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Acquisitions Editor: Christey Bahn
Project Editor: Kim Fryer

B

have to one another, Boolean algebra produces such propositions as $C = A \text{ AND } B$, which means that C is *true* if and only if both A is *true* and B is *true*; thus, it can be used to process information and to solve problems. Furthermore, Boolean logic can be readily applied to the electronic circuitry used in digital computing. Like the binary numbers 1 and 0, *true* and *false* are easily represented by two contrasting physical states of a circuit, such as voltages, and computer circuits known as logic gates control the flow of electricity (bits of data) so as to represent AND, OR, NOT, and other Boolean operators. Within a computer, these logic gates are combined, with the output from one becoming the input to another so that the final result (still nothing more than sets of 1s and 0s) is meaningful data, such as the sum of two numbers. See the illustration. *See also* adder (definition 1), binary¹, Boolean operator, gate (definition 1), logic circuit, truth table.

Boolean expression \bōō'lē-ən eks-presh'ən\ *n.* An expression that yields a Boolean value (*true* or *false*). Such expressions can involve comparisons (testing values for equality or, for non-Boolean values, the < [less than] or > [greater than] relation) and logical combination (using Boolean operators such as AND, OR, and XOR) of Boolean expressions. *Also called* conditional expression, logical expression. *See also* Boolean, Boolean algebra, Boolean operator, relational operator.

Boolean logic \bōō'lē-ən loj'ik\ *n.* *See* Boolean algebra.

Boolean operator \bōō'lē-ən op'ər-ā-tər\ *n.* An operator designed to work with Boolean values. The four most common Boolean operators in programming use are AND (logical conjunction), OR (logical inclusion), XOR (exclusive OR), and NOT (logical negation). Boolean operators are often used as qualifiers in database searches—for example, *find all records where DEPARTMENT = "marketing" OR DEPARTMENT = "sales" AND SKILL = "word processing"*. *Also called* logical operator. *See also* AND, exclusive OR, NOT, OR.

Boolean search \bōō'lē-ən sərch\ *n.* A database search that uses Boolean operators. *See also* Boolean operator.

boost *vb.* To strengthen a network signal before it is transmitted further.

boot¹ *n.* The process of starting or resetting a computer. When first turned on (*cold boot*) or reset (*warm boot*), the computer executes the software that loads and starts the computer's more complicated operating system and prepares it for use. Thus, the computer can be said to pull itself up by its own bootstraps. *Also called* bootstrap. *See also* BIOS, bootstrap loader, cold boot, warm boot.

boot² *vb.* 1. To start or reset a computer by turning the power on, by pressing a reset button on the computer case, or by issuing a software command to restart. *Also called* bootstrap, boot up. *See also* reboot. 2. To execute the bootstrap loader program. *Also called* bootstrap. *See also* bootstrap loader.

bootable *adj.* Containing the system files necessary for booting a PC and running it. *See also* boot².

bootable disk *n.* *See* boot disk.

boot block *n.* A portion of a disk that contains the operating-system loader and other basic information that enables a computer to start up. *See also* block¹ (definition 5).

boot disk *n.* A floppy disk that contains key system files from a PC-compatible operating system and that can boot, or start, the PC. A boot disk must be inserted in the primary floppy disk drive (usually drive A:) and is used when there is some problem with starting the PC from the hard disk, from which the computer generally boots. *Also called* bootable disk. *See also* A:, boot², boot drive, hard disk.

boot drive *n.* In a PC-compatible computer, the disk drive that the BIOS uses to automatically load the operating system when the computer is turned on. Generally, the default boot drive is the primary floppy disk drive A: in PC-compatible computers with MS-DOS, Windows 3x, or Windows 9x operating systems. If a floppy disk is not found in that drive, the BIOS will check the primary hard disk next, which is drive C:. The BIOS for these operating systems can be reconfigured to search drive C: first by using the BIOS setup program. *See also* A:, BIOS, disk drive, hard disk.

boot failure *n.* The inability of a computer to locate or activate the operating system and thus boot, or start, the computer. *See also* boot².

boot loader *n.* *See* bootstrap loader.

BOOTP \bōōt'P\ *n.* *See* Boot Protocol.

C

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

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

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

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

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

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

CERT \sɜrt\ *n.* Acronym for Computer Emergency Response Team. An organization that provides a round-the-clock security consultation service for Internet users and provides advisories whenever new virus programs and other computer security threats are discovered.

certificate authority *n.* An issuer of digital certificates, the cyberspace equivalent of identity cards. A certificate authority may be an external issuing company (such as VeriSign) or an internal company authority that has installed its own server (such as the Microsoft Certificate Server) for issuing and verifying certificates. A certificate authority is responsible for providing and assigning the unique strings of numbers that make up the "keys" used in digital certificates for authentication and to encrypt and decrypt sensitive or confidential incoming and outgoing online information. *Acronym:* CA. *See also* digital certificate, encryption.

Certificate in Computer Programming *n.* *See* CCP.

