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COMPUTER DICTIONARY

SECOND EDITION



THE COMPREHENSIVE
STANDARD FOR
BUSINESS, SCHOOL,
LIBRARY, AND HOME



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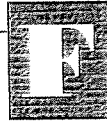
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8, 13, 21, 34.... Fibonacci numbers, also called the Fibonacci sequence, are named for the thirteenth-century mathematician Leonardo Fibonacci. In computing, Fibonacci numbers are used to speed binary searches by repeatedly dividing a set of data into groups in accordance with successively smaller pairs of numbers in the Fibonacci sequence. For example, a data set of 34 items would be divided into one group of 21 and another of 13. If the item being sought were in the group of 13, the group of 21 would be discarded, and the group of 13 would be divided into 5 and 8; the search would continue thus, through successive divisions, until the item was located. The ratio of two successive terms in the Fibonacci sequence converges on the Golden Ratio, a "magic number" that describes many things, from the curve of a nautilus shell to the proportions of the Parthenon.

fiche *See* microfiche.

field A location in a record in which a particular type of data is stored. For example, EMPLOYEE-RECORD might contain fields to store Last-Name, First-Name, Address, City, State, Zip-Code, Hire-Date, Current-Salary, Pay-Grade, Title, Department, Last-Increase-Date, and so on.

Individual fields have their own specifications as to maximum length and the type of data (for example, alphabetic, numeric, or financial) that can be placed in them. The facility for creating these specifications usually is contained in the data definition language (DDL).

In relational database management systems, fields are called columns.

field-effect transistor *See* FET.

field-programmable logic array Abbreviated FPLA; also known as programmable logic array (PLA). An integrated circuit containing an array of logic circuits in which the connections between the individual circuits, and thus the logic functions of the array, can be programmed after manufacture, typically at the time of installation (in the field). The programming can be performed only once, and it is typically done by passing high current through fusible links on the chip.

field separator Any character that separates one field of data from another. *See also* delimiter, field.

FIFO *See* first in, first out.

fifth-generation computer *See* computer.

fifth normal form (5NF) *See* normal form.

file A complete, named collection of information, such as a program, a set of data used by a program, or a user-created document. A file is the basic unit of storage that enables a computer to distinguish one set of information from another. A file might or might not be stored in human-readable form, but it is still the "glue" that binds a conglomeration of instructions, numbers, words, or images into a coherent unit that a user can retrieve, change, delete, save, or send to an output device.

file allocation table A table or list maintained by some operating systems to keep track of the status of various segments of disk space used for file storage. Files on a disk are stored, as space allows, in fixed-size groups of bytes (characters) rather than from beginning to end as neat, continuous strings of text or numbers. A single file can thus be scattered in pieces over many separate storage areas. A file allocation table enables the operating system to maintain a "map" of available disk storage space so that it can mark flawed segments that should not be used and can find and link the pieces of a file. In the MS-DOS operating system, the file allocation table is commonly known as the FAT (pronounced "fat"). *See also* FAT file system.

file attribute A restrictive label attached to a file that describes and regulates its use—for example, hidden, system, read-only, archive, and so forth. In MS-DOS, this information is stored as part of the file's directory entry.

file backup *See* backup.

file compression The process of reducing the storage space required for a file. *See also* data compression.

file control block Abbreviated FCB. A small block of memory temporarily assigned by a computer's operating system to hold information about a file that has been opened for use. A file control block typically contains such information as the file's identification, its location on disk, and a pointer



that marks the user's current (or last) position in the file.

file conversion The process of transforming the data in a file from one format to another without altering the meaning of its contents—for example, converting a file from a word processor's format to its ASCII equivalent.

file extension *See* extension.

file extent *See* extent.

file format The structure of a file that defines the way it is stored and laid out on the screen or in print. The format can be fairly simple and common, as are files stored as "plain" ASCII text, or it can be quite complex and include various types of control instructions and codes used by programs and by printers and other devices. Examples include RTF (Rich Text Format), DCA (Document Content Architecture), PICT, DIF (Data Interchange Format), DXF, TIFF (Tag Image File Format), and EPSF (Encapsulated PostScript Format).

file fragmentation A condition in which files are broken apart on disk into small, physically separated segments. The condition is a natural consequence of enlarging files and saving them on a crowded disk that no longer contains contiguous blocks of free space large enough to hold them. File fragmentation is not an integrity problem, although it can eventually slow read and write access times if the disk is very full and storage is badly fragmented. Software products are available for redistributing (optimizing) file storage.

In a database, a situation in which records are not stored in their optimal access sequence due to accumulated additions and deletions of records. Most database systems offer or contain utility programs that resequence records to improve efficiency of access and to aggregate free space occupied by deleted records.

file gap *See* block gap.

file handle In MS-DOS, OS/2, and Windows NT, a "token" (number) that the system uses in referring to an open file or, sometimes, to a device. A file handle, like a CB radio operator's nickname, is a unique identifier.

file-handling routine Any routine designed to

assist in creating, opening, accessing, and closing files. Most high-level languages have built-in file-handling routines, although more sophisticated or complex file-handling routines in an application are often created by the programmer.

file header *See* header.

