

Index

Note: **Boldface** numbers indicate illustrations and code samples; *t* indicates a table.

A

- ABEND, 66*t*
- ABEXP, 54*t*
- ABIND, 54*t*, 569
- access control, ii, 95–144, **96**. *See also* security
 - Advanced Access Control and, 9, 13, 16, 17
 - Application Transparent–Transport Layer Security (AT–TLS) and, 99
 - auditing, 132–140. *See also* auditing, 132
 - authorities in, 114–125
 - authorization control through exit routines and, 98
 - authorization IDs for, 101–102
 - catalog table, 131
 - CICS and, 99
 - column, 6
 - column masks in, 102, 104–105, **104**, **105**
 - Communications Database (CDB) and, 99
 - data set protection in, 100
 - DB2_SECURE_VAR security function for, 132, **132**
 - denial of service attacks and, 100
 - direct row access and ROWID in, 168
 - encryption and, 100
 - environments and, 97
 - exit routines and, for authorization control, 98
 - explicit privileges in, 109–114, 110–113*t*
 - GRANT and, 101
 - hash, iii, vi
 - IDs for objects and, 100–101
 - IMS and, 99
 - Kerberos security and, 6, 99, 133
 - Label Based Access Control (LBAC) and, 9
 - local DB2, 98
 - Logical Terminals (LTERMs) and, 99
 - object, 100–131. *See also* specific objects
 - ownership in, 125–130, 125
 - performing tasks on behalf of others in, DBADM authority, 108–109, **109**
 - PERMIT in, 97, **97**
 - privileges in, 109–114, 110–113*t*
 - remote access, 98
 - Resource Access Control Facility (RACF) and, 97, 98, 100, 101, 132
 - REVOKE and, 101
 - roles in, 102
 - row, 6
 - row permissions in, 102–103, **103**, 104–105, **105**
 - Secure Sockets Layer (SSL) and, 99–100
 - SQLID in, 102, **102**
 - subsystem, 97–100
 - trust attributes and, 107–108*t*
 - trusted contexts in, 102, 105–108
 - TSO and, 98
 - views, 131, **131**
- ACCESS DATABASE(DB2), 67*t*
- Access Method Services (AMS), REORG, 381
- Access Path Advisor, 30
- access paths, vi, 30, 745–756
 - Access Path Advisor for, 30
 - Access Plan Graph for, 30
 - ACCESSCREATOR and, 756
 - ACCESSNAME and, 756
 - ACCESSTYPE and, 756, 757
 - Cartesian joins and, 767–768
 - direct row access in, 761
 - DISTINCT and, 759
 - DSN_COLDIST_TABLE and, 802, 802–803*t*
 - DSN_DET COST_TABLE and, 790, 791–792*t*
 - DSN_FILTER_TABLE, 789, 789–790*t*
 - DSN_FUNCTION_TABLE and, 773, 773–775*t*
 - DSN_GROUP_TABLE, 784, 784–786*t*
 - DSN_KEYTGTDIST_TABLE and, 803, 804–805*t*
 - DSN_PGRANGE_TABLE and, 797, 797–798*t*
 - DSN_PREDICATE_TABLE and, 778, 778–781*t*
 - DSN_PTASK_TABLE, 787, 787–789*t*

- DSN_QUERY_TABLE and, 800, 800–801*t*
- DSN_SORT_TABLE and, 793, 793–794*t*
- DSN_STATEMENT_CACHE_TABLE and, 775, 775–778*t*
- DSN_STATEMENT_TABLE and, 770, 771–773*t*
- DSN_STRUCT_TABLE and, 782, 782–784*t*
- DSN_VIEWREF_TABLE and, 798, 798–799*t*
- evaluation of, 756–806
- EXPLAIN output and, guidelines for use of, 806–808
- EXPLAIN table queries and Optim products in, 805–806
- global optimization and, 769
- GROUP BY and, 759
- hash access and, 761
- hybrid joins in, 764–765
- index access and, 756–758, **757**, 819–824
- INDEXONLY and, 758
- limited partition scanning in, 760–761, **761**
- list prefetch in, 760
- MATCHCOLS and, 757
- merge scan join in, 763–764
- MIXOPSEQ and, 756
- nested loop joins in, 762–763
- non-matching index scan and, 757
- Optim Data Studio and, 770
- Optim Query Tuner and, 770
- optimization hints for, 808–809
- optional tables populated by EXPLAIN in, 770–805
- parallelism usage and, 768
- prefetching in, 760
- SELECT and, 758, 759, **759**
- sequential detection (dynamic prefetch) in, 760
- sequential prefetch in, 760
- SORT and, 761–762
- star joins in, 765–768
- subqueries and, interpreting access for, 768–770, 769*t*, **769**
- table, 758–770
- TNAME and, 756
- topology check in, 766
- unique index check, 765
- Access Plan Graph, 30
- access plans, 746
 - EXPLAIN and, 746
 - ownership of, and privileges, 126, 128*t*
 - privileges for, 110*t*
- ACCESS(FORCE), 430, **430**
- ACCESS_CNTL_MODULE, 54*t*
- ACCESS_DEGREE, 752*t*, 768
- ACCESS_PGROU_ID, 752*t*
- ACCESSCREATOR, 750*t*, 756
- ACCESSCTRL, 115, 117*t*, 121*t*
- ACCESSNAME, 750*t*, 756
- ACCESSTYPE, 749–750*t*, 756, 757
- accounting trace, 835–837, 840–842*t*
- ACSSCTRL, 123
- ACCUMACC, 54*t*, 658
- ACCUMUID, 54*t*, 658
- ACHKP, 426*t*
- ACQUIRE, 562*t*, 725
- ACTION, 562*t*
- ADD_VERSIONING, 217, 218
- ADD_MONTHS, 167
- address spaces, 38–41, **39**
 - Advanced Database Management Facility (ADMF) and, 40
 - allied, 38, 41
 - CICS and, 38
 - database services (DSAS) and, 38, 40
 - Distributed Database Facility (DDF), 38, 40–41
 - IMS and, 38
 - Internal Resource Lock Manager (IRLM), 38, 39
 - relationships among, **39**
 - stored procedures and, 38, 616
 - system services (SSAS) and, 38, 39
 - Workload Manager (WLM), 41, 629
- ADDRESS, 107*t*
- ADMIN_TASK_ADD, 816
- ADMIN_UTL_EXECUTE, 816
- ADMIN_UTL_MODIFY, 816
- ADMIN_UTL_MONITOR, 816
- Administration Console, Data Studio, 27
- administrative authorities, 114–125. *See also* authorities
- ADMTPROC, 54*t*
- ADO.NET, DB2 Connect, 25
- Advanced Access Control for LUW, 9, 13, 16, 17
- Advanced Copy Services, 9, 13–17
- Advanced Database Management Facility (ADMF), 40
- Advanced Enterprise Server, DB2, 4, 17–18. *See also* DB2 for Linux, UNIX, and Windows (LUW)
- advanced functionality, 667–714
- Advanced Program-to-Program Communications (APPC)
 - distributed data access and, 646
- Advisory Reorg-Pending (AREO) status, 189
 - indexes and, 234
 - table spaces, 210
- advisory status, *iv*
 - resolving, using DISPLAY DATABASE, 424–426, **424**, **425**, **426**, 426–429*t*
- AEXITLIM, 54*t*
- affinity processing, data sharing, 506
- AFTER, 316
- after trigger, 669, 671–672, **671–672**
- AGCCSID, 54*t*
- agent services manager, 40
- aggregate functions. *See* column functions
- AIX, 2, 15, 18
- ALCUNIT, 54*t*
- aliases, 148
 - creating, using CREATE, 153
 - distributed data access and, 646–647
 - ownership of, and privileges, 126–127, 128*t*
- ALL, 304
- ALL/DBNAME, 55*t*
- allied address spaces, 38, 41
- ALLOCATE, 725
- allocation, table space, using PRIQTY and SECQTY, 206–207
- ALLOW DEBUG MODE, 628

- ALTER, 110*t*, 113*t*, 116*t*, 117*t*, 120*t* 121*t*, 128*t*, 129, 135*t*, 136, 152, 154–155, 474, 855, 858
 binding/rebinding and, 572
 coordinating updates to distributed data with, 653
 sequence objects and, 600
 user-defined data types and, 686
- ALTER BUFFERPOOL, 67*t*, 87
- ALTER DATABASE, 235, **235**
- ALTER FUNCTION, 722
- ALTER GROUPBUFFERPOOL, 67*t*, 500–501, **501**
- ALTER INDEX, 233–234, **234**, 396, 453, 855
 freespace and LOAD in, 366
 table- vs. index controlled partitioning and, 200
- ALTER PROCEDURE, 617, 626, **626**, 722
 COMMIT ON RETURN in, 623–624, 625
- ALTER SEQUENCE, 193
- ALTER STOGROUP, 236, **236**
- ALTER TABLE, 12, 151, 152, 180, 189–191, **191**, 392–393, 681, 709, **709**
 adding partitions with, 197, **197**
 catalog and directory use of, 190
 check constraints and, 182–183
 clone tables and, 215, **215**
 fullselects and, 256–257
 Materialized Query Tables (MQTs) and, 215
 rotating partitions and, 198–199, **199**
 system-period temporal tables, 218, **218–219**
 table- vs. index controlled partitioning and, 200
 traces and, 838
 versioning with, ADD VERSIONING and, 217, 218
- ALTER TABLESPACE, 201, 209–210, **210**, 855
 binding/rebinding and, 569
 freespace and LOAD in, 366
- ALTER UTILITY, 67*t*
- ALTERDTS, 137*t*, 137
- ALTERIN, 113*t*, 116*t*, 120*t*
- ALWAYS, 175*t*
- AMCCSID, 55*t*
- AND, 822
- anomalies in data, 242, 243*t*
- ANY, 304
- APPENSCH, 55*t*
- application development, 30–31
- application drivers, DB2, 20–21
- application period, 151–152, 216–219, 285–286, **286**, 310–311, **311**, 605, 607–608, **607**, **608**
- Application Programming Interfaces (APIs), 2, 23, 25, 593
- application programs, 577–612. *See also* application programs and SQL, *below*
 backing out of uncommitted changes in, 579
 bi-temporal management/tables in, 608
 commit in, 577–579
 concurrency and, 578
 deadlocks or timeouts in, 586
 Distributed Data Facility (DDF) and, 586
 distributed environments and sharepoints in, CONNECT statement for, 586
 fetch for limited rows in, 591–592, **591**, **592**
 global temporary tables and, 586–591. *See also* temporary tables
 global transactions in, 586
 identity columns and, 596–599. *See also* identity columns
 Independent Software Vendors (ISVs) and, 578
 Information Management System (IMS) and, 586
 LOCK TABLE and, 586
 logic UOWs and, 579
 multi-row FETCH in, 593–594, **593**, **594**
 multi-row INSERT in, 594–595, **595**
 multi-row MERGE in, 595–596, **596**
 multi-row operations in, 593–595
 object-oriented (OO) interfaces and, 586
 online transactions and, 578
 optimistic locking in, 603–604
 points of consistency in, 579
 Recoverable Resource Services (RRS) and, 586
 releasing a savepoint in, using RELEASE SAVEPOINT, 585, **585**, **586**
 restoring to a savepoint in, 582–585, **582–585**
 rollback of transaction in, using ROLLBACK, 577–579, 580, **580**, 582–585, **582–585**
 SAVEPOINT statement in, 580–586, **580**, **581**, 582*t*
 savepoints in, 577, 580–586, **580**. *See also* savepoints
 sequence objects in, 599–603. *See also* sequence objects
 SET SAVEPOINT in, 586
 temporal data management and, 605–608. *See also* temporal tables
 TO SAVEPOINT clause in, 580, 582–585, **582–585**
 unit of recovery (UR) and, 580
 unit of work (UOW) in, 578, 579, 586
- application programs and SQL, 517–554. *See also* application programs; SQL
 CLOSE CURSOR in, 541, **541**
 communicating with DB2 in, methods for, 517
 concentration of literals in, 548
 CURSOR WITH HOLD in, 541–542, **542**, 552, 554
 cursors in, 536–538, **536**, **537**, **538**, 542–546, 542*t*, 552. *See also* cursors
 DCLGEN and, 519, 524–526, **524**, **525–526**
 DECLARE CURSOR in, 536, **536**
 deferred embedded SQL in, 546–547
 DELETE in, 553
 delimiting, using EXEC SQL and END-EXEC, 518, **518**
 dynamic SQL in, 517, 546–549, 552. *See also* dynamic SQL
 embedded dynamic SQL in, 546
 EXECUTE in, 520
 executing SQL statements in, 538–546
 execution validation in, 528–535
 FETCH in, 523, 538–540, **539**, **540**
 GET DIAGNOSTICS in, 532–535, 532–535*t*, 546, 554
 HAVING in, 520
 host arrays in, 523–524, **523**, **524**
 host structures in, 520, 523, **523**
 host variables and, 520–521, **521**

- indicator variables in, 521–522, **522**
- INSERT in, 523
- inserting data in, using SET clause with INSERT in, 527, **527**
- INSTEAD OF in, 537
- interactive SQL in, 546
- Java Database Connectivity (JDBC) for, 517–518, 549–550
- MERGE in, 523
- OPEN CURSOR in, 537–538, **538**
- Open Database Connectivity (ODBC) for, 517–518, 548–549
- OPEN in, 520
- positioned delete in, 540, **540**, 543
- positioned update in, 539–540, **540**, 543
- PREPARE in, 520, 521
- PureQuery and, 549–550
- retrieving multiple rows of data in, using SELECT INTO, 527, 552
- retrieving single row of data in, using SELECT, 526–527, **527**
- REXX and, 518
- rowset cursors in, 545–546, **546**
- SCROLL in, scrollable/nonscrollable cursors and, 542–545, **543**, **544**, **544t**, **545**
- searching data in, using SELECT, 528, **528**
- SQL communication areas (SQLCA) in, 528, 528–531*t*
- SQLCODE in, 531
- SQLJ for, 517–518, 549–550
- SQLSTATE in, 531
- static SQL in, 517, 546, 554
- table definitions in, DECLARE, 518–528, **519**
- UPDATE COLUMN in, 536–537, **536**, **537**
- updating data in, using SET clause with UPDATE, 527, **527**
- view definitions in, DECLARE, 518–528, **519**
- WHERE clause in, 520
- WHERE CURRENT in, 537
- application requestors, 84, 641
- Application Server Edition, DB2 Connect, 23, 25
- application servers, 83, 641
- Application Transparent–Transport Layer Security (AT–TLS), 99
- application-period temporal tables, 219, **219**
- applications, checking access to, with EXPLAIN, 807–808
- APPLNAME, 748*t*
- approximate data type, 156*t*
- APRETAINDUP, 562*t*
- ARC2FRST, 55*t*
- archive log data sets, 439
- ARCHIVE LOG, 67*t*
- archive logs, 470
- ARCHIVE, 111*t*, 118*t*
- ARCPFX/ARCPFX2, 55*t*
- ARCRTN, 55*t*
- ARCWRTC, 55*t*
- ARCWTOR, 55*t*
- ARDBP, 428*t*
- AREO, 429*t*
- AREOR, 429*t*
- AREST, 430
- arithmetic expressions, 338
- ARM/XSCALE, 19
- arrays, host, 523–524, **523**, **524**
- AS IDENTITY, 175*t*
- AS keyword, 274
- AS SECURITY LABEL, 132
- ASCCSID, 55*t*
- ASCII, 164, **164**, 171, 253, 268, 273, 366. *See also* CCSIDs
- Assembler, 616
- ASSIST, 55*t*
- asterisk (*) command, 66*t*, 257–258
- ASUTIME parameter, 630
- asynchronous read/write, 858
- ATOMIC, 595
- atomic key, 227, 246
- attachment
 - data sharing and, 507
- attachments/attachment facilities, 41–46
 - call, 42, 43, 45
 - CICS, 41, 42, **42**
 - IMS, 42–43, **43**
 - Recoverable Resource Manager Services, 42
 - Resource Recovery Services (RRS) and, 43, 45–46
 - SQL and, 42
 - TSO, 41, 43–44, **44**
 - Universal Language Interface, 42, 46
- attributes, 238–239
- AUDIT, 568
- audit policies, 137–140, 137–140*t*
- audit trace event classes, 134, 134–135*t*
- auditing, v, 5, 132–140, 142
 - audit trace event classes in, 134, 134–135*t*
 - categories of, 139, 139–140*t*
 - IDs, specific, 135
 - policies for, 137–140, 137–140*t*
 - roles, specific, 135
 - starting/stopping trace in, 136, **136**
 - table, 136, 137
 - trace in, 133–135, 134–135*t*
 - trace, audit trace, 838, 842*t*
- AUDITPOLICYNAME, 137*t*
- AUDITST, 55*t*
- AUTH, 55*t*
- AUTHCACH, 55*t*
- authorities, ii, 114–125
 - GRANT, 124, **124**
 - managing, 122–125
 - REVOKE, 124, **124**
 - separating, SEPARATE_SECURITY and, 122–125
 - WITH GRANT OPTION, 124, **125**
- authorizations, v, 98, 101–102, 144
 - binding/rebinding and, 568
 - column level, v
 - exit routines to control, 98
 - IDs for, 101–102

- plan execution, 130
 - primary vs. secondary ID for, 101, 133
 - roles in, 102
 - row level, v
 - SQLID in, 102, **102**
 - SYSADM and, 102
 - trusted contexts in, 102
 - AUTOESTSPACE, 377
 - automatic rebinding, 567–569
 - Automatic Restart Manager (ARM), 492
 - autonomic computing, 7
 - autonomic statistics, 814–816
 - auxiliary tables, 147, 153, 185–188, **187–188**
 - auxiliary warning (AUXW) status, 426–427*t*, 472
 - availability, in DB2 for z/OS, 5
 - available pages, 855
 - AVG, 276–277, **277**
 - avoidance, lock, 728–729, **728**, 729*t*
- B**
- backing out of uncommitted changes, 579
 - BACKODUR, 55*t*
 - BACKUP SYSTEM, 464, 466
 - backups, *iv*, 482. *See also* recovery and restart
 - BACKUP SYSTEM in, 464, 466
 - compression and, 8, 13–17
 - COPYPOOL in, 464
 - DUMP, FROM DUMP in, 466
 - Hierarchical Storage Management (HSM) in, 464
 - LIST COPYPOOL in, 466
 - LOAD REPLACE, 467
 - object-level recovery, with system-level backups, 466–467
 - REBUILD INDEX, 467
 - RECOVER in, 466–467
 - REORG in, 467
 - RESTORE SYSTEM in, 464–466
 - Storage Management Subsystem (SMS) in, 464
 - system-level, 464–467
 - base (permanent) tables, 147, 269
 - maximum number of, 269
 - basic row format, 161
 - Basic Sequential Access Method (BSAM), 371
 - BATCH, 97
 - batch performance monitors, 831–833
 - batch processes, 6, 37, 38
 - distributed data access and, 653–654
 - PERMIT, 97, **97**
 - before trigger, 669, 672–673, **672–673**
 - BETWEEN/NOT BETWEEN, 262, 282, **282**, 687
 - BI, DB2 Connect and, 23
 - bi-temporal tables, 219–220, **220**, 608
 - BIGINT, 157, 158, 172*t*, 174
 - BINARY/binary data type, 156*t*, 159, 162, 190
 - binding/rebinding and, 568
 - binary large object (BLOB), 159, 163, 172*t*. *See also* large objects (LOBs)
 - BIND/REBIND, 47, 66*t*, 110*t*, 116*t*, 117*t*, 120*t*, 123, 128*t*, 129, 130, 558, 561, 566–567, **566**, 571–572, 574, 746, 828
 - data maintenance and, 411
 - locks and, 721, 724
 - BIND/REBIND PACKAGE, 560, 565, 573, 651–652, 685, 722
 - BIND/REBIND PLAN, 558, **558**, 565, 573, 652–653, 685, 722
 - BIND QUERY, 808
 - BIND(ADD), 561
 - BIND(REPLACE), 561
 - BIND_EXPLAIN_ONLY, 755*t*
 - BINDADD, 111*t*, 116*t*, 119*t*
 - BINDAGENT, 111*t*, 116*t*, 119*t*, 129, 572
 - binding and rebinding, 555–576
 - ABIND subsystem parameter and, 569
 - ALTER TABLESPACE and, 569
 - AUDIT and, 568
 - authorizations and, 568
 - automatic, 567–569
 - BINARY, VARBINARY and, 568
 - BIND/REBIND PACKAGE and, 560, 565, 573, 651–652, 685, 722
 - BIND/REBIND PLAN and, 558, **558**, 565, 573, 652–653, 685, 722
 - bind process in, 555, 557
 - BIND/REBIND statement in, 47, 66*t*, 110*t*, 116*t*, 117*t*, 120*t*, 123, 128*t*, 129, 130, 558, 561, 566–567, **566**, 571–572, 574, 746, 828
 - BIND(ADD) in, 561
 - BIND(REPLACE) in, 561
 - BINDAGENT privilege for, 572
 - buffer pools and, 569, 576
 - CALL in, 556
 - CASCADE and, 568
 - CHAR, VARCHAR and, 568
 - CICS and, 558
 - COEXIST parameter and, 569
 - collections in, 558–559, 570
 - columns and, 568
 - coprocessor use in, 557
 - CURRENT PACKAGE PATH in, 559
 - CURRENT PACKAGESET in, 559, **559**
 - data types and, 568
 - Database Request Module (DBRM) for, 555–558, 560, 566, 568
 - DCLGEN and, 556
 - DECLARE TABLE and, 556
 - DEFER in, 576
 - DISCONNECT bind parameter and, 651
 - distributed data access and, 651
 - Environmental Descriptor Manager (EDM) pool and, 558
 - EXEC SQL in, 556
 - EXECUTE and, 571–572
 - EXPLAIN and, 569, 747
 - GRAPHIC, VARGRAPHIC and, 568
 - in-use packages/plans and, 560–561
 - indexes, 568

- inoperative plans/packages and, 569
 - invalidations in, 566, 574
 - ISOLATION and, 561
 - isolation levels and, 575, 576
 - load modules for, 555
 - locks and, 716
 - migration of plans and packages and, 570–571
 - naming conventions and, 559, 566
 - options for, 561–565, 562–565*t*
 - ownership of plan/package and, using OWNER, 571–572
 - package lists and, using REBIND, 567, **567**
 - packages and, using BIND/REBIND, 558, 566–570, **566**
 - PADDED/NOT PADDED and, 568
 - Partitioned Data Sets (PDS) and, 556
 - plan execution authorization and, using VALIDATE, 573
 - plan-to-package ratio in, 558
 - PLANMGMT options for, 570–571, 570*t*, **571**
 - plans and, 558, 568, 570
 - precompile process in, 555, 556–557
 - preliminary steps in, 566
 - program preparation for, using PREPARE, 555, **556**, 558
 - REBIND in, 561
 - removing a plan or package in, 571, **571**
 - REOPT in, 574, 576
 - RUN in, 559
 - RUNSTATS and, 561
 - schemas and, 685
 - SET NULL and, 568
 - SQL and, 555–558, 560
 - SQLCA and, 556, 557
 - static binding in, 558
 - SYSADM and, 567
 - SYSPLAN and SYSPACKAGES for, 561, 569
 - table spaces and, 568–569
 - tables and, 568
 - TIME, TIMESTAMP, DATE columns, 568
 - trigger packages and, 561
 - triggers and, using REBIND TRIGGER PACKAGE, 576, 678
 - unqualified objects and QUALIFIER, 572
 - user-defined functions and, 568
 - versioning in, 559
 - views and, 568
- BINDNV, 55*t*
- BLKSIZE, 55*t*
- BLOB. *See* binary large object (BLOB); large objects (LOBs)
- block fetch, vi
- BMPTOUT, 55*t*
- Boolean terms and predicates, 344
- boot strap data set (BSDS), 112*t*, 116*t*, 440–441
- data sharing and, 494, 509
 - distributed data access and, 646
 - buffer pools and, 855
 - DSNJU003 (Change Log Inventory) and, 419, 465, 475
- bottom-up vs. top-down approach to design, 238
- buffer manager, 40
- buffer pools, v, 9–10, 86–87, 855–871
- ALTER/DISPLAY GROUPBUFFERPOOL in, 500–501, **501**
 - asynchronous read/write in, 858
 - binding/rebinding and, 569, 576
 - BUFFERPOOL command and, 116*t*, 120*t*, 204, 222
 - checkpoints and page externalization in, 858–859
 - creating, using ALTER BUFFERPOOL, 87
 - Data Manager Threshold (DMTH) in, 863
 - data sharing and, 494
 - Deferred Write Threshold (DWQT) and, 860–861
 - design strategies for, 864–865, 864–865*t*
 - DSVCI and, 856
 - dynamic SQL caching in, 870–871, **870**, **871**
 - Environmental Descriptor Manager (EDM), 869–871
 - First-In First-Out (FIFO) queuing in, 857
 - group buffer pool dependent data in, 495–496
 - group buffer pools (GBPs, cache structures) in, 489–490, 499–502, **500**
 - I/O requests and externalization of, 857–858
 - Immediate Write Threshold (IWTH) and, 858, 863–864
 - inter-DB2 read/write (R/W) interest and, 495–496
 - internal thresholds in, 863–864
 - page fixing in, with PGFIX, 862–863
 - page size in, 856
 - pages in, 855–856
 - parallelism and, using VPPSEQT and VPXPSEQT, 862
 - queue management in, 857
 - Row Identifier (RID), 866–868
 - Sequential Prefetch Threshold (SPTH) in, 863
 - sequential vs. random processing in, using VPSEQT, 860
 - size of, 501, 859, 866, 868, 869–870
 - sort and, 868
 - statistics on, 867–868
 - stealing method in, using PGSTEAL, 862
 - synchronous reads/writes in, 857–858
 - tuning, using DISPLAY BUFFERPOOL, 865, **865**
 - virtual, 856–857
 - work file overflow in, 867
 - writes to, 860–861
- BUFFERPOOL, 116*t*, 120*t*, 204, 222
- buffers, FLA, 460
- BUILD phase, 375
- in REORG, 379, 388
 - in LOAD, 356
- built-in functions, 275
- user-defined data types and, 689, **689**
- BY DEFAULT, 175*t*
- C**
- C/C++, 1, 2, 14, 593, 616, 710
- DB2 Connect and, 25
 - user-defined functions (UDFs) and, 690
- cache, v
- CACHE DYNAMIC SQL, 87
- cache invalidation, SQL, using RUNSTATS, 405
- CACHE option, 174
- cache structures, group buffer pools, 489–490

- cache tables, EXPLAIN and, 746–747
- CACHE, 175*t*
- CACHEDYN, 55*t*
- CACHEDYN_FREELocal, 55*t*
- CACHEPAC, 55*t*
- CACHERAC, 55*t*
- CACHESIZE, 562*t*
- CAF. *See* Call Attachment Facility (CAF)
- CALL, 614, **614**, 617, **617**, 634
 - binding/rebinding and, 556
 - distributed data access and, 659
 - stored procedures and, 623, 624, 627, 629
- Call Attachment Facility (CAF), 41–43, 45, 97
 - CURSOR WITH HOLD in, 541–542, **542**
 - IMS and, 45
 - interfacing with DB2 through, 47
 - locks and, 727, 728
 - traces and, 834
 - TSO and, 43, 45
- calls, ii, 612
- CANCEL THREAD, 67*t*
- cardinality, 809
- Cartesian joins, 767–768
- Cartesian products, 262–265, **263–264**, 301
- CASCADE, in binding/rebinding, 568
- cascading triggers, 669
- CASE, 334–335, **334**, **335**, 350, 634
 - column masks and, 104
 - triggers and, 671
- CASE WHEN, 104
- casting, 714
 - large objects (LOBs) and, 707
 - user-defined data types and, 687–688, **688**
- castout process, 501–502, **502**
- CATALOG, 55*t*
- catalog, v, 74–82, 74–81*t*, **82**, 92, 94. *See also* catalog statistics, *below*
 - access control and, 131
 - ALTER TABLE and, 190
 - check constraints and, 182
 - Communications Database (CDB) and, 74
 - consistency queries to, 82, **82**
 - copying, 453–454
 - DATA CAPTURE CHANGE and, 83
 - Data Control Language (DCL) and, 74
 - Data Definition Language (DDL) and, 74
 - data sharing and, 494, 505
 - DSN1CHKR and, 74
 - DSN1COPY and, 74
 - ICF catalog in, 470
 - indexes and, restrictions on, 223, 233
 - LISTCAT in, 470
 - locks and locking in tables of, 74
 - recovery and, 467
 - REORG and, 389–391, 395–396
 - RUNSTATS and, 399, **399**, 404
 - SQL access to, 74
 - statistics on. *See* catalog statistics, *below*
 - SYSDATABASE to reorganize, 396
 - UPDATE, 399, **399**
- catalog statistics, 809–816
 - autonomic statistics and, 814–816
 - cardinality in, 809
 - filter factors and, 809–811
 - histogram statistics and, 811–812, **812**
 - partitioned table spaces, 812–813, 812*t*
 - production environment modeling using, 411, 813–814, 813–814*t*
- CATDDACL, 55*t*
- CATDMGCL, 55*t*
- CATDSTCL, 55*t*
- CATENFM, 420
- CATMAINT, 420
- CATXDAACL, 55*t*
- CATXMGCL, 56*t*
- CATXSTCL, 56*t*
- CCSIDs, 162, 164, 171, 203
 - large objects (LOBs) and, 703
 - LOAD and, 366
- CDSRDEF, 56*t*
- CEEDUMP, 632
- CHANGELIMIT, 448–449, **448**
- CHAR/character data type, 156*t*, 159, 160, 171, 172*t*, 190, 568
- character large object (CLOB), 159, 161, 163, 171, 172*t*. *See also* large objects (LOBs)
- CHARDEL, 362, 372–373
- CHARSET, 56*t*
- CHECK, 355, 411–414, 484
 - check constraints, iv, 178, 182–183, **183**, 681–682
 - CHECK DATA, 183, 365, 412–413, **413**, 461–464
 - CHECK INDEX, 413–414, **414**, 434, 461–462
 - Check Pending (CHKP) status, 182, 461–462
 - check utilities, iv
 - CHECK_FASTREPLICATION, 56*t*
 - CHECK_SETCHKP, 56*t*
 - CHECKING, 137*t*, 139*t*, 144
- checkpoints, iv
 - intervals for, using SET LOG, 477, 478
 - page externalization and, 858–859
- CHGDC, 56*t*
- CHKFREQ, 56*t*, 858–859
- CHKLOGR, 56*t*
- CHKMINS, 56*t*
- CHKP, 427*t*
- CHKTYPE, 56*t*, 858–859
- CICS. *See* Customer Information Control System (CICS)
- CICS attachment facility, 41, 42
- claims, locks and, 731, 731*t*
- CLASST threshold, 502
- CLI, 19–22
 - DB2 Connect and, 25
 - traces and, 834
 - trusted contexts and, 106
- CLIST. *See* Command List (CLIST)

