

600	DATA WAREHOUSE, DATA MART, ONLINE ANALYTICAL PROCESSING (OLAP), DECISION SUPPORT SYSTEMS	638	..Replication version control (i.e., version management)
601	..Tools to automate schema definition process	639	..Snapshot replication
602	..Data extraction, transformation, and loading (ETL)	640	..Database backup
603	..Reporting, knowledge discovery (KD) systems	641	..Merging data for backup
604	..Using a denormalized schema	642	..Data dump
605	..Using a star schema	643	..Batch
606	..Using a snowflake schema	644	..Types of backup
607	ONLINE TRANSACTIONAL PROCESSING (OLTP) SYSTEM	645	...Full backup
608	COLLABORATIVE DOCUMENT DATABASE AND WORKFLOW	646	...Incremental backup
609	FILE OR DATABASE MAINTENANCE	647	...Partial backup
610	..Synchronization (i.e., replication)	648	...Transaction log backup (i.e, audit file, journal)
611	..Synchronous	649	...Database snapshots or database checkpointing
612	..Multiway synchronization	650	...System data backup
613	..Asynchronous synchronization (e.g., message or notification based)	651	...Hierarchical backup
614	...Multiway synchronization	652	...Distributed backup
615	...Transactional replication	653	...Customized backup
616	...Merge replication	654	..Backup interface, scheduling and management
617	..Connection based synchronization	655	..Database mirroring
618	..Scheduled synchronization	656	...Synchronous mirroring
619	..Background replication	657	....Copy-on-write
620	..Synchronization environment	658	...Asynchronous mirroring
621	...Portable devices	659	...Mirroring configuration and management
622	...Peer-to-peer	660	..Mirroring optimization
623	..Master/slave	661	..Database archive
624	..Incremental synchronization	662	..Deletion, retention or expiration of archive records
625	..Change records or delta	663	...Deletion due to expiration
626	..Objects of replication	664	...Deletion due to duplication
627	...Publication	665	..Rules for archiving
628	...Push subscriptions	666	...Records that have expired in the database
629	....Push-to-master	667	..Means for or methods of archiving
630	....Push-to-nearest-neighbor	668	...Automatic archiving
631	....Push-to-broadcast	669	....Data dump
632	...Pull subscriptions	670	....Transparently archiving data
633	..Replication agent	671	..Manual archiving
634	..Management, interface, monitoring and configurations of replication	672	..Log of the archive
635	..Replication-to-heterogeneous database	673	..Indexing the archive
636	..Distributor management	674	..Database recovery
637	..Optimizing replication	675	..Database recovery model
		676	...Full database recovery
		677	...Simple database recovery
		678	..Database recovery phase
		679	...Database restore
		680	....Complete database restore
		681	....Differential database restore

682	...Restoring backups of transaction log	724	...Spatial (i.e., location based)
683	..Redo (i.e., roll forward)	725	...Temporal (i.e., time based)
684	..Undo (i.e., roll back)	726	...Links from other files or link content analysis
685	..Incremental Recovery	727	...Frequency of document selection
686	..Recovery optimization	728	...Relevance of document based on features in query
687	DATA INTEGRITY	729	...Location of features in the document
688	.Statistics maintenance	730	...Frequency of features in the document
689	.Detection of expired data	731	...Based on category of the query and the document
690	.Checking consistency	732	...Personalized results
691	..Repair consistency errors	733	...Explicit profile
692	.Data cleansing, data scrubbing, and deleting duplicates	734	...Implicit profile
693	.Fragmentation, compaction and compression	735	...Artificial Inflation of Search Rank
694	.Policy, rule-based management of records, files, and documents	736	.Preparing data for information retrieval
695	..Version management	737	..Clustering and grouping
696	.Index maintenance	738	...Based on topic
697	..Using checksum	739	...Latent semantic index or analysis (LSI or LSA)
698	..Using hash function	740	...Cataloging
699	..Using cyclic redundancy checking (CRC)	741	..Generating an index
700	.Range checking	742	...Inverted index
701	.Type checking	743	...Spatial index
702	.Triggers, stored procedures, user defined function (UDF)	744	...Sparse index
703	.Transactional processing	745	...Bitmap index
704	.Concurrent read/write management using locks	746	...Temporal index
705	DATABASE AND FILE ACCESS	747	...Using a hash
706	.Search engines	748	..Ranking, scoring, and weighting records
707	..Search engine portal (e.g., metasearch engine)	749	...Based on record similarity and relevance
708	...Analyzing or parsing query to determine topic or category	750	...Based on term frequency of appearance
709	..Web crawlers	751	...Based on historical data
710	..Category specific web crawling	752	..Sorting and ordering data
711	..Index generation	753	...Sorting indices
712	..Embedded or hardware based search engine	754	..Filtering data
713	.Query optimization	755	..Parsing data structures and data objects
714	..Based on joins	756	..Transforming data structures and data objects
715	..Based on index optimization	757	..Hiding and masking database data
716	..Based on access path	758	.Record, file, and data search and comparisons
717	..Based on materialized view	759	..Query statement modification
718	..Query execution plan		
719	..Query cost estimation		
720	...Based on resource consumption		
721	..Based on query history		
722	.Post processing of search results		
723	..Ranking search results		

