, 512

On-error, 380, 391

Open, 265

Other, 187, 201

Out, 335, 337

output file, 258–260

Read, 37, 249–250, 273, 287, 306

Readc, 412, 414, 417

Reade, 252–253, 273

Readdp, 253–254, 273

Readpe, 253–254, 273

Return, 38, 337

Select, 186–187, 201

selection, 181–187

Setgt, 252, 273

Setll, 251, 273

Sorta, 223–224, 241

Subdur, 516–517

Test, 385–386, 391

Unlock, 264–265, 273, 335, 336, 337

Update, 262–263, 273

When, 187

Write, 70, 260, 273, 287, 306, 405

Or operation, 182, 183

OS/400 operating system, 3, 4

Other operation, 187, 201

Out (Write a Data Area) operation, 335, 337

Output continuation lines, 34

Output editing, 42

currency, 44–45

defined, 9, 42

numbers, 43–44

use of, 42

Output errors, 498–500

calculations, 500

correcting, 499–500

defined, 498

detecting, 498

field problems, 499

If logic, 500

loops, 499–500

See also Errors

Output files

defined, 23

operations for, 258–260

Output specifications, 28–34, 46, 455–457

Constants, 32–33

defined, 19, 28

Edit Codes, 33–34

End Position in Output Record, 33

Exception Name, 30

externally described files, 455

Field Name, 32

File Name, 30

layout, 30

line types, 29

operations, 36–38

program described files, 456–457

Space and Skip Entries, 30–31

Type, 30

Overflow

defined, 24

error, 112

high-order, 112

Overflow indicators, 69, 198

defined, 24

externally described files, 69

See also Indicators

Overlay keyword, 94, 95, 231, 402

P

(P) operation code extender, 512, 513

Packed decimal data type, 56, 57, 82

PAGEDOWN keyword, 406, 409

PAGNBR keyword, 68

Parameters

data type, 324

defined, 320

defining, 324

passing, 324

passing by read-only reference, 329–331

passing by reference, 324, 329

passing by value, 359–360

protecting, 467

prototype maximum, 321

usage documentation, 321

variables, 324

Passing parameters, 324

by read-only reference, 329–331

by reference, 324, 329

by value, 359–360

methods, mixing, 359

- Perrcd keyword, 210, 216
 PFILE keyword, 61
 Phantom updates, 264
 Physical files, 52–54, 55–60, 72
 changing, 65
 creating, 65, 70
 data storage, 56–59
 data types, 56–59
 date storage, 59
 defined, 5
 definition, changing, 65
 deleting, 65
 information categories, 6
 numeric data storage, 56–59
 record format, 7
 source, 11
 source statements, 55
 See also Files
 Positional notation
 defined, 8, 91
 illustrated, 8
 Preruntime arrays, 211–212
 defined, 211
 Definition specification, 211
 See also Arrays
 Preruntime tables, 238
 Priming read, 36
 PRINT keyword, 290, 296
 Printer files, 66–70, 73
 creating, 66, 70
 designing with CODE Designer, 487
 printing arrays in, 234
 RPG and, 69–70
 Printer spacing charts, 9–10
 currency symbols, 9
 defined, 9
 illustrated, 10
 output editing, 9
 zero suppression, 9
 Problem definitions, 10
 Procedural languages, 1
 Procedure Boundary specifications, 352–353, 458
 defined, 19, 352
 keywords, 458
 using, 358
 Procedure interface, 322–324, 330
 coding, 323
 defined, 323
 example, 323–324
 Procedures, 369
 calling, 351
 coding, 347, 350–351, 354–355
 coding requirements, 349
 defined, 347
 hiding, 362
 local, 348–354
 main, 348, 350–351
 nomain, 354–359
 processing steps, 351
 reused, 467
 service programs, 362
 specifications, 348
 using, 466
 Program module objects, 12
 Program status data structure (PSDS), 390
 Program variables. *See* Variables
 Program-described files
 defined, 51
 field description entry, 443
 record identifier entry, 442
 Programming, 1
 with externally defined files, 65–66
 modular, 2, 192, 319–320, 331–332
 specifications, 8–10
 structured, 469
 with subfiles, 397–430
 tricks, avoiding, 473
Programming DDS for Physical and Logical Files, 64
 Programming Development Manager (PDM), 11, 65, 475, 488–493
 defined, 488
 entering/editing source members, 489–491
 menu, 488
 working with objects, 493
 working with source members, 490
 Programs
 abend, 377
 binding, 12, 346
 called, 327, 331
 calling, 319–320, 327, 331
 compiling, 12, 346
 creating, 345
 debugging, 501–506
 defined, 5
 design, 10
 development cycle, 10–11, 14
 development tools, 475–493
 dump, 389, 391
 enter, test, debug steps, 13
 entry, 12
 ILE, 354, 361–362
 maintenance, 11
 multiple entry point, 347
 running, 485, 492–493
 service, 347, 362–368
 single entry point, 346
 single-module, 354
 testing, 12
 update, 297
 workflow control, 179–206
 Prototypes, 330
 defined, 321
 definition, 321
 matching, 323
 maximum parameters, 322
 storing in /Copy members, 357–358, 468
 subprocedure, 350
 Pseudocode, 10
 control break logic, 196
 defined, 35
 interactive file maintenance, 301–302
 multiple-level control break logic, 199–200
 subfile loading, 404
*PSSR subroutine, 389–390
 complexity, 389
 defined, 389
 error handling, 390
 return point, 389
- ## Q
- QCMDEXC (Execute Command) API, 333, 337
 Qualified data structures
 defined, 97
 using, 463–464
 Qualified keyword, 97, 229
 QUSCMDLN (Display Command Line Window) API, 332–333, 337
- ## R
- RANGE keyword, 63
 defined, 293
 format, 293
 Range tables, 239
 Read (Read a Record) operation, 37, 249–250, 273, 306
 arguments, 250
 defined, 249
 format, 249
 result data structure, 250
 in screen I/O, 287
 Readc (Read Next Changed Record) operation, 412, 414, 417
 Reade (Read Equal Key) operation, 252–253, 273
 defined, 252
 format, 252
 use example, 252–253
 Read-only reference
 advantages, 329
 defined, 329
 passing parameters by, 329–331
 Readp (Read Prior Record) operation, 253–254, 273
 defined, 253
 format, 253
 use example, 253–254
 Readpe (Read Prior Equal) operation, 253–254, 273
 defined, 253
 %Eof function support, 253

