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Association for Computing Machinery \ə-sō-sē-ā`shən fər kəm-pyo͞o´tēng mə-shē`nər-ē\ *n.* A membership society founded in 1947 and devoted to the advancement of knowledge and technical proficiency of information processing professionals. *Acronym:* ACM (A`C-M´).

Association of C and C++ Users \ə-sō-sē-ā`shən əv C` and C-plus-plus´ yo͞o-zərz\ *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 non-professional programming enthusiasts. *Acronym:* ACCU (A`C-C-U´).

associative storage \ə-sō`shē-ā-tiv stōr´əj, ə-sō`sē-ā-tiv, ə-sō´shə-tiv\ *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 \ə-sō`shē-ə-tiv´ə-tē, ə-sō`sē-ə-tiv´ə-tē, ə-sō`shə-tiv´ə-tē\ *n. See* operator associativity.

asterisk \a´stər-isk\ *n.* **1.** The character (*) used in applications and programming languages to signify multiplication. **2.** In Windows, MS-DOS, OS/2, and other operating systems, a wildcard character that can be used in place of other characters, as in *.*, which represents any combination of filename and extension. *See also* question mark, star-dot-star, wildcard character. **3.** In the C and C++ programming languages, the character used to dereference a pointer to a class or structure. *See also* dereference, pointer (definition 1).

asymmetrical transmission \ā`si-me`trə-kəl tranz-mish´ən\ *n.* A form of transmission used by high-speed modems, typically those that operate at rates of 9,600 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 9,600 bps or more.

asymmetric digital subscriber line \ā`si-me-trik dij`i-təl sub-skrī´bər līn`\ *n.* Technology and equipment allowing high-speed digital communication, including video signals, across an ordinary twisted-pair copper phone line, with speeds up to 9 megabits per second (9 Mbps) downstream (to the customer) and up to 800 kilobits per second (800 Kbps) upstream. *Acronym:* ADSL (A`D-S-L´). *Also called* asymmetric digital subscriber loop. *Compare* symmetric digital subscriber line.

asymmetric digital subscriber loop \ā`si-me-trik dij`i-təl sub-skrī´bər lo͞op`\ *n. See* asymmetric digital subscriber line.

asynchronous device \ā-sēn`krə-nəs də-vīs´\ *n.* A device whose internal operations are not synchronized with the timing of any other part of the system.

asynchronous operation \ā-sēn`krə-nəs op`-ər-ā´shən\ *n.* An operation that proceeds independently of any timing mechanism, such as a clock. For example, two modems communicating asynchronously rely upon each sending the other start and stop signals in order to pace the exchange of information. *Compare* synchronous operation.

asynchronous procedure call \ā-sēn`krə-nəs prə-sē´jur käl\ *n.* A function call that executes separately from an executing program when a set of enabling conditions exist. After the conditions have been met, the operating system's kernel issues a software interrupt and directs the executing program to execute the call. *Acronym:* APC (A`P-C´). *See also* function call.

Asynchronous Protocol Specification \ā-sin`krə-nəs prō´tə-kol spes`ə-fə-kā`shən\ *n.* The X.445 standard. *See* CCITT X Series.

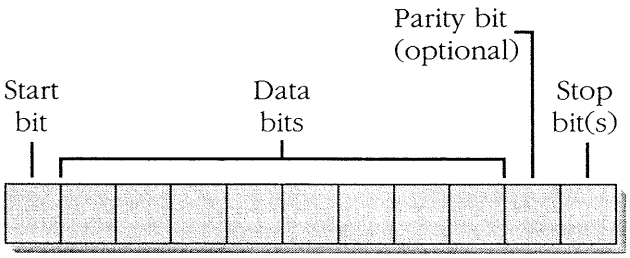
Asynchronous Transfer Mode \ā-sēn`krə-nəs trans´fər mōd`\ *n. See* ATM (definition 1).

asynchronous transmission \ā-sēn`krə-nəs tranz-mish´ən\ *n.* In modem communication, a form of data transmission in which data is sent intermittently, one character at a time, rather than in a steady stream with characters separated by fixed time intervals. Asynchronous transmission relies on the use of a start bit and stop bit(s), in addition to the bits representing the character (and an optional parity bit), to distinguish separate characters. See the illustration on the next page.

.at \dot`A-T´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Austria.

AT&T System V \A`T-ənd-T` si-stəm fīv´\ *n. See* System V.

ATA \A`T-A´\ *n.* Acronym for **A**dvanced **T**echnology **A**ttachment. ANSI group X3T10's official name



Asynchronous transmission. The coding of a typical character sent in asynchronous transmission.

for the disk drive interface standard commonly known as Integrated Drive Electronics (IDE). *Also called* AT Attachment.

ATA hard disk drive card \A`T-A` härd disk` drīv kärd`\ *n.* Expansion card used to control and interface with an ATA hard disk drive. These cards are usually ISA cards. *See also* ATA, ISA.

ATA/IDE hard disk drive \A-T-A`I-D-E` härd disk´ drīv`\ *n.* IDE (Integrated Drive Electronics—or numerous other interpretations) and ATA (AT Attachment) are one and the same thing: a disk drive implementation designed to integrate the controller onto the drive itself, thereby reducing interface costs and making firmware implementations easier.

ATAPI \A`T-A-P-I´\ *n.* The interface used by the IBM PC AT system for accessing CD-ROM devices.

AT Attachment \A-T´ ə-tach`mənt\ *n. See* ATA.

AT bus \A-T´ 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.

aTdHvAaNnKcSe \thanks` in əd-vans´\ *n. See* TIA.

ATDP \A`T-D-P´\ *n.* Acronym for **At**tention **D**ial **P**ulse, a command that initiates pulse (as opposed to touch-tone) dialing in Hayes and Hayes-compatible modems. *Compare* ATDT.

ATDT \A`T-D-T´\ *n.* Acronym for **At**tention **D**ial **T**one, a command that initiates touch-tone (as opposed to pulse) dialing in Hayes and Hayes-compatible modems. *Compare* ATDP.

.atl.ga.us \dot-A-T-L`dot-G-A`dot-U-S´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Atlanta, Georgia, United States.

ATM \A`T-M´\ *n.* **1.** Acronym for **A**synchronous **T**ransfer **M**ode. A network technology capable of transmitting data, voice, 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. ATM is defined in the broadband ISDN protocol at the levels corresponding to levels 1 and 2 of the ISO/OSI model. It is currently used in 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 model. **2.** *See* Adobe Type Manager.

ATM Forum \A`T-M´ fōr`um\ *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).

atomic operation \ə-tom`ik op`ər-ā´shən\ *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.

at sign \at´ sīn\ *n. See* @.

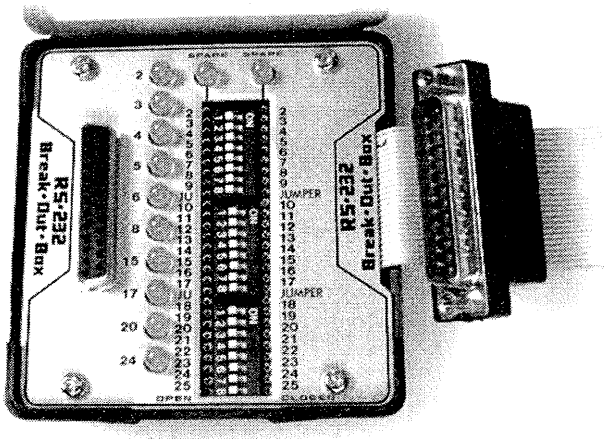
attach \ə-tach´\ *vb.* To include an external document as part of an e-mail message, using MIME or some other encoding application. Most modern e-mail clients have the ability to attach documents, as well as to decode attached documents that are received.

attached document \ə-tachd` do´kyə-mənt\ *n.* An ASCII text file or a binary file, such as a document created in a word processing system, that is included with an e-mail message as an attachment. The file is not part of the actual e-mail message, and it is generally encoded using uuencoding, MIME, or BinHex. Most e-mail programs automatically encode an attached docu-

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On Macintosh computers, the key combination that sends a break code is Command-period.

breakout box \brāk´out boks`\ *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. See the illustration.



Breakout box.

breakpoint \brāk´point\ *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 \B`R-I´\ *n.* Acronym for **B**asic **R**ate **I**nterface. 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 \brij\ *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 local area networks, whether or not they use the same protocols. A bridge operates at the ISO/OSI data-link layer. *See also* data-link layer. *Compare* router.

bridge router \brij´ rou`tər, rōō`tər\ *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 \brij´wâr\ *n.* Hardware or software designed to convert application programs or data files to a form that can be used by a different computer.

Briefcase \brēf´kās\ *n.* A system folder in Windows 95 used for synchronizing files between two computers, usually between desktop and laptop computers. The Briefcase can be transferred to another computer via disk, cable, or network. When files are transferred back to the original computer, the Briefcase updates all files to the most recent version.

brightness \brīt´nəs\ *n.* The perceived quality of radiance or luminosity of a visible object. Brightness is literally in the eye (and mind) of the beholder; a candle in the night appears brighter than the same candle under incandescent lights. Although its subjective value cannot be measured with physical instruments, brightness can be measured as luminance (radiant energy). The brightness component of a color is different from its color (the hue) and from the intensity of its color (the saturation). *See also* color model, HSB.

broadband \brod´band\ *adj.* Of or relating to communications systems in which the medium of transmission (such as a wire or fiber-optic cable) carries multiple messages at a time, each message modulated on its own carrier frequency by means of modems. Broadband communication is found in wide area networks. *Compare* baseband.

broadband modem \brod`band mō´dəm\ *n.* A modem for use on a broadband network. Broadband technology allows several networks to coexist on a single cable. Traffic from one network does not interfere with traffic from another, since the conversations happen on different frequencies, rather like the commercial radio system. *See also* broadband network.

broadband network \brod`band net´wərk\ *n.* A local area network on which transmissions travel as radio-frequency signals over separate inbound and outbound channels. Stations on a broadband network are connected by coaxial or fiber-optic cable, which can carry data, voice, and video

which have speeds of 500 kilobits per second (Kbps), can generally transmit data faster than current conventional modems. *See also* coaxial cable, modem.

cabling diagram \kā´bə-lēng dī`ə-gram\ *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 \kash\ *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 \kash´ kärd\ *n.* An expansion card that increases a system's cache memory. *See also* cache, expansion board.

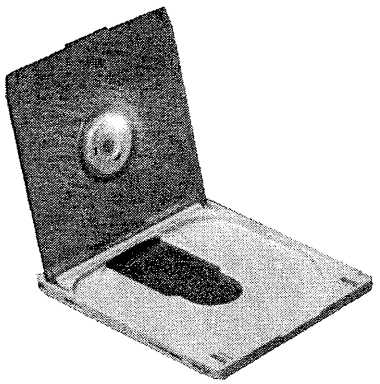
cache memory \kash´ mem`ər-ē\ *n. See* cache.

CAD \kad, C`A-D´\ *n.* Acronym for **c**omputer-**a**ided **d**esign. 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 \kad´kam, C-A-D`C-A-M´\ *n.* Acronym for **c**omputer-**a**ided **d**esign/**c**omputer-**a**ided **m**anufacturing. 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 \C`A-D-D´, kad-D´\ *n. See* computer-aided design and drafting.

caddy \kad´ē\ *n.* A plastic carrier that holds a CD-ROM and is inserted into a CD-ROM drive. Some personal computers, especially older models, have CD-ROM drives that require the use of a caddy. Most current CD-ROM drives do not require a caddy. See the illustration.



Caddy.

CAE \C`A-E´\ *n.* Acronym for **c**omputer-**a**ided **e**ngineering. 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.

CAI \C`A-I´\ *n.* Acronym for **c**omputer-**a**ided (or **c**omputer-**a**ssisted) **i**nstruction. An educational program designed to serve as a teaching tool. CAI programs typically use tutorials, drills, and question-and-answer sessions to present a topic and to test the student's comprehension. CAI programs are excellent aids for presenting factual material and for allowing students to pace their learning speed. Subjects and complexity range from beginning arithmetic to advanced mathematics, science, history, computer studies, and specialized topics. *See also* I-CASE. *Compare* CBT, CMI.

CAL \C`A-L´\ *n.* Acronym for **c**omputer-**a**ssisted (or **c**omputer-**a**ugmented) **l**earning. *See* CAI.

flicts that lower the performance of the system, make some programs inoperable, or crash the computer. *See also* boot[1], crash[2] (definition 1), operating system.

clean install \klēn` in-stäl´\ *n.* Reinstallation of software in a manner that ensures that no application or system files from a previous installation will remain. The procedure prevents "smart" installer programs from skipping file installations where a file already exists, which could potentially keep a problem from being removed.

clean interface \klēn` in´tər-fās\ *n.* A user interface with simple features and intuitive commands. *See also* user interface.

clean room \klēn´ rōōm\ *n.* A room in which dust and other small particles are filtered from the air and in which protective clothing is worn to avoid contaminating electronic components and other delicate, sensitive equipment.

Clear key \klēr´ kē\ *n.* A key in the upper left corner of the numeric keypad on some keyboards. In many applications, it clears the currently selected menu choice or deletes the current selection.

Clear To Send \klēr` tə send´\ *n. See* CTS.

click \klik\ *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 \klik`ə-bl maps´\ *n. See* image map.

click speed \klik´ spēd\ *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.

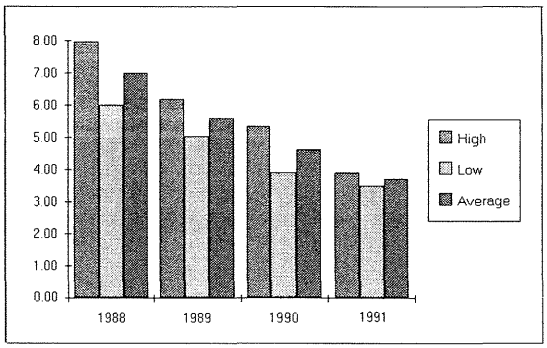
clickstream \klik´strēm\ *n.* The path a user takes while browsing a Web site. Each distinct selection made on a Web page adds one click to the stream. The further down the clickstream the user goes without finding the sought item, the more likely he or she is to depart to another Web site. Analysis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

client \klī´ənt\ *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 \klī´ənt âr`ər\ *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 \klī`ənt-sər-vər är´kə-tek-chur\ *n.* An arrangement used on 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.

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Column chart.

sion that identifies a command file. *See also* COM (definition 3).

COM \C`O-M´\ *n.* **1.** A name reserved by the MS-DOS operating system for serial communications ports. For example, if a modem is connected to one serial port and a serial printer to another, the devices are identified as COM1 and COM2 by the operating system. **2.** Acronym for **C**omponent **O**bject **M**odel. A specification developed by Microsoft for building software components that can be assembled into programs or add functionality to existing programs running on Microsoft Windows platforms. COM components can be written in a variety of languages, although most are written in C++, and can be unplugged from a program at run time without having to recompile the program. COM is the foundation of the OLE (object linking and embedding), ActiveX, and DirectX specifications. *See also* ActiveX, component (definition 2), DirectX, OLE. **3.** The extension reserved by MS-DOS for a type of executable binary (program) file limited to a single 64-kilobyte (KB) segment. COM files are often used for utility programs and short routines. They are not supported in OS/2. **4.** Acronym for **c**omputer-**o**utput **m**icrofilm. Microfilm that can record data from a computer.

COM1 \kom-wən´\ *n.* A serial communications port in Wintel systems. COM1 is usually specified by the I/O range 03F8H, is usually associated with interrupt request line IRQ4, and in many systems is used to connect an RS232 serial mouse. *See also* IRQ.

COM2 \kom-to͞o´\ *n.* A serial communications port in Wintel systems. COM2 is usually specified by the I/O range 02F8H, is usually associated with interrupt request line IRQ3, and in many systems is used to connect a modem. *See also* IRQ.

COM3 \kom-thrē´\ *n.* A serial communications port in Wintel systems. COM3 is usually specified by the I/O range 03E8H, is usually associated with interrupt request line IRQ4, and in many systems is used as an alternative to COM1 or COM2 if the latter is being used by some other peripheral. *See also* IRQ.

combinatorial explosion \kom-bə-nə-tōr`ē-əl eks-plō´zhən\ *n.* A condition inherent in certain types of mathematical problems in which small increases in the problem's size (number of data items or parameters of the operation) lead to enormous increases in the time required to obtain a solution. *See also* combinatorics.

combinatorics \kom`bə-nə-tōr´iks\ *n.* A branch of mathematics related to probability and statistics, involving the study of counting, grouping, and arrangement of finite sets of elements. Combinatorics involves the two concepts of combinations and permutations. A combination is the grouping of elements taken from a larger set without regard to the order of the elements in each group; for example, taking two elements at a time from a set of four objects (A, B, C, and D) creates six combinations of objects: AB, AC, AD, BC, BD, and CD. A permutation is a grouping of elements taken from a larger set with regard to the order of the elements. For example, in making permutations of two objects from the same set of four objects, there would be four candidates to choose from for the first selection (A), and three left over to choose from for the second selection (B), or twelve permutations in all: AB, AC, AD, BA, BC, BD, CA, CB, CD, DA, DB, DC. *See also* combinatorial explosion.

COMDEX \kom´deks\ *n.* Any of a series of annual computer trade shows operated by Softbank COMDEX, Inc. One of these shows takes place in Las Vegas each November and is the largest computer trade show in the United States.

Comité Consultatif International Télégraphique et Téléphonique \kō-mē-tā` kōn-so͞ol-tä-tēf` an-târ-nä-sē-ō-näl` tā`lā-grä-fēk` ā tā`lā-fō-nēk`\ *n. Also called* International Telegraph and Telephone Consultative Committee. *See* CCITT.

comma-delimited file \kom`ə-də-lim`ə-təd fīl´\ *n.* A data file consisting of fields and records, stored as text, in which the fields are separated

from each other by commas. Use of comma-delimited files allows communication between database systems that use different formats. If the data in a field contains a comma, the field is further surrounded with quotation marks.

command \kə-mand´\ *n.* An instruction to a computer program that, when issued by the user, causes an action to be carried out. Commands are usually either typed at the keyboard or chosen from a menu.

command buffer \kə-mand´ buf`ər\ *n.* An area in memory in which commands entered by the user are kept. A command buffer can enable the user to repeat commands without retyping them completely, edit past commands to change some argument or correct a mistake, undo commands, or obtain a list of past commands. *See also* history, template (definition 4).

command button \kə-mand´ but`ən\ *n.* A control shaped like a pushbutton in a dialog box in a graphical user interface. By clicking a command button, the user causes the computer to perform some action, such as opening a file that has just been selected using the other controls in the dialog box.

COMMAND.COM \kə-mand´dot-kom`, kə-mand´-dot-C-O-M`\ *n.* The command interpreter for MS-DOS. *See also* command interpreter.

command-driven \kə-mand´driv`ən\ *adj.* Accepting commands in the form of code words or letters, which the user must learn. *Compare* menu-driven.

command-driven system \kə-mand´driv-ən si`stəm\ *n.* A system in which the user initiates operations by a command entered from the console. *Compare* graphical user interface.

command interpreter \kə-mand´ in-tər`prə-tər\ *n.* A program, usually part of the operating system, that accepts typed commands from the keyboard and performs tasks as directed. The command interpreter is responsible for loading applications and directing the flow of information between applications. In OS/2 and MS-DOS, the command interpreter also handles simple functions, such as moving and copying files and displaying disk directory information. *See also* shell[1].

Command key \kə-mand´ kē`\ *n.* On the original Macintosh keyboard, a key labeled with the special symbol, sometimes called the propeller or puppy foot ⌘. This key is found on one or both sides of the Spacebar, depending on the version of the Apple keyboard. The key serves some of the same functions as the Control key on IBM keyboards. *See also* Control key.

command language \kə-mand´ lang`wəj\ *n.* The set of keywords and expressions that are accepted as valid by the command interpreter. *See also* command interpreter.

command line \kə-mand´ līn`\ *n.* A string of text written in the command language and passed to the command interpreter for execution. *See also* command language.

command-line interface \kə-mand`līn in´tər-fās\ *n.* A form of interface between the operating system and the user in which the user types commands, using a special command language. Although systems with command-line interfaces are usually considered more difficult to learn and use than those with graphical interfaces, command-based systems are usually programmable; this gives them flexibility unavailable in graphics-based systems that do not have a programming interface. *Compare* graphical user interface.

command mode \kə-mand´ mōd`\ *n.* A mode of operation in which a program waits for a command to be issued. *Compare* edit mode, insert mode.

command processing \kə-mand´ pros`es-ēng\ *n.* *See* command-driven system.

command processor \kə-mand´ pros`es-ər\ *n.* *See* command interpreter.

command shell \kə-mand´ shel\ *n.* *See* shell[1].

command state \kə-mand´ stāt`\ *n.* The state in which a modem accepts commands, such as a command to dial a telephone number. *Compare* online state.

comment \kom´ent\ *n.* Text embedded in a program for documentation purposes. Comments usually describe what the program does, who wrote it, why it was changed, and so on. Most programming languages have a syntax for creating comments so that they can be recognized and ignored by the compiler or assembler. *Also called* remark. *See also* comment out.

comment out \kom`ent out´\ *vb.* To disable one or more lines of code from a program temporarily

CP/M \C`P-M´\ *n.* Acronym for **C**ontrol **P**rogram/**M**onitor. A line of operating systems from Digital Research, Inc., 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.

cps \C`P-S´\ *n. See* characters per second.

CPSR \C`P-S-R´\ *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 \C`P-U´\ *n. See* central processing unit.

CPU-bound \C`P-U´bound\ *adj. See* computation-bound.

CPU cache \C`P-U´ kash\ *n.* A section of fast memory linking the central processing unit (CPU) 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, central processing unit, VCACHE.

CPU cycle \C`P-U´ sī-kl\ *n.* **1.** The smallest unit of time recognized by the central processing unit (CPU)—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 \C-P-U´ fan`\ *n.* An electric fan usually placed directly on a central processing unit (CPU) or on the CPU's heat sink to help dissipate heat from the chip by circulating air around it. *See also* central processing unit, heat sink.

CPU speed \C-P-U´ spēd`\ *n.* A relative measure of the data-processing capacity of a particular central processing unit (CPU), usually measured in megahertz. *See also* central processing unit.

CPU time \C`P-U´ tīm\ *n.* In multiprocessing, the amount of time during which a particular process has active control of the central processing unit (CPU). *See also* central processing unit, multiprocessing.

.cr \dot`C-R´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Costa Rica.

