

**CLASS 707, DATA PROCESSING: DATABASE, DATA MINING, AND FILE MANAGEMENT OR DATA STRUCTURES**

**SECTION I - CLASS DEFINITION**

This class is for computerized data processing systems and corresponding methods for the retrieval of records stored in a database or as computer files.

This class includes computerized systems for organizing and indexing of records and files in a manner that facilitate the retrieval of the records and files.

This class also includes computerized data processing means or steps for organizing and inter-relating data files (e.g., relational, object-oriented, hierarchical, entity-relational models, and data management systems categorized as data warehouses.).

This class also includes computerized data processing means or steps for maintaining, archiving, backing-up, recovering, versioning, naming and maintaining integrity of files, records, directories and databases.

Subclasses 707/600-831 were established as a result of the reclassification of 707/1-206 in January 2010. Documents from abolished subclasses 707/1-206 are in the process of being reclassified. Documents from 707/1-206 have been temporarily transferred to cross-reference art collections (XRACs) 707/999.001-999.206, pending completion of the reclassification of all documents in the abolished subclasses. Until completion of the reclassification work the XRAC 707/999.001-999.206 should also be considered.

**RELATIONSHIP WITH OTHER CLASSES**

- (1) Note. This class is directed to computerized database and file accessing and retrieval, such as hierarchical, bit-mapped and flat indexing, hashing, categorizing, and labeling. Accessing and control of a memory, per se, is classified elsewhere. Restricting access to a system, per se, is also classified elsewhere. And, prevention or detection of malicious attacks on a system is also classified elsewhere. See the search class notes in References to Other Classes, below.
- (2) Note. The combination of details of database technology with the business data processing is classified in the business art. See

search class notes in References to Other Classes, below.

- (3) Note. The combination of details of database technology with a nominal recitation of the subject matter of another class is classified herein. A particular field of use of database technology in combination with the basic subject matter of another class to affect some end other than information accessing or retrieval is classified with the subject matter of the other class, unless specifically excluded therefrom. See the search class notes in References to Other Classes, below.
- (4) Note. This class is directed to generic methods and apparatus for accessing and retrieving data housed in either databases or files. The generic steps to access and retrieve an object from an object-oriented database may be properly classified herein; however, objects themselves for an application other than database accessing and retrieving data, such as, for example an operator interface object, an icon object capable of instantiating a process, or a simulation system physical structure object are classified elsewhere. See the search class notes in References to Other Classes, below.
- (5) Note. This class area is directed to generic methods and apparatus for accessing and retrieving data from either databases or files. Nominal recitation of an environment or database application in combination with details of accessing and retrieving data, or information, is proper for this class. Details of a design environment in combination with generic or nominal database methods are classified with the environment. Examples of such "environments" include a computer aided design (CAD) and analysis tool "environments", a software development tool "environment", an image processing "environment", a desktop or other operator interface "environment" may rely on accessing and retrieving information or routines from libraries while working in the "environment". The "environments" themselves are classified elsewhere in the data processing arts. See the search class notes in References to Other Classes, below.

- (6) Note. The combination of a database accessing method and query generation method with a particular operator interface feature may be found in these subclasses. However, this class accepts only nominal recitations to operator interfaces, icons, or metaphors used in access of files and databases. Operator interface based file management tools, menus, metaphors, or objects with significant operator interface features are classified elsewhere. Operator interfaces, per se, are classified elsewhere. See the search class notes in References to Other Classes, below.
- (7) Note. Classification of data structures herein typically requires a combination of a data structure and an access or retrieval method; or, an apparatus for employing, or storing the data structure.
- (8) Note. This class is directed to means and steps for handling of generic files and databases only in computers and digital data processing systems. File content and database content authoring, generating, producing, and editing in information processing applications art areas, such as, for example, business data processing, machine translation, graphics processing, simulation, animation and software development, is classified elsewhere.
- (9) Note. This class is directed to management and maintenance of files and databases in computers and digital data processing systems. This class accepts computerized database and file accessing and retrieval, and data structures within single memories and across multiple memories. Memory accessing and control and memory management, per se, is classified elsewhere.
- (10) Note. Formatting and file allocation in memory systems, such as direct access storage systems, is generally found in the art area directed to the storage system device.
- (11) Note. This class includes operations for transforming and filtering data, data structures and schema in databases and file systems. Cryptographic transformations on data for the purpose (a) concealing or obscuring intelligible information by transforming such information so as to make the information unintelligible to a casual or unauthorized recipient, or (b) extracting intelligible information from such a concealed representation, including breaking of unknown codes and messages is classified elsewhere.
- (12) Note. This class includes operations for backing up, archiving and recovering databases and file systems. Processes or apparatus for detecting and recovering from faults in electrical computers (e.g., state recovery in a multiprocessor arrangement, recovery using a backup processor) and digital data processing systems are classified elsewhere.
- (13) Note. Data mining operations comprise aggregating and analyzing data to discover relationships and dependencies (knowledge discovery). Related detailed methods for implementing rule bases, inferences, data mining algorithms, regression analysis, and mathematical techniques are also found in Class 706.
- (14) Note. Document Management System and Workflow comprises maintaining integrity of the document itself and facilitating access to the document at all stages of the workflow.
- (15) Note. Combinations of methods and apparatus of this class with nominal recitation of artificial intelligence methods and apparatus are properly classifiable as an original in this class. More than nominal recitation of artificial intelligence processing in combination with the subject matter of this class requires careful consideration of the artificial intelligence art of class 706. See the line notes in class 706 for more details of artificial intelligence subject matter covered in class 706. Also, see the See or Search Class notes below.
- (16) Note. Database aspects of social networking may be classified in class 707. Related classes to consider for aspects of social networking include classes 705, 706, 709, 715. For example the artificial intelligence methods for discovering relationships

amongst static or dynamic data, depending on claims, may require consideration of either, or both of classes 706 and 707. For example, class 707 provides for clustering but classifiers per se that use artificial intelligence methods are in class 706. In further combination with business related transactions class 705 must be considered.

## SECTION II - REFERENCES TO OTHER CLASSES

### SEE OR SEARCH CLASS:

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| <p>235, Registers, various subclasses for basic machines and associated indicating mechanisms for ascertaining the number of movements of various devices and machines, plus machines made from these basic machines alone (e.g., cash registers, voting machines), and in combination with various perfecting features, such as printers and recording means. In addition, search Class 235 for various data bearing record controlled systems.</p> <p>345, Computer Graphics Processing and Selective Visual Display Systems, subclasses 418 through 475 for computer graphics processing, and subclasses 1.1 through 111 for visual display systems with selective electrical control including display memory organization and structure for storing image data and manipulating image data between a display memory and display device.</p> <p>358, Facsimile and Static Presentation Processing, appropriate subclasses for transmitting, processing, or reproducing a permanent picture.</p> <p>379, Telephonic Communications, various subclasses for two-way electrical communication of intelligible audio information of arbitrary content over a link including an electrical conductor.</p> <p>380, Cryptography, various subclasses for password generations, breaking of a secret code or cipher, devices to encrypt and decrypt the password, code, or cipher.</p> <p>382, Image Analysis, various subclasses for operations performed on image data with the aim of measuring a characteristic of an image, detecting variations, detecting structures, or transforming the image data, and for procedures for analyzing and categorizing patterns present in image data.</p> | <p>700, Data Processing: Generic Control Systems or Specific Applications, subclasses 1 through 89 for data processing generic control systems, and subclasses 90 through 306 for applications of computers in various environments including CAD.</p> <p>702, Data Processing, Measuring, Calibrating, or Testing, appropriate subclasses for the application of computers in measuring and testing.</p> <p>703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, subclasses 3 through 22 for data processing simulation.</p> <p>704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses 1 through 10 for linguistics, dictionaries and natural language processing.</p> <p>705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, appropriate subclasses for business data processing.</p> <p>706, Data Processing: Artificial Intelligence, appropriate subclasses for artificial intelligence, in general.</p> <p>708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 1 through 9 for hybrid computers, subclasses 100 through 714 for calculators, digital signal processing and arithmetical processing, per se, and subclasses 800 through 854 for electric analog computers.</p> <p>709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring, appropriate subclasses for networking.</p> <p>711, Electrical Computers and Digital Processing Systems: Memory, for garbage collection, per se, in addition, subclasses 1 through 6 for addressing particular memory configurations and systems, subclasses 100 through 173 for memory accessing and control, per se, (in particular subclasses 113 for disk caching, subclasses 117 through 146 for hierarchical memory, per se, (including caching), subclasses 147 through 153 for shared memory accessing and control, subclasses 154 through 166 for memory control, maintenance and management techniques (including subclasses 161 and 162 for archiving and backup under memory accessing and subclasses 163 and 164 for memory access limiting), and subclasses 170 through 173 for memory configuring and allocation), and subclasses 200 through 221 for address formation processing, particularly subclass 216 for address hashing.</p> |
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- 713, Electrical Computers and Digital Processing Systems: Support, appropriate subclasses for system access control and multiple computer communication in combination with cryptography, and synchronizing clocks.
- 714, Error Detection/Correction and Fault Detection/Correction, subclasses 1 through 57 , and 100 for data processing system error or fault handling including state recovery.
- 715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclasses 200 through 277 for document processing performed by a computer for presentation including annotation and document editing, and subclasses 700 through 866 for operator interface processing.
- 717, Data Processing: Software Development, Installation, and Management, appropriate subclasses for data processing software development tool.
- 725, Interactive Video Distribution Systems, appropriate subclasses for video distribution, billing and the user interface.
- 726, Information Security, subclass 1 for policy, subclasses 2 through 21 for access control and authentication, subclasses 22 through 25 for monitoring or scanning of software or data including attack prevention, subclasses 26 through 33 for prevention of unauthorized use of data including prevention of piracy, privacy violations or unauthorized data modification.
- Data structure or file organizational format storing bits in a spatial map.
- COMPUTER**
- A machine that inputs data, processes data, stores data, and outputs data.
- CONCEPT-RELATION-CONCEPT (CRC) TRIPLES**
- A logical structure for storing data representative of real-world knowledge through the use of objects or concepts (stored as nodes), and relationships between them (stored as links between the nodes). When combined, they can form large semantic networks, or ontologies. See also Ontology, Semantic Network and Taxonomy.
- DATA**
- Representation of information in a coded manner suitable for communication, interpretation, or processing.
- DATABASE**
- A collection of data arranged for ease of storage, retrieval, updating, searching and sorting by computerized means. Storage and organization of data, examples of a database include relational model based, hierarchical, or object oriented.
- DATABASE MANAGEMENT SYSTEM (DBMS)**
- A suite of software that is designed to manage the organization, storage and retrieval of data within a database.

### SECTION III - GLOSSARY

#### ACTIVE

Active is used in the definition to distinguish between LIVE. An active database is online and can receive updates but is not being used by users, per se, for responding to queries.

#### BINARY LARGE OBJECTS (BLOBS)

An object for storing a large amount of binary data within a database management system. BLOBs are often used to store media or multimedia data. Because of its size, it is sometimes stored external to a database management system, with the DBMS storing only references to the BLOB. See also LOBs.

#### BITMAP

#### DATABASE TRIGGER

Trigger is procedural code that is automatically executed in response to certain events on a particular table in a database

#### DATA MART

Small logical units (subsets) of the larger data warehouse, they typically provide specific access points to portions of the warehouse.

#### DATA STRUCTURE

A physical or logical relationship among a set of data elements designed to support specific data manipulation functions in a computerized data processing system.

**DIGITAL DATA PROCESSING SYSTEM**

An arrangement of processor(s) in combination with either memory or peripherals, or both, performing data processing.

**EXTENSIBLE MARKUP LANGUAGE (XML)**

A markup language that allows a user to create custom annotations (tags) and to define those custom annotations for use in indicating the structure, formatting, or display instructions for a given section of text or data. It is commonly used as an intermediate format for transferring data between applications.

**FEATURE**

A character, word or phrase that is part of a search query used in search ranking.

**FILE**

A named collection of data.

**FILTER**

A technique or program for removing unrequested or specifically identified data from results thereby controlling data output.

**INDEX**

An organized structure used for improving the speed for which data can be accessed.

**JOURNAL (SEE ALSO LOG)**

A historical record of transactions and activities related to the database or file system.

**LARGE OBJECTS (LOBs)**

An object for storing a large amount of data within a database management system. Because of its size, it is sometimes stored external to a database management system, with the DBMS storing only references to the LOB. See also BLOBs.

**LIVE**

Live is used in the definitions to distinguish between Active. A live database is online, is responding to trans-

actions (e.g., it is receiving updates) and can be in use by users, for example, is responsive to queries.

**LOG (SEE ALSO JOURNAL)**

A historical record of transactions and activities related to the database or file system.

**MARKUP LANGUAGE**

A language in which a set of annotations, or tags, are embedded within text. The annotations are designed to indicate the structure, formatting, or display instructions for a given section of text or data. Common examples of a Markup Language are HTML, SGML and XML. See also Extensible Markup Language and Semi-Structured Data.

**MATERIALIZED VIEW**

A cached representation (typically as a table) of query results which may be updated from the original database tables from time to time to promote efficient access and reduction in query execution time

**MEMORY**

A functional unit to which data can be stored and from which data can be retrieved.

**METADATA**

Data about data, typical examples include author of document, date, timestamp..

**ONLINE ANALYTICAL PROCESSING (OLAP)**

Software tool that provides fast analysis and reporting typically used in the data processing of data warehouse data, called data mining.

**ONTOLOGY**

A formal representation of a set of objects or concepts and the relationships between those objects or concepts, within a specific domain. Also included could be collections and attributes. In essence, an ontology is a model of the specified domain, in as much or little detail as desired. See also Concept-Relation-Concept Triples, Semantic Network and Taxonomy.

**PARSING**

An operation that breaks up a data structure or query to

smaller parts that still have value to facilitate storage or processing.

#### PROCESSING

Methods or apparatus performing systematic operations upon data or information exemplified by functions such as data or information transferring, merging, sorting, and calculating (i.e., arithmetic operations or logical operations).

- (1) Note. In this class, the glossary term data is used to modify processing in the term data processing; whereas the term digital data processing system refers to a machine performing data processing.
- (2) Note. In an effort to avoid redundant constructions, in this class, where appropriate, the term address data processing is used in place of address data processing.

#### QUERY

A request for data, typically used in database management systems to find data.

#### SCHEMA

The specification and plan followed within the database to arrange and store data.

#### SEARCH STRING

A sequence of features submitted as part of unstructured request.

#### SEMANTIC NETWORK

A directed or undirected network which represents the semantic relationships between concepts. The nodes of the graph represent concepts, and the links between nodes represent relationships between concepts. See also Concept-Relation-Concept Triples, Ontology and Taxonomy.

#### SEMI-STRUCTURED DATA

A collection of data which is formatted in a way that reflects the structural relationships between the elements of data. Sometimes the data is stored in a form that includes schema information within the data. Markup Languages, and in particular XML are examples of

semi-structured data. See also Markup Language and Extensible Markup Language.

#### STRUCTURED DATA

A collection of data stored in a form that can be readily translated to a database. The most common form of structured data is Common separated values (CSV).

#### TAXONOMY

An organization of objects or concepts to support the classification of the objects or concepts. The objects or concepts are normally related to each other through hierarchical relationships. See also Concept-Relation-Concept Triples, Ontology and Semantic Network.

#### UNSTRUCTURED DATA

A collection of data stored in a form that does not readily translate to a database. The most common form of unstructured data is text documents.

#### WAREHOUSE

A tailored repository holding large amounts of data generated by integration of various sources of data in a single consistent architecture to facilitate and support analysis, reporting, and decision operations.

#### SUBCLASSES

#### **600 DATA WAREHOUSE, DATA MART, ONLINE ANALYTICAL PROCESSING (OLAP), DECISION SUPPORT SYSTEMS:**

This subclass is indented under the class definition. Subject matter relating to database architectures that extract data from live transaction-oriented database management systems in order to create new database systems in which data can be analyzed regardless of the data's original source.

- (1) Note. OLAP systems include relational (ROLAP), multidimensional (MOLAP), and hybrid (HOLAP) systems.
- (2) Note. Transaction-oriented applications are those applications which process commercial transactions in real-time, typically including such industries as banking, airlines, mail-order and on-line sales, supermarkets and manufacturing.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

607, for online transactional processing (OLTP) systems.

SEE OR SEARCH CLASS:

706, Data Processing: Artificial Intelligence, subclasses 45 through 61 for decision support systems focused on algorithm details for the decision-making.

**601 Tools to automate schema definition process:**

This subclass is indented under subclass 600. Subject matter relating to mechanisms for specifying the structure of how the data is to be stored, particularly through the utilization of a graphical user interface.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

803, for schema definition, per se.  
805, for database, schema and/or data structure creation and/or modification via a graphical user interface.

SEE OR SEARCH CLASS:

715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclasses 700 through 867 for user interface layout, design, and presentation.

**602 Data extraction, transformation, and loading (ETL):**

This subclass is indented under subclass 600. Subject matter relating to facilities for retrieving, cleaning, preparing, converting, migrating, integrating, and/or storing data into the data warehouse.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

756, for changing the format of a data structure, or data objects, using various methods such as a translation, mapping, or altering with the purpose of facilitating further processing of the data structure or data object.

761, for converting a query from one query language to another query language.

802, for the management of data structures, including their definition and creation, modification, transformation and population.

809, for generalized transformation or conversion from one schema to another.

809, for subject matter wherein data is transferred from one schema/structure to another through the use of a logical data model.

975, for transferring of data from one database having one database schema to another database having a different database schema.

**603 Reporting, knowledge discovery (KD) systems:**

This subclass is indented under subclass 600. Subject matter including means to present information (reporting/KD systems) resulted from extracting, analyzing or manipulating large data sets or complex databases.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

776 through 778, for data mining and taxonomy discovery in nondata warehouse systems.

737 through 740, for clustering and grouping in nondata warehouse systems.

794, for semantic networks, per se.

SEE OR SEARCH CLASS:

706, Data Processing: Artificial Intelligence, subclasses 45 through 61 for knowledge processing systems including knowledge databases.

**604 Using a denormalized schema:**

This subclass is indented under subclass 600. Subject matter wherein the data is stored into a corresponding database having fewer tables but more columns in each table.

(1) Note. Some columns will contain redundant information.

