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Microsoft

Computer Dictionary

Fifth Edition

- Fully updated with the latest technologies, terms, and acronyms
- Easy to read, expertly illustrated
- Definitive coverage of hardware, software, the Internet, and more!



PUBLISHED BY
Microsoft Press
A Division of Microsoft Corporation
One Microsoft Way
Redmond, Washington 98052-6399

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Library of Congress Cataloging-in-Publication Data
Microsoft Computer Dictionary.--5th ed.

p. cm.

ISBN 0-7356-1495-4

1. Computers--Dictionaries. 2. Microcomputers--Dictionaries.

AQ76.5. M52267 2002
004'.03--dc21

200219714

Printed and bound in the United States of America.

2 3 4 5 6 7 8 9 QWT 7 6 5 4 3 2

Distributed in Canada by H.B. Fenn and Company Ltd.

A CIP catalogue record for this book is available from the British Library.

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Body Part No. X08-41929

Advanced Encryption Standard *n.* See AES.

Advanced Interactive Executive *n.* See AIX.

Advanced Mobile Phone Service *n.* See AMPS.

Advanced Power Management *n.* An older power management technology used in mobile PCs before the implementation of Advanced Configuration and Power Interface (ACPI). Advanced Power Management is a software interface that functions between the BIOS power-management software that is specific to the hardware and a power-management policy driver that is run by the operating system. *Acronym:* APM.

Advanced Program-to-Program Communication *n.* See APPC.

Advanced Research Projects Agency Network *n.* See ARPANET.

Advanced RISC *n.* Short for **Advanced reduced instruction set computing**. A specification for a RISC microchip architecture and system environment designed by MIPS Computer Systems to provide binary compatibility among software applications. *See also* RISC.

Advanced RISC Computing Specification *n.* The minimum hardware requirements enabling a RISC-based system to comply with the Advanced Computing Environment standard. *See also* Advanced RISC.

Advanced RISC Machines *n.* See ARM.

Advanced SCSI Programming Interface *n.* An interface specification developed by Adaptec, Inc., for sending commands to SCSI host adapters. The interface provides an abstraction layer that insulates the programmer from considerations of the particular host adapter used. *Acronym:* ASPI. *See also* adapter, SCSI.

Advanced Streaming Format *n.* An open file format specification for streaming multimedia files containing text, graphics, sound, video, and animation. Advanced Streaming Format (ASF) does not define the format for any media streams within the file. Rather, it defines a standardized, extensible file “container” that is not dependent on a particular operating system or communication protocol, or on a particular method (such as HTML or MPEG-4) used to compose the data stream in the file. An ASF file consists of three objects: a Header object containing information about the file itself, a Data object containing the media streams, and an optional Index object that can help support random access to data within the file. The ASF

specification has been submitted to the ISO (International Organization for Standardization) for consideration. *Acronym:* ASF. *See also* streaming.

adventure game *n.* A role-playing computer game in which the player becomes a character in a narrative. In order to complete the game, the player must solve problems and avoid or overcome attacks and other forms of interference from the game’s environment and other characters. The first adventure game was called “Adventure.” It was developed in 1976 by Will Crowther of Bolt, Baranek & Newman. *See also* arcade game, computer game, role-playing game.

AE *n.* Acronym for application entity. In the ISO/OSI reference model, one of the two software parties involved in a communications session. *See also* ISO/OSI reference model.

A/E/C SYSTEMS conference *n.* Annual conference of the architecture, engineering, and construction industry. The conference promotes the exchange of information on new techniques and technologies used by these industries.

.aero *n.* One of seven new top-level domain names approved in 2000 by the Internet Corporation for Assigned Names and Numbers (ICANN). .aero is meant for use with air-transport industry-related Web sites. The seven new domain names became available for use in the spring of 2001.

AES *n.* Acronym for Advanced Encryption Standard. A cryptographic algorithm specified by the National Institute of Standards and Technology (NIST) to protect sensitive information. AES is specified in three key sizes: 128, 192, and 256 bits. AES replaces the 56-bit key Data Encryption Standard (DES), which was adopted in 1976. *See also* DES.

AFC *n.* See Application Foundation Classes.

AFDW *n.* See Active Framework for Data Warehousing.

affinity *n.* For Network Load Balancing, the method used to associate client requests to cluster hosts. When no affinity is specified, all network requests are load balanced across the cluster without respect to their source. Affinity is implemented by directing all client requests from the same IP address to the same cluster host. *See also* client request, IP address.

AFIPS *n.* Acronym for American Federation of Information Processing Societies. An organization formed in 1961 for the advancement of computing and information-related

concerns. The U.S. representative of the International Federation of Information Processing, AFIPS was replaced by the Federation on Computing in the United States (FOCUS) in 1990.

AFK *adv.* Acronym for **a**way from **k**eyboard. A phrase occasionally seen in live chat services on the Internet and online information services as an indication that one is momentarily unable to answer. *See also* chat¹ (definition 1).

AFP *n.* Acronym for **A**pple**T**alk **F**iling **P**rotocol. A remote filing system protocol that provides a standard means for a workstation on an AppleTalk network to access and manipulate files on an AFP-implemented server. *Also called:* AppleShare File Server.

AFS *n.* Acronym for **A**ndrew **F**ile **S**ystem. A distributed file system that allows clients and servers to share resources through local-area and wide-area networks. AFS is based on a distributed file system developed at Carnegie-Mellon University, and is named for the university's founders—Andrew Carnegie and Andrew Mellon. AFS is now maintained and supplied by Transarc Corporation. *See also* distributed file system.

agent *n.* **1.** A program that performs a background task for a user and reports to the user when the task is done or some expected event has taken place. **2.** A program that searches through archives or other repositories of information on a topic specified by the user. Agents of this sort are used most often on the Internet and are generally dedicated to searching a single type of information repository, such as postings on Usenet groups. Spiders are a type of agent used on the Internet. *Also called:* intelligent agent. *See also* spider. **3.** In client/server applications, a process that mediates between the client and the server. **4.** In Simple Network Management Protocol (SNMP), a program that monitors network traffic. *See also* SNMP.

aggregated links *n.* *See* link aggregation.

aggregation of links *n.* *See* link aggregation.

AGP *n.* Acronym for **A**ccelerated **G**raphics **P**ort. A high-performance bus specification designed for fast, high-quality display of 3-D and video images. Developed by Intel Corporation, AGP uses a dedicated point-to-point connection between the graphics controller and main system memory. This connection enables AGP-capable display adapters and compatible chip sets to transfer video data directly between system memory and adapter memory, to display images more quickly and smoothly than they can be displayed when the information must be transferred over

the system's primary (PCI) bus. AGP also allows for storing complex image elements such as texture maps in system memory and thus reduces the need for large amounts of memory on the adapter itself. AGP runs at 66 MHz—twice as fast as the PCI bus—and can support data transfer speeds of up to 533 Mbps. *See also* PCI local bus.

AH *n.* **A**uthentication **H**eder. A form of IP packet authentication included in the IPSec security standard. AH attaches a header to the packet with authentication information but does not encrypt the packet data, which allows its use in cases where encryption is not allowed. *See also* ESP, IPSec.

AI *n.* *See* artificial intelligence.

.aiff *n.* The file extension that identifies audio files in the sound format originally used on Apple and Silicon Graphics (SGI) computers.

AIFF *n.* The sound format originally used on Apple and Silicon Graphics (SGI) computers. AIFF stores waveform files in an 8-bit monaural format. *See also* waveform.

AIM *n.* Acronym for **A**merica **O**nline **I**ntant **M**essenger. A popular instant-messaging service provided for free by America Online. With the AIM service, instant messages can be sent over an Internet connection using the AIM software or directly from a Web browser using AIM Express. *See also* America Online, instant messaging. *Compare* ICQ, .NET Messenger Service, Yahoo! Messenger.

AirPort *n.* A wireless connectivity option introduced by Apple in 1999. AirPort provides wireless network and Internet communications to all AirPort card-equipped Macintosh computers within 150 feet of an AirPort base station. AirPort was developed around the IEEE 802.11 Direct Sequence Spectrum (DSSS) industry standard and is interoperable with other 802.11-based equipment.

AirSnort *n.* A hacking tool used to gather and decrypt passwords in data sent over wireless networks. AirSnort monitors wireless transmissions and collects packets of data. When it has collected enough data, AirSnort is able to compute the encryption key used in the transmission. AirSnort takes advantage of security flaws in the Wired Equivalent Protocol (WEP) standard. *See also* password sniffing.

AIX *n.* Acronym for **A**dvanced **I**nteractive **E**xecutive. A version of the UNIX operating system developed and maintained by IBM for its UNIX workstations and PCs.

alarm *n.* A visual or auditory signal from a computer alerting the user to an error or a hazardous situation.

ALB *n.* See load balancing.

alert *n.* **1.** In many operating systems with GUIs (graphical user interfaces), an audible or visual alarm that signals an error or represents a warning of some sort. *See also* alert box. **2.** In programming, an asynchronous notification sent by one thread to another. The alert interrupts the recipient thread at defined points in its execution and causes it to execute an asynchronous procedure call. *See also* asynchronous procedure call, thread (definition 1).

alert box *n.* An on-screen box in a GUI (graphical user interface) that is used to deliver a message or warning. *Compare* dialog box.

Alerter service *n.* A service used by the server and other services to notify selected users and computers of administrative alerts that occur on a computer. The Alerter service requires the Messenger service. *See also* administrative alerts, Messenger service, service.

ALGOL *n.* Acronym for **Algorithmic Language**. The first structured procedural programming language, developed in the late 1950s and once widely used in Europe.

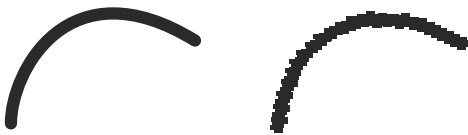
algorithm *n.* A finite sequence of steps for solving a logical or mathematical problem or performing a task.

algorithmic language *n.* A programming language, such as Ada, Basic, C, or Pascal, that uses algorithms for problem solving.

Algorithmic Language *n.* See ALGOL.

alias *n.* **1.** An alternative label for some object, such as a file or data collection. **2.** A name used to direct e-mail messages to a person or group of people on a network. **3.** A false signal that results from the digitization of an analog audio sample.

aliasing *n.* In computer graphics, the jagged appearance of curves or diagonal lines on a display screen, which is caused by low screen resolution. *See the illustration.*

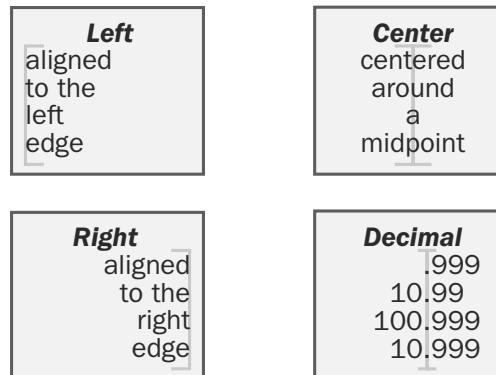


Aliasing. *The lower resolution of the image on the right reveals the aliasing effect.*

aliasing bug *n.* A class of subtle programming errors that can arise in code that performs dynamic allocation. If sev-

eral pointers address the same chunk of storage, the program may free the storage using one of the pointers but then attempt to use another one (an alias), which would no longer be pointing to the desired data. This bug is avoidable by the use of allocation strategies that never use more than one copy of a pointer to allocated core memory, or by the use of higher-level languages, such as LISP, which employ a garbage collection feature. *Also called:* stale pointer bug. *See also* alias, dynamic allocation, garbage collection.

align *vb.* **1.** In an application such as a word processor, to position lines of type relative to some point, such as the page margin. The most common types of alignment are left- and right-aligned and centered. *See the illustration.* **2.** To adjust some device to position it within specified tolerances, such as the read/write head relative to a track on a disk. **3.** In data handling, to store multiple-byte data units so that the respective bytes fall in corresponding locations of memory.



Align.

alignment *n.* The arrangement of objects in fixed or predetermined positions, rows, or columns. For example, the Macintosh Finder can do automatic alignment of icons in a folder or on the desktop.

Allegro *n.* Ported to a number of operating systems, Allegro is a freeware library of functions for use in programming computer games and graphics programs. It is written for the DJGPP compiler in a mixture of C and assembly language. The most recent release version is 4.0.0. *See also* assembly language, DJGPP.

allocate *vb.* To reserve a resource, such as sufficient memory, for use by a program. *Compare* deallocate.

allocation *n.* In operating systems, the process of reserving memory for use by a program.

the controller onto the drive itself, thereby reducing interface costs and making firmware implementations easier.

ATAPI *n.* The interface used by the IBM PC AT system for accessing CD-ROM devices.

AT Attachment *n.* See ATA.

AT bus *n.* The electric pathway used by IBM AT and compatible computers to connect the motherboard and peripheral devices. The AT bus supports 16 bits of data, whereas the original PC bus supports only 8 bits. *Also called:* expansion bus. *See also* EISA, ISA, Micro Channel Architecture.

aTdTdHvAaNNKcSe *n.* See TIA.

ATDP *n.* Acronym for **Attention Dial Pulse**, a command that initiates pulse (as opposed to touch-tone) dialing in Hayes and Hayes-compatible modems. *Compare* ATDT.

ATDT *n.* Acronym for **Attention Dial Tone**, a command that initiates touch-tone (as opposed to pulse) dialing in Hayes and Hayes-compatible modems. *Compare* ATDP.

Athlon *n.* Family of x86-compatible processors introduced by Advanced Micro Devices, Inc. (AMD) in 1999. Athlon, which was code-named AMD-K7, is a successor to the AMD-K6 family. Comparable to upper-end Intel Pentium III processors in performance, Athlon is distinguished by over 22 million transistors; a fully pipelined, superscalar floating-point engine, which enhances performance of graphics and multimedia programs, Internet streaming applications, and games; a 200-MHz system bus; and a 128-KB L1 cache. Although the L2 cache is 512 KB in size, the Athlon can support L2 cache sizes up to 8 MB. The first Athlon releases featured clock speeds of 500 to 650 MHz; 800-MHz and faster versions are now available. Athlon, which runs 32-bit programs, is compatible with most PC operating systems, including Microsoft Windows, Linux, OS/2 Warp, and NetWare. *See also* AMD-K6.

ATM *n.* **1.** Acronym for **Asynchronous Transfer Mode**. A network technology capable of transmitting data, voice, audio, video, and frame relay traffic in real time. Data, including frame relay data, is broken into packets containing 53 bytes each, which are switched between any two nodes in the system at rates ranging from 1.5 Mbps to 622 Mbps (over fiber optic cable). The basic unit of ATM transmission is known as a cell, a packet consisting of 5 bytes routing information and a 48-byte payload (data). These

cells are transmitted to their destination, where they are reassembled into the original traffic. During transmission, cells from different users may be intermixed asynchronously to maximize utilization of network resources. ATM is defined in the broadband ISDN protocol at the levels corresponding to levels 1 and 2 of the ISO/OSI reference model. It is currently used in LANs (local area networks) involving workstations and personal computers, but it is expected to be adopted by the telephone companies, which will be able to charge customers for the data they transmit rather than for their connect time. *See also* broadband, ISDN, ISO/OSI reference model. **2.** Acronym for **auto-mated teller machine**. A special-purpose terminal that bank customers can use to make deposits, obtain cash, and perform other transactions. **3.** *See* Adobe Type Manager.

ATM Adaptation Layer *n.* The ATM layer that mediates between higher-level and lower-level services, converting different types of data (such as audio, video, and data frames) to the 48-byte payloads required by ATM. *Acronym:* AAL. *See also* ATM (definition 1).

ATM Forum *n.* Forum created in 1991 and including more than 750 companies related to communications and computing, as well as government agencies and research groups. The forum aims to promote Asynchronous Transfer Mode for data communication. *See also* ATM (definition 1).

Atomicity, Consistency, Isolation, Durability *n.* See ACID.

atomic operation *n.* An operation considered or guaranteed to be indivisible (by analogy with an atom of matter, once thought to be indivisible). Either the operation is uninterruptible or, if it is aborted, a mechanism is provided that ensures the return of the system to its state prior to initiation of the operation.

atomic transaction *n.* A set of operations that follow an “all or nothing” principle, in which either all of the operations are successfully executed or none of them is executed. Atomic transactions are appropriate for order entry and fulfillment or for money transfers to ensure that information is fully updated. For example, if funds are transferred between accounts on two databases, one account cannot be credited if the other is not debited by the same amount. An atomic transaction would involve both recording the credit in one database and recording the corresponding debit in the other. If any operation in the transaction fails, the transaction is aborted and any infor-

B

equipment, such as a transformer or a power line. A blackout might or might not damage a computer, depending on the state of the computer when the blackout occurs. As with switching a computer off before saving any data, a blackout will cause all unsaved data to be irretrievably lost. The most potentially damaging situation is one in which a blackout occurs while a disk drive is reading information from or writing information to a disk. The information being read or written will probably become corrupted, causing the loss of a small part of a file, an entire file, or the entire disk; the disk drive itself might suffer damage as a result of the sudden power loss. The only reliable means of preventing damage caused by a blackout is to use a battery-backed uninterruptible power supply (UPS). *See also* UPS. *Compare* brownout.

blank¹ *n.* The character entered by pressing the spacebar. *See also* space character.

blank² *vb.* To not show or not display an image on part or all of the screen.

blanking *n.* The brief suppression of a display signal as the electron beam in a raster-scan video monitor is moved into position to display a new line. After tracing each scan line, the beam is at the right edge of the screen and must return to the left (horizontal retrace) to begin a new line. The display signal must be turned off during the time of the retrace (horizontal blanking interval) to avoid overwriting the line just displayed. Similarly, after tracing the bottom scan line, the electron beam moves to the top left corner (vertical retrace), and the beam must be turned off during the time of this retrace (vertical blanking interval) to avoid marking the screen with the retrace path.

blast *vb.* *See* burn (definition 1).

bleed *n.* In a printed document, any element that runs off the edge of the page or into the gutter. Bleeds are often used in books to mark important pages so they are easier to find. *See also* gutter.

blend¹ *n.* A photo or graphic created with a software blending process.

blend² *vb.* In illustration and other graphics software, to create a new combined graphic from two or more separate graphic elements. Photos, art, colors, shapes, and text may be blended together digitally. Graphic elements may be blended for artistic effect, or may be realistic enough to appear as a single photo or graphic.

blind carbon copy *n.* *See* bcc.

blind courtesy copy *n.* *See* bcc.

blind search *n.* A search for data in memory or on a storage device with no foreknowledge as to the data's order or location. *See also* linear search. *Compare* binary search, indexed search.

blink *vb.* To flash on and off. Cursors, insertion points, menu choices, warning messages, and other displays on a computer screen that are intended to catch the eye are often made to blink. The rate of blinking in a graphical user interface can sometimes be controlled by the user.

blink speed *n.* The rate at which the cursor indicating the active insertion point in a text window, or other display element, flashes on and off.

blip *n.* A small, optically sensed mark on a recording medium, such as microfilm, that is used for counting or other tracking purposes.

blit *vb.* To render a glyph/bitmap to the display. *Also called:* blitting. *See also* bit block transfer.

blitter *n.* A function that copies a bitmap from memory onto the screen.

bloatware *n.* Software whose files occupy an extremely large amount of storage space on a user's hard disk, especially in comparison with previous versions of the same product.

block¹ *n.* **1.** Generally, a contiguous collection of similar things that are handled together as a whole. **2.** A section of random access memory temporarily assigned (allocated) to a program by the operating system. **3.** A group of statements in a program that are treated as a unit. For example, if a stated condition is true, all of the statements in the block are executed, but none are executed if the condition is false. **4.** A unit of transmitted information consisting of identification codes, data, and error-checking codes. **5.** A collection of consecutive bytes of data that are read from or written to a device (such as a disk) as a group. **6.** A rectangular grid of pixels that are handled as a unit. **7.** A segment of text that can be selected and acted upon as a whole in an application. **8.** In the Java programming language, any code between matching braces constitutes a block. For example, { *x* = 1; }. *See also* code, Java.

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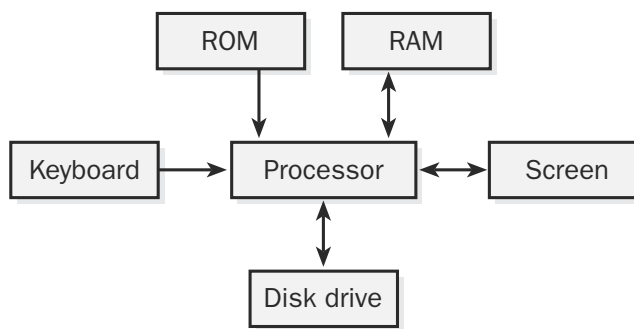
3. To select a segment of text, by using a mouse, menu selection, or cursor key, to be acted upon in some way, such as to format or to delete the segment.

block cipher *n.* A private key encryption method that encrypts data in blocks of a fixed size (usually 64 bits). The encrypted data block contains the same number of bits as the original. *See also* encryption, private key.

block cursor *n.* An on-screen cursor that has the same width and height in pixels as a text-mode character cell. A block cursor is used in text-based applications, especially as the mouse pointer when a mouse is installed in the system. *See also* character cell, cursor (definition 1), mouse pointer.

block device *n.* A device, such as a disk drive, that moves information in blocks—groups of bytes—rather than one character (byte) at a time. *Compare* character device.

block diagram *n.* A chart of a computer or other system in which labeled blocks represent principal components and lines and arrows between the blocks show the pathways and relationships among the components. A block diagram is an overall view of what a system consists of and how it works. To show the various components of such a system in more detail, different types of diagrams, such as flowcharts or schematics, are used. *See the illustration.* *Compare* bubble chart, flowchart.



Block diagram.

block gap *n.* The unused physical space that separates blocks of data or physical records on a tape or formatted sectors on a disk. *Also called:* IBG, interblock gap.

block header *n.* Information that appears at the beginning of a block of data and serves such purposes as signaling the beginning of the block, identifying the block, providing error-checking information, and describing such characteristics as the block length and the type of data contained in the block. *See also* header (definition 2).

blocking factor *n.* **1.** The size of the chunks in which data is transferred to or from a block device such as a disk. If fewer bytes are requested, the disk drive will still read the whole block. Common blocking factors on personal computers are 128, 256, and 512 bytes. **2.** The number of file records in one disk block. If the record length for a file is 170 bytes, a block on the disk contains 512 bytes, and records do not span blocks, then the blocking factor is 3, and each block contains 510 (170 x 3) bytes of data and 2 unused bytes.

block length *n.* The length, usually in bytes, of a block of data. Block length typically ranges from 512 bytes through 4096 kilobytes (KB), depending on the purpose for which the block is used.

block move *n.* Movement of a number of items of data together to a different location, as in reorganizing documents with a word processor or moving the contents of cell ranges in a spreadsheet. Most CPUs have instructions that easily support block moves.

block size *n.* The declared size of a block of data transferred internally within a computer, via FTP, or by modem. The size is usually chosen to make the most efficient use of all the hardware devices involved. *See also* FTP¹ (definition 1).

block structure *n.* The organization of a program into groups of statements called *blocks*, which are treated as units. Programming languages such as Ada, C, and Pascal were designed around block structure. A block is a section of code surrounded by certain delimiters (such as BEGIN and END or { and }), which signify that the intervening code can be treated as a related group of statements. For example, in C, each function is a separate block. Block structure also limits the scope of constants, data types, and variables declared in a block to that block. *See also* function (definition 2), procedure, scope (definition 1).

block transfer *n.* The movement of data in discrete blocks (groups of bytes).

blog¹ *n.* *See* weblog.

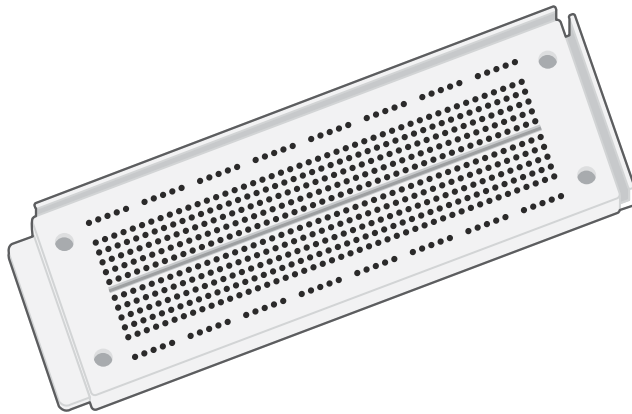
blog² *vb.* To create or maintain a weblog.

logger *n.* One who creates or maintains a weblog.

blow *vb.* *See* burn (definition 1).

blow up *vb.* To terminate abnormally, as when a program crosses some computational or storage boundary and cannot handle the situation on the other side, as in, "I tried to

B

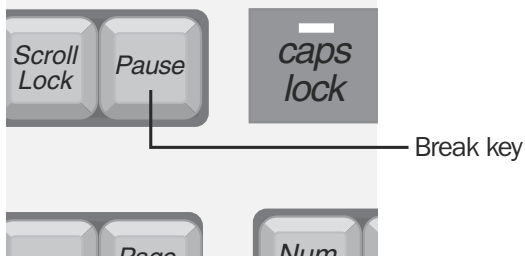


Breadboard.

break¹ *n.* **1.** Interruption of a program caused by the user pressing the Break key or its equivalent. **2.** Interruption of a communications transmission that occurs when the receiving station interrupts and takes over control of the line or when the transmitting station prematurely halts transmission. **3.** In the Java programming language, a keyword used to resume program execution at the next statement following the current statement. If the keyword is followed by a label, the program resumes at the indicated labeled statement. *See also* execute, statement.

break² *vb.* **1.** To interrupt execution at a given spot, usually for the purpose of debugging. *See also* breakpoint. **2.** To cause a routine, module, or program that had previously worked to cease working correctly.

Break key *n.* A key or combination of keys used to tell a computer to halt, or break out of, whatever it is doing. On IBM PCs and compatibles under DOS, pressing the Pause/Break or Scroll Lock/Break key while holding down the Ctrl key issues the break command (as does Ctrl-C). On Macintosh computers, the key combination that sends a break code is Command-period. *See the illustration.*



Break key.

break mode *n.* A temporary suspension of program execution while in the development environment. In break mode, you can examine, debug, reset, step through, or continue program execution.

breakout box *n.* A small hardware device that can be attached between two devices normally connected by a cable (such as a computer and a modem) to display and, if necessary, change the activity through individual wires of the cable.

breakpoint *n.* A location in a program at which execution is halted so that a programmer can examine the program's status, the contents of variables, and so on. A breakpoint is set and used within a debugger and is usually implemented by inserting at that point some kind of jump, call, or trap instruction that transfers control to the debugger. *See also* debug, debugger.

BRI *n.* Acronym for **Basic Rate Interface**. An ISDN subscriber service that uses two B (64 Kbps) channels and one D (64 Kbps) channel to transmit voice, video, and data signals. *See also* ISDN.

bridge *n.* In terms of the Year 2000 problem, a program, routine, or other conversion mechanism that converts date formats from 2-digit years to 4-digit years and vice versa. A bridge is used as a remedy for literally bridging the 2-digit/4-digit format gap between programs or systems.

bridge *n.* **1.** A device that connects networks using the same communications protocols so that information can be passed from one to the other. *Compare* gateway. **2.** A device that connects two LANs (local area networks), whether or not they use the same protocols, and allows information to flow between them. The bridge operates at the ISO/OSI data-link layer. *Also called:* layer switch. *See also* data-link layer. *Compare* router.

bridge page *n.* *See* doorway page.

bridge router *n.* A device that supports the functions of both a bridge and router. A bridge router links two segments of a local or wide area network, passing packets of data between the segments as necessary, and uses Level 2 addresses for routing. *Also called:* Brouter. *See also* bridge (definition 2), router.

bridgeware *n.* Hardware or software designed to convert application programs or data files to a form that can be used by a different computer.

downstream rates from about 10 Mbps to 36 Mbps. *See also* coaxial cable, modem.

cable telephony *n.* Telephone service provided over a cable TV connection rather than over traditional telephone lines. Although service is delivered over cable rather than telephone wire, the end user perceives no difference between cable telephony and normal telephone service. Proponents of cable telephony see it as part of the eventual integration of Internet, television, and telephone services into a single communication/entertainment unit.

cable television *n.* *See* CATV.

cabling diagram *n.* A plan that shows the path of cables that attach computer system components or peripherals. Cabling diagrams are particularly important for explaining the connection of disk drives to a disk controller.

cache *n.* A special memory subsystem in which frequently used data values are duplicated for quick access. A memory cache stores the contents of frequently accessed RAM locations and the addresses where these data items are stored. When the processor references an address in memory, the cache checks to see whether it holds that address. If it does hold the address, the data is returned to the processor; if it does not, a regular memory access occurs. A cache is useful when RAM accesses are slow compared with the microprocessor speed because cache memory is always faster than main RAM memory. *See also* disk cache, wait state.

cache card *n.* An expansion card that increases a system's cache memory. *See also* cache, expansion board.

Cache-Coherent Non-Uniform Memory Access *n.* *See* ccNUMA.

cache farm *n.* A group of servers that save copies of Web pages to caches to fulfill successive requests without calling the pages up repeatedly from the Web server. In essence, the servers are dedicated to caching. By saving Web pages where they can be accessed without increasing traffic on the Web site, the cache farm allows higher-performance Web access for the end user and a reduction in network congestion and volume. *See also* cache.

cache memory *n.* *See* cache.

cache poisoning *n.* Deliberate corruption of Internet Domain Name System (DNS) information through alteration of data that equates host names with their IP

addresses. Misleading information of this type, when cached (saved) by one DNS server and later passed to another, exposes DNS servers to attacks in which data sent from one host to another can be accessed or corrupted. Cache poisoning has been used to redirect network requests from a legitimate server to an alternate Web site. *See also* DNS.

CAD *n.* Acronym for **computer-aided design**. A system of programs and workstations used in designing engineering, architectural, and scientific models ranging from simple tools to buildings, aircraft, integrated circuits, and molecules. Various CAD applications create objects in two or three dimensions, presenting the results as wire-frame “skeletons,” as more substantial models with shaded surfaces, or as solid objects. Some programs can also rotate or resize models, show interior views, generate lists of materials required for construction, and perform other allied functions. CAD programs rely on mathematics, often requiring the computing power of a high-performance workstation. *See also* CAD/CAM, I-CASE.

CAD/CAM *n.* Acronym for **computer-aided design/computer-aided manufacturing**. The use of computers in both the design and manufacture of a product. With CAD/CAM, a product, such as a machine part, is designed with a CAD program and the finished design is translated into a set of instructions that can be transmitted to and used by the machines dedicated to fabrication, assembly, and process control. *See also* CAD, I-CASE.

CADD *n.* A system of hardware and software similar to CAD but with additional features related to engineering conventions, including the ability to display dimension specifications and other notes. *Acronym:* CADD. *See also* CAD.

caddy *n.* A plastic carrier that holds a CD-ROM and is inserted into a CD-ROM drive. Some PCs, especially older models, have CD-ROM drives that require the use of a caddy. Most current CD-ROM drives do not require a caddy.

CAE *n.* Acronym for **computer-aided engineering**. An application that enables the user to perform engineering tests and analyses on designs created with a computer. In some instances, capabilities such as logic testing that are generally attributed to CAE applications are also part of CAD programs, so the distinction between CAD and CAE is not a hard-and-fast one. *See also* CAD, I-CASE.

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click *vb.* To press and release a mouse button once without moving the mouse. Clicking is usually performed to select or deselect an item or to activate a program or program feature. *See also* right click. *Compare* double-click, drag.

clickable maps *n.* *See* image map.

click rate *n.* *See* clickthrough rate.

clicks and mortar *n.* A business that combines an online presence with traditional “bricks and mortar” outlets.

click speed *n.* The maximum interval between the first and second time a user presses a button on a mouse or other pointing device that will still identify these actions as a double-click to the computer as opposed to two single-clicks. *See also* double-click, mouse, pointing device.

clickstream *n.* The path a user takes while browsing a Web site. Each distinct selection made on a Web page adds one click to the stream. The further down the clickstream the user goes without finding the sought item, the more likely he or she is to depart to another Web site. Analysis of usage patterns helps Web site designers create user-friendly site structures, links, and search facilities. *See also* Web site.

clickthrough *n.* The number of times that visitors to a Web site click on an advertising banner within a specified period of time. Clickthrough is one of the elements that Web site producers use to decide how much to charge advertisers. *See also* clickthrough rate.

clickthrough rate *n.* The proportion of visitors to a Web site who click on a banner advertisement there, expressed as a percentage of total visitors to the Web site. *Also called:* click rate. *See also* clickthrough.

clickwrap agreement *n.* A contract or license in software or on a Web site that sets forth conditions for use of the software or for goods and services distributed through the Web site. Users must agree to the terms in a clickwrap agreement—typically by clicking on a button that states “I Agree” or “Agree”—before they can install the software or utilize goods or services. A clickwrap agreement is an electronic version of an End-User License Agreement. *Also called:* clickwrap license. *See also* End-User License Agreement. *Compare* shrinkwrap agreement.

clickwrap license *n.* *See* clickwrap agreement.

client *n.* **1.** In object-oriented programming, a member of a class (group) that uses the services of another class to which it is not related. *See also* inheritance (definition 1). **2.** A process, such as a program or task, that requests a

service provided by another program—for example, a word processor that calls on a sort routine built into another program. The client process uses the requested service without having to “know” any working details about the other program or the service itself. *Compare* child (definition 1), descendant (definition 2). **3.** On a local area network or the Internet, a computer that accesses shared network resources provided by another computer (called a *server*). *See also* client/server architecture, server.

client error *n.* A problem reported by the Hypertext Transfer Protocol (HTTP) client module as the result of difficulty in interpreting a command or the inability to connect properly to a remote host.

client/server architecture *n.* An arrangement used on LANs (local area networks) that makes use of distributed intelligence to treat both the server and the individual workstations as intelligent, programmable devices, thus exploiting the full computing power of each. This is done by splitting the processing of an application between two distinct components: a “front-end” client and a “back-end” server. The client component is a complete, stand-alone personal computer (not a “dumb” terminal), and it offers the user its full range of power and features for running applications. The server component can be a personal computer, a minicomputer, or a mainframe that provides the traditional strengths offered by minicomputers and mainframes in a time-sharing environment: data management, information sharing between clients, and sophisticated network administration and security features. The client and server machines work together to accomplish the processing of the application being used. Not only does this increase the processing power available over older architectures but it also uses that power more efficiently. The client portion of the application is typically optimized for user interaction, whereas the server portion provides the centralized, multiuser functionality. *See also* distributed intelligence. *Compare* peer-to-peer network.

client/server network *n.* *See* client/server architecture.

client-side image maps *n.* An image map that performs the processing completely within the client program (i.e., Web browser) itself. Early Web implementations of image maps (circa 1993) transmitted user mouse click coordinates to the Web server for processing. Generally client-side image maps improve the speed of response to the user. *See also* image map.

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database of opinions and ratings regarding several products, researchers can predict which new products the people contributing to the database will like.

collapsed backbone *n.* See backbone (definition 3).

collate *vb.* In data handling, to merge items from two or more similar sets to create a combined set that maintains the order or sequence of items in the original sets.

collating sort *n.* A sort that proceeds by continuous merging of two or more files to produce a certain sequence of records or data items.

collation sequence *n.* The ordering relationship (sequence) among objects that is to be established by a collating sort. See also collating sort.

collector *n.* The region of a bipolar transistor into which charge carriers flow under normal operating conditions. The output of the transistor is usually taken from the collector. With respect to the base and emitter, the collector is positive in an NPN transistor and negative in a PNP transistor. See also NPN transistor, PNP transistor. Compare base (definition 3), emitter.

collision *n.* The result of two devices or network workstations trying to transmit signals at the exact same time on the same channel. The typical outcome is a garbled transmission.

collision detection *n.* **1.** The process by which a node on a local area network monitors the communications line to determine when a collision has occurred; that is, when two nodes have attempted to transmit at the same time.

Although network stations usually avoid collisions by monitoring the line and waiting for it to clear before transmitting, the method is not foolproof. When a collision does occur, the two nodes involved usually wait a random amount of time before attempting to retransmit. See also contention, CSMA/CD. **2.** The process by which a game or simulation program determines whether two objects on the screen are touching each other. This is a time-consuming, often complicated procedure; some computers optimized for graphics and games, such as the Amiga, have special hardware built in specifically to detect collisions.

colocation or **co-location** *n.* The operation of a server, router, or other device in a facility that provides a dedicated Internet connection, physical space in a secured cage, and regulated power. Colocation services often include fire detection and extinguishing, backup power, technical support, and additional security measures to ensure high availability.

color *n.* In physics, the component of the human perception of light that depends on frequency. For light of a single frequency, color ranges from violet at the high-frequency end of the visible-light band (a small portion of the total electromagnetic spectrum) to red at the low-frequency end. In computer video, color is produced by a combination of hardware and software. Software manipulates combinations of bits that represent the distinct shades of color that are destined for particular positions on the screen (characters or individual dots, called pixels). The video adapter hardware translates these bits into electrical signals, which in turn control the brightnesses of different-colored phosphors at the corresponding positions on the screen of the monitor CRT. The user's eye unites the light from the phosphors to perceive a single color. See also color model, color monitor, CRT, HSB, monitor, RGB, video, video adapter.

color bits *n.* A predetermined number of bits assigned to each displayable pixel that determine the pixel's color when it is displayed on a monitor. For example, two color bits are required for four colors; eight color bits are required for 256 colors. See also pixel image. Compare bit plane.

color box *n.* In the Windows NT and Windows 9x Paint accessory, a graphic screen element in the form of a paint box that is used to select foreground and background colors.

color burst *n.* A technique used to encode color in a composite video signal, originally developed so that black-and-white television monitors could display programs broadcast in color. The color burst consists of a combination of the red, green, and blue intensities (used by black-and-white displays) and two color-difference signals that determine separate red, green, and blue intensities (used by color displays). See also color look-up table.

color cycling *n.* A technique used in computer graphics for changing the color of one or more pixels on the screen by changing the color palette used by the video adapter rather than by changing the color bits for each pixel. For example, to cause a red circle to fade away to a black background color, the program need only change the set of signal values corresponding to "red" in the video adapter's color look-up table, periodically making it darker until it matches the black background. At each step, the apparent color of the whole circle changes instantly; it appears to fade rather than to be painted over and over. The speed at which and the degree to which the circle fades are entirely up to the programmer.

machine language situations. Condition codes are hardware-specific but usually include carry, overflow, zero result, and negative result codes. *See also* conditional branch.

conditioning *n.* The use of special equipment to improve the ability of a communications line to transmit data. Conditioning controls or compensates for signal attenuation, noise, and distortion. It can be used only on leased lines, where the path from sending to receiving computer is known in advance.

conductor *n.* A substance that conducts electricity well. Metals are good conductors, with silver and gold being among the best. The most commonly used conductor is copper. *Compare* insulator, semiconductor.

Conference on Data Systems Languages *n.* *See* CODASYL.

