Index

Boldface numbers indicate illustrations and tables.

Access control, 76 ALTER TABLE and, 323 ACCESSCTRL, 81, 90 Actionable compression, 10, 63, 164 Activation time for triggers, 337 Adaptive compression, 10 Add-on products for DB2, 35, 48–51 ADMIN_CMD, 17 ADMIN_MOVE_TABLE (), 7 Administrative views, 7 ADO, 142 ADO.NET, 15, 142 Advanced Copy Services (ACS), 10, 40 Advanced Database Administrator. See IBM Certified Advanced Database Administrator, DB2 10.1 Advanced recovery, 48, 50 AFTER trigger, 126, 337, 341, 342–343 AIX, 36, 38, 43, 76 Aliases, 14, 117, 123–124 ALL clause, SELECT, 180, 184 ALTER, 87 nicknames and, 88 tables and, 85 ALTER INDEX, 336–337 compression and, 163–164	locks and, 364–366, 373 ALTERIN, 84 Ambiguous cursors, 231 Analytics, 4, 9 ANALYTICS, 59–60 Analyze, 11 ANY clause SELECT and, 184 Apache, 41 Application developer. See IBM Certified Application Developer, DB2 9.7 Application period, 160 Application-period tables, 3 Application-period temporal tables, 161 SELECT and, 236 Approximate Huffman encoding, 10, 63, 63, 164 Arithmetic expressions, XML, 241 ARRAY, 71 label-based access control (LBAC) and, 103 Arrays, 17 Assembler, 130, 250 Assignment statements, 16 ASYNC mode, 57 ATTACH/DETACH PARTITION, 153 Audit, 8, 13, 43
tables and, 85	ATTACH/DETACH PARTITION, 153

Distributed Computing Environment (DCE) Security	workload privileges, 89
Services in, 77	XML schema repository (XSR) objects, 89
GSS_SERVER_ENCRYPT, 79	Authorization ID privilege, 84
GSSPLUGIN, 79	Authorization levels, 75
KERBEROS, 78	Auto-monitoring, 7
KRB_SERVER_ENCRYPT, 78–79	Automatic maintenance, 42
location for, 77–79	Automatic storage, 7, 42
passwords in, 77	Automatic storage (AS) table space, 134
SERVER, 78	
SERVER_ENCRYPT, 78	Autonomic features, 9, 42–43
user IDs in, 77	Availability
Authorities and privileges, 2, 5, 8, 14, 75, 79–97	pureScale and, 56
ACCESSCTRL, 81	workload management and, 52
administrative, 80	
authorization ID privilege in, 84	В
DATAACCESS, 82	Backup and recovery, 7, 12, 41, 43, 45. See also high
database privileges in, 82-83	availability disaster recovery (HADR),
DBADM, 81	Advanced Recovery feature for, 50
explicitly granting, 90	High-Performance Unload for, 50
granting, 89–94	Merge Backup for, 50
implicitly granting, 89–90	Recovery Expert for, 50
indexes, 86	Backup compression, 10, 39
indirectly granting, 90	Base tables, 119, 152, 267, 324, 324–326
LBAC and, 80-81	temporary tables vs., 324–326
nicknames, 88	
object privileges in, 82-83	BEFORE triggers, 126, 337, 341–342
packages, 87	BETWEEN, 152
RCAC and, 80–81	SELECT and, 183, 187–188
REVOKE and revoking, 94–97	BIGINT, 124, 269, 304
roles and, 92–93	Binary large object (BLOB), 274, 305
routines, 87	BIND, packages, 87
schema privileges in, 84	BINDADD, 83
SECADM, 81, 82	Binder, 131
separation of management and security-related tasks	Binding/rebinding, 15, 83, 131
in, 82	deferred, 131
sequence privileges and, 86–87	Bitemporal (time-travel) tables, 3, 161
server, 87–88	SELECT and, 237
SQLADM, 82	Blink Ultra, 57–58
SYSADM, 80, 82	BLOBs, 274, 305
SYSCTRL, 80	BLU Acceleration, 4, 9–10, 35, 43, 45, 48, 49, 57–68
SYSMAINT, 80–81	Blink Ultra project and, 57–58
SYSMON, 81	column organized tables and column store in, 61–62
table privileges in, 85	62 , 68
table space privilege in, 84	compression in, 62–64, 63
variables, 89	configuring for, using db2set and WORKLOAD
view privileges in, 85–86	ANALYTICS, 59–60
WLMADM, 82	data skipping in, 67

design principles of, 58–67	CATALOG/UNCATALOG TCPIP NODE, 145–147
encoding in, 62–64, 63	Cataloging/uncataloging
IBM Smart Analytics Optimizer for DB2 for z/OS and, 58	database and CATALOG/UNCATALOG DATABASE, 142–145
implementation and use of, 58-60	DCS database, CATALOG/UNCATALOG DCS
Informix Warehouse accelerator and, 58	DATABASE and, 147-148
memory caching in, 66-67	nodes, CATALOG/UNCATALOG TCPIP NODE,
online transaction processing (OLTP) and, 68	145–147
parallel vector processing in, 64-65, 65	Cells, 119
parallelism in, 65–66	Certificate of completion, 32–33
query performance in, 59	Certification process, 18–33
REORG and, 59	arranging to take exams in, 20–22
RUNSTATS and, 59	certificate for, 32–33
shadow tables and, 159	cost of exams for, 22
single instruction multiple data (SIMD) processing in,	Fulfillment ID and Validation Number in, 32
64–65, 65	identification needed to take exams in, 22
transaction processing in, 66–67	information required for registration in, 21
use of, 68	objectives of exams in, 20
Boundaries, transaction, 256	pass and fail in, 31
Buffer pools, 12, 131–132	preparing for the exams, in, 18–20
transaction management and, 256	previous exams taken and, 22
Built-in functions, 14, 69, 165	sample questions and practice exams for, 20
Business Application Continuity, 43, 45, 48, 49	score report for, 31, 32
Business time, 160	taking the exams, 22–33
	Chaining, 124
С	Change Data Capture (CDC), 46
	Change transaction, 366–367, 367
C/C++, 130, 250	CHAR VARYING, 271, 305. See also VARCHAR
Cache memory, 82	CHAR/CHARACTER, 71, 265, 271, 305
BLU Acceleration and, 66–67	Character data string data types, 270–272
CALL, 339	CHAR/CHARACTER, 271, 305
stored procedures and, 253–256	fixed length, 270–271
Call Level Interface (CLI)	fixed-length double-byte (DBCS), 271, 305
connectivity and, 151	GRAPHIC, 271, 305
isolation levels and, 359	large object (CLOB), 274
Call Level Interface/Open Database Connectivity (CLI/ODBC), 15	multibyte-byte character set (MBCS) and, 274 national fixed-length, 271–272, 305
Cartesian products, join operations, 211–212	national varying-length, 272
CASCADED CHECK OPTION, 330–331, 331 , 332	NCHAR/NVARCHAR, 272
CASE expressions, SELECT, 207–211	single-byte character set (SBCS) and, 274
CAST, 266	Unicode and, 271–272
Cast expressions, XML, 241	VARCHAR/CHAR VARYING/CHARACTER
Casting, in data types, 69	VARYING, 271, 305
Catalog See System catalog	VARGRAPHIC, 271, 305
Catalog. See System catalog CATALOG/UNCATALOG DATABASE, 140–141,	VARGRAPHIC, 271, 305 varying-length double-byte, 271, 305

