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# Computer Dictionary

Third Edition

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

**clean install** \klēn` in-stāl` *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 ār`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 ār`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.

or a palette of shapes or patterns in a drawing program.

**display board** \di-splā' bōrd\ *n.* See video adapter.

**display card** \di-splā' kārd\ *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, rōō'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'byōōt\ *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'byōō-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'byōō-təd kom\ *n.* See DCOM.

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

**distributed computing** \dis-tri'byōō-təd kəm-pyōō'tēng\ *n.* See distributed processing.

**Distributed Computing Environment** \dis-tri'-byōō-təd kəm-pyōō'tēng en-vī'rən-mənt, en-vī'ərən-mənt\ *n.* A set of standards from the Open Group (formerly the Open Software Foundation) for development of distributed applications that

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

**distributed database** \dis-tri-byōō-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-byōō-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-byōō-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-byōō-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-byōō-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-byōō-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-byōō-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-byōō-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-byōō`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 *half-tones*, 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

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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´ sərvər\ *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´wār\ *n.* Software that monopolizes hard disk space and power due to an overabundance of features or inefficient design. *Also called* bloatware.

**fault** \fält, fölt\ *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, fölt\ *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** \fä´vər-īt, fä´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** \fä´vər-its fōl´dər, fä´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

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<sup>2</sup>.

**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**<sup>1</sup> \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**<sup>2</sup> \fēng'ər\ *vb.* To obtain information on a user by means of the finger program.

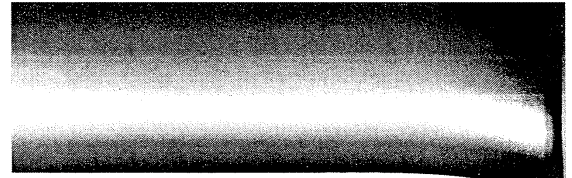
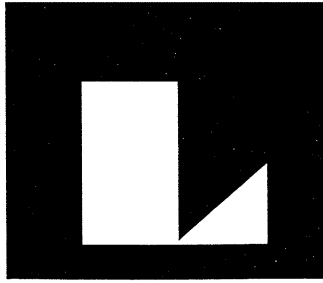
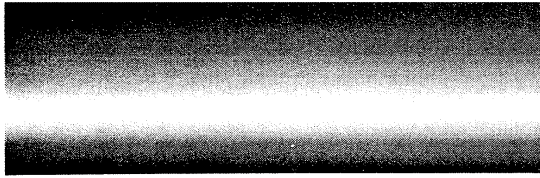
**fingerprint reader** \fēng'-ər-print rē`dər\ *n.* A scanner that reads human fingerprints for comparison to a database of stored fingerprint images.

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

**firewall** \fir'wāl\ *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 **fast infrared port**. A wireless I/O port, most common on a portable computer, that exchanges data with an



**L1 cache** \L-wənˈkash\ *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-tōōˈkash\ *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.

**LSR** \lāˈtər\ *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** \lāˈbəl\ *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** \lāˈbəl prēˈfiks\ *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** \landˈskāp 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.

Lorem ipsum solebat somnus complexus est.  
Africanus se ostendit es forma quae mihi  
imagine elus quam ex isso erat notior. Quem ubi  
agnovi, quidem cohorui. Quaesivi tamen  
vivertne ipse et Paulus pater et ali quos nos  
extintos.

*Landscape mode.*

**landscape monitor** \landˈskāp monˈə-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**<sup>1</sup> \lɔd\' *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**<sup>2</sup> \lɔd\' *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** \lɔd'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** \lɔd'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** \lɔ'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** \lɔ'dər rōō-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<sup>1</sup> (definition 1).

**load module** \lɔd' moj'ōōl, mo'dyōōl\' *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** \lɔd' point\' *n.* The beginning of the valid data area on a magnetic tape.