CONFIG.SYS *n.* A special text file that controls certain aspects of operating-system behavior in MS-DOS and OS/2. Commands in the CONFIG.SYS file enable or disable system features, set limits on resources (for example, the maximum number of open files), and extend the operating system by loading device drivers that control hardware specific to an individual computer system.

configuration *n.* **1.** In reference to a single microcomputer, the sum of a system's internal and external components, including memory, disk drives, keyboard, video, and generally less critical add-on hardware, such as a mouse, modem, or printer. Software (the operating system and various device drivers), the user's choices established through configuration files such as the AUTOEXEC.BAT and CONFIG.SYS files on IBM PCs and compatibles, and sometimes hardware (switches and jumpers) are needed to "configure the configuration" to work correctly. Although system configuration can be changed, as by adding more memory or disk capacity, the basic structure of the system—its architecture—remains the same. *See also* AUTOEXEC.BAT, CONFIG.SYS. **2.** In relation to networks, the entire interconnected set of hardware, or the way in which a network is laid out—the manner in which elements are connected.

configuration file *n.* A file that contains machine-readable operating specifications for a piece of hardware or software or that contains information on another file or on a specific user, such as the user's logon ID.

congestion *n.* The condition of a network when the current load approaches or exceeds the available resources and bandwidth designed to handle that load at a particular

location in the network. Packet loss and delays are associated with congestion.

connect charge *n.* The amount of money a user must pay for connecting to a commercial communications system or service. Some services calculate the connect charge as a flat rate per billing period. Others charge a varying rate based on the type of service or the amount of information being accessed. Still others base their charges on the number of time units used, the time or distance involved per connection, the bandwidth of each connected session, or some combination of the preceding criteria. *See also* connect time.

connection *n.* A physical link via wire, radio, fiberoptic cable, or other medium between two or more communications devices.

connection-based session *n.* A communications session that requires a connection to be established between hosts prior to an exchange of data.

connectionism *n.* A model in artificial intelligence that advocates using highly parallel, specialized processes that compute simultaneously and are massively connected. Thus, the connectionist approach would not use a single high-speed processor to compute an algorithm, but would break out many simple specialized processing elements that are highly connected. Neural networks are classic examples of connectionism in that each "neuron" in the network may be assigned to a single processor. *See also* algorithm, artificial intelligence, neural network.

connectionless *adj.* In communications, of, pertaining to, or characteristic of a method of data transmission that does not require a direct connection between two nodes on one or more networks. Connectionless communication is achieved by passing, or routing, data packets, each of which contains a source and destination address, through the nodes until the destination is reached. *See also* node (definition 2), packet (definition 2). *Compare* connection-oriented.

connectionless session *n.* A communications session that does not require a connection to be established between hosts prior to an exchange of data.

connection-oriented *adj.* In communications, of, pertaining to, or characteristic of a method of data transmission that requires a direct connection between two nodes on one or more networks. *Compare* connectionless.

connection pooling *n.* A resource optimization feature of ODBC (Open Database Connectivity) 3 that results in

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coordinates specify such elements as points on a line, the corners of a square, or the location of a pixel on the screen. In other computer applications, coordinates specify cells on a spreadsheet, data points on a graph, locations in memory, and so on. *See also* Cartesian coordinates, polar coordinates.

coordinate dimensioning *n.* A form of spatial positioning in which a point is described, relative to a fixed reference, in terms of its distance and direction along predefined axes. *See also* Cartesian coordinates, three-dimensional model, two-dimensional model.

coordinated universal time format *n.* *See* Universal Time Coordinate.

coordinate pair *n.* A pair of values representing the x-coordinate and y-coordinate of a point that are stored in a two-dimensional array that can contain coordinates for many points.

COPPA *n.* Acronym for Children's Online Privacy Protection Act. A U.S. federal law enacted in April 2000 and designed to protect the online privacy of children under the age of 13. COPPA requires Web sites that collect personal information from children under 13 to receive permission from parents or guardians first, and to monitor and supervise children's experiences with interactive Web elements such as chat rooms and e-mail.

copper chip *n.* A microprocessor that uses copper (rather than the more common aluminum) to connect transistors in a computer chip. Copper chip technology, which was developed by IBM and introduced in 1997, can be expected to boost the speed of a microprocessor by as much as 33 percent.

coprocessor *n.* A processor, distinct from the main microprocessor, that performs additional functions or assists the main microprocessor. The most common type of coprocessor is the floating-point coprocessor, also called a numeric or math coprocessor, which is designed to perform numeric calculations faster and better than the general-purpose microprocessors used in personal computers. *See also* floating-point processor.

copy *vb.* To duplicate information and reproduce it in another part of a document, in a different file or memory location, or in a different medium. A copy operation can affect data ranging from a single character to large segments of text, a graphics image, or from one to many data

files. Text and graphics, for example, can be copied to another part of a document, to the computer's memory (by means of a temporary storage facility such as the Windows or Macintosh Clipboard), or to a different file. Similarly, files can be copied from one disk or directory to another, and data can be copied from the screen to a printer or to a data file. In most cases, a copy procedure leaves the original information in place. *Compare* cut and paste, move.

copy disk *n.* An MS-DOS command to duplicate the contents of a floppy disk on a second disk. *See also* floppy disk, MS-DOS.

copy holder *n.* An inclined clipboard or other such device designed to hold printed material so that it can be easily viewed by someone working at a computer keyboard.

copyleft *n.* *See* General Public License.

copy program *n.* **1.** A program designed to duplicate one or more files to another disk or directory. **2.** A program that disables or circumvents the copy-protection device on a computer program so that the software can be copied, often illegally, to another disk. *See also* copy protection.

copy protection *n.* A software lock placed on a computer program by its developer to prevent the product from being copied and distributed without approval or authorization.

copyright *n.* A method of protecting the rights of an originator of a creative work, such as a text, a piece of music, a painting, or a computer program, through law. In many countries the originator of a work has copyright in the work as soon as it is fixed in a tangible medium (such as a piece of paper or a disk file); that rule applies in the United States for works created after 1977. Registration of a copyright, or the use of a copyright symbol, is not needed to create the copyright but does strengthen the originator's legal powers. Unauthorized copying and distribution of copyrighted material can lead to severe penalties, whether done for profit or not. Copyrights affect the computer community in three ways: the copyright protection of software, the copyright status of material (such as song lyrics) distributed over a network such as the Internet, and the copyright status of original material distributed over a network (such as a newsgroup post). The latter two involve electronic media that are arguably not tangible, and legislation protecting the information disseminated through electronic media is still evolving. *See also* fair use, General Public License.

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for microcomputers based on Intel microprocessors. The first system, CP/M-80, was the most popular operating system for 8080- and Z80-based microcomputers. Digital Research also developed CP/M-86 for 8086/8088-based computers, CP/M-Z8000 for Zilog Z8000-based computers, and CP/M-68K for Motorola 68000-based computers. When the IBM PC and MS-DOS were introduced, common use of CP/M by end users dwindled. DRI continues to enhance the CP/M line, supporting multitasking with the Concurrent CP/M and MP/M products. *See also* MP/M.

CPM *n.* *See* critical path method.

CPRM *n.* Acronym for **C**ontent **P**rotection for **R**ecordable **M**edia. Technology developed to control the use of copyrighted digital music and video material by blocking the transfer of protected files to portable media such as zip disks and smart cards. CPM would be added to storage devices and provide data scrambling and identification codes to block the copying of copyrighted files.

cps *n.* *See* characters per second.

CPSR *n.* Acronym for **C**omputer **P**rofessionals for **S**ocial **R**esponsibility. A public advocacy organization of computer professionals. CPSR was originally formed out of concern over the use of computer technology for military purposes but has extended its interest to such issues as civil liberties and the effect of computers on workers.

CPU *n.* Acronym for **c**entral **p**rocessing **u**nit. The computational and control unit of a computer. The CPU is the device that interprets and executes instructions. Mainframes and early minicomputers contained circuit boards full of integrated circuits that implemented the CPU. Single-chip central processing units, called *microprocessors*, made possible personal computers and workstations. Examples of single-chip CPUs are the Motorola 68000, 68020, and 68030 chips and the Intel 8080, 8086, 80286, 80386, and i486 chips. The CPU—or microprocessor, in the case of a microcomputer—has the ability to fetch, decode, and execute instructions and to transfer information to and from other resources over the computer's main data-transfer path, the bus. By definition, the CPU is the chip that functions as the “brain” of a computer. In some instances, however, the term encompasses both the processor and the computer's memory or, even more broadly, the main computer console (as opposed to peripheral equipment). *See the illustration. See also* microprocessor.



CPU.

CPU-bound *adj.* *See* computation-bound.

CPU cache *n.* A section of fast memory linking the CPU (central processing unit) and main memory that temporarily stores data and instructions the CPU needs to execute upcoming commands and programs. Considerably faster than main memory, the CPU cache contains data that is transferred in blocks, thereby speeding execution. The system anticipates the data it will need through algorithms. *Also called:* cache memory, memory cache. *See also* cache, CPU, VCACHE.

CPU cycle *n.* **1.** The smallest unit of time recognized by the CPU (central processing unit)—typically a few hundred-millionths of a second. **2.** The time required for the CPU to perform the simplest instruction, such as fetching the contents of a register or performing a no-operation instruction (NOP). *Also called:* clock tick.

CPU fan *n.* An electric fan usually placed directly on a CPU (central processing unit) or on the CPU's heat sink to help dissipate heat from the chip by circulating air around it. *See also* CPU, heat sink.

CPU speed *n.* A relative measure of the data-processing capacity of a particular CPU (central processing unit), usually measured in megahertz. *See also* CPU.

CPU time *n.* In multiprocessing, the amount of time during which a particular process has active control of the CPU (central processing unit). *See also* CPU, multiprocessing.

CR *n.* *See* carriage return.

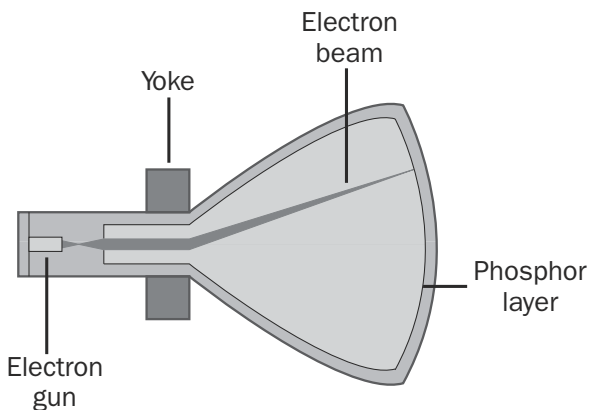
crack *vb.* **1.** To gain unauthorized access to a network by breaching its security. **2.** To decipher encrypted information.

cracker *n.* A person who overcomes the security measures of a computer system and gains unauthorized access. The goal of some crackers is to obtain information ille-

crosstab query *n.* A query that calculates a sum, an average, a count, or other type of total on records, and then groups the result by two types of information—one down the left side of the datasheet and the other across the top.

crosstalk *n.* Interference caused by a signal transferring from one circuit to another, as on a telephone line.

CRT *n.* Acronym for **cathode-ray tube**. The basis of the television screen and the standard microcomputer display screen. A CRT display is built around a vacuum tube containing one or more electron guns whose electron beams rapidly sweep horizontally across the inside of the front surface of the tube, which is coated with a material that glows when irradiated. Each electron beam moves from left to right, top to bottom, one horizontal scan line at a time. To keep the screen image from flickering, the electron beam refreshes the screen 30 times or more per second. The clarity of the image is determined by the number of pixels on the screen. See the illustration. *See also* pixel, raster, resolution (definition 1).



CRT. *Cutaway view of a CRT.*

CRT controller *n.* The part of a video adapter board that generates the video signal, including the horizontal and vertical synchronization signals. *See also* video adapter.

cruise *vb.* *See* surf.

crunch *vb.* To process information. *See also* number crunching.

cryoelectronic *adj.* Involving the use of superconducting electronics kept in a cryogenic environment at very low temperatures.

crypto *n.* *See* cryptography.

cryptoanalysis *n.* The decoding of electronically encrypted information for the purpose of understanding encryption techniques. *See also* cryptography, encryption.

CryptoAPI *n.* An application programming interface (API) that is provided as part of Microsoft Windows. CryptoAPI provides a set of functions that allows applications to encrypt or digitally sign data in a flexible manner while providing protection for the user's sensitive private key data. Actual cryptographic operations are performed by independent modules known as cryptographic service providers (CSPs). *See also* application programming interface (API), cryptographic service provider, private key.

cryptographic service provider *n.* An independent module that performs cryptographic operations, such as creating and destroying keys. A cryptographic service provider consists of, at a minimum, a DLL and a signature file. *Acronym:* CSP.

cryptography *n.* The use of codes to convert data so that only a specific recipient will be able to read it using a key. The persistent problem of cryptography is that the key must be transmitted to the intended recipient and may be intercepted. Public key cryptography is a recent significant advance. *Also called:* crypto. *See also* code¹(definition 2), encryption, PGP, private key, public key.

CSD *n.* *See* circuit-switched data.

C shell *n.* One of the command-line interfaces available under UNIX. The C shell is very usable but is not on every system. *Compare* Bourne shell, Korn shell.

CSLIP *n.* *See* Compressed SLIP.

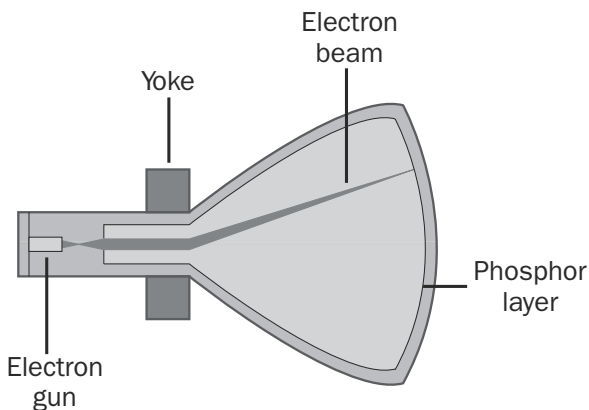
CSMA/CA *n.* Acronym for **Carrier Sense Multiple Access with Collision Avoidance**, a protocol for controlling network access similar to CSMA/CD, in that nodes (stations) listen to the network and transmit only when it is free. But in CSMA/CA, nodes avoid data collisions by signaling their intention with a brief Request to Send (RTS) signal and then waiting for acknowledgment before actually transmitting.

CSMA/CD *n.* Acronym for **Carrier Sense Multiple Access with Collision Detection**. A network protocol for handling situations in which two or more nodes (stations) transmit at the same time, thus causing a collision. With CSMA/CD, each node on the network monitors the line and transmits when it senses that the line is not busy. If a collision occurs because another node is using the same

crosstab query *n.* A query that calculates a sum, an average, a count, or other type of total on records, and then groups the result by two types of information—one down the left side of the datasheet and the other across the top.

crosstalk *n.* Interference caused by a signal transferring from one circuit to another, as on a telephone line.

CRT *n.* Acronym for **cathode-ray tube**. The basis of the television screen and the standard microcomputer display screen. A CRT display is built around a vacuum tube containing one or more electron guns whose electron beams rapidly sweep horizontally across the inside of the front surface of the tube, which is coated with a material that glows when irradiated. Each electron beam moves from left to right, top to bottom, one horizontal scan line at a time. To keep the screen image from flickering, the electron beam refreshes the screen 30 times or more per second. The clarity of the image is determined by the number of pixels on the screen. See the illustration. *See also* pixel, raster, resolution (definition 1).



CRT. *Cutaway view of a CRT.*

CRT controller *n.* The part of a video adapter board that generates the video signal, including the horizontal and vertical synchronization signals. *See also* video adapter.

cruise *vb.* *See* surf.

crunch *vb.* To process information. *See also* number crunching.

cryoelectronic *adj.* Involving the use of superconducting electronics kept in a cryogenic environment at very low temperatures.

crypto *n.* *See* cryptography.

cryptoanalysis *n.* The decoding of electronically encrypted information for the purpose of understanding encryption techniques. *See also* cryptography, encryption.

CryptoAPI *n.* An application programming interface (API) that is provided as part of Microsoft Windows. CryptoAPI provides a set of functions that allows applications to encrypt or digitally sign data in a flexible manner while providing protection for the user's sensitive private key data. Actual cryptographic operations are performed by independent modules known as cryptographic service providers (CSPs). *See also* application programming interface (API), cryptographic service provider, private key.

cryptographic service provider *n.* An independent module that performs cryptographic operations, such as creating and destroying keys. A cryptographic service provider consists of, at a minimum, a DLL and a signature file. *Acronym:* CSP.

cryptography *n.* The use of codes to convert data so that only a specific recipient will be able to read it using a key. The persistent problem of cryptography is that the key must be transmitted to the intended recipient and may be intercepted. Public key cryptography is a recent significant advance. *Also called:* crypto. *See also* code¹(definition 2), encryption, PGP, private key, public key.

CSD *n.* *See* circuit-switched data.

C shell *n.* One of the command-line interfaces available under UNIX. The C shell is very usable but is not on every system. *Compare* Bourne shell, Korn shell.

CSLIP *n.* *See* Compressed SLIP.

CSMA/CA *n.* Acronym for **Carrier Sense Multiple Access with Collision Avoidance**, a protocol for controlling network access similar to CSMA/CD, in that nodes (stations) listen to the network and transmit only when it is free. But in CSMA/CA, nodes avoid data collisions by signaling their intention with a brief Request to Send (RTS) signal and then waiting for acknowledgment before actually transmitting.

CSMA/CD *n.* Acronym for **Carrier Sense Multiple Access with Collision Detection**. A network protocol for handling situations in which two or more nodes (stations) transmit at the same time, thus causing a collision. With CSMA/CD, each node on the network monitors the line and transmits when it senses that the line is not busy. If a collision occurs because another node is using the same

C

opportunity to transmit, both nodes stop transmitting. To avoid another collision, both then wait for differing random amounts of time before attempting to transmit again. *Compare* token passing.

CSO *n.* Acronym for **Computing Services Office**. An Internet directory service that matches users' own names with e-mail addresses, generally at colleges and universities. The CSO service, which can be reached through Gopher, was originally developed at the Computing Services Office at the University of Illinois.

CSO name server *n.* A facility that provides e-mail directory information through the CSO system. *See also* CSO.

CSR *n.* *See* continuous speech recognition.

CSS *n.* **1.** *See* cascading style sheets. **2.** Acronym for **Content Scrambling System**. An encryption feature added to DVDs distributed with approval of the MPAA. CSS looks for a matching region code on the DVD and the playback device. If the codes do not match (such as for a DVD purchased in Japan and a DVD player purchased in the United States), CSS will not allow the DVD to play. CSS also will not allow a DVD to be played on playback equipment not approved by the MPAA. *See also* deCSS, region code.

CSS1 *n.* *See* cascading style sheets.

CSTN display *n.* *See* supertwist display.

CSU *n.* *See* DDS.

.csv *n.* The file extension for a comma-delimited text file.

CSV *n.* **1.** *See* circuit-switched voice. **2.** *See* alternate circuit-switched voice/circuit-switched data. **3.** Acronym for **comma separated values**. Filename extension assigned to text files containing tabular data of the sort stored in database fields. As the name indicates, individual data entries are separated by commas. *Compare* TSV.

CTERM *n.* *See* Communications Terminal Protocol.

CT Expo *n.* Acronym for **Computer Telephony Expo**. Annual exposition on data and communications issues involving the computer, telecommunications, and Internet industries. Held in Los Angeles, California, CT Expo features exhibits by hundreds of companies displaying their latest products and services, as well as conferences on a range of subjects affecting computer telephony.

CTI *n.* Acronym for **computer-telephony integration**. The practice of using a computer to control one or more telephone and communications functions.

CTIA *n.* *See* Cellular Telecommunications and Internet Association.

CTIA Wireless *n.* Annual conference of the wireless data, mobile Internet, and handheld computing industries. Sponsored by the Cellular Telecommunications and Internet Association, CTIA Wireless showcases products and technical developments in the field of wireless communications and data.

CTL *n.* Short for **control**. *See* control character (definition 2), Control key.

CTO *n.* Acronym for **Chief Technology Officer**. A corporate executive in charge of managing a company's information technology (IT) architecture and other technological assets. The CTO's responsibilities may include oversight of IT centers, networks and intranet, applications, databases, Web presence, and other technological resources.

CTRL or **Ctrl** *n.* Short for **control**. A designation used to label the Control key on computer keyboards. *See also* control character (definition 2), Control key.

Ctrl+Alt+Delete *n.* A three-key combination used with IBM and compatible computers to restart (reboot) the machine. Pressing Ctrl+Alt+Delete (Control+Alternate+Delete) causes a warm boot in MS-DOS—the computer restarts but does not go through all of the internal checks involved when power to the system is switched on (cold boot). In Windows 9x and Windows NT, Ctrl+Alt+Delete provides a dialog box from which the user may choose to shut down the computer or end any current tasks.

Ctrl+C *n.* **1.** In UNIX, the key combination used to break out of a running process. **2.** The keyboard shortcut recognized by many programs (as in Windows) as an instruction to copy the currently selected item.

Ctrl+S *n.* **1.** On systems in which a software handshake is used between terminals and a central computer, the key combination used to suspend output. Ctrl+Q will resume output after a Ctrl-S suspension. *See also* software handshake, XON/XOFF. **2.** A keyboard shortcut recognized by many programs as an instruction to save the current document or file.

CTS *n.* Acronym for **Clear To Send**. In serial communications, a signal sent, as from a modem to its computer, to indicate that transmission can proceed. CTS is a hardware signal sent over line 5 in RS-232-C connections. *Compare* RTS.

CUA *n.* *See* Common User Access.

into the lens of the projection system and thus create a bright, full-color display. Displays can be combined to create high-definition systems of 1920×1035 (1,987,200) pixels with 64 million colors. *Acronym:* DMD.

digital modem *n.* **1.** A communications device that acts as the intermediary between a digital device such as a computer or terminal and a digital communications channel, such as a high-speed network line, an ISDN circuit, or a cable TV system. Although a digital modem supports standard (analog) modem protocols, it is not a “typical” modem in the sense of being a device whose primary function is to modulate (convert digital to analog) before transmission and demodulate (convert analog to digital) after transmission. It uses advanced digital modulation techniques for changing data frames into a format suitable for transmission over a digital line. *See also* terminal adapter. *Compare* modem. **2.** A 56 Kbps modem. Such a modem is not purely digital but does eliminate the traditional digital-to-analog conversion for downstream transmissions—that is, transmissions moving from the Internet to the end user. A 56 Kbps modem is also digital in that it requires a digital connection, such as T1, between the telephone company and the user’s Internet Service Provider (ISP) in order to achieve its highest speed. *See also* 56-Kbps modem. **3.** A term used to distinguish all-digital communications devices, such as ISDN and cable “modems” from the more traditional analog-to-digital, phone-based modems.

Digital Network Architecture *n.* A multilayered architecture and set of protocol specifications for networks. Designed by the Digital Equipment Corporation, Digital Network Architecture is implemented in the set of products known by the name *DECnet*. *Acronym:* DNA. *See also* DECnet.

digital photography *n.* Photography by means of a digital camera. Digital photography differs from conventional photography in that a digital camera does not use a silver halide-based film to capture an image. Instead, a digital camera captures and stores each image electronically. *See also* digital camera.

digital picture frame *n.* Electronic device used in displaying digital photos and graphics while giving the outward appearance of a traditional picture frame. Digital picture frames allow users to rotate photos within the frame at specified intervals, display a series of photos as a slide show, or use an Internet connection to download photos, order prints, or send customized photo sets to others.

Digital Print Order Format *n.* *See* DPOF.

digital proof *n.* *See* direct digital color proof.

digital recording *n.* The storage of information in binary-encoded (digital) format. Digital recording converts information—text, graphics, sound, or pictures—to strings of 1s and 0s that can be physically represented on a storage medium. Digital recording media include computer disks and tapes, optical (or compact) discs, and ROM cartridges of the type used for some software and many computer games.

Digital Rights Management *n.* *See* DRM.

digital satellite system *n.* A high-powered satellite system with the capability to deliver high-quality transmissions of hundreds of channels directly to television receivers. A DSS broadcast begins as a digital signal sent from a service provider’s station to a satellite. From there, it is directed to a satellite dish (typically 18 inches) at the user’s premises. The dish next transmits the signal to a converter box, which changes it to an analog signal before sending it to the television set. *Acronym:* DSS.

Digital Services *n.* *See* DS.

digital signal *n.* A signal, such as one transmitted within or between computers, in which information is represented by discrete states—for example, high and low voltages—rather than by fluctuating levels in a continuous stream, as in an analog signal.

Digital Signal *n.* *See* DS.

digital signal processor *n.* An integrated circuit designed for high-speed data manipulation and used in audio, communications, image manipulation, and other data acquisition and data control applications. *Acronym:* DSP.

digital signature *n.* A security mechanism used on the Internet that relies on two keys, one public and one private, that are used to encrypt messages before transmission and to decrypt them on receipt.

Digital Signature Algorithm *n.* The U.S. government standard for digital signatures, as specified by the National Institute of Standards and Technology, in FIPS 186, Digital Signature Standard. DSA is based on signature encryption based on a public and a private key. *Acronym:* DSA. *See also* digital signature.

Digital Signature Standard *n.* A public key cryptographic standard issued in 1994 by the United States National Institute of Standards and Technology (NIST) to authenticate electronic documents. The DSS uses a Digital Signature Algorithm (DSA) to generate and verify digital

D

directly between an input/output channel and memory rather than taking the longer and more circuitous route of I/O channel to microprocessor to memory. *See also* random access. *Compare* direct memory access.

direct access storage device *n.* *See* DASD.

direct address *n.* *See* absolute address.

DirectAnimation *n.* *See* DirectX.

direct broadcast satellite *n.* A digital telecommunications service that delivers television programming via the Digital Satellite System (DSS). Direct broadcast satellite technology uses a geostationary orbit satellite (GEO) to receive digitized signals sent by ground-based uplink centers; the satellite then beams the signal across a wide swath on Earth. Subscribers within that swath use small (18-inch) satellite dishes to bring the signal into a set-top box decoder for playback. Although primarily used for television broadcasts, the technology is seen as having potential to also deliver high-quality, digital communications and multimedia content in the future. *Acronym:* DBS. *Also called:* digital broadcast satellite. *See also* digital satellite system, geostationary orbit satellite, webcasting.

direct cable connection *n.* A link between the I/O ports of two computers that uses a single cable rather than a modem or other active interface device. In most cases, a direct cable connection requires a null modem cable.

direct-connect modem *n.* A modem that uses standard telephone wire and connectors and that plugs directly into a telephone jack, eliminating the need for an intermediary telephone. *Compare* acoustic coupler.

direct-coupled transistor logic *n.* A circuit design that uses transistors and resistors only, with the transistors directly connected to each other. This design was used in the earliest commercial integrated circuits. The switching speed and power consumption of such circuits are about average. *Acronym:* DCTL.

direct current *n.* Electrical current whose direction of flow does not reverse. The current may stop or change amplitude, but it always flows in the same direction. *Acronym:* DC. *Compare* alternating current.

direct digital color proof *n.* A test sheet produced by a lower-cost output device, such as a color laser printer, to serve as an approximation of what the final image will look like when produced on professional-quality printing equipment. A direct digital color proof does not involve color separation, as in traditional proofs. Instead, a direct digital color proof is printed in all colors at one time on a

single page, resulting in somewhat lower quality compared with traditional separation methods but having the advantages of increased speed and reduced cost. *Acronym:* DDCP. *Also called:* digital proof. *See also* color separation (definition 1).

DirectDraw *n.* *See* DirectX.

Direct Graphics Interface Specification *n.* *See* DGIS.

DirectInput *n.* An API (application programming interface) developed by Microsoft for joysticks and similar pointing devices in Windows 9x. *See also* DirectX.

direction key *n.* *See* arrow key.

direct memory access *n.* Memory access that does not involve the microprocessor and is frequently used for data transfer directly between memory and an “intelligent” peripheral device, such as a disk drive. *Acronym:* DMA. *Compare* PIO.

DirectMusic *n.* *See* DirectX.

directory *n.* **1.** A catalog for filenames and other directories stored on a disk. A directory is a way of organizing and grouping the files so that the user is not overwhelmed by a long list of them. The uppermost directory is called the *root directory*; the directories within a directory are called *subdirectories*. Depending on how an operating system supports directories, filenames in a directory can be viewed and ordered in various ways—for example, alphabetically, by date, by size, or as icons in a graphical user interface. What the user views as a directory is supported in the operating system by tables of data, stored on the disk, that indicate characteristics and the location of each file. In the Macintosh and Windows 9x operating systems, directories are called *folders*. **2.** On a network, an index of names and pertinent information related to authorized users and network resources.

Directory Access Protocol *n.* The protocol that governs communications between X.500 clients and servers. *See also* CCITT X series.

Directory Client Agent *n.* *See* DUA.

Directory Information Base *n.* *See* DIB (definition 2).

Directory Mozilla *n.* *See* Open Directory Project.

directory path *n.* *See* pathname.

directory replication *n.* The copying of a master set of directories from a server (called an *export server*) to specified servers or workstations (called *import computers*) in the same or other domains. Replication simplifies the task of maintaining identical sets of directories and files on

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DirectX Transform *n.* See DirectX.

dirty *adj.* Of, pertaining to, or characteristic of a communications line that is hampered by excessive noise, degrading the quality of the signal. *See also* noise (definition 2).

dirty bit *n.* A bit used to mark modified data in a cache so that the modifications may be carried over to primary memory. *See also* bit, cache.

dirty power *n.* A power source that can cause damage to electronic components, due to noise, voltage spikes, or incorrect voltage levels.

dirty ROM *n.* Short for **dirty read-only memory**. In the earlier versions of the Macintosh (Mac II, IIx, SE/30, and IICx), a memory system that simulates a 32-bit system but is not a true (clean) 32-bit system. Among other flaws, a dirty ROM machine can access only 8 megabytes of memory under Mac OS System 7. System extensions such as MODE32 and the 32-bit enabler are available to allow a dirty ROM machine to function like a true, 32-bit clean machine.

disable *vb.* To suppress something or to prevent it from happening. Disabling is a method of controlling system functions by disallowing certain activities. For example, a program might temporarily disable nonessential interrupts (requests for service from system devices) to prevent interruptions during a critical point in processing. *Compare* enable.

disabled folders *n.* In the Mac OS, several folders in the System folder that contain system extensions, control panels, and other items that have been removed from the system by the extension manager. Items currently in disabled folders will not be installed upon system startup; they may, however, later be moved back to their regular folders automatically by the extension manager. *See also* extension manager, System folder.

disassembler *n.* A program that converts machine code to assembly language source code. Most debuggers have some kind of built-in disassembler that allows the programmer to view an executable program in terms of human-readable assembly language. *See also* decompiler. *Compare* assembler.

disassociate *vb.* In Windows 95 and Windows NT, to remove an association between a file and some application. *Compare* associate.

disaster dump *n.* A dump (transfer of memory contents to a printer or other output device) made when a program fails without hope of recovery.

disc *n.* A round, flat piece of nonmagnetic, shiny metal encased in a plastic coating, designed to be read from and written to by optical (laser) technology. It is now standard practice to use the spelling *disc* for optical discs and *disk* in all other computer contexts, such as floppy disk, hard disk, and RAM disk. *See also* compact disc.

disconnect *vb.* To break a communications link.

discrete *adj.* Separate; individual; identifiable as a unit. For example, bits are discrete elements of data processed by a computer.

discrete multitone *n.* In telecommunications, a technology that uses digital signal processors to split available bandwidth into a number of subchannels, allowing over 6 Mbps of data to be carried over one copper twisted-pair wire. *Acronym:* DMT.

discrete speech recognition *n.* Computer speech recognition format in which each word is recognized as a distinct individual unit, requiring a pause between each word spoken.

discretionary access control list *n.* The part of an object's security descriptor that grants or denies specific users and groups permission to access the object. Only the owner of an object can change permissions granted or denied in a DACL; thus, access to the object is at the owner's discretion. *Acronym:* DACL. *See also* distribution group.

discretionary hyphen *n.* *See* hyphen.

discussion group *n.* Any of a variety of online forums in which people communicate about subjects of common interest. Forums for discussion groups include electronic mailing lists, Internet newsgroups, and IRC channels.

dish *n.* *See* satellite dish.

disk *n.* **1.** A round, flat piece of flexible plastic coated with a magnetic material that can be electrically influenced to hold information recorded in digital (binary) form and encased in a protective plastic jacket to protect the disk from damage and contamination. *Also called:* floppy, floppy disk, microfloppy disk. *Compare* compact disc, disc. **2.** *See* hard drive.

disk access time *n.* *See* access time (definition 2).

disk buffer *n.* A small amount of memory set aside for the purpose of storing data read from, or soon to be written

to, a disk. Because disk devices are slow compared with the CPU, it is not efficient to access the disk for only one or two bytes of data. Instead, during a read, a large chunk of data is read and stored in the disk buffer. When the program wants information, it is copied from the buffer. Many requests for data can be satisfied by a single disk access. The same technique can be applied to disk writes. When the program has information to store, it writes it into the disk buffer area in memory. When the buffer has been filled, the entire contents of the buffer are written to the disk in a single operation.

disk cache *n.* A portion of a computer's random access memory (RAM) set aside for temporarily holding information read from disk. A disk cache does not hold entire files, as does a RAM disk (a portion of memory that acts as if it were a disk drive). Instead, a disk cache is used to hold information that either has recently been requested from disk or has previously been written to disk. If the required information remains in a disk cache, access time is considerably faster than if the program must wait for the disk drive mechanism to fetch the information from disk. *See also* cache. *Compare* disk buffer.

disk cartridge *n.* A removable disk enclosed in a protective case. A disk cartridge can be used by certain types of hard disk drives and related devices, such as the external data storage units known as Bernoulli boxes.

disk controller *n.* A special-purpose chip and associated circuitry that directs and controls reading from and writing to a computer's disk drive. A disk controller handles such tasks as positioning the read/write head, mediating between the drive and the microprocessor, and controlling the transfer of information to and from memory. Disk controllers are used with floppy disk drives and hard disks and can either be built into the system or be part of a card that plugs into an expansion slot.

disk copy *n.* The process of duplicating a source disk's data and the data's organizational structure onto a target disk. *See also* backup.

disk crash *n.* The failure of a disk drive. *See also* crash¹.

disk directory *n.* An index of the files on a disk, analogous to a card catalog. A disk directory includes information about the files, such as their names, sizes, dates of creation, and physical locations on the disk. *See also* directory.

disk drive *n.* An electromechanical device that reads from and writes to disks. The main components of a disk

drive include a spindle on which the disk is mounted, a drive motor that spins the disk when the drive is in operation, one or more read/write heads, a second motor that positions the read/write heads over the disk, and controller circuitry that synchronizes read/write activities and transfers information to and from the computer. Two types of disk drives are in common use: floppy disk drives and hard disk drives. Floppy disk drives are designed to accept removable disks in either 5.25-inch or 3.5-inch format; hard disk drives are faster, high-capacity storage units that are completely enclosed in a protective case.

disk driver *n.* A device driver that is added to a system to support a specific manufacturer's disk device. *See also* device driver.

disk duplexing *n.* *See* disk mirroring.

disk envelope *n.* The paper container that holds a 5.25-inch floppy disk and its attached jacket. The disk envelope protects exposed surfaces of the disk from dust and other foreign material that can scratch and otherwise damage the surface, resulting in the loss of recorded data. *See also* disk jacket.

diskette *n.* *See* floppy disk.

disk farm *n.* A number of disk drives in a single location used together to store or process vast quantities of information, such as scientific data, years' worth of corporate sales figures, large numbers of graphic images, or telephone company billing records. Current disk farms consist of magnetic or optical disks and can hold terabytes of information. In older usage, disk farms were sometimes known as "Laundromats" because they contained large drives referred to in jargon as "washing machines." *See also* server farm.

disk interface *n.* **1.** The circuitry that connects a disk drive to a computer system. **2.** A standard for connecting disk drives and computers. For example, the ST506 standard for connecting hard disks to computers is a disk interface standard.

disk jacket *n.* The protective plastic sheath that covers a floppy disk.

diskless workstation *n.* A station on a computer network that is not equipped with a disk drive and that uses files stored in a file server. *See also* file server.

disk memory *n.* *See* virtual memory.

disk mirroring *n.* A technique in which all or part of a hard disk is duplicated onto one or more other hard disks,

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each of which ideally is attached to its own controller. With disk mirroring, any change made to the original disk is simultaneously made to the other disks so that if the original disk becomes damaged or corrupted, the mirror disks will contain a current, undamaged collection of the data from the original disk. *Also called:* disk duplexing. *See also* fault tolerance.

disk operating system *n.* *See* DOS.

disk pack *n.* A collection of disks in a protective container. Used primarily with minicomputers and mainframe computers, a disk pack is a removable medium, generally a stack of 14-inch disks in a plastic housing.

disk partition *n.* A logical compartment on a physical disk drive. A single disk might have two or more logical disk partitions, each of which would be referenced with a different disk drive name. Multiple partitions are divided into a primary (boot) partition and one or more extended partitions.

disk server *n.* A node on a local area network that acts as a remote disk drive shared by network users. Unlike a file server, which performs the more sophisticated tasks of managing network requests for files, a disk server functions as a storage medium on which users can read and write files. A disk server can be divided into sections (volumes), each of which appears to be a separate disk. *Compare* file server.

disk striping *n.* The procedure of combining a set of same-size disk partitions that reside on separate disks (from 2 to 32 disks) into a single volume, forming a virtual stripe across the disks that the operating system recognizes as a single drive. Disk striping enables multiple I/O operations in the same volume to proceed concurrently, thus offering enhanced performance. *See also* disk striping with parity, input/output.

disk striping with parity *n.* The technique of maintaining parity information across a disk stripe so that if one disk partition fails, the data on that disk can be re-created using the information stored across the remaining partitions in the disk stripe. *See also* disk striping, fault tolerance, parity.

disk unit *n.* A disk drive or its housing.

dispatcher *n.* In some multitasking operating systems, the set of routines responsible for allocating CPU (central processing unit) time to various applications.

dispatch table *n.* A table of identifiers and addresses for a certain class of routines such as interrupt handlers (routines carried out in response to certain signals or conditions). *Also called:* interrupt vector table, jump table, vector table. *See also* interrupt handler.

disperse *vb.* To break up and place in more than one location—for example, to disperse results among several sets of data or to disperse items (such as fields in records) so that they appear in more than one place in the output. *Compare* distribute.

dispersion *n.* The degree to which, at any given time, data in a distributed (interconnected) system of computers is stored at different locations or on different devices.

display *n.* The visual output device of a computer, which is commonly a CRT-based video display. With portable and notebook computers, the display is usually an LCD-based or a gas plasma-based flat-panel display. *See also* flat-panel display, liquid crystal display, video adapter, video display.

display adapter *n.* *See* video adapter.

display attribute *n.* A quality assigned to a character or an image displayed on the screen. Display attributes include such features as color, intensity, and blinking. Users of applications can control display attributes when programs allow them to change color and other screen elements.

display background *n.* In computer graphics, the portion of an on-screen image that remains static while other elements change; for example, window borders on a screen, or a palette of shapes or patterns in a drawing program.

display board *n.* *See* video adapter.

display card *n.* *See* video adapter.

display cycle *n.* The complete set of events that must occur in order for a computer image to be displayed on the screen, including both the software creation of an image in a computer's video memory and the hardware operations required for accurate on-screen display. *See also* refresh cycle.

