GLOSSARY OF TERMS

Note: Number (letter) in parenthesis corresponds to the chapter (appendix) in which the term is found. Terms in Chapters 12 through 14 will best be found in the full versions of the chapters on the book’s Web site.

Aborted transaction A transaction in progress that terminates abnormally. (11)
Abstract class A class that has no direct instances but whose descendants may have direct instances. (13)
Abstract operation An operation whose form or protocol is defined but whose implementation is not defined. (w13)
Accessor method A method that provides other objects with access to the state of an object. (w14)
After image A copy of a record (or page of memory) after it has been modified. (11)
Aggregation A part-of relationship between a component object and an aggregate object. (w13) The process of transforming data from a detailed level to a summarized level. (10)
Agile software development An approach to database and software development that emphasizes “individuals and interactions” over processes and tools, working software over comprehensive documentation, customer collaboration over contract negotiation, and response to change over following a plan.” (1)
Alias An alternative name used for an attribute. (4)
Anomaly An error or inconsistency that may result when a user attempts to update a table that contains redundant data. The three types of anomalies are insertion, deletion, and modification anomalies. (4)
Application partitioning The process of assigning portions of application code to client or server partitions after it is written to achieve better performance and interoperability (ability of a component to function on different platforms). (8)
Application program interface (API) Sets of routines that an application program uses to direct the performance of procedures by the computer’s operating system. (8)
Association A named relationship between or among object classes. (13)
Association class An association that has attributes or operations of its own or that participates in relationships with other classes. (13)
Association role The end of an association, where it connects to a class. (13)
Associative entity An entity type that associates the instances of one or more entity types and contains attributes that are peculiar to the relationship between those entity instances. (2)
Asynchronous distributed database A form of distributed database technology in which copies of replicated data are kept at different nodes so that local servers can access data without reaching out across the network. (12)
Attribute A property or characteristic of an entity or relationship type that is of interest to the organization. (2)
Attribute inheritance A property by which subtype entities inherit values of all attributes and instances of all relationships of their supertype. (3)
Authorization rules Controls incorporated in a data management systems that restrict access to data and also restrict the actions that people may take when they access data. (11)
Backup facility A DBMS COPY utility that produces a backup copy (or save) of an entire database or a subset of a database. (11)
Backward recovery (rollback) The backout, or undo, of unwanted changes to a database. Before images of the records that have been changed are applied to the database, and the database is returned to an earlier state. Rollback is used to reverse the changes made by transactions that have been aborted, or terminated abnormally. (11)
Base table A table in the relational data model containing the inserted raw data. Base tables correspond to the relations that are identified in the database’s conceptual schema. (6)
Before image A copy of a record (or page of memory) before it has been modified. (11)
Behavior The way in which an object acts and reacts. (13)
Big data An ill-defined term applied to databases whose size strains the ability of commonly used relational DBMSs to capture, manage, and process the data within a tolerable elapsed time. (9)
Binary relationship A relationship between the instances of two entity types. (2)
Boyce-Codd normal form (BCNF) A normal form of a relation in which every determinant is a candidate key. (B)
Business rule A statement that defines or constrains some aspect of the business. It is intended to assert business structure or to control or influence the behavior of the business. (2)
Call-level application programming interface A mechanism that provides an application program with access to an external service, such as a database management system. (14)
Candidate key An attribute, or combination of attributes, that uniquely identifies a row in a relation. (4)
Cardinality constraint A rule that specifies the number of instances of one entity that can (or must) be associated with each instance of another entity. (2)
Catalog A set of schemas that, when put together, constitute a description of a database. (6)
Changed data capture (CDC) Technique that indicates which data have changed since the last data integration activity. (10)
Checkpoint facility A facility by which a DBMS periodically refuses to accept any new transactions. The system is in a quiet state, and the database and transaction logs are synchronized. (11)
Class An entity type that has a well-defined role in the application domain about which the organization wishes to maintain state, behavior, and identity. (13)
Class diagram A diagram that shows the static structure of an object-oriented model: the object classes, their internal structure, and the relationships in which they participate. (13)
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Class-scope attribute  An attribute of a class that specifies a value common to an entire class rather than a specific value for an instance. (13)