**load sharing** \lɔd' 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** \lɔ'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** \lɔ'kəl âr'ē-ə net'wɜrk\' *n.* See LAN.

**local bus** \lɔ'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** \lɔ'kəl bī'pas\' *n.* A telephone connection used by some businesses that links separate buildings but bypasses the telephone company.

**local group** \lɔ'kəl grōōp\' *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<sup>1</sup>. **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<sup>1</sup>.

**localhost** \lɔ'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** \lɔ'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.



**local loop** \lō`kəl lōōp` \ *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 nōōz`grōōps\ *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`bōōt\ *n.* A reboot of the machine that one is directly working on, rather than a remote host. *See also* reboot.

**LocalTalk** \lō`kəl-tāk` \ *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 vār`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<sup>1</sup> (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`yōōm\ *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<sup>1</sup>.

**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

allow modification of microcode for an installed processor. *See also* microcode.

**microsecond** \mī'krō-sek`ənd\ *n.* Abbreviated  $\mu$ s. One millionth ( $10^{-6}$ ) of a second.

**Microsoft DOS** \mī'krō-soft dos', D-O-S'\ *n.* *See* MS-DOS.

**Microsoft Internet Explorer** \mī'krō-soft in'tər-net eks-plōr'ər\ *n.* *See* Internet Explorer.

**Microsoft Network** \mī'krō-soft net'wərk\ *n.* *See* The Microsoft Network.

**Microsoft Windows** \mī'krō-soft win'dōz\ *n.* *See* Windows.

**Microsoft Windows 95** \mī'krō-soft win'dōz nīn-tē-fiv'\ *n.* *See* Windows 95.

**microspace justification** \mī'krō-spās ju-stə-fə-kā'shən\ *n.* The addition of thin spaces between characters within words to fill out a line for justification, instead of relying only on adding space between words. Good microspace justification gives justified text a more polished, professional look; excessive microspace justification causes words to lose visual coherence. *Also called* microjustification. *See also* justify (definition 2), microspacing.

**microspacing** \mī'krō-spā`sēng\ *n.* In printing, the process of adjusting character placement by very small increments.

**microtransaction** \mī'krō-tranz-ak'shən\ *n.* A business transaction that involves a very small amount of money, typically under about \$5. *See also* millicent technology.

**microwave relay** \mī'krō-wāv rē'lā\ *n.* A communications link that uses point-to-point radio transmissions at frequencies higher than approximately 1 gigahertz (1,000 megahertz).

**middleware** \mid'l-wâr'\ *n.* **1.** Software that sits between two or more types of software and translates information between them. Middleware can cover a broad spectrum of software and generally sits between an application and an operating system, a network operating system, or a database management system. Examples of middleware include CORBA and other object broker programs and network control programs. *See also* CORBA. **2.** Software that provides a common application programming interface (API). Applications written using that API will run in the same computer systems as the middleware. An example of this type

of middleware is ODBC, which has a common API for many types of databases. *See also* application programming interface, ODBC. **3.** Software development tools that enable users to create simple programs by selecting existing services and linking them with a scripting language. *See also* scripting language.

**MIDI** \mid'ē, M'I-D-I'\ *n.* Acronym for **M**usical **I**nstrument **D**igital **I**nterface. A serial interface standard that allows for the connection of music synthesizers, musical instruments, and computers. The MIDI standard is based partly on hardware and partly on a description of the way in which music and sound are encoded and communicated between MIDI devices. The information transmitted between MIDI devices is in a form called a *MIDI message*, which encodes aspects of sound such as pitch and volume as 8-bit bytes of digital information. MIDI devices can be used for creating, recording, and playing back music. Using MIDI, computers, synthesizers, and sequencers can communicate with each other, either keeping time or actually controlling the music created by other connected equipment. *See also* synthesizer.

**midrange computer** \mid'rānj kəm-pyōō'tər\ *n.* A medium-size computer. The term is used interchangeably with *minicomputer*, except midrange computers do not include single-user workstations. *See also* minicomputer.

