

Index

A

- Accelerator-only tables, 71–72
- ACCESS, 556
- Access control, 4, 5, 33, 305–310
 - advisory or restrictive states for, 266, 270
 - auditing and, 325
 - authentication and, 305, 307
 - column masks, 320–321
 - communication database, 307
 - concurrent access and, 400
 - CONNECT and, 305, 307
 - data, 307
 - establishing, 321
 - Kerberos security and, 306–307
 - loading, 400
 - local DB2 access and, 305
 - objects, using authorities and privileges, 308
 - RACF in, 305, 306
 - remote DB2 access and, 305–306
 - row and column, 318–321
 - row permissions in, 319–320
 - Security Server in, 305, 306
 - workstations, 307
- Access paths, 4, 525–547, 553, 558
 - access path compare (APCOMPARE) in, 532–533
 - access path reuse (APREUSE) in, 532–533
 - BIND QUERY in, 527
 - binding into separate collections, 550
 - capturing reoptimized, 534–535
 - change management for, 531–533
 - EXPLAIN and, 534–535, 536–547
 - indexes, influencing access to, 530–531
 - influencing selection of, 526–530
 - management of, 528
 - parameter markers and literal value replacement in, 535
 - performance, 525–547
 - plan stability and, 549
 - regression, 549
 - reoptimization of, 533–535
 - selectivity overrides and, 529–530
 - statement cache and, 547–550. *See also* Cache
 - statistics, RUNSTATS and, resetting, 450–451
- ACCESSCTRL, 310, 312–313
- Accidentally dropped objects, recovery of, 376–377
- Accounting reports, 512
- Accounting trace, 501–505, 552, 555
- Active logs, 27, 36, 39
- Active threads, 288
- Address spaces, 11–14, 35, 37
 - database services and, 12
 - distributed data facility and, 13
 - Exam 610–DB2 10.1 Fundamentals, sections and objectives, 5–6
 - internal resource lock manager (IRLM) and, 13, 32
 - system services and, 12
 - work load manager (WLM)—established, 13–14
- Administrative authorities, 304, 309
 - separating, 312
- Administrative task scheduler, 260–261, 262
- Advanced Database Management Facility (ADMF), 12
- Advisory states, 3, 266
 - displaying, DISPLAY DATABASE and, 270–272
- After triggers, 98
- Agent services manager, 12
- Aggregate functions, 186, 196

- Aliases, authorities and privileges, 316
- ALL, 164, 183
- Allied threads, 287, 288
- ALTER, 31, 115–129, 242, 264, 316, 318, 327
 - index versions and, 128–129
 - invalidations caused by, 128
 - issues with, 127–129
 - RECOVER and, 371
 - REORG and, 420
- ALTER DATABASE, 48, 115–116
- ALTER FUNCTION, 199, 234
- ALTER INDEX, 102, 125
- ALTER PROCEDURE, 194–195, 234
- ALTER STOGROUP, 116–117
- ALTER TABLE, 71, 77, 78, 120–124
 - access control and, 321
 - archive-enabled tables and, 208
 - check constraints and, 97
 - referential constraints and, 95
- ALTER TABLESPACE, 54, 117–120, 131–136
- Altering structures, 115–129
- ALWAYS, 91
- ANY, 164
- ANY locks, 66–67
- APCOMPARE, 532–533
- APPC, 8
- APPEND, 121
- Application development, environments, 189
- Application period temporal table, 204
- Application plan privileges, 304
- Application plans, 143
- Application processes, 23, 141–143
 - application plans in, 143
 - locking and concurrency in, 141
 - packages in, 143
 - rolling back work in, 142
 - savepoints in, 142–143
 - unit of recovery in, 142
 - unit of work in, 141–142
- Application program preparation, 222–230
 - binding and rebinding in, 222, 223–230. *See also* Binding and rebinding, 223
 - compiling and, 222
 - load modules in, 222
 - packages in, 222
 - precompiling and, 222, 223
- Application programming, 139–141
 - SQL in, 139–141
- Application servers, 294
- Application-period temporal tables, 78
- Applications and database functionality, 139–254
 - application processes in, 141–143
 - application program preparation and, 222–230
 - application programming in, 139–141
 - DRDA access in, 237–240
 - environments for, 189
 - SQL in, 143–247. *See also* SQL
- APREUSE, 532–533
- Architecture for z/OS, 7–10
- Archive log, 27
- Archive tables, 71, 72, 207
- Archive transparency, 211
- Archive-enabled tables, 71, 72, 184, 207–213
 - archive transparency and, 211
 - creating, ALTER TABLE and ENABLE ARCHIVE in, 208
 - disabling, 212–213
 - dynamic transaction and, 211
 - querying, SELECT and, 210–211
 - row deletion from, DELETE and, 210
 - row insertion into, INSERT and, 209
 - static application with, 211–212
 - triggers and, 208
- Archiving, recovery, 347
- Array types, 176, 248, 252
 - associative, 178–179
 - MAX_CARDINALITY in, 177
 - null, 179–180
 - ordinary array in, 177–178
 - values in, 179–180
- Array variables, 185–186
- Arrays, 248, 251
 - associative, 252
- AS, 150–151
- AS IDENTITY, 91
- ASC/DESC, 101–102
- ASCII, 87, 133, 138, 394
- Assembler, 181, 189
- Associative arrays, 178–179, 252
- Asterisk (*), SELECT, 145–146

- Attachment facilities, 15–19, 37, 40
 - call attachment facility (CAF) and, 18
 - CICS, 16, 262
 - DB2 Interactive (DB2I) and, 18
 - distributed data facility (DDF), 19
 - DSN command processor for, 17
 - IMS, 17
 - Resource Recovery Services (RRS) and, 18
 - TSO, 17
 - universal language interface (DSNULI) and, 18
- Attributes, 42
 - data type, 43
- AUDIT, 121
- Audit trace, 507. *See also* Auditing
- Auditing, 4, 325–329, 384, 385, 389, 390
 - access and, 325
 - classes and events in trace for, 327
 - GRANT and, 326
 - Kerberos and, 326
 - policies for, 329
 - REVOKE and, 326
 - specific IDs and roles, 328
 - starting/stopping trace, 328
 - tables, 328–329
 - trace in, 326–328
- Authentication, 305, 307
- Authorization IDs, primary and secondary, 303–304
- Authorization/authorities and privileges, 5, 33, 249, 253, 303
 - access control and, 305–310
 - ACCESSCTRL, 310, 312–313
 - administrative authorities in, 304, 309, 312
 - aliases, 316
 - application plan privileges in, 304
 - auditing. *See* Auditing
 - authorization IDs in, primary and secondary, 303–304
 - cascade revoke in, 311
 - column masks and, 320–321
 - CURRENT SQLID in, 304
 - DATAACCESS, 310
 - database, 315
 - DBADM, 309, 310, 312–313, 315
 - DBCTRL, 309, 315
 - DBMAINT, 309, 310
 - DEPENDENT PRIVILEGES and, 311
 - distinct types, 316
 - explicit, 308–309
 - global variables and, 183
 - GRANT in, 308, 310–312
 - implicit, 308, 313
 - indexes, 316
 - JARs, 316
 - object access, 308
 - object ownership and, 313–318
 - object privileges in, 304
 - PACKADM, 310
 - package, 304, 316
 - plan execution, 318
 - plans, 316
 - PUBLIC keyword and, 311
 - REVOKE in, 308, 310–312
 - roles and, 305, 316, 322–323
 - row permissions, 319–320
 - SECADM, 310, 312–313, 319, 320
 - security labels in, 305
 - separating admin authorities in, SEPARATE SECURITY for, 312
 - sequences, 316
 - SQLADM, 310
 - storage group, 315
 - stored procedures, 317
 - SYSADM, 309, 312–313, 320
 - SYSCTRL, 309, 312–313
 - SYSOPR, 309
 - table spaces, 316
 - tables, 316
 - trusted connections in, 321–324
 - trusted contexts in, 305, 316, 321–324
 - user-defined functions, 317
 - variables, 317
 - views, 316
 - WITH GRANT option in, 312
- AUTO BIND, 228–230
- Automated statistics collection, 454–456, 524–525
- Automatic queries, MQT, 213–215
- Automatic Restart Manager (ARM), 26, 301
- Autonomic statistics, 454–456, 524–525
- Autonomous procedure, 192
- Auxiliary index, 103, 103
- Auxiliary table spaces, 56–57
- Auxiliary tables, 71, 72–73, 112
- Auxiliary warning status, 266–267
- AVG, 186

B

- BACKOUT, LIMIT/DURATION, 352
- BACKUP SYSTEM, 337, 340, 348, 363–366, 378
- Backup, recovery, restart, 3, 33–34, 329–381, 383
 - accidentally dropped objects, 376–377
 - archiving and, 347
 - automatic restart manager (ARM) in, 301
 - availability during, 346
 - BACKOUT in, LIMIT/DURATION, 352
 - BACKUP SYSTEM in, 337, 348, 363–366, 378
 - bootstrap data set (BSDS) in, 333–334, 350
 - CHECK DATA in, 343
 - checkpoint intervals in, 283–284
 - clone tables, 377
 - COMMIT and, 344
 - concurrent copies and, using DFSMS, 361
 - conditional restart in, 281–282, 374
 - conditional restart control record (CRCR) for, 281–282
 - coordinated updates and, 345
 - COPY in, 330, 334–335, 348, 349, 355, 359–361, 372
 - copy pools in, 363
 - COPYTOCOPY in, 335, 348, 360
 - coupling facility failure, 379
 - CRESTART in, 282
 - DASD failure and, 379
 - data checks, 343
 - data consistency in, 344
 - data set copies and, 359–360
 - data sets in, 330, 357–360
 - data sharing and, 378–381
 - data sharing group termination and, 282–283
 - data-only system backups in, 364
 - DB2 catalog and directory, 374–375
 - DB2 failure and, 379
 - DFSMSHsm in, 337, 338, 350
 - DIAGNOSE in, 339
 - disaster recovery and, 347, 352–353, 372–374
 - distributed data and, 348–349
 - documentation for, 330
 - DSN1COMP, 360
 - DSN1COPY in, 340–341, 360
 - DSN1LOGP in, 341
 - DSN1PRNT in, 341–342, 360
 - DSNJCNVB in, 342
 - DSNJCNTV in, 342
 - DSNJLOGF in, 339
 - DSNJU003 utility and, 282, 339
 - DSNJU004 in, 339–340
 - dual operations in, 330
 - duplexing and, 381
 - FlashCopy function in, 360–361, 363, 365, 372, 404, 427–428, 441, 445
 - full system backup in, 364–365
 - group buffer pool and, 380
 - inconsistency and, recovery from, 353–356
 - indexes in, 330, 349, 371, 375–376
 - INDOUBT threads and, 286
 - information on, 350
 - LOAD in, 335, 350, 360, 361, 365, 368, 372
 - lock structures and, 380
 - logs and logging in, 331–333, 346, 378–379
 - MEREGCOPY in, 348, 335, 336–337
 - MODIFY, 351–352
 - NOT LOGGED tables and, 282, 376
 - page copies and, 359–360
 - pages in, 330, 357–360
 - parallel recoveries in, 356–357
 - partitions in, 330
 - plans for, 348
 - point in time (PIT), 362–368
 - points of consistency in, systemwide, 353
 - postponed units of recovery in, 284–285
 - procedures for, 330–331, 348
 - QUIESCE in, 335–336, 348, 350, 354, 363
 - REBUILD in, 365
 - REBUILD INDEX in, 337, 349, 350, 360
 - RECOVER in, 337, 345, 348, 349, 353–358, 360, 365–366, 369, 371, 375–376
 - RECOVER, options for, 366–368
 - RECOVER pending status in, 282
 - RECOVER TOCOPY, 350
 - RECOVER TOLOGPOINT, 350
 - recovery process in, 345–347
 - remote sites in, 331
 - REORG in, 330, 335, 350, 361, 363, 365, 368, 372
 - REORG INDEX, 360
 - REORG TABLESPACE, 360
 - REPAIR in, 338
 - REPLACE, 368, 372
 - REPORT in, 337, 348, 351, 355
 - restarting DB2 in, 281, 342–343, 346
 - RESTORE SYSTEM in, 338, 348, 364, 378
 - ROLLBACK and, 344
 - savepoints and, 344