Display Data Channel *n.* *See* DDC.

display device *n.* *See* display.

display element *n.* *See* graphics primitive.

display entity *n.* *See* entity, graphics primitive.

display face *n.* A typeface suitable for headings and titles in documents, distinguished by its ability to stand out from

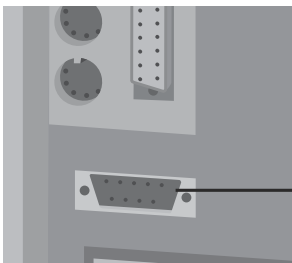
other text on the page. Sans serif faces such as Helvetica and Avant Garde often work well as display faces. *See also* sans serif. *Compare* body face.

display frame *n.* One image in an animation sequence. *See also* frame (definition 3).

display image *n.* The collection of elements displayed together at a single time on a computer screen.

display page *n.* One screenful of display information stored in a computer's video memory. Computers can have enough video memory to hold more than one display page at a time. In such instances, programmers, especially those concerned with creating animation sequences, can update the screen rapidly by creating or modifying one display page while another is being viewed by the user. *See also* animation.

display port *n.* An output port on a computer that provides a signal for a display device such as a video monitor. *See the illustration. Also called:* monitor port.



Display port.

Display PostScript *n.* An extended version of the PostScript language intended to provide a device-independent language for displaying images and text on bitmapped displays. *See also* PostScript.

Display Power Management Signaling *n.* *See* DPMS.

display screen *n.* The part of a video unit on which images are shown. *See also* CRT.

display terminal *n.* *See* terminal (definition 1).

distance learning *n.* Broadly, any educational or learning process or system in which the teacher/instructor is separated geographically or in time from his or her students, or in which students are separated from other students or educational resources. Contemporary distance learning is effected through the implementation of computer and electronics technology to connect teacher and student in either real or delayed time or on an as-needed basis. Content delivery may be achieved through a variety

of technologies, including satellites, computers, cable television, interactive video, electronic transmissions via telephone lines, the World Wide Web and other Internet technology, and others. Distance learning does not preclude traditional learning processes; frequently it is used in conjunction with in-person classroom or professional training procedures and practices.

Distance Vector Multicast Routing Protocol *n.* An Internet routing protocol that provides an efficient mechanism for connectionless datagram delivery to a group of hosts across an Internet network. It is a distributed protocol that dynamically generates IP multicast delivery trees using a technique called Reverse Path Multicasting (RPM). *Acronym:* DVMRP.

distance-vector routing algorithm *n.* *See* Bellman-Ford distance-vector routing algorithm.

distortion *n.* An undesirable change in the waveform of a signal. Distortion can occur during signal transmission, as when a radio broadcast becomes garbled, or when a signal passes through a circuit, as when a stereo system is turned up too loud. Distortion often results in loss of information. It is mainly a problem in analog signals; digital signals are not affected by moderate distortion.

distribute *vb.* To allocate among locations or facilities, as in a data-processing function that is performed by a collection of computers and other devices linked together by a network.

distributed bulletin board *n.* A collection of newsgroups distributed to all computers in a wide area network. *See also* newsgroup, Usenet.

Distributed COM *n.* *See* DCOM.

Distributed Component Object Model *n.* *See* DCOM.

distributed computing *n.* *See* distributed processing.

Distributed Computing Environment *n.* A set of standards from the Open Group (formerly the Open Software Foundation) for development of distributed applications that can operate on more than one platform. *Acronym:* DCE. *See also* distributed processing.

distributed database *n.* A database implemented on a network. The component partitions are distributed over various nodes (stations) of the network. Depending on the specific update and retrieval traffic, distributing the database can significantly enhance overall performance. *See also* partition (definition 2).

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distributed database management system *n.* A database management system capable of managing a distributed database. *Acronym:* DDBMS. *See also* distributed database.

distributed denial of service attack *n.* *See* DDoS.

distributed file system *n.* A file management system in which files may be located on multiple computers connected over a local or wide area network. *Acronym:* DFS.

distributed intelligence *n.* A system in which processing ability (intelligence) is distributed among multiple computers and other devices, each of which can work independently to some degree but can also communicate with the other devices to function as part of the larger system. *See also* distributed processing.

distributed network *n.* A network in which processing, storage, and other functions are handled by separate units (nodes) rather than by a single main computer.

distributed processing *n.* A form of information processing in which work is performed by separate computers linked through a communications network. Distributed processing is usually categorized as either plain distributed processing or true distributed processing. Plain distributed processing shares the workload among computers that can communicate with one another. True distributed processing has separate computers perform different tasks in such a way that their combined work can contribute to a larger goal. The latter type of processing requires a highly structured environment that allows hardware and software to communicate, share resources, and exchange information freely.

distributed services *n.* *See* BISDN.

distributed system *n.* A noncentralized network consisting of numerous computers that can communicate with one another and that appear to users as parts of a single, large, accessible “storehouse” of shared hardware, software, and data.

Distributed System Object Model *n.* IBM’s System Object Model (SOM) in a shared environment, where binary class libraries can be shared between applications on networked computers or between applications on a given system. The Distributed System Object Model complements existing object-oriented languages by allowing SOM class libraries to be shared among applications writ-

ten in different languages. *Acronym:* DSOM. *See also* SOM (definition 1).

distributed transaction processing *n.* Transaction processing that is shared by one or more computers communicating over a network. *Acronym:* DTP. *See also* distributed processing, transaction processing.

distributed workplace *n.* An environment other than the traditional office or factory, in which work is carried out on a regular basis. The flexibility afforded by the combination of communications and computing technologies enables many workers to conduct business anywhere the appropriate computer and data communications infrastructure has been set up. *See also* SOHO, telecommute.

distribution group *n.* A group that is used solely for e-mail distribution and that is not security-enabled. Distribution groups cannot be listed in discretionary access control lists (DACLS) used to define permissions on resources and objects. Distribution groups can be used only with e-mail applications (such as Microsoft Exchange) to send e-mail messages to collections of users. If you do not need a group for security purposes, create a distribution group instead of a security group. *See also* discretionary access control list, security group.

distribution list *n.* A list of recipients on an e-mail mailing list. This can be in the form of either a mailing list program, such as LISTSERV, or an alias in an e-mail program for all recipients of an e-mail message. *See also* alias (definition 2), LISTSERV, mailing list.

distribution services *n.* *See* BISDN.

distributive sort *n.* An ordering process in which a list is separated into parts and then reassembled in a particular order. *See also* sort algorithm. *Compare* bubble sort, insertion sort, merge sort, quicksort.

distro¹ *n.* **1.** A distribution of software (usually a version of Linux), digital music, or an online magazine or e-zine. *See also* e-zine, Linux. **2.** A company or individual that sells items, typically software, music CDs, or books, via the Web.

distro² *vb.* To distribute or sell software releases, digital music, or text items via the Web.

dithering *n.* A technique used in computer graphics to create the illusion of varying shades of gray on a monochrome display or printer, or additional colors on a color display or printer. Dithering relies on treating areas of an

DRDW *n.* Acronym for **d**irect **r**ead **d**uring **w**rite. A technique used with optical discs to verify the accuracy of information at the time it is being recorded on the disc. *Compare* DRAW.

Dreamcast *n.* A console game system designed by the Sega corporation. It features a Hitachi 128-bit graphics engine with an on-board SH-4 RISC processor (operating frequency of 200 MHz 360 MIPS/1.4 GFLOPS) and a customized OS using Windows CE as its base (supporting DirectX). Game developers for the Dreamcast platform use an environment supported by Microsoft Visual Studio and refined Visual C++. *See also* computer game, console game, DirectX, gigaflops, MIPS, OS, RISC, Visual C++. *Compare* GameCube, PlayStation, Xbox.

dribbleware *n.* Updates, patches, and new drivers for a software product that are released one at a time, as they become available, rather than being issued together in a new version of the product. A company using the dribbleware technique might distribute new and replacement files on diskette or CD-ROM, or make them available for download through the Internet or a private network. *See also* driver, patch¹.

drift *n.* The movement of charge carriers in a semiconductor caused by an applied voltage. The term is also used to refer to any slow, unwanted change in a parameter; for example, the value of a resistor might change, or drift, slightly as the resistor warms or cools.

drill down *vb.* To start at a top-level menu, directory, or Web page and pass through several intermediate menus, directories, or linked pages, until the file, page, menu command, or other item being sought is reached. Drilling down is common practice in searching for files or information on the Internet, where high-level Gopher menus and World Wide Web pages are frequently very general and become more specific at each lower level. *See also* Gopher, menu, Web page.

drive *n.* *See* disk drive.

drive bay *n.* A hollow, rectangular area in a computer chassis designed to hold a disk drive. A drive bay always has side walls, usually made of metal, that generally contain holes to facilitate installation of a disk drive. Some drive bays, such as those intended to hold hard disks, are not visible to the user. Most drives are located on the front of the chassis so that the user can interact with the drive.

drive letter *n.* The naming convention for disk drives on IBM and compatible computers. Drives are named by letter, beginning with A, followed by a colon.

drive mapping *n.* The assignment of a letter or name to a disk drive so that the operating system or network server can identify and locate it. For example, in PCs, the primary drive mappings are A: and B: for floppy disk drives and C: for the hard disk. *See also* A:, disk drive, hard disk.

drive number *n.* The naming convention for Macintosh disk drives. For example, a two-drive system calls its drives 0 and 1.

driver *n.* A hardware device or a program that controls or regulates another device. A line driver, for example, boosts signals transmitted over a communications line. A software driver is a device-specific control program that enables a computer to work with a particular device, such as a printer or a disk drive. Because the driver handles device-specific features, the operating system is freed from the burden of having to understand—and support—the needs of individual hardware devices. *See also* device driver.

Driver Development Kit *n.* *See* DDK.

DRM *n.* Acronym for **D**igital **R**ights **M**anagement. A group of technologies developed to protect intellectual property from online piracy by controlling who can view protected content and in what form. A DRM package may allow the purchaser to view protected content, but prevent printing or forwarding. Content may also be set to expire after a set amount of time or if distributed to multiple users. DRM technology is meant to protect multiple forms of digital and analog content, and includes encryption, digital watermarking, and content tracking software.

DRO *n.* Acronym for **d**estructive **r**ead **o**ut. *See* destructive read.

drop cable *n.* A cable, also known as a transceiver cable, that is used to connect a network interface card (NIC) to a Thick Ethernet network.

drop cap *n.* A large capital letter at the beginning of a text block that occupies the vertical depth of two or more lines of regular text. *See* the illustration.

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Drop cap.

drop-dead halt *n.* *See* dead halt.

D

ratings for computer games and other interactive products such as Web sites, online games, and interactive chat.

e-tail *n.* See e-commerce.

e-text *n.* Short for **electronic text**. A book or other text-based work that is available on line in an electronic media format. An e-text can be read online or downloaded to a user's computer for offline reading. *See also* e-zine.

Ethernet *n.* **1.** The IEEE 802.3 standard for contention networks. Ethernet uses a bus or star topology and relies on the form of access known as Carrier Sense Multiple Access with Collision Detection (CSMA/CD) to regulate communication line traffic. Network nodes are linked by coaxial cable, by fiberoptic cable, or by twisted-pair wiring. Data is transmitted in variable-length frames containing delivery and control information and up to 1500 bytes of data. The Ethernet standard provides for baseband transmission at 10 megabits (10 million bits) per second and is available in various forms, including those known as Thin Ethernet, Thick Ethernet, 10Base2, 10Base5, 10Base-F, and 10Base-T. The IEEE standard dubbed 802.3z, or Gigabit Ethernet, operates at 10 times 100 Mbps speed. *See also* ALOHAnet, baseband, bus network, coaxial cable, contention, CSMA/CD, Gigabit Ethernet, IEEE 802 standards, twisted-pair cable. **2.** A widely used local area network system developed by Xerox in 1976, from which the IEEE 802.3 standard was developed.

Ethernet/802.3 *n.* The IEEE standard for 10- or 100-Mbps transmissions over an Ethernet network. Ethernet/802.3 defines both hardware and data packet construction specifications. *See also* Ethernet.

E-time *n.* See execution time.

etiquette *n.* See netiquette.

ETX *n.* See end-of-text.

Eudora *n.* An e-mail client program originally developed as freeware for Macintosh computers by Steve Dorner at the University of Illinois, now maintained in both freeware and commercial versions for both Macintosh and Windows by Qualcomm, Inc.

EULA *n.* See End-User License Agreement.

Euphoria *n.* Acronym for **End User Programming with Hierarchical Objects for Robust Interpreted Applications**. An interpreted programming language intended for general application development and game programming on MS-DOS, Windows, and Linux platforms.

European Computer Manufacturers Association

n. See ECMA.

European Laboratory for Particle Physics *n.* See CERN.

EUV lithography *n.* Acronym for **Extreme UltraViolet lithography**. Manufacturing process allowing smaller circuits to be etched onto chips than is possible with traditional lithographic techniques. With this process, it is possible to economically produce chips that are much faster than those that are created using traditional processes. In EUV lithography, the image of a map of circuits to appear on a chip is bounced off a series of mirrors that condense the image. The condensed image is projected onto wafers containing layers of metal, silicon, and photo-sensitive material. Because EUV light has a short wavelength, extremely intricate circuit patterns can be created on the wafers.

evaluation *n.* The determination, by a program, of the value of an expression or the action that a program statement specifies. Evaluation can take place at compile time or at run time.

even parity *n.* See parity.

event *n.* An action or occurrence, often generated by the user, to which a program might respond—for example, key presses, button clicks, or mouse movements. *See also* event-driven programming.

event-driven *adj.* Of, pertaining to, or being software that accomplishes its purpose by responding to externally caused events, such as the user pressing a key or clicking a button on a mouse. For example, an event-driven data entry form will allow the user to click on and edit any field at any time rather than forcing the user to step through a fixed sequence of prompts.

event-driven processing *n.* A program feature belonging to more advanced operating-system architectures such as the Apple Macintosh operating system, Windows, and UNIX. In times past, programs were required to interrogate, and effectively anticipate, every device that was expected to interact with the program, such as the keyboard, mouse, printer, disk drive, and serial port. Often, unless sophisticated programming techniques were used, one of two events happening at the same instant would be lost. Event processing solves this problem through the creation and maintenance of an event queue. Most common events that occur are appended to the event queue for the program to process in turn; however, certain types of events can preempt others if they have a higher priority.

extensible language *n.* A computer language that allows the user to extend or modify the syntax and semantics of the language. In the strict sense, the term relates to only a few of the languages actually used that allow the programmer to change the language itself, such as Forth. *See also* computer language, semantics (definition 1), syntax.

Extensible Markup Language or **eXtensible Markup Language** *n.* *See* XML.

extensible style language *n.* *See* XSL.

eXtensible Stylesheet Language *n.* *See* XSL.

eXtensible Stylesheet Language Formatting Objects *n.* *See* XSL-FO.

Extensible Stylesheets Language-Transformations *n.* *See* XSLT.

extension *n.* **1.** A set of characters added to a filename that serves to extend or clarify its meaning or to identify a file as a member of a category. An extension may be assigned by the user or by a program, as, for example, .com or .exe for executable programs that MS-DOS can load and run. **2.** A supplemental set of codes used to include additional characters in a particular character set. **3.** A program or program module that adds functionality to or extends the effectiveness of a program. **4.** On the Macintosh, a program that alters or augments the functionality of the operating system. There are two types: system extensions, such as QuickTime, and Chooser extensions, such as printer drivers. When a Macintosh is turned on, the extensions in the Extensions folder within the System folder are loaded into memory. *See also* Chooser extension, QuickTime, System folder.

Extension Manager *n.* A Macintosh utility developed by Apple that allows the user to determine which extensions are loaded when the computer is turned on. *See also* extension (definition 4).

extent *n.* On a disk or other direct-access storage device, a continuous block of storage space reserved by the operating system for a particular file or program.

exterior gateway protocol *n.* A protocol used by routers (gateways) on separate, independent networks for distributing routing information between and among themselves—for example, between hosts on the Internet. *Acronym:* EGP. *Also called:* external gateway protocol. *Compare* interior gateway protocol.

external command *n.* A program included in an operating system such as MS-DOS that is loaded into memory

and executed only when its name is entered at the system prompt. Although an external command is a program in its own right, it is called a command because it is included with the operating system. *See also* XCMD. *Compare* internal command.

external function *n.* *See* XFCN.

External Gateway Protocol *n.* A protocol for distributing information regarding availability to the routers and gateways that interconnect networks. *Acronym:* EGP. *See also* gateway, router.

external gateway protocol *n.* *See* exterior gateway protocol.

external hard disk *n.* A free-standing hard disk with its own case and power supply, connected to the computer with a data cable and used mainly as a portable unit. *See also* hard disk.

external interrupt *n.* A hardware interrupt generated by hardware elements external to the microprocessor. *See also* hardware interrupt, internal interrupt, interrupt.

external modem *n.* A stand-alone modem that is connected via cable to a computer's serial port. *See also* internal modem.

external reference *n.* A reference in a program or routine to some identifier, such as code or data, that is not declared within that program or routine. The term usually refers to an identifier declared in code that is separately compiled. *See also* compile.

external storage *n.* A storage medium for data, such as a disk or tape unit, that is external to a computer's memory.

external viewer *n.* A separate application used to view documents that are of a type that cannot be handled by the current application. *See also* helper program.

extract *vb.* **1.** To remove or duplicate items from a larger group in a systematic manner. **2.** In programming, to derive one set of characters from another by using a mask (pattern) that determines which characters to remove.

extra-high-density floppy disk *n.* A 3.5-inch floppy disk capable of holding 4 MB of data and requiring a special disk drive that has two heads rather than one. *See also* floppy disk.

extranet *n.* An extension of a corporate intranet using World Wide Web technology to facilitate communication with the corporation's suppliers and customers. An extranet allows customers and suppliers to gain limited access

E

fat client *n.* In a client/server architecture, a client machine that performs most or all of the processing, with little or none performed by the server. The client handles presentation and functions, and the server manages data and access to it. *See also* client (definition 3), client/server architecture, server (definition 2), thin server. *Compare* fat server, thin client.

FAT file system *n.* The system used by MS-DOS to organize and manage files. The FAT (file allocation table) is a data structure that MS-DOS creates on the disk when the disk is formatted. When MS-DOS stores a file on a formatted disk, the operating system places information about the stored file in the FAT so that MS-DOS can retrieve the file later when requested. The FAT is the only file system MS-DOS can use; OS/2, Windows NT, and Windows 9x operating systems can use the FAT file system in addition to their own file systems (HPFS, NTFS, and VFAT, respectively). *See also* file allocation table, HPFS, NTFS, OS/2, VFAT, Windows.

father *n.* *See* generation (definition 1).

father file *n.* A file that is the last previously valid set of a changing set of data. The father file is immediately preceded by a grandfather file and immediately succeeded by its son. The pairs *father* and *son*, *parent* and *child* (or *descendant*), and *independent* and *dependent* are synonymous. *See also* generation (definition 1).

fat server *n.* In a client/server architecture, a server machine that performs most of the processing, with little or none performed by the client. Applications logic and data reside on the server, and presentation services are handled by the client. *See also* client (definition 3), client/server architecture, server (definition 2), thin client. *Compare* fat client, thin server.

fatware *n.* Software that monopolizes hard disk space and power due to an overabundance of features or inefficient design. *Also called:* bloatware.

fault *n.* **1.** A physical defect, such as a loose connection, that prevents a system or device from operating as it should. **2.** A programming error that can cause the software to fail. **3.** As page fault, an attempt to access a page of virtual memory that is not mapped to a physical address. *See also* page fault.

fault resilience *n.* *See* high availability.

fault tolerance *n.* The ability of a computer or an operating system to respond to a catastrophic event or fault, such as a power outage or a hardware failure, in a way that ensures that no data is lost and any work in progress is not

corrupted. This can be accomplished with a battery-backed power supply, backup hardware, provisions in the operating system, or any combination of these. In a fault-tolerant network, the system has the ability either to continue the system's operation without loss of data or to shut the system down and restart it, recovering all processing that was in progress when the fault occurred.

favorite *n.* In Microsoft Internet Explorer, a user-defined shortcut to a page on the World Wide Web, analogous to a bookmark in Netscape Navigator. *See also* Favorites folder, hotlist. *Compare* bookmark (definition 2).

Favorites folder *n.* In Microsoft Internet Explorer, a collection of shortcuts to Web sites that a user has selected for future reference. Other Web browsers refer to this collection by other names, such as bookmarks or hotlists. *See also* bookmark file (definition 1), Internet Explorer, URL. *Compare* bookmark (definition 2), hotlist.

fax *n.* Short for **facsimile**. The transmission of text or graphics over telephone lines in digitized form. Conventional fax machines scan an original document, transmit an image of the document as a bit map, and reproduce the received image on a printer. Resolution and encoding are standardized in the CCITT Groups 1–4 recommendations. Fax images can also be sent and received by microcomputers equipped with fax hardware and software. *See also* CCITT Groups 1–4.

fax machine *n.* Short for **facsimile machine**. A device that scans pages, converts the images of those pages to a digital format consistent with the international facsimile standard, and transmits the image through a telephone line. A fax machine also receives such images and prints them on paper. *See also* scan (definition 2).

fax modem *n.* A modem that sends (and possibly receives) data encoded in a fax format (typically CCITT fax format), which a fax machine or another modem decodes and converts to an image. The image must already have been encoded on the host computer. Text and graphic documents can be converted into fax format by special software usually provided with the modem; paper documents must first be scanned in. Fax modems may be internal or external and may combine fax and conventional modem capabilities. *See also* fax, modem.

fax on demand *n.* An automated system that makes information available for request by telephone. When a request is made, the system faxes the information to the telephone number given in the request. *Acronym:* FOD.

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*. **2.** A space in an on-screen form where the user can enter a specific item of information.

field-effect transistor *n.* See FET.

field expansion *n.* See date expansion.

Field Programmable Gate Array *n.* See FPGA.

field-programmable logic array *n.* 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. Programming can be performed only once, typically by passing high current through fusible links on the chip. *Acronym:* FPLA. *Also called:* PLA, programmable logic array.

field separator *n.* Any character that separates one field of data from another. See also delimiter, field (definition 1).

FIFO *n.* See first in, first out.

fifth-generation computer *n.* See computer.

fifth normal form *n.* See normal form (definition 1).

file *n.* 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 is 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 *n.* A table or list maintained by some operating systems to manage 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 contiguous strings of text or numbers. A single file can thus be scattered in pieces over many separate storage areas. A file allocation table maps 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 MS-DOS, the file allocation table is commonly known as the FAT. See also FAT file system.

file attribute *n.* A restrictive label attached to a file that describes and regulates its use—for example, hidden, sys-

tem, read-only, archive, and so forth. In MS-DOS, this information is stored as part of the file’s directory entry.

file backup *n.* See backup.

file compression *n.* The process of reducing the size of a file for transmission or storage. See also data compression.

file control block *n.* A small block of memory temporarily assigned by a computer’s operating system to hold information about an opened file. A file control block typically contains such information as the file’s identification, its location on a disk, and a pointer that marks the user’s current (or last) position in the file. *Acronym:* FCB.

file conversion *n.* The process of transforming the data in a file from one format to another without altering the data—for example, converting a file from a word processor’s format to its ASCII equivalent. In some cases, information about the data, such as formatting, may be lost. Another, more detailed, type of file conversion involves changing character coding from one standard to another, as in converting EBCDIC characters (which are used primarily with mainframe computers) to ASCII characters. See also ASCII, EBCDIC.

file extension *n.* See extension (definition 1).

file extent *n.* See extent.

file format *n.* 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, printers, and other devices. Examples include RTF (Rich Text Format), DCA (Document Content Architecture), PICT, DIF (Data Interchange Format), DXF (Data Exchange File), TIFF (Tagged Image File Format), and EPSF (Encapsulated PostScript Format).

file fragmentation *n.* **1.** The breaking apart of files as they are stored by the operating system into small, separate segments on disk. 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 to reduce fragmentation. **2.** In a database, a situation in which records are not stored in their optimal access sequence because of 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 *n.* See block gap.

file handle *n.* In MS-DOS, OS/2, and Windows, a token (number) that the system uses to identify or refer to an open file or, sometimes, to a device.

file-handling routine *n.* 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 *n.* See header (definition 2).

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

file maintenance *n.* Broadly, the process of changing 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 are all forms of file maintenance.

file management system *n.* The organizational structure that an operating system or program uses to order and track files. For example, a hierarchical file system uses directories in a so-called tree structure. All operating systems have built-in file management systems. Commercially available products implement additional features that provide more sophisticated means of navigating, finding, and organizing files. *See also* file system, hierarchical file system.

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

file name *n.* The set of letters, numbers, and allowable symbols assigned to a file to distinguish it from all other files in a particular directory on a disk. A file name is the label under which a computer user saves and requests a block of information. Both programs and data have file names and often extensions that further identify the type or purpose of the file. Naming conventions, such as maxi-

mum length and allowable characters of a file name, vary from one operating system to another. *See also* directory, path (definition 5).

file name extension *n.* See extension (definition 1).

filename globbing *n.* A Linux command-line feature, available on most FTP servers, which allows a user to refer to sets of files without individually listing each file name. Filename globbing can be used to select or delete all files in a working directory with a single command. At the discretion of the user, globbing can match all files, or only those with filenames containing a specific character or range of characters. *See also* wildcard character.

file property *n.* A detail about a file that helps identify it, such as a descriptive title, the author name, the subject, or a keyword that identifies topics or other important information in the file.

file protection *n.* 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 *n.* 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 utility programs that attempt to rebuild on-disk information about the storage locations of 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. 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 retrieval *n.* The act of accessing a data file and transferring it from a storage location to the machine where it is to be used.

file server *n.* 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 net-

systems offer or contain utility programs that resequence records to improve efficiency of access and to aggregate free space occupied by deleted records.

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file property *n.* A detail about a file that helps identify it, such as a descriptive title, the author name, the subject, or a keyword that identifies topics or other important information in the file.

file protection *n.* 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 *n.* 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 utility programs that attempt to rebuild on-disk information about the storage locations of 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. 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 retrieval *n.* The act of accessing a data file and transferring it from a storage location to the machine where it is to be used.

file server *n.* 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 net-

work 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 Server for Macintosh *n.* An AppleTalk network integration service that allows Macintosh clients and personal computers clients to share files. *Also called:* MacFile. *See also* Print Server for Macintosh, Services for Macintosh.

file sharing *n.* The use of computer files on networks, wherein files are stored on a central computer or a 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 *n.* 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 actual 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 is larger than the logical size of the file.

filespec *n.* *See* file specification (definition 1).

file specification *n.* **1.** The path to a file, from a disk drive through a chain of directory files to the file name that serves to locate a particular file. Abbreviated filespec. **2.** A file name containing wildcard characters that indicate which files among a group of similarly named files are requested. **3.** A document that describes the organization of data within a file.

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

that translates requests for file operations from an application program into low-level, sector-oriented tasks that can be understood by the drivers controlling the disk drives. *See also* driver.

file transfer *n.* The process of moving or transmitting a file from one location to another, as between two programs or over a network.

File Transfer Protocol *n.* *See* FTP¹ (definition 1).

file type *n.* A designation of the operational or structural characteristics of a file. A file's type is often identified in the file name, usually in the file name extension. *See also* file format.

fill¹ *n.* In computer graphics, the colored or patterned “paint” inside an enclosed figure, such as a circle. The portion of the shape that can be colored or patterned is the fill area. Drawing programs commonly offer tools for creating filled or nonfilled shapes; the user can specify color or pattern.

fill² *vb.* To add color or a pattern to the enclosed portion of a circle or other shape.

fill handle *n.* The small black square in the lower-right corner of a cell selection. When you point to the fill handle, the pointer changes to a black cross.

film at 11 *n.* A phrase sometimes seen in newsgroups. An allusion to a brief newsbreak on TV that refers to a top news story that will be covered in full on the 11 o'clock news, it is used sarcastically to ridicule a previous article's lack of timeliness or newsworthiness. *See also* newsgroup.

film recorder *n.* A device for capturing on 35-mm film the images displayed on a computer screen.

film ribbon *n.* *See* carbon ribbon.

filter *n.* **1.** A program or set of features within a program that reads its standard or designated input, transforms the input in some desired way, and then writes the output to its standard or designated output destination. A database filter, for example, might flag information of a certain age. **2.** In communications and electronics, hardware or software that selectively passes certain elements of a signal and eliminates or minimizes others. A filter on a communications network, for example, must be designed to transmit a certain frequency but attenuate (dampen) frequencies above it (a lowpass filter), those below it (a highpass filter), or those above and below it (a bandpass filter). **3.** A pattern or mask through which data is passed to weed out specified items. For instance, a filter used in e-mail or in retrieving newsgroup messages can allow users to filter

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out messages from other users. *See also* e-mail filter, mask. **4.** In computer graphics, a special effect or production effect that is applied to bitmapped images; for example, shifting pixels within an image, making elements of the image transparent, or distorting the image. Some filters are built into a graphics program, such as a paint program or an image editor. Others are separate software packages that plug into the graphics program. *See also* bitmapped graphics, image editor, paint program.

filtering program *n.* A program that filters information and presents only results that match the qualifications defined in the program.

FilterKeys *n.* A Windows 9x accessibility control panel feature that enables users with physical disabilities to use the keyboard. With FilterKeys, the system ignores brief and repeated keystrokes that result from slow or inaccurate finger movements. *See also* accessibility. *Compare* MouseKeys, ShowSounds, SoundSentry, StickyKeys, ToggleKeys.

Final-Form-Text DCA *n.* A standard in Document Content Architecture (DCA) for storing documents in ready-to-print form for interchange between dissimilar programs. A related standard is Revisable-Form-Text DCA (RFTDCA). *Acronym:* FFTDCA. *See also* DCA (definition 1). *Compare* Revisable-Form-Text DCA.

finally *n.* A keyword used in the Java programming language that executes a block of statements regardless of whether a Java exception, or run-time error, occurred in a previous block defined by the “try” keyword. *See also* block, exception, keyword, try.

find *vb.* *See* search².

Finder *n.* The standard interface to the Macintosh operating system. The Finder allows the user to view the contents of directories (folders); to move, copy, and delete files; and to launch applications. Items in the system are often represented as icons, and a mouse or similar pointing device is used to manipulate these items. The Finder was the first commercially successful graphical user interface, and it helped launch a wave of interest in icon-based systems. *See also* MultiFinder.

finger¹ *n.* An Internet utility, originally limited to UNIX but now available on many other platforms, that enables a user to obtain information on other users who may be at other sites (if those sites permit access by finger). Given an e-mail address, finger returns the user’s full name, an indication of whether or not the user is currently logged

on, and any other information the user has chosen to supply as a profile. Given a first or last name, finger returns the logon names of users whose first or last names match.

finger² *vb.* To obtain information on a user by means of the finger program.

fingerprint¹ *vb.* To scan a computer system to discover what operating system (OS) the computer is running. By detecting a computer’s OS through fingerprinting, a hacker is better able to specify attacks on system vulnerabilities and therefore better able to plan an attack on that system. A hacker may use several different fingerprinting schemes separately and in tandem to pinpoint the OS of a target computer.

fingerprint² *n.* Information embedded or attached to a file or image to uniquely identify it. *Compare* digital watermark.

fingerprint reader *n.* A scanner that reads human fingerprints for comparison to a database of stored fingerprint images.

fingerprint recognition *n.* A technology used to control access to a computer, network, or other device or to a secure area through a user’s fingerprints. The patterns of an individual’s fingers are scanned by a fingerprint reader or similar device and matched with stored images of fingerprints before access is granted. *See also* biometric.

FIPS *n.* *See* Federal Information Processing Standards.

FIPS 140-1 *n.* Acronym for **Federal Information Processing Standard 140-1**. A U.S. Government standard, issued by the National Institute of Standards and Technology (NIST), entitled Security Requirements for Cryptographic Modules. FIPS 140-1 defines four levels of security requirements related to cryptographic hardware and software modules within computer and telecommunications systems used for sensitive but unclassified data. The four security levels range from basic module design through increasingly stringent levels of physical security. The standard covers such security-related features as hardware and software security, cryptographic algorithms, and management of encryption keys. FIPS 140-1 products can be validated for federal use in both the United States and Canada after independent testing under the Cryptographic Module Validation (CMV) Program, developed and jointly adopted by NIST and the Canadian Communication Security Establishment. *See also* cryptography.

firewall *n.* A security system intended to protect an organization’s network against external threats, such as hackers, coming from another network, such as the Internet.

Usually a combination of hardware and software, a firewall prevents computers in the organization's network from communicating directly with computers external to the network and vice versa. Instead, all communication is routed through a proxy server outside of the organization's network, and the proxy server decides whether it is safe to let a particular message or file pass through to the organization's network. *See also* proxy server.

firewall sandwich *n.* The use of load-balancing appliances on both sides of Internetworked firewalls to distribute both inbound and outbound traffic among the firewalls. The firewall sandwich architecture helps to prevent firewalls from degrading network performance and creating a single point of network failure. *See also* firewall, load balancing.

FireWire *n.* A high-speed serial bus from Apple that implements the IEEE 1394 standard. *See also* IEEE 1394.

firmware *n.* Software routines stored in read-only memory (ROM). Unlike random access memory (RAM), read-only memory stays intact even in the absence of electrical power. Startup routines and low-level input/output instructions are stored in firmware. It falls between software and hardware in terms of ease of modification. *See also* RAM, ROM.

FIR port *n.* Short for **fast infrared port**. A wireless I/O port, most common on a portable computer, that exchanges data with an external device using infrared light. *See also* infrared, input/output port.

FIRST *n.* Acronym for **Forum of Incident Response and Security Teams**. An organization within the Internet Society (ISOC) that coordinates with CERT in order to encourage information sharing and a unified response to security threats. *See also* CERT, Internet Society.

first-generation computer *n.* *See* computer.

first in, first out *n.* A method of processing a queue, in which items are removed in the same order in which they were added—the first in is the first out. Such an order is typical of a list of documents waiting to be printed. *Acronym:* FIFO. *See also* queue. *Compare* last in, first out.

first normal *n.* *See* normal form (definition 1).

fishbowl *n.* A secure area within a computer system in which intruders can be contained and monitored. A fishbowl is typically set up by a security administrator to impersonate important applications or information so that

the system administrator can learn more about hackers who have broken into the network without the hacker learning more about or damaging the system. *See also* honeypot.

fitting *n.* The calculation of a curve or other line that most closely approximates a set of data points or measurements. *See also* regression analysis.

five-nines availability *n.* The availability of a system 99.999 percent of the time. *See also* high availability.

FIX *n.* Acronym for **Federal Internet Exchange**. A connection point between the U.S. government's various internets and the Internet. There are two Federal Internet Exchanges: FIX West, in Mountain View, California; and FIX East, in College Park, Maryland. Together, they link the backbones of MILNET, ESnet (the TCP/IP network of the Department of Energy), and NSInet (NASA Sciences Internet) with NSFnet. *See also* backbone (definition 1), MILNET, NSFnet, TCP/IP.

fixed disk *n.* *See* hard disk.

fixed-length field *n.* In a record or in data storage, a field whose size in bytes is predetermined and constant. A fixed-length field always takes up the same amount of space on a disk, even when the amount of data stored in the field is small. *Compare* variable-length field.

fixed-pitch spacing *n.* *See* monospacing.

fixed-point arithmetic *n.* Arithmetic performed on fixed-point numbers. *See also* fixed-point notation.

fixed-point notation *n.* A numeric format in which the decimal point has a specified position. Fixed-point numbers are a compromise between integral formats, which are compact and efficient, and floating-point numeric formats, which have a great range of values. Like floating-point numbers, fixed-point numbers can have a fractional part, but operations on fixed-point numbers usually take less time than floating-point operations. *See also* floating-point notation, integer.

fixed space *n.* A set amount of horizontal space used to separate characters in text—often, the width of a numeral in a given font. *See also* em space, en space, thin space.

fixed spacing *n.* *See* monospacing.

fixed storage *n.* Any nonremovable storage, such as a large disk that is sealed permanently in its drive.

fixed-width font *n.* *See* monospace font.

fixed-width spacing *n.* *See* monospacing.

fixed-word-length computer *n.* A description that applies to almost all computers and refers to the uniform size of the data units, or words, that are processed by the microprocessor and shuttled through the system over the hardware lines composing the main data bus. Fixed-word-length computers, including IBM and Macintosh personal computers, commonly work with 2 or 4 bytes at a time.

F keys *n.* See function key.

flag *n.* **1.** Broadly, a marker of some type used by a computer in processing or interpreting information; a signal indicating the existence or status of a particular condition. Flags are used in such areas as communications, programming, and information processing. Depending on its use, a flag can be a code, embedded in data, that identifies some condition, or it can be one or more bits set internally by hardware or software to indicate an event of some type, such as an error or the result of comparing two values. **2.** In the HDLC communications protocol, a flag is the unique series of bits 01111110, used to start and end a transmission frame (message unit). See also HDLC.

flame¹ *n.* An abusive or personally insulting e-mail message or newsgroup posting.

flame² *vb.* **1.** To send an abusive or personally insulting e-mail message or newsgroup posting. **2.** To criticize personally by means of e-mail messages or newsgroup postings.

flame bait *n.* A posting to a mailing list, newsgroup, or other online conference that is likely to provoke flames, often because it expresses a controversial opinion on a highly emotional topic. See also flame¹, flame war. Compare troll.

flamefest *n.* A series of inflammatory messages or articles in a newsgroup or other online conference.

flamer *n.* A person who sends or posts abusive messages via e-mail, in newsgroups and other online forums, and in online chats. See also chat¹ (definition 1), newsgroup.

flame war *n.* A discussion in a mailing list, newsgroup, or other online conference that has turned into a protracted exchange of flames. See also flame¹.

Flash *n.* A vector graphics file format (extension .swf) developed by Macromedia to enable designers to add animation and interactivity to multimedia Web pages. Flash files can be played back with a downloadable Shockwave plug-in or a Java program. The file format has been released by Macromedia as an open standard for the Internet.

flash *vb.* See burn.

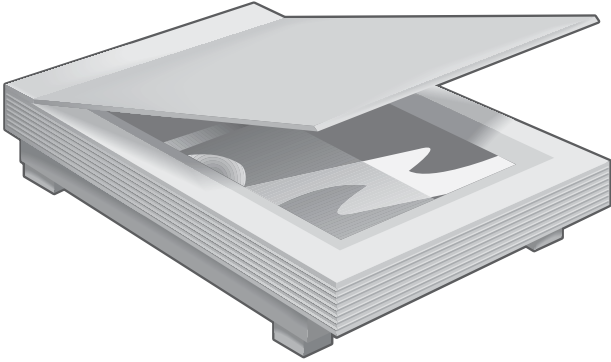
flash memory *n.* A type of nonvolatile memory. Flash memory is similar to EEPROM memory in function but it must be erased in blocks, whereas EEPROM can be erased one byte at a time. Because of its block-oriented nature, flash memory is commonly used as a supplement to or replacement for hard disks in portable computers. In this context, flash memory either is built into the unit or, more commonly, is available as a PC Card that can be plugged into a PCMCIA slot. A disadvantage of the block-oriented nature of flash memory is that it cannot be practically used as main memory (RAM) because a computer needs to be able to write to memory in single-byte increments. See also EEPROM, nonvolatile memory, PC Card, PCMCIA slot.

flash ROM *n.* See flash memory.

flat address space *n.* An address space in which each location in memory is specified by a unique number. (Memory addresses start at 0 and increase sequentially by 1.) The Macintosh operating system, OS/2, and Windows NT use a flat address space. MS-DOS uses a segmented address space, in which a location must be accessed with a segment number and an offset number. See also segmentation. Compare segmented address space.

flatbed plotter *n.* A plotter in which paper is held on a flat platform and a pen moves along both axes, traveling across the paper to draw an image. This method is slightly more accurate than that used by drum plotters, which move the paper under the pen, but requires more space. Flatbed plotters can also accept a wider variety of media, such as vellum and acetate, because the material does not need to be flexible. See also plotter. Compare drum plotter, pinch-roller plotter.

flatbed scanner *n.* A scanner with a flat, transparent surface that holds the image to be scanned, generally a book or other paper document. A scan head below the surface moves across the image. Some flatbed scanners can also reproduce transparent media, such as slides. See the illustration. Compare drum scanner, handheld scanner, sheet-fed scanner.



