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

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SECTION I - CLASS DEFINITION

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

This class provides for data processing means or steps for organizing and inter-relating data or files (e.g., relational, network, hierarchical, and entity-relationship models).

This class also provides for data processing means or steps for generic data, file and directory upkeeping, file naming, and file and database maintenance including integrity consideration, recovery, and versioning.

Class 707 is structured into three main divisions:

A. Database and file accessing.

B. Database schema and data structure.

C. File and database maintenance.

See Subclass References to the Current Class, below, for the location of subclasses within these three main divisions.

RELATIONSHIP WITH OTHER CLASSES

A. Database and File Accessing

(1) Note. This class area 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 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. 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 in References to Other Classes, below.

(4) Note. This class area 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 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 in References to Other Classes, 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 in References to Other Classes, below.

B. Database Schema and Data Structures

(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.

C. File and Database Maintenance

(1) Note. This class area is 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.

(2) Note. This class area 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 class area 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.

(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.

SECTION II - SUBCLASS REFERENCES TO THE CURRENT CLASS

SEE OR SEARCH THIS CLASS, SUBCLASS:

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1 through **10** for database and file accessing.
100 through **104.1** for database schema and data structure.
200 through **206** for file and database maintenance.

SECTION III - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

235, Registers, various subclassesfor 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.

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses **700** through **867**for operator interfaces, subclasses 418-475 for computer graphics processing, subclasses 1.1-111 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.

358, Facsimile and Static Presentation Processing, appropriate subclassesfor transmitting, processing, or reproducing a permanent picture.

379, Telephonic Communications, various subclassesfor two-way electrical communication of intelligible audio information of arbitrary content over a link including an electrical conductor.

381, Electrical Audio Signal Processing Systems and Devices, various subclassesfor wired one-way audio systems, per se.

382, Image Analysis, various subclassesfor 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.

600, Surgery, subclasses **300** through **595**for diagnostic testing applications of computers in the life sciences including patient monitoring and medical imaging.

700, Data Processing: Generic Control Systems or Specific Applications, subclasses **1** through **89**for data processing generic control systems, and subclasses 90-306 for applications of computers in various environments.

702, Data Processing, Measuring, Calibrating, or Testing, appropriate subclassesfor the application of computers in measuring and testing.

703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, subclasses **3** through **22**for data processing simulation.

704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses **1** through **10**for linguistics.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, appropriate subclassesfor business data processing.

706, Data Processing: Artificial Intelligence, appropriate subclassesfor artificial intelligence in general.

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.

711, Electrical Computers and Digital Processing Systems: Memory, 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.

715, Data Processing: Presentation Processing of Document, appropriate subclassesfor document presentation processing.

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

SECTION IV - GLOSSARY

The terms below have been defined for purposes of classification in this class and are shown in underlined type when used in the class and subclass definitions. When these terms are not underlined in the definitions, the meaning is not restricted to the glossary definitions below.

ADDRESS DATA

Data that represent or identify a source or destination. (Also see Data)

COMPUTER:

A machine that inputs data, processes data, stores data, and outputs data.

DATA

Representation of information in a coded manner suitable for communication, interpretation, or processing. See Address Data, Instruction Data, Status Data, and User Data in this Glossary.

DATABASE

A collection of data arranged for ease of storage, retrieval, updating, searching and sorting by computerized means.

DATA PROCESSING

See Processing, below.

DIGITAL DATA PROCESSING SYSTEM:

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

FILE

A named collection of data.

INFORMATION

Meaning that a human being assigns to data by means of the conventions applied to that data.

INSTRUCTION DATA

Data that represent an operation and identify its operands, if any. (Also see Data)

MEMORY

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

PERIPHERAL

A functional unit that transmits data to or receives data from a computer to which it is coupled.

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 data processing.

PROCESSOR

A functional unit that interprets and executes instruction data.

STATUS DATA

Data that represent conditions of data, computers, peripherals, memory, etc. (Also see Data)

USER DATA

Data other than address data, instruction data, or status data. (Also see Data)

SUBCLASSES

1 **DATABASE OR FILE ACCESSING:**
This subclass is indented under **the class definition**. 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.

SEE OR SEARCH THIS CLASS, SUBCLASS:

100+, for data structures, per se.
102, for indexing, per se, in the creation of a database.