- SCA structure and, 380
 - scheduling backups and data checks for, 343
 - SET LOG SUSPEND/RESUME, 283
 - standalone utilities for, 339–342
 - structure failure and, 380
 - SYSIBM.SYSLGRNX, 350
 - SYSIBM.SYSCOPY, 350
 - system-level backups for object-level recoveries in, 361–366
 - system-wide, 378
 - table spaces and, 330, 368–370, 375–376, 383, 388
 - temporal tables, 377–378
 - TERM UTILITY in, 355–356
 - TOCOPY in, 362
 - unit of recovery in, 142, 284–285
 - UNLOAD in, 335
 - utilities for, 334–342, 346, 348, 355–356
 - viewing threads affected by failure in, 285–287
- Base table space, 57
- Base tables, 71, 73
- Batch, 11, 14, 15, 287
- Before triggers, 98
- BETWEEN, 521
- BIGINT, 44, 88, 91
- BINARY, 43, 86
- BIND/REBIND, 4, 31, 226, 227, 250, 317, 318, 324, 522, 551, 555. *See also* Binding and rebinding
- BIND PACKAGE, 226, 234, 237
- BIND PLAN, 224, 234, 238
- BIND QUERY, 527, 553
- BINDAGENT, 317
- Binding and rebinding, 30, 143, 222, 223–230. *See also* BIND/REBIND, *above*
- automatic rebinding, AUTO BIND and, 228–230, 228
 - BIND (ADD/REPLACE) and, 226
 - BIND PACKAGE and, 226, 234, 237
 - BIND PLAN and, 224, 234, 238
 - collections and, 224, 225
 - CONNECT and, 237, 240–241
 - DBRMs and, 223, 226
 - DISCONNECT and, 241
 - distributed applications and, 236
 - DRDA access and, 237–240
 - freeing a plan or package in, 225
 - isolation levels and, 235–236
 - package lists, PKLIST and, 227–228
 - packages and, 224, 227
 - plan stability and, PLANMGMT and, 230
 - plans and, 224
 - precompiling, 237
 - REBIND and, 227
 - RUNSTATS and, 227
 - SQL and, 237
 - static, 224
 - statistics collection and, 525
 - trigger packages and, 228
 - versioning in, 225
- Bitemporal tables, 78–79, 204–205
- BLOB, 44, 86, 89
- Bootstrap data set (BSDS), 27–28, 36, 39, 281, 333–334, 339, 340, 350
- Buffer manager, 12
- Buffer pools, 28–29, 36, 39, 48, 131, 135
- DISPLAY BUFFER POOL in, 483
 - group, in data sharing, 297–298, 299
 - I/O management and, 495
 - performance and, 481, 482
 - RECOVER pending status in, 268
 - recovery and, 380
 - write operations and thresholds in, 494–495
- BUFFERPOOL, 58, 115
- Built-in functions, 196
- Business rules, 42
- ## C
- C or C++, 181, 189
- Cache and caching, 10, 28–30, 495, 547–550, 554, 558
- access path regression and, 549
 - externalizing stats for, 547–549
 - global dynamic SQL cache and, 485–486
 - invalidating statements in dynamic statement cache in, 486–487
 - local dynamic SQL cache in, 487
 - plan stability and, 549
 - setting up table for, 547
- CACHE, 137
- CACHERAC, 200
- CALL, 223, 244
- Call Attachment Facility (CAF), 16, 18, 287
- Call-Level Interface (CLI), 144, 145
- CANCEL, 383

- CANCEL SHRLEVEL, 387
- Cardinality stats, 520
- CASCADE, 96, 327
- Cascade revoke, 311
- CASE, 320
- CAST, 166–169
 - functions using, 196
- Catalogs,
 - COPY and copies in, 460
 - DB2, 22
 - indexes and, 108
 - recovery and, 374–375
 - REORG and, 435–436
 - statistics, RUNSTATS and, 447, 453
- CCSID, 87, 340
 - loading, 394
- Channels, 495
- CHAR, 43, 121
- CHARACTER, 86
- CHECK, 266, 267, 368
- Check constraints, 21, 95, 97, 130, 134
- CHECK DATA, 275, 276, 343, 355, 474
 - referential constraints and, 96
- CHECK INDEX, 275, 276, 355
- CHECK LOB, 275, 276
- CHECK-pending, 266, 267, 469
- CHECKING, 329
- Checking data utilities, 275, 276
- Checkpoint intervals, 283–284
- CICS, 8, 11, 14, 15, 16, 262, 263, 287, 307, 345, 478, 509, 510
 - attachment facility for, 16–17
- CLIST, installation/migration, 256
- CLOB, 43, 86, 89
- Clone tables, 71, 73–74, 377
- CLUSTER/NOT CLUSTER, 115, 125
- Clustering, 9
 - reclustering and REORG in, 433
 - “well-clustered” defined, 466
- Clustering index, 103, 105–106
- CMTSTAT, 200
- COBOL, 24, 181, 189
- Collections, binding/rebinding, 224, 225
- Column masks, 320–321
- Columns, 67–68, 136
 - access control in, 318–321
 - adding/dropping, 133, 138
 - derived, 148
 - dropping, 123
 - generated column types, 403
 - hidden, 161
 - index, adding, 125–126
 - loading, 395–396
 - loading, default values, 395
 - LOB, 396
 - masks for, 320–321
 - null values and, 94
 - renaming, 123–124
 - SELECT and, 146–147
 - transaction start ID and, 93–94
 - XML, 395–396
- commands, 3, 31–33, 262–266
- COMMANDS, 31
- COMMENT, 175, 242
- COMMENT ON, 316, 318
- COMMIT, 115, 141, 142, 183, 192, 231, 233, 244, 316, 327
 - recovery and, 344
 - SQL procedures and, 193
 - table spaces and, 122
 - threads and, 289–290
- Common table expressions, 215–219
- Communications, 8
- Communications database (CDB), 23, 296
 - access to, 307
- Communications protocols, 295–296
- Comparison operators, SELECT, 147
- Compiling, 222
- COMPRESS/NOT COMPRESS, 58, 64–65, 125
- Compressed index, 103, 106
- Compression, hardware, 10
- Compression, data, 64–65
- Compression dictionary, REORG, 435
- Compression statistics, 448–449, 471, 476
- CONCAT, 186
- Concurrency, 6, 141, 230–237, 386. *See also* Locks and locking, 230
 - application design recommendations for, 231
 - COMMIT and, 231
 - CONCURRENT ACCESS RESOLUTION and, 234
 - coordinated updates and, 345

- currently committed data and, 233–234
- data consistency and, 344
- LOCK TABLE and, 232–233
- recovery and, 344
- restricted system of DB2 in, 242
- ROLLBACK and, 231
- SKIP LOCKED DATA and, 233
- two-phase commit and, 241–242
- update coordination and, 241–242
- Concurrent access, 400
- CONCURRENT ACCESS RESOLUTION, 234
- Concurrent copies, using DFSMS, 361
- Conditional restart, 281–282, 374
- Conditional restart control record (CRCR), 281–282, 339
- CONNECT, 237, 240–241, 253, 305, 307
 - CURRENT SERVER register and, 243
 - programming considerations and, 243
 - servers and, 243
 - SQLRULES and, 243–244
- Connections, connectivity, and CONNECT, 385, 389
 - communications database in, 296
 - communications protocols in, 295–296
 - CURRENT SERVER register and, 243
 - managing, 287
 - programming considerations and, 243
 - queuing, with threads, 292
 - servers and, 243
 - SQLRULES and, 243–244
 - trusted connections in, 321–324
- Consistency, points of, 142
- Constraints, 21, 42, 94–97
 - after, 98
 - before, 98
 - CASCADE in, 96
 - check, 95, 97, 130, 134
 - delete rule for, 96
 - informational referential, 96
 - insert rule for, 96
 - instead of, 98–99
 - NO ACTION in, 96
 - Referential, 95–97
 - RESTRICT in, 96–97
 - SET NULL in, 96
 - unique, 94, 95, 388
 - update rule for, 96
- CONTEXT, 329
- Continuous performance monitoring, 509–510
- Control interval (CI) processing, 392
- Conversion mode/mode* migration, 257
- Converting to DB2 11, 256
- Coordinated updates, 345
- Copies/copying, 391, 392, 456, 470. *See also* Backup, recovery, restart
 - access during, 458
 - catalogs, 460
 - concurrent copies and, using DFSMS, 361
 - COPY and, 456. *See* COPY
 - COPY-pending status and, 457
 - data sets, 458
 - data, 456
 - directories, 460
 - DSNICOPY in, 461
 - FlashCopy function in, 360–361, 372, 404, 427–428, 441, 445
 - indexes, 456, 460
 - inline copies and, 404
 - multiple image copies in, 458
 - partition-by-growth table spaces and, 459
 - partitions, 458
 - RECOVER, 457
 - REORG and, 426–427
 - SHRLEVEL and, 458–459
 - table spaces and, 459
 - VSAM and, 461
 - XML table spaces and, 459–460
- COPY, 275, 330, 334–335, 348, 349, 355, 359–360, 361, 372, 404
 - statistics, RUNSTATS and, 462
- COPY-pending status, 267
 - informational, 268
- Copy pools, 363
- COPYTOCOPY, 275, 335, 348, 360, 472
- Correlated subqueries, 162, 165–166
 - names in, 166
 - UPDATE and, 166–167
- Cost estimation using EXPLAIN, 546–547
- Couple data sets, 299
- Coupling facilities (CF), 297–301
 - Parallel Sysplex and, 20
 - recovery and, 379
- Coupling facility control code (CFCC), 297
- Coupling facility resource management (CFRM), 299–300

CPU performance, 479, 480
CRCR. *See* conditional restart control record (CRCR)
CREATE, 45, 115, 242, 316, 318, 327
 object ownership and, 313
 qualified objects and, 315
 unqualified objects and, 314
CREATE DATABASE, 47–48
CREATE FUNCTION, 185, 187, 196, 197, 199, 234
CREATE INDEX, 67, 99–101
 large objects (LOB) and, 113
 table spaces and, partitioning, 59
CREATE PROCEDURE, 185, 190, 191, 194, 200, 234
CREATE STOGROUP, 46
CREATE TABLE, 47, 49, 68–71, 81–82, 196, 203–204, 316
 check constraints and, 97
 large objects (LOB) and, 113
 referential constraints and, 95
CREATE TABLESPACE, 49, 50–53, 54, 130
 large objects (LOB) and, 113
CREATE TRIGGER, 98, 228
CREATE TYPE, 175, 176
CREATE VIEW, 110–111, 124, 174, 327
 common table expressions in, 215
 SELECT and, AS clause and, 150–151
Created global temporary tables, 79–80, 201
CRESTART, 282
Cross Loader, 407–409, 468, 472
Cross System Coupling Facility (XCF), 265
Cross System Extended (XES), 301
CTHREAD, 389
CURRENT, 112
CURRENT PACKAGESET, 225
CURRENT SQLID, 304, 327
Cursor stability (CS), 235–236
Cursors, 169–171
 declaring, 170
 DELETE and, 169, 170
 FETCH and, 170
 nonscrollable, 170
 scrollable, 170
 skeleton cursor tables (SKCT) in, 483
 stability in, 169
 types of, 170
 UPDATE and, 169, 170

 WITH RETURN and, 170
Customer Information Control System (CICS). *See* CICS

D

DASD, recovery, 379
Data access, 307–308. *See also* Access control
Data checks, 343
Data Communications Resource Manager (DCRM), 13
Data compression, 64–65
 table spaces and, 64–65
Data consistency
 inconsistency vs., recovery from, 353–356
 points of, systemwide, 353
Data Control Language (DCL), 310
Data Definition Language (DDL), 5, 45
Data dictionaries, 42
Data Facility Storage Management Subsystem (DFSMS), 26
Data integrity, 3, 21, 94–99. *See also* Constraints; Triggers
Data management, 391–476
 utilities for, 274–275
Data Manager, 12
Data Manager Threshold (DMTH), 494
Data organization, 417–445, 513–525. *See also* REORG
 copies/copying in, 456
 DSNACCOX and, 514, 517
 index reorganization and, 514
 LOB tables and, 417
 performance:, 514
 REBUILD INDEX and, 442–445
 REORG and, 514, 517
 REORG INDEX in, 438–442
 REORG TABLESPACE in, 417–438
 SHRLEVEL in, 417, 420–422
 statistics and, 445–456, 461–466, 516–525. *See also* Statistics and RUNSTATS
 STOSPACE utility in, 456
 table space reorganization, determining when, 515–516
Data sets, 388, 490–491
 bootstrap, 333–334
 COPY and copies in, 458
 copying, 359–360
 definitions of, changing with REORG, 425
 distributed, for I/O, 495, 496
 extent of, in I/O, 497–498