SEE OR SEARCH CLASS:

706, Data Processing: Artificial Intelligence, subclass 12, 14, and 45-61 for knowledge discovery (KD) systems focused on algorithm details, such as data mining, data fusion, natural lan-

guage processing (NLP), and machine learning.

**605 Using a star schema:**

This subclass is indented under subclass 604. Subject matter relating to a star schema is utilized in the organization of its tables into a star shape, with a single centralized fact table connected to any number of dimensions which are denormalized and represented by single dimension tables.

**606 Using a snowflake schema:**

This subclass is indented under subclass 604. Subject matter relating to a snowflake schema is utilized in the organization of its tables into a snowflake shape with a centralized fact table connected to multiple dimensions which are normalized into multiple related dimension tables.

**607 ONLINE TRANSACTIONAL PROCESSING (OLTP) SYSTEM:**

This subclass is indented under the class definition. Subject matter relating to a class of programs that facilitate and manage transaction-oriented applications so that the systems are updated in real-time, current and online using a normalized schema, typically used for data entry and retrieval transactions in a number of industries.

- (1) Note. This subclass is directed to storage and organization of data to support such applications with nominal recitation of business related operations and/or data. Business oriented operations and/or data (e.g. inventory management, forecasting, accounting, and finance) is classified in Class 705.
- (2) Note. Transaction-oriented applications are those applications which process commercial transactions in real-time, typically including such industries as banking, airlines, mail-order and on-line sales, supermarkets and manufacturing.

**SEE OR SEARCH CLASS:**

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, for automated, financial, or business practice, or management systems.

**608 COLLABORATIVE DOCUMENT DATABASE AND WORKFLOW:**

This subclass is indented under the class definition. Subject matter relating to document management systems (DMS) that control access to shareable documents.

**SEE OR SEARCH CLASS:**

706, Data Processing: Artificial Intelligence, subclass 14 and 45-61 for artificial intelligence methods of agent or multiagent collaboration, blackboard systems, intelligent collaboration, and rule determination of workflow.  
715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclasses 200 through 277 for document Presentation, layout, and annotation.

**609 FILE OR DATABASE MAINTENANCE:**

This subclass is indented under the class definition. Subject matter for supporting a database and performing actions to keep a database functioning properly (i.e., upkeep of a database), wherein such actions are typically carried out on database records by the database management system.

- (1) Note. This subclass does not include memory accessing, memory control, and memory management, per se. This subject matter is classified elsewhere.
- (2) Note. This subclass does not include anything that deals with specific memory addresses, memory addressing schemes, and low-level memory operations. This subject matter is classified elsewhere.

**SEE OR SEARCH CLASS:**

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring, appropriate subclasses for multicomputer data transferring and network management and configuration.  
711, Electrical Computers and Digital Processing Systems: Memory, for memory and memory management.



- 714, Error Detection/Correction and Fault Detection/Recovery, for process or apparatus for detecting and recovering from faults in electrical computers and digital data processing systems.
- 610 Synchronization (i.e., replication):**  
This subclass is indented under subclass 609. Subject matter relating to data between multiple databases being made consistent for the purpose of ensuring coherence of copies or versions of databases, database records, files, or their associated metadata.
- (1) Note. The terms synchronization and replication are equivalent.
  - (2) Note. Database caching is for performance and synchronization if for data recovery.
  - (3) Note. This subclass is for consistency amongst plural databases. Internal consistency within a database is classified elsewhere.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
691, for internal consistency within a database.
- SEE OR SEARCH CLASS:  
709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring, subclass 248 for multi-computer synchronizing.
- 611 Synchronous:**  
This subclass is indented under subclass 610. Subject matter relating to a propagation method that involves a multi-phase commit wherein the source database system waits for the copy process to complete at the target system.
- 612 Multiway synchronization:**  
This subclass is indented under subclass 611. Subject matter relating to a database model wherein updates occur at any replica and then synchronously sent to all replicas (e.g., update anywhere and two-way updates).
- 613 Asynchronous synchronization (e.g., message or notification based):**  
This subclass is indented under subclass 610. Subject matter relating to a propagation method that involves a message or notification-based system where the source database does not wait for the target to process the copy.
- 614 Multiway synchronization:**  
This subclass is indented under subclass 613. Subject matter relating to a database model wherein updates occur at any replica and then asynchronously sent to all replicas.
- 615 Transactional replication:**  
This subclass is indented under subclass 613. Subject matter relating to updates (i.e., copies) sent as transactions that group operations on data to ensure atomicity, consistency, isolation and durability.
- 616 Merge replication:**  
This subclass is indented under subclass 613. Subject matter relating to combining changes from multiple sources and resolving conflicts to synchronize multiple sources.
- 617 Connection based synchronization:**  
This subclass is indented under subclass 610. Subject matter relating to a propagation method that requires a continuous connection between two databases wherein synchronization only occurs when the databases are connected and the synchronization process is often commenced when the connection is created.
- 618 Scheduled synchronization:**  
This subclass is indented under subclass 610. Subject matter wherein synchronization occurs at a pre-set point in time (e.g., chron job).
- 619 Background replication:**  
This subclass is indented under subclass 618. Subject matter relating to running replication without impacting other use of the database.
- 620 Synchronization environment:**  
This subclass is indented under subclass 610. Subject matter relating to the computer system environment in which synchronization occurs, wherein the environment comprises physical and logical architecture.

- 621 Portable devices:**  
This subclass is indented under subclass 620. Subject matter relating to synchronization of data between a portable device and another computer especially concerning file size, protocol and connectivity issues.
- SEE OR SEARCH CLASS:  
455, Telecommunications, appropriate subclass for operation, functions, and services of portable telecommunication devices.
- 622 Peer-to-peer:**  
This subclass is indented under subclass 620. Subject matter relating to synchronizing databases on two peer computers using direct communication, wherein each database can be a client or a server at anytime.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 45 through 61 for details on agent-based peer-to-peer interactions. Review the class 706 notes for a listing of artificial intelligence methods.  
709, Electrical Computers and Digital Processing Systems: Multi-computer Data Transferring, subclasses 227 through 237 for computer-to-computer connection and data transfer.
- 623 Master/slave:**  
This subclass is indented under subclass 620. Subject matter relating to a database model wherein updates only occur at the master database and then are sent to the slaves (i.e., one-way updates).
- SEE OR SEARCH CLASS:  
709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring, subclass 208 for master/slave computer controlling.
- 624 Incremental synchronization:**  
This subclass is indented under subclass 610. Subject matter wherein less than the whole of the data is synched per operation (i.e., only changed or updated data since last point in time is copied).
- 625 Change records or delta:**  
This subclass is indented under subclass 624. Subject matter relating to storing of information describing the change or modification between different versions of a database.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 45 through 61 for details on agent or multiagent systems.
- 626 Objects of replication:**  
This subclass is indented under subclass 610. Subject matter relating to specifying desired target data including tables, files, or records to be used in a replication process.
- 627 Publication:**  
This subclass is indented under subclass 626. Subject matter wherein a group of data including tables, records, or files are specified to be replicated to a set of targets.
- 628 Push subscriptions:**  
This subclass is indented under subclass 626. Subject matter relating to computer database systems in which a centralized distributor will establish the schedule on which connections will be made with remote subscribers.
- 629 Push-to-master:**  
This subclass is indented under subclass 628. Subject matter relating to computer database systems in which updates are sent to master and the master sends the updates to other databases (i.e., subscribers).
- 630 Push-to-nearest-neighbor:**  
This subclass is indented under subclass 628. Subject matter relating to computer database systems in which updates are sent from a publisher to closest connected database (i.e., subscriber).
- 631 Push-to-broadcast:**  
This subclass is indented under subclass 628. Subject matter relating to computer database systems in which updates are broadcast from a publisher to other databases which are subscribers.

- 632 Pull subscriptions:**  
This subclass is indented under subclass 626. Subject matter relating to computer database systems in which subscribers request updates from a publisher database.
- 633 Replication agent:**  
This subclass is indented under subclass 626. Subject matter relating to computer database systems in which a distributor or agent assists in replication of data in a database including logging history or errors.
- 634 Management, interface, monitoring and configurations of replication:**  
This subclass is indented under subclass 610. Subject matter relating to a process that oversees replication of data in a database including assigning Replica ID, change logs, demotions, promotions, replication and verification.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
654, Backup interface, scheduling and management for subject matter relating to interface for management processes that oversees backup including planning, scheduling, and reporting.  
659, Mirroring configuration and management for subject matter relating to set-up and oversight of mirroring.
- 635 Replication-to-heterogeneous database:**  
This subclass is indented under subclass 610. Subject matter relating to data that is copied to a target in different data format or data type thereby implementing updates of unlike kind for the purpose of flexibility and integration of different data systems.
- 636 Distributor management:**  
This subclass is indented under subclass 610. Subject matter relating to functionality and organization of a distributor, wherein the distributor is defined as a software or hardware entity which typically sends the replication data to the subscribers.
- 637 Optimizing replication:**  
This subclass is indented under subclass 610. Subject matter relating to improving the performance of a database replication process, wherein the improving comprises reducing
- latency, reducing resource consumption, and/or increasing throughput.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclass 14, 19, and 45-61 for optimization methods using suboptimal solutions, heuristic methods, non-linear optimizations, etc.
- 638 Replication version control (i.e., version management):**  
This subclass is indented under subclass 610. Subject matter relating to management of versions within a replication model to maintain a history of changes to the data.
- 639 Snapshot replication:**  
This subclass is indented under subclass 610. Subject matter relating to any replication process that is based on point in time (PIT) copy of the data.
- 640 Database backup:**  
This subclass is indented under subclass 609. Subject matter relating to database management systems in which a copy of data, which is usually active, can be used for restoration after an event or subject matter comprising the copying of databases, database records, files, or their associated metadata to be used for restoration after an event.
- (1) Note. The term backup typically infers that the copy made of the database, database record, file, or their associated metadata is left active.
- SEE OR SEARCH CLASS:  
711, Electrical Computers and Digital Processing Systems: Memory, subclass 161 and 162 for archiving of memory and lower application level archiving, and for backup of memory and lower application level backup, respectively.
- 641 Merging data for backup:**  
This subclass is indented under subclass 640. Subject matter relating to using multiple sources of data merged together to create a backup.

- 642 Data dump:**  
This subclass is indented under subclass 640. Subject matter relating to the ability to export database data in full at once to a flat file.
- 643 Batch:**  
This subclass is indented under subclass 640. Subject matter relating to processing changes for backup as units rather than being processed immediately on demand.
- 644 Types of backup:**  
This subclass is indented under subclass 640. Subject matter relating to different mechanisms, methodologies and structures for forming and storing a copy designed to support specific data redundancy and recoverability standards and requirements, taking into account a variety of possible system architectures.
- 645 Full backup:**  
This subclass is indented under subclass 644. Subject matter relating to a copy of all data from a source regardless of whether or not if the data has been modified or not to provide a complete copy at a target destination that facilitates easier subsequent recovery operations.
- 646 Incremental backup:**  
This subclass is indented under subclass 644. Subject matter wherein only data that changed since previous backup is processed.
- 647 Partial backup:**  
This subclass is indented under subclass 644. Subject matter relating to backing up copies of data subsets.
- 648 Transaction log backup (i.e., audit file, journal):**  
This subclass is indented under subclass 644. Subject matter relating to a type of database back-up which involves making copies of a log of change, addition, or deletion of data.
- 649 Database snapshots or database checkpointing:**  
This subclass is indented under subclass 644. Subject matter relating to backups which include point-in-time copies of data that may be used as fault tolerance technique to restart
- execution of data or database transactions upon fault.
- 650 System data backup:**  
This subclass is indented under subclass 644. Subject matter relating to a partial database back-up which involves only making copies of database or system related data, such as management records, state data and system catalogs, but not user data.
- 651 Hierarchical backup:**  
This subclass is indented under subclass 644. Subject matter relating to a storage structure of storing a backup of database data in a hierarchy of different storage media each with a different level of cost and speed of access.
- 652 Distributed backup:**  
This subclass is indented under subclass 644. Subject matter relating to a storage structure of storing the backup of database data in multiple locations.
- 653 Customized backup:**  
This subclass is indented under subclass 644. Subject matter relating to storing the database backup based on user specified criteria for data records into a user-defined storage schema.
- 654 Backup interface, scheduling and management:**  
This subclass is indented under subclass 640. Subject matter relating to interface for management processes that oversees backup including planning, scheduling, and reporting.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
634, for subject matter relating to a process that oversees replication of data in a database including assigning Replica ID, change logs, demotions, promotions, replication and verification.  
659, for subject matter relating to set-up and oversight of mirroring.
- 655 Database mirroring:**  
This subclass is indented under subclass 640. Subject matter relating to a full copy of a database is maintained at another site, generally limited to databases and database management systems and how to store the data.

- (1) Note. This subclass excludes recovery of the redundant structures.

SEE OR SEARCH CLASS:

- 706, Data Processing: Artificial Intelligence, subclasses 45 through 61 for methods focusing on rule-based systems.
- 709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring, appropriate subclasses for storage management including Storage Area Network (SAN), and Network based storage (NAS).
- 711, Electrical Computers and Digital Processing Systems: Memory, subclass 161 and 162 for archiving of memory and lower application level archiving, and for backup of memory and lower application level backup, respectively, appropriate subclasses for RAID and volume management.
- 714, Error Detection/Correction and Fault Detection/Recovery, subclasses 6.1 through 6.32 for reliability and availability by redundant stored data access on a network.

**656 Synchronous mirroring:**

This subclass is indented under subclass 655. Subject matter relating to maintaining a full copy of data in another site in real-time that includes updating both copies of the database before a write is confirmed thus keeping data sets in synch.

**657 Copy-on-write:**

This subclass is indented under subclass 656. Subject matter relating to a concept that includes creating a snapshot (i.e., a dynamic backup copy) of the data just before modifying it so that the database can be restored at any given point in time.

**658 Asynchronous mirroring:**

This subclass is indented under subclass 655. Subject matter relating to maintaining a full copy of data in another site updated periodically.

- 659 Mirroring configuration and management:**  
This subclass is indented under subclass 655. Subject matter relating to set-up and oversight of mirroring.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 654, for subject matter relating to interface for management processes that oversees backup including planning, scheduling, and reporting.
- 659, for subject matter relating to set-up and oversight of mirroring.

**660 Mirroring optimization:**

This subclass is indented under subclass 655. Subject matter relating to improving the mirroring process which comprises reducing latency, reducing resource consumption, or increase availability of mirrored copies.

**661 Database archive:**

This subclass is indented under subclass 609. Subject matter relating to database management systems in which a copy of databases, database records, files, or their associated metadata is to be used as a record or history for the purpose of long-term storage.

- (1) Note. The term archive typically infers that the copy made of the database, database record, file, or their associated metadata is left not active.

SEE OR SEARCH CLASS:

- 711, Electrical Computers and Digital Processing Systems: Memory, subclass 161 and 162 for archiving of memory and lower application level archiving, and for backup of memory and lower application level backup, respectively.

**662 Deletion, retention or expiration of archive records:**

This subclass is indented under subclass 661. Subject matter relating to management of archived records and rules for how long data is to be kept in the archive.

**663 Deletion due to expiration:**

This subclass is indented under subclass 662. Subject matter relating to removing data from the archive after a set amount of time.

- 664 Deletion due to duplication:**  
This subclass is indented under subclass 662. Subject matter relating to removing redundant data from the archive.
- 665 Rules for archiving:**  
This subclass is indented under subclass 661. Subject matter relating to criteria for when to move which data into an archive.
- 666 Records that have expired in the database:**  
This subclass is indented under subclass 665. Subject matter relating to temporal based rules for automatically moving data to the archive.
- 667 Means for or methods of archiving:**  
This subclass is indented under subclass 661. Subject matter relating to different mechanisms, methodologies and structures for moving data to off-line storage, designed to support specific data redundancy and recoverability standards and requirements, taking into account a variety of possible system architectures.
- 668 Automatic archiving:**  
This subclass is indented under subclass 667. Subject matter relating to scheduling the movement of data to occur without additional user action, for example at a given time or on a given event.
- 669 Data dump:**  
This subclass is indented under subclass 668. Subject matter relating to automatic archiving of a database being created by exporting data to the archive periodically.
- 670 Transparently archiving data:**  
This subclass is indented under subclass 668. Subject matter relating to automatic database archives being created without interrupting the operations of a user or a client.
- 671 Manual archiving:**  
This subclass is indented under subclass 667. Subject matter involving manual selection of data from a database to be archived and its archival destination.
- 672 Log of the archive:**  
This subclass is indented under subclass 661. Subject matter relating to a record of data moved into the archive and its associated meta-data.
- 673 Indexing the archive:**  
This subclass is indented under subclass 661. Subject matter relating to creating an index of archive data as an ordered list of search key values and pointers.
- 674 Database recovery:**  
This subclass is indented under subclass 609. Subject matter wherein a database, database record, or associated metadata is restored to a desired consistent state.
- (1) Note. This subclass excludes the underlying hardware, processors and RAID.
- (2) Note. This subclass excludes system failures or physical failures.
- SEE OR SEARCH CLASS:
- 711, Electrical Computers and Digital Processing Systems: Memory, subclass 161 and 162 for archiving of memory and lower application level archiving, and for backup of memory and lower application level backup, respectively.
- 714, Error Detection/Correction and Fault Detection/Recovery, subclasses 2 through 20 and 748 for fault recovery including physical and data system recovery and disaster recovery, failure of devices and physical errors.
- 675 Database recovery model:**  
This subclass is indented under subclass 674. Subject matter relating to the establishment and implementation of restoring data (i.e., defining what is involved in restoring data).
- 676 Full database recovery:**  
This subclass is indented under subclass 675. Subject matter relating to the recovery model that uses point in time logging of all transactions to allow for recovery to any point in time.