CR \C-R´\ *n. See* carriage return.

cracker \krak´ər\ *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 illegally from a computer system or use computer resources. However, the goal of the majority is to merely break into the system. *See also* hacker (definition 2).

crash[1] \krash\ *n.* The failure of either a program or a disk drive. A program crash results in the loss of all unsaved data and can leave the operating system unstable enough to require restarting the computer. A disk drive crash, sometimes called a disk crash, leaves the drive inoperable and can cause loss of data. *See also* abend, head crash.

crash[2] \krash\ *vb.* **1.** For a system or program, to fail to function correctly, resulting in the suspension of operation. *See also* abend. **2.** For a magnetic head, to hit a recording medium, with possible damage to one or both.

crash recovery \krash´ rə-kəv`ər-ē\ *n.* The ability of a computer to resume operation after a disastrous failure, such as the failure of a hard drive. Ideally, recovery can occur without any loss of data, although usually some, if not all, data is lost. *See also* crash[1].

crawler \krä´lər, krô´lər\ *n. See* Web browser, spider.

Cray-1 \krā-wən´\ *n.* An early supercomputer developed in 1976 by Seymour Cray. Extremely powerful in its day, the 64-bit Cray-1 ran at 75 MHz and was capable of executing 160 million floating-point operations per second. *See also* supercomputer.

CRC \C`R-C´\ *n.* Acronym for **c**yclical (or **c**yclic) **r**edundancy **c**heck. A procedure used in checking for errors in data transmission. CRC error checking

device dependence \də-vīs´ də-pen`dəns\ *n.* The requirement that a particular device be present or available for the use of a program, interface, or protocol. Device dependence in a program is often considered unfortunate because the program either is limited to one system or requires adjustments for every other type of system on which it is to run. *Compare* device independence.

device driver \də-vīs´ drī`vər\ *n.* A software component that permits a computer system to communicate with a device. In most cases, the driver also manipulates the hardware in order to transmit the data to the device. However, device drivers associated with application packages typically perform only the data translation; these higher-level drivers then rely on lower-level drivers to actually send the data to the device. Many devices, especially video adapters on PC-compatible computers, will not work properly—if at all—without the correct device drivers installed in the system.

device independence \də-vīs` in-də-pen´dəns\ *n.* A characteristic of a program, interface, or protocol that supports software operations that produce similar results on a wide variety of hardware. For example, the PostScript language is a device-independent page description language because programs issuing PostScript drawing and text commands need not be customized for each potential printer. *Compare* device dependence.

device-independent bitmap \də-vīs`in-də-pen`-dənt bit´map\ *n. See* DIB.

device manager \də-vīs´ man`ə-jər\ *n.* A software utility that allows viewing and changing hardware configuration settings, such as interrupts, base addresses, and serial communication parameters.

Device Manager \də-vīs´ man`ə-jər\ *n.* In Windows 95, a function within the System Properties utility that indicates device conflicts and other problems and allows a user to change the properties of the computer and each device attached to it. *See also* property, property sheet.

device name \də-vīs´ nām`\ *n.* The label by which a computer system component is identified by the operating system. MS-DOS, for example, uses the device name COM1 to identify the first serial communications port.

device resolution \də-vīs` rez`ə-lo͞o´shən\ *n. See* resolution (definition 1).

DFS \D`F-S´\ *n. See* distributed file system.

DGIS \D`G-I-S´\ *n.* Acronym for **D**irect **G**raphics **I**nterface **S**pecification. An interface developed by Graphics Software Systems. DGIS is firmware (generally implemented in ROM on a video adapter) that allows a program to display graphics on a video display through an extension to the IBM BIOS Interrupt 10H interface.

DHCP \D`H-C-P´\ *n.* Acronym for **D**ynamic **H**ost **C**onfiguration **P**rotocol. A TCP/IP protocol that enables a network connected to the Internet to assign a temporary IP address to a host automatically when the host connects to the network. *See also* IP address, TCP/IP. *Compare* dynamic SLIP.

Dhrystone \drī´stōn\ *n.* A general-performance benchmarking test, originally developed by Rheinhold Weicker in 1984 to measure and compare computer performance. The test reports general system performance in dhrystones per second. It is intended to replace the older and less reliable Whetstone benchmark. The Dhrystone benchmark, like most benchmarks, consists of standard code revised periodically to minimize unfair advantages to certain combinations of hardware, compiler, and environment. Dhrystone concentrates on string handling and uses no floating-point operations. Like most benchmarking tests, it is heavily influenced by hardware and software design, such as compiler and linker options, code optimizing, cache memory, wait states, and integer data types. *See also* benchmark[2]. *Compare* sieve of Eratosthenes, Whetstone.

DIA \D`I-A´\ *n.* Acronym for **D**ocument **I**nterchange **A**rchitecture. A document exchange guideline used in IBM's Systems Network Architecture (SNA). DIA specifies methods of organizing and addressing documents for transmission between computers of different sizes and models. DIA is supported by IBM's Advanced Program-to-Program Communication (APPC) and by Logical Unit (LU) 6.2, which establish the capabilities and types of interactions possible in an SNA environment. *See also* DCA (definition 1), SNA.

diacritical mark \dī-ə-krit´i-kəl märk`\ *n.* An accent mark above, below, or through a written character—for example, the acute (´) and grave (`) accents.

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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 95 operating systems, directories are called *folders.*

Directory Access Protocol \dər-ek`tər-ē ak-ses prō´tə-kol\ *n.* The protocol that governs communications between X.500 clients and servers. *See also* CCITT X series.

Directory Client Agent \dər-ek`tər-ē klī´ənt ā`jənt\ *n. See* DUA.

Directory Information Base \dər-ek`tər-ē in-fər-mā´shən bās`\ *n. See* DIB (definition 2).

directory path \dər-ek´tər-ē path`\ *n. See* pathname.

directory replication \dər-ek´tər-ē re-plə-kā´-shən\ *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 multiple computers because only a single master copy of the data must be maintained. *See also* directory, server.

Directory Server Agent \dər-ek`tər-ē sər´vər ā`jənt\ *n. See* DSA.

directory service \dər-ek´tər-ē sər`vəs\ *n.* A service on a network that returns mail addresses of other users or enables a user to locate hosts and services.

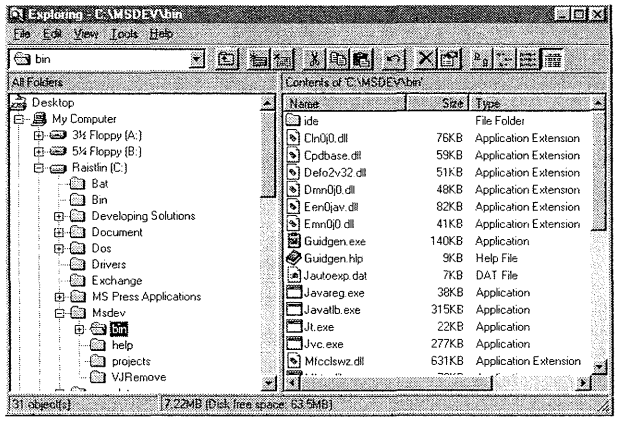
Directory System Agent \dər-ek`tər-ē si´stəm ā`jənt\ *n. See* DSA.

directory tree \dər-ek´tər-ē trē`\ *n.* A graphic display listing the directories and subdirectories on a hard disk in tree form, with subdirectories shown as branches of the main directory. See the illustration. *See also* branch (definition 1), directory, tree structure.

Directory User Agent \dər-ek`tər-ē yo͞o´zər ā`jənt\ *n. See* DUA.

direct processing \dər-ekt` pros´e-sēng\ *n.* Processing of data as it is received by the system, as opposed to deferred processing, in which data is stored in blocks before processing. *Compare* deferred processing.

direct read after write \dər-ekt` rēd af-tər rīt´\ *n. See* DRAW.



Directory tree. An example of a directory tree shown in Windows Explorer.

direct read during write \dər-ekt` rēd dər-ēng rīt´\ *n. See* DRDW.

direct sequence \dər-ekt` sē´kwəns\ *n.* In spread spectrum communication, a form of modulation in which a carrier is modulated by a series of binary pulses. *See also* modulation (definition 1), spread spectrum.

direct view storage tube \dər-ekt` vyo͞o stōr´əj to͞ob\ *n.* A type of cathode-ray tube (CRT) in which the screen can retain images for a long time and in which a beam of electrons from an electron gun can be moved arbitrarily across the screen surface (as opposed to a standard cathode-ray tube, in which the electron beam is moved in a specific pattern). This type of CRT is capable of displaying a precise, detailed image without requiring any screen refresh. However, once the image is drawn, it cannot be changed without a complete erasing of the screen. *Acronym:* DVST (D`V-S-T´). *Also called* storage tube. *Compare* CRT.

DirectX \dər-ekt`X´\ *n.* Windows 95 software that gives applications direct access to a computer's sound and graphics hardware.

dirty \dər´tē\ *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 \dər´tē 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 \dər`tē pou´ər\ *n.* A power source that can cause damage to electronic components,

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 \disk´ kash\ *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 \disk´ kär`trij\ *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.

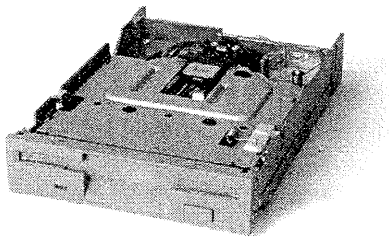
disk controller \disk´ kən-trō`lər\ *n.* A special-purpose chip and associated circuitry that directs and controls reading from and writing to a computer's disk drive. A disk controller handles such tasks as positioning the read/write head, mediating between the drive and the microprocessor, and controlling 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 \disk´ kop`ē\ *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 \disk´ krash\ *n.* The failure of a disk drive. *See also* crash[1].

disk directory \disk´ dər-ek`tər-ē\ *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 \disk´ drīv\ *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 head(s) 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. See the illustration.



Disk drive. ***A 3.5-inch floppy disk drive.***

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

disk duplexing \disk´ dōō`pleks-ēng\ *n. See* disk mirroring.

disk envelope \disk´ en`və-lōp, än`və-lōp\ *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 \dis-ket´\ *n. See* floppy disk.

disk interface \disk´ in`tər-fās\ *n.* **1.** The circuitry that connects a disk drive to a computer system. **2.** A standard for connecting disk drives and computers. The ST506 standard for connecting hard disks to computers is a disk interface standard.

disk jacket \disk´ jak`et\ *n.* The protective plastic sheath that covers a floppy disk.

diskless workstation \disk`ləs wərk´stā-shən\ *n.* A station on a computer network that is not

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equipped with a disk drive and that uses files stored in a file server. *See also* file server.

disk memory \disk´ mem`ər-ē\ *n.* *See* virtual memory.

disk mirroring \disk´ mēr`ər-ēng\ *n.* A technique in which all or part of a hard disk is duplicated onto one or more other hard disks, 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 \disk´ op`ər-ā-tēng si`stəm\ *n.* *See* DOS.

disk pack \disk´ pak\ *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 \disk´ pär-tish`ən\ *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 \disk´ sər`vər\ *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 \disk´ strī`pēng\ *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 \disk` strī-pēng with pâr´ə-tē\ *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 \disk´ yo͞o`nit\ *n.* A disk drive or its housing.

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

dispatch table \di´spach tā`bl\ *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 \di-spərs´\ *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 \di-spər´shən, di-spər´zhən\ *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 \di-splā´\ *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 \di-splā´ ə-dap`tər\ *n.* *See* video adapter.

display attribute \di-splā´ a`tri-byo͞ot\ *n.* A quality assigned to a character or 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 \di-splā´ bak`ground\ *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 \di-splā´ bōrd`\ *n.* *See* video adapter.

display card \di-splā´ kärd`\ *n.* *See* video adapter.

display cycle \di-splā´ sī`kl\ *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 \dis-plā´ dā`tə chan`əl, dat`ə\ *n.* *See* DDC.

display device \di-splā´ də-vīs`\ *n.* *See* display.

display element \di-splā´ el`ə-mənt\ *n.* *See* graphics primitive.

display entity \di-splā´ en`tə-tē\ *n.* *See* entity, graphics primitive.

display face \di-splā´ fās`\ *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 \di-splā´ frām`\ *n.* One image in an animation sequence. *See also* frame (definition 3).

display image \di-splā´ im`əj\ *n.* The collection of elements displayed together at a single time on a computer screen.

display page \di-splā´ pāj`\ *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 \dis-plā´ pōrt`\ *n.* An output port on a computer that provides a signal for a display device such as a video monitor.

Display PostScript \di-splā´ pōst`skript\ *n.* An extended version of the PostScript language, intended for device-independent imaging (including monitors and printers) in a multitasking environment. Display PostScript has been adopted by some hardware manufacturers as the standard imaging approach for both screens and printers. *See also* PostScript.

Display Power Management Signaling \dis-plā` pou-ər man´əj-mənt sig`nə-lēng\ *n.* *See* DPMS.

display screen \di-splā´ skrēn`\ *n.* The part of a video unit on which images are shown. *See also* CRT.

display terminal \di-splā´ tər`mə-nəl\ *n.* *See* terminal (definition 1).

Distance Vector Multicast Routing Protocol \di`stəns vek`tər mul`tē-kast rou´tēng prō`tə-kol, mul`tī-kast, rō͞o´tēng\ *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 (D`V-M-R-P´).

distortion \di-stōr´shən`\ *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 \di-stri´by͞ot`\ *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 \dis-tri`by͞o-təd bul´ə-tin bōrd\ *n.* A collection of newsgroups distributed to all computers in a wide area network. *See also* newsgroup, Usenet.

Distributed COM \dis-tri`by͞o-təd kom\ *n.* *See* DCOM.

Distributed Component Object Model \dis-tri`by͞o-təd kəm-pō`nənt ob´jekt mod`əl\ *n.* *See* DCOM.

distributed computing \dis-tri`by͞o-təd kəm-py͞o´tēng\ *n.* *See* distributed processing.

Distributed Computing Environment \dis-tri`by͞o-təd kəm-py͞o´tēng en-vīr`ən-mənt, en-vī`ərn-mənt\ *n.* A set of standards from the Open Group (formerly the Open Software Foundation) for development of distributed applications that

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can operate on more than one platform. *Acronym:* DCE (D`C-E´). *See also* distributed processing.

distributed database \dis-tri`byo͞o-təd da´tə-bās\ *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).

distributed database management system \dis-tri`byo͞o-təd da´tə-bās man`əj-mənt si`stəm\ *n.* A database management system capable of managing a distributed database. *Acronym:* DDBMS (D`D-B`M-S´). *See also* distributed database.

distributed file system \dis-tri´byo͞o-təd fīl si`stəm\ *n.* A file management system in which files may be located on multiple computers connected over a local or wide area network.

distributed intelligence \dis-tri`byo͞o-təd in-tel´ə-jəns\ *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 \dis-tri´byo͞o-təd net`wərk\ *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 \dis-tri`byo͞o-təd pros´es-ēng\ *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 System Object Model \dis-tri`byo͞o-təd si`stəm ob´jekt mod`əl\ *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 written in different languages. *Acronym:* DSOM (D`S-O-M´). *See also* SOM (definition 1).

distributed transaction processing \dis-tri`byo͞o-təd tranz-ak´shən pros`es-ēng\ *n.* Transaction processing that is shared by one or more computers communicating over a network. *Acronym:* DTP (D`T-P´). *See also* distributed processing, transaction processing.

distribution list \dis-trə-byo͞o´shən 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.

distributive sort \di-stri´byə-tiv sōrt`\ *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.

dithering \didh´ər-ēng\ *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 image as groups of dots that are colored in different patterns. Akin to the print images called *halftones,* dithering takes advantage of the eye's tendency to blur spots of different colors by averaging their effects and merging them into a single perceived shade or color. Depending on the ratio of black dots to white dots within a given area, the overall effect is of a particular shade of gray. Dithering is used to add realism to computer graphics and to soften jagged edges in curves and diagonal lines at low resolutions. See the illustration. *See also* aliasing, halftone.

divergence \di-vər´jəns\ *n.* A moving apart or separation. On computer displays, divergence occurs when the red, green, and blue electron beams in a color monitor do not collectively light the same spot on the screen. Within a program, such as a spreadsheet, divergence can occur when

can operate on more than one platform. *Acronym:* DCE (D`C-E´). *See also* distributed processing.

distributed database \dis-tri`byo͞o-təd da´tə-bās\ *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).

distributed database management system \dis-tri`byo͞o-təd da´tə-bās man`əj-mənt si`stəm\ *n.* A database management system capable of managing a distributed database. *Acronym:* DDBMS (D`D-B`M-S´). *See also* distributed database.

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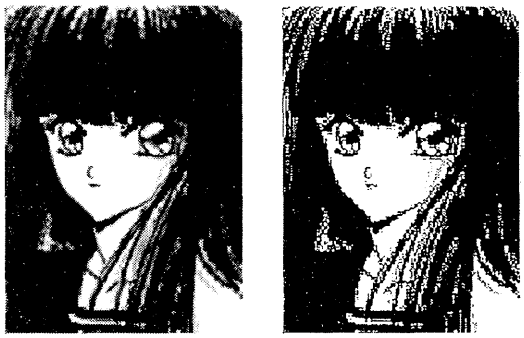
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Not dithered Dithered

Dithering. A halftone image (left) and a dithered image (right), both at 72 cells per inch.

a circular set of formulas is repeatedly recalculated (iterated), with the results of each iteration moving further from a stable solution. *Compare* convergence.

divide overflow \di-vīd` ō´vər-flō\ *n.* *See* overflow error.

division by zero \di-vizh`ən bī zēr´ō\ *n.* An error condition caused by an attempt to divide a number by zero, which is mathematically undefined, or by a number that is sufficiently near to zero that the result is too large to be expressed by the machine. Computers do not allow division by zero, and software must provide some means of protecting the user from program failure on such attempts.

.dj \dot`D-J´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Djibouti.

.dk \dot`D-K´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Denmark.

.dl_ \dot`D-L´\ *n.* A file extension indicating a compressed .dll file, used in a Windows setup procedure. *See also* .dll.

DLC \D`L-C´\ *n.* Acronym for **D**ata **L**ink **C**ontrol. An error-correction protocol in the Systems Network Architecture (SNA) responsible for transmission of data between two nodes over a physical link. *See also* HDLC, SNA.

.dll \dot`D-L-L´\ *n.* A file extension for a dynamic-link library. *See also* dynamic-link library.

DLL \D`L-L´\ *n.* *See* dynamic-link library.

DLT \D`L-T´\ *n.* *See* digital linear tape.

DMA \D`M-A´\ *n.* *See* direct memory access.

DMD \D`M-D´\ *n.* *See* Digital Micromirror Display.

DMI \D`M-I´\ *n.* Acronym for **D**esktop **M**anagement **I**nterface. A system for managing the configurations and status of PCs on a network from a central computer. In DMI an agent program runs in the background on each machine and returns information or performs some action (as specified by a file on that machine) in response to a query received from the central computer. The actions to be performed by the agent may include watching for errors and reporting them to the central computer as they occur; for example, a printer may be set up to report to the central computer when paper runs out or jams. DMI was developed by the DMTF (Desktop Management Task Force), a consortium of computer equipment manufacturers, and competes with SNMP (although the two can coexist on the same system). *See also* agent (definition 1), DMTF. *Compare* SNMP.

DML \D`M-L´\ *n.* *See* data manipulation language.

DMT \D`M-T´\ *n.* *See* discrete multitone.

DMTF \D`M-T-F´\ *n.* Acronym for **D**esktop **M**anagement **T**ask **F**orce. A consortium formed in 1992 to develop standards for PC-based stand-alone and networked systems based on user and industry needs.

DNS \D`N-S´\ *n.* **1.** Acronym for **D**omain **N**ame **S**ystem. The system by which hosts on the Internet have both domain name addresses (such as bluestem.prairienet.org) and IP addresses (such as 192.17.3.4). The domain name address is used by human users and is automatically translated into the numerical IP address, which is used by the packet-routing software. *See also* domain name address, IP address. **2.** Acronym for **D**omain **N**ame **S**ervice. The Internet utility that implements the Domain Name System (see definition 1). DNS servers, also called *name servers*, maintain databases containing the addresses and are accessed transparently to the user.

DNS server \D`N-S´ sər`vər\ *n.* A computer that can answer Domain Name Service (DNS) queries. The DNS server keeps a database of host computers and their corresponding IP addresses. Presented with the name apex.com, for example, the DNS server would return the IP address of the hypothetical company Apex. *See also* DNS (definition 2), IP address.

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DoD \D`O-D´\ *n. See* U.S. Department of Defense.

DO loop \dō̄ lō̄p`, D-O´\ *n.* A control statement used in programs that executes a section of code a number of times until a specified condition is met. DO loops are found in FORTRAN and Basic, among other languages. *See also* iterative statement. *Compare* FOR loop.

domain \dō-mān´\ *n.* **1.** In database design and management, the set of valid values for a given attribute. For example, the domain for the attribute AREA-CODE might be the list of all valid three-digit numeric telephone area codes in the United States. *See also* attribute (definition 1). **2.** For Windows NT Advanced Server, a collection of computers that share a common domain database and security policy. Each domain has a unique name. **3.** In the Internet and other networks, the highest subdivision of a domain name in a network address, which identifies the type of entity owning the address (for example, .com for commercial users or .edu for educational institutions) or the geographical location of the address (for example, .fr for France or .sg for Singapore). The domain is the last part of the address (for example, www.acm.org). *See also* domain name.

domain name \dō-mān´ nām`\ *n.* An address of a network connection that identifies the owner of that address in a hierarchical format: *server.organization.type*. For example, www.whitehouse.gov identifies the Web server at the White House, which is part of the U.S. government.

domain name address \dō-mān` nām a´dres, ə-dres´\ *n.* The address of a device connected to the Internet or any other TCP/IP network, in the hierarchical system that uses words to identify servers, organizations, and types, such as www.logos.net. *See also* TCP/IP.

domain name server \dō-mān` nām sər´vər\ *n. See* DNS server.

Domain Name System \dō-mān` nām si´stəm\ *n. See* DNS (definition 1).

Domain Naming System \dō-mān´ nā`mēng si`stəm\ *n. See* DNS (definition 1).

dongle \dong´l\ *n. See* hardware key.

do-nothing instruction \dō̄´nə-thēng in-struk`-shən\ *n. See* no-operation instruction.

dopant \dō´pənt\ *n.* An impurity that is added in small quantities to semiconductor material during the manufacture of diodes, transistors, and integrated circuits. The resistance of a semiconductor falls between the resistance of a conductor and the resistance of an insulator (hence its name); dopants are added to the semiconductor to increase its conductivity. The type and amount of dopant determine whether the semiconductor will be N-type (in which current is conducted by free electrons) or P-type (in which current is conducted by electron vacancies, called "holes"). Common dopants include arsenic, antimony, bismuth, and phosphorus. *See also* N-type semiconductor, P-type semiconductor.

DOS \dos, D`O-S´\ *n.* Acronym for **d**isk **o**perating **s**ystem. A generic term describing any operating system that is loaded from disk devices when the system is started or rebooted. The term originally differentiated between disk-based systems and primitive microcomputer operating systems that were memory-based or that supported only magnetic or paper tape. *See also* MS-DOS, PC-DOS.