Certificate in Data Processing *n.* *See* CDP.

certification *n.* **1.** The act of awarding a document to demonstrate a computer professional's competence in a particular field. Some hardware and software suppliers, such as Microsoft and Novell, offer certification in the use of their products; other organizations, such as the Institute for Certification of Computer Professionals (ICCP) and the Computing Technology Industry Association (CompTIA), offer more general certification. **2.** The act of awarding a document to demonstrate that a hardware or software product meets some specification, such as being able to work with a certain other hardware or software product. **3.** The issuance of a notice that a user or site is trusted for the purpose of security and computer authentication. Often certification is used with Web sites.

certification authority *n.* An organization that assigns encryption keys.

CGA *n.* Acronym for Color/Graphics Adapter. A video adapter board introduced by IBM in 1981. The CGA is capable of several character and graphics modes, including character modes of 40 or 80 horizontal characters (columns) by 25 vertical lines with 16 colors, and graphics modes of 640 horizontal pixels by 200 vertical pixels with 2 colors, or 320 horizontal pixels by 200 vertical pixels with 4 colors. *See also* graphics adapter, video adapter.

CGI *n.* **1.** Acronym for Common Gateway Interface. The specification that defines communications between information servers (such as HTTP servers) and resources on the server's host computer, such as databases and other programs. For example, when a user submits a form through a Web browser, the HTTP server executes a program (often called a CGI script) and passes the user's input information to that program via CGI. The program then returns information to the server via CGI. Use of CGI can make a Web page much more dynamic and add interactivity for the user. *See also* CGI script, HTTP server (definition 1). **2.** *See* Computer Graphics Interface.

cgi-bin *n.* Short for Common Gateway Interface-binaries. A file directory that holds external applications to be executed by HTTP servers via CGI. *See also* CGI (definition 1).

CGI program *n.* *See* CGI script.

CGI script *n.* Short for Common Gateway Interface script. An external application that is executed by an HTTP server machine in response to a request by a

database *n.* A file composed of records, each containing fields together with a set of operations for searching, sorting, recombining, and other functions.

database administrator *n.* One who manages a database. The administrator determines the content, internal structure, and access strategy for a database, defines security and integrity, and monitors performance. *Acronym:* DBA. *Also called* database manager.

database analyst *n.* One who provides the analytic functions needed to design and maintain applications requiring a database.

database designer *n.* One who designs and implements functions required for applications that use a database.

database engine *n.* The program module or modules that provide access to a database management system (DBMS).

database machine *n.* **1.** A peripheral that executes database tasks, thereby relieving the main computer from performing them. **2.** A database server that performs only database tasks.

database management system *n.* A software interface between the database and the user. A database management system handles user requests for database actions and allows for control of security and data integrity requirements. *Acronym:* DBMS. *Also called* database manager. *See also* database engine.

database manager *n.* *See* database administrator, database management system.

database publishing *n.* The use of desktop publishing or Internet technology to produce reports containing information obtained from a database.

database server *n.* A network node, or station, dedicated to storing and providing access to a shared database. *Also called* database machine.

database structure *n.* A general description of the format of records in a database, including the number of fields, specifications regarding the type of data that can be entered in each field, and the field names used.

data bit *n.* In asynchronous communications, one of a group of from 5 to 8 bits that represents a single character of data for transmission. Data bits are preceded by a start bit and followed by an optional parity bit and one or more stop bits. *See also* asynchronous transmission, bit, communications parameter.

data buffer *n.* An area in memory where data is temporarily stored while being moved from one location to another. *See also* buffer¹.

data bus *n.* *See* bus.

data cable *n.* Fiber-optic or wire cable used to transfer data from one device to another.

data capture *n.* **1.** The collection of information at the time of a transaction. **2.** The process of saving on a storage medium a record of interchanges between a user and a remote information utility.

data carrier *n.* *See* carrier (definition 1).

Data Carrier Detected *n.* *See* DCD (definition 1).

data chaining *n.* The process of storing segments of data in noncontiguous locations while retaining the ability to reconnect them in the proper sequence.

data channel *n.* *See* channel (definition 1).

data collection *n.* **1.** The process of acquiring source documents or data. **2.** The grouping of data by means of classification, sorting, ordering, and other organizing methods.

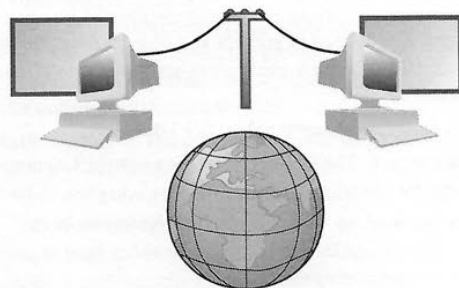
datacom *n.* Short for **data communications**. *See* communications.

data communications *n.* *See* communications.

data compaction *n.* *See* data compression.

data compression *n.* A means of reducing the amount of space or bandwidth needed to store or transmit a block of data, used in data communications, facsimile transmission, file storage and transfer, and CD-ROM publishing. *Also called* data compaction.

data conferencing *n.* Simultaneous data communication among geographically separated participants in a meeting. Data conferencing involves whiteboards and other software that enable a single set of files at one location to be accessed and modified by all participants. *See the illustration. See also* desktop conferencing, whiteboard. *Compare* video conferencing.



Data conferencing.