Character large object (CLOB), 265, 274, 305 Compatibility of locks, 373, 374 CHARACTER VARYING, 271, 305. See also VARCHAR Compatibility, Oracle data types, 276 CHARVAR, 271, 305 Compatibility, SQL, 39, 165, 263-266 CHECK, 3, 7, 267, 277, 282-283, 283 extended row size support, 264-265 CREATE TABLE and, 304, 306, 309 NULL index keys and, 265 string unit attributes and, 265-266 Check conditions, 283 Compression, 7, 10, 12, 39, 162-164 CHECK OPTION, 328-331 329, 331, 332 actionable, 10, 63, 164 Child table/row, referential integrity constraints, 285, 286 adaptive row, 163 CLIENT authentication, 78 approximate Huffman encoding and, 10. 63, 63, 164 CLOBs, 265, 274, 305 BLU Acceleration and, 62-64, 63 Cluster Caching Facility (CF), 55 CREATE/ALTER INDEX and, 163-164 Cluster Services (CS), 55 row, 163 Clustering, 123 static, 163 indexes and, 335 Concurrency, 256, 345-380. See also Transactions and insert time clustering tables (ICT), 119, 158 transaction management multidimensional clustering (MDC) tables, 12, 44, 53, consistency of data and, 346 59, 119, 154-158, **155**, **156**, **157** currently committed (CC) semantics and, 368-373, 368 range-clustered tables (RCT) and, 12, 119, 154, isolation levels and, 345, 347-360. See also Isolation 264-265 COBOL, 130, 250 locks and locking in, 345, 347, 360–380, **360**. See also Codd, Edgar Frank (Ted), 36 Locks and Locking CODEUNITS16, string unit attributes, 266 transactions and, 347 CODEUNITS32, string unit attributes, 266 Conditional expressions, XML, 241 Column data size, 10 Configuration, 9, 43 Column masks, 100-101 Configuration Manager, 47 Column-organized tables, 10, 45, 61-62, 62, 68 CONNECT, 83 db2convert and, 69 CONNECT BY PRIOR, 71 Column Table Queue (CTQ), 10 Connection concentrator, 44 Column-level LBAC, 108-109 Connectivity, 8, 83, 144 Columnar Data Engine (CDE), 10 Call Level Interface (CLI) and, 151 Columns, 119 Command Line Processor (CLP) and, 151 CONNECT and, 148-151 Command Line Processor (CLP) Database Connection Services (DCS), 142 connectivity and, 151 dormant connections and, 151 isolation levels and, 359 Open Database Connectivity (ODBC) and, 151 SQL and, 166 SET CONNECTION, 150, 150 COMMIT, 5, 14, 256-260, 257, 258, 259 type 1 and type 2, 115, 150–151, **150** isolation levels and, 350 Consistency of data, 346 locks and, 360 Constraints, 3, 7, 15, 267, 277–302 Common table expressions, 205-207 CHECK, 277, 282-283, 283, 304 Comparison expressions, XML, 241 default, 277, 278-280, 280 Comparison functions, 127 informational, 277, 301-302, 302, 308, 309 Comparison operators, 184-186. See also Relational NOT NULL, 277, 278, 279, 282, 308 predicates and WHERE primary key and UNIQUE, 282 Compatibility features in DB2 10.5, 69-73

enabling, 72-73

referential integrity, 277, 283–301, 284 , 304, 307, 309.	CREATE TRIGGER, 17, 337–344
See also Referential integrity	CREATE TRUSTED CONTEXT, 111
table check, 282–283. <i>See also</i> CHECK UNIQUE, 277, 280–282, 281 , 304, 306, 309	CREATE VIEW, 327–328
	WITH CHECK OPTION, 7
Constructor expressions, XML, 241	CREATE_EXERNAL_ROUTINE, 83
Containers, in table spaces, 132	CREATE_NOT_FENCED_ROUTINE, 83
Continuous data ingest (CDI), 46	CREATE_SECURE_OBJECT, 83
CONTROL, 90	Created global temporary tables, 162, 324
indexes and, 86–87	CREATETAB, 83
nicknames and, 88	CREATIN, 84
packages and, 87 tables and, 85	CUBE, GROUP BY, 197–199
views and, 85	Currently committed (CC) semantics, 368-373. See
Control statements, 16	also Concurrency; Transactions and transaction
	management
Control structures, 130	enabling, 372
Core-friendly parellelism in BLU, 65–66	overriding, 372–373
Cost of certification exams, 22	CURRVAL, 70
Crash recover, 7	Cursor scope, 14
CREATE DATABASE, 136–139	Cursor stability (CS) isolation level, 3, 6, 349, 353–354,
CREATE EVENT MONITOR, 82	355
CREATE FUNCTION, 17, 244–248, 252	Cursor-controlled transaction, 366–367, 367
CREATE INDEX, 265, 333	Cursors, 16
compression and, 163–164	ambiguous, 231
CREATE MASK, 100–101	DECLARE CURSOR and, 231–232
CREATE PERMISSION, row and column access control	FETCH and, 232
(RCAC), 98–99	insensitive, 72
CREATE PROCEDURE, 16, 251–253	read-only, 231
CREATE ROLE, 92	results and results sets using, 231–232
CREATE SECURITY LABEL, 106	updatable, 231
CREATE SECURITY LABEL COMPONENT, 103–104	
CREATE SECURITY POLICY, 105	D
CREATE TABLE, 264, 303–321	Data Architect, 47
CHECK constraint in, 304, 306, 309	Data concurrency. See Concurrency
compression and, 163	Data constraints. See Constraints
data type definitions in, built-in, 304-306	Data Control Language (DCL), 3, 5, 166
examples of, 315–321	Data Definition Language (DDL), 3, 5, 47, 88, 115, 166
identity columns and, 310–313	Data dictionaries, 72
informational constraint in, 308, 309	Data encryption key (DEK), 113
LIKE and, 313–314	Data Manipulation Language (DML), 3, 5, 88, 166,
NOT NULL constraint in, 308	167–237. See also DELETE, INSERT, SELECT,
referential integrity constraint and, 304, 307, 309–310	UPDATE
schemas and, 314–315	XML and, 237–243
similar tables, with LIKE, 313–314	Data objects, 117–131
syntax of, 303–304	Data Partitioning Feature (DPF), 12, 46, 53–54, 54
UNIQUE constraint in, 304, 306, 309	Data skinning 10, 67