- 677 Simple database recovery:**  
This subclass is indented under subclass 675. Subject matter relating to the recovery model including restoring data in a database to a point in time of the last backup without using an update log.
- 678 Database recovery phase:**  
This subclass is indented under subclass 674. Subject matter relating to a specific stage (e.g., redo, restore, undo) in a recovery process.
- 679 Database restore:**  
This subclass is indented under subclass 678. Subject matter directed to the restore phase in the recovery process.
- SEE OR SEARCH CLASS:  
714, Error Detection/Correction and Fault Detection/Recovery, appropriate subclasses for state transitions
- 680 Complete database restore:**  
This subclass is indented under subclass 679. Subject matter relating to restoring and recovering an entire database as a whole.
- SEE OR SEARCH CLASS:  
714, Error Detection/Correction and Fault Detection/Recovery, appropriate subclasses for diagnostics and analysis of failures
- 681 Differential database restore:**  
This subclass is indented under subclass 679. Subject matter relating to recovering data copies of all modified data after the last full backup.
- 682 Restoring backups of transaction log:**  
This subclass is indented under subclass 679. Subject matter relating to using a history of actions executed by a database management system for recovery.
- 683 Redo (i.e., roll forward):**  
This subclass is indented under subclass 678. Subject matter relating to database management systems that cause all the changes to be replayed and committed since a certain point in time (i.e. the last backup).
- (1) Note. This subclass excludes instruction and lower level processing.
- SEE OR SEARCH CLASS:  
714, Error Detection/Correction and Fault Detection/Recovery, subclass 16 for forward recovery.
- 684 Undo (i.e., roll back):**  
This subclass is indented under subclass 678. Subject matter relating to database management systems that cause all the changes to be rolled back to a certain point in the past.
- SEE OR SEARCH CLASS:  
714, Error Detection/Correction and Fault Detection/Recovery, subclass 19 for undo record.
- 685 Incremental recovery:**  
This subclass is indented under subclass 674. Subject matter relating to database management systems that cause specified targets to be recovered from a last point in time backup.
- 686 Recovery optimization:**  
This subclass is indented under subclass 674. Subject matter directed to processes that improve recovery (e.g., the time it takes, the amount of storage required).
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclass 14, 19, and 45-61 for related applications of optimization methods using suboptimal solutions, heuristic methods, nonlinear optimizations, and related techniques. See class 706 line notes for further examples.
- 687 DATA INTEGRITY:**  
This subclass is indented under the class definition. Subject matter for assuring and preserving the accuracy, validity, usability, state and consistency of databases, database records, files, and associated metadata, including detecting and monitoring data for issues, conflicts and errors.

## SEE OR SEARCH CLASS:

- 711, Electrical Computers and Digital Processing Systems: Memory, for garbage collection, per se, in addition, subclasses 1 through 6 for addressing particular memory configurations and systems, subclasses 100 through 173 for memory accessing and control, per se, (in particular subclasses 113 for disk caching, subclasses 117 through 146 for hierarchical memory, per se, (including caching), subclasses 147 through 153 for shared memory accessing and control, subclasses 154 through 166 for memory control, maintenance and management techniques (including subclasses 161 and 162 for archiving and backup under memory accessing and subclasses 163 and 164 for memory access limiting), and subclasses 170 through 173 for memory configuring and allocation), and subclasses 200 through 221 for address formation processing, particularly subclass 216 for address hashing.
- 713, Electrical Computers and Digital Processing Systems: Support, appropriate subclasses for system access control and multiple computer communication in combination with cryptography, and synchronizing clocks.
- 714, Error Detection/Correction and Fault Detection/Recovery, subclasses 1 through 57 and subclass 100 for data processing system error or fault handling including state recovery, and subclasses 47.1 through 47.3 for actively preventing errors; appropriate subclasses for state validity checks, error and fault detection, and monitoring.
- 726, Information Security, subclass 1 for policy, subclasses 2 through 21 for access control and authentication, subclasses 22 through 25 for monitoring or scanning of software or data including attack prevention, subclasses 26 through 33 for prevention of unauthorized use of data including prevention of piracy, privacy viola-

tions or unauthorized data modification.

**688 Statistics maintenance:**

This subclass is indented under subclass 687. Subject matter relating to collecting and updating performance data.

**689 Detection of expired data:**

This subclass is indented under subclass 687. Subject matter relating to finding and determining that data has expired.

**690 Checking consistency:**

This subclass is indented under subclass 687. Subject matter relating to testing or comparing data to find conflicts.

**691 Repair consistency errors:**

This subclass is indented under subclass 690. Subject matter relating to fixing data so that it conforms to constraints.

- (1) Note. This subclass is for internal consistency within a database. Consistency among plural databases is classified elsewhere in this class.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

610, for consistency among plural databases.

**692 Data cleansing, data scrubbing, and deleting duplicates:**

This subclass is indented under subclass 687. Subject matter relating to any data cleansing or scrubbing operations in order to correct or screen inconsistent and/or corrupt data.

- (1) Note. For classification herein, the data can be, for example, records in a database, data in XML nodes, data in a file.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

708, for subject matter relating to selecting which database(s) to search based on the topic or category of the query submitted to the meta-search engine.

755, for subject matter relating to breaking down an input comprised of a data structure or data object into finer components for the purpose of further pro-



cessing or storage of the data structure or data object. The finer components are identified because they have an individual value.

771, for subject matter relating to categorizing a query into a particular group or category so that only data in that group or category needs to be searched.

811, for subject matter wherein data is received in unstructured form (such as by importing and parsing a document or web page), and converted to a form that can be stored in a data structure/database schema.

**SEE OR SEARCH CLASS:**

715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclasses 234 through 242 for structured documents and in particular, subclass 239 for conversion from one markup language to another (e.g., XML to HTML or utilizing an intermediate format), and subclass 249 for format transformation.

**693 Fragmentation, compaction and compression:**

This subclass is indented under subclass 687. Subject matter relating to database management systems performing compression of data from tables and records to reduce the storage space requirements, which includes encoding information in fewer bits and dividing data into pieces, and the reverse processes such as defragmentation and decompression.

**SEE OR SEARCH CLASS:**

348, Television, subclass 14.13 for television signal and transmission compression.

360, Dynamic Information Storage or Retrieval, for apparatus and corresponding processes for the storage and retrieval of information based on relative movement between a magnetic record carrier and a transducer (e.g., magnetic disk drives).

369, Dynamic Information Storage or Retrieval, various subclasses for record carriers and systems wherein

data are stored and retrieved by interaction with a medium and there is relative motion between a medium and a transducer (e.g., optical disks, CD-ROMs, jukeboxes), particularly subclasses 30.01 through 41.01, 69, and 176 through 271 for designating or selecting storage media to be used for storage and retrieval.

370, Multiplex Communications, subclass 477 for conserving transmission bandwidth, subclass 521 for time compression or expansion.

380, Cryptography, subclass 217 for video compression cryptography, subclass 269 for communication compression.

382, Image Analysis, subclass 232 for image compression.

704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclass 500 for audio and speech compression.

708, Electrical Computers: Arithmetic Processing and Calculating, subclass 203 for electric digital calculating computers performing specialized functions for compressing or decompressing data.

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring, subclass 247 for compression to reduce the transfer payload volume.

713, Electrical Computers and Digital Processing Systems: Support, appropriate subclasses for compressions algorithms related to authentication and security.

**694 Policy, rule-based management of record, files and documents:**

This subclass is indented under subclass 687. Subject matter relating to management of integrity policy and rules.

**SEE OR SEARCH CLASS:**

706, Data Processing: Artificial Intelligence, subclasses 45 through 61 for related methods on rule-based systems, self-managing, self-healing, self-protecting, and autonomic computing.

- 717, Data Processing: Software Development, Installation, and Management, subclasses 168 through 173 for version management, CVS, and document management in data processing software development tool environments.
- 695 Version management:**  
This subclass is indented under subclass 694. Subject matter relating to overseeing control of different versions of data.
- 696 Index maintenance:**  
This subclass is indented under subclass 687. Subject matter for updating, defragmenting or rebuilding an index to improve the performance of the index (e.g., by reducing storage size or reducing access time).
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
711, for creating a structure by a search engine used for the searching of web content consisting of feature frequency and location.  
741, for index generation by database management outside of a search engine environment.
- 697 Using checksum:**  
This subclass is indented under subclass 687. Subject matter relating to validation and comparison of checksums being used to find data errors.
- (1) Note. This subclass excludes algorithms per se and mathematical functions from definitions belonging to CRC, Hashing, and checksum.
- SEE OR SEARCH CLASS:  
708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 200 through 714 for particular arithmetic function performed with calculating computer including compression, decompression, detecting a particular sequence of bits, and convolution and subclasses 530 through 534 for error detection or correction.
- 713, Electrical Computers and Digital Processing Systems: Support, subclass 175 for mathematical algorithm for data verification.
- 698 Using hash function:**  
This subclass is indented under subclass 697. Subject matter relating to validation and comparisons of hash functions are used to find data errors.
- (1) Note. This subclass excludes algorithms, per se, and mathematical functions from definitions belonging to CRC, Hashing, and checksum.
- SEE OR SEARCH CLASS:  
708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 200 through 714 for particular arithmetic function performed with calculating computer including compression, decompression, detecting a particular sequence of bits, and convolution and subclasses 530 through 534 for error detection or correction.  
713, Electrical Computers and Digital Processing Systems: Support, subclass 175 for mathematical algorithm for data verification.
- 699 Using cyclic redundancy checking (CRC):**  
This subclass is indented under subclass 697. Subject matter relating to validation and comparison of CRC being used to find data errors.
- (1) Note. This subclass excludes algorithms per se and mathematical functions from definitions belonging to CRC, Hashing, and checksum.
- (2) Note. This subclass is limited to using CRC in record, file, or database management for verification.
- SEE OR SEARCH CLASS:  
708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 200 through 714 for particular arithmetic function performed with calculating computer including compression, decompression, detecting a particular sequence of bits, and

- convolution and subclasses 530 through 534 for error detection or correction.
- 713, Electrical Computers and Digital Processing Systems: Support, subclass 175 for mathematical algorithm for data verification.
- 714, Error Detection/Correction and Fault Detection Recovery, subclasses 48 and 100 for CRC algorithm itself or details related to using CRC for error detection such as in data transmission.
- 700 Range checking:**  
This subclass is indented under subclass 687. Subject matter relating to validation of data values being used to ensure that they fall within boundary constraints.
- 701 Type checking:**  
This subclass is indented under subclass 687. Subject matter relating to validation of data types being used to find errors.
- 702 Triggers, stored procedures, user defined function (UDF):**  
This subclass is indented under subclass 687. Subject matter relating to programs for ensuring data integrity.
- (1) Note. Triggers which initiate an action on a database belong in this subclass when integrity is the main problem being solved.
- 703 Transactional processing:**  
This subclass is indented under subclass 687. Subject matter relating to the handling of integrity for transactions to ensure atomicity, consistency, isolation and durability.
- 704 Concurrent read/write management using locks:**  
This subclass is indented under subclass 687. Subject matter relating to creating and enforcing limits on access with the use of locks.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
781 through 789 , for database access control methods and lists.
- SEE OR SEARCH CLASS:  
726, Information Security, for processes or apparatus for increasing a systems extension of protection of system hardware, software, or data from maliciously caused destruction, unauthorized modification, or unauthorized disclosure, per se.
- 705 DATABASE AND FILE ACCESS:**  
This subclass is indented under the class definition. . Subject matter relating to retrieval of information stored in a database as well as restriction of access to a database.
- SEE OR SEARCH CLASS:  
726, Information Security, for processes or apparatus for increasing a system s extension of protection of system hardware, software, or data from maliciously caused destruction, unauthorized modification, or unauthorized disclosure, per se.
- 706 Search engines:**  
This subclass is indented under subclass 705. Subject matter relating to programs which enable an end user to query unstructured, semi-structured or structured documents that have been indexed, categorized or organized.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 12 through 14, 20, and 45-55 for related methods of search engine techniques and methods involving decision making, agents or “bots”, pattern recognition, clustering, classification, data mining, machine learning, context-based analysis and semantic processing, particularly subclass 50 for related methods of knowledge base management; subclasses 45-55 for details relating to parsing using Natural Language Processing (NLP), probabilistic reasoning, neural networks, fuzzy-processing, and related analysis techniques.

**707 Search engine portal (e.g., meta-search engine):**

This subclass is indented under subclass 706. Subject matter relating to searching multiple search engines or online databases with a single query (i.e., e.g., federated search, meta-search).

**708 Analyzing or parsing query to determine topic or category:**

This subclass is indented under subclass 707. Subject matter relating to selecting which database(s) to search based on the topic or category of the query submitted to the meta-search engine.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

692, for subject matter relating to any data cleansing or scrubbing operations in order to correct or screen inconsistent and/or corrupt data.

755, for subject matter relating to breaking down an input comprised of a data structure or data object into finer components for the purpose of further processing or storage of the data structure or data object. The finer components are identified because they have an individual value.

771, for subject matter relating to categorizing a query into a particular group or category so that only data in that group or category needs to be searched.

811, for subject matter wherein data is received in unstructured form (such as by importing and parsing a document or web page), and converted to a form that can be stored in a data structure/database schema.

**709 Web crawlers:**

This subclass is indented under subclass 706. Subject matter relating to programs commonly known as Spider, Bots, and Harvesters, which include an automated program that is used by search engines to acquire content for indexing that often employ filtering and categorizing techniques to remove unwanted content including advertisement data.

(1) Note. These subclasses accept crawling for a specific MIME type and crawling for specific content e.g., sports, medicine.

**710 Category specific web crawling:**

This subclass is indented under subclass 709. Subject matter relating to crawling documents to acquire contents using filtering and categorizing techniques so that only content within certain categories is returned.

**711 Index generation:**

This subclass is indented under subclass 706. Subject matter relating to creating a structure by a search engine used for the searching of web content comprising feature frequency and location.

(1) Note. Content features include character, word or phrase; and, locations include an inverted index data structure.

(2) Note. The index may be created locally or remotely by the search engine.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

696, for updating, defragmenting or rebuilding an index to improve the performance of the index.

741, for index generation by database management outside of a search engine environment.

**712 Embedded or hardware based search engine:**

This subclass is indented under subclass 706. Subject matter relating to a search engine that is embedded or mainly hardware based and does not include software instructions.

**713 Query optimization:**

This subclass is indented under subclass 705. Subject matter relating to mechanisms, methodologies and structures within a database management system designed to support analysis and consideration of different ways of processing a query (i.e., different query plans) such that the query is processed as efficiently as possible, minimizing the time to process the query and the resources utilized.

- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 12 through 14, 19, 21, and 45-61 for optimization methods using suboptimal solutions, heuristic methods, and nonlinear optimizations; for planning algorithms related to adaptation, learning, or optimization; for methods related to cost prediction algorithms; for methods related to the decisions using incomplete data, such as when some resources are unknown, and for methods related to learning or predicting based on historical data.
- 714 Based on joins:**  
This subclass is indented under subclass 713. Subject matter relating to the optimization of a query based on joining of database structures in order to more efficiently execute a query.
- 715 Based on index optimization:**  
This subclass is indented under subclass 713. Subject matter relating to the optimization of a query by creating an index, or the optimization of an already created index.
- 716 Based on access path:**  
This subclass is indented under subclass 713. Subject matter relating to the optimization of a query by choosing an efficient order or path in which to execute a query (i.e., choosing which tables to execute a query against first).
- 717 Based on materialized view:**  
This subclass is indented under subclass 713. Subject matter relating to the optimization of a query by selecting a set of views that should be kept for future use in query execution.
- 718 Query execution plan:**  
This subclass is indented under subclass 713. Subject matter relating to optimizing query execution by having set processes or plans to execute queries of certain types (e.g., adjusting the ordering of processing the subqueries so that the query is executed in a more efficient manner).
- 719 Query cost estimation:**  
This subclass is indented under subclass 713. Subject matter relating to processes by which the cost (e.g., time, amount of data movement) of executing a query using different strategies is examined before choosing the best strategy for the situation.
- 720 Based on resource consumption:**  
This subclass is indented under subclass 719. Subject matter relating to performing cost estimation by evaluating processor time and memory consumption of strategies in order to choose the best strategy for the situation.
- 721 Based on query history:**  
This subclass is indented under subclass 713. Subject matter relating to performing query optimization by looking at records of execution of past queries and basing the optimization process on what is learned from these records.
- 722 Post processing of search results:**  
This subclass is indented under subclass 705. Subject matter relating to post-processing of query operations performed on records, files, and their associated metadata to facilitate more efficient comprehension and presentation of the records or files.
- (1) Note. The post-processing operations typically include ranking query or search results and/or providing a customized view of results.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 14, 20, and 45-48 for methods related to post-processing using correlation, clustering, or pattern recognition.
- 723 Ranking search results:**  
This subclass is indented under subclass 722. Subject matter relating to assigning a value to search results based on set criteria to provide rankings to search results which usually entails placing higher ranked search results higher in the list of results displayed to the user.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
748, for ranking scoring and weighting of database records.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 12 through 14 and 45-61 if ranking method is directed to the overall structure of knowledge or ontology, or for ranking methods using learning and/or adaptation.
- 724 Spatial (i.e., location based):**  
This subclass is indented under subclass 723. Subject matter relating to assigning a higher rank to search results that are closer to a desired geographical location and a lower rank to search results that are further from that desired geographical location.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 12 through 14 and 45-61 if ranking method is directed to the overall structure of knowledge or ontology, or for ranking methods using learning and/or adaptation.
- 725 Temporal (i.e., time based):**  
This subclass is indented under subclass 723. Subject matter relating to assigning a higher rank to search results that are more current or closer to a desired time and assigning a lower rank to search results that are older or further away from a desired time.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 12 through 14 and 45-61 if ranking method is directed to the overall structure of knowledge or ontology, or for ranking methods using learning and/or adaptation.
- 726 Links from other files or link content analysis:**  
This subclass is indented under subclass 723. Subject matter relating to assigning a higher rank to search results that are referenced more often by other documents and a lower rank to search results that are not referenced as often by other documents.
- 727 Frequency of document selection:**  
This subclass is indented under subclass 723. Subject matter relating to assigning a higher rank to search results based on the history of selection (e.g., frequency of access) of that document in past queries.
- 728 Relevance of document based on features in query:**  
This subclass is indented under subclass 723. Subject matter relating to assigning a higher rank to search results that have a higher occurrence of words or phrases that are part of the search query and assigning a lower rank to search results that have a lower occurrence of the words or phrases.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 12, 20, 22 and 45-61 for methods related to machine learning (e.g., deterministic state machines etc.), adaptive relevance processing, pattern relevance, and relevance by classification.
- 729 Location of features in the document:**  
This subclass is indented under subclass 728. Subject matter relating to assigning a higher rank to search results in which words or phrases from the query appear in more prominent locations such as the title, areas with larger or emphasized text, or in the beginning of the search result document and assigning a lower rank to search results in which words or phrases from the query appear in less prominent locations.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 12 through 14, 20, 22 and 45-55 for feature recognition or feature detection methods that adapt, learn, classify, or cluster.
- 730 Frequency of features in the document:**  
This subclass is indented under subclass 728. Subject matter relating to assigning a higher rank to search results in which words or phrases from the query appear more often and assigning a lower rank to search results in which words or phrases from the query occur less often.