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data control *n.* The aspect of data management concerned with tracking how and by whom data is used, accessed, altered, owned, and reported on.

data conversion *n.* Changing the way information is represented in a document or file—for instance, changing binary representation to decimal or hexadecimal.

data corruption *n.* *See* corruption.

data declaration *n.* A statement in a program that specifies the characteristics of a variable. The requirements for data declarations vary among different programming languages but can include such values as variable name, data type, initial value, and size specification. *See also* array, data type, record¹, variable.

data definition language *n.* A language that defines all attributes and properties of a database, especially record layouts, field definitions, key fields, file locations, and storage strategy. *Acronym:* DDL.

data description language *n.* A language designed specifically for declaring data structures and files. *See also* data definition language.

data dictionary *n.* A database containing data about all the databases in a database system. Data dictionaries store all the various schema and file specifications and their locations. They also contain information about which programs use which data and which users are interested in which reports.

data directory *n.* *See* catalog, data dictionary.

data-driven processing *n.* A form of processing where the processor or program must wait for data to arrive before it can advance to the next step in a sequence.

data element *n.* A single unit of data. *Also called* data item. *See also* data field.

data encryption *n.* *See* encryption.

data encryption key *n.* A sequence of secret information, such as a string of decimal numbers or binary digits, that is used to encrypt and decrypt data. *Acronym:* DEK. *See also* decryption, encryption, key (definition 3).

data encryption standard *n.* *See* DES.

data entry *n.* The process of writing new data to computer memory.

data/fax modem *n.* A modem that can handle both serial data and facsimile images to either send or receive transmissions.

data field *n.* A well-defined portion of a data record, such as a column in a database table.

data field masking *n.* The process of filtering or selecting part of a data field to control the way it is returned and displayed.

data file *n.* A file consisting of data in the form of text, numbers, or graphics, as distinct from a program file of commands and instructions. *Compare* program file.

data flow or **dataflow** *n.* **1.** The movement of data through a system, from entry to destination. **2.** In parallel processing, a design in which a calculation is made either when all necessary data is available (data-driven processing) or when other processors request the data (demand-driven processing). *See also* parallel processing.

data fork *n.* In Macintosh files, the part of a stored document that contains user-supplied information, such as the text of a word-processing document. A Macintosh file can have a data fork, a resource fork (which contains information such as program code, font data, digitized sound, or icons), and a header. All three parts are used by the operating system in file management and storage. *See also* resource (definition 2), resource fork.

data format *n.* The structure applied to data by an application program to provide a context in which the data can be interpreted.

data frame *n.* A packet of information transmitted as a unit on a network. Data frames are defined by the network's data-link layer and exist only on the wire between network nodes. *See also* data-link layer, frame (definition 2).

data glove *n.* A data input device or controller in the form of a glove fitted with sensors that convert movement of the hand and fingers into commands. *See also* virtual reality.

datagram *n.* One packet, or unit, of information, along with relevant delivery information such as the destination address, that is sent through a packet-switching network. *See also* packet switching.

data independence *n.* The separation of data in a database from the programs that manipulate it. Data independence makes stored data as accessible as possible.

data integrity *n.* The accuracy of data and its conformity to its expected value, especially after being transmitted or processed.

each node refers to both the next node and the preceding node. Because of these two-way references, a doubly linked list can be traversed both forward and backward, rather than in a forward direction only, as with a singly linked list.

down *adj.* Not functioning, in reference to computers, printers, communications lines on networks, and other such hardware.

downflow *n.* One of the four stages of the data warehousing process, during which stored information is delivered and archived. *See also* data warehouse². *Compare* inflow, metaflow, upflow.

downlink *n.* The transmission of data from a communications satellite to an earth station.

download *vb.* **1.** In communications, to transfer a copy of a file from a remote computer to the requesting computer by means of a modem or network. **2.** To send a block of data, such as a PostScript file, to a dependent device, such as a PostScript printer. *Compare* upload.

downloadable font *n.* A set of characters stored on disk and sent (downloaded) to a printer's memory when needed for printing a document. Downloadable fonts are most commonly used with laser printers and other page printers, although many dot-matrix printers can accept some of them. *Also called* soft font.

downsizing *n.* In computing, the practice of moving from larger computer systems, such as mainframes and minicomputers, to smaller systems in an organization, generally to save costs and to update to newer software. The smaller systems are usually client/server systems composed of a combination of PCs, workstations, and some legacy system such as a mainframe, connected in one or more local area networks or wide area networks. *See also* client/server architecture, legacy system.

downstream¹ *n.* The direction in which information, such as a news feed for a newsgroup or data from an http (Web) server, is passed from one server to the next. *See also* news feed, newsgroup, server.

downstream² *adv.* **1.** The location of a client computer in relation to a server. **2.** The direction in which data moves from the server to the client.

downstream³ *adj.* Refers to data that moves from a remote network to an individual computer. In some Internet-related communications technologies, data flows more quickly downstream than upstream; cable

modems, for example, can transfer data as fast as 30 Mbps downstream but support much slower rates, from 128 Kbps to about 2 Mbps, upstream. *Compare* upstream.

downtime *n.* The amount or percentage of time a computer system or associated hardware remains nonfunctional. Although downtime can occur because hardware fails unexpectedly, it can also be a scheduled event, as when a network is shut down to allow time for maintenance.

downward compatibility *n.* The capability of source code or programs developed on a more advanced system or compiler version to be executed or compiled by a less advanced (older) version. *Compare* upward-compatible.