DOS box \dos´ boks, D`O-S´\ *n.* **1.** An OS/2 process that supports the execution of MS-DOS programs. *Also called* compatibility box. **2.** A computer that uses the MS-DOS or PC-DOS operating system, as opposed to one that runs some other operating system, such as UNIX.

DOS extender \dos´ eks-ten`dər, D`O-S´\ *n.* A program designed to extend the 640 KB of conventional memory available for use by DOS and DOS-based applications. A DOS extender works by claiming a portion of reserved memory (memory used by other parts of the system, such as the video adapter, the ROM BIOS, and the I/O ports).

DOS prompt \dos´ prompt, D`O-S´\ *n.* The visual indication from the MS-DOS command processor that the operating system is ready to accept a new command. The default DOS prompt is a path followed by a greater-than sign (for example, C:>); the user can also design a custom prompt with the PROMPT command.

dot \dot\ *n.* **1.** In the UNIX, MS-DOS, OS/2, and other operating systems, the character that separates a filename from an extension as in TEXT.DOC (pronounced "text-dot-doc"). **2.** In computer graphics and printing, a small spot combined with others in a matrix of rows and

be created and destroyed as required. *See also* allocate, deallocate. *Compare* static allocation.

dynamic binding \dī-nam`ik bīn`dēng\ *n.* Binding (converting symbolic addresses in the program to storage-related addresses) that occurs during program execution. The term often refers to object-oriented applications that determine, during run time, which software routines to call for particular data objects. *Also called* late binding. *Compare* static binding.

dynamic caching \dī-nam`ik kash´ēng\ *n.* A technique for storing recently used data in memory where cache size is based on how much memory is available rather than how much memory is assigned to the application currently running.

Dynamic Data Exchange \dī-nam`ik dā´tə eks-chānj`, dat´ə\ *n. See* DDE.

dynamic dump \dī-nam`ik dump´\ *n.* A listing, either stored on disk or sent to a printer, of memory contents generated at the time of a break in the execution of a program—a useful tool for programmers interested in knowing what is happening at a certain point in the execution of a program.

Dynamic Host Configuration Protocol \dī-nam`ik hōst´ kən-fi-gyər-ā`shən prō`tə-kol\ *n. See* DHCP.

dynamic keys \dī-nam`ik kēz´\ *n.* An encryption technique in which messages are encrypted differently for each transmission based on different keys so that if a key is captured and decrypted, it would never be useful again. *See also* encryption, key (definition 3).

dynamic-link library \dī-nam`ik-lēnk lī´brâr-ē\ *n.* A feature of the Microsoft Windows family of operating systems and OS/2 that allows executable routines to be stored separately as files with DLL extensions and to be loaded only when needed by a program. A dynamic-link library has several advantages. First, it does not consume any memory until it is used. Second, because a dynamic-link library is a separate file, a programmer can make corrections or improvements to only that module without affecting the operation of the calling program or any other dynamic-link library. Finally, a programmer can use the same dynamic-link library with other programs. *Acronym:* DLL (D`L-L´).

dynamic memory allocation \dī-nam`ik mem´ər-ē al-ə-kā`shən\ *n.* The allocation of memory to a process or program at run time. Dynamic memory is allocated from the system heap by the operating system upon request from the program.

dynamic page \dī-nam`ik pāj´\ *n.* An HTML document that contains animated GIFs, Java applets, or ActiveX controls. *See also* ActiveX controls, GIF, HTML, Java applet.

dynamic RAM \dī-nam`ik ram´, R-A-M´\ *n.* A form of semiconductor random access memory (RAM). Dynamic RAMs store information in integrated circuits containing capacitors. Because capacitors lose their charge over time, dynamic RAM boards must include logic to refresh (recharge) the RAM chips continuously. While a dynamic RAM is being refreshed, it cannot be read by the processor; if the processor must read the RAM while it is being refreshed, one or more wait states occur. Despite being slower, dynamic RAMs are more commonly used than RAMs because their circuitry is simpler and because they can hold up to four times as much data. *Acronym:* DRAM (dram, D´ram). *See also* RAM. *Compare* static RAM.

dynamic random access memory \dī-nam`ik ran`dəm ak-ses mem´ər-ē\ *n. See* dynamic RAM.

dynamic relocation \dī-nam`ik rē-lō-kā´shən\ *n.* The relocation in memory of data or of the code of a currently running program by an internal system routine. Dynamic relocation helps a computer use memory efficiently.

dynamic scheduling \dī-nam`ik skej`ə-lēng\ *n.* The management of concurrently running processes (programs), usually by the operating system.

dynamic SLIP \dī-nam`ik slip´, S`L-I-P´\ *n.* Short for **dynamic S**erial **L**ine **I**nternet **P**rotocol. Internet access under SLIP in which the user's IP address is not permanent but is reassigned from a pool each time the user connects. The number of IP addresses an Internet service provider needs to offer is reduced to the number of connections that can be in use at once, rather than the total number of subscribers. *See also* IP address, ISP, SLIP.

dynamic storage \dī-nam`ik stōr`əj\ *n.* **1.** Information storage systems whose contents will be lost if power is removed from the system. RAM (random access memory) systems are the most

troller and display mode design, introduced by IBM in 1990. This standard supports 640 × 480 resolution with 65,536 colors, or 1,024 × 768 resolution with 256 colors, and is used mainly on workstation-level systems. *Acronym:* XGA (X`G-A´).

Extended Industry Standard Architecture \eks-ten`dəd in`du-strē stan-dərd är´kə-tek-chur\ *n. See* EISA.

extended memory \eks-ten`dəd mem´ər-ē\ *n.* System memory beyond 1 megabyte in computers based on the Intel 8086 processors. This memory is accessible only when an 80386 or higher-level processor is operating in protected mode or in emulation on the 80286. To use extended memory, MS-DOS programs need the aid of software that temporarily places the processor into protected mode or by the use of features in the 80386 or higher-level processors to remap portions of extended memory into conventional memory. Programs running under Microsoft Windows, OS/2, and other operating systems that run on Intel processors and use the protected mode of the 80386 and higher-level processors can access all system memory in the same way. *See also* EMS, extended memory specification, protected mode.

extended memory specification \eks-ten`dəd mem`ər-ē spes`-ə-fə-kā´shən\ *n.* A specification developed by Lotus, Intel, Microsoft, and AST Research that defines a software interface allowing real-mode applications to use extended memory and areas of memory not managed by MS-DOS. Memory is managed by an installable device driver, the Expanded Memory Manager (EMM). The application must use the driver to access the additional memory. *Acronym:* XMS (X`M-S´). *See also* Expanded Memory Manager, extended memory.

extended VGA \eks-ten`dəd V-G-A´\ *n.* An enhanced set of Video Graphics Array (VGA) standards that is capable of displaying an image of from 800 × 600 pixels to 1600 × 1200 pixels and that can support a palette of up to 16.7 million (2^{24}) colors. This palette approaches the 19 million colors that a normal person can distinguish, so it is considered a digital standard for color realism that parallels analog television. *Also called* Super VGA, SVGA. *See also* analog-to-digital converter, CRT, VGA.

extender board \eks-ten´dər bōrd`\ *n. See* expansion board.

extensible language \eks-ten`sə-bl lang´wəj\ *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, such as Forth, that allow the programmer to change the language itself. *See also* computer language, semantics (definition 1), syntax.

extension \eks`-ten´shən\ *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 \eks-ten´shən man`ə-jər\ *n.* On the Macintosh, a utility that allows the user to determine which extensions are loaded when the computer is turned on. *See also* extension (definition 4).

extent \eks-tent´\ *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.

external command \eks-tər`nəl kə-mand´\ *n.* A program included in an operating system 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 \eks-tər`nəl funk´shən\ *n. See* XFCN.

External Gateway Protocol \eks-tər`nəl gāt´wā prō`tə-kol\ *n.* A protocol for distributing information regarding availability to the routers and gate-

fan-in \fan´in\ *n.* The maximum number of signals that can be fed to a given electronic device, such as a logic gate, at one time without risking signal corruption. The fan-in rating of a device depends on its type and method of construction. *Compare* fan-out.

fan-out \fan´out\ *n.* The maximum number of electronic devices that can be fed by a given electronic device, such as a logic gate, at one time without the signal becoming too weak. The fan-out rating of a device depends on its type and method of construction. *Compare* fan-in.

fanzine \fan´zēn\ *n.* A magazine, distributed online or by mail, that is produced by and devoted to fans of a particular group, person, or activity. *See also* ezine.

FAQ \fak, F`A-Q´\ *n.* Acronym for **f**requently **a**sked **q**uestions. A document listing common questions and answers on a particular subject. FAQs are often posted on Internet newsgroups where new participants ask the same questions that regular readers have answered many times.

farad \fâr´ad\ *n.* Abbreviated F. The unit of capacitance (the ability to hold a charge). A 1-farad capacitor holds a charge of 1 coulomb with a potential difference of 1 volt between its plates. In practical use, a farad is an extremely large amount of capacitance; capacitance is usually expressed in terms of microfarads (10^{-6}) or picofarads (10^{-12}).

FARNET \fär´net, F-A-R´net`\ *See* Federation of American Research Networks.

Fast Ethernet \fast` ē´thər-net\ *n.* Ethernet capable of supporting 100 megabits per second. *See also* Ethernet (definition 1).

fast Fourier transform \fast fo͝or`ē-ā trans´fōrm\ *n.* A set of algorithms used to compute the discrete Fourier transform of a function, which in turn is used for solving series of equations, performing spectral analysis, and carrying out other signal-processing and signal generation tasks. *Acronym:* FFT (F`F-T´). *See also* Fourier transform.

fast infrared port \fast` in`frə-red pōrt´\ *n. See* FIR port.

fast packet \fast´ pak`et\ *n.* A standard for high-speed network technology that utilizes fast switching of fixed-length cells or packets for real-time transmission of data. *Also called* Asynchronous Transfer Mode, ATM. *See also* packet (definition 2), packet switching.

Fast SCSI \fast´ skuz`ē, S`C-S-I´\ *n.* A form of the SCSI-2 interface that can transfer data 8 bits at a time at up to 10 megabytes per second. The Fast SCSI connector has 50 pins. *Also called* Fast SCSI-2. *See also* SCSI, SCSI-2. *Compare* Fast/Wide SCSI, Wide SCSI.

Fast/Wide SCSI \fast`wīd skuz´ē, S`C-S-I´\ *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 Fast/Wide SCSI connector has 68 pins. *Also called* Fast/Wide SCSI-2. *See also* SCSI, SCSI-2. *Compare* Fast SCSI, Wide SCSI.

FAT \fat, F`A-T´\ *n. See* file allocation table.

fatal error \fā´təl âr`ər\ *n.* An error that causes the system or application program to crash—that is, to fail abruptly with no hope of recovery.

fat application \fat´ a-plə-kā`shən\ *n.* An application that can be used on both PowerPC processor–based Macintosh computers and 68K-based Macintosh computers.

fat binary \fat` bī´nər-ē\ *n.* An application format that supports both PowerPC processor–based Macintosh computers and 68K-based Macintosh computers.

fatbits \fat´bits\ *n.* **1.** Originally (as FatBits), a feature of the Apple MacPaint program in which a small portion of a drawing can be enlarged and modified one pixel (FatBit) at a time. **2.** A similar feature in any program that allows pixel-by-pixel modification through a zoom feature.

fat client \fat` clī´ənt\ *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 \fat` fīl´ si-stəm, F`A-T´\ *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 95 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 95, Windows NT.

father \fä´dhər\ *n.* *See* generation (definition 1).

father file \fä´dhər fīl`\ *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 \fat` sər´vər\ *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 \fat´wâr\ *n.* Software that monopolizes hard disk space and power due to an overabundance of features or inefficient design. *Also called* bloatware.

fault \fält, fôlt\ *n.* A physical defect, such as a loose connection, that prevents a system or device from operating as it should.

fault tolerance \fält´ tol`ər-ens, fôlt´\ *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 \fā´vər-it`, fā´vrət\ *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 \fā´vər-its fōl`dər, fā´vrəts\ *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 \faks\ *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 \faks´ mə-shēn`\ *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 the illustration. *See also* scan (definition 2).



Fax machine.

fax modem \faks´ mō`dəm\ *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

The FAT is the only file system MS-DOS can use; OS/2, Windows NT, and Windows 95 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 95, Windows NT.

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.fidonet.org \dot-fī`dō-net-dot-ōrg´\ *n.* On the Internet, the major domain specifying that an address is located on Fidonet.

field \fēld\ *n.* **1.** A location in a record in which a particular type of data is stored. For example, EMPLOYEE-RECORD might contain fields to store Last-Name, First-Name, Address, City, State, Zip-Code, Hire-Date, Current-Salary, Title, Department, and so on. Individual fields are characterized by their maximum length and the type of data (for example, alphabetic, numeric, or financial) that can be placed in them. The facility for creating these specifications usually is contained in the data definition language (DDL). In relational database management systems, fields are called *columns.* **2.** A space in an on-screen form where the user can enter a specific item of information.

field-effect transistor \fēld`ə-fekt tranz-i´stər\ *n. See* FET.

field-programmable logic array \fēld`prō-gram-ə-bl loj´ik ər-ā`\ *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 (F`P-L-A´). *Also called* PLA, programmable logic array.

field separator \fēld´ sep`ər-ā-tər\ *n.* Any character that separates one field of data from another. *See also* delimiter, field (definition 1).

FIFO \fī´fō, F`I-F-O´\ *n. See* first in, first out.

fifth-generation computer \fifth`jen-ər-ā`shən kəm-pyo͞o´tər\ *n. See* computer.

fifth normal form \fifth` nōr`məl fōrm´\ *n.* Abbreviated 5NF. *See* normal form (definition 1).

file \fīl\ *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 \fīl´ al-ə-kā`shən tā`bl\ *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 \fīl´ a`trə-byo͞ot\ *n.* A restrictive label attached to a file that describes and regulates its use—for example, hidden, system, read-only, archive, and so forth. In MS-DOS, this information is stored as part of the file's directory entry.

file backup \fīl´ bak`up\ *n. See* backup.

file compression \fīl´ kəm-presh`ən\ *n.* The process of reducing the size of a file for transmission or storage. *See also* data compression.

file control block \fīl´ kən-trōl` blok\ *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 disk, and a pointer that marks the user's current (or last) position in the file. *Acronym:* FCB (F`C-B´).

file conversion \fīl´ kən-vər`zhən\ *n.* The process of transforming the data in a file from one format to another without altering its contents—for example, converting a file from a word processor's format to its ASCII equivalent.

file extension \fīl´ eks-ten`shən\ *n. See* extension (definition 1).

file extent \fīl´ eks-tent`\ *n. See* extent.

file format \fīl´ fōr`mat\ *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, TIFF (Tagged Image File Format), and EPSF (Encapsulated PostScript Format).

file fragmentation \fīl´ frag-mən-tā`shən\ *n.* **1.** The breaking apart of files into small, separate segments for storage 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 \fīl´ gap\ *n. See* block gap.

file handle \fīl´ han`dl\ *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 \fīl´hand-lēng rōō-tēn`\ *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 \fīl´ hed`ər\ *n. See* header (definition 2).

file layout \fīl´ lā`out\ *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 \fīl´ lī-brār`ē-ən\ *n.* A person or process responsible for maintaining, archiving, copying, and providing access to a collection of data.

file maintenance \fīl´ mān`tə-nəns\ *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 manager \fīl´ man`ə-jər\ *n.* A module of an operating system or environment that controls the physical placement of and access to a group of program files.

filename \fīl´nām\ *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 filename is the handle by which a computer user saves and requests a block of information. Both programs and data have filenames and often extensions that further identify the type or purpose of the file. Naming conventions, such as maximum length and allowable characters of a filename, vary from one operating system to another. *See also* directory, path (definition 5).

filename extension \fīl´nām eks-ten`shən\ *n. See* extension (definition 1).

file protection \fīl´ prə-tek`shən\ *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 \fīl´ rə-kəv`ər-ē\ *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 \fīl´ rə-trē`vəl\ *n.* The act of transferring a data file from a storage location to the machine where it is to be used.

file server \fīl´ sər`vər\ *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 network users request files and make changes to them. To deal with the tasks of handling multiple—sometimes simultaneous—requests for files, a file server contains a processor and controlling software as well as a disk drive for storage. On local area networks, a file server is often a computer with a large hard disk that is dedicated only to the task of managing shared files. *Compare* disk server.

file sharing \fīl´ shâr`ēng\ *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 \fīl´ sīz\ *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 \fīl´spek\ *n.* *See* file specification (definition 1).

file specification \fīl` spes`ə-fə-kā´shən\ *n.* **1.** Abbreviated filespec. The path to a file, from a disk drive through a chain of directory files to the filename that serves to locate a particular file. **2.** A filename 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 \fīl´ struk`chur\ *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 \fīl´ si`stəm\ *n.* In an operating system, the overall structure in which files are named, stored, and organized. A file system consists of files, directories, and the information needed to locate and access these items. The term can also refer to the portion of an operating system that translates 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 \fīl´ trans`fər\ *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 \fīl` trans-fər prō´tə-kol\ *n.* *See* FTP[1] (definition 1).

file type \fīl´ tīp\ *n.* A designation of the operational or structural characteristics of a file. A file's type is often identified in the filename. With MS-DOS, a file's type is usually reflected in the filename extension. *See also* file format.

fill \fil\ *n.* In computer graphics, to "paint" the inside of an enclosed figure, such as a circle, with color or a pattern. 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.

film at 11 \film` at ə-lev´ən\ 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 \film´ rə-kōr`dər\ *n.* A device for capturing on 35-mm film the images displayed on a computer screen.

film ribbon \film´ rib`ən\ *n.* *See* carbon ribbon.

filter \fil´tər\ *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

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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 low-pass 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 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 \fil´tər-ēng prō`gram\ *n.* A program that filters information and presents only results that match the qualifications defined in the program.

FilterKeys \fil´tər-kēz`\ *n.* A Windows 95 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 \fī`nəl-fōrm-tekst` D-C-A´\ *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 (F`F-T`D-C-A´). *See also* DCA (definition 1). *Compare* Revisable-Form-Text DCA.

find \fīnd\ *vb. See* search[2].

Finder \fīn´dər\ *n.* The standard interface to the Macintosh operating system, allowing 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.

finger[1] \fēng´ər\ *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.

finger[2] \fēng´ər\ *vb.* To obtain information on a user by means of the finger program.

fingerprint reader \fēng´-ər-print rē`dər\ *n.* A scanner that reads human fingerprints for comparison to a database of stored fingerprint images.

FIPS \fips, F`I-P-S´\ *n. See* Federal Information Processing Standards.

firewall \fīr´wäl\ *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. 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.

firmware \fərm´wâr\ *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 \F`I-R´ pōrt\ *n.* Short for **f**ast **i**nfra**r**ed **port**. A wireless I/O port, most common on a portable computer, that exchanges data with an

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series of bits 01111110, used to start and end a transmission frame (message unit). *See also* HDLC.

flame[1] \flām\ *n.* An abusive or personally insulting e-mail message or newsgroup posting.

flame[2] \flām\ *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 \flām´ bāt\ *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* flame[1], flame war. *Compare* troll.

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

flamer \flā´mər\ *n.* A person who sends or posts abusive messages via e-mail, in newsgroups and other online forums, and in online chats. *See also* chat[1] (definition 1), newsgroup.

flame war \flām´ wōr\ *n.* A discussion in a mailing list, newsgroup, or other online conference that has turned into a protracted exchange of flames. *See also* flame[1].

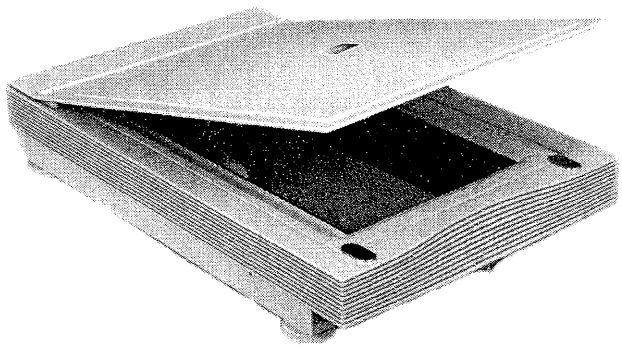
flash memory \flash´ mem`ər-ē\ *n.* A type of nonvolatile memory. Flash memory is similar to EEPROM memory in function but it must be erased in blocks, whereas EEPROM can be erased one byte at a time. Because of its block-oriented nature, flash memory is commonly used as a supplement to or replacement 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 \flash´ rom, R-O-M`\ *n.* *See* flash memory.

flat address space \flat` a´dres spās`, ə-dres´\ *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 \flat´bed plot`ər\ *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 \flat´bed skan`ər\ *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.



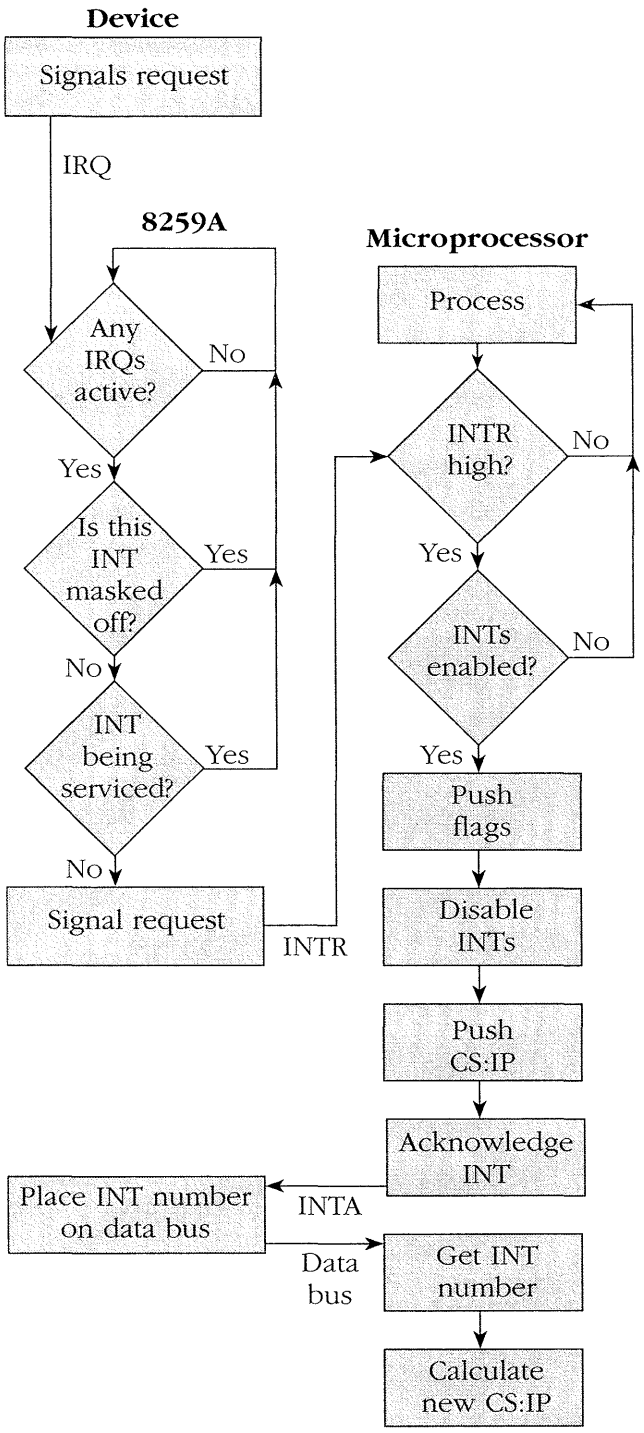
Flatbed scanner.

flat file \flat´ fīl\ *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 \flat`fīl dā´tə-bās\ *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 \flat` fīl´ dər-ek`tər-ē\ *n.* A directory that cannot contain subdirectories but

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Flowchart.

various operations. These symbols are connected by lines and arrows to indicate the flow of data or control from one point to another. Flowcharts are used both as aids in showing the way a proposed program will work and as a means of understanding the operations of an existing program. See the illustration.