- format, 253
use example, 253–254
- Record formats, 54
defined, 6, 29
multiple, 7
physical file, 7
separate, 7
type, 30
- Record identification entries
defined, 25
Input specification, 25–26, 441, 442
Output specification, 30–31, 455, 456
- Record locking
built-in, 272
defined, 264
releasing, 264–265
- Record-level keywords, 290–291
CA, 290
CF, 290
defined, 54, 290
OVERLAY, 402
PRINT, 290
SFL, 399
SFLCLR, 400
SFLCTL, 400, 417
SFLDSP, 400
SFLDSPCTL, 400
SFLEND, 406, 409
SFLPAG, 400, 403
SFLRCNBR, 406, 409
SFLSIZ, 400, 401
VLDCMDKEY, 290
See also Keywords
- Records
**Cdata, 210
defined, 6
deleting, 261–262
duplicate keys, processing, 252
layouts, 8
length, 24
logical-file, 53
reading, 249–250
updating, 262–264
writing, 259, 260
See also Files
- Recursion, 194
- REF keyword, 285
- Relational comparisons, 180–181, 518
character values, 180
indicators, 181
relational symbols, 180
- Relational operators, 63, 293
- Relative record number, 403
- %Rem (Remainder) function, 117, 120
- Remote Systems Explorer (RSE), 479
- %Replace (Replace character string) function, 134, 146
- Report Layout Utility (RLU), 66
- Report Program Generator. *See* RPG; RPG III; RPG IV
- Reports, 22
- Reserved words, 32
- Resolution, 345
- Result data structures, 250
- Result decimal positions rule, 115
- Result field size
for addition, 113
for division, 114
for multiplication, 113
for subtraction, 113
- Resulting indicators, 510–511
- Return (Return to Caller) operation, 337
defined, 38
syntax, 337
- Rounding, 114–115
- RPG
cycle summary, 522
defined, 1
fixed logic cycle, 4
history, 1–4
indicators, 2
learning, 4
as procedural language, 1
RPG II, 2, 521–522
as strictly typed language, 117
- RPG III, 2–3, 517–521
calculations, 518–519
converting to RPG IV, 520–521
data definition, 519–520
looping/selecting, 518–519
specifications, 517
- RPG IV, 3–4
case sensitivity and, 23
compiler, 4
converting to, 520–521
defined, 3
features, 3
operations, 36–38
specifications, 4, 19–38
style guide, 461–473
summary, 431–459
usage conventions, 431
- Rules of precedence, 110
- Runtime arrays
array data structures as, 229
data structures and, 212–215
defined, 209
use examples, 209
See also Arrays
- Runtime errors, 496–498
abends, 496–497
dates and, 162
infinite loops, 497–498
See also Errors
- S**
- S (Signed numeric shift), 283
- SBMJOB (Submit Job) command, 334
- %Scan (Scan string) function, 136–137, 146
defined, 136
return values, 136
use examples, 136–137
- Screen design, 305, 306
- Screen Design Aid (SDA), 281
- Searches
binary, 224
unequal, 222–223
- %Seconds function, 162
- Select fields, 64
- Select operation, 186–187, 201
defined, 186
flowchart, 187
use example, 187
- Select specifications, 62
- Selection
defined, 179
operations, 181–187
- Separator characters (/), 156
- Sequence
checking, 26
defined, 179
- Sequential access, 249–254
defined, 249
processing begin point, 251, 252
- Sequential retrieval, 52
- Service entry points, 504, 505
- Service programs, 347, 362–368, 369
binding, 364
creating, 363
defined, 362
displaying, 365
maintaining, 365
as multiple entry point program, 362
multiple signatures, 367–368
organizing, 364
procedures, 362
signature, 365–368
updating, 365
using, 363–364
- Setgt (Set Greater Than) operation, 252, 273
- Setll (Set Lower Limit) operation, 251, 273
- SFL (Subfile) keyword, 399
- SFLCLR (Subfile Clear) keyword, 400
- SFLCTL (Subfile Control) keyword, 400, 417
- SFLDSP (Subfile Display) keyword, 400
- SFLDSPCTL (Subfile Display Control) keyword, 400
- SFLEND (Subfile End) keyword, 406, 409
- SFLPAG (Subfile Page) keyword, 400, 403
- SFLRCNBR (Subfile Record Number) keyword, 406, 409
- SFLSIZ (Subfile Size) keyword, 400, 401