760 ...Translating a query to another language or schema
 761 ...Verifying or testing translated query
 762 ...Legacy query generator
 763 ...Query mapping
 764 ...For parallel processing system
 765 ...Query expansion or refinement
 766 ...Interactive query refinement
 767Recommending or suggesting search terms and queries
 768Based on query history
 769 ..Database query processing
 770 ..Distributed search and retrieval
 771 ..Analyzing or parsing query to determine topic or category
 772 ...Query-by-example
 773 ...Recursive queries
 774 ...Nested queries
 775 ...Cascading queries
 776 ...Data mining
 777 ...Taxonomy discovery
 778Hierarchical structures
 779 ...Query templates
 780 ...Fuzzy searching and comparisons
 781 ..Database access control methods
 782 ..Alternative access and redirection
 783 ..Privileged access
 784 ...Based on user profile
 785Access control lists
 786Hierarchical access control
 787Temporal access control
 788Spatial access control
 790 **DATABASE DESIGN**
 791 ..Data structure types
 792 ..Database management system frameworks
 793 ..Custom data structure types
 794 ...Semantic network
 795 ...Including data structures referencing externally stored data
 796 ...Including structural features to support data retrieval and/or manipulation
 797 ..Trees
 798 ..Graphs
 799 ..Queues
 800 ..Linked lists
 801 ..Arrays

802 ..Database and data structure management
 803 ..Database, schema, and data structure creation and/or modification
 804 ...Automatic generation based on input file or data
 805 ...Via a graphical user interface
 806 ...Maintaining schema version information
 807 ...Through the use of structural data to support dynamic schemas
 808 ...Merging schemas
 809 ..Moving data from one schema or structure to another
 810 ...Through the use of a logical data model
 811 ...From unstructured or semi-structured data to structured data
 812 ..Data storage operations
 813 **GARBAGE COLLECTION**
 814 ..Reference counting
 815 ..Cyclic
 816 ..Mark-sweep
 817 ..Mark-compact
 818 ..Copying
 819 ..Generational
 820 ..Incremental
 821 **FILE MANAGEMENT**
 822 ..File systems
 823 ..Disk file systems
 824 ..Flash file systems
 825 ..Database file systems
 826 ..Transactional file systems
 827 ..Network file systems
 828 ..File directory structure
 829 ..Hierarchical structure
 830 ..Indexing structure
 831 ..Virtual directory structure
 899 **MISCELLANEOUS**

E-SUBCLASSES

The following subclasses beginning with the letter E are E-subclasses. Each E-subclass corresponds in scope to a classification in a foreign classification system, for example, the European Classification system (ECLA). The foreign classification equivalent to an E-subclass is identified

in the subclass definition. In addition to US documents classified in E-subclasses by US examiners, documents are regularly classified in E-subclasses according to the classification practices of any foreign Offices identified in parentheses at the end of the title. For example, "(EPO)" at the end of a title indicates both European and US patent documents, as classified by the EPO, are regularly added to the subclass. E-subclasses may contain subject matter outside the scope of this class. Consult their definitions, or the documents themselves to clarify or interpret titles.