Data Studio, 7, 9, 12, 17, 38–39, 140	DATE and dates, 272–273, 272 , 276, 305
indexes and, 123	DB2 10.1 Advanced Database Admin for LUW (Exam
SQL and, 166	614), 13
Data types, 3, 5, 14, 127–128, 265–266, 267, 268–277. See	DB2 10.1 DBA for LUW (Exam 611), 8, 11, 13, 19
also specific data types	DB2 10.1 Fundamentals (Exam 610), 8, 11, 13, 15, 17
ARRAY, 71	DB2 10.5 compatibility features, 69-73
CREATE TABLE and, 304–306	DB2 10.5 DBA for LUW Upgrade (Exam 311), 11
built-in, 304	DB2 10.5 Fundamentals for LUW (Exam 615), 8, 11, 13,
distinct, 127, 277	20, 35, 75, 115, 165, 267, 345
implicit casting in, 69	DB2 9 Family Fundamentals (Exam 730), 8, 11, 13, 15, 17
Oracle, compatibility of, 276	DB2 9.7 Application Development (Exam 543), 15
reference/referenced types and, 162	DB2 9.7 certification roles, 14–17
sequences and, 124–125 string unit attributes and, 265–266	DB2 9.7 SQL Procedure Developer (Exam 545), 17
structured, 127–128, 277	DB2 Advanced Enterprise Server Edition (AESE), 37, 48
sub, 128	DB2 Advanced Workgroup Server Edition (AWSE), 37,
super, 128	45–47
typed tables and, 162	DB2 CLI, 142
Unicode and, 266	DB2 Connect, 46, 144
user-defined. See User-defined data types	DB2 Enterprise Server Edition (ESE), 37, 38, 44–45
weak typing in, 69	DB2 Express Server Edition, 37, 40–42
XML, 275–276	DB2 Express-C, 37, 38–40
Data warehouse, 2, 4, 35, 51	DB2 Family of products, 36–48
DATA_ENCRYPT authentication, 78	DB2 for Common Servers, 36
DATA_ENCRYPT_CMP authentication, 78	DB2 for z/OS, 37, 38, 48
DATAACCESS, 82	DB2 V8.1 Family Fundamentals (Exam 700), 15, 17
row and column access control (RCAC) and, 97, 102	DB2 Workgroup Server Edition (WSE), 37, 42–43
Database administrator. See IBM Certified Database	DB2 EVALUNCOMMITTED, 369
Administrator, DB2 10.1; IBM Certified Database	DB2 SKIPDELETED, 369
Administrator, DB2 10.5; IBM Certified Advanced	DB2 SKIPINSERTED, 368
Database Administrator, DB2 10.1	db2convert, 11, 69
Database associate. See IBM Certified Database Associate,	DB2LBACRULES, 104
DB2 10.1; IBM Certified Database Associate, DB2 10.5	db2move, 7
Database Connection Services (DCS)	DB2SECURITYLABEL data type, 108
cataloging/uncataloging database, CATALOG/	db2set, BLU Acceleration, 59–60
UNCATALOG DCS DATABASE and, 147–148	DBADM, 81
directory for, 142	
Database creation and CREATE DATABASE, 136–139	DBCLOB, 266, 274, 306 Deadlocks, 378–380, 379
Database managed space (DMS) table space, 134	
Database Manager, 36	DEC/DECIMAL, 124, 269, 304
Database privileges, 82–83	DECFLOAT, 270, 304
Database workloads. See Workload management	Decimal points, 270
Databases, 116–117, 116	Decision support system (DSS), 2, 4
cataloging/uncataloging, 142–145	DECLARE, 339
connecting to and CONNECT, 148–151	stored procedures and, 255–256

Services, 77

Distributed platforms, 36

Distributed units of work, 15

EXECUTE

packages and, 87

routines and, 87

EXISTS, SELECT, 184, 192–193	Foreign key, 283. See also Referential integrity
Explain, 7, 10, 17	referential integrity constraints and, 285, 286
EXPLAIN, 83	FROM clause, SELECT, 183
Explicit Hierarchical Locking Multi-Tenancy Feature, 10	Fulfillment ID and Validation Number, 32
Explicitly granting authorities and privileges, 90	Functions, 17
EXPORT, 7	built-in. See Built-in functions
Expression-based index, 10	comparison, 127
Extensible markup language. See XML	scalar, 69–70
Extents, in table spaces, 133	SQL/XML, 240
External routines, 83	user-defined. See User-defined functions
External scalar user-defined function, 128, 243	
External stored procedures, 130	G
External table user-defined function, 128–129, 243–244	General Parallel File System (GPFS), 55
Extract, transform, load (ETL) solutions, 46	GET DIAGNOSTIC, 339
	Global declared temporary tables, 15, 162
F	Global variables, 17, 70
	GRANT and granting authorities/privileges, 2, 5, 75,
FALSE values	89–94
CHECK and, 283	roles, 92–93
SELECT and, 183, 199, 208–211 Endered Information Processing Standard (EIDS) 50	security labels to users, 107
Federal Information Processing Standard (FIPS), 50	Granularity of triggers, 337
Federated databases/federation, 13, 39, 44, 87–88	GRAPHIC, 71, 265, 271, 305
FETCH	greater-than/greater-than or equal to, 184-186
isolation levels and, 354	GROUP, 165
SELECT and, 232	GROUP BY, 122
FETCH FIRST	SELECT and, 179, 183, 194-196
SELECT and, 179, 183, 202–204	GROUP BY CUBE
Fields, 119	SELECT and, 197-199
Fine-grained access control (FGAC), 98	GROUP BY ROLLUP
Firing, of triggers, 337	SELECT and, 196-197
FIRST, 72	Grouping, 5
Fixed-length character data, 270–271	GSS_SERVER_ENCRYPT authentication, 79
Fixed-length double-byte (DBCS) character data, 271, 305. <i>See also</i> GRAPHIC	GSSPLUGIN authentication, 79
Fixed-Term License (FTL), 40	
FixPacks, 10	Н
FLOAT, 269, 270, 304	HACMP Reliable Services Clustering Technology
Floating data type, double-precision, 270	(RCST), 56
Floating data type, single-precision, 269	HADR. See High Availability Disaster Recovery (HADR)
Floating-point, decimal, 270	HAVING, SELECT and, 179, 183, 199–200
FLUSH EVENT MONITOR, 82	Health monitoring, 43
FLUSH OPTIMIZATION PROFILE CACHE, 82	High availability (HA) features, 8
FLUSH PACKAGE CACHE, 7, 82	High Availability Disaster Recovery (HADR), 8, 10, 12,
FLWOR expressions, in XML, 241	40, 41
FOR, 339	pureScale and, 57