DP *n.* *See* data processing.

dpi *n.* *See* dots per inch.

DPMA *n.* Acronym for Data Processing Management Association. A trade organization of information systems (IS) professionals. DPMA was founded in 1951 as the National Machine Accountants Association.

DPMI *n.* *See* DOS Protected Mode Interface.

DPMS *n.* Acronym for VESA Display Power Management Signaling. A VESA standard for signals that put a video monitor into "standby" or "suspend" mode to reduce power consumption. *See also* green PC, VESA².

DPSK *n.* Acronym for differential phase-shift keying. *See* phase-shift keying.

draft mode *n.* A high-speed, relatively low-quality print mode offered by most dot-matrix printers. *See also* dot-matrix printer, draft quality, print quality.

draft quality *n.* A low grade of printing generated by the draft mode on dot-matrix printers. Draft quality varies among printers, ranging from suitable for most purposes to nearly useless. *See also* draft mode, print quality.

drag *vb.* In graphical user interface environments, to move an image or a window from one place on the screen to another by "grabbing" it and pulling it to its new location using the mouse. The mouse pointer is positioned over the object, and the mouse button is pressed and held while the mouse is moved to the new location.

drag-and-drop *vb.* **1.** In general, to delve into something in increasing detail. **2.** More specifically, to

D

perform operations in a graphical user interface by dragging objects on the screen with the mouse. For example, to delete a document, a user can drag the document icon across the screen and drop it on the trashcan icon (Macintosh OS) or in the Recycle Bin (Windows). *See also* drag, graphical user interface.

drain *n.* **1.** In a FET, the electrode toward which charge carriers (electrons or holes) move from the source under control of the gate. *See also* FET, gate (definition 2), MOSFET, source (definition 2). **2.** *See* current drain.

DRAM \D'rəm, drəm\ *n.* *See* dynamic RAM.

DRAW \drä, drò\ *n.* Acronym for **direct read after write**. A technique used with optical discs to verify the accuracy of information immediately after it has been recorded (written) on the disc. *Compare* DRDW.

drawing interchange format *n.* *See* DXF.

drawing program *n.* A program for manipulating object-oriented graphics, as opposed to manipulating pixel images. In a drawing program, for example, the user can manipulate an element, such as a line, a circle, or a block of text, as an independent object simply by selecting the object and moving it. *See also* object-oriented graphics, pixel image, vector graphics.

DRDW *n.* Acronym for **direct read during write**. A technique used with optical discs to verify the accuracy of information at the time it is being recorded on the disc. *Compare* DRAW.

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

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

drill down *vb.* To start at a top-level menu, directory, or Web page and pass through several intermediate menus, directories, or linked pages, until the file, page, menu command, or other item being sought is

reached. Drilling down is common practice in searching for files or information on the Internet, where high-level Gopher menus and World Wide Web pages are frequently very general and become more specific at each lower level. *See also* Gopher, menu, Web page.

drive *n.* *See* disk drive.

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

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

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

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

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

DRO *n.* Acronym for **destructive readout**. *See* destructive read.

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

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

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

DVMRP *n.* See Distance Vector Multicast Routing Protocol.

Dvorak keyboard \də-vōr'ak kē'bōrd, də-vōr'zhak\ *n.* A keyboard layout developed by August Dvorak and William L. Dealey in 1936 as an alternative to the overwhelmingly popular QWERTY keyboard. The Dvorak keyboard was designed to speed typing by placing the characters on the keyboard for easiest access to the most frequently typed letters. In addition, pairs of letters that often occur sequentially were separated so that the hands could alternate typing them. See the illustration. *See also* ergonomic keyboard, keyboard. *Compare* QWERTY keyboard.



Dvorak keyboard.

DVST *n.* See direct view storage tube.

DXF *n.* Short for drawing interchange format. A computer-aided design file format originally developed by Autodesk; for use with the AutoCAD program to facilitate transfer of graphics files between different applications.

dyadic \dī-ad'ik\ *adj.* Of, pertaining to, or characteristic of a pair—for example, a dyadic processor, which contains two processors controlled by the same operating system. The term is usually limited to describing a system with two microprocessors. Dyadic Boolean operations are those such as AND and OR in which the outcome depends on both values. *See also* Boolean algebra, operand. *Compare* unary.

dye-diffusion printer *n.* See continuous-tone printer.

dye-polymer recording *n.* A recording technology used with optical discs in which dye embedded in a plastic polymer coating on an optical disc is used to create minute bumps on the surface that can be read by a laser. Dye-polymer bumps can be flattened and re-created, thus making an optical disc rewritable.

dye-sublimation printer *n.* See continuous-tone printer.

dynalink *n.* Short for **dynamic link**. *See* dynamic-link library.