Class-scope operation  An operation that applies to a class rather than to an object instance. (w13)

Client/server system  A networked computing model that distributes processes between clients and servers, which supply the requested services. In a database system, the database generally resides on a server that processes the DBMS. The clients may process the application systems or request services from another server that holds the application programs. (8)

Commit protocol  An algorithm to ensure that a transaction is either successfully completed or aborted. (12)

Completeness constraint  A type of constraint that addresses whether an instance of a supertype must also be a member of at least one subtype. (3)

Composite attribute  An attribute that has meaningful component parts (attributes). (2)

Composite identifier  An identifier that consists of a composite attribute. (2)

Composite key  A primary key that consists of more than one attribute. (4)

Composition  A part-of relationship in which parts belong to only one whole object and live and die with the whole object. (13)

Computer-aided software engineering (CASE) tools  Software tools that provide automated support for some portion of the systems development process. (1)

Conceptual schema  A detailed, technology-independent specification of the overall structure of organizational data. (1)

Concrete class  A class that can have direct instances. (13)

Concurrency control  The process of managing simultaneous operations against a database so that data integrity is maintained and the operations do not interfere with each other in a multuser environment. (11)

Concurrency transparency  A design goal for a distributed database, with the property that although a distributed system runs many transactions, it appears that a given transaction is the only activity in the system. Thus, when several transactions are processed concurrently, the results must be the same as if each transaction were processed in serial order. (12)

Conformed dimension  One or more dimension tables associated with two or more fact tables for which the dimension tables have the same business meaning and primary key with each fact table. (9)

Constraint  A rule that cannot be violated by database users. (1)

Constructor operation  An operation that creates a new instance of a class. (w13)

Correlated subquery  In SQL, a subquery in which processing the inner query depends on data from the outer query. (7)

Data  Stored representations of objects and events that have meaning and importance in the user’s environment. (1)

Data administration  A high-level function that is responsible for the overall management of data resources in an organization, including maintaining corporate-wide definitions and standards. (11)

Data archiving  The process of moving inactive data to another storage location where it can be accessed when needed. (11)

Data control language (DCL)  Commands used to control a database, including those for administering privileges and committing (saving) data. (6)

Data definition language (DDL)  Commands used to define a database, including those for creating, altering, and dropping tables and establishing constraints. (6)

Data dictionary  A repository of information about a database that documents data elements of a database. (11)

Data federation  A technique for data integration that provides a virtual view of integrated data without actually creating one centralized database. (11)

Data governance  High-level organizational groups and processes that oversee data stewardship across the organization. It usually guides data quality initiatives, data architecture, data integration and master data management, data warehousing and business intelligence, and other data-related matters. (10)

Data independence  The separation of data descriptions from the application programs that use the data. (1)

Data manipulation language (DML)  Commands used to maintain and query a database, including those for updating, inserting, modifying, and querying data. (6)

Data mart  A data warehouse that is limited in scope, whose data are obtained by selecting and summarizing data from a data warehouse or from separate extract, transform, and load processes from source data systems. (9)

Data mining  Knowledge discovery, using a sophisticated blend of techniques from traditional statistics, artificial intelligence, and computer graphics. (9)

Data model  Graphical systems used to capture the nature and relationships among data. (1)

Data scrubbing  A process of using pattern recognition and other artificial intelligence techniques to upgrade the quality of raw data before transforming and moving the data to the data warehouse. Also called data cleansing. (10)

Data steward  A person assigned the responsibility of ensuring that organizational applications properly support the organization’s enterprise goals for data quality. (10)