Flatbed scanner.

flat file *n.* A file consisting of records of a single record type in which there is no embedded structure information that governs relationships between records.

flat-file database *n.* A database that takes the form of a table, where only one table can be used for each database. A flat-file database can only work with one file at a time. *Compare* relational database.

flat file directory *n.* A directory that cannot contain sub-directories but simply contains a list of file names. *Compare* hierarchical file system.

flat file format *n.* An image file format in which individual objects cannot be edited. Files stored in JPEG, GIF, and BMP formats, for example, are all flat files.

flat file system *n.* A filing system with no hierarchical order in which no two files on a disk may have the same name, even if they exist in different directories. *Compare* hierarchical file system.

flat memory *n.* Memory that appears to a program as one large addressable space, whether consisting of RAM or virtual memory. The 68000 and VAX processors have flat memory; by contrast, 80x86 processors operating in real mode have segmented memory, although when these processors operate in protected mode, OS/2 and 32-bit versions of Windows access memory using a flat memory model. *Also called:* linear memory.

flat pack *n.* An integrated circuit housed in a flat rectangular package with connecting leads along the edges of the package. The flat pack was a precursor of surface-mounted chip packaging. *See also* surface-mount technology. *Compare* DIP (definition 1).

flat-panel display *n.* A video display with a shallow physical depth, based on technology other than the CRT (cathode-ray tube). Such displays are typically used in lap-

top computers. Common types of flat-panel displays are the electroluminescent display, the gas discharge display, and the LCD display.

flat panel monitor *n.* A desktop computer monitor that uses a liquid crystal display (LCD) rather than a cathode ray tube (CRT) to display data. Flat panel monitors are not as deep as CRT monitors and so occupy much less physical space.

flat screen *n.* *See* flat-panel display.

flatten *vb.* In digital graphic creation and manipulation programs, to combine all layers of text, images, and other graphic elements into a single layer. Elements cannot be edited after the graphic is flattened, so a graphic is not usually flattened until the final step when all adjustments have been made to the individual layers. Flattening an image significantly reduces its file size and allows it to be saved in a wider range of formats. Flattening is similar to grouping in that both actions combine a set of objects. However, flattening is a permanent action, whereas a group of objects can be ungrouped. *See also* layering.

flavor *n.* One of several varieties of a system, having its own details of operation. UNIX in particular is found in distinct flavors, such as BSD UNIX or AT&T UNIX System V.

flex circuit *n.* A circuit printed on a thin sheet of flexible polymer film that can be used in applications requiring circuits to curve and bend. Flex circuits offer space and weight savings over traditional circuits, and are used extensively for medical, industrial, and telecommunications applications.

flexible disk *n.* *See* floppy disk.

flexible transistor *n.* *See* plastic transistor.

flicker *n.* Rapid, visible fluctuation in a screen image, as on a television or computer monitor. Flicker occurs when the image is refreshed (updated) too infrequently or too slowly for the eye to perceive a steady level of brightness. In television and raster-scan displays, flicker is not noticeable when the refresh rate is 50 to 60 times per second. Interlaced displays, in which the odd-numbered scan lines are refreshed on one sweep and even-numbered lines on the other, achieve a flicker-free effective refresh rate of 50 to 60 times per second because the lines appear to merge, even though each line is actually updated only 25 to 30 times per second.

flush¹ *adj.* Aligned in a certain way on the screen or on paper. Flush left, for example, means aligned on the left side; flush right means aligned on the right side. *See also* align (definition 1).

flush² *vb.* To clear a portion of memory. For example, to flush a disk file buffer is to save its contents on disk and then clear the buffer for filling again.

flux *n.* **1.** The total strength of a magnetic, electric, or radiation field over a given area. **2.** A chemical used to aid the binding of solder to electrical conductors.

flux reversal *n.* The change in orientation of the minute magnetic particles on the surface of a disk or tape toward one of two magnetic poles. The two different alignments are used to represent binary 1 and binary 0 for data storage: a flux reversal typically represents a binary 1, and no reversal represents a binary 0.

fly swapping *n.* *See* swap-on-the-fly.

FM *n.* *See* frequency modulation.

FM encoding *n.* *See* frequency modulation encoding.

focus *vb.* In television and raster-scan displays, to make an electron beam converge at a single point on the inner surface of the screen.

FOCUS *n.* *See* Federation on Computing in the United States.

FOD *n.* *See* fax on demand.

folder *n.* In the Mac OS, 32-bit versions of Windows, and other operating systems, a container for programs and files in graphical user interfaces, symbolized on the screen by a graphical image (icon) of a file folder. This container is called a directory in other systems, such as MS-DOS and UNIX. A folder is a means of organizing programs and documents on a disk and can hold both files and additional folders. It first appeared commercially in Apple Computer's Lisa in 1983 and in the Apple Macintosh in 1984. *See also* directory.

folio *n.* A printed page number.

follow-up *n.* A post to a newsgroup that replies to an article. The follow-up has the same subject line as the original article, with the prefix "Re:" attached. An article and all of its follow-ups, in the order they were received, constitute a thread, which a user can read together using a newsreader.

font *n.* A set of characters of the same typeface (such as Garamond), style (such as italic), and weight (such as bold).

A font consists of all the characters available in a particular style and weight for a particular design; a typeface consists of the design itself. Fonts are used by computers for on-screen displays and by printers for hard-copy output. In both cases, the fonts are stored either as bit maps (patterns of dots) or as outlines (defined by a set of mathematical formulas). Even if the system cannot simulate different typefaces on the screen, application programs may be able to send information about typeface and style to a printer, which can then reproduce the font if a font description is available. *See also* bit map, font generator.

font card *n.* *See* font cartridge, ROM card.

font cartridge *n.* A plug-in unit available for some printers that contains fonts in several different styles and sizes. Font cartridges, like downloadable fonts, enable a printer to produce characters in sizes and styles other than those created by the fonts built into it. *Also called:* font card. *See also* ROM cartridge.

Font/DA Mover *n.* An application for older Apple Macintosh systems that allows the user to install screen fonts and desk accessories.

font editor *n.* A utility program that enables the user to modify existing fonts or to create and save new ones. Such an application commonly works with a screen representation of the font, with a representation that can be downloaded to a PostScript or other printer, or with both. *See also* PostScript font, screen font.

font family *n.* The set of available fonts representing variations of a single typeface. For example, Times Roman and Times Roman Italic are members of the same font family. When the user indicates italic, the system selects the correct italic font for the font family, with its characteristic appearance. If there is no italic font in the family, the system simply slants, or "obliques," the corresponding roman character. *See also* italic, roman.

font generator *n.* A program that transforms built-in character outlines into bit maps (patterns of dots) of the style and size required for a printed document. Font generators work by scaling a character outline to size; often they can also expand or compress the characters they generate. Some font generators store the resultant characters on disk; others send them directly to the printer.

font number *n.* The number by which an application or operating system internally identifies a given font. On the Apple Macintosh, for example, fonts can be identified by their exact names as well as their font numbers, and a font

formal logic *n.* A study of the logical expressions, sequences, and overall construction of a valid argument, without regard to the truth of the argument. Formal logic is used in proving program correctness.

format¹ *n.* **1.** In general, the structure or appearance of a unit of data. **2.** The arrangement of data within a document file that typically permits the document to be read or written by a certain application. Many applications can store a file in a more generic format, such as plain ASCII text. **3.** The layout of data storage areas (tracks and sectors) on a disk. **4.** The order and types of fields in a database. **5.** The attributes of a cell in a spreadsheet, such as its being alphabetic or numeric, the number of digits, the use of commas, and the use of currency signs. **6.** The specifications for the placement of text on a page or in a paragraph.

format² *vb.* **1.** To change the appearance of selected text or the contents of a selected cell in a spreadsheet. **2.** To prepare a disk for use by organizing its storage space into a collection of data “compartments,” each of which can be located by the operating system so that data can be sorted and retrieved. When a previously used disk is formatted, any preexisting information on it is lost.

format bar *n.* A toolbar within an application used for modifying the format of the document being displayed, such as changing font size or type.

formatting *n.* **1.** The elements of style and presentation that are added to documents through the use of margins, indents, and different sizes, weights, and styles of type. **2.** The process of initializing a disk so that it can be used to store information. *See also* initialize.

form control *n.* On a Web site, an individual box or button with which you enter information on an electronic form.

form factor *n.* **1.** The size, shape, and configuration of a piece of computer hardware. The term is often applied to subcomponents such as disk drives, circuit boards, and small devices, such as handheld PCs. It can also be used more broadly to include the arrangement and positioning of external switches, plugs, and other components of the device, or it can refer to the footprint of an entire computer. **2.** A term used in computer graphics, specifically with reference to a method of rendering known as radiosity, which divides an image into small patches for calculating illumination. The form factor is a calculated value that represents the amount of energy radiated by one surface and received by another, taking into account such conditions as the distance between the surfaces, their orientation with respect to one another, and the presence of obstructions between them. **3.** When used to describe software,

refers to the amount of memory required, the size of the program, and so on.

form feed *n.* A printer command that tells a printer to move to the top of the next page. In the ASCII character set, the form-feed character has the decimal value 12 (hexadecimal 0C). Because its purpose is to begin printing on a new page, form feed is also known as the page-eject character. *Acronym:* FF.

form letter *n.* A letter created for printing and distribution to a group of people whose names and addresses are taken from a database and inserted by a mail-merge program into a single basic document. *See also* mail merge.

formula *n.* A mathematical statement that describes the actions to be performed on numeric values. A formula sets up a calculation without regard to the actual values it is to act upon, such as $A + B$, with A and B representing whatever values the user designates. Thus, a formula is unlike an arithmetic problem, such as $1 + 2$, which includes values and must be restated if any value is changed. Through formulas, users of applications such as spreadsheets gain the power to perform “what-if” calculations simply by changing selected values and having the program recalculate the results. Sophisticated programs include many built-in formulas for performing standard business and mathematical calculations.

Forte *n.* Sun Microsystems integrated development environment (IDE) for Java developers. *See also* integrated development environment.

Fortezza *n.* A cryptographic technology developed by the United States National Security Agency (NSA) for enabling secure communication of sensitive information. Fortezza is based on encryption, authentication, and other technologies built into a personalized card known as the Fortezza Crypto Card that can be inserted into a PCMCIA slot on a computer. This card works with Fortezza-enabled hardware and software to secure applications such as e-mail, Web browsing, e-commerce, and file encryption. An RS-232 token can also be used with legacy systems that do not have card-reading capability. The technology is supported by a number of commercial vendors.

Forth *n.* A programming language originated by Charles Moore in the late 1960s. Moore chose the language’s name, a shortened version of the word *fourth*, because he believed it was a fourth-generation language and his operating system would allow him to use only five letters for a program name. Forth is an interpreted, structured language that uses threading, which lets programmers easily extend the language and enables Forth to fit a great deal of

A front-end processor is dedicated entirely to handling transmitted information, including error detection and control; receipt, transmission, and possibly encoding of messages; and management of the lines running to and from other devices. *See also* communications controller.

front panel *n.* The faceplate of a computer cabinet through which the control knobs, switches, and lights are available to an operator. *See also* console.

fry *vb.* To destroy a circuit board or another component of a computer by applying excessive voltage. Even when applied voltage is not excessive, an electronic component can become fried when it breaks down, conducting more current than its design permits.

fs *n.* *See* femtosecond.

FSK *n.* Acronym for **f**requency-**s**hift **k**eying. A simple form of modulation in which the digital values 0 and 1 are represented by two different frequencies. FSK was used by early modems running at 300 bits per second.

FT1 *n.* *See* fractional T1.

FTAM *n.* Acronym for **F**ile-**T**ransfer **A**ccess and **M**anagement. A communications standard for transferring files between different makes and models of computer.

FTP¹ *n.* **1.** Acronym for **F**ile **T**ransfer **P**rotocol, a fast, application-level protocol widely used for copying files to and from remote computer systems on a network using TCP/IP, such as the Internet. This protocol also allows users to use FTP commands to work with files, such as listing files and directories on the remote system. *See also* TCP/IP. **2.** A common logon ID for anonymous FTP.

FTP² *vb.* To download files from or upload files to remote computer systems, via the Internet's File Transfer Protocol. The user needs an FTP client to transfer files to and from the remote system, which must have an FTP server. Generally, the user also needs to establish an account on the remote system to FTP files, although many FTP sites permit the use of anonymous FTP. *See also* FTP client, FTP server.

FTP client or **ftp client** *n.* A program that enables the user to upload and download files to and from an FTP site over a network, such as the Internet, using the File Transfer Protocol. *See also* FTP¹ (definition 1). *Compare* FTP server.

FTP commands *n.* Commands that are part of the File Transfer Protocol. *See also* FTP¹ (definition 1).

FTP program or **ftp program** *n.* *See* FTP client.

FTP server *n.* A file server that uses the File Transfer Protocol to permit users to upload or download files through the Internet or any other TCP/IP network. *See also* file server, FTP¹ (definition 1), TCP/IP. *Compare* FTP client.

FTP site *n.* The collection of files and programs residing on an FTP server. *See also* FTP¹ (definition 1), FTP server.

FTTC *n.* Acronym for **f**iber **t**o **t**he **c**urb. The installation and use of fiber-optic cable from the central office (CO) to within a thousand feet of a user's home or office. With FTTC, coaxial cable or another medium carries the signals from the curb into the home or office. FTTC is a replacement for Plain Old Telephone Service (POTS) that enables the distribution of telephony, cable TV, Internet access, multimedia, and other communications over one line. *Compare* FTTH, POTS.

FTTH *n.* Acronym for **f**iber **t**o **t**he **h**ome. The installation and use of fiber-optic cable from the central office (CO) directly into a user's home or office. FTTH is a replacement for Plain Old Telephone Service (POTS) that enables the distribution of telephony, cable TV, Internet access, multimedia, and other communications over one line. *Compare* FTTC, POTS.

FUD *n.* Acronym for **f**ear, **u**ncertainty, and **d**oubt. Derogatory slang used to express disagreement or displeasure with a vendor's public statements, particularly when the vendor is speaking of a competitor's products. If a vendor is perceived as implying that buying from a competitor is obviously the wrong choice, that vendor is said to be using FUD as a marketing technique.

fuel cell *n.* An electrochemical device, similar to a battery in function, in which the chemical energy of a fuel, such as hydrogen, and an oxidant, usually oxygen, are converted directly into electrical energy. Unlike batteries, however, fuel cells do not store energy, and they never run down or need recharging as long as the fuel and oxidant are supplied continuously. The principle of fuel cell technology was discovered more than 100 years ago, but until recently it had found use only in laboratories and in space travel (the Apollo missions and the space shuttle). Today, large and small fuel cells are being developed that will power portable devices such as laptop computers and cellular phones, generate electricity and heat, and replace automotive combustion engines.

game tree *n.* A tree structure representing contingencies in a game and used by game developers for design purposes. Each node in a game tree represents a possible position (for example, the configuration of pieces on a chessboard) in the game, and each branching represents a possible move. *See also* computer game.

gamut *n.* The complete range of colors a display or printer is capable of producing. If a color falls outside the gamut of a device, it cannot be accurately displayed or printed from that device.

gamut alarm *n.* A feature in graphics programs that alerts the user if a chosen color will fall outside the currently selected gamut. *See also* gamut.

Gantt chart *n.* A bar chart that shows individual parts of a project as bars against a horizontal time scale. Gantt charts are used as a project-planning tool for developing schedules. Most project-planning software can produce Gantt charts.

gap *n.* *See* inter-record gap.

garbage *n.* **1.** Incorrect or corrupted data. **2.** Gibberish displayed on screen, either due to faulty hardware or software or because a program is unable to display a file's content. For example, an executable file is not meant to be displayed by a text editor and so is indecipherable on screen.

garbage collection *n.* A process for automatic recovery of heap memory. Blocks of memory that had been allocated but are no longer in use are freed, and blocks of memory still in use may be moved to consolidate the free memory into larger blocks. Some programming languages require the programmer to handle garbage collection. Others, such as Java, perform this task for the programmer. *See also* heap (definition 1).

garbage in, garbage out *n.* A computing axiom meaning that if the data put into a process is incorrect, the data output by the process will also be incorrect. *Acronym:* GIGO.

gas-discharge display *n.* A type of flat-panel display, used on some portable computers, containing neon between a horizontal and a vertical set of electrodes. When one electrode in each set is charged, the neon glows (as in a neon lamp) where the two electrodes intersect, representing a pixel. *Also called:* gas-plasma display. *See also* flat-panel display, pixel.

gas-plasma display *n.* *See* gas-discharge display.

gate *n.* **1.** An electronic switch that is the elementary component of a digital circuit. It produces an electrical output signal that represents a binary 1 or 0 and is related to the states of one or more input signals by an operation of Boolean logic, such as AND, OR, or NOT. *Also called:* logic gate. *See also* gate array. **2.** The input terminal of a field-effect transistor (FET). *Also called:* gate electrode. *See also* drain (definition 1), FET, MOSFET, source (definition 2). **3.** A data structure used by 80386 and higher microprocessors to control access to privileged functions, to change data segments, or to switch tasks.

gate array *n.* A special type of chip that starts out as a nonspecific collection of logic gates. Late in the manufacturing process, a layer is added to connect the gates for a specific function. By changing the pattern of connections, the manufacturer can make the chip suitable for many needs. This process is very popular because it saves both design and manufacturing time. The drawback is that much of the chip goes unused. *Also called:* application-specific integrated circuit, logic array.

gated *adj.* **1.** Transmitted through a gate to a subsequent electronic logic element. **2.** Transmitted through a gateway to a subsequent network or service. For example, a mailing list on BITNET may be gated to a newsgroup on the Internet.

gate electrode *n.* *See* gate (definition 2).

gateway *n.* A device that connects networks using different communications protocols so that information can be passed from one to the other. A gateway both transfers information and converts it to a form compatible with the protocols used by the receiving network. *Compare* bridge.

gateway page *n.* *See* doorway page.

gating circuit *n.* An electronic switch whose output is either on or off, depending on the state of two or more inputs. For example, a gating circuit may be used to pass or not pass an input signal, depending on the states of one or more control signals. A gating circuit can be constructed from one or more logic gates. *See also* gate (definition 1).

gated *vb.* To have been the victim of a hijackware program that seized control of an Internet shopping or surfing experience and caused the victim's browser to display ads and Web sites chosen by the program. Users may be

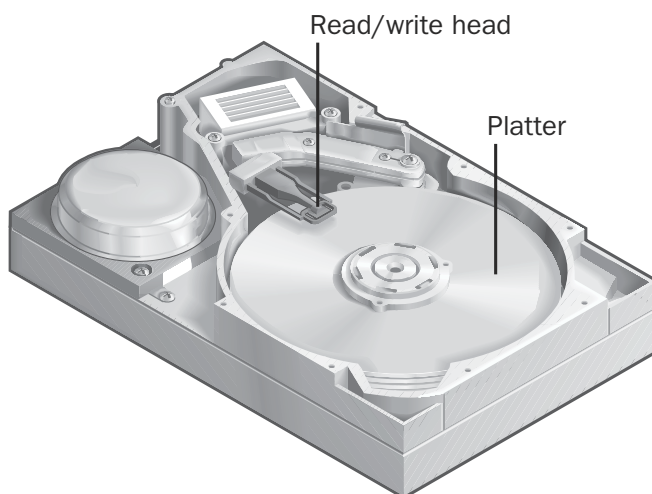
hard-sectored disk. *Compare* soft (definition 1). **2.** Retaining magnetization even in the absence of an external magnetic field. *Compare* soft (definition 2).

hard card *n.* A circuit board, carrying a hard disk and containing its controller, that plugs into an expansion slot and uses the expansion bus for power as well as for data and control signals. By contrast, a hard disk in a drive bay communicates with a separate controller card by a ribbon cable and has a direct cable to the computer's main power supply. *See also* controller, drive bay, expansion slot, ribbon cable.

hard-coded *adj.* **1.** Designed to handle a specific situation only. **2.** Depending on values embedded in the program code rather than on values that can be input and changed by the user.

hard copy *n.* Printed output on paper, film, or other permanent medium. *Compare* soft copy.

hard disk *n.* A device containing one or more inflexible platters coated with material in which data can be recorded magnetically, together with their read/write heads, the head-positioning mechanism, and the spindle motor in a sealed case that protects against outside contaminants. The protected environment allows the head to fly 10 to 25 millionths of an inch above the surface of a platter rotating typically at 3600 to 7200 rpm; therefore, much more data can be stored and accessed much more quickly than on a floppy disk. Most hard disks contain from two to eight platters. *See the illustration. Also called:* hard disk drive. *Compare* floppy disk.



Hard disk. The cover of this hard disk has been removed to reveal the components within.

hard disk drive *n.* *See* hard disk.

hard disk type *n.* One or more numbers that inform a computer about the characteristics of a hard disk, such as the number of read/write heads and the number of cylinders the hard disk contains. The hard disk type numbers are usually marked on a label attached to the disk and must be input to the computer when the hard disk is installed, often by means of the computer's CMOS setup program. *See also* CMOS setup.

hard error *n.* **1.** An error caused by a hardware failure or by accessing incompatible hardware. *See also* hard failure. *Compare* soft error. **2.** An error that prevents a program from returning to normal operation. *See also* fatal error.

hard failure *n.* A cessation of function from which no recovery is possible, usually requiring a call to a repair service to correct. *Also called:* hardware failure.

hard hyphen *n.* *See* hyphen.

hard return *n.* A character input by the user to indicate that the current line of text is to end and a new line is to begin. In word-processing programs that automatically break lines within the margins of a page, a hard return indicates the end of a paragraph. In text-entry programs that lack wordwrap, on the other hand, a hard return is required to end each line, and often two or more hard returns are needed to end a paragraph. *See also* wordwrap. *Compare* soft return.

hard-sectored disk *n.* A floppy disk whose data sectors have been physically marked with punched holes that are detected by sensors in the drive to locate the beginning of each sector. *Compare* soft-sectored disk.

hard space *n.* *See* nonbreaking space.

hardware *n.* The physical components of a computer system, including any peripheral equipment such as printers, modems, and mouse devices. *Compare* firmware, software.

hardware abstraction layer *n.* In advanced operating systems such as Windows NT, Windows 2000, and Windows XP a layer in which assembly language code is isolated. A hardware abstraction layer functions similarly to an application programming interface (API) and is used by programmers to write device-independent applications. *Acronym:* HAL. *See also* application programming interface, device independence.

hardware address *n.* *See* physical address.

hardware check *n.* **1.** An automatic check performed by hardware to detect internal errors or problems. **2.** On a PC, a check of system hardware performed by a PC's BIOS

hierarchical *adj.* Of, relating to, or organized as a hierarchy. *See also* hierarchy.

hierarchical computer network *n.* **1.** A network in which one host computer controls a number of smaller computers, which may in turn act as hosts to a group of PC workstations. **2.** A network in which control functions are organized according to a hierarchy and in which data processing tasks may be distributed.

hierarchical database *n.* A database in which records are grouped in such a way that their relationships form a branching, treelike structure. This type of database structure, most commonly used with databases for large computers, is well suited for organizing information that breaks down logically into successively greater levels of detail. The organization of records in a hierarchical database should reflect the most common or the most time-critical types of access expected.

hierarchical database management system *n.* A database management system that supports a hierarchical model. *Acronym:* HDBMS. *See also* hierarchical model.

Hierarchical Data Format *n.* A file format for storing multiple types of graphical and numerical data and transferring them between different types of machines, together with a library of functions for handling such files in a uniform way. NCSA developed and supports the file function and library and has placed them in the public domain. Hierarchical Data Format files are supported on most common types of computers. The format can easily be extended to accommodate additional data models. The library functions have both FORTRAN and C interfaces. *Acronym:* HDF. *See also* NCSA (definition 1).

hierarchical file system *n.* A system for organizing files on a disk in which files are contained in directories or folders, each of which can contain other directories as well as files. The main directory for the disk is called the root; the chain of directories from the root to a particular file is called the path. *See also* hierarchy, path (definition 2), root. *Compare* flat file system.

Hierarchical File System *n.* A tree-structured file system used on the Apple Macintosh in which folders can be nested within other folders. *Acronym:* HFS. *See also* hierarchy, path (definition 2), root. *Compare* flat file system.

hierarchical menu *n.* A menu that has one or more submenus. Such a menu/submenu arrangement is hierarchical because each level subsumes the next.

hierarchical model *n.* A model used in database management in which each record may be the “parent” of one or more child records, which may or may not have the same structure as the parent; a record can have no more than one parent. Conceptually, therefore, a hierarchical model can be, and usually is, regarded as a tree. The individual records are not necessarily contained in the same file. *See also* tree.

Hierarchical Storage Management *n.* *See* HSM.

hierarchy *n.* A type of organization that, like a tree, branches into more specific units, each of which is “owned” by the higher-level unit immediately above. Hierarchies are characteristic of several aspects of computing because they provide organizational frameworks that can reflect logical links, or relationships, between separate records, files, or pieces of equipment. For example, hierarchies are used in organizing related files on a disk, related records in a database, and related (interconnected) devices on a network. In applications such as spreadsheets, hierarchies of a sort are used to establish the order of precedence in which arithmetic operations are to be performed by the computer. *See also* hierarchical file system.

high availability *n.* The ability of a system or device to be usable when it is needed. When expressed as a percentage, high availability is the actual service time divided by the required service time. Although high availability does not guarantee that a system will have no downtime, a network often is considered highly available if it achieves 99.999 percent network uptime. *Also called:* RAS (reliability/availability/serviceability), fault resilience. *See also* five-nines availability, four-nines availability, three-nines availability, two-nines availability. *Compare* fault tolerance.

High-bit-rate Digital Subscriber Line *n.* *See* HDSL.

high byte *n.* The byte containing the most significant bits (bits 8 through 15) in a 2-byte grouping representing a 16-bit (bits 0 through 15) value. *See the illustration. See also* hexadecimal.

High resolution is achieved by using a large number of pixels (dots) to create an image in a given area. For screen displays, the resolution is stated in terms of the total number of pixels in the horizontal and vertical dimensions. For example, the VGA video adapter has a resolution of 640 by 480 pixels. In printing, resolution refers to the number of dots per inch (dpi) produced by the printer, such as 300 to 600 dpi for a desktop laser or ink-jet printer or 1000 to 2000 dpi for a production-quality imagesetter. *Also called:* hi-res.

High Sierra specification *n.* An industry-wide format specification for the logical structure, file structure, and record structures on a CD-ROM. The specification is named after a meeting on CD-ROM held near Lake Tahoe in November 1985. It served as the basis for the international standard, ISO 9660.

high tech *n.* **1.** Cutting-edge applied science and engineering, usually involving computers and electronics. **2.** Sophisticated, often complex, specialized technical innovation.

hijackware *n.* Software that appears to be a useful plugin or utility, but which will take over a user's Internet surfing or shopping activity by creating pop-up advertisements for competing products or redirecting the user to competitor's Web sites. Typically users will download and install a hijackware product believing it to be free browser enhancement software. Businesses pay the makers of hijackware products to push their shopping sites and product advertising onto Internet users, sometimes to the point of denying the user access to competing Web sites. *See also* gated.

Hijiri calendar *n.* The lunar calendar used in Islamic countries. *Compare* Gregorian calendar, Julian calendar.

HIPPI *n.* Acronym for **H**igh-**P**erformance **P**arallel **I**nterface. An ANSI communications standard used with supercomputers.

hi-res *n.* *See* high resolution.

histogram *n.* A chart consisting of horizontal or vertical bars, the widths or heights of which represent the values of certain data.

history *n.* A list of the user's actions within a program, such as commands entered in an operating system shell, menus passed through using Gopher, or links followed using a Web browser.

hit *n.* **1.** A successful retrieval of data from a cache rather than from the slower hard disk or RAM. *See also* cache,

hard disk, RAM. **2.** A successful retrieval of a record matching a query in a database. *See also* query (definition 1), record¹. **3.** Retrieval of a file from a Web site. Each separate file accessed on a Web page, including HTML documents and graphics, counts as a hit. **4.** In computer war and other games, when a character is successfully fired on, attacked, or otherwise taken out.

hit points *n.* Used in most computer and console war games to refer to the amount of times a player can be damaged before his or her character passes out or dies.

hive *n.* One of the top-level sets of keys, subkeys, and values in Windows 9x, Windows NT, Windows 2000, and Windows CE Registries. The term was created by a Microsoft programmer who thought the structure of the Registry resembled a beehive. Each hive is a permanent part of the Registry and is associated with a set of files containing information related to the configuration (applications, user preferences, devices, and so on) of the computer on which the operating system is installed. Registry hives include HKEY_LOCAL_MACHINE, HKEY_CURRENT_USER, and HKEY_CURRENT_CONFIG. *See also* Registry.

HKEY *n.* Short for **h**key handle. In Windows 9x, Windows NT, and Windows 2000, a handle to a Registry key in which configuration information is stored. Each key leads to subkeys containing configuration information that, in earlier versions of Windows, was stored in .ini files. For example, the handle key HKEY_CURRENT_USERControl Panel leads to the subkey for the Windows Desktop. *See also* handle (definition 1).

HLL *n.* *See* high-level language.

HLS *n.* Acronym for **h**ue-**l**ightness-**s**aturation. *See* HSB.

HMA *n.* *See* high memory area.

HMD *n.* *See* head-mounted device.

Hollerith tabulating/recording machine *n.* An electromechanical machine invented by Herman Hollerith in the late 1800s for processing data supplied in the form of holes punched at predetermined locations in cards. Contacts made through the holes completed electrical circuits, allowing signals to be passed to counting and tabulating devices. This machine is considered to have reduced the time required to finish the 1890 U.S. census by two-thirds. Such machines were manufactured in the early 1900s by Hollerith's Tabulating Machine Company, which eventually became the International Business Machines Corporation (IBM).

hot swapping *n.* See hot plugging.

HotSync *n.* Software application from Palm that permits data synchronization between a Palm handheld computing device and another computing device, such as a laptop or personal computer. The synchronization occurs via a cable connection or wirelessly (for example, via infrared signals).

HotWired *n.* A Web site affiliated with *Wired* magazine that contains news, gossip, and other information about the culture of the Internet.

housekeeping *n.* Any of various routines, such as updating the clock or performing garbage collection, designed to keep the system, the environment within which a program runs, or the data structures within a program in good working order.

hover button *n.* Text or an image on a Web page, usually in the form of a button, that changes appearance when a cursor passes over it. The hover button may change color, blink, display a pop-up with additional information, or produce other similar effects. Hover buttons are usually implemented through ActiveX objects and scripting, although hover behavior can also be set through HTML attributes.

HPC *n.* See handheld PC.

HPFS *n.* Acronym for **H**igh **P**erformance **F**ile **S**ystem. A file system available with OS/2 versions 1.2 and later. See also FAT file system, NTFS.

HPGL *n.* Acronym for **H**ewlett-**P**ackard **G**raphics **L**anguage. A language originally developed for images destined for plotters. An HPGL file consists of instructions that a program can use to reconstruct a graphical image.

HPIB *n.* Acronym for **H**ewlett-**P**ackard **I**nterface **B**us. See general-purpose interface bus.

HPPCL *n.* Acronym for **H**ewlett-**P**ackard **P**rinter **C**ontrol **L**anguage. See Printer Control Language.

HP/UX or **HP-UX** *n.* Acronym for **H**ewlett-**P**ackard **U**NIX. A version of the UNIX operating system specifically designed to be run on Hewlett-Packard's workstations. See also UNIX.

.hqx *n.* A file extension for a file encoded with BinHex. See also BinHex.

HREF *n.* Short for **h**ypertext **r**eference. An attribute in an HTML document that defines a link to another document on the Web. See also HTML.

HSB *n.* Acronym for **h**ue-**s**aturation-**b**rightness. A color model in which hue is the color itself as placed on a color wheel, where 0° is red, 60° is yellow, 120° is green, 180° is cyan, 240° is blue, and 300° is magenta; saturation is the percentage of the specified hue in the color; and brightness is the percentage of white in the color. Also called: HLS, HSV, hue. See also color model. Compare CMY, RGB.

HSM *n.* Short for **H**ierarchical **S**torage **M**anagement. A technology for managing online data and data storage in which the medium on which the information resides is linked to the frequency with which the information is accessed. By migrating data to and from primary (rapidly accessed but expensive) and secondary (slower but less expensive) storage, HSM maintains often-used information on primary storage media and less frequently used data on secondary storage such as tape or an optical jukebox. Although information resides on different storage media, all of it appears to be on line and remains accessible to the user. When users request data residing on secondary storage, HSM moves the information back to the primary storage medium.

HSV *n.* Acronym for **h**ue-**s**aturation-**v**alue. See HSB.

H-sync *n.* See horizontal synchronization.

HTCPCP *n.* Acronym for **H**yper **T**ext **C**offee **P**ot **C**ontrol **P**rotocol. A protocol defined in jest as an April Fools' Day spoof of open Internet standards. HTCPCP/1.0 was proposed in RFC 2324 on April 1, 1998 by Larry Masinter of Xerox PARC. In this RFC, Masinter described a protocol for controlling, monitoring, and diagnosing coffee pots.

.htm *n.* The MS-DOS/Windows 3.x file extension that identifies Hypertext Markup Language (HTML) files, most commonly used as Web pages. Because MS-DOS and Windows 3.x cannot recognize file extensions longer than three letters, the .html extension is truncated to three letters in those environments. See also HTML.

.html *n.* The file extension that identifies Hypertext Markup Language (HTML) files, most commonly used as Web pages. See also HTML.

HTML *n.* Acronym for **H**ypertext **M**arkup **L**anguage. The markup language used for documents on the World Wide Web. A tag-based notation language used to format documents that can then be interpreted and rendered by an Internet browser. HTML is an application of SGML (Standard Generalized Markup Language) that uses tags to mark elements, such as text and graphics, in a document to

Scotland, it offers such features as WAIS search capability. *See also* HTTP server, WAIS.

HTTP server *n.* **1.** Server software that uses HTTP to serve up HTML documents and any associated files and scripts when requested by a client, such as a Web browser. The connection between client and server is usually broken after the requested document or file has been served. HTTP servers are used on Web and Intranet sites. *Also called:* Web server. *See also* HTML, HTTP, server (definition 2). *Compare* application server. **2.** Any machine on which an HTTP server program is running.

HTTP status codes *n.* Three-digit codes sent by an HTTP server that indicate the results of a request for data. Codes beginning with 1 respond to requests that the client may not have finished sending; with 2, successful requests; with 3, further action that the client must take; with 4, requests that failed because of client error; and with 5, requests that failed because of server error. *See also* 400, 401, 402, 403, 404, HTTP.

HTTP streaming *n.* The process of downloading streaming digital media using an HTTP server (a standard Internet server) rather than a server designed specifically to transmit streaming media. HTTP streaming downloads the media file onto a computer, which plays the downloaded file as it becomes available. *See also* real-time streaming.

hub *n.* In a network, a device joining communication lines at a central location, providing a common connection to all devices on the network. The term is an analogy to the hub of a wheel. *See also* active hub, switching hub.

hue *n.* In the HSB color model, one of the three characteristics used to describe a color. Hue is the attribute that most readily distinguishes one color from other colors. It depends on the frequency of a light wave in the visible spectrum. *See also* color model, HSB. *Compare* brightness, saturation (definition 2).

Huffman coding *n.* A method of compressing a given set of data based on the relative frequency of the individual elements. The more often a given element, such as a letter, occurs, the shorter, in bits, is its corresponding code. It was one of the earliest data compression codes and, with modifications, remains one of the most widely used codes for a large variety of message types.

human engineering *n.* The designing of machines and associated products to suit the needs of humans. *See also* ergonomics.

human-machine interface *n.* The boundary at which people make contact with and use machines; when applied to programs and operating systems, it is more widely known as the user interface.

hung *adj.* *See* hang.

hybrid circuit *n.* A circuit in which fundamentally different types of components are used to perform similar functions, such as a stereo amplifier that uses both tubes and transistors.

hybrid computer *n.* A computer that contains both digital and analog circuits.

hybrid microcircuit *n.* A microelectronic circuit that combines individual microminiaturized components and integrated components.

hybrid network *n.* A network constructed of different topologies, such as ring and star. *See also* bus network, ring network, star network, Token-Ring network, topology.

Hybris virus *n.* A slow-spreading but persistent self-updating Internet worm first detected in late 2000. The Hybris virus is activated whenever an infected computer is connected to the Internet. It attaches itself to all outgoing e-mail messages, maintains a list of all e-mail addresses in the headers of incoming e-mail messages, and sends copies of itself to all e-mail addresses on the list. Hybris is difficult to eradicate because it updates itself regularly, accessing and downloading updates and plug-ins from anonymous postings to the alt.comp.virus newsgroup. Hybris incorporates downloaded extensions into its code, and it e-mails its modified form to additional potential victims. Hybris often includes a spiral plug-in which produces a spinning disk on top of any active windows on a user's screen.

HyperCard *n.* An information-management software tool, designed for the Apple Macintosh, that implements many hypertext concepts. A HyperCard document consists of a series of cards, collected into a stack. Each card can contain text, graphical images, sound, buttons that enable travel from card to card, and other controls. Programs and routines can be coded as scripts in an object-oriented language called HyperTalk or developed as external code resources (XCMDs and XFCNs). *See also* hypertext, object-oriented programming, XCMD, XFCN.

hyperlink *n.* A connection between an element in a hypertext document, such as a word, a phrase, a symbol, or an image, and a different element in the document, another

significantly to the user-friendliness of graphical user interfaces and to PCs in general. *See also* graphical user interface. **2.** A high-level programming language designed to process non-numerical data structures and character strings using a Pascal-like syntax.

iconic interface *n.* A user interface that is based on icons rather than on typed commands. *See also* graphical user interface, icon.

icon parade *n.* The sequence of icons that appears during the boot-up of a Macintosh computer.

ICP *n.* Acronym for **I**nternet **C**ache **P**rotocol. A networking protocol used by cache servers to locate specific Web objects in neighboring caches. Typically implemented over UDP, ICP also can be used for cache selection. ICP was developed for the Harvest research project at the University of Southern California. It has been implemented in SQUID and other Web proxy caches.

ICQ *n.* A downloadable software program developed by Mirabilis, and now owned by AOL Time-Warner Inc., that notifies Internet users when friends, family, or other selected users are also on line and allows them to communicate with one another in real time. Through ICQ, users can chat, send e-mail, exchange messages on message boards, and transfer URLs and files, as well as launch third-party programs, such as games, in which multiple people can participate. Users compile a list of other users with whom they want to communicate. All users must register with the ICQ server and have ICQ software on their computer. The name is a reference to the phrase “I seek you.” *See also* instant messaging.