**migration** \mī-grā'shən\ *n.* The process of making existing applications and data work on a different computer or operating system.

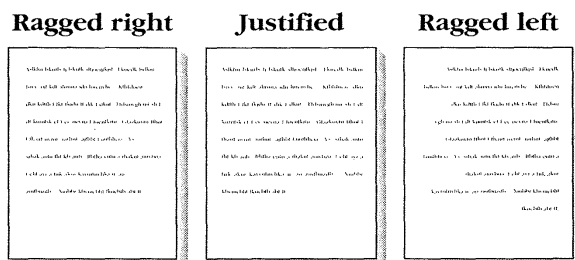
**.mil** \dot-mil', -M'I-L'\ *n.* In the Internet's Domain Name System, the top-level domain that identifies addresses operated by U.S. military organizations. The .mil designation appears at the end of the address. *See also* DNS (definition 1), domain (definition 3). *Compare* .com, .edu, .gov, .net, .org.

**Military Network** \mil'ə-târ-ē net'wərk\ *n.* *See* MILNET.

**milli-** \mil'ə\ *prefix* Abbreviated m. Metric prefix meaning  $10^{-3}$  (one thousandth).

**millicent technology** \mil'ə-sent tek-nol'ə-jē\ *n.* A set of protocols for small-scale commercial transactions over the Internet, developed by Digital Equipment Corporation. Millicent technology is intended to handle purchases of items of information at prices less than a cent.

**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 **redundant array of independent disks** (formerly called **redundant array of inexpensive disks**). 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 **random access memory**. Semiconductor-based memory

that can be read and written by the central processing unit (CPU) or other hardware devices. The storage locations can be accessed in any order. Note that the various types of ROM memory are capable of random access but cannot be written to. The term *RAM*, however, is generally understood to refer to volatile memory that can be written to as well as read. *Compare* core, EPROM, flash memory, PROM, ROM (definition 2).

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

**RAM cartridge** \ram`kār`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 **random access memory compression**. This technology was an attempt by a number of software vendors to solve the problem of running out of global memory under Windows 3.x. Compression of the usual contents of RAM may lessen the system's need to read or write to virtual (hard disk-based) memory and thus speed up the system, as virtual memory is much slower than physical RAM. Because of the falling prices of RAM and the introduction of 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 **random access memory digital-to-analog converter**. 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 **random access memory disk**. A simulated disk drive

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.

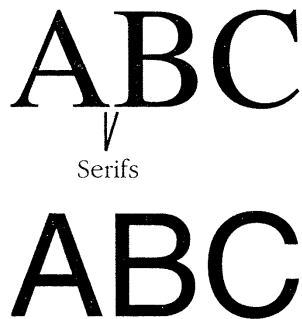
**RARP** \R`A-R-P'\ *n.* Acronym for **Reverse Address Resolution Protocol**. A TCP/IP protocol for determining the IP address (or logical address) of a node on a local area network connected to the Internet, when only the hardware address (or physical address) is known. While RARP refers only to finding 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.



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

**serif**<sup>2</sup> \sâr'îf\ *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).

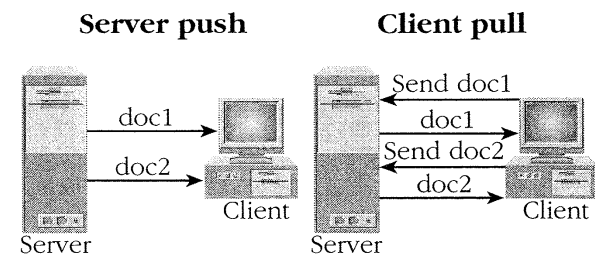
**server-based application** \sər'vər-bāsd a-plə-kā'shən\ *n.* A program that is shared over a network. The program is stored on the network server and can be used at more than one client machine at a time.