Data transformation  The component of data reconciliation that converts data from the format of the source operational systems to the format of the enterprise data warehouse. (10)

Data type  A detailed coding scheme recognized by system software, such as a DBMS, for representing organizational data. (5)

Data visualization  The representation of data in graphical and multimedia formats for human analysis. (9)

Data warehouse  A subject-oriented, integrated, time-variant, nonupdateable collection of data used in support of management decision-making processes. (9) An integrated decision support database whose content is derived from the various operational databases. (1)

Database  An organized collection of logically related data. (1)

Database administration  A technical function that is responsible for physical database design and for dealing with technical issues, such as security enforcement, database performance, and backup and recovery. (11)

Database application  An application program (or set of related programs) that is used to perform a series of database activities (create, read, update, and delete) on behalf of database users. (1)
Glossary of Terms

Database change log  A log that contains before and after images of records that have been modified by transactions. (11)

Database destruction  The database itself is lost, destroyed, or cannot be read. (11)

Database management system (DBMS)  A software system that is used to create, maintain, and provide controlled access to user databases. (1)

Database recovery  Mechanisms for restoring a database quickly and accurately after loss or damage. (11)

Database security  Protection of database data against accidental or intentional loss, destruction, or misuse. (11)

Database server  A computer that is responsible for database storage, access, and processing in a client/server environment. Some people also use this term to describe a two-tier client/server applications. (8)

Deadlock  An impasse that results when two or more transactions have locked a common resource, and each waits for the other to unlock that resource. (11)

Deadlock prevention  A method for resolving deadlocks in which user programs must lock all records they require at the beginning of a transaction (rather than one at a time). (11)

Deadlock resolution  An approach to dealing with deadlocks that allows deadlocks to occur but builds mechanisms into the DBMS for detecting and breaking the deadlocks. (11)

Decentralized database  A database that is stored on computers at multiple locations; these computers are not interconnected by network and database software that make the data appear in one logical database. (w12)

Declarative mapping schema  A structure that defines the relationships between domain classes in the object-oriented model and relations in the relational model. (14)

Degree  The number of entity types that participate in a relationship. (2)

Denormalization  The process of transforming normalized relations into non-normalized physical record specifications. (5)

Dependent data mart  A data mart filled exclusively from an enterprise data warehouse and its reconciled data. (9)

Derived attribute  An attribute whose values can be calculated from related attribute values. (2)

Derived data  Data that have been selected, formatted, and aggregated for end-user decision support applications. (9)

Determinant  The attribute on the left side of the arrow in a functional dependency. (4)

Disjoint rule  A rule that specifies that an instance of a supertype may not simultaneously be a member of two (or more) subtypes. (3)

Disjointness constraint  A constraint that addresses whether an instance of a supertype may simultaneously be a member of two (or more) subtypes. (3)

Distributed database  A single logical database that is spread physically across computers in multiple locations that are connected by a data communication link. (12)

Dynamic SQL  Specific SQL code generated on the fly while an application is processing. (7)

Dynamic view  A virtual table that is created dynamically upon request by a user. A dynamic view is not a temporary table. Rather, its definition is stored in the system catalog, and the contents of the view are materialized as a result of an SQL query that uses the view. It differs from a materialized view, which may be stored on a disk and refreshed at intervals or when used, depending on the RDBMS. (6)

Embedded SQL  Hard-coded SQL statements included in a program written in another language, such as C or Java. (7)

Encapsulation  The technique of hiding the internal implementation details of an object from its external view. (13)

Encryption  The coding or scrambling of data so that humans cannot read them. (11)

Enhanced entity-relationship (EER) model  A model that has resulted from extending the original E-R model with new modeling constructs. (3)

Enterprise data modeling  The first step in database development, in which the scope and general contents of organizational databases are specified. (1)

Enterprise data warehouse (EDW)  A centralized, integrated data warehouse that is the control point and single source of all data made available to end users for decision support applications. (9)

