Glossary

1:1 Shorthand for a one-to-one relationship.

1:M Shorthand for a one-to-many relationship.

A

Abstract class A class from which no objects are created.

Abstract data type In an object-oriented environment, a user-defined data type; a class.

Accessor method A function that returns the values of private data stored about an object.

Aggregate function A SQL function—for example, AVG and SUM—that computes a variety of measures based on values in one or more numeric columns.

Aggregation In an object-oriented environment, a class that manages objects created from another class.

All-key relation A relation in which every column is part of the primary key.

American National Standards Institute (ANSI) The US body that approves standards for many items, including the SQL data manipulation language.

Array In a SQL database, an ordered collection of elements of the same data type, stored in a single column and row of a table.

Assertion A constraint that is not attached to a table, but is instead a distinct database object. It therefore can be used to enforce rules that apply to multiple tables or to verify that tables are not empty.

Attribute Data that describes an entity; the formal term for a column in a relation.

Authorization matrix A database system table that contains information about which users have access to which parts of the database. The DBMS consults the authorization matrix before performing user data manipulation requests.

B

Base class A class at the "general" end of an inheritance relationship; a parent class.

Base table Relations whose data are physically stored in a database.

Before-image file A file that contains images of every action taken by a transaction and is used to undo actions when a transaction is rolled back.

Binary large object (BLOB) A column data type specifying that the column will show the contents of a file (text and/or graphics) in its binary representation, without being searchable or readable in any way by the DBMS.

Black hat hackers Hackers who break into a computer system for profit or with a desire to do harm.

Buffer overflow attack An attempt to gain unauthorized control over a computer system by exploiting a programming error in an application or system program.

C

Candidate key A column or combination of columns that can be used as the primary key of a relation.

Cardinality (of a relationship) The type of relationship (one-to-one, one-to-many, or many-to-many).

Case sensitive Aware of the difference between upper- and lower-case letters.

Catalog Another term for a data dictionary.

Class A declaration of data and methods that describe a single entity and that will be used as a template to create objects.

Circular inclusion constraint A constraint on a relation that specifies that if a row is added to a specific table, rows must be added to one or more other tables.

Client/server architecture System architecture where processing tasks are shared between server and client computers.

Cluster (noSQL) A collection of commodity computers that are networked together to store a single database.

Cluster (SQL) A group of catalogs. Cluster definition is specific to a given DBMS.

Clustering Physically storing foreign key rows close to the primary key rows they reference to improve database performance.

Clustering Physically storing foreign key rows close to the primary key rows they reference to improve database performance.

CODASYL database A database that adheres to the CODASYL database standard.

Column homogeneous A property of a relation stating that all the values in a given column are taken from the same domain.

Commit (a transaction) End a transaction by making its changes permanent.

Committee on Data Systems Languages (CODASYL) A committee of government and industry technologists that developed the COBOL programming language and a standard for a simple network database.

Common table expression (CTE) A virtual table created by a SQL query that is used as the data source for another query. Unlike a view, the definition of a CTE is not stored in the database and must be used immediately after it is created.

Complex network data model A navigational data model that permits direct many-to-many relationships as well as one-to-many and one-to-one relationships.

Composite entity An entity that exists to represent the relationship between two other entities. It may have relationship data as attributes.

Composition A relationship between two classes where objects created from one class are part of objects created from the other.

Computer-aided software engineering (CASE) tool A software package that provides specialized tools for software and database modeling diagrams.

Concatenated foreign key A foreign key made up of two or more columns that references a concatenated primary key.

Concatenated identifier An entity identifier made up of a combination of values from multiple attributes.

Concatenated primary key A primary key made up of the combination of two or more columns.

Concatenation Combining two strings by placing one at the end of the other.

Concrete class A class from which objects are created.

Concurrency control Mechanisms to ensure that a database remains consistent and accurate during concurrent use.

Concurrent execution The simultaneous handling of multiple transactions by a single database.

Concurrent use Multiple users working with the same database at the same time.

Conforming parser Software that can read an XML document to determine whether the document is well-formed.

Connect (to a database) Establish a user session with a database.

Container class In an object-oriented environment, a class that manages groups of objects created from another class.

Constraint A rule to which data in a database must adhere.

Constructor In an object-oriented environment, a method that is executed automatically every time an object is created from a class.

Context diagram The top-level diagram in a data flow diagram that shows the environmental context in which the information system exists.

Control class A class that controls the operational flow of an object-oriented program.