High availability environments, 53	IBM Insight conference, 21
High volume environments, 52	IBM Knowledge Center, 19
High-Performance Unload, 50	IBM Smart Analytics Optimizer for DB2 for z/OS, 58
History of DB2 development, 36–48	Identifier length, 71
History tables, 119, 161	Identity columns, CREATE TABLE and, 310–313
HP-UX, 36, 43, 76	IF, 339
Huffman encoding, 10, 63, 63 , 164	IMPLICIT_SCHEMA, 83
C , , , , ,	Implicitly granting authorities and privileges, 89–90
	IMPORT, 7
I	IN, 152
IBM and DB2 development, 36–48	SELECT and, 184, 190–192
IBM Certified Advanced Database Administrator, DB2 10.1 for LUW	INCLUDE, indexes and, 334
certification, 12–13	INDEX
knowledge required for, 12-13	nicknames and, 88
prerequisite exams for, 13	tables and, 85
roadmap to certification for, 13	Index key columns, 10
IBM Certified Application Developer, DB2 9.7	Indexes, 3, 5, 12, 117, 121–123, 122 , 267, 332–337
certification, 14–15	ALTER INDEX and, 336–337
knowledge required for, 14	clustering and, 123, 335
prerequisite exams for, 15	compression and, 163–164
roadmap to certification for, 16	CREATE INDEX and, 265, 333
IBM Certified Database Administrator, DB2 10.1	expression-based, 10
DBA for LUW, 6–8	INCLUDE clause and, 334
knowledge required for, 6–8	keys or key columns in, 121
prerequisite exams for, 8	NULL keys in, 71, 265
roadmap to certification for, 9	online transaction processing (OLTP) and, 336 partitioning and, 153
IBM Certified Database Administrator, DB2 10.5	privileges for, 86
DBA for LUW upgrade certification, 9–11	REORG and, 335
prerequisite exams for, 11	unique and UNIQUE clause and, 265, 334
required knowledge for, 9–11	Indirectly granting authorities and privileges, 90
roadmap to certification for, 11	InfiniBand, 56
IBM Certified Database Associate, DB2 10.1	
Fundamentals certification, 2–4	Informational constraints, 3, 7, 277, 301–302, 302
required knowledge for, 2–3	CREATE TABLE and, 308, 309
roadmap to certification for, 4	Informix, 39, 41
IBM Certified Database Associate, DB2 10.5	Informix Warehouse accelerator, 58
Fundamentals certification, 4–6	InfoSphere, shadow tables and, 159
required knowledge for, 4–6	InfoSphere Optim Query Tuner, 69
roadmap to certification for, 6	InfoSphere Optim, 46–47
IBM Certified Solution Developer, DB2 9.7 SQL	Ingest, 7
Procedure	Ingres, 36
certification, 16–17	Inline LOBs, 275
knowledge required for, 16–17	Inner joins, 212–216, 212 , 216
prerequisite exams for, 17 roadmap to certification for, 18	INOUT, 72
roadinap to certification for, 10	INSERT, 165, 166, 167-170

global temporary tables and, 162	SELECT and, 179, 183, 204-205, 349, 359, 370, 371
Insert Rule for, 287–290, 288, 289	setting the level of, in different applications, 359
locks and, 361, 362, 363, 367	specifying, 358–360
nicknames and, 88	SQL for Java (SQLJ) and, 359
NULL/NOT NULL in, 168	uncommitted read (UR), 349, 356, 357
referential integrity constraints and, 286-290	ITERATE, 339
SELECT and, 169, 177	
subselects and, 169	
tables and, 85	J
temporal or time-travel tables and, 232-234	Java, 47, 130, 250
triggers and, 340	Java Database Connectivity (JDBC), 15, 142
VALUES clause in, 168	isolation levels and, 359
views and, 86, 328	Java Message Service (JMS), 46
XML and, 239	Join operations, 71, 211–223
Insert Rule, referential integrity constraints and, 287–290,	Cartesian products and, 211–212
288, 289	full outer, 217–223, 218, 220, 221, 222
Insert time clustering (ITC) tables, 12, 119, 158	inner, 212–216, 212 , 216
pureScale and, 57	left outer, 217–223, 218 , 220 , 221 , 222
Insertable view, 120	outer, 212, 217–223, 218 , 220 , 221 , 222
Instances, 6, 116–117, 116	right outer, 217–223, 218, 220, 221, 222, 217
INSTEAD OF triggers, 126, 337, 341, 343-344	
INT/INTEGER, 124, 269, 304	K
Intent exclusive (IX) locks, 362	KERBEROS authentication, 78
Intent none (IN) locks, 361	Keys, 121
Intent share (IS) locks, 361	primary, 10
Intent to change transaction, 366–367, 367	unique, 10
Interleaved transactions, 347	Key columns, 121
International DB2 User's Group (IDUG) conference, 21	KRB_SERVER_ENCRYPT authentication, 78–79
INTERSECT, SELECT and, 226, 226, 230, 230	The _bent encert i www.www.ou, 70 77
INTERSECT ALL, SELECT and, 227, 227, 230, 230	
IS NOT NULL, 152	L
Isolation levels, 3, 5, 6, 14, 345, 347–360	Label-based access control (LBAC), 5, 8, 40, 41, 75,
Call Level Interface (CLI) and, 359	102–109
choosing proper, 358	ARRAY in, 103
Command Line Processor (CLP) and, 359	authorities and privileges and, 80–81
COMMIT and, 350	column-level, 108–109
currently committed (CC) semantics and, 368–373	CREATE SECURITY LABEL COMPONENT in, 103–104
cursor stability (CS), 349, 353–354, 355	CREATE SECURITY LABEL in, 106
Embedded SQL and, 359	CREATE SECURITY POLICY in, 105
FETCH and, 354Java Database Connectivity (JDBC)	DB2LBACRULES in, 104
and, 359	DB2SECURITYLABEL data type for, 108
locks and locking in, 349	granting security labels to users in, 107
Open Database Connectivity (ODBC) and, 359	implementing, 108
read stability (RS), 349, 352, 353	multilevel security in, 102
repeatable read (RR), 349-350, 351	SECADM and, 102
ROLLBACK and, 350	security label components in, 103

security labels in, 105-106	intent none (IN), 361
security policies in, 104-105	intent share (IS), 361
SET in, 103	isolation levels and, 204-205
TREE in, 103	lock list and, 376
Languages for DB2, 40, 43, 45, 47	LOCK TABLE and, 364-366, 373
Large objects (LOBs), 2, 14, 127, 274-275	maxlocks and, 376, 377
inline, 275	next key weak exclusive (NW), 362
LAST, 72	object of, 361
LBAC. See label-based access control (LBAC)	overriding currently committed (CC) semantics, 372
Least recently used (LRU), 66	performance issues and, 373–380
LEAVE, 339	ROLLBACK and, 360
Less-than/less-than or equal to, 184–186	scan share (NS), 362
Lightweight Directory Access Protocol (LDAP), 8	SELECT and, 204–205, 361 , 362 , 363 , 367 , 368
LIKE	selecting locks to acquire, 366–367
CREATE TABLE and, 313–314	share (S), 362
SELECT and, 183, 188–190	share with intent exclusive (SIX), 362
LIMIT, 72	size of, 361
Linux, 36, 38, 41, 76	state (mode), 361, 361–363
	super exclusive (Z), 363
LIST DATABASE DIRECTORY, 140–141	timeouts and, 378 transaction types and associated, 366–367, 367
LIST NODE DIRECTORY, 142	update (U), 363
Load, 11	UPDATE and, 361, 362, 363, 367
LOAD, 7, 83	victim process and, 380
LOBs, 2, 14, 127, 274–275. See also Large objects	waits, 378
LOCAL CHECK OPTION, 328–329, 329	Log buffer, 135
Local database directory, 141	
Lock count, 361	Logging, 12 buffer for, 135
Lock list, 376	transaction log files and, 131, 135–136, 136
LOCK TABLE, 3, 5, 364–366, 373	write-ahead, 135
Lock waits, 378	Logical expressions, XML and, 241
Locks and locking, 3, 5, 345, 347, 349, 360–380, 360	
acquiring, with ALTER or LOCK TABLE, 364-366	Logical partition (LPAR), 55
ALTER TABLE and, 364-366, 373	
attributes of, 361	M
avoidance of, 367–368	Maintenance, 42
COMMIT and, 360	Management console, 46
compatibility of, 373, 374	Masks, column masks, 100–101
conversion of, 374–376, 375	Materialized query table (MQT), 15, 44, 53, 59, 119,
currently committed (CC) semantics and, 368-373	158–159
deadlocks and, 378–380, 379	Maxlocks, 376, 377
duration of, or lock count, 361	MDC. See Multidimensional clustered (MDC) tables
enabling currently committed (CC) semantics, 372	Memory, 12, 43, 57
escalation of, 376–378, 377	BLU Acceleration and, 66–67
exclusive (X), 363	buffer pools in, 131–132
INSERT and, 361, 362, 363, 367	MERGE triggers, 340
intent exclusive (IX), 362	