Enterprise key  A primary key whose value is unique across all relations. (4)

Enterprise resource planning (ERP)  A business management system that integrates all functions of the enterprise, such as manufacturing, sales, finance, marketing, inventory, accounting, and human resources. ERP systems are software applications that provide the data necessary for the enterprise to examine and manage its activities. (1)

Entity  A person, a place, an object, an event, or a concept in the user environment about which the organization wishes to maintain data. (1, 3)

Entity class  A class that represents a real-world entity. (w14)

Entity cluster  A set of one or more entity types and associated relationships grouped into a single abstract entity type. (3)

Entity instance  A single occurrence of an entity type. (2)

Entity integrity rule  A rule that states that no primary key attribute (or component of a primary key attribute) may be null. (4)

Entity type  A collection of entities that share common properties or characteristics. (2)

Entity-relationship diagram (E-R diagram, or ERD)  A graphical representation of an entity-relationship model. (2)

Entity-relationship model (E-R model)  A logical representation of the data for an organization or for a business area, using entities for categories of data and relationships for associations between entities. (2)

Equi-join  A join in which the joining condition is based on equality between values in the common columns. Common columns appear (redundantly) in the result table. (7)

Exclusive lock (X lock, or write lock)  A technique that prevents another transaction from reading and therefore updating a record until it is unlocked. (11)

Extensible Markup Language (XML)  A text-based scripting language used to describe data structures hierarchically, using HTML-like tags. (8)

Extensible Stylesheet Language Transformation (XSLT)  A language used to transform complex XML documents and also used to create HTML pages from XML documents. (8)