ICSA *n.* Acronym for **I**nternational **C**omputer **S**ecurity **A**ssociation. An education and information organization concerned with Internet security issues. Known as the NCSA (National Computer Security Association) until 1997, the ICSA provides security assurance systems and product certification; disseminates computer security information in white papers, books, pamphlets, videos, and other publications; organizes consortiums devoted to various security issues; and maintains a Web site that provides updated information on viruses and other computer security topics. Founded in 1987, the ICSA is currently located in Reston, VA.

ID *n.* Acronym for **i**ntrusion **d**etection. *See* IDS.

IDE *n.* **1.** Acronym for **I**ntegrated **D**evice **E**lectronics. A type of disk-drive interface in which the controller electronics reside on the drive itself, eliminating the need for a separate adapter card. The IDE interface is compatible with the controller used by IBM in the PC/AT computer but offers advantages such as look-ahead caching. **2.** *See* integrated development environment.

identifier *n.* Any text string used as a label, such as the name of a procedure or a variable in a program or the name attached to a hard disk or floppy disk. *Compare* descriptor.

IDL *n.* Acronym for **I**nterface **D**efinition **L**anguage. In object-oriented programming, a language that lets a program or object written in one language communicate with another program written in an unknown language. An IDL is used to define interfaces between client and server programs. For example, an IDL can provide interfaces to remote CORBA objects. *See also* CORBA, MIDL, object-oriented programming.

idle *adj.* **1.** Operational but not in use. **2.** Waiting for a command.

idle character *n.* In communications, a control character transmitted when no other information is available or ready to be sent. *See also* SYN.

idle interrupt *n.* An interrupt that occurs when a device or process becomes idle.

idle state *n.* The condition in which a device is operating but is not being used.

IDS *n.* Acronym for **i**ntrusion-**d**etection **s**ystem. A type of security management system for computers and networks that gathers and analyzes information from various areas within a computer or a network to identify possible security breaches, both inside and outside the organization. An IDS can detect a wide range of hostile attack signatures, generate alarms, and, in some cases, cause routers to terminate communications from hostile sources. *Also called:* intrusion detection. *Compare* firewall.

IDSL *n.* Acronym for **I**nternet **d**igital **s**ubscriber **l**ine. A high-speed digital communications service that provides Internet access as fast as 1.1 Mbps (megabits per second) over standard telephone lines. IDSL uses a hybrid of ISDN and digital subscriber line technology. *See also* digital subscriber line, ISDN.

internal font *n.* A font that is already loaded in a printer's memory (ROM) when the printer is shipped. *Compare* downloadable font, font cartridge.

internal interrupt *n.* An interrupt generated by the processor itself in response to certain predefined situations, such as an attempt to divide by zero or an arithmetic value exceeding the number of bits allowed for it. *See also* interrupt. *Compare* external interrupt.

internal memory *n.* *See* primary storage.

internal modem *n.* A modem constructed on an expansion card to be installed in one of the expansion slots inside a computer. *Compare* external modem, integral modem.

internal schema *n.* A view of information about the physical files composing a database, including file names, file locations, accessing methodology, and actual or potential data derivations, in a database model such as that described by ANSI/X3/SPARC, that supports a three-schema architecture. The internal schema corresponds to the schema in systems based on CODASYL/DBTG. In a distributed database, there may be a different internal schema at each location. *See also* conceptual schema, schema.

internal sort *n.* **1.** A sorting operation that takes place on files completely or largely held in memory rather than on disk during the process. **2.** A sorting procedure that produces sorted subgroups of records that will be subsequently merged into one list.

International Computer Security Association *n.* *See* ICSA.

International Federation of Information Processing *n.* *See* IFIP.

International Maritime Satellite *n.* *See* Inmarsat.

International Mobile Telecommunications for the Year 2000 *n.* Specifications set forth by the International Telecommunications Union (ITU) to establish third-generation wireless telecommunication network architecture. The specifications include faster data transmission speeds and improved voice quality. *Acronym:* IMT-2000.

International Organization for Standardization *n.* *See* ISO.

International Telecommunication Union *n.* *See* ITU.

International Telecommunication Union-Telecommunication Standardization Sector *n.* *See* ITU-T.

International Telegraph and Telephone Consultative Committee *n.* English-language form of the name for the

Comité Consultatif International Télégraphique et Téléphonique, a standards organization that became part of the International Telecommunication Union in 1992. *See also* CCITT, ITU-T.

Internaut *n.* *See* cybernaut.

internet *n.* Short for **internetwork**. A set of computer networks that may be dissimilar and are joined together by means of gateways that handle data transfer and conversion of messages from the sending networks' protocols to those of the receiving network.

Internet *n.* The worldwide collection of networks and gateways that use the TCP/IP suite of protocols to communicate with one another. At the heart of the Internet is a backbone of high-speed data communication lines between major nodes or host computers, consisting of thousands of commercial, government, educational, and other computer systems, that route data and messages. One or more Internet nodes can go off line without endangering the Internet as a whole or causing communications on the Internet to stop, because no single computer or network controls it. The genesis of the Internet was a decentralized network called ARPANET created by the U.S. Department of Defense in 1969 to facilitate communications in the event of a nuclear attack. Eventually other networks, including BITNET, Usenet, UUCP, and NSFnet, were connected to ARPANET. Currently the Internet offers a range of services to users, such as FTP, e-mail, the World Wide Web, Usenet news, Gopher, IRC, telnet, and others. *Also called:* the Net. *See also* BITNET, FTP¹ (definition 1), Gopher, IRC, NSFnet, telnet¹, Usenet, UUCP, World Wide Web.

Internet2 *n.* A computer-network development project launched in 1996 by a collaborative group of 120 universities under the auspices of the University Corporation for Advanced Internet Development (UCAID). The consortium is now being led by over 190 universities working with industry and government. The goal of Internet2, whose high-speed, fiberoptic backbone was brought on line in early 1999, is the development of advanced Internet technologies and applications for use in research and education at the university level. Though not open for public use, Internet2 and the technologies and applications developed by its members are intended to eventually benefit users of the commercial Internet as well. Some of the new technologies Internet2 and its members are developing and testing include IPv6, multicasting, and quality of service (QoS). Internet2 and the Next Generation Internet



L1 cache *n.* A memory cache built into i486 and higher-level processors to help improve processing speed. The L1 cache, typically containing 8 KB, can be read in a single clock cycle, so it is tried first. The i486 contains one L1 cache; the Pentium contains two, one for code and one for data. *Also called:* level 1 cache, on-chip cache. *See also* cache, i486DX, Pentium. *Compare* L2 cache.

L2 cache *n.* A memory cache consisting of static RAM on a motherboard that uses an i486 or higher-level processor. The L2 cache, which typically contains 128 KB to 1 MB, is faster than the system DRAM but slower than the L1 cache built into the CPU chip. *Also called:* level 2 cache. *See also* cache, dynamic RAM, i486DX, static RAM. *Compare* L1 cache.

L2TP *n.* *See* Layer Two Tunneling Protocol.

L8R *adv.* Abbreviation for later, as in “See you later,” an expression often used in e-mail or Usenet groups as a closing remark.

label *n.* An identifier. A label can be a physical item, such as a stick-on tag used to identify disks and other computer equipment, or an electronic label added to floppy disks or hard disks. It can also be a word, symbol, or other group of characters used to identify a file, a storage medium, an element defined in a computer program, or a specific item in a document such as a spreadsheet or a chart. *See also* identifier.

label edge router *n.* *See* MPLS.

label prefix *n.* In a spreadsheet, a character at the beginning of a cell entry that identifies the entry to the program as a label.

label switching *n.* *See* MPLS.

label switch path *n.* *See* MPLS.

label switch router *n.* *See* MPLS.

LACP *n.* Acronym for **Link Aggregation Control Protocol**. *See* link aggregation.

lag *n.* The time difference between two events. In electronics, a lag is a delay between a change in input and a change in output. On computer displays, a lag is a fading

brightness left on the phosphor coating of the screen after an image changes. *See also* persistence.

LAN *n.* Acronym for **local area network**. A group of computers and other devices dispersed over a relatively limited area and connected by a communications link that enables any device to interact with any other on the network. LANs commonly include PCs and shared resources such as laser printers and large hard disks. The devices on a LAN are known as nodes, and the nodes are connected by cables through which messages are transmitted. *See also* baseband network, broadband network, bus network, client/server architecture, collision detection, communications protocol, contention, CSMA/CD, network, peer-to-peer architecture, ring network, star network. *Compare* WAN.

landscape mode *n.* A horizontal print orientation in which text or images are printed “sideways”—that is, the width of the image on the page is greater than the height. *Compare* portrait mode.

landscape monitor *n.* A monitor that is wider than it is high. Landscape monitors are usually about 33 percent wider than they are high—roughly the same proportion as a television screen. *Compare* full-page display, portrait monitor.

LANE *n.* Acronym for **LAN Emulation**. *See* ATM (definition 1), communications protocol, LAN.

LANGID *n.* *See* language identifier.

language *n.* *See* programming language.

language-description language *n.* *See* metalanguage.

language identifier *n.* A standard international numeric abbreviation for a country or geographical region. A language identifier is a 16-bit value that consists of a primary language identifier and a secondary language identifier. *Acronym:* LANGID. *See also* locale identifier.

language processor *n.* A hardware device or a software program designed to accept instructions written in a particular language and translate them into machine code. *See also* compiler (definition 2), interpreter.



identifier (LCID) identifies the primary language and any secondary language of a specific locale. *Acronym:* LCID. *See also* language identifier.

localhost *n.* The name that is used to represent the same computer on which a TCP/IP message originates. An IP packet sent to localhost has the IP address 127.0.0.1 and does not actually go out to the Internet. *See also* IP address, packet (definition 1), TCP/IP.

localization *n.* The process of altering a program so that it is appropriate for the geographic area in which it is to be used. Localization involves the customization or translation of the separated data and resources required for a specific region or language. For example, the developers of a word processing program must localize the sorting tables in the program for different countries or languages because the correct order of characters in one language might be incorrect in another. L10N is a common abbreviation for Localization, where the “L” in Localization is followed by 10 letters and ends with the letter “N.”

localized version *n.* A version of a program that has been translated into another language. *Also called:* international version.

local loop *n.* The (end) portion of a telephone connection that runs from the subscriber to the local telephone exchange. *See also* last mile.

local memory *n.* In multiprocessor systems, the memory on the same card or high-speed bus as a particular processor. Typically, memory that is local to one processor cannot be accessed by another without some form of permission.

local newsgroups *n.* Newsgroups that are targeted toward a geographically limited area such as a city or educational institution. Posts to these newsgroups contain information that is specific to the area, concerning such topics as events, meetings, and sales. *See also* newsgroup.

local reboot *n.* A reboot of the machine that one is directly working on, rather than of a remote host. *See also* reboot.

LocalTalk *n.* An inexpensive cabling scheme used by AppleTalk networks to connect Apple Macintosh computers, printers, and other peripheral devices. *See also* AppleTalk.

local user profile *n.* A user profile that is created automatically on the computer the first time a user logs on to a

computer. *See also* mandatory user profile, roaming user profile, user profile.

local variable *n.* A program variable whose scope is limited to a given block of code, usually a subroutine. *See also* scope (definition 1). *Compare* global variable.

location *n.* *See* address¹ (definition 1).

location-based service *n.* A service provided to a wireless mobile device based on the device's location. Location-based services can range from simple services, such as listing nearby restaurants, to more complex features, such as connecting to the Internet to monitor traffic conditions and find the least congested route to a destination.

lock *n.* **1.** A software security feature that requires a key or dongle in order for the application to run correctly. *See also* dongle. **2.** A mechanical device on some removable storage medium (for example, the write-protect notch on a floppy disk) that prevents the contents from being overwritten. *See also* write-protect notch.

locked file *n.* **1.** A file on which one or more of the usual types of manipulative operation cannot be performed—typically, one that cannot be altered by additions or deletions. **2.** A file that cannot be deleted or moved or whose name cannot be changed.

locked volume *n.* On the Apple Macintosh, a volume (storage device, such as a disk) that cannot be written to. The volume can be locked either physically or through software.

lockout *n.* The act of denying access to a given resource (file, memory location, I/O port), usually to ensure that only one program at a time uses that resource.

lock up *n.* A condition in which processing appears to be completely suspended and in which the program in control of the system will accept no input. *See also* crash¹.

log *n.* A record of transactions or activities that take place on a computer system. *See* logarithm.

logarithm *n.* Abbreviated log. In mathematics, the power to which a base must be raised to equal a given number. For example, for the base 10, the logarithm of 16 is (approximately) 1.2041 because $10^{1.2041}$ equals (approximately) 16. Both natural logarithms (to the base *e*, which is approximately 2.71828) and common logarithms (to the base 10) are used in programming. Languages such as C and Basic include functions for calculating natural logarithms.

message transfer agent *n.* See MTA.

messaging *n.* The use of computers and data communication equipment to convey messages from one person to another, as by e-mail, voice mail, or fax.

messaging application *n.* An application that enables users to send messages (such as e-mail or fax) to each other.

Messaging Application Programming Interface *n.* See MAPI.

messaging client *n.* An application program that enables its user to send or receive messages (such as e-mail or fax) to and from other users with the help of a remote server.

messaging-oriented middleware *n.* See MOM.

meta- *prefix* Literally, a prefix that describes a process or characteristic beyond the normal meaning of the word without the prefix. For example, metaphysics is “beyond physics.” In computing, meta- is usually attached to a word to indicate that the “metaterm” describes, defines, or acts upon objects or concepts of the same type as itself. So, for example, metadata is data about data and a meta-tool is a tool for working on tools.

metacharacter *n.* A character embedded in a program source or a data stream that conveys information about other characters, rather than itself representing a character. A simple example is the backslash (\) character, which, when used in strings in the C programming language, indicates that the letter following the backslash is part of an escape sequence that enables C to display a nongraphic character. See also escape character.

metacompiler *n.* A compiler that produces compilers. The UNIX utility *yacc* (Yet Another Compiler-Compiler) is a metacompiler. If it is given a language specification, yacc produces a compiler for that language. See also compiler (definition 2).

Meta-Content Format *n.* An open format for describing information about content of a structured body of data such as a Web page, a set of files on a Windows desktop, or a relational database. Meta-Content Format might be used for indexes, data dictionaries, or price lists. *Acronym:* MCF.

metadata or **meta data** *n.* **1.** Data about data. For example, the title, subject, author, and size of a file constitute metadata about the file. See also data dictionary, repository. **2.** In the Microsoft .NET Framework, information that describes every element managed by the runtime: an

assembly, loadable file, type, method, and so on. This can include information required for debugging and garbage collection, as well as security attributes, marshaling data, extended class and member definitions, version binding, and other information required by the runtime.

Metadata Interchange Specification *n.* A set of specifications dealing with the exchanging, sharing, and managing of metadata. *Acronym:* MDIS. See also metadata (definition 1).

metafile *n.* A file that contains or defines other files. Many operating systems use metafiles to contain directory information about other files on a given storage device.

metaflow *n.* One of the four stages of the data warehousing process, during which metadata (data about data) is tracked and managed; the business modeling stage. During metaflow, the operational environment is mapped to the data warehouse environment. See also data warehouse (definition 2), downflow, inflow, metadata (definition 1), upflow.

metalanguage *n.* A language used to describe other languages. Backus-Naur form (BNF) is a metalanguage commonly used to define programming languages. Also called: language-description language. See also Backus-Naur form.

metal-oxide semiconductor *n.* See MOS.

metal-oxide semiconductor field-effect transistor *n.* See MOSFET.

metaoperating system *n.* An operating system under which several other operating systems are active. Also called: supervisor.

metatag or **meta tag** *n.* A tag in an HTML or XML document that allows a Web-page creator to include such information as the author's name, keywords identifying content, and descriptive details (for example, non-text objects on the page). The information that is marked with metatags does not appear on the Web page when a user views it in a browser, but it can be viewed in the HTML or XML source. Metatags are included in the head of a document and are often used to assist search engines in indexing the page. See also HTML, source, tag, XML.

method *n.* In object-oriented programming, a process performed by an object when it receives a message. See also object (definition 2), object-oriented programming.

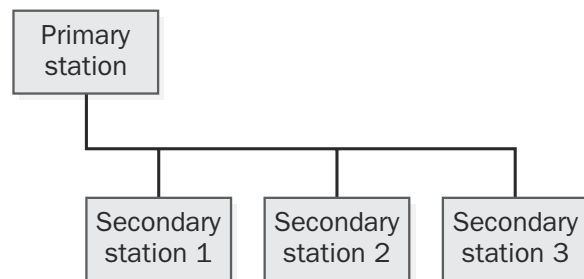
Metropolitan Area Exchange *n.* See MAE (definition 2).

metropolitan area network *n.* See MAN.

is the same if the two are reversed—for example, 2×3 and 3×2 . In arithmetic performed by computers, however, the multiplicand is different from the multiplier because computer multiplication is usually performed as addition. Therefore, 2×3 means “add 2 three times,” whereas 3×2 means “add 3 two times.” *See also* factor. *Compare* multiplier (definition 1).

multiplier *n.* **1.** In arithmetic, the number that indicates how many times another number (the multiplicand) is multiplied. *See also* factor. *Compare* multiplicand. **2.** In computing, an electronic device independent of the central processing unit (CPU) that performs multiplication by adding the multiplicand according to the value of the digits in the multiplier.

multipoint configuration *n.* A communications link in which multiple stations are connected sequentially to the same communications line. Typically, the communications line is controlled by a primary station, such as a computer, and the stations attached to the line are secondary. *See* the illustration.



Multipoint configuration.

multiport repeater *n.* *See* active hub.

multiprocessing *n.* A mode of operation in which two or more connected and roughly equal processing units each carry out one or more processes (programs or sets of instructions) in tandem. In multiprocessing, each processing unit works on a different set of instructions or on different parts of the same process. The objective is increased speed or computing power, the same as in parallel processing and in the use of special units called *coprocessors*. *Compare* coprocessor, parallel processing.

multiprogramming *n.* A form of processing in which a computer holds more than one program in memory and works on them in round-robin fashion—that is, by sharing out the processor’s time so that each program receives some

attention some of the time. This way of working is in contrast to using the processor to run one program at a time.

Multiprotocol Label Switching *n.* *See* MPLS.

Multi-Protocol Over ATM *n.* *See* MPOA.

Multipurpose Internet Mail Extensions *n.* *See* MIME.

Multipurpose Internet Mail Extensions HTML *n.* *See* MHTML.

multiscan monitor *n.* A computer monitor capable of adapting to different video frequencies to accommodate multiple screen resolutions and to support different video adapters and graphics display methods.

Multistation Access Unit *n.* *See* MAU.

multisystem network *n.* A communications network in which two or more host computers can be accessed by network users.

multitasking *n.* A form of processing supported by most current operating systems in which a computer works on multiple tasks—roughly, separate “pieces” of work—seemingly at the same time by parceling out the processor’s time among the different tasks. Multitasking can be either cooperative or preemptive. In the former, the operating system relies on the task to voluntarily cede control to another task; in the latter, the operating system decides which task receives priority. *See also* background¹, context switching, cooperative multitasking, foreground¹, time slice.

multithreaded application *n.* A program capable of running more than one program thread simultaneously. *See also* multithreading (definition 1), thread (definition 1).

multithreading *n.* **1.** The running of several processes in rapid sequence (multitasking) within a single program. *See also* thread (definition 1). **2.** In data manipulation, a technique in which nodes in a tree data structure contain pointers to higher nodes to make traversal of the structure more efficient. *See also* thread (definition 2).

multi-tier *n.* *See* three-tier.

multiuser *n.* *See* multiuser system.

multiuser dungeon *n.* *See* MUD.

multiuser simulation environment *n.* *See* MUD.

multiuser system *n.* Any computer system that can be used by more than one person. Although a microcomputer

through the server to a CGI script for processing. *See also* CGI, CGI script, HTML.

naming container *n.* Any ASP.NET control that implements the INamingContainer interface. This is a marker interface that enables a control to create a new naming scope under itself so that ID attributes assigned to its child controls are unique within the entire ASP.NET page that contains the control.

NAMPS *n.* Acronym for **N**arrow-band **A**nalog **M**obile **P**hone **S**ervice. A standard proposed by Motorola Corporation that combines the current AMPS cellular telephone standard with digital signaling information, resulting in higher performance and increased capabilities. *See also* AMPS.

NAND *n.* Short for **NOT AND**. A logical operation that combines the values of two bits (0,1) or two Boolean values (false, true) that returns a value of 1 (or true) if one input value is 0 (or false), and returns a 0 (false) only if both inputs are true.

NAND gate *n.* Short for **NOT AND gate**. A digital circuit whose output is true (1) if any input is false (0). A NAND gate is an AND circuit (output with the value of 1 when all input values are 1) followed by a NOT circuit (output that is the logical complement of the input). Thus, NAND gate output is high if any of its inputs are low. *See also* AND gate, gate (definition 1), NOT gate.

nano- *prefix* Abbreviated *n.* Metric prefix meaning 10^{-9} (one billionth).

nanosecond *n.* One billionth of a second. A nanosecond is a time measure used to represent computing speed, particularly the speed at which electrical signals travel through circuits within the computer. *Acronym:* ns.

NAP *n.* *See* Network Access Point.

Napster *n.* An Internet music search application that allows users to search for and swap MP3 files over the Web. In response to a user request for a song or an artist, Napster searches the hard drives of all other Napster users on line. When the requested item is found, the file is downloaded to the computer making the request. Napster also includes a chat room and a library of most popular items. The introduction of Napster in 1999 sparked heated debate over copyright and digital distribution issues. *See also* MP3.

narrowband *n.* A bandwidth set aside by the FCC for mobile or portable radio services, such as advanced two-way paging systems, including transmission rates between 50 bps and 64 Kbps. Narrowband formerly referred to the bandwidth from 50 to 150 bps. *See also* bandwidth, FCC. *Compare* broadband.

narrowband ISDN *n.* Name used to distinguish current ISDN lines from the developing broadband ISDN technology. *See also* broadband ISDN, ISDN.

narowcast *vb.* To transmit data or programming to a defined or limited area or audience. A cable television company narrowcasts its programs only to subscribers, whereas network television stations *broadcast* to everyone with reception equipment in their transmission range. On the Web, content delivered to users via push technology represents a form of narrowcasting. *See also* unicast. *Compare* broadcast (definition 2), multicasting.

Narrow SCSI *n.* A SCSI or SCSI-2 interface that can transfer data only 8 bits at a time. *See also* SCSI, SCSI-2. *Compare* Fast/Wide SCSI, Wide SCSI.

NAS *n.* Acronym for **N**etwork-**A**ttached **S**torage. A platform-independent storage appliance connected to a network. NAS uses a storage unit with a built-in server that can communicate with clients over a network. NAS devices are popular for ease of maintenance, manageability, and scalability. *Compare* SAN.

NAT *n.* Acronym for **N**etwork **A**ddress **T**ranslation. The process of converting between IP addresses used within an intranet or other private network and Internet IP addresses. This approach makes it possible to use a large number of addresses within the private network without depleting the limited number of available numeric Internet IP addresses. Variations of NAT displaying similar functions include IP aliasing, IP masquerading, and Port Address Translation.

national attachment point *n.* *See* Network Access Point.

National Center for Supercomputing Applications *n.* *See* NCSA (definition 1).

National Committee for Information Technology Standards *n.* A committee formed by the Information Technology Industry Council to develop national standards for use in the information technology industry and to promote those standards for international use. *Acronym:* NCITS.

National Computer Security Association *n.* *See* ICISA.

Net surfing *n.* The practice of exploring the Internet without a specific goal in mind. The concept of Net surfing is similar to (and probably derived from) “channel surfing” in reference to watching television.

Net TV *n.* See Internet television.

NetWare *n.* A family of LAN (local area network) operating system products developed by Novell, Inc. Designed to run on PCs and Macintoshes, Novell NetWare allows users to share files and system resources such as hard disks and printers. See also network operating system.

network *n.* A group of computers and associated devices that are connected by communications facilities. A network can involve permanent connections, such as cables, or temporary connections made through telephone or other communication links. A network can be as small as a LAN (local area network) consisting of a few computers, printers, and other devices, or it can consist of many small and large computers distributed over a vast geographic area (WAN, or wide area network). See also ALOHAnet, Ethernet (definition 1), LAN, WAN.

Network Access Point *n.* One of the interchange points for Internet traffic, where various Internet network carriers and major ISPs exchange data. When Internet traffic originates on one network and goes to another network, it almost always passes through at least one Network Access Point, or NAP. In the United States, major NAPs include MAE East, in Vienna, Virginia, and MAE West, in San Jose, California (both operated by MCI WorldCom); the Chicago NAP (operated by Ameritech); the Pacific Bell NAP (with multiple locations in California); the Digital Internet Exchange in Palo Alto, California (operated by Digital/Compaq); and the Sprint NAP in Pennsauken, New Jersey. Additional local and regional exchange points are located in many other locations around the world. *Acronym:* NAP. *Also called:* National Attachment Point.

network adapter *n.* See network interface card.

Network Address Translation *n.* See NAT.

network administrator *n.* The person in charge of operations on a computer network. The duties of a network administrator can be broad and might include such tasks as installing new workstations and other devices, adding and removing individuals from the list of authorized users, archiving files, overseeing password protection and other security measures, monitoring usage of shared resources, and handling malfunctioning equipment. See also system administrator.

network architecture *n.* The underlying structure of a computer network, including hardware, functional layers, interfaces, and protocols, used to establish communication and ensure the reliable transfer of information. Network architectures are designed to provide both philosophical and physical standards for the complexities of establishing communications links and transferring information without conflict. Various network architectures exist, including the internationally accepted seven-layer ISO Open Systems Interconnection (OSI) model and IBM's Systems Network Architecture (SNA). See also ISO/OSI reference model, SNA.

Network-Attached Storage *n.* See NAS.

network boot *n.* See PXE boot.

network card *n.* See network interface card.

network-centric computing *n.* A computing environment in which a network server or servers represent the hub of activity. Considered the “third wave” in large-system computing after mainframe and desktop developments, network-centric computing establishes servers as the main source of computing power, to give users direct access to network-based applications and information. In network-centric computing systems, applications are not preinstalled or uninstalled locally, that is, on the desktop; they are accessed on an as-needed, “on-the-fly” basis. Thus, individual desktop computers do not have to maintain large amounts of disk storage or load and manage application programs. See also server.

network computer *n.* A computer designed for use on a network in which programs and storage are provided by servers. Network computers, unlike dumb terminals, have their own processing power, but their design does not include local storage and they depend on network servers for applications. *Acronym:* NC.

network congestion *n.* See congestion.

network connection *n.* See Ethernet.

network control program *n.* In a communications network that includes a mainframe computer, a program that usually resides in a communications controller and takes over communications tasks such as routing, error control, line control, and polling (checking terminals for transmissions), leaving the main computer free for other functions. See also communications controller.

Network Control Protocol *n.* See Point-to-Point Protocol.

network database *n.* **1.** A database that runs in a network. **2.** A database containing the address of other users in the network. **3.** In information management, a type of database in which data records can be related to one another in more than one way. A network database is similar to a hierarchical database in the sense that it contains a progression from one record to another. It differs in being less rigidly structured: any single record can point to more than one other record and, conversely, can be pointed to by one or more records. In effect, a network database allows more than one path between any two records, whereas a hierarchical database allows only one, from parent (higher-level record) to child (lower-level record). *Compare* hierarchical database, relational database.

Network Data Management Protocol *n.* *See* NDMP.

network device driver *n.* Software that coordinates communication between the network adapter card and the computer's hardware and other software, controlling the physical function of the network adapter card.

network directory *n.* On a local area network, a directory on a disk that is located on a computer other than the one the user is operating. A network directory differs from a network drive in that the user has access to only that directory. Whether the rest of the disk is accessible to the user depends on whether he or she has been granted access rights by the network administrator. On the Macintosh, a network directory is referred to as a shared folder. *Also called:* networked directory, shared directory. *See also* network drive, shared folder.

network drive *n.* On a local area network, a disk drive whose disk is available to other computers on the network. Access to a network drive might not be allowed to all users of the network; many operating systems contain security provisions that enable a network administrator to grant or deny access to part or all of a network drive. *Also called:* networked drive. *See also* network directory.

Network Driver Interface Specification *n.* *See* NDIS.

networked directory *n.* *See* network directory.

networked drive *n.* *See* network drive.

networked home *n.* *See* smart home.

Network File System *n.* *See* NFS.

network information center *n.* *See* NIC (definition 2).

network interface card *n.* An expansion card or other device used to provide network access to a computer or other device, such as a printer. Network interface cards

mediate between the computer and the physical media, such as cabling, over which transmissions travel. *Acronym:* NIC. *Also called:* network adapter, network card.

Network Kernel Extension *n.* *See* NKE.

network latency *n.* The time it takes for information to be transferred between computers in a network.

network layer *n.* The third of the seven layers in the ISO/OSI reference model for standardizing computer-to-computer communications. The network layer is one level above the data-link layer and ensures that information arrives at its intended destination. It is the middle of the three layers (data-link, network, and transport) concerned with the actual movement of information from one device to another. *See* the illustration. *See also* ISO/OSI reference model.

ISO/OSI MODEL	
ISO/OSI Layer	Focus
Application (highest level)	Program-to-program transfer of information
Presentation	Text formatting and display, code conversion
Session	Establishing, maintaining, and coordinating communication
Transport	Accurate delivery, service quality
Network	Transport routes, message handling and transfer
Data-link	Coding, addressing, and transmitting information
Physical	Hardware connections

Network layer.

network meltdown *n.* *See* broadcast storm, meltdown.

network model *n.* A database structure, or layout, similar to a hierarchical model, except that records can have multiple parent records as well as multiple child records. A database management system that supports a network model can be used to simulate a hierarchical model. *See also* CODASYL, network database (definition 3). *Compare* hierarchical model.

network modem *n.* A modem that is shared by users of a network for calling an online service provider, an ISP, a service bureau, or other online source. *See also* ISP, modem online information service, service bureau (definition 2).

news.announce.newusers *n.* A newsgroup that contains general information for new users about using Internet newsgroups.

newsfeed or **news feed** *n.* Deliveries, exchanges, or distributions of newsgroup articles to and from news servers. Newsfeeds are accomplished through cooperating news servers, which communicate via NNTP through network connections. *Also called:* feed. *See also* newsgroup, news server, NNTP.

newsgroup *n.* A forum on the Internet for threaded discussions on a specified range of subjects. A newsgroup consists of articles and follow-up posts. An article with all of its follow-up posts—which are (supposed to be) related to the specific subject named in the original article’s subject line—constitutes a thread. Each newsgroup has a name that consists of a series of words, separated by periods, indicating the newsgroup’s subject in terms of increasingly narrow categories, such as rec.crafts.textiles.needlework. Some newsgroups can be read and posted to only on one site; others, such as those in the seven Usenet hierarchies or those in ClariNet, circulate throughout the Internet. *See also* article, bit, newsgroups, ClariNet, follow-up, Great Renaming, local newsgroups, mail reflector, threaded discussion, traditional newsgroup hierarchy, Usenet. *Compare* mailing list.

newsmaster *n.* The person in charge of maintaining the Internet news server at a particular host. Sending e-mail to “newsmaster@domain.name” is the standard way to reach a given newsmaster.

news. newsgroups *n.* Usenet newsgroups that are part of the news. hierarchy and begin with “news.” These newsgroups cover topics that deal with Usenet itself, such as Usenet policy and the creation of new Usenet newsgroups. *See also* newsgroup, traditional newsgroup hierarchy, Usenet. *Compare* comp. newsgroups, misc. newsgroups, rec. newsgroups, sci. newsgroups, soc. newsgroups, talk. newsgroups.

.newsrsrc *n.* The file extension that identifies a setup file for UNIX-based newsreaders. The setup file typically contains a current list of newsgroups that the user subscribes to and the articles in each newsgroup that the user has already read. *See also* newsreader, setup (definition 2).

newsreader *n.* A Usenet client program that enables a user to subscribe to Usenet newsgroups, read articles, post follow-ups, reply by e-mail, and post articles. Many Web browsers also provide these functions. *See also* article,

e-mail (definition 1), follow-up, newsgroup, Usenet, Web browser.

news server *n.* A computer or program that exchanges Internet newsgroups with newsreader clients and other servers. *See also* newsgroup, newsreader.

Newton *n.* A personal digital assistant (PDA) developed by Apple Computer, Inc. *See also* PDA.

Newton OS *n.* The operating system that controls the Newton MessagePad personal digital assistant (PDA). *See also* PDA.

NeXT *n.* A computer designed and produced by NeXT Computer, Inc. (later NeXT Software, Inc.), a computer manufacturer and software developer founded in 1985 by Steven Jobs. NeXT was purchased by Apple Computer in 1997.

Next Generation Internet *n.* An initiative funded by the U.S. federal government designed to develop faster, more powerful networking technologies than are available on the current global Internet. The Next Generation Internet, or NGI, was begun in 1997 under the auspices of a number of government agencies, including DARPA (Defense Advanced Research Projects Agency), NASA (National Aeronautics & Space Administration), and the NSF (National Science Foundation). Its objective is to develop advanced networking technologies and to demonstrate them on university and government test networks running 100 to 1000 times faster than the current Internet. The technologies developed are intended for eventual use by schools, businesses, and the general public. *Acronym:* NGI. *Compare* Internet, Internet2.

NFS *n.* Acronym for Network File System. A distributed file system that allows users to access remote files and directories on a network as if they were local. NFS is compatible with Microsoft Windows and UNIX-based systems, including Linux and Mac OS X.

NGI *n.* *See* Next Generation Internet.

nibble or **nybble** *n.* Half a byte (4 bits). *Compare* quadbit.

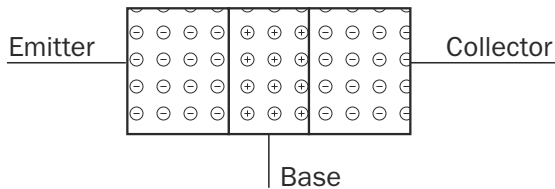
NIC *n.* **1.** *See* network interface card. **2.** Acronym for network information center. An organization that provides information about a network and other support to users of the network. The principal NIC for the Internet is InterNIC. Intranets and other private networks may have their own NICs. *See also* InterNIC.

NiCad battery *n.* *See* nickel cadmium battery.

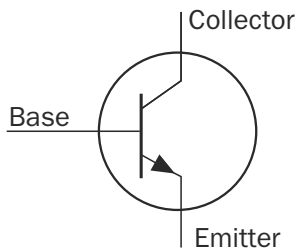


an NPN transistor, electrons represent the majority of the charge carriers, and they flow from the emitter to the collector. See the illustration. *See also* N-type semiconductor, P-type semiconductor. *Compare* PNP transistor.

Internal diagram



Schematic diagram



NPN transistor.

NQL *n.* *See* Network Query Language.

NRZ *n.* *See* nonreturn to zero.

ns *n.* *See* nanosecond.

NSAPI *n.* Acronym for Netscape Server Application Programming Interface. A specification for interfaces between the Netscape HTTP server and other application programs. NSAPI can be used to provide access to application programs from a Web browser through a Web server. *See also* HTTP server (definition 1), Web browser.

NSF *n.* *See* National Science Foundation.

NSFnet *n.* Short for the National Science Foundation Network. A WAN (wide area network), developed by the National Science Foundation to replace ARPANET for civilian purposes. NSFnet served as a major backbone for the Internet until mid-1995. Backbone services in the United States for the Internet are now provided by commercial carriers. *See also* ARPANET, backbone (definition 1).

NSFnet Network Information Center *n.* *See* InterNIC.

NSI *n.* Acronym for Network Solutions, Inc. The organization responsible, since 1992, for registering top-level

Internet domain names and maintaining the authoritative (“A”) database of top-level domains replicated daily on 12 other root servers on the Internet. In 1998, with the privatization of Internet administration, the functions performed by NSI (under cooperative agreement with the U.S. National Science Foundation) became the responsibility of ICANN, a new, nonprofit organization. NSI remains active, but its association with the U.S. government entered the “ramping down” phase in 1998/1999. *See also* IANA, ICANN.

NT *n.* *See* Windows NT.

NT-1 *n.* *See* Network Terminator 1.

NT file system *n.* *See* NTFS.

NTFS *n.* Acronym for NT file system. An advanced file system designed for use specifically with the Windows NT operating system. It supports long filenames, full security access control, file system recovery, extremely large storage media, and various features for the Windows NT POSIX subsystem. It also supports object-oriented applications by treating all files as objects with user-defined and system-defined attributes. *See also* FAT file system, HPFS, POSIX.

NTLM authentication protocol *n.* A challenge/response authentication protocol. The NTLM authentication protocol was the default for network authentication in Windows NT version 4.0 and earlier and Windows Millennium Edition (Windows Me) and earlier. The protocol continues to be supported in Windows 2000 and Windows XP but no longer is the default. *See also* Kerberos.

NTP *n.* Acronym for Network Time Protocol. A protocol used for synchronizing the system time on a computer to that of a server or other reference source such as a radio, satellite receiver, or modem. NTP provides time accuracy within a millisecond on local area networks and a few tens of milliseconds on wide area networks. NTP configurations may utilize redundant servers, diverse network paths, and cryptographic authentication to achieve high accuracy and reliability.

NTSC *n.* Acronym for National Television System (later changed to Standards) Committee. The standards-setting body for television and video in the United States. It is the sponsor of the NTSC standard for encoding color, a coding system compatible with black-and-white signals and the system used for color broadcasting in the United States.

P

p *prefix* See pico-.

P *prefix* See peta-.

P2P or P-to-P *n.* An Internet-based networking option in which two or more computers connect directly to each other to communicate and share files without use of a central server. Interest in P2P networking blossomed with the introduction of Napster and Gnutella. Short for Peer-to-Peer. *See also* peer-to-peer architecture, peer-to-peer communications.

P3P *n.* Acronym for **P**latform for **P**rivacy **P**references. An open W3C protocol that allows Internet users to control the type of personal information that is collected by the Web sites they visit. P3P uses User Agents built into browsers and Web applications to allow P3P-enabled Web sites to communicate privacy practices to users before they log on to the Web site. P3P compares the Web site's privacy policies with the user's personal set of privacy preferences, and it reports any disagreements to the user.