.fl.us \dot-F-L`dot-U-S´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Florida, United States.

flush[1] \flush\ *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).

flush[2] \flush\ *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 \fluks\ *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 \fluks´ rə-vər`səl\ *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.

.fm \dot`F-M´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Micronesia.

FM \F-M´\ *n. See* frequency modulation.

FM encoding \F-M´ en-kō`dēng\ *n. See* frequency modulation encoding.

.fo \dot`F-O´\ *n.* On the Internet, the major geographic domain specifying that an address is located in the Faeroe Islands.

focus \fō´kus,\ *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 \fō´kus, F`O-C-U-S´\ *n. See* Federation on Computing in the United States.

FOD \F`O-D´\ *n. See* fax on demand.

folder \fōl´dər\ *n.* In the Mac OS, Windows 95, 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

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is the U.S. Army phrase FUBAR (an acronym which, in discreet language, represents Fouled Up Beyond All Recognition/Repair). However, other origins have been claimed. *Compare* fred (definition 2).

footer \fo͝ot´ər\ *n.* One or more identifying lines printed at the bottom of a page. A footer may contain a folio (page number), a date, the author's name, and the document title. *Also called* running foot. *Compare* header (definition 1).

footprint \fo͝ot´print\ *n.* The surface area occupied by a personal computer or other device.

force \fōrs\ *vb.* In programming, to perform a particular action that would normally not occur. The term is most often used in the context of forcing data to be within a particular range of values—for example, forcing a divisor to be nonzero. *See also* cast.

foreground[1] \fōr´ground\ *adj.* Currently having control of the system and responding to commands issued by the user. *See also* multitasking. *Compare* background[1].

foreground[2] \fōr´ground\ *n.* **1.** The color of displayed characters and graphics. *Compare* background[2] (definition 1). **2.** The condition of the program or document currently in control and affected by commands and data entry in a windowing environment. *Compare* background[2] (definition 4).

fork[1] \fōrk\ *n.* One of the two parts of a file recognized by the Mac OS. A Macintosh file has a data fork and a resource fork. Most or all of a typical user-produced document is in the data fork; the resource fork usually contains application-oriented information, such as fonts, dialog boxes, and menus. *See also* data fork, resource fork.

fork[2] \fōrk\ *vb.* To initiate a child process in a multitasking system after a parent process has been started. *See also* multitasking.

FOR loop \fōr´ lo͞op\ *n.* A control statement that executes a section of code a specified number of times. Actual syntax and usage vary from language to language. In most cases, the value of an index variable moves through a range of values, being assigned a different (and usually consecutive) value each time the program moves through the section of code. *See also* iterative statement, loop[1] (definition 1). *Compare* DO loop.

form \fōrm\ *n.* **1.** A structured document with spaces reserved for entering information and often containing special coding as well. **2.** In some applications (especially databases), a structured window, box, or other self-contained presentation element with predefined areas for entering or changing information. A form is a visual "filter" for the underlying data it is presenting, generally offering the advantages of better data organization and greater ease of viewing. **3.** In optical media, a data storage format used in compact disc technology. **4.** In programming, a metalanguage (such as Backus-Naur form) used to describe the syntax of a language. *See also* Backus-Naur form.

formal language \fōr`məl lang´wəj\ *n.* A combination of syntax and semantics that completely defines a computer language. *See also* Backus-Naur form, semantics (definition 1), syntax.

formal logic \fōr`məl loj´ik\ *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.

format[1] \fōr´mat\ *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.

format[2] \fōr´mat\ *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 \fōr´mat bär`\ *n.* A toolbar within an application used for modifying the format of the

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and higher microprocessors to control access to privileged functions, to change data segments, or to switch tasks.

gate array \gāt´ ər-ā`\ *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 \gā´təd\ *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 \gāt´ ə-lek`trōd\ *n. See* gate (definition 2).

gateway \gāt´wā\ *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.

gating circuit \gā´tēng sər`kət\ *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).

.ga.us \dot-G-A`dot-U-S´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Georgia, United States.

.gb \dot`G-B´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Great Britain.

GB \gig´ə-bīt`, jig´ə-bīt`, G-B´\ *n. See* gigabyte.

Gbps \G`B-P-S´\ *n. See* gigabits per second.

.gd \dot`G-D´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Grenada.

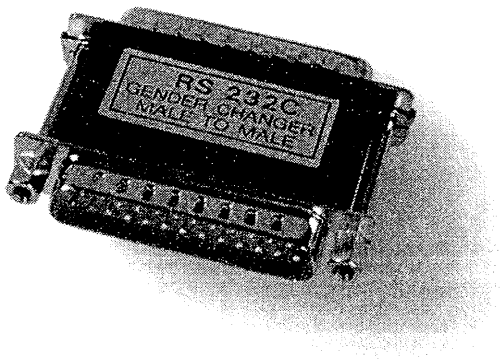
GDI \G`D-I´\ *n.* Acronym for **G**raphical **D**evice **I**nterface. In Microsoft Windows, a graphics display system used by applications to display or print bitmapped text (TrueType fonts), images, and other graphical elements. The GDI is responsible for drawing dialog boxes, buttons, and other elements in a consistent style on screen by calling the appropriate screen drivers and passing them the information on the item to be drawn. The GDI also works with GDI printers, which have limited ability to prepare a page for printing. Instead, the GDI handles that task by calling the appropriate printer drivers and moving the image or document directly to the printer, rather than reformatting the image or document in PostScript or another printer language. *See also* bitmapped font, dialog box, driver, PostScript.

.ge \dot`G-E´\ *n.* On the Internet, the major geographic domain specifying that an address is located in the republic of Georgia.

geek \gēk\ *n.* **1.** Generally, a person who enjoys cerebral activities (such as wordplay, computer programming, and use of the Internet) more than the mainstream population does. Geeks in this sense increasingly claim the word with pride, but it may give offense when used by others, suggesting inadequacy in normal social relationships. **2.** A computer expert or specialist. For issues of etiquette, see definition 1. *Compare* guru, techie.

gender bender \jen´dər ben`dər\ *n. See* gender changer.

gender changer \jen´dər chān`jər\ *n.* A device for joining two connectors that are either both male (having pins) or both female (having sockets). See the illustration. *Also called* gender bender.



Gender changer.

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the data wires), in which each device indicates its readiness to send or receive data. A software handshake consists of signals transmitted over the same wires used to transfer data, as in modem-to-modem communications over telephone lines.

hands-on \handz´on\ *adj.* Involving interactive work with a computer or a computer program. A hands-on tutorial, for example, would teach a skill (such as the use of a program) by means of practice sessions and question-and-answer dialogues.

handwriting recognition \hand´rī`tēng rek-əg-nish`ən\ *n.* **1.** The ability of a computer to identify a user by recognizing features of handwriting, especially a signature. **2.** The ability of a computer to translate handwritten text into character data for input. This technology is still under considerable development, and most handwriting recognition programs require users to form letters and words in a very consistent and clear manner to work adequately. The development of handwriting recognition programs has been spurred by PDAs, which frequently have keyboards that are too small for data entry, and software designed for Asian markets that have languages with numerous characters, which makes keyboards a cumbersome method for entering text. *See also* PDA. *Compare* optical character recognition.

hang \hang\ *vb.* To stop responding. A hung program or computer system does not respond to user input, but the screen looks as if everything is running normally. The program or system might be waiting for something, for example, information from a network, or it might have terminated abnormally. It might resume running normally on its own, or the user might need to terminate and restart the program or reboot the computer. A hung computer system is said to be locked up. *See also* crash[2] (definition 1).

hanging indent \hang`ēng in´dent\ *n.* Placement of the beginning of the first line of a paragraph farther to the left than the subsequent lines. *Also called* outdent. *Compare* indent.

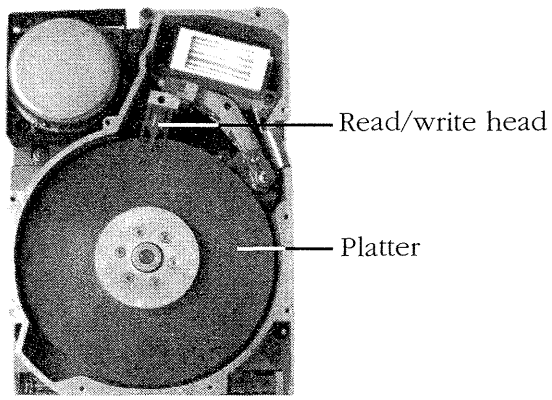
hard \härd\ *adj.* **1.** Permanent, fixed, or physically defined; unchangeable by the ordinary operation of a computer system. *See also* hard copy, hard error, hard return, hard-sectored disk. *Compare* soft (definition 1). **2.** Retaining magnetization even in the absence of an external magnetic field. *Compare* soft (definition 2).

hard card \härd´ kärd\ *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 \härd`kō´dəd\ *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.

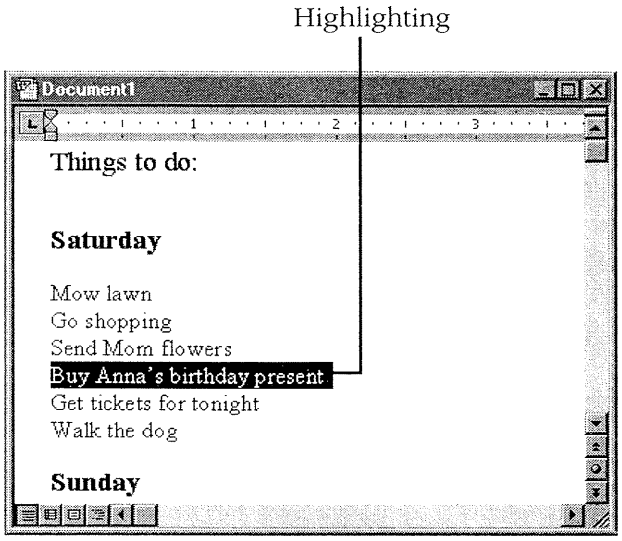
hard copy \härd´ kop`ē\ *n.* Printed output on paper, film, or other permanent medium. *Compare* soft copy.

hard disk \härd´ 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 3,600 to 7,200 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.

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Highlighting.

of conventional memory available for applications. *Acronym:* HMA (H`M-A´). *See also* conventional memory, expanded memory.

high-order \hī´ōr`dər\ *adj.* Having the most weight or significance. The high-order term usually appears first or leftmost in writing systems based on the Roman alphabet or Arabic numerals. For example, in the 2-byte hex value 6CA2, the high-order byte 6C has a value by itself of decimal 108 but counts for 108 × 256 = 27,648 in the group, whereas the low-order byte A2 counts only for decimal 162. *Compare* low-order.

high-order language \hī`ōr-dər lang´wəj\ *n. See* high-level language.

highpass filter \hī´pas fil`tər\ *n.* An electronic circuit that passes all frequencies in a signal that are above a specified frequency. *Compare* bandpass filter, lowpass filter.

High Performance File System \hī` pər-fōr`məns fīl´ si-stəm\ *n. See* HPFS.

High-Performance Parallel Interface \hī`pər-fōr-məns pâr`ə-lel in´tər-fās\ *n. See* HIPPI.

High Performance Serial Bus (1394) \hī` pər-fōr`məns sēr´ē-əl bus` thər`tēn-nīn-tē-fōr´\ *n.* A serial bus interface for both the PC and Macintosh that can support transmission speeds of 100, 200, or 400 Mbps and allows daisy-chaining of up to 63 devices in a branched form. Devices connected in such a way will be able to draw power directly through the interface.

high-persistence phosphor \hī` pər-si`stəns fos´-fər\ *n.* A phosphor that glows for a relatively long time after being struck by electrons. High-persistence phosphors are used in direct view storage tubes, but most CRTs (cathode-ray tubes) use phosphors of relatively low persistence so that their images can be changed quickly without "ghosts" of earlier images remaining on the screen. *See also* CRT, direct view storage tube.

high resolution \hī` rez-ə-l$\overline{\text{oo}}$´shən\ *n.* The capability for reproducing text and graphics with relative clarity and fineness of detail. 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 1,000 to 2,000 dpi for a production-quality imagesetter. *Also called* hi-res.

High Sierra specification \hī` sē-âr´ə spes-ə-fə-kā`shən\ *n.* An industrywide 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 \hī tek´\ *n.* **1.** Cutting-edge applied science and engineering, usually involving computers and electronics. **2.** Sophisticated, often complex, specialized technical innovation.

HIPPI \H`I-P-P-I´, hip´ē\ *n.* Acronym for **H**igh-**P**erformance **P**arallel **I**nterface. An ANSI communications standard used with supercomputers.

hi-res \hī-rez´\ *n. See* high resolution.

histogram \hi´stə-gram`\ *n.* A chart consisting of horizontal or vertical bars, the widths or heights of which represent the values of certain data.

history \hi´stər-ē`\ *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 \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), record[1]. **3.** Retrieval of a document, such as a home page, from a Web site.

.hk \dot`H-K´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Hong Kong.

HKEY \H´kē\ *n.* Short for **h**andle **key.** In Windows 95, 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_USER\Control Panel leads to the subkey for the Windows Desktop. *See also* handle (definition 1).

HLS \H`L-S´\ *n.* Acronym for **h**ue-**l**ightness-**s**aturation. *See* HSB.

HMA \H`M-A´\ *n. See* high memory area.

.hn \dot`H-N´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Honduras.

Hollerith tabulating/recording machine \hol`ər-ith ta`byə-lā-tēng-rə-kōr´dēng mə-shēn\ *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).

hologram \hol´ə-gram`\ *n.* A three-dimensional image record created by holography. The hologram consists of a light interference pattern preserved in a medium such as photographic film. When suitably illuminated, it produces an image that changes its appearance as the viewer changes viewing angle. *See also* holography.

holography \hə-lo´grə-fē`\ *n.* A method of reproducing three-dimensional visual images by recording light interference patterns on a medium such as photographic film, creating a hologram.

holy war \hō´lē wōr`\ *n.* **1.** A widespread and acrimonious debate among computer professionals over some aspect of the computer field, such as the debate over use of the GOTO statement in programming or that over big-endian versus little-endian data storage. **2.** An argument in a mailing list, newsgroup, or other forum over some emotional and controversial topic, such as abortion or Northern Ireland. Introducing a holy war that is off the purported topic of the forum is considered a violation of netiquette.

home \hōm\ *n.* A beginning position, such as the top left corner of a character-based display, the left end of a line of text, cell A1 of a spreadsheet, or the top of a document.

homebrew \hōm´brōō\ *n.* Hardware or software developed by an individual at home or by a company for its own use rather than as a commercial product, such as hardware developed by electronics hobbyists when microcomputers first appeared in the 1970s.

home computer \hōm` kəm-pyōō´tər\ *n.* A personal computer designed and priced for use in the home.

home directory \hōm` dər-ek´tər-ē\ *n.* A directory associated with a user account under UNIX. The home directory is the current directory when the user first logs in, and the user can return to it by entering the command *cd* (change directory) without a pathname. The user's files will ordinarily be stored in the home directory and its descendants.

homegrown software \hōm`grōn soft´wâr\ *n.* Software developed by an individual at home rather than in a professional environment. Most public-domain and shareware programs are created this way.

Home key \hōm´ kē\ *n.* A key, found on most keyboards, whose function usually involves sending the cursor to some type of home position in an application. *See also* home.

home office \hōm` of´əs\ *n.* **1.** An office set up within a residence. **2.** The main headquarters of a company.

home page \hōm´pāj\ *n.* **1.** A document intended to serve as a starting point in a hypertext system,

especially the World Wide Web. A home page is called a *start page* in Microsoft Internet Explorer. **2.** An entry page for a set of Web pages and other files in a Web site.

home record \hōm´ rek`ərd\ *n. See* header record.

homogeneous environment \hō-mō-jē`nē-əs en-vīr´ən-mənt, en-vī´ərn-mənt\ *n.* A computing milieu, usually within an organization, in which only one manufacturer's hardware and one manufacturer's software are used. *Compare* heterogeneous environment.

homogeneous network \hō-mō-jē`nē-əs net´-wərk\ *n.* A network on which all the hosts are similar and only one protocol is used.

hook \ho͝ok\ *n.* A location in a routine or program in which the programmer can connect or insert other routines for the purpose of debugging or enhancing functionality.

horizontal blanking interval \hōr`ə-zon-təl blan´-kēng in-tər-vəl\ *n. See* blanking, horizontal retrace.

horizontal flyback \hōr`ə-zon-təl flī´bak\ *n. See* horizontal retrace.

horizontal market software \hōr-ə-zon`təl mär`-kət soft´wâr\ *n.* Application programs, such as word processors, that can be used in all types of business, as opposed to those geared for a certain industry.

horizontal retrace \hōr`ə-zon-təl rē´trās\ *n.* The movement of the electron beam in a raster-scan video display from the right end of one scan line to the left end (the beginning) of the next. During horizontal retrace, the electron beam is turned off, so the time required for the beam to move is called the horizontal blanking interval. *See also* blanking. *Compare* vertical retrace.

horizontal scrolling \hōr`ə-zon-təl skrō´lēng\ *n.* A feature of programs such as word processors and spreadsheets that enables the user to scroll left and right to display information beyond the horizontal limits of the screen (or window, in a graphical user interface).

horizontal synchronization \hōr`ə-zon-təl sēn`-krə-nə-zā´shən\ *n.* On raster displays, the timing produced by a signal that controls the sweep of the display's electron beam as it moves from left to right and back again to form an image line by line. The horizontal synchronization signal is usually controlled by a circuit known as a phase-locked loop, which maintains a constant precise frequency so that a clear image is formed.

host \hōst\ *n.* The main computer in a system of computers or terminals connected by communications links.

host adapter \hōst´ ə-dap`tər\ *n.* A device for connecting a peripheral to the main computer, typically in the form of an expansion card. *Also called* controller, host bus adapter.

host bus adapter \hōst´ bus ə-dap`tər\ *n. See* host adapter.

host language \hōst´ lang`wəj\ *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 \hōst´ nām\ *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.

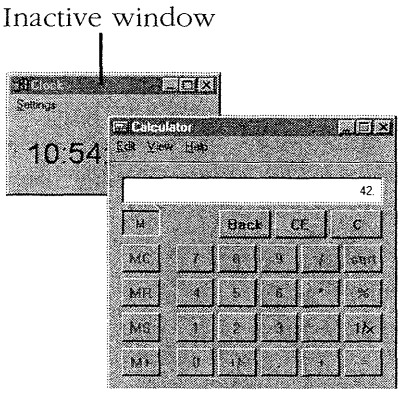
host not responding \hōst` not rə-spon´dēng\ *n.* An error message issued by an Internet client indicating that the computer to which a request has been sent is refusing the connection or is otherwise unavailable to respond to the request.

host timed out \hōst` tīmd 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 \hōst` un-rē´chə-bl\ *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 \hot\ *adj.* Of special or urgent interest, or deemed popular.

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Inactive window.

in-betweening \in`bə-twē´nēng\ *n.* *See* tween.

Inbox \in´boks\ *n.* In many e-mail applications, the default mailbox where the program stores incoming messages. *See also* e-mail, mailbox. *Compare* Outbox.

incident light \in´sə-dənt līt`\ *n.* The light that strikes a surface in computer graphics. *See also* illuminance.

INCLUDE directive \in-klo͞od´ dər-ek`tiv\ *n.* A statement within a source-code file that causes another source-code file to be read in at that spot, either during compilation or during execution. It enables a programmer to break up a program into smaller files and enables multiple programs to use the same files.

inclusive OR \in-klo͞o`siv ōr´\ *n.* *See* OR.

increment[1] \in´krə-mənt\ *n.* A scalar or unit amount by which the value of an object such as a number, a pointer within an array, or a screen position designation is increased. *Compare* decrement[1].

increment[2] \in´krə-mənt\ *vb.* To increase a number by a given amount. For example, if a variable has the value 10 and is incremented successively by 2, it takes the values 12, 14, 16, 18, and so on. *Compare* decrement[2].

indent[1] \in-dent´\ *n.* **1.** Displacement of the left or right edge of a block of text in relation to the margin or to other blocks of text. **2.** Displacement of the beginning of the first line of a paragraph relative to the other lines in the paragraph. *Compare* hanging indent.

indent[2] \in-dent´\ *vb.* To displace the left or right edge of a text item, such as a block or a line, relative to the margin or to another text item.

independent content provider \in-də-pen`dənt kon´tent prə-vī`dər\ *n.* A business or organization that supplies information to an online information service, such as America Online, for resale to the information service's customers. *See also* online information service.

independent software vendor \in`də-pen`dənt soft´wâr ven`dər\ *n.* A third-party software developer; an individual or an organization that independently creates computer software. *Acronym:* ISV (I`S-V´).

index[1] \in´deks\ *n.* **1.** A listing of keywords and associated data that point to the location of more comprehensive information, such as files and records on a disk or record keys in a database. **2.** In programming, a scalar value that allows direct access into a multi-element data structure such as an array without the need for a sequential search through the collection of elements. *See also* array, element (definition 1), hash, list.

index[2] \in´deks\ *vb.* **1.** In data storage and retrieval, to create and use a list or table that contains reference information pointing to stored data. **2.** In a database, to find data by using keys such as words or field names to locate records. **3.** In indexed file storage, to find files stored on disk by using an index of file locations (addresses). **4.** In programming and information processing, to locate information stored in a table by adding an offset amount, called the index, to the base address of the table.

indexed address \in`deksd a´dres, ə-dres´\ *n.* The location in memory of a particular item of data within a collection of items, such as an entry in a table. An indexed address is calculated by starting with a base address and adding to it a value stored in a register called an index register.

indexed search \in`deksd sərch´\ *n.* A search for an item of data that uses an index to reduce the amount of time required.

indexed sequential access method \in`deksd si-kwen`shəl ak´ses meth`əd\ *n.* A scheme for decreasing the time necessary to locate a data record within a large database, given a key value that identifies the record. A smaller index file is used to store the keys along with pointers that locate the corresponding records in the large main database file. Given a key, first the index file is

about 15 MB of disk space. Features include the Internet Hall of Flame and the Geek of the Week. *Acronym:* ITR (I`T-R´).