Merge Backup, 50	Nonrepeatable reads, 348
Metadata, 135	NoSQL, 45
Methods, 128. See also User-defined functions	NOT, 152
Migration, 10	NOT BETWEEN, 152
MINUS, 70	Not equal, 184–186
Modules, 17	NOT NULL, 3, 7, 267, 277, 278, 279 , 282
Mon_GET_ROUTEIN, 10	CREATE TABLE and, 308
Monitoring, 7, 10, 43, 82	NTFS, 38
Most recently used (MRU), 66	NULL/NOT NULL, 71
MQT. See materialized query table (MQT)	index keys and, 265
Multi-temperature data, 7, 12, 44	INSERT and, 168
Multibyte-byte character set (MBCS), 274	passwords and, 77
Multidimensional clustered (MDC) tables, 12, 44, 53, 59,	SELECT and, 180, 184, 193-194
119, 154–158, 155 , 156 , 157	NULL key, 10
Multilevel security, 102. See also Label-based access	NUM/NUMERIC, 269
control (LBAC)	NUMBER, 71, 276
MVS operating system, 36	Numeric data/numbers, 268-270
MySAP Business Suite, 41	big integer, 269
MySQL, 69, 72	DEC/DECIMAL, 269
	DECFLOAT, 270
N	decimal points in, 270
N	DOUBLE/DOUBLE PRECISION, 270
Naming conventions, 14	FLOAT, 269, 270
nicknames in, 88	floating, double-precision, 270
National character large objects (NCLOB), 274, 306	floating, single-precision, 269
National fixed-length character string, 271–272, 305	floating-point, decimal, 270
National Institute of Standards and Technology (NIST)	INT/INTEGER, 269
requirements, 50	NUM/NUMERIC, 269 precision in, 268, 269
National varying-length character string, 272	REAL, 269
Native encryption, 40, 42, 46, 112–113	sign in, 268
NCHAR/NATIONAL CHARACTER, 272, 305	SMALLINT, 269
NCHAR/NVARCHAR, 272	NVARCHAR, 305
NCLOB, 70, 274, 306	NVARCHAR2, 276
Net Search Extender, 39	1, 7, 11, 11, 11, 11, 11, 11, 11, 11, 11
NEXT, 72	
Next key weak exclusive (NW) locks, 362	0
NEXT VALUE, 70, 87	Object privileges, 82–83
sequences and, 125	Objectives of the certification exams, 20
NEXTVAL, 70	Objects, 3, 5, 7
Nickname privileges, 88	OCTETS, string unit attributes, 266
Node directory, 141–142	ODBC. See Open Database Connectivity (ODBC)
Nodes, 53	OFFSET, 72
cataloging/uncataloging, and CATALOG/	Offset coding, 63
UNCATALOG TCPIP NODE, 145–147	OLE DB, 15, 142
Nonrelational data, 2	OLE DB external table UDF, 129

OLE DB external table user-defined function, 244	elimination of, 153–154
OLTP. See Online transaction processing (OLTP)	indexes and, 153
Online reorganization, 41	tables and, 152–154, 153
Online transaction processing (OLTP), 2, 4, 35, 51, 52–53,	PASSTHRU, 88, 258
68, 159	Passwords, 77
BLU Acceleration and, 68	NULL, 77
indexes and, 336	Path expressions, XML and, 241
OPEN, global temporary tables and, 162	Pearson VUE, 20–21
Open Database Connectivity (ODBC), 142	Performance management, 12, 43, 45, 48, 50-51
connectivity and, 151	high performance environments and, 52
isolation levels and, 359	high availability environments and, 53
Operating systems for DB2, 41, 43, 45, 47	high volume environments and, 52
Optim, 46–47, 50	locks and, 373–380
Optim Query Workload Tuner, 11	pureScale and, 56
Optim Workload Table Organization Advisor, 11	stored procedures and, 250
Optimizer, informational constraints and, 301–302, 302	workload management and, 51-52
Oracle, 10, 44, 69, 88	Performance Manager, 47
compatibility/compatibility data, 3, 5	Phantom transactions, 348
pseuodcolumns in, 71	PHP, 15
Oracle PL/SQL, 17	PL/I, 130, 250
ORDER BY, 122	PL/SQL, 70, 72
SELECT and, 179, 183, 200-202	Positioned deletes, 175
OS/2, 36	Positioned updates, 173
Outer joins, 71, 212, 217–223, 218 , 220 , 221 , 222	Postgre-SQL, 72
	Practice exams, 20. See also Taking the certification exams
D.	Precision, numeric data and, 268, 269
P	Precompilers, 130–131
Packages, 15, 82, 117, 130–131	Prefetch, 10
privileges for, 87	PREPARE, 82
Pages, in table spaces, 132	Preparing to take certification exams, 18–20
Parallel transaction, 347	PREVIOUS, 72
Parallel vector processing, BLU Acceleration and, 64–65,	PREVIOUS VALUE, 70, 87
65	sequences and, 125
Parallelism, 13, 45	Primary database, 41
BLU Acceleration and, 65–66	Primary key, 10
core-friendly, in BLU, 65–66	referential integrity constraints and, 285
Parameter passing, 5	UNIQUE constraints and, 282
Parameters, 15	Privileges. See Authorities and privileges
Parent key, parent table, referential integrity constraints	Problem Determination Tool (db2pd), 7
and, 285, 285 , 286	Procedures, 16, 17
Parent row, referential integrity constraints and, 286	stored. See Stored procedures
Partition elimination, 153–154	-
Partitioned tables, 119, 152–154, 153 . See also range-	Propagation, 296
partitioned tables	Pseudocolumn, 71
Partitioning, 7, 43, 53	Public Key Cryptography Standard 12 (PKCS12), 113
ATTACH/DETACH PARTITION and, 153	Publications to study for certification, 19