P5 *n.* Intel's internal working name for the Pentium microprocessor. Although it was not intended to be used publicly, the name P5 leaked out to the computer-industry trade press and was commonly used to reference the microprocessor before it was released. *See also* 586, Pentium.

pack *vb.* To store information in a more compact form. Packing eliminates unnecessary spaces and other such characters and may use other special methods of compressing data as well. It is used by some programs to minimize storage requirements.

package *n.* **1.** A computer application consisting of one or more programs created to perform a particular type of work—for example, an accounting package or a spreadsheet package. **2.** In electronics, the housing in which an electronic component is packaged. *See also* DIP. **3.** A group of classes or interfaces and a keyword in the Java programming language. Packages are declared in Java by using the “package” keyword. *See also* class, declare, interface (definition 1), keyword.

packaged software *n.* A software program sold through a retail distributor, as opposed to custom software. *See also* canned software.

packed decimal *adj.* A method of encoding decimal numbers in binary form that maximizes storage space by using each byte to represent two decimal digits. When signed decimal numbers are stored in packed decimal format, the sign appears in the rightmost four bits of the rightmost (least significant) byte.

packet *n.* **1.** A unit of information transmitted as a whole from one device to another on a network. **2.** In packet-switching networks, a transmission unit of fixed maximum size that consists of binary digits representing both data and a header containing an identification number, source and destination addresses, and sometimes error-control data. *See also* packet switching.

packet assembler and disassembler *n.* *See* packet assembler/disassembler.

packet assembler/disassembler *n.* An interface between non-packet-switching equipment and a packet-switching network. *Acronym:* PAD.

packet filtering *n.* The process of controlling network access based on IP addresses. Firewalls will often incorporate filters that allow or deny users the ability to enter or leave a local area network. Packet filtering is also used to accept or reject packets such as e-mail, based on the origin of the packet, to ensure security on a private network. *See also* firewall, IP address, packet (definition 1).

packet flooding *n.* A technique employed in a number of DoS (denial of service) attacks in which a flood of packets of data are sent to a target server, overwhelming the computer and rendering it unable to respond to legitimate network requests. Examples of specific types of packet flooding include smurf attacks and SYN flood attacks. *See also* DoS, packet, smurf attack, SYN flood.

packet header *n.* The portion of a data packet that precedes the body (data). The header contains data, such as

P

source and destination addresses and control and timing information, that is needed for successful transmission.

Packet Internet Groper *n.* See ping¹ (definition 1).

packet sniffer *n.* A hardware and/or software device that examines every packet sent across a network. To work, a packet sniffer must be installed in the same network block as the network it is intended to sniff. Designed as a problem-solving tool to isolate problems degrading network performance, packet sniffers have become security risks on some networks because crackers can use them to capture nonencrypted user IDs, passwords, credit card numbers, e-mail addresses, and other confidential information. *See also* cracker, packet. *Compare* monitoring software.

packet switching *n.* A message-delivery technique in which small units of information (packets) are relayed through stations in a computer network along the best route available between the source and the destination. A packet-switching network handles information in small units, breaking long messages into multiple packets before routing. Although each packet may travel along a different path, and the packets composing a message may arrive at different times or out of sequence, the receiving computer reassembles the original message correctly. Packet-switching networks are considered to be fast and efficient. To manage the tasks of routing traffic and assembling/disassembling packets, such a network requires some intelligence from the computers and software that control delivery. The Internet is an example of a packet-switching network. Standards for packet switching on networks are documented in the International Telecommunication Union (ITU) recommendation X.25. *Compare* circuit switching.

Packet Switching Exchange *n.* An intermediary switching station in a packet-switching network.

packet trailer *n.* The portion of a data packet that follows the body (data). The trailer typically contains information related to error checking and correction. *See also* packet.

packing density *n.* The number of storage units per length or area of a storage device. Bits per inch is one measure of packing density.

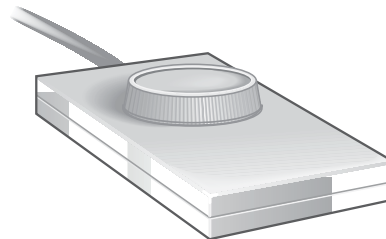
PackIT *n.* A file format used on the Apple Macintosh to represent collections of Mac files, possibly Huffman compressed. *See also* Huffman coding, Macintosh.

PAD *n.* *See* packet assembler/disassembler.

pad character *n.* In data input and storage, an extra character inserted as filler to use up surplus space in a predefined block of a specified length, such as a fixed-length field.

padding *n.* In data storage, the addition of one or more bits, usually zeros, to a block of data to fill it, to force the actual data bits into a certain position, or to prevent the data from duplicating a bit pattern that has an established meaning, such as an embedded command.

paddle *n.* An early type of input device often used with computer games especially for side-to-side or up-and-down movements of an on-screen object. A paddle is less sophisticated than a joystick because it permits the user, by turning a dial, to specify movement along only a single axis. The paddle got its name because its most popular use was to control the on-screen paddles in the simple early video games, such as Pong. *See* the illustration.



Paddle.

paddle switch *n.* Any switch that has a wide handle. The large on/off switch on many IBM personal computers is one type of paddle switch.

page *n.* **1.** In word processing, the text and display elements to be printed on one side of a sheet of paper, subject to formatting specifications such as depth, margin size, and number of columns. **2.** A fixed-size block of memory. When used in the context of a paging memory system, a page is a block of memory whose physical address can be changed via mapping hardware. *See also* EMS, memory management unit, virtual memory. **3.** In computer graphics, a portion of display memory that contains one complete full-screen image; the internal representation of a screenful of information. **4.** *See* Web page.

page banner *n.* A section of a Web page containing a graphic element and text, such as the page title. Page banners are usually displayed at the top of a Web page. Page banners can also be used to link to other Web sites for advertising purposes. *Also called:* banner.

circumstances. Patching is a common means of adding a feature or a function to a program until the next version of the software is released. *Compare* hack (definition 2), kludge (definition 2).

path *n.* **1.** In communications, a link between two nodes in a network. **2.** A route through a structured collection of information, as in a database, a program, or files stored on disk. **3.** In programming, the sequence of instructions a computer carries out in executing a routine. **4.** In information processing, such as the theory underlying expert (deductive) systems, a logical course through the branches of a tree of inferences leading to a conclusion. **5.** In file storage, the route followed by the operating system through the directories in finding, sorting, and retrieving files on a disk. **6.** In graphics, an accumulation of line segments or curves to be filled or drawn.

path menu *n.* In windowed environments, the menu or drop box used to enter the universal naming convention path to a shared network resource.

pathname *n.* In a hierarchical filing system, a listing of the directories or folders that lead from the current directory to a file. *Also called:* directory path.

pattern recognition *n.* **1.** A broad technology describing the ability of a computer to identify patterns. The term usually refers to computer recognition of visual images or sound patterns that have been converted to arrays of numbers. **2.** The recognition of purely mathematical or textual patterns.

P

Pause key *n.* **1.** A key on a keyboard that temporarily stops the operation of a program or a command. The Pause key is used, for example, to halt scrolling so that a multi-screen listing or document can be read. **2.** Any key that creates a pause in an operation. For example, many game programs have a Pause key, often simply the P key, that temporarily suspends the game.

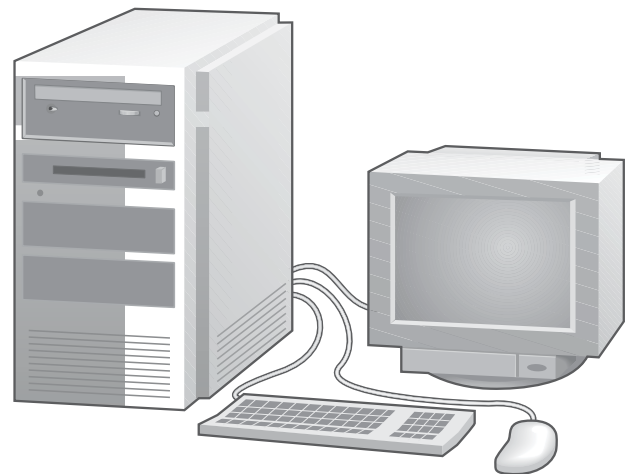
payload *n.* The effects caused by a virus or other malicious code. The payload of a virus may include moving, altering, overwriting, and deleting files, or other destructive activity. A virus or worm may contain more than one payload, each with a separate trigger.

PB *n.* *See* petabyte.

PB SRAM *n.* *See* pipeline burst static RAM.

PBX *n.* Acronym for **P**riate **B**ranch **E**xchange. An automatic telephone switching system that enables users within an organization to place calls to each other without going through the public telephone network. Users can also place calls to outside numbers.

PC *n.* **1.** A microcomputer that conforms to the standard developed by IBM for personal computers, which uses a microprocessor in the Intel 80x86 family (or compatible) and can execute the BIOS. *See* the illustration. *See also* 8086, BIOS, clone, IBM PC. **2.** A computer in IBM's Personal Computer line. *Also called:* IBM PC. *See also* PC-compatible (definition 1), personal computer.



PC.

PCB *n.* *See* printed circuit board.

PC board *n.* *See* printed circuit board.

PC Card *n.* An add-in card that conforms to the PCMCIA specification. A PC Card is a removable device, approximately the same size as a credit card, that is designed to plug into a PCMCIA slot. Release 1 of the PCMCIA specification, introduced in June 1990, specified a Type I card that is 3.3 millimeters thick and is intended to be used primarily as a memory-related peripheral. Release 2 of the PCMCIA specification, introduced in September 1991, specifies both a 5-millimeter-thick Type II card and a 10.5-millimeter-thick Type III card. Type II cards accommodate devices such as modem, fax, and network cards. Type III cards accommodate devices that require more space, such as wireless communications devices and rotating storage media (such as hard disks). *See also* PCMCIA, PCMCIA slot.

of a chip-level hardware layer, a firmware and operating-system layer, and an applications program layer, the bottommost layer of a machine is often called a platform.

2. In everyday usage, the type of computer or operating system being used.

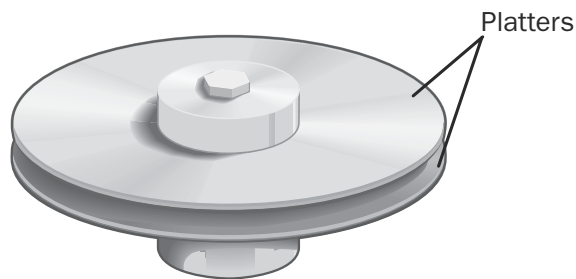
Platform for Internet Content Selection *n.* A specification for rating and labeling Internet content. Originally developed by the World Wide Web Consortium to enable parents, teachers, administrators, and other caretakers to control the material to which children have online access, its use has expanded to include the protection of privacy and intellectual property. PICS is not itself a system for rating Internet content. Rather, it specifies the format conventions to be used by rating systems in devising labels that can be read by PICS-compatible software. *Acronym:* PICS.

Platform for Privacy Preference Project *n.* See P3P.

Platform for Privacy Preferences *n.* See P3P.

platform invoke *n.* The functionality provided by the run time to enable managed code to call unmanaged native DLL entry points.

platter *n.* One of the individual metal data storage disks within a hard disk drive. Most hard disks have from two to eight platters. See the illustration. *See also* hard disk.



Platter.

player *n.* In relation to digital audio, a program that plays music and other audio files that have been ripped (transferred from a compact disc to a hard disk) and then encoded in a playable format, such as MP3. *See also* encoder, MP3, ripper.

PlayStation *n.* Sony Corporation's console computer entertainment gaming system. PlayStation 2, the latest version, is a 128-bit system that features a 300-Mhz pro-

cessor, 32 MB of Direct RDRAM main memory, and a floating-point performance of 6.2 GFLOPS. PlayStation 2 also offers the capability to play CDs and DVDs. *See also* computer game, console game. *Compare* Dreamcast, GameCube, Xbox.

PL/C *n.* A version of the PL/I programming language developed at Cornell University and used on mainframe computers. *See also* PL/I.

PLCC *n.* Acronym for **plastic leadless chip carrier**. An inexpensive variation of the leadless chip carrier (LCC) method of mounting chips on boards. Although the two carriers are similar in appearance, PLCCs are physically incompatible with leadless chip carriers, which are made from a ceramic material. *See also* leadless chip carrier.

PLD *n.* *See* programmable logic device.

PL/I *n.* Acronym for **Programming Language I (One)**. A programming language developed by IBM (1964–1969), designed to bring together the key features of FORTRAN, COBOL, and ALGOL while introducing such new concepts as condition-based error handling and multitasking. The result of this effort was a compiled, structured language that was so complex that it never gained widespread acceptance. Nevertheless, PL/I is still used in some academic and research environments. *See also* ALGOL, COBOL, compiled language, FORTRAN.

PL/M *n.* Acronym for **Programming Language for Microcomputers**. A programming language derived from PL/I and developed in the early 1970s by Intel Corporation for microprocessors. PL/M was used primarily for the creation of operating systems. *See also* PL/I.

plot *vb.* To create a graphic or a diagram by connecting points representing variables (values) that are defined by their positions in relation to a horizontal (*x*) axis and a vertical (*y*) axis (and sometimes a depth, or *z*, axis).

plotter *n.* Any device used to draw charts, diagrams, and other line-based graphics. Plotters use either pens or electrostatic charges and toner. Pen plotters draw on paper or transparencies with one or more colored pens. Electrostatic plotters “draw” a pattern of electrostatically charged dots on the paper and then apply toner and fuse it in place. Plotters use three basic types of paper handling: flatbed,

preventive maintenance *n.* Routine servicing of hardware intended to keep equipment in good operating condition and to find and correct problems before they develop into severe malfunctions.

preview *n.* In word processors and other applications, the feature that formats a document for printing but displays it on the video monitor rather than sending it directly to the printer.

PRI *n.* Acronym for **Primary Rate Interface**. One of two ISDN transmission rate services (the other is the basic rate interface, BRI). PRI has two variations. The first, which operates at 1.536 Mbps, transmits data over 23 B channels and sends signaling information at 64 Kbps over one D channel in the United States, Canada, and Japan. The second, which operates at 1.984 Mbps, transmits data over 30 B channels and sends signaling information at 64 Kbps over one D channel in Europe and Australia. *See also* BRI, ISDN.

primary channel *n.* The data-transmission channel in a communications device, such as a modem. *Compare* secondary channel.

Primary Domain Controller *n.* **1.** In Windows NT, a database providing a centralized administration site for resources and user accounts. The database allows users to log onto the domain, rather than onto a specific host machine. A separate account database keeps track of the machines in the domain and allocates the domain's resources to users. **2.** In any local area network, the server that maintains the master copy of the domain's user accounts database and that validates logon requests. *Acronym:* PDC.

primary key *n.* In databases, the key field that serves as the unique identifier of a specific tuple (row) in a relation (database table). *Also called:* major key. *See also* alternate key (definition 1), candidate key. *Compare* secondary key.

Primary Rate Interface *n.* *See* PRI.

primary storage *n.* Random access memory (RAM); the main general-purpose storage region to which the microprocessor has direct access. A computer's other storage options, such as disks and tape, are called *secondary storage* or (sometimes) *backing storage*.

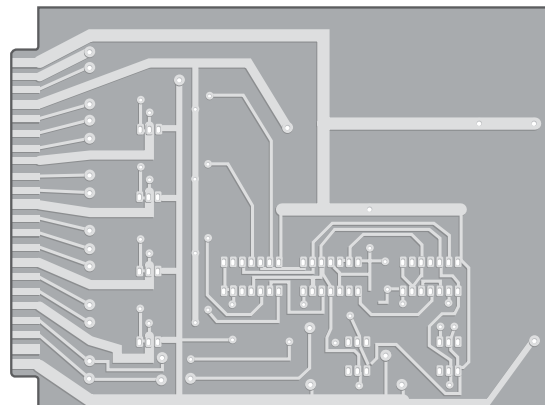
primitive *n.* **1.** In computer graphics, a shape, such as a line, circle, curve, or polygon, that can be drawn, stored, and manipulated as a discrete entity by a graphics program. A primitive is one of the elements from which a large graphic design is created. **2.** In programming, a fundamen-

tal element in a language that can be used to create larger procedures that do the work a programmer wants to do.

print *vb.* In computing, to send information to a printer. The word is also sometimes used in the sense of "show me" or "copy this." For example, the PRINT statement in Basic causes output to be displayed (printed) on the screen. Similarly, an application program that can be told to print a file to disk interprets the command as an instruction to route output to a disk file instead of to a printer.

print buffer *n.* A section of memory to which print output can be sent for temporary storage until the printer is ready to handle it. A print buffer can exist in a computer's random access memory (RAM), in the printer, in a separate unit between the computer and the printer, or on disk. Regardless of its location, the function of a print buffer is to free the computer for other tasks by taking print output at high speed from the computer and passing it along at the much slower rate required by the printer. Print buffers vary in sophistication: some simply hold the next few characters to be printed, and others can queue, reprint, or delete documents sent for printing.

printed circuit board *n.* A flat board made of nonconducting material, such as plastic or fiberglass, on which chips and other electronic components are mounted, usually in predrilled holes designed to hold them. The component holes are connected electrically by predefined conductive metal pathways that are printed on the surface of the board. The metal leads protruding from the electronic components are soldered to the conductive metal pathways to form a connection. A printed circuit board should be held by the edges and protected from dirt and static electricity to avoid damage. *See the illustration.* *Acronym:* PCB.



Printed circuit board.

P

analyzer can filter and decode traffic, suggest solutions to problems, provide graphical reports, and show traffic by protocol and percent utilization. *See also* communications protocol.

protocol layer *n.* *See* layer.

protocol stack *n.* The set of protocols that work together on different levels to enable communication on a network. For example, TCP/IP, the protocol stack on the Internet, incorporates more than 100 standards including FTP, IP, SMTP, TCP, and Telnet. *See also* ISO/OSI reference model. *Compare* protocol suite.

protocol suite *n.* A set of protocols designed, usually by one vendor, as complementary parts of a protocol stack. *Compare* protocol stack.

prototyping *n.* The creation of a working model of a new computer system or program for testing and refinement. Prototyping is used in the development of both new hardware and software systems and new systems of information management. Tools used in the former include both hardware and support software; tools used in the latter can include databases, screen mockups, and simulations that, in some cases, can be developed into a final product.

proxy *n.* A computer (or the software that runs on it) that acts as a barrier between a network and the Internet by presenting only a single network address to external sites. By acting as a go-between representing all internal computers, the proxy protects network identities while still providing access to the Internet. *See also* proxy server.

proxy server *n.* A firewall component that manages Internet traffic to and from a local area network (LAN) and can provide other features, such as document caching and access control. A proxy server can improve performance by supplying frequently requested data, such as a popular Web page, and can filter and discard requests that the owner does not consider appropriate, such as requests for unauthorized access to proprietary files. *See also* firewall.

PrtSc key *n.* *See* Print Screen key.

.ps *n.* The file extension that identifies PostScript printer files. *See also* PostScript.

PS/2 bus *n.* *See* Micro Channel Architecture.

PSD *n.* A graphics file format used to create, modify, and display still images in Photoshop, a software application designed by Adobe Systems. PSD files have a file extension of .psd.

PSE *n.* *See* Packet Switching Exchange.

psec *n.* *See* picosecond.

pseudocode *n.* **1.** A machine language for a nonexistent processor (a pseudomachine). Such code is executed by a software interpreter. The major advantage of p-code is that it is portable to all computers for which a p-code interpreter exists. The p-code approach has been tried several times in the microcomputer industry, with mixed success. The best known attempt was the UCSD p-System. *Abbreviation:* p-code. *See also* pseudomachine, UCSD p-System. **2.** Any informal, transparent notation in which a program or algorithm description is written. Many programmers write their programs first in a pseudocode that looks much like a mixture of English and their favorite programming language, such as C or Pascal, and then translate it line by line into the actual language being used.

pseudo compiler *n.* A compiler that generates a pseudolanguage. *See also* pseudolanguage.

pseudocomputer *n.* *See* pseudomachine.

pseudolanguage *n.* A nonexistent programming language—that is, one for which no implementation exists. The term can refer either to the machine language for a nonexistent processor or to a high-level language for which no compiler exists. *See also* pseudocode.

pseudomachine *n.* A processor that doesn't actually exist in hardware but that is emulated in software. A program written for the pseudomachine can run on several platforms without having to be recompiled. *Abbreviation:* p-machine. *See also* pseudocode, UCSD p-System.

pseudo-op *n.* *See* pseudo-operation.

pseudo-operation *n.* In programming, a program instruction that conveys information to an assembler or compiler but is not translated into a machine language instruction—for example, an instruction that establishes the value of a constant or the manner in which Boolean (logical) expressions are to be evaluated. *Abbreviation:* pseudo-op.

pseudo-streaming *n.* A method used for real-time display of audio and video over the Web. Unlike sound or video files that are downloaded to a computer in their entirety before they can be played back, pseudo-streaming enables playback after only a portion of the file—enough to fill a buffer on the receiving computer—has been downloaded. Pseudo-streaming, unlike “true,” or Web, streaming, does not depend on server software to dynamically monitor the transmission. It can, however, play back only

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from the beginning of the file, rather than from any point, as can be the case with true streaming. *See also* stream.

PSK *n.* *See* phase-shift keying.

PSN *n.* Acronym for **packet-switching network**. *See* packet switching.

PSTN *n.* *See* Public Switched Telephone Network.

p-system *n.* An operating system based on a pseudomachine implemented in software. A program written for the p-system is more portable than one written for a machine-dependent operating system. *See also* UCSD p-System.

P-type semiconductor *n.* Semiconductor material in which electrical conduction is carried by holes (“vacancies” left by electrons). Whether a semiconductor is N-type or P-type depends on the kind of dopant added during manufacture. A dopant with a shortage of electrons results in a P-type semiconductor. *Compare* N-type semiconductor.

pub *n.* *See* /pub.

/pub *n.* Short for **public**. A directory in an anonymous FTP archive that is accessible by the public and that generally contains files available for free download. *See also* anonymous FTP.

public *adj.* A keyword in some programming languages to signify that methods or variables can be accessed by elements residing in other classes or modules. *See also* class., keyword (definition 2), global variable, reserved word, scope. *Compare* private.

public directory *n.* A directory on an FTP server that is accessible by anonymous users for the purpose of retrieving or storing files. Often the directory is called /pub. *See also* anonymous FTP, FTP (definition 1), FTP server /pub.

public domain *n.* The set of all creative works, such as books, music, or software, that are not covered by copyright or other property protection. Works in the public domain can be freely copied, modified, and otherwise used in any manner for any purpose. Much of the information, texts, and software on the Internet is in the public domain, but putting a copyrighted work on the Internet does not put it in the public domain. *Compare* proprietary.

public-domain software *n.* A program donated for public use by its owner or developer and freely available for copying and distribution. *Compare* free software, free-ware, proprietary software, shareware.

public files *n.* Files with no access restrictions.

public folders *n.* The folders that are made accessible on a particular machine or by a particular user in a shared networking environment. *Compare* private folders.

public key *n.* One of two keys in public key encryption. The user releases this key to the public, who can use it for encrypting messages to be sent to the user and for decrypting the user’s digital signature. *See also* public key encryption. *Compare* private key.

public key cryptography *n.* *See* public key encryption.

public key encryption *n.* An asymmetric scheme that uses a pair of keys for encryption: the public key encrypts data, and a corresponding secret key decrypts it. For digital signatures, the process is reversed: the sender uses the secret key to create a unique electronic number that can be read by anyone possessing the corresponding public key, which verifies that the message is truly from the sender. *See also* private key, public key.

public rights *n.* In the context of the Internet, the extent to which members of the public are permitted to use (and to place) information on the Internet under intellectual property law. *See also* fair use, public domain, public-domain software.

Public Switched Telephone Network *n.* The public telephone system.

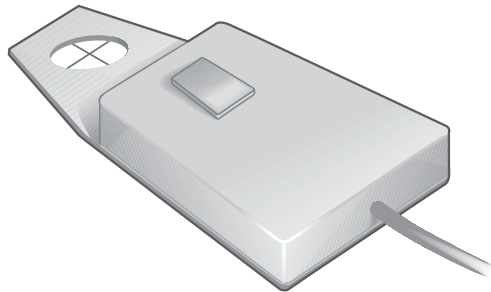
Publisher *n.* A software application developed by Microsoft Corporation to help businesses create high-quality marketing and business material. A part of the Office product family, Publisher provides business users with design options for a variety of publications, such as newsletters, flyers, brochures, and Web pages.

publishing point *n.* A publishing point is a virtual directory used for storing content or delivering a live stream. End users reach a publishing point through its URL. There are two types of unicast publishing points: on-demand for stored content and broadcast for live streams. *See also* on-demand publishing point, broadcast publishing point. *Compare* unicast.

puck *n.* A pointing device used with a graphics tablet. A puck, which is often used in engineering applications, is a mouselike device with buttons for selecting items or choosing commands and a clear plastic section extending from one end with cross hairs printed on it. The intersection of the cross hairs on the puck points to a location on the graphics tablet, which in turn is mapped to a specific

P

location on the screen. Because the puck's cross hairs are on a transparent surface, a user can easily trace a drawing by placing it between the graphics tablet and the puck and moving the cross hairs over the lines of the drawing. *See also* graphics tablet, stylus.



Puck.

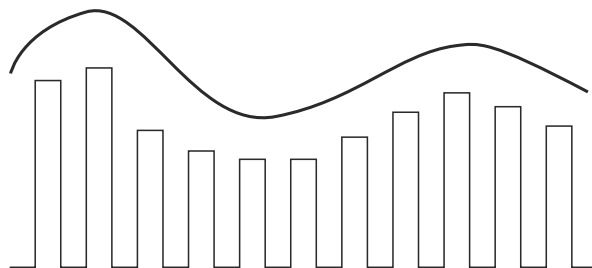
puff and sip device *n.* An assistive computer technology for people with mobility impairments. A puff and sip device is a head-mounted alternative to using a mouse or keyboard. For mouse functionality, the device allows a user to move the mouse pointer without using his or her hands by puffing air into a tube.

pull *vb.* The process of retrieving data from a network server. *Compare* push (definition 2). *See* pop.

pull-down menu *n.* A menu that is pulled down from the menu bar and that remains available as long as the user holds it open. *Compare* drop-down menu.

pulse *n.* A transient signal, usually brief and with a discrete onset and offset.

pulse amplitude modulation *n.* A method of encoding information in a signal by varying the amplitude of pulses. The unmodulated signal consists of a continuous train of pulses of constant frequency, duration, and amplitude. During modulation the pulse amplitudes are changed to reflect the information being encoded. *See the illustration.* *Acronym:* PAM. *Compare* pulse code modulation, pulse duration modulation, pulse position modulation.

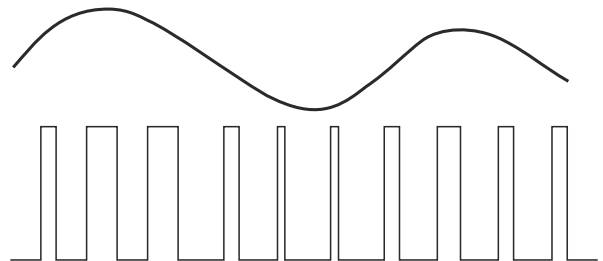


Pulse amplitude modulation.

pulse code modulation *n.* A method of encoding information in a signal by varying the amplitude of pulses. Unlike pulse amplitude modulation (PAM), in which pulse amplitude can vary continuously, pulse code modulation limits pulse amplitudes to several predefined values. Because the signal is discrete, or digital, rather than analog, pulse code modulation is more immune to noise than PAM. *Acronym:* PCM. *Compare* pulse amplitude modulation, pulse duration modulation, pulse position modulation.

pulse dialing *n.* *See* rotary dialing.

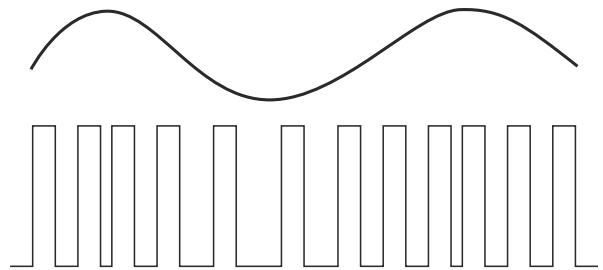
pulse duration modulation *n.* A method of encoding information in a signal by varying the duration of pulses. The unmodulated signal consists of a continuous train of pulses of constant frequency, duration, and amplitude. During modulation, the pulse durations are changed to reflect the information being encoded. *See the illustration.* *Acronym:* PDM. *Also called:* pulse length modulation, pulse width modulation.



Pulse duration modulation.

pulse length modulation *n.* *See* pulse duration modulation.

pulse position modulation *n.* A method of encoding information in a signal by varying the position of pulses. The unmodulated signal consists of a continuous train of pulses of constant frequency, duration, and amplitude. During modulation, the pulse positions are changed to reflect the information being encoded. *See the illustration.* *Acronym:* PPM. *Compare* pulse amplitude modulation, pulse code modulation, pulse duration modulation.



Pulse position modulation.

pulse width modulation *n.* See pulse duration modulation.

punched card *n.* An outdated computer-input medium made of stiff paper that stores data bits in columns containing patterns of punched holes. The method for creating the patterns used for different byte values is called Hollerith coding. *See also* Hollerith tabulating/recording machine.

punched-card reader *n.* See card reader.

pure procedure *n.* Any procedure that modifies only data that is dynamically allocated (usually on the stack). A pure procedure cannot modify either global data or its own code. This restriction allows a pure procedure to be called simultaneously by separate tasks. *See also* reentrant code.

purge *vb.* To eliminate old or unneeded information systematically; to clean up, as files.

push¹ *n.* A technology developed in relation to the World Wide Web, designed to provide end users with personalized Web access by having a site actively “push” requested information to the user’s desktop, either automatically or at specified intervals. Push was developed as a means of relieving users from having to actively retrieve (“pull”) information from the Web. It is not, as yet, especially popular.

push² *vb.* **1.** To add a new element to a stack, a data structure generally used to temporarily hold pieces of data being transferred or the partial result of an arithmetic operation. *See also* stack. *Compare* pop. **2.** In networks and the Internet, to send data or a program from a server to a client at the instigation of the server. *See also* push¹. *Compare* pull.

put *vb.* In programming, to write data, typically to a file; in particular, to write a very small unit of data, such as a character.

PVC *n.* Acronym for **p**ermanent **v**irtual **c**ircuit. A permanent logical connection between two nodes on a packet-switching network. The PVC appears as a dedicated line to the nodes, but the data can be transmitted on a common carrier. *See also* common carrier, node (definition 2), packet switching, virtual private network. *Compare* SVC.

pwd *n.* Acronym for **p**rint **w**orking **d**irectory. The UNIX command for displaying the current directory.

PWM *n.* Acronym for **p**ulse **w**idth **m**odulation. *See* pulse duration modulation.

PXE boot *n.* Acronym for **P**reboot **E**xecution **E**nvironment **b**oot. A BIOS-supported technology used to boot a PC remotely. To power on a PC and boot it from the network, PXE must be enabled in the BIOS, and the NIC in the PC must be PXE compliant. PXE boot is specified in the Intel Wired for Management (WfM) standard. *Also called:* network boot.

pyramid diagram *n.* A diagram that is used to show foundation-based relationships.

Python *n.* A portable, interpreted, object-oriented programming language developed and freely distributed by its developer. Python runs on many platforms, including UNIX, Windows, OS/2, and Macintosh, and is used for writing TCP/IP applications.

side. Each resulting side is sorted the same way, until a fully sorted list results. *See also* sort algorithm. *Compare* bubble sort, insertion sort, merge sort.

QuickTime *n.* Software components developed by Apple for creating, editing, publishing, and viewing multimedia content. QuickTime, which supports video, animation, graphics, 3-D, VR (virtual reality), MIDI, music, sound, and text, has been part of the Mac OS since version 7 of the operating system and is used in many Macintosh applications. Windows applications can also run QuickTime files but require the installation of special player software. QuickTime is often used on the Web to provide Web pages with video and animation. Most Web browsers support plug-ins for running these types of files. QuickTime is also part of the new MPEG-4 specification. *See also* MPEG-4.

Quick View *n.* A feature, optionally installed as part of Windows 9x, that provides a set of file viewers for previewing the contents of files without having to start the application(s) that created them. The feature is accessed through the Quick View command, available either from the File menu or by right-clicking a filename. If the feature has been installed but the file type is not supported by a viewer, the Quick View command does not appear.

quiet answer *n.* A telephone-answering protocol in which incoming calls are answered with silence instead of a tone signal. Some telephone-switching systems use quiet answering. These switching systems expect the caller to provide another phone number, code, or extension after the quiet answer.

quit¹ *n.* **1.** An FTP command that instructs the server to drop the current connection with the client from which it received the command. **2.** A command in many applications for exiting the program.

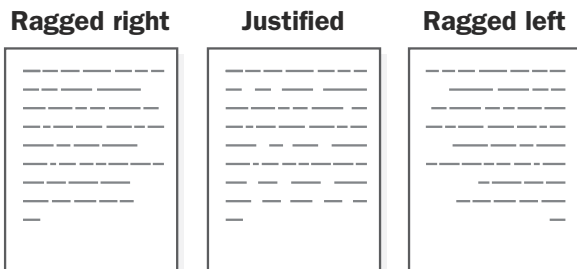
quit² *vb.* **1.** To stop in an orderly manner. **2.** To execute the normal shutdown of a program and return control to the operating system. *Compare* abort, bomb², crash² (definition 1), hang.

QWERTY keyboard *n.* A keyboard layout named for the six leftmost characters in the top row of alphabetic characters on most keyboards—the standard layout of most typewriters and computer keyboards. *Compare* Dvorak keyboard.

Q

(asymmetric digital subscriber line) that is capable of adjusting transmission speed (bandwidth) based on signal quality and length of the transmission line. As the signal quality improves or deteriorates while a transmission line is being used, the transmission speed is adjusted accordingly. *See also* ADSL, xDSL.

rag *n.* Irregularity along the left or right edge of a set of lines of text on a printed page. Rag complements justification, in which one or both edges of the text form a straight vertical line. *See the illustration. See also* justify, ragged left, ragged right.



Rag.

ragged left *adj.* Of, relating to, or being lines of text whose left ends are not vertically aligned but form an irregular edge. Text may be right-justified and have a ragged left margin. Ragged-left text is used infrequently—typically, for visual effect in advertisements. *See also* rag, right-justify.

ragged right *adj.* Of, relating to, or being lines of text whose right ends are not vertically aligned but form an irregular edge. Letters and other word-processed documents are commonly left-justified, with ragged-right margins. *See also* left-justify, rag.

RAID *n.* Acronym for **redundant array of independent** (or **inexpensive**) **disks**. A data storage method in which data is distributed across a group of computer disk drives that function as a single storage unit. All the information stored on each of the disks is duplicated on other disks in the array. This redundancy ensures that no information will be lost if one of the disks fails. RAID is generally used on network servers where data accessibility is critical and fault tolerance is required. There are various defined levels of RAID, each offering differing trade-offs among access speed, reliability, and cost. *See also* disk controller, error-correction coding, Hamming code, hard disk, parity bit, server (definition 1).

RAID array *n.* *See* RAID.

RAM *n.* Acronym for **random access memory**. Semiconductor-based memory that can be read and written by the central processing unit (CPU) or other hardware devices. The storage locations can be accessed in any order. Note that the various types of ROM memory are capable of random access but cannot be written to. The term *RAM*, however, is generally understood to refer to volatile memory that can be written to as well as read. *Compare* core, EPROM, flash memory, PROM, ROM (definition 2).

RAMAC *n.* **1.** Acronym for **Random Access Method of Accounting Control**. Developed by an IBM team led by Reynold B. Johnson, RAMAC was the first computer disk drive. It was introduced in 1956. The original RAMAC consisted of a stack of 50 24-inch platters, with a storage capacity of 5 megabytes and an average access time of 1 second. **2.** A high-speed, high-capacity disk storage system introduced by IBM in 1994. Based on the original RAMAC storage device, it was designed to fulfill enterprise requirements for efficient and fault-tolerant storage.

Rambus DRAM *n.* *See* RDRAM.

Rambus dynamic random access memory *n.* *See* RDRAM.

RAM cache *n.* Short for **random access memory cache**. Cache memory that is used by the system to store and retrieve data from the RAM. Frequently accessed segments of data may be stored in the cache for quicker access compared with secondary storage devices such as disks. *See also* cache, RAM.

RAM card *n.* Short for **random access memory card**. An add-in circuit board containing RAM memory and the interface logic necessary to decode memory addresses.

RAM cartridge *n.* *See* memory cartridge.

RAM chip *n.* Short for **random access memory chip**. A semiconductor storage device. RAM chips can be either dynamic or static memory. *See also* dynamic RAM, RAM, static RAM.

RAM compression *n.* Short for **random access memory compression**. This technology was an attempt by a number of software vendors to solve the problem of running out of global memory under Windows 3.x. Compression of the usual contents of RAM may lessen the system's need to read or write to virtual (hard disk-based) memory and thus speed up the system, as virtual memory is much slower than physical RAM. Because of the falling prices of RAM and the introduction of operating systems that handle RAM

R

Real-Time Control Protocol *n.* A scalable transport control protocol that works with the Real-Time Protocol (RTP) to monitor real-time transmissions to multiple participants over a network—for example, during videoconferencing. The Real-Time Control Protocol, or RTCP, transmits packets of control information at regular intervals and is used to determine how well information is being delivered to recipients. *Acronym:* RTCP. *See also* Real-Time Protocol, Real-Time Streaming Protocol, Resource Reservation Setup Protocol.

real-time operating system *n.* An operating system designed for the needs of a process-controlled environment. A real-time operating system recognizes that responses must be made and tasks handled instantly, with no lag time. Real-time operating systems are typically used as embedded systems in devices and applications requiring time-critical reaction, such as telecommunications, air traffic control, and robotic functions. *Acronym:* RTOS. *See also* real-time system.

Real-Time Protocol *n.* An Internet-standard network transport protocol used in delivering real-time data, including audio and video. The Real-Time Protocol, or RTP, works with both unicast (single sender, single recipient) and multicast (single sender, multiple recipients) services. RTP is often used in conjunction with the Real-Time Control Protocol (RTCP), which monitors delivery. *Acronym:* RTP. *See also* Real-Time Control Protocol, Real-Time Streaming Protocol, stream.

real-time streaming *n.* The process of delivering a streaming media file via a specialized streaming media server using real-time streaming protocol (RTSP). With real-time streaming, the file itself actually plays on the streaming media server, even though it is viewed on the computer that opened the file. Real-time streaming transmits at a higher bandwidth than HTTP streaming. It is often used to broadcast live events, such as concerts or keynote conference addresses. *See also* HTTP streaming.

Real-Time Streaming Protocol *n.* A control protocol for the delivery of streamed multimedia data over Internet Protocol (IP) networks. The Real-Time Streaming Protocol, or RTSP, was developed by Columbia University, Progressive Networks, and Netscape and has been submitted as a proposed standard to the IETF (Internet Engineering Task Force). RTSP is designed to deliver real-time, live, or stored audio and video efficiently over a network. It can be used either for groups of recipients or for on-demand

delivery to a single recipient. *Acronym:* RTSP. *See also* Advanced Streaming Format, Real-Time Protocol, Resource Reservation Setup Protocol, stream.

real-time system *n.* A computer and/or a software system that reacts to events before the events become obsolete. For example, airline collision avoidance systems must process radar input, detect a possible collision, and warn air traffic controllers or pilots while they still have time to react.

RealVideo *n.* The streaming technology developed by RealNetworks, Inc., for distributing video over intranets and the Internet. RealVideo transmits video from a server in encoded (compressed) form. The video and accompanying sound are viewed on the client end with the help of a software player. RealVideo works with both IP and IP multicasting and, as with RealAudio, does not require transmission of complete files before playback can begin. *See also* RealAudio, RealPlayer, streaming.

reboot *vb.* To restart a computer by reloading the operating system. *See also* boot², cold boot, warm boot.

receipt notification *n.* An e-mail feature providing feedback to the sender that a message has been received by the recipient.

receive *vb.* To accept data from an external communications system, such as a local area network (LAN) or a telephone line, and store the data as a file.