Extent  A contiguous section of disk storage space. (5)
Fact  An association between two or more terms. (2)
Failure transparency  A design goal for a distributed database, which guarantees that either all the actions of each transaction are committed or else none of them is committed. (12)
Fat client  A client PC that is responsible for processing presentation logic, extensive application and business rules logic, and many DBMS functions. (8)
Fetching strategy  A model for specifying when and how an ORM framework retrieves persistent objects to the run-time memory during a navigation process. (14)
Field  The smallest unit of application data recognized by system software. (5)
File organization  A technique for physically arranging the records of a file on secondary storage devices. (5)
First normal form (1NF)  A relation that has a primary key and in which there are no repeating groups. (4)
Foreign key  An attribute in a relation that serves as the primary key of another relation in the same database. (4)
Forward recovery (rollforward)  A technique that starts with an earlier copy of a database. After images (the results of good transactions) are applied to the database, and the database is quickly moved forward to a later state. (11)
Fourth normal form (4NF)  A normal form of a relation in which the relation is in BCNF and contains no multivalued dependencies. (8)
Function  A stored subroutine that returns one value and has only input parameters. (7)
Functional dependency  A constraint between two attributes in which the value of one attribute is determined by the value of another attribute. (4)
Generalization  The process of defining a more general entity type from a set of more specialized entity types. (3)
Global transaction  In a distributed database, a transaction that requires reference to data at one or more nonlocal sites to satisfy the request. (w12)
Grain  The level of detail in a fact table, determined by the intersection of all the components of the primary key, including all foreign keys and any other primary key elements. (9)
Hash index table  A file organization that uses hashing to map a key into a location in an index, where there is a pointer to the actual data record matching the hash key. (5)
Hashed file organization  A storage system in which the address for each record is determined using a hashing algorithm. (5)
Hashing algorithm  A routine that converts a primary key value into a relative record number or relative file address. (5)
Heartbeat query  A query submitted by a DBA to test the current performance of a database or to predict the response time for queries that have promised response times. Also called a canary query. (11)
Homonym  An attribute that may have more than one meaning. (4)
Horizontal partitioning  Distribution of the rows of a logical relation into several separate tables. (5)
Identifier  An attribute (or combination of attributes) whose value distinguishes instances of an entity type. (2)
Identifying owner  The entity type on which the weak entity type depends. (2)
Identifying relationship  The relationship between a weak entity type and its owner. (2)
Inconsistent read problem  An unrepeatable read, one that occurs when one user reads data that have been partially updated by another user. (11)
Incremental extract  A method of capturing only the changes that have occurred in the source data since the last capture. (10)
Independent data mart  A data mart filled with data extracted from the operational environment, without the benefit of a data warehouse. (9)
Index  A table or other data structure used to determine in a file the location of records that satisfy some condition. (5)
Indexed file organization  The storage of records either sequentially or nonsequentially with an index that allows software to locate individual records. (5)
Information  Data that have been processed in such a way as to increase the knowledge of the person who uses the data. (1)
Information repository  A component that stores metadata that describe an organization’s data and data processing resources, manages the total information processing environment, and combines information about an organization’s business information and its application portfolio. (11)
Information Resource Dictionary System (IRDS)  A computer software tool that is used to manage and control access to the information repository. (11)
Informational system  A system designed to support decision making based on historical point-in-time and prediction data for complex queries or data-mining applications. (9)
Java servlet  A Java program that is stored on the server and contains the business and database logic for a Java-based application. (8)
Join  A relational operation that causes two tables with a common domain to be combined into a single table or view. (7)
Join index  An index on columns from two or more tables that come from the same domain of values. (5)
Joining  The process of combining data from various sources into a single table or view. (10)
Journalizing facility  An audit trail of transactions and database changes. (11)
Local autonomy  A design goal for a distributed database, which says that a site can independently administer and operate its database when connections to other nodes have failed. (12)
Local transaction  In a distributed database, a transaction that requires reference only to data that are stored at the site where the transaction originates. (w12)
Location transparency  A design goal for a distributed database, which says that a user (or user program) using data need not know the location of the data. (12)
Locking  A process in which any data that are retrieved by a user for updating must be locked, or denied to other users, until the update is completed or aborted. (11)
Locking level (lock granularity)  The extent of a database resource that is included with each lock. (11)
Logical data mart  A data mart created by a relational view of a data warehouse. (9)
Logical schema  The representation of a database for a particular data management technology. (1)
Master data management (MDM) Disciplines, technologies, and methods used to ensure the currency, meaning, and quality of reference data within and across various subject areas. (10)

Materialized view Copies or replicas of data, based on SQL queries created in the same manner as dynamic views. However, a materialized view exists as a table, and, thus, care must be taken to keep it synchronized with its associated base tables. (6)

Maximum cardinality The maximum number of instances of one entity that may be associated with each instance of another entity. (2)

Metadata Data that describe the properties or characteristics of end-user data and the context of those data. (1)

Method The implementation of an operation. (w13)

Middleware Software that allows an application to interoperate with other software without requiring the user to understand and code the low-level operations necessary to achieve interoperability. (8)

Minimum cardinality The minimum number of instances of one entity that may be associated with each instance of another entity. (2)

Multidimensional OLAP (MOLAP) OLAP tools that load data into an intermediate structure, usually a three- or higher-dimensional array. (9)

Multiple classification A situation in which an object is an instance of more than one class. (w13)

Multiplicity A specification that indicates how many objects participate in a given relationship. (13)

Multivalued attribute An attribute that may take on more than one value for a given entity (or relationship) instance. (2)

Multivalued dependency The type of dependency that exists when there are at least three attributes (e.g., A, B, and C) in a relation, with a well-defined set of B and C values for each A value, but those B and C values are independent of each other. (8)

N+1 selects problem A performance problem caused by too many SELECT statements generated by an ORM framework. (14)

Natural join A join that is the same as an equi-join except that one of the duplicate columns is eliminated in the result table. (7)

Normal form A state of a relation that requires that certain rules regarding relationships between attributes (or functional dependencies) are satisfied. (4)