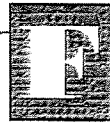
file layout In data storage, the organization of records within a file. Frequently, descriptions of the record structure are also included within the file layout.

file librarian A person or process responsible for maintaining, archiving, copying, and providing access to a collection of data.

file maintenance Broadly, the process of changing, inserting, or deleting information in a file, altering a file's control information or structure, or copying and archiving files. A person using a terminal to enter data, the program accepting the data from the terminal and writing it to a data file, and a database administrator using a utility to alter the format of a database file can all be said to be performing file maintenance.

file manager A module of an operating system or environment that controls the physical placement of and access to a group of program files.

filename The set of letters, numbers, and allowable symbols assigned to a file that distinguishes it from all other files in a particular directory on a disk. A filename is the "handle" by which a computer user saves and requests a block of information. Both programs and data have filenames and, often, extensions that further identify the type or purpose of the file. In MS-DOS, a filename can be up to eight characters long and, in addition to alphanumeric characters, can include certain punctuation marks, such as hyphens and underlines. On Macintosh computers, a filename can be up to 31 characters long and can include any symbol other than the colon (:), which is used to separate the elements of a path-name. In the OS/2 High-Performance File System (HPFS), filenames can be up to 254 characters long, although the combination of drive letter, path, and filename cannot exceed 259 characters. In the Windows NT File System (NTFS), filenames can be up to 255 characters long. Both



HPFS and NTFS support spaces in filenames. *See also* directory, path.

filename extension *See* extension.

file protection A process or device by which the existence and integrity of a file are maintained. Methods of file protection range from allowing read-only access and assigning passwords to covering the write-protect notch on a disk and locking away floppy disks holding sensitive files.

file recovery The process of reconstructing lost or unreadable files on disk. Files are lost when they are inadvertently deleted, when on-disk information about their storage is damaged, or when the disk is damaged. File recovery involves the use of specialized utility programs, which attempt to rebuild on-disk information about the storage locations of information belonging to deleted files. Because deletion makes the file's disk space available but does not remove the data, data that has not yet been overwritten can be recovered. In the case of damaged files or disks, recovery programs read whatever raw data they can find and save the data to a new disk or file in ASCII or numeric (binary or hexadecimal) form. Files salvaged in this way might require editing to become usable. In some instances, however, such reconstructed files contain so much extraneous or mixed information that they are unreadable. The best way to recover a file is to restore it from a backup copy.

file server A file-storage device on a local area network that is accessible to all users on the network. Unlike a disk server, which appears to the user as a remote disk drive, a file server is a sophisticated device that not only stores files but manages them and maintains order as network users request files and make changes to them. To deal with the tasks of handling multiple—sometimes simultaneous—requests for files, a file server contains a processor and controlling software as well as a disk drive for storage. On local area networks, a file server is often a computer with a large hard disk that is dedicated only to the task of managing shared files. *Compare* disk server.

file sharing The use of computer files on net-

works, where files are stored on a central computer or a shared server and are requested, reviewed, and modified by more than one individual. When a file is used with different programs or different computers, file sharing can require conversion to a mutually acceptable format. When a single file is shared by many people, access can be regulated through such means as password protection, security clearances, or file locking to prohibit changes to a file by more than one person at a time.

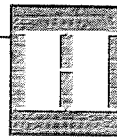
file size The length of a file, typically given in bytes. A computer file stored on disk actually has two "file sizes," logical size and physical size. The logical file size corresponds to the file's true size—the number of bytes it contains. The physical size refers to the amount of storage space allotted to the file on disk. Because space is set aside for a file in blocks of bytes, the last characters in the file might not completely fill the block (allocation unit) reserved for them. When this happens, the physical size (total number of bytes in all allocation units) is larger than the logical size of the file. This distinction helps explain why an application and the operating system sometimes report different sizes for the same file.

filespec *See* file specification.

file specification Often abbreviated filespec. The path to a file, from a disk drive through a chain of directory files to the filename that serves to locate a particular file. A file specification can also be a filename containing wildcard characters that indicate which files among a group of similarly named files are requested. In some situations, a file specification is also a document that describes the organization of data within a file.

file structure A description of a file or group of files that are to be treated together for some purpose. Such a description includes file layout and location for each file under consideration.

file system In an operating system, the overall structure in which files are named, stored, and organized. A file system consists of files, directories, and the information needed to locate and access these items. The term can also refer to the portion of an operating system that translates



as a modem manufactured by Hayes Microcomputer Products, originators of the de facto standard for microcomputer modems.

HDBMS See hierarchical database management system.

HDLC Abbreviation for High-level Data Link Control, a widely accepted international protocol governing information transfer that was developed by the International Organization for Standardization (ISO). HDLC is a bit-oriented, synchronous protocol that applies to the data-link (message-packaging) layer of the ISO Open Systems Interconnection (OSI) model for computer-to-computer communications. Under the HDLC protocol, messages are transmitted in units called frames, each of which can contain a variable amount of data but which must be organized in a particular way. *See also* frame.