Receive Data *n.* *See* RXD.

rec. newsgroups *n.* Usenet newsgroups that are part of the rec. hierarchy and whose names have the prefix *rec.* These newsgroups cover topics devoted to discussions of recreational activities, hobbies, and the arts. *See also* newsgroup, traditional newsgroup hierarchy, Usenet. *Compare* comp. newsgroups, misc. newsgroups, news. newsgroups, sci. newsgroups, soc. newsgroups, talk. newsgroups.

recompile *vb.* To compile a program again, usually because of changes that needed to be made in the source code in response to error messages generated by the compiler. *See also* compile.

record¹ *n.* A data structure that is a collection of fields (elements), each with its own name and type. Unlike an array, whose elements all represent the same type of information and are accessed using an index, the elements of a record represent different types of information and are accessed by name. A record can be accessed as a collective

than those produced by a composite monitor, which receives levels for all three colors over a single line. *See also* RGB. *Compare* composite video display.

ribbon cable *n.* A flat cable containing up to 100 parallel wires for data and control lines. For example, ribbon cables are used inside a computer's case to connect the disk drives to their controllers.

ribbon cartridge *n.* A disposable module containing an inked fabric ribbon or a carbon-coated plastic film ribbon. Many impact printers use ribbon cartridges to make ribbon changing easier and cleaner.

Rich Text Format *n.* An adaptation of DCA (Document Content Architecture) that is used for transferring formatted text documents between applications, even those applications running on different platforms, such as between IBM and compatibles and Macintoshes. *Acronym:* RTF. *See also* DCA.

RIFF *n.* Acronym for **Resource Interchange File Format**. Developed jointly by IBM and Microsoft, RIFF is a broad-based specification designed to be used in defining standard formats for different types of multimedia files. A tagged-file specification, RIFF relies on headers that "tag" individual data elements in a file, identifying them by type and length. Because tags identify data elements, the RIFF specification can be extended to cover new types of elements while continuing to support older applications, which can simply ignore new, unrecognized elements they encounter in a file. *See also* AVI, MCI.

right click *vb.* To make a selection using the button on the right side of a mouse or other pointing device. Doing so in Windows 9x and Windows NT 4.0 and later typically brings up a pop-up menu with options applicable to the object over which the cursor is positioned. *See also* mouse, pointing device.

right click disabler *n.* A program or script that prevents a user from employing any functions controlled by clicking the right mouse button. A right click disabler script may be run when a user visits a Web site to control the user's actions and options.

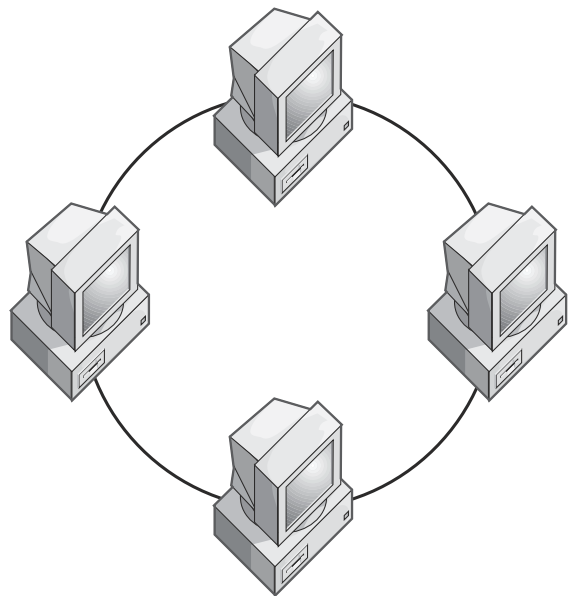
right justification *n.* In typesetting, word processing, and desktop publishing, the process of aligning text evenly along the right margins of a column or page. The left edge of the text is ragged. *See also* justify (definition 1), rag. *Compare* full justification, left justification.

right-justify *vb.* To align lines of text and other display elements so that the right edges form a smooth line. *See also* align (definition 1), rag. *Compare* left-justify.

rigid disk *n.* *See* hard disk.

RIMM *n.* A plug-in module jointly developed by Rambus and Intel for the high-bandwidth computer memory known as Direct RDRAM. A RIMM is comparable to a DIMM in size and shape, but the two are not pin-compatible. *See also* DIMM, RDRAM.

ring network *n.* A LAN (local area network) in which devices (nodes) are connected in a closed loop, or ring. Messages in a ring network pass around the ring from node to node in one direction. When a node receives a message, it examines the destination address attached to the message. If the address is the same as the node's, the node accepts the message; otherwise, it regenerates the signal and passes the message along to the next node in the ring. Such regeneration allows a ring network to cover larger distances than star and bus networks. The ring can also be designed to bypass any malfunctioning or failed node. Because of the closed loop, however, adding new nodes can be difficult. *See the illustration. Also called:* ring topology. *See also* token passing, token ring network. *Compare* bus network, star network.



Ring network.

ring topology *n.* *See* ring network.

roman *adj.* Having upright rather than slanted characters in a typeface. *See also* font family. *Compare* italic.

ROM Basic *n.* Short for **read-only memory Beginner's All-purpose Symbolic Instruction Code**. A Basic interpreter stored in ROM (read-only memory) so that the user can start programming after simply turning on the machine, without having to load Basic from a disk or tape. ROM Basic was a feature of many early home computers.

ROM BIOS *n.* Acronym for **read-only memory basic input/output system**. *See* BIOS.

ROM card *n.* Short for **read-only memory card**. A plug-in module that contains one or more printer fonts, programs, or games or other information stored in ROM (read-only memory). A typical ROM card is about the size of a credit card and several times thicker. It stores information directly in integrated circuit boards. *Also called:* font card, game card. *See also* ROM (definition 1), ROM cartridge.

ROM cartridge *n.* Short for **read-only memory cartridge**. A plug-in module that contains one or more printer fonts, programs, games, or other information stored in ROM (read-only memory) chips on a board enclosed in a plastic case with a connector exposed at one end so that it can easily plug into a printer, computer, game system, or other device. For example, a cartridge that plugs into a game system is a ROM cartridge. *Also called:* game cartridge. *See also* ROM (definition 1), ROM card.

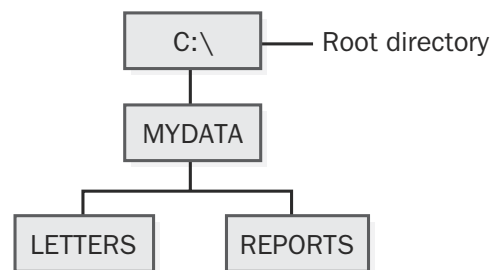
ROM emulator *n.* Short for **read-only memory emulator**. A special circuit containing RAM memory that is connected to a target computer in place of the target computer's ROM chips. A separate computer writes the contents into the RAM, and then the target computer reads the RAM as if it were ROM. ROM emulators are used to debug ROM-resident software without the high cost and delay of manufacturing chips. Even though the use of a ROM emulator is more expensive than programming an EPROM, it is often preferred today because its contents can be changed much more quickly than those of an EPROM. *Also called:* ROM simulator. *See also* EEPROM, EPROM, ROM (definition 1).

ROM simulator *n.* *See* ROM emulator.

root *n.* The main or uppermost level in a hierarchically organized set of information. The root is the point from which subsets branch in a logical sequence that moves from a broad focus to narrower perspectives. *See also* leaf, tree.

root account *n.* On UNIX systems, the account having control over the operation of a computer. The system administrator uses this account for system maintenance. *Also called:* superuser. *See also* system administrator.

root directory *n.* The point of entry into the directory tree in a disk-based hierarchical directory structure. Branching from this root are various directories and subdirectories, each of which can contain one or more files and subdirectories of its own. For example, in the MS-DOS operating system the root directory is identified by a name consisting of a single backslash character (\). Beneath the root are other directories, which may contain further directories, and so on. *See* the illustration.



Root directory.

root folder *n.* The folder on a drive from which all other folders branch. The root folder's name consists of a single backslash character (\). For example, on drive C, this folder would be represented in the file system as C:\.

rootless *n.* A mode in which an application belonging to a different user interface can run on top of a computer's underlying operating system without affecting that desktop or applications it may be running. For example, programs belonging to a rootless version of the X Window System can be run on a Mac OS X computer without disturbing the Aqua desktop. *See also* Mac OS X, X Window System.

root name *n.* In MS-DOS and Windows, the first part of a filename. In MS-DOS and earlier versions of Windows, the maximum length of the root name was eight characters; in Windows NT and later versions of Windows, the root name may be as long as 255 characters. *See also* 8.3, extension (definition 1), filename, long filenames.

root name server *n.* *See* root server.

root server *n.* A computer with the ability to locate DNS servers containing information about top-level Internet domains, such as com, org, uk, it, jp, and other country domains, in the Internet's Domain Name System (DNS) hierarchy. Beginning with the root server and

continuing through referrals to name servers at lower levels of the hierarchy, the DNS is able to match a “friendly” Internet address, such as microsoft.com, with its numerical counterpart, the IP address. Root servers thus contain the data needed for referrals to name servers at the highest level of the hierarchy. There are 13 root servers in the world, located in the United States, the United Kingdom, Sweden, and Japan. *Also called:* root name server. *See also* DNS (definition 1), DNS server, top-level domain.

root web *n.* The default, top-level web provided by a Web server. To access the root web, you supply the URL of the server without specifying a page name or subweb.

ROT13 encryption *n.* A simple encryption method in which each letter is replaced with the letter of the alphabet 13 letters after the original letter, so that A is replaced by N, and so forth; N, in turn, is replaced by A, and Z is replaced by M. ROT13 encryption is not used to protect messages against unauthorized readers; rather, it is used in newsgroups to encode messages that a user may not want to read, such as sexual jokes or spoilers. Some newsreaders can automatically perform ROT13 encryption and decryption at the touch of a key.

rotary dialing *n.* The signaling system used in telephones with rotary dials, in which each digit is associated with a set number of pulses. During dialing, these pulses, which are audible as series of clicks, momentarily turn the current in the telephone wires on and off. *Also called:* pulse dialing. *Compare* touch tone dialing.

rotate *vb.* **1.** To turn a model or other graphical image so that it is viewed at a different angle. **2.** To move bits in a register to the left or to the right. The bit that moves out of the end position rotates to the newly vacated position at the opposite end of the register. *Compare* shift.

rotational delay *n.* The time required for a desired disk sector to rotate to the read/write head. *Also called:* rotational latency.

rotational latency *n.* *See* rotational delay.

RO terminal *n.* Short for **read-only terminal**. A terminal that can receive data but cannot send data. Nearly all printers can be classified as RO terminals.

ROTFL *n.* *See* ROFL.

round *vb.* To shorten the fractional part of a number, increasing the last remaining (rightmost) digit or not, according to whether the deleted portion was over or

under five. For example, 0.3333 rounded to two decimal places is 0.33, and 0.6666 is 0.67. Computer programs often round numbers, sometimes causing confusion when the resulting values do not add up “correctly.” Percentages in a spreadsheet can thus total 99 percent or 101 percent because of rounding.

round robin *n.* A sequential, cyclical allocation of resources to more than one process or device.

roundtripping *n.* The process of converting files from one format to another for viewing or editing and then converting the files back to the original format again. In some cases, roundtripping can involve repeated conversions of the file from one format to another and back. Frequent roundtripping may be a concern because each conversion has the potential to introduce unwanted changes to the file.

routable protocol *n.* A communications protocol that is used to route data from one network to another by means of a network address and a device address. TCP/IP is an example of a routable protocol.

router *n.* An intermediary device on a communications network that expedites message delivery. On a single network linking many computers through a mesh of possible connections, a router receives transmitted messages and forwards them to their correct destinations over the most efficient available route. On an interconnected set of LANs (local area networks)—including those based on differing architectures and protocols—using the same communications protocols, a router serves the somewhat different function of acting as a link between LANs, enabling messages to be sent from one to another. *See also* bridge, gateway.

routine *n.* Any section of code that can be invoked (executed) within a program. A routine usually has a name (identifier) associated with it and is executed by referencing that name. Related terms (which may or may not be exact synonyms, depending on the context) are *function*, *procedure*, and *subroutine*. *See also* function (definition 3), procedure, subroutine.

routing *n.* The process of forwarding packets between networks from source to destination. *See also* dynamic routing, static routing.

Routing Information Protocol *n.* *See* RIP (definition 1).

routing table *n.* In data communications, a table of information that provides network hardware (bridges and routers) with the directions needed to forward packets of data to locations on other networks. The information contained

R

recorded piano note, digitized and stored in memory, is used by the synthesizer to create other piano-like notes.

samurai *n.* A hacker employed by a company or organization to manage network security or conduct legal cracking operations. A samurai uses the skills of a hacker to meet the legitimate needs of an employer.

SAN *n.* *See* storage area network.

sandbox *n.* **1.** Java Virtual Machine security area for downloaded (remote or untrusted) applets, an area in which such applets are confined and prevented from accessing system resources. Confinement to the sandbox prevents downloaded applets from carrying out potentially dangerous operations, maliciously or otherwise. They have to “play” inside the sandbox, and any attempt to “escape” is thwarted by the Java Security Manager.

2. Slang for the research and development department at many software and computer companies. *See also* applet, Java Virtual Machine.

sans serif *adj.* Literally, “without stroke”; describes any typeface in which the characters have no serifs (the short lines or ornaments at the upper and lower ends of the strokes). A sans serif typeface usually possesses a more straightforward, geometric appearance than a typeface with serifs and typically lacks the contrast between thick and thin strokes found in serif faces. Sans serif typefaces are used more frequently in display type, such as headlines, than in blocks of text. *Compare* serif¹.

SAOL *n.* Acronym for **Structured Audio Orchestra Language**. Part of the MPEG-4 standard, SAOL describes a set of tools for producing computer music, audio for computer games, streaming Internet sound or music, and other multimedia applications. SAOL is a flexible computer language for describing music synthesis and integrating synthetic sound with recorded sound in an MPEG-4 bit stream. *See also* bit stream, MPEG-4, streaming (definition 1).

SAP *n.* *See* Service Advertising Protocol.

SAPI *n.* Acronym for **Speech Application Programming Interface**. A feature in Windows 9x and Windows NT that allows applications to include speech recognition or convert text to speech. *Also called:* Speech API. *See also* voice recognition.

SAS *n.* *See* single attachment station.

SASL *n.* Acronym for **Simple Authentication and Security Layer**. An authentication support mechanism for use with connection-based protocols. SASL allows a client to request identification from a server and negotiate use of an added security layer for authentication during subsequent client/server interaction.

satellite *n.* *See* communications satellite.

satellite computer *n.* A computer that is connected to another computer, with which it interacts over a communications link. As its name indicates, a satellite computer is of lesser “stature” than the main, or host, computer; the host controls either the satellite itself or the tasks the satellite performs. *See also* remote communications.

satellite dish *n.* A parabolic (dish-shaped) reflector and antenna that is used for transmitting and receiving signals between the ground and earth satellites. Satellite dishes are commonly used for receiving television transmissions.

saturated mode *n.* The state in which a switching device or amplifier is passing the maximum possible current. A device is in saturated mode when increasing the control signal does not result in output of additional current.

saturation *n.* **1.** In a switching device or amplifier, the fully conducting state. At saturation, the device is passing the maximum possible current. The term is most commonly used with reference to circuits containing bipolar or field-effect transistors. **2.** In color graphics and printing, the amount of color in a specified hue, often specified as a percentage. *See also* HSB.

save *vb.* To write data (typically a file) to a storage medium, such as a disk or tape.

SAX *n.* Acronym for **Simple API for XML**. An event-driven application program interface (API) used to interpret an XML file. SAX works with an XML parser, providing an interface between the parser and an XML application. SAX is used as an alternative to the more complex object-based Document Object Model (DOM) interface. *See also* DOM.

scalability *n.* A measure of how well a computer, service, or application can grow to meet increasing performance demands. For server clusters, it is the ability to incrementally add one or more systems to an existing cluster when the overall load of the cluster exceeds its capabilities. *See also* server cluster.

Scroll Lock key *n.* On the IBM PC/XT and AT and compatible keyboards, a key on the top row of the numeric keypad that controls the effect of the cursor control keys and sometimes prevents the screen from scrolling. On the enhanced and Macintosh keyboards, this key is to the right of the function keys on the top row. Many modern applications ignore the Scroll Lock setting.

scroll wheel *n.* A thumbwheel on a mouse that, when turned, enables the user to scroll or zoom without clicking the scroll bar or using the keyboard. Depending on the mouse, a scroll wheel can also double as a third mouse button. *See also* scroll bar.

SCSI *n.* Acronym for Small Computer System Interface, a standard high-speed parallel interface defined by the X3T9.2 committee of the American National Standards Institute (ANSI). A SCSI (pronounced “scuzzy”) interface is used to connect microcomputers to SCSI peripheral devices, such as many hard disks and printers, and to other computers and local area networks. *Also called:* SCSI-1, SCSI I. *Compare* ESDI, IDE.

SCSI-1 *n.* *See* SCSI.

SCSI-2 *n.* An enhanced ANSI standard for SCSI (Small Computer System Interface) buses. Compared with the original SCSI standard (now called SCSI-1), which can transfer data 8 bits at a time at up to 5 MB per second, SCSI-2 offers increased data width, increased speed, or both. A SCSI-2 disk drive or host adapter can work with SCSI-1 equipment at the older equipment’s maximum speed. *Also called:* SCSI II. *See also* Fast SCSI, Fast/Wide SCSI, SCSI, Wide SCSI. *Compare* UltraSCSI.

SCSI bus *n.* A parallel bus that carries data and control signals from SCSI devices to a SCSI controller. *See also* bus, controller, SCSI device.

SCSI chain *n.* A set of devices on a SCSI bus. Each device (except the host adapter and the last device) is connected to two other devices by two cables, forming a daisy chain. *See also* daisy chain, SCSI.

SCSI connector *n.* A cable connector used to connect a SCSI device to a SCSI bus. *See the illustration. See also* bus, connector (definition 1), SCSI device.



SCSI connector.

SCSI device *n.* A peripheral device that uses the SCSI standard to exchange data and control signals with a computer’s CPU. *See also* peripheral, SCSI.

SCSI I *n.* *See* SCSI.

SCSI II *n.* *See* SCSI-2.

SCSI ID *n.* The unique identity of a SCSI device. Each device connected to a SCSI bus must have a different SCSI ID. A maximum of eight SCSI IDs can be used on the same SCSI bus. *See also* bus, SCSI device.

SCSI network *n.* A set of devices on a SCSI bus, which acts like a local area network. *See also* SCSI.

SCSI port *n.* **1.** A SCSI host adapter within a computer, which provides a logical connection between the computer and all of the devices on the SCSI bus. *See also* SCSI. **2.** A connector on a device for a SCSI bus cable. *See also* SCSI.

SDH *n.* *See* Synchronous Digital Hierarchy.

SDK *n.* Acronym for software **d**evelopment **k**it. *See* developer’s toolkit.

SDLC *n.* Acronym for Synchronous **D**ata **L**ink **C**ontrol, the data transmission protocol most widely used by networks conforming to IBM’s Systems Network Architecture (SNA). SDLC is similar to the HDLC (High-level Data Link Control) protocol developed by the International Organization for Standardization (ISO). *See also* HDLC.

SDM *n.* *See* space-division multiplexing.

SDMI *n.* See Secure Digital Music Initiative.

SDRAM *n.* Acronym for synchronous **DRAM**. A form of dynamic random access memory (DRAM) that can run at higher clock speeds than conventional DRAM by employing a bursting technique in which the DRAM predicts the address of the next memory location to be accessed. *See also* dynamic RAM.

SDSL *n.* Acronym for symmetric (or single-line) digital subscriber line, a digital telecommunications technology that is a variation of HDSL. SDSL uses one pair of copper wires rather than two pairs of wires and transmits at 1.544 Mbps. *Compare* ADSL.

.sea *n.* A file extension for a self-extracting Macintosh archive compressed with StuffIt. *See also* self-extracting file.

seamless integration *n.* The favorable result that occurs when a new hardware component or program blends smoothly into the overall operation of the system. It is usually the result of thoughtful design and programming.

search¹ *n.* The process of seeking a particular file or specific data. A search is carried out by a program through comparison or calculation to determine whether a match to some pattern exists or whether some other criteria have been met. *See also* binary search, hash search, linear search, search and replace, wildcard character.

search² *vb.* **1.** To look for the location of a file. **2.** To seek specific data within a file or data structure. *See also* replace.

search algorithm *n.* An algorithm designed to locate a certain element, called the target, in a data structure. *See also* algorithm, binary search, hash search, linear search.

search and replace *n.* A common process in applications such as word processors in which the user specifies two strings of characters. The process finds instances of the first string and replaces them with the second string.

search criteria *n.* The terms or conditions that a search engine uses to find items in a database. *See also* search engine.

search engine *n.* **1.** A program that searches for keywords in documents or in a database. **2.** On the Internet, a program that searches for keywords in files and documents found on the World Wide Web, newsgroups, Gopher menus, and FTP archives. Some search engines are used for a single Internet site, such as a dedicated search engine for a Web site. Others search across many sites, using such agents as spiders to gather lists of avail-

able files and documents and store these lists in databases that users can search by keyword. Examples of the latter type of search engine are Lycos and Excite. Most search engines reside on a server. *See also* agent (definition 2), FTP, Gopher or gopher, newsgroup, spider, World Wide Web.

search key *n.* **1.** The particular field (or column) of the records to be searched in a database. *See also* primary key, secondary key. **2.** The value that is to be searched for in a document or any collection of data.

search path *n.* The route followed by an operating system to find the location of a stored file. The search path begins with a drive or volume (disk) designator or a network share, continues through a chain of directories and subdirectories, if any, and ends with the file name. C:\books\diction\start.exe is an example of a search path. *Also called:* access path.

search string *n.* The string of characters to be matched in a search—typically (but not necessarily) a text string.

seat¹ *n.* One workstation or computer, in the context of software licensing on a per-seat basis. *See also* license agreement, workstation (definition 1).

seat² *vb.* To insert a piece of hardware fully and position it correctly in a computer or affiliated equipment, as in seating a single inline memory module (SIMM) in its socket.

secondary channel *n.* A transmission channel in a communications system that carries testing and diagnostic information rather than actual data. *Compare* primary channel.

secondary key *n.* A field that is to be sorted or searched within a subset of the records having identical primary key values. *See also* alternate key (definition 1), candidate key. *Compare* primary key.

secondary service provider *n.* An Internet service provider that provides a Web presence but not direct connectivity. *See also* ISP.

secondary storage *n.* Any data storage medium other than a computer's random access memory (RAM)—typically tape or disk. *Compare* primary storage.

Second Generation *n.* *See* 2G.

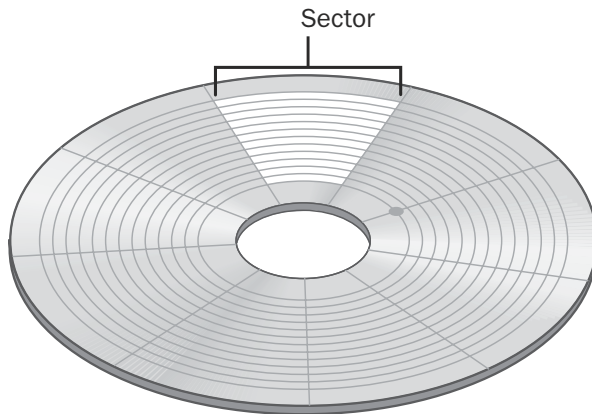
second-level domain *n.* The level immediately beneath the top-level domain in the Internet's DNS hierarchy. *See also* domain (definition 3).

second normal form *n.* *See* normal form (definition 1).

secret channel *n.* See private channel.

section *n.* A length of fiberoptic cable in a SONET network. See also line, path.

sector *n.* A portion of the data storage area on a disk. A disk is divided into sides (top and bottom), tracks (rings on each surface), and sectors (sections of each ring). Sectors are the smallest physical storage units on a disk and are of fixed size; typically, they are capable of holding 512 bytes of information apiece. See the illustration.



Sector.

sector interleave *n.* See interleave.

sector map *n.* **1.** A map that indicates the unusable sectors on a disk. **2.** A table used to translate the sector numbers that are requested by the operating system into physical sector numbers. The sector map represents a different method of performing sector interleaving. When a sector map is used, the sectors are formatted on the disk in sequential order. The mapping enables the system to read sectors in a nonsequential order. For example, using a 3-to-1 sector interleaving map, a system request for sectors 1 through 4 will result in the disk driver reading physical sectors 1, 4, 7, and 10. See also interleave.

secure channel *n.* A communications link that has been protected against unauthorized access, operation, or use by means of isolation from the public network, encryption, or other forms of control. See also encryption.

Secure Digital Music Initiative *n.* A coalition of companies from the recording, electronics, and information technology industries founded in February 1999 for the purpose of developing an open standard for the secure distribution of music in digital form. The Secure Digital Music Initiative specification is designed to provide consumers with flexibility and convenient access to electroni-

cally distributed music (that is, over the Internet) while also protecting the rights of artists. *Acronym:* SDMI. See also MP3, Windows Media Technologies.

Secure Electronics Transactions protocol *n.* Protocol for conducting secure transactions over the Internet, the result of a joint effort by GTE, IBM, MasterCard, Microsoft, Netscape, SAIC, Terisa Systems, VeriSign, and Visa. *Acronym:* SET.

Secure Hash Algorithm *n.* See SHA.

Secure HTTP *n.* See S-HTTP, HTTPS.

Secure Hypertext Transfer Protocol *n.* See S-HTTP.

Secure/Multipurpose Internet Mail Extensions *n.* See S/MIME.

Secure Password Authentication *n.* A feature that allows a server to confirm the identity of the person logging on. *Acronym:* SPA.

secure site *n.* A Web site having the capability of providing secure transactions, ensuring that credit card numbers and other personal information will not be accessible to unauthorized parties.

Secure Sockets Layer *n.* See SSL.

Secure Transaction Technology *n.* The use of the SSL (Secure Sockets Layer), S-HTTP (Secure HTTP), or both in online transactions, such as form transmission or credit card purchases. *Acronym:* STT. See also S-HTTP, SSL.

secure wide area network *n.* A set of computers that communicate over a public network, such as the Internet, but use security measures, such as encryption, authentication, and authorization, to prevent their communications from being intercepted and understood by unauthorized users. *Acronym:* S/WAN. See also authentication, authorization, encryption, virtual private network (definition 1).

security *n.* The technologies used to make a service resistant to unauthorized access to the data that it holds or for which it is responsible. A major focus of computer security, especially on systems that are accessed by many people or through communications lines, is the prevention of system access by unauthorized individuals.

security kernel *n.* An operating-system kernel that is protected from unauthorized use. See also kernel.

security log *n.* A log, generated by a firewall or other security device, that lists events that could affect security, such as access attempts or commands, and the names of the users involved. See also firewall, log (definition 1).

serial port adapter *n.* An interface card or device that either provides a serial port or converts a serial port to another use. *See also* adapter, serial port.

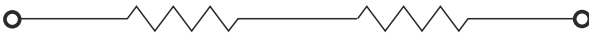
serial printer *n.* A printer connected to the computer via a serial interface (commonly RS-232-C or compatible). Connectors for this type of printer vary widely, which is one reason they are less popular than parallel printers among those who use IBM and IBM-compatible PCs. Serial printers are standard for Apple computers. *See also* DB connector, serial, serial transmission. *Compare* parallel printer.

serial processing *n.* *See* sequential processing (definition 2).

Serial Storage Architecture *n.* *See* SSA.

serial transmission *n.* The transfer of discrete signals one after another. In communications and data transfer, serial transmission involves sending information over a single line one bit at a time, as in modem-to-modem connections. *Compare* parallel transmission.

series circuit *n.* A circuit in which two or more components are linked in series. All the current passes through each component in a series circuit, but the voltage is divided among the components. *See the illustration. Compare* parallel circuit.



Series circuit.

serif¹ *adj.* Marked by the use of serifs. For example, Goudy is a serif typeface, whereas Helvetica is a sans serif typeface. *See the illustration. See also* serif². *Compare* sans serif.



Serif. A serif typeface (top) and a sans serif typeface (bottom).

serif² *n.* Any of the short lines or ornaments at the ends of the strokes that form a typeface character.

server *n.* **1.** On a local area network (LAN), a computer running administrative software that controls access to the network and its resources, such as printers and disk drives, and provides resources to computers functioning as workstations on the network. **2.** On the Internet or other network, a computer or program that responds to commands from a client. For example, a file server may contain an archive of data or program files; when a client submits a request for a file, the server transfers a copy of the file to the client. *See also* application server (definitions 1 and 2), client/server architecture. *Compare* client (definition 3).

server appliance *n.* A device designed to deliver one or more specific network services in a single turnkey package that includes both hardware and software. All necessary programs are preinstalled on a server appliance, which has minimal, simplified options and controls. Server appliances can be used to complement or replace traditional servers on a network and can provide such services as file and printer sharing and Internet connectivity. *Also called:* appliance. *See also* information appliance.

server-based application *n.* A program that is shared over a network. The program is stored on the network server and can be used at more than one client machine at a time.

server cluster *n.* A group of independent computer systems, known as nodes, working together as a single system to ensure that mission-critical applications and resources remain available to clients. A server cluster is the type of cluster that Cluster service implements. *See also* cluster.

server control *n.* *See* ASP.NET server control.

server error *n.* A failure to complete a request for information through HTTP that results from an error at the server rather than an error by the client or the user. Server errors are indicated by HTTP status codes beginning with 5. *See also* HTTP, HTTP status codes.

server farm *n.* A centralized grouping of network servers maintained by an enterprise or, often, an Internet service provider (ISP). A server farm provides a network with load balancing, scalability, and fault tolerance. Individual servers may be connected in such a way that they appear to represent a single resource.

serverlet *n.* *See* servlet.

Server Message Block *n.* *See* SMB.

soft patch *n.* A fix or modification performed only while the code being patched is loaded into memory, so that the executable or object file is not modified in any way. *See also* patch¹.

soft return *n.* A line break inserted in a document by a word processor when the next word in the current line of text would cause the line to overflow into the margin—a movable line break. *See also* wordwrap. *Compare* hard return.

soft-sectored disk *n.* A disk, especially a floppy disk, whose sectors have been marked with recorded data marks rather than punched holes. *See also* index hole. *Compare* hard-sectored disk.

software *n.* Computer programs; instructions that make hardware work. Two main types of software are system software (operating systems), which controls the workings of the computer, and applications, such as word processing programs, spreadsheets, and databases, which perform the tasks for which people use computers. Two additional categories, which are neither system nor application software but contain elements of both, are network software, which enables groups of computers to communicate, and language software, which provides programmers with the tools they need to write programs. In addition to these task-based categories, several types of software are described based on their method of distribution. These include packaged software (canned programs), sold primarily through retail outlets; freeware and public domain software, which are distributed free of charge; shareware, which is also distributed free of charge, although users are requested to pay a small registration fee for continued use of the program; and vaporware, software that is announced by a company or individuals but either never makes it to market or is very late. *See also* application, canned software, freeware, network software, operating system, shareware, system software, vaporware. *Compare* firmware, hardware, liveware.

Software & Information Industry Association *n.* *See* SIIA.

software-based modem *n.* A modem that uses a general-purpose, reprogrammable digital signal processor chip and RAM-based program memory rather than a dedicated chip with the modem functions burned into the silicon. A software-based modem can be reconfigured to update and change the modem's features and functions.

software bloat *n.* A software condition caused by the addition of excessive number of possibly unnecessary features and functions as new versions of the software are released. Software bloat is generally assumed to result in long loading times and inordinate resource (memory and storage) requirements. *See also* bloatware, creeping featurism.

software conversion *n.* Changing or moving a program designed to run on one computer to run on another. Usually this involves detailed (professional) work on the program itself.

software-dependent *adj.* Of, pertaining to, or being a computer or device that is tied to a particular program or set of programs developed for it.

software development kit *n.* *See* developer's kit.

software engineer *n.* **1.** In general, one who works at the code level with software. Although such engineering can be considered to encompass everything from software design to management and testing, the term is generally considered more or less synonymous with *programmer*—one who actually writes the code. **2.** *See* developer.

software engineering *n.* The design and development of software. *See also* programming.

software handshake *n.* A handshake that consists of signals transmitted over the same wires used to transfer the data, as in modem-to-modem communications over telephone lines, rather than signals transmitted over special wires. *See also* handshake.

software house *n.* An organization that develops and supports software for its customers.

software IC *n.* *See* software integrated circuit.

software integrated circuit *n.* An existing software module that can be designed into a program, much as an integrated circuit can be designed into a logic board. *Abbreviation:* software IC. *See also* abstract data type, module (definition 1), object-oriented programming.

software interrupt *n.* A program-generated interrupt that stops current processing in order to request a service provided by an interrupt handler (a separate set of instructions designed to perform the task required). *Also called:* trap.

software package *n.* A program sold to the public, ready to run and containing all necessary components and documentation.

software piracy *n.* *See* piracy.

sorter *n.* A program or routine that sorts data. *See also* sort.

sort field *n.* *See* sort key.

sort key *n.* A field (commonly called a key) whose entries are sorted to produce a desired arrangement of the records containing the field. *See also* field (definition 1), primary key, secondary key.

SOS *n.* *See* silicon-on-sapphire.

Sound Blaster *n.* **1.** A family of sound cards manufactured by Creative Technology or its subsidiary, Creative Labs. *See also* sound card. **2.** A de facto standard set by the family of sound cards developed by Creative Technologies and its subsidiaries. Many other manufacturers also make Sound Blaster-compatible products.

sound board *n.* *See* sound card.

sound buffer *n.* A region of memory used to store the bit image of a sequence of sounds to be sent to a computer's speaker(s).

sound card *n.* A type of expansion board on PC-compatible computers that allows the playback and recording of sound, such as from a WAV or MIDI file or a music CD-ROM. Most PCs sold at retail include a sound card. *Also called:* sound board. *See also* expansion board, MIDI, WAV.

sound clip *n.* A file that contains a short audio item, usually an excerpt from a longer recording.

sound editor *n.* A program that allows the user to create and manipulate sound files.

sound generator *n.* A chip or chip-level circuit that can produce electronic signals that can drive a speaker and synthesize sound.

sound hood *n.* A five-sided box, lined with soundproofing material, that is placed over a loud printer to muffle its noise.

SoundSentry *n.* An optional Windows feature that instructs Windows to produce a visual cue such as a screen flash or a blinking title bar whenever a system beep occurs. SoundSentry is designed for users with hearing impairments or users who operate a computer in a noisy environment.

source *n.* **1.** In information processing, a disk, file, document, or other collection of information from which data is taken or moved. *Compare* destination. **2.** In a FET, the electrode toward which charge carriers (electrons or holes) move from the source under control of the gate. *See also*

CMOS (definition 1), drain (definition 1), FET, gate (definition 2), MOSFET, NMOS, PMOS.

source code *n.* Human-readable program statements written by a programmer or developer in a high-level or assembly language that are not directly readable by a computer. Source code needs to be compiled into object code before it can be executed by a computer. *Compare* object code.

source code control system *n.* A tool designed to track changes made to source code files. Changes are documented in such a way that previous versions of the files can be retrieved. Source code control is used in software development, particularly in situations involving concurrent development and multiple user access to source code files.

source computer *n.* **1.** A computer on which a program is compiled. *Compare* object computer. **2.** A computer from which data is transferred to another computer.

source data *n.* The original data on which a computer application is based.

source data acquisition *n.* The process of sensing, as with a bar code reader or other scanning device, or receiving source data. *See also* source data.

source data capture *n.* *See* source data acquisition.

source directory *n.* During a file copy operation, the directory in which the original versions of the files are located.

source disk *n.* Any disk from which data will be read, as during a copy operation or when an application is loaded from a disk into memory. *Compare* target disk.

source document *n.* The original document from which data is taken.

source drive *n.* The disk drive from which files are being copied during a copy operation.

source file *n.* **1.** A file that contains source code. *See also* source code. **2.** A file that contains the data that a program will process and store in a destination file. **3.** In MS-DOS and Windows commands that involve the copying of data or program instructions, the file containing the data or instructions that are copied.

source language *n.* The programming language in which the source code for a program is written. *See also* programming language, source code.

source program *n.* The source code version of a program. *See also* source code. *Compare* executable program.

statistical multiplexer *n.* A multiplexing device that adds intelligence to time-division multiplexing by using buffering (temporary storage) and a microprocessor to combine transmission streams into a single signal and to allocate available bandwidth dynamically. *Also called:* stat mux. *See also* dynamic allocation, multiplexing, time-division multiplexing.

statistics *n.* The branch of mathematics that deals with the relationships among groups of measurements and with the relevance of similarities and differences in those relationships. *See also* binomial distribution, Monte Carlo method, probability, regression analysis, standard deviation, stochastic.

stat mux *n.* *See* statistical multiplexer.

status *n.* The condition at a particular time of any of numerous elements of computing—a device, a communications channel, a network station, a program, a bit, or other element—used to report on or to control computer operations.

status bar *n.* In Windows 9x and Windows NT 4 and later, a space at the bottom of many program windows that contains a short text message about the current condition of the program. Some programs also display an explanation of the currently selected menu command in the status bar. *See the illustration.*



Status bar.

status codes *n.* Strings of digits or other characters that indicate the success or failure of some attempted action. Status codes were commonly used to report the results of early computer programs, but most software today uses words or graphics. Internet users, especially those with UNIX shell accounts, are likely to encounter status codes while using the Web or FTP. *See also* HTTP status codes.

steganography *n.* A “hide-in-plain-sight” technique for concealing information by embedding a message within an innocuous cover message. In steganography, bits of unnecessary data within an image, sound, text, or even a blank file are replaced with bits of invisible information. The term steganography comes from the Greek for “covered writing” and has traditionally included any method of secret communication that conceals the existence of the message. Because steganography cannot be detected by decryption software, it is often used to replace or supplement encryption.

step-frame *n.* The process of capturing video images one frame at a time. This process is used by computers that are too slow to capture analog video images in real time.

stepper motor *n.* A mechanical device that rotates only a fixed distance each time it receives an electrical pulse. A stepper motor is part of a disk drive.

step-rate time *n.* The time required to move a disk actuator arm from one track to the next. *See also* actuator, stepper motor.

stereogram *n.* *See* autostereogram.

sticky *adj.* In reference to a Web site, properties such as targeted content or services that increase the amount of time users choose to spend at the site and increase user’s desire to return to the site repeatedly.

StickyKeys *n.* An accessibility feature built into Macintosh and Windows computers that causes modifier keys such as Shift, Control, or Alt to “stay on” after they are pressed, eliminating the need to press multiple keys simultaneously. This feature facilitates the use of modifier keys by users who are unable to hold down one key while pressing another.

stochastic *adj.* Based on random occurrences. For example, a stochastic model describes a system by taking into account chance events as well as planned events.

stop bit *n.* In asynchronous transmission, a bit that signals the end of a character. In early electromechanical teleprinters, the stop bit provided time for the receiving mechanism to coast back to the idle position and, depending on the mechanism, had a duration of 1, 1.5, or 2 data bits. *See also* asynchronous transmission. *Compare* parity bit, start bit.