Correlated subquery A subquery that a DBMS cannot process completely before turning to the outer query. The DBMS must execute the subquery repeatedly for every row in the outer query.

Correlation name An alias for a table used in a SQL query.

Currency indicator A system value kept by a navigational database to indicate a transaction's current position in the database hierarchy.

Cyberterrorists Hackers who are motivated by a political, religious, or philosophical agenda.

Cylinder The same track on all surfaces in a stack of platters in a hard disk.

D

Data definition language A special purpose computer language used to define the schema of a navigational database.

Data dictionary A repository that describes the data stored in a database along with definitions of data relationships.

Data dictionary driven A property of relational databases in which all access to stored data is preceded by access to the data dictionary to determine if the requested data elements exist and if the user has the access rights to perform the requested action.

Data flow The path taken by data as they are processed throughout an organization.

Data flow diagram (DFD) A graphic method for documenting the flow of data within an organization.

Data mart A small data warehouse.

Data model The formal way of expressing relationships in a database.

Data store A place where data are stored.

Data warehouse A repository of transaction and nontransaction data used for querying, reporting, and corporate decision making.

Database A collection of data and information about the relationships among those data.

Database administrator (DBA) A person who has the responsibility for maintaining a database.

Database key In a CODASYL database, an internal pointer to the physical storage location of a record occurrence in a file.

Database key In a DBMS-controlled database, an internal pointer to the physical storage location of a record occurrence in a file.

Database management system (DBMS) Software that manages the storage and retrieval of data stored in a database.

Declaration (in an XML document) A statement at the beginning of an XML document that identifies the XML version being used and, optionally, a character encoding scheme.

Deadlock A problem that occurs as a result of exclusive/writing locking where two or more transactions become stalled waiting for the release of locks held by each other.

Deletion anomaly A problem with the design of a relation such that deleting data about one entity in a row causes a part of the primary key to become null, requiring the deletion of the entire row, which may contain data that need to be retained.

Denial of service attack An attack on a computer system that attempts to prevent legitimate users from gaining access to network resources and, by extension, any database that uses that network.

Derived class A class at the "specific" end of an inheritance relationship; a child class.

Destructor In an object-oriented environment, a method that is run each time an object is destroyed (removed from main memory).

Determinant An attribute upon which other attributes are functionally dependent.

Difference A relational algebra operation that returns the rows found in one table but not in another.

Dimension table A table in a data warehouse that contains descriptive information for grouping data stored in fact tables.

Dimensional modeling The most frequently used data model for data warehouses.

Dirty read A problem with uncontrolled concurrent use of a database where a transaction acts on data that have been modified by an update transaction that hasn't committed and is later rolled back.

Disconnect (from a database) Terminate a user session with a database.

Distributed database A database where portions of the database are stored on computers at physically distributed locations. The entire database is the sum of all the parts.

Disaster recovery Activities that must take place to bring the database back into use after it has been damaged in some way.

Distribution independence A constraint on a distributed database that specifies that the database should look and act like a centralized database to users.

Divide A relational algebra operation that searches for multiple rows in a table.

Domain A specification of permissible values for an attribute.

Domain constraint A rule that requires that all values of an attribute come from a specified domain.

Drop Delete an element of database structure from a database.

E

Embedded SQL SQL statements placed within a host language, allowing SQL to be executed by application programs.

Entity Something about which we store data.

Entity class In an object-oriented environment, a class that is used to create objects that manipulate data.

Entity identifier A value (or combination of values) that uniquely identifies each occurrence of an entity in a database.

Entity integrity A constraint on a relation that states that no part of the primary key can be null.

Entity-relationship diagram (ERD) A graphic technique for representing entity relationships.

Entity-relationship (ER) model A technique for representing entity relationships that is independent of any specific data model and any specific software.

Equi-join A join based on matching identical values.

Escape character A character, usually \, that removes the special meaning of whatever follows in a literal string.

Evolutionary prototyping A form of prototyping in which successive prototypes of the software are modified based on user feedback, eventually converging on the production system.

Exclusive lock A lock that gives the transaction holding the lock the exclusive right to read and write a portion of the database.

Extensible markup language (XML) A platform-independent markup language for specifying the structure of data in a text document used for both data storage and the transfer of data.

Extract-transform-load The process of taking data from operational databases (and optionally external sources), modifying the data to meet the requirements of a data warehouse, and loading the data into the warehouse.

F

Fact table A table used in dimensional modeling to contain summarizable facts.

