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Microsoft

Computer Dictionary

Fifth Edition

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all but the necessary information. For example, in a network that uses XXX.XXX.XXX.YYY and where all computers within the network use the same first address numbers, the mask will block out XXX.XXX.XXX and use only the significant numbers in the address, YYY. *See also* address¹ (definition 2).

address mode *n.* The method used to indicate an address in memory. *See also* absolute address, indexed address, paged address, relative address.

address modification *n.* The process of updating an address of a location in memory during computation.

address munging *n.* The practice of modifying an e-mail address in posts to newsgroups or other Internet forums to foil computer programs that gather e-mail addresses. The host name in an e-mail address is altered to create a fictitious address in such a way that a human can still easily determine the correct address. For example, a person with an e-mail address of Jane@myispooffers-usersfreeemail.com could modify, or “mung,” her address to read Jane@remove-this-to-reply-myispooffersusers-freeemail.com. Address munging is generally used to prevent delivery of unsolicited junk e-mail or spam. *Also called:* munging. *See also* address¹ (definition 2), host name, mung, spam.

address register *n.* A register (a high-speed memory circuit) that holds an address where specific data can be found for the transfer of information. *See also* register.

address resolution *n.* The identification of a computer's IP (Internet Protocol) address by finding the corresponding match in an address mapping table. *See also* address mapping table.

Address Resolution Protocol *n.* *See* ARP.

address space *n.* The total range of memory locations addressable by a computer.

address translation *n.* The process of converting one kind of address to another, such as a virtual address to a physical address.

ad-hoc network *n.* A temporary network formed by communicating stations or computers in a wireless LAN. *See also* wireless LAN.

ADJ *n.* Short for **adjacent**. A Boolean qualifier to indicate cases where two instances are adjacent to each other. In the case of a search string, “Microsoft ADJ Word” would

return only instances where “Microsoft” and “Word” are adjacent in the string.

administrative alerts *n.* Alerts that relate to server and resource use. They notify users about problems in areas such as security and access, user sessions, server shutdown due to power loss (when an uninterruptible power supply is available), directory replication, and printing. When a computer generates an administrative alert, a message is sent to a predefined list of users and computers. *See also* Alerter service.

ADN *n.* *See* Advanced Digital Network.

ADO *n.* *See* Active data object.

Adobe Type Manager *n.* Software from Adobe Systems, Inc., that manages PostScript fonts on a system. *Acronym:* ATM. *See also* PostScript.

ADO.NET *n.* The suite of data access technologies included in the .NET Framework class libraries that provide access to relational data and XML. ADO.NET consists of classes that make up the DataSet (such as tables, rows, columns, relations, and so on), .NET Framework data providers, and custom type definitions (such as SqlTypes for SQL Server).

ADP *n.* *See* data processing.

ADPCM *n.* *See* adaptive delta pulse code modulation.

ADSL *n.* Acronym for **asymmetric digital subscriber line**. Technology and equipment allowing high-speed digital communication, including video signals, across an ordinary twisted-pair copper phone line, with speeds up to 8 Mbps (megabits per second) downstream (to the customer) and up to 640 Kbps (kilobits per second) upstream. ADSL access to the Internet is offered by some regional telephone companies, offering users faster connection times than those available through connections made over standard phone lines. *Also called:* asymmetric digital subscriber loop. *Compare* SDSL.

Advanced Configuration and Power Interface *n.* *See* ACPI.

Advanced Digital Network *n.* A dedicated line service capable of transmitting data, video, and other digital signals with exceptional reliability, offered as a premier service by communications companies. Usually Advanced Digital Network refers to speeds at or above 56 kilobits per second (Kbps). *See also* dedicated line.

processor. Advantages of using an assembly language include increased execution speed and direct programmer interaction with system hardware. *See also* assembler, compiler, high-level language, low-level language, machine code.

assembly listing *n.* A file created by an assembler that includes the statements of an assembly language program, the machine language generated by the assembler, and a list of the symbols used in the program. *See also* assembler, assembly language.

assertion *n.* A Boolean statement used in a program to test a condition that, if the program is operating correctly, should always evaluate as true; otherwise the program will typically terminate with an appropriate error message. Assertions are used for debugging programs and for documenting how a program should operate.

assignment operator *n.* An operator used to assign a value to a variable or data structure. *See also* assignment statement, operator (definition 1).

assignment statement *n.* A programming language statement used to assign a value to a variable. It usually consists of three elements: an expression to be assigned, an assignment operator (typically a symbol such as = or :=), and a destination variable. On execution of the assignment statement, the expression is evaluated and the resulting value is stored in the specified destination. *See also* assignment operator, expression, variable.

associate *vb.* To inform the operating system that a particular file name extension is linked to a specific application. When a file is opened that has an extension associated with a given application, the operating system automatically starts the application and loads the file.

Association Control Service Element *n.* An Open Systems Interconnection (OSI) method to establish a call between two applications by checking the identities and contexts of the application entities and performing an authentication security check. *Acronym:* ACSE. *See also* ISO/OSI reference model.

Association for Computing Machinery *n.* A membership society founded in 1947 and devoted to the advancement of knowledge and technical proficiency of information processing professionals. *Acronym:* ACM.

Association of C and C++ Users *n.* An organization of people interested in the programming language C and its variants. Members of the association include professional

programmers, manufacturers and vendors of compilers, and nonprofessional programming enthusiasts.