- E17.001 **INFORMATION RETRIEVAL; DATABASE STRUCTURES THEREFORE (EPO)**
- E17.002 .Data Indexing; Abstracting; Data Reduction (EPO)
- E17.003 ..Of chemical information (EPO)
- E17.004 ..Of images (EPO)
- E17.005 .Interfaces; database management systems; updating (EPO)
- E17.006 ..File format conversion (EPO)
- E17.007 .Concurrency control and recovery (EPO)
- E17.008 .Document retrieval systems (EPO)
- E17.009 .Information processing systems, e.g., multimedia systems, etc. (EPO)
- E17.01 .File systems; file servers (EPO)
- E17.011 .Processing chained data, e.g., graphs, linked lists, etc. (EPO)
- E17.012 ..Trees (EPO)
- E17.013 ..Hypermedia (EPO)
- E17.014 .Query processing for the retrieval of structured data (EPO)
- E17.015 ..Natural language query interface (EPO)
- E17.016 ..Menu driven systems; graphical querying; query-by-example (EPO)
- E17.017 ..Query optimization (EPO)
- E17.018 .In geographical information databases (EPO)
- E17.019 .In image databases (EPO)
- E17.02 ..Based on image content (EPO)
- E17.021 ...Using color (EPO)
- E17.022 ...Using extracted text (EPO)
- E17.023 ...Using a combination of image content features (EPO)
- E17.024 ...Using shape and object relationship (EPO)
- E17.025 ...Using texture (EPO)
- E17.026 ..Based on bibliographical data of images (EPO)
- E17.027 ..The images having vectorial formats (EPO)
- E17.028 ..The images being video sequences (EPO)
- E17.029 ..By browsing (EPO)
- E17.03 ..By graphical querying (EPO)
- E17.031 ..Data organization and access thereof (EPO)
- E17.032 .Using distributed data base systems, e.g., networks, etc. (EPO)
- E17.033 .Processing unordered data (EPO)
- E17.034 ..Random access (EPO)
- E17.035 ...Using parallel associative memories (EPO)
- E17.036 ...By address calculation or conversion, e.g., hashing, etc. (EPO)
- E17.037 ...Using directory or table lookup (EPO)
- E17.038Using more than one table in sequence, i.e., systems with three or more layers, etc. (EPO)
- E17.039 ..Sequential access, e.g., string matching, etc. (EPO)
- E17.04 ...On static storage (EPO)
- E17.041 ...Comparing simultaneously a plurality of search arguments with a simple file data, finite state machine (EPO)
- E17.042 ...Comparing simultaneously search arguments with more than one file data (EPO)
- E17.043Comparing simultaneously search arguments with more than one file data (EPO)
- E17.044 .In structured data stores (EPO)
- E17.045 ..Relational databases (EPO)
- E17.046 ...Clustering or classification (EPO)
- E17.047Including cluster or class visualization or browsing (EPO)
- E17.048 ...Entity relationship models (EPO)
- E17.049 ...Physical indexing structures (EPO)
- E17.05Trees, e.g., B+ trees, etc. (EPO)