Field In a file processing system, the smallest unit of meaningful data, such as a first name or street address.

File processing system A system that handles data by storing them in data files and then manipulating the files through application programs.

Firewall A piece of software that filters incoming and outgoing network traffic and stops messages that violate the rules that define allowable traffic.

Foreign key (FK) An attribute (or combination of attributes) in a relation that is the same as the primary key of another relation. A foreign key may be a non-key attribute in its own relation or it may be part of a concatenated primary key.

Frame (in a windowing query) A portion of a windowing query's window that "slides" to present to the DBMS the rows that share the same value of the partitioning criteria.

Function A small program that performs one task and returns a single value. It may be built into the SQL language or written by a user, database administrator, or application programmer.

Functional dependency A relationship between two attributes (or a concatenation of attributes and another attribute) in a relation such that for every unique value of the second attribute, the table contains only one value of the first attribute (or concatenation of attributes). The first attribute, however, may be associated with multiple values of the second attribute.

G

Get method A function that returns the values of private data stored about an object.

Grant Give access rights to database elements to users. The user that creates a database element has all rights to that element. Other users have no access unless they are specifically granted access rights.

Granularity (of a lock) The size of the portion of a database to which a lock is applied.

Grouping query A query that groups rows of data based on common values in one or more columns and that optionally computes summary values from each group.

H

Hashing A technique for providing fast access to data based on a key value by determining the physical storage location of those data.

Hierarchical data model A legacy data model where all relationships are one-to-many or one-to-one and entities at the "many" end of a relationship can be related to only one entity at the "one" end of the relationship.

Hierarchy A structure for data relationships where all relationships are one-to-many and no child entity may have more than one parent entity.

Horizontal portioning Splitting the rows of a table between multiple tables with the same structure to improve database performance.

I

Identifier chain The fully qualified name of an element in a SQL database, including the catalog, schema, table, and column of the element.

Immutable Unable to be changed. Wherever possible, primary keys should be immutable as long the row containing the key is in the database.

Inconsistent analysis A problem that occurs from uncontrolled concurrent use of a database where a transaction produces incorrect output because another transaction was concurrently modifying data being retrieved.

Index A data structure in a database that provides a logical ordering of data based on key values.

Indexed sequential access method (ISAM) A physical file storage technique that also provides indexes to data based on a key for fast access on that key.

Inheritance A general to specific relationship between classes in an object-oriented environment.

Inner join An equi-join.

Insertion anomaly A problem with the design of a relation such that all data for a complete primary key are not available, preventing data from being stored in the relation.

Instance (of an entity) A group of attributes that describes a single real-world occurrence of an entity.

Instance (of a relation) A relation that contains at least one row of data.

Interactive SQL Individual SQL statements entered from the keyboard and processed immediately.

Interface class In an object-oriented environment, a class that handles input and output operations.

Interleaved execution The interleaving of the actions of two or more concurrent database transactions.

Intersect A relational algebra operation that returns all rows common to two tables.

IPSec A type of security used by a virtual private network.

Isolation level The degree to which a transaction can view data modified by other transactions running concurrently.

J

Join A relational algebra operation that combines two relations horizontally by matching values between the two tables. Most valid joins involve

matching primary key values to foreign key values.

Join dependency The most general form of dependency between attributes in a relation such that a table can be put together correctly by joining two or more tables, all of which contain only attributes from the original table.

L

Legacy database A database using a prerelational data model that is still in use.

Locking Restricting access to parts of a database to specific transactions to provide concurrency control.

Logging The process of keeping an audit trail of changes made by a transaction to be used to undo the transaction should it need to be rolled back.

Lost update A problem that occurs during uncontrolled concurrent use of a database where an update made by one transaction wipes out the effect of an update made by a concurrent transaction.

M

Malware Unwanted software—such as a virus, worm, or Trojan horse—that is inadvertently loaded onto a computer and causes disruption of computer functioning.

Mandatory relationship A relationship between two entities in a database such that an instance of the second entity cannot exist in the database unless it is related to an instance of the first entity.

Many-to-many relationship (M:M or M:N) A relationship between two entities in a database such that each instance of the first entity can be related to many instances of the second and each instance of the second entity can be related to many instances of the first.

Markup language A set of special codes placed inside a text document to identify the elements of the document and optionally to give instructions to software using the document.

Message Requests for data manipulation sent from one object to another.

Metadata Data about data; the data stored in a data dictionary.

Method (class) A program module that acts on objects created from a class in an object-oriented program.