SEE OR SEARCH CLASS:

128, Surgery, subclasses **630**+ for diagnostic testing and appropriate subclasses for applications of computers in the life sciences including patient monitoring and medical imaging.
273, Amusement Devices: Games, for games and amusements. Classes 463 and 473 will eventually replace 273.
345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses **700** through **867**for operator interfaces, per se, in particular subclasses 866 for interface customization, subclasses 764-862 for on-screen work or objects, and subclasses 810-845 for menus.
358, Facsimile and Static Presentation Processing, subclass **403** directed to facsimile document filing and retrieval system.
382, Image Analysis, for image recognition, transformation and sensing, per se, and applications therefor.
463, Amusement Devices: Games, for a specific type of amusement, recreation, or play activity.
472, Amusement Devices, for the amusement or recreation of human beings, and includes patents relating to devices of the type.
473, Amusement Devices: Games, for devices ancillary or appurtenant to games for which there is no provision in other classes.
700, Data Processing: Generic Control Systems or Specific Applications, subclasses **95** through **212**for manufacturing applications of computers.
703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, subclasses **13** through **22**for the use of database in simulating electronic device and electrical system.
704, Data Processing - Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclass **10** for dictionary building in machine translation systems.
705, Data Processing - Financial, Business Practice, Management, or Cost/Price Determination, subclasses **1**+ for applications of databases in business transaction processing.

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711, Electrical Computers and Digital Processing Systems - Memory, subclasses **1** through **5**for addressing particular memory configurations and systems, subclasses 100+ for memory accessing and control, per se, and in particular subclasses 113 for disk caching, subclasses 117+ for hierarchical memory, per se, subclasses 118+ for caching, subclasses 147+ for shared memory accessing and control, subclasses 170+ for memory configuring and allocation, subclasses 200+ for address formation processing, and subclass 216 for address hashing.

714, Error Detection/Correction and Fault Detection/Recovery, subclasses **15**+ for state recovery, per se, in particular, subclass 20 for plural recovery sets with set interrelation data.

715, Data Processing: Presentation Processing of Document, appropriate subclasses for document processing, per se, particularly subclass **501.1** for processing a document including hypermedia, subclass 513 for processing a structured document (e.g., HTML, SGML, ODA, CDA), and subclasses 515-516 for compound documents.

716, Data Processing: Design and Analysis of Circuit or Semiconductor Mask, appropriate subclasses for the use of database in the design and analysis of circuit or semiconductor mask.

2 **Access augmentation or optimizing:**
This subclass is indented under **subclass 1**. 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.

SEE OR SEARCH CLASS:

340, Communications: Electrical, subclasses **825.01** through **825.04**for selective communications path routing.

701, Data Processing: Vehicles, Navigation, and Relative Location, subclasses **200**+ for navigation within a physical reality.

704, Data Processing - Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclass **10** for linguistics dictionary building.

705, Data Processing - Financial, Business Practice, Management, or Cost/Price Determination, subclasses **7**+ for operations research, per se, including systems directed to generalized linear programming problem solving.

708, Electrical Computers: Arithmetic Processing and Calculating, subclasses **490**+ for arithmetical processing of data.

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses **201** through **203**for distributed data processing.

710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclasses **131** through **132**for bus path selecting in a computer or digital data processing system.

714, Error Detection/Correction and Fault Detection/Recovery, subclass **4** for masking or reconfiguring of network paths.

715, Data Processing: Presentation Processing of Document, subclass **501.1** for processing a document including hypermedia, subclass 513 for processing a structured document (e.g., HTML, SGML, ODA, CDA), subclasses 515-516 for compound documents, and subclass 532 for text data document processing with a dictionary.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly subclass **106** for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

3 **Query processing (i.e., searching):**
This subclass is indented under **subclass 1**. 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 subclasses. Operator interfaces, per se, are classified elsewhere.

SEE OR SEARCH CLASS:

178, Telegraphy, subclasses **18**+ for writing systems such as, for example, digitizing tablets.

235, Registers, subclasses **375**+ for systems controlled by data bearing member.

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses **156**+ for input devices such as mice, touch screens, etc., subclasses 700-867 for operator interfaces, per se, and in particular subclasses 764-862 for on-screen workspaces and objects, subclasses 781-807 for windowing, and subclass 808 for pop-up controls.

353, Optics: Image Projectors, subclass **25** for selective optical data retrieval.