- E17.051Vectors, bitmaps or matrices (EPO)
E17.052Hash tables (EPO)
E17.053Index managing details (EPO)
E17.054 ...Relational operators, e.g., joins, transitive closure, partitioning, etc. (EPO)
E17.055 ..Object oriented databases (EPO)
E17.056 ..Multidimensional databases (EPO)
E17.057 ...Indexing (EPO)
E17.058 .Of unstructured textual data (EPO)
E17.059 ..Filtering based on additional data, e.g., user or group profiles, etc. (EPO)
E17.06 ...Profile generation, learning or modification (EPO)
E17.061 ..Querying (EPO)
E17.062 ...Query formulation (EPO)
E17.063Reformulation based on results of preceding query (EPO)
E17.064Using relevance feedback from the user, e.g., relevance feedback on documents, documents sets, document terms or passages, etc. (EPO)
E17.065Using graphical result space presentation or visualization (EPO)
E17.066Using system suggestions (EPO)
E17.067Using document space presentation or visualization, e.g., category, hierarchy or range presentation and selection, etc. (EPO)
E17.068Natural language query formulation or dialogue systems (EPO)
E17.069 ...Query processing (EPO)
E17.07Query translation (EPO)
E17.071Selection or weighting of terms from queries, including natural language queries (EPO)
E17.072Syntactic pre-processing steps, e.g., stopword elimination, stemming, etc. (EPO)
E17.073Translation of the query language, e.g., Chinese to English, etc. (EPO)
E17.074Query expansion (EPO)
E17.075Query execution (EPO)
E17.076Using Boolean model (EPO)
E17.077Using phonetics (EPO)
E17.078Using natural language analysis (EPO)
E17.079Using probabilistic model (EPO)
E17.08Using vector based model (EPO)
E17.081Reuse of stored results of previous queries (EPO)
E17.082 ...Presentation or visualization of query results (EPO)
E17.083 ..Indexing (EPO)
E17.084 ...Selection or weighting of terms for indexing (EPO)
E17.085 ...Physical indexing structures (EPO)
E17.086Inverted lists (EPO)
E17.087Trees (EPO)
E17.088Index managing details (EPO)
E17.089 ..Clustering or classification (EPO)
E17.09 ...Into predefined classes (EPO)
E17.091 ...Including class or cluster creation or modification (EPO)
E17.092 ...Including cluster or class visualization or browsing (EPO)
E17.093 ..Browsing or visualization (EPO).
E17.094 ...Summarization for human users (EPO)
E17.095 ..Based on associated metadata or manual classification, e.g., bibliographic data, etc. (EPO)
E17.096 ...Using identifiers, e.g., barcodes, radio frequency identifications, etc. (EPO)
E17.097 ...Using citations (EPO)
E17.098 ..Creation of semantic tools (EPO)
E17.099 ...Ontology (EPO)
E17.1 ...Thesaurus (EPO)
E17.101 .Of audio data (EPO)
E17.102 ..Based on associated metadata, e.g., bibliographic data, images associated with audio data, etc. (EPO)
E17.103 ...Wherein the metadata is a transcript of the audio data (EPO)
E17.104 .Processing sequentially ordered data, e.g., alpha-numerically ordered, etc. (EPO)
E17.105 ..Binary access (EPO)

- E17.106 ..Sequential access (EPO)
- E17.107 ..Retrieval from the Internet, e.g., browsers, etc. (EPO)
- E17.108 ..By querying, e.g., search engines or meta-search engines, crawling techniques, push systems, etc. (EPO)
- E17.109 ...With filtering and personalization (EPO)
- E17.11 ..Spatially dependent indexing and retrieval, e.g., location dependent results to queries, etc. (EPO)
- E17.111 ..By navigation, e.g., using categorized browsing, portals, synchronized browsing, visual networks of documents, virtual worlds or tours, etc. (EPO)
- E17.112 ..By using information identifiers, e.g., encoding URL in specific indicia, browsing history, etc. (EPO)
- E17.113 ...By using bar codes (EPO)
- E17.114 ...Bookmark management (EPO)
- E17.115 ...URL specific, e.g., using aliases, detecting broken or misspelled links, etc. (EPO)
- E17.116 ..Web site content organization and management, e.g., publishing, automatic linking or maintaining pages, etc. (EPO)
- E17.117 ...Access to data in other repository systems, e.g., legacy data or dynamic web page generation, etc. (EPO)
- E17.118 ...Document structures and storage, e.g., HTML extensions, etc. (EPO)
- E17.119 ..Browsing optimization (EPO)
- E17.12 ...Of access to content, e.g., by caching, etc. (EPO)
- E17.121 ...Optimizing the visualization of content, e.g., distillation of HTML documents, etc. (EPO)
- E17.122 ..Of semistructured data, the underlying structure being taken into account, e.g., mark-up language structure data, etc. (EPO)
- E17.123 ..Indexing, e.g., of XML tags, etc. (EPO)
- E17.124 ..Mapping or conversion (EPO)
- E17.125 ...Mapping to a database (EPO)
- E17.126 ...Mark-up to mark-up conversion (EPO)
- E17.127 ..XML native databases, structures and querying (EPO)
- E17.128 ...Query formulation (EPO)
- E17.129 ...Query processing (EPO)
- E17.13Query translation (EPO)
- E17.131Query optimization (EPO)
- E17.132Query execution (EPO)
- E17.133 ...Results presentation (EPO)
- E17.134 ..Details of database functions independent of the retrieved data type (EPO)
- E17.135 ..Querying (EPO)
- E17.136 ...Query formulation (EPO)
- E17.137Using system suggestions (EPO)
- E17.138Using search space presentation or visualization, e.g., category or range presentation and selection, etc. (EPO)
- E17.139 ...Natural language query formulation or dialogue systems (EPO)
- E17.14 ...Query processing (EPO)
- E17.141 ...Presentation or visualization of query results (EPO)
- E17.142 ..Browsing or visualization (EPO)
- E17.143 ..Retrieval based on associated meditate (EPO)