Acronym: ACCU.

associative storage *n.* A memory-based storage method in which data items are accessed not on the basis of a fixed address or location but by analysis of their content. *Also called:* content-addressed storage.

associativity *n.* *See* operator associativity.

asterisk *n.* *See* *.

asymmetrical transmission *n.* A form of transmission used by high-speed modems, typically those that operate at rates of 9600 bps or more, that allows simultaneous incoming and outgoing transmission by dividing a telephone line bandwidth into two channels: one in the range of 300 to 450 bps and one at a speed of 9600 bps or more.

asymmetric digital subscriber line *n.* *See* ADSL.

asymmetric digital subscriber loop *n.* *See* ADSL.

asymmetric modem *n.* A modem that transmits data to the telephone network and receives data from the network at different speeds. Most commonly, an asymmetric modem will have a maximum download speed substantially higher than its upload speed. *See also* modem.

asynchronous *adj.* Pertaining to, being, or characteristic of something that is not dependent on timing. For example, asynchronous communications can start and stop at any time instead of having to match the timing governed by a clock.

asynchronous chip *n.* A microprocessor chip that does not need to operate in sync with a system clock. Asynchronous chip operations do not need to be timed to clock speed and draw power only when operations are in progress. This allows asynchronous chips the potential for greater computational speed and lower power consumption than traditional chips.

asynchronous communications *n.* Computer-to-computer communications in which the sending and receiving computers do not rely on timing as a means of determining where transmissions begin and end. *Compare* synchronous communications.

asynchronous device *n.* A device whose internal operations are not synchronized with the timing of any other part of the system.

asynchronous operation *n.* An operation that proceeds independently of any timing mechanism, such as a clock.

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receives from its neighboring cells, and all cells output their values simultaneously. **2.** Systems in which rules are applied to multiple cells and their neighbors in a regular spatial lattice or grid that advances through time. Usually, each cell in a cellular automaton has any one state out of a finite number of states. The state changes discretely in time according to rules that depend on the condition of the individual cell and its neighbors. Thus, an individual cell in a cellular automaton takes a neighbor cell's state as input before outputting its own state. Additionally, all the cells in the lattice are updated simultaneously, while the state of the entire lattice also advances discretely in time. Many computer simulations of cellular automata are demonstrated on Web sites; the best known Web example is J.H. Conway's Game of Life.

Cellular Digital Packet Data *n.* A wireless standard providing two-way, 19.2-Kbps packet data transmission over existing cellular telephone channels. *Acronym:* CDPD. *See also* packet, wireless.

Cellular Telecommunications and Internet Association *n.* Association based in Washington, D.C. that represents the wireless telecommunications industry and its equipment manufacturers. *Acronym:* CTIA.

censorship *n.* The action of preventing material that a party considers objectionable from circulating within a system of communication over which that party has some power. The Internet as a whole is not censored, but some parts of it come under varying degrees of control. A news server, for example, often is set to exclude any or all of the alt. newsgroups, such as alt.sex.* or alt.music.white-power, which are unmoderated and tend to be controversial. A moderated newsgroup or mailing list might be considered to be "censored" because the moderator will usually delete highly controversial and obscene content or content that is on a different topic from that followed by the newsgroup. Online services have identifiable owners, who often take some share of responsibility for what reaches their users' computer screens. In some countries, censorship of certain political or cultural Web sites is a matter of national policy.

ensorware *n.* Software that imposes restrictions on what Internet sites, newsgroups, or files may be accessed by the user.

center *vb.* To align characters around a point located in the middle of a line, page, or other defined area; in effect, to place text an equal distance from each margin or border. *See also* align (definition 1).

centi- prefix **1.** One hundred. **2.** One hundredth, as in *centimeter*—one hundredth of a meter.

centralized network *n.* A network in which nodes connect to and use resources on a single central computer, typically a mainframe.

centralized processing *n.* The location of computer processing facilities and operations in a single (centralized) place. *Compare* decentralized processing, distributed processing.

central office *n.* In communications, the switching center where interconnections between customers' communications lines are made.

central office exchange service *n.* *See* Centrex.

central processing unit *n.* *See* CPU.

Centrex *n.* An option offered by some phone companies in which up-to-date phone facilities are available to business customers, giving the customer access to a complete range of phone services without having to purchase or maintain the necessary equipment. Customers can purchase just the lines and services they will use. The name *central office exchange* refers to the fact that the phone facilities for Centrex services, particularly switching services, are generally maintained at the offices of the local or central phone company. Since Centrex offers a wider range of services, it is replacing PBX for businesses. *See also* switching. *Compare* PBX.

Centronics parallel interface *n.* A de facto standard for parallel data exchange paths between computers and peripherals, originally developed by the printer manufacturer Centronics, Inc. The Centronics parallel interface provides eight parallel data lines plus additional lines for control and status information. *See also* parallel interface.

CERN *n.* Acronym for Conseil Européen pour la Recherche Nucléaire (the European Laboratory for Particle Physics). CERN, a physics research center located in Geneva, Switzerland, is where the original development of the World Wide Web took place by Tim Berners-Lee in 1989 as a method to facilitate communication among members of the scientific community. *See also* NCSA (definition 1).

CERN server *n.* One of the first Hypertext Transfer Protocol (HTTP) servers, developed at CERN by Tim Berners-Lee. The CERN server is still in wide use and is free of charge. *See also* CERN, HTTP server (definition 1).

CERT *n.* Acronym for Computer Emergency Response Team. An organization that provides a round-the-clock

DRDW *n.* Acronym for **direct read during write**. 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 **Digital Rights Management**. 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 **destructive read out**. *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.

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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

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 newscast 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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development tools that enable integration with client/server and Web networks.

host language *n.* 1. The machine language of a CPU.
2. A high-level language that is specifically supported by an operating system with its toolbox routines and native development systems.

host name *n.* The name of a specific server on a specific network within the Internet, leftmost in the complete host specification. For example, www.microsoft.com indicates the server called "www" within the network at Microsoft Corporation.

host not responding *n.* An error message issued by an Internet client indicating that the computer to which a request has been sent is refusing the connection or is otherwise unavailable to respond to the request.

host replacement *n.* See rehosting.

host timed out *n.* An error condition that occurs when a remote system fails to respond within a reasonable amount of time (a few minutes) during an exchange of data over a TCP connection. This condition may mean that the remote system has crashed or been disconnected from the network. The error message the user sees may or may not be phrased in this manner. *See also* TCP. *Compare* host not responding.

host unreachable *n.* An error condition that occurs when the particular computer to which the user wishes to connect over a TCP/IP network cannot be accessed on its LAN because it is either down or disconnected from the network. The error message the user sees may or may not be phrased in this manner. *See also* TCP/IP.

hot *adj.* Of special or urgent interest, or deemed popular.