Method (SQL) A program module that is part of a user-defined data type that is used to create objects.

Modification anomaly A problem that occurs when duplicated data become inconsistent when not all occurrences of the same value are modified at the same time.

Module A group of SQL routines.

Multiset In a SQL database, an unordered collection of elements of the same data type that is stored in a single column and row.

Multivalued attribute An attribute that can contain more than one value at a time.

Multivalued dependency A general case of a functional dependency where a determinant determines a small group of values (as opposed to a single value) for each of two or more unrelated attributes.

Multi-version concurrency control A concurrency control method in which data retrievals and modifications are marked with the time they occur. Modifications are allowed if no other transaction holds an earlier timestamp on the data.

Mutually exclusive relationship A relationship between entities such that an instance of an entity can be related to an instance of either a second or third entity, but not both.

Mutator method A function that modifies the values of private data stored about an object.

N

Natural equi-join An equi-join.

Natural identifiers Entity identifiers that are unique by nature, such as invoice numbers.

Navigational data model A data model where relationships between entities are represented by physical data structures (for example, pointers or indexes) that provide the only paths for data access.

Nonprocedural A process that specifies “what” but not “how,” leaving the manner in which the result is obtained up to the DBMS.

Non-repeatable read A problem with uncontrolled concurrent use of a database that occurs when a transaction reads data for the second time and determines that the data are not the same as they were from the first read.

Normal form A set of theoretical rules to which a relation must conform.

Normalization The process of designing relations to adhere to increasingly stringent sets of rules to avoid problems with poor database design.

NoSQL Arguably, “not only SQL”; a collection of postrelational data models that do not use SQL and that are intended for fast retrieval from extremely large databases.

Null A database value, distinct from a blank or zero, meaning “unknown.”

O

O

Object An instance of a self-contained element used by an object-oriented program, containing data that describe the specific element and links to program modules that operate on the element.

Object-oriented analysis A method for viewing the interaction of data and manipulations of data that is based on the object-oriented programming paradigm.

Object-oriented paradigm A programming and database framework in which the elements in the environment are conceptualized as entities (classes). Data and programs for each class are stored together.

Object-Oriented Programming (OOP) A method for structuring a program so that it adheres to the precepts of the object-oriented paradigm.

Object-relational (OR) An environment in which object-oriented principles (for example, classes as domains) are made part of a relational database system.

One-to-many relationship (1:M) A relationship between two entities in a database such that one instance of an entity can be related to many instances of a second entity and the second entity can be related to only one instance of the first.

One-to-one (1:1) relationship A relationship between two entities in a database such that each instance of an entity is related to no more than one instance of the other entity.

Online analytical processing (OLTP) Data processing systems that are used in support of high-level organizational decision making.

Online transaction processing (OLTP) Data processing systems that handle the day-to-day operations of an organization.

Optimistic locking A concurrency control method that allows all modifications but then rolls back transactions if other transactions have modified the data.

Outer join A join that preserves all rows from both source tables. Where a new row cannot be formed by combining rows, the outer join places nulls in empty columns.

Overloading In an object-oriented environment, two methods of the same class that have the same name but different signatures (input parameters and data types).

P

Page The size of the block of data that a computer (and therefore a database) transfers between disk and main memory at one time.

Partition (in a windowing query) A set of rows for which an aggregate function will compute a summary value.

Performance tuning Making changes to the design of a database to enhance database performance.

Persistent stored module (PSM) A SQL program module that is stored within a database. It may be a trigger or a stored procedure.

Phantom read A problem with uncontrolled concurrent use of a database that occurs when a transaction reads data for the second time and determines that new rows have been inserted by another transaction.

Physical schema The underlying physical storage of a database, managed by the DBMS.

Polymorphism The redefinition of the body of a superclass method inherited by a subclass. The polymorphic method retains the same signature.

Post-relational A collection of data models developed since the introduction of the relational data model. Data models typically included in this category include object-relational, object-oriented, and NoSQL.

Precedence The order in which a DBMS evaluates operators in a predicate when multiple operators are present.

Precision The number of digits to the right of a decimal point in a number.

Predicate A statement of logical criteria against which data are evaluated during a query.

Primary key (PK) A column or combination of columns whose value uniquely identifies each row in a relation.

Procedural A process that is expressed in a step-by-step manner. It specifies “how” as well as “what.”

Procedure A SQL routine that is stored in a database and executed with the SQL CALL statement. It does not return a value.