**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 pōōsh'pul', pōōl'\ *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-klōōdz'\ *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-

## video RAM

**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-tek's \ *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.

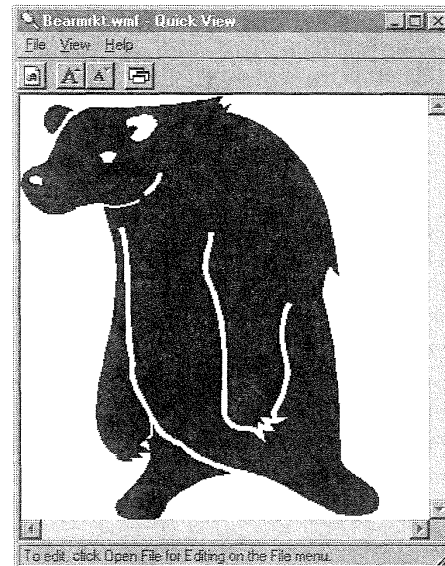
**view**<sup>1</sup> \vyōō \ *n.* **1.** The display of data or an image from a given perspective or location. **2.** In relational database management systems, a logical table created through the specification of one or more relational operations on one or more tables. A view is equivalent to a divided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

**view**<sup>2</sup> \vyōō \ *vb.* To cause an application to display information on a computer screen.

**viewer** \vyōō'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

## virtual address

in GIF or JPEG files. *See the illustration. See also* GIF, JPEG.



*Viewer.*

**viewport** \vyōō'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'gyōōl \ *n.* The forward slash (/) character. *Compare* backslash.

**virtual** \vər'chōō-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'chōō-əl ā'tē-āt-siks' mōd \ *n.* *See* virtual real mode.

**virtual 86 mode** \vər'chōō-əl ā-tē-siks' mōd \ *See* virtual real mode.

**virtual address** \vər'chōō-əl ā'dres, ə-dres \ *n.* In a virtual memory system, the address that the

## video RAM

**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-tek's \ *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.

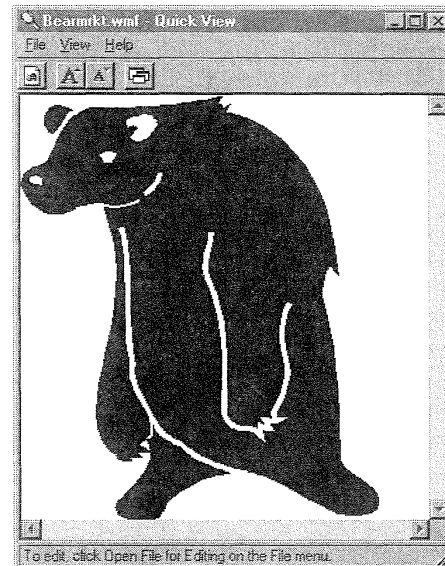
**view**<sup>1</sup> \vyōō \ *n.* **1.** The display of data or an image from a given perspective or location. **2.** In relational database management systems, a logical table created through the specification of one or more relational operations on one or more tables. A view is equivalent to a divided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

**view**<sup>2</sup> \vyōō \ *vb.* To cause an application to display information on a computer screen.

**viewer** \vyōō'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

## virtual address

in GIF or JPEG files. *See the illustration. See also* GIF, JPEG.



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**virtual address** \vər'chōō-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** \vərˈchɒd-əl ˈtʃənəl\ *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** \vərˈchɒd-əl sərˈkət\ *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** \vərˈchɒd-əl kə-myooˈnə-tē\ *n.* *See* online community.

**Virtual Control Program Interface** \vərˈchɒd-əl kən-trɒlˈ prɒˈgram inˈtər-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 (VˈC-P-Iˈ). *See also* 80386DX, extended memory, multitasking. *Compare* protected mode.