704, Data Processing - Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses **1**+ for machine translation and linguistic data processing and subclasses 200+ for speech translation methods and apparatus.

706, Data Processing: Artificial Intelligence, subclasses **45** through **61**for input means in a knowledge-based system.

715, Data Processing: Presentation Processing of Document, subclasses **530** through **541**for text editing, composition or storage control.

717, Data Processing: Software Development, Installation, and Management, subclasses **136** through **161**for program compilers and procedural language translators.

4 **Query formulation, input preparation, or translation:**
This subclass is indented under **subclass 3**. 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.

SEE OR SEARCH CLASS:

715, Data Processing: Presentation Processing of Document, subclasses **503** through **510**for spreadsheets, forms, and tables under document processing.

5 **Query augmenting or refining (e.g., inexact access):**
This subclass is indented under **subclass 3**. 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.

SEE OR SEARCH CLASS:

704, Data Processing - Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses **1**+ for linguistic data processing and machine translation.

706, Data Processing: Artificial Intelligence, subclasses **1** through **9**for fuzzy logic, per se, and subclasses 15-44 for knowledge processing, per se, including trainable neural nets and expert systems.

710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclasses **200** and 241+ for limiting access to system resources and access arbitrating.

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711, Electrical Computers and Digital Processing Systems - Memory, subclasses **163**+ for memory access limiting.

713, Electrical Computers and Digital Processing Systems: Support, subclasses **200**+ for security in computers or digital processing systems.

715, Data Processing: Presentation Processing of Document, subclasses **530** through **541**for text document editing, composition or storage control.

6 **Pattern matching access:**
This subclass is indented under **subclass 3**. 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 subclass includes text searching and indexing, per se, for database. Text presentation data processing is classified elsewhere.

SEE OR SEARCH CLASS:

382, Image Analysis, appropriate subclasses for image recognition, transformation, and sensing, per se, and applications therefor, particularly subclasses **181**+ for image pattern recognition.

704, Data Processing - Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses **2**+ for machine translation systems.

705, Data Processing - Financial, Business Practice, Management, or Cost/Price Determination, subclasses **7**+ for operations research, per se, including systems directed to generalized linear programming problem solving.

708, Electrical Computers: Arithmetic Processing and Calculating, subclasses **490**+ for arithmetical processing, per se, and subclass 212 for detection of a particular sequence of bits.

714, Error Detection/Correction and Fault Detection/Recovery, for pertinent subclass(es) as determined by schedule review.

715, Data Processing: Presentation Processing of Document, appropriate subclassesfor document processing, per se.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly subclass **106** for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

7 **Sorting:**
This subclass is indented under **subclass 1**. 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 subclass is for sorting database data or files. Generic sorting, per se, is classified elsewhere.

SEE OR SEARCH CLASS:

341, Coded Data Generation or Conversion, subclasses **50**+ for digital code to digital code convertors.

712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses **1**+ for sorter processing in computer and digital data system architecture and subclass 300 for generic string-level and bite-word order rearranging, bit-field insertion and extraction, and string length and sequence detecting.

8 **Concurrency (e.g., lock management in shared database):**
This subclass is indented under **subclass 1**. 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 subclass 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.

SEE OR SEARCH CLASS:

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses **716** through **726**for operator interface aspects of workgroup data processing environments for plural users or sites and cross-reference art collection 971 directed to interface aspects of cooperative decision support systems for groups of users.

705, Data Processing - Financial, Business Practice, Management, or Cost/Price Determination, subclasses **1** through **45**for automated financial or business practice or management systems and in particular subclasses 1 through 6 for file and database maintenance systems including data coherency in database systems.

710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclass **200** for access locking.

711, Electrical Computers and Digital Processing Systems - Memory, subclasses **141** through **146**for cache memory data coherency, and subclasses 147 through 153 for sharing memory and prioritized access regulation.

715, Data Processing: Presentation Processing of Document, subclass **511** for document version management under document processing.

717, Data Processing: Software Development, Installation, and Management, subclass **122** for source code version management in a software programming environment, and subclasses 174 through 178 for software installation and version management of operating systems, application programs, and other executable programs.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly subclass **106** for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

9 **Privileged access:**

This subclass is indented under **subclass 1**. 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 subclass is directed to access control in database systems. Computer system security is classified elsewhere.