- CLOB. *See* character large object (CLOB)
- clone tables, iii, 147, 151, 215–216
 limitations on, 215–216
 recovery of, 463
- CLOSE, 541
- CLOSE CURSOR, 541, **541**
- Cloudscape, 18
- CLUSTER, 222
- clustering, vi, 10, 15–16
 indexes and, 224–225, **225**
 Multidimensional Clustering (MDC) tables and, 12, 13, 16, 17
 pureScale and, 10
- CLUSTERRATIO, 395, 411
- CMTSTAT, 56*t*, 658, 664
- COALESCE, 330–332
- COBOL, 1, 2, 7, 593, 616, 690, 710
- CODESET default, 171
- COEXIST parameter, 569
- Cognos, 2
- coherency control, in data sharing, 496
- COLDEL, 362, **362**, 372–373
- COLGROUP, 401–402
- collections, 558–559
 binding into, 570
 privileges for, 111*t*
- COLLID, 139*t*
- column distribution tables, 802, 802–803*t*
- column function, 275, 276–277, **276**, **277**
 COUNT, 279, **279**
 GROUP BY and, 277–278, **277**, **278**
 SUM, 279, **279**
- COLUMN_FN_EVAL, 751*t*
- columns, 145
 access control for, 6
 atomic key in, 246
 authorization at level of, v
 binding/rebinding and, 568
 cardinality of, 809
 composite key in, 246
 correlation names in, 269–270, **269**
 defining, with CREATE TABLE, 245–246, **246**
 derived, 273–274, **274**
 EMPNO fields and, 172–176
 foreign key in, 246, 248–249
 functions on, 275, 276–277, **276**, **277**
 GENERATED ALWAYS in, 173
 GROUP BY and, 277–278, **277**, **278**
 identity, iii, 172–176, **173**, **174**, 175–176*t*
 include, vi, 228, **228**
 INSERT into specific, 289, **289**
 join, 266–267, **266–267**
 LOAD and ROWID, 365–366
 masks on, for access control, 102, 104–105, **104**, **105**
 maximum of, 184, 184*t*
 permutation, changing order using SELECT in, 260, **260–261**
 primary key in, 246, 247
 projection, projecting columns from table using SELECT for, 259–260, **259–260**
 renaming, using SELECT ORDER BY, 272, **273**
 selecting from multiple tables using SELECT, 262–269
 transaction start ID, 177–178
 unique key in, 246, 248
 UNLOAD and, 372
- combined outer joins, 331, **331–332**, 332
- COMMAND, 652
- Command Center, Control Center, DB2 and, 33
- Command Editor, Control Center, DB2 and, 34
- Command Line Processor (CLP), 19, 21
- Command List (CLIST)
 installation, migration and, 50
 stored procedures and, 634
 utilities and, 70
- commands, 65–68, 67–68*t*, 91
 DB2 Interactive (DB2I) and, 47
 DSN, 65–66, 66*t*
- COMMENT, 128*t*, 653
- COMMENT ON, 129, 572
- commit, ii, 554, 577–579
 two-phase, 653–654
- COMMIT, 49, 128*t*, 609
 claims and, 731, 731*t*, 731
 distributed data access and, 659
 locks and, 719, 725, 727, 728, 734
 ODBC and, 549
 scope of, 438–439, 715
 sequence objects and, 601
 stored procedures and, 623, 624
- COMMIT ON RETURN, 623–624, 625
- communicating with DB2, using SQL methods, 517
- Communications Database (CDB)
 access control and, 99
 catalog and, 74
 distributed data access and, 85–86, 641, 644–646, 663
- communications protocols, 84–85, 643–644
- communications. *See* distributed data
- COMPACT, 56*t*
- comparison expressions, 338
- comparison operators, 261, 304, 687
- COMPAT, 56*t*
- COMPOSITE, 652
- composite key, 227, 246
- compound predicates, 344
- COMPRESS, 204, 207–208, **208**, 222, 224
- COMPRESS_SPT01, 56*t*
- compression, v, 6, 714
 backup and, 8, 13–16
 in DB2 for z/OS, 6
 in DB2 for Linux, UNIX, Windows (LUW) and, 8, 9–10, 13–17
 DSN1COMP and, 420–421, **421**
 indexes and, 224
 large objects (LOBs) and, 704

- Lempel-Ziv (LZ), 8
- row-level, 9–10, 13, 16, 17
- RUNSTATS and, 403–404
- concentration of literals, 548
- concurrency, iii, 578, 715–743. *See also* locks and locking
 - claims on, 731, 731*t*
 - commit scope in, 715
 - data sharing and, 496
 - database design for, 736–737, **737**
 - drains on, 732
 - in DB2 for z/OS, 4
 - serialization in, 715
- CONCURRENT ACCESS RESOLUTION, 562*t*
- concurrent copies, DFSMS, 450
- CONDBAT, 56*t*, 660
- Conditional Restart Control Record (CRCR), 475
- conditional restart of DB2, 475
- CONNECT, 84, 541, 586, 642–643, 649–651, **649**
- Connection Concentrator, 10, 16, 17
- connection pooling, vi, 659–661
- CONNECTIONS, 665
- connectivity, v, 10, 16–17, 19–25, 19
 - Data Server Clients for, 19–22
 - Data Server Drivers for, 19
 - Data Server Driver for JDBC and SQLJ in, 20, 21
 - Data Server Driver for ODBC and CLI in, 20–22
 - Data Server Driver Package and, 20–22
 - Data Server Runtime Client for, 19–22
 - DB2 application drivers in, 20–21
 - DB2 Connect and, 19, 22–25
 - instance merge modules in, DB2, 21
 - non-DB2 instance merge modules in, 21
 - trusted connections in, 106
- consistency queries, catalog, 82, **82**
- consistency, points of, 579
- console, z/OS, 93
- constants, 688
- constraints, iii, 178–183, 253
 - check, iv, 178, 182–183, **183**
 - foreign key, 181
 - INSERT and, 287
 - keys and, 178–180
 - LOAD and, 363–365, **364**
 - primary key, 180, **180**
 - referential, 178–180, **179**
 - triggers and vs., 681–682
 - unique, 178
 - UPDATE and, 291
- Content Management (CM), 2, 3
- contention, 499, 721, 742
- CONTEXT, 138*t*, 140*t*
- contexts, trusted. *See* trusted contexts
- continuous availability, in DB2 for z/OS, 4
- Control Center, 30, 32–35, 70, 685
- CONTSTOR, 56*t*
- conversion, 50–51, 91. *See also* installation and migration
- COORDNTR, 56*t*
- coprocessor, in binding/rebinding, 557
- COPY, 110*t*, 116*t*, 117*t*, 120*t*, 128*t*, 134, 194, 222, 427*t*, 463, 469, 474, 562*t*
 - DSNICOPI and, 421–422
 - image copies and, 442, 444, **444**, 447
 - recovery and, 438
 - statistics and, 408, 410
- copy pools, 484
- copying, v. *See also* inline copies; recovery and restart
 - Advanced Copy Services, 9, 13, 14, 15, 16, 17
- COPYDDN, in LOAD and REOGR, 357, 360, 380
- COPYPOOL, 464
- COPYTOCOPY, 444–445, **445**, 457
- correlated reference (correlation predicate), 304
- correlated subquery, 305–307, **306**, **307**
- correlation names, 269–270, **269**
- CORRELATION_NAME, 753*t*
- cost tables, 790, 791–792*t*
- COUNT, 279, **279**, 280, **280**, 300
- couple data sets, 490
- coupling, v, vi, 4
- Coupling Facility (CF), 487–492, **488**, 513, 514
 - Automatic Restart Manager (ARM) in, 492
 - couple data sets in, 490
 - Coupling Facility Control Code (CFCC) in, 487
 - Coupling Facility Resource Management (CFRM) in, 490, **490–491**, 501
 - Cross System Coupling Facility (XCF) and, 490, 493–494, **493**, 499
 - failure of, 511
 - group buffer pools (GBPs, cache structures) in, 489–490
 - Internal Coupling Facilities (ICFs) in, 487–488
 - Internal Resource Lock Manager (IRLM) in, 489
 - IXCL1DSU utility for, 490
 - list structure (SCA) in, 488–489, 509, 511, 512
 - lock structure in, 489
 - Parallel Sysplex and, 490, 491
 - Shared Communication Area (SCA) in, 488–489, 509, 511, 512
 - structures and policies in, 490
 - Sysplex Failure Management (SFM) in, 491, **492**
- Coupling Facility Control Code (CFCC), 487
- Coupling Facility Resource Management (CFRM), 490, **490–491**, 501
- C#, DB2 Connect and, 25
- CPU usage, 35
 - DB2 for z/OS, 5
 - parallelism in, 827–830
 - wait time in, vi
- CREATE AUXILIARY TABLE, 148
- CREATALIAS, 112*t*
- CREATE, 107, **108**, 117*t*, 128*t*, 129, 135*t*, 136, 152, 153, **153**, 474
 - binding/rebinding and, 572
 - coordinating updates to distributed data with, 653
 - ownership and, 125–127
 - sequence objects and, 599, 600

- user-defined data types and, 686
 - CREATE DATABASE, 171, **171**, 235, **235**
 - CREATE FUNCTION, 689–691, **689**, **691**, 693, **693**, 722
 - CREATE GLOBAL TEMPORARY TABLE, 148
 - CREATE INDEX, 366, 453, 456
 - CREATE LIKE, 188, **189**
 - CREATE PERMISSION, 103, **103**
 - CREATE PROCEDURE, 617–620, **618**, **619**, 624–627, **625**, **626** 631, **631**, **633**, 722
 - COMMIT ON RETURN in, 623–624, 625
 - CREATE SEQUENCE, 192, **192**
 - CREATE STOGROUP, 236, **236**
 - CREATE TABLE, 148, 150, 184–185, **184–186**, 709, **709**
 - clone tables and, 215
 - column definition using, 245–246, **246**
 - constraints and, 178
 - copying table definitions for, using LIKE, 188, **189**, 464, 590
 - encoding scheme setting with, 164
 - fullselects and, 256–257
 - hash tables, ORGANIZED BY HASH and, 220–221, **221**
 - Materialized Query Tables (MQTs) and, 213–214, **214**
 - null values and NOT NULL with, 170
 - permutation and, 260
 - primary key constraints with, 180, **180**
 - projection and, 260
 - system-period temporal tables, 218, **218–219**
 - traces and, 838
 - VARCHAR and, 161
 - CREATE TABLESPACE, 163, 201, 203–209, 366, 734
 - CREATE TRIGGER, 669–671, **671**
 - CREATE TYPE, 686–687, **686**
 - CREATE VIEW, 135*t*, 210, **211**
 - fullselects and, 256–257
 - table expressions and, 315–316
 - CREATE_SECURE_OBJECT, 112*t*
 - CREATEALIAS, 116*t*, 119*t*
 - Created Temporary Tables (CTTs), 587–588, **587**
 - CREATEDBA, 112*t*, 116*t*, 119*t*
 - CREATEDBC, 112*t*, 116*t*, 119*t*
 - CREATEDTS, 137*t*
 - CREATEIN, 111*t*, 113*t*, 116*t*, 119*t*, 120*t*
 - CREATESG, 112*t*, 116*t*
 - CREATETAB, 111*t*, 121*t*
 - CREATETMTAB, 112*t*, 116*t*, 119*t*
 - CREATETS, 111*t*, 119*t*, 121*t*
 - CREATOR, 749*t*
 - CRESTART, 475, **475**
 - CRM. See Customer Relationship Management (CRM)
 - Cross System Coupling Facility (XCF), 490, 493–494, **493**, 499, 830
 - Cross System Extended Service (XES), 492, 493
 - cross-invalidation, 499, **500**
 - CTHREAD, 56*t*
 - CTREF, 755*t*
 - CURRENT DATA, 737
 - CURRENT EXPLAIN MODE register, 747
 - CURRENT PACKAGE PATH, 559
 - CURRENT PACKAGESET, 559, **559**
 - CURRENT PATH, 572, 627, 685–686
 - CURRENT RULES, 659
 - CURRENT SCHEMA, 686
 - CURRENT SERVER, 562*t*, 652, 654
 - CURRENT SQLID, 572
 - CURRENTDATA, 562*t*, 652, 653, 678, 728–729, 729*t*
 - CURRENTLY COMMITTED, 721–722, 737
 - Cursor Tables (CTs), 87
 - CURSOR WITH HOLD, 541–542, **542**, 552, 554
 - cursors, 552
 - claims and, 731, 731*t*
 - DESCRIBE CURSOR in, 623, **623**
 - dynamic, 554
 - dynamic scrollable, 545, **545**
 - FETCH in, 543–545
 - inactive threads and, 657
 - LOAD and, 370–371, **371**
 - locks and, stability of, 725–726, 727
 - multi-row FETCH and, 594, **594**
 - parallelism and, 830
 - rowset, 545–546, **546**
 - SCROLL in, scrollable/nonscrollable cursors and, 542–545, **543**, **544**, 544*t*, **545**
 - SELECT and, 536–538, **536**, **537**, **538**
 - sensitivity in, INSENSITIVE/SENSITIVE, 543–544, **543**, 544*t*
 - sequence objects and, 601, **601**, 602
 - in SQL, 542–546
 - temporary tables and, 587
 - Customer Information Control System (CICS), 4, 6, 37, 97, 242
 - access control and, 99
 - address spaces and, 38
 - attachment/attachment facility, 41, 42, **42**
 - binding/rebinding and, 558
 - commands for attachment facility in, 65
 - CURSOR WITH HOLD in, 541–542, **542**
 - data sharing and, 507
 - DB2 Connect and, 24
 - DB2 and, relationship between, **42**
 - distributed data access and, 653, 655, **656**
 - interfacing with DB2 through, 47
 - locks and, 727, 728
 - performance and, 852, 853
 - security in, 99
 - stored procedures and, 615
 - traces and, 834
 - Customer Relationship Management (CRM), 2–4, , 16, 23, 242
 - CYCLE, 176*t*
- ## D
- DAS, 8
 - DASD
 - data sharing and, 485, 510
 - REORG and, 390
 - utilities and, 72

- data access. *See* access control
- DATA CAPTURE CHANGE, 83
- data change tables, 316–317, **317**
- Data Communications Resource Manager (DCRM), 41
- data concurrency. *See* concurrency
- data conditioning, 668
- Data Control Language (DCL), 145
- catalog and, 74
- Data Definition Language (DDL), ii, 28, 145, 152, 255
- catalog and, 74
 - locks and, 716
 - stored procedures and, 634
- Data Facility Storage Management System (DFSMS), 450
- data integrity, 668
- data maintenance, iv, 355–435. *See also* CHECK; LOAD; REORG; RUNSTATS; UNLOAD
- CHECK for, 411–414
 - DIAGNOSE for, 418, **418**
 - MODIFY for, 414–417
 - MODIFY RECOVERY for, 414–416, **415**
 - MODIFY STATISTICS for, 414, 416–417, **417**
 - REBIND for, 411
 - REORG for, 411
 - REPAIR for, 417–418
 - restrictions on starting table space or index in, 430, **430**
 - restrictive and advisory status in, 424–426, **424**, **425**, **426**, 426–429*t*
 - RUNSTATS for, 411
 - utilities for, 419–424
- Data Manager, 40
- Data Manager Threshold (DMTH), 863
- Data Manipulation Language (DML), 145, 255–354
- data mining, DB2 Connect and, 23
- data model, iv
- Data Partitioned Secondary Indexes (DPSI), 229–231, **230**, **231**
- Data Propagator Relational Capture, 7
- Data Protection for Snapshot Devices, 9
- Data Server Clients, 19–22, 19
- Data Server Drivers, 19
- for JDBC and SQLJ, 20, 21
 - for ODBC and CLI, 20–22
- Data Server Driver Package, 20–22
- Data Server Runtime Client, 19–22
- data sets
- coupled, in data sharing, 490
 - data sharing and, 494
 - DSMAX and, 872–873
 - image copies and, 447
 - OPEN/CLOSE, 872–873
 - performance and, 872–873
 - protection of, 100
 - recovery and, 437
 - security and, 100
- data sharing, v, vi, 485–516, **486**. *See also* distributed data
- affinity processing for, 506
 - ALTER/DISPLAY GROUPBUFFERPOOL in, 500–501, **501**
 - application analysis before beginning, 504
 - Automatic Restart Manager (ARM) in, 492
 - benefits of, 486–487, 514
 - castout process in, 501–502, **502**
 - catalog merging in, 505
 - CICS and, 507
 - coherency control in, 496
 - communicating with group in, 508
 - concurrency control in, 496
 - couple data sets in, 490
 - Coupling Facility (CF) in, 487–492, **488**, 511, 513, 514
 - Coupling Facility Control Code (CFCC) in, 487
 - Coupling Facility Resource Management (CFRM) in, 490, **490–491**, 501
 - Cross System Coupling Facility (XCF) and, 490, 493–494, **493**
 - Cross System Extended Service (XES) in, 492, 493, 499
 - cross-invalidation and, 499, **500**
 - current environment evaluation before beginning, 504–505
 - DASD and, 485, 510
 - DB2 for z/OS and, 5
 - DB2 failure and, 511
 - deciding what to share in, 495
 - Distributed Data Facility (DDF) in, 485
 - DRDA and, 509
 - duplexing of structures in, 512, 516
 - environment for, 485, **486**, 504–505
 - Explicit Hierarchical Locking (EHL) in, 496–497, **496**
 - group attachment in, 507
 - group buffer pool–dependent data in, 495–496
 - group buffer pools (GBPs, cache structures) in, 489–490, 499–502, **500**, 512, 513
 - group XCF services in, 493
 - groups for, 485
 - groups for, communicating with, 646
 - image copies and, 516
 - IMS and, 507
 - integrity of data in, 495–502. *See also* integrity of shared data; locks and locking
 - inter-DB2 read/write (R/W) interest and, 495–496
 - Internal Coupling Facilities (ICFs) in, 487–488
 - Internal Resource Lock Manager (IRLM) in, 489
 - IXCL1DSU utility for, 490
 - links in, 492
 - list structure (SCA) in, 488–489, 509, 511, 512
 - lock structure in, 489
 - LOCK/UNLOCK and, 502
 - locks and locking in, 496–499, 511, 516. *See also* locks and locking
 - Log Record Sequence Number (LRSN) in, 509–510, **510**
 - logging and, 509–510, **510**
 - members in, 485, 513
 - migration issues in, 505–506
 - moving to, 503–506
 - naming conventions and, 505–506
 - non-shared objects in, 494–495, **495**
 - Parallel Sysplex and, 485, 490

- performance and, 502–503
 - processing costs of, 503
 - recovery and, 471, 480, 509, 515
 - restarting DB2 and, 476
 - savepoints and, CONNECT statement for, 586
 - Shared Communication Area (SCA) in, 488–489, 509, 511, 512
 - Shared Data Architecture (SDA) and, 487
 - shared data in, 494–495
 - signaling XCF services in, 493–494
 - START DATABASE in, 512
 - status monitoring XCF services in, 494
 - structure failure in, 511
 - structures and policies in, 490
 - subgroup attachment in, 507
 - submitting work for, 507–508
 - subsystem members in, 485
 - Sysplex Failure Management (SFM) in, 491, **492**
 - Sysplex query parallelism and, 508–509, **508**
 - Sysplex Timer in, 492, 493
 - utilities use in, 507–508
 - virtual buffer pools and, 515
 - workload management in, 506
- data space managers, 40
- Data Space Support for VSE/VM, 7, 8
- data structures, 146–152
- Data Studio. *See* Optim Data Studio
- Data System Control Facility (DSCF), 39
- data types, iii, 684, 685, 712
- approximate, 156*t*
 - ASCII and, 164, **164**
 - BIGINT, 157, 158, 172*t*, 174
 - BINARY, 159, 162
 - binary large object (BLOB), 159, 163, 172*t*. *See also* large objects (LOBs)
 - binary, 156*t*
 - binding/rebinding and, 568
 - built-in vs. user-defined, 155, 156*t*
 - CACHE option and, 174
 - CCSIDs and, 162, 164
 - CHAR, 159, 160, 171, 172*t*
 - character large object (CLOB) 159, 161, 163, 171, 172*t*.
See also large objects (LOBs)
 - character, 156*t*
 - choosing, 171–172, 172*t*
 - CODESET default for, 171
 - constants as, 688
 - CREATE for, 153
 - DATE, 165
 - date and time, 156*t*, 165–168
 - DATE, 166–167, 167*t*
 - DBCLOB, 159, 162, 171, 172*t*
 - DECFLOAT, 156*t*, 157, 158–159, 172*t*
 - decimal floating point. *See* DECFLOAT
 - DECIMAL, 172*t*, 172
 - DECIMAL/DEC/NUMERIC, 157, 158, 174
 - distinct types and, 169
 - DOUBLE, 172*t*
 - DOUBLE/FLOAT, 157, 158
 - double-byte character large object. *See* DBCLOB
 - double-byte character. *See* GRAPHIC
 - double-precision floating point. *See* DOUBLE/FLOAT
 - EBCDIC and, 164, **164**
 - encoding schemes and, for string types, 163–164
 - exact, 156*t*
 - fixed-length binary string. *See* BINARY
 - fixed-length character. *See* CHAR
 - FLOAT, 172*t*
 - GRAPHIC, 156*t*, 159, 162, 171
 - identity columns and, 172–176, **173**, **174**, 175–176*t*
 - INSERT and, 287
 - INTEGER, 157–158, 172*t*, 174
 - large objects (LOBs) and, 163, 703–704
 - LOAD and, 366
 - LONG VARCHAR, 160, 171
 - LONG VARGRAPHIC, 160, 171
 - null values and, 170, **170**
 - NUMERIC, 156*t*, 157–159, 172*t*
 - ownership of, 127
 - REAL, 157, 158, 172*t*
 - row begin/end timestamps and, 177
 - row change timestamps and, 177, **177**
 - row identifier (ROWID), 156*t*, 168–169
 - signed numeric, 156*t*
 - single-precision floating point. *See* REAL
 - SMALLINT, 157, 172*t*, 174
 - string, 156*t*, 159–164
 - strong typing and, 170
 - TIME, 156*t*, 165, 167–168, **167**
 - TIMESTAMP, 156*t*, 165, 166, 168
 - TIMESTAMP WITH/WITHOUT TIME ZONE, 165
 - transaction start ID columns and, 177–178
 - Unicode and, 164, 171
 - user-defined, 169–170, user-defined, 686–689. *See also* user-defined data types
 - VARBINARY, 159, 162, 172*t*
 - VARCHAR, 159, 160–161, 171, 172*t*
 - VARGRAPHIC, 159, 160, 171
 - varying-length binary string. *See* VARBINARY
 - varying-length character. *See* VARCHAR
 - XML, 156*t*, 172*t*, 169, 707–711. *See also* XML
- data validation, 668
- data warehousing, 12, 15–16, 23
- DATAACCESS, 115, 122*t*
- Database Access Threads (DBATs), vi, 658, 662
- Database Administrators (DBA), 7, 29
- database copy pool, 457–458, 457
- Database Descriptor (DBD), 198, 716
- Database Exception Table (DBET), 418
- Database Management Systems (DBMS)
- local DB2 vs. application servers in, 83
- Database Request Module (DBRM), 746
- binding/rebinding and, 555, 557, 558, 560, 566, 568
 - distributed data access and, 647

- user-defined functions (UDFs) and, 690
- Database Services Address Space (DSAS), 38, 40
- databases, ii, iii
 - accessing data in, 145
 - aliases in, 148
 - ALTER/ALTER DATABASE and, 152, 154–155, 235, 235, 235
 - anomalies in, 242, 243*t*
 - attributes of, 238–239
 - batch performance monitors for, 831–833
 - bottom-up vs. top-down approach to design of, 238
 - clone tables in, 151, 215–216
 - columns in, 145
 - communications in, in distributed data, 85–86
 - concurrency and, designing for, 736–737, 737
 - CREATE/CREATE DATABASE for, 152, 153, 153, 153, 235, 235
 - Data Control Language (DCL) in, 145
 - Data Definition Language (DDL) in, 145, 152
 - Data Manipulation Language (DML) in, 145
 - data retrieval in, 256–287. *See also* SELECT
 - data sharing in. *See* data sharing
 - data structures in, 146–152
 - data types in, 155–170. *See also* data types
 - DECLARE in, 152, 154, 154
 - deleting data from, 371–374. *See also* UNLOAD
 - design of, 237–243, 237
 - DROP/DROP DATABASE for, 152, 154, 154, 236, 236
 - entities in, 238
 - first normal form (1NF) in, 240, 240
 - foreign keys in, 248–249
 - functions in, 275–277
 - grouping values in, 277–278
 - hash spaces/tables in, 150, 220–221
 - hierarchy of structures in, 146, 147
 - history tables in, 152
 - identity columns in, 172–176, 173, 174, 175–176*t*
 - implementation of, 243–249
 - indexes/index spaces in, 149, 150, 222–235
 - inserting data in, using INSERT, 287–290, 287–290. *See also* INSERT
 - inserting large amounts of data into, using LOAD, 355–371. *See also* LOAD
 - keys in, 149, 246
 - logical design in, 237–242
 - logical design of, transforming to physical, 243
 - maintaining data in, 355–435. *See also* CHECK; data maintenance; LOAD; REORG; RUNSTATS; UNLOAD, 355
 - Materialized Query Tables (MQTs) in, 151, 213–215
 - merging data in, using MERGE, 292
 - normal forms in, 239–241, 240, 241
 - normalization of, 239–241, 240, 241
 - null values in, 170, 170
 - object management in, 152–155
 - objects in, 145–253. *See also* specific objects
 - OMEGAMON DB2 Performance Monitor for, 831, 832, 833
 - online performance monitors for, 831–833
 - Optim Database Administrator for, 27–28
 - ownership of, and privileges, 128*t*
 - performance monitoring for, 830–834
 - physical design of, 243
 - physical organization of data in, 374
 - primary key definition in, 247, 247
 - privileges for, 111*t*
 - relationships in, 238
 - removing data from, using DELETE, 293–295, 294–295. *See also* DELETE
 - REORG to move/remove data from, 374–397. *See also* REORG
 - resource limit facility (governor) for, 834
 - retrieving and manipulating objects in, 255–354. *See also* specific objects; SQL
 - rows in, 145
 - sample of, 878–891
 - schemas in, 151
 - second normal form (2NF) in, 240–241, 241
 - SELECT statement in, 256–287. *See also* SELECT
 - sequence objects in, 152, 191–193
 - SQL and, 145. *See also* SQL
 - statistics on data in, 397–411. *See also* RUNSTATS; statistics
 - storage groups in, 151, 236–237, 236–237
 - synonyms in, 148
 - table spaces in, 149–150, 193–210. *See also* table spaces
 - tables in, 147–148, 178–191, 244, 256. *See also* tables
 - temporal tables in, 151–152, 216–220
 - third normal form (3NF) in, 241, 241
 - Tivoli OMEGAMON XE for, 831, 832, 833
 - Unicode support and, 171
 - unique key definition in, 248
 - updating records in, using UPDATE, 290–292, 291, 292. *See also* UPDATE
 - views in, 148, 210–213, 256, 295–297, 296, 297. *See also* views
- DATE, 56*t*, 156*t*, 165, 166–167, 167*t*, 190
 - binding/rebinding and, 568
- date and time data types, 156*t*, 165–168
- DATELEN, 56*t*
- DAY, 167
- DAYOF WEEK, 167
- DAYOFMONTH, 167
- DAYOFWEEK_ISO, 167
- DAYOFYEAR, 167
- DAYS, 167
- DB2, overview of, 1–36
- DB2 10 for z/OS Database Administration (exam 612), i, iii–vi, 1
- DB2 Advanced Enterprise Server Edition, 4, 17–18, 242. *See also* DB2 for Linux, UNIX, and Windows (LUW)
- DB2 application drivers, 20–21
- DB2 command, 66*t*

- DB2 Connect, 19, 22–25, 32, 659–661
 - distributed data access and, 646
 - idle agent pool and, 660
 - target database in, 85
- DB2 Control Center, 30, 32–35, 70, 685
- DB2 Enterprise Server Edition, 4, 242
- DB2 Enterprise, 15–16. *See also* DB2 for Linux, UNIX, and Windows (LUW)
- DB2 Everyplace, 4, 18–19. *See also* DB2 for Linux, UNIX, and Windows (LUW)
- DB2 Express, 4, 13–14. *See also* DB2 for Linux, UNIX, and Windows (LUW)
- DB2 Express-C, 4, 14
- DB2 Extenders. *See* Extenders, DB2
- DB2 failure, data sharing and, 511
- DB2 for i, 7
- DB2 for Linux, UNIX, Windows, 3, 8–19, 340–341
- DB2 for VSE/VM, 3, 7–8
- DB2 for z/OS, 3, 4–6, 36, 38–46
- DB2 Governor, 12
- DB2 inactive connection support, 658
- DB2 Information Center, 30
- DB2 instance merge modules
- DB2 Interactive (DB2I) interface, 47–48, **48**
 - BIND/REBIND/FREE and, 47
 - DB2 commands and, 47
 - DB2 programming and, 47
 - DCLGEN and, 47
 - defaults of, 47
 - defaults of, **48**
 - main menu of, **48**
 - precompiling with, 47
 - SPUFI and, 47
 - SQL and, 47
 - utilities and, 47
 - utility execution using, 69, **69**
- DB2 Personal, 4, 12–13 *See also* DB2 for Linux, UNIX, and Windows (LUW)
- DB2 private protocol, distributed data access and, 643
- DB2 Technical Library, 7
- DB2 Workgroup Server Edition, 4, 242
- DB2 Workgroup, 15. *See also* DB2 for Linux, UNIX, and Windows (LUW)
- DB2_SECURE_VAR security function, 132, **132**
- DB2SORT, 57*t*
- DB2START, 139*t*
- DB2SUPLD, 57*t*
- DBA. *See* Database Administrator
- DBACRV2, 56*t*
- DBADM, 115, 119–120*t*, 121*t*, 128*t*, 125, 129, 293
 - managing and separating authorities for, 123
 - performing tasks on behalf of others and, 108–109, **109**
 - row and column access control in, 105
- DBADMIN, 139*t*, 140*t*
- DBCLOB, 159, 162, 171, 172*t*
- DBCTRL, 115, 121*t*, 128*t*
- DBD01 directory table, 83*t*
- DBETE, 427*t*
- dbextents, 8
- DBINFO, 620–621, 620–621*t*
- DBMI, 40
- DBMAINT, 115, 121*t*
- DBNAME, 139*t*
- DBPROTOCOL, 562*t*
- DBRM. *See* Database Request Module (DBRM)
- DCLGEN, 47, 66*t*, 519, 524–526, **524**, **525–526**
 - binding/rebinding and, 556
- DDF. *See* Distributed Data Facility (DDF)
- DDL. *See* Data Definition Language (DDL)
- DEADLINE, REORG and, 386
- DEADLOCK, 730*t*, 732–734
- deadlocks, vi, 586, 732–734
- DEALLCT, 57*t*
- DEALLOCATE, 725
- debugging
 - ALLOW DEBUG MODE and, 628
 - stored procedures and, 635
 - Unified Debugger for, 635
- DEBUGSESSION, 112*t*, 117*t*, 122*t*, 144
- DECARTH, 57*t*
- DECDIV3, 57*t*
- DECFLOAT, 156*t*, 157, 158–159, 172*t*, 179, 228, 346
- DECIMAL/DEC/NUMERIC, 57*t*, 157, 158, 172*t*, 174
- decimal floating point. *See* DECFLOAT
- Decision Support Systems (DSS), 38
- declarative referential integrity, 249
- DECLARE, 152, 154, **154**, 518–528, **519**, 588–591, **589**, **591**
- DECLARE CURSOR, 257, 536, **536**
- DECLARE GLOBAL TEMPORARY TABLE, 256–257
- DECLARE TABLE, 556
- Declared Temporary Tables (DTTs), 588–591, **589**
- decomposition, 341
- DECPT, 362, 372–373
- DEF_DECFLAOT_ROUND_MODE, 57*t*
- DEFAULT, INSERT and, 288, 289
- DEFER, 576, 562*t*
- deferred embedded SQL, 546–547
- Deferred Write Threshold (DWQT), 860–861, 875, 877
- DEFINE, 204, 222
- DEFINEBIND, 563*t*
- DEFINERUN, 563*t*
- DEFLANG, 57*t*
- DEFLTID, 57*t*
- DEGREE, 562*t*
- DEL_CRSTRUCTS_ON_RESTART, 57*t*
- DELAY, 385, 386
- DELETE, ii, 110*t*, 116*t*, 117*t*, 118*t*, 120*t*, 121*t*, 122*t*, 128*t*, 135*t*, 192, 255, 293–295, **294–295**, 474, 553, 611, 713
 - access paths and, 758, 761
 - all rows in table, using TRUNCATE, 294, **295**
 - check constraints and, 182–183
 - coordinating updates to distributed data with, 653
 - data change tables and, 316–317, **317**