Stop error *n.* A serious error that affects the operating system and that could place data at risk. The operating system generates an obvious message, a screen with the Stop error, rather than continuing on and possibly corrupting data. *Also called:* blue screen error, fatal system error. *See also* Blue Screen of Death.

storage *n.* In computing, any device in or on which information can be kept. Microcomputers have two main types of storage: random access memory (RAM) and disk drives and other external storage media. Other types of storage include read-only memory (ROM) and buffers.

storage area network *n.* A high-speed network that provides a direct connection between servers and storage, including shared storage, clusters, and disaster-recovery

devices. A storage area network, or SAN, includes components such as hubs and routers that are also used in local area networks (LANs), but it differs in being something of a “subnetwork” dedicated to providing a high-speed connection between storage elements and servers. Most SANs rely on fiber-channel connections that deliver speeds up to 1000 Mbps and can support up to 128 devices. SANs are implemented to provide the scalability, speed, and manageability required in environments that demand high data availability. *Acronym: SAN. Also called: system area network.*

storage device *n.* An apparatus for recording computer data in permanent or semipermanent form. When a distinction is made between primary (main) storage devices and secondary (auxiliary) storage devices, the former refers to random access memory (RAM) and the latter refers to disk drives and other external devices.

storage location *n.* The position at which a particular item can be found—either an addressed location or a uniquely identified location on a disk, tape, or similar medium.

storage media *n.* The various types of physical material on which data bits are written and stored, such as floppy disks, hard disks, tape, and optical discs.

storage tube *n.* *See* direct view storage tube.

store-and-forward *n.* A method of delivering transmissions in which messages are held temporarily by an intermediary before being sent on to their destination. Store and forward is used by some switches in delivering packets to their destinations. *Compare* cut-through switch.

stored procedure *n.* A precompiled collection of SQL statements and optional control-of-flow statements stored under a name and processed as a unit. They are stored in an SQL database and can be run with one call from an application.

stored program concept *n.* A system architecture scheme, credited largely to the mathematician John von Neumann, in which both programs and data are in direct-access storage (random access memory, or RAM), thereby allowing code and data to be treated interchangeably. *See also* von Neumann architecture.

storefront *n.* *See* virtual storefront.

storm *n.* On a network, a sudden, excessive burst of traffic. Storms are often responsible for network outages.

STP *n.* Acronym for shielded twisted pair. A cable consisting of one or more twisted pairs of wires and a sheath

of foil and copper braid. The twists protect the pairs from interference by each other, and the shielding protects the pairs from interference from outside. Therefore, STP cable can be used for high-speed transmission over long distances. *See also* twisted-pair cable. *Compare* UTP.

straight-line code *n.* Program code that follows a direct sequence of statements rather than skipping ahead or jumping back via transfer statements such as GOTO and JUMP. *See also* GOTO statement, jump instruction. *Compare* spaghetti code.

stream¹ *n.* Any data transmission, such as the movement of a file between disk and memory, that occurs in a continuous flow. Manipulating a data stream is a programming task. Consumers, however, are likely to encounter references to streams and streaming in connection to the Internet, which has increased reliance on stream techniques to enable users (even those with slower equipment) to access large multimedia files—especially those containing audio and video components—and to display or play them before all the data has been transferred.

stream² *vb.* To transfer data continuously, beginning to end, in a steady flow. Many aspects of computing rely on the ability to stream data: file input and output, for example, and communications. If necessary, an application receiving a stream must be able to save the information to a buffer in order to prevent loss of data. On the Internet, streaming enables users to begin accessing and using a file before it has been transmitted in its entirety.

stream cipher *n.* A method for encrypting a data sequence of unlimited length using a key of fixed length. *See also* key (definition 3). *Compare* block cipher.

streaming *n.* **1.** On the Internet, the process of delivering information, especially multimedia sound or video, in a steady flow that the recipient can access as the file is being transmitted. **2.** In magnetic tape storage devices, a low-cost technique to control the motion of the tape by removing tape buffers. Although streaming tape compromises start/stop performance, it achieves highly reliable storage and retrieval of data, and is useful when a steady supply of data is required by a particular application or computer.

streaming buffer *n.* A small sound buffer that can play lengthy sounds because the application dynamically loads audio data into the buffer as it plays. For example, an application could use a buffer that can hold 3 seconds of audio data to play a 2-minute sound. A streaming buffer requires much less memory than a static buffer. *See also* static buffer.

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Streaming Server *n.* A server technology designed by Apple Computer to send streaming QuickTime media files over the Internet. Built on RTP and RTSP standard Internet protocols, Streaming Server can set up a QuickTime streaming media Web broadcasting station capable of streaming digital videos and music files to more than 3000 users via the Internet. Streaming Server may be used with Mac OS X and other UNIX-based operating systems. *Also called:* Darwin Streaming Server, QuickTime Streaming Server.

streaming tape *n.* *See* tape (definition 1).

stream interface device driver *n.* A user-level DLL that controls devices connected to a Windows CE-based platform. A stream interface device driver presents the services of a hardware device to applications by exposing Win32 stream interface functions. Stream interface drivers also can control devices built into a Windows CE-based platform, depending on the software architecture for the drivers. *Also called:* installable device driver.

stream-oriented file *n.* A file used to store a fairly continuous series of bits, bytes, or other small, structurally uniform units.

street price *n.* The actual retail or mail-order price of a consumer hardware or software product. In most cases, the street price is somewhat lower than the “suggested retail price.”

stress test *n.* A test of a software or hardware system’s functional limits, performed by subjecting the system to extreme conditions, such as peak volumes of data or extremes in temperature.

strikethrough *n.* One or more lines drawn through a selected range of text, usually to show deletion or the intent to delete. *See* the illustration.

s **strikethrough**

Strikethrough.

string *n.* A data structure composed of a sequence of characters usually representing human-readable text.

string variable *n.* An arbitrary name assigned by the programmer to a string of alphanumeric characters and used to reference that entire string. *See also* string.

stripe *vb.* *See* disk striping.

stripe pitch *n.* The distance, measured horizontally, between bands of phosphor that are the same color on a cathode ray tube (CRT) display based on aperture grill technology. Although the measurements are based on different methods of applying phosphor to the screen surface, stripe pitch is comparable to dot pitch, the measurement used with CRTs based on shadow mask technology. *See also* aperture grill, CRT, mask (definition 2). *Compare* dot pitch, slot pitch.

striping *n.* A means of protecting data on a network by spreading it across multiple disks. In the most commonly used approach, striping is combined with parity (error-correcting information) to ensure that if some portion of the data is lost, it can be reconstructed. Striping is implemented in RAID security. *See also* RAID. *Compare* disk mirroring.

strobe *n.* A timing signal that initiates and coordinates the passage of data, typically through an input/output (I/O) device interface, such as a keyboard or printer.

stroke *n.* **1.** In data entry, a keystroke—a signal to the computer that a key has been pressed. **2.** In typography, a line representing part of a letter. **3.** In paint programs, a “swipe” of the brush made with the mouse or keyboard in creating a graphic. **4.** In display technology, a line created as a vector (a path between two coordinates) on a vector graphics display (as opposed to a line of pixels drawn dot by dot on a raster graphics display).

stroke font *n.* A font printed by drawing a combination of lines rather than by filling a shape, as with an outline font. *Compare* outline font.

stroke weight *n.* The width, or thickness, of the lines (strokes) that make up a character. *See also* font.

stroke writer *n.* In video, a display unit that draws characters and graphic images as sets of strokes—lines or curves connecting points—rather than as sets of dots, as on a typical raster-scan monitor. *See also* vector graphics.

StrongARM *n.* The architecture underlying Intel’s low-power, high-performance SA microprocessors. StrongARM is based on the 32-bit RISC architecture licensed by ARM Limited. StrongARM-based SA microprocessors support a number of platforms, including Windows CE and Java, and are designed for use in four primary areas:

tie together complex data structures into scripts. *See also* graphical user interface, script, scripting language.

TCM *n.* *See* trellis-coded modulation.

TCO *n.* *See* total cost of ownership.

TCP *n.* Acronym for **T**ransmission **C**ontrol **P**rotocol. The protocol within TCP/IP that governs the breakup of data messages into packets to be sent via IP (Internet Protocol), and the reassembly and verification of the complete messages from packets received by IP. A connection-oriented, reliable protocol (reliable in the sense of ensuring error-free delivery), TCP corresponds to the transport layer in the ISO/OSI reference model. *See also* ISO/OSI reference model, packet, TCP/IP. *Compare* UDP.

TCP/IP *n.* Acronym for **T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol. A protocol suite (or set of protocols) developed by the U.S. Department of Defense for communications over interconnected, sometimes dissimilar, networks. It is built into the UNIX system and has become the de facto standard for data transmission over networks, including the Internet.

TCP/IP reference model *n.* A networking model designed around the concept of internetworking—the exchange of information among different networks, often built on different architectures. The TCP/IP reference model, often called the Internet reference model, consists of four layers, the most distinctive of which is the internet-work that deals with routing messages and that has no equivalent in the ISO/OSI reference model or the SNA model. *Compare* ISO/OSI reference model, SNA.

TCP/IP stack *n.* The set of TCP/IP protocols. *See also* protocol stack, TCP/IP.

TDM *n.* *See* time-division multiplexing.

TDMA *n.* Short for **T**ime **D**ivision **M**ultiple **A**ccess. A multiplexing technology used to divide a single cellular phone channel into multiple subchannels. TDMA works by allocating separate time slots to each user. It is implemented in D-AMPS (Digital Advanced Mobile Phone Service), which relies on TDMA to divide each of the 30 analog AMPS channels into 3 separate subchannels, and GSM (Global System for Mobile Communications). *See also* D-AMPS, Global System for Mobile Communications. *Compare* AMPS, FDMA.

team Web site *n.* *See* SharePoint team Web site.

Teardrop attack *n.* An Internet-based attack that breaks a message into a series of IP fragments with overlapping offset fields. When these fragments are reassembled at

their destination, the fields don't match, causing the system to hang, reboot, or crash.

tearing *n.* A visual artifact produced when the screen refresh rate is out of sync with an application's frame rate. The top portion of one frame is displayed at the same time as the bottom portion of another frame, with a discernible tear between the two partial images.

tear-off *adj.* Capable of being dragged from an original position in a graphical user interface and placed where the user desires. For example, many graphics applications feature tear-off menus of tool palettes that can be dragged to locations other than the menu bar.

techie *n.* A technically oriented person. Typically, a techie is the person on whom a user calls when something breaks or the user cannot understand a technical problem. A techie may be an engineer or a technician, but not all engineers are techies. *See also* guru.

technical author *n.* *See* tech writer.

technobabble *n.* Language that includes incomprehensible technical terms and jargon. In ordinary conversation, many of the words in this dictionary might be considered technobabble.

technology *n.* The application of science and engineering to the development of machines and procedures in order to enhance or improve human conditions, or at least to improve human efficiency in some respect. *See also* high tech.

technophile *n.* Someone who is enthusiastic about emerging technology. *Compare* computerphile.

technophobe *n.* A person who is afraid of or dislikes technological advances, especially computers. *See also* Luddite. *Compare* technophile.

tech writer *n.* Short for technical writer. One who writes the documentation material for a hardware or software product. *Also called:* technical author. *See also* documentation.

telco *n.* Short for **t**elephone **c**ompany. A term generally used in reference to a telephone company's provision of Internet services.

telecom closet *n.* *See* wiring closet.

telecommunications *n.* The transmission and reception of information of any type, including data, television pictures, sound, and facsimiles, using electrical or optical signals sent over wires or fibers or through the air.

telecommunications closet *n.* *See* wiring closet.

locate a particular item. A three-dimensional array treats data as if it were laid out in rows, columns, and layers. *See also* 3-D array, array, two-dimensional array.

three-dimensional model *n.* A computer simulation of a physical object in which length, width, and depth are real attributes—a model, with *x*-, *y*-, and *z*-axes, that can be rotated for viewing from different angles.

three-finger salute *n.* Slang term for a warm, or soft, boot, in which the Ctrl, Alt, and Delete keys are pressed simultaneously to restart a computer without first turning off the power. *Also called:* Vulcan death grip. *See also* warm boot.

three-nines availability *n.* The availability of a system 99.9% of the time. Three-nines availability equates to approximately 526 minutes of downtime in a standard 365-day year. *See also* high availability.

three-point editing *n.* In digital video editing, a feature that simplifies the process of placing new video within a sequence by assisting in calculating edit points. To make an edit, in and out points must be defined in the video clip to be added and in the sequence into which the clip is to be inserted. The user provides any three of these edit points and the editing software determines the fourth.

three-tier client/server *n.* A client/server architecture in which software systems are structured into three tiers or layers: the user interface layer, the business logic layer, and the database layer. Layers may have one or more components. For example, there can be one or more user interfaces in the top tier, each user interface may communicate with more than one application in the middle tier at the same time, and the applications in the middle tier may use more than one database at a time. Components in a tier may run on a computer that is separate from the other tiers, communicating with the other components over a network. *See also* client/server architecture. *Compare* two-tier client/server.

throbber *n.* An animated icon that moves while an application is completing a task, such as a browser loading a Web page. Throbbles serve to reassure the user that the application is still working on the task and has not frozen. Web browsers and some other applications come with a throbber icon. In some cases, the user can replace the original throbber with a customized icon of the user's choice.

throttle control *n.* A device that enables the user of a flight simulator or game to control simulated engine power. The throttle control is used along with a joystick

(which controls the simulated ailerons and elevators) and possibly a rudder control.

throughput *n.* **1.** The data transfer rate of a network, measured as the number of bits per second transmitted. **2.** A measure of the data processing rate in a computer system.

throughput test *n.* *See* bandwidth test.

thumb *n.* *See* elevator.

thumbnail *n.* A miniature version of an image or electronic version of a page that is generally used to allow quick browsing through multiple images or pages. For example, Web pages often contain thumbnails of images (which can be loaded much more quickly by the Web browser than the full-size image). Many of these thumbnails can be clicked on to load the complete version of the image.

thumbwheel *n.* A wheel embedded in a case so that only a portion of the outside rim is revealed. When rolled with the thumb, the wheel can control an on-screen element such as a pointer or a cursor. Thumbwheels are used with three-dimensional joysticks and trackballs to control the depth aspect of the pointer or cursor. *See also* joystick, relative pointing device, trackball.

thunk¹ *n.* Code that enables 16-bit code to call 32-bit code, and vice versa. There are three different types of thunk: a flat thunk relies on a thunk compiler to allow 32-bit code to call a 16-bit DLL and 16-bit code to call a 32-bit DLL; a generic thunk enables a 16-bit application to load and call a 32-bit DLL; and a universal thunk allows 32-bit code to load and call a 16-bit DLL. All thunks are Windows-based, but the type of thunk used depends on the Windows version.

thunk² *vb.* To call 32-bit code from 16-bit code, or vice versa. Thunking involves, in large part, the translation to and from 16-bit segment offset memory addressing and 32-bit flat, or linear, memory addressing. *See also* address space, flat address space, segmented address space.

TIA *n.* Acronym for **thanks in advance**. On the Internet, a popular sign-off to a request of some sort. *Also called:* aTdHvAaNnKcSe.

tick *n.* **1.** A regular, rapidly recurring signal emitted by a clocking circuit; also, the interrupt generated by this signal. **2.** In some microcomputer systems, notably Macintosh, one sixtieth of a second, the basic time unit used by the internal clock that is accessible by programs.

T

trackpad *n.* A pointing device consisting of a small, flat pad that is sensitive to touch. Users move the mouse cursor on screen by touching the trackpad and moving their fingers across the trackpad's surface. Such devices are most commonly installed on laptop computers. *See also* pointing device.

tracks per inch *n.* The density with which concentric tracks (data storage rings) are recorded or can be recorded in an inch of radius on a disk. The greater the density (the more tracks per inch), the more information a disk can hold. *Acronym:* TPI.

tractor feed *n.* A method of feeding paper through a printer using pins mounted on rotating belts. The pins engage holes near the edges of continuous-form paper and either push or pull the paper through. *See also* continuous-form paper. *Compare* pin feed.

trademark *n.* A word, phrase, symbol, or design (or some combination thereof) used to identify a proprietary product, often accompanied by the symbol TM or ®.

trade show *n.* A multivendor sales event or exposition that showcases companies' products. The computer industry has a number of trade shows every year, including COMDEX.

traditional newsgroup hierarchy *n.* The seven standard newsgroup categories in Usenet: comp., misc., news., rec., sci., soc., and talk. Newsgroups can be added within the traditional hierarchy only following a formal voting process. *See also* comp. newsgroups, misc. newsgroups, newsgroup, news. newsgroups, rec. newsgroups, Request for Discussion, sci. newsgroups, soc. newsgroups, talk. newsgroups, Usenet. *Compare* alt. newsgroups.

traffic *n.* The load carried by a communications link or channel.

traffic management *n.* *See* ITM.

traffic shaping *n.* A technique for allocating bandwidth and preventing packet loss by enforcing prioritization policies on the transmission of data over a network. *Also called:* bandwidth shaping. *See also* bandwidth management, bandwidth reservation, token passing.

trailer *n.* Information, typically occupying several bytes, at the tail end of a block (section) of transmitted data and often containing a checksum or other error-checking data useful for confirming the accuracy and status of the transmission. *See also* checksum. *Compare* header (definition 2).

trailer label *n.* **1.** A small block of information used in tape processing that marks the end of a file or the end of the tape and that can contain other information, such as the number of records in the file or files on the tape. *Compare* header label. **2.** A label used in communications data frames that follows the data and might contain an end-of-message mark, a checksum, and some synchronization bits.

trailing edge *n.* The latter part of an electronic signal. When a digital signal switches from on to off, the transition is the trailing edge of the signal.

train¹ *n.* A sequence of items or events, such as a digital pulse train consisting of transmitted binary signals.

train² *vb.* To teach an end user how to use a software or hardware product.

transaction *n.* A discrete activity within a computer system, such as an entry of a customer order or an update of an inventory item. Transactions are usually associated with database management, order entry, and other online systems.

transactional e-mail *n.* A form of Web-based marketing in which goods and services are sold to consumers directly from an e-mail message. Unlike traditional e-mail marketing that requires the e-mail recipient to visit the seller's Web site, transactional e-mail allows an entire sales transaction to be completed from within the marketing e-mail. To take advantage of transactional e-mail buying options, the recipient must view the e-mail message in HTML format.

transaction file *n.* A file that contains the details of transactions, such as items and prices on invoices. It is used to update a master database file. *See also* transaction. *Compare* master file.

transaction log *n.* *See* change file.

transaction processing *n.* A processing method in which transactions are executed immediately after they are received by the system. *Acronym:* TP. *See also* transaction. *Compare* batch processing (definition 3).

Transaction Processing Council *n.* A group of hardware and software vendors with the goal of publishing benchmark standards. *Acronym:* TPC.

transaction processing monitor *n.* *See* TP monitor.

Transaction Tracking System *n.* *See* TTS (definition 2).

Transact-SQL *n.* A query language. Transact-SQL is sophisticated SQL dialect loaded with additional features beyond what is defined in the ANSI SQL 92 Standard. *Also called:* T-SQL, TSQL.

ISO/OSI MODEL	
ISO/OSI Layer	Focus
Application (highest level)	Program-to-program transfer of information
Presentation	Text formatting and display, code conversion
Session	Establishing, maintaining, and coordinating communication
Transport	Accurate delivery, service quality
Network	Transport routes, message handling and transfer
Data-link	Coding, addressing, and transmitting information
Physical	Hardware connections

Transport layer.

Transport Layer Security *n.* See TLS.

transpose¹ *n.* The result of rotating a matrix.

transpose² *vb.* **1.** To reverse, as the order of the letters *h* and *t* in *hte*, in correcting the spelling of *the*; or reversing two wires in a circuit. **2.** In mathematics and spreadsheets, to rotate a matrix (a rectangular array of numbers) about a diagonal axis.

transputer *n.* Short for **transistor computer**. A complete computer on a single chip, including RAM and an FPU, designed as a building block for parallel computing systems.

trap¹ *n.* See interrupt.

trap² *vb.* **1.** To intercept an action or event before it occurs, usually in order to do something else. Trapping is commonly used by debuggers to allow interruption of program execution at a given spot. See also interrupt, interrupt handler. **2.** To slightly overlap adjacent colors in preparing material for printing. Page layout and prepress programs trap color to prevent gaps between colors caused by minor variations in registration during printing.

trapdoor *n.* See back door.

trap handler *n.* See interrupt handler.

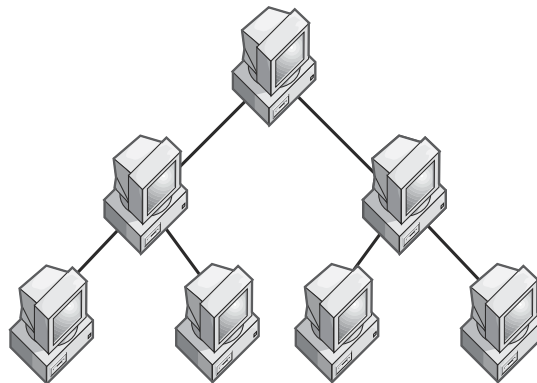
Trash *n.* An icon on the screen in the Macintosh Finder, resembling a garbage can. To delete a file or eject a diskette, the user drags the icon for the file or diskette to the Trash. However, until the user shuts down the system or

chooses the menu option “Empty Trash,” a file in the Trash is not actually deleted; the user can retrieve it by double-clicking the Trash icon and dragging the file’s icon out of the resulting window. Compare Recycle Bin.

traverse *vb.* In programming, to access in a particular order all of the nodes of a tree or similar data structure.

tree *n.* A data structure containing zero or more nodes that are linked together in a hierarchical fashion. If there are any nodes, one node is the root; each node except the root is the child of one and only one other node; and each node has zero or more nodes as children. See also child (definition 2), graph, leaf, node (definition 3), parent/child (definition 2), root.

tree network *n.* A topology for a local area network (LAN) in which one machine is connected to one or more other machines, each of which is connected to one or more others, and so on, so that the structure formed by the network resembles that of a tree. See the illustration. See also bus network, distributed network, ring network, star network, token ring network, topology.



Tree network.

tree search *n.* A search procedure performed on a tree data structure. At each step of the search, a tree search is able to determine, by the value in a particular node, which branches of the tree to eliminate, without searching those branches themselves. See also branch (definition 1), tree structure.

tree structure *n.* Any structure that has the essential organizational properties of a tree. See also tree.

tree view *n.* A hierarchical representation of the folders, files, disk drives, and other resources connected to a computer or network. For example, Windows Explorer uses a tree view to display the resources that are attached to a computer or a network. See also resource.

T

digits are 1s and the other three digits are 0s or two of the digits are 0s and the other three digits are 1s.

two's complement *n.* A number in the base-2 system (binary system) that is the true complement of another number. A two's complement is usually derived by reversing the digits in a binary number (changing 1s to 0s and 0s to 1s) and adding 1 to the result. When two's complements are used to represent negative numbers, the most significant (leftmost) digit is always 1. *See also* complement.

two-tier client/server *n.* A client/business logic layer and the database layer. Fourth-generation languages (4GL) have helped to popularize the two-tier client/server architecture. *Compare* three-tier client/server.

two-way trust *n.* A type of trust relationship in which both of the domains in the relationship trust each other. In a two-way trust relationship, each domain has established a one-way trust with the other domain. For example, domain A trusts domain B and domain B trusts domain A. Two-way trusts can be transitive or nontransitive. All two-way trusts between Windows domains in the same domain tree or forest are transitive. *See also* domain, forest, one-way trust, transitive trust.

TXD *n.* Short for Transmit (tx) Data. A line used to carry transmitted data from one device to another, as from computer to modem; in RS-232-C connections, pin 2. *See also* RS-232-C standard. *Compare* RXD.

.txt *n.* A file extension that identifies ASCII text files. In most cases, a document with a .txt extension does not include any formatting commands, so it is readable in any text editor or word processing program. *See also* ASCII.

Tymnet *n.* A public data network available in over 100 countries, with links to some online services and Internet service providers.

type¹ *n.* **1.** In programming, the nature of a variable—for example, integer, real number, text character, or floating-point number. Data types in programs are declared by the programmer and determine the range of values a variable can take as well as the operations that can be performed on it. *See also* data type. **2.** In printing, the characters that make up printed text, the design of a set of characters (typeface), or, more loosely, the complete set of characters in a given size and style (font). *See also* font, typeface.

type² *vb.* To enter information by means of the keyboard.

Type I PC Card *n.* *See* PC Card.

Type II PC Card *n.* *See* PC Card.

Type III PC Card *n.* *See* PC Card.

type-ahead buffer *n.* *See* keyboard buffer.

type-ahead capability *n.* The ability of a computer program to gather incoming keystrokes in a temporary memory reservoir (buffer) before displaying them on the screen. This capability ensures that keystrokes are not lost if they are typed faster than the program can display them.

type ball *n.* A small ball mounted on the print head of a printer or a typewriter (for example, the IBM Selectric) that bears all the characters in the character set on its surface. The ball rotates to align the correct character with the paper and with an inked or carbon ribbon before striking against the paper. *See* the illustration.



Type ball.

type checking *n.* The process performed by a compiler or interpreter to make sure that when a variable is used, it is treated as having the same data type as it was declared to have. *See also* compiler (definition 2), data type, interpreter.

type declaration *n.* A declaration in a program that specifies the characteristics of a new data type, usually by combining more primitive existing data types.

typeface *n.* A specific, named design of a set of printed characters, such as Helvetica Bold Oblique, that has a specified obliqueness (degree of slant) and stroke weight (thickness of line). A typeface is not the same as a *font*, which is a specific size of a specific typeface, such as 12-point Helvetica Bold Oblique. Nor is a typeface the same as a *typeface family*, which is a group of related typefaces, such as the Helvetica family including Helvetica, Helvetica Bold, Helvetica Oblique, and Helvetica Bold Oblique. *See also* font.

type font *n.* *See* font.

from the common language runtime. *See also* managed code.

unmoderated *adj.* Of, pertaining to, or characteristic of a newsgroup or mailing list in which all articles or messages received by the server are automatically available or distributed to all subscribers. *Compare* moderated.

unmount *vb.* To remove a disk or tape from active use. *Compare* mount.

unpack *vb.* To restore packed data to its original format. *Compare* pack.

unpopulated board *n.* A circuit board whose sockets are empty. *Compare* fully populated board.

unread *adj.* **1.** Of, pertaining to, or being an article in a newsgroup that a user has not yet received. Newsreader client programs distinguish between “read” and “unread” articles for each user and download only unread articles from the server. **2.** Of, pertaining to, or being an e-mail message that a user has received but has not yet opened in an e-mail program.

unrecoverable error *n.* A fatal error—one that a program is unable to recover from without the use of external recovery techniques. *Compare* recoverable error.

unreliable protocol *n.* A communications protocol that makes a “best effort” attempt to deliver a transmission but does not provide for verifying that the transmission arrives without error.

unroll *adj.* *See* inline (definition 1).

unset *vb.* To make the value of a bit position equal to 0. *Compare* set (definition 1).

unshielded cable *n.* Cable that is not surrounded with a metal shield. If the wires in an unshielded cable are not at least twisted around each other in pairs, the signals they carry have no protection from interference by external electromagnetic fields. Consequently, unshielded cable should be used only over very short distances. *Compare* coaxial cable, ribbon cable, twisted-pair cable, UTP.

unshielded twisted pair *n.* *See* UTP.

unshielded twisted-pair wiring *n.* *See* UTP.

unsolicited commercial e-mail *n.* *See* spam.

unsubscribe *vb.* **1.** In a newsreader client program, to remove a newsgroup from the list of newsgroups to which

one subscribes. *See also* newsgroup. **2.** To remove oneself as a recipient on a mailing list. *See also* mailing list.

untar¹ *n.* A utility, available for systems in addition to UNIX, for separating the individual files out of an archive assembled using the UNIX *tar* program. *Compare* tar¹.

untar² *vb.* To separate the individual files out of an archive assembled with the UNIX *tar* program. *Compare* tar².

unzip *vb.* To uncompress an archive file that has been compressed by a program such as compress, gzip, or PKZIP.

up *adj.* Functioning and available for use; used in describing computers, printers, communications lines on networks, and other such hardware.

UPC *n.* Acronym for **Universal Product Code**. A system of numbering commercial products using bar codes. A UPC consists of 12 digits: a number system character, a five-digit number assigned to the manufacturer, a five-digit product code assigned by the manufacturer, and a modulo 10 check digit. *See also* bar code.

update¹ *n.* A new release of an existing software product. A software update usually adds relatively minor new features to a product or corrects errors (bugs) found after the program was released. Updates are generally indicated by small changes in software version numbers, such as 4.0b from 4.0. *See also* version number. *Compare* release¹.

update² *vb.* To change a system or a data file to make it more current.

update query *n.* A database query that changes a set of records according to search conditions or criteria.

upflow *n.* In the data warehousing process, the stage during which stored information is checked for completeness, summarized, and readied for distribution. *See also* data warehouse². *Compare* downflow, inflow, metaflow.

upgrade¹ *n.* The new or enhanced version of a product.

upgrade² *vb.* To change to a newer, usually more powerful or sophisticated version.

uplink *n.* The transmission link from an earth station to a communications satellite.

upload¹ *n.* **1.** In communications, the process of transferring a copy of a file from a local computer to a remote computer by means of a modem or network. **2.** The copy of the file that is being or has been transferred.

U

the merchant's server and allows the user to authorize the appropriate debit to a credit card.

wallpaper *n.* In a graphical user interface such as Windows, a pattern or picture in the screen background that can be chosen by the user. *See also* graphical user interface.

WAN *n.* Acronym for **wide area network**. A geographically widespread network, one that relies on communications capabilities to link the various network segments. A WAN can be one large network, or it can consist of a number of linked LANs (local area networks).

wand *n.* Any pen-shaped device used for data entry, such as a graphics tablet's stylus or, most commonly, the scanning instrument used with many bar code readers. *See also* optical scanner, scan head. *Compare* stylus.

wanderer *n.* A person who frequently uses the World Wide Web. Many of these people make indexes of what they find.

WAP *n.* *See* Wireless Application Protocol.

war dialer *n.* A computer program that calls a range of phone numbers to identify those numbers that make a connection to a computer modem. War dialers are typically used by hackers to search for vulnerable computers and, once a connection is made, the war dialers may automatically probe the computer for potential weaknesses. Early war dialer programs called demon dialers were used to crack telephone systems in the 1970s and 1980s.

warez *n.* Illegal copies of computer software distributed through the Internet and other online channels, such as bulletin boards and FTP servers. The spelling is part of the tendency among some online groups to use odd symbols and intentional misspellings. *Compare* freeware, shareware.

warm boot *n.* The restarting of a running computer without first turning off the power. *Also called:* soft boot, three-finger salute, vulcan death grip, warm start.

warm start *n.* *See* warm boot.

warp *vb.* Sometimes used by computer game developers to describe the need to completely redraw a screen within a game. For example, moving through a door or advancing to a higher level would require a complete screen overhaul. *See also* computer game.

watchdog *n.* A hardware device (usually a timer or driver) used to monitor continuing system health and functionality through communications with the system software using a dedicated device driver.

watermark *n.* A semitransparent image often used for letters and business cards. In currency, a watermark is visible when you hold a bill up to the light.

watt *n.* The unit of power equal to the expenditure of 1 joule of energy in 1 second. The power of an electrical circuit is a function of the potential across the circuit and the current flowing through the circuit. If E = potential, I = current, and R = resistance, power in watts can be calculated as $I \times E$, $I^2 \times R$, or E^2/R .

.wav *n.* The file extension that identifies sound files stored in waveform (WAV) audio format. *See also* WAV.

WAV *n.* A file format in which Windows stores sounds as waveforms. Such files have the extension .wav. Depending on the sampling frequency, on whether the sound is monaural or stereo, and on whether 8 or 16 bits are used for each sample, one minute of sound can occupy as little as 644 kilobytes or as much as 27 megabytes of storage. *See also* sampling, waveform.

wave *n.* **1.** Any disturbance or change that has an oscillatory, periodic nature, for example, a light or sound wave. *See also* waveform. **2.** In electronics, the time-amplitude profile of an electrical signal.

wave division multiplexing *n.* *See* dense wavelength division multiplexing.

waveform *n.* The manner in which a wave's amplitude changes over time. *See also* period, phase, wavelength.

wavelength *n.* The distance between successive peaks or troughs in a periodic signal that is propagated through space. Wavelength is symbolized by the Greek letter lambda and can be calculated as speed divided by frequency.

wavelet *n.* A mathematical function that varies over a limited extent of time. Wavelets are coming into increasing use for analyzing signals (such as sound). They have limited duration and sudden changes in frequency and amplitude rather than the infinite duration and constant amplitude and frequency of the sine and cosine functions. *Compare* Fourier transform.

wave table synthesis or **wavetable synthesis** *n.* A method of producing sound, especially music, through a PC. Wave table synthesis is based on use of a wave table, which is a collection of digitized sound samples taken from recordings of actual instruments. These samples are typically stored on a sound card and are edited and mixed together to produce music. Wave table synthesis produces

whiteboard *n.* Software that allows multiple users across a network to work together on a document that is simultaneously displayed on all the users' screens, as though they are all gathered around a physical whiteboard.

Whiteboard *n.* Microsoft NetMeeting feature that opens a separate window in which multiple users can simultaneously review, create, and update graphic information. The Whiteboard is object-oriented, not pixel-oriented, allowing participants to manipulate the contents by clicking and dragging with the mouse. In addition, they can use a remote pointer or highlighting tool to point out specific contents or sections of shared pages. The NetMeeting Whiteboard is T.126 compliant and is interoperable with other T.126-compatible whiteboards.

white box *n.* A nonbranded PC assembled by a reseller, potentially including components from a number of manufacturers. The name refers to the typical color of the shipping carton, a box unadorned by brand name or logo.

white box testing *n.* A method of testing software that is based on knowledge of how the software is intended to function. Unlike black box testing, which focuses on how the software functions without reference to how it is designed, white box testing relies on detailed knowledge of the program code itself and is intended to find flaws and/or errors in its design and specification. *Also called:* glass box testing. *Compare* black box testing.

white hat *n.* A hacker who operates without malicious intent. A white hat will not break into a system with the intention of doing damage. White hats may be employed to provide security against other hackers. *See also* hacker. *Compare* black hat.

white noise *n.* Noise that contains components at all frequencies, at least within the frequency band of interest. It is called "white" by analogy to white light, which contains light at all the visible frequencies. In the audible spectrum, white noise is a hiss or a roar, such as that produced when a television set is tuned to a channel over which no station is broadcasting.

white pages *n.* *See* DIB (definition 2).

white space *n.* The areas of blank space on a page that can be used in a design for balance, contrast, and visual appeal.

whois *n.* **1.** An Internet service, provided by some domains, that enables a user to find e-mail addresses and other information for users listed in a database at that domain. **2.** A UNIX command to access the whois service. **3.** A command that displays a list of all users logged onto a Novell network.

whois client *n.* A program (such as the UNIX whois command) that enables a user to access databases of usernames, e-mail addresses, and other information. *See also* whois (definition 1).

whois server *n.* Software that provides the usernames and e-mail addresses from a database (often listing people who have accounts at an Internet domain) to users who request the information using whois clients. *See also* whois (definition 1).

Whole Earth 'Lectronic Link *n.* *See* WELL.

whole number *n.* A number without a fractional component—for example, 1 or 173; an integer.

WID *n.* Acronym for **Wireless Information Device**. Smart phone or other handheld wireless device capable of multiple communications functions, including e-mail and Internet access.

Wide Area Information Server *n.* *See* WAIS.

wide area network *n.* *See* WAN.

wideband transmission *n.* *See* broadband network.

Wide SCSI *n.* A form of the SCSI-2 interface that can transfer data 16 bits at a time at up to 20 megabytes per second. The Wide SCSI connector has 68 pins. *Also called:* Wide SCSI-2. *See also* SCSI, SCSI-2. *Compare* Fast SCSI, Fast/Wide SCSI.

Wide SCSI-2 *n.* *See* Wide SCSI.

widow *n.* A last line of a paragraph, shorter than a full line, appearing at the top of a page. A widow is considered visually undesirable on the printed page. *Compare* orphan.

wildcard character *n.* A keyboard character that can be used to represent one or many characters. The asterisk (*), for example, typically represents one or more characters, and the question mark (?) typically represents a single character. Wildcard characters are often used in operating systems as a means of specifying more than one file by name.

high-end scanners and allows retrieving of still images from IEEE 1394-based DV camcorders and USB-based Web cams. *Acronym:* WIA.

Windows IP Configuration *n.* See Winipcfg.

Windows Management Instrumentation *n.* A management infrastructure in Windows that supports monitoring and controlling system resources through a common set of interfaces and provides a logically organized, consistent model of Windows operation, configuration, and status. *Acronym:* WMI. *See also* resource.

Windows Me *n.* Released in 2000, the Windows Millennium Edition (Windows Me) operating system designed for home users as an upgrade from Windows 95 or Windows 98. Windows Me offers an improved home user experience including making it easier for users to share and manipulate digital photos, music, and videos, enhanced home networking capabilities, a rich Internet experience with support for broadband connections, different Internet communication tools, and online gaming.

Windows Media Audio *n.* A digital audio coding scheme developed by Microsoft that is used in distributing recorded music, usually over the Internet. Windows Media Audio shrinks the size of the audio file by a factor of 20 to 24 without seriously degrading the quality (CD-recording level) of the sound. Windows Media Audio files are given the file extension .wma and can be created with Windows Media Tools and played with the Windows Media Player. *Acronym:* WMA. *See also* Windows Media Technologies. *Compare* MP3, RealAudio, Secure Digital Music Initiative.

Windows Media Encoder *n.* A Windows Media technology that compresses live or prerecorded audio and video into a Windows Media stream, which can either be distributed immediately or saved as a Windows Media file for later distribution. The technology allows content developers to convert both live and prerecorded audio, video, and computer screen images to Windows Media Format for live and on-demand delivery. Windows Media Encoder also can save a stream as a Windows Media file and convert a file into Windows Media Format. Windows Media Encoder can distribute a stream via HTTP protocol. *Also called:* (if context is clear) Encoder, the encoder, the encoder engine.

Windows Media Player *n.* A client/control that receives a stream from a Windows Media server or local content for playback. It can run as a stand-alone client executable program. Windows Media Player can also be embedded in

a Web page, a C++ program, or a Microsoft Visual Basic program that uses the client ActiveX control.

Windows Media server *n.* A server on which Windows Media Services has been installed.

Windows Media Services *n.* A digital media platform that runs on a server, such as Windows 2000, to support streaming media, such as video and audio.

Windows Media Technologies *n.* Microsoft technologies for the creation, delivery, and playing of streaming audio and video over a network, including both intranets and the Internet. Windows Media Technologies, downloadable from the Microsoft Web site, support both live and on-demand (delivered from storage) content and are based on files delivered in Advanced Streaming Format (ASF). Three major components—Windows Media Tools, Windows Media Services, and Windows Media Player—comprise Windows Media Technologies. *See the table.* *See also* Advanced Streaming Format. *Compare* Real-System G2.

Table W.2 ATA Specifications.

<i>Component</i>	<i>Purpose</i>	<i>Features</i>
Windows Media Tools	Content creation	ASF authoring and editing tools, including tools for converting files from other formats (WAV, AVI, MPEG, and MP3) to ASF.
Windows Media Services	Content delivery	Tools for real-time and on-demand content delivery, administration tools, and Windows Media Rights Manager for piracy control.
Windows Media Player for PC platforms, Windows Media Player for Macintosh, Windows Media Player for UNIX	Content playback	ASF player for audio, audio plus still images, and full-motion video. Also supports other multimedia data, including RealAudio.