Normalization The process of decomposing relations with anomalies to produce smaller, well-structured relations. (4)

NoSQL Short for “Not only SQL,” a class of database technology used to store and access textual and other unstructured data, using more flexible structures than the rows and columns format of relational databases. (9)

Null A value that may be assigned to an attribute when no other value applies or when the applicable value is unknown. (4)

Object An instance of a class that encapsulates data and behavior. (13)

Object diagram A graph of objects that are compatible with a given class diagram. (w13)

Object identity A property of an object that separates it from other objects based on its existence. (w14)

Object-relational impedance mismatch The conceptual differences between the object-oriented approach to application design and the relational model for database design and implementation. (14)

Object-relational mapping Definition of structural relationships between object-oriented and relational representations of data, typically to enable the use of a relational database to provide persistence for objects. (14)

Online analytical processing (OLAP) The use of a set of graphical tools that provides users with multidimensional views of their data and allows them to analyze the data using simple windowing techniques. (9)

Open database connectivity (ODBC) An application programming interface that provides a common language for application programs to access and process SQL databases independent of the particular DBMS that is accessed. (8)

Open source DBMS Free DBMS source code software that provides the core functionality of an SQL-compliant DBMS. (11)

Operation A function or a service that is provided by all the instances of a class. (13)

Operational data store (ODS) An integrated, subject-oriented, continuously updateable, current-valued (with recent history), enterprise-wide, detailed database designed to serve operational users as they do decision support processing. (9)

Operational system A system that is used to run a business in real-time, based on current data. Also called a system of record. (9)

Optional attribute An attribute that may not have a value for every entity (or relationship) instance with which it is associated. (2)

Outer join A join in which rows that do not have matching values in common columns are nevertheless included in the result table. (7)

Overlap rule A rule that specifies that an instance of a supertype may simultaneously be a member of two (or more) subtypes. (3)

Overriding The process of replacing a method inherited from a superclass by a more specific implementation of that method in a subclass. (w13)

Partial functional dependency A functional dependency in which one or more nonkey attributes are functionally dependent on part (but not all) of the primary key. (4)

Partial specialization rule A rule that specifies that an entity instance of a supertype is allowed not to belong to any subtype. (3)

Periodic data Data that are never physically altered or deleted once they have been added to the store. (9)

Persistence An object’s capability to maintain its state between application execution sessions. (14)

Persistent Stored Modules (SQL/PSM) Extensions defined in SQL:1999 that include the capability to create and drop modules of code stored in the database schema across user sessions. (7)

Physical file A named portion of secondary memory (such as a hard disk) allocated for the purpose of storing physical records. (5)

Physical schema Specifications for how data from a logical schema are stored in a computer’s secondary memory by a database management system. (1)

Pointer A field of data indicating a target address that can be used to locate a related field or record of data. (5)

Polymorphism The ability of an operation with the same name to respond in different ways depending on the class context. (13)

Pooling of database connections The process of using a limited number of database connections that are shared by multiple applications and users. (w14)
**Primary key** An attribute or a combination of attributes that uniquely identifies each row in a relation. (4)

**Procedure** A collection of procedural and SQL statements that are assigned a unique name within the schema and stored in the database. (7)

**Project** A planned undertaking of related activities to reach an objective that has a beginning and an end. (1)

**Prototyping** An iterative process of systems development in which requirements are converted to a working system that is continually revised through close work between analysts and users. (1)

**Query operation** An operation that accesses the state of an object but does not alter the state. (w13)

**Real-time data warehouse** An enterprise data warehouse that accepts near-real-time feeds of transactional data from the systems of record, analyzes warehouse data, and in near-real-time relays business rules to the data warehouse and systems of record so that immediate action can be taken in response to business events. (9)

**Reconciled data** Detailed, current data intended to be the single, authoritative source for all decision support applications. (9)