Dynaload drivers *n.* Device drivers that are supported by Dynaload. Dynaload is a command that can be run from a DOS prompt under IBM's PC DOS 7 and will load compliant device drivers without modification of the CONFIG.SYS file. *See also* CONFIG.SYS.

dynamic *adj.* Occurring immediately and concurrently. The term is used in describing both hardware and software; in both cases it describes some action or event that occurs when and as needed. In dynamic memory management, a program is able to negotiate with the operating system when it needs more memory.

dynamic address translation *n.* On-the-fly conversion of memory-location references from relative addresses (such as "three units from the beginning of X") to absolute addresses (such as "location number 123") when a program is run. *Acronym:* DAT.

dynamic allocation *n.* The allocation of memory during program execution according to current needs. Dynamic allocation almost always implies that dynamic deallocation is possible too, so data structures can be created and destroyed as required. *See also* allocate, deallocate. *Compare* static allocation.

dynamic binding *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 *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 *n.* See DDE.

dynamic 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 *n.* See DHCP.

dynamic HTML *n.* A technology designed to add richness, interactivity, and graphical interest to Web pages by providing those pages with the ability to change and update themselves dynamically, that is, in response to user actions, without the need for repeated

downloads from a server. Dynamic HTML enables client-side scripts programs that affect elements on a Web page produced with languages such as VBScript and JavaScript to control and manipulate elements, such as fonts and graphics, by means of HTML tags that describe how the page is to appear on the user's screen. From the user's point of view, dynamic HTML produces the type of interactivity and relatively rapid download times associated with multimedia CD-ROM products. Examples of dynamic HTML actions include moving graphics on the page and displaying information, such as menus or tables, in response to mouse movements or clicks. A number of vendors, including Microsoft and Netscape, have developed their own versions of Dynamic HTML and have submitted them to the World Wide Web Consortium (W3C) for possible inclusion in the Document Object Model (DOM) specification being developed by W3C. *See also* Document Object Model.

dynamic keys *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 *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.

dynamic memory allocation *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 *n.* An HTML document that contains animated GIFs, Java applets, or ActiveX controls. *See also* ActiveX control, GIF, HTML, Java applet.

dynamic RAM \dī-nam'ik ram\ *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. *See also* RAM. *Compare* static RAM.

dynamic random access memory *n.* *See* dynamic RAM.

dynamic relocation *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 *n.* The management of concurrently running processes (programs), usually by the operating system.

dynamic SLIP \dī-nam'ik slip\ *n.* Short for **dynamic Serial Line Internet Protocol**. 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 *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 common form of dynamic storage, and both dynamic RAM (DRAM) and static RAM (SRAM) are considered forms of dynamic storage. *See also* dynamic RAM, static RAM. *Compare* permanent storage. **2.** In programming, blocks of memory that can be allocated, deallocated, or freely changed in size.

dynamic Web page *n.* A Web page that has fixed form but variable content, allowing it to be tailored to a customer's search criteria.

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authorized memory space or an invalid instruction is issued. *Acronym:* GPF. *See also* protected mode.

General Public License *n.* The agreement under which software, such as the GNU (GNU's Not UNIX) utilities, is distributed by the Free Software Foundation. Anyone who has a copy of such a program may redistribute it to another party and may charge for distribution and support services, but may not restrict the other party from doing the same. A user may modify the program, but if the modified version is distributed, it must be clearly identified as such and is also covered under the General Public License. A distributor must also either provide source code or indicate where source code can be obtained. *Acronym:* GPL. *Also called* copyleft. *See also* free software, Free Software Foundation, GNU.

general-purpose computer *n.* A computer that can perform any computational task for which software is available. A PC is a general-purpose computer.

general-purpose controller *n.* A controller that is designed for multiple uses. *See also* controller.

General-Purpose Interface Bus *n.* A bus developed for the exchange of information between computers and industrial automation equipment. The electrical definition of this bus has been incorporated into an IEEE standard. *Acronym:* GPIB. *See also* IEEE 488.

general-purpose language *n.* A programming language, such as Ada, Basic, C, or Pascal, designed for a variety of applications and uses. By contrast, SQL is a language designed to be used only with databases.

general-purpose register *n.* 1. A register within a microprocessor that is available for any use rather than being reserved, like a segment selector or stack pointer, for a specific use by the processor design or operating system. 2. Any digital circuit capable of storing binary data.

generation *n.* 1. A concept used to distinguish stored versions of a set of files. The oldest is called the grandfather, the next oldest is the father, and the newest is the son. 2. A concept used to distinguish among a process, another process that it initiates (its child), and the process that initiated it (its parent or the child's grandparent). *See also* process¹. 3. A category that distinguishes products, such as computers or programming languages, according to the technological advances they represent. *See also* computer.

generic icon *n.* An icon on a Macintosh screen that identifies a file only as a document or an application.

Ordinarily the icon for an application will be specific to that application, and the icon for a document will be specific to the application that opens it. If a generic icon appears instead, the information that the Macintosh Finder uses to identify the application has been damaged. *See also* Finder, icon, Macintosh.

Genie \jē'nē\ *n.* An online information service originally developed by General Electric (GE) Information Services as GENie (General Electric network for information exchange); currently owned and provided by IDT Corporation as Genie (lowercase *e*). Genie provides business information, forums, home shopping, and news and can exchange e-mail with the Internet.