(2) Note. This subclass 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.

SEE OR SEARCH CLASS:

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses **716** through **726**for operator interface aspects of workgroup data processing environments for plural users or sites.

710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclasses **107**+ for bus access regulating.

711, Electrical Computers and Digital Processing Systems - Memory, subclasses **147**+ for shared memory access and control, and subclasses 163+ for access limiting and password use in memory accessing and control.

713, Electrical Computers and Digital Processing Systems: Support, subclasses **200**+ for computer security per se.

10 **Distributed or remote access:**

This subclass is indented under **subclass 1**. 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.

SEE OR SEARCH CLASS:

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses **716** through **726**for operator interface aspects of workgroup data processing environments for plural users or sites and cross-reference art collection 971 directed to interface aspects of cooperative decision support systems for groups of users.

705, Data Processing - Financial, Business Practice, Management, or Cost/Price Determination, subclasses **1**+ for automated business systems, per se, and in particular subclasses 26-27 for electronic shopping and catalogue browsing.

709, Electrical Computers and Digital Processing Systems: Multiple Computer or Process Coordinating, subclasses **210** through **203**for multicomputer distributed data processing and subclasses 208-211 for multicomputer data transfer processing with master/slave arrangement.

711, Electrical Computers and Digital Processing Systems - Memory, subclasses **117** through **146**for hierarchical memory and caching, and subclasses 147+ for shared memory access and control.

712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclasses **1**+ for processor, coprocessor arrangements.

100 **DATABASE SCHEMA OR DATA STRUCTURE:**

This subclass is indented under **the class definition**. 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.

SEE OR SEARCH CLASS:

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses **700** through **867**for object-oriented operator interface elements, per se.

717, Data Processing: Software Development, Installation, and Management, appropriate subclasses for object-oriented programming environments, per se.

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

This subclass is indented under **subclass 100**. Subject matter including data structure conversion, compression, compaction, and compilation, for optimization of database and file storing, and for data compatibility between different or multiple databases.

SEE OR SEARCH THIS CLASS, SUBCLASS:

8, for database concurrency management.

200, through 206, for file and database maintenance systems including data coherency in database systems.

SEE OR SEARCH CLASS:

341, Coded Data Generation or Conversion, subclasses **50** through **107**for digital code to digital code data conversion.

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses **716** through **726**for operator interface aspects of workgroup data processing environments for plural users or sites and cross-reference art collection 971 directed to interface aspects of cooperative decision support systems for groups of users.

703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, subclass **527** for aspects of data compatibility related to emulation.

708, Electrical Computers: Arithmetic Processing and Calculating, subclass **203** for computer data compression and decompression.

711, Electrical Computers and Digital Processing Systems - Memory, subclasses **141** through **146**for cache memory data coherency, and subclasses 147-153 for sharing memory and prioritized access regulation.

712, Electrical Computers and Digital Processing Systems: Processing Architectures and Instruction Processing (e.g., Processors), subclass **300** for generic string-level and byte-word level order rearranging, bit-field insertion and extraction, and string length and sequence detecting.

715, Data Processing: Presentation Processing of Document, subclass **511** for document version management under document processing.

717, Data Processing: Software Development, Installation, and Management, subclass **122** for source code version management in a software programming environment, and subclasses 174 through 178 for software installation and version management of operating systems, application programs, and other executable programs.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executable programs, tasks, and processes

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(e.g., data dependencies, control flow dependencies, etc.), particularly subclass **106** for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

102 **Generating database or data structure (e.g., via user interface):**
This subclass is indented under **subclass 100**. Subject matter including means or steps for generating database schema and data structures.

(1) Note. This subclass accepts operator interface features for data structure development environments. Operator interfaces, per se, are classified elsewhere.

SEE OR SEARCH CLASS:

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses **700** through **867**for operator interfaces.

358, Facsimile and Static Presentation Processing, for facsimile producing systems.

382, Image Analysis, for image recognition, transformation and sensing, per se, and applications therefor, and in particular subclasses **181**+ for image pattern recognition.

704, Data Processing - Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclass **10** for linguistics dictionary building.

706, Data Processing: Artificial Intelligence, subclasses **45** through **61**for knowledge processing system operator interface.