- (1) Note. The distance between the occurrence of words or phrases of the query in the search result is often another feature used in this type of ranking.

**731 Based on category of the query and the document:**

This subclass is indented under subclass 723. Subject matter relating to assigning a higher rank to search results that fall within a category of a query wherein the category may be determined based on explicit selection of the user or by performing an analysis on the query itself.

**732 Personalized results:**

This subclass is indented under subclass 723. Subject matter relating to the assigning of a rank to a search result based on a user profile wherein the profile may be unique for use by that user or may be designated for use with a group of users that have similar roles.

- (1) Note. Group profiles are also known as collaborative profiles.

**SEE OR SEARCH CLASS:**

706, Data Processing: Artificial Intelligence, subclasses 12 through 14 and 45-61 for personal profiles that use artificial intelligence techniques to learn, adapt, apply knowledge, make decisions, have specific management of a knowledge base, or have a specific representation, reasoning, or processing of information.

**733 Explicit profile:**

This subclass is indented under subclass 732. Subject matter relating to the assigning of a rank to a search results based on a user or group profile wherein the user, group, or administrator is given the chance to define or edit the profile by making explicit selections.

**734 Implicit profile:**

This subclass is indented under subclass 732. Subject matter relating to the assigning of a rank to search results based on a user or group profile that is defined and can be adapted over time by analysis of the interaction of the user or group of users with a computerized system.

**735 Artificial inflation of search rank:**

This subclass is indented under subclass 723. Subject matter relating to processes which cause a particular instance of a search result to rank higher in the results even though it may not be the most relevant result.

- (1) Note. This subclass also includes processes meant to prevent the inflation of search results.

- (2) Note. This type of ranking is also known as search engine optimization.

- (3) Note. This subclass is for recognizing and trying to eliminate SPAM in search results and for systems that cause low relevance results to appear more relevant. E-mail SPAM filtering is classified elsewhere.

**SEE OR SEARCH CLASS:**

706, Data Processing: Artificial Intelligence, subclasses 12 through 14 and 45-61 for inflating search ranks based on data fusion, machine learning, preferences, classification, or clustering.

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring, subclasses 204 through 206 for computer conferencing and demand based e-mail communications including spam filtering.

**736 Preparing data for information retrieval:**

This subclass is indented under subclass 705. Subject matter relating to pre-processing operations performed on records, files, or their associated metadata to facilitate more efficient access of the records or files which typically include ordering, organizing, and filtering.

**737 Clustering and grouping:**

This subclass is indented under subclass 736. Subject matter relating to preparing data by placing data that is similar into a group cluster or partition so that it is easier to find at a later time.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 794, for Semantic Network for structure of ontologies and taxonomies.  
696, for Index Maintenance.

SEE OR SEARCH CLASS:

- 706, Data Processing: Artificial Intelligence, subclasses 12 through 14 and 45-61 for clustering, grouping, and classifying methods including unsupervised or supervised learning, discovery, LSA, and LSI.

**738 Based on topic:**

This subclass is indented under subclass 737. Subject matter relating to clustering or grouping data based on the main idea that the data items portray.

- (1) Note. This subclass is for segmenting data along topic lines where there is only nominal recitation of the environment and the focus is on the preparation of the data for information retrieval.

**739 Latent semantic index or analysis (LSI or LSA):**

This subclass is indented under subclass 737. Subject matter relating to items being clustered or grouped together when they include many of the same features (i.e., words).

SEE OR SEARCH CLASS:

- 706, Data Processing: Artificial Intelligence, subclass 55 for details related to algorithms for semantic networks, LSI, LSA, etc.

**740 Cataloging:**

This subclass is indented under subclass 737. Subject matter wherein clustering or grouping is based on known categories, and new documents are cataloged into those set categories.

**741 Generating an index:**

This subclass is indented under subclass 736. Subject matter relating to the generation of data structures by a database management system which improves the efficiency of look-up operations of data items stored in a data store

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 696, for updating, defragmenting or rebuilding an index to improve the performance of the index.  
711, for creating a structure by a search engine used for the searching of web content consisting of feature frequency and location.

**742 Inverted index:**

This subclass is indented under subclass 741. Subject matter relating to a type of index that facilitates the mapping of words to their location in a set of documents, typically used in document retrieval systems and search engines.

**743 Spatial index:**

This subclass is indented under subclass 741. Subject matter relating to a type of index that allows data to be stored and accessed in a two dimensional context, effectively mapping the data to the (X, Y) coordinate pair (e.g., this can include Grid and R-trees).

**744 Sparse index:**

This subclass is indented under subclass 741. Subject matter wherein relating to a type of index wherein the index records are only created for some of the records and it contains pairs of keys and pointers for every block (i.e., not records) in a data file.

**745 Bitmap index:**

This subclass is indented under subclass 741. Subject matter relating to a special type of index wherein the column values are stored in bits.

**746 Temporal index:**

This subclass is indented under subclass 741. Subject matter relating to time-based indexing.

**747 Using a hash:**

This subclass is indented under subclass 741. Subject matter relating to a type of index that allows key value pairs to be stored based on a pseudo randomizing function called hash function.

- (1) Note. This subclass excludes hashing algorithm per se and mathematical algorithms.



## SEE OR SEARCH CLASS:

- 370, Multiplex Communications, subclass 395.32 for subject matter related to re-routing network packets using employing particular searching function (e.g., hashing, alternate, re-routing).
- 380, Cryptography, subclass 217 for video and communication compression.
- 713, Electrical Computers and Digital Processing Systems: Support, subclass 175 for generating hash functions relevant to security.

**748 Ranking, scoring or weighting records:**  
This subclass is indented under subclass 736. Subject matter relating to assigning a value to data items such as records, files or their associated metadata based on set criteria to provide a distinction between data items.

**749 Based on record similarity and relevance:**  
This subclass is indented under subclass 748. Subject matter relating to assigning the ranking, scoring, or weighting based on the similarity (e.g., closeness), or relevance, measured between a plurality of data items.

## SEE OR SEARCH CLASS:

- 706, Data Processing: Artificial Intelligence, subclasses 12 through 14 and 45-61 if ranking is directed to the overall structure of knowledge or ontology, or for ranking methods using learning and/or adaptation.

**750 Based on term frequency of appearance:**  
This subclass is indented under subclass 748. Subject matter relating to assigning the ranking, scoring, or weighting based on how often a word, phrase or attribute appears in a group of data items.

**751 Based on historical data:**  
This subclass is indented under subclass 748. Subject matter relating to assigning the ranking, scoring, or weighting based on past selection of a data item when compared to selection of a group of data items.

## SEE OR SEARCH CLASS:

- 706, Data Processing: Artificial Intelligence, subclasses 12 through 14 and 45-61 for algorithm details related to learning or predicting based on historical data.

**752 Sorting and ordering data:**  
This subclass is indented under subclass 736. Subject matter relating to ordering and reordering data based on a selected record, such as, putting data into a numerical or alphabetical order.

**753 Sorting indices:**  
This subclass is indented under subclass 752. Subject matter relating to the ordering of an index to a record so that the record can appear to be ordered in a particular manner.

**754 Filtering data:**  
This subclass is indented under subclass 736. Subject matter relating to extracting and removing of either wanted or unwanted data from a data source, wherein the data source typically comprises some form of structured data.

- (1) Note. This subclass excludes SPAM, e-mail, targeted ads.

## SEE OR SEARCH CLASS:

- 705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination subclass 14 Distribution or redemption of coupon, or incentive or promotion program.
- 706, Data Processing: Artificial Intelligence, subclass 14, 22, and 45-61 for filtering using data fusion, Kalman filtering, probabilistic reasoning, decision theory, etc.
- 715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclasses 234 through 242 for structured documents and in particular, subclass 239 for Conversion from one markup language to another (e.g., XML to HTML or utilizing an intermediate format) and subclass 249 for format transformation.

726, Information Security, for processes or apparatus for increasing a systems extension of protection of system hardware, software, or data from maliciously caused destruction, unauthorized modification, or unauthorized disclosure, per se.

**755 Parsing data structures and data objects:**

This subclass is indented under subclass 736. Subject matter relating to breaking down an input comprised of a data structure or data object into finer components for the purpose of further processing or storage of the data structure or data object.

- (1) Note. This subclass does not require a structural change in the data. No transformation occurs.

SEE OR SEARCH THIS CLASS, SUBCLASS:

692, for subject matter relating to any data cleansing or scrubbing operations in order to correct or screen inconsistent and/or corrupt data.

708, for subject matter relating to selecting which database(s) to search based on the topic or category of the query submitted to the meta-search engine.

771, for subject matter relating to categorizing a query into a particular group or category so that only data in that group or category needs to be searched.

811, for subject matter wherein data is received in unstructured form (such as by importing and parsing a document or web page), and converted to a form that can be stored in a data structure/database schema.

SEE OR SEARCH CLASS:

706, Data Processing: Artificial Intelligence, subclasses 45 through 55 for Natural Language Processing (NLP), probabilistic reasoning, neural networks, fuzzy-processing, and analysis methods.

715, Data Processing: Presentation Processing of Document, Operator Inter-

face Processing, and Screen Saver Display Processing, subclasses 234 through 242 for structured documents and in particular, subclass 239 for Conversion from one markup language to another (e.g., XML to HTML or utilizing an intermediate format) and subclass 249 for format transformation.

**756 Transforming data structures and data objects:**

This subclass is indented under subclass 736. Subject matter relating to changing format of a data structure, or data objects, using various methods such as a translation, mapping, or altering with the purpose of facilitating further processing of the data structure or data object.

- (1) Note. This subclass excludes the conversion and/or mapping of data being transferred.

- (2) Note. This subclass is not concerned with identifying proper transformations from one schema to another.

SEE OR SEARCH THIS CLASS, SUBCLASS:

602, for retrieving, cleaning, preparing, converting, migrating, integrating, and/or storing data into the data warehouse.

761, for converting a query from one query language to another query language.

802, for the management of data structures, including their definition and creation, modification, transformation and population.

809, for generalized transformation/conversion from one schema to another.

810, for subject matter wherein data is transferred from one schema/structure to another through the use of a logical data model.

975, for transferring of data from one database having one database schema to another database having a different database schema.

- 757 Hiding and masking database data:**  
This subclass is indented under subclass 736. Subject matter relating to manipulating data structures or data objects to make portions of them invisible or inaccessible.
- 758 Record, file, and data search and comparisons:**  
This subclass is indented under subclass 705. Subject matter relating to processes that attempt to locate or match records or files desired by the user or computer system.
- (1) Note. This subclass does not include query optimization processes.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
713, and its indented subclasses for query optimization processes.
- 759 Query statement modification:**  
This subclass is indented under subclass 758. Subject matter relating to adapting a query statement from its original form in order to assist in retrieval and execution of desired search results.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
769, for database query processing.
- 760 Translating a query to another language or schema:**  
This subclass is indented under subclass 759. Subject matter relating to translating queries so that the query can be executed against a database that is using a different language or schema than the language and schema the query was written in.
- 761 Verifying or testing translated query:**  
This subclass is indented under subclass 760. Subject matter relating to performing a test to translated queries in order to test performance or to insure that the query was translated correctly.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
602, for retrieving, cleaning, preparing, converting, migrating, integrating, and/or storing data into the data warehouse.
- 756, for changing the format of a data structure, or data objects, using various methods such as a translation, mapping, or altering with the purpose of facilitating further processing of the data structure or data object.
- 802, for the management of data structures, including their definition and creation, modification, transformation and population.
- 809, for generalized transformation/conversion from one schema to another.
- 810, for subject matter wherein data is transferred from one schema/structure to another through the use of a logical data model.
- 975, for transferring of data from one database having one database schema to another database having a different database schema.
- 762 Legacy query generator:**  
This subclass is indented under subclass 760. Subject matter relating to performing a query translation in order to access a legacy (i.e., an older existing computerized system) database system.
- 763 Query mapping:**  
This subclass is indented under subclass 760. Subject matter relating to performing a query translation by using a map of query elements in one language or schema that tells the equivalent element in another language or schema.
- 764 For parallel processing system:**  
This subclass is indented under subclass 759. Subject matter relating to adapting a query so that it can be executed on a parallel processing system.
- 765 Query expansion or refinement:**  
This subclass is indented under subclass 759. Subject matter relating to processes of adapting an original query in order to provide more recall or precision.
- (1) Note. This subclass accepts thesauri.

- 766 Interactive query refinement:**  
This subclass is indented under subclass 765. Subject matter relating to adapting an original query by user interaction to get more desired results as chosen by the user.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 11 through 14 and 45-61 if the interaction learns from the user, or makes judgments or decisions based on the interaction and for chat processing, Natural Language Processing (NLP), learning or prediction.  
715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclasses 200 through 277 for document processing performed by a computer for presentation including annotation and document editing, and subclasses 700 through 866 for operator interface processing.
- 767 Recommending or suggesting search terms and queries:**  
This subclass is indented under subclass 766. Subject matter relating to adapting an original query by user interaction wherein the user is presented with a choice of terms or modified queries.
- 768 Based on query history:**  
This subclass is indented under subclass 765. Subject matter relating to adapting an original query based on an analysis of past queries.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 11 through 14 and 45-61 for learning or predicting methods based on historical data.
- 769 Database query processing:**  
This subclass is indented under subclass 758. Subject matter relating to execution of a request for data by a computerized data processing system.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
759, for query statement modification.
- 770 Distributed search and retrieval:**  
This subclass is indented under subclass 769. Subject matter relating to processes that locate and retrieve data from multiple databases located over different locations around a network.
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 10 and 45-61 for agent, multiagent, or distributed agent systems performing search and retrieval employing artificial intelligence.
- 771 Analyzing or parsing query to determine topic or category:**  
This subclass is indented under subclass 769. Subject matter relating to categorizing a query into a particular group or category so that only data in that group or category needs to be searched.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
692, for subject matter relating to any data cleansing or scrubbing operations in order to correct or screen inconsistent and/or corrupt data.  
708, for subject matter relating to selecting which database(s) to search based on the topic or category of the query submitted to the meta-search engine.  
755, for subject matter relating to breaking down an input comprised of a data structure or data object into finer components for the purpose of further processing or storage of the data structure or data object. The finer components are identified because they have an individual value.  
811, for subject matter wherein data is received in unstructured form (such as by importing and parsing a document or web page), and converted to a form that can be stored in a data structure/database schema.

## SEE OR SEARCH CLASS:

706, Data Processing: Artificial Intelligence, subclasses 45 through 55 for parsing using Natural Language Processing (NLP), probabilistic reasoning, neural networks, fuzzy-processing, and analysis techniques or methods.

**772 Query-by-example:**

This subclass is indented under subclass 769. Subject matter relating to queries that are unstructured examples instead of a formalized structured query (e.g., the user may submit an example text string or document and documents or records which are similar to the example string or documents are retrieved).

**773 Recursive queries:**

This subclass is indented under subclass 769. Subject matter relating to execution of a query wherein the query references itself.

**774 Nested queries:**

This subclass is indented under subclass 769. Subject matter relating to execution of a query wherein the query is comprised of two or more sub-queries.

**775 Cascading queries:**

This subclass is indented under subclass 769. Subject matter relating to execution of a group of queries wherein a query that is executed later is executed against the result set of a prior query.

**776 Data mining:**

This subclass is indented under subclass 769. Subject matter relating to the analysis and interpretation of large datasets to find new associations, patterns, and relationships amongst the data.

## SEE OR SEARCH THIS CLASS, SUBCLASS:

600, for data mining in data warehouse systems.  
607, for on-line transactional processing, per se.

## SEE OR SEARCH CLASS:

706, Data Processing: Artificial Intelligence, subclasses 45 through 61 for data artificial intelligence mining methods, rule/relation discovery, knowledge processing systems handling mined information, and mining datasets.

**777 Taxonomy discovery:**

This subclass is indented under subclass 776. Subject matter relating to analysis and interpretation of large datasets to build/construct a taxonomy for future searching.

## SEE OR SEARCH CLASS:

706, Data Processing: Artificial Intelligence, subclasses 45 through 61 for inductive reasoning or other intelligent discovery methods.

**778 Hierarchical structures:**

This subclass is indented under subclass 777. Subject matter relating to analysis and interpretation of large datasets to build/construct a hierarchical taxonomy.

**779 Query templates:**

This subclass is indented under subclass 769. Subject matter relating to generating or using predefined forms to construct a query and its parameters.

**780 Fuzzy searching and comparisons:**

This subclass is indented under subclass 769. Subject matter relating to searching wherein queries and algorithms generate best match results based on likely relevance even though the inputted search may not match exactly.

(1) Note. Fuzzy searching is also known as inexact or approximate matching.

## SEE OR SEARCH CLASS:

706, Data Processing: Artificial Intelligence, subclasses 1 through 9, 12, 14, and 45-61 for details related to fuzzy logic, reasoning under uncertainty, etc.

**781 Database access control methods:**

This subclass is indented under subclass 705. Subject matter relating to granting and denying the user access to requested data or by choosing locations to retrieve data from when it is requested.

- (1) Note. This subclass is directed to access control in database systems.
- (2) Note. This subclass excludes aspects of computer system security, such as details of encryption algorithms, decryption algorithms, firewalls, virus protection, spamming, algorithms for generating passwords and user names.
- (3) Note. This subclass does not include data integrity operations.

**SEE OR SEARCH CLASS:**

- 380, Cryptography, for equipment and processes which (a) conceal or obscure intelligible information by transforming such information so as to make the information unintelligible to a casual or unauthorized recipient, or (b) extract intelligible information from such a concealed representation, including breaking of unknown codes and messages.
- 713, Electrical Computers and Digital Processing Systems: Support, appropriate subclasses for system access control and multiple computer communication in combination with cryptography, and synchronizing clocks.
- 726, Information Security, subclass 1 for policy, subclasses 2 through 21 for access control and authentication, subclasses 22 through 25 for monitoring or scanning of software or data including attack prevention, subclasses 26 through 33 for prevention of unauthorized use of data including prevention of piracy, privacy violations or unauthorized data modification.