HotBot *n.* An Internet search engine developed by Ink-tomi Corporation and HotWired, Inc. Using Slurp, a Web robot, this tool maintains a database of documents that can be matched to key words entered by the user, in a fashion similar to other search engines. HotBot incorporates many workstations in parallel to search and index Web pages. *See also* spider.

hot carrier diode *n.* *See* Schottky diode.

hot docking *n.* The process of attaching a laptop computer to a docking station while the computer is running, and automatically activating the docking station's video display and other functions. *See also* docking station, laptop.

hot insertion *n.* The insertion of a device or card while there is power to the system. Many newer laptops allow

for hot insertion of PCMCIA cards. High-end servers may also allow hot insertion to reduce downtimes.

HotJava *n.* A Web browser developed by Sun Microsystems, Inc., that is optimized to run Java applications and applets embedded in Web pages. *See also* applet, Java, Java applet.

hot key¹ *n.* A keystroke or combination of keystrokes that switches the user to a different program, often a terminate-and-stay-resident (TSR) program or the operating system user interface. *See also* TSR.

hot key² *vb.* To transfer to a different program by pressing a hot key.

hot link *n.* A connection between two programs that instructs the second program to make changes to data when changes occur in the first program. For example, a word processor or desktop publishing program could update a document based on information obtained from a database through a hot link. *See* hyperlink.

hotlist *n.* A list of frequently accessed items, such as Web pages in a Web browser, from which the user can select one. The hotlist of Web pages is called the bookmark list in Netscape Navigator and Lynx and is called the Favorites folder in Microsoft Internet Explorer.

Hotmail *n.* A Web-based e-mail service launched in 1996 and owned and operated by Microsoft since December 1997. Hotmail provides free e-mail accounts and can be used by anyone with Internet access and Web browsing software.

hot plugging *n.* A feature that allows equipment to be connected to an active device, such as a computer, while the device is powered on.

hot-potato routing *n.* A packet routing scheme that relies on keeping data moving, even if it may temporarily move away from its final destination. *Also called:* deflection routing.

hot spare *n.* In RAID (redundant array of independent disks) systems, a spare drive in the array that is configured as a backup on which data can be rebuilt in the event that another drive fails. Hot spares are kept on line and do not require operator intervention to be activated. *See also* RAID.

hot spot *n.* The position in a mouse pointer, such as the position at the tip of an arrow or the intersection of the lines in a cross, that marks the exact location that will be affected by a mouse action, such as a button press.

indicate how Web browsers should display these elements to the user and should respond to user actions such as activation of a link by means of a key press or mouse click. HTML 2, defined by the Internet Engineering Task Force (IETF), included features of HTML common to all Web browsers as of 1994 and was the first version of HTML widely used on the World Wide Web. HTML+ was proposed for extending HTML 2 in 1994, but it was never implemented. HTML 3, which also was never standardized or fully implemented by a major browser developer, introduced tables. HTML 3.2 incorporated features widely implemented as of early 1996, including tables, applets, and the ability to flow text around images. HTML 4, the latest specification, supports style sheets and scripting languages and includes internationalization and accessibility features. Future HTML development will be carried out by the World Wide Web Consortium (W3C). Most Web browsers, notably Netscape Navigator and Internet Explorer, recognize HTML tags beyond those included in the present standard. *See also* .htm, .html, SGML, tag (definition 3), Web browser.

HTML attribute *n.* A value within an HTML tag that assigns additional properties to the object being defined. Some HTML editing software assigns some attributes automatically when you create an object such as a paragraph or table.

HTML code fragment *n.* HTML code that you add to a Web page to create features such as a script, a counter, or a scrolling marquee. Often used in the context of webrings to add a link and standard graphics or automation to an individual page to indicate membership.

HTML document *n.* A hypertext document that has been coded with HTML. *See* Web page.

HTML editor *n.* A software program used to create and modify HTML documents (Web pages). Most HTML editors include a method for inserting HTML tags without actually having to type out each tag. A number of HTML editors will also automatically reformat a document with HTML tags, based on formatting codes used by the word processing program in which the document was created. *See also* tag (definition 3), Web page.

HTML extensions *n.* A feature or setting that is an extension to the formal HTML specification. Extensions may not be supported by all Web browsers, but they may be used widely by Web authors. An example of an extension is marquee scrolling text.

HTML page *n.* *See* Web page.

HTML server control *n.* An ASP.NET server control that belongs to the System.Web.UI.HtmlControls namespace. An HTML server control maps directly to an HTML element and is declared on an ASP.NET page as an HTML element marked by a `runat=server` attribute. In contrast to Web server controls, HTML server controls do not have an `<asp:ControlName>` tag prefix. *See also* Web server control.

HTML source *n.* *See* source (definition 2).

HTML source file *n.* *See* source (definition 2).

HTML tag *n.* *See* tag (definition 3).

HTML validation service *n.* A service used to confirm that a Web page uses valid HTML according to the latest standard and/or that its hyperlinks are valid. An HTML validation service can catch small syntactical errors in HTML coding as well as deviations from the HTML standards. *See also* HTML.

HTTP *n.* Acronym for **H**ypertext **T**ransfer **P**rotocol. The protocol used to carry requests from a browser to a Web server and to transport pages from Web servers back to the requesting browser. Although HTTP is almost universally used on the Web, it is not an especially secure protocol.

HTTPd *n.* Acronym for **H**ypertext **T**ransfer **P**rotocol **D**emon. A small, fast HTTP server that was available free from NCSA. HTTPd was the predecessor for Apache. *Also called:* HTTP Daemon. *See also* Apache, HTTP server, NCSA (definition 1).

HTTP Daemon *n.* *See* HTTPd.

HTTP Next Generation *n.* *See* HTTP-NG.

HTTP-NG *n.* Acronym for **H**ypertext **T**ransfer **P**rotocol **N**ext **G**eneration. A standard under development by the World Wide Web Consortium (W3C) for improving performance and enabling the addition of features such as security. Whereas the current version of HTTP establishes a connection each time a request is made, HTTP-NG will set up one connection (which consists of separate channels for control information and data) for an entire session between a particular client and a particular server.