GEO \gē'ō\ *n.* *See* geostationary orbit satellite.

geographic information system *n.* An application or suite of applications for viewing and creating maps. Generally, geographic information systems contain a viewing system (sometimes allowing users to view maps with a Web browser), an environment for creating maps, and a server for managing maps and data for real-time online viewing. *Acronym:* GIS.

geometry *n.* The branch of mathematics that deals with the construction, properties, and relationships of points, lines, angles, curves, and shapes. Geometry is an essential part of computer-aided design and graphics programs.

GeoPort *n.* A fast serial input/output port on a range of Macintosh computers, including Macintosh Centris 660AV, Quadra 660AV, Quadra 840AV, or PowerMac. Any Macintosh-compatible serial device can be connected to a GeoPort, but with GeoPort-specific hardware and software the GeoPort can transmit data at up to 2 Mbps (megabits per second) and can handle voice, fax, data, and video transmission.

GEOS \jē'ōs\ *n.* An operating system created by Geoworks (formerly Berkeley Softworks). GEOS is a compact, object-oriented GUI that can run on Apple, Commodore, and MS-DOS platforms.

geostationary *adj.* *See* geosynchronous.

geostationary orbit satellite *n.* A communications satellite that rotates with the earth and thus appears to remain fixed, or stationary, over a particular location. A GEO travels in orbit 22,282 miles above the equator, where its period of rotation matches the earth's rotation. The service area, or *footprint*, of a GEO is approximately one-third of the earth's surface, so global satellite coverage can be achieved

transferring graphical images. It functions at the application level rather than the hardware level and deals with logical workstations (combinations of input and output devices such as keyboard, mouse, and monitor) rather than with individual devices. Graphical Kernel System was developed in 1978 to handle two-dimensional graphics; the later modification, GKS-3D, extended the standard to three-dimensional graphics. *Acronym:* GKS. *See also* ANSI, ISO.

graphical user interface *n.* A visual computer environment that represents programs, files, and options with graphical images, such as icons, menus, and dialog boxes on the screen. The user can select and activate these options by pointing and clicking with a mouse or, often, with the keyboard. A particular item (such as a scroll bar) works the same way to the user in all applications, because the graphical user interface provides standard software routines to handle these elements and report the user's actions (such as a mouse click on a particular icon or at a particular location in text, or a key press); applications call these routines with specific parameters rather than attempting to reproduce them from scratch. *Acronym:* GUI.

graphic character *n.* Any character that is represented by a visible symbol, such as an ASCII character. A graphic character is not the same as a graphics character. *Compare* graphics character.

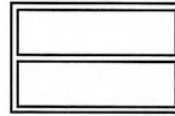
graphic limits *n.* On a computer screen, the boundary of a graphical image in a graphics software program, including all the area enclosed within the graphic. In some graphics environments the limits of a graphic consist of the smallest rectangle that can completely enclose it, called its *bounding rectangle* or *bounding box*.

graphics accelerator *n.* A video adapter that contains a graphics coprocessor. A graphics accelerator can update the video display much more quickly than the CPU can, and it frees the CPU for other tasks. A graphics accelerator is a necessity for modern software such as graphical user interfaces and multimedia applications. *See also* graphics coprocessor, video adapter.

graphics adapter *n.* A video adapter capable of displaying graphics as well as alphanumeric characters. Almost all video adapters in common use today are graphics adapters.

graphics card *n.* *See* video adapter.

graphics character *n.* A character that can be combined with others to create simple graphics, such as lines, boxes, and shaded or solid blocks. *See* the illustration. *Compare* graphic character.



Graphics character. Box built up from line graphics characters.

graphics controller *n.* The part of the EGA and VGA video adapters that allows the computer to access the video buffer. *See also* EGA, VGA.

graphics coprocessor *n.* A specialized microprocessor, included in some video adapters, that can generate graphical images such as lines and filled areas in response to instructions from the CPU, freeing the CPU for other work.

graphics data structure *n.* A data structure that is designed specifically for representing one or more elements of a graphical image.

graphics engine *n.* **1.** A display adapter that handles high-speed graphics-related processing, freeing the CPU for other tasks. *Also called* graphics accelerator, video accelerator. **2.** Software that, based on commands from an application, sends instructions for creating graphic images to the hardware that actually creates the images. Examples are Macintosh QuickDraw and Windows Graphics Device Interface (GDI).

Graphics Interchange Format *n.* *See* GIF.

graphics interface *n.* *See* graphical user interface.

graphics mode *n.* **1.** On computers such as the IBM PC, the display mode in which lines and characters on the screen are drawn pixel by pixel. Because graphics mode creates images from individual dots on the screen, programs have more flexibility in creating images than they do in text (or character) mode. Thus, the computer is able to display a mouse pointer as an arrowhead or other shape rather than as a blinking square or rectangle, and it can display character attributes, such as boldface and italics, as they will appear in print rather than using conventions such as highlighting, underlining, or alternate colors. *Compare* text mode. **2.** A particular set of color and resolution values, often related to a particular video

are returned to active display by issuing the appropriate command to the operating system.

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

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

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

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

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

Acronym: HDF. *See also* NCSA (definition 1).