- DROP commands and, 293
- DSNTIAUL vs., 371
- EXPLAIN and, 746
- foreign key constraints and, 181–182
- indexes and, 149
- LOAD/REPLACE and, 293
- locks and, 718, 720, 721, 724
- mass, 293
- mass delete and table spaces, 201
- multi-row FETCH in, 594, **594**
- ODBC and, 549
- positioned, 554
- positioned delete and, 293, 540, **540**, 543
- referential constraints and, 180
- resource limit facility (governor) and, 834
- scalar-fullselect and, 257
- searched delete and, 293–294, **294**
- SELECT and, 294
- temporal tables and, 607
- temporary tables and, 587, 590
- triggers and, 667, 668
- TRUNCATE and, 293, 294, **295**
- UNLOAD vs., 371–374
- views and, 148, 211, 295, 296
- WHERE clause and, 294
- DELIM, *57t*
- delimited LOAD (using COLDEL, CHARDEL, DECPT), 362, **362**
- delimited UNLOAD (COLDEL, CHARDEL, DECPT options), 372–373
- denial of service attacks, 100
- denormalization vs. joins, 331–332
- dependent tables, 179, 190
- DEPLOY, *562t*
- derived columns, 273–274, **274**
- DESCRIBE CURSOR, 623, **623**
- DESCRIBE PROCEDURE, 622–623, **623**
- DESCSTAT, *57t*
- Design Advisor, 33, 36
- designing databases, 237–243, **237**
- detailed cost tables, 790, 791–792*t*
- detailed performance monitoring, 853–854
- deterministic user-defined functions (UDFs), 697
- Developer Workbench, Optim Development Studio and, 28–29
- DFSORT, 375, 379, 382
- DIAGNOSE, 418, **418**, 434
- dimension tables, 765
- direct row access, 168, 761
- directory, v, 74, 82, 82–83*t*, 92
 - ALTER TABLE and, 190
 - copying, 453–454
 - DATA CAPTURE CHANGE and, 83
 - data sharing and, 494
 - recovery and, 467
 - REORG and, 395–396
 - SYSPLAN and SYSPACKAGE to reorganize, 396
- DISABLE, 766
- DISABSCL, *57t*
- disaster recovery, 468–471, 483, 484. *See also* recovery and restart
 - archive logs/ARCHIVE LOG in, 470, 471
 - COPY in, 469
 - data sharing environments and, 471
 - DSNTIJUZ in, 470
 - ICF catalog in, 470
 - image copies in, 469
 - items needed for, 469–470
 - libraries in, 470
 - LISTCAT in, 470
 - minimizing data loss through, 471
 - objects to be copied for, 468
 - preparing for, 468
 - RECOVERYDDN and RECOVERYSITE in, 469
 - SYSCOPY in, 469
 - table spaces offline in, 471
- DISCARD phase
 - LOAD and, 356
 - REORG and, 387–388, **388**
- DISCONNECT, *562t*, 651, 652, 659
- DISPLAY, iv, 112*t*, 118*t*, 119*t*, 663, 855
- DISPLAY ARCHIVE, *67t*, 854
- DISPLAY BUFFERPOOL, *67t*, 854, 865, **865**
- DISPLAY DATABASE LOCKS, 739, **739**, 743
- DISPLAY DATABASE, *67t*, 424–426, **424**, **425**, **426**, 426–429*t*, 854
- DISPLAY DDF, *67t*, 645–646, **645**, 647, 664, 854
- DISPLAY FUNCTION SPECIFIC, *67t*, 702, **702**, 854
- DISPLAY GROUP, 52–53, **53**, *67t*, 854
- DISPLAY GROUPBUFFERPOOL, *67t*, 500, 854
- DISPLAY LOCATION, *67t*, 854
- DISPLAY LOG, *67t*, 440, 854
- DISPLAY PROCEDURE, *67t*, 628, **628**, 854
- DISPLAY PROFILE, *67t*
- DISPLAY RLIMIT, *67t*, 854
- DISPLAY THREAD, *67t*, 479–480, **480**, 628, 658, **658**, 854
- DISPLAY TRACE, *67t*, 136, **136**, 839, 854
- DISPLAY UTILITY, *67t*, 73, **73**, 423–424, **424**, 854
- DISPLAYYDB, 111*t*, 119*t*, 121*t*
- DIST, 97
- DISTINCT, 257, 279–280, **280**, 301, 824
 - access paths and, 759, 762
 - IS DISTINCT FROM/IS NOT DISTINCT FROM, 284, **285**
 - views and, 212, 295, 296
- distinct types, 169
 - ownership of, and privileges, 113*t*, 127, 128*t*
- distributed data, 83–86, 641–665. *See also* data sharing
 - ACCUMACC and ACCUMID in, 658
 - Advanced Program-to-Program Communications (APPC) and, 646
 - aliases in, 646–647
 - application design options for, 655–656
 - application requesters in, 84, 641
 - application servers and, 83, 641

- batch processing and, 653–654
- BIND options for, 651
- BIND PACKAGE and, 651–652
- BIND PLAN and, 652–653
- BSDS and, 646
- CALL and, 659
- CICS and, 653, 655, **656**
- CMTSTAT and, 658, 664
- coding methods for, 647–654
- COMMIT and, 659
- Communications Database (CDB) and, 85–86, 641, 644–646, 663
- communications protocols for, 84–85, 643–644
- configuration settings for connection pooling in, 660–661
- CONNECT and, 84, 642–643, 649–651, **649**
- connection pooling for, 659–661
- CONNECTIONS catalog and, 665
- coordinating updates in, 653–654
- CURRENT RULES and, 659
- CURRENTSERVER and, 654
- data sharing groups and, communicating with, 646
- Database Access Threads (DBATs) and, 658, 662
- Database Management Systems (DBMSs) and, 83
- Database Request Module (DBRMs) and, 647
- DB2 Connect and, 646, 659–661
- DB2 inactive connection support and, 658
- DB2 private protocol and, 643
- DISCONNECT and, 651, 659
- DISPLAY and, 663
- DISPLAY DDF and, 664
- DISPLAY THREADS in, 658, **658**
- Distributed Data Facility (DDF) and, 641
- distributed request in, 642, 664
- distributed unit of work (DUW) in, 642
- DRDA and, 84, 642–643, 645, 648, 651–653, 655–657, 662
- DSNJU003 (Change Log Inventory) and, 646, 647
- DSNJU004 (Print Log Map) and, 647
- DSNTIP5 and, 645
- DSNTIPR and, 645
- DSNTP2DP and, 643
- FETCH and, 662, 664
- gathering configuration information for, using DISPLAY DDF, 645–646, **645**, 647
- idle agent pool and, 660
- IMS and, 653, **656**
- inactive threads and, 657
- INSERT and, 648, 649, 650
- IPLIST and, 641, 644, 665
- IPNAMES and, 641, 644, 645, 665
- LINKNAME in, 86, 644, 645
- local DB2 and, 641
- location name and, 85
- LOCATION and, 641, 644, 645, 665
- Logical Unit name (LU name) and, 85
- LULIST and, 644, 665
- LUMODES and, 644, 665
- LUNAME in, 86, 644, 645, 665
- member-specific routing in, 646–647, **647**
- MODESELECT and, 644, 665
- MODIFY DDF and, 647
- naming conventions for, 641
- non-DB2 relational database names (RDBNAM), 85
- OPTIMIZE FOR n ROWS in, 656–657, 659, 662, 664
- pooled threads and, 658
- precompiler options for, 651
- programming considerations when using, 654–655
- releasing connections in, using RELEASE, 650–651, 659
- remote query performance in, 656–661
- remote requests in, 642
- remote servers and, 83, 641
- remote unit of work (RUW) in, 642
- restricted systems and, 653
- REXX and, 643
- SET CONNECTION and, 654
- SQL and, 84, 641
- SQL(xxx) and, 651, 655
- SQLERROR and, 655
- SQLRULES and, 654
- stored procedures and, 655–656
- System Management Facility (SMF) and, 658
- System Network Architecture (SNA) and, 84–86, 643, 646
- target database name in, 85
- TCP/IP and, 84–86, 641, 643, 644–646
- temporary tables and, accessing, 649, **649**
- three-part names in, 647–649
- TSO and, 653–654
- tuning applications for, 659
- two-phase commit and, 653–654
- USERNAMES and, 644, 665
- Virtual IP Address (VIPA) and, 646
- Virtual Terminal Access Method (VTAM) and, 85, 86, 643, 644, 645
- Workload Manager (WLM) and, 655, **656**
- Distributed Data Facility (DDF), vi, 57*t*, 97, 485, 641
 - address space for, 38, 40–41
 - data sharing and, 485
 - DISPLAY DDF for, 647, 645–646, **645**, 664
 - global transactions and, 586
 - MODIFY DDF and, 647
 - multi-row FETCH in, 594
- Distributed Data Interchange Services (DDIS), 41
- Distributed Relational Database Architecture (DRDA), 27, 84, 85, 164
 - data sharing and, 509
 - distributed data access and, 84, 642–643, 645, 648, 651–653, 655, 656–657, 662
 - result sets and, 621
 - stored procedures and, 621
- Distributed Relational Data System Manager (DRDS), 41
- distributed requests, 642, 664
- distributed threads, 639
- Distributed Transaction Manager (DTM), 40, 41
- Distributed Unit of Work (DUW), 642
- LLDFREQ, 57*t*

- DLITOUT, 57*t*
DM component, predicates, 818
DML. *See* Data Manipulation Language (DML)
Document Type Definition (DTD), 708
Domino, 18
DOUBLE/FLOAT, 157, 158, 172*t*
double-byte character large object (DBCLOB). *See* large objects (LOBs)
double-byte character. *See* GRAPHIC
double-precision floating point. *See* DOUBLE/FLOAT
DPSEGSZ, 57*t*
Dragonball, 19
drains, locks and, 732
DRDA. *See* Distributed Relational Database Architecture (DRDA)
DROP, 108, 111*t*, 117*t*, 119*t*, 121*t*, 128*t*, 129, 135*t*, 152, 154, 154, 474
 binding/rebinding and, 572
 coordinating updates to distributed data with, 653
 sequence objects and, 600
DROP DATABASE, 236, **236**, 293
DROP INDEX, 234, **234**, 251
DROP PACKAGE, 571, **571**
DROP PROCEDURE, 627, **627**
DROP SEQUENCE, 193
DROP STOGROUP, 236, **237**
DROP TABLE, 191, 194, 293, 376
DROP TABLESPACE, 210, **210**, 293
DROP TRIGGER, 678, 684
DROP VIEW, 213, **213**
DROPIN, 116*t*, 120*t*
DRPIN, 113*t*
DSCVI, 57*t*
DSHARE, 57*t*
DSMAX, 57*t*, 872–873
DSN commands, 65–66, 66*t*
DSN_COLDIST_TABLE, 802, 802–803*t*
DSN_FILTER_TABLE, 789, 789–790*t*
DSN_FUNCTION_TABLE, 773, 773–775*t*
DSN_GROUP_TABLE, 784, 784–786*t*
DSN_KEYTGTDIST_TABLE, 803, 804–805*t*
DSN_PTASK_TABLE, 787, 787–789*t*
DSN_QUERY_TABLE, 800, 800–801*t*
DSN_SORTKEY_TABLE, 795, 795–796*t*
DSN_STATEMENT_CACHE_TABLE, 775, 775–778*t*, 827
DSN_STATEMENT_TABLE, 770, 771–773*t*
DSN_STRUCT_TABLE, 782, 782–784*t*
DSN_USERQUERY_TABLE, 808
DSN_VIEWREF_TABLE, 798, 798–799*t*
DSN1CHKR, 74, 93, 134, 420
DSN1COPY, 74, 185, 371, 484
DSN1DBM1, 40
DSN1DIST, 41
DSN1LOGP, 422
DSN1MSTR, 39
DSN1PRNT, 134, 423
DSN1SDMP (IFC Selective Dump), 423
DSNACCOR, 410
DSNACCOR(X), v
DSNACCOX, 636, 410
DSNACICS, 636
DSNAEXP, 636, 747
DSNAIMS, 636
DSNALI, 45, 46
DSNCLI, 46
DSNDB01, 88
DSNDB01SYSUTILX, 467
DSNELI, 43, 46
DSNJLOGF (Preformat Active Log), 419
DSNJU003 (Change Log Inventory), 419, 440, 441, 465, 475, 646, 647, 646
DSNJU004 (Print Log Map), 419–420, 441, 470–471, 647
DSNRLI, 46, 629
DSNTEP2, 82
DSNTIAUL, 371
DSNTIJUZ, 470
DSNTIPS, 645
DSNTIPP1, 122
DSNTIPR, 645
DSNTP2DP, 643
DSNTPSMP, 634, 635
DSNU, 70
DSNULI, 46
DSNUTILB, 70
DSNUTILU, 70–71, **71**
DSNZPARAMs, vi, 37, 53–54, 54–65*t*, 89, 93
 locks and, 730, 741, 743
 online, 53–54
 SET SYSPARM for, 53–54, **54**
DSQLELI, 57*t*
DSSIZE, 57*t*, 203, 205–206, 205*t*, 209, 221
DSSTIME, 57*t*
DSVCI, 856
DUMP, FROM DUMP, 466
DUMPCCLASS, 457–458
dumps, DSN1SDMP (IFC Selective Dump), 423
duplexing structures, data sharing and, 512, 516
dynamic cursors, 554
dynamic logical partitioning, 7
dynamic prefetch, 760
dynamic scrollable cursors, 545, **545**
dynamic SQL, vi, 517, 546–549, 552, 576, 825–827, 870–871, **870**, **871**
 caching in, 826–827, **827**, 870–871, **870**, **871**
 concentration of literals in, 548
 data sharing and, 494
 ODBC/JDBC execution of, 547
dynamic statement cache, 826–827, **827**
DYNAMICRULES, 563*t*, 572, 581
DYNRULS, 57*t*
- E**
EBCDIC, 164, **164**, 171, 252, 268, 273, 366
Eclipse, 25–26

- EDM. *See* Environmental Descriptor Manager (EDM)
- EDM_SKELETON_POOL, 57*t*, 87
- EDMDBDC, 57*t*
- EDMPOOL, 87
- EDMSTMTC, 57*t*, 87
- EDPROP, 57*t*
- electronic commerce/e-commerce, 2, 3
- embedded dynamic SQL, 546
- DB2 Connect and, 25
 - IMS and, 43
- EMPNO fields, 172–176
- EN_PJSJ, 58*t*
- ENABLE, 766
- Enable New Function Mode (ENFM), 51, 52, 420
- ENABLE QUERY OPTIMIZATION, 214–215
- ENABLE/DISABLE, 563*t*
- Encina, 24
- encoding schemes (EBCDIC, ASCII, and Unicode), iv, 242, 253, 273
- joins and, 268
 - SELECT and, 273
 - string data types, 163–164
- ENCODING, 563*t*
- encryption, ii, 100
- DB2 for z/OS, 6
 - InfoSphere Guardium Data Encryption, 6
 - Integrated Cryptographic Services Facility (ICSF) and, 100
- ENCRYPTION, 108*t*
- end of log recovery, 438
- END, 66*t*
- END-EXEC, 518, **518**
- ENFORCE, 356, 435
- ENFORCE CONSTRAINTS, 365
- ENFORCE NO, 364, **364**
- ENSCHHEME, 58*t*
- Enterprise Edition, DB2 Connect, 23, 24
- Enterprise Resource Planning (ERP), 2–4, 6, 16, 23, 242
- Enterprise Server Edition, 4, 242
- Enterprise, DB2, 15–16. *See also* DB2 for Linux, UNIX, and Windows (LUW)
- entities, in databases, 238
- environment, 37–94
- access control and, 97
 - address spaces in, 38–41, **39**
 - attachments/attachment facilities in, 41–46
 - catalog in, 74–82, 74–81*t*, **82**
 - commands in, 65–68, 67–68*t*
 - conversion and, 50
 - Data Facility Storage Management Subsystem (DFSMS) and, 47
 - directory in, 74
 - distributed data in, 83–86
 - installation and migration in, 50–65, **53**, **54–65**
 - interfaces with DB2 and, 47–50
 - Parallel Sysplex support and, 46
 - Resource Access Control Facility (RACF) and, 46, 132
 - security and, 46
 - utilities in, 69–73
- Environmental Descriptor Manager (EDM) pool, v, 87–88, 869–871
- binding/rebinding and, 558
 - data sharing and, 494
 - DSNZPARMs and, 53
- equal-to operator, 261
- equal unique index, 824
- ERP. *See* Enterprise Resource Planning (ERP)
- error messages, v
- error pages, recovery and, 456
- escalation of locks, 734–735
- EUR date/time format, 167*t*, 168*t*
- EVALUNC, 58*t*, 730*t*
- Everyplace, DB2, 4, 18–19, 242. *See also* DB2 for Linux, UNIX, and Windows (LUW)
- exact data type, 156*t*
- exams for IBM DB2 10 for z/OS database administrator certification, i–vi
- EXCEPT, 257, 354
- exception performance monitoring, 854
- exception tables, 464
- excepts/EXCEPT/EXCEPT ALL, 311, **312**
- EXCHANGE, 151
- exclusive (X) locks, 722, 724, 728
- EXEC SQL, 518, **518**, 556
- EXECUTE, 110*t*, 117*t*, 120*t*, 122*t*, 128*t*, 138*t*, 140*t*, 144, 520, 546, 549, 571–572, 689
- EXECUTE ON FUNCTION, 113*t*
- EXECUTE ON PROCEDURE, 113*t*
- executing SQL statements, 538–546
- execution environments, for stored procedures, 628–632
- execution validation, SQL, 528–535
- existence checking, FETCH for, 592, **593**
- EXISTS, 304–307, **307**
- exit routines, authorization control, 98
- EXPLAIN, vi, 112*t*, 117*t*, 118*t*, 119*t*, 563*t*, 569, 678, 745–756, 876, 877
- access plans and, 746
 - binding and, 747
 - cache tables in, 746–747
 - checking application access with, 807–808
 - cost of execution in, 746
 - CURRENT EXPLAIN MODE register for, 747
 - DELETE and, 746
 - DSN_COLDIST_TABLE and, 802, 802–803*t*
 - DSN_DETCCOST_TABLE and, 790, 791–792*t*
 - DSN_FILTER_TABLE, 789, 789–790*t*
 - DSN_FUNCTION_TABLE and, 773, 773–775*t*
 - DSN_GROUP_TABLE, 784, 784–786*t*
 - DSN_KEYTGTDIST_TABLE and, 803, 804–805*t*
 - DSN_PGRANGE_TABLE and, 797, 797–798*t*
 - DSN_PREDICATE_TABLE and, 778, 778–781*t*
 - DSN_PTASK_TABLE, 787, 787–789*t*
 - DSN_QUERY_TABLE and, 800, 800–801*t*
 - DSN_SORT_TABLE and, 793, 793–794*t*
 - DSN_STATEMENT_CACHE_TABLE and, 775, 775–778*t*

- DSN_STATEMENT_TABLE and, 770, 771–773*t*
- DSN_STRUCT_TABLE and, 782, 782–784*t*
- DSN_VIEWREF_TABLE and, 798, 798–799*t*
- DSNAEXP stored procedure for, 747
- dynamic statement cache and, 826–827, **827**
- EXPLAIN table queries and Optim products in, 805–806
- filtering and, 747
- function tables in, 746
- gathering data from, 747
- INSERT and, 746
- locks and, 735, 738
- Optim Data Studio and, 747
- Optim Development Studio and, 747
- Optim Query Tuner and, 747
- optional tables populated by, 770–805
- output from, 806–808
- packages and, 746
- parallel operations and, 747
- partitioning and, 747
- plan tables and, 746, 747, 748, 748–756*t*
- plans and, 746
- predicates and, 747
- Query Management Facility (QMF) and, 747
- SELECT and, 746
- sorting and, 747
- SPUFI and, 747
- SQL statements and, 746, 747
- SQL tuning with, 825–827
- statement table for, 746
- subqueries and, interpreting access for, 768
- tables for, 25
- UPDATE and, 746
- user-defined functions and, 746
- verifying index use with, 806–807
- Explicit Hierarchical Locking (EHL), 496–497, **496**
- explicit privileges, 109–114, 110–113*t*
- Express, DB2, 4, 13–14. *See also* DB2 for Linux, UNIX, and Windows (LUW)
- Express-C, DB2, 4, 14. *See also* DB2 for Linux, UNIX, and Windows (LUW)
- expressions, 315–316, **315**, 354
 - arithmetic, 338
 - AVG, 276–277, **277**
 - CASE, 334–335, **334**, **335**, 350
 - comparison, 338
 - COUNT, 279, **279**, 280
 - DISTINCT, 279–280, **280**
 - filter, 338
 - HAVING clause and, 279, **279**
 - indexes and, 228–229
 - LIKE and, 280–281, **280**, **281**
 - logical, 338
 - MAX, 276–277, **276**
 - MIN, 277
 - nested table expressions in, 313–315, **313**, **314**, **315**
 - path, 338
 - primary, 338
 - row, 301, 336, **336**
 - STDDEV, 277
 - SUM, 279, **279**
 - VARIANCE, 277
 - XPath, 337–341
- EXTENDED INDICATOR, 563*t*
- Extended Recovery Facility (XRF), 43
- Extenders, DB2, ii, 30, 31
- Extensible Markup Language. *See* XML
- extensions, 684–689
- EXTENTS, 410
- EXTERNAL, 617, 634, 639
- external scalar user-defined functions (UDFs). *See* user-defined functions (UDFs)
- external SQL stored procedures, 634–635
- external table functions, 696–697, **696**, **697**
- external user-defined functions (UDFs). *See* user-defined functions (UDFs)
- externalization, I/O, 857–858
- externalizing statistics, 409
- EXTRAREQ, 58*t*, 657
- EXTRASRV, 58*t*, 657
- EXTSEC, 58*t*
- F**
- fact table, 765
- fallback, 11
- fallback recovery, 458–459
- false lock contention, 499
- Family Fundamentals (exam 610), i–iii
- FARINDREF, 395
- FAROFFPOS, 395
- Fast Log Apply (FLA), 459–460
- FASTSWITCH, REORG and, 381–382
- FCCOPYDDN, 58*t*
- federation
 - DB2 Connect and, 24, 25
 - DB2 for Linux, UNIX, Windows (LUW) and, 8, 16, 17
 - homogeneous, 8, 13–17
- FENCED, 617, 634, 638, 639
- FETCH, 523, 538–540, **539**, **540**, 591–592, **591**, **592**, 610, 710–711
 - cursors and, 543–545
 - distributed data access and, 662, 664
 - existence checking with, 592, **593**
 - FETCH FIRST and, 592, **592**
 - FIRST, 257, 333, **333**, **334**
 - large objects (LOBs) and, 706, 710–711
 - locks and, 724, 727
 - multi-row, 593–594, **593**, **594**
 - OPTIMIZE FOR and, 592, **592**
 - sequence objects and, 601, 602
 - streaming data using, 706, 710–711
 - WITH CONTINUE, 336
- file reference variable, LOBs and, 704–705
- filter expressions, 338
- filter factors, 809–811

- filter tables, 789, 789–790*t*
 - FILTER, 563*t*
 - filtering, 343–346
 - EXPLAIN and, 747
 - First-In First-Out (FIFO) queuing, 857
 - first normal form (1NF), 240, **240**
 - fixed-length binary string. *See* BINARY
 - fixed-length character. *See* CHAR
 - FLAG, 563*t*, 678
 - FlashCopy, *v*
 - image copies and, 442
 - recovery from a backup by, 462–463
 - UNLOAD and, 371
 - FLASHCOPY, 58*t*, 367, 451, 484
 - FLASHCOPY_COPY, 58*t*
 - FLASHCOPY_LOAD, 58*t*
 - FLASHCOPY_PPRC, 58*t*
 - FLASHCOPY_REBUILD_INDEX, 58*t*
 - FLASHCOPY_REORG_INDEX, 58*t*
 - FLASHCOPY_REORG_TS, 58*t*
 - FLOAT, 172*t*
 - FOR, 634
 - FOR EACH ROW, 674
 - FOR EACH STATEMENT, 674, **675**
 - FOR FETCH ONLY, 297
 - FOR READ ONLY, 297
 - FOR SYSTEM TIME, 286, **286**
 - FORCE, 474
 - foreign keys, 179, 181, 227, 246, 248–249
 - FORTRAN, 531
 - FREE, 47, 66*t*, 128*t*, 571, **571**
 - free space, FREEPAGE/PCTFREE, 203, 206, 222, 366, 375
 - FREEPAGE, 203, 206, 366
 - frequency distribution statistics, RUNSTATS, 400–402, 401*t*, **401**, **402**, 402*t*
 - FREQVAL, 402, **402**
 - FROM, 147, 257, 264, 267, 268, 275, 285–286, **286**, 301, 696–697, **696**, **697**
 - joins and, 326
 - subqueries and, 304
 - views and, 212, 295, 296
 - FROM DUMP, 457–458
 - full copy, 438, 445–447
 - full outer join, 327–331, **327–329**
 - fullselects, 256–257, 292
 - function tables, EXPLAIN and, 746
 - functions, *ii*, 275–277
 - aggregate. *See* column functions
 - ALTER for, 155
 - built-in, 275, 689, **689**
 - CASE expression in, 335, **335**
 - column, 275, 276–277, **276**, **277**
 - DSN_FUNCTION_TABLE and, 773, 773–775*t*
 - GROUP BY and, 277–278, **277**, **278**
 - row. *See* scalar functions
 - scalar, 275–276, **275**, **276**
 - set. *See* column functions
 - string, 276
 - table, 275
 - user-defined, *iv*, 275, 689–703. *See also* user-defined functions
 - vector. *See* column functions
 - fuzzy copy, 449
- ## G
- GBP, *vi*
 - GBPCACHE, 204, 223
 - GBPOOLT threshold, 502
 - GCCSID, 58*t*
 - general command processor, 40
 - Generalized Trace Facility (GTF), 834
 - GENERATED, 175*t*, 176
 - GENERATED ALWAYS, 173, 365–366, 596, 597, 598
 - GENERATED BY DEFAULT, 365–366, 596, 597, 598
 - Generation Data Groups (GDGs), 443
 - GENERIC, 563*t*
 - Geodetic Extender, 10, 16, 17, 31
 - GET DIAGNOSTICS, 532–535, 532–535*t*, 546, 554, 595, 634
 - global lock contention, 499
 - Global Lock Manager (GLM), 498
 - global locks, 497–498
 - global optimization, 769
 - global temporary tables, 639
 - global transactions, 586
 - governor, resource limit facility, 834
 - GRANT, 98, 101, 108, 113–114, **113**, **114**, 115*t*, 117*t*, 121*t*, 129, 133, 134*t*, 474
 - authorities, 124, **124**
 - binding/rebinding and, 572
 - coordinating updates to distributed data with, 653
 - GRANT ALL, 110*t*
 - granularity of statements, 674
 - GRAPHIC, 156*t*, 159, 162, 171, 190, 568
 - greater-than operator, 261
 - greater-than/equal-to operator, 261
 - GRECP, 427*t*
 - group buffer pool (GBPs), 499–502, **400**, 513
 - ALTER/DISPLAY GROUPBUFFERPOOL in, 500–501, **501**
 - castout process in, 501–502, **502**
 - coherency control in, 496
 - concurrency control in, 496
 - Coupling Facility Resource Management (CFRM) in, 501
 - data sharing and, 512
 - dependent data, 495–496, 495
 - Explicit Hierarchical Locking (EHL) in, 496–497, **496**
 - inter-DB2 read/write (R/W) interest and, 495–496
 - locks and locking in, 496–499. *See also* locks and locking
 - sizing of, 501
 - GROUP BY, 256, 257, 275, 277–278, **277**, **278**, 759, 806, 824
 - ORDER BY and, 278
 - views and, 212, 295
 - group manager, 40
 - group tables, parallel, 784, 784–786*t*

group XCF services, in data sharing, 493
 GROUP_MEMBER, 753*t*
 grouping values, 277–278, **277**, **278**. *See also* GROUP BY
 groups, data sharing, 485
 GRPNAME, 58*t*
 Guest Sharing Environment, 8