- Simple logical files, 61–62
 %Size (Byte size) function, 143, 146, 217, 241
 Skip entries, 30
 defined, 31
 illustrated, 31
 SKIPA keyword, 69
 SKIPB keyword, 69
 Sorta (Sort an Array) function, 223–224, 241
 Source code, 14
 defined, 12
 HLL, 1
 translation, 12
 Source Entry Utility (SEU), 491–492
 Source members
 compiling, 492
 defined, 12
 editing, 480–482
 editing (PDM), 489–492
 opening, 479–480, 486
 opening (PDM), 489
 saving, 482
 working with (PDM), 490
 Space entries, 30
 defined, 30
 illustrated, 31
 SPACEA keyword, 69
 SPACEB keyword, 69
 Specifications, 8–10, 19–38, 46
 Calculation, 19, 34–39, 444–454
 defined, 19
 Definition, 19, 79–108, 437–440
 File, 19, 22–24, 435–437
 fixed-position entries, 20
 free-format, 4, 20
 Header (Control), 19, 22, 432–434
 Input, 19, 25–28, 441–443
 main procedure, 348
 Omit, 62
 Output, 19, 28–34, 455–457
 Procedure Boundary, 19, 352–353, 458
 program order, 19
 RPG III, 517
 sample program, 20–21
 Select, 62
 types, 19
 %Sqrt (Square root), 117, 120
 Standalone variables, 80–87, 103
 character literals, 86
 data type, 81–82
 date, 84
 decimal position, 81
 defining, 80–87
 figurative constants, 87
 indicator data type, 84–85
 initializing, 87
 length, 81
 name, 80–81
 named constants versus, 89
 numeric data types, 82–84
 numeric literals, 85–86
 time, 84
 timestamp, 84
 type, 81
 typed literals, 86
 Static binding, 345
 %Status (Return File or Program Status) function, 379–380, 391
 Status codes, 379, 450–452
 Stepping, 502
 STRDBG (Start Debug) command, 501
 debugging with, 502–504
 uses, 501
 STRPGMEXP (Start Program Export List) command, 365, 366
 Structured design, 179–192
 defined, 2, 179
 flow of control, 2
 iteration, 80, 179
 iteration operations, 188–191
 logic structures, 179
 loops and early exits, 192
 relational comparisons, 180–181
 selection, 179
 selection operations, 181–187
 sequence, 179
 Structured programming, 469
 Structured Query Language (SQL)
 collections, 54
 DDL, 54
 defined, 2
 DML, 54
 i5/OS database and, 54
 statements, 54
 statements, embedding, 268–269
 syntax, 54
 views, 54
 %Subarr (Set/get portion of an array) function, 224–228, 241
 defined, 224
 format, 224
 use examples, 225–228
 %Subdt (Extract from Date/Time/Timestamp) function, 165–166
 Subdur (Subtract Duration) operation, 516–517
 Subfields
 defined, 91
 %Kds and, 258
 length notation, 462–463
 numeric, 92
 in OVERLAY keyword, 95
 redefining, 95
 Subfiles, 397–430
 change and, 412–416
 control record format, 400–401
 for data display, 416
 for data entry, 416
 defined, 397
 fields, 412
 load pseudocode, 404
 loading, 401–412
 loading page at a time, 406–412
 record formats, 399
 relative record number, 403
 scrolling forward, 409
 size, 405
 size equals page, 409–412
 uses, 416
 Subprocedures
 calling, 351
 coding, 352–353
 defined, 347
 global scope, 352–353
 local scope, 352
 prototype, 350
 return value, 348, 350
 subroutines versus, 347–348
 variable scope, 353
 Subroutines
 break, 199
 coding, 193
 defined, 193
 defining, 193–194
 executing, 193–194
 INFSR, 386–388
 *PSSR, 389–390
 subprocedures versus, 347–348
 %Subst (Get or set substring) function, 133–134, 146
 defined, 133
 parameters, 133
 return value, 133
 use examples, 133–134
 Subtraction, 113
 Syntax errors, 495–496
 compiler notes, 496
 defined, 11, 495
See also Errors
 System i development tools, 475–476