**782 Alternative access and redirection:**

This subclass is indented under subclass 781. Subject matter relating to providing requested data access to a user at alternative sites or different data locations, which can be both for load balancing and in order to provide the user with data that is more proximate to the user's current location.

- (1) Note. This subclass excludes redirection due to failure or system errors.

**783 Privileged access:**

This subclass is indented under subclass 781. Subject matter relating to determination and granting of access to data and files by direct means, such as by the file or database creator or database manager, or by indirect means, such as by inheritance, by group/user access profiles created, by a user or a computer system.

**SEE OR SEARCH CLASS:**

- 706, Data Processing: Artificial Intelligence, subclasses 11 through 14 and 45-61 for methods related to privileged access using intelligent computations, machine learning, inference, intelligent user profiling.

**784 Based on user profile:**

This subclass is indented under subclass 783. Subject matter relating to granting or denying user access to data based on a profile that has been previously set up.

**785 Access control lists:**

This subclass is indented under subclass 784. Subject matter relating to granting or denying user access wherein the user profile is a list of areas the user has a right to access or a list of areas the user does not have a right to access.

**786 Hierarchical access control:**

This subclass is indented under subclass 785. Subject matter relating to user profiles wherein the data elements have a hierarchical relationship, and when the user is granted access to a node, the user is in turn given access to the child nodes of that node.

**787 Temporal access control:**

This subclass is indented under subclass 785. Subject matter relating to granting or denying access to data based on time or date based constraints.

**788 Spatial access control:**

This subclass is indented under subclass 785. Subject matter relating to granting or denying access to data based on physical location of the data.

**790 DATABASE DESIGN:**

This subclass is indented under the class definition. . Subject matter wherein detailed information for implementing a database and/or database management system are provided, including data modeling, schema, conceptual layout and physical layout.

**SEE OR SEARCH CLASS:**

- 703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, subclass 3 for modeling by mathematical expression.
- 715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclasses 700 through 866 for operator interface processing.
- 716, Computer-Aided Design and Analysis of Circuits and Semiconductor Masks, subclasses 50 through 56 for design of semiconductor masks and subclasses 100 through 139 for circuit design.
- 717, Data Processing: Software Development, Installation, and Management, appropriate subclasses for data processing software development.

**791 Data structure types:**

This subclass is indented under subclass 790. Subject matter directed to data structure, per se, which involves the actual organization of data in its simplest form (e.g., trees, arrays, linked lists).

- (1) Note. Use of conventional data structures for the creation and management of records, files, or messages are classified under subclass 802.

**SEE OR SEARCH CLASS:**

706, Data Processing: Artificial Intelligence, subclasses 1 through 61 if artificial intelligence techniques or structures are involved.

**792 Database management system frameworks:**

This subclass is indented under subclass 791. Subject matter wherein object oriented data structures define one or more of the following aspects of the database management system: (a) the data storage, (b) data access methods, (c) schema, (d) views, (e) interfaces.

- (1) Note. This subclass encompasses structures which define the DBMS itself.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

793, for the details of the underlying database and structures thereof.

**SEE OR SEARCH CLASS:**

717, Data Processing: Software Development, Installation, and Management, appropriate subclasses for data processing software development.

**793 Custom data structure types:**

This subclass is indented under subclass 791. Subject matter wherein customized data structures designed to support specific applications are created and/or managed (e.g., data structures to manage page layout in a document).

**794 Semantic network:**

This subclass is indented under subclass 793. Subject matter wherein the customized data structures are designed to store some type of knowledge representation, such as a semantic network, ontology, taxonomy, or concept-relation-concept (C-R-C) triples.

**SEE OR SEARCH CLASS:**

706, Data Processing: Artificial Intelligence, subclass 55 for semantic network by a knowledge processing system.

**795 Including data structures referencing externally-stored data:**

This subclass is indented under subclass 793. Subject matter wherein the customized data structures reference externally-stored data (e.g., a database schema including a pointer to a file stored in a file system, or a pointer to a Binary Large Object, or BLOB).

**796 Including structural features to support data retrieval and/or manipulation:**

This subclass is indented under subclass 793. Subject matter wherein the customized data structures include features which are designed to support management (e.g., retrieval or manipulation) of data.

**SEE OR SEARCH CLASS:**

706, Data Processing: Artificial Intelligence, subclasses 12 through 14, 20, 22, and 45-55 for details on feature analysis and extraction algorithms that adapt, learn, classify, cluster, etc.

**797 Trees:**

This subclass is indented under subclass 791. Subject matter wherein a data structure is represented as an acyclic connected graph where each node has a set of zero or more children nodes, and at most one parent node are created and/or managed.

- (1) Note. All types of tree data structures not provided for elsewhere are included in this subclass, including B-trees, B+-trees, binary trees, or tries.
- (2) Note. One example of a tree management operation to be included within this subclass is a tree balancing operation.

**798 Graphs:**

This subclass is indented under subclass 791. Subject matter comprising creating or managing an abstract data type (ADT) that consists of a set of nodes (i.e., vertices) and a set of edges that establish relationships between the nodes.

- (1) Note. All types of graph data structures not provided for elsewhere are included in this subclass, including, for example, directed and undirected graphs, and networks.

**799 Queues:**

This subclass is indented under subclass 791. Subject matter including a created and/or managed data structure that contains buffered elements, generally following a FIFO or LIFO priority for removal.

- (1) Note. All types of queue data structures are included in this subclass, including, for example, circular queue and priority queues.

**800 Linked lists:**

This subclass is indented under subclass 791. Subject matter including a created and/or managed data structure containing a list of values, where each value references a next value in the collection.

- (1) Note. All types of linked list data structures are included in this subclass, including, for example doubly-linked lists.

**801 Arrays:**

This subclass is indented under subclass 791. Subject matter including a created and/or managed data structure containing a list of elements that are referenced by an index.

- (1) Note. All types of array data structures are included in this subclass, including, for example, bitmaps and stacks.

**802 Database and data structure management:**

This subclass is indented under subclass 790. Subject matter which facilitates the management of data structures, including their definition and creation, modification, transformation and population.

**SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 761, for converting a query from one query language to another query language.
- 756, for changing the format of a data structure, or data objects, using various methods such as a translation, mapping, or altering with the purpose of facilitating further processing of the data structure or data object.
- 602, for retrieving, cleaning, preparing, converting, migrating, integrating,



- and/or storing data into the data warehouse.
- 809, for generalized transformation/conversion from one schema to another.
- 810, for subject matter wherein data is transferred from one schema/structure to another through the use of a logical data model.
- 975, for transferring of data from one database having one database schema to another database having a different database schema.
- 803 Database, schema, and data structure creation and/or modification:**  
This subclass is indented under subclass 802. Subject matter wherein the structure of a database, schema, or data structure is created, modified or populated using a formal language supported by a database management system.
- 804 Automatic generation based on input file or data:**  
This subclass is indented under subclass 803. Subject matter wherein a database, schema, or data structure is automatically generated based upon input data (e.g., a data file).
- SEE OR SEARCH CLASS:  
706, Data Processing: Artificial Intelligence, subclasses 11 through 13, 16, 45-61 for automatic generation involving intelligence, decisions, inference, detailed classification algorithms, detailed clustering algorithms, adaptation, or learning.
- 805 Via a graphical user interface:**  
This subclass is indented under subclass 803. Subject matter wherein a database, schema, or data structure is generated or modified through the use of a graphical user interface.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
601, for automating schema definition of a data warehouse.
- SEE OR SEARCH CLASS:  
715, Data Processing: Presentation Processing of Document, Operator Inter-
- face Processing, and Screen Saver Display Processing, subclasses 700 through 866 for operator interface processing.
- 806 Maintaining schema version information:**  
This subclass is indented under subclass 805. Subject matter wherein a database schema can be modified, and wherein schema version information is maintained such that different schema versions can be utilized in database transactions (e.g., insert, select).
- 807 Through the use of structural data to support dynamic schemas:**  
This subclass is indented under subclass 805. Subject matter wherein a database schema includes support for dynamic schema management. The database schema includes a subset of tables and fields which themselves represent the database schema (e.g., a table storing table information, a table storing field/attribute information, a table storing key information, adding a new record to the field/attribute table dynamically modifies a data table by adding a new field/attribute).
- 808 Merging schemas:**  
This subclass is indented under subclass 805. Subject matter wherein a plurality of database schema are normalized and merged.
- 809 Moving data from one schema or structure to another:**  
This subclass is indented under subclass 802. Subject matter wherein data is transferred from one schema or structure to another.
- (1) Note. This subclass includes the conversion and/or mapping of data being transferred.
- (2) Note. This subclass is concerned with identifying proper transformations from one schema to another. The execution of such transformations to store data in a database is classified elsewhere.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
602, for retrieving, cleaning, preparing, converting, migrating, integrating, and/or storing data into the data warehouse.

- 756, for changing the format of a data structure, or data objects, using various methods such as a translation, mapping, or altering with the purpose of facilitating further processing of the data structure or data object.
- 761, for converting a query from one query language to another query language.
- 802, for the management of data structures, including their definition and creation, modification, transformation and population.
- 810, for subject matter wherein data is transferred from one schema/structure to another through the use of a logical data model.
- 975, for transferring of data from one database having one database schema to another database having a different database schema.

**810 Through the use of a logical data model:**

This subclass is indented under subclass 809. Subject matter wherein data is transferred from a schema or data structure to another schema or data structure through the use of a business model.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 602, for retrieving, cleaning, preparing, converting, migrating, integrating, and/or storing data into the data warehouse.
- 756, for changing the format of a data structure, or data objects, using various methods such as a translation, mapping, or altering with the purpose of facilitating further processing of the data structure or data object.
- 761, for converting a query from one query language to another query language.
- 802, for the management of data structures, including their definition and creation, modification, transformation and population.
- 809, for generalized transformation/conversion from one schema to another.
- 975, for transferring of data from one database having one database schema to another database having a different database schema.

**811 From unstructured or semi-structured data to structured data:**

This subclass is indented under subclass 809. Subject matter wherein data is received in unstructured form, such as by importing and parsing a document or web page, and converted to a form that can be stored in a data structure/database schema.

- (1) Note. Examples of documents to be parsed are XML or markup language files.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 692, for subject matter relating to any data cleansing or scrubbing operations in order to correct or screen inconsistent and/or corrupt data.
- 708, for subject matter relating to selecting which database(s) to search based on the topic or category of the query submitted to the meta-search engine.
- 755, for subject matter relating to breaking down an input comprised of a data structure or data object into finer components for the purpose of further processing or storage of the data structure or data object. The finer components are identified because they have an individual value.
- 771, for subject matter relating to categorizing a query into a particular group or category so that only data in that group or category needs to be searched.

SEE OR SEARCH CLASS:

- 715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclasses 234 through 242 for structured documents and in particular, subclass 239 for conversion from one markup language to another (e.g., XML to HTML or utilizing an intermediate format) and subclass 249 for format transformation.

**812 Data storage operations:**

This subclass is indented under subclass 802. Subject matter wherein data is received for storage, and the most suitable device, volume, location or data structure/schema is selected for storage based on the characteristics of the data to be stored.

**SEE OR SEARCH CLASS:**

360, Dynamic Magnetic Information Storage or Retrieval, for apparatus and corresponding processes for the storage and retrieval of information based on relative movement between a magnetic record carrier and a transducer (e.g., magnetic disk drives).

365, Static Information Storage and Retrieval, various subclasses for apparatus or corresponding processes for the static storage and retrieval of information.

369, Dynamic Information Storage or Retrieval, various subclasses for record carriers and systems wherein data are stored and retrieved by interaction with a medium and there is relative motion between a medium and a transducer (e.g., optical disks, CD-ROMs, jukeboxes), particularly subclasses 30.01 through 41.01, 69, and 176 through 271 for designating or selecting storage media to be used for storage and retrieval.

711, Electrical Computers and Digital Processing Systems: Memory, subclasses 133 through 136 for cache entry replacement strategies, subclasses 159 through 160 for memory accessing and control entry replacement strategies, per se, and subclasses 170 through 173, especially subclass 173, for memory accessing and control memory configuring and partitioning, per se.

**813 GARBAGE COLLECTION:**

This subclass is indented under the class definition. Subject matter comprising automatic management or maintenance of a heap data structure, which includes reclaiming memory resources and the reorganizing of memory space storing data objects based upon the need for the data by the current processes.

(1) Note. This subclass includes operating systems, virtual machines as well as a single program.

(2) Note. Cache management on the die is classified elsewhere.

(3) Note. Web-server cache management is properly classified herein.

**SEE OR SEARCH CLASS:**

711, Electrical Computers and Digital Processing Systems: Memory, subclasses 133 through 136 for cache entry replacement strategies, subclasses 159 through 160 for memory accessing and control entry replacement strategies, per se, and subclasses 170 through 173, especially subclass 173, for memory accessing and control memory configuring and partitioning, per se.

**814 Reference counting:**

This subclass is indented under subclass 813. Subject matter comprising a form of heap management/maintenance where each data object stored in memory stores a count of the number of references, pointers, or handles which currently reference the data object.

**815 Cyclic:**

This subclass is indented under subclass 814. Subject matter comprising a form of reference counting garbage collection wherein one or more objects refer either directly or indirectly to itself.

**816 Mark-sweep:**

This subclass is indented under subclass 813. Subject matter comprising traversing and marking/tagging each data object in a heap data structure which are accessible by a computer program, wherein after the traversal of the heap is complete, all untagged data objects are collected or deallocated.

**817 Mark-compact:**

This subclass is indented under subclass 813. Subject matter comprising traversing and marking/tagging each data object in a heap data structure which are accessible by a computer program, and after the traversal of the heap is

complete, all untagged data objects are collected or deallocated.

- (1) Note. Remaining data objects in the heap are compacted so as to leave two portions of the heap, one area containing allocated and accessible objects, and another area that is free memory available to a computer program for allocation.

**818 Copying:**

This subclass is indented under subclass 813. Subject matter comprising traversing the heap data structure and copying each live object into contiguous destination area, wherein variations include semi-space collector, stop-and-copy, and Cheney's algorithm.

- (1) Note. This subclass differs from Mark-compact in that there is no marking of objects, so the heap needs to be traversed only once.

**819 Generational:**

This subclass is indented under subclass 813. Subject matter comprising separating portions of the heap data structure into specific memory regions for different ages of data objects stored in memory and considering the age of a data object when rearranging data objects in the heap, as well as how often to perform garbage collection on a particular memory region.

**820 Incremental:**

This subclass is indented under subclass 813. Subject matter comprising traversing the heap incrementally, as opposed to stopping any running applications and completely traversing the entire heap in a single garbage collection operation.

**821 FILE MANAGEMENT:**

This subclass is indented under the class definition. Subject matter comprising organizing, storing, managing, and maintaining flat files stored in a computer system.

- (1) Note. This subclass excludes allocating the space to store the files, addresses, byte-level information, instructions and volume management.

**SEE OR SEARCH CLASS:**

- 711, Electrical Computers and Digital Processing Systems: Memory, subclasses 101 through 146 for memory accessing and control, per se, and subclasses 154 through 166 for memory control, maintenance and management techniques.

**822 File systems:**

This subclass is indented under subclass 821. Subject matter comprising means or steps for managing the storage, organization and accessing of files on a media.

**SEE OR SEARCH CLASS:**

- 711, Electrical Computers and Digital Processing Systems: Memory, subclass 100 for memory accessing and control, per se, and subclasses 154-166 for memory control, maintenance and management techniques.

**823 Disk file systems:**

This subclass is indented under subclass 822. Subject matter comprising means or steps for managing the storage, organization and accessing of files on a data storage device.

- (1) Note. Examples include FAT, NTFS, HFS, HFS+, ext2, ext3, ISO 9660, ODS-5 and UDF.
- (2) Note. This subclass includes file systems for storing data files on a data storage device such as a disk drive.

**SEE OR SEARCH CLASS:**

- 360, Dynamic Information Storage or Retrieval, for apparatus and corresponding processes for the storage and retrieval of information based on relative movement between a magnetic record carrier and a transducer (e.g., magnetic disk drives).
- 365, Static Information Storage and Retrieval, various subclasses for apparatus or corresponding processes for the static storage and retrieval of information.
- 369, Dynamic Information Storage or Retrieval, various subclasses for record carriers and systems wherein

data are stored and retrieved by interaction with a medium and there is relative motion between a medium and a transducer (e.g., optical disks, CD-ROMs, jukeboxes), particularly subclasses 30.01 through 41.01 , 69, and 176 through 271 for designating or selecting storage media to be used for storage and retrieval.

711, Electrical Computers and Digital Processing Systems: Memory, subclasses 133 through 136 for cache entry replacement strategies, subclasses 159 through 160 for memory accessing and control entry replacement strategies, per se, and subclasses 170 through 173, especially subclass 173, for memory accessing and control memory configuring and partitioning, per se.

**824 Flash file systems:**

This subclass is indented under subclass 822. Subject matter comprising means or steps for managing the storage, organization and accessing of files on a non-volatile solid-state memory storage device.

(1) Note. Examples include JFFS2 and YAFFS.

**SEE OR SEARCH CLASS:**

365, Static Information Storage and Retrieval, subclasses 185.01 through 185.33 for solid state memories, per se.

**825 Database file systems:**

This subclass is indented under subclass 822. Subject matter comprising means or steps for managing the storage, organization and accessing of files identified by their characteristics or metadata.

**826 Transactional file systems:**

This subclass is indented under subclass 822. Subject matter comprising means or steps for managing the storage, organization and accessing of files through transactional processing, wherein specific groups of database modifications, additions and deletions which constitute a specific transaction are guaranteed to be fully completed or rolled back, such that the ACID

(i.e., atomicity, consistency, isolation and durability) properties of the files are maintained.

**827 Network file systems:**

This subclass is indented under subclass 822. Subject matter comprising means or steps for managing the storage, organization and accessing of files remotely on a server.

(1) Note. Examples include NFS, AFS and SMB.

**828 File directory structure:**

This subclass is indented under subclass 821. Subject matter comprising the use of a specific directory structure to support the efficient storage and retrieval of files in a file system.

**829 Hierarchical structure:**

This subclass is indented under subclass 828. Subject matter comprising the use of a path (i.e., chain) of folders or directories to maintain files in a file system.

**830 Indexing structure:**

This subclass is indented under subclass 828. Subject matter comprising the use of an addressing mechanism in a file system to facilitate efficient access to a specific file.