HTTPS *n.* **1.** Acronym for **H**ypertext **T**ransfer **P**rotocol **S**ecure. A variation of HTTP that provides for encryption and transmission through a secure port. HTTPS was devised by Netscape and allows HTTP to run over a security mechanism known as SSL (Secure Sockets Layer). *See also* HTTP, SSL. **2.** Web server software for Windows NT. Developed by the European Microsoft Windows NT Academic Centre (EMWAC) at the University of Edinburgh,

insider attack *n.* An attack on a network or system carried out by an individual associated with the hacked system. Insider attacks are typically the work of current or former employees of a company or organization who have knowledge of passwords and network vulnerabilities. *Compare* intruder attack.

Ins key *n.* *See* Insert key.

install *vb.* To set in place and prepare for operation. Operating systems and application programs commonly include a disk-based installation, or setup, program that does most of the work of preparing the program to work with the computer, printer, and other devices. Often such a program can check for devices attached to the system, request the user to choose from sets of options, create a place for the program on the hard disk, and modify system startup files as necessary.

installable device driver *n.* A device driver that can be embedded within an operating system, usually in order to override an existing, less-functional service.

Installable File System Manager *n.* In Windows 9x and Windows 2000, the part of the file system architecture responsible for arbitrating access to the different file system components. *Acronym:* IFS.

installation program *n.* A program whose function is to install another program, either on a storage medium or in memory. An installation program, also called a setup program, might be used to guide a user through the often complex process of setting up an application for a particular combination of machine, printer, and monitor.

Installer *n.* A program, provided with the Apple Macintosh operating system, that allows the user to install system upgrades and make bootable (system) disks.

instance *n.* An object, in object-oriented programming, in relation to the class to which it belongs. For example, an object *myList* that belongs to a class *List* is an instance of the class *List*. *See also* class, instance variable, instantiate, object (definition 2).

instance variable *n.* A variable associated with an instance of a class (an object). If a class defines a certain variable, each instance of the class has its own copy of that variable. *See also* class, instance, object (definition 2), object-oriented programming.

instantiate *vb.* To create an instance of a class. *See also* class, instance, object (definition 2).

instant messaging *n.* A service that alerts users when friends or colleagues are on line and allows them to communicate with each other in real time through private online chat areas. With instant messaging, a user creates a list of other users with whom he or she wishes to communicate; when a user from his or her list is on line, the service alerts the user and enables immediate contact with the other user. While instant messaging has primarily been a proprietary service offered by Internet service providers such as AOL and MSN, businesses are starting to employ instant messaging to increase employee efficiency and make expertise more readily available to employees.

Institute of Electrical and Electronics Engineers *n.* *See* IEEE.

instruction *n.* An action statement in any computer language, most often in machine or assembly language. Most programs consist of two types of statements: declarations and instructions. *See also* declaration, statement.

instruction code *n.* *See* operation code.

instruction counter *n.* *See* instruction register.

instruction cycle *n.* The cycle in which a processor retrieves an instruction from memory, decodes it, and carries it out. The time required for an instruction cycle is the sum of the instruction (fetch) time and the execution (translate and execute) time and is measured by the number of clock ticks (pulses of a processor's internal timer) consumed.

instruction mix *n.* The assortment of types of instructions contained in a program, such as assignment instructions, mathematical instructions (floating-point or integer), control instructions, and indexing instructions. Knowledge of instruction mixes is important to designers of CPUs because it tells them which instructions should be shortened to yield the greatest speed, and to designers of benchmarks because it enables them to make the benchmarks relevant to real tasks.

instruction pointer *n.* *See* program counter.

instruction register *n.* A register in a central processing unit that holds the address of the next instruction to be executed.

instruction set *n.* The set of machine instructions that a processor recognizes and can execute. *See also* assembler, microcode.

IntelliSense *n.* A Microsoft technology used in various Microsoft products, including Internet Explorer, Visual Basic, Visual Basic C++, and Office that is designed to help users perform routine tasks. In Visual Basic, for example, information such as the properties and methods of an object is displayed as the developer types the name of the object in the Visual Basic code window.

Intensity Red Green Blue *n.* *See* IRGB.

Interactive *adj.* Characterized by conversational exchange of input and output, as when a user enters a question or command and the system immediately responds. The interactivity of microcomputers is one of the features that makes them approachable and easy to use.

Interactive fiction *n.* A type of computer game in which the user participates in a story by giving commands to the system. The commands given by the user determine, to some extent, the events that occur during the story. Typically the story involves a goal that must be achieved, and the puzzle is to determine the correct sequence of actions that will lead to the accomplishment of that goal. *See also* adventure game.

Interactive graphics *n.* A form of user interface in which the user can change and control graphic displays, often with the help of a pointing device such as a mouse or a joystick. Interactive graphics interfaces occur in a range of computer products, from games to computer-aided design (CAD) systems.

Interactive processing *n.* Processing that involves the more or less continuous participation of the user. Such a command/response mode is characteristic of microcomputers. *Compare* batch processing (definition 2).

Interactive program *n.* A program that exchanges output and input with the user, who typically views a display of some sort and uses an input device, such as a keyboard, mouse, or joystick, to provide responses to the program. A computer game is an interactive program. *Compare* batch program.

Interactive services *n.* *See* BISDN.

Interactive session *n.* A processing session in which the user can more or less continuously intervene and control the activities of the computer. *Compare* batch processing (definition 2).

Interactive television *n.* A video technology in which a viewer interacts with the television programming. Typical uses of interactive television include Internet access, video

on demand, and video conferencing. *See also* video conferencing.

Interactive TV *n.* *See* iTV.

Interactive video *n.* The use of computer-controlled video, in the form of a CD-ROM or videodisc, for interactive education or entertainment. *See also* CD-ROM, interactive, interactive television, videodisc.

Interactive voice response *n.* A computer that operates through the telephone system, in which input commands and data are transmitted to the computer as spoken words and numbers or tones and dial pulses generated by a telephone instrument; and output instructions and data are received from the computer as prerecorded or synthesized speech. For example, a dial-in service that provides airline flight schedules when you press certain key codes on your telephone is an interactive voice response system. *Also called:* IVR.