- I/O management and, 497–498
- I/O management and, distributed, 495, 496
- I/O management and, fast devices for, 496
- management of, 33
- open, 490–491
- performance, 490–491
- recovery and, 330, 357–360
- Data sharing, 4, 35, 38, 297–302, 385
 - automatic restart manager (ARM) in, 301
 - benefits of, 21
 - components of, 297
 - couple data sets in, 299
 - Coupling Facility (CF) for, 297–301
 - Coupling Facility Control Code (CFCC) in, 297
 - Coupling Facility Resource Management (CFRM) in, 299–300
 - Cross System Extended (XES) in, 301
 - Group Buffer Pool (GBP) in, 297–298, 299
 - groups for, 20
 - list structure in, 298
 - lock structure in, 298–299
 - log record sequence numbers (LRSNs) and, 301
 - nonshared objects in, 302
 - Parallel Sysplex and, 297. *See also* Parallel Sysplex policies in, 299
 - recovery and, 378–381
 - restart/recovery after termination of, 282–283
 - Shared Communications Area (SCA) in, 297, 298
 - Shared Data Architecture (SDA) in, 297
 - shared data in, 302
 - Sysplex Failure Management (SFM) policy in, 300–301
 - Sysplex Timer in, 301
- Data space manager, 12
- Data structures, 21
- Data Studio, 25
- Data System Control Facility (DSCF), 12
- Data types, 6, 85–94, 121, 132, 174–180
 - array, 176, 179–180
 - associative arrays in, 178–179
 - attributes and, 43
 - CAST and, 167–169
 - CCSID character set in, 87
 - creating, CREATE TYPE and, 175, 176
 - date/time, 86, 88–89
 - distinct, 90, 175–176
 - generated column types in, 90–91
 - IBM-supplied, 85
 - identity columns in, 91
 - large object, 86, 89
 - null arrays and, 179–180
 - null values and, 94
 - numeric, 85, 87–88
 - ordinary arrays and, 177–178
 - ROW BEGIN/END, 93
 - row change timestamp and, 92
 - ROWID, 92–93, 112
 - string, 85, 86–87
 - tables and, 121
 - transaction start ID, 93–94
 - user-defined, 175
 - UTF8 and UTF16 in, 87
 - values in, sources of, 174–175, 179–180
 - XML, 90, 188–189
- DATAACCESS, 310
- Database Access Threads (DBATs), 287, 290, 385, 390
 - allocation/deallocation in, 292
 - queuing connections with, 292
 - timing out, 291
- Database Descriptors (DBD), 22
- Database design and implementation, 41–138. *See also* Databases
 - altering structures in, 115–129
 - data integrity and, 94
 - data structures in, 67–85. *See also* Tables
 - data types for attributes in, 43
 - data types in, 85–94. *See also* Data types
 - entity relationships in, 42
 - hash spaces in, 67
 - index spaces in, 67
 - indexes in, 99–110
 - large object support and, 112–114
 - logical data modeling in, 42–44
 - normalization in, 43
 - physical data modeling, 44–45
 - schemas and, 111–112
 - structure creation in, 45–67
 - tables in, 67–85. *See also* Tables
 - views in, 110–111
 - XML and, 114–115
- Database services, 12
- Database Services Address Space (DSAS), 12
- Databases, 6, 21, 47–48. *See also* Database design and implementation
 - authorities and privileges for, 315

- changing, ALTER DATABASE and, 48, 115–116
 - creating, CREATE DATABASE and 47–48
 - removing, DROP DATABASE and, 48
 - stopping, STOP DATABASE and, 272–273
- DATE, 44, 88, 186
- Date/time data, 44, 86, 88–89, 185
- formats for, 89, 185
 - row change timestamp and, 92
 - temporal tables and, 205–207
 - unique business time index and, 104
- DB2, 8
- DB2 catalog, 22
- recovery and, 374–375
 - statistics, RUNSTATS and, 453
- DB2 commands, 262, 263–265
- DB2 directory, 22, 37, 40
- recovery and, 374–375
- DB2 failure and recovery, 379
- DB2 Interactive (DB2I), 31, 259, 263
- attachment facilities and, 18
 - utilities and, 279
- DB2 monitoring. *See* Monitoring
- DB2 ODBC, 189
- DB2 Query Management Facility (DB2QMF), SELECT, 145
- DB2 traces, 500
- DBADM, 309, 310, 312–313, 315
- DBADMIN, 329
- DBAT. *See* Database Access Threads (DBATs)
- DBCLOB, 43, 86, 89
- DBCTRL, 309, 315
- DBD01, 22
- DBETE status, 267
- DBMAINT, 309, 310
- DBRMs, 223
- binding/rebinding and, 223, 226
- DCLGEN, 31, 223, 259
- DDF. *See* Distributed Data Facility (DDF)
- Deadlock, 254
- DECFLOAT, 44, 88
- DECIMAL, 88, 91, 121, 168
- DECIMAL(p,s), 44
- DECLARE, 185
- DECLARE CURSOR, 144
- DECLARE TABLE, 223
- Declared global temporary tables, 80, 201, 202
- CONNECT and, 240
- DEFAULT, 31, 91
- Deferred embedded SQL, 144
- DELETE, 6, 23, 42, 136, 171, 173, 203, 242, 327, 386, 499
- archive-enabled tables and, 210
 - correlated subqueries and, 167
 - cost estimation using EXPLAIN, 546–547
 - cursors and, 169, 170
 - declared global temporary tables and, 202
 - referential constraints and, 96
 - triggers and, 97
 - views and, 111, 174
 - WHERE and, 173
- Delete rule, for constraints, 96
- Delimited files, loading, 394
- Delimited unloads, 112–113
- DEPENDENT PRIVILEGES, 311
- Derived columns, SELECT, 148
- DESCRIBE, 144
- Detailed performance monitoring, 510–511
- Deterministic procedure, 192
- DFSMS, 15, 361
- DFSMSHsm, 337, 338, 350
- DIAGNOSE, 339
- Dictionary, compression, and REORG, 435
- Direct row access, 542
- Directories
- COPY and copies in, 460
 - DB2, 22, 37, 40
 - recovery and, 374–375
 - REORG and, 435–436
- Disaster recovery, 347, 352–353, 372–374. *See also* Backup, recovery, restart
- DISCONNECT, 241, 244
- Disk arrays, 495
- DISPLAY, 31, 264
- DISPLAY BUFFER POOL, 483
- DISPLAY DATABASE, 266, 270–272, 391, 513
- DISPLAY LOG, 340
- DISPLAY THREAD, 293–294
- DISPLAY TRACE, 328, 508
- DISPLAY UTILITY, 280–281
- DISTINCT, 150

- Distinct data type, 90, 175–176
 - authorities and privileges for, 316
 - DISTINCT FROM, 148
 - Distributed access, 5
 - Distributed applications
 - binding/rebinding and, 236
 - distributed database access threads (DBATs) and, 245–247
 - MODIFY and, 246–247
 - pooled thread in, 245
 - RELEASE(DEALLOCATE) and, 245–246
 - tuning of, guidelines for, 244–245
 - Distributed data, 294–296. *See also* Data sharing
 - application servers and, 294
 - communications database in, 296
 - communications protocols in, 295–296
 - distributed data facility and, 294
 - DRDA and, 294–295
 - RDBNAM and, 296
 - recovery and, 348–349
 - SNA and, 295, 296
 - TCP/IP and, 295, 296
 - VTAM and, 296
 - Distributed Data Facility (DDF), 5, 11, 13, 19, 33, 37, 40, 294, 303
 - Distributed Data Interchange Services (DDIS), 13
 - Distributed Database Access Threads (DBATs), 245–247
 - Distributed environments, 477
 - Distributed Relational Data System Manager (DRDS), 13
 - Distributed Relational Database Architecture (DRDA), 13, 19, 191, 237–240, 250, 294–295, 345
 - BIND PACKAGE options and, 237
 - BIND PLAN options in, 238
 - CONNECT in, 237
 - precompiler options in, 237
 - remote queries and OPTIMIZE in, 243–244
 - SQL and, 237
 - three-part names and, 239–240, 239
 - Distributed Transaction Manager (DTM), 12–13
 - Distribution statistics, 448, 521
 - DL/I, 18
 - Document ID index, 114
 - Documentation for recovery, 330
 - DOUBLE, 44, 88, 121
 - DPSI access, 542
 - DRDA. *See* Distributed Relational Database Architecture (DRDA)
 - DROP, 115, 175, 242, 318, 327
 - DROP DATABASE, 48
 - DROP PACKAGE, 225
 - DROP TABLE, 430
 - DROP TABLESPACE, 285
 - DROP VIEW, 124
 - DSN, 263
 - DSN commands/subcommands, 262, 263
 - DSN command processor, attachment facilities, 17
 - DSN1COMP, 360
 - DSN1COPY, 340–341, 360, 415, 461, 470, 475
 - DSN1LOGP, 341
 - DSN1PRNT, 341–342, 360
 - DSNACCOX, 439, 462, 464–465, 514, 517, 557
 - DSNJCNVB, 342
 - DSNJCNVT, 342
 - DSNJLOGF, 339
 - DSNJU003 utility, 282, 339
 - DSNJU004, 339–340
 - DSNPARMS, 261–262
 - DSNTEP2, 260
 - DSNTEP4, 260
 - DSNTIAD, 260
 - DSNTIAUL, 259–260, 393, 409–411
 - DSNTRACE, 200
 - DSNU utilities, 279
 - DSNUTILU, 276, 279
 - DSNZPARMs, 4, 5
 - DSSIZ, 58
 - Dual operations, recovery, 330
 - Duplexing, 381
 - Dynamic prefetch, 491–492
 - Dynamic SQL, 24–25, 36, 40, 144
 - global dynamic SQL cache and, 485–486
 - host variables in, 181
 - performance:, 477
 - Dynamic statement cache. *See* Cache
 - Dynamic transactions, archive-enabled tables, 211
- E**
- EA-enabled partitioning, 61. *See also* Extended addressability

- EBCDIC, 87, 133, 138, 394
 - ECSA, 481
 - EDM pool, 28–29
 - efficiency of, statistics for, 484–485
 - global dynamic SQL cache and, 485–486
 - invalidating statements in dynamic statement cache in, 486–487
 - local dynamic SQL cache in, 487
 - performance, 481, 483–487
 - stolen pages in, 484
 - threads and, 289
 - Elapsed time, 504
 - Embedded SQL, 144, 189
 - Empty tables, 71, 74
 - Enabling new function mode/mode*, 258
 - Encoding, 3, 133, 138
 - Encryption, 6
 - Kerberos, 306–307
 - ENDING AT partition, 83
 - Enterprise Storage Server (ESS), 9
 - Entities, 42
 - relationships in, 42
 - Environment for DB2 z/OS, 11–34
 - Environment management, 30, 255–390
 - Environmental Descriptor Manager. *See* EDM pool
 - Environments for application development, 189
 - Equal unique indexes, 541
 - Exam 312 sections and objectives, 2–4
 - Exam 320 sections and objectives, 4–5
 - Exam 610–DB2 10.1 Fundamentals, sections and objectives, 5–6
 - EXCEPT, 153, 154
 - Exception monitoring, 511
 - EXEC, 223
 - EXEC SQL, 274, 276, 393, 407–408
 - EXECUTE, 144, 329
 - EXISTS, 164–165
 - EXIT, 31
 - EXPLAIN, 477, 511–512, 522, 536–547, 553, 555, 557
 - access paths and, 534–535, 536–547
 - cost estimation using, 546–547
 - direct row access and, 542
 - DPSI access and, 542
 - equal unique index, 541
 - EXPLAIN tables for, 536–538
 - hash access in, 539
 - in-list access and, 541–542
 - index access in, 539
 - index-only access and, 541
 - indexes, matching, 539
 - indexes, multiple, access to, 540
 - indexes, nonmatching, 540
 - indexes, screening, 539–540
 - joins and, 543–544
 - locking, 544
 - one-fetch index access and, 540–541
 - page range screening in, 542
 - parallel access and, 542
 - performance and, 536–547
 - PLAN_TABLE and, 538–546
 - predicate performance and, 544–546
 - prefetch access and, 542–543
 - range-list index scan, 541
 - sorting and, 543
 - table space scans in, 539
 - Explicit privileges, 308–309
 - Expression-based index, 103, 106
 - Expressions
 - common table, 215–219
 - GROUP BY and, 156
 - XML, 188
 - Extended addressability (EA) partitioning, 61
 - Extensible Markup Language. *See* XML
 - External SQL procedure, 192
 - External stored procedures, 190
 - Externalized statistics, 462–463, 469, 473, 522
- ## F
- Feedback from stats, 522–524
 - FETCH, 245
 - cursors and, 170
 - FICON channels, 10, 495
 - File reference variables, 182
 - FlashCopy, 360–361, 363, 365, 372, 404, 427–428, 441, 445, 475, 495
 - FLOAT, 121, 168
 - FLOAT8, 121
 - Floating-point numbers, 44
 - FOR UPDATE, 161
 - FORCE, 281