Process (in a DFD) Something that is done to data.

Product The relational algebra operation that combines two tables by forming all possible combination of rows; the Cartesian product of two tables.

Project The relational algebra operation that creates a projection of a relation.

Projection A subset of a relation created by copying selected columns and all rows in those columns.

Prolog (of an XML document) A statement at the beginning of an XML document that identifies the XML version being used and optionally a character encoding scheme.

Prototyping A form of system development where developers prepare models of a system that are not fully functional. User feedback is used to modify the prototype or to develop a final system.

Q

Query optimizer A portion of a DBMS that determines the most efficient sequence of relational algebra operations to use to satisfy a query.

R

Read lock Control over a portion of the database given to one or more transactions that prevents other transactions from modifying the data while the locks are in place.

Reblocking In an ISAM file, rewriting the file to leave physical space on each track occupied by the file to allow the addition of records in key sequence order.

Record In a file processing system, a collection of data that describe one instance of an entity.

Recovery The process of restoring a database from a damaged or inconsistent state so that it becomes operational again.

Recursive query A query that queries itself.

Referential integrity A constraint on a relation that states that every non-null foreign key value must match an existing primary key value.

Relation The definition of a two-dimensional table with columns and rows. There is no more than one value at the intersection of each column and row (no repeating groups).

Relational algebra The set of theoretical operations used to manipulate data in a relation.

Relational calculus A set of nonprocedural operations used to manipulate relations.

Relational data model A paradigm for describing the structure of a database in which entities are represented as tables and relationships between the entities are represented by matching data.

Relationship data Data that apply to the relationship between two entities rather than to the entities themselves.

Repeating group A multivalued attribute that must be removed before the data in the group can be stored in a relational database.

Replication In a NoSQL environment, placing identical copies of a database on multiple servers.

Requirements document A document prepared as the output of a systems analysis describing the information requirements of a new or modified information system.

Restrict The more recent term for the relational algebra operation that chooses rows from a table based on evaluating data against logical criteria (a *predicate*).

Revoke Remove previously granted access rights from a user.

Roll back (a transaction) Undo the changes made by a transaction, restoring the database to the state it was in before the transaction began.

Root (of an XML hierarchy) The top node in a hierarchy, providing a single point of access to the hierarchy.

Routine The smallest unit of a SQL PSM. Typically, it performs a single action, such as updating a total or inserting a row in a table.

S

Schema The overall logical plan of a database.

Script kiddies Hackers who use prewritten software to break into computer systems.

Scope (of a temporary table) The visibility of a temporary table. Local temporary tables can be seen only by the program module that created them. Global temporary tables can be seen by the entire database session.

Select The original relational algebra term for *restrict*; the SQL command to retrieve data from a database.

Serial execution A sequence of executing concurrent transactions in which one transaction runs from start to finish before a second transaction begins.

Serializable A condition in which interleaved transactions produce the same result as they would had they run in a series.

Service-oriented architecture (SOA) A method for organizing a company's entire information system functions so that all information components are viewed as services that are provided to the organization.

Session A block of time during which a user interacts with a database.

Set In a CODASYL database, a two-level hierarchy representing one or more one-to-many relationships.

Set function A SQL function—for example, AVG or SUM—that computes a variety of measures based on values in one or more numeric columns.

Set method A function that modifies the values of private data stored about an object.

Shard In a NoSQL environment, placing unique parts of a database on multiple servers.

Sharding In a NoSQL environment, maintaining a database that has been broken into shards.

Shared lock Control over a portion of the database given to one or more transactions that prevents other transactions from modifying the data while the locks are in place.

Simple network data model A legacy data model where all relationships are one-to-many or one-to-one; a navigational data model where relationships are represented with physical data structures such as pointers.

Single-valued attribute An attribute that contains only one value at any given time.

Social engineering A nontechnological method for gaining unauthorized access to a computer system by tricking people into revealing access information.

Sorting Physically reordering the rows in a table based on the values in one or more columns.

Spiral methodology A more formal form of prototyping that uses a gradual process in which each cycle further refines the system, bringing it closer to the desired end point.

SQL injection attack An attack against a database system launched through an application program containing embedded SQL.

Stored procedure A SQL program module that is invoked by an application program using the SQL CALL command. Stored procedures are stored in the database they manipulate.

Structured design life cycle The classic model for developing an information system. It involves a sequence of activities that define and develop a new or modified system. It works best in environments where information needs are well known.