**Recovery manager** A module of a DBMS that restores the database to a correct condition when a failure occurs and then resumes processing user questions. (11)

**Recursive foreign key** A foreign key in a relation that references the primary key values of the same relation. (4)

**Referential integrity constraint** A rule that states that either each foreign key value must match a primary key value in another relation or the foreign key value must be null. (4)

**Refresh mode** An approach to filling a data warehouse that involves bulk rewriting of the target data at periodic intervals. (10)

**Relation** A named two-dimensional table of data. (4)

**Relational database** A database that represents data as a collection of tables in which all data relationships are represented by common values in related tables. (1)

**Relational database (RDBMS)** A database management system that manages data as a collection of tables in which all data relationships are represented by common values in related tables. (6)

**Relational OLAP (ROLAP)** OLAP tools that view the database as a traditional relational database in either a star schema or other normalized or denormalized set of tables. (9)

**Relationship instance** An association between (or among) entity instances where each relationship instance associates exactly one entity instance from each participating entity type. (2)

**Relationship type** A meaningful association between (or among) entity types. (2)

**Replication transparency** A design goal for a distributed database, which says that although a given data item may be replicated at several nodes in a network, a developer or user may treat the data item as if it were a single item at a single node. Also called fragmentation transparency. (12)

**Repository** A centralized knowledge base of all data definitions, data relationships, screen and report formats, and other system components. (1)

**Required attribute** An attribute that must have a value for every entity (or relationship) instance with which it is associated. (2)

**Restore/rerun** A technique that involves reprocessing the day’s transactions (up to the point of failure) against the backup copy of the database. (11)

**Scalar aggregate** A single value returned from an SQL query that includes an aggregate function. (6)

**Schema** A structure that contains descriptions of objects created by a user, such as base tables, views, and constraints, as part of a database. (6)

**Second normal form (2NF)** A relation in first normal form in which every nonkey attribute is fully functionally dependent on the primary key. (4)

**Secondary key** One field or a combination of fields for which more than one record may have the same combination of values. Also called a nonunique key. (5)

**Selection** The process of partitioning data according to predefined criteria. (10)

**Semijoin** A joining operation used with distributed databases in which only the joining attribute from one site is transmitted to the other site, rather than all the selected attributes from every qualified row. (12)

**Separation of concerns** The approach of dividing an application or a system into feature or behavior sets that overlap with each other as little as possible. (w14)

**Sequential file organization** The storage of records in a file in sequence according to a primary key value. (5)

**Serialization** The writing of an object onto a storage medium or a communication channel as a data stream. (w14)

**Service-oriented architecture (SOA)** A collection of services that communicate with each other in some manner, usually by passing data or coordinating a business activity. (8)

**Shared lock (S lock, or read lock)** A technique that allows other transactions to read but not update a record or another resource. (11)

**Simple (or atomic) attribute** An attribute that cannot be broken down into smaller components that are meaningful to the organization. (2)

**Simple Object Access Protocol (SOAP)** An XML-based communication protocol used for sending messages between applications via the Internet. (8)

**Smart card** A credit card–sized plastic card with an embedded microprocessor chip that can store, process, and output electronic data in a secure manner. (11)

**Snowflake schema** An expanded version of a star schema in which dimension tables are normalized into several related tables. (9)

**Specialization** The process of defining one or more subtypes of the supertype and forming supertype/subtype relationships. (3)

**Star schema** A simple database design in which dimensional data are separated from fact or event data. A dimensional model is another name for a star schema. (9)

**State** An object’s properties (attributes and relationships) and the values those properties have. (13)

**Static extract** A method of capturing a snapshot of the required source data at a point in time. (10)

**Strong entity type** An entity that exists independently of other entity types. (2)

**Subtype** A subgrouping of the entities in an entity type that is meaningful to the organization and that shares common attributes or relationships distinct from other subgroupings. (3)
Synchronous distributed database