Interactive voice system *n.* *See* interactive voice response.

Interapplication communication *n.* The process of one program sending messages to another program. For example, some e-mail programs allow users to click on a URL within the message. After the user clicks on the URL, browser software will automatically launch and access the URL.

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

Interchange File Format *n.* *See* .iff.

Interchange Format *n.* *See* Rich Text Format.

Interconnect *n.* **1.** *See* System Area Network. **2.** An electrical or mechanical connection. Interconnect is the physical connection and communication between two components in a computer system.

Interface *n.* **1.** The point at which a connection is made between two elements so that they can work with each other or exchange information. **2.** Software that enables a program to work with the user (the user interface, which can be a command-line interface, menu-driven interface, or a graphical user interface), with another program such as the operating system, or with the computer's hardware. *See also* application programming interface, graphical user interface. **3.** A card, plug, or other device that connects pieces of hardware with the computer so that information can be moved from place to place. For example, standardized interfaces such as RS-232-C standard and

kern *vb.* To alter selectively the distance between pairs of letters for readability and to make the type spacing more balanced and proportional. See the illustration.

AWAKE
AWAKE

Kern. *The first three letters of the second example are kerned.*

kernel *n.* The core of an operating system—the portion of the system that manages memory, files, and peripheral devices; maintains the time and date; launches applications; and allocates system resources.

Kernel Extension *n.* See KEXT.

kernel panic *n.* In Mac OS X and UNIX-based systems, a type of error that occurs when the core level of the operating system is unable to properly handle an instruction. A kernel panic appears to the user as a text screen containing information about the nature of the error, which often can be corrected with a system reboot.

KEXT *n.* Acronym for **Kernel Extension**. In Mac OS X, an extension mechanism created to expand the functionality of the operating system kernel. KEXTs are modular and dynamic loading, and they may be created for any service that requires access to kernel internal interfaces. Creation of a KEXT allows the loading of pieces of code into the kernel without the need to recompile.

key *n.* **1.** On a keyboard, the combination of a plastic keycap, a tension mechanism that suspends the keycap but allows it to be pressed down, and an electronic mechanism that records the key press and key release. **2.** In database management, an identifier for a record or group of records in a datafile. *See also* B-tree, hash², index¹ (definition 1), inverted list, key field. **3.** In encryption and digital signatures, a string of bits used for encrypting and decrypting information to be transmitted. Encryption commonly relies on two different types of keys, a public key known to more than one person (say, both the sender and the receiver) and a private key known only to one person (typically, the sender). **4.** A metal object used with a physical lock to disable a computer system.

key binary large object *n.* A key binary large object (BLOB) provides a way to store keys outside of the cryptographic service provider (CSP) and is used to transfer

keys securely from one CSP to another. A key BLOB consists of a standard header followed by data representing the key. *Acronym:* key BLOB.

key BLOB *n.* *See* key binary large object.

keyboard *n.* A hardware unit with a set of switches that resembles a typewriter keyboard and that conveys information from a user to a computer or data communications circuit. *See also* Alt key, Apple key, arrow key, Backspace key, Break key, Caps Lock key, character code, Clear key, Command key, control character, Control key, Delete key, Dvorak keyboard, End key, enhanced keyboard, Enter key, ergonomic keyboard, Escape key, function key, Help key, Home key, Insert key, keyboard buffer, keyboard controller, keyboard enhancer, keycap, key code, numeric keypad, Num Lock key, Option key, original Macintosh keyboard, Page Down key, Page Up key, Pause key, PC/XT keyboard, Power-on key, Print Screen key, QWERTY keyboard, Return key, scan code, Scroll Lock key, Shift key, Sys Req key, Tab key.

keyboard buffer *n.* A small amount of system memory that stores the most recently typed characters. This buffer is used to store typed characters that have not yet been processed. *Also called:* type-ahead buffer.

keyboard controller *n.* A microprocessor installed in a keyboard whose primary function is to wait for and report on keystrokes.

keyboard enhancer *n.* A program that monitors keystrokes as they are typed and that can be used to redefine the meaning of certain keys or key combinations. Keyboard enhancers are used to create and store macros—sets of keystrokes, mouse actions, menu selections, or other instructions—that are then assigned to keys. *Also called:* macro program.

keyboard layout *n.* The key arrangement used for a particular keyboard, including such factors as the number of keys (101 is the current standard) and the configuration of the keys (QWERTY is the United States standard). Some proprietary systems use different layouts, and many allow you to map the keys to characters according to your preferences.

keyboard port *n.* The connector on a computer that receives data from the keyboard. *See also* port¹ (definition 1).

keyboard processor *n.* *See* keyboard controller.

keyboard repeat *n.* *See* typematic.

a new spreadsheet software release be able to read the existing business records without expensive and time-consuming conversion to a new format? Legacy systems in many organizations are based on mainframe computers, which may be either augmented or slowly replaced by client/server architectures. *See also* mainframe computer. *Compare* client/server architecture.

legend *n.* Text that describes or explains a graphic, usually printed below the graphic. On a graph or map, the legend is the key to the patterns or the symbols used.

Lempel Ziv compression *n.* A data compression method designed by Abraham Lempel and Jakob Ziv in 1977 and 1978. Lempel Ziv compression is based on the substitution of certain values for repeated data. It is implemented in two basic forms: LZ77, which is based on values that point to the positions of repeating data, and LZ78, which builds a dictionary and uses the dictionary index to point to repeating data. An enhanced version of LZ78, known as LZW, is implemented in well-known file formats, such as GIF and TIF. *See also* .lzh, LZW compression.

length *n.* The number of linear units of storage space occupied by an object, such as a file on disk or a data structure in a program, typically measured in bits, bytes, or blocks.

LEO *n.* *See* low-Earth-orbit satellite.