H

Handheld PC, 18
 hash access, iii, vi, 761
 hash key, 253
 hash-organized table spaces, 377
 hash spaces, 150
 hash tables, 220–221, 251, 253
 HAVING, 279, **279**, 343, 520
 CASE expression in, 334–335, **334**, **335**
 views and, 212, 295
 Health Center, Control Center, DB2 and, 33
 health checks, iv, vi
 Health Monitor, Data Studio, 27
 held cursor, 542, **542**
 Hierarchical Storage Management (HSM), 464
 hierarchy of database structures, 146, **147**
 High Availability Disaster Recovery (HADR), 10–11, 13–17
 HIGH2KEY, 411
 HIGHVALUE, 403
 HINT_USED, 754*t*
 histogram statistics, 402–403, 811–812, **812**
 historical statistics, 405–406, **406**
 history tables, 148, 152
 homogeneous federation, 8, 13–17
 homogeneous Q replication, 11, 16, 17
 homogeneous replication, 8, 16, 17
 HONOR_KEEPDICTIONARY, 58*t*
 host arrays, 523–524, **523**, **524**
 host structures, SQL application programming and, 520, 523,
 523
 host variables, SQL application programming and, 520–521,
 521
 HOUR, 168
 HP-UX, 2
 HTML, Net Search Extender and, 8–9, 13–17
 hybrid joins, 764–765

I

i. *See* System i
 I/O, v–vi, 8, 857–858
 asynchronous read/write in, 858
 Immediate Write Threshold (IWT) and, 858
 parallelism in, 827–830
 synchronous reads/writes to, 857–858
 writes to, 860–861
 IBM Developer Kit, 24
 IBM i, 2
 IBM_SERVICE_DATA, 753*t*
 IBMREQD, 139*t*
 ICF catalog, 470

ICOPY, 427*t*
 IDAUTH_MODULE, 58*t*
 IDBACK, 58*t*
 identity columns, iii, 172–176, **173**, **174**, 175–176*t*, 596–599,
 596
 GENERATED ALWAYS in, 596, 597
 GENERATED BY DEFAULT in, 596, 597, 598
 INSERT in, 597–598, **597**
 OVERRIDING USER VALUE in, 597
 sequence objects vs., 192, 602–603, 603*t*
 UPDATE in, 597–598
 values in, obtaining with INSERT with SELECT, 598–599,
 599
 IDFORE, 58*t*
 idle agent pool, 660
 IDs, auditing, 135
 IDTHTOIN, 58*t*
 IDXBPOOL, 59*t*
 IF, 634
 IFCID, 826
 IGNSORTN, 59*t*
 IMAGCOPY, 111*t*, 119*t*, 121*t*
 image copies, 442–454, 469
 access during, using SHRLEVEL, 449, **450**
 catalog copying in, 453–454
 CHANGELIMIT in, 448–449, **448**
 COPY in, 442, 444, **444**, 447
 COPYTOCOPY in, 444–445, **445**
 data sets, 447
 data sharing and, 516
 DFSMS concurrent copy and, 450
 directory copying in, 453–454
 dual, 443–444
 FlashCopy in, 442
 FLASHCOPY option for, 451
 frequency of, 443
 full, 445–447
 fuzzy copy in, 449
 Generation Data Groups (GDGs) in, 443
 incremental, 445–447
 index copies in, 453
 inline copies and, 449–450
 LOAD REPLACE and, 449–450, **450**
 MERGECOPY and, 446
 multiple objects in, 447–448, **448**
 partitions, 447
 REPORT in, 453
 REPORTONLY in, 448–449, **448**
 retention periods in, 443
 SHRLEVEL in, 454
 SYSCOPY and, 445, 447, 452, 453
 SYSLGRNX and, 453
 TABLESPACESET in, 453
 tape vs. disk, 445
 TEMPLATE in, 445
 TRACKMOD in, 446
 utility mode and, 449

- Immediate Write Threshold (IWTH), 858, 863–864
 IMMEDIATE, 563*t*
 IMMEDWRI, 59*t*
 IMPDSDEF, 59*t*
 IMPDSSIZE, 59*t*
 implementing a database, 243–249
 IMPLICIT_TIMEZONE, 59*t*
 implicit joins, 264, **264–265**
 IMPTKMOD, 59*t*
 IMPTSCMP, 59*t*
 IMS. *See* Information Management System (IMF)
 IMS attachment facility, 41
 IN, 262, 285, **285**, 304–307, **307**, 757, 758, 817
 IN EXCLUSIVE MODE, 719–720, **720**, 719
 IN SHARE MODE, 719–720, **720**
 IN/NOT, 687
 IN-list direct table access, 758
 IN-list index scan, 821–822, **821**
 in-memory objects, 862
 in-use pages, 856
 inactive connection support, 658
 inactive threads, 657
 include columns, vi, **228**, **228**
 INCREMENT BY n, 175*t*
 incremental copy, 438, 445–447
 Independent Software Vendors (ISV), 19
 application programs and, 578
 DB2 Data Server Driver and, 21–22
 Index Advisor, 30
 index copies, 453
 index matching predicates, 819
 index spaces, 150, 437
 INDEX, 110*t*, 116*t*, 120*t*, 121*t*
 INDEX_IO_PARALLELISM, 59*t*
 index-only access, 823
 indexable predicates, 344, 345, 346, 346–348*t*, 817–818, **817**, **818**
 indexes, ii–iii, 30, 35, 149, 222–235, 251, 819–825
 access path evaluation for, 756–758, **757**
 access to, 819–824
 advisory reorg-pending (AREO) status, 234
 modifying, using ALTER INDEX, 155, 233–234, **234**, 396
 atomic key in, 227
 avoiding sorts by using, 824–825, **824**, **825**
 binding/rebinding and, 568
 BUFFERPOOL in, 222
 catalog restrictions for, 223
 CHECK, 413–414, **414**, 434
 clustering, and CLUSTER in, 222, 224–225, **225**
 composite key in, 227
 compression of, using COMPRESS, v, 222, 224
 COPY in, 222
 creating, using CREATE INDEX, 153, 222–223
 Data Partitioned Secondary (DPSI), 229–231, **230**, **231**
 DB2 for z/OS and, 6
 deferring physical definition in, 224
 DEFINE in, 222
 DELETE in, 149
 DROP INDEX to remove, 234, **234**
 equal unique, 824
 expressions and, 228–229
 foreign key in, 227
 free space for, FREEPAGE/PCTFREE in, 222
 GBPCACHE in, 223
 generating, guidelines for, 233
 GROUP BY in, 278
 image copies and, 453
 IN-list direct table access for, 758
 IN-list index scan and, 821–822, **821**
 INCLUDE columns in, 228, **228**
 Index Advisor for, 30
 index matching predicates and, 819
 index spaces and, 150
 index-only access in, 758, 823
 indexable predicates and, 344, 345, 346, 346–348*t*,
 817–818, **817**, **818**
 INSERT in, 149
 join columns and, 267
 keys in, 227
 large objects (LOBs) and, 231
 locks and, 716
 matching index scan and, 819, 820
 multiple access to, 756, 822
 nested loop join with sparse index in, 763
 non-matching index scan and, 757, 821
 Non-Partitioning Secondary (NPSI), 198, 202, 229, **229**,
 370
 non-unique, 226–227
 NOT PADDED in, 223
 null values and, 227
 number of matching indexes, in accessing, 757
 one-fetch access to, 823
 ORDER BY and, 271
 ownership of, and privileges, 126–127, 128*t*
 Page Set Rebuild-Pending (PSRBD) status, 234
 parallel index build using REORG, 379–380
 parallel index builds using LOAD, 369
 partitioning controlled by, 199–200, **199**, 200*t*
 partitioning of, using PART/PARTITIONED, iv, 223,
 225–226, **225–226**
 performance and, 819–825
 primary key in, 227
 range-list index access in, 758, 822–823, **823**
 Rebuild-Pending (RBDP) status, 234
 rebuilding, using REBUILD INDEX, 397, 404
 recovery and, 437, 456
 RENAME INDEX in, 235, **235**
 REORG and, 388–389, **389**, 390, **390**, 391, 394, 396
 restrictions start on, using ACCESS(FORCE), 430,
 430
 restrictions to defining, 223
 screening of, 820, **820**
 storage groups in, 236–237, **236–237**
 system catalog, 233

- unique and UNIQUE, 223, 226–227
- unique index check, 765
- unique key in, 227
- unique where not null, 227
- UPDATE in, 149
- USING STOGROUP in, 223
- USING VCAT in, 223
- VALUES in, 223
- verifying use of, with EXPLAIN, 806–807
- Virtual Storage Access Method (VSAM) and, 150
- XML, 231–232, **232**
- INDEXONLY, 750*t*, 758
- INDEXVAL phase, LOAD, 356
- indicator variables, 521–522, **522**
- indirect reference rows, 160
- INDREFLIMIT, 391–392, **391**, **392**
- Information Center, DB2, 30
- Information Management, 1
- Information Management System (IMS), 2, 4, 6, 37, 97
 - access control and, 99
 - address spaces and, 38
 - attachment facility and, 41, 42–43, **43**
 - call attachment facility and, 45
 - commands for, 65
 - CURSOR WITH HOLD in, 541–542, **542**
 - data sharing and, 507
 - DB2 and, relationship between, **43**, **43**
 - distributed data access and, 653, **656**
 - embedded SQL and, 43
 - Extended Recovery Facility (XRF), 43
 - global transactions and, 586
 - locks and, 727, 728
 - performance and, 853
 - security in, 99
 - stored procedures and, 615
 - traces and, 834
- Informix, 2, 8, 16, 18
 - DB2 Connect and, 24, 25
 - Optim Development Studio and, 29
- InfoSphere Guardium Data Encryption, 6
- InfoSphere Optim, 2
- InfoSphere Optim Data Lifecycle Management for DB2, 26
- inherited privileges, 114
- initialization procedures, 40
- inline copies, 366–367, 449–450
- inline statistics
 - LOAD and, 367, **367**
 - REORG and, 386–387
 - RUNSTATS and, 404–405, **405**
- inline views, 313
- INLISTP, 59*t*
- inner join, 269, 318–319, **318**, **319**, 354
- INNER, 318–319, **318**, **319**
- inoperative plans/packages, 569
- INSENSITIVE/SENSITIVE, 543–544, **543**, 544*t*
- INSERT, ii, 104, 110*t*, 116*t*, 117*t*, 118*t*, 120*t*, 121*t*, 122*t*, 128*t*, 135*t*, 192, 173, 185, 255, 287–290, **287–290**, 474, 523
 - check constraints and, 182–183
 - constraints and, 180–183, 287
 - coordinating updates to distributed data with, 653
 - data change tables and, 316–317, **317**
 - data types and, 287
 - DEFAULT keyword and, 288, 289
 - distributed data access and, 648–650
 - EXPLAIN and, 746
 - foreign key constraints and, 181
 - fullselects and, 256–257
 - identity columns and, 597–599, **597**, **599**
 - indexes and, 149
 - large amounts of data with, using LOAD instead, 290, 355.
 - See also* LOAD
 - large objects (LOBs) and, 704–705, **704**
 - LOCATION column and, 288
 - locks and, 718, 721, 724, 743
 - MERGE and, 292
 - multi-row, 594–595, **595**
 - NOT ATOMIC and, 595
 - null values and, 288
 - referential constraints and, 180
 - resource limit facility (governor) and, 834
 - sequence objects and, 599, 602, **602**
 - SET clause and, 527, **527**
 - set of values, from SELECT, 289–290, **290**
 - specific column, 289, **289**
 - statistics and, 410
 - table expressions and, 315–316
 - temporary tables and, 587–588, **587**, 590
 - triggers and, 667, 668
 - VALUES and, 288
 - views and, 148, 211, 295, 296
 - with SELECT, 598–599, **599**
 - XML and, 341
- installation and migration, vi, 50–65, **53**, **54–65**
 - command list (CLIST) for, 50
 - conversion, conversion mode in, 51, 52
 - data sharing and, 505–506
 - DISPLAY GROUP to see mode for, 52–53, **53**
 - DSNZPARMs for, 53–54, 54–65*t*
 - enabling new function mode in, 51, 52
 - Environmental Descriptor Manager (EDM) and, 53
 - ISPF and ISPF/Program Development Facility (ISPF/PDF), 50
 - JCL for, 50
 - jobs in, 50
 - modes of migration for, 51
 - new function mode in, 52
 - packages and, testing, 570–571
 - plans and, testing, 570–571
 - SET SYSPARM for, 53–54, **54**
 - storage and, 50
- Installation Verification Procedure (IVP), 371
- instance merge modules, DB2 and non-DB2, 21
- INSTEAD OF, 316, 537, 667, 669, 673–674, **673**, **674**, 684
- Instrument Facility Interface (IFI), 45, 690, 837

- instrumentation facilities, 40
 - instrumentation facility ID (IFCID), 834, 838, 839, 840, 840–852*t*
 - INTEGER, 157–158, 172*t*, 174
 - Integrated Catalog Facility, 494
 - Integrated Cryptographic Services Facility (ICSF), 100
 - Integrated Development Environment (IDE), 21, 26
 - integrity of shared data, iv, 495–502, 668. *See also* locks and locking
 - declarative referential, 249
 - Intel platforms, 1, 2
 - Intent Exclusive (IX) locks, 722, 723
 - Intent Share (IS) locks, 722, 723
 - inter-DB2 read/write (R/W) interest, 495–496
 - interactive SQL, 546. *See also* dynamic SQL; SQL
 - Interactive System Productivity Facility (ISPF), 47
 - interfaces with DB2, 47–50
 - Call Attachment Facility (CAF) and, 47
 - CICS and, 47
 - DB2 Interactive (DB2I), 47–48, **48**, 69
 - Interactive System Productivity Facility (ISPF) and, 47
 - SQL Processing Using File Input (SPUFI) and, 49–50, **49**
 - TSO and, 47
 - Internal Coupling Facilities (ICFs), 487–488
 - Internal Resource Lock Manager (IRLM), 489
 - commands in, 65
 - data sharing and, 494
 - locks and, 716, 728, 730
 - traces and, 834
 - intersects/INTERSECT, 257, 312, **313**
 - invalidations, binding/rebinding and, 566, 574
 - INVOKEBIND, 563*t*
 - INVOKERUN, 563*t*
 - IPLIST, 74*t*, 641, 644, 665
 - IPNAMES, 74*t*, 85, 641, 644, 645, 665
 - IRLM. *See* Internal Resource Lock Manager (IRLM)
 - IRLMAUT, 59*t*
 - IRLMPRC, 59*t*
 - IRLMPROC, 39
 - IRLMRWT, 59*t*, 93, 730*t*, 743
 - IRLMSID, 59*t*
 - IRLMSWT, 59*t*
 - IS DISTINCT FROM/IS NOT DISTINCT FROM, 284, **285**
 - IS NULL/IS NOT NULL, 282–283, **283**, 687, 817
 - iSeries, DB2 Connect and, 25
 - ISO date/time format, 167*t*, 168*t*
 - ISOLATION, 561, 563*t*, 678, 737
 - isolation levels, iii, 575, 576, 725–726, 726–727*t*, 731, **731**. *See also* claims
 - ISPF and ISPF/Program Development Facility (ISPF/PDF), 50
 - IXCL1DSU utility, 490
 - IXQTY, 59*t*
- J**
- J2EE, 7, 25
 - JAR, 126, 128*t*
 - Java, 1, 7, 14, 18, 21, 142, 613, 616
 - DB2 Connect and, 23–25
 - Optim Development Studio and, 28–29
 - stored procedures and, 619, 635
 - user-defined functions (UDFs) and, 690
 - Java Database Connectivity (JDBC), 18–21, 517–518, 825
 - DB2 Connect and, 25
 - dynamic SQL executed through, 547
 - Optim Development Studio and, 28–29
 - SQL application programming and, 549–550
 - temporary tables and, 590
 - traces and, 834
 - trusted contexts and, 106
 - Java Technology Edition, 24
 - JCL. *See* Job Control Language (JCL)
 - JDBC. *See* Java Database Connectivity (JDBC)
 - JIS date/time format, 167*t*, 168*t*
 - Job Control Language (JCL), 46, 629, 630. *See also* Workload Manager (WLM)
 - installation, migration and, 50
 - stored procedures and, 634
 - utility execution and, 70
 - JOBNAME, 108*t*
 - jobs, installation, migration and, 50
 - join predicates, 267, 344
 - JOIN_DEGREE, 752*t*, 768
 - JOIN_PGROU_ID, 752*t*
 - JOIN_TYPE, 753*t*
 - joins, vi, 264–269, **264–265**, **266–269**, 317–333, 349, 354
 - Cartesian, 767–768
 - COALESCE function and, 330, 331, 332
 - combining outer, 331, **331–332**, 332
 - denormalization vs. 331–332
 - encoding schemes (EBCDIC, ASCII, and Unicode) with, 268
 - FROM clause and, 267, 268, 326
 - full outer, 327–331, **327–329**
 - hybrid, 764–765
 - implicit, 264, **264–265**
 - inner, 269, 318–319, **318**, **319**, 354
 - join columns and, 266–267, **266–267**
 - left outer, 320–326, **321**, **321–322**, **323**, **324**, **325**
 - merge scan, 763–764
 - nested loop, 762–763
 - null-supplying table in, 320
 - ON clause in, 319, 325–326
 - outer, 320–332, **320**
 - predicate, join predicate, 267, 344
 - predicates and, 346
 - preserved row table in, 320
 - right outer, 326–327, **326**
 - star, 765–768
 - VALUE function and, 330
 - WHERE clause and, 268, 323–325, **324**, **325**
 - Journal, 33, 36
 - JSON, Optim Development Studio and, 29
 - JULIAN_DAY, 167

K

KEEPDYNAMIC, 563*t*, 825
 Kerberos security, 6, 99, 133
 key target distribution tables, 803, 804–805*t*
 keys, 149, 178–180, 227, 246
 atomic key in, 227, 246
 composite key in, 227, 246
 dependent tables and, 179
 foreign, 179, 181, 227, 246, 248–249
 foreign key constraints, 181
 hash, 253
 parent, 179
 primary, 178–180, 190, 227, 246, 247, **247**
 primary key constraints, 180, **180**, 180
 sort key tables and, 795, 795–796*t*
 unique, 227, 246, 248

L

L locks, 498
 Label-based Access Control (LBAC), 9
 LABEL, 128*t*, 653
 labeled duration UPDATE, 291
 Language Environment, 616, 639
 Large Object Manager (LOBM), 40
 large objects (LOBs), iii–vi, 40, 163, 179, 228, 684, 703–707, 713
 auxiliary tables and, 186–188, **187–188**
 auxiliary warning (AUXW) status in, 472
 binary (BLOB). *See* binary large object (BLOB)
 casting and, 707
 CCSIDs and, 703
 character (CLOB). *See* character large object (CLOB)
 CHECK, 414, **414**
 compression and, 704
 data types of, 703–704
 DB2 for z/OS and, 4
 double-byte character (DBCLOB), 703
 file reference variable and, 704–705
 implementation of, 704
 indexes, 231, **231**
 INLINE option for, 186–188, **187–188**
 insert, using INSERT, 704–705, **704**
 LOAD and UNLOAD with, 705
 locks and, 717, 718–719
 logging and, 472
 LONG VARCHAR and, 703
 point-in-time recovery and, 472
 reading, 705–706, **705**, **706**
 recovery and, 472
 REORG and, 376, 377–378
 REPAIR and, 418
 SELECT and, 336
 SET command with, 705
 streaming, using FETCH WITH CONTINUE, 706, 710–711
 table spaces for. *See* LOB table spaces
 temporary tables and, 590
 UNLOAD and, 373, **373**
 user-defined data types and, 706–707, **707**
 XML and, 710
 LAST_DAY, 167
 LBACKOUT, 59*t*, 478–479, **478**, **479**
 LC_CTYPE, 59*t*
 LEAFDIST, 395
 LEAFDISTLIMIT, 392, **392**
 Least Recently Used (LRU) pages, 857
 LEAVE, 634
 left outer join, 320–326, **321**, **321–322**, **323**, **324**, **325**
 LEMAX, 59*t*
 Lempel-Ziv (LZ) compression, 8
 less-than operator, 261
 less-than/equal-to operator, 261
 levels of security, 132
 libraries, recovery of, 470
 LIBRARY, 563*t*
 LIKE/NOT LIKE, 188, 262, 280–281, **280**, **281**, 687
 limited partition scanning, 760–761, **761**
 LINKNAME, 86, 644, 645
 links, in data sharing, 492
 Linux, 1, 2, 3, 8–19
 Data Studio, Optim Data Studio and, 27
 DB2 Connect and, 22–25
 Optim Database Administrator for, 27–28
 Optim pureQuery Runtime and, 29
 Optim Query Tuner and, 29–30
 performance and, 853
 LIST COPYPOOL, 466
 list prefetch, 760
 list structure (SCA), data sharing and, 488–489, 509, 511, 512
 LISTCAT, 470
 literals, concentration of, 548
 LOAD, 111*t*, 121*t*, 122*t*, 128*t*, 134, 135*t*, 182, 185, 290, 293, 355–371, **357**, **358**, 705
 BUILD phase in, 356
 CCSID incompatibility in, 366
 CHECK DATA utility and, 365
 concurrent access during, 362–363
 COPYDDN keyword in, 357, 360
 cursors and, 370–371, **371**
 data type incompatibility in, 366
 delimited (using COLDEL, CHARDEL, DECPT), 362, **362**
 DISCARD phase in, 356
 ENFORCE CONSTRAINTS in, 365
 ENFORCE NO option in, 364, **364**
 ENFORCE phase in, 356
 FLASHCOPY and, 367
 freespace (FREEPAGE/PCTFREE) and, 366
 GENERATED options and, 365–366
 historical statistics with, 405–406, **406**
 INDEXVAL phase in, 356
 inline copies using, 366–367
 inline statistics with, 367, **367**
 input and target for, 357–358, **357**, **358**
 load parallelism for partitioned table spaces and, 370, **370**

- LOAD SHRLEVEL in, 356
- LOGAPPLY phase in, 356
- logging with, 360
- LOGSCR phase in, 356
- LOGUNDO phase in, 356
- ordered rows and, 361
- parallel index builds and, 369
- partitions and, using PART, 361–362, **361**, **362**
- phases of, 356–357
- PREFORMAT and, 357, 368–369
- REBALANCE partitions and, 367, **367**
- RECOVERYDDN keyword in, 357
- REDO phase in, 357
- referential integrity during, 363–365, **364**
- REPLACE and, to add to or replace data using, 358–360, **359**
- REPORT phase in, 357
- RESUME in, 359
- rotating partitions and, 198–199, **199**
- ROWID columns and, 365–366
- rules added to, 358, **358**
- RUNSTATS and, 367
- SHRLEVEL in, 362
- SORT phase in, 357
- SORTBLD phase in, 357
- SORTKEYS and, 368, 369
- statistics and, 408, 410
- table spaces and, 206, 210, 393
- tables and, 393
- triggers and, 667
- UTILINIT phase in, 357
- UTILTERM phase in, 357
- XML and, 709
- load modules, binding/rebinding and, 555
- load parallelism for partitioned table spaces, 370, **370**
- LOAD REPLACE, 408, 443, 449–450, **450**, 464, 467
- loading/unloading data, iv. *See* LOAD
- LOB data type. *See* large objects (LOBs)
- LOB table spaces, 150, 193, 202, **202**, 203
 - DSNICOMP and, 420–421
 - recovery and, 458
 - REORG and, 394
 - statistics and REORG in, 406
- LOB_INLINE_LENGTH, 59*t*
- LOBVALA/LOBVALS, 59*t*
- Local Area Networks (LANs), 24
- local DB2, 83
 - access control and, 98
 - distributed data access and, 641
- Local Lock Manager (LLM), 498
- local locks, 497–498
- local predicates, 344
- LOCATION column, INSERT, 288
- location name, 85
- LOCATIONS, 74*t*, 85, 641, 644, 665
- LOCK, 128*t*, 502
- lock structure, data sharing and, 489
- LOCK TABLE, 135*t*, 586, 717, 719–720, **720**
- LOCK TABLESPACE, 717, 719
- lock-latch wait, vi
- LOCKMAX, 203, 734–736
- locks and locking, iii–v, 496–499, 715–743. *See also*
 - concurrency
 - accounting and statistics reports on, 738–739, **738–739**
 - ACQUIRE in, 725
 - address spaces and, 38, 39
 - ALLOCATE/DEALLOCATE in, 725
 - attributes of, 716–717
 - avoiding, 728–729, **728**, 729*t*
 - binding and, 716
 - catalog and tables, 74
 - claims on, 731, 731*t*
 - coding retry logic for errors in, 734
 - COMMIT in, 725, 734
 - commit scope in, 715
 - contention in, 499, 721, 742
 - CURRENTDATA and, 728–729, 729*t*, 737
 - currently committed data access and, 721–722
 - CURRENTLY COMMITTED and, 737
 - cursor stability and, 725–726
 - data sharing and, 489, 511, 516
 - Database Descriptor (DBD) and, 716
 - DDL and, 716
 - deadlocks in, 732–734
 - displaying, using DISPLAY DATABASE LOCKS, 739, **739**, 743
 - drains on, 732
 - duration of, 716, 724–728
 - escalation of, 734–735
 - exclusive (X), 722, 724, 728
 - EXPLAIN and, 738
 - Explicit Hierarchical Locking (EHL) in, 496–497, **496**
 - false lock contention in, 499
 - FETCH with, 727
 - global, 497–498
 - global lock contention in, 499
 - Global Lock Manager (GLM) and, 498
 - IN EXCLUSIVE MODE and, 719–720, **720**
 - IN SHARE MODE and, 719–720, **720**
 - indexes and, 716
 - Intent Exclusive (IX), 722, 723
 - Intent Share (IS), 722, 723
 - Internal Resource Lock Manager (IRLM) and, 38, 39, 489, 716, 728, 730
 - IRLMRWT and, 743
 - ISOLATION and, 737
 - isolation levels for, 725–726, 726–727*t*
 - Large Object (LOB), 717, 718–719
 - local, 497–498
 - Local Lock Manager (LLM) and, 498
 - LOCK TABLE in, 586
 - LOCK/UNLOCK and, 502
 - lockable objects for, 716
 - LOCKMAX and, 734–735, 736

- LOCKSIZE and, 204, 736
 - Logical (L), 498
 - modes for, 716, 722–724, 722*t*, 723*t*, 724*t*, 742, 743
 - modified resource list for, 498
 - modify, 498
 - monitoring, 738–740, **738–739**
 - NUMLKTS and, 735
 - optimistic, 603–604, 737
 - Page (P), 497–498, 718, 724, 725
 - Page Set (P), 497–498
 - partitions and, 725
 - performance issues and, 715
 - Physical (P), 497–498
 - promotion of, 734, 735
 - read stability with, 726
 - RELEASE in, 725
 - repeatable read isolation with, 726
 - RESTART LIGHT and, 499
 - retained, 498–499
 - ROLLBACK and, 734
 - row, 718, 724, 725
 - SELECT and, 727, 728–729, **728**, 741
 - serialization in, 715
 - Share (S), 722, 724, 727
 - Share with Intent Exclusive (SIX), 722, 723
 - size of, 716, 717–719
 - Skeleton Cursor Table (SKCT) and, 716
 - Skeleton Package Table (SKPT) and, 716
 - SKIP LOCKED DATA option for, 720, **721**, 737, 743
 - SKIP LOCKED ROWS and, 721
 - system parameters for, 730, 730*t*, 741, 743
 - table spaces and, using LOCK TABLESPACE, 717, 719, 723–725, 741
 - tables and, using LOCK TABLE, 717, 719–720, **720**, 723–725
 - temporary tables and, 590
 - timeouts in, 732–734, 732*t*
 - traces for, 740, 743
 - TSLOCKMODE and, 735, 738
 - uncommitted read with, 726
 - Update (U), 722, 724, 727
 - XES contention in, 499
 - XML and, 719
 - LOCKSIZE, 204, 736
 - LOG, 203, 375, 388
 - log data sets, archive, 439
 - Log Record Sequence Number (LRSN), v, 439, 509–510, **510**
 - LOGAPPLY, 356, 455, 456, 457, 459
 - LOGGED/NOT LOGGED, 204
 - logs and logging, 439–442, 611, 871–872. *See also* recovery and restart
 - archive log data sets in, 439, 470
 - Bootstrap Data Set (BSDS) and, 440–441
 - checkpoint intervals in, using SET LOG, 477, 478
 - data sharing and, 494, 509–510, **510**
 - DISPLAY LOG in, 440
 - DSN1LOGP and, 422
 - DSNJLOGF (Preformat Active Log) and, 419
 - DSNJU003 (Change Log Inventory) and, 419, 440, 441, 465, 475
 - DSNJU004 (Print Log Map) and, 419–420, 470–471, 441, 647
 - LOAD and, 360
 - LOBs and, 472
 - log data sets in, archive, 439
 - Log Record Sequence Number (LRSN) in, 439, 509–510, **510**
 - MODIFY and, 442
 - performance and, 871–872
 - reads/writes in, 871–872
 - redo records in, 439
 - Relative Byte Address (RBA) in, 439
 - REORG and, 380, 384–386
 - SET LOG SUSPEND/RESUME in, 476
 - SYSCOPY and, 442
 - SYSLGRNX in, 441–442
 - undo records in, 439
 - Logical (L) locks, 498
 - logical database design, 237–242
 - logical expressions, 338
 - logical operators
 - NOT, 283–285, **283**, **284–285**
 - OR, 285, **285**
 - Logical Terminal (LTERM), 99
 - Logical Unit name (LU name), 85
 - Logical Unit of Work (UOW), 579
 - LOGSCR phase, LOAD and, 356
 - LOGUNDO phase, LOAD and, 356
 - long log conditions, REORG and, controlling, 385, 386
 - LONG VARCHAR, 160, 171, 703
 - LONG VARGRAPHIC, 160, 171
 - LOOKUP, 564*t*
 - LOOP, 634
 - LOW2KEY, 411
 - LOWVALUE, 403
 - LPL, 427*t*
 - LRDRTHLD, 59*t*, 730*t*
 - LRSN. *See* Log Record Sequence Number (LRSN)
 - LULIST, 75*t*, 85, 644, 665
 - LUMODES, 75*t*, 85, 644, 665
 - LUNAMES, 75*t*, 85, 86, 644, 645, 665
- M**
- MAINTAINED options, 214
 - maintaining data. *See* data maintenance
 - MAINTYPE, 59*t*
 - management, 30–31
 - mapping table, REORG and, 382–384, **383**, **384**
 - masks
 - ALTER for, 155
 - column, 102, 104–105, **104**, **105**
 - CREATE for, 153
 - MASS, 97
 - mass deletes, 293