715, Data Processing: Presentation Processing of Document, subclass **501.1** for processing a document including hypermedia, subclass 513 for processing a structured document (e.g., HTML, SGML, ODA, CDA), subclasses 515-516 for processing a compound document using hierarchy control, subclasses 517– 525 for document layout processing including spacing control, format transforming, etc., and subclass 532 for text data document processing with a dictionary.

103 **Object-oriented database structure:**
This subclass is indented under **subclass 100**. Subject matter further comprising an object-oriented data structure and its maintenance in memory.

(1) Note. This subclass includes object-oriented data organization.

SEE OR SEARCH CLASS:

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses **764** through **862**for on-screen workspaces or objects, and subclasses 810 through 845 for menus.

703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, subclasses **13** through **22**for simulating electronic device and electrical system which may employ object-oriented data structure.

715, Data Processing: Presentation Processing of Document, appropriate subclasses for document processing, per se, in particular, subclass **501** for hypermedia, subclass 513 for structured documents (e.g., HTML, SGML, ODA, CDA), and subclasses 515-516 for compound documents.

716, Data Processing: Design and Analysis of Circuit or Semiconductor Mask, appropriate subclasses for designing and analyzing circuit or semiconductor mask which may include the use of libraries or objects.

717, Data Processing: Software Development, Installation, and Management, appropriate subclasses for software development tools, per se, including computer-aided software engineering and object-oriented programming environments.

104.1 **Application of database or data structure (e.g., distributed, multimedia, image):**
This subclass is indented under **subclass 100**. 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. See SEE OR SEARCH CLASS notes below.

(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. See the SEE OR SEARCH CLASS notes below.

SEE OR SEARCH CLASS:

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.

600, Surgery, subclasses **300** through **595**for diagnostic testing applications of computers in the life sciences including patient monitoring and medical imaging.

700, Data Processing: Generic Control Systems or Specific Applications, subclasses **90** through **306**for data structures in various computer-based applications and in combination with the basic subject matter of another class.

703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, appropriate subclasses for simulation.

704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses **1** through **10**for linguistics.

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, for business data processing.

706, Data Processing: Artificial Intelligence, appropriate subclasses for artificial intelligence.

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

200 **FILE OR DATABASE MAINTENANCE:**
This subclass is indented under **the class definition**. Subject matter directed to generic data, file, and directory upkeeping, file naming, and file and database maintenance including integrity consideration, recovery, and versioning.

(1) Note. These subclasses 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 subclass 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 subclass 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

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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.

SEE OR SEARCH THIS CLASS, SUBCLASS:

1, for database content authoring tools.

102, for database data structure generating, per se.

SEE OR SEARCH CLASS:

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclass **866** for file content authoring, generating, producing, and edit in operator interface customization and editioning, and subclasses 467+ for file content authoring, generating, producing, and editing in font generation and animation.

703, Data Processing: Structural Design, Modeling, Simulation, and Emulation, subclasses **13** through **22**for file content authoring, generating, producing, and editing in simulating electronic device and electrical system; and subclasses 23 through 28 for file content authoring, generating, producing, and editing in emulation systems.

704, Data Processing - Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses **2**+ for file content authoring, generating, producing, and editing in machine translation, per se.

705, Data Processing - Financial, Business Practice, Management, or Cost/Price Determination, subclasses **1**+ for file content authoring, generating, producing, and editing in business data processing.

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

715, Data Processing: Presentation Processing of Document, appropriate subclassesfor file content authoring, generating, producing, and editing in document processing, word processing, and text processing.

716, Data Processing: Design and Analysis of Circuit or Semiconductor Mask, appropriate subclasses for file content authoring, generating, producing, and editing in designing and analyzing circuit or semiconductor mask.

717, Data Processing: Software Development, Installation, and Management, appropriate subclasses for file content authoring, generating, producing, and editing in software development environments, per se.

201 **Coherency (e.g., same view to multiple users):**
This subclass is indented under **subclass 200**. 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 subclass above.

(2) Note. This subclass 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 subclass 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 subclass 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 subclass 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.

SEE OR SEARCH THIS CLASS, SUBCLASS:

8, for database concurrency.

SEE OR SEARCH CLASS:

345, Computer Graphics Processing, Operator Interface Processing, and Selective Visual Display Systems, subclasses **716** through **726**for operator interface aspects of workgroup data processing environments for plu users or sites and cross-reference art collection 971 directed to interface aspects of coop decision support systems for groups of users.