LER *n.* *See* MPLS.

less than *adj.* *See* relational operator.

less than or equal to *adj.* *See* relational operator.

letterbomb *n.* An e-mail message that is intended to impair the recipient's computer use. Some sequences of control characters can lock up a terminal, files attached to the message may contain viruses or Trojan horses, and a sufficiently large message can overflow a mailbox or crash a system. *See also* control character, e-mail¹ (definition 1), mailbox, Trojan horse, virus.

letter quality *adj.* Pertaining to or being a level of print quality on dot-matrix printers that is better than draft quality. As the name implies, letter quality is supposed to be crisp and dark enough for use in business letters. *See also* print quality. *Compare* draft quality, near-letter-quality.

letter-quality printer *n.* Any printer that produces output high enough in quality to be acceptable for business letters. *See also* daisy-wheel printer, laser printer.

level 1 cache *n.* *See* L1 cache.

level 2 cache *n.* *See* L2 cache.

lexicographic sort *n.* A sort that arranges items in the order in which they would appear if listed in a dictionary. A lexicographic sort puts numbers, for instance, where they would be if they were spelled out; for example, 567 would fall in the Fs. *Compare* alphanumeric sort.

lexicon *n.* **1.** The words of a language and their definitions. **2.** In programming, the identifiers, keywords, constants, and other elements of a language that make up its "vocabulary." The ways in which these vocabulary elements can be put together is the syntax of the language. *Compare* syntax.

LF *n.* *See* linefeed.

LHARC *n.* A freeware file-compression utility program developed by Haruyasu Yoshizaki and introduced in 1988. With LHARC, the contents of one or more files can be compressed into a singular, smaller file, with the extension .lha. A copy of the program is required to uncompress these files. LHARC can also embed a small program with the compressed information and save everything in a single file, called a self-extracting archive, with an .exe extension. As a result, the recipient of the compressed file does not need a separate utility program to uncompress the file. *See also* freeware, PKZIP, utility program.

library *n.* **1.** In programming, a collection of routines stored in a file. Each set of instructions in a library has a name, and each performs a different task. **2.** A collection of software or data files.

library routine *n.* In programming, a routine stored in a collection of routines (a library) that can be used by any program that can link into the library. *See also* function library, library (definition 1).

license agreement *n.* A legal contract between a software provider and a user specifying the rights of the user regarding the software. Usually the license agreement is in effect with retail software once the user opens the software package. *See also* End-User License Agreement.

licensing key *n.* A short character string that serves as a password during the installation of licensed commercial software. The use of licensing keys is a security device aimed at reducing illegal duplication of licensed software.

LIFO *n.* *See* last in, first out.

ligature *n.* In typography, a single character created from two joined letters that replaces the two separate letters. Because ligatures are not included with all digital

L

shared by several people can be considered a multiuser system, the term is generally reserved for machines that can be accessed simultaneously by several people through communications facilities or via network terminals. *Compare* single-user computer.

multum in parvo mapping *n.* See MIP mapping.

MUMPS *n.* Acronym for **Mass(achusetts) Utility Multi Programming System**. An advanced, high-level programming language and integrated database developed in 1966 at Massachusetts General Hospital and used widely by health care businesses. A unique feature of MUMPS is its ability to store both data and program fragments in its database.

munging *n.* See address munging.

MUSE *n.* Short for **multiuser simulation environment**. See MUD.

.museum *n.* One of seven new top-level domain names approved in 2000 by the Internet Corporation for Assigned Names and Numbers (ICANN). .museum is meant for use by museum Web sites.

Musical Instrument Digital Interface *n.* See MIDI.

mutual exclusion *n.* A programming technique that ensures that only one program or routine at a time can

access some resource, such as a memory location, an I/O port, or a file, often through the use of semaphores, which are flags used in programs to coordinate the activities of more than one program or routine. *See also* semaphore.

MUX *n.* See multiplexer.

My Briefcase *n.* A Windows 9x utility, helpful for workers away from the office, that manages the updating of modified files once the remote user's computer is connected back on the office network.

Mylar *n.* A polyester film product created by DuPont, often used as the base for magnetically coated storage media (disks and tape) and for carbon ribbons used with impact printers.

Mylar ribbon *n.* See carbon ribbon.

MYOB *n.* Acronym for **Mind your own business**. An expression used in e-mail and newsgroups.

my two cents *n.* An expression used informally in newsgroup articles and, less frequently, e-mail messages or mailing lists, to indicate that the message is the writer's contribution to an ongoing discussion. *Also called:* \$0.02. *See also* mailing list, newsgroup.

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).

achieve personalization and privacy concomitantly, OPS is based on the concept of a Personal Profile, which is stored on the individual's computer and contains the user's unique identification, demographic and contact data, and possibly content preferences. This information remains under the user's control and can be released wholly or in part to the requesting site. *Acronym:* OPS. *See also* cookie, digital certificate.

open shop *n.* A computer facility that is open to users and not restricted to programmers or other personnel. An open shop is one in which people can work on or attempt to solve computer problems on their own rather than handing them over to a specialist.

Open Shortest Path First *n.* *See* OSPF.

Open Software Foundation *n.* *See* OSF.

open source *n.* The practice of making the source code (program instructions) for a software product freely available, at no cost, to interested users and developers, even though they were not involved in creating the original product. The distributors of open source software expect and encourage users and outside programmers to examine the code in order to identify problems, and to modify the code with suggested improvements and enhancements. Widely used open source products include the Linux operating system and the Apache Web server.

open standard *n.* A publicly available set of specifications describing the characteristics of a hardware device or software program. Open standards are published to encourage interoperability and thereby help popularize new technologies. *See also* standard (definition 2).

open system *n.* **1.** In communications, a computer network designed to incorporate all devices—regardless of the manufacturer or model—that can use the same communications facilities and protocols. **2.** In reference to computer hardware or software, a system that can accept add-ons produced by third-party suppliers. *See also* open architecture (definition 1).

Open Systems Interconnection reference model *n.* *See* ISO/OSI reference model.

OpenType *n.* A collaborative initiative by Microsoft and Adobe to unify support for Microsoft TrueType and Adobe PostScript Type 1 fonts. The OpenType font format enables font creators and users to work with the font type that best suits their needs without having to worry about

whether the font is based on TrueType or PostScript technology. *Also called:* TrueType Open version 2. *See also* PostScript font, TrueType.