- massively parallel, 15–16
- MATCHCOLS, 750*t*, 757
- matching index scan, 819, 820
- Materialized Query Tables (MQT), iii, 11, 13, 16, 17, 35, 147, 148, 151, 213–215
 - altering, using ALTER TABLE, 215
 - creating, using CREATE TABLE for, 153, 213–214, **214**
 - DB2 for Linux, UNIX, Windows (LUW) and, 11, 16, 17
 - defining, 213
 - ENABLE QUERY OPTIMIZATION option for, 214–215
 - MAINTAINED options for, 214
 - OLAP and, 213
 - options for, 214
 - queries and, 213
 - REFRESH options for, 214
- materializing a temporary table, 588, **588**, 591
- mathematical operations, derived columns and, 273–274, **274**
- MAX, 276–277, **276**, 823
- MAX_CONCURRENT_PKG_OPS, 59*t*
- MAX_COORDAGENTS, 660
- MAX_NUM_CUR, 60*t*
- MAX_ST_PROC, 60*t*
- MAXAGENTS, 660
- MAXARCH, 59*t*, 441
- MAXBLKEXT, 657
- MAXDBAT, 59*t*, 660
- MAXKEEPD, 60*t*
- MAXOFILR, 60*t*
- MAXPARTITIONS, 201, 204, 208, 209*t*, 221, 253
- MAXRBLK, 60*t*
- MAXROWS, 204, 221, 384–385
- MAXRTU, 60*t*
- MAXTEMPS, 60*t*
- MAXTEMPS_RID, 60*t*
- MAXTYPE1, 60*t*
- MAXVALUE, 176*t*
- MCCSID, 60*t*
- MEMBER CLUSTER, 209
- MEMBER, 564*t*
- member-specific routing, in distributed data access, 646–647, **647**
- members, data sharing and, 485, 513
- MEMBNAME, 60*t*
- memory/memory management, v, 86–89. *See also* buffer pools;
Environmental Descriptor Manager (EDM) pools
 - buffer pools in, 86–87
 - Environmental Descriptor Manager (EDM) pools in, 87–88
 - memory and memory management in, 86–89
 - Row Identifier (RID) pool in, 88
 - skeleton pools in, 87
 - sort pool in, 88–89
 - STAY RESIDENT option for, 616
 - stored procedures and, 616
- MERG_JOIN_COLS, 753*t*
- MERGC, 756*t*
- MERGE, 104, 255, 292, 523
 - coordinating updates to distributed data with, 653
 - data change tables and, 316–317, **317**
 - multi-row, 595–596, **596**
 - scalar-fullselect and, 257
 - triggers and, 667
- merge scan join, 763–764
- MERGECOPY, 446, 451–452, 452*t*, **452**
- MERGN, 756*t*
- message generator, 40, 41
- METHOD, 749*t*
- MGEXTSZ, 60*t*
- MICROSECOND, 168
- Microsoft.NET, 7
- Microsoft Transaction Server, DB2 Connect and, 24
- Microsoft Windows, 2, 3, 8–19
 - DB2 Connect and, 22–25
 - Optim Data Studio and, 27
 - Optim Database Administrator for, 27–28
 - Optim pureQuery Runtime and, 29
 - Optim Query Tuner and, 29–30
 - performance and, 853
- middleware, 19–25
 - Data Server Clients as, 19–22
 - Data Server Drivers as, 19–21
 - Data Server Driver for JDBC and SQLJ, 20, 21
 - Data Server Driver for ODBC and CLI, 20–22
 - Data Server Driver Package as, 20–22
 - Data Server Runtime Client as, 19–22
 - DB2 application drivers and, 20–21
 - DB2 Connect as, 19, 22–25
 - instance merge modules, DB2, 21
 - non-DB2 instance merge modules, 21
- migration. *See* installation and migration, 50
- MIN, 277, 823
- MINSTOR, 60*t*
- MINUTE, 168
- MINVALUE, 176*t*
- MIPS, 18, 19
- mirroring, 9
- MIXED, 60*t*
- MIXOPSEQ, 751*t*, 756
- mobile users, DB2 Connect and, 23
- modeling production environments, 411, 813–814, 813–814*t*
- models, data, iv
- modes, for locks, 722–724, 722*t*, 723*t*, 724*t*
- MODESELECT, 75*t*, 85, 644, 665
- modified resource list, locks, 498
- MODIFY, 414–417, 442
- MODIFY DDF, 67*t*, 647
- modify locks, 498
- MODIFY RECOVERY, 414, 415–416, **415**
- MODIFY STATISTICS, 406, 414, 416–417, **417**
- MODIFY TRACE, 67*t*, 839
- Module Entry Point Lists (MEPLs), 418
- MON, 60*t*
- monitor trace, 838–839, 843–844*t*
- MONITOR1/MONITOR2, 112*t*, 116*t*, 118*t*, 119*t*
- monitoring performance. *See* performance and tuning

- MONSIZE, 60*t*
MONTH, 167
MONTHS_BETWEEN, 167
MQSeries, stored procedures and, 635
MSTR, 39
MSU, DB2 Connect and, 24
multi-row operations, 593–595
Multibyte Character Set (MBCS), 161
Multidimensional Clustering (MDC) tables, 12, 13, 16, 17
Multidimensional Online Analytical Processing (MOLAP),
temporary tables and, 589
multiple index access, 822
Multiple Virtual Storage (MVS), 38, 834
MXDTCACH, 60*t*
- N**
- NACTIVE, 411
naming conventions
aliases and, 148
binding/rebinding and, 559, 566
correlation names in, 269–270, **269**
data sharing and, 505–506
distributed data access and, 641
schemas, 685
three-part names in, 647–649, **648**
unqualified names and, 129–130
NEARINDREF, 395
NEAROFFPOS, 395
negative conditions
IS DISTINCT FROM/IS NOT DISTINCT FROM, 284,
285
NOT, 283–285, **283, 284–285**
nested loop joins, 762–763
nested stored procedures, 624–625
nested table expressions, 313–315, **313, 314, 315**
nested views, 212
.NET, 7, 14, 19, 21, 25
Net Search Extender, 8–9, 13–17, 31
Netezza, 2
network improvement using stored procedures, 614–615, **614**
networks, ii
Neutrino, 18
New Function Mode (NFM), 52, 93, 420
NEXT VALUE FOR (NEXTVAL), 192–193, 599–603, **600,**
601, 610, 611
NEXT_DAY, 167
NLEAF, 411
NO CACHE, 175*t*
non-deterministic UDFs, 697
non-line SQL scalar UDF. *See* user-defined functions (UDFs),
693
non-matching index scan, 757, 821
non-read-only views, 295, 296–297
non-unique index, 226–227
Nonpartitioned Secondary Indexes (NPSI), 198, 202, 229, **229,**
370
nonrelational data, ii
nonsargable predicates, 344–345
NOPKLIST, 564*t*
normal forms, database, 239–241, **240, 241**
normalization, iv, 239–241, **240, 241**
joins, denormalization and, 331–332
NOT, 283–285, **283, 284–285**
NOT ATOMIC, 595
not-equal-to operator, 261
NOT LOGGED, 427*t*
recovery and, 458
restarting DB2 and, 476
NOT NULL, 170
NOT NULL WITH DEFAULT, 289
NOT PADDED, 223
NPAGES, 411
NPGTHRS, 60*t*
null values, 170, **170**
indexes and, 227
INSERT and, 288
IS NULL, 282–283, **283**
null-supplying table and, in joins, 320
null-supplying table, in joins, 320
NUM_INITAGENTS, 660
NUM_POOLAGENTS, 661
NUMERIC, 156*t*, 157–159, 172*t*
NUMLKTS, 60*t*, 730*t*, 735
NUMLKUS, 60*t*, 730*t*
Numparts, 201, 204, 208, 209*t*
NUMTCB, 639
- O**
- Object Descriptors (OBDs), 432
DIAGNOSE, 418
REPAIR and, 418
object identifiers
DSN1COPY and, 422
logging and, 441
object-level recovery with system-level backups, 466–467
object-oriented (OO) interfaces, global transactions and, 586
object-relational extensions, 684–689. *See also* extensions
OBJECTNAME, 137*t*
objects, iii. *See also* specific objects
access control and, 100–131. *See also* specific objects, 100
IDs for, 100–101
in-memory, 862
managing, in database, 152–155
ownership of, 100–101
privileges associated with, by owner, 128
qualified, 126–127
recovery of, 468
sequence, 152, 599–603. *See also* sequence objects
trusted context, 127
unqualified, 125–126, 572
OBJECTSCHEMA, 137*t*
OBJECTTYPE, 137*t*
OBJMAINT, 138*t*, 140*t*
ODBC. *See* Open Database Connectivity (ODBC)

- offline utilities, iv
- OFFPOSLIMIT, 391–392, **391**, **392**
- OJPERFEH, 60*r*
- OLAP. *See* Online Analytical Processing (OLAP)
- OLD TABLE, 316–317, **317**
- OLE DB, 19, 21, 25
- OLTP. *See* Online transaction processing (OLTP)
- OMEGAMON DB2 Performance Monitor, 831, **832**, **833**
- ON, 319, 325–326, 343, 354
 - CASE expression in, 334–335, **334**, **335**, 334
- On/Off Capacity Upgrade on Demand, 7
- On-Demand business capabilities 2–3, 7
- one-fetch index access, 823
- Online Analytical Processing (OLAP)
 - DB2 Connect and, 23
 - Materialized Query Tables (MQTs) and, 213
 - SQL and, 341–343, **342**, **343**
- online DSNZPARMS, 53–54, 53
- online performance monitors, 831–833
- online reorganization, 12–17
- Online Transaction Processing (OLTP), ii, 6, 23, 38, 578, 807
- OPEN CURSOR, 537–538, **538**
- Open Database Connectivity (ODBC), 19–22, 517–518
 - DB2 Connect and, 25
 - dynamic SQL executed through, 547
 - result sets and, 621
 - SQL application programming and, 548–549
 - stored procedures and, 621
 - temporary tables and, 589, 590
 - traces and, 834
 - trusted contexts and, 106
- open development environments, DB2 for i
- OPEN, 520
- Open Transaction Environment (OTE), 852
- operating systems, 2
- operators
 - comparison, 304, 687
 - logical, 283–285, **283**, **284–285**
 - NOT, 283–285, **283**, **284–285**
 - OR, 285, **285**
- OPTHINT, 60*r*, 564*r*, 754*r*
- Optim Data Lifecycle Management for DB2, 26
- Optim Data Studio, 17, 26–27, 805–806
 - access paths and, 770
 - EXPLAIN and, 747
- Optim Database Administrator, 9, 13–17, 26–28
- Optim Development Studio, 9, 13, 14, 15, 16, 17, 21, 26, 28–29, 805–806
 - DB2 Connect and, 19, 23
 - DB2 for Linux, UNIX, Windows (LUW) and, 9, 13–17
 - EXPLAIN and, 747
 - stored procedures and, 617, 632, **633**, 634, 635
- Optim Performance Manager, 16, 17
- Optim pureQuery Runtime, 26, 29
- Optim Query Tuner, 29–30, 747, 770, 805–806
- Optim Query Workload Tuner, 26, 805–806
- Optim. *See also* InfoSphere Optim
 - optimistic locking, 603–604, 737
 - optimization, 745–756
 - Cartesian products and, 263–265, **263–264**
 - global, 769
 - hints for improving, 808–809
 - query, 214–215
 - OPTIMIZE, 592, **592**, 807, 824
 - OPTIMIZE FOR n ROWS, 656–657, 659, 662, 664
 - optimizers, 746
 - OPTIONS, 71–72, 652, 564*r*
 - OPTIOWGT, 60*r*
 - OR, 285, **285**, 758, 766, 822, 823
 - Oracle, 18, 25
 - ORDER BY, 256, 257, 270–274, **271**, **272**, **273**, 278, 300, 301, 333, **333**, **334**, 343, 806, 824
 - access paths and, 762
 - indexes and, 271
 - ORDER OF, 333, **333**, **334**
 - ORDER/NO ORDER, 176*r*
 - ordered rows, LOADING, 361
 - ORGANIZED BY HASH, 220–221, **221**
 - OS/400, 2
 - OTC_LICENSE, 60*r*
 - outages, iv, 5, 478
 - OUTBUFF, 60*r*
 - outer joins, 320–332, **320**
 - overloading, user-defined functions (UDFs) and, 700
 - OVERRIDING USER VALUE, 597
 - OWNER, 564*r*, 571–572
 - ownership of objects, 100–101, 125–130
 - access plans, 126
 - CREATE and, 125–127
 - package, 126, 129, 571–572
 - plan, 129, 571–572
 - privileges of, by object, 128
 - qualified objects and, 126–127
 - QUALIFIER option and, 125–126, 129–130
 - ROLE AS OBJECT OWNER and, 127, 130
 - trusted contexts and, 127, 130
 - unqualified names, 129–130
 - unqualified objects, 125–126

P

- P locks, 497–498
- PACKADM, 115, 120*r*
- package lists, REBIND, 567, **567**
- Package Tables (PT), 87
- PACKAGE, 564*r*
- packages, 558
 - BIND/REBIND in, 560, 561, 565, 566–571, **566**, 651–652
 - binding when in use, 560–561
 - collections of, binding into, 570
 - CURRENT PACKAGE PATH register in, 559
 - CURRENT PACKAGESET register in, 559, **559**
 - EXPLAIN and, 746
 - inoperative, 569
 - invalidation of, 566, 574

- migration of, 570–571
 - ownership of, 126, 128*t*, 129, 571–572
 - plan-to-package ratio in, 558
 - privileges for, 110*t*, 128*t*
 - removing, using FREE or DROP PACKAGE, 571, **571**
 - triggers forming, 678
- PADDED/NOT PADDED, 568
- PADIX, 60*t*
- PADNTSTR, 61*t*
- Page (P) locks, 497–498
- page range tables, 797, 797–798*t*
- Page Set (P) locks, 497–498
- Page Set Rebuild-Pending (PSRBD) status, 234, 428*t*
- PAGE_RANGE, 753*t*
- pages
 - asynchronous read/write in, 858
 - available, 855
 - buffer pool, 855–856
 - checkpoints and page externalization in, 858–859
 - fixing, with PGFIX, 862–863
 - in-use, 856
 - Least Recently Used (LRU), 857
 - locks and, 718, 724, 725
 - recovery and, 437, 456
 - Sequential Least Recently Used (SLRU), 857
 - size of, in table space, 205, 205*t*
 - stealing, 862
 - synchronous reads/writes in, 857–858
 - updated, 856
- PAGESAVE, 404
- Palm OS, 18, 19
- PARA_EFF, 61*t*
- parallel group tables, 784, 784–786*t*
- parallel index build, 369, 379–380
- parallel operations, EXPLAIN and, 747
- Parallel Sysplex, 46, 830
 - data sharing and, 485, 490, 491, 508–509, **508**
 - DB2 for z/OS and, 5, 6
 - logging and, 439
 - recovery and, 439
 - Sysplex Failure Management (SFM) in, 491, **492**
 - Sysplex Timer in, 492, 493
 - temporary tables and, 590
- parallel task tables, 787, 787–789*t*
- parallelism, 7, 827–830
 - buffer pools and, using VPPSEQT and VPXPSEQT, 862
 - cursors and, 830
 - data sharing and, 508–509, **508**
 - massive, 15–16
 - partitioned table spaces and, 370, **370**
 - query, 12
 - query, vi
 - temporary tables and, 590
 - UNLOAD and, 373
 - usage of, 768
 - Virtual Pool Parallel Sequential Threshold (VPPSEQT) and, 862
 - Virtual Pool Sysplex Parallel Sequential Threshold (VPXPSEQT) and, 862
 - PARALLELISM_MODE, 753*t*
 - PARAMDEG, 61*t*
 - PARAMETER STYLE, 618–620, **618, 619**
 - parameters. *See also* DSNZPARMS
 - DBINFO for, 620–621, 620–621*t*
 - PARAMETER STYLE in, 618–620, **618, 619**
 - passing, 691–692
 - stored procedures and, 617–621, **617, 618, 619**
 - parent keys, 179
 - PARENT_PLANNO, 755*t*
 - PARENT_QBLOCK, 754*t*
 - PART, 223, 361–362, **361, 362**
 - PARTITION BY, 343
 - PARTITIONED, 223
 - Partitioned Data Sets (PDS), 556
 - partitioned table spaces, iv, 150, 193, 196–200, 812–813, 812*t*
 - adding, 197, **197, 198**
 - creating, 196, **196–197**
 - REORG and, 376–377, **377**
 - rotating, 198–199, **199**
 - table-controlled, 199–200, **199, 200*t***
 - partitioned tables, locks and, 717
 - partitioning, 251, 253
 - Dynamic Logical Partitioning, 7
 - EXPLAIN and, 747
 - image copies and, 447
 - indexes and, iv, 225–226, **225–226**
 - limited partition scanning in, 760–761, **761**
 - load parallelism for table spaces and, 370, **370**
 - LOAD for, 361–362, **361, 362**
 - locks and, 725
 - MAXPARTITIONS and, 201
 - REBALANCE, 367, **367**
 - rebalancing, using REORG, 396–397, **396**
 - recovery and, 437, 456
 - REORG and, 396–397, **396**
 - rotating partitions and, 198–199, **199**
 - table, 12, 16, 18
 - table space, iv, 150, 193, 196–200, 812–813, 812*t*. *See also*
 - partitioned table spaces
 - table- vs. index-controlled, 199–200, **199, 200*t***
 - UNLOAD and, 372
 - passing parameters, 691–692
 - PATH, 126, 685, 564*t*, 572
 - path expressions, 338
 - PATHDEFAULT, 564*t*
 - PCLOSEN/PCLOSET, 61*t*
 - PCTFREE, 203, 206, 366
 - PCTROWCOMP, 404
 - pending conditions, 461–462
 - pending definition change, 393
 - performance and tuning, iv–v, 93, 745–877
 - access paths in, 745–756. *See also* access paths
 - access plans in, 746. *See also* access plans
 - batch processes and, 831–833

- buffer pools and, 855–871
- catalog statistics in, 809–816. *See* catalog statistics
- checkpoints and page externalization in, 858–859
- CICS and, 852, 853
- continuous, 852–853
- data set opening and closing in, 872–873
- data sharing and, 502–503
- database monitoring and, 830–834
- Database Request Module (DBRM) and, 746
- DB2 for z/OS and, 5
- detailed, 853–854
- DISPLAY commands for, 854–855
- DSN_COLDIST_TABLE and, 802, 802–803*t*
- DSN_DETCOST_TABLE and, 790, 791–792*t*
- DSN_FILTER_TABLE, 789, 789–790*t*
- DSN_FUNCTION_TABLE and, 773, 773–775*t*
- DSN_GROUP_TABLE, 784, 784–786*t*
- DSN_KEYTGTDIST_TABLE and, 803, 804–805*t*
- DSN_PGRANGE_TABLE and, 797, 797–798*t*
- DSN_PREDICATE_TABLE and, 778, 778–781*t*
- DSN_PTASK_TABLE, 787, 787–789*t*
- DSN_QUERY_TABLE and, 800, 800–801*t*
- DSN_SORT_TABLE and, 793, 793–794*t*
- DSN_STATEMENT_CACHE_TABLE and, 775, 775–778*t*
- DSN_STATEMENT_TABLE and, 770, 771–773*t*
- DSN_STRUCT_TABLE and, 782, 782–784*t*
- DSN_VIEWREF_TABLE and, 798, 798–799*t*
- dynamic SQL and, 825–827
- exception, 854
- EXPLAIN and, 745–756, 806–808
- GET DIAGNOSTICS in, 532–535, 532–535*t*, 546, 554
- global optimization and, 769
- Health Monitor, Data Studio for, 27
- I/O requests and externalization of, 857–858
- IMS and, 853
- indexes and, 819–825
- locks and, 715
- logging and, 871–872
- OMEGAMON DB2 Performance Monitor for, 831, **832**, **833**
- online, 831–833
- Open Transaction Environment (OTE) and, 852
- Optim Performance Manager and, 16–17
- optimization and optimizers in, 745–756
- periodic, 853
- predicate types and, 817–819, **817**
- query parallelism and, 827–830
- resource limit facility (governor) for, 834
- SQL and, 746
- Statistics Advisor and, 30
- Tivoli OMEGAMON XE for, 831, **832**, **833**
- trace for, 834–854, 845–851*t*. *See also* traces
- triggers and, 669, 680
- WebSphere and, 853
- period specification
 - FROM, 285–286, **286**
 - UNION, 310–311, **311**
- periodic performance monitoring, 853
- periods, application and system, 151–152, 216–219, 285–286, **286**, 310–311, **311**
- permanent (base) tables, 147
- permissions
 - ALTER, 155
 - CREATE PERMISSION in, 103, **103**, 153
 - row, 102–103, **103**, 104–105, **105**
- PERMIT, 97, **97**
- permutation, changing column order using SELECT, 260, **260–261**
- Personal Edition, DB2 Connect, 4, 12–13, 23–24. *See also* DB2 for Linux, UNIX, and Windows (LUW)
- PGFIX, 862–863
- PGSTEAL, 862
- PHP, 14, 19, 25
- Physical (P) locks, 497–498
- physical model, iv
- physical organization of data, 374
- PKLIST, 564*t*
- PL/1, 593, 616, 710
 - stored procedures and, 638
 - user-defined functions (UDFs) and, 690
- plan tables, in EXPLAIN, 746, 747, 748, 748–756*t*
- PLAN, 564*t*
- PLAN_TABLE, 808, 876, 877
- PLANMGMT, 61*t*, 564*t*, 570–571, 570*t*, **571**
- PLANMGMTSCOPE, 61*t*
- PLANNO, 748*t*
- plans, 143, 558
 - authorization to execute, 573
 - binding/rebinding of, using BIND/REBIND PLAN, 558, **558**, 561, **561**, 565, 568, 570–571, 652–653, 652
 - binding when in use, 560–561
 - collections of, binding into, 570
 - execution of, authorization for, 130
 - EXPLAIN and, 746
 - inoperative, 569
 - invalidation of, 566, 574
 - migration of, 570–571
 - migration testing for, 570–571
 - ownership of, 129, 571–572
 - plan-to-package ratio in binding, 558
 - PLANMGMT options for, 570–571, 570*t*, **571**
 - removing, using FREE or DROP PACKAGE command, 571, **571**
 - stability of, 570
- PLslash1, 1, 2
- PocketPC, 18, 19
- point of consistency, using QUIESCE, 438, 454–455, **454**, 579
- Point-in-Time (PIT) recovery, iv, 382, 460–462
 - LOBs and XML objects, 472
- policies, audit, 137–140, 137–140*t*
- polymorphism, user-defined functions (UDFs) and, 700–701, **700–701**
- pooled threads, 658
- POOLINAC, 61*t*, 660

- pools, v–vi, 9–10
 buffer. *See* buffer pools
 copy, 484
 data sharing and, 494
 database copy pool, 457–458
 Environmental Descriptor Manager (EDM). *See*
 Environmental Descriptor Manager (EDM) pool
 group buffer pools (GBPs, cache structures) in, 489–490
 idle agent, 660
 virtual buffer. *See* virtual buffer pools
 positioned delete, 293, 540, **540**, 543, 554
 positioned update, 291, 539–540, **540**, 543
 precompile, 47, 555, 556–557, 651
 predicates, vi, 261–262, 343–346, 346–348*t*, 817–819, **817**
 BETWEEN, 282, **282**
 Boolean terms and, 344
 compound, 344
 correlation (correlated reference), 304
 DM component and, 818
 DSN_PREDICATE_TABLE and, 778, 778–781*t*
 EXPLAIN and, 747
 IN, 285, **285**, 817
 index matching, 819
 indexable, 344, 345, 346, 346–348*t*, 817–818, **817**, **818**
 IS DISTINCT FROM/IS NOT DISTINCT FROM, 284, **285**
 IS NOT NULL, 817
 IS NULL, 282–283, **283**
 join, 267, 344, 346
 LIKE, 280–281, **280**, **281**
 local, 344
 nonsargable or residual, 344–345
 quantified, 304
 RDS component and, 818
 sargable, 344–345
 simple, 344
 stage 1, 344–345, 346–348*t*, 818, **818**
 stage 2, 344–345, 818–819, **819**
 XMLEXISTS, 340–341, **340**
 predictive governing, 834
 PREFETCH, 751*t*, 760
 PREFORMAT, 357, 368–369
 PREPARE, 520, 521, 546, 558, 720–721, 828, 871
 preserved row tables, 320
 PREVIEW, 72–73
 PREVIOUS VALUE FOR (PREVVAL), 192–193, 599–603, **600**, **601**, 610, 611
 primary expressions, 338
 primary keys, 178–180, 180, 190, 227, 246, 247, **247**
 primary, in recovery, 10
 PRIMARY_ACESSTYPE, 754*t*
 printing
 DSN1PRNT and, 423
 DSNJU004 (Print Log Map), 419–420, 419, 470–471, 647
 PRIQTY, 61*t*, 206–207
 private protocol, distributed data access and, 643
 privileges, ii, v, 144. *See also* authorities
 collection, 111*t*
 database, 111*t*
 distinct type, 113*t*
 explicit, 109–114, 110–113*t*
 GRANT, 113–114, **113**, **114**
 inherited, 114
 object ownership, 128
 package, 110*t*
 plan, 110*t*
 related, 114
 REVOKE, 113–114, **113**, **114**
 routine, 113*t*
 schema, 113*t*, 685
 sequence object, 113*t*
 subsystem, 111–113*t*
 table, 110*t*
 usage, 113*t*
 user-defined data types and, 689
 procedures. *See* stored procedures
 processing, data sharing and, cost of, 503. *See also* performance and tuning
 production environment modeling, 411, 813–814, 813–814*t*
 profiles, RUNSTAT, 406–407, **407**, 815–816
 PROGRAM, 748*t*
 PROGRAM SUB TYPE, 631, **631**
 programming, for distributed data access, 654–655
 projection, projecting columns from table using SELECT, 259–260, **259–260**
 promotion of locks, 734, 735
 PROTECT, 61*t*
 pruning of subqueries, 310, **310**
 PSRBD. *See* Page Set Rebuild-Pending (PSRBD) status
 PTASKROL, 61*t*
 pureQuery, 21, 26, 29
 DB2 Connect and, 24, 25
 Optim Development Studio and, 29
 SQL application programming and, 549–550
 pureScale, 10, 15–17, 27
 pureXML, 336–341
 DB2 Connect and, 23
 DB2 for z/OS and, 6
 DB2 for Linux, UNIX, Windows (LUW) and, 9, 13–17
- Q**
 Q replication, 11, 16, 17
 QBLOCK_TYPE, 754*t*
 QBLOCKNO, 748*t*
 QNX Neutrino, 18
 qualified objects, ownership of, 126–127
 QUALIFIER, 129–130, 564*t*, 572, 627, 678
 QUALIFIER BIND, 590
 qualifying rows, 262, **262**
 quantified predicates, 304
 QUANTILENO, 403

QUARTER, 167

queries

- aggregating/grouping data in, using GROUP BY, 277–278, 277, **278**
- consistency, for catalog, 82, **82**
- data sharing and, parallelism in, 508–509, **508**
- DSN_QUERY_TABLE and, 800, 800–801*t*
- duplicate data in, DISTINCT clause in, 279–280, **280**
- filtering in, 343–346
- health check and, *iv*
- Materialized Query Tables (MQTs) and, 213
- negative conditions in, using IS DISTINCT FROM/IS NOT DISTINCT FROM, 284, **285**
- negative conditions in, using NOT, 283–285, **283, 284–285**
- null values in, using IS NULL, 282–283, **283**
- number of tables supported in, 318
- Optim pureQuery Runtime, 26, 29
- Optim Query Tuner, 26, 29–30
- OPTIMIZE FOR *n* ROWS in, 656–657, 662, 664
- optimizing, 214–215
- parallelism in, *vi*, 12, 827–830
- patterns of strings in, using LIKE, 280–281, **280, 281**
- performance of, *vi*
- period specification in, using FROM, 285–286, **286**
- predicates and, 343–346, 346–348*t*
- PureQuery and, 21, 549–550
- Query Advisor for, 30
- Query Annotation for, 30
- Query Management Facility (QMF) and, 31–32, 125, 467, 747
- Query Report for, 30
- ranges of data in, using BETWEEN, 282, **282**
- remote, with distributed data, 656–661
- REORG and, in catalog, 389–391
- restricting use of sets in, HAVING clause and, 279, **279**
- SELECT statement in, 256–287. *See also* SELECT
- set of values, using IN, 285, **285**
- set of values, using OR, 285, **285**
- SQL Processing Using File Input (SPUFI) and, 49–50, **49**
- stacking, using semicolon delimiter, 49
- sub-, 257, 303–307, **304, 305, 306, 307**
- temporal tables and, 606
- user-defined functions (UDFs) and, 697
- views and subqueries in, 212
- wildcard characters in, 280–281
- XMLQUERY and, 336–341
- XQuery and, 340–341
- Query Advisor, 30
- Query Annotation, 30
- Query Management Facility (QMF), 31–32, 125, 467, 747
- Query Patroller, 12
- Query Report, 30
- query tables, 800, 800–801*t*
- QUERYID, 564*t*
- QUERYNO, 748*t*
- questions and answers, sample, 892–940
- QUIESCE, 61*t*, 454–455, **454**, 472, 474, **474**

R

- RAISE_ERROR, 679
- RAND function, 759
- RANDOMATT, 61*t*
- range-list index access, 758, 822–823, **823**
- Rational Application Developer, 1, 25
- Rational Data and Application Modeling, 1, 2
- Rational Developer for zEnterprise, 1, 2
- RBDP. *See* Rebuild-Pending (RBDP) status
- RDBNAM, 85
- RDS component, predicates, 818
- read stability, locks and, 726
- read/write online reorgs, 381, 382
- read-only views, 212–213, 295–296, 299
- REAL, 157, 158, 172*t*
- Real Time Statistics (RTS), *v*, 395, 408–410, **409**
- realm, in Kerberos, 99
- REBALANCE, 197, 367, **367**
- REBIND. *See also* BIND/REBIND
- REBIND PACKAGE, 685, 722
- REBIND PLAN, 685, 722
- REBIND TRIGGER PACKAGE, 66*t*, 678
- rebinding. *See* binding and rebinding
- REBUILD, 404, 405–406, **406**, 408
- REBUILD INDEX, 397, 456, 461–462, 467
- Rebuild-Pending (RBDP) status, 234, 428*t*, 461–462
- REC_FASTREPLICATION, 61*t*
- RECALD, 61*t*
- RECALL, 61*t*
- RECORD TEMPORAL HISTORY, 565*t*
- RECOVER, *iv*, 112*t*, 118*t*, 134, 455–459, **457**, 460, 462, 463, 464, 466–467
- RECOVER BSDS, 67*t*
- RECOVER INDOUBT, 67*t*
- Recover Pending (RECP), 428*t*, 464
- RECOVER POSTPONED, 68*t*, 430, 478–479, **478, 479**, 482
- Recoverable Resource Manager Services Attachment Facility (RRSAF), 41–42, 629
- Recoverable Resource Services (RRS), global transactions and, 586
- RECOVERDB, 111*t*, 119*t*, 121*t*, 122*t*
- recovery and restart, 437–484
 - access during, using SHRLEVEL, 449, **450**
 - ARCHIVE LOG in, 470, 471
 - Auxiliary Warning (AUXW) status in, 472
 - backing out work to a point-in-time in, 462
 - BACKUP SYSTEM in, 464, 466
 - Bootstrap Data Set (BSDS) and, 440–441
 - catalog, catalog copying for, 453–454, 467
 - CHANGELIMIT in, 448–449, **448**
 - CHECK DATA and, 461–464
 - CHECK INDEX and, 461–462
 - check pending in, 461–462
 - checkpoint intervals in, SET LOG in, 477, 478
 - clone tables and, 463
 - commit scope in, 438–439
 - concepts in, 437–438