T

- Tables, 234–240
 in alternating format, 235
 array definition versus, 235
 compile time, 235
 defined, 235
 defining, 235
 lookups, 236–238
 pruntime, 238
 primary, 237–238

range, 238–239
 related, using, 237–238
 values, changing, 239

Test (Test Date/Time/Timestamp) operation, 385–386, 391

TEXT keyword, 56

%Time (Convert to time) function, 168–169
 defined, 168
 format, 168
 result format, 169
 separator character, 168
 use examples, 168–169

Time

converting to, 168–169
 data type, 84, 155
 errors, 385–386
 extracting, 165–166

Time formats
 Control (H) specification, 434
 list, 158

TIME keyword, 294

%Timestamp (Convert to Timestamp) function, 169–170

Timestamp data type, 84, 155, 169–170

%Tlookup (Look up a table element) function, 236–238
 defined, 236

format, 236
 return value, 236
 search argument, 236
 successful, 236
 variations, 236

Tofile (To file) keyword, 212

Top down design, 192–200
 control break logic, 194–200
 defined, 192
 hierarchical decomposition, 192
 subroutines, 193–194

Trailing decision loops, 188

Transaction files, 6

%Trim (Trim blanks at edges) function, 131–132, 146
 defined, 131
 examples, 132
 uses, 131

Truncation, 112

Typed literals, 86
 date assignment with, 160–161
 defined, 86

U

UCS (Universal Character Set), 60

Unicode, 60

UNIQUE keyword, 55

Unlock (Unlock a Data Area or Release a Record) operation, 264–265, 273, 335, 336, 337

%Uns (Convert to unsigned integer format) function, 118, 120
 %Unsh (Convert to unsigned integer format with half adjust) function, 118, 120
 Update (Modify Existing Record) operation, 262–263, 273
 defined, 262
 format, 262
 use examples, 262–263
 Update programs, 297
 Update(s)
 binder language, 368
 files, 260–264, 267
 ILE programs, 361–362
 interactive, 297
 phantom, 264
 service programs, 365
 UPDPGM (Update Program) command, 362
 UPDSRVPGM (Update Service Program) command, 365
 Usage conventions, 431
 User profiles, 5
 User spaces, 332
 Usropn (User Open) keyword, 265

V

Validation, 292, 298
 Value keyword, 359
 VALUES keyword, 62, 63
 defined, 293
 format, 293
 Variable-length character variables, 146
 current length, 142
 declared length, 142
 initialization, 142
 return values, 142–145
 Variable-length fields, 470
 Variables
 defined, 5
 fixed-length, 142, 146
 global, 347, 351
 indicators, 2
 initializing, 88
 local, 348
 parameter, 324
 program, 5
 scope, 353
 standalone, 80–87, 103
 variable length, 142, 146
 Views
 debugging, 501–502
 SQL, 54

VLDCMDKEY (Valid Command Key) keyword, 290

W

Warnier-Orr diagrams, 10
 WebSphere Development Studio Clients (WDSc), 11, 65, 475, 476, 477–485
 Debug perspective, 505, 506
 debugging with, 504–506
 learning, 477
 program verification, 480
 views, 478
 When operation, 187
 While loops, 35–36
 Work fields, 509–510
 Workflow
 control, 179–206
 structured design, 2, 179–192
 top down design, 192–200

Write (Write a Record to a File) operation, 70, 273, 306, 405

defined, 260
 format, 260
 in screen I/O, 287
 use example, 260

WRKBNDDIRE (Work with Binding Directory Entries) command, 361

WRKMBRPDM (Work with Members Using PDM) command, 489

WRKSPLF (Work with Spooled Files) command, 333

X

X (Alphabetic shift), 283
 X edit code, 44
 %Xfoot (Sum the elements of an array) function, 224, 241
 %Xlate (Translate) function, 135–136, 146
 arguments, 135
 defined, 135
 use examples, 135–136

Y

Y edit code, 33, 44
 Y (numeric shift), 283
 %Years function, 162

Z

Z edit code, 33, 44
 Zero suppression, 9, 43
 Zoned decimal data type, 56, 57, 82