Opera *n.* A Web browser developed by Opera Software S/A. Opera is notable for its strict W3C standards support. Opera is often chosen by Web developers to test Web sites for W3C compliance. *See also* W3C, Web browser.

operand *n.* The object of a mathematical operation or a computer instruction.

operating system *n.* The software that controls the allocation and usage of hardware resources such as memory, central processing unit (CPU) time, disk space, and peripheral devices. The operating system is the foundation software on which applications depend. Popular operating systems include Windows 98, Windows NT, Mac OS, and UNIX. *Acronym:* OS. *Also called:* executive.

operation *n.* **1.** A specific action carried out by a computer in the process of executing a program. **2.** In mathematics, an action performed on a set of entities that produces a new entity. Examples of mathematical operations are addition and subtraction.

operation code *n.* The portion of a machine language or assembly language instruction that specifies the type of instruction and the structure of the data on which it operates. *Also called:* opcode. *See also* assembly language, machine code.

operations research *n.* The use of mathematical and scientific approaches to analyze and improve efficiency in business, management, government, and other areas. Developed around the beginning of World War II, operations research was initially used to improve military operations during the war. The practice later spread to business and industry as a means of breaking down systems and procedures and studying their parts and interactions to improve overall performance. Operations research involves use of the critical path method, statistics, probability, and information theory.

operator *n.* **1.** In mathematics and in programming and computer applications, a symbol or other character indicating an operation that acts on one or more elements. *See also* binary¹, unary. **2.** A person who controls a machine or system such as a computer or telephone switchboard.

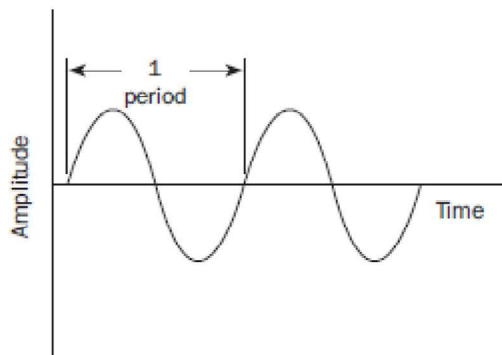
operator associativity *n.* A characteristic of operators that determines the order of evaluation in an expression

2. A 486 PC that can be upgraded to Pentium class by adding a Pentium processor. *See also* i486DX.

perfboard *n.* Short for **perforated fiber board**. *See* breadboard.

performance monitor *n.* A process or program that appraises and records status information about various system devices and other processes.

period *n.* The length of time required for an oscillation to complete one full cycle. For an oscillating electrical signal, the period is the time between waveform repetitions. If f is the frequency of oscillation in hertz, and t is the period in seconds, then $t = 1/f$. *See* the illustration.



Period. *The period of an oscillating signal.*

peripheral *n.* In computing, a device, such as a disk drive, printer, modem, or joystick, that is connected to a computer and is controlled by the computer's microprocessor. *Also called:* peripheral device. *See also* console.

Peripheral Component Interconnect *n.* *See* PCI local bus.

peripheral device *n.* *See* peripheral.

peripheral power supply *n.* An auxiliary source of electricity used by a computer or a device as a backup in case of a power failure. *Acronym:* PPS.

Perl *n.* Acronym for **Practical Extraction and Report Language**. An interpreted language, based on C and several UNIX utilities. Perl has powerful string-handling features for extracting information from text files. Perl can assemble a string and send it to the shell as a command; hence, it

is often used for system administration tasks. A program in Perl is known as a script. Perl was devised by Larry Wall at NASA's Jet Propulsion Laboratory.

permanent storage *n.* A recording medium that retains the data recorded on it for long periods of time without power. Ink on paper is by far the most widely used permanent storage, but data can be transferred from paper to a computer only with difficulty. Typically, some form of magnetic medium, such as floppy disk or tape, is preferable. Magnetic media are generally accepted as permanent, even though the magnetic fields that encode data in the media tend to fade eventually (in five years or more). *See also* nonvolatile memory.

permanent swap file *n.* In Windows, a file composed of contiguous disk sectors used for virtual memory operations. *See also* swap file, virtual memory.

permanent virtual circuit *n.* *See* PVC.

permission *n.* In a networked or multiuser computer environment, the ability of a particular user to access a particular resource by means of his or her user account. Permissions are granted by the system administrator or other authorized person. Several levels of access can be given: read only, read and write (view and change), or read, write, and delete. *Also called:* Access permission.

permission class *n.* A class that defines access to a resource or defines an identity by supporting authorization checks.

permission object *n.* An instance of a permission class that represents access rights to resources or identity. A permission object can be used to specify a request, a demand, or a grant of permission.

permissions log *n.* A file on a network or multiuser computer environment where permissions for users are stored. When a user attempts to access a resource on the system, the permissions log is checked to see whether the user has permission to use it.

perpendicular recording *n.* A method of increasing storage capacity on magnetic media by aligning the magnetic dipoles, whose orientation determines bit values, in a direction that is perpendicular to the recording surface. *Also called:* vertical recording.

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.

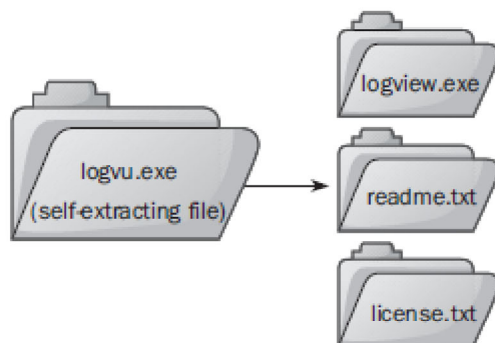
router *n.* An intermediary device on a communications network that expedites message delivery. On a single network linking many computers through a mesh of possible connections, a router receives transmitted messages and forwards them to their correct destinations over the most efficient available route. 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



Self-extracting file.

self-modifying code *n.* Program code, usually object code generated by a compiler or an assembler, that modifies itself during instruction by writing new operation codes, addresses, or data values over existing instructions. *See also* pure procedure.

self-monitoring analysis and reporting technology system *n.* *See* SMART system.

self-organizing map *n.* *See* SOM (definition 2).

self-test *n.* A set of one or more diagnostic tests that a computer or peripheral device (such as a printer) performs on itself. *See also* power-on self test.

self-validating code *n.* Program code that can test itself to verify that it behaves correctly, usually by feeding itself a set of standard input values and testing the results against a set of expected output values.

semantic error *n.* An error in meaning; a statement in a program that is syntactically correct (legal) but functionally incorrect. *See also* logic, semantics (definition 1), syntax.

semantics *n.* **1.** In programming, the relationship between words or symbols and their intended meanings. Programming languages are subject to certain semantic rules; thus, a program statement can be syntactically correct but semantically incorrect; that is, a statement can be written in an acceptable form and still convey the wrong meaning. *See* the illustration. *See also* syntax. **2.** In artificial-intelligence research, the capacity of a network to represent relationships among objects, ideas, or situations in a humanlike way. *Compare* syntax.