pureQuery Runtime, 47	READ, 89
pureScale, 8, 10, 13, 46	Read stability (RS) isolation level, 349, 352, 353
application transparency in, 55	Read-only cursors, 231
availability of, 56	Read-only transaction, 366–367, 367
capacity of, 55	Read-only view, 120
Cluster Caching Facility (CF) and, 55	REAL, 269, 304
Cluster Services (CS) and, 55	REBIND, 7
DB 10.5 enhancements to, 57	
General Parallel File System (GPFS) and, 55	Records, 119
HACMP Reliable Services Clustering Technology	Recovery Expert, 50
(RCST) in, 56	Recovery. See Backup and recovery
HADR and, 57	Red Hat Enterprise Linux (RHEL), 41
insert time clustering (ITC) tables in, 57	Redbooks, 19–20
performance of, 56	Reference/referenced types, 162
Remote Direct Memory Access (RDMA) and, 55	REFERENCES
shared data architecture of, 55	nicknames and, 88
Tivoli System Automation for Multiplatforms (SAMP)	tables and, 85
and, 56	REFERENCING, 340
workload management and, 55–57, 56	Referential constraint. See Referential integrity
pureXML, 39, 237. See also XML	Referential cycle, 286
	Referential integrity, 3, 7, 15, 267, 277, 283–301, 284
Q	child table/row in, 285, 286
Q replication, 47	CREATE TABLE and, 304, 307, 309-310
Qualifiers, schema, 117, 314–315	DELETE and, 293-296, 294, 295, 297-300
	Delete Rule in, 293-296, 294, 295, 297-300
Queries, 14, 15, 47, 59	descendant table/row in, 286
BLU Acceleration and, 68	foreign key in, 285, 286
compression and, 164	INSERT and, 286–290
materialized query tables (MQTs) and, 158–159 parallelism for, 45	Insert Rule for, 287–290, 288, 289
partition elimination and, 153–154	parent key, parent table and, 285, 285, 286
predicates in, 152	parent row and, 286
SELECT and. See SELECT	primary key and, 285
sub-, 177	propagation through, 296
Query optimizer, 12	referential cycle in, 286
	self-referencing table/row in, 286
Query Tuner, 47	terminology of, 285–286
QUIESCE_CONNECT, 83	unique key and, 285
	UPDATE and, 286–287, 290–293, 291 , 292
R	Update Rule for, 290–293, 291 , 292
RAM, BLU Acceleration and, 66-67	REFRESH IMMEDIATE/DEFERRED, MQTs and, 159
Random ordering, 10	REFRESH TABLE, 159
Range-clustered tables (RCT), 12, 119, 154, 264–265	Registering stored procedures, 250
Range-partitioned tables, 12, 152–154, 153 . <i>See also</i>	Regular table. See Base table
Partitioned tables	Relational database management system (RDBMS), 69
RCAC. See row and column access control (RCAC)	Relational predicates and WHERE, 183, 184–186
RDO, 142	Reliable Services Clustering Technology (RCST), 56
NDO, 172	

Remote Direct Memory Access (RDMA), 55	\$
REORG, 7, 10, 82	Sample questions, 20
BLU Acceleration and, 59	SAVEPOINT, 5, 14, 260–263, 262
indexes and, 335	Scalability, workload management and, 52
multidimensional clustering (MDC) tables and, 155	Scalar functions, 69–70
tables and, 85	Scalar user-defined function, 243, 244–249
Reorganization, 41	Scan share (NS) locks, 362
REORGCHK, 7	Schemas, 3, 14, 83, 117–118, 118
Repeatable read (RR) isolation level, 349–350, 351	CREATE TABLE and, 314–315
Replication, 13, 47	privileges, 84
Replication, SQL, 41	qualifiers in, 314–315
Resource Description Framework (RDF), 45	Scope of cursor, 14
Result sets, 177	Search conditions, SELECT and, 183
REVOKE and revoking authorities and privileges, 94-97	Searched deletes, 175
Revoking authorities/privileges, 2, 5, 75	SECADM, 8, 81, 82, 90
REXX, 130, 250	label-based access control (LBAC) and, 102
RoCE Ethernet, 56	roles and, granting, 92–93
Roles, 3, 5, 75, 92–93	trusted contexts and, 110
Roles in DB2 10.1 and 10.5 certification, 2–18	Security, 75–113
Roll forward recovery, 7	access control and, 76
ROLLBACK, 5, 14, 256–260, 257 , 258 , 259	authentication in, 76–79
isolation levels and, 350	authorities and privileges in, 79-97. See also
locks and, 360	Authorities and privileges
ROLLUP, GROUP BY, 196–197	encryption in, 112–113
Root tables, 162	label-based access control (LBAC) in, 102-109
Routines, 83	policies for, 104–105
privileges for, 87	row and column access control (RCAC) in, 97–102
Row and column access control (RCAC), 3, 5, 8, 40–41, 75, 97–102	separation of management and security-related tasks in, 82
authorities and privileges and, 80–81	trusted contexts in, 109–112
activating, 102	Security Administrator. See SECADM
column masks in, 100–101	Security labels, 105–106
CREATE PERMISSION in, 98–99	Security policies, 104–105
DATAACCESS authority for, 97, 102	SELECT, 72, 165, 166, 177–237
row permissions in, 98–99	ALL clause and, 180, 184
Row compression, 7	ANY clause in, 184
Row permissions, in RCAC, 98–99	application-period temporal tables and, 236
Row size support, 10	BETWEEN clause and, 183, 187–188
ROWID, 71	bitemporal tables and, 237
ROWNUM, 71	CASE expressions and, 207–211
Rows, 119	common table expressions and, 205–207
size of, 71, 264–265	cursor used to obtain results with, 231–232 DECLARE CURSOR and, 231–232
RS/6000, 36	DELETE and, 174
RUNSTATS, 7	DISTINCT clause and, 180, 183
BLU Acceleration and, 59	EXCEPT and, 228, 228 , 230, 230

EXCEPT ALL and, 229, 229 , 230, 230	Self-Tuning Memory Manager (STMM), 10, 42
EXISTS clause and, 184, 192-193	Separation of management and security-related tasks, 82
FETCH and, 232	Sequence expressions, XML and, 241
FETCH FIRST and, 179, 183, 202-204	Sequence privileges, 86–87
FROM clause and, 183	Sequences, 15, 117, 124–125
global temporary tables and, 162	Serializable transactions, 347
GROUP BY clause and, 179, 183, 194-196	SERVER authentication, 78
GROUP BY CUBE and, 197-199	SERVER ENCRYPT authentication, 78, 144
GROUP BY ROLLUP and, 196-197	=
HAVING and, 179, 183, 199-200	Servers, 3, 5, 6, 115, 116–117, 116
IN clause and, 184, 190–192	federated, 13, 39, 44, 87–88
INSERT and, 169, 177	privileges for, 87–88
INSERT, subselects, and, 169	SET, 339
INTERSECT and, 226, 226, 230, 230	label-based access control (LBAC) and, 103
INTERSECT ALL and, 227, 227, 230, 230	SET CONNECTION, 150, 258
isolation levels and, 179, 183, 204–205, 349, 359, 370,	SET EVENT MONITOR STATE, 82
371	SET INTEGRITY, 7
join operations and, 211–223. See also Join operations	Set operators, 223–231
LIKE clause and, 183, 188–190	EXCEPT, 228, 228 , 230, 230
locks and, 361 , 362 , 363 , 367 , 368	EXCEPT ALL, 229, 229, 230, 230
nicknames and, 88	INTERSECT, 226, 226, 230, 230
NULL clause and, 180, 184, 193–194	INTERSECT ALL, 227, 227, 230, 230
NULL values and, 180	SELECT and, 223–231
ORDER BY and, 179, 183, 200–202	UNION, 223, 224 , 230, 230
relational predicates and WHERE in, 183, 184-186	UNION ALL, 225, 225 , 230, 230
result sets and, 177	SET PASSTHRU, 258
search conditions in, 183	SET SERVER OPTION, 258
set operators and, combining results with, 223–231	SET SESSION AUTHORIZATION, 84
SOME clause in, 184	SET SESSION USER, 84
subqueries and, 177	Shadow tables, 119, 159
subselects and, 169	Share (S) locks, 362
system-period temporal tables and, 234–236	Share with intent exclusive (SIX) locks, 362
tables and, 85	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
temporal or time-travel tables and, 232–237	Shared-nothing environments, 53
triggers and, 339	Sign, numeric data and, 268
TRUE/FALSE/UNKNOWN values in, 183, 199,	SIGNAL, 339
208–211	Single instruction multiple data (SIMD) processing,
UNION and, 223, 224 , 230, 230	64–65, 65
UNION ALL and, 225, 225 , 230, 230	Single-byte character set (SBCS), 274
UPDATE and, 171, 172, 177	SMALLINT, 124, 269, 304
user-defined functions and, 248–249	Solaris, 36, 41, 43, 76
views and, 86, 327	Solution developer. See IBM Certified Solution Developer
WHERE clause and, 179, 183–194	DB2 9.7 SQL Procedure
WITH and, 205–207	SOME clause, SELECT and, 184
Self-configuration, 43	SORT, 165
Self-referencing table/row, referential integrity constraints and, 286	Sorting, 5