- COPY in, 438, 463, 469
- COPYPOOL in, 464
- COPYTOCOPY in, 457
- CREATE TABLE LIKE and, 464
- data only, not layout in, 438
- data sharing and, 471, 480, 509, 515
- database copy pool for, using FROM DUMP, DUMPCLASS in, 457–458
- DFSMS concurrent copy and, 450
- directory copying for, 453–454
- directory, 467
- disaster, 468–471. *See also* disaster recovery
- DISPLAY LOG in, 440
- DSN1LOGP and, 422
- DSNTIJUZ in, 470
- DUMP, FROM DUMP in, 466
- error pages, 456
- exception tables and, 464
- failback and, 11, 458–459
- Fast Log Apply (FLA) in, with RECOVER, 459–460
- FlashCopy backup and, 462–463
- FLASHCOPY option for, 451
- full copy in, 438
- Hierarchical Storage Management (HSM) in, 464
- High Availability Disaster Recovery (HADR), 10–11, 13–17
- ICF catalog in, 470
- image copies in, 442–454, 469. *See also* image copies
- incremental copy, 438
- index copies in, 453
- index, 456
- inline copies and, 449–450
- items needed for, 469–470
- large objects (LOBs), 472
- libraries in, 470
- LIST COPYPOOL in, 466
- LISTCAT in, 470
- LOAD REPLACE, 464, 467
- LOB tables, 458
- log data sets in, archive, 439
- log for, DSN1LOGP and, 422, 439–442
- Log Record Sequence Number (LRSN) in, 439, 509–510, **510**
- LOGAPPLY in, 455, 456, 457, 459
- MERGECOPY in, 451–452, 452*t*, **452**
- minimizing data loss through, 471
- MODIFY and, 442
- MODIFY RECOVERY and, 414, 415–416, **415**
- multiple object, 456–457, **457**
- NOT LOGGED tables and, 458
- object-level, with system-level backups, 466–467
- objects to be copied for, 468
- outage minimization and, URCHKTH and URLGWTH, 478
- pages, 456
- Parallel Sysplex and, 439
- partitions, 456
- pending conditions and, 461–462
- Point-in-Time (PIT), 382, 460–462, 472
- point of consistency in, using QUIESCE, 438, 454–455, **454**
- postponed units of recovery, with RECOVER POSTPONED and LBACKOUT, 478–479, **478, 479**
- preparing for recovery plan, 468
- QUIESCE in, 472
- REBUILD INDEX and, 461–462, 467
- rebuild pending in, 461–462
- RECOVER in, 455–460, **457, 462–467**
- Recover Pending (RECP) in, 464
- recovery to current in, 438
- recovery to end of log in, 438
- RECOVERYDDN and RECOVERYSITE in, 469
- redo records in, 439
- Relative Byte Address (RBA) in, 439
- REORG in, 467
- REPAIR in, 464
- REPORT in, 453
- REPORT RECOVERY in, 459
- RESET INDOUBT in, 480, **480**
- restarting DB2 in, 474–480. *See also* restarting DB2
- RESTORE in, 455, 457
- RESTORE SYSTEM in, 464, 465, 466
- RESTOREBEFORE in, 461
- ROLLBACK and, 458
- SHRLEVEL in, 454, 455, 472
- Storage Management Subsystem (SMS) in, 464
- SYSCOPY and, 442, 452, 453, 455, 459, 460, 469
- SYSLGRNX and, 441–442, 453, 459
- system-level backup and, 464–467
- system-period temporal tables and, 463
- table space, 455–456
- table spaces offline in, 471
- TABLESPACESET in, 453
- threads affected by failure and, viewing, DISPLAY THREAD, 479–480, **480**
- TOLOGPOINT in, 460–462
- Tracker Site and, 473–474, **473**
- undo records in, 439
- Unit of Recovery (UR) and, 438–439, 580
- Unit of Recovery ID (URID) and, 422
- unit of work in, 438–439
- VOL-SER numbers and, 459
- XML objects and, 472
- XML table spaces and, 458
- recovery log manager, 40
- recovery manager, 40
- recovery to current, 438
- recovery to end of log, 438
- RECOVERYDDN, 357, 380, 469
- RECOVERYSITE, 469
- RECP. *See* Recover Pending (RECP)
- REDO, 357
- redo records, 439

- reference, correlated (subqueries), 304
- REFERENCES, 110*t*, 116*t*, 120*t*, 121*t*
- references/sources for book, 940
- REFERENCING, 675–676, **675**
- referential constraints, 178–180, **179**
- referential integrity, ii, iv
 - LOAD and, 363–365, **364**
 - temporary tables and, 590
 - triggers and, 680, 682
 - UPDATE and, 291
- referential relationships, sequence objects and, 602, **602**
- REFF, 428*t*, 484
- REFRESH, 214, 632
- REFRESH DB2, EARLY, 68*t*
- REFSHAGE, 61*t*
- related privileges, 114
- Relational Data System (RDS), 40
- Relational Database Management System (RDBMS), 4, 18, 242
- Relational Online Analytical Processing (ROLAP), 589
- relationships, 238, 251
- Relative Byte Address (RBA), 439
- REEASE, 565*t*, 581, 650–651, 678, 725
 - distributed data access and, 659
 - locks and, 719
- RELEASE SAVEPOINT, 585, **585**, **586**
- RELOAD, 375, 379, 381, 384
- REMARKS, 751*t*
- remote access
 - access control, 98
 - Resource Access Control Facility (RACF) and, 98, 100, 101
- remote queries, 656–661
- remote requests, 642
- remote servers, 83, 641
- Remote Unit of Work (RUW), 642
- RENAME, 653
- RENAME INDEX, 235, **235**
- RENAME TABLE, 184
- renaming columns using SELECT ORDER BY, 272, **273**
- REOPT, 565*t*, 574, 576, 825
- REOPTTEXT, 61*t*
- reordered row format, iii, 161
- REORG, v, 111*t*, 121*t*, 122*t*, 194, 197, 355, 374–397, 420, 433, 435, 443, 467
 - Access Method Services (AMS) and, 381
 - ALTER TABLE and, 392–393
 - analyzing physical organization of data for, 374
 - AUTOESTSPACE and, 377
 - BUILD in, 375, 379, 388
 - catalog/catalog queries and, 389–391, 395–396
 - CLUSTERRATIO and, 395
 - COPYDDN and, 380
 - DASD space, 390
 - data maintenance and, 411
 - DBA analysis to determine, 395
 - DEADLINE parameter for, 386
 - DELAY in, 385, 386
 - DFSORT and, 375, 379, 382
 - directory, 395–396
 - DISCARD in, 374, 387–388, **388**
 - DROP TABLE and, 376
 - FAROFFPOS/NEAROFFPOS and, 395
 - FASTSWITCH in, 381–382
 - freespace (FREEPAGE/PCTFREE) in, 375
 - hash-organized table spaces and, 377
 - indexes and, 394, 388–391, **389**, **390**, **391**
 - INDREFLIMIT for, 391–392, **391**, **392**
 - inline statistics during, 386–387
 - LEAFDIST and, 395
 - LEAFDISTLIMIT for, 392, **392**
 - LOB table spaces and, 377–378, 394
 - LOBs and, 376
 - logging, log iterations and, controlling, 380, 384–386, 388
 - LOG phase in, 375, 388
 - long log conditions and, controlling, 385, 386
 - mapping table in, 382–384, **383**, **384**
 - MAXRO in, 384–385
 - NEARINDREF/FARINDREF and, 395
 - OFFPOSTLIMIT trigger for, 391–392, **391**, **392**
 - Online Reorganization (OLR) with, 380–381
 - parallel index build and, 379–380
 - partition rebalancing using, 396–397, **396**
 - partitioned table spaces and, 376–377, **377**
 - pending definition change and, 393
 - phases in, 375–376
 - Point-in-Time (PIT) recovery and, 382
 - read/write online reorgs and, 381, 382
 - read-only OLR and, 381
 - Real Time Statistics (RTS) and, 395
 - RECOVERYDDN and, 380
 - RELOAD in, 375, 379, 381, 384
 - RUNSTATS and, 374, 386–387
 - segmented table spaces and, 376
 - SHRLEVEL and, 375–378, **378**, 380–381, 393
 - SORT phase in, 375, 379
 - SORTBLD phase in, 375, 379, 384
 - SORTDATA in, 378–379, **379**, 382
 - SORTKEYS in, 379
 - statistics and, 408, 410
 - STATISTICS and, 380, 386–387, **386**
 - SWITCH phase in, 376, 381, 382, 388
 - SYSINDEXPART catalog and, 394
 - SYSTABLEPART catalog and, 393
 - table spaces and, 201, 206, 210, 375–378, 389–391, **389**, **390**, **391**, 392–394
 - tables and, 390, **390**, 392–393
 - triggering, 389–395
 - UNLOAD EXTERNAL option in, 374
 - UNLOAD phase in, 376, 381, 384, 387–388, **388**
 - UTILINT phase in, 376, 388
 - UTILTERM phase in, 376, 388
 - when to run, 395
- reorganization, online, 12–17. *See also* REORG

- REORP, 429*t*
- REPAIR, 72, 111*t*, 121*t*, 122*t*, 134, 417–418, 464, 474
- REPEAT, 634
- repeatable read isolation, 726
- REPLACE, 128*t*, 293, 358–360, **359**
- replication, 8, 16, 17
- DB2 Connect and, 24, 25
 - DB2 for Linux, UNIX, Windows (LUW) and, 11
 - homogenous, 8, 16, 17
 - homogenous Q, 11, 16, 17
 - homogenous SQL, 13, 14, 15
- Replication Center, 33
- REPORT, 357, 453
- REPORT RECOVERY, 459
- REPORTONLY, 448–449, **448**
- RESET, rotating partitions and, 198–199, **199**
- RESET GENERICLU, 68*t*
- RESET INDOUBT, 68*t*
- RESET INDOUBT, 480, **480**
- residual predicates, 344–345
- Resource Access Control Facility (RACF), 46, 97, 98, 100, 101, 132
- resource limit facility (governor), 834
- Resource Recovery Services (RRS), 43–46
- Resource Recovery Services Attachment Facility (RRSAF)
- CURSOR WITH HOLD in, 541–542, **542**
- RESOURCE TIMEOUT, 732–734
- response time, *v*
- RESTART, *iv*, 61*t*
- RESTART LIGHT, 499
- restart. *See* recovery and restart
- restarting DB2, 474–480
- Automatic Restart Manager (ARM) in, 492
 - checkpoint intervals in, SET LOG in, 477, 478
 - conditional, 475
 - CRESTART in, 475, **475**
 - data sharing and, 476
 - NOT LOGGED tables and, 476
 - outage minimization and, using URCHKTH and URLGWTH, 478
 - postponed units of recovery, using RECOVER
 - POSTPONED and LBACKOUT, 478–479, **478, 479**
 - RESET INDOUBT in, 480, **480**
 - SET LOG SUSPEND/RESUME in, 476
 - stopping, 474
 - threads affected by failure and, viewing, DISPLAY THREAD, 479–480, **480**
- RESTORE, 8, 455, 477
- RESTORE SYSTEM, 464–466
- RESTORE_RECOVER_FROMDUMP, 61*t*
- RESTORE_TAPEUNITS, 61*t*
- RESTOREBEFORE, 461
- RESTP, 429*t*, 430
- RESTRICT, 410, 627
- RESTRICT ON DROP, 191
- restricted systems, distributed data access and, 653
- restriction
- restricting rows from table using SELECT, 261–262, **261, 262**
 - restricting rows using multiple conditions, 262, **262**
- restrictive status, *iv*
- resolving, using DISPLAY DATABASE, 424–426, **424, 425, 426, 426–429*t***
- result sets/result tables, 257, 536
- DRDA and, 621
 - dynamically identifying, using DESCRIBE CURSOR, 623, **623**
 - dynamically identifying, using DESCRIBE PROCEDURE, 622–623, **623**
 - ODBC and, 621
 - SQLDA and, 623
 - stored procedures and, 621–623, **622, 623**
 - WITH RETURN clause and, 621, 622, **622**
- RESUME, 359
- RESYNC, 61*t*
- retained locks, 498–499
- RETLWAIT, 61*t*
- RETURN, 634
- RETURNS clause, 693, 695
- RETVLCFK, 61*t*
- REVOKE, 101, 113–114, **113, 114**, 115*t*, 117*t*, 121*t*, 128*t*, 129, 133, 134*t*, 474
- authorities, 124, **124**
 - binding/rebinding and, 572
 - coordinating updates to distributed data with, 653
- REVOKE_DEP_PRIVILEGS, 61*t*
- REXX, 616
- distributed data access and, 643
 - host structures and, 520
 - SQL application programming and, 518
 - stored procedures and, 619, 630, 634
 - Workload Manager (WLM) and, 630
- RGFCOLID, 61*t*
- RGFDBNAM, 62*t*
- RGFDEDPL, 62*t*
- RGFDEFLT, 62*t*
- RGFESCP, 62*t*
- RGFFULLQ, 62*t*
- RGFINSTL, 62*t*
- RGFNMORT, 62*t*
- RGFNMPRT, 62*t*
- RID. *See* Row Identifier (RID) pool
- right outer join, 326–327, **326**
- RLF, 62*t*
- RLFAUTH, 62*t*
- RLFERR, 62*t*
- RLFERRD, 62*t*
- RLFOTBL, 62*t*
- ROLB, 727, 728
- ROLE AS OBJECT OWNER, 106–107, 127, 130
- roles, *v*, 144, 684
- auditing, 135
 - CREATE, 153
 - ownership of, and privileges, 128*t*

- trusted contexts and, 102, 106
 - rollback and ROLLBACK, ii, iv, 458, 541, 577–579, 580–585, **580**, **582–585**
 - locks and, 727, 728, 734
 - ODBC and, 549
 - sequence objects and, 600, 601
 - stored procedures and, 624
 - triggers and, 679
 - rotating partitions, 198–199, **199**
 - ROUNDING, 565*t*
 - ROUTCDE, 62*t*
 - routines, privileges for, 113*t*
 - ROUTINE_ID, 755*t*
 - ROW CHANGE TIMESTAMP, 604
 - row functions. *See* scalar functions
 - Row Identifier (RID) pool, v, 88, 866–868
 - row identifier data type, 156*t*
 - ROWID, 156*t*, 168–169, 179, 822
 - access paths and, 761, 762
 - LOAD and, 365–366
 - temporary tables and, 590
 - rows, iii, 145
 - access control for, 6
 - ATOMIC/NOT ATOMIC and, 595
 - authorization at level of, v
 - basic row format for, 161
 - begin/end timestamps for, 177
 - change timestamps for, 177, **177**
 - compression of, 9–10, 13, 16, 17
 - DDF and, for multi-row FETCH, 594
 - deleting all, using TRUNCATE, 294, **295**
 - direct access in, 168, 761
 - expressions in, 301
 - FETCH in, 591–592, **591**, **592**
 - FOR EACH ROW and, 674
 - fullselect of, 292
 - functions in. *See* scalar functions
 - ID, iii. *See also* ROWID
 - indirect reference, 160
 - LOAD ordered, 361
 - locks and, 718, 724, 725
 - maximum of, 184, 184*t*
 - multi-row FETCH in, 593–594, **593**, **594**
 - multi-row INSERT in, 594–595, **595**
 - multi-row MERGE in, 595–596, **596**
 - multi-row operations on, 593–595
 - OPTIMIZE FOR n ROWS in, 656–657, 662, 664
 - permissions for, for access control, 102–103, **103**, 104–105, **105**
 - preserved row table and, in joins, 320
 - qualifying, 262, **262**
 - reordered format for, iii, 161
 - restriction, restricting rows from table using SELECT, 261–262, **261**, **262**
 - restriction, restricting rows using multiple conditions, 262, **262**
 - retrieving multiple, using SELECT INTO, 527, 552
 - retrieving single, using SELECT, 526–527, **527**
 - row expressions in, 336, **336**
 - Row Identifier (RID) pool and, 88
 - ROWID and, 168–169, 365–366
 - rowset cursors and, 545–546, **546**
 - SKIP LOCKED ROWS and, 721
 - temporal tables and, 606
 - triggers and, 674
 - UNLOAD and, 372
 - rowset cursors, 545–546, **546**
 - RPG, 7
 - RRF, 62*t*
 - RRS, 834
 - RRSAF, 97
 - RRULOCK, 62*t*, 730*t*
 - Ruby, 19
 - RUN, 66*t*, 559
 - RUNSTATS, v, 82, 355, 374, 397–411, **399**, 432, 433, 434, 474, 561, 806, 807, 809, 811, 812, 825. *See also* statistics
 - access during, 399
 - autonomic statistics and, 814–816
 - catalog and, 404
 - catalog updates and, 399, **399**
 - COLGROUP and, 401–402
 - compression, 403–404
 - data maintenance and, 411
 - frequency distribution and, 400–402, 401*t*, **401**, **402**, 402*t*
 - FREQVAL and, 402, **402**
 - HIGHVALUE, LOWVALUE, QUANTILENO in, 403
 - histograms and, 402–403
 - historical statistics with, 405–406, **406**
 - inline statistics and, 404–405, **405**
 - LOAD and, 367
 - LOB table spaces and, 406
 - MODIFY STATISTICS utility and, 406
 - PAGESAVE in, 404
 - PCTROWCOMP in, 404
 - profiles in, 406–407, **407**, 815–816
 - REORG and, 386–387
 - sampling with, 400, **400**
 - SHRLEVEL and, 399
 - SQL cache invalidation using, 405
 - statistics and, 408, 410
 - SYSCOLDIST and, 400–402, **401**
 - SYSCOLDISTSTATS and, 402, 402*t*
 - SYSCOLUMNS and, 400–402, **401**
 - XML table spaces, 406
- ## S
- sampling, RUNSTATS and, 400, **400**
 - SAP, 18
 - sargable predicates, 344–345
 - SASS, 97
 - SAVEPOINT, 580–586, **580**, **581**, 582*t*
 - savepoints, 577, 580–586, **580**, 609, 611
 - distributed environments and, CONNECT statement for, 586

- DYNAMICRULES and, 581
- establishing, using UNIQUE, 581–582, **581**
- RELEASE and, 581
- releasing, using RELEASE SAVEPOINT, 585, **585**, **586**
- restoring to, 582–585, **582–585**
- ROLLBACK and, 581, 582–585, **582–585**
- SET SAVEPOINT in, 586
- TO SAVEPOINT in, 582–585, **582–585**
- scalability, 7
 - pureScale and, 10, 15–17
- scalar functions, 275
- scalar-fullselect, 257
- scans
 - IN-list index scan and, 821–822, **821**
 - limited partition, 760–761, **761**
 - matching index, 819, 820
 - merge scan join in, 763–764
 - non-matching index, 757, 821
 - range-list index, 758
- SCCSID, 62*t*
- schemas, iii, 151, 684, 685–686
 - CURRENT PATH register and, 685–686
 - CURRENT SCHEMA, 686
 - dimension tables in, 765
 - fact table in, 765
 - names for, 685
 - PATH bind option and, 685
 - privileges for, 113*t*, 685
 - snowflake, 766
 - star joins and, 765–768
 - stored procedures and, using CREATE PROCEDURE, 627
 - SYSFUN, 685
 - SYSTOOLS, 685
 - topology check in, 766
 - validation of, in XML, 708–709, **709**
 - XML Schema Definition (XSD) and, 708
- SCM, 16
- scope, commit scope, 715
- screening, index, 820, **820**
- SCROLL, scrollable/nonscrollable cursors and, 542–545, **543**, **544**, 544*t*, **545**
- SCTO2 directory table, 83*t*
- SDSNSAMP, 82
- search, Net Search Extender, 8–9, 13–17
- searched delete, 293–294, **294**
- searched updates, 291
- SECADM, 62*t*, 114, 117*t*
 - managing and separating authorities for, 123–124
 - row and column access control in, 103–105
- SECADM1_TYPE, 62*t*
- SECADM2, 62*t*
- SECADM2_TYPE, 62*t*
- SECMAINT, 138*t*, 140*t*
- SECOND, 168
- second normal form (2NF), 240–241, **241**
- SECQTY, 62*t*, 206–207
- SECTNOI, 756*t*
- Secure Sockets Layer (SSL), 6, 99–100
- security, ii, v, 5, 46, 95–144. *See also* access control
 - Application Transparent–Transport Layer Security (AT–TLS) and, 99
 - AS SECURITY LABEL in, 132
 - CICS, 99
 - DB2 for z/OS, 6
 - DB2_SECURE_VAR security function for, 132, **132**
 - denial of service attacks and, 100
 - encryption and, 100
 - IMS and, 99
 - Integrated Cryptographic Services Facility (ICSF) and, 100
 - Kerberos security and, 6, 99, 133
 - logical terminals (LTERMs) and, 99
 - multilevel, 132
 - Resource Access Control Facility (RACF) and, 132
 - Secure Sockets Layer (SSL) and, 99–100
 - SEPARATE_SECURITY and, 122–125
 - trusted contexts in, 105–108
- SELECT, 121*t*
- segmented table spaces, 149, 193, 194–196, 195*t*, **195**, 376
- SEGSIZE, 195–196, 195*t*, 201, 204, 208, 209*t*
- SELECT, ii, 27, 110*t*, 116*t*, 117*t*, 118*t*, 120*t*, 121*t*, 122*t*, 128*t*, 192, 255–287, 300, 349, 351–353, 474, 528, **528**, 696–697, **696**, **697**, 807, 823
 - access paths and, 758, 759, **759**, 761, 762
 - application programs and, INSERT with, 598–599, **599**
 - AS keyword and, 274
 - asterisk (*) in, 257–258
 - BETWEEN and, 262, 282, **282**
 - Cartesian products and, 262–265, **263–264**
 - CASE expression in, 334–335, **334**, **335**
 - column renaming and, 272, **273**
 - columns, selecting from multiple tables using, 262–269
 - comparison operators with, 261
 - correlation names in, 269–270, **269**
 - COUNT, 300
 - cursors use and, 536–538, **536**, **537**, **538**
 - data change tables and, 316–317, **317**
 - DECLARE CURSOR clause and, 257
 - DELETE and, 294
 - derived columns and, 273–274, **274**
 - DISTINCT and, 257, 279–280, **280**
 - dynamic SQL and, 547
 - EXCEPT clause and, 257
 - EXPLAIN and, 746
 - FETCH FIRST and, 257, 333, **333**, **334**
 - FOR SYSTEM TIME, 286, **286**
 - FROM and, 257, 264, 267, 268, 267, 285–286
 - fullselects in, 256–257
 - functions and, 275–277
 - GROUP BY and, 256, 257, 277–278, **277**, **278**
 - grouping values in, 277–278, **277**, **278**. *See also* GROUP BY
 - HAVING and, 257, 279, **279**
 - IN and, 262, 285, **285**
 - INTERSECT and, 257

- IS DISTINCT FROM/IS NOT DISTINCT FROM, 284, **285**
- IS NULL, 282–283, **283**
- joins and, 264, **264–265**, 265–269, **266–269**
- LIKE and, 262, 280–281, **280, 281**
- LOB values and, 336
- locks and, 718, 720, 724, 727–729, **728**, 735, 741
- major components of, 256–257
- nested table expressions in, 314–315, **313, 314, 315**
- NOT and, 283–285, **283, 284–285**
- ODBC and, 549
- optimistic locking and, 604, **604**
- OR and, 285, **285**
- ORDER BY and, 256, 257, 270–274, **271, 272, 273**, 333, **333, 334**
- ORDER OF clause in, 333, **333, 334**
- permutation, changing column order using, 260, **260–261**
- predicates in, 261–262
- projection, projecting columns from table using, 259–260, **259–260**
- PureXML usage and, 336–341. *See also* PureXML
- qualifying rows and, 262, **262**
- resource limit facility (governor) and, 834
- restriction, restricting rows from table using, 261–262, **261, 262**
- restriction, restricting rows using multiple conditions, 262, **262**
- result set or result table from, 257, 536
- row change timestamps and, 177, **177**
- row expressions in, 336, **336**
- scalar functions (SUBSTR) and, 275–276, **275, 276**
- scalar-fullselect and, 257
- SELECT INTO and, 316–317, **317**, 527, 599, 720
- select list from, 259, **259**
- select-statement in, 256–257
- sequence objects and, 599
- set of values and, using INSERT, 289–290, **290**
- single row retrieval using, 526–527, **527**
- sorting output using ORDER BY. *See* ORDER BY
- subqueries using, 257, 303–307, **304, 305, 306, 307**
- subselects in, 256–257
- table expressions and, 315–316, **315**
- table, retrieving entire table using, 257–259, **257–258, 259**
- temporary tables and, 590
- TRUE, FALSE, UNKNOWN conditions and, 261
- UPDATE and, 291–292, **292**
- UNION/UNION ALL and, 257, 308–311, **310**
- views and, 211, 295
- WHERE and, 257, 259, 261, 264, 268, 273–274
- XML EXISTS predicate in, 340–341, **340**
- XMLQUERY and, 336–341
- XPath expressions and, 337–341
- SELECT INTO, 527
 - data change tables, 316–317, **317**
 - locks and, 720
 - sequence objects and, 599
- select list, 259, **259**
- select-statement, 256–257
- selective dump, DSN1SDMP (IFC Selective Dump), 423
- semicolon delimiter, stacking queries, 49
- sensitivity in cursors, INSENSITIVE/SENSITIVE, 543–544, **543, 544t**
- SEPARATE_SECURITY, 62t, 122, 144
- SEQCACH, 62t
- SEQPRES, 62t
- sequence, 684
 - ownership of, and privileges, 127, 128t
- sequence objects, iii, 152, 191–193, 599–603
 - ALTER and, 155, 193, 600
 - COMMIT and, 601
 - CREATE and, 153, 599, 600
 - CREATE SEQUENCE and, 192, **192**
 - cursors and, 601, **601, 602**
 - DROP and, 193, 600
 - FETCH and, 601, 602
 - identity columns and, 192, 602–603, 603t
 - INSERT and, 599, 602, **602**
 - NEXT VALUE FOR (NEXTVAL) in, 192–193, 599–603, **600, 601**
 - PREVIOUS VALUE FOR (PREVAL) in, 192–193, 599–603, **600, 601**
 - privileges for, 113t
 - programming with, 599–602
 - referential relationships and, populating, 602, **602**
 - ROLLBACK and, 600, 601
 - SELECT and SELECT INTO with, 599
 - SET and, 599
 - UDPATE and, 599
 - using, with NEXTVAL and PREVVAL, 192–193, 599–603, **600, 601**
 - VALUES/VALUES INTO and, 599
- sequential detection (dynamic prefetch), 760
- Sequential Least Recently Used (SLRU) pages, 857
- sequential prefetch, 760
- Sequential Prefetch Threshold (SPTH), 863
- serialization, 715
- SERVAUTH, 105, 107t
- servers, 1–2, 35
 - application, 641
 - application, vs. local DB2, 83
 - Data Server Client, 19–22
 - Data Server Driver for JDBC and SQLJ, 20, 21
 - Data Server Driver for ODBC and CLI, 20–22
 - Data Server Driver Package and, 20–22
 - Data Server Driver, 19
 - Data Server Runtime Client, 19–22
 - DB2 application drivers, 20–21
 - DB2 Connect, 19, 22–25
 - DB2 for z/OS, 4, 242
 - instance merge modules, DB2, 21
 - local DB2 and, 83
 - non-DB2 instance merge modules, 21
 - remote, 83, 641
- service controller, 40

- Service Oriented Architecture (SOA), 2, 25
- SESSION, 589–590
- SET, 292, 527, **527**
 large objects (LOBs) and, 705
 sequence objects and, 599
- SET ARCHIVE, 68*t*
- SET CONNECTION, 654
- SET CURRENT DEGREE, 825, 830
- SET CURRENT PACKAGESET, 830
- SET CURRENT SQLID, 135*t*
- set functions. *See* column functions
- SET LOG SUSPEND/RESUME, 476
- SET LOG, 68*t*, 477, 478
- SET NULL, 568
- SET SAVEPOINT, 586
- SET SYSPARM, 53–54, **54**, 68*t*
- Share (S) locks, 722, 724, 727
- Share with Intent Exclusive (SIX) locks, 722, 723
- Shared Communication Area (SCA), 488–489, 509, 511, 512
- Shared Data Architecture (SDA), 487
- shredding, ii, 341
- SHRLEVEL, 362, 454–455, 472, 482
 image copies and, 449, **450**
 REORG and, 375, 376, 377–378, **378**, 380–381, 393
 RUNSTATS and, 399
- SIGNAL, 679
- SIGNAL SQLSTATE, 679
- SIGNAL/RESIGNAL, 634
- signaling XCF services, 493–494
- signed numeric data type, 156*t*
- simple predicates, 344
- simple table space, 149, 193, 194
- Single-Byte Character Set (SBCS), 161
- single-precision floating point. *See* REAL
- SITETYP, 62*t*
- SJTABLES, 63*t*, 766
- Skeleton Cursor Table (SKCT), 87, 716
- Skeleton Package Table (SKPT), 87, 716
- skeleton pool, 87
- SKIP LOCKED DATA, 720, **721**, 737, 743
- SKIP LOCKED ROWS, 721
- SKIPUNCI, 63*t*, 730*t*
- slash (/) character, XPath expressions, 338–341
- slash slash (//) character, XPath expressions, 338–341
- SMALLINT, 157, 172*t*, 174
- SMF89, 63*t*
- SMFACCT, 63*t*
- SMFCOMP, 63*t*
- SMFSTAT, 63*t*
- SMSDCFL, 63*t*
- SMSDCIX, 63*t*
- snowflake schemas, 766
- SOA. *See* Service Oriented Architecture (SOA)
- Solaris, 2, 14
- SolidDB, 2
- SOME, 304
- SORT, ii
 access paths and, 761–762
 LOAD and, 357
 REORG and, 375, 379
- SORT BY, 300
- sort key tables, 795, 795–796*t*
- sort pool, v, 88–89, 494, 868
- sort tables, 793, 793–794*t*
- SORTBLD, 357, 375, 379, 384
- SORTC_GROUPBY, 750*t*
- SORTC_JOIN, 750*t*
- SORTC_PGROU_ID, 752*t*
- SORTC_UNIQ, 750*t*
- SORTDATA, 378–379, **379**, 382
- sorting
 using EXPLAIN, 747
 indexes to avoid, 824–825, **824**, **825**
 using ORDER BY, **271**, **272**, **273**
 sort pool in, 88–89
 tournament, 88
- SORTKEYS, 368, 369, 379
- SORTN_GROUPBY, 750*t*
- SORTN_JOIN, 750*t*
- SORTN_ORDERBY, 750*t*
- SORTN_PRGROU_ID, 752*t*
- SORTN_UNIQ, 750*t*
- SORTTC_ORDERBY, 750*t*
- sourced UDFs. *See* user-defined functions (UDFs)
- sparse index, nested loop join with, 763
- Spatial Extender, 9, 13–18, 31
- SPT01 directory table, 82*t*
- SPUFI. *See* SQL Processing Using File Input (SPUFI)
- SPUFI command, 66*t*
- SQL, ii, vi, 2, 19, 26, 27, 142, 145, 192, 244, 303–354. *See also*
 application programs and SQL
 ALTER in. *See* ALTER
 application program use of, 517–554. *See also* application
 programs and SQL
 attachment facility and, 42
 BIND in. *See* BIND
 binding/rebinding and, 555–560
 cache invalidation in, using RUNSTATS, 405
 calls in, 612
 CASE expression in, 334–335, **334**, **335**
 catalog table access using, 74
 clone tables and, 151
 CLOSE CURSOR in, 541, **541**
 communicating with DB2 through, methods for, 517
 concurrency, claims and drains for, 731–732, 731*t*
 CREATE in. *See* CREATE
 CURSOR WITH HOLD in, 541–542, **542**, 552, 554
 cursors in, 536–538, **536**, **537**, **538**, 542–546, 542*t*, 552.
 See also cursors, 542
 data change tables and, 316–317, **317**
 Data Control Language (DCL) in, 145
 Data Definition Language (DDL) in, 145, 152
 Data Manipulation Language (DML) in, 145
 Database Request Module (DBRM) and, 746