Internet telephone \in`tər-net tel´ə-fōn\ *n.* Point-to-point voice communication that uses the Internet instead of the public-switched telecommunications network to connect the calling and called parties. Both the sending and the receiving party need a computer, a modem, an Internet connection, and an Internet telephone software package to make and receive calls.

Internet television \in`tər-net tel´ə-vizh-ən\ *n.* The transmission of television audio and video signals over the Internet.

internetwork \in`tər-net´wərk\ *adj.* Of or pertaining to communications between connected networks. Often used to refer to communication between one local area network and another over the Internet or another wide-area network. *See also* LAN, wide area network.

Internetwork Packet Exchange \in`tər-net-wərk pak´ət eks-chānj`\ *n. See* IPX.

Internet Worm \in`tər-net wərm`\ *n.* A string of self-replicating computer code that was distributed through the Internet in November 1988. In a single night, it overloaded and shut down a large portion of the computers connected to the Internet at that time by replicating itself over and over on each computer it accessed, exploiting a bug in UNIX systems. Intended as a prank, the Internet Worm was written by a student at Cornell University. *See also* back door, worm.

InterNIC \in´tər-nik`, in`tər-N-I-C´\ *n.* Short for NSFnet (**Inter**net) **N**etwork **I**nformation **C**enter. The organization that is charged with registering domain names and IP addresses as well as distributing information about the Internet. InterNIC was formed in 1993 as a consortium involving the U.S. National Science Foundation, AT&T, General Atomics, and Network Solutions Inc. (Herndon, Va.). The latter partner administers InterNIC Registration Services, which assigns Internet names and addresses. InterNIC can be reached by e-mail at info@internic.net or on the Web at http://www.internic.net/.

interoperability \in`tər-op`ər-ə-bil´ə-tē\ *n.* Referring to components of computer systems that are able to function in different environments. For example, Microsoft's NT operating system is interoperable on Intel, DEC Alpha, and other CPUs. Another example is the SCSI standard for disk drives and other peripheral devices that allows them to interoperate with different operating systems. With software, interoperability occurs when programs are able to share data and resources. Microsoft Word, for example, is able to read files created by Microsoft Excel.

interpolate \in-tər´pə-lāt\ *vb.* To estimate intermediate values between two known values in a sequence.

interpret \in-tər´prət\ *vb.* **1.** To translate a statement or instruction into executable form and then execute it. **2.** To execute a program by translating one statement at a time into executable form and executing it before translating the next statement, rather than by translating the program completely into executable code (compiling it) before executing it separately. *See also* interpreter. *Compare* compile.

interpreted language \in-tər`prə-təd lang´wəj\ *n.* A language in which programs are translated into executable form and executed one statement at a time rather than being translated completely (compiled) before execution. Basic, LISP, and APL are generally interpreted languages, although Basic can also be compiled. *See also* compiler. *Compare* compiled language.

interpreter \in-tər´prə-tər\ *n.* A program that translates and then executes each statement in a program written in an interpreted language. *See also* compiler, interpreted language, language processor.

interprocess communication \in`tər-pros`es kə-myōō-nə-kā´shən\ *n.* The ability of one task or process to communicate with another in a multitasking operating system. Common methods include pipes, semaphores, shared memory, queues, signals, and mailboxes. *Acronym:* IPC (I`P-C´).

inter-record gap \in`tər-ek`ərd gap´\ *n.* An unused space between data blocks stored on a disk or tape. Because the speed of disks and tapes fluctuates slightly during operation of the drives, a new data block may not occupy the exact space occupied by the old block it overwrites. The inter-record gap prevents the new block from overwrit-

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tion, ion-deposition printers tend to produce thick, slightly fuzzy characters; the technology is also more expensive than that of a laser printer. *See also* electrophotographic printers, nonimpact printer, page printer. *Compare* laser printer, LCD printer, LED printer.

I/O port \I-O´ pōrt`\ *n.* *See* input/output port.

I/O processor \I-O´ pros`es-ər\ *n.* *See* input/output processor.

IO.SYS \ī´ō-sis`, I-O`dot-S-Y-S'´\ *n.* One of two hidden system files installed on an MS-DOS startup disk. IO.SYS in IBM releases of MS-DOS (called IBMBIO.COM) contains device drivers for peripherals such as the display, keyboard, floppy disk drive, hard disk drive, serial port, and real-time clock. *See also* MSDOS.SYS.

IP \I-P´\ *n.* Acronym for **I**nternet **P**rotocol. The protocol within TCP/IP that governs the breakup of data messages into packets, the routing of the packets from sender to destination network and station, and the reassembly of the packets into the original data messages at the destination. IP corresponds to the network layer in the ISO/OSI model. *See also* ISO/OSI model, TCP/IP. *Compare* TCP.

IP address \I-P´ a`dres, ə-dres`\ *n.* Short for **I**nternet **P**rotocol **address.** A 32-bit (4-byte) binary number that uniquely identifies a host (computer) connected to the Internet to other Internet hosts, for the purposes of communication through the transfer of packets. An IP address is expressed in "dotted quad" format, consisting of the decimal values of its 4 bytes, separated with periods; for example, 127.0.0.1. The first 1, 2, or 3 bytes of the IP address, assigned by InterNIC Registration Services, identify the network the host is connected to; the remaining bits identify the host itself. The 32 bits of all 4 bytes together can signify almost 2^{32}, or roughly 4 billion, hosts. (A few small ranges within that set of numbers are not used.) *See also* host, InterNIC, IP, packet (definition 2). *Compare* domain name.

IPC \Ī`P-C´\ *n.* *See* interprocess communication.

IPL \Ī`-P-L´\ *n.* *See* initial program load.

IP multicasting \I-P` mul`tē-kas´tēng, mul`tī-kas´tēng\ *n.* Short for **I**nternet **P**rotocol **multicasting.** The extension of local area network multicasting technology to a TCP/IP network. Hosts send and receive multicast datagrams, the destination fields of which specify IP host group addresses rather than individual IP addresses. A host indicates that it is a member of a group by means of the Internet Group Management Protocol. *See also* datagram, Internet Group Membership Protocol, IP, MBONE, multicasting.

IPng \I´pēng, Ī`P-N-G´\ Acronym for **I**nternet **P**rotocol **n**ext **g**eneration. A version of Internet Protocol (IP) developed by the Internet Engineering Task Force (IETF). Improvements over the original Internet Protocol include better security and an increased IP address size of 16 bytes. *See also* IETF, IP, IP address.

IP spoofing \I-P´ spo͞o`fēng\ *n.* The act of inserting a false sender IP address into an Internet transmission in order to gain unauthorized access to a computer system. *See also* IP address, spoofing.

IP switching \I-P´ swich`ēng\ *n.* A technology developed by Ipsilon Networks (Sunnyvale, Calif.) that enables a sequence of IP packets with a common destination to be transmitted over a high-speed, high-bandwidth Asynchronous Transfer Mode (ATM) connection.

IPv6 \Ī`P-V-siks´\ *n.* Short for **I**nternet **P**rotocol **v**ersion **6**. A proposed next generation for the Internet Protocol, currently version 4, which was introduced in September 1995 by the Internet Engineering Task Force and formerly known as IPng. *See also* IP, IPng.

IPX \Ī`P-X´\ *n.* Acronym for **I**nternetwork **P**acket **Ex**change. The protocol in Novell NetWare that governs addressing and routing of packets within and between LANs. IPX packets can be encapsulated in Ethernet packets or Token Ring frames. IPX operates at ISO/OSI levels 3 and 4 but does not perform all the functions at those levels. In particular, IPX does not guarantee that a message will be complete (no lost packets); SPX has that job. *See also* Ethernet (definition 1), packet, Token Ring network. *Compare* SPX (definition 1).

IPX/SPX \Ī`P-X-S´P-X\ *n.* The network and transport level protocols used by Novell NetWare, which together correspond to the combination of TCP and IP in the TCP/IP protocol suite. *See also* IPX, SPX (definition 1).

.iq \dot`I-Q´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Iraq.

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L1 cache \L-wən´ kash`\ *n.* A memory cache built into i486 and higher-level processors. 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 \L-to͞o´ kash`\ *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.

L8R \lā´tər\ *adv.* Abbreviation for "later." As in "See you later," an expression often used in e-mail or Usenet groups as a closing remark.

.la \dot`L-A´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Laos.

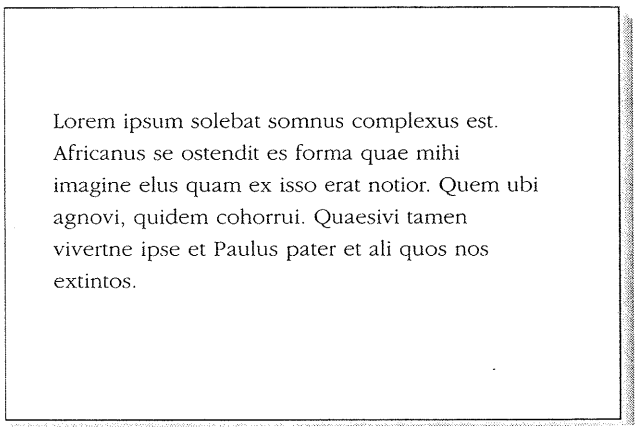
label \lā´bəl\ *n.* An identifier. A label can be a physical item, such as a stick-on tag used to identify disks and other computer equipment, or an electronic label added to floppy disks or hard disks. It can also be a word, symbol, or other group of characters used to identify a file, a storage medium, 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 prefix \lā´bəl prē`fiks\ *n.* In a spreadsheet, a character at the beginning of a cell entry that identifies the entry to the program as a label.

lag \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 \lan\ *n.* Acronym for **l**ocal **a**rea **n**etwork. 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 microcomputers 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, collision detection, communications protocol, contention, CSMA/CD, network, ring network, star network, token bus network, token passing, token ring network. *Compare* wide area network.

landscape mode \land´skāp mōd`\ *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. See the illustration. *Compare* portrait mode.



Landscape mode.

landscape monitor \land´skāp mon`ə-tər\ *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

LLC \L`L-C´\ *n.* *See* IEEE 802 standards.

load[1] \lōd\ *n.* **1.** The total computing burden a system carries at one time. **2.** In electronics, the amount of current drawn by a device. **3.** In communications, the amount of traffic on a line.

load[2] \lōd\ *vb.* To place information from storage into memory for processing, if it is data, or for execution, if it is program code.

load-and-go \lōd`ənd-gō´\ *adj.* In reference to a routine, able to begin execution immediately, once loaded. The term is commonly used in reference to compilers and the machine code they generate.

loaded line \lō`dəd līn´\ *n.* A transmission cable fitted with loading coils, usually spaced about a mile apart, that reduce amplitude distortion in a signal by adding inductance (resistance to changes in current flow) to the line. Loaded lines minimize distortion within the range of frequencies affected by the loading coils, but the coils also reduce the bandwidth available for transmission.

loader \lō´dər\ *n.* A utility that loads the executable code of a program into memory for execution. On most microcomputers, the loader is an invisible part of the operating system and is automatically invoked when a program is run. *See also* load module, loader routine.

loader routine \lō´dər rō͞o-tēn`\ *n.* A routine that loads executable code into memory and executes it. A loader routine can be part of an operating system or it can be part of the program itself. *See also* loader, overlay[1] (definition 1).

load module \lōd´ moj`o͞ol, mo`dyo͞ol\ *n.* An executable unit of code loaded into memory by the loader. A program consists of one or more load modules, each of which can be loaded and executed independently. *See also* loader.

load point \lōd´ point\ *n.* The beginning of the valid data area on a magnetic tape.

load sharing \lōd´ shâr`ēng\ *n.* A method of managing one or more tasks, jobs, or processes by scheduling and simultaneously executing portions of them on two or more microprocessors.

local \lō´kəl\ *adj.* Close at hand or restricted to a particular area. More specifically, in communications, a local device is one that can be accessed directly rather than by means of a communications line. In information processing, a local operation is one performed by the computer at hand rather than by a remote computer. In programming, a local variable is a variable that is restricted in scope, that is, used in only one part (subprogram, procedure, or function) of a program. *Compare* remote.

local area network \lō`kəl âr`ē-ə net´wərk\ *n.* *See* LAN.

local bus \lō`kəl bus´\ *n.* A PC architecture designed to speed up system performance by allowing some expansion boards to communicate directly with the microprocessor, bypassing the normal system bus entirely. *See also* PCI local bus, VL bus.

local bypass \lō`kəl bī´pas\ *n.* A telephone connection used by some businesses that links separate buildings but bypasses the telephone company.

local group \lō`kəl gro͞op´\ *n.* **1.** In Windows NT, a group that is granted permissions and rights to only those resources on the workstation on which the group resides. Local groups provide a convenient means of allowing users both inside and outside the workstation to use resources found only on the workstation containing the local group. *See also* group[1]. **2.** In Windows NT Advanced Server, a group that is granted permissions and rights to only the resources on the servers of its own domain. Local groups in this context provide a convenient means of allowing users from both inside and outside the domain to use resources found only on the servers of the domain. *See also* global group, group[1].

localhost \lō´kəl-hōst`\ *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 \lō`kə-lə-zā´shən\ *n.* The process of altering a program so that it is appropriate for the area in which it is used. 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.

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local loop \lō`kəl lo͞op´\ *n.* A telephone connection that runs from the subscriber to the local telephone exchange.

local memory \lō`kəl mem´ər-ē\ *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 \lō`kəl no͞oz´gro͞ops\ *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 \lō`kəl rē´bo͞ot\ *n.* A reboot of the machine that one is directly working on, rather than a remote host. *See also* reboot.

LocalTalk \lō´kəl-täk`\ *n.* An inexpensive cabling scheme used by AppleTalk networks to connect Apple Macintosh computers, printers, and other peripheral devices. *See also* AppleTalk.

local variable \lō`kəl vâr´ē-ə-bl\ *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 \lō-kā´shən`\ *n.* *See* address[1] (definition 1).

lock \lok\ *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 \lokd fīl´\ *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 \lokd` vol´yo͞om\ *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 \lok´out\ *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 \lok´ 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* crash[1].

log \log\ *n.* **1.** A record of transactions or activities that take place on a computer system. **2.** *See* logarithm.

logarithm \log´ər-idh`əm\ *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.

logic \loj´ik\ *n.* In programming, the assertions, assumptions, and operations that define what a given program does. Defining the logic of a program is often the first step in developing the program's source code. *See also* formal logic.

logical \loj´ə-kəl\ *adj.* **1.** Based on true and false alternatives as opposed to arithmetic calculation of numeric values. For example, a logical expression is one that, when evaluated, has a single outcome, either true or false. *See also* Boolean algebra. *Compare* fuzzy logic. **2.** Of or pertaining to a conceptual piece of equipment or frame of reference, regardless of how it may be realized physically. *Compare* physical.

logical decision \loj`ə-kəl də-sizh´ən\ *n.* Any decision that can have one of two outcomes (true/false, yes/no, and so on). *Compare* fuzzy logic.

logical device \loj`ə-kəl də-vīs´\ *n.* A device named by the logic of a software system, regardless of its physical relationship to the system. For example, a single floppy disk drive can simultaneously be, to the MS-DOS operating system, both logical drive A and drive B.

logical drive \loj`ə-kəl drīv´\ *n.* *See* logical device.

logical error \loj`ə-kəl âr´ər\ *n.* *See* logic error.

logical expression \loj`ə-kəl eks-presh´ən\ *n.* *See* Boolean expression.

logical file \loj´ə-kəl fīl`\ *n.* A file as seen from a conceptual standpoint, without reference to and as

ments, such as Microsoft Windows, a unit of information passed among running programs, certain devices in the system, and the operating environment itself.

message header \mes´əj hed`ər\ *n.* A sequence of bits or bytes at the beginning of a message that usually provides a timing sequence and specifies such aspects of the message structure as its length, data format, and block identification number. *See also* header (definition 2).

message of the day \mes`əj əv dhə dā´\ *n.* A daily bulletin for users of a network, multiuser computer, or other shared system. In most cases, users are shown the message of the day when they log into the system. *Acronym:* MOTD (M`O-T-D´).

message queue \mes´əj kyo͞o`\ *n.* An ordered list of messages awaiting transmission, from which they are taken up on a first in, first out (FIFO) basis.

message reflection \mes´əj rə-flek`shən\ *n.* In object-oriented programming environments, such as Visual C++, OLE, and ActiveX, a function that allows a control to handle its own message. *See also* ActiveX controls, control (definition 2), OCX, VBX.

Message Security Protocol \mes`əj se-kyər`i-tē prō´tə-kol\ *n.* A protocol for Internet messages that is based on the use of encryption and verification to ensure security. It also allows for permissions at the server level for delivery or rejection of e-mail. *Acronym:* MSP (M`S-P´).

message switching \mes´əj swich`ēng\ *n.* A technique used on some communications networks in which a message, with appropriate address information, is routed through one or more intermediate switching stations before being sent to its destination. On a typical message-switching network, a central computer receives messages, stores them (usually briefly), determines their destination addresses, and then delivers them. Message switching enables a network both to regulate traffic and to use communications lines efficiently. *Compare* circuit switching, packet switching.

messaging \mes´ə-jēng\ *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 \mes´ə-jēng a-plə-kā`shən\ *n.* An application that enables users to send messages (such as e-mail or fax) to each other.

Messaging Application Programming Interface \mes`ə-jēng a-plə-kā-shən prō´gram-ēng in`tər-fās\ *n. See* MAPI.

messaging client \mes´ə-jēng klī`ənt\ *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.

metacharacter \met´ə-kâr`ək-tər\ *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.

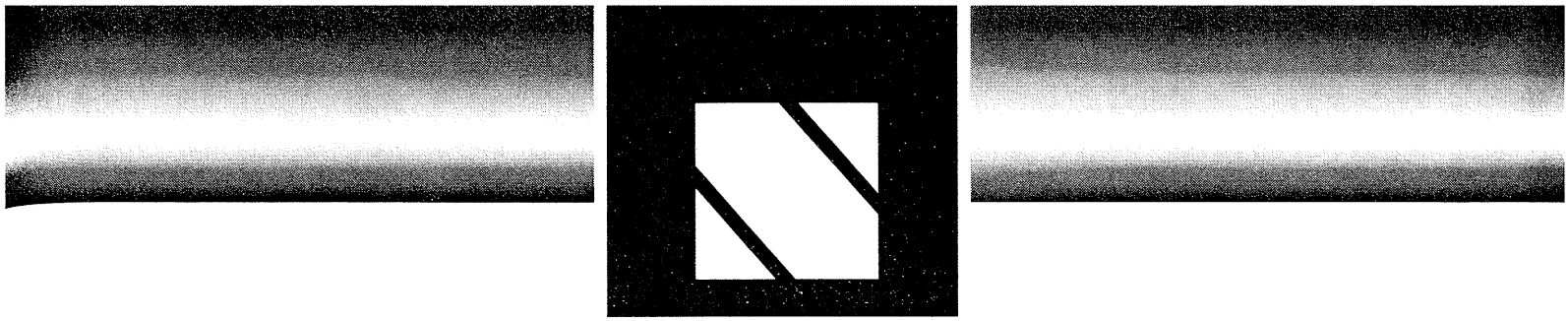
metacompiler \met´ə-kəm-pī`lər\ *n.* A compiler that produces compilers. The UNIX utility *yacc* (Yet Another Compiler-Compiler) is a metacompiler. If it is given a language specification, yacc produces a compiler for that language. *See also* compiler (definition 2).

Meta-Content Format \met`ə-kon´tent fōr`mat\ *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 (M`C-F´).

meta data or **metadata** \met´ə dā`tə, dat`ə\ *n.* Data about data. For example, the title, subject, author, and size of a file constitute meta data about the file. *See also* data dictionary, repository.

Metadata Interchange Specification \met`ə-dā`tə in´tər-chānj spes-ə-fə-kā`shən\ *n.* A set of specifications dealing with the exchanging, sharing, and managing of meta data. *Acronym:* MDIS (M`D-I-S´). *See also* meta data.

metafile \met´ə-fīl`\ *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.



n \N\ *prefix See* nano-.

.na \dot`N-A´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Namibia.

NAK \nak, N`A-K´\ *n.* Acronym for **n**egative **ac**knowledgment. A control code, ASCII character 21 (hexadecimal 15), transmitted to a sending station or computer by the receiving unit as a signal that transmitted information has arrived incorrectly. *Compare* ACK.

Name Binding Protocol \nām` bīn`dēng prō´tə-kol\ *n. See* NBP.

named anchor \nāmd` an´kər\ *n.* In HTML, a tag within a document that can act as a destination for a hyperlink. Named anchors are useful because they allow a link to a specific location within a document. *Also called* named target. *See also* anchor (definition 2), HTML, hyperlink.

named target \nāmd` tär´gət\ *n. See* named anchor.

name server \nām´ sər`vər\ *n. See* CSO name server, DNS server.

name-value pair \nām`val´yo͞o pâr\ *n.* **1.** In the Perl programming language, a data set in which the data is associated with a name. *See also* Perl. **2.** In CGI programming, one of the data items collected from an HTML form by the browser and passed through the server to a CGI script for processing. *See also* CGI, CGI script, HTML.

NAMPS \namps, N`A-M-P-S´\ *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.

nano- \nan´ō\ *prefix* Abbreviated n. Metric prefix meaning 10^{-9} (one billionth).

nanosecond \nan´ō-sek`ənd\ *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 (N-S´).

NAP \N`A-P´\ *n. See* National Attachment Point.

narrowband \nâr´ō-band`\ *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.

Narrow SCSI \nâr`ō skuz´ē, S`C-U-S-I´\ *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.

NAT \N`A-T´\ *n.* Acronym for **n**etwork **a**ddress **t**ranslation. The process of converting between IP addresses used within an intranet or other private network (called a *stub domain*) and Internet IP addresses. This approach makes it possible to use a large number of addresses within the stub domain without depleting the limited number of available numeric Internet IP addresses. *See also* intranet, IP address.

National Attachment Point \nash`ə-nəl ə-tach´-mənt point`\ *n.* One of the four exchange points for Internet traffic sponsored by the National Science Foundation. Internet service providers connect with one of the National Attachment Points in order to exchange data with other providers. The four National Attachment Points are located in the San Francisco Bay area (operated by Pacific Bell), Chicago (operated by Ameritech), New York (operated by Sprint), and Washington, D.C. (operated by MFS). *Acronym:* NAP (N`A-P´).

National Center for Supercomputing Applications \nash`ən-əl sen`tər fōr so͞o`pər-kəm-pyo͞o´tēng a`plə-kā´shənz\ *n. See* NCSA (definition 1).

cially available Web browsers. *See also* Mosaic, Web browser.