CANARY — is a — BIRD
 |
 has
 |
 FEATHERS

Semantics.

semaphore *n.* In programming, a signal—a flag variable—used to govern access to shared system resources. A semaphore indicates to other potential users that a file or other resource is in use and prevents access by more than one user. *See also* flag (definition 1).

Semicon *n.* Short for Semiconductors Equipment and Material International Conference. A series of international conferences sponsored by the Semiconductors Equipment and Material International (SEMI), a trade group for the international semiconductor industry. The conference provides members with up-to-date information on issues affecting the semiconductor industry and provides SEMI members with a forum for showcasing products and services.

semiconductor *n.* A substance, commonly silicon or germanium, whose ability to conduct electricity falls between that of a conductor and that of a nonconductor (insulator). The term is used loosely to refer to electronic components made from semiconductor materials.

send *vb.* To transmit a message or file through a communications channel.

sendmail *n.* A popular open-source UNIX-based implementation of the Simple Mail Transfer Protocol (SMTP) for delivering e-mail. Written in 1981 by Eric Allman at the University of California at Berkeley, sendmail was the first Internet message transfer agent (MTA).

send statement *n.* In SLIP and PPP scripting languages, a statement that tells the program that dials an Internet service provider's number (a *dialer program*) to send certain characters. *See also* ISP, PPP, scripting language, SLIP.

sensor *n.* A device that detects or measures something by converting nonelectrical energy to electrical energy. A photocell, for example, detects or measures light by converting it to electrical energy. *See also* transducer.

sensor glove *n.* A hand-worn computer input device for virtual-reality environments. The glove translates finger movements by the user to commands for manipulating objects in the environment. *Also called:* data glove. *See also* virtual reality.

however, each type bar is bent 90 degrees at its halfway point, so the type bars stick straight up with the type facing away from the hub. *See also* thimble printer. *Compare* daisy wheel, daisy-wheel printer.

thimble printer *n.* A printer that uses a thimble print element, best known in a line of printers from NEC. Because these printers use fully formed characters like those on a typewriter, they generate letter-quality output that is indistinguishable from that of a typewriter. This includes the slight impression created by the type hitting the paper hard through the ribbon, which distinguishes this type of print-out from that of laser printers. *See also* thimble. *Compare* daisy-wheel printer.

thin client *n.* A software layer of a small client for a centrally managed, network terminal. The thin client allows the user access to server-hosted applications and data.

thin Ethernet *n.* *See* 10Base2.

thin film *adj.* A method used in the fabrication of integrated circuits. Thin film technology operates on the same basic principles as thick film technology. Rather than using inks or pastes, however, thin film technology uses metals and metal oxides that are “evaporated” and then deposited on the substrate in the desired pattern to form the integrated circuit’s passive components (wires, resistors, and capacitors). *See also* molecular beam epitaxy. *Compare* thick film.

thin film transistor *n.* *See* TFT.

ThinNet *n.* *See* 10Base2.

thin server *n.* A client/server architecture in which most of an application is run on the client machine, which is called a fat client, with occasional data operations on a remote server. Such a configuration yields good client performance, but complicates administrative tasks, such as software upgrades. *See also* client/server architecture, fat client, thin client. *Compare* fat server.

thin space *n.* An amount of horizontal space in a font, equal to one-quarter the point size of the font. For example, a thin space in a 12-point font is 3 points wide. *See also* point¹ (definition 1). *Compare* em space, en space, fixed space.

thin system *n.* *See* thin server.

ThinWire *n.* *See* 10Base2.

Third Generation *n.* *See* 3G.

third-generation computer *n.* Any of the computers produced from the mid-1960s to the 1970s that were based on integrated circuits rather than on separately wired transistors. *See also* computer.

third-generation language *n.* *See* 3GL.

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

third-party¹ *adj.* In computer console games, a game made for a specific console by a company other than the console manufacturer.

third party² *n.* A company that manufactures and sells accessories or peripherals for use with a major manufacturer’s computer or peripheral, usually without any involvement from the major manufacturer.

thrashing *n.* The state of a virtual memory system that is spending almost all its time swapping pages in and out of memory rather than executing applications. *See also* swap (definition 2), virtual memory.

thread *n.* **1.** In programming, a process that is part of a larger process or program. **2.** In a tree data structure, a pointer that identifies the parent node and is used to facilitate traversal of the tree. **3.** In electronic mail and Internet newsgroups, a series of messages and replies related to a specific topic.

threaded discussion *n.* In a newsgroup or other online forum, a series of messages or articles in which replies to an article are nested directly under it, instead of the articles being arranged in chronological or alphabetical order. *See also* newsgroup, thread (definition 3).

threaded newsreader *n.* A newsreader that displays posts in newsgroups as threads. Replies to a post appear directly after the original post, rather than in chronological or any other order. *See also* newsreader, post, thread (definition 3).

threaded tree *n.* A tree in which the leaf (end) nodes contain pointers to some of the nodes from which they arise. The pointers facilitate searching the tree for information. *See also* thread (definition 2).

threading *n.* A technique used by certain interpretive languages, such as many Forth implementations, to speed execution. The references to other support routines in each threaded support routine, such as a predefined word in Forth, are replaced by pointers to those routines. *See also* Forth, thread (definition 1).

three-dimensional array *n.* An ordered arrangement of information in which three numbers (integers) are used to