Foreign keys, 45, 110
 Formats for date/time/timestamps, 89
 Fortran, 181
 FREE, 31, 225
 Free space, loading and assigning, 404
 FREEPAGE, 58, 63–64, 404
 Freezing DB2 activity, 283
 Frequency (distribution) stats, 521
 FROM, 159

- aggregate functions and, 186
- recursion and common table expressions with, 216

 Functions, 186–187, 195–201

- aggregate, 186, 196
- built in, 196
- CAST, 196
- defining, CREATE FUNCTION and, 196, 197, 199
- performance considerations for, 199–201
- scalar, 186–187, 196, 197–198
- sourced, 199
- SQL procedural language and, 195
- table, 196, 198–199
- user-defined, 187, 196–197

G

GBPCACHE, 58, 115
 General command processor, 12
 Generalized Trace Facility (GTF), 500
 GENERATED, 90–91
 Generated column types, 90–91

- loading, 403

 Global dynamic SQL cache, 485–486
 Global trace, 508
 Global variables, 5, 182–185, 248, 251, 253

- privileges for, 183
- scope of, 183
- triggers and, 183

 Governor (resource limit facility), 499–500
 GRANT, 175, 242, 303, 308, 310–312, 318, 326, 327
 GRAPHIC, 43, 86, 121
 GRECP, 268
 GROUP, 6
 Group Buffer Pool (GBP), 297–298, 299

- RECOVER-pending status, 268
- recovery and, 380

GROUP BY, 155–156, 159, 521

- aggregate functions and, 186
- expressions and, 156
- HAVING and, 156

 Group manager, 12

H

Hard Disk Drives (HDD), 9
 Hard limit to logs, 332–333
 Hardware compression, 10
 Hash access, 3, 45, 130, 134, 219–220, 249, 252

- EXPLAIN and, 539

 Hash-organized table spaces, 67, 432
 Hash-organized tables, 71, 74–76, 220
 Hash spaces, 67, 432
 HAVING, 156, 159, 521

- aggregate functions and, 186
- subqueries with SELECT and, 162–167

 Health checks, 3
 Hidden columns, SELECT, 161
 High availability, 25–26
 High performance FICON (zHPF), 10
 High-speed communications, 8
 HiperSockets, 8
 Histogram stats, 521
 History tables, 71, 76, 252, 449–450
 Horizontal deferred write threshold (DWQT), 493
 Host variable, 180–182
 HyperPAV, 10, 495

I

I/O management, 491–498

- allocation of space for, 497
- buffer pools in, 495
- data sets in, distributed, 495, 496
- data sets in, extent of, 497–498
- data sets in, fast devices for, 496
- extent size of data sets in, 497
- faster, 495–498
- index parallelism and, 498
- parallel access volumes (PAV) and, 495, 496
- performance, 491–498
- prefetch in, 491–493
- preformatting for, 497

- read operations in, 491–493
 - storage and, 495
 - table spaces and, optimizing, 496–497
 - write operations in, 493–495
- IBM Certified Database Administrator, 1
- IBM Certified Database Administrator, DB2 11 for z/OS, 2–6
- Identity columns, 3, 91
- data types and, 91
 - numeric data and, 88
- IDFORE, 386
- Image copies, 275
- Immediate write threshold (IMTH), 494–495
- Implicit privileges, 308, 313
- IMS. *See* Information Management System (IMS)
- IMS/ESA, 8
- IN/INOUT, 47, 83–84, 164, 192, 521
- In-list access, 541–542
- Include index, 103, 107
- Inconsistency of data and recovery from, 353–356
- Index spaces, 21, 67
- Index-controlled partitioning, 59
- Indexable predicates, 545
- Indexes, 2, 6, 21, 22, 33, 45, 99–110, 135, 388
- access paths and, influencing, 530–531
 - access to, EXPLAIN, 539
 - ASC and DESC in, 101–102
 - authorities and privileges for, 316
 - auxiliary, 103, 108
 - benefits of, 99
 - buffer pools in, 48
 - changing, ALTER INDEX and, 102, 125
 - CLUSTER/NOT CLUSTER in, 125
 - clustering, 103, 105–106
 - columns added to, 125–126
 - COMPRESS/NOT COMPRESS in, 125
 - compressed, 103, 106
 - COPY and copies in, 102, 456, 460
 - creating, CREATE INDEX and, 67, 99–101
 - DB2 catalog, 108
 - DBETE status and, 267–268
 - deferred allocation of index space data sets in, USING STOGROUP and, 102–103
 - document ID, 114
 - DSNACCOX and, 439
 - equal unique, 541
 - expression-based, 103, 106
 - FlashCopy and, 441, 445
 - in parallel rebuilding, 443
 - include, 103, 107
 - index spaces and, 67
 - index-only access, 541
 - keys in, 104–105, 108–110
 - large objects (LOB) and, 108, 113
 - loading, 401
 - matching, 539
 - multi-piece, 105
 - multiple, access to, 540
 - node ID, 114
 - nonmatching, 540
 - nonpartitioned (NPI), 105
 - nonpartitioned secondary (NPSI), 105
 - null-excluding, 103, 107
 - one-fetch access to, 540–541
 - PADDED/NOT PADDED in, 125
 - parallel build, 406, 428
 - parallel subtasks and, 443–444
 - parallel, building with REORG, 428
 - parallelism in, for I/O, 498
 - partitioned, 59, 103, 105
 - partitions in, rebuilding, 442–443
 - primary, 103, 104–105
 - range-list, 541
 - RBA/LRSN conversion and, 445
 - REBUILD-pending status in, 268–269
 - rebuilding, REBUILD INDEX utility and, 102, 442–445
 - recovery of, 330, 349, 371, 375–376
 - renaming, RENAME INDEX and, 126
 - reorganizing, REORG INDEX and, 438–442, 514
 - reorganizing, determining when, 514
 - resetting REBUILD-pending (RBDP) status in, 444
 - screening, 539–540
 - sequence of entries in, 101–102
 - SHRLEVEL access and, 440–441
 - size of, 33
 - STOP DATABASE and, 272–273
 - table spaces and, 55
 - types of, 103
 - unique business time, 104
 - unique, 103–104
 - versions of, 133, 138
 - versions of, ALTER and, 128–129

- XML, 103, 107–108, 127, 188
 - Indicator variables, 200
 - INDOUBT threads, 286, 391
 - Information Management System (IMS), 11, 15, 16, 263, 287, 307, 345, 510
 - attachment facility for, 17
 - commands, 262
 - control region, 14
 - dependent region, 14
 - Informational COPY pending status, 268
 - Informational referential constraint, 96
 - Initialization procedures, 12
 - Inline copies, 275, 404
 - REORG and, 426–427
 - Inline LOBs, 113–114
 - Inline statistics, 449
 - loading, 405
 - Inner joins, 158
 - INSERT, 6, 23, 42, 132, 136, 137, 171–172, 203, 242, 320, 327, 386, 499
 - archive-enabled tables and, 209
 - authorities and privileges for, 308
 - common table expressions in, 215
 - cost estimation using EXPLAIN, 546–547
 - declared global temporary tables and, 202
 - LOAD and, 84
 - referential constraints and, 95
 - tables and, 84–85
 - triggers and, 97
 - views and, 111
 - Insert rule, for constraints, 96
 - Installation and migration, 4, 255–256, 384, 388
 - administrative task scheduler and, 260–261
 - CLIST for, 256
 - commands and, 262–266
 - conversion mode/mode *, 257
 - converting to DB2 11 and, 256
 - DB21 and, 259
 - DSNTEP2 and, 260
 - DSNTEP4, 260
 - DSNTIAD and, 260
 - DSNTIAUL and, 259–260
 - enabling new function mode/mode* in, 258
 - interacting with DB2 in, 259–261
 - ISPF and, 256
 - migration, 255–256
 - modes of, 257
 - new function mode in, 258–259
 - premigration checklist for, 256–257
 - productivity aid sample programs for, 259–260
 - Program Development Facility (PDF) and, 256
 - storage requirements and, 256
 - subsystem parameters (DSNZPARMS) and, 261–262
 - Instead of triggers, 98–99
 - Instructions, System z, 10
 - Instrumental Facility IDs (IFCIDs), 500
 - Instrumentation facilities, 12
 - INTEGER/INT, 44, 88, 91, 121, 168
 - Integrated Catalog Facility (ICF), 281
 - Integrity. *See* Data integrity
 - Intelligent Resource Director (IRD), 8
 - Interacting with DB2 for z/OS, 30–31, 259–261
 - Interactive SQL, 24, 145
 - Interactive System Productivity Facility (ISPF), 30–31
 - installation/migration and, 256
 - Internal Resource Lock Manager (IRLM), 13, 32, 37, 262
 - commands for, 265–266
 - locks and, 230
 - Internet Connection Server, 8
 - INTERSECT, 153, 155
 - Invalidating statements in dynamic statement cache, 486–487
 - Invalidations caused by ALTER, 128
 - IP addresses, 185
 - IRLM. *See* Internal Resource Lock Manager (IRLM),
 - IS NULL, 521
 - Isolation levels, 6, 235–236, 250, 253
 - locks and, 235–236
 - ISPF. *See* Interactive System Productivity Facility (ISPF)
- ## J
- JARs, authorities and privileges, 316
 - Java, 25, 181, 189
 - JDBC, 15, 24, 189
 - SQL and, 145
 - JES, 8
 - JOIN and joins, 157–160
 - EXPLAIN and, 543–544
 - inner, 158
 - outer, 159–160

WHERE in, 158

K

KEEPDICTIONARY, 435

Kerberos, 326

Keys, 21, 45, 104–105, 108–110, 124

foreign, 110

loading, 401

parent, 109

primary, 109

SORTKEYS and, 405

unique, 109

Key-Sequenced Data Set (KSDS), 27

L

LABEL, 242, 316

Language elements of SQL, 174–187

Large object (LOB) table space, 50, 112, 369

Large Object Manager (LOBM), 12

Large objects (LOB), 58, 86, 89, 112–114, 138

auxiliary tables for, 112

base table and, 112

columns for, 396

CREATE INDEX and, 113

CREATE TABLE and, 113

CREATE TABLESPACE and, 113

host variables and, 181–182

indexes and, 108, 113

inline, 113–114

loading, 402

locator variables and, 182

locks, 66

ROWID and, 112

statistics, RUNSTATS and, 450

table spaces for, 50, 112, 267, 369, 431

tables for, 417

unloading, 413

Latches, locks, 230

LDS, 392

Left outer joins, 159

LIKE, 521

tables and, 82

Limit keys, 124

Linear Data Set (LDS), 27

Linux, 8, 510

List prefetch, 492–493

List structure, 298

LISTDEF, 277

LISTPARTS, 429, 430

Literal values, access paths, replacing, 535

LOAD and loading data, 267, 274, 276, 285, 316, 327, 335, 350, 360, 361, 365, 368, 372, 392–409, 404, 474, 469, 521