- DB2 Connect and, 24
- DB2 for z/OS and, 4, 5
- DB2 Interactive (DB2I) and, 47
- DCLGEN and, 519, 524–526, **524**, **525–526**
- DECLARE CURSOR in, 536, **536**
- DECLARE in. *See* DECLARE
- deferred embedded, 546–547
- DELETE in. *See also* DELETE
- delimiting, using EXEC SQL and END-EXEC, 518, **518**
- distributed data access and, 84, 641
- DROP in, 152, 154, **154**
- dynamic. *See* dynamic SQL
- embedded dynamic, 546
- excepts/EXCEPT/EXCEPT ALL and, 311, **312**
- EXEC SQL and END-EXEC in, 518, **518**
- executing statements in, 538–546
- execution validation in, 528–535
- EXPLAIN and, 746, 747, 825–827
- expressions in, common table, 315–316, **315**
- external stored procedures in, 634–635
- FETCH in. *See* FETCH
- filtering in, 343–346
- FROM clause in, 147
- functions and, 275
- GET DIAGNOSTICS in, 532–535, 532–535*t*, 546, 554
- homogeneous replication in, 13–15
- host arrays in, 523–524, **523**, **524**
- host structures in, 520, 523, **523**
- host variables and, 520–521, **521**
- indicator variables in, 521–522, **522**
- INSERT in. *See* INSERT
- INSTEAD OF in, 537
- interactive, 546
- intersects/INTERSECT in, 312, **313**
- Java Database Connectivity (JDBC) for, 517–518, 547, 549–550
- joins and, 317–333. *See also* joins
- locks and, 727
- MERGE in. *See* MERGE
- nested table expressions in, 313–315, **313**, **314**, **315**
- Net Search Extender and, 8–9, 13–17
- Online Analytical Processing (OLAP) and, 341–343, **342**, **343**
- OPEN CURSOR in, 537–538, **538**
- Open Database Connectivity (ODBC) for, 517–518, 547, 548–549
- Optim Development Studio and, 28–29, 28
- Optim pureQuery Runtime and, 29
- ORDER BY in, 333, **333**, **334**
- ORDER OF clause in, 333, **333**, **334**
- orthogonality of, 257
- performance and, 746
- predicates and, 343–346, 346–348*t*
- PureQuery and, 549–550
- PureXML and, 336–341. *See also* PureXML
- Query Management Facility (QMF) and, 31–32
- replication, homogeneous and, 8, 16, 17
- result sets in, 536
- result tables in, 536
- retrieving and manipulating objects with, 255–354
- row expressions in, 336, **336**
- rowset cursors in, 545–546, **546**
- scrollable/nonscrollable cursors and, 542–545, **543**, **544**, 544*t*, **545**
- SELECT. *See* SELECT
- SET in, 527, **527**
- SQL communication areas (SQLCA) in, 528, 528–531*t*
- SQL Procedure Language for, 632–635
- SQL Processing Using File Input (SPUFI) and, 49–50, **49**
- SQLCODE in, 531
- SQLJ and, 517–518, 549–550
- SQLSTATE in, 531
- static, 517, 546, 554
- stored procedures and, 613, 632–635. *See also* stored procedures
- subqueries in, 303–307, **304**, **305**, **306**, **307**
- table definitions in, DECLARE, 518–528, **519**
- table functions in, 695–696, **695**, **696**
- temporary tables and, 589, 590
- trusted contexts and, 106
- UNION/UNION ALL and unions in, 308–311, **310**
- UPDATE in. *See* UPDATE
- user-defined functions (UDFs) and, 690, 693–695, **693**, **694–695**. *See also* user-defined functions (UDFs)
- view definitions in, using DECLARE, 518–528, **519**
- Visual Explain and, 26–27
- WHERE in. *See* WHERE
- XMLEXISTS predicate in, 340–341, **340**
- XMLQUERY and, 336–341
- XQuery and, 340–341
- SQL API, 2
- SQL Communication Areas (SQLCAs), 528, 528–531*t*, 556, 557
- SQL Procedure Language, 632–635, 632
- SQL Processing Using File Input (SPUFI), 49–50, **49**, 125
- commands in, 65
- DB2 Interactive (DB2I) and, 47
- EXPLAIN and, 747
- stored procedures and, 617
- SQL scalar UDFs. *See* user-defined functions (UDFs)
- SQL Server, DB2 Connect and, 25
- SQL(*xxx*), 651, 655
- SQLADM, 114, 118*t*, 119*t*, 808, 826
- SQLCA. *See* SQL Communication Areas (SQLCAs)
- SQLCODE, 531
- ODBC and, 549
- stored procedures and, 620
- SQLDA, 623
- SQLDELI, 63*t*
- SQLERROR, 565*t*, 573, 652, 655
- SQLID, 102, **102**, 123, 126, 135*t*
- SQLJ, 19, 20, 21, 517–518
- DB2 Connect and, 25
- Optim Development Studio and, 28–29

- SQL application programming and, 549–550
- stored procedures and, 635
- traces and, 834
- SQLRULES, 565*t*, 652–653, 654
- SQLSTA, 531
- SQLSTATE, 531
 - ODBC and, 549
 - stored procedures and, 620
 - user-defined functions (UDFs) and, 692
- SRTPOOL, 63*t*
- SSID, 63*t*
- SSL. *See* Secure Sockets Layer (SSL)
- stacking queries, semicolon delimiter, 49
- stage 1 predicates, 344–345, 346–348*t*, 818, **818**
- stage 2 predicates, 344–345, 818–819, **819**
- standalone utilities, 419–424. *See also* utilities
- standby, in recovery, 10
- star joins, 765–768
- STARJOIN, 63*t*, 766
- START, *iv*, 118*t*, 128*t*, 855
- START DATABASE/STARTDB, 68*t*, 111*t*, 118*t*, 119*t*, 121*t*, 430, **430**, 512
- START DB2, 68*t*, 93
- START DDF, 68*t*
- START FUNCTION, 701
- START FUNCTION SPECIFIC, 68*t*, 701–702, **701**
- START PROCEDURE, 68*t*, 628, **629**, 631
- START PROFILE, 68*t*
- START RLIMIT, 68*t*
- START TRACE, 68*t*, 136, **136**, 835, 837–839, **838**, **840**
- START WITH *n*, 175*t*
- STATCLUS, 63*t*
- statement table, EXPLAIN and, 746
- statement triggers, 674, **675**
- statements
 - DSN_STATEMENT_CACHE_TABLE and, 775, 775–778*t*
 - DSN_STATEMENT_TABLE and, 770, 771–773*t*
 - granularity of, 674
- STATHIST, 63*t*
- static binding, 558
- static SQL, 517, 546, 554. *See also* dynamic SQL; SQL
- STATIME, 63*t*
- statistics, *iv*, 91, 397–411, 875, 877. *See also* RUNSTATS
 - autonomic, 814–816
 - buffer pool, 867–868
 - catalog. *See* catalog statistics
 - collection of, 408
 - compression, 403–404
 - COPY and, 408, 410
 - DSNACCOR for, 410
 - DSNACCOX for, 410
 - EXTENTS and, 410
 - externalizing, using STATSINST, 409
 - frequency distribution, 400–402, 401*t*, **401**, **402**, 402*t*
 - histogram, 402–403, 811–812, **812**
 - historical, 405–406, **406**
 - inline, 367, **367**, 404–405, **405**
 - INSERT and, 410
 - LOAD and, 367, **367**, 408, 410
 - LOAD REPLACE and, 408
 - LOB table space, 406
 - locks and, 738–739, **738–739**
 - MODIFY STATISTICS and, 414, 416–417, **417**
 - production environment modeling using, 411, 813–814, 813–814*t*
 - profiles of, RUNSTATS and, 406–407, **407**
 - real-time, 408
 - REBUILD and, 408
 - REORG and, 408, 410
 - RESTRICT and, 410
 - RUNSTATS and. *See* RUNSTATS
 - sampling, 400
 - SQL cache invalidation and RUNSTATS in, 405
 - STATSINST, 409
 - STOSPACE utility for, 407, **407**
 - SYSINDEXSPACESTATS for, 408, 410
 - SYSTABLESPACESTATS for, 408, 409
 - table space, 434
 - trace, statistics trace, 835, 851–852*t*
 - triggers and, 680
 - user-defined functions (UDFs) and, 702, **702**
 - XML table space, 406
- STATISTICS, in REORG, 380, 386–387, **386**
- Statistics Advisor, 30
- STATROLL, 63*t*
- STATS, 111*t*, 121*t*
- STATSINT, 63*t*, 409
- status monitoring XCF services, 494
- STAY RESIDENT, 616
- STDDEV, 277
- STDSQL, 63*t*
- stealing method, buffer pools and, with PGSTEAL, 862
- STMTOKEN, 755*t*
- STOBB, 121*t*
- STOGROUP, 116*t*, 120*t*
- STOP, *iv*, 118*t*, 128*t*, 429*t*, 855
- STOP DATABASE/STOPDB, 68*t*, 111*t*, 119*t*
- STOP DB2, 68*t*
- STOP DDF, 68*t*
- STOP FUNCTION SPECIFIC, 68*t*, 702, **702**
- STOP PROCEDURE, 68*t*, 628, **629**, 631
- STOP PROFILE, 68*t*
- STOP RLIMIT, 68*t*
- STOP TRACE, 68*t*, 136, **136**, 839
- STOPALL, 112*t*, 118*t*, 119*t*
- stopping DB2, 474
- STOPSPACE, 113*t*
- storage
 - in DB2 for z/OS, 4, 242
 - buffer pools in, 86–87
 - Data Facility Storage Management Subsystem (DFSMS) and, 47
 - Hierarchical Storage Management (HSM) in, 464
 - INLINE option for, 186–188, **187–188**

- installation, migration and, 50
- storage groups and, 151, 236–237, **236–237**
- Storage Management Subsystem (SMS) in, 464
- stored procedures and, 616
- system-managed (SMS), 236
- virtual, v
- storage groups, 151, 236–237, **236–237**
 - ALTER for, 155
 - CREATE for, 153
 - ownership of, and privileges, 128*t*
- Storage Management Subsystem (SMS), 7, 464
- storage manager, 40
- stored procedures, 613–639, 684
 - accessing external resources with, 625
 - address space for, 38, 616
 - ALLOW DEBUG MODE and, 628
 - ALTER PROCEDURE in, 155, 617, 623–624, 626, **626**
 - ASUTIME parameter in, 630
 - benefits of, 614–615
 - CICS and, 615
 - CLIST and, 634
 - COMMIT in, 623, 624
 - COMMIT ON RETURN in, 623–624
 - CREATE PROCEDURE and, 153, 617–620, **618, 619**, 623–626, **626**, 627, 631, **631, 633**
 - CURRENT PATH and, 627
 - DB2-supplied, 625, 636
 - DBINFO for, 620–621, 620–621*t*
 - DDL and, 634
 - debugging, 635
 - DEFINER, 625
 - defining, using CREATE PROCEDURE, 626, **626**
 - DESCRIBE PROCEDURE in, 622–623, **623**
 - developing SQL type, 634
 - diagnostic information on, using CEEDUMP, 632
 - DISPLAY PROCEDURE and, 628, **628**
 - DISPLAY THREAD and, 628
 - distributed data access and, 655–656
 - DRDA and, 621
 - DSNACCOX DB2-supplied, 636
 - DSNACICS DB2-supplied, 636
 - DSNAEXP DB2-supplied, 636
 - DSNAIMS DB2-supplied, 636
 - DSNTPSMP and, 634, 635
 - execution environments for, 628–632
 - EXTERNAL option and, 617, 634, 639
 - external SQL, 613, 634–635
 - external, 613
 - FENCED option in, 617, 634, 638, 639
 - IMS and, 615
 - invoking, using CALL, 614, **614**, 617, **617**, 623, 624, 627, 629
 - Java and, 619, 635
 - JCL and, 634
 - Language Environment for, 616, 639
 - manager for, 40
 - managing environments for, using VARY WLM, 631–632, **631, 632**
 - memory and, STAY RESIDENT option for, 616
 - MQSeries and, 635
 - native SQL, 613, 617–625
 - nesting, 624–625
 - network improvement using, 614–615, **614**
 - NUMTCB and, 639
 - ODBC and, 621
 - Optim Development Studio and, 617, 632, **633**, 634, 635
 - ownership of, and privileges, 127, 128*t*
 - parameters for, using PARAMETER STYLE, 617–621, **617, 618, 619**
 - PL/1 and, 638
 - program type specified for, using PROGRAM SUB TYPE in, 631, **631**
 - QUALIFIER and, 627
 - removing, using DROP PROCEDURE, 627, **627**
 - RESTRICT keyword in, 627
 - result sets and, 621–623, **622, 623**
 - REXX and, 619, 630, 634
 - ROLLBACK in, 624
 - schema qualification and, using CREATE PROCEDURE, 627
 - SECURITY keyword, external resources and, 625
 - SPUFI and, 617
 - SQL Procedure Language for, 632–635
 - SQLCODE and, 620
 - SQLJ and, 635
 - SQLSTATE and, 620
 - START/STOP PROCEDURE and, 628, **629**, 631
 - storage of, in SYSROUTINES and SYSPARMS, 626
 - SYSFUN and, 627
 - tables and, 637
 - triggers and, 682, 683, **683**
 - Unit of Work (UOW) in, 623–625
 - USER in, 625
 - VSAM and, 615
 - WLM_REFRESH DB2-supplied, 636
 - WLM_SET_CLIENT_INFO DB2-supplied, 636
 - Workload Manager (WLM) and, 616, 625, 628–632, 637. *See also* Workload Manager
 - writing, 616
 - XDBDECOMPXML as, 341
 - XML and, 635, 708
 - XSR_xxx DB2-supplied, 636
- STORMXAB, 63*t*
- STORTIME, 63*t*
- STOSPACE, 116*t*, 407, **407**
- streaming
 - FETCH WITH CONTINUE for, 706, 710–711
 - large objects (LOBs) and, 706, 710–711
 - XML and, 710–711
- string data type, 156*t*
- string functions, 276
- strong typing, 170

- STRONGARM/XSCALE, 18
 structure tables, DSN_STRUCT_TABLE and, 782, 782–784
 Structured Query Language. *See* SQL, ii, 1
 subprograms, 639
 subqueries, 257, 303–307, **304**, **305**, **306**, **307**
 correlated, 305–307, **306**, **307**
 EXISTS, 304–307, **307**
 FROM clause and, 304
 global optimization and, 769
 IN, 304–307, **307**
 interpreting access for, using EXPLAIN, 768
 number of tables supported in, 318
 pruning of, 310, **310**
 quantified predicates and, 304
 reference within, correlated (correlation predicate), 304
 WHERE clause and, 307
 subselects, 256–257
 SUBSTR, 275–276, **275**, **276**
 subsystems, 40, 41
 access control and, 97–100
 data sharing and, 485
 PERMIT in, 97, 97
 privileges for, 111–113
 Resource Access Control Facility (RACF) and, 97, 98, 100, 101
 SUM, 279, **279**, 335, **335**
 Sun Unix, 18
 SUPERRS, 63*t*
 Supply Chain Management (SCM), 2, 3
 SVOLARC, 63*t*
 SWITCH phase, in REORG and, 376, 381, 382, 388
 SWITCH, 565*t*
 Sybase, 18, 25
 Symbian, 18, 19
 Symmetric Multiprocessing (SMP), 7
 SYNCH, locks and, 727, 728
 synchronous reads/writes, 857–858
 SYNCVAL, 63*t*
 synonyms, 148
 CREATE, 153
 ownership of, and privileges, 126–127, 128*t*
 SYSABAUTH, 131*t*
 SYSADM, 63*t*, 98, 114, 115*t*, 117*t*, 129, 143, 144, 293, 808, 826
 authorizations and, 102
 binding/rebinding and, 567
 managing and separating authorities for, 122–124
 row and column access control in, 104, 105
 SYSADM2, 63*t*
 SYSADMIN, 138*t*, 140*t*
 SYSAUDIPOLICIES, 75*t*
 SYSAUTOALERTS, 75*t*
 SYSAUTOALERTS_OUT, 75*t*
 SYSAUTORUNS_HIST, 75*t*
 SYSAUTORUNS_HISTOU, 75*t*
 SYSAUTOTIMEWINDOWS, 75*t*, 816
 SYSAUXRELS, 75*t*
 SYSCHECKDEP, 75*t*, 182
 SYSCHECKS, 75*t*, 182
 SYSCHECKS2, 75*t*
 SYSCOLAUTH, 75*t*
 SYSCOLAUTH, 131*t*
 SYSCOLDIST, 76*t*, 400–402, **401**, 416, 809, 812*t*, 813*t*
 SYSCOLDIST_HIST, 76*t*
 SYSCOLDISTSTATS, 76*t*, 402, 402*t*, 812*t*, 812, 813*t*
 SYSCOLSTATS, 76*t*, 812*t*
 SYSCOLUMNS, 76*t*, 400–402, **401**, 406, 416, 809, 812*t*, 813*t*
 table- vs. index-controlled partitioning and, 200
 SYSCOLUMNS_HIST, 76*t*
 SYSCONSTDEP, 76*t*
 SYSCONTEXT, 76*t*, 131*t*
 SYSCONTEXTAUTHIDS, 76*t*, 131*t*
 SYSCONTROLS, 131*t*
 SYSCOPY, 76*t*, 415, 452, 453, 455, 459, 460, 467, 469
 image copies and, 445, 447
 logging and, 442
 SYSCTRL, 114, 116*t*, 123–124, 129, 808
 SYSTXTTRUSTATTRS, 76*t*, 131*t*
 SYSDATABASE, 76*t*, 82
 SYSDATATYPES, 76*t*, 689
 SYSDBASE, 396
 SYSDBAUTH, 76*t*, 131*t*
 SYSDBDXA, 467
 SYSDBRM, 76*t*
 SYSDDEPENDENCIES, 76*t*
 SYSDUMMY1, 77*t*
 SYSDUMMYA, 77*t*
 SYSDUMMYE, 77*t*
 SYSDUMMYU, 77*t*
 SYSENVIRONMENT, 77*t*
 SYSFIELDS, 77*t*
 SYSFORIGNKEYS, 77*t*
 SYSFUN, 627, 685
 SYSGROUP, 467
 SYSIBM, 415, 627
 SYSIBM.xxx tables. *See* table names (SYSKEYTARGETS, SYSTABLES, etc.)
 SYSINDEXES, 77*t*, 406, 416, 812*t*, 813*t*
 SYSINDEXES_HIST, 77*t*
 SYSINDEXES_RTSECT, 77*t*
 SYSINDEXES_TREE, 77*t*
 SYSINDEXPART, 77*t*, 394, 406, 416
 SYSINDEXPART_HIST, 77*t*
 SYSINDEXSPACESTATS, 77*t*, 408, 410
 SYSINDEXSTATS, 77*t*, 406, 416, 812*t*, 813*t*
 SYSINDEXSTATS_HIST, 77*t*
 SYSJARCLASS_SOURCE, 77*t*
 SYSJARCONTENTS, 77*t*
 SYSJARDTAT, 77*t*
 SYSJAROBJECTS, 77*t*
 SYSJAVAOPTS, 77*t*
 SYSJAVAPATHS, 77*t*
 SYSKEYCOLUSE, 78*t*
 SYSKEYS, 78*t*

- SYSKEYTARGETS, 78*t*, 228, 406, 417, 812*t*, 814*t*
- SYSKEYTARGETS_HIST, 78*t*
- SYSKEYTARGETSSTATS, 78*t*, 812*t*, 814*t*
- SYSKEYTGTDIST, 78*t*, 228, 406, 417, 812*t*, 814*t*
- SYSKEYTGTDIST_HIST, 78*t*
- SYSKEYTGTDISTSTATS, 78*t*, 228, 812*t*, 814*t*
- SYSLGRNX, 83*t*, 415, 441–442, 453, 459, 467
- SYSLOBSTATS, 78*t*, 406, 416
- SYSLOBSTATS_HIST, 78*t*
- SYSOBJROLEDEP, 78*t*
- SYSOPR, 98, 114, 118–119*t*, 808
- SYSOPR1, 63*t*
- SYSOPR2, 63*t*
- SYSPACKAGE, 78*t*, 396, 561, 569, 668
- SYSPACKAUTH, 78*t*, 131*t*
- SYSPACKCOPY, 78*t*
- SYSPACKDEP, 78*t*, 694
- SYSPACKLIST, 78*t*
- SYSPACKSTMT, 78*t*
- SYSPACKSTMT_STMB, 78*t*
- SYSPACKSTMT_STMT, 78*t*
- SYSPARMS, 78*t*, 626
- SYSPENDINGDDL, 78*t*
- SYSPENDINGOBJECTS, 79*t*
- SYSPKSYSTEM, 79*t*
- SYSPLAN, 79*t*, 396, 561, 569
- SYSPLANAUTH, 79*t*, 131*t*
- SYSPLANDEP, 79*t*, 694
- Sysplex Failure Management (SFM), 491, **492**
- Sysplex Timer, 492, 493
- sysplex. *See* Parallel Sysplex
- SYSPLSYSTEM, 79*t*
- SYSPROC, 627
- SYSPROC.XSR_ADDSCHEMADOC, 708
- SYSPROC.XSR_COMPLETE, 708
- SYSPROC.XSR_REGISTER, 708
- SYSPROC.XSR_REMOVE, 708
- SYSPUNCH, 372
- SYSQUERY, 79*t*
- SYSQUERY_AUX, 79*t*
- SYSQUERYOPTS, 79*t*
- SYSQUERYPLAN, 79*t*
- SYSRELS, 79*t*
- SYSRESAUTH, 79*t*, 131*t*, 689
- SYSROLES, 79*t*, 131*t*
- SYSROUTEINAUTH, 79*t*, 131*t*, 689
- SYSROUTINES, 79*t*, 626, 689, 703, 814*t*
- SYSROUTINES_OPTS, 79*t*
- SYSROUTINES_PTREE, 79*t*
- SYSROUTINES_SRC, 79*t*
- SYSROUTINESTEXT, 79*t*
- SYSRTSTS, 467
- SYSSCHEMAAUTH, 80*t*, 131*t*
- SYSSEQUENCEAUTH, 80*t*, 131*t*
- SYSSEQUENCEDEP, 80*t*
- SYSSTAT, 702
- SYSSTMT, 80*t*
- SYSSTOGROUP, 80*t*
- SYSSYNONYMS, 80*t*
- SYSTABAUTH, 80*t*
- SYSTABCONST, 80*t*
- SYSTABLEPART, 80*t*, 200, 393, 406, 416
- SYSTABLEPART_HIST, 80*t*
- SYSTABLES, 80*t*, 200, 812*t*, 814*t*, 406
- SYSTABLES_HIST, 80*t*
- SYSTABLES_PROFILES, 80*t*
- SYSTABLES_PROFILES_TEXT, 80*t*
- SYSTABLESPACE, 80*t*
- SYSTABLESPACESTATS, 80*t*, 408, 409
- SYSTABSTATS, 80*t*, 406, 417, 812*t*, 814*t*
- SYSTABSTATS_HIST, 80*t*
- System Catalog, indexing, 233
- System i, 1, 3, 7, 19, 23
- System Management Facility (SMF), 834
 - distributed data access and, 658
- System Network Architecture (SNA), 84–86
 - distributed data access and, 643, 646
- system parameter manager, 40
- system parameters, locks and, 730, 730*t*, 741
- system period, 151–152, 216–219, 285–286, **286**, 310–311, **311**, 605–607, **605–606**
- System Services Address Space (SSAS), 38, 39
- System z, 1, 23
- SYSTEM_LEVEL_BACKUPS, 63*t*
- system-level backup, 464–467
- System-Managed Storage (SMS), 236
- system-period temporal tables, 218, **218–219**, 463
- SYSTKEYTARGETSTATS, 228
- SYSTOOLS, 685
- SYSTRIGGERS, 80*t*, 668, 681, **681**
- SYSTRIGGERS_STMT, 80*t*
- SYSTSIN, 44
- SYSTSSTG, 467
- SYSTVOL, 467
- SYSUSERAUTH, 80*t*, 131*t*
- SYSUSERNAMES, 81*t*
- SYSUTIL, 418
- SYSUTILX directory table, 83*t*
- SYSVIEWDEP, 81*t*
- SYSVIEWS, 81*t*, 694
- SYSVIEWS_STMT, 81*t*
- SYSVIEWS_TREE, 81*t*
- SYSVOLUMES, 81*t*
- SYSXMLRELS, 81*t*
- SYSXMLSTRINGS, 81*t*
- SYSXMLTYPMOD, 81*t*
- SYSXMLTYPSCHEMA, 81*t*
- SYSXSRCOMPONENT, 81*t*
- SYSXSROBJECT HIERARCHIES, 81*t*
- SYSXSROBJECTCOMPONENTS, 81*t*
- SYSXSROBJECTGRAMMER, 81*t*
- SYSXSROBJECTPROPERTY, 81*t*
- SYSXSROBJECTS, 81*t*
- SYSXSRRPROPERTY, 81*t*

T

- table functions, 275
- TABLE keyword, 314–315, 354
- table spaces, iv, 12, 149–150, 184–185, 193–210, 251, 467
 - access paths and, scan for, 758–759
 - advisory reorg–pending (AREO) status in, 210
 - allocation in, using PRIQTY and SECQTY, 206–207
 - altering, using ALTER TABLESPACE to modify, 155, 201, 208, 209*t*, 209–210, **210**
 - benefits of, 201
 - binding/rebinding and, 568–569
 - BUFFERPOOL in, 204
 - CHECK, 414, **414**
 - COMPRESS in, 204, 207–208, **208**
 - creating, using CREATE TABLESPACE, 153, 201, 203–209
 - DEFINE in, 204
 - DROP TABLESPACE to remove, 210, **210**
 - DSSIZE in, 203, 205–206, 205*t*, 209
 - free space in, FREEPAGE and PCTFREE in, 203, 206
 - GBPCACHE in, 204
 - hash, 377
 - LOAD and, load parallelism for partitioned, 370, **370**, 393
 - LOB, 150, 193, 202–203, **202**, 377–378, 394, 406
 - locks and, 717, 723–725, 741
 - LOCKSIZE in, 204
 - LOGGED/NOT LOGGED in, 204
 - mass delete and, 201
 - MAXPARTITIONS in, 201, 204, 208, 209*t*
 - MAXROWS in, 204
 - MEMBER CLUSTER in, 209
 - NUMPARTS in, 201, 204, 208, 209*t*
 - offline, 471
 - ownership of, and privileges, 128*t*
 - page sizes in, 205, 205*t*
 - parameters for CREATE TABLESPACE in, 203–204
 - partitioned, iv, 150, 193, 196–200, 376–377, **377**, 812–813.
 - See also* partitioned table spaces, 196
 - partitioned tables and, 201
 - partitioning controlled by, 199–200, **199**, 200*t*
 - pending definition change and, 393
 - recovery and, 437, 455–456, 471
 - REORG and, 201, 210, 375–378, 389–394, **389**, **390**, **391**
 - restrictions start on, using ACCESS(FORCE), 430, **430**
 - segmented, 149, 193–196, 195*t*, **195**, 376
 - SEGSIZE in, 201, 204, 208, 209*t*, 209
 - simple, 149, 193, 194
 - statistics on, 434
 - storage groups in, 236–237, **236–237**
 - TRACKMOD in, 205, 209
 - type of, 208
 - universal, 150, 193, 200–202
 - USING STOGROUP in, 203
 - USING VCAT in, 203, 209
 - XML and, 150, 193, 203, 406
- TABLE_DCCSID, 755*t*
- TABLE_ENCODE, 755*t*
- TABLE_MCCSID, 755*t*
- TABLE_SCCSID, 755*t*
- TABLE_TYPE, 755*t*
- table-controlled partitioning, 199–200, **199**, 200*t*
- tables, ii–iii, 147–148, 256, 609
 - access paths and, 758–770
 - Advisory Reorg–Pending (AREO) status in, 189
 - aliases and, 148
 - altering, using ALTER TABLE, 155, 189–191, **191**, 392–393
 - auditing, 136, 137
 - auxiliary, 147, 186–188, **187–188**
 - base, 269
 - binding/rebinding and, 568
 - cache, 746–747
 - Cartesian joins and, 767–768
 - check constraints in, 178, 182–183, **183**
 - Check Pending (CHKP) status for, 182
 - clone, iii, 147, 151, 215–216, 463
 - column distribution, 802, 802–803*t*
 - columns in, 245
 - compression of, v, 6
 - constraints in, 178–183, 681–682. *See also* constraints
 - copying table definitions for, 188, **189**
 - correlation names in, 269–270, **269**
 - CREATE AUXILIARY TABLE for, 148
 - CREATE GLOBAL TEMPORARY TABLE for, 148
 - creating, using CREATE TABLE, 148, 153, 184–185, **184–186**
 - cursor, 87
 - data change, 316–317, **317**
 - DB2 for z/OS and, 5
 - declarative referential integrity in, 249
 - denormalization vs. joins in, 331–332
 - dependent, 179, 190
 - descriptions for, sample, 244–245
 - detailed cost, 790, 791–792*t*
 - dimension, 765
 - direct row access in, 761
 - DROP TABLE to remove, 191
 - exception, 464
 - EXPLAIN, 26
 - expressions in, 315–316, **315**
 - external table functions and, 696–697, **696**, **697**
 - fact, 765
 - filter, 789, 789–790*t*
 - foreign key constraints and, 181
 - FROM clause and, 147
 - function, 746
 - functions in, 275
 - hash access and, 761
 - hash spaces in, 150
 - hash, 220–221, 251
 - history, 148, 152
 - hybrid joins in, 764–765
 - IN-list direct table access for, 758