Netscape Server Application Programming Interface \net-skāp sər-vər a-plə-kā`shən prō-gram-ēng in´tər-fās\ *n.* *See* NSAPI.

Netspeak \net´spēk\ *n.* The set of conventions for writing English in e-mail, IRCs, and newsgroups. Netspeak is characterized by acronyms (such as IMHO or ROFL) and clarifying devices such as emotags and emoticons. Use of Netspeak should be governed by netiquette. *See also* emotag, emoticon, IMHO, IRC, netiquette, ROFL.

Net surfing \net´ sur`fēng\ *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-top box \net´top boks`\ *n.* A type of personal computer with a reduced number of components that is built primarily to provide a low-cost access terminal to the various services available on the Internet, such as e-mail, Web access, and telnet connectivity. These machines, which are under development, will not have locally addressable hard disks or installable programs, but will obtain any necessary materials for the user from somewhere on a network to which the net-top box is connected. *Compare* Java terminal, NetPC.

Net TV \net` T-V´\ *n.* *See* Internet television.

NetWare \net´wâr\ *n.* Novell's LAN operating system. NetWare runs on many different hardware platforms and network configurations.

network \net´wərk\ *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 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.

network adapter \net´wərk ə-dap`tər\ *n.* An expansion card or other device used to connect a computer to a local area network.

network address translation \net`wərk a´dres tranz-lā`shən, ə-dres`\ *n.* *See* NAT.

network administrator \net`wərk əd-min´ə-strā-tər\ *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 \net`wərk är´kə-tek-chər\ *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 model, SNA.

network card \net´wərk kärd`\ *n.* *See* network adapter.

network computer \net´wərk kəm-pyo͞o`tər\ *n.* A computer having the hardware and software necessary for it to be connected to a network. *Acronym:* NC (N-C´).

network control program \net`wərk kən-trōl´ prō-gram\ *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 database \net`wərk dā´tə-bās\ *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

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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 \net`wərk dā`tə man´əj-mənt prō`tə-kol, dat`ə\ *n.* *See* NDMP.

network device driver \net`wərk də-vīs´ drī`vər\ *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 \net`wərk dər-ek´tər-ē\ *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 Apple 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 \net`wərk drīv´\ *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.

networked directory \net`wərkd dər-ek´tər-ē\ *n.* *See* network directory.

networked drive \net`wərkd drīv´\ *n.* *See* network drive.

Network File System \net`wərk fīl´ si`stəm\ *n.* A distributed file system developed by Sun Microsystems, Inc. that allows users of Windows NT and UNIX workstations to access remote files and directories on a network as if they were local. *Acronym:* NFS (N`F-S´).

network information center \net`wərk in-fər-mā´shən sen`tər\ *n.* *See* NIC (definition 2).

network interface card \net`wərk in´tər-fās kärd`\ *n.* *See* network adapter.

network latency \net`wərk lā´tən-sē\ *n.* The time it takes for information to be transferred between computers in a network.

network layer \net`wərk lâr, lā´ər\ *n.* The third of the seven layers in the ISO/OSI 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 also* ISO/OSI model.

network meltdown \net´wərk melt´doun\ *n.* *See* broadcast storm.

network model \net´wərk mod`əl\ *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 \net`wərk mō´dəm\ *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).

network news \net`wərk nōōz´\ *n.* The newsgroups on the Internet, especially those in the Usenet hierarchy.

Network News Transfer Protocol \net`wərk nōōz´ trans`fər prō`tə-kol\ *n.* *See* NNTP.

network operating system \net`wərk op´ər-ā-tēng si`stem\ *n.* An operating system installed on a server in a local area network that coordinates the activities of providing services to the computers and other devices attached to the network. Unlike a single-user operating system, a network operating system must acknowledge and respond to requests from many workstations, managing such details as network access and communications, resource allocation and sharing, data protection, and error control.

newsmaster \nōōz´ma`stər\ *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 \nōōz`dot-nōōz´grōōps\ *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.

.newsrc \dot-N`E-W`S-R-C´\ *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 \nōōz´rē`dər\ *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[1] (definition 1), follow-up, newsgroup, Usenet, Web browser.

news server \nōōz´ sər`vər\ *n.* A computer or program that exchanges Internet newsgroups with newsreader clients and other servers. *See also* newsgroup, newsreader.

Newton \nōō´tən\ *adj.* Pertaining to the Apple Newton MessagePad personal digital assistant (PDA). *See also* PDA.

Newton OS \nōō`tən O-S´\ *n.* The operating system that controls the Apple Newton MessagePad personal digital assistant (PDA). *See also* PDA.

NeXT \nekst\ *n.* A product of 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.

.nf \dot`N-F´\ *n.* On the Internet, the major geographic domain specifying that an address is located on Norfolk Island.

.nf.ca \dot-N-F`dot-C-A´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Newfoundland, Canada.

NFS \N`F-S´\ *n. See* Network File System.

.ng \dot`N-G´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Nigeria.

.nh.us \dot-N-H`dot-U-S´\ *n.* On the Internet, the major geographic domain specifying that an address is located in New Hampshire, United States.

.ni \dot`N-I´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Nicaragua.

nibble or **nybble** \nib´l\ *n.* Half a byte (4 bits). *Compare* quadbit.

NIC \N`I-C´\ *n.* **1.** Acronym for **n**etwork **i**nterface **c**ard. *See* network adapter. **2.** Acronym for **n**etwork **i**nformation **c**enter. 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 \nik`ad bat´ər-ē\ *n. See* nickel cadmium battery.

nickel cadmium battery \nik`əl kad`mē-um bat´ər-ē\ *n.* A rechargeable battery that uses an alkaline electrolyte. Nickel cadmium batteries typically have a longer operating life and storage life than similar lead-acid batteries. *Also called* NiCad battery. *Compare* lead ion battery, lithium ion battery, nickel metal hydride battery.

nickel metal hydride battery \nik`əl met`əl hī´drīd bat`ər-ē\ *n.* A rechargeable battery that offers longer life and superior performance compared with similar nickel cadmium or other alkaline batteries. *Also called* NiMH battery. *Compare* lead ion battery, lithium ion battery, nickel cadmium battery.

nickname \nik´nām\ *n.* A name used in the destination field of an e-mail editor in place of one or more complete network addresses. For example "Fred" might be a nickname for fred@history.washington.edu. If the nickname has been established within the program, a user need only type "Fred" instead of the entire address, or perhaps "history faculty" instead of all the individual faculty addresses. *See also* alias (definition 2).

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authorized users access to a computer system or its files.

paste \pāst\ *vb.* To insert text or a graphic that has been cut or copied from one document into a different location in the same or a different document. *See also* cut, cut and paste.

patch[1] \pach\ *n.* A piece of object code that is inserted in an executable program as a temporary fix of a bug.

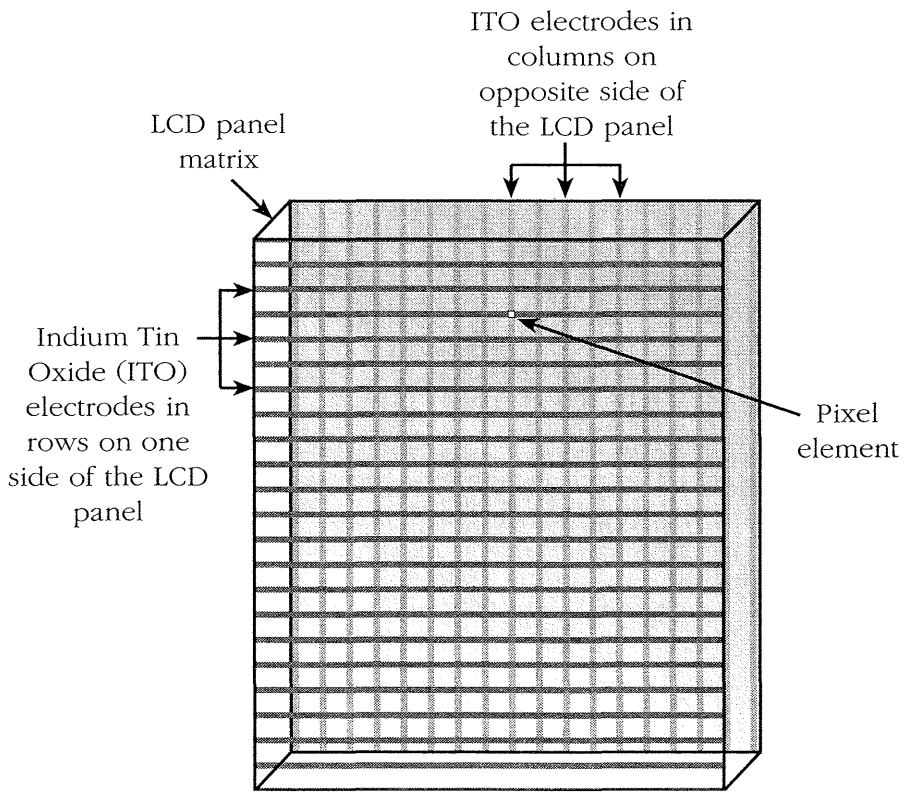
patch[2] \pach\ *vb.* In programming, to repair a deficiency in the functionality of an existing routine or program, generally in response to an unforeseen need or set of operating circumstances. Patching is a common means of adding a feature or a function to a program until the next version of the software is released. *Compare* hack (definition 2), kludge (definition 2).

path \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. See the illustration.

path menu \path´ men`yo͞o\ *n.* In windows environments, the menu or drop box used to enter the universal naming convention path to a shared network resource.

pathname \path´nām\ *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 \pat´ərn rek-əg-nish`ən\ *n.* **1.** A broad technology describing the ability of a



Passive-matrix display.

operators appear before the operands. For example, the expression $(a + b) * (c - d)$ would be written in prefix notation as * + *a b* – *c d*. *Also called* Polish notation. *See also* infix notation, postfix notation.

Prefs \prefs\ *n.* *See* Preferences.

PReP \prep, P`R-E-P´\ *n.* *See* Power PC Reference Platform.

preprocessor \prē`pros´es-ər\ *n.* A device or routine that performs preliminary operations on input before passing it on for further processing. *See also* front-end processor (definition 1). *Compare* postprocessor.

presentation graphics \prē-zən-tā´shən graf`iks, prez-ən-tā´shən\ *n.* The representation of business information, such as sales figures and stock prices, in chart form rather than as lists of numbers. Presentation graphics are used to give viewers an immediate grasp of business statistics and their significance. Common examples are area charts, bar charts, line charts, and pie charts. *Also called* business graphics.

presentation layer \prē-zən-tā´shən lâr`, prez-ən-tā´shən, lā`ər\ *n.* The sixth of the seven layers in the International Organization for Standardization's Open Systems Interconnection (ISO/OSI) model for standardizing computer-to-computer communications. The presentation layer is responsible for formatting information so that it can be displayed or printed. This task generally includes interpreting codes (such as tabs) related to presentation, but it can also include converting encryption and other codes and translating different character sets. *See also* ISO/OSI model.

Presentation Manager \prē-zən-tā´shən man`ə-jər, prez-ən-tā´shən\ *n.* The graphical user interface provided with OS/2 versions 1.1 and later. The Presentation Manager derives from the MS-DOS–based Windows environment and provides similar capabilities. The user sees a graphical, window-oriented interface, and the programmer uses a standard set of routines for handling screen, keyboard, mouse, and printer input and output, no matter what hardware is attached to the system. *See also* OS/2, Windows.

pressure-sensitive \presh´ər-sen`sə-tiv\ *adj.* Of or pertaining to a device in which pressing on a thin surface produces an electrical connection and causes an event to be registered by the computer. Pressure-sensitive devices include touch-sensitive drawing pens, membrane keyboards, and some touch screens. *See also* touch screen.

Pretty Good Privacy \prit`ē gōōd prī´və-sē\ *n.* *See* PGP.

pretty print \prit´ē print`\ *n.* A feature of some editors used in programming that formats code so that it is easier to read and understand when printed. For example, a pretty-print feature might insert blank lines to set off modules or indent nested routines to make them easier to spot. *See also* code[1] (definition 1), editor, module (definition 1), routine.

preventive maintenance \prə-ven`tiv mān´tə-nəns\ *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 \prē´vyōō\ *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.

primary channel \prī`mâr-ē chan´əl\ *n.* The data-transmission channel in a communications device, such as a modem. *Compare* secondary channel.

Primary Domain Controller \prī`mâr-ē dō-mān´kən-trō`lər\ *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 (P`D-C´).

primary key \prī´mâr-ē kē`\ *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 storage \prī`mâr-ē stōr´əj\ *n.* Random access memory (RAM); the main general-purpose storage region to which the microprocessor has direct access. A computer's other storage options,

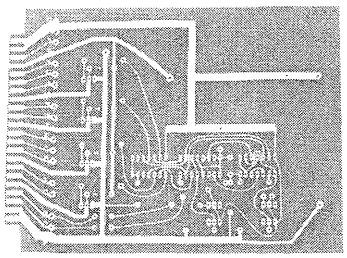
such as disks and tape, are called *secondary storage* or (sometimes) *backing storage.*

primitive \prim´ə-tiv\ *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 fundamental element in a language that can be used to create larger procedures that do the work a programmer wants to do.

print \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 \print´ buf`ər\ *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 \prin`təd sər´kət bōrd\ *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 (P`C-B´).



Printed circuit board.

printer \prin´tər\ *n.* A computer peripheral that puts text or a computer-generated image on paper or on another medium, such as a transparency film. Printers can be categorized in any of several ways. The most common distinction is impact versus nonimpact. Impact printers physically strike the paper and are exemplified by pin dot-matrix printers and daisy-wheel printers; nonimpact printers include every other type of print mechanism, including laser, ink-jet, and thermal printers. Other possible methods of categorizing printers include (but are not limited to) the following:

- Print technology: Chief among these are pin dot-matrix, ink-jet, laser, thermal, and (although somewhat outdated) daisy-wheel or thimble printers. Pin dot-matrix printers can be further classified by the number of pins in the print head: 9, 18, 24, and so on.
- Character formation: Fully formed characters made of continuous lines (such as those produced by a daisy-wheel printer) versus dot-matrix characters composed of patterns of dots (such as those produced by standard dot-matrix, ink-jet, and thermal printers). Laser printers, while technically dot-matrix, are generally considered to produce fully formed characters because their output is very clear and the dots are extremely small and closely spaced.
- Method of transmission: Parallel (byte-by-byte transmission) versus serial (bit-by-bit transmission). These categories refer to the means by which output is sent to the printer rather than to any mechanical distinctions. Many printers are available in either parallel or serial versions, and still other printers offer both choices, yielding greater flexibility in installation options.

presents the user with a tabbed, index-card-like selection of property pages, each of which features standard dialog-style controls for customizing parameters.

proportional font \prə-pōr´shən-əl font`\ *n.* A set of characters in a particular style and size in which a variable amount of horizontal space is allotted to each letter or number. In a proportional font, the letter *i,* for example, is allowed less space than the letter *m. Compare* monospace font.

proportional spacing \prə-pōr`shən-əl spā´sēng\ *n.* A form of character spacing in which the horizontal space each character occupies is proportional to the width of the character. The letter *w,* for example, takes up more space than the letter *i. Compare* monospacing.

proprietary \prə-prī´ə-târ-ē\ *adj.* Of, pertaining to, or characteristic of something that is privately owned. Generally, the term refers to technology that has been developed by a particular corporation or entity, with specifications that are considered by the owner to be trade secrets. Proprietary technology may be legally used only by a person or entity purchasing an explicit license. Also, other companies are unable to duplicate the technology, both legally and because its specifications have not been divulged by the owner. *Compare* public domain.

proprietary software \prə-prī`ə-târ-ē soft´wār\ *n.* A program owned or copyrighted by an individual or a business and available for use only through purchase or by permission of the owner. *Compare* public-domain software.

protected mode \prə-tek´təd mōd`\ *n.* An operating mode of the Intel 80286 and higher microprocessors that supports larger address spaces and more advanced features than real mode. When started in protected mode, these CPUs provide hardware support for multitasking, data security, and virtual memory. The Windows NT and OS/2 operating systems run in protected mode, as do most versions of UNIX for these microprocessors. *Compare* real mode.

protocol \prō´tə-kol`\ *n. See* communications protocol.

protocol layer \prō´tə-kol lā`ər, lâr`\ *n. See* layer.

protocol stack \prō´tə-kol stak`\ *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. *Also called* protocol suite. *See also* ISO/OSI model.

protocol suite \prō´tə-kol swēt`\ *n. See* protocol stack.

prototyping \prō´tə-tī`pēng\ *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 \proks´ē\ *n. See* proxy server.

proxy server \proks´ē sər`vər\ *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 \print´ skrēn kē`\ *n. See* Print Screen key.

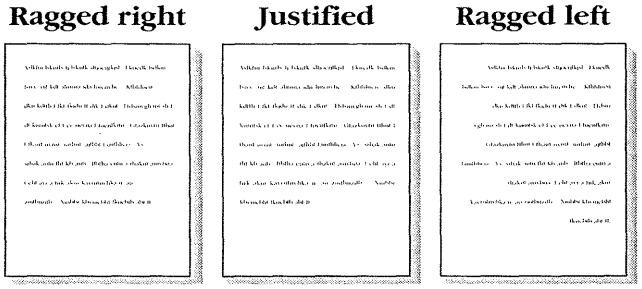
.ps \dot`P-S´\ *n.* The file extension that identifies PostScript printer files. *See also* PostScript.

PS/2 bus \P`S-tōō´ bus\ *n. See* Micro Channel Architecture.

psec \pī´kō-sek`ənd\ *n. See* picosecond.

pseudocode \sōō´dō-kōd`\ *n.* **1.** Abbreviated p-code. 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. *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

rag \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 \rag`əd 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 \rag`əd rīt´\ *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 \rād, R`A-I-D´\ *n.* Acronym for **r**edundant **a**rray of **i**ndependent **d**isks (formerly called **r**edundant **a**rray of **i**nexpensive **d**isks). A data storage method in which data, along with information used for error correction, such as parity bits or Hamming codes, is distributed among two or more hard disk drives in order to improve performance and reliability. The hard disk array is governed by array management software and a disk controller, which handles the error correction. RAID is generally used on network servers. Several defined levels of RAID offer 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 \rād´ ə-rā`, R`A-I-D´\ *n. See* RAID.

RAM \ram, R`A-M´\ *n.* Acronym for **r**andom **a**ccess **m**emory. 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).

RAM cache \ram´ kash, R`A-M´\ *n.* 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 \ram´ kärd, R`A-M´\ *n.* An add-in circuit board containing RAM memory and the interface logic necessary to decode memory addresses.

RAM cartridge \ram´ kär`trij, R`A-M´\ *n. See* memory cartridge.

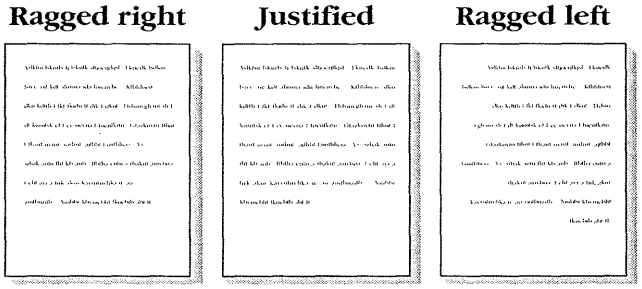
RAM chip \ram´ chip, R`A-M´\ *n.* A semiconductor storage device. RAM chips can be either dynamic or static memory. *See also* dynamic RAM, RAM, static RAM.

RAM compression \ram´ kəm-presh`ən, R-A-M´\ *n.* Short for **r**andom **a**ccess **m**emory **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 Windows 95 and Windows NT, which handle RAM more effectively, RAM compression is generally used only on older PCs. *See also* compression, RAM, Windows, Windows 95.

RAMDAC \ram´dak, R-A-M`D-A-C´\ *n.* Acronym for **r**andom **a**ccess **m**emory **d**igital-to-**a**nalog **c**onverter. A chip built into some VGA and SVGA video adapters that translates the digital representation of a pixel into the analog information needed by the monitor to display it. The presence of a RAMDAC chip generally enhances overall video performance. *See also* SVGA, VGA.

RAM disk \ram´ disk, R`A-M´\ *n.* Short for **r**andom **a**ccess **m**emory **disk.** A simulated disk drive

rag \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 \rag`əd 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 \rag`əd rīt´\ *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 \rād, R`A-I-D´\ *n.* Acronym for **r**edundant **a**rray of **i**ndependent **d**isks (formerly called **r**edundant **a**rray of **i**nexpensive **d**isks). A data storage method in which data, along with information used for error correction, such as parity bits or Hamming codes, is distributed among two or more hard disk drives in order to improve performance and reliability. The hard disk array is governed by array management software and a disk controller, which handles the error correction. RAID is generally used on network servers. Several defined levels of RAID offer 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 \rād´ ə-rā`, R`A-I-D´\ *n. See* RAID.

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whose data is actually stored in RAM memory. A special program allows the operating system to read from and write to the simulated device as if it were a disk drive. RAM disks are extremely fast, but they require that system memory be given up for their use. Also, RAM disks usually use volatile memory, so the data stored on them disappears when power is turned off. Many portables offer RAM disks that use battery-backed CMOS RAM to avoid this problem. *See also* CMOS RAM. *Compare* disk cache.

RAM refresh \ram´ rē-fresh`, R`A-M´\ *n.* *See* refresh (definition 2).

RAM resident \ram´ rez`ə-dənt, R-A-M´\ *adj.* *See* memory-resident.

RAM-resident program \ram`rez-ə-dent prō´-gram, R`A-M´\ *n.* *See* terminate-and-stay-resident program.

random access \ran`dəm ak´ses\ *n.* The ability of a computer to find and go directly to a particular storage location without having to search sequentially from the beginning location. The human equivalent of random access would be the ability to find a desired address in an address book without having to proceed sequentially through all the addresses. A computer's semiconductor memory (both RAM and ROM) provides random access. Certain types of files stored on disk under some operating systems also allow random access. Such files are best used for data in which each record has no intrinsic relationship to what comes physically before or after it, as in a client list or an inventory. *Also called* direct access. *See also* RAM, ROM. *Compare* indexed sequential access method, sequential access.

random access memory \ran`dəm ak-ses mem´-ər-ē\ *n.* *See* RAM.

random noise \ran`dəm noiz´\ *n.* A signal in which there is no relationship between amplitude and time and in which many frequencies occur randomly, without pattern or predictability.

random number generation \ran`dəm num´bər jen-ər-ā`shən\ *n.* Production of an unpredictable sequence of numbers in which no number is any more likely to occur at a given time or place in the sequence than any other. Truly random number generation is generally viewed as impossible. The process used in computers would be more properly called "pseudorandom number generation."

range \rānj\ *n.* **1.** A block of cells selected for similar treatment in a spreadsheet. A range of cells can extend across a row, down a column, or over a combination of the two, but all cells in the range must be contiguous, sharing at least one common border. Ranges allow the user to affect many cells with a single command—for example, to format them similarly, enter the same data into all of them, give them a name in common and treat them as a unit, or select and incorporate them into a formula. **2.** In more general usage, the spread between specified low and high values. Range checking is an important method of validating data entered into an application.

range check \rānj´ chek\ *n.* In programming, a limit check of both the upper and lower limits of a value, thus determining whether the value lies within an acceptable range. *See also* limit check.