Subclass A class at the "specific" end of an inheritance relationship; a child class.

Subquery A complete SELECT statement that is part of another SELECT.

Substring A portion of a string.

Superclass A class at the "general' end of an inheritance relationship; a parent class.

System set In a CODASYL database, a special set with only one owner occurrence that is used to collect all occurrences of a single entity.

Systems analysis Conduct a needs assessment to determine what a new or modified information system should do.

T

Table A term used synonymously with *relation* in the *relational data model*.

Tag The markup device in an XML file. XML tags exist in pairs, with an opening tag before the element being identified and a closing tag after it.

Temporary table A relation whose contents are not stored in the database, but that exists only during the database session in which it was created.

Θ-join (theta-join) A join that combines two tables on some condition, which may be equality or something else such as greater than or less than.

Three-schema architecture A view of a database environment in which the logical schema provides an interface between the physical schema and user views of the database.

Three-valued logic A set of logical truth tables that include the values true, false, and unknown.

Throwaway prototyping A type of prototyping in which the prototype software is demonstrated and evaluated and then discarded. The production system is developed from scratch, based on feedback to the prototype.

Timestamping A concurrency control method in which data retrievals and modifications are marked with the time they occur. Modifications are allowed if no other transaction holds an earlier timestamp on the data.

Transaction A unit of work presented to a database.

Transitive dependency A set of functional dependencies where an attribute that is a candidate key for its relation determines a second attribute and the second attribute determines a third, producing a functional dependency between the first and third as well.

Tree In the hierarchical data mode, a single entity hierarchy.

Trigger A SQL program module that is executed when a specific data modification activity occurs. Triggers are stored in the database they manipulate.

Truncate (a table) Remove all rows from a table, leaving the structure of the table in the database's data dictionary.

Tuple The formal term for a row in a relation.

Two-phase locking A concurrency control method that begins by giving transactions shared/read locks on data and then upgrades the locks to exclusive/write locks only when the transaction is ready to modify data.

Typecast Change the data type of a value for output or use in a SQL program.

Typed table A table created as a class using a user-defined data type to define the structure of the objects to be stored in the table. Each row contains one object.

U

Uncorrelated subquery A subquery that a DBMS can process completely before processing the query in which the subquery is contained.

Unified modeling language (UML) A style of ER diagramming.

Union A relational algebra operation that combines two tables by merging their rows into the same structure.

Union compatible A property of two tables where all columns in both tables are drawn from the same logical domains.

Unit of recovery A transaction, so called because a transaction either succeeds or fails as a whole.

Updatability A property of a view that indicates whether it can be used to perform updates that can then be propagated to the base table from which it was derived.

Update anomaly A problem that occurs when duplicated data become inconsistent when not all occurrences of the same value are modified at the same time.

User-defined data type (UDT) In a SQL database, a declaration of a structured data type that can be used as the domain of a column or as an object.

V

Vertical partitioning Storing a relation as two or more tables that are projections of the original relation to improve database performance.

View A virtual table that is constructed by executing a named query that is stored as part of a database.

Virtual class A class from which no objects are created.

Virtual private network (VPN) A method providing remote access to local area networks that uses the Internet and encrypts transmissions for security.

Virtual table A table whose data exist only in main memory rather than being stored physically in the database.

W

Wait state A hold placed by a DBMS on the execution of a transaction because the transaction is unable to obtain a needed lock on a database

Wait state A hold placed by a DBMS on the execution of a transaction because the transaction is unable to obtain a needed lock on a database element, usually because the element is locked by another transaction. The transaction must wait until the lock can be placed.

Waterfall method An alternative name for the traditional structured systems development life cycle based on the idea that one step falls into another.

Weak entity An entity whose instances cannot exist in a database unless a related instance of another entity is present and related to it.

Well-formed (XML document) An XML document that conforms to the syntax rules for a correct document.

White hat hackers Hackers who break into computer systems and then report vulnerabilities to the software owner or developer. Their motives are usually to help make systems more secure.

Window A set of rows for which an aggregate function will compute a summary value.

Windowing A SQL technique for computing aggregate measures for groups of rows that also displays the individual rows in each group.

Windowing function A function that computes an aggregate measure about a partition in a windowing query.

Write lock A lock that gives the transaction holding the lock the exclusive right to read and write a portion of the database.

X

Extended (Extensible) Markup Language (XML) A way of representing data and data relationships in text files, typically for data exchange between software of different types.

XML schema A document without data that specifies the structure of an XML document.