availability during, 395

CCSID options for, 394

column default values and, 395

concurrent access and, 400

COPY, 404

Cross Loader in, 407–409

delimited file loading in, 394

DSNTIAUL, 393

EXEC SQL, 393, 407–408

free space assignment, 404

generated column types, 403

indexes, 401

inline copies and, 404

inline statistics and, 405

INSERT and, 84

keys, 401

large objects (LOBs), 402

LOB columns and, 396

logging and, 400–401

parallel build indexes and, 406

partitions, 399–400

preformatting pages for, 405–406

RBA/LRSN CONVERSION in, 406–407

REBUILD and, 404

referential constraints and, 96

referential integrity and, 401

REORG and, 404

REORG DISCARD and, 393

REORG UNLOAD EXTERNAL and, 393

REPLACE and, 396–397

replacement or addition of data in, 396–397

RESUME and, 396–397

rows, 398

SHRLEVEL and, 405

SORTKEYS and, 405

statistics, RUNSTATS and, 462

table spaces and, 55, 399–400

tables and, 397–400

triggers and, 97

- UNLOAD and, 393
 - XML/XML columns and, 395–396, 402–403
 - Load modules, 222
 - LOB. *See* Large objects (LOBs)
 - LOB columns, 396
 - LOB host variable, 181–182
 - LOB locator variables, 182
 - LOB locks, 66
 - LOB table space, 50, 112, 267, 369, 431
 - LOB tables, 417
 - Local dynamic SQL cache, 487
 - Locator variables, LOB, 182
 - Lock structure, in data sharing, 298–299
 - LOCK TABLE, 232–233, 316, 327
 - Locks and locking, 6, 141, 230–237, 253. *See also*
 - Concurrency
 - accounting reports and, 512
 - ANY locks, 66–67
 - application design recommendations for, 231
 - COMMIT and, 231
 - CONCURRENT ACCESS RESOLUTION and, 234
 - Cross System Coupling Facility (XCF) and, 265
 - currently committed data and, 233–234
 - data sharing lock structure and, 298–299
 - displaying, DISPLAY DATABASE and, 513
 - duration of, 235–236
 - EXPLAIN and, 511–512, 544
 - Internal Resource Lock Manager (IRLM) and, 13, 32, 230
 - isolation levels and, 235–236
 - latches in, 230
 - LOB locks, 66
 - Lock Detail Analysis report in, 499
 - LOCK TABLE and, 232–233
 - monitoring and, 499, 511–513
 - optimistic, 234–235, 250, 254
 - page locks, 66
 - partition, 65
 - performance, 481
 - recovery and, 380
 - retry logic in, 231
 - ROLLBACK and, 231
 - row locks, 66
 - SKIP LOCKED DATA and, 233
 - statistics reports and, 512
 - table spaces and, 49
 - table spaces and, size of locks in, 65–67
 - table type, 65
 - trace classes for monitoring of, 513
 - LOCKSIZE, 58
 - Log range table, 22
 - Log Record Sequence Numbers (LRSNs), 301, 332–333, 340, 406–407
 - REBUILD INDEX and, 445
 - REORG and, 435
 - Logical data modeling, 41, 42–44, 131, 135
 - Logical page list (LPL), 266, 268, 383, 388
 - Logs and logging, 27, 386, 389. *See also* Backup,
 - recovery, restart
 - active, 27
 - archive, 27
 - bootstrap data set in, 333–334
 - life cycle of records in, 332
 - limits to, soft and hard, 332–333
 - loading, 400–401
 - log record sequence numbers (LRSNs) and, 301, 332–333
 - recovery and, 331–333, 346, 378–379
 - REORG and, 424, 434–435
 - table spaces and, 62–63
 - writing to, 332
 - LPAR performance, 478, 480
 - LRSN. *See* Log Record Sequence Numbers (LRSNs)
 - LSFM, 8
- ## M
- Maintenance, 461–466
 - Management of data sets, 33
 - Many-to-many relationship, 42, 45
 - Mapping tables, 423–424, 475
 - Masks, column, 320–321
 - Matching indexes, 539
 - Materialized query tables (MQT), 71, 76–77, 213–215
 - automatic queries rewrite and, 213–215
 - MAX, 186
 - MAX ABEND, 199
 - MAX_CARDINALITY, 177
 - MAXKEEPD, 482
 - MAXPARTITIONS, 49, 54, 58
 - MAXROWS, 58
 - MEMBER CLUSTER, 58

Memory, 28–30

MERGE, 23, 171, 172–173, 242, 320, 386
referential constraints and, 95

MERGECOPY, 275, 335, 336–337, 348

Message generator, 12

Metrics, 3

MIDAW. *See* Modified Indirect Data Address Word (MIDAW)

Migration. *See* Installation and migration

MIN, 186

Modeling of data, 41–45

Modified Indirect Data Address Word (MIDAW), 10

MODIFY, 246–247, 265, 351–352

MODIFY TRACE, 508

Monitor trace, 508

Monitoring, 498–513, 498
accounting reports in, 499, 512
accounting trace in, 501–505
audit trace in, 507. *See also* Auditing
continuous, 509–510
detailed, 510–511
elapsed time in, 504
exception, 511
EXPLAIN in, 511–512
global trace in, 508
governing in, predictive and reactive, 499
IBM Software Support and, 511
Lock Detail Analysis report in, 499
lock, 499, 511–513
monitor trace in, 508
OMEGAMON for, 498, 511
Online Monitor in, 499
performance monitors in, 498–499
performance trace in, 505–507
performance, 3, 509–511
periodic, 510
resource limit facility in, 499–500
response times in, 503
snapshots in, 510
statistics in, 499, 500–501, 511–512. *See also* Statistics and RUNSTATS
suspensions in, 504–505
threads and, 293–294
trace in, 500–509. *See also* Traces
utilities and, 280–281
wait times in, 504–505

Moving DB2 data, 391–416. *See also* LOAD and Loading data; UNLOAD and unloading data, 391
availability during loading in, 395
column default values and, 395
concurrent access and, 400
control interval (CI) processing and, 392
COPY in, 392, 404
copying data and, 391, 392
DISPLAY DATABASE and, 391
DSN1COPY and, 392, 415
DSNTIAUL and, 392, 393, 409–411
EXEC SQL, 393
LDS in, 392
LOAD, loading and unloading in, 392–409. *See also* LOAD and loading data
logs and logging in, 400–401
REBUILD and, 404, 415–416
RECOVER and, 392, 415–416
RECOVER INDOUBT, 391
referential integrity and, 401
REORG and, 392, 404, 415–416
REORG DISCARD, 393
REORG UNLOAD EXTERNAL, 393
REPLACE and, 396–397
RESUME and, 396–397
string data, 394
UNLOAD and unloading data in, 392–394, 409–415.
See also UNLOAD and unloading data
VSAM and, 391–392

MQSeries, 18

MQT, 120, 121

MSTR, 38

Multi-streaming prefetching (AMP), 10

Multilevel security, 324–325, 384, 388

Multipiece index, 105

Multiple Allegiance, 9, 495

N

Naming conventions
column renaming and, 123–124
DRDA and three-part names in, 239–240
index renaming, 126
unqualified names in, 317–318

Native mode, 30

Native SQL procedures, 191, 201, 251

Nested SQL, 169

New function mode, 258–259
 NO ACTION, 96
 NO CASCADE, 98
 Node ID indexes, 114
 Non-indexable predicates, 545
 Nonpartitioned index (NPI), 105
 Nonpartitioned secondary index (NPSI), 105
 Nonrelational data, 6
 Nonscrollable cursors, 170
 Nonvolatile storage (NVS), 495
 Normalization, 2, 43
 NOT LOGGED objects, 282, 376
 NOT NULL, 91, 94
 Null arrays, 179–180
 Null values, 93–94
 Null-excluding index, 103, 107
 NUMERIC, 44, 88
 Numeric data, 44, 85, 87–88
 CAST and, 168
 identity columns and, 88
 NUMPARTS, 58

O

Object ownership
 authorities and privileges for, 313–318
 BIND/REBIND and, 324
 CREATE and, 313
 plans and packages, 317
 qualified objects and, 315
 roles and, 322–323
 trusted context and, 324
 unqualified objects and, 314
 Object privileges, 304
 Objects, 5
 OBJMAINT, 329
 ODBC. *See* Open Database Connectivity (ODBC)
 OMEGAMON, 484, 498, 511
 One-to-many relationship, 42
 One-to-one relationship, 42
 Online Monitor, 499
 Open Database Connectivity (ODBC), 15, 24, 25
 SQL and, 145
 Open software, 9
 Open transaction environment (OTE), 509

Operating system, z/OS, 7, 11
 performance:, 478
 Optimistic locking, 234–235, 250, 254
 Optimization, 551, 554
 OPTIMIZE, 243–244, 245
 Optimizing for *n* rows, in remote queries, 243–244
 OPTIONS, 277–278
 OPx buffer, 500
 ORDER BY, 151–152, 521
 Ordinary arrays, 177–178
 Organizing data. *See* Data organization
 Outages, 3
 Outer joins, 159–160
 Outer SELECT, 161
 OVER, 152–153
 Overrides, selectivity, in access paths, 529–530
 Ownership. *See* Object ownership

P

PACKADM, 310
 Package lists, 227–228
 Package privileges, 304
 Packages, 143, 185, 222
 authorities and privileges for, 316
 binding/rebinding and, 224, 227
 ownership of, 317
 skeleton application plans and packages (SKPT) in, 483
 trigger, 228
 unqualified names in, 317–318
 PADDED/NOT PADDED, 115, 125
 Page locks, 66
 Page range screening, 542
 Page sets, 21
 Page size, 10
 Pages/paging, 40
 copying, 359–360
 loading, 405–406
 LPL status in, 268
 preformatting, 405–406
 recovery and, 330, 357–360
 recovery and, RECOVER and, 345
 RESTART pending status in, 270
 stolen, 484
 table spaces and, 49

- write error page range (WEPR) status, 270
- write operations and, 493
- Parallel access, 9, 542
- Parallel access volume (PAV), 9, 10, 495, 496
- Parallel build indexes, 406
- Parallel indexes, REORG, 428
- Parallel recoveries, 356–357
- Parallel subtasks, 443–444
- Parallel Sysplex, 9, 11, 14, 19–21, 40, 297. *See also* Data sharing
 - benefits of data sharing, 21
 - coupling facility for, 20
 - performance, 478
 - sysplex failure management (SFM) policy in, 300–301
 - Sysplex Timer and, 20, 301
- Parallelism, 468, 473
 - indexes and I/O and, 498
 - unloading and, 413–414
- Parameter marker variable, 180
- Parameters, 384, 385, 390, 553, 555, 556, 557
 - access paths and, replacing, 535
 - DSNPARMS, 261–262
 - subsystem, 261–262
- Parent keys, 109
- PART, table spaces, 55
- Partition locks, 65
- Partitioned Data Set Extended (PDSE), 15, 201
- Partitioned Data Sets (PDS), 223
- Partitioned index, 103, 105
- Partitioned (classic) table spaces, 50, 55–56, 369, 428–429, 447–448
 - statistics, RUNSTATS and, 447–448
- Partitioned-by-growth table spaces, 53–55, 60, 370, 428–430, 459
- Partitioning, 2, 131
 - adding/dropping, 119
 - by size, 83–84
 - COPY and copies in, 458
 - DBETE status and, 267–268
 - ENDING AT, 83
 - extended addressability (EA), 61
 - IN clause and, 83–84
 - index-controlled, 59
 - loading partitions and, 399–400
 - locks and, 65
 - partitioned-by-growth, 53–55, 60, 370, 428–430, 459
 - range-partitioned, 53–55, 60–61
 - REBALANCE in, 425–426, 433–434
 - REBUILD INDEX and, 442–443
 - recovery and, 330
 - REORG and, 425–426
 - rotation of, 55, 120
 - size of, 132, 136, 137
 - statistics, RUNSTATS and, 447–448
 - STOP DATABASE and, 272–273
 - table spaces and, 49, 59, 119–120
 - table-controlled, 59–60, 82
 - tables and, 82–85
- Partitioning index, 59
- PCTFREE, 58, 115
- Performance and tuning, 3, 4, 477–558
 - access path tuning in, 525–547. *See also* Access paths
 - buffer pools and, 481, 482–483
 - CPU and, 479, 480
 - data organization and, 513–525. *See also* Data organization
 - distributed environments and, 477
 - dynamic SQL and, 477
 - ECSA and, 481
 - EDM pools in, 483–487
 - EXPLAIN and, 477, 536–547
 - functions and, 199–201
 - I/O management in, 491–498
 - locks and, 481
 - LPAR and, 478, 480
 - MAXKEEPD in, 482
 - minimizing storage use in, 481
 - monitoring of DB2 in, 498–513
 - open data sets in, 490–491
 - Parallel Sysplex and, 19–21, 478. *See also* Parallel Sysplex
 - procedures and, 199–201
 - REORG and, 514
 - RID pool in, 487–489
 - sort pool in, 489–490
 - sorting and, 481
 - statement cache and, dynamic, 547–550
 - statistics and, 513–514. *See also* Statistics and RUNSTATS
 - storage and, 480–490
 - threads and, pooled, 481
 - traces in, 477