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

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

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

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

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

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

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

high-capacity CD-ROM *n.* *See* digital video disc.

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

high-definition television *n.* *See* HDTV.

high-density disk *n.* **1.** A 3.5-inch floppy disk that can hold 1.44 MB. *Compare* double-density disk. **2.** A 5.25-inch floppy disk that can hold 1.2 MB. *Compare* double-density disk.

high DOS memory *n.* *See* high memory.

high-end *adj.* A descriptive term for something that uses the latest technology to maximize performance. There is usually a direct correlation between high-end technology and higher prices.

High-level Data Link Control *n.* *See* HDLC.

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 *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 *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 *n.* 1. An office set up within a residence. 2. The main headquarters of a company.

home page *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. 3. A personal Web page, usually for an individual.

home record *n.* *See* header record.

homogeneous environment *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 *n.* A network on which all the hosts are similar and only one protocol is used.

hook *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.

hop *n.* In data communications, one segment of the path between routers on a geographically dispersed network. A hop is comparable to one "leg" of a journey that includes intervening stops between the starting point and the destination. The distance between each of those stops (routers) would be a communications hop.

horizontal blanking interval *n.* *See* blanking, horizontal retrace.

horizontal flyback *n.* *See* horizontal retrace.

horizontal market *n.* A broad category of business activity, such as accounting or inventory control, that carries across many types of business. *Compare* vertical market.

horizontal market software *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 *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 *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 *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.

host¹ *n.* 1. The main computer in a mainframe or mini-computer environment, that is, the computer to which terminals are connected. 2. In PC-based networks, a computer that provides access to other computers. 3. On the Internet or other large networks, a server computer that has access to other computers on the network. A host computer provides services, such as news, mail, or data, to computers that connect to it.

host² *vb.* To provide services to client computers that connect from remote locations—for example, to offer Internet access or to be the source for a news or mail service.

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

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

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increment¹ *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* decrement¹.

increment² *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* decrement².

incumbent local exchange carrier *n.* See ILEC.

indent¹ *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.

indent² *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.

Indeo *n.* A codec technology developed by Intel for compressing digital video files. *See also* codec. *Compare* MPEG.

independent content provider *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 *n.* A third-party software developer; an individual or an organization that independently creates computer software. *Acronym:* ISV.

index¹ *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.

index² *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 *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 *n.* A search for an item of data that uses an index to reduce the amount of time required.

indexed sequential access method *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 searched for the key and then the associated pointer is used to access the remaining data of the record in the main file. *Acronym:* ISAM.

index hole *n.* The small round hole near the large round spindle opening at the center of a 5.25-inch floppy disk. The index hole marks the location of the first data sector, enabling a computer to synchronize its read/write operations with the disk's rotation.

index mark *n.* 1. A magnetic indicator signal placed on a soft-sectored disk during formatting to mark the logical start of each track. 2. A visual information locator, such as a line, on a microfiche.

indicator *n.* A dial or light that displays information about the status of a device, such as a light connected to a disk drive that glows when the disk is being accessed.

indirect address *n.* *See* relative address.

inductance *n.* The ability to store energy in the form of a magnetic field. Any length of wire has some inductance, and coiling the wire, especially around a ferromagnetic core, increases the inductance. The unit of inductance is the henry. *Compare* capacitance, induction.

induction *n.* The creation of a voltage or current in a material by means of electric or magnetic fields, as in the secondary winding of a transformer when exposed to the changing magnetic field caused by an alternating current in the primary winding. *See also* impedance. *Compare* inductance.

inductor *n.* A component designed to have a specific amount of inductance. An inductor passes direct current but impedes alternating current to a degree dependent on its frequency. An inductor usually consists of a

inline image *n.* An image that is embedded within the text of a document. Inline images are common on Web pages. *See also* inline graphics.

inline processing *n.* Operation on a segment of low-level program code, called inline code, to optimize execution speed or storage requirements. *See also* inline code.

inline subroutine *n.* A subroutine whose code is copied at each place in a program at which it is called, rather than kept in one place to which execution is transferred. Inline subroutines improve execution speed, but they also increase code size. Inline subroutines obey the same syntactical and semantic rules as ordinary subroutines.

inner join *n.* An operator in relational algebra, often implemented in database management. The inner join produces a relation (table) that contains all possible ordered concatenations (joinings) of records from two existing tables that meet certain specified criteria on the data values. It is thus equivalent to a product followed by a select applied to the resulting table. *Compare* outer join.

inoculate *vb.* To protect a program against virus infection by recording characteristic information about it. For example, checksums on the code can be recomputed and compared with the stored original checksums each time the program is run; if any have changed, the program file is corrupt and may be infected. *See also* checksum, virus.

input¹ *n.* Information entered into a computer or program for processing, as from a keyboard or from a file stored on a disk drive.

input² *vb.* To enter information into a computer for processing.

input area *n.* *See* input buffer.

input-bound *adj.* *See* input/output-bound.

input buffer *n.* A portion of computer memory set aside for temporary storage of information arriving for processing. *See also* buffer¹.

input channel *n.* *See* input/output channel.

input device *n.* A peripheral device whose purpose is to allow the user to provide input to a computer system. Examples of input devices are keyboards, mice, joysticks, and styluses. *See also* peripheral.