Transaction log

Transaction manager

Transient data

Transitive dependency

Transparent persistence

Trigger

Two-phase commit

Two-phase locking protocol

Update mode

Update operation

User view

User-defined data type (UDT)

User-defined procedures

Value type

Vector aggregate

Versioning

Vertical partitioning

Subtype discriminator

Supertype

Supertype/subtype hierarchy

Surrogate primary key

Synonyms

System catalog

Systems development life cycle (SDLC)

Tablespace

Third normal form (3NF)

Three-tier architecture

Time stamp

Time-stamping

Total specialization rule

Transaction

Transaction boundaries

Transaction log

Transaction manager

Transient data

Transitive dependency

Transparent persistence

Trigger

Two-phase commit

Two-phase locking protocol

Update mode

Update operation

User view

User-defined data type (UDT)

User-defined procedures

Value type

Vector aggregate

Versioning

Vertical partitioning

Subtype discriminator An attribute of a supertype whose values determine the target subtype or subtypes. (3)

Supertype A generic entity type that has a relationship with one or more subtypes. (3)

Supertype/subtype hierarchy A hierarchical arrangement of supertypes and subtypes in which each subtype has only one supertype. (3)

Surrogate primary key A serial number or other system-assigned primary key for a relation. (4)

Synchronous distributed database A form of distributed database technology in which all data across the network are continuously kept up to date so that a user at any site can access data anywhere on the network at any time and get the same answer. (w12)

Synonyms Two (or more) attributes that have different names but the same meaning. (4)

System catalog A system-created database that describes all database objects, including data dictionary information, and also includes user access information. (11)

Systems development life cycle (SDLC) The traditional methodology used to develop, maintain, and replace information systems. (1)

Tablespace A named logical storage unit in which data from one or more database tables, views, or other database objects may be stored. (5)

Term A word or phrase that has a specific meaning for the business. (2)

Ternary relationship A simultaneous relationship among the instances of three entity types. (2)

Thin client An application where the client (PC) accessing the application primarily provides the user interfaces and some application processing, usually with no or limited local data storage. (8)

Third normal form (3NF) A relation that is in second normal form and has no transitive dependencies. (4)

Three-tier architecture A client/server configuration that includes three layers: a client layer and two server layers. Although the nature of the server layers differs, a common configuration contains an application server and a database server. (8)

Time stamp A time value that is associated with a data value, often indicating when some event occurred that affected the data value. (2)

Time-stamping In distributed databases, a concurrency control mechanism that assigns a globally unique time stamp to each transaction. Time-stamping is an alternative to the use of locks in distributed databases. (w14)

Total specialization rule A rule that specifies that each entity instance of a supertype must be a member of some subtype in the relationship. (3)

Transaction A discrete unit of work that must be completely processed or not processed at all within a computer system. Entering a customer order is an example of a transaction. (11)

Transaction boundaries The logical beginning and end of a transaction. (11)

Transaction log A record of the essential data for each transaction that is processed against the database. (11)
Virtual table  A table constructed automatically as needed by a DBMS. Virtual tables are not maintained as real data. (6)

Weak entity type  An entity type whose existence depends on some other entity type. (2)

Web services  A set of emerging standards that define protocols for automatic communication between software programs over the Web. Web services are XML based and usually run in the background to establish transparent communication among computers. (8)

Web Services Description Language (WSDL)  An XML-based grammar or language used to describe a Web service and specify a public interface for that service. (8)

Well-structured relation  A relation that contains minimal redundancy and allows users to insert, modify, and delete the rows in a table without errors or inconsistencies. (4)

XML Schema Definition (XSD)  Language used for defining XML databases that has been recommended by the World Wide Web Consortium (W3C). (8)

XPath  One of a set of XML technologies that supports XQuery development. XPath expressions are used to locate data in XML documents. (8)

XQuery  An XML transformation language that allows applications to query both relational databases and XML data. (8)