CROSS-REFERENCE ART COLLECTIONS

- 912 **APPLICATIONS OF A DATABASE**
- 913 .Multimedia
- 914 ..Video
- 915 ..Image
- 916 ..Audio
- 917 .Text
- 918 .Location
- 919 ..Geographic
- 920 ...Navigation
- 921 ..Spatial
- 922 .Communications
- 923 ..Intellectual property
- 924 ..Patent procedure
- 925 ...Drafting an application
- 926 ...Drafting drawing or figures
- 927 ...Validation
- 928 ...Electronic submission
- 929 ...Docketing
- 930 ..Intellectual property analysis
- 931 ...Patent comparison
- 932 Infringement detection
- 933 ...Citation analysis

- 934 ...Analyzing patent activity
 - 935 ...Company or stock valuation
 - 936 ..For use in research and development
 - 937 ..Intellectual property searching
 - 938 ..Intellectual property markets
 - 939 ..Idea solicitation
 - 940 ..Infrastructure
 - 941 ..Human sciences
 - 942 ..Legal/academic
 - 943 ..News
 - 944 ..Business related
 - 945 ..Contract negotiation
 - 946 ..Real estate
 - 947 ..Human resources
 - 948 ..Product or catalog
 - 949 ..Inventory
 - 950 ..Financial
 - 951 ..Calendar or scheduling
 - 952 ..Malicious software
 - 953 **ORGANIZATION OF DATA**
 - 954 ..Relational
 - 955 ..Object-oriented
 - 956 ..Hierarchical
 - 957 ..Multidimensional
 - 958 ..Data cubes
 - 959 ..Network
 - 960 ..Object-relational
 - 961 ..Associative
 - 962 ..Entity-attribute-value
 - 963 ..Hybrid
 - 964 **DATABASE ARRANGEMENT**
 - 965 ..Standalone
 - 966 ..Distributed
 - 967 ..Peer-to-peer
 - 968 ...Partitioning
 - 969Horizontal partitioning
 - 970Vertical partitioning
 - 971 ..Federated
 - 972 ...Partitioning
 - 973Horizontal partitioning
 - 974Vertical partitioning
 - 975 ..Portable database architecture
 - 999.001 **DATABASE OR FILE ACCESSING (707/1)**
 - 999.002 ..Access augmentation or optimizing (707/2)
 - 999.003 ..Query processing (i.e., searching) (707/3)
 - 999.004 ..Query formulation, input preparation, or translation (707/4)
 - 999.005 ..Query augmenting and refining (e.g., inexact access) (707/5)
 - 999.006 ..Pattern matching access (707/6)
 - 999.007 ..Sorting (707/7)
 - 999.008 ..Concurrency (e.g., lock management in shared database) (707/8)
 - 999.009 ..Privileged access (707/9)
 - 999.01 ..Distributed or remote access (707/10)
 - 999.1 **DATABASE SCHEMA OR DATA STRUCTURE (707/100)**
 - 999.101 ..Manipulating data structure (e.g., compression, compaction, compilation) (707/101)
 - 999.102 ..Generating database or data structure (e.g., via user interface) (707/102)
 - 999.103 ..Object-oriented database structure (707/103R)
 - 999.104 ..Object-oriented database structure processing (707/103Y)
 - 999.105 ..Object-oriented database structure network (707/103X)
 - 999.106 ..Object-oriented database structure reference (707/103Z)
 - 999.107 ..Application of database or data structure (e.g., distributed, multimedia, image) (707/104.1)
 - 999.2 **FILE OR DATABASE MAINTENANCE (707/200)**
 - 999.201 ..Coherency (e.g., same view to multiple users) (707/201)
 - 999.202 ..Recoverability (707/202)
 - 999.203 ..Version management (707/203)
 - 999.204 ..Archiving or backup (707/204)
 - 999.205 ..File allocation (707/205)
 - 999.206 ..Garbage collection (707/206)
- FOREIGN ART COLLECTIONS**
- FOR 000 **CLASS-RELATED FOREIGN DOCUMENTS**