input driver *n.* *See* device driver.

input/output *n.* The complementary tasks of gathering data for a computer or a program to work with, and of making the results of the computer's activities available to the user or to other computer processes. Gathering data is usually done with input devices such as the keyboard and the mouse, while the output is usually made available to the user via the display and the printer. Other data resources, such as disk files and communications ports for the computer, can serve as either input or output devices. *Acronym:* I/O.

input/output area *n.* *See* input/output buffer.

input/output-bound *adj.* Characterized by the need to spend lengthy amounts of time waiting for input and output of data that is processed much more rapidly. For example, if the processor is capable of making rapid changes to a large database stored on a disk faster than the drive mechanism can perform the read and write operations, the computer is input/output-bound. A computer may be just input-bound or just output-bound if only input or only output limits the speed at which the processor accepts and processes data. *Also called* I/O-bound.

input/output buffer *n.* A portion of computer memory reserved for temporary storage of incoming and outgoing data. Because input/output devices can often write to a buffer without intervention from the CPU, a program can continue execution while the buffer fills, thus speeding program execution. *See also* buffer¹.

input/output bus *n.* A hardware path used inside a computer for transferring information to and from the processor and various input and output devices. *See also* bus.

input/output channel *n.* A hardware path from the CPU to the input/output bus. *See also* bus.

input/output controller *n.* Circuitry that monitors operations and performs tasks related to receiving input and transferring output at an input or output device or port, thus providing the processor with a consistent means of communication (input/output interface) with the device and also freeing the processor's time for other work. For example, when a read or write operation is performed on a disk, the drive's controller carries out the high-speed, electronically sophisticated tasks involved in positioning the read-write heads, locating specific storage areas on the spinning disk, reading from and writing to the disk surface, and even

tion and data without the need for device drivers or reliance on servers or user intervention. The protocol is intended for use with printers, scanners, fax machines, and other such information "appliances" and was developed to simplify and improve interoperability between and among a wide range of devices.

jewel box *n.* A clear plastic container used to package and store a compact disc. *Also called* jewel case.

JFC *n.* *See* Java Foundation Classes.

JFIF *n.* Acronym for **JPEG File Interchange Format**. A means of saving photographic images stored according to the Joint Photographic Experts Group image compression technique. JFIF represents a "common language" file format in that it is designed specifically to allow users to transfer JPEG images easily between different computers and applications. *See also* JPEG, TIFF JPEG.

Jini *n.* A technical specification developed by Sun Microsystems that uses a small piece (48 KB) of Java code to allow any network device with a Java virtual machine (JVM) to announce its availability and provide its services to any other device connected to the same network. Jini is based on the concept of creating a "federation" of self-configuring devices capable of transparently exchanging code when necessary to simplify interactions between network devices. *See also* Java.

JIT *n.* *See* just-in-time.

jitter *n.* **1.** Small vibrations or fluctuations in a displayed video image caused by irregularities in the display signal. Jitter is often visible in the form of horizontal lines that are of the same thickness as scan lines. **2.** A rough appearance in a fax caused by dots that are incorrectly recorded during the scanning process and thus wrongly positioned in the output. **3.** In digital communication, distortion caused by lack of synchronization of signals.

JMAPI \J-map`ē\ *n.* *See* Java Management Application Programming Interface.

job *n.* A specified amount of processing performed as a unit by a computer. On early mainframe computers, data was submitted in batches, often on punched cards, for processing by different programs; work was therefore scheduled and carried out in separate jobs, or operations.

Job Control Language *n.* *See* JCL.

job processing *n.* A computing method in which a series of jobs, each consisting of one or more tasks grouped together as a computationally coherent whole, is processed sequentially. *See also* batch processing (definition 2).

job queue *n.* A list of programs or tasks waiting for execution by a computer. Jobs in the queue are often ordered according to some basis of priority. *See also* queue.

join *n.* **1.** A database table operation that creates a resultant entry in another table for each entry in the one table whose key field matches that of an entry in the other. *See also* inner join. **2.** A multiprocessing command that causes a child process to return control to its parent. *See also* child (definition 1), multiprocessing.

Joint Photographic Experts Group *n.* *See* JPEG (definition 1).

Joliet \jō`lē-et\ *n.* An extension to the ISO 9660 (1988) standard developed to include long filenames or filenames outside the 8.3 convention. This format is used in some new CD-ROMs for operating systems, such as Windows 9x, that can handle such filenames. *See also* 8.3, ISO 9660, long filenames.

Josephson junction *n.* A cryoelectronic device that can attain extremely high circuit-switching speeds. In the Josephson effect, when two superconducting materials are in close proximity but are separated by an insulator, electric current can jump or tunnel through the gap.

journal *n.* A computer-based log or record of transactions that take place in a computer or across a network. A journal could be used, for example, to record message transfers on a communications network, to keep track of system activities that alter the contents of a database, or to maintain a record of files that have been archived for storage or deleted from the system. A journal is often kept as a means of reconstructing events or sets of data should they become lost or damaged. *See also* audit trail.

joystick *n.* A pointing device used mainly but not exclusively for computer games. A joystick has a base, on which control buttons