**831 Virtual directory structure:**

This subclass is indented under subclass 828. Subject matter comprising the use of a virtual directory system to link to an actual directory in a file system.

**899 MISCELLANEOUS:**

This subclass is indented under the class definition. Subject matter comprising database and file management or data structure apparatus and methods not provided for above.

**E-SUBCLASSES**

The E-subclasses in U.S. Class 707 provide for digital computing or data processing equipment or methods specially adapted for the retrieval of information data and database structures for such data.

**E17.001 INFORMATION RETRIEVAL; DATABASE STRUCTURES THEREFORE (EPO):**

This group of subclasses provides for digital computing or data processing equipment or

methods specially adapted for the retrieval of information, and data base structures for such data. This subclass is substantially the same in scope as ECLA classification G06F17/30.

- (1) Note. This group includes compilation of abstracts.

**E17.002 Data indexing; abstracting; data reduction (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30A.

**E17.003 Of chemical information (EPO):**

This subclass is indented under subclass E17.002. This subclass is substantially the same in scope as ECLA classification G06F17/30A2.

**E17.004 Of images (EPO):**

This subclass is indented under subclass E17.002. This subclass is substantially the same in scope as ECLA classification G06F17/30A3.

**E17.005 Interfaces; database management systems; updating (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30B.

**E17.006 File format conversion (EPO):**

This subclass is indented under subclass E17.005. This subclass is substantially the same in scope as ECLA classification G06F17/30B2.

**E17.007 Concurrency control and recovery (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30C.

**E17.008 Document retrieval systems (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30D.

**E17.009 Information processing systems, e.g., multi-media systems, etc. (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30E.

**E17.01 File systems; file servers (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30F.

**E17.011 Processing chained data, e.g., graphs, linked lists, etc. (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30G.

**E17.012 Trees (EPO):**

This subclass is indented under subclass E17.011. This subclass is substantially the same in scope as ECLA classification G06F17/30G3.

**E17.013 Hypermedia (EPO):**

This subclass is indented under subclass E17.011. This subclass is substantially the same in scope as ECLA classification G06F17/30G4.

**E17.014 Query processing for the retrieval of structured data (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30H.

**E17.015 Natural language query interface (EPO):**

This subclass is indented under subclass E17.014. This subclass is substantially the same in scope as ECLA classification G06F17/30H2.

**E17.016 Menu driven systems; graphical querying; query-by-example (EPO):**

This subclass is indented under subclass E17.014. This subclass is substantially the same in scope as ECLA classification G06F17/30H4.

**E17.017 Query optimization (EPO):**

This subclass is indented under subclass E17.014. This subclass is substantially the same in scope as ECLA classification G06F17/30H6.

**E17.018 In geographical information databases (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30L.

**E17.019 In image databases (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30M.

**E17.02 Based on image content (EPO):**

This subclass is indented under subclass E17.019. This subclass is substantially the same in scope as ECLA classification G06F17/30M1.

**E17.021 Using color (EPO):**

This subclass is indented under subclass E17.02. This subclass is substantially the same in scope as ECLA classification G06F17/30M1C.

**E17.022 Using extracted text (EPO):**

This subclass is indented under subclass E17.02. This subclass is substantially the same in scope as ECLA classification G06F17/30M1E.

**E17.023 Using a combination of image content features (EPO):**

This subclass is indented under subclass E17.02. This subclass is substantially the same in scope as ECLA classification G06F17/30M1H.

**E17.024 Using shape and object relationship (EPO):**

This subclass is indented under subclass E17.02. This subclass is substantially the same in scope as ECLA classification G06F17/30M1S.

**E17.025 Using texture (EPO):**

This subclass is indented under subclass E17.02. This subclass is substantially the same

in scope as ECLA classification G06F17/30MIT.

**E17.026 Based on bibliographical data of images (EPO):**

This subclass is indented under subclass E17.019. This subclass is substantially the same in scope as ECLA classification G06F17/30M2.

**E17.027 The images having vectorial formats (EPO):**

This subclass is indented under subclass E17.019. This subclass is substantially the same in scope as ECLA classification G06F17/30M4.

**E17.028 The images being video sequences (EPO):**

This subclass is indented under subclass E17.019. This subclass is substantially the same in scope as ECLA classification G06F17/30M5.

**E17.029 By browsing (EPO):**

This subclass is indented under subclass E17.019. This subclass is substantially the same in scope as ECLA classification G06F17/30M7.

**E17.03 By graphical querying (EPO):**

This subclass is indented under subclass E17.019. This subclass is substantially the same in scope as ECLA classification G06F17/30M8.

**E17.031 Data organization and access thereof (EPO):**

This subclass is indented under subclass E17.019. This subclass is substantially the same in scope as ECLA classification G06F17/30M9.

**E17.032 Using distributed data base systems, e.g., networks, etc.(EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30N.

**E17.033 Processing unordered data (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30P.

**E17.034 Random access (EPO):**

This subclass is indented under subclass E17.033. This subclass is substantially the same in scope as ECLA classification G06F17/30P1.

**E17.035 Using parallel associative memories (EPO):**

This subclass is indented under subclass E17.034. This subclass is substantially the same in scope as ECLA classification G06F17/30P1A.

**E17.036 By address calculation or conversion, e.g., hashing (EPO):**

This subclass is indented under subclass E17.034. This subclass is substantially the same in scope as ECLA classification G06F17/30P1C.

**E17.037 Using directory or table look-up (EPO):**

This subclass is indented under subclass E17.034. This subclass is substantially the same in scope as ECLA classification G06F17/30P1D.

**E17.038 Using more than one table in sequence, i.e., systems with three or more layers, etc. (EPO):**

This subclass is indented under subclass E17.037. This subclass is substantially the same in scope as ECLA classification G06F17/30P1D3.

**E17.039 Sequential access, e.g., string matching, etc. (EPO):**

This subclass is indented under subclass E17.033. This subclass is substantially the same in scope as ECLA classification G06F17/30P2.

**E17.04 On static storage (EPO):**

This subclass is indented under subclass E17.039. This subclass is substantially the same in scope as ECLA classification G06F17/30P2S.

**E17.041 Comparing simultaneously a plurality of search arguments with a simple file data, finite state machine (EPO):**

This subclass is indented under subclass E17.039. This subclass is substantially the same in scope as ECLA classification G06F17/30P2A.

**E17.042 Comparing simultaneously search arguments with more than one file data (EPO):**

This subclass is indented under subclass E17.039. This subclass is substantially the same in scope as ECLA classification G06F17/30P2F.

**E17.043 Comparing simultaneously search arguments with more than one file data (EPO):**

This subclass is indented under subclass E17.042. This subclass is substantially the same in scope as ECLA classification G06F17/30P2S9.

**E17.044 In structured data stores (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30S.

**E17.045 Relational databases (EPO):**

This subclass is indented under subclass E17.044. This subclass is substantially the same in scope as ECLA classification G06F17/30S1.

**E17.046 Clustering or classification (EPO):**

This subclass is indented under subclass E17.045. This subclass is substantially the same in scope as ECLA classification G06F17/30S1C.

SEE OR SEARCH THIS CLASS, SUBCLASS:  
E17.089, for textual data.

**E17.047 Including cluster or class visualization or browsing (EPO):**

This subclass is indented under subclass E17.046. This subclass is substantially the same in scope as ECLA classification G06F17/30S1C1.

**E17.048 Entity relationship models (EPO):**

This subclass is indented under subclass E17.045. This subclass is substantially the same in scope as ECLA classification G06F17/30S1E.

**E17.049 Physical indexing structures (EPO):**

This subclass is indented under subclass E17.045. This subclass is substantially the



same in scope as ECLA classification G06F17/30S1N.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
E17.059, for indexing structures for textual data.

**E17.05 Trees, e.g., B+ trees, etc. (EPO):**

This subclass is indented under subclass E17.049. This subclass is substantially the same in scope as ECLA classification G06F17/30S1N1.

**E17.051 Vectors, bitmaps or matrices (EPO):**

This subclass is indented under subclass E17.049. This subclass is substantially the same in scope as ECLA classification G06F17/30S1N3.

**E17.052 Hash tables (EPO):**

This subclass is indented under subclass E17.049. This subclass is substantially the same in scope as ECLA classification G06F17/30S1N5.

**E17.053 Index managing details (EPO):**

This subclass is indented under subclass E17.049. This subclass is substantially the same in scope as ECLA classification G06F17/30S1N7.

**E17.054 Relational operators, e.g., joins, transitive closure, partitioning, etc.(EPO):**

This subclass is indented under subclass E17.045. This subclass is substantially the same in scope as ECLA classification G06F17/30S1R.

**E17.055 Object oriented databases (EPO):**

This subclass is indented under subclass E17.044. This subclass is substantially the same in scope as ECLA classification G06F17/30S3.

**E17.056 Multidimensional databases (EPO):**

This subclass is indented under subclass E17.044. This subclass is substantially the same in scope as ECLA classification G06F17/30S5.

**E17.057 Indexing (EPO):**

This subclass is indented under subclass E17.056. This subclass is substantially the

same in scope as ECLA classification G06F17/30S5N.

**E17.058 Of unstructured textual data (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30T.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

E17.008, for document management systems.

**E17.059 Filtering based on additional data, e.g., user or group profiles, etc. (EPO):**

This subclass is indented under subclass E17.058. This subclass is substantially the same in scope as ECLA classification G06F17/30T3.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

E17.109, for filtering in web context.

**E17.06 Profile generation, learning or modification (EPO):**

This subclass is indented under subclass E17.059. This subclass is substantially the same in scope as ECLA classification G06F17/30T3L.

**E17.061 Querying (EPO):**

This subclass is indented under subclass E17.058. This subclass is substantially the same in scope as ECLA classification G06F17/30T2.

**E17.062 Query formulation (EPO):**

This subclass is indented under subclass E17.061. This subclass is substantially the same in scope as ECLA classification G06F17/30T2F.

**E17.063 Reformulation based on results of preceding query (EPO):**

This subclass is indented under subclass E17.062. This subclass is substantially the same in scope as ECLA classification G06F17/30T2F2.

**E17.064 Using relevance feedback from the user, e.g., relevance feedback on documents, docu-**

**ments sets, document terms or passages, etc. (EPO):**

This subclass is indented under subclass E17.063. This subclass is substantially the same in scope as ECLA classification G06F17/30T2F2R.

**E17.065 Using graphical result space presentation or visualization (EPO):**

This subclass is indented under subclass E17.064. This subclass is substantially the same in scope as ECLA classification G06F17/30T2F2R1.

**E17.066 Using system suggestions (EPO):**

This subclass is indented under subclass E17.062. This subclass is substantially the same in scope as ECLA classification G06F17/30T2F1.

**E17.067 Using document space presentation or visualization, e.g., category, hierarchy or range presentation and selection, etc. (EPO):**

This subclass is indented under subclass E17.066. This subclass is substantially the same in scope as ECLA classification G06F17/30T2F1V.

**E17.068 Natural language query formulation or dialogue systems (EPO):**

This subclass is indented under subclass E17.062. This subclass is substantially the same in scope as ECLA classification G06F17/30T2F4.

**E17.069 Query processing (EPO):**

This subclass is indented under subclass E17.061. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P.

**E17.07 Query translation (EPO):**

This subclass is indented under subclass E17.069. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P2.

**E17.071 Selection or weighting of terms from queries, including natural language queries (EPO):**

This subclass is indented under subclass E17.07. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P2E.

**E17.072 Syntactic pre-processing steps, e.g., stop-word elimination, stemming, etc.(EPO)**

This subclass is indented under subclass E17.07. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P2S.

**E17.073 Translation of the query language, e.g., Chinese to English, etc. (EPO):**

This subclass is indented under subclass E17.07. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P2T.

**E17.074 Query expansion (EPO):**

This subclass is indented under subclass E17.07. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P2X.

**E17.075 Query execution (EPO):**

This subclass is indented under subclass E17.069. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P4.

**E17.076 Using Boolean model (EPO):**

This subclass is indented under subclass E17.075. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P4B.

**E17.077 Using phonetics (EPO):**

This subclass is indented under subclass E17.075. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P4F.

**E17.078 Using natural language analysis (EPO):**

This subclass is indented under subclass E17.075. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P4N.

**E17.079 Using probabilistic model (EPO):**

This subclass is indented under subclass E17.075. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P4P.

**E17.08 Using vector based model (EPO):**

This subclass is indented under subclass E17.075. This subclass is substantially the

same in scope as ECLA classification G06F17/30T2P4V.

**E17.081 Reuse of stored results of previous queries (EPO):**

This subclass is indented under subclass E17.069. This subclass is substantially the same in scope as ECLA classification G06F17/30T2P9.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
E17.063, for formulation of new queries.

**E17.082 Presentation or visualization of query results (EPO):**

This subclass is indented under subclass E17.061. This subclass is substantially the same in scope as ECLA classification G06F17/30T2V.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
17.093, browsing or visualization of document space.

**E17.083 Indexing (EPO):**

This subclass is indented under subclass E17.058. This subclass is substantially the same in scope as ECLA classification G06F17/30T1.

**E17.084 Selection or weighting of terms for indexing (EPO):**

This subclass is indented under subclass E17.083. This subclass is substantially the same in scope as ECLA classification G06F17/30T1E.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
E17.094, for summarization.

**E17.085 Physical indexing structures (EPO):**

This subclass is indented under subclass E17.083. This subclass is substantially the same in scope as ECLA classification G06F17/30T1P.

**E17.086 Inverted lists (EPO):**

This subclass is indented under subclass E17.085. This subclass is substantially the same in scope as ECLA classification G06F17/30T1P1.

**E17.087 Trees (EPO):**

This subclass is indented under subclass E17.085. This subclass is substantially the same in scope as ECLA classification G06F17/30T1P3.

**E17.088 Index managing details (EPO):**

This subclass is indented under subclass E17.085. This subclass is substantially the same in scope as ECLA classification G06F17/30T1P9.

**E17.089 Clustering or classification (EPO):**

This subclass is indented under subclass E17.058. This subclass is substantially the same in scope as ECLA classification G06F17/30T4.

SEE OR SEARCH THIS CLASS, SUB-CLASS:  
E17.095, for manual classification.

**E17.09 Into predefined classes (EPO):**

This subclass is indented under subclass E17.089. This subclass is substantially the same in scope as ECLA classification G06F17/30T4C.

**E17.091 Including class or cluster creation or modification (EPO):**

This subclass is indented under subclass E17.089. This subclass is substantially the same in scope as ECLA classification G06F17/30T4M.

**E17.092 Including cluster or class visualization or browsing (EPO):**

This subclass is indented under subclass E17.089. This subclass is substantially the same in scope as ECLA classification G06F17/30T4V.

**E17.093 Browsing or visualization (EPO):**

This subclass is indented under subclass E17.058. This subclass is substantially the same in scope as ECLA classification G06F17/30T5.

**E17.094 Summarization for human users (EPO):**

This subclass is indented under subclass E17.093. This subclass is substantially the same in scope as ECLA classification G06F17/30T5S.

**E17.095 Based on associated metadata or manual classification, e.g., bibliographic data, etc. (EPO):**

This subclass is indented under subclass E17.058. This subclass is substantially the same in scope as ECLA classification G06F17/30T6.

**E17.096 Using identifiers, e.g., barcodes, RFIDs, etc. (EPO):**

This subclass is indented under subclass E17.095. This subclass is substantially the same in scope as ECLA classification G06F17/30T6A.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

E17.113, for URLs.

**E17.097 Using citations (EPO):**

This subclass is indented under subclass E17.095. This subclass is substantially the same in scope as ECLA classification G06F17/30T6C.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

E17.013, for hypermedia.

**E17.098 Creation of semantic tools (EPO):**

This subclass is indented under subclass E17.058. This subclass is substantially the same in scope as ECLA classification G06F17/30T8.

**E17.099 Ontology (EPO):**

This subclass is indented under subclass E17.098. This subclass is substantially the same in scope as ECLA classification G06F17/30T8G.

**E17.1 Thesaurus (EPO):**

This subclass is indented under subclass E17.098. This subclass is substantially the same in scope as ECLA classification G06F17/30T8T.

**E17.101 Of audio data (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30U.

**E17.102 Based on associated metadata, e.g., bibliographic data, images associated with audio data, etc. (EPO):**

This subclass is indented under subclass E17.101. This subclass is substantially the same in scope as ECLA classification G06F17/30U6.

**E17.103 Wherein the metadata is a transcript of the audio data (EPO):**

This subclass is indented under subclass E17.102. This subclass is substantially the same in scope as ECLA classification G06F17/30U6T.

**E17.104 Processing sequentially ordered data, e.g., alpha-numerically ordered, etc. (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30V.

**E17.105 Binary access (EPO):**

This subclass is indented under subclass E17.104. This subclass is substantially the same in scope as ECLA classification G06F17/30V2.

**E17.106 Sequential access (EPO):**

This subclass is indented under subclass E17.104. This subclass is substantially the same in scope as ECLA classification G06F17/30V3.

**E17.107 Retrieval from the Internet, e.g., browsers, etc. (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30W.

**E17.108 By querying, e.g., search engines or meta-search engines, crawling techniques, push systems, etc. (EPO):**

This subclass is indented under subclass E17.107. This subclass is substantially the same in scope as ECLA classification G06F17/30W1.

**E17.109 With filtering and personalization (EPO):**

This subclass is indented under subclass E17.108. This subclass is substantially the

same in scope as ECLA classification G06F17/30W1F.

**E17.11 Spatially dependent indexing and retrieval, e.g., location dependent results to queries, etc. (EPO):**

This subclass is indented under subclass E17.108. This subclass is substantially the same in scope as ECLA classification G06F17/30W1S.

**E17.111 By navigation, e.g., using categorized browsing, portals, synchronized browsing, visual networks of documents, virtual worlds or tours, etc. (EPO):**

This subclass is indented under subclass E17.107. This subclass is substantially the same in scope as ECLA classification G06F17/30W3.

**E17.112 By using information identifiers, e.g., encoding URL in specific indicia, browsing history, etc. (EPO):**

This subclass is indented under subclass E17.107. This subclass is substantially the same in scope as ECLA classification G06F17/30W5.

**E17.113 By using bar codes (EPO):**

This subclass is indented under subclass E17.112. This subclass is substantially the same in scope as ECLA classification G06F17/30W5B.