RARP \R`A-R-P´\ *n.* Acronym for **R**everse **A**ddress **R**esolution **P**rotocol. A TCP/IP protocol for determining the IP address (or logical address) of a node on a local area network connected to the Internet, when only the hardware address (or physical address) is known. While RARP refers only to finding the IP address and ARP technically refers to the opposite procedure, ARP is commonly used for both senses. *See also* ARP.

RAS \R`A-S´\ *n.* *See* remote access server, Remote Access Service.

raster \ra´stər\ *n.* A rectangular pattern of lines; on a video display, the horizontal scan lines from which the term *raster scan* is derived.

raster display \ra´stər dis-plā`\ *n.* A video monitor (typically a CRT) that displays an image on the screen as a series of horizontal scan lines from top to bottom. Each scan line consists of pixels that can be illuminated and colored individually. Television screens and most computer monitors are raster displays. *See also* CRT, pixel. *Compare* vector display.

raster graphics \ra´stər graf`iks\ *n.* A method of generating graphics that treats an image as a collection of small, independently controlled dots (pixels) arranged in rows and columns. *Compare* vector graphics.

round \round\ *vb.* To shorten the fractional part of a number, usually increasing the last remaining (rightmost) digit or not, according to whether the deleted portion was over or under 5. 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 \round` rob´in\ *n.* A sequential, cyclical allocation of resources to more than one process or device.

routable protocol \rou´tə-bl pro`tə-kol, rōō´tə-bl\ *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 \rou´tər\ *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 local area networks (LANs) 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 \rōō-tēn´\ *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.

row \rō\ *n.* A series of items arranged horizontally within some type of framework—for example, a continuous series of cells running from left to right in a spreadsheet; a horizontal line of pixels on a video screen; or a set of data values aligned horizontally in a table. *Compare* column.

RPC \R`P-C´\ *n. See* remote procedure call.

RPF \R`P-F´\ *n. See* reverse path forwarding.

RPN \R`P-N´\ *n.* Acronym for **r**everse **P**olish **n**otation. *See* postfix notation.

RPROM \R´prom, R`P´rom, R`P-R`O-M´\ *n.* Short for **r**eprogrammable **PROM.** *See* EPROM.

RRSP \R`R-S-P´\ *n. See* Resource Reservation Setup Protocol.

RS-232-C standard \R`S-tōō-thrē-tōō-C´ stan`-dərd\ *n.* An accepted industry standard for serial communications connections. Adopted by the Electrical Industries Association, this Recommended Standard (RS) defines the specific lines and signal characteristics used by serial communications controllers to standardize the transmission of serial data between devices. The letter *C* denotes that the current version of the standard is the third in a series. *See also* CTS, DSR, DTR, RTS, RXD, TXD.

RS-422/423/449 \R`S-fōr-tōō-tōō`fōr-tōō-thrē`fōr-fōr-nīn´\ *n.* Standards for serial communications with transmission distances over 50 feet. RS-449 incorporates RS-422 and RS-423. Macintosh serial ports are RS-422 ports. *See also* RS-232-C standard.

RSAC \R´sak, R`S-A-C´\ *n. See* Recreational Software Advisory Council.

RSA encryption \R-S-A´ en-krip`shən\ *n.* Short for **R**ivest-**S**hamir-**A**dleman **encryption.** The patented public key encryption algorithm, introduced by Ronald Rivest, Adi Shamir, and Leonard Adleman in 1978, on which the PGP (Pretty Good Privacy) encryption program is based. *See also* PGP, public key encryption.

RSI \R`S-I´\ *n. See* repetitive strain injury.

RSN \R`S-N´\ *See* Real Soon Now.

RSVP \R`S-V-P´\ *n. See* Resource Reservation Setup Protocol.

RTF \R`T-F´\ *n. See* Rich Text Format.

RTFM \R`T-F-M´\ Acronym for **r**ead **t**he **f**laming (or **f**riendly) **m**anual. A common answer to a question in an Internet newsgroup or product support conference that is adequately explained in the instruction manual. *Also called* RTM.

RTM \R`T-M´\ Acronym for **r**ead **t**he **m**anual. *See* RTFM.

RTS \R`T-S´\ *n.* Acronym for **R**equest **t**o **S**end. A signal sent, as from a computer to its modem, to request permission to transmit; the signal is often used in serial communications. RTS is a hardware signal sent over pin 4 in RS-232-C connections. *See also* RS-232-C standard. *Compare* CTS.

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The instructions usually use the rules and syntax of the application or utility. *See also* macro.

scripting language \skrip´tēng lang`wəj\ *n.* A simple programming language designed to perform special or limited tasks, sometimes associated with a particular application or function. An example of a scripting language is Perl. *See also* Perl, script.

scroll \skrōl\ *vb.* To move a document or other data in a window in order to view a particular portion of the document. Scrolling may be controlled by the mouse, arrow keys, or other keys on the keyboard. *See also* scroll bar.

scroll arrow \skrōl´ âr`ō\ *n. See* scroll bar.

scroll bar \skrōl´ bär\ *n.* In some graphical user interfaces, a vertical or horizontal bar at the side or bottom of a display area that can be used with a mouse for moving around in that area. Scroll bars often have four active areas: two scroll arrows for moving line by line, a sliding scroll box for moving to an arbitrary location in the display area, and gray areas for moving in increments of one window at a time. See the illustration.

scroll box \skrōl´ boks\ *n. See* elevator.

Scroll Lock key \skrōl´ lok kē`\ *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.

SCSI \skuz´ē, S`C-S-I´\ *n.* Acronym for **S**mall **C**omputer **S**ystem **I**nterface, a standard high-speed parallel interface defined by the X3T9.2 committee of the American National Standards Institute (ANSI). A SCSI 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. *Compare* ESDI, IDE.

SCSI-1 \skuz`ē-wən´, S-C-S-I`wən´\ *n. See* SCSI.

SCSI-2 \skuz`ē-to͞o´, S-C-S-I`-to͞o´\ *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. *See also* Fast SCSI, Fast/Wide SCSI, SCSI, Wide SCSI. *Compare* UltraSCSI.

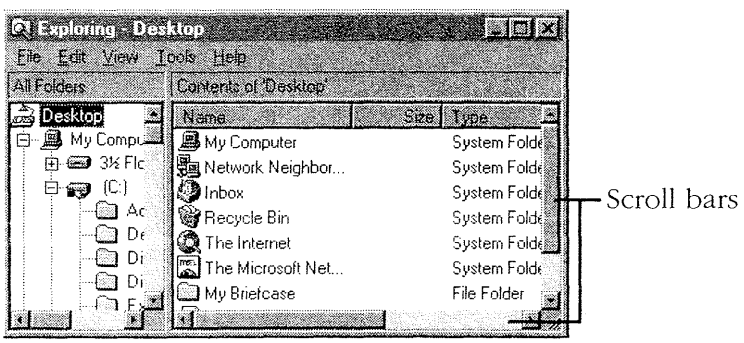
SCSI bus \skuz´ē bus, S`C-S-I´\ *n.* A parallel bus that carries data and control signals from SCSI devices to a SCSI controller. *See also* bus, controller, SCSI device.

SCSI chain \skuz´ē chān`, S`C-S-I´\ *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.

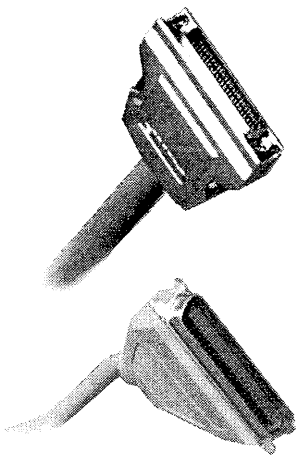
SCSI connector \skuz´ē kə-nek`tər, S`C-S-I´\ *n.* A cable connector used to connect a SCSI device to a SCSI bus. See the illustration on the next page. *See also* bus, connector (definition 1), SCSI device.

SCSI device \skuz´ē də-vīs`, S`C-S-I´\ *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 ID \skuz´ē I-D´ S-C-S-I´\ *n.* The unique identity of a SCSI device. Each device connected to a SCSI bus must have a different SCSI ID. A maxi-



Scroll bar.



SCSI connector.

mum of eight SCSI IDs can be used on the same SCSI bus. *See also* bus, SCSI device.

SCSI network \skuz´ē net`wərk, S`C-S-I´\ *n.* A set of devices on a SCSI bus, which acts like a local area network. *See also* SCSI.

SCSI port \skuz´ē pōrt`, S`C-S-I´\ *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.

scuzzy \skuz´ē\ *n. See* SCSI.

.sd \dot`S-D´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Sudan.

SDK \S`D-K´\ *n.* Acronym for **s**oftware **d**eveloper's **k**it. *See* developer's toolkit.

SDLC \S`D-L-C´\ *n.* Acronym for **S**ynchronous **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 \S`D-M´\ *n. See* space-division multiplexing.

SDRAM \S`D´ram, S`D-R-A-M´\ *n. See* synchronous DRAM.

SDSL \S`D-S-L´\ *n. See* symmetric digital subscriber line.

.se \dot`S-E´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Sweden.

.sea \dot`S-E-A´\ *n.* A file extension for a self-extracting Macintosh archive compressed with StuffIt. *See also* self-extracting archive.

seamless integration \sēm`ləs in-tə-grā´shən\ *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.

search[1] \sərch\ *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.

search[2] \sərch\ *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 \sərch´ al`gər-idh-əm\ *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 \sərch` ənd rə-plās´\ *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 \sərch´ krī-tēr`ē-ə\ *n.* The terms or conditions that a search engine uses to find items in a database. *See also* search engine.

search engine \sərch´ en`jən\ *n.* **1.** A program that searches for key words 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 available 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, AliWeb, and Excite. Most search engines reside on a server. *See also* agent (definition 2), FTP, Gopher, newsgroup, spider, World Wide Web.

search key \sərch´ kē\ *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 string \sərch´ strēng\ *n.* The string of characters to be matched in a search—typically (but not necessarily) a text string.

seat[1] \sēt\ *n.* One workstation or computer, in the context of software licensing on a per-seat basis. *See also* license agreement, workstation (definition 1).

seat[2] \sēt\ *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 \sek`ən-dâr-ē chan´əl\ *n.* A transmission channel in a communications system that carries testing and diagnostic information rather than actual data. *Compare* primary channel.

secondary key \sek´ən-dâr-ē kē`\ *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 \sek´ən-dâr-ē sər´vis prə-vī`dər\ *n.* An Internet service provider that provides a Web presence but not direct connectivity. *See also* ISP.

secondary storage \sek`ən-dâr`ē stōr´əj\ *n.* Any data storage medium other than a computer's random access memory (RAM)—typically tape or disk. *Compare* primary storage.

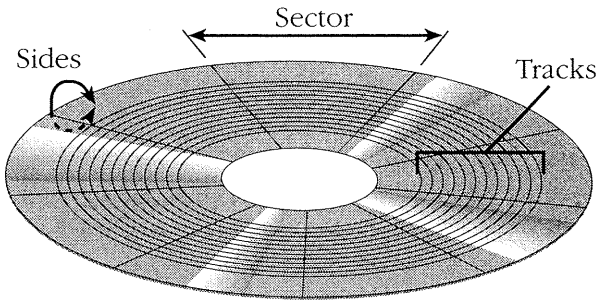
second normal form \sek`ənd nōr´məl fōrm`\ *n. See* normal form (definition 1).

secret channel \sē`krət chan´əl\ *n. See* private channel.

sector \sek´tər\ *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 interleave \sek´tər in`tər-lēv\ *n. See* interleave.

sector map \sek´tər 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.



Sector.

secure channel \se-kyər` chan´əl\ *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 Electronics Transactions protocol \sə-kyər` ə-lek-tron´iks tranz-ak`shənz prō`tə-kol\ *n.* Protocol for conducting secure transactions on the Internet, the result of a joint effort by GTE, IBM, MasterCard, Microsoft, Netscape, SAIC, Terisa Systems, VeriSign, and Visa. *Acronym:* SET (S`E-T´).

Secure Hash Algorithm \sə-kyər` hash` al´gə-ridh`əm, se-kyo͝or`\ *n. See* SHA.

Secure HTTP \se-kyər` H`T-T-P´\ *n. See* S-HTTP.

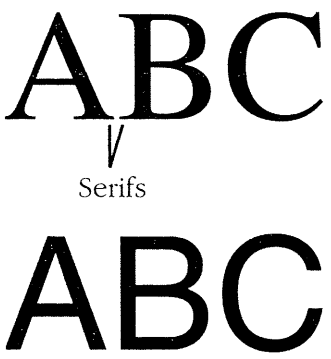
Secure Hypertext Transfer Protocol \se-kyər` hī`pər-tekst trans´fər pro`tə-kol\ *n. See* S-HTTP.

Secure/Multipurpose Internet Mail Extensions \se-kyər` mul`tē-pur-pəs in`tər-net māl´ eks-ten`shənz, mul`tī-pur-pəs\ *n. See* S/MIME.

secure site \sə-kyər` sīt´\ *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 \se-kyər` sok´əts lā`ər, lâr`\ *n.* A proposed open standard developed by Netscape Communications for establishing a secure

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Serif. A serif typeface (top) and a sans serif typeface (bottom).

serif[2] \sâr´if\ *n.* Any of the short lines or ornaments at the ends of the strokes that form a typeface character.

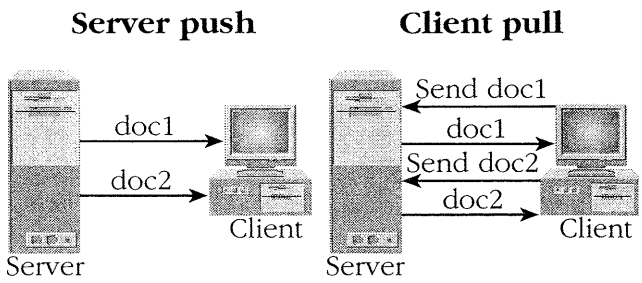
server \sər´vər\ *n.* **1.** On a local area network (LAN), a computer running administrative software that controls access to the network and its resources, such as printers and disk drives, and provides resources to computers functioning as workstations on the network. **2.** On the Internet or other 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* client/server architecture. *Compare* client (definition 3).

server-based application \sər`vər-bāsd a-plə-kā´-shən\ *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 \sər´vər klu`stər\ *n.* A group of independent computers that work together as a single system. A server cluster presents the appearance of a single server to a client.

server error \sər´vər âr`ər\ *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 push-pull \sər`vər po͝osh`pul´, po͝ol´\ *n.* A combination of Web client/server techniques individually called "server push" and "client pull." In server push, the server loads data to the client, but the data connection stays open. This allows the server to continue sending data to the browser as necessary. In client pull, the server loads data to the client, but the data connection does not stay open. The server sends an HTML directive to the browser telling it to reopen the connection after a certain interval to get more data or possibly to open a new URL. See the illustration. *See also* HTML, server (definition 2), URL.



Server push-pull.

server-side includes \sər`vər-sīd in-klo͞odz´\ *n.* A mechanism for including dynamic text in World Wide Web documents. Server-side includes are special command codes that are recognized and interpreted by the server; their output is placed in the document body before the document is sent to the browser. Server-side includes can be used, for example, to include the date/time stamp in the text of the file. *See also* server (definition 2).

service \sər´vəs\ *n.* **1.** A customer-based or user-oriented function, such as technical support or network provision. **2.** In reference to programming and software, a program or routine that provides support to other programs, particularly at a low (close to the hardware) level. *See also* utility.

Service Advertising Protocol \sər`vəs ad`vər-tī-zēng prō´tə-kol\ *n.* A method used by a service-providing node in a network (such as a file server or application server) to notify other nodes on the network that it is available for access. When a server boots, it uses the protocol to advertise its service; when the same server goes offline, it uses the protocol to announce that it is no longer available. *Acronym:* SAP (S`A-P´). *See also* server (definition 1).

service bureau \sər´vis byər`ō\ *n.* **1.** A company that provides various services related to publishing, such as prepress production, desktop pub-

someone in a conference devoted to television may ask about a news program; then somebody else may say something about a story on that program about food poisoning, which leads somebody else to start a general discussion on the advantages of organic fruits and vegetables.

topic group \top´ik grōōp`\ *n.* An online discussion area for participants with a common interest in a particular subject.

top-level domain \top`lev-əl dō-mān´\ *n.* In the domain-name system of Internet addresses, any of the broadest category of names, under which all domain names fit. Top-level domains for sites in the United States include .com, .edu, .gov, .net, and .org. *See also* DNS (definition 1), major geographic domain.

top-of-file \top`əv-fīl´\ *n.* **1.** The beginning of a file. **2.** A symbol used by a program to mark the beginning of a file—the first character in the file or, in an indexed (ordered) database, the first indexed record. *See also* beginning-of-file. *Acronym:* TOF (T`O-F´, tof).

topology \to-pol´ə-jē`\ *n.* The configuration formed by the connections between devices on a local area network (LAN) or between two or more LANs. *See also* bus network, LAN, ring network, star network, token ring network, tree network.

.tor.ca \dot-T-O-R`dot-C-A´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Toronto, Canada.

total bypass \tō`təl bī´pas\ *n.* A communications network that uses satellite transmission to bypass both local and long-distance telephone links.

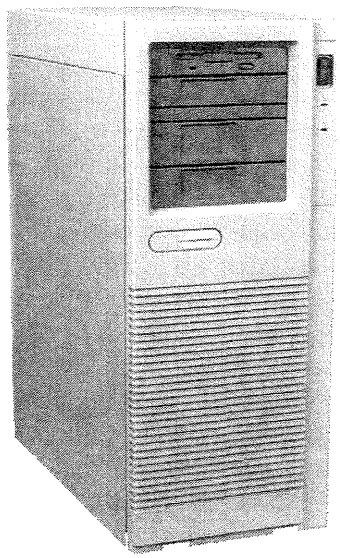
touch pad \tuch´ pad\ *n.* A variety of graphics tablet that uses pressure sensors, rather than the electromagnetics used in more expensive high-resolution tablets, to track the position of a device on its surface. *See also* absolute pointing device, graphics tablet.

touch screen \tuch´ skrēn\ *n.* A computer screen designed or modified to recognize the location of a touch on its surface. By touching the screen, the user can make a selection or move a cursor. The simplest type of touch screen is made up of a grid of sensing lines, which determine the location of a touch by matching vertical and horizontal contacts. Another, more accurate type uses an electrically charged surface and sensors around the outer edges of the screen to detect the amount of electrical disruption and pinpoint exactly where contact has been made. A third type has infrared light-emitting diodes (LEDs) and sensors around the outer edges of the screen. These LEDs and sensors create an invisible infrared grid, which the user's finger interrupts, in front of the screen. *Compare* light pen.

touch-sensitive display \təch`sen`sə-tiv dis-plā´\ *n. See* touch screen.

touch-sensitive tablet \tuch`sen-sə-tiv ta´blət\ *n. See* touch pad.

tower \tou´ər\ *n.* A microcomputer system in which the cabinet for the central processing unit (CPU) is tall, narrow, and deep rather than short, wide, and deep. The motherboard is usually vertical, and the disk drives are often perpendicular to the motherboard. A tower cabinet is at least 24 inches tall. See the illustration. *See also* cabinet, microcomputer, motherboard. *Compare* minitower.



Tower.

.tp \dot`T-P´\ *n.* On the Internet, the major geographic domain specifying that an address is located in East Timor.

TP \T-P´\ *n. See* transaction processing.

TPC \T`P-C´\ *n. See* Transaction Processing Council.

TPC-D \T`P-C-D´\ *n.* Acronym for **T**ransaction **P**rocessing **C**ouncil Benchmark **D**. A benchmark

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telephone line, consisting of a keyboard that sends a character code for each keystroke and a printer that prints characters as their codes are received. The simplest video display interface behaves like a TTY. *See also* KSR terminal, teletype mode.

tunnel \tun´əl\ *vb.* To encapsulate or wrap a packet or a message from one protocol in the packet for another. The wrapped packet is then transmitted over a network via the protocol of the wrapper. This method of packet transmission is used to avoid protocol restrictions. *See also* communications protocol, packet (definition 2).

tuple \tup´l\ *n.* In a database table (relation), a set of related values, one for each attribute (column). A tuple is stored as a row in a relational database management system. It is the analog of a record in a nonrelational file. *See also* relation.

Turing machine \to͞or´ēng mə-shēn`, tər´ēng\ *n.* **1.** A theoretical model created by British mathematician Alan Turing in 1936 that is considered the prototype for digital computers. Described in a paper ("On Computable Numbers with an Application to the Entscheidungsproblem") published in the *Proceedings of the London Mathematical Society,* the Turing machine was a logical device that could scan one square at a time (either blank or containing a symbol) on a paper tape. Depending on the symbol read from a particular square, the machine would change its status and/or move the tape backward or forward to erase a symbol or to print a new one. *See also* status. **2.** A computer that can successfully mimic human intelligence in the Turing test.

Turing test \to͞or´ēng test`, tər´ēng\ *n.* A test of machine intelligence proposed by Alan Turing, British mathematician and developer of the Turing machine. In the Turing test, also known as the Imitation Game, a person uses any series of questions to interrogate two unseen respondents, a human and a computer, to try to determine which is the computer.

turnaround time \tur´nər-ound tīm`\ *n.* **1.** The elapsed time between submission and completion of a job. **2.** In communications, the time required to reverse the direction of transmission in half-duplex communication mode. *See also* half-duplex transmission.

turnkey system \turn´kē si`stəm\ *n.* A finished system, complete with all necessary hardware and documentation and with software installed and ready to be used.

turnpike effect \turn´pīk ə-fekt`\ *n.* The communications equivalent of gridlock; a reference to bottlenecks caused by heavy traffic over a communications system or network.

turtle \tur´tl\ *n.* A small on-screen shape, usually a triangle or a turtle shape, that acts as a drawing tool in graphics. A turtle is a friendly, easily manipulated tool designed for children learning to use computers. It takes its name from a mechanical, dome-shaped "turtle" that was developed for the Logo language and moved about the floor in response to Logo commands, raising and lowering a pen to draw lines.

turtle graphics \tur´tl graf`iks\ *n.* A simple graphics environment, present in Logo and other languages, in which a turtle is manipulated by simple commands. Some versions display the turtle and its track on screen; others use electromechanical turtles that write on paper.

tutorial \to͞o-tōr´ē-əl\ *n.* A teaching aid designed to help people learn to use a product or procedure. In computer applications, a tutorial might be presented in either a book or a manual or as an interactive disk-based series of lessons provided with the program package.