HDTV Abbreviation for high-definition television, a method of transmitting and receiving television signals that produces a picture with much greater resolution and clarity than does standard television technology. With suitable standards, the quality of an HDTV picture can approach that of a movie screen. The standards for HDTV are not yet established, although the FCC has decided that the HDTV format used in the United States will be digital (as opposed to the analog-based HDTV standards in Europe and Japan).

head The read/write mechanism in a disk drive or magnetic tape drive, composed of one or more small coils contained in a molding. As the magnetic fields recorded on a disk or tape pass through the coils, an electric current is generated. The drive then processes this current into binary signals. To write data to disk or tape, the drive sends a current through the head's coils, changing the magnetic flux (orientation of magnetic particles) of the surface of the disk directly under the head. The bipolar flux (north-south or vice versa) determines whether that portion of the disk stores a binary 1 or a binary 0. Most disk drives contain one head for each surface that can be read from and written to.

head-cleaning device An apparatus for applying

a small amount of cleaning fluid to a magnetic head to remove accumulated debris.

head crash A hard disk failure in which a read/write head collides with the surface of the platter on which information is stored. In a hard disk, the read/write heads float less than a hair's breadth over the surface of the platter as it spins. When a head crash occurs, a read/write head comes into contact with the platter, cutting a groove in its magnetic coating. Such a crash can be caused by mechanical failure or by heavy shaking of the disk drive. It generally causes loss of information and can cause even more damage when the head encounters loose debris. The result of a head crash can be disastrous, particularly if the crash occurs on a directory track, which would effectively destroy the data that indicates where all files are located on the disk, rendering the disk unreadable.

header In word processing and printing, one or more identifying lines printed at the top of a page. A header might be printed on the first page, all pages, or every even or odd page, and it might be centered or aligned with the left or right margin. A header usually includes the page number and might also show the date, author, or title of a document. Also called running head. *Compare* footer.

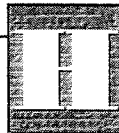
In other aspects of computing, a header is, broadly, a unit of information that precedes and identifies whatever follows. The specifics depend on the context in which the term is used:

In communications, a header is a block of bytes that precedes a packet of data and contains control information, such as identification of the sending and receiving stations.

In a database, a header is a record that identifies the fields and types of information in the data records that follow.

In data storage, a file header identifies a data file by name, size, and time and date of creation or revision; it might also identify the program with which the file was created.

In programming, a header, or heading, is a line that identifies the program, function, or procedure immediately following the heading.



In executable programs, a header is a block of data containing the size, location, and other such details about a program.

In device management, a device header is a block of descriptive information about a device, such as a disk drive, and appears at the beginning of the program (device driver) that controls the device.

On the Apple Macintosh, a zone header appears at the beginning of a block of memory and contains information the computer's memory-management facility needs in order to use that block of memory effectively.

header file In programming, a file of information, identified at the beginning of a program, that contains the definitions of data types and variables used by the functions in the program.

header label An initial structure, such as an opening record, in the linear organization of a file or communication that describes the length, type, and structure of the data that follows. *Compare* trailer label.

header record The first record in a sequence of records.

head-per-track disk drive A disk drive designed with a read/write head for every data track. Such a disk drive has a very low seek time because the heads do not have to move across the disk surface to the required track for reading or writing data. Because read/write heads are expensive, this type of drive is uncommon.

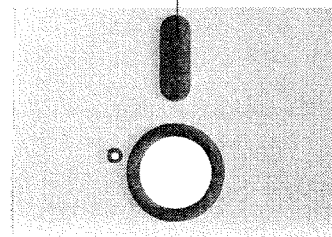
head positioning The process of moving the read/write head of a disk drive to the proper track for reading or writing data.

head slot The oblong opening in the jacket of a floppy disk that provides a read/write head access to the magnetic surface of the disk. See the illustration.

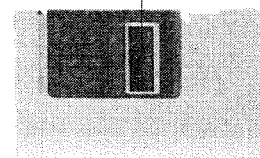
head switching The process of electrically switching among multiple read/write heads in a disk drive.

heap A portion of memory reserved for a program to use for the temporary storage of data structures whose existence or size cannot be determined until the program is running. The program can request free memory from the heap to hold

Head slot



Head slot



Head slot.

The head slots on a 5.25-inch disk (top) and a 3.5-inch disk (bottom). (The metal shutter on the 3.5-inch disk has been pulled back to show the head slot.)

such elements, use it as necessary, and later free the memory. Programming languages such as C and Pascal include functions and procedures for requesting and freeing memory from the heap. Unlike another reserved portion of memory called the stack, the heap is allocated in differently sized blocks according to the needs of the program. These blocks may come from various portions of the heap—wherever a block of sufficient size happens to be. As the program continues running, the heap becomes fragmented, and a process known as heap compaction might be needed to merge small blocks into larger units and enable memory to be used more efficiently. *Compare* stack.

In sorting, a complete binary tree with the property that the value of any node is not exceeded by the value of either of its children.

heap sort A space-efficient sorting method that first converts the key field into a heap (a type of binary tree), and then repeatedly removes the