- Workload Manager in, 478–480
 - z/OS and DB2 in, 478
 - Performance trace, 505–507
 - Periodic performance monitoring, 510
 - Permissions, row, 319–320
 - Persistent Read Only (PRO) restricted status, 268
 - Physical data modeling, 41, 44–45
 - PKLIST, 227–228
 - PL/I, 181, 189
 - Plan stability, 250, 254
 - access paths, 549
 - binding/rebinding and, PLANMGMT and, 230
 - PLANMGMT, 230
 - Plans
 - authorities and privileges for, 316
 - binding/rebinding and, 224
 - execution of, authorization for, 318
 - ownership of, 317
 - skeleton application plans and packages (SKPT) in, 483
 - stability of, 230, 250, 254, 549
 - unqualified names in, 317–318, 317
 - Point in time (PIT) recovery, 362–368
 - Points of consistency, 142
 - Pooled threads, 245, 287–288, 290
 - Precision, 44
 - PRECOMPILE, 31
 - Precompiling, 222, 223, 250, 253
 - CONNECT in, 237
 - options for, 237
 - SQL in, 237
 - Predicates
 - EXPLAIN and, 544–546
 - indexable vs. non-indexable, 545
 - quantified, in subquery, 164
 - residual, 545–546
 - stage 1 and stage 2, 545–546
 - subqueries and, 162–166
 - Predictive governing, 499
 - Prefetch, 10, 35, 38, 491–493, 551, 555
 - EXPLAIN tables and, 542–543
 - PREFORMAT, 405–406, 497
 - Preformatting, I/O management, 497
 - PREPARE, 144, 486
 - Primary index, 103, 104–105
 - Primary key, 45, 104–105, 109
 - Primary Option menu, 35, 38
 - Privileges. *See* Authorization and privileges
 - PRO restricted status, 268
 - Procedures
 - autonomous, 192
 - changing, ALTER PROCEDURE and, 194–195
 - creating, CREATE PROCEDURE and, 190, 191, 194, 200
 - deterministic, 192
 - external SQL, 192
 - external stored, 190
 - external vs. SQL, 193
 - native SQL, 191, 201, 251
 - performance considerations for, 199–201
 - SQL, 191, 193
 - stored, 189–181
 - Profiles, RUNSTATS, 451–453, 471, 473, 476
 - Program Development Facility (PDF), installation/migration, 256
 - PROGRAM PREPARATION, 31
 - PSRB, 268
 - PSRBD, REBUILD INDEX, 444
 - PUBLIC, 311
 - pureQuery, 24, 25, 189
 - pureXML, 25, 187–189. *See also* XML
 - data model for, 187
 - XQuery and, 188
- ## Q
- QMF, 24, 478
 - Qualified objects, 315
 - QUALIFIER, 317–318
 - Queries, remote. *See* Remote queries
 - QUIESCE, 275, 281, 335–336, 348, 350, 354, 363
- ## R
- RACF. *See* Resource Access Control Facility (RACF)
 - Range-list index scan, 541
 - Range-partitioned table space, 53–55, 60–61, 82
 - RANK, 153
 - RBA
 - REBUILD INDEX and, 445
 - REORG and, 435
 - RBA/LRSN CONVERSION, 406–407, 406

- RBDP, 268
- RDBNAM, 296
- Reactive governing, 499
- READ, 183
- Read operations, 491–493
 - prefetch in, 491–493
- Read stability (RS), 235–236
- REAL, 44, 88, 121
- Real-time statistics (RTS), 462, 468, 469, 472, 525, 553, 557
- REBALANCE, 433–434
 - table spaces and, 55
- REBIND. *See* BIND/REBIND
- REBIND PACKAGE, 234, 254
- REBIND PLAN, 234
- Rebinding. *See* Binding and rebinding; BIND/REBIND
- REBUILD, 268–269, 365, 404, 415–416, 497, 521
 - tables and, 84
- REBUILD INDEX, 102, 337, 349, 350, 360, 442–445, 468, 473
 - FlashCopy and, 445
 - in parallel index rebuilding with, 443
 - index partitions and, 442–443, 442
 - parallel subtasks and, 443–444, 443
 - PSRBD and, 444
 - RBA/LRSN conversion and, 445
 - resetting REBUILD-pending (RBDP) status in, 444
- REBUILD-pending (RBDP) status, 268–269, 444
- Reclustering, REORG, 433
- Record identifier (RID). *See* RID pool
- RECOVER, 267, 268, 269, 273, 275, 337, 345, 348, 349, 353–358, 360, 365–366, 369, 371, 375–376, 383, 415–416, 457. *See also* Backup, recovery, restart
 - ALTER statements and, 371
 - moving, 391
 - options for, 366–368
- RECOVER-pending status, 269, 282
- RECOVER POSTPONED, 273, 284–285
- RECOVER TOCOPY, 350
- RECOVER TOLOGPOINT, 350
- Recovery. *See* Backup, recovery, restart
- Recovery log manager, 12
- Recovery manager, 12
- Recovery utilities, 275
- RECP, 268
- Recursion, common table expressions, 216–219
- Referential constraints, 21, 95–97
- Referential integrity, 21
 - loading, 401
- REFRESH, 269
- REFRESH-pending status, 269
- Registers, temporal tables, 206–207
- Regression, access path, 549
- Relational Data System (RDS), 12
- Relationships, 42
- RELEASE, 244
- RELEASE(DEALLOCATE), 245–246
- Remote DB2 access, 305–306
- Remote queries, 243–244
- Remote requests, 40
- Remote sites for recovery, 331
- RENAME, 242
- RENAME INDEX, 126
- Reoptimization, access paths, 533–535
- REORG, 3, 119, 121, 136, 269, 330, 335, 350, 361, 363, 365, 368, 372, 404, 414–415, 417–438, 514, 517, 521. *See also* Data organization; REORG TABLESPACE
 - ALTER statements and, 420
 - catalogs and, 435–436
 - data set definitions and, changing, 425
 - determining objects for reorganization with, 418–419
 - directories and, 435–436
 - DROP TABLE and, 430
 - FlashCopy image copy and, 427–428
 - hash-organized table spaces and, 432
 - improving performance of, 436–438
 - indexes and, 514
 - inline copies and, 426–427
 - KEEPDICTIONARY and, 435
 - LISTPARTS option in, 429, 430
 - LOB table spaces and, 431
 - LOB tables and, 417
 - log processing and, 424
 - logging and, 434–435
 - mapping tables and, 423–424
 - parallel index building and, 428
 - partitioned table spaces and, 428–429
 - pending definition changes and, 431–432
 - performance, 514
 - RBA/LRSN conversion and, 435

- REBALANCE and, 425–426
- rebalancing partitions and, 433–434
- reclustering and, 433
- redistributing data across partitions and, 425–426
- removing data with, 414
- SHRLEVEL access and, 417, 420–422
- SORTCLUSTER in, 426
- SORTDATA and, 433
- statistics, RUNSTATS and, 462
- table spaces and, 55, 122–123, 428–429, 515–516
- unloading and, 414–415
- unloading with reloading and, 424
- XML table spaces and, 431
- REORG DISCARD, 393
- REORG INDEX, 275, 360, 438–442
 - determining indexes to reorganize with, 438–439
 - DSNACCOX in, 439
 - FlashCopy and, 441
 - improving performance of, 441–442
 - reorganizing, determining which ones, 438–439
 - SHRLEVEL access and, 440–441
- REORG-pending status, 269
- REORG TABLESPACE, 275, 360, 417–438
- REORG UNLOAD EXTERNAL, 393
- REORG UNLOAD EXTERNAL/DISCARD, 414–415
- REPAIR, 338
- Repeatable read (RR), 235–236
- REPLACE, 285, 368, 372, 396–397
- REPORT, 275, 337, 348, 351, 355, 447
- Requests, 37
- Residual predicates, 545–546
- Resource Access Control Facility (RACF), 14, 27, 305–306, 324, 326
- Resource limit facility, 499–500
- Resource Recovery Services (RRS), 16, 18, 334
- Response times, 503
- RESTART, 270. *See also* Backup, recovery, restart
- RESTART-pending status, 270, 273
- Restarting DB2, 281, 342–343, 346–347. *See also* Backup, recovery, restart
 - automatic restart manager (ARM) in, **301**
 - conditional, 281–282
 - data sharing group termination and, 282–283
 - NOT LOGGED tables, 282, 376
- RESTORE SYSTEM, 338, 348, 364, 378
- RESTRICT, 96–97, 327
- Restrictive states, 3, 266
 - displaying, DISPLAY DATABASE and, 270–272
- Result sets, locator variables, 182
- Result tables, 71
 - combining, with UNION, EXCEPT, or INTERSECT, 153–155
 - filtering groups in, with HAVING, 156
 - formatting, 149
 - JOINS in, 157–160
 - naming, with AS, 150
 - numbering rows in, with OVER, 152–153
 - ordering rows in, with ORDER BY, 151–152
 - ranking rows in, with RANK, 153
 - specified time periods for, with ROW CHANGE
TIMESTAMP, 157
 - summarizing group views in, with GROUP BY, 155–156
- RESUME, 396–397
- Retry logic, 250, 254
 - locks and, 231
- REVOKE, 175, 242, 303, 308, 310–312, 316, 318, 326, 327
- REXX, 144, 181, 182
- RID pool, 28, 29, 487–489
 - performance and, 481, 487–489
 - prefetch in, 492–493
- Right outer joins, 159
- Roles, 305, 322–323
 - authorities and privileges for, 316
- ROLLBACK, 141, 142, 183, 231
 - recovery and, 344
 - SQL procedures and, 193
- ROTATE PARTITION, 120
- Rotation, 55
- Routines, 21, 189–201. *See also* Stored procedures
- ROW BEGIN/END, 93
- Row change timestamp, 92
- ROW CHANGE TIMESTAMP, 157
- Row ID, 2
- Row locks, 66
- Row permissions, 319–320
- Row-level security, 324
- ROWID data type 92–93, 112
- Rows, 67–68

- access control in, 318–321
- BEGIN/END, 93
- loading, 398
- null values and, 94
- permissions for, 319–320
- row change timestamp and, 92
- row-level security and, 324
- ROWID data type and, 92–93, 112
- transaction start ID and, 93–94

RRS. *See* Resource Recovery Services (RRS)

RRSAF, 287, 323

RUN, 31

Runs, in sorting, 29

RUNSTATS. *See* Statistics and RUNSTATS

S

- Savepoints, 142–143, 344
- SCA. *See* Shared Communication Area
- Scalar functions, 186–187, 196, 197–198
- Scale, 44
- Scheduling backups and data checks, 343
- Schemas, 6, 111–112
 - CURRENT, 112
 - naming, 112
 - XML, 188
- Scope
 - global variables, 183
 - trigger, 183
- Scrollable cursors, 170
- SCT02, 22
- SDA. *See* Shared Data Architecture (SDA)
- Search conditions and SELECT, 147–148
- SECADM, 310, 312–313, 319, 320, 329
- SECMAINT, 329
- Secure Sockets Layer (SSL), 9
- Security, 3, 9, 33, 303
 - multilevel, 324–325, 384
- Security labels, 305
- Security Server, 14, 27, 305, 306
- Segmented table space, 50, 56, 369, 430
- SEGSIZE, 115
 - table spaces and, 55
- SELECT, 6, 23, 145–149, 260, 499. *See also* Result tables
 - ALL in, 164
 - ANY in, 164
 - archive-enabled tables and, 210–211
 - AS and, 150–151
 - asterisk used in, 145–146
 - authorities and privileges for, 308
 - common table expressions in, 215
 - comparison of distinct types in, with CAST, 167–169
 - comparison operators and, 147
 - cost estimation using EXPLAIN, 546–547
 - CREATE VIEW with AS clause and, 150–151
 - cursors and, 169–171
 - DB2 Query Management Facility (DB2QMF) and, 145
 - declared global temporary tables and, 202
 - DELETE and, 167, 173
 - derived columns and, 148
 - DISTINCT and, 150
 - DISTINCT FROM and, 148
 - duplication in, eliminating with DISTINCT, 150
 - EXCEPT and, 153, 154
 - EXISTS in, 164–165
 - FETCH and, 160–161
 - FOR UPDATE in, 161
 - FROM, 159
 - GROUP BY and, 155–156, 159
 - HAVING in, 156, 159
 - hidden columns and, 161
 - implications of use of, 161
 - IN in, 164
 - individual columns for, 146–147
 - INSERT and, 171–172
 - INTERSECT and, 153, 155
 - JOIN in, 157–160
 - MERGE and, 172–173
 - nested statements in, 169
 - OPTIMIZE in, 160–161
 - optimizing a query in, with FETCH, 160–161
 - optimizing a query in, with OPTIMIZE, 160–161
 - ORDER BY and, 151–152
 - ordering of clauses in, 159
 - OVER and, 152–153
 - RANK and, 153
 - result tables from, combining, with UNION, EXCEPT, or INTERSECT, 153–155
 - result tables from, filtering groups in, with HAVING, 156
 - result tables from, formatting, 149
 - result tables from, JOINS in, 157–160
 - result tables from, naming, 150