**E17.114 Bookmark management (EPO):**

This subclass is indented under subclass E17.112. This subclass is substantially the same in scope as ECLA classification G06F17/30W5K.

**E17.115 URL specific, e.g., using aliases, detecting broken or misspelled links, etc. (EPO):**

This subclass is indented under subclass E17.112. This subclass is substantially the same in scope as ECLA classification G06F17/30W5L.

**E17.116 Web site content organization and management, e.g., publishing, automatic linking or maintaining pages, etc. (EPO):**

This subclass is indented under subclass E17.107. This subclass is substantially the same in scope as ECLA classification G06F17/30W7.

**E17.117 Access to data in other repository systems, e.g., legacy data or dynamic Web page generation, etc. (EPO):**

This subclass is indented under subclass E17.116. This subclass is substantially the same in scope as ECLA classification G06F17/30W7L.

**E17.118 Document structures and storage, e.g., HTML extensions, etc. (EPO):**

This subclass is indented under subclass E17.116. This subclass is substantially the same in scope as ECLA classification G06F17/30W7S.

**E17.119 Browsing optimization (EPO):**

This subclass is indented under subclass E17.107. This subclass is substantially the same in scope as ECLA classification G06F17/30W9.

**E17.12 Of access to content, e.g., by caching, etc. (EPO):**

This subclass is indented under subclass E17.119. This subclass is substantially the same in scope as ECLA classification G06F17/30W9C.

**E17.121 Optimizing the visualization of content, e.g., distillation of HTML documents, etc. (EPO):**

This subclass is indented under subclass E17.119. This subclass is substantially the same in scope as ECLA classification G06F17/30W9V.

**E17.122 Of semistructured data, the underlying structure being taken into account, e.g., mark-up language structure data, etc. (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30X.

**E17.123 Indexing, e.g., of XML tags, etc. (EPO):**

This subclass is indented under subclass E17.122. This subclass is substantially the same in scope as ECLA classification G06F17/30X1.

**E17.124 Mapping or conversion (EPO):**

This subclass is indented under subclass E17.122. This subclass is substantially the same in scope as ECLA classification G06F17/30X3.

**E17.125 Mapping to a database (EPO):**

This subclass is indented under subclass E17.124. This subclass is substantially the same in scope as ECLA classification G06F17/30X3D.

**E17.126 Mark-up to mark-up conversion (EPO):**

This subclass is indented under subclass E17.124. This subclass is substantially the same in scope as ECLA classification G06F17/30X3M.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

E17.121, for conversion for visualization in web browsing.

**E17.127 XML native databases, structures and querying (EPO):**

This subclass is indented under subclass E17.122. This subclass is substantially the same in scope as ECLA classification G06F17/30X7.

**E17.128 Query formulation (EPO):**

This subclass is indented under subclass E17.127. This subclass is substantially the same in scope as ECLA classification G06F17/30X7F.

**E17.129 Query processing (EPO):**

This subclass is indented under subclass E17.127. This subclass is substantially the same in scope as ECLA classification G06F17/30X7P.

**E17.13 Query translation (EPO):**

This subclass is indented under subclass E17.129. This subclass is substantially the same in scope as ECLA classification G06F17/30X7P2.

**E17.131 Query optimization (EPO):**

This subclass is indented under subclass E17.129. This subclass is substantially the same in scope as ECLA classification G06F17/30X7P3.

**E17.132 Query execution (EPO):**

This subclass is indented under subclass E17.129. This subclass is substantially the same in scope as ECLA classification G06F17/30X7P4.

**E17.133 Results presentation (EPO):**

This subclass is indented under subclass E17.127. This subclass is substantially the same in scope as ECLA classification G06F17/30X7V.

**E17.134 Details of database functions independent of the retrieved data type (EPO):**

This subclass is indented under subclass E17.001. This subclass is substantially the same in scope as ECLA classification G06F17/30Z.

**E17.135 Querying (EPO):**

This subclass is indented under subclass E17.134. This subclass is substantially the same in scope as ECLA classification G06F17/30Z2.

**E17.136 Query formulation (EPO):**

This subclass is indented under subclass E17.135. This subclass is substantially the same in scope as ECLA classification G06F17/30Z2F.

**E17.137 Using system suggestions (EPO):**

This subclass is indented under subclass E17.136. This subclass is substantially the same in scope as ECLA classification G06F17/30Z2F1.

**E17.138 Using search space presentation or visualization, e.g., category or range presentation and selection, etc. (EPO):**

This subclass is indented under subclass E17.137. This subclass is substantially the same in scope as ECLA classification G06F17/30Z2F1V.

**E17.139 Natural language query formulation or dialogue systems (EPO):**

This subclass is indented under subclass E17.136. This subclass is substantially the same in scope as ECLA classification G06F17/30Z2F4.

**E17.14 Query processing (EPO):**

This subclass is indented under subclass E17.135. This subclass is substantially the same in scope as ECLA classification G06F17/30Z2P.

**E17.141 Presentation or visualization of query results (EPO):**

This subclass is indented under subclass E17.135. This subclass is substantially the same in scope as ECLA classification G06F17/30Z2V.

**E17.142 Browsing or visualization (EPO):**

This subclass is indented under subclass E17.134. This subclass is substantially the same in scope as ECLA classification G06F17/30Z5.

**E17.143 Retrieval based on associated metadata (EPO):**

This subclass is indented under subclass E17.134. This subclass is substantially the same in scope as ECLA classification G06F17/30Z6.

## CROSS-REFERENCE ART COLLECTIONS

**912 APPLICATIONS OF A DATABASE:**

This subclass is indented under the class definition. This cross-reference art collection is indented. Subject matter in combination with a database wherein the schemas, structures, interfaces or functionality has been customized to support a specific task or data type.

**913 Multimedia:**

This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing multimedia data, such as combinations of video, audio, images, animations and text data.

**914 Video:**

This cross-reference art collection is indented under cross-reference art collection 913. Subject matter in combination with a database for storing and managing video data representing live action images that have been recorded by, for instance, video camera.

**915 Image:**

This cross-reference art collection is indented under cross-reference art collection 913. Subject matter in combination with a database for storing and managing image data representing still images, such as photographs taken with a camera.

**915 Image:**

This cross-reference art collection is indented under cross-reference art collection 913. Subject matter in combination with a database for storing and managing image data representing still images, such as photographs taken with a camera.

**916 Audio:**

This cross-reference art collection is indented under cross-reference art collection 913. Subject matter in combination with a database for storing and managing audio data representing sounds.

**917 Text:**

This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing text data representing writing.

**918 Location:**

This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing location data representing a physical location, normally through the use of a set of two or three-dimensional coordinates, such as Global Positioning System (GPS) data.

(1) Note. Location data can include, for example, data about landmarks, structures, or businesses.

**919 Geographic:**

This cross-reference art collection is indented under cross-reference art collection 918. Subject matter in combination with a database for storing and managing geographic data representing the real world, including topological, geophysical and geopolitical information such as continents, oceans, lakes, rivers, coastlines, depths, elevations and terrain.

- (1) Note. Map data, including aerial or satellite imagery, is included herein.

**920 Navigation:**

This cross-reference art collection is indented under cross-reference art collection 919. Subject matter in combination with a database for storing and managing geographic data to be used for navigation such as the location of roads and highways, restrictions (e.g., information on changeable lanes, high-occupancy vehicle (HOV) restrictions, and height/weight restrictions), as well as waterway and water hazard information.

**921 Spatial:**

This cross-reference art collection is indented under cross-reference art collection 918. Subject matter in combination with a database for storing and managing spatial data representing the physical positions of objects and their relationships to each other in the real world.

- (1) Note. Spatial data can include, for example, data about landmarks, building structures, or businesses.

**922 Communications:**

This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing communications data, such as e-mail, and Short Messaging Service (SMS).

**SEE OR SEARCH CLASS:**

- 379, Telephonic Communications, for telephony, per se.  
 455, Telecommunications, for cellular communications, per se, and, in particular, subclass 466 for SMS.  
 709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring, subclasses 204 through 206 for computer conferencing and demand based e-mail communications.

**923 Intellectual property:**

This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing intellectual property data

regarding trade secrets, copyrights, trademarks, and patents.

**924 Patent procedure:**

This cross-reference art collection is indented under cross-reference art collection 923. Subject matter in combination with a database for storing and managing intellectual property data to support applicants and attorneys in applying for and securing patent protection for an invention.

**925 Drafting an application:**

This cross-reference art collection is indented under cross-reference art collection 924. Subject matter in combination with a database for storing and managing intellectual property data to support the creation of a patent application.

**926 Drafting drawings or figures:**

This cross-reference art collection is indented under cross-reference art collection 924. Subject matter in combination with a database for storing and managing intellectual property data to support the creation of drafting of drawing figures for a patent application.

**927 Validation:**

This cross-reference art collection is indented under cross-reference art collection 924. Subject matter in combination with a database for storing and managing intellectual property data to support the automatic testing of a patent application for compliance with rules and regulations regarding the composition of a patent application (i.e., claim dependency testing).

**928 Electronic submission:**

This cross-reference art collection is indented under cross-reference art collection 924. Subject matter in combination with a database for storing and managing intellectual property data to support the electronic submission of a patent application to a patenting authority through electronic means, normally via the Internet.

**929 Docketing:**

This cross-reference art collection is indented under cross-reference art collection 924. Subject matter in combination with a database for storing and managing intellectual property data to support the management of a docket of a repository of a plurality of patent applications.



- (1) Note. Included herein are applications for tracking deadlines, managing prosecution rules and regulations, tracking fees, and remotely checking status at the patenting authority.
- 930 Intellectual property analysis:**  
This cross-reference art collection is indented under cross-reference art collection 923. Subject matter in combination with a database for storing and managing intellectual property data to support the study of the intellectual property in order to discover the nature of the invention, its relationship with other inventions, and/or to draw conclusions about the state of the art or the inventor(s)/author(s) and/or assignee .
- 931 Patent comparison:**  
This cross-reference art collection is indented under cross-reference art collection 930. Subject matter in combination with a database for storing and managing intellectual property data to support the analysis of intellectual property to the discovery of the similarities and differences between multiple intellectual property documents (e.g., patent mapping, etc.).
- 932 Infringement detection:**  
This cross-reference art collection is indented under cross-reference art collection 931. Subject matter in combination with a database for storing and managing intellectual property data to support the analysis of intellectual property documents to include a comparison of multiple patent documents for the purpose of detecting possible violation of intellectual property rights.
- 933 Citation analysis:**  
This cross-reference art collection is indented under cross-reference art collection 930. Subject matter in combination with a database for storing and managing intellectual property data to support the analysis of the citations therebetween.
- 934 Analyzing patenting activity:**  
This cross-reference art collection is indented under cross-reference art collection 930. Subject matter in combination with a database for storing and managing intellectual property data to support the analysis of the patenting activities of specific business entities.
- (1) Note. Included herein are applications for performing competitive intelligence.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
776, for query processing in data mining.  
600, for data mining in data warehouse systems.  
607, for on-line transactional processing, per se.
- 935 Company or stock valuation:**  
This cross-reference art collection is indented under cross-reference art collection 934. Subject matter in combination with a database for storing and managing intellectual property data to support the derivation of the monetary value of a company or the company's stock based at least in part upon that company's patenting activity.
- SEE OR SEARCH CLASS:  
705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, appropriate sub-classes for business data processing.
- 936 For use in research and development:**  
This cross-reference art collection is indented under cross-reference art collection 923. Subject matter in combination with a database for storing and managing intellectual property data to support activities pursuing the creation of new knowledge and/or products.
- 937 Intellectual property searching:**  
This cross-reference art collection is indented under cross-reference art collection 923. Subject matter in combination with a database for storing and managing intellectual property data to support the searching and retrieval of intellectual property matching search criteria.
- (1) Note. Systems which search for patents in order to determine the novelty of a patentable invention are included herein, as well as systems which search for possibly infringing intellectual property.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
772, for query by example.

932, for systems which perform analysis to determine infringement.

**938 Intellectual property markets:**

This cross-reference art collection is indented under cross-reference art collection 923. Subject matter in combination with a database for storing and managing intellectual property data to support a centralized repository and interface for managing the exchange of intellectual property.

(1) Note. Intellectual Property Markets facilitate the buying, selling and/or licensing of intellectual property.

**939 Idea solicitation:**

This cross-reference art collection is indented under cross-reference art collection 923. Subject matter in combination with a database for storing and managing intellectual property data to support the solicitation, development, and management of ideas.

(1) Note. Included herein are systems which facilitate the analysis and consideration of the merits of submitted ideas, and their development and refinement into possibly patentable ideas.

**940 Infrastructure:**

This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing infrastructure data, such as data concerning buildings, or utilities.

SEE OR SEARCH CLASS:

506, Combinatorial Chemistry Technology: Method, Library, Apparatus, for in silico or mathematical conception of a chemical or biological library.

700, Data Processing: Generic Control Systems or Specific Applications, subclasses 266 through 274 for chemical process control or monitoring system.

702, Data Processing: Measuring, Calibrating, or Testing, subclasses 19 through 21 for biological or biochemical data processing analysis and measurement.

703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, subclass 1 for structural design, and subclasses 6 through 12 for simulating mechanical biological and chemical devices.

**941 Human sciences:**

This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing health sciences data, such as medical data, health sciences data, chemical data, and bio-technical data.

SEE OR SEARCH CLASS:

435, Chemistry: Molecular Biology and Microbiology, subclasses 4 through 40.52 for testing processes involving micro-organisms and enzymes not specially adapted for combinatorial chemistry technology.

436, Chemistry: Analytical and Immunological Testing, subclasses 500 through 542 for immunological tests and related subject matter, and for processes of analysis of chemical properties of a sample, physiological effect of a sample, or chemical determination of a physical property of a sample not specially adapted for combinatorial chemistry technology.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclass 2 for health care management (e.g., record management, ICDA billing, etc.), subclass 3 for patient record management, and subclass 4 for insurance.

**942 Legal/academic:**

This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing legal and/or academic data, such as academic and/or conference papers or legal decisions.

**943 News:**

This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing news data, including any

- data which is generally publicly available information.
- 944 Business related:**  
This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing any data which supports the creation and running of a business.
- SEE OR SEARCH CLASS:  
705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, appropriate subclasses for specific business applications.
- 945 Contract negotiation:**  
This cross-reference art collection is indented under cross-reference art collection 944. Subject matter in combination with a database for storing and managing business data to support the negotiation of contracts or other agreements, wherein the business data includes predefined contract templates with static and dynamic data fields, profiles and/or terms and conditions.
- 946 Real estate:**  
This cross-reference art collection is indented under cross-reference art collection 944. Subject matter in combination with a database for storing and managing real estate data, wherein the real estate data comprises listings for commercial and/or residential properties (including pricing, tax records, and for sale/rent status), public records of titles, wills, and/or tenancy listings.
- 947 Human resources:**  
This cross-reference art collection is indented under cross-reference art collection 944. Subject matter in combination with a database for storing and managing human resources data, wherein the human resources data comprises employee identification, business status, employee roles, supervisory hierarchy, business and individual employee workflow and/or employee access permission levels.
- 948 Product or catalog:**  
This cross-reference art collection is indented under cross-reference art collection 944. Subject matter in combination with a database for storing and managing product/catalog data, wherein the product/catalog data comprises an online/mail index of a seller's merchandise for real-time/mail purchase by customers.
- 949 Inventory:**  
This cross-reference art collection is indented under cross-reference art collection 944. Subject matter in combination with a database for storing and managing inventory data, wherein the inventory data comprises real-time current stock of merchandise/records/supplies, statistics regarding future/expected stocks of merchandise/records/supplies, and/or a detailed listing of business assets.
- 950 Financial:**  
This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing financial data, wherein the financial data comprises balance sheets, real-time stock market data, current and predicted wealth, and/or financial planning data.
- 951 Calendar or scheduling:**  
This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing calendar data to support scheduling and/or task management.
- 952 Malicious software:**  
This cross-reference art collection is indented under cross-reference art collection 912. Subject matter in combination with a database for storing and managing data to support malicious software applications (e.g., applications which discreetly collect and transmit user information to a third party, etc.), or applications designed to detect viruses, spyware, or other malicious software.
- SEE OR SEARCH CLASS:  
726, Information Security, subclass 1 for policy, subclasses 2 through 21 for access control and authentication, subclasses 22 through 25 for monitoring or scanning of software or data including attack prevention, and subclasses 26 through 33 for prevention of unauthorized use of data including prevention of piracy, privacy viola-

tions, or unauthorized data modification.

**953 ORGANIZATION OF DATA:**

This subclass is indented under the class definition. This cross-reference art collection is indented . Subject matter for expressing or storing data in a specific type of data model.

**954 Relational:**

This cross-reference art collection is indented under cross-reference art collection 953. Subject matter in combination with a database for storing and managing data in a relational data model, wherein data is stored in normalized tables, related by key fields which uniquely identify rows in the tables.

**955 Object-oriented:**

This cross-reference art collection is indented under cross-reference art collection 953. Subject matter in combination with a database for storing and managing information represented as objects as used in object-oriented programming.

- (1) Note. Object-oriented database management systems extend the programming language with transparently persistent data, concurrency control, data recovery, and associative queries.

**956 Hierarchical:**

This cross-reference art collection is indented under cross-reference art collection 953. Subject matter in combination with a database for storing and managing data in a hierarchical data model wherein data is organized in a hierarchical or tree structure.

**957 Multidimensional:**

This cross-reference art collection is indented under cross-reference art collection 953. Subject matter in combination with a database for storing and managing data in a multidimensional data model wherein data is stored according to dimensions, and operations are optimized to provide efficient processing of large volumes of multidimensional data.

**958 Data cubes:**

This cross-reference art collection is indented under cross-reference art collection 953. Subject matter in combination with a database for

storing and managing data represented conceptually as data (or OLAP) cubes.

- (1) Note. Physically, data cubes can be implemented in a relational database through a star or snowflake schema, or in a multidimensional database.

**959 Network:**

This cross-reference art collection is indented under cross-reference art collection 953. Subject matter in combination with a database for storing and managing data in a network data model.

- (1) Note. Similar to the hierarchical data model, the network data model stores data in a lattice or network, as opposed to a tree-like structure.

SEE OR SEARCH THIS CLASS, SUBCLASS:

956, for hierarchical data models.