Sourced UDF, 128	calling with CALL, 253–256
Sourced user-defined function, 243	CREATE PROCEDURE and, 251–253
Spatial Extender, 39–40	DECLARE and, 255-256
SQL, 3, 5, 14, 16, 17, 36, 39, 47, 165–266	developing, 250–253
aliasing and, 124	external, 250
common table expressions and, 205–207	registering, 250–253
compatibility issues. See Compatibility, SQL	SQL or native SQL, 250
Data Control Language (DCL) statements in, 166	String data. See Character string data types
Data Definition Language (DDL) statements in, 166	String unit attributes, 265–266
Data Manipulation Language (DML) statements in,	String units, 71
166, 167–237. <i>See also</i> DELETE, INSERT,	Structured data types, 127-128, 277
SELECT, UPDATE	Structured Query Language. See SQL
embedded application construct statements in, 166	Studying for certification exams, 18-20
indexes and, 123	Subqueries, 177
precompiler for, 130–131 restrictions to, lifting of, 70	Subscriptions for DB2, 40
SQL/XML functions and, 240	Subtables, 162
stored procedures and, 129–130, 249–256	Subtypes, 128
syntax of, 70	Sun Solaris, 41
transaction management statements in, 167	Super Async (SUPERASYNC) mode, 57
user-defined functions (UDFs) and, 128–129, 243–249	Super exclusive (Z) locks, 363
SQL Binder, 131	Supertables, 162
SQL Communications Area (SQLCA), 15	Supertypes, 128
SQL for Java (SQLJ), 15	SUSE Linux, 41
isolation levels and, 359	Sybase, 69
SQL isolation level, 339–340	Synopsis tables, 10, 67, 119, 152
SQL PL, 16	SYSADM, 80, 82
SQL replication, 41	SYSCTRL, 80
SQL scalar user-defined function, 243, 244–249	SYSMAINT, 80–81
SQL table user-defined function, 243, 244–249	SYSMON, 81
SQL/XML functions, 240	System Automation for Multiplatforms (SAMP), 56
SQLADM, 82	System catalog, 131, 134–135
SQLJ, 142	System database directory, 140–141
Standby cluster, 10	System features, 17
Standby database, 41	System managed space (SMS) table space, 133
State (mode) of locks, 361, 361–363	System objects, 131–136
Static compression, 10	System period, 160
Static SQL, 14	System-period temporal tables, 3, 160
Storage, 12, 42, 43, 45	SELECT and, 234–236
Storage groups, 44	System R, 36
Storage optimization, 45	System time, 160
Storage paths, 12	
Stored procedures, 14, 15, 17, 47, 117, 129–130, 165,	т
249–256 advantages of, 250	Table check constraint, 282-283. See also CHECK
auvaniages 01, 250	Table spaces, 12, 131, 132–134, 133

automatic storage (AS), 134	Temporal (time-travel) tables, 3, 5, 119, 159–161, 267,
database managed space (DMS), 134	324–327
privileges for, 84	base vs., 324–326
system managed space (SMS), 133	created, 324
Table user-defined function, 243, 244–249	declared, 324
Tables, 3, 5, 7, 14, 83, 115, 117, 119, 119 , 151–162, 267.	SELECT and, 232–237
Also see specific table types	Temporary tables, 119, 161–162
ALTER TABLE and, 321–323	TIME, 272–273, 305
column masks in, 100–101	Time period, 159
common table expressions and, 205–207	Time/timestamps, 70, 71, 272–273, 272 , 305
compression and, 163	application period in, 160
CREATE TABLE and, 264, 303–321. See also	application time in, 160
CREATE TABLE	business time in, 160
db2convert and, 69	system period in, 160
identity columns in, 310-313	system time in, 160
join operations and, 211–223. See also Join operations	time period in, 159
partitioning of, 43	valid time in, 160
privileges for, 85	Time-travel query, 39
row permissions in, 98–99	Time-travel tables. See Bitemporal tables; Temporal (time
row size in, 264–265	travel) tables
schemas and, 314–315	Timeouts and locks, 378
similar, with LIKE, 313-314	TIMESTAMP, 71, 273, 305
triggers and, 340	
tuple sequence number (TSN) row identifiers and, 62,	TIMESTAMP_FORMAT, 70
62	Tivoli System Automation for Multiplatforms (SAMP),
Taking the certification exams, 22–33	41, 56
Begin Test screen in, 24–26	TO_CHAR, 70
Done button in, 29	TO_DATE, 70
End of exam confirmation screen in, 30, 30	TO_TIMESTAMP, 70
Finish screen in, 29, 29	Transaction log files, 12, 131, 135–136, 136
Flag for Review in, 26–27, 28–29	Transaction processing, BLU Acceleration and, 66-67
Help in, 27	Transactions and transaction management, 3, 5, 14, 165,
I Agree button in, 24, 24	256–263, 347
moving through the exam in, 23	change, 366–367, 367
Next button in, 23, 27, 30	COMMIT, 360
Previous button in, 27, 30	currently committed (CC) semantics and, 368-373
question screen in, 26, 26 , 27	cursor-controlled, 366–367, 367
refresher course in, 25	intent to change, 366–367, 367
Review in, 27–29, 28	lock compatibility with, 373, 374
score report in, 31, 32	read-only, 366–367, 367
signing in, 22	ROLLBACK, 360
Test Results screen in, 31, 31	boundaries in, 256
Time Remaining information in, 26–27	buffer pools and, 256
Title screen for, 22–23, 23	COMMIT and, 256–260, 257, 258, 259
Template UDF, 128	concurrency and, 256
Template user-defined function, 243	ROLLBACK and, 256-260, 257, 258, 259
•	SAVEPOINT and, 260-263, 262