- result tables from, numbering rows in, OVER and, 152–153
- result tables from, ordering rows in, and ORDER BY, 151–152
- result tables from, ranking rows in, with RANK, 153
- result tables from, specified time periods for, with ROW CHANGE TIMESTAMP, 157
- result tables from, summarizing group views in, with GROUP BY, 155–156
- ROW CHANGE TIMESTAMP, 157
- rows and, with search conditions, 147–148
- search conditions with, 147–148
- SOME in, 164
- SPUFI and, 145
- subqueries using, 161–167. *See* Subqueries with SELECT, 161
- TRUNCATE and, 173
- UNION and, 153, 154
- UPDATE and, 166–167, 172
- updating data during retrieval with, with FOR UPDATE, 161
- views and, 110–111
- WHERE and, 147, 158, 159, 161–167, 173. *See also* Subqueries with SELECT
- XML data, XPath, and, 148–149
- Selectivity overrides, 529–530
- Sequence objects, 220–222
- Sequences, authorities and privileges, 316
- Sequential prefetch, 491
- Sequential prefetch threshold (SPTH), 494
- Servers, 6
- Service controller, 12
- Session variables, 185
- SET, 265
- SET CURRENT SQLID, 327
- SET LOG SUSPEND/RESUME, 283
- SET NULL, 96, 327
- Shared Communications Area (SCA), 297, 298
 - recovery and, 380
- Shared Data Architecture (SDA), 297
- SHRLEVEL, 383, 405, 417, 440–441, 420–422, 458–459, 470, 475
 - statistics, RUNSTATS and, 447
- Simple table space, 50
- Skeleton application plans and packages (SKPT), 22, 483
- Skeleton cursor tables (SKCT), 22, 483
- Skeleton package table (SKPT), 22, 483
- SKIP LOCKED DATA, 233
- SMALL INTEGER/SMALLINT, 44, 88, 91, 121, 168
- SNA. *See* System Network Architecture (SNA)
- Snapshots, 510
- Soft limit to logs, 332–333
- Software Support, 511
- Solid-state drives (SSD), 9
- SOME, 164
- SORT, 6, 521
- Sort pool, 28, 29–30, 481, 489–490
- SORTCLUSTER, 426, 434
- Sorting
 - EXPLAIN and, 543
 - performance of, 481
 - REORG and, 433
 - sort pool and, 489–490, 489
 - SORTDATE, 433
 - tournament sort, 489–490, 489
- SORTKEYS, 405
- Sourced functions, 199
- Specialty engines, 8
- SPT01, 22
- SPUFI, 24, 31, 145, 191, 259
 - SELECT and, 145
- SQL, 4, 5, 6, 18, 23–25, 36, 39, 143–247.
 - application programming and, 139–141
 - binding/rebinding and, 143, 237
 - Call Level Interface (CLI) and, 144, 145
 - cursors in, 169–171
 - Data Control Language (DCL) in, 310
 - data types in. *See* Data types
 - DECLARE CURSOR in, 144
 - deferred embedded, 144
 - DELETE in, 173
 - DESCRIBE in, 144
 - dynamic, 24–25, 144
 - embedded, 144
 - EXECUTE in, 144
 - functions and, 186–187, 195–201
 - global dynamic SQL cache and, 485–486
 - host variables and, 181
 - INSERT in, 171–172
 - interactive, 24, 145
 - Java and, 25
 - JDBC and, 145

- language elements in, 174–187
 - local dynamic SQL cache in, 487
 - MERGE in, 172–173
 - modification restrictions with views and, 173–174
 - modifying data with, 171–187
 - native procedures in, 191, 201
 - nested statements in, 169
 - Open Database Connectivity (ODBC) and, 25, 145
 - PREPARE in, 144
 - procedures in, 191, 193
 - pureQuery and, 25
 - pureXML and, 187–189
 - REXX and, 144
 - routines in, 189–201
 - scalar functions and, 197–198
 - SELECT in, 145–169, 171. *See also* SELECT
 - SPUFI and, 145
 - SQL procedural language and, 195
 - SQLCA and, 193
 - SQLJ and, 25, 145
 - static, 24, 144
 - table functions and, 198–199
 - TRUNCATE in, 173
 - UPDATE in, 172
 - variables in, 180–186
 - XML document updates with, 188
 - XQuery and, 188
- SQL parameter variable, 180
- SQL Procedural Language (SQL/PL), 4, 189, 195
- SQL procedures, 191, 193
- SQL Processor Using File Input. *See* SPUFI
- SQL variable, 180
- SQLADM, 310, 528
- SQLCA, 193, 223
- SQLERROR, 318
- SQLID, 304
- SQLJ, 15, 25, 189
 - SQL and, 145
- SQLRULES, 243–244
- Stage 1 and 2 predicates, 545–546
- START, 264
- START DATABASE, 273
- START DB2, 31
- START TRACE, 328, 508
- Statement cache. *See* Cache
- Static binding, 224
- Static SQL, 24, 144
- Statistics and RUNSTATS, 2, 3, 275, 445–456, 461–466, 469, 470, 472, 474, 511, 551, 552, 554, 555, 556, 557
 - access during execution and, 447
 - access path, resetting, 450–451
 - automatic collection of, 524–525
 - autonomic and, 454–456
 - binding/rebinding and, 227
 - cardinality, 520
 - catalog updates and, 447
 - collection of, automated, 524–525
 - collection of, how, 519–520
 - collection of, when, 517–519
 - compression statistics and, 448–449, 471, 476
 - COPY, 462
 - data organization and, 516–525
 - DB2 catalog, 453
 - distribution type statistics and, collecting, 448
 - DSNACCOX and, 462, 464–465
 - EDM pool efficiency, 484–485
 - EXPLAIN and, 522
 - externalized, 462–463, 469, 473, 522
 - feedback from, 522–524
 - frequency (distribution), 521
 - histogram, 521
 - history tables and, 449–450
 - improving performance of, 453–454
 - inline statistics and, 449
 - LOAD and loading and, 405, 462
 - LOB and XML, 450
 - partitioned table spaces, 447–448
 - profiles for, 451–453, 471, 473, 476
 - real-time (RTS), 462, 468, 469, 472, 525
 - rebinding after collection, 525
 - REORG and, 462
 - REPORT and, 447
 - SHRLEVEL and, 447
 - statement cache, externalizing, 547–549
 - statistic trace in, 500–501
 - SYSINDEXSPACESTATS and, 462, 466
 - SYSTABLESPACESTATS and, 462, 465
 - types of, 520
 - user queries and, 465
 - when to gather, 446–447
- Statistics reports, 512
- Statistics trace, 500–501
- STOGROUP, 115

- STOP, 264
- STOP AFTER FAILURES, 200
- STOP DATABASE, 272–273
- STOP DB2, 31, 281
- STOP status, 270
- STOP TRACE, 328, 508
- Stopping DB2, 281
 - SET LOG SUSPEND/RESUME to freeze activity or, 283
- Storage, 21, 470, 475, 480–490. *See also* Buffer pools
 - buffer pools in, 481, 482–483
 - EDM pools in, 481, 483–487
 - I/O management and, optimizing, 495
 - installation/migration requirements for, 256
 - MAXKEEPD in, 482
 - minimizing use of, 481
 - nonvolatile, 495
 - performance, 480–490
 - RID pool in, 481, 487–489
 - skeleton application plans and packages (SKPT) in, 483
 - skeleton cursor tables (SKCT) in, 483
 - sort pool in, 481, 489–490
 - STOSPACE utility and, 456
 - threads and, 293
- Storage capacity, 8
- Storage groups, 22, 45–47
 - authorities and privileges for, 315
 - changing, ALTER STOGROUP and, 116–117
 - creating, CREATE STOGROUP and, 45–47
 - STOSPACE, 456
- Storage Management System (SMS), 15, 26
- Storage Manager, 13
- Storage structures, 49–57. *See also* Table spaces
- Stored procedures, 4, 11, 16, 19, 189–191, 248, 251, 469
 - authorities and privileges for, 317
 - changing, ALTER PROCEDURE and, 194–195
 - creating, CREATE PROCEDURE and, 190, 191
 - external, 190
 - manager for, 12
 - native SQL, 191
 - SQL, 191
- STOSPACE, 456, 470, 475
- String data, 85, 86–87
 - encoding schemes for, 87, 133, 138
 - loading, 394
- Structure failure and recovery, 380
- Structures, creating, 45–67
- Subqueries with SELECT, 161–167
 - comparison of distinct types in, with CAST, 167–169
 - correlated and uncorrelated, 162
 - correlated, 165–166
 - correlation names in references and, 166
 - DELETE and, 167
 - EXISTS in, 164–165
 - HAVING and, 162
 - IN in, 164
 - nested, 163
 - outer SELECT and, 161
 - predicates and, 162–166
 - quantified predicates in, 164
 - single table for, 167
 - SOME, ALL, ANY in, 164
 - UPDATE and, correlated, 166–167
 - user-defined functions in, 166
 - WHERE and, 161–167
- SUBSTR, 186
- Subsystem support, 13
- SUM, 186
- Suspensions, 504–505
- SYSADM, 309, 312–313, 320, 528, 552, 556
- SYSADMIN, 329
- SYSCTRL, 309, 312–313, 528
- SYSDEFLT, 45
- SYSIBM.CLIENT_IPADDR, 185
- SYSIBM.IPNAMES, 296
- SYSIBM.LOCATIONS, 296
- SYSIBM.LULIST, 296
- SYSIBM.LUMODES, 296
- SYSIBM.LUNAMES, 296
- SYSIBM.MODESELECT, 296
- SYSIBM.PACKAGE_NAME, 185
- SYSIBM.SYSCOLAUTH, 325
- SYSIBM.SYSCONTEXT, 325
- SYSIBM.SYSCONTEXTAUTHIDS, 326
- SYSIBM.SYSCONTROLS, 325
- SYSIBM.SYSCOPY, 350
- SYSIBM.SYSCTXTTRUSTATTRS, 326
- SYSIBM.SYSDBAUTH, 325
- SYSIBM.SYSEQUENCEAUTH, 325
- SYSIBM.SYSLGRNX, 350
- SYSIBM.SYSPACKAUTH, 325

SYSIBM.SYSPLANAUTH, 325
SYSIBM.SYSRESAUTH, 325
SYSIBM.SYSROLES, 325
SYSIBM.SYSROUTINEAUTH, 325
SYSIBM.SYSROUTINES, 199
SYSIBM.SYSSCHEMAAUTH, 325
SYSIBM.SYSTABAUTH, 325
SYSIBM.SYSUSERAUTH, 325
SYSIBM.SYSVARIABLEAUTH, 325
SYSIBM.TIME_FORMAT, 185
SYSIBM.USERNAMES, 296
SYSIBMADM.GET_ARCHIVE, 184
SYSIBMADM.MOVE_TO_ARCHIVE, 184
SYSINDEXSPACESTATS, 462, 466
SYSKEYTARGETS, 40
SYSLGRNX, 22
SYSOPR, 253, 309, 528
SYSPACKAUTH, 289
Sysplex Failure Management (SFM) policy, 300–301
Sysplex Timer, 20, 301
SYSTABLESPACESTATS, 462, 465
System Management Facility (SMF), 500
System Network Architecture (SNA), 13, 19, 295, 296
System objects, 21–23
System parameter manager, 13
System services, 12
System Services Address Space (SSAS), 12
System utility table, 22
System z instructions, 10
System z Integrated Information Processor (zIIP), 8
System-level backup
 data-only, 364
 for object-level recoveries in, 361–362, 363–366
 full, 364–365
System-period temporal tables, 77–78
System-wide recovery, 378
System-wide points of consistency, 353
SYSUTILX, 22

T

Table functions, 196, 198–199
Table spaces, 3, 21, 22, 33, 49–57, 130, 132, 134, 135,
 137, 382, 386, 389
 ANY locks in, 66–67

 authorities and privileges for, 316
 auxiliary warning status in, 266–267
 auxiliary, 56–57
 base, 57
 buffer pools and, 48
 changing, ALTER TABLESPACE and, 54, 117–120,
 131, 136
 CHECK pending status in, 266, 267
 clauses to define, in CREATE TABLESPACE, 58
 COMMIT and, 122
 compressing data and, 64–65
 COPY and copies in, 459
 creating, CREATE TABLESPACE and, 49, 50–53, 58,
 130
 DBETE status and, 267–268
 dropped, recovery of, 376–377
 extended addressability (EA) partitioning in, 61
 free space in, reserving for I, 63–64
 FREEPAGE in, 63–64
 hash-organized table spaces and, 432
 I/O management and, optimizing, 496–497
 index-controlled partitioning in, 59
 indexes and, 55
 keys in, 124
 large object (LOB), 50, 56–57, 112, 267, 369, 431
 loading, 399–400
 LOB locks in, 66
 locks and locking in, 49, 65–67
 logging and, 62–63
 materializing pending definition changes in, 118–119
 MAXPARTITIONS and, 54
 number of, 49
 page locks in, 66
 pages in, 49
 partition locks in, 65
 partitioned (classic), 50, 55–56, 369, 428–429, 447–448
 partitioned-by-growth, 53–55, 60, 370, 428–430, 459
 partitioning in, 49, 59, 119–120
 partitioning index, CREATE INDEX and, 59
 Persistent Read Only (PRO) restricted status in, 268
 range-partitioned, 53–55, 60–61
 RECOVER pending status in, 269
 recovery and, 330, 368–370, 375–375, 383, 388
 REFRESH pending status in, 269
 REORG and, 55, 122–123, 417–438, 428–429,
 515–516
 REORG-pending status in, 269