- indexes and. *See* indexes
- key target distribution, 803, 804–805*t*
- keys and, 149, 178–180
- limited partition scanning in, 760–761, **761**
- list prefetch in, 760
- loading data into, with INSERT, LOAD, DSN1 COPY, 185, 393
- loading/unloading data to, *iv*
- LOCK TABLE in, 586
- locks and, 717, 719–720, **720**, 723–725
- mapping, in REORG, 382–384, **383**, **384**
- Materialized Query Tables (MQTs). *See* Materialized Query Tables (MQTs)
- maximum columns and rows in, 184, 184*t*
- merge scan join in, 763–764
- Multidimensional Clustering (MDC), 12, 13, 16, 17
- nested loop joins in, 762–763
- nested table expressions in, 313–315, **313**, **314**, **315**
- NOT LOGGED, 458, 476
- null-supplying, in joins, 320
- OLD TABLE clause in, 316–317, **317**
- ownership of, and privileges, 126–127, 128*t*
- package, 87
- page range, 797, 797–798*t*
- parallel group, 784, 784–786*t*
- parallel task, 787, 787–789*t*
- parallelism usage and, 768
- parent-child relationships in, 249, 251
- partitioning of, 12, 16, 18, 717
- pending definition change and, 393
- permanent (base), 147
- permutation in, changing column order using SELECT in, 260, **260–261**
- physical organization of data in, 374
- plan, 746–748, 748–756*t*
- prefetching in, 760
- preserved row table, in joins, 320
- primary key constraints and, using CREATE TABLE, 180, **180**
- privileges for, 110*t*
- projection, projecting columns from table using SELECT for, 259–260, **259–260**
- queries and, 318, 800, 800–801*t*
- referential constraints in, 178–180, **179**
- relationships between, 251
- RENAME TABLE in, 184
- REORG and, 390, **390**, 392–393
- reorganization of, 12–15
- restriction, restricting rows from, using SELECT, 261–262, **261**, **262**
- result table/result set and, 257, 536
- SELECT in, to retrieve entire, 257–259, **257–258**, **259**
- sequential detection (dynamic prefetch) in, 760
- sequential prefetch in, 760
- size of, 5–6
- skeleton cursor, 87
- skeleton package, 87
- sort/SORT and, 761–762, 793, 793–794*t*
- sort key, 795, 795–796*t*
- SQL and, using DECLARE, 518–528, **519**
- SQL table function for, 695–696, **695**, **696**
- star joins in, 765–768
- statement, 746
- stored procedures and, 637
- structure, 782, 782–784*t*
- synonyms and, 148
- table space scan for, 758–759
- table spaces and. *See* table spaces
- temporal, *iii*, 5, 148, 151–152, 216–220, 463, 605–608
- temporary, *iii*, 147, 185, 586–591, 611, 639, 649. *See also* temporary tables
- transition, 676–677, **676**, **677**
- triggers and, 667, 670, 681–682
- unique constraints in, 178
- unique index check, 765
- universal, 717
- UNLOAD and, 372
- view reference, 798, 798–799*t*
- XML, 148
- TABLESPACE, 116*t*, 120*t*
- TABLESPACESET, 453
- TABNO, 749*t*
- TAPE, 72
- target database name, 85
- Task Center, DB2 and, 33–34
- Task Control Block (TCB), 46, 629, 837
- task tables, parallel, 787, 787–789*t*
- TBSBP16K, 64*t*
- TBSBP8K, 63*t*
- TBSBPOOL, 64*t*
- TBSBPXML, 64*t*
- TBSP32K, 64*t*
- TCP/IP, 3, 84, 85, 86
 - Application Transparent–Transport Layer Security (AT–TLS) and, 99
 - DB2 Connect and, 24
 - distributed data access and, 641, 643–646
 - High Availability Disaster Recovery (HADR) and, 11
 - Virtual IP Address (VIPA) and, 646
- TCPALVER, 64*t*
- TCPKALV, 64*t*
- Technical Library, DB2, 7
- TEMPLATE, 373, 445
- templates, for utilities, 70–73, **72**
- temporal tables, *iii*, 5, 148, 151–152, 216–220, 463, 605–608
 - application-period, 219, 605, 607–608, **607**, **608**
 - bi-, 219–220, **220**, 608
 - CREATE, 153
 - DELETE, 606, 607
 - period in, 216–217
 - queries to, 606
 - rows in, 606
 - system-period, 218, **218–219**, 605–607, **605–606**
 - UPDATE, 607, **607**

- versioning of data in, ADD VERSIONING and USE HISTORY, 217, 218
- temporary tables, iii, 147, 185, 586–591, 611, 639
 - accessing, with distributed data, 649, **649**
 - commit options for, 590–591, **591**
 - created (CTT), 587–588, **587**
 - creating, 588, **588**
 - DECLARE in, 590–591, **591**
 - declared (DTT), using DECLARE, 588–591, **589**
 - locks and locking in, 590
 - materializing, 588, **588**, 591
 - Multidimensional Online Analytical Processing (MOLAP) and, 589
 - ODBC and, 589
 - QUALIFIER BIND in, 590
 - Relational Online Analytical Processing (ROLAP) and, 589
 - SESSION qualifier for, 589–590
 - SQL and, 589
 - unsupported objects in, 590
 - VSAM and, 589
- TERM UTILITY, 68*t*
- Terminal Monitor Program (TMP), 44
- TERMINATE THREAD, 541
- third normal form (3NF), 241, **241**
- threads
 - ACCUMACC and ACCUMID in, 658
 - CMTSTAT and, 658
 - Database Access (DBATs), 658
 - DB2 inactive connection support and, 658
 - DISPLAY THREAD, 479–480, **480**, 658, **658**
 - distributed, 639
 - inactive, 657
 - pooled, vi, 658
 - temporary tables and, 590
 - Workload Manager (WLM) and, 629, 637
- three-part names, 647–649, **648**
- thresholds, performance, vi
 - CLASST threshold, 502
 - Data Manager Threshold (DMTH), 863
 - Deferred Write Threshold (DWQT), 860–861, 875, 877
 - GBPOOLT threshold, 502
 - Immediate Write Threshold (IWTH), 858, 863–864
 - Sequential Prefetch Threshold (SPTH), 863
 - Vertical Deferred Write Threshold (VDWQT), 875, 877
 - Virtual Pool Parallel Sequential Threshold (VPPSEQT), 860, 862
 - Virtual Pool Sysplex Parallel Sequential Threshold (VPXPSEQT), 862
- TIME, 64*t*, 156*t*, 165, 167–168, **167**, 190, 568
- Time-Sharing Option (TSO), 6, 37, 43, 97
 - access control and, 98
 - attachment facility and, 43–44, **44**
 - attachment, 41
 - call attachment facility and, 43, 45
 - commands/CLIST in, 65
 - DB2 and, relationship between, **44**
 - distributed data access and, 653–654
 - Interactive System Productivity Facility (ISPF) and, 47
 - interfacing with DB2 through, 47
 - locks and, 727, 728
 - Resource Recovery Services (RRS) and, 43, 45–46
 - traces and, 834
- TIMELEN, 64*t*
- timeouts, vi, 91, 586, 732–734, 732*t*
- timer, Sysplex Timer in, 492, 493, 492
- TIMESTAMP, 156*t*, 165, 166, 168, 568, 751*t*
- TIMESTAMP WITH/WITHOUT TIME ZONE, 165, 190
- TIMESTAMP_FORMAT, 168
- TIMESTAMP_ISO, 168
- TIMESTAMP_TZ, 168
- TIMESTAMPADD, 168
- TIMESTAMPDIFF, 168
- timestamps
 - row begin/end, 177
 - row change, 177, **177**
 - temporal tables and, 605–608. *See also* temporal tables
- Tivoli, 1, 2
- Tivoli OMEGAMON XE, 831, **832**, **833**
- Tivoli Storage Manager, 9
- Tivoli System Administration, 12
- Tivoli System Automation, 14–18
- TNAME, 749*t*, 756
- TO SAVEPOINT, 580, 582–585, **582–585**
- TOLOGPOINT, 460–462
- tools, ii
- top-down approach to design, 238
- topology check, 766
- tournament sort, 88
- TP Monitor, DB2 Connect and, 24
- TRACE, 113*t*, 118*t*, 119*t*
- traces, iv–vi, 142, 834–854
 - accounting type, 835–837, 840–842*t*
 - AUDIT TRACE and, 838
 - audit trace event classes in, 134, 134–135*t*
 - audit, 133–135, 134–135*t*, 838, 842*t*
 - classes of, 840, **840**
 - continuous performance monitoring and, 852–853
 - CREATE/ALTER TABLE and, 838
 - DB2, 834–839
 - detailed performance monitoring and, 853–854
 - details of, 134
 - DISPLAY TRACE and, 839
 - DSN1SDMP (IFC Selective Dump) and, 423
 - exception performance monitoring and, 854
 - Generalized Trace Facility (GTF) and, 834
 - Instrumentation Facility ID (IFCID) and, 834, 838, 839, 840–852*t*
 - Instrumentation Facility Interface (IFI) and, 837
 - invoking, 839–840
 - locks and, 740, 743
 - MODIFY TRACE and, 839
 - monitor type, 838–839, 843–844*t*
 - performance type, 837–838, 845–851*t*
 - periodic performance monitoring and, 853

- START TRACE and, 835, 837–838, **838**, 839, **840**
 starting/stopping, 136, **136**
 statistics and, 835
 statistics type, 851–852*t*
 STOP TRACE and, 839
 System Management Facility (SMF) and, 834
 Task Control Block (TCB) and, 837
 triggers for, 680
- Tracker Site recovery, 473–474, **473**
- TRACKMOD, 205, 209, 446
- TRACSTR, 64*t*
- TRACTBL, 64*t*
- transaction boundaries, *ii*
- transaction start ID columns, 177–178
- transition tables, triggers and, 676–677, **676**, **677**
- transition variables, triggers and, 675–676, **675**
- Transmission Control Protocol/Internet Protocol. *See* TCP/IP
- trigger packages, binding/rebinding and, 561
- TRIGGER, 110*t*, 116*t*, 120*t*, 121*t*
- triggers, *iii–iv*, 667–684, 713, 714
 activation (firing) of, 668–669
 after, 669, 671–672, **671–672**
 ALTER for, 155
 before, 669, 672–673, **672–673**
 binding/rebinding and, 576
 cascading activation of, 669
 CASE with, 671, **671**
 catalog information about, in SYSTRIGGERS, 681, **681**
 combinations of, 677–678, 677–678*t*
 creating, using CREATE TRIGGER, 153, 669–671, **671**
 data conditioning with, 668
 data integrity and, 668
 data validation and, 668
 DELETE as, 667, 668
 deleting packages of, using DROP TRIGGER, 678, 684
 DML statements and, execution of, 683–684
 dropping, with DROP TRIGGER, 678, 684
 granularity of statements and, 674
 INSERT as, 667, 668
 INSTEAD OF, 667, 669, 673–674, **673**, **674**, 684
 invalidation of, using SIGNAL SQLSTATE or RAISE_
 ERROR, 679
 LOAD and, 667
 MERGE as, 667
 monitoring of, 680–681
 order of execution of, 667–668, 670
 outside a database use of, 682
 ownership of, 127
 packages of, with REBIND TRIGGER PACKAGE, 678
 performance issues and, 669, 680
 qualifier for, with QUALIFIER, 678
 REFERENCING clause and, 675–676, **675**
 referential integrity and, 680, 682
 rollbacks and, 679
 row, using FOR EACH ROW in, 674
 statement, using FOR EACH STATEMENT in, 674, **675**
 storage of, in SYSPACKAGE and SYSTRIGGERS, 668
 stored procedures and, 682, 683, **683**
 table check constraints vs., 681–682
 tables and, 667, 670
 temporary tables and, 590
 text of, 681, **681**
 transition tables and, 676–677, **676**, **677**
 transition variables and, 675–676, **675**
 types of, **670**
 UPDATE as, 667, 668
 user-defined functions and, 682–683, **682**, **683**
 uses for, 668
 violations of, 670–671
- TRKRSITE, 64*t*
- TRUE/FALSE, 261
- TRUNCATE, 293, 294, **295**, 653
- trust attributes, 107–108*t*
- trusted connections, 106
- trusted contexts, *v*, 6, 105–108, 142
 ALTER, 155
 attributes of, 107, 107–108*t*
 client applications supporting, 106
 CREATE, 153
 defining, 107–108, 107–108*t*
 ownership of, 127, 128*t*, 130
 performing tasks on behalf of others in, 108–109, **109**
 ROLE AS OBJECT OWNER in, 106–107
 roles in, 102, 105–107
 SERVAUTH and, 105
 SYSADM or SECADM authority for, 105
 trusted connections in, 106
- TSLOCKMODE, 735, 738, 751*t*
- TSO. *See* Time-Sharing Option (TSO)
- TSO attachment facility, 41
- TSQTY, 64*t*
- TSTAMP, 64*t*
- tuning CPU, *v*
- tuning distributed applications, 659
- tuning. *See* performance and tuning
- two-phase commit and, 653–654
- TWOACTV, 64*t*
- TWOARCH, 64*t*
- TWOBSDS, 64*t*
- U**
- UPDATE, 104, 192–193, 599
- UDT. *See* user-defined data type
- UGCCSID, 64*t*
- UIFCIDS, 64*t*
- UMCCSID, 64*t*
- uncommitted read, 726
- undo records, 439
- Unicode, 164, 171, 268, 273, 366
- Unified Debugger, 635
- UNION_COLNAME_7, 64*t*
- unions/UNION/UNION ALL, 257, 308–311, **310**, **311**, 762
- UNIQUE, 223, 581–582, **581**
- unique constraints, 178, 253

- unique index, 226–227
- unique index check, 765
- unique key, 248, 227, 246
- unique where not null indexes, 227
- Unit of Recovery (UR), 438–439, 580
 - postponed, with RECOVER POSTPONED and LBACKOUT, 478–479, **478**, **479**
- Unit of Recovery ID (URID), 422
- Unit of Work (UOW), 438–439, 578, 579, 623–625
- UNIT/UNIT2, 64*t*
- units of work (UOW), 586
- Universal Language Interface attachment facility, 41, 42, 46
- universal table, 717
- universal table space, 150, 193, 200–202
- UNIX, 1–3, 6, 9–19
 - Data Studio, Optim Data Studio and, 27
 - DB2 Connect and, 22–25
 - Optim Database Administrator for, 27–28
 - Optim pureQuery Runtime and, 29
 - Optim Query Tuner and, 29–30
 - performance and, 853
 - Resource Recovery Services attachment facility (RRSAF) and, 45–46
- UNIX System Services, 6
- UNKNOWN, 261
- Unlimited Edition for System i, DB2 Connect, 23, 25
- Unlimited Edition for System z, DB2 Connect, 23, 24
- UNLOAD, 355, 371–374, **372**, **705**
 - Basic Sequential Access Method (BSAM) and, 371
 - delimited (COLDEL, CHARDEL, DECPT options), 372–373
 - DSNTIAUL vs., 371
 - FlashCopy and, 371
 - large objects (LOBs) and, 373, **373**
 - locks and, 720
 - parallelism and, 373
 - REORG and, 376, 381, 384, 387–388, **388**
 - source of data for, 371
 - SYSPUNCH in, 372
 - TEMPLATE and, 373
 - UTILINIT in, 372
 - UTILTERM in, 372
 - XML data and, 373, **373**
- UNLOCK, 502
- unqualified names, ownership of, 129–130
- unqualified objects
 - binding/rebinding and, 572
 - ownership of, 125–126
- UPDATE, ii, 110*t*, 116*t*, 117*t*, 118*t*, 120*t*, 121*t*, 122*t*, 128*t*, 135*t*, 255, 290–292, **291**, **292**, 299, 474
 - access paths and, 758, 761
 - catalog, 399, **399**
 - check constraints and, 182–183
 - constraints and, 291
 - coordinating updates to distributed data with, 653
 - data change tables and, 316–317, **317**
 - EXPLAIN and, 746
 - foreign key constraints and, 182
 - identity columns and, 597–598
 - indexes and, 149
 - labeled duration with, 291
 - large amounts of data for, 292
 - locks and, 718, 720, 721, 724
 - MERGE and, 292
 - multi-row FETCH in, 594, **594**
 - ODBC and, 549
 - optimistic locking and, 604, **604**
 - positioned update using, 291, 539–540, **540**, 543
 - referential constraints and, 180
 - resource limit facility (governor) and, 834
 - row fullselect and, 292
 - scalar-fullselect and, 257
 - searched updates using, 291
 - SELECT and, 291–292, **292**
 - SET clause and, 292, 527, **527**
 - temporal tables and, 607, **607**
 - temporary tables and, 587, 590
 - triggers and, 667, 668
 - views and, 148, 211, 295, 296, 297
 - WHERE clause and, 291
- Update (U) locks, 722, 724, 727
- UPDATE COLUMN, 536–537, **536**, **537**
- updated pages, 856
- upgrades, vi
 - On/Off Capacity Upgrade on Demand, 7
- URCHKTH, 64*t*, 478, 730*t*
- URLGWTH, 64*t*, 478, 730*t*
- USA date/time format, 167*t*, 168*t*
- usage privileges, 113*t*
- USAGE, 117*t*, 120*t*, 122*t*, 689
- USAGE ON DISTINCT TYPE, 113*t*
- USAGE ON JAR, 113*t*
- USAGE ON SEQUENCE, 113*t*
- USCCSID, 64*t*
- USE HISTORY, 217, 218
- USE OF BUFFERPOOL, 113*t*
- USE OF STOGROUP, 113*t*
- USE OF TABLESPACE, 113*t*
- user-defined data type (UDT), ii–iii, 155, 169–170, 686–689
 - ALTER and, 686
 - built-in functions for, using CREATE FUNCTION, 689, **689**
 - casting of, 687–688, **688**
 - catalog information on, 689
 - comparison operators for, 687
 - CREATE, 686
 - CURRENT SCHEMA and, 686
 - defining, using CREATE TYPE, 686–687, **686**
 - large objects (LOBs) and, 706–707, **707**
 - privileges with, 689
- user-defined functions (UDFs), iv, 275, 684, 685, 689–703, 712, 714
 - binding/rebinding and, 568
 - C/C++, COBOL, Java, PL/1 and, 690

- catalog information on, 703, **703**
- controlling, with START FUNCTION SPECIFIC, 701–702, **701**
- cost information on, 703
- creating, using CREATE FUNCTION, 153, 690–693, **691**, **693**
- Database Request Module (DBRM) and, 690
- defining, 697
- deterministic, 697
- displaying statistics about, using DISPLAY FUNCTION SPECIFIC, 702, **702**
- EXPLAIN and, 746
- external, 690
- external execution of, 701
- external scalar, 690–692, **691**
- external table, using FROM and SELECT, 696–697, **696**, **697**
- Instrument Facility Interface (IFI) and, 690
- invoking, 697–700, **697**, **698**, **699**, **700**
- monitoring of, 701–702
- non-deterministic, 697
- non-inline SQL scalar, 693–695, **694–695**
- overloading in, 700
- ownership of, and privileges, 127, 128*t*
- parameter passing in, 691–692
- polymorphism and, 700–701, **700–701**
- queries and, 697
- RETURNS clause in, 693, 695
- sourced, 690, 692–693, **693**
- SQL and, 690
- SQL scalar, 693–695, **693**, **694–695**
- SQL table functions in, 695–696, **695**, **696**
- SQLSTATE and, 692
- starting, with START FUNCTION, 701
- statistics used by, in SYSSTAT, 702
- stopping, using STOP FUNCTION SPECIFIC, 702, **702**
- storing code of, 694
- triggers and, 682–683, **682**, **683**
- Workload Manager (WLM) and, 701
- USERNAMES, 85, 644, 665
- USING STOGROUP, 203, 223
- USING VCAT, 203, 209, 223
- UTF-8/UTF-16, 171
- UTILINIT, 357, 372, 376, 388
- utilities, iv, vi, 37, 40, 69–73, 91, 97, 419–424, 432, 482
 - activities performed by, 69
 - address spaces for, 41
 - CLIST command and, 70
 - concurrency, claims and drains for, 731–732, 731*t*
 - Control Center execution of, 70
 - DASD and, 72
 - data sharing and, 507–508
 - DB2 Interactive (DB2I) and, 47
 - DB2I execution of, 69, **69**
 - Display Utility dialog for, 70
 - displaying, using DISPLAY UTILITY, 73, **73**, 423–424, **424**
 - DSN1CHKR, 420
 - DSN1COMP, 420–421, **421**
 - DSN1COPY, 421–422
 - DSN1LOGP, 422
 - DSN1PRNT, 423
 - DSN1SDMP (IFC Selective Dump), 423
 - DSNJLOGF (Preformat Active Log), 419
 - DSNJU003 (Change Log Inventory), 419, 440, 441, 465, 475
 - DSNJU004 (Print Log Map), 419–420, 419, 441, 470–471, 647
 - DSNU command to execute, 70
 - DSNUTILU to execute, 70–71, **71**
 - executing, 69–73
 - IDs for, 70
 - OPTIONS control statement for, 71, **72**
 - performance of, v
 - PERMIT, 97, **97**
 - PREVIEW of, 72–73
 - REPAIR utility and, 72
 - standalone, attachment facilities for, 41
 - TAPE and, 72
 - templates for, 70, 71–73, **72**
 - utility mode, image copies and, 449
 - UTILS_DUMP_CLASS_NAME, 64*t*
 - UTILS_TEMP_STORCLAS, 64*t*
 - UTILTERM, 357, 372, 376, 388
 - UTIMOUT, 64*t*
 - UTSORTAL, 65*t*
- V**
- VALIDATE, 137*t*, 139*t*, 565*t*, 573
- validation, 668
- VALUE function, 330
- VALUES/VALUES INTO, 223, 288, 599
- VARBINARY, 159, 162, 172*t*, 190, 568
- VARCHAR, 159, 160–161, 171, 172*t*, 190
 - binding/rebinding and, 568
- VARGRAPHIC, 159, 160, 171, 190, 568
- variables
 - file reference, 704–705
 - host, declaring, 520–521, **521**
 - indicator, 521–522, **522**
 - transition type, triggers and, 675–676, **675**
- VARIANCE, 277
- VARY WLM, 631–632, **631**, **632**
- varying-length binary string. *See* VARBINARY
- varying-length character. *See* VARCHAR
- vector functions. *See* column functions
- VERSION, 751*t*
- versioning, 217, 218, 559
- Vertical Deferred Write Threshold (VDWQT), 875, 877
- view reference tables, 798, 798–799*t*
- views, ii–iii, 148, 210–213, 256, 295–297, **296**, **297**, 299
 - access control and 131, **131**
 - ALTER for, 155
 - authority for creating, 110

- binding/rebinding of, 568
 - classification of, 295–297
 - creating, using CREATE VIEW, 153, **131**, 210, **211**
 - deleting, using DELETE, 148, 211, 295, 296
 - DISTINCT clause and, 212, 295, 296
 - FOR FETCH ONLY/FOR READ ONLY and, 297
 - FROM clause and, 212, 295, 296
 - GROUP BY clause and, 212, 295
 - HAVING clause and, 212, 295
 - inline, 313
 - INSERT and, 148, 211, 295, 296, 297
 - Materialized Query Tables (MQT) and, 11
 - modifying, 213
 - nested table expressions (inline views) in, 313–315, **313**, **314**, **315**
 - nested, definitions for, 212
 - non-read-only, 295, 296–297
 - ownership of, and privileges, 126–127, 128*t*
 - read-only, 212–213, 295–296, 299
 - removing, using DROP VIEW, 213, **213**
 - SELECT and, 211, 295
 - SQL and, using DECLARE, 518–528, **519**
 - subqueries and, 212
 - updating, using UPDATE, 148, 211, 295, 296, 297
 - WITH CHECK OPTION in, 211–212, **212**
 - virtual buffer pools, 515, 856–857
 - Virtual IP Address (VIPA), 646
 - Virtual Pool Parallel Sequential Threshold (VPPSEQT), 860, 862
 - Virtual Pool Sysplex Parallel Sequential Threshold (VPXPSEQT), 862
 - Virtual Storage Access Method (VSAM), 150
 - DSNICOPY and, 421–422
 - DSN1PRNT and, 423
 - DSNJLOGF (Preformat Active Log), 419
 - DSNJU003 (Change Log Inventory) and, 419, 475
 - index spaces and, 150
 - stored procedures and, 615
 - temporary tables and, 587–588, **587**, 589
 - virtual storage, *v*
 - Virtual Terminal Access Method (VTAM), 85, 86, 643, 644, 645
 - Visual Basic, DB2 Connect and, 25
 - Visual Explain, 26–27, 685
 - Visual Studio, DB2 Connect and, 25
 - VM Data Space Support (VMDSS), 3, 4, 8
 - VOL-SER numbers, recovery and, 459
 - VOLTDEVT, 65*t*
 - VPPSEQT. *See* Virtual Pool Parallel Sequential Threshold (VPPSEQT)
 - VPXPSEQT. *See* Virtual Pool Sysplex Parallel Sequential Threshold (VPXPSEQT)
 - VSAM. *See* Virtual Storage Access Method
 - VSE/VM, 2, 3, 7–8, 19, 24
- V**
- wait time, *vi*
 - warehousing. *See* data warehousing
 - Web services, 7
 - WebSphere, 1, 7, 11, 853
 - WebSphere Application Server, 2, 106
 - WebSphere Information Integrator, 25
 - WebSphere MQ, 24
 - WebSphere Studio, 25
 - WEEK, 167
 - WEEK_ISO, 167
 - WEPR, 429*t*
 - WFDBSEP, 65*t*
 - WHEN_OPTIMIZE, 753*t*
 - WHERE, 257–261, 264, 268, 273–274, 276, 291, 294, 343, 354, 520, 824
 - CASE expression in, 334–335, **334**, **335**
 - joins and, 323–325, **324**, **325**
 - subqueries and, 307
 - WHERE CURRENT, 537
 - WHILE, 634
 - wildcard characters, 280–281
 - Windows. *See* Microsoft Windows
 - WITH, 724
 - WITH CHECK OPTION, 211–212, **212**
 - WITH CONTINUE, 706, 710–711
 - WITH DEFAULT, 289
 - WITH GRANT OPTION, 124, **125**
 - WITH HOLD, 541, 552, 554, 587, 731, 830, 837
 - WITH ISOLATION, 725
 - WITH RETURN, 621, 622, **622**
 - WLM. *See* Workload Manager (WLM) and workload management
 - WLM_REFRESH, 636
 - WLM_SET_CLIENT_INFO, 636
 - WLMENV, 65*t*
 - work files
 - data sharing and, 494
 - overflow of, in RID pool, 867
 - Workgroup Server Edition, DB2, 4, 36, 242
 - Workgroup, DB2, 15. *See also* DB2 for Linux, UNIX, and Windows (LUW)
 - Workload Manager (WLM) and workload management, *vi*, 6, 12, 16, 18, 629–632
 - address spaces within, 41, 629
 - ASUTIME parameter in, 630
 - CALL statement for stored procedures and, 629
 - data sharing and, 506
 - DB2 for z/OS and, 5, 6
 - DB2 for Linux, UNIX, Windows (LUW) and, 12
 - DB2 Governor and, 12
 - diagnostic information in, using CEEDUMP, 632
 - distributed data access and, 655, **656**
 - DSNRLI interface and, 629
 - Job Control Language (JCL) and, 629, 630
 - managing environments in, using VARY WLM, 631–632, **631**, **632**
 - NUMTCB and, 639
 - Optim Query Workload Tuner, 26

- program type and, 631, **631**
 - Query Patroller and, 12
 - Recoverable Resource Manager Services Attachment Facility (RRSAF) and, 629
 - REFRESH in, 632
 - REXX and, 630
 - stored procedures and, 616, 625, 628–632, 637
 - Task Control Blocks (TCBs) and, 629
 - thread management in, 629, 637, 639
 - user-defined functions (UDFs) and, 701
- WRITE, 135*t*
- writes, 860–861
- X**
- XCF. *See* Cross System Coupling Facility (XCF)
 - XDBDECOMPXML, 341
 - XES. *See* Cross System Extended Service (XES)
 - XLKUPDLT, 730*t*
 - XLKUPDT, 65*t*
 - XML, ii–iii, 1, 3, 14, 156*t*, 169, 172, 172*t*, 179, 352, 354, 467, 684, 707–711. *See also* PureXML
 - Auxiliary Warning (AUXW) status in, 472
 - C/C++, COBOL, PL/1 and, 710
 - CHECK DATA and, 412–413, **413**
 - CREATE/ALTER TABLE and, 709, **709**
 - DB2 for z/OS and, 4, 242
 - decomposition and, 341
 - Document Type Definition (DTD) and, 708
 - functions and, 275
 - indexes and, 231–232, **232**
 - INSERT and, 341
 - inserting and loading, using LOAD, 709
 - large objects (LOBs) and, 710
 - locks and, 719
 - Net Search Extender and, 8–9, 13–17
 - Optim Development Studio and, 28–29
 - point-in-time recovery and, 472
 - reads/reading in, 710
 - recovery and, 472
 - shredding and, 341
 - stored procedures and, 635, 708
 - streaming of, using FETCH WITH CONTINUE, 710–711
 - table spaces and. *See* XML table spaces
 - UNLOAD and, 373, **373**
 - updating, using XMLMODIFY, 709–710, **710**
 - validation of schema in, automatic vs. manual, 708–709, **709**
 - XML Schema Definition (XSD) and, 708
 - XML Schema Definition (XSD), 708
 - XML tables/table spaces, 148, 193, 150, 203
 - recovery of, 458
 - statistics and REORG in, 406
 - XMLEXISTS, 340–341, **340**, 346
 - XMLMODIFY, 709–710, **710**
 - XMLQUERY, 336–341, 352, 354
 - XMLVALA/XMLVALS, 65*t*
 - XPath expressions, 337–341, 352
 - XQuery, ii, 26–29, 340–341, 354
 - Optim Data Studio and, 27
 - Optim Development Studio and, 28–29, 28
 - XSR_XXX stored procedures, 636
- Y**
- YEAR, 167
- Z**
- z/OS, 2–6, 19, 37, 38
 - commands, IRLM, 65
 - console for, 93
 - DB2 Connect and, 22–25
 - Optim Development Studio and, 28–29
 - Optim pureQuery Runtime and, 29
 - ZOSMETRICS, 65*t*