**960 Object-relational:**

This cross-reference art collection is indented under cross-reference art collection 953. Subject matter in combination with a database management system which stores and manages data in an object-relational data model wherein data is represented as objects, with classes and inheritance supported in the database schemas and query language.

- (1) Note. Custom data types and methods can also be classified herein.

**961 Associative:**

This cross-reference art collection is indented under cross-reference art collection 953. Subject matter in combination with a database for storing and managing data in an associative data model, wherein all data is stored as either items or links.

**962 Entity-attribute-value:**

This cross-reference art collection is indented under cross-reference art collection 953. Subject matter in combination with a database for storing and managing data in an entity-attribute-value data model wherein data is conceptually stored as a three-column table, including columns for entities, attributes, and values.

- 963 Hybrid:**  
This cross-reference art collection is indented under cross-reference art collection 953. Subject matter in combination with a database for storing and managing data in a hybrid data model.
- (1) Note. Also classified herein are databases that store data using combinations of elements or features from other data models, and not provided for elsewhere.
- 964 DATABASE ARRANGEMENT:**  
This subclass is indented under the class definition. This cross-reference art collection is indented . Subject matter in combination with computer systems hosting a database arranged in a specific architecture.
- 965 Standalone:**  
This cross-reference art collection is indented under cross-reference art collection 964. Subject matter wherein a database is hosted on a single local computer system.
- 966 Distributed:**  
This cross-reference art collection is indented under cross-reference art collection 964. Subject matter wherein a database is distributed across multiple computer systems.
- 967 Peer-to-peer:**  
This cross-reference art collection is indented under cross-reference art collection 966. Subject matter wherein a number of homogeneous databases are distributed across multiple computer systems and all of the database managers are peers (i.e., there is no master copy of the database).
- 968 Partitioning:**  
This cross-reference art collection is indented under cross-reference art collection 967. Subject matter wherein data is physically assigned to multiple distributed database managers on multiple computer systems.
- 969 Horizontal partitioning:**  
This cross-reference art collection is indented under cross-reference art collection 968. Subject matter wherein specific rows of a table are stored in different databases.
- 970 Vertical partitioning:**  
This cross-reference art collection is indented under cross-reference art collection 968. Subject matter wherein specific columns of a table are stored in different databases.
- 971 Federated:**  
This cross-reference art collection is indented under cross-reference art collection 966. Subject matter wherein a number of heterogeneous databases are distributed across multiple computer systems and the databases are managed such that, to a client, it appears as a single database.
- 972 Partitioning:**  
This cross-reference art collection is indented under cross-reference art collection 971. Subject matter wherein data is physically assigned across multiple distributed database managers on multiple computer systems.
- 973 Horizontal partitioning:**  
This cross-reference art collection is indented under cross-reference art collection 972. Subject matter wherein specific rows of a table are stored in different databases.
- 974 Vertical partitioning:**  
This cross-reference art collection is indented under cross-reference art collection 972. Subject matter specific columns of a table are stored in different databases.
- 975 Portable database architecture:**  
This cross-reference art collection is indented under cross-reference art collection 964. Subject matter comprising databases containing specific structures and features to support the efficient transfer of data from one database having one database schema to another database having a different database schema.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
602, for retrieving, cleaning, preparing, converting, migrating, integrating, and/or storing data into the data warehouse.  
756, for changing the format of a data structure, or data objects, using various methods such as a translation, mapping, or altering with the purpose

- of facilitating further processing of the data structure or data object.
- 761, for converting a query from one query language to another query language
- 802, for the management of data structures, including their definition and creation, modification, transformation and population.
- 809, for generalized transformation/conversion from one schema to another.
- 810, for subject matter wherein data is transferred from one schema/structure to another through the use of a logical data model.

**999.001 DATABASE OR FILE ACCESSING (707/1):**

This subclass is indented under the class definition. This cross-reference art collection is indented. Cross-reference art collection including subject matter directed to the retrieval of data stored in a database or as computer files, where a file is defined as a named collection of data.

- (1) Note. This class is directed to computerized database and file accessing and retrieval, including hierarchical, bit-mapped and flat indexing, hashing, stapling, containerizing, and other methods. Accessing and control of a memory, per se, is classified elsewhere. See the search class notes below.
- (2) Note. The combination of details of database technology with the business data processing is classified in the business art. See search class notes below.
- (3) Note. The combination of details of database technology with a nominal recitation of the subject matter of another class is classified herein. Particular fields of use of database technology performing in combination with the basic subject matter of another class to effect some end other than mere information accessing or retrieval is classified with the subject matter of the other class, unless specifically excluded therefrom. See the search class notes below.
- (4) Note. This class is directed to generic methods and apparatus for accessing and

retrieving data housed in either databases or files. The generic steps to access and retrieve an object from an object-oriented database may be properly classified herein; however, objects themselves for an application other than database accessing and retrieving data, such as, for example an operator interface object, an icon object capable of instantiating a process, or a simulation system physical structure object are classified elsewhere. See the search class notes below.

- (5) Note. This class is directed to generic methods and apparatus for accessing and retrieving data housed in either databases or files. The generic steps of accessing and retrieving data or information in a particular computer design "environment" may be properly classified herein. Examples of such "environments" include, for example, a computer aided design (CAD) and analysis tool "environment", a software development tool "environment", an image processing "environment", a desk-top or other operator interface "environment", etc., may rely on accessing and retrieving information or routines from libraries while working in the "environment". The "environments" themselves are classified elsewhere in the data processing arts. See the search class notes below.
- (6) Note. The combination of a database accessing method with a particular operator interface feature may be found in these subclasses. Operator interfaces, per se, are classified elsewhere. See the search class notes below.
- (7) Note. KEYWORDS: Directory, hierarchy, hierarchical, tree, indexing, pointers, folders, books, bit map, hashing.

**999.002 Access augmentation or optimizing (707/2):**

This cross-reference art collection is indented under cross-reference art collection 999.001. Cross-reference art collection including subject matter directed to methods of access, including query path traversal, mapping, and reuse, joining tables in relational databases, view composition, index choice, bit mapping, and query reuse.

**999.003 Query processing (i.e., searching) (707/3):**

This cross-reference art collection is indented under cross-reference art collection 999.001. Cross-reference art collection including subject matter directed to methods of searching for (i.e., querying) data stored as a database in a computer or digital data processing system, including sequential searching, primary and secondary index searching, and bit-map searching of inverted lists or topological maps.

- (1) Note. The combination of a database accessing method with a particular operator interface feature may be found in these cross-reference art collections. Operator interfaces, per se, are classified elsewhere.

**999.004 Query formulation, input preparation, or translation (707/4):**

This cross-reference art collection is indented under cross-reference art collection 999.003. Cross-reference art collection including subject matter directed to methods for translating an external access to a database or files into internal access to the database or files, and translation of an external query format into an intermediate or internal query format.

**999.005 Query augmenting or refining (e.g., inexact access) (707/5):**

This cross-reference art collection is indented under cross-reference art collection 999.003. Cross-reference art collection including subject matter directed to methods of expanding or limiting access to and retrieval of data or files by techniques including fuzzy search, ranking or weighing, relevance, thesaurus, and concept retrieval.

**999.006 Pattern matching access (707/6):**

This cross-reference art collection is indented under cross-reference art collection 999.003. Cross-reference art collection including subject matter directed to methods employing determination of equivalence of retrieval keys and stored data by matching characteristic patterns of one data set with one or more characteristic patterns of a candidate data set.

- (1) Note. This cross-reference art collection includes text searching and indexing, per

se, for database. Text presentation data processing is classified elsewhere.

**999.007 Sorting (707/7):**

This cross-reference art collection is indented under cross-reference art collection 999.001. Cross-reference art collection including subject matter directed to data oriented accessing methods benefiting from the creation of ordered lists.

- (1) Note. For clarification, sorting includes elementary sorting methods such as selection sort, bubble sort, distribution counting, and other methods, such as Quicksort, Radix Sort, Priority Queues including heap sort, Selection and Merging, and External sort.
- (2) Note. This cross-reference art collection is for sorting database data or files. Generic sorting, per se, is classified elsewhere.

**999.008 Concurrency (e.g., lock management in shared database) (707.8):**

This cross-reference art collection is indented under cross-reference art collection 999.001. Cross-reference art collection including subject matter directed to serialization of multiple accesses to the same unit of data or file for the purpose of data integrity.

- (1) Note. Concurrency is related to controlling the ability of a plurality of users to simultaneously access the same (i.e., a single unit or copy of) information or proximately located information stored in a database or file (i.e., the ability to control "sharing" of information). Such control may involve the prioritizing or serializing of access to the "shared" information, or the copying of information into independent copies, which must ultimately be "integrated" for data coherency. Coherency, on other hand, although a related topic, is related to the maintaining of multiple copies of information in a database or file in a manner which ensures data integrity amongst the plurality of copies, regardless of whether a single user or plurality of simultaneous users are accessing the information. When a plurality of users are accessing

the plurality of copies of information, then both concurrency and coherency concepts may be involved, and the subject matter may be properly classified herein based on hierarchy. Database or file coherency, per se, is classified elsewhere. Source code version management and software version management are classified elsewhere.

- (2) Note. For clarification, the methods of ensuring data concurrency include employing time-stamping, semaphores, global and local shared locking (i.e., read only), and exclusive locking (i.e., read and write), multiple versioning, and temporal versioning, such as snapshots.
- (3) Note. This cross-reference art collection is directed to data integrity in database accessing and control. A concept search on this subject or the related subjects of data coherency and version management should consider the related topics as they appear in this class.

**999.009 Privileged access (707/9):**

This cross-reference art collection is indented under cross-reference art collection 999.001. Cross-reference art collection including subject matter directed to determination and granting of access to data and files by direct means, such as by the file or database creator or database manager, or by indirect means, such as by inheritance, such as by group/user access profiles.

- (1) Note. This cross-reference art collection is directed to access control in database systems. Computer system security is classified elsewhere.
- (2) Note. This cross-reference art collection is directed to access control in database systems. The concept of access control exists throughout the class. Therefore, a search to a particular concept of access control should consider the related topics in bus access control, memory access control, computer system access control, generic access control, etc.

**999.01 Distributed or remote access (707/10):**

This cross-reference art collection is indented under cross-reference art collection 999.001. Cross-reference art collection including subject matter directed to management of distributed database data and file access and retrieval, and retrieval of database data and files from a centralized or remote site.

**999.1 DATABASE SCHEMA OR DATA STRUCTURE (707/100):**

This subclass is indented under the class definition. This cross-reference art collection is indented . Cross-reference art collection including subject matter comprising means or steps for organizing and inter-relating data or files, including relational, network, hierarchical, and entity-relationship models, among others.

- (1) Note. Classification herein requires a combination of a data structure and the access or retrieval method, or apparatus for employing or storing the data structure.
- (2) Note. KEYWORDS: entity relational, entity attribute, relational, hierarchical and network databases, b-tree, temporal multi-key, superblock, cross-linked tree, referential constraints, linked list, dual linked, quad linked, inverted file, inverted list, vector relational object, hypertext data dictionary.

**999.101 Manipulating data structure (e.g., compression, compaction, compilation) (707/101):**

This cross-reference art collection is indented under cross-reference art collection 999.1. Cross-reference art collection including data structure conversion, compression, compaction, and compilation, for optimization of database and file storing, and for data compatibility between different or multiple databases.

**999.102 Generating database or data structure (e.g., via user interface) (707/102):**

This cross-reference art collection is indented under cross-reference art collection 999.1. Cross-reference art collection including means or steps for generating database schema and data structures.



- (1) Note. This cross-reference art collection accepts operator interface features for data structure development environments. Operator interfaces, per se, are classified elsewhere.

**999.103 Object-oriented database structure (707/103R):**

This cross-reference art collection is indented under cross-reference art collection 999.1. Cross-reference art collection including subject matter further comprising an object-oriented data structure and its maintenance in memory.

- (1) Note. This cross-reference art collection includes object-oriented data organization.

**999.104 Object-oriented database structure processing (707/103Y):**

This subclass is indented under cross-reference art collection 999.103. Cross-reference art collection including subject matter further comprising an object-oriented data structure processing and its maintenance in memory

**999.105 Object-oriented database structure network (707/103X):**

This subclass is indented under cross-reference art collection 999.103. Cross-reference art collection including subject matter further comprising an object-oriented data structure network and its maintenance in memory

**999.106 Object-oriented database structure reference (707/103Z):**

This subclass is indented under cross-reference art collection 999.103. Cross-reference art collection including subject matter further comprising an object-oriented data structure reference and its maintenance in memory

**999.107 Application of database or data structure (e.g., distributed, multimedia, image) (707/104.1):**

This cross-reference art collection is indented under cross-reference art collection 999.1. Cross-reference art collection including subject matter directed to specific applications of database schema and data structures to commercial, scientific, and medical fields not provided for elsewhere.

- (1) Note. The combination of details of database technology with the business data processing is classified in the business art.

- (2) Note. The combination of details of database technology with a nominal recitation of the subject matter of another class is classified herein. Particular fields of use of database technology, performing in combination with the basic subject matter of another class to effect some end other than mere information accessing or retrieval, is classified with the subject matter of the other class, unless specifically excluded therefrom.

**999.2 FILE OR DATABASE MAINTENANCE (707/200):**

This subclass is indented under the class definition. This cross-reference art collection is indented Cross-reference art collection including subject matter directed to generic data, file, and directory upkeep, file naming, and file and database maintenance including integrity consideration, recovery, and versioning.

- (1) Note. These cross-reference art collections are directed to means and steps for handling of generic files and databases only in computers and digital data processing systems. For the purpose of these definitions, a generic file is defined as a named collection of data. File content and database content authoring, generating, producing, and editing in information processing applications art areas, such as, for example, business data processing machine translation, graphics processing, simulation, animation and software development, is classified elsewhere. See the search class notes below.
- (2) Note. This cross-reference art collection is directed to management and maintenance of files and databases in computers and digital data processing systems and accepts subject solutions working within single memories and across multiple memories. Memory accessing and control and memory management, per se, is classified elsewhere.

- (3) Note. This cross-reference art collection is directed to management and maintenance of files and databases in computers and digital data processing systems and accepts only nominal recitations to operator interfaces, icons and other metaphors used in the maintenance of files and databases. File management tools, metaphors or objects with significant operator interface features are classified elsewhere. See the search class notes below.
- (4) Note. Formatting and file allocation in memory systems such as direct access storage systems is generally found in the art area directed to the storage system device.
- (5) Note. KEYWORDS: file caching, differential file, incremental file, merge update, (re)naming, name standardization, file deletion, directory maintenance, file replication.

**999.201 Coherency (e.g., same view to multiple users) (707/201):**

This cross-reference art collection is indented under cross-reference art collection 999.2. Cross-reference art collection including subject matter further comprising means or steps for distributed and temporal database management to ensure presentation of the same data or view to one or a plurality of users.

- (1) Note. Coherency is related to the maintaining of multiple copies of information in a database or a file in a manner which ensures data integrity amongst the plurality of copies, regardless of whether a single user or plurality of simultaneous users are accessing the information. When a plurality of users is accessing the multiple copies of information, then both concurrency and coherency concepts may be involved, and the subject matter is classified in the concurrency cross-reference art collection above.
- (2) Note. This cross-reference art collection is directed to file and database coherency and may include file caching. Caching, per se, however, is classified elsewhere.

In addition, cache memory entry replacement strategies are classified elsewhere.

- (3) Note. This cross-reference art collection is directed to file and database coherency and may include management of transactions against a database by means of commit procedures. Transaction management, per se, is classified elsewhere.
- (4) Note. This cross-reference art collection is directed to file and database coherency and may involve access control. Access control in combination with other data processing system methods or apparatus (e.g., memory), computer security, per se, and access control, per se, are classified elsewhere.
- (5) Note. This cross-reference art collection is directed to file and database coherency and may include recitations to shared memory. Managing shared memory, however, is classified elsewhere. Further, data transferring between computers or digital data processing systems is classified elsewhere.

**999.202 Recoverability (707/202):**

This cross-reference art collection is indented under cross-reference art collection 999.201. Cross-reference art collection including means or steps for transaction logging, log recovery, and recovery of data in the event of a fault.

- (1) Note. This cross-reference art collection is directed to fault recovery in combination with file or data maintenance. Fault recovery, per se, is classified elsewhere.

**999.203 Version management (707/203):**

This cross-reference art collection is indented under cross-reference art collection 999.201. Cross-reference art collection including subject matter further comprising means or steps for maintenance and management of multiple copies of database information or files on a computer.

- (1) Note. Database concurrency, file or database coherency, and document version management are classified elsewhere in this class.

- (2) Note. Software component managing in a software development tool, software upgrading or updating (e.g., plural version management), and software installation are classified elsewhere.

**999.204 Archiving or backup (707/204):**

This cross-reference art collection is indented under cross-reference art collection 999.201. Cross-reference art collection including subject matter further comprising means or steps for backing up database information or files, file migration to and from high density nonvolatile storage, and immediate, delayed, and scheduled backup.

- (1) Note. This cross-reference art collection is directed to file and database coherency and aspects thereof directed to making copies for expressed purposes. Means and steps for controlling memory access to data (i.e., addressing, per se) during the act of backing up or archiving is classified elsewhere.

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dant, obsolete, or unreferenced database and file information, in order to increase the efficiency of memory space usage. The related concepts of memory reclamation and disk defragmentation do not take into account the interrelatedness of the database and file information. However, techniques used in memory reclamation and disk defragmentation may be relevant to the subject matter in this cross-reference art collection, and a concept search on garbage collection should carefully consider related concepts classified under memory accessing and control entry replacement strategies and memory configuring.

**999.205 File allocation (707/205):**

This cross-reference art collection is indented under cross-reference art collection 999.2. Cross-reference art collection including subject matter further comprising means or steps for reserving memory space or organizing memory space in order to contain a file.

- (1) Note. This cross-reference art collection is directed to reserving memory space or organizing memory space in order to contain a file. Memory accessing and control for data is classified elsewhere. A concept search to allocation should consider both areas.

**999.206 Garbage collection (707/206):**

This cross-reference art collection is indented under cross-reference art collection 999.205. Cross-reference art collection including subject matter further comprising means or steps for deallocating of obsolete or unreferenced files and database objects, and maintenance of associated directories or links.

- (1) Note. This cross-reference art collection is directed to reorganizing of memory space, by deallocating unused, redun-