SET commands and, 258	CREATE TRUSTED CONTEXT for, 111
transaction management and, 256-263	implicit and explicit trusted connections in, 110
unit of work and, 256	SECADM and, 110
BLU Acceleration and, 66-67	trusted connections and, 110
concurrency and. See also Concurrency	WITH/WITHOUT AUTHENTICATION in, 111
dirty reads and, 348	Tuple sequence number (TSN) row identifiers, 62, 62
interleaved, 347	Tutorials, online, 19
locks and locking in, 349, 366–367, 367	Type 1 and type 2 connections, 115, 150–151, 150
lost updates and, 348	Typed tables, 119, 162
nonrepeatable reads and, 348	1) pod moios, 119, 102
owning or holding a lock in, 349	
parallel, 347	U
phantom, 348	Ubuntu Linux, 41
serializable, 347	Uncommitted read (UR) isolation level, 349, 356, 357
SQL and, 167	Unicode, 266, 271–272
unit of work in, 15, 256, 347	Uniform Resource Identifiers (URIs), 45
Transform expressions, XML and, 241	UNION, SELECT and, 223, 224, 230, 230
Transition tables, 340	UNION ALL, SELECT and, 225, 225 , 230, 230
Transitional variables, triggers and, 340	UNIQUE, 3, 7, 70, 123, 267, 277, 280–282, 281
TREE, label-based access control (LBAC) and, 103	CREATE TABLE and, 304, 306, 309
Triggers, 3, 5, 7, 17, 117, 125–126, 267, 337–344	Unique indexes, 265, 334
action of, 337	Unique key, 10
activation time for, 337	referential integrity constraints and, 285
AFTER, 337, 341, 342–343	Unit of work, 15, 256, 347. See also Transactions and
altering not possible in, 344	transaction management, 256
BEFORE, 337, 341–342	Universal Database, 36
components of, 126, 337	UNKNOWN values
CREATE TRIGGER and, 337–344	CHECK and, 283
event for, 337	SELECT and, 183, 199, 208–211
firing of, 337	Updatable cursors, 231
granularity of, 337	Updatable view, 120
INSTEAD OF, 337, 341, 343–344	UPDATE, 72, 165, 166
REFERENCING clause and, 340	
rows affected by, 337	global temporary tables and, 162 locks and, 361, 362, 363, 367
SQL and SQL PL statements with, 339–340	nicknames and, 88
table or view associated with, 337	positioned updates and, 173
transitional variables and, 340	referential integrity constraints and, 286–287, 290–293,
transition tables with, 340	291, 292
TRUNCATE and, 176–177	SELECT and, 171, 172, 177
TRUE/FALSE/UNKNOWN values	tables and, 85
CHECK and, 283	temporal or time-travel tables and, 232–234
SELECT and, 183, 199, 208–211	transaction management and, 348
TRUNCATE, 71, 175–177	triggers and, 340
DELETE and, 175–177	Update Rule for, 290–293, 291 , 292
Trusted connections, 110	views and, 86
Trusted contexts, 3, 5, 8, 15, 75, 109–112	WHERE clause and, 171, 172, 173

WHERE CURRENT and, 172, 173	CREATE VIEW and, 327–328
XML and, 239-240	INSERT and, 328
Update (U) locks, 363	LOCAL CHECK OPTION with, 328-329, 329
Update Rule, 290–293, 291 , 292	privileges for, 85–86
UPDATE, 170–174	SELECT and, 327
Upgrading DB2 editions, 38	
USAGE, 87	W
XSR objects and, 89	Waits, lock, 378
USE, 84	Warehousing. See Data warehousing
User IDs, 77	Weak typing, 69
User-defined data types (UDTs), 117, 127–128, 277	WebSphere, 41
User-defined functions (UDF), 3, 5, 15, 17, 47, 83, 117,	WHERE clause
128–129, 165, 243–249	DELETE and, 174
CREATE FUNCTION and, 244-248	SELECT and, 179, 183–194
external scalar, 243	UPDATE and, 171, 172, 173
external table, 243–244	WHILE, 339
OLE DB external table, 244	Windows, 36, 38, 41–42, 76
scalar, 243, 244–249	WITH, SELECT and, 205–207
SELECT and, invoking, 248–249	WITH CHECK OPTION, 7
sourced, 243	WITH GRANT OPTION, 7 WITH GRANT OPTION, 90
SQL scalar, 243, 244–249	
SQL table, 243, 244–249	WLMADM, 82
table, 243, 244–249	WORKLOAD ANALYTICS, 59–60
template, 243	Workload management, 9, 51–57
	availability and, 52
V	BLU Acceleration and, 59–60, 68 Data Partitioning Feature (DPF) for, 53–54, 54
Valid time, 160	data warehousing and, 51
Value compression, 10	high availability environments and, 53
Values, 119	high performance environments and, 52
VALUES, INSERT and, 168	high volume environments and, 52
VARCHAR, 264–265, 266, 271, 305	manageability and, 52
VARCHAR FORMAT, 70	online transaction processing (OLTP) and, 51, 52–53
VARCHAR2, 71, 276	68
VARGRAPHIC, 264–265, 266, 271, 305	optimized solutions for, 53
Variables, 16, 17	performance and, 51–52
global, 70	privileges for, 89
privileges for, 89	pureScale Feature in, 55–57, 56 . <i>See also</i> pureScale
transitional, 340	scalability and, 52
Varying-length character data, 271, 305	shared-nothing environments, 53
Varying-length double-byte character data, 271, 264–265,	Workload Manager (WLM), 7, 12, 46
266, 271, 305. See also VARGRAPHIC	Workload Table Organization Advisor, 69
Version recovery, 7	WRITE, 89
Victim process, 380	Write-ahead logging, 135
Views, 3, 5, 14, 59, 117, 120–121, 120 , 267, 327–332	

CASCADED CHECK OPTION with, 330-331, 331

X	UPDATE and, 239–240
XML, 2, 5, 7, 14, 165, 237–243. See also pureXML	version and encoding declaration in, 238
arithmetic expressions for, 241	XML data type and, 70, 275–276
attributes in, 238	XMLPARSE, 240
case-sensitivity of tags in, 238	XMLSERIALIZE, 240
cast expressions for, 241	XMLTABLE, 240–241
comparison expressions for, 241	XMLTEXT, 240
conditional expressions for, 241	XMLVALIDATE, 241
constructor expressions for, 241	XQuery and, 241
Data Manipulation Language (DML) and, 237–243	XML data type, 70, 275–276
DELETE and, 240	XML schema repository (XSR) objects, privileges for, 89
elements in, 238	XMLPARSE, 240
FLWOR expressions for, 241	XMLSERIALIZE, 240
INSERT and, 239	XMLTABLE, 240-241
logical expressions for, 241	XMLTEXT, 240
opening/closing tags in, 238	XQuery, 3, 5, 15, 39, 165–266
path expressions for, 241	XSR objects, 89
pureXML and, 237. See also pureXML	
retrieving XML data from tables in, 240-243	_
sequence expressions for, 241	Z
SQL/XML functions and, 240	z/OS, 36
transform expressions for, 241	zLinux, 38