**virtual desktop** \vərˈchɒd-əl deskˈtɒp\ *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** \vərˈchɒd-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** \vərˈchɒd-əl də-vīsˈ 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 discus-

sion. *Acronym:* VxD (Vˈ-X-Dˈ). *See also* device driver.

**virtual disk** \vərˈchɒd-əl disk\ *n.* *See* RAM disk.

**virtual display device driver** \vərˈchɒd-əl dis-plāˈ de-vīsˈ drī-vər\ *n.* *See* virtual device driver.

**Virtual File Allocation Table** \vərˈchɒd-əl filˈ al-ə-kāˈ shən tāˈbl\ *n.* *See* VFAT.

**virtual image** \vərˈchɒd-əl imˈəj\ *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** \vərˈchɒd-əl imˈəj fil\ *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** \vərˈchɒd-əl lanˈ, L-A-N\ *n.* Short for **virtual local area network**. 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** \vərˈchɒd-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-Mˈ).

**virtual memory** \vərˈchɒd-əl memˈər-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-Mˈ). *Also called* disk memory. *See also* paging, segmentation.

**virtual monitor** \vərˈchɒd-əl monˈə-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** \vərˈchōō-əl nāmˈ 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** \vərˈchōō-əl netˈwɜrk\ *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** \vərˈchōō-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\sin-ister\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** \vərˈchōō-əl pər-ɪfˈər-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** \vərˈchōō-əl prɪnˈtər\ *n.* A feature in many operating systems that allows printer output to be saved to a file until a printer becomes available.

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**virtual private network** \vərˈchōō-əl prɪˈvət netˈwɜrk\ *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 (VˈP-Nˈ). *See also* ATM (definition 1), frame relay, PVC.

**virtual reality** \vərˈchōō-əl rē-alˈə-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-Rˈ).

**Virtual Reality Modeling Language** \vərˈchōō-əl rē-alˈə-tē modˈə-lēng langˈwəj\ *n.* *See* VRML.

**virtual real mode** \vərˈchōō-əl rēlˈ 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** \vərˈchōō-əl rōōtˈ, rōōt\ *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** \vərˈchōō-əl rōōtˈ, rout\ *n.* *See* virtual circuit.

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

**virtual server** \vərˈchōō-əl sərˈvər\ *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** \vərˈchōō-əl stōrˈfrənt\ *n.* A company's point of presence on the Web, providing opportunities for online sales. *Also called* electronic storefront.

**virtual terminal** \vərˈchōō-əl tərˈmə-nəl\ *n.* *See* terminal emulation.

**virtual timer device driver** \vərˈchōō-əl tīˈmər de-vīsˈ drīˈvər\ *n.* *See* virtual device driver.

**virtual world** \vərˈchōō-əl wɜrld\ *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<sup>1</sup> (definition 1), MUD, talker.

**virus** \vīrˈus\ *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** \vīrˈus sigˈnə-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** \vizˈə-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** \vizhˈōō-əl bāˈsik\ *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** \vizhˈōō-əl bāˈsik fər əˈplə-kāˈshənz\ *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** \vizhˈōō-əl bāˈsik skript\ *n.* *See* Visual Basic, Scripting Edition.

**Visual Basic, Scripting Edition** \vizhˈōō-əl bāˈsik skripˈtēng ə-dishˈən\ *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++** \vizhˈōō-əl Cˈplus-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** \vizhˈōō-əl inˈtər-fās\ *n.* *See* graphical user interface.

**visualization** \vizhˈōō-əl ə-zāˈshən\ *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++** \vizhˈōō-əl Jˈplus-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** \vizhˈōō-əl prōˈgram-ēng\ *n.* A method of programming using a programming environment or language in which basic program components can be selected through menu



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<sup>1</sup>, Dhrystone, sieve of Eratosthenes.

**WHIRLWIND** \hwər'lwind, wər'lwind\ *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** \hōō-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** \hōō-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** \hōō-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 'Electronic 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 infər-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'kărd kăr'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-tōō'\ *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.