709, Electrical Computers and Digital Processing Systems: Multicomputer Data Transferring or Plural Processor Synchronization, subclasses **213** through **216**for multicomputer data transferring with shared memory.

710, Electrical Computers and Digital Data Processing Systems: Input/Output, subclass **200** for access control, per se.

711, Electrical Computers and Digital Processing Systems - Memory, subclasses **141** through **146**for cache coherency, and subclasses 147-153 for shared memory accessing and control.

714, Error Detection/Correction and Fault Detection/Recovery, subclasses **15**+ for process and data state recovery, per se, and in particular subclass 20 for use of plural data sets (i.e., logs) containing set interrelation data, and subclass 49, for state error detection, per se.

715, Data Processing: Presentation Processing of Document, subclass **511** for document version management under document processing.

718, Electrical Computers and Digital Processing Systems: Virtual Machine Task or Process Management or Task Management/Control, appropriate subclasses for identifying and dealing with run-time dependencies between executing programs, tasks, and processes (e.g., data dependencies, control flow dependencies, etc.), particularly subclass **106** for dependency based cooperative processing of multiple programs working together to accomplish a larger task.

719, Electrical Computers and Digital Processing Systems: Interprogram Communication or Interprocess Communication (IPC), appropriate subclassesfor interprocess and interprogram communication.

202 **Recoverability:**
This subclass is indented under **subclass 201**. Subject matter including means or steps for transaction logging, log recovery, and recovery of data in the event of a fault.

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

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SEE OR SEARCH CLASS:

714, Error Detection/Correction and Fault Detection/Recovery, subclasses **1**+ for reliability and availability, per se, subclass 15 for process and data state recovery, per se, and in particular subclass 20 for use of plural data sets (i.e., logs) containing set interrelation data.

203 **Version management:**
This subclass is indented under **subclass 201**. 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. See the SEE OR SEARCH THIS CLASS, SUBCLASS references below and also the line notes and search notes associated therewith.

(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. See the SEE OR SEARCH CLASS references below and also the line notes and search notes associated therewith.

SEE OR SEARCH THIS CLASS, SUBCLASS:

8, for concurrency in database or file accessing.
201, for file or database coherency.
511, for document version management.

SEE OR SEARCH CLASS:

715, Data Processing: Presentation Processing of Document, subclass **511** for document version management.
717, Data Processing: Software Development, Installation, and Management, subclasses **120** through **123,**168-173, and 174-178 for software component managing in a software development tool, software upgrading or updating (e.g., plural version management), and software installation, respectively.

204 **Archiving or backup:**
This subclass is indented under **subclass 201**. 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 subclass 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.

SEE OR SEARCH CLASS:

711, Electrical Computers and Digital Processing Systems - Memory, subclass **113** for cache by DASD, subclass 114 for RAID, subclasses 117+ for hierarchical memory accessing and controlling, per se, subclasses 133-136 for cache entry replacement strategies, subclasses 159-160 for memory accessing and control entry replacement strategies, per se, subclasses 161-162 for archiving and backup under memory accessing, and subclass 165 for internally relocating data.
714, Error Detection/Correction and Fault Detection/Recovery, subclass **6** for memory or peripheral subsystem fault recovery including access to redundant stored data, such as, error correction coded data, subclass 15 for process and data state recovery, per se, and in particular subclass 20 for use of plural data sets (i.e., logs) containing set interrelation data.

205 **File allocation:**
This subclass is indented under **subclass 200**. Subject matter further comprising means or steps for reserving memory space or organizing memory space in order to contain a file.

(1) Note. This subclass 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.

SEE OR SEARCH CLASS:

711, Electrical Computers and Digital Processing Systems - Memory, subclasses **1** through **5**for addressing specific memory configurations, subclasses 100+ for disk defragmenting, subclasses 170+ for memory accessing and control memory configuring and partitioning, per se, subclasses 200+ for address formation, subclass 209 for addressing plural pages, blocks, segments, etc.

206 **Garbage collection:**
This subclass is indented under **subclass 205**. 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 subclass is directed to reorganizing of memory space, by deallocating unused, redundant, 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 subclass, and a concept search on garbage collection should carefully consider related concepts classified under memory accessing and control entry replacement strategies and memory configuring.

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+ for memory accessing and control memory configuring and partitioning, per se.

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