- reorganizing, determining when, 515–516
- rotation and, 55
- row locks in, 66
- segmented, 50, 56, 369, 430
- sets of, 370
- simple, 50
- size of, 33
- statistics, RUNSTATS and, 447–448
- STOP DATABASE and, 272–273
- table locks in, 65
- table-controlled partitioning in, 59–60
- universal, 50, 53–55
- version of, 121–123
- VSAM and, 49
- XML, 50, 57, 127, 369, 431, 459, 471, 475
- Table-controlled partitioning, 59–60, 82
- Tables, 2, 5, 21, 45, 67–85, 130, 134, 249
 - Accelerator-only, 71–72
 - application-period temporal, 78, 204
 - archive, 71, 72, 207
 - archive-enabled, 71, 71, 184, 207–213
 - auditing and, 328–329
 - authorities and privileges for, 316
 - auxiliary, 71, 72–73, 112
 - base, 73, 112
 - bitemporal, 78–79, 204–205
 - by-size partition in, 83–84
 - changing, ALTER TABLE and, 71, 77, 78, 120–124
 - clone, 71, 73–74, 377
 - column masks in, 320–321
 - columns in, 67–68
 - columns in, dropping, 123
 - columns in, renaming, 123–124
 - common table expressions in, 215–219
 - copying, LIKE clause and, 82
 - created global temporary, 79–80, 201
 - creating, CREATE TABLE and, 47, 68–71, 81–82, 196
 - data types in, 121
 - DB2 catalog and, 22–23
 - DBETE status and, 267–268
 - declared global temporary, 80, 201, 202, 240
 - DRDA and, three-part names and, 239–240
 - dropped, recovery of, 376–377
 - empty, 71, 74
 - ENDING AT partition in, 83
 - hash-organized table spaces, 71, 74–76, 220, 432
 - history, 71, 76, 252, 449
 - INSERT and, 84–85
 - invalidations caused by ALTER in, 128
 - large objects (LOB) and, 112, 417
 - LOAD, loading and, 84, 397–400
 - locks and, LOCK TABLE and, 232–233
 - mapping, 423–424, 475
 - Materialized query (MQT), 71, 76–77, 120, 121, 213–215
 - partitioning definition in, 82–85
 - range-partitioned, 82
 - REBUILD and, 84
 - recovery and, 377–378
 - restart and, NOT LOGGED, 282, 376
 - result, from SELECT, 71, 149–152
 - rows in, 67–68
 - skeleton cursor tables (SKCT) in, 483
 - statement cache, dynamic, 547
 - statistics, RUNSTATS and, 449
 - system-period temporal, 77–78
 - table functions and, 196, 198–199
 - table space version in, 121–123
 - temporal, 71, 77, 201–207, 249, 252, 377–378
 - temporary, 71, 79, 201–202
 - types of, 71
 - volatile, 81
 - XML, 71, 81, 114–115, 127
- Task Control Block (TCB), 509
- TCP/IP, 13, 19, 295, 296, 384, 389, 479
- TEMPLATE, 277–279
- Temporal tables, 71, 77, 201–207, 249, 252, 377–378
 - application period for, 204
 - bitemporal, 204–205
 - creating, CREATE TABLE and, 203–204
 - querying, 205–206
 - recovery and, 377–378
 - special registers and, 206–207
- Temporary tables, 71, 79, 201–202
- TERM UTILITY, 355–356
- Third Form Normal (3NF), 43
- Threads, 3, 285–288, 389
 - active, 288
 - allied, 287, 288
 - allocation of allied, 288
 - allocation/deallocation in, 292
 - commit processing and termination of, 289–290
 - connection queuing and, 292

- creating, 288–289
 - database access (DBATs), 287, 290, 291, 292
 - EDM pool and, 289
 - INDOUBT, 286
 - limits to, setting, 290–291
 - managing, 287
 - monitoring, DISPLAY THREAD and, 293–294
 - performance of, 481
 - pooled, 287–288, 290, 481
 - resource allocation in, 289
 - SQL statement execution in, 289
 - storage of, 293
 - termination of, 289–290
 - timing out idle, 291
 - types of, 287
 - viewing, after recovery, 285–287
- Thresholds, write, 493–495
- TIME, 44, 89
- Time Sharing Option (TSO), 11, 32
- Time Sharing Option/Extensions (TSO/E), 30
- Timeout, 254
- threads and, 291
- TIMESTAMP, 44, 88–89
- Tivoli, 484, 498, 511
- TOCOPY, 362
- Tournament sort, 29, 489–490
- Trace, 3, 500–509
- accounting trace in, 501–505
 - audit trace in, 507. *See also* Auditing
 - changing IFCIDs for, MODIFY TRACE, 508
 - classes, recommendations for, 509
 - DB2, 500
 - displaying options for, DISPLAY TRACE and, 508
 - elapsed time in, 504
 - generalized trace facility (GTF), 500
 - global trace, 508
 - invoking, START TRACE and, 508
 - monitor trace in, 508
 - performance trace, 477, 505–507
 - response times in, 503
 - statistics trace, 500–501. *See also* Statistics and RUNSTATS
 - stopping, STOP TRACE and, 508
 - suspensions in, 504–505
 - types of, 500
 - wait times in, 504–505
- Trace, audit, 326–328
- classes and events for, 327
 - starting/stopping, 328
 - viewing, with DISPLAY TRACE, 328
- TRACKMOD, 58
- Transaction control, start ID, 93–94
- Transaction management, 6, 23, 344
- coordinated updates and, 345
 - recovery and, 344
- Transition variable, 180
- Trigger packages, binding/rebinding, 228
- Triggers, 6, 21, 97–99, 249, 253
- archive-enabled tables and, 208
 - binding/rebinding and, REBIND and, 228
 - creating, CREATE TRIGGER and, 98, 228
 - global variables and, 183
 - NO CASCADE in, 98
- TRUNCATE, 23, 171, 173, 242
- Trusted connections, 321–324
- Trusted context, 305, 321–324, 327
- authorities and privileges for, 316
 - ownership and, 324
- TSO, 14, 15, 16, 262, 263, 287, 323, 382, 386, 478
- attachment facility for, 17
- TSO/E, 8
- Two-phase commit, 241–242
- Type modifiers, XML, 188–189

U

- Uncommitted read (UR), 235–236, 253
- Uncorrelated subqueries, 162
- Unicode, 9, 87, 133, 138, 394
- UNION, 153, 154
- Unique business time index, 104
- Unique constraints, 94, 95, 388
- Unique index, 103–104
- Unique keys, 109
- Unit of recovery, 142, 284–285
- Unit of work, 23, 141–142, 248, 251
- Universal language interface (DSNULI), 18
- Universal table space, 50, 53–55
- UNIX, 15, 345, 510
- UNIX DDF, 8

- UNLOAD and unloading data, 259–260, 274, 276, 335, 393, 409–415, 424–425, 468, 472
 - data sources form, 411–412
 - delimited, 112–113
 - DSNTIAUL and, 409–411
 - LOB data, 413
 - parallelism in, 413–414
 - REORG to remove data in, 414
 - REORG UNLOAD EXTERNAL/DISCARD, 414–415
 - XML data, 413
 - Unqualified names, 317–318
 - Unqualified objects, 314
 - UPDATE, 6, 23, 42, 135, 136, 171, 172, 203, 242, 320, 327, 345, 386, 499
 - authorities and privileges for, 308
 - coordinating, two-phase commit and, 241–242
 - correlated subqueries and, 166–167
 - cost estimation using EXPLAIN, 546–547
 - cursors and, 169, 170
 - declared global temporary tables and, 202
 - FOR UPDATE clause and, 161
 - positioned, 161
 - referential constraints and, 95
 - triggers and, 97
 - views and, 111, 174
 - Update rule, for constraints, 96
 - Upgrades, 4
 - User address spaces, 14
 - User queries, statistics, RUNSTATS, 465
 - User-defined data types, 175
 - User-defined functions, 4, 6, 187, 196–197, 317
 - changing, ALTER FUNCTION and, 199
 - creating, CREATE FUNCTION and, 187
 - subqueries and, 166
 - UT* status, 270
 - UTF8 and UTF16, 87
 - Utilities, 3, 12, 33, 35, 38, 274–281
 - checking data, 275, 276
 - commonly used, 274
 - data management, 274–275
 - DB2, 274–281
 - DB2I execution of, 279
 - DSNU command execution of, 279
 - DSNUTILU stored procedure and, 276, 279
 - execution of, 279
 - loading/unloading data, 276
 - monitoring, DISPLAY UTILITY and, 280–281
 - online, 274, 276
 - recovery and, 275, 334–342, 346, 348, 355–356
 - running, 276
 - standalone, 274, 276, 339–342
 - uses for, 274
 - vendors of, 274
 - UTILITIES, 31
- ## V
- VALIDATE, 318, 329
 - VARBINARY, 43, 86, 89
 - VARCHAR, 43, 86, 87, 89, 121
 - VARGRAPHIC, 43, 86, 87, 89, 121
 - Variables, 180–186
 - array, 185–186
 - authorities and privileges for, 317
 - dynamic SQL and, host, 181
 - file reference, 182
 - global, 182–185, 248, 251, 253
 - host, 180–182
 - indicator, 200
 - LOB host, 181–182
 - LOB locator, 182
 - parameter marker, 180
 - result set locator, 182
 - session, built in, 185
 - SQL, 180
 - SQL parameter, 180
 - SYSIBM.CLIENT_IPADDR, 185
 - SYSIBM.PACKAGE_NAME, 185
 - SYSIBM.TIME_FORMAT, 185
 - SYSIBMADM.GET_ARCHIVE, 184
 - SYSIBMADM.MOVE_TO_ARCHIVE, 184
 - transition, 180
 - XML host, 182
 - Vendors for utilities, 274
 - Versioning, 225
 - Vertical deferred write threshold (VDWQT), 493
 - Views, 2, 6, 21, 110–111, 173–174
 - authorities and privileges for, 316
 - changing, DROP VIEW and, 124
 - creating, CREATE VIEW and, 110–111, 124, 174
 - DELETE and, 111, 174
 - INSERT and, 111
 - restrictions on modifying data with, 173–174

SELECT and, 110–111
SELECT and, with AS clause, 150–151
UPDATE and, 111, 174
WITH CHECK option in, 174
Virtual Storage Access Method (VSAM), 18, 21, 45–46,
27, 339
COPY and copies in, 461
moving, 391–392
table spaces and, 49
Virtual Telecommunications Access Method (VTAM),
296, 479
Volatile tables, 81

W

Wait times, 504–505, 554
Warning, auxiliary warning status, 266–267
WebSphere, 11, 14, 15, 16, 345, 478, 510
“Well-clustered” defined, 466
WHEN, 320
WHERE, 147, 159
aggregate functions and, 186
DELETE and, 173
subqueries with SELECT and, 161
Windows, 15, 345, 510
WITH DEFAULT, 91
WLM. *See* Workload Manager (WLM)
Work file database, 37
Workload, 4
Workload Manager (WLM), 4, 8, 35, 37, 191, 200,
478–480
address space for, 13–14
performance and, 478–480
unit of work in, 141–142
Workstations, access to, 307
WRITE, 183
Write Error Page Range (WEPR) status, 270
Write operations, 493–495
horizontal deferred write threshold (DWQT) in, 493
internal buffer pool thresholds and, 494–495
thresholds for, 493–495
vertical deferred write threshold (VDWQT) in, 493

X

XES. *See* Cross System Extended (XES)
XML, 4, 5, 6, 9, 36, 39, 44, 114–115, 132, 136, 251. *See*
also pureXML
application development environments for, 189
changing objects in, 126–127
data type for, 90
expressions in, 188
host variables for, 182
index for, 103, 107–108, 127, 188
loading, 395–396, 402–403
pureXML and, 25, 187–189
schema and, 188
SELECT and, 148–149
statistics, RUNSTATS and, 450
table space for, 50, 57, 127, 369, 431, 459, 471, 475
tables for, 71, 81, 114–115, 127
type modifiers in, 188–189
unloading, 413
updating documents in, 188
XPath and, 148–149
XQuery and, 188
XML data type, 90
XML index, 103, 107–108, 127, 188
XML table spaces, 50, 57, 127, 369, 431, 471, 475
COPY and copies in, 459
XML tables, 71, 81, 114–115, 127
XMLSERIALIZE, 90
XPath, SELECT, 148–149
XQuery, 6, 188

Y

YEAR, 186

Z

z/Architecture, 7–10
zHPF. *See* high performance FICON (zHPF)
zIIP. *See* System z Integrated Information Processor (zIIP)