.tv \dot`T-V´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Tuvalu.

.tw \dot`T-W´\ *n.* On the Internet, the major geographic domain specifying that an address is located in Taiwan.

TWAIN \twān, T`W-A-I-N´\ *n.* Acronym for **t**echnology **w**ithout **a**n **i**nteresting **n**ame. The de facto standard interface between software applications and image-capturing devices such as scanners. Nearly all scanners contain a TWAIN driver, but only TWAIN-compatible software can use the technology. *See also* scanner.

tweak \twēk\ *vb.* To make final small changes to improve hardware or software performance; to fine-tune a nearly complete product.

tween \twēn\ *vb.* In a graphics program, to calculate intermediary shapes during the metamorphosis of one shape into another.

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video RAM \vid´ē-ō ram`, R-A-M´\ *n.* A special type of dynamic RAM (DRAM) used in high-speed video applications. Video RAM uses separate pins for the processor and the video circuitry, providing the video circuitry with a "back door" to the video RAM. The video circuitry can access the video RAM serially (bit by bit), which is more appropriate for transferring pixels to the screen than is the parallel access provided by conventional DRAM. *Acronym:* VRAM (V´ram, V`R-A-M´). *See also* dynamic RAM.

video server \vid´ē-ō sər`vər\ *n.* A server designed to deliver digital video-on-demand and other broadband interactive services to the public over a wide area network.

video signal \vid´ē-ō sig`nəl\ *n.* The signal sent from a video adapter or other video source to a raster display. The signal can include horizontal and vertical synchronization signals, as well as image information. *See also* composite video display, RGB monitor.

video terminal \vid´ē-ō tər`mə-nəl\ *n. See* terminal (definition 1).

videotex \vid´ē-ō-teks`\ *n.* An interactive information retrieval service designed to be accessed by subscribers over telephone lines. Information can be displayed on a home television screen or a videotex terminal. Subscribers use keypads to choose from menus and to request specific screens, or pages. *Also called* videotext.

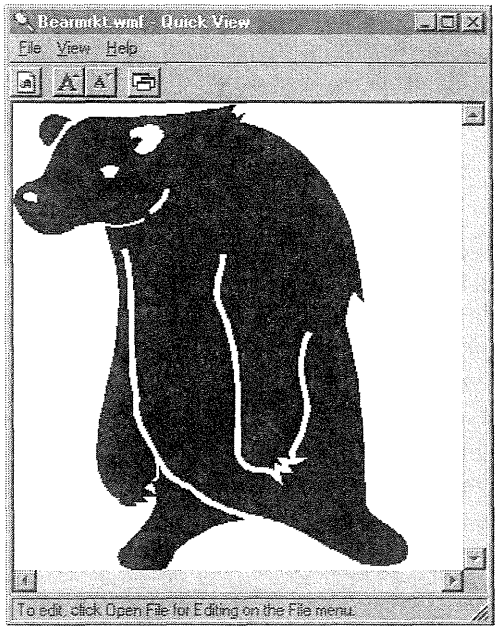
videotext \vid´ē-ō-tekst`\ *n. See* videotex.

Vienna Definition Language \vē-en`ə def-ə-nish`ən lang´wəj\ *n. See* VDL.

view[1] \vyo͞o\ *n.* **1.** The display of data or an image from a given perspective or location. **2.** In relational database management systems, a logical table created through the specification of one or more relational operations on one or more tables. A view is equivalent to a divided relation in the relational model. *See also* relational database, relational model.

view[2] \vyo͞o\ *vb.* To cause an application to display information on a computer screen.

viewer \vyo͞o´ər\ *n.* An application that displays or otherwise outputs a file in the same way as the application that created the file. An example of a viewer is a program to display the images stored in GIF or JPEG files. See the illustration. *See also* GIF, JPEG.



Viewer.

viewport \vyo͞o´pōrt\ *n.* In computer graphics, a view of a document or image. A viewport is similar to the view in a window, but usually only part of the document or graphical image is visible. *Compare* window.

vine \vīn\ *n.* A means of distributing audiotape copies that is similar to a tape tree. Because vine tapes are digital in format, there is no degradation of sound quality as tapes are copied down the vine from one participant to the next. *Compare* tape tree.

virgule \vər´gyo͞ol\ *n.* The forward slash (/) character. *Compare* backslash.

virtual \vər´cho͞-əl\ *adj.* Of or pertaining to a device, service, or sensory input that is perceived to be what it is not in actuality, usually as more "real" or concrete than it actually is.

virtual 8086 mode \vər`cho͞-əl āt`ō-āt-siks´ mōd\ *n. See* virtual real mode.

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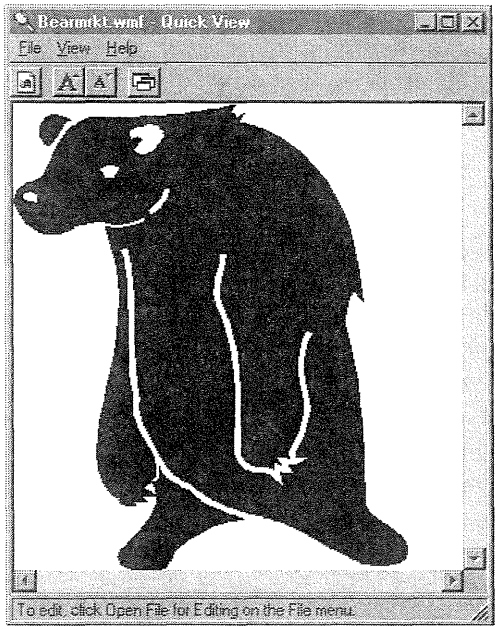
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virtual address \vər`cho͞o-əl a´dres, ə-dres´\ *n.* In a virtual memory system, the address that the

application uses to reference memory. The memory management unit (MMU) translates this address into a physical address before the memory is actually read or written to. *See also* physical address, virtual memory. *Compare* real address.

virtual channel \vər`chōō-əl chan´əl\ *n.* In Asynchronous Transfer Mode (ATM), the path taken by data sent from one sender to one receiver. *See also* ATM (definition 1), virtual path (definition 2).

virtual circuit \vər`chōō-əl sər´kət\ *n.* A communications link that appears to be a direct connection between sender and receiver, although physically the link can be routed through a more circuitous path.

virtual community \vər`chōō-əl kə-myōō´nə-tē\ *n. See* online community.

Virtual Control Program Interface \vər`chōō-əl kən-trōl` prō´gram in`tər-fās\ *n.* A specification for MS-DOS programs to allow access to extended memory under a multitasking environment (for example, Microsoft Windows) for 386 and higher-level processors. *Acronym:* VCPI (V`C-P-I´). *See also* 80386DX, extended memory, multitasking. *Compare* protected mode.

virtual desktop \vər`chōō-əl desk´top\ *n.* A desktop enhancement tool that provides access to the desktop when it is covered by open windows or that expands the size of the working desktop. *See also* desktop.

virtual device \vər`chōō-əl də-vīs´\ *n.* A device that can be referenced but that does not physically exist. Virtual-memory addressing, for example, uses magnetic disk storage to simulate memory larger than that physically available.

virtual device driver \vər`chōō-əl də-vīs` drī´-vər\ *n.* Software in Windows 95 that manages a hardware or software system resource. If a resource retains information from one access to the next that affects the way it behaves when accessed (for example, a disk controller with its status information and buffers), a virtual device driver must exist for it. Virtual device drivers are described using three-letter abbreviations beginning with V and ending with D; the middle letter indicates the type of device, such as D for a display, P for a printer, T for a timer, and *x* when the type of device is not under discussion. *Acronym:* V*x*D (V`-X-D´). *See also* device driver.

virtual disk \vər`chōō-əl disk´\ *n. See* RAM disk.

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Virtual File Allocation Table \vər`chōō-əl fīl´ al-ə-kā`shən tā`bl\ *n. See* VFAT.

virtual image \vər`chōō-əl im´əj\ *n.* An image that is stored in computer memory but is too large to be shown in its entirety on the screen. Scrolling and panning are used to bring unseen portions of the image into view. *See also* virtual screen.

virtual-image file \vər`chōō-əl im´əj fīl\ *n.* A file that specifies the material to be recorded onto a CD-ROM. A virtual-image file generally contains pointers to files that are distributed across a hard disk rather than gathered in one area. Since a complete copy of the material is not assembled, problems may occur in writing the CD-ROM due to delays in assembling the material from a scattered group of files. *See also* CD-ROM. *Compare* physical-image file.

virtual LAN \vər`chōō-əl lan´, L-A-N´\ *n.* Short for **virtual** local **a**rea **n**etwork. A local area network consisting of groups of hosts that are on physically different segments but that communicate as though they were on the same wire. *See also* LAN.

virtual machine \vər`chōō-əl mə-shēn´\ *n.* Software that mimics the performance of a hardware device, such as a program that allows applications written for an Intel processor to be run on a Motorola chip. *Acronym:* VM (V-M´).

virtual memory \vər`chōō-əl mem´ər-ē\ *n.* Memory that appears to an application to be larger and more uniform than it is. Virtual memory may be partially simulated by secondary storage such as a hard disk. Applications access memory through virtual addresses, which are translated (mapped) by special hardware and software onto physical addresses. *Acronym:* VM (V-M´). *Also called* disk memory. *See also* paging, segmentation.

virtual monitor \vər`chōō-əl mon´ə-tər\ *n.* An enhanced monitor viewing system for visually impaired users that uses a virtual-reality headset to move enlarged text across the screen in a direction opposite to head motion. *See also* virtual reality.

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virtual name space \vər`chōō-əl nām´ spās\ *n.* The set of all hierarchical sequences of names that can be used by an application to locate objects. One such sequence of names defines a path through the virtual name space, regardless of whether the hierarchy of names reflects the actual arrangement of objects around the system. For example, the virtual name space of a Web server consists of all possible URLs on the network on which it runs. *See also* URL.

virtual network \vər`chōō-əl net´wərk\ *n.* A part of a network that appears to a user to be a network of its own. For example, an Internet service provider can set up multiple domains on a single HTTP server so that each one can be addressed with its company's registered domain name. *See also* domain name, HTTP server (definition 1), ISP.

virtual path \vər`chōō-əl path´\ *n.* **1.** A sequence of names that is used to locate a file and that has the same form as a pathname in the file system but is not necessarily the actual sequence of directory names under which the file is located. The part of a URL that follows the server name is a virtual path. For example, if the directory *c:\bar\sinister\forces\distance* on the server *miles* is shared on the local area network at *foo.com* under the name *\\miles\baz* and contains the file *elena.html*, that file might be returned by a Web request for *http://miles.foo.com/baz/elena.html*. **2.** In Asynchronous Transfer Mode (ATM), a set of virtual channels that are switched together as a unit through the network. *See also* ATM (definition 1), virtual channel.

virtual peripheral \vər`chōō-əl pər-if´ər-əl\ *n.* A peripheral that can be referenced but does not physically exist. For example, an application might treat a serial port through which data is being transmitted as a printer, but the device receiving the data might be another computer instead.

virtual printer \vər`chōō-əl prin´tər\ *n.* A feature in many operating systems that allows printer output to be saved to a file until a printer becomes available.

virtual printer device driver \vər`chōō-əl prin´-tər de-vīs` drī`vər\ *n.* *See* virtual device driver.

virtual private network \vər`chōō-əl prī`vət net´-wərk\ *n.* **1.** A set of nodes on a public network such as the Internet that communicate among themselves using encryption technology so that their messages are as safe from being intercepted and understood by unauthorized users as if the nodes were connected by private lines. **2.** A wide area network formed of permanent virtual circuits (PVCs) on another network, especially a network using technologies such as ATM or frame relay. *Acronym:* VPN (V`P-N´). *See also* ATM (definition 1), frame relay, PVC.

virtual reality \vər`chōō-əl rē-al´ə-tē\ *n.* A simulated 3-D environment that a user can experience and manipulate as if it were physical. The user sees the environment on display screens, possibly mounted in a special pair of goggles. Special input devices, such as gloves or suits fitted with motion sensors, detect the user's actions. *Acronym:* VR (V-R´).

Virtual Reality Modeling Language \vər`chōō-əl rē-al`ə-tē mod´ə-lēng lang`wəj\ *n.* *See* VRML.

virtual real mode \vər`chōō-əl rēl´ mōd`\ *n.* A feature of the Intel 80386 (SX and DX) and higher microprocessors that allows them to emulate several 8086 (real-mode) environments at the same time. The microprocessor provides a set of virtual registers and virtual memory space to each virtual 8086 environment. A program running in a virtual 8086 environment is completely protected from other virtual 8086 environments in the system and behaves as if it had control of the entire system. *Also called* V86 mode, virtual 8086 mode, virtual 86 mode. *See also* real mode.

virtual root \vər`chōō-əl rōōt´, rōt´\ *n.* The root directory that a user sees when connected to an Internet server, such as an HTTP or FTP server. The virtual root is actually a pointer to the physical root directory, which may be in a different location, such as another server. The advantages of using a virtual root include being able to create a simple URL for the Internet site and to move the root directory without affecting the URL. *Also called* v-root. *See also* pointer (definition 1), root directory, server (definition 2), URL.

virtual route \vər`chōō-əl rōōt´, rout´\ *n.* *See* virtual circuit.

virtual screen \vər`chōō-əl skrēn´\ *n.* An image area that extends beyond the dimensions of the physical screen on the monitor, allowing manipulation of large documents or of multiple documents

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virtual screen \vər`chōō-əl skrēn´\ *n.* An image area that extends beyond the dimensions of the physical screen on the monitor, allowing manipulation of large documents or of multiple documents

that lie partially outside the normal screen view. *See also* monitor.

virtual server \vər`chōō-əl sər´vər\ *n.* A virtual machine that resides on an HTTP server but has the appearance to the user of being a separate HTTP server. Several virtual servers can reside on one HTTP server, each capable of running its own programs and each with individualized access to input and peripheral devices. Each virtual server has its own domain name and IP address and appears to the user as an individual Web site. Some Internet service providers use virtual servers for those clients who want to use their own domain names. *See also* domain name, HTTP server (definition 2), IP address.

virtual storefront \vər`chōō-əl stōr´frənt\ *n.* A company's point of presence on the Web, providing opportunities for online sales. *Also called* electronic storefront.

virtual terminal \vər`chōō-əl tər´mə-nəl\ *n.* *See* terminal emulation.

virtual timer device driver \vər`chōō-əl tī´mər de-vīs` drī`vər\ *n.* *See* virtual device driver.

virtual world \vər`chōō-əl wərld´\ *n.* **1.** A 3-D modeled environment, often created in VRML, where a user can interact with the viewer to change variables. *See also* viewer, VRML. **2.** An electronic environment that has no basis in the physical world. Multiuser dungeons (MUDs), talkers, and chat rooms are often considered virtual worlds. *See also* chat[1] (definition 1), MUD, talker.

virus \vīr´us\ *n.* An intrusive program that infects computer files by inserting in those files copies of itself. The copies are usually executed when the file is loaded into memory, allowing them to infect still other files, and so on. Viruses often have damaging side effects—sometimes intentionally, sometimes not. For example, some viruses can destroy a computer's hard disk or take up memory space that could otherwise be used by programs. *See also* Good Times virus, Trojan horse, worm.

virus signature \vīr´us sig`nə-chur\ *n.* A portion of unique computer code contained in a virus. Antivirus programs search for known virus signatures to identify infected programs and files. *See also* virus.

visible page \viz`ə-bl pāj´\ *n.* In computer graphics, the image that is being displayed on the screen. Screen images are written into display memory in sections called pages, each of which contains one screen display.

Visual Basic \vizh`ōō-əl bā´sik\ *n.* A high-level, visual-programming version of Basic. Visual Basic was developed by Microsoft for building Windows-based applications. *See also* Basic, Visual Basic for Applications, Visual Basic, Scripting Edition, visual programming.

Visual Basic for Applications \vizh`ōō-əl bā`sik fər a`plə-kā´shənz\ *n.* A macro-language version of Visual Basic that is used to program many Windows 95 applications and is included with several Microsoft applications. *Acronym:* VBA (V`B-A´). *See also* macro language, Visual Basic.

Visual Basic Script \vizh`ōō-əl bā´sik skript\ *n.* *See* Visual Basic, Scripting Edition.

Visual Basic, Scripting Edition \vizh`ōō-əl bā`-sik skrip´tēng ə-dish`ən´\ *n.* A subset of the Visual Basic for Applications programming language, optimized for Web-related programming. As with JavaScript, code for Visual Basic, Scripting Edition is embedded in HTML documents. This version is included with the Internet Explorer Web browser. *Also called* VBScript, Visual Basic Script. *See also* Visual Basic for Applications.

Visual C++ \vizh`ōō-əl C`plus-plus´\ *n.* A Microsoft application development system for the programming language C++ that runs under MS-DOS and Windows. Visual C++ is a visual programming environment. *See also* visual programming. *Compare* Visual Basic, Visual J++.

visual interface \vizh`ōō-əl in´tər-fās\ *n.* *See* graphical user interface.

visualization \vizh`ōō-əl-ə-zā´shən\ *n.* A feature of an application that displays data in the form of a video image. For example, some databases can interpret and show data in the form of a two- or three-dimensional model.

Visual J++ \vizh`ōō-əl J`plus-plus´\ *n.* Microsoft's Java visual programming environment, which can be used to create applets and applications in the Java language. *See also* applet, Java, Java applet, visual programming.

visual programming \vizh`ōō-əl prō´gram-ēng\ *n.* A method of programming using a programming environment or language in which basic program components can be selected through menu

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.wav \dot`W-A-V´\ *n.* The file extension that identifies sound files stored in waveform (WAV) audio format. *See also* WAV.

WAV \wāv, W`A-V´\ *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 (definition 2), waveform.

wave \wāv\ *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.

waveform \wāv´fōrm\ *n.* The manner in which a wave's amplitude changes over time. *See also* period, phase, wavelength.

wavelength \wāv´lenkth, wāv´length\ *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 (λ) and can be calculated as speed divided by frequency.

wavelet \wāv´lət\ *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.

WBEM \W`B-E-M´\ *n.* Acronym for **W**eb-**B**ased **E**nterprise **M**anagement. A protocol that links a Web browser directly to a device or application that monitors a network. *See also* communications protocol.

WDEF \W`D-E-F´\ *n. See* window definition function.

WDL \W`D-L´\ *n. See* Windows Driver Library.

weak typing \wēk` tī´pēng\ *n.* A characteristic of a programming language that allows the program to change the data type of a variable during program execution. *See also* data type, variable. *Compare* strong typing.

web \web\ *n.* A set of interlinked documents in a hypertext system. The user enters the web through a home page. *See also* World Wide Web.

Web \web\ *n. See* World Wide Web.

Web address \web´ a`dres, ə-dres`\ *n. See* URL.

Web-Based Enterprise Management \web`bāsd en`tər-prīz man´əj-mənt\ *n. See* WBEM.

Web browser \web´ brou`zər\ *n.* A client application that enables a user to view HTML documents on the World Wide Web, another network, or the user's computer; follow the hyperlinks among them; and transfer files. Text-based Web browsers, such as Lynx, can serve users with shell accounts but show only the text elements of an HTML document; most Web browsers, however, require a connection that can handle IP packets but will also display graphics that are in the document, play audio and video files, and execute small programs, such as Java applets or ActiveX controls, that can be embedded in HTML documents. Some Web browsers require helper applications or plug-ins to accomplish one or more of these tasks. In addition, most current Web browsers permit users to send and receive e-mail and to read and respond to newsgroups. *Also called* browser. *See also* ActiveX controls, helper application, hyperlink, Internet Explorer, Java applet, Lynx, Mosaic, Netscape Navigator, plug-in.

WebCrawler \web´krä`lər, krô`lər\ *n.* A World Wide Web search engine operated by America Online. *See also* search engine.

Web development \web´ de-vel`əp-mənt\ *n.* The design and coding of World Wide Web pages.

Web directory \web´ dər-ek`tər-ē\ *n.* A list of Web sites, giving the URL and a description of each. *See also* URL.

Web index \web´ in`deks\ *n.* A Web site intended to enable a user to locate other resources on the Web. The Web index may include a search facility or may merely contain individual hyperlinks to the resources indexed.

Webmaster or **webmaster** \web´ma`stər\ *n.* A person responsible for creating and maintaining a World Wide Web site. A Webmaster is often responsible for responding to e-mail, ensuring the site is operating properly, creating and updating Web pages, and maintaining the overall structure

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point operations. The result of the test is given in units called *whetstones*. The Whetstone benchmark has fallen out of favor because it produces inconsistent results compared with other benchmarks such as the Dhrystone and the sieve of Eratosthenes. *See also* benchmark[1], Dhrystone, sieve of Eratosthenes.

WHIRLWIND \hwərl´wind, wərl´wind\ *n.* A digital computer using vacuum tubes, developed at Massachusetts Institute of Technology in the 1940s and used during the 1950s. The innovations introduced with WHIRLWIND included CRT displays and real-time processing. WHIRLWIND project members included Kenneth H. Olsen, who later founded Digital Equipment Corporation in 1957. *See also* CRT, real-time, vacuum tube.

whiteboard \hwīt´bōrd, wīt´bōrd\ *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.

white noise \hwīt noiz´, wīt\ *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 \hwīt´ pā`jəz, wīt´\ *n. See* DIB (definition 2).

white paper \hwīt´ pā`pər, wīt´\ *n.* An informal paper stating a position or proposing a draft specification, usually on a technical topic. *See also* specification (definition 1).

whois \hō͞o-iz´\ *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 \hō͞o`iz klī´ənt\ *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.

whois server \hō͞o`iz sər´vər\ *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.

Whole Earth 'Lectronic Link \hōl` ərth` lek-tron`ik lēnk´\ *n. See* WELL.

whole number \hōl` num´bər\ *n.* A number without a fractional component—for example, 1 or 173; an integer.

Wide Area Information Server \wīd` âr-ē-ə in-fər-mā´shən sər`vər\ *n. See* WAIS.

wide area network \wīd` âr-ē-ə net´wərk\ *n.* A communications network that connects geographically separated areas. *Acronym:* WAN (W`A-N´, wan).

wideband transmission \wīd`band tranz-mish´-ən\ *n. See* broadband network.

Wide SCSI or **Wide SCSI-2** \wīd´ skuz`ē, S-C-S-I`\ *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. *See also* SCSI, SCSI-2. *Compare* Fast SCSI, Fast/Wide SCSI.

widow \wid´ō\ *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 \wīld´kärd kâr`ək-tər\ *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.

Win32 \win`thər-tē-tō͞o´\ *n.* The application programming interface in Windows 95 and Windows NT that enables applications to use the 32-bit instructions available on 80386 and higher processors. Although Windows 95 and Windows NT support 16-bit 80x86 instructions as well, Win32 offers greatly improved performance. *See also* 16-bit machine, 32-bit machine, 80386DX, 8086, application programming interface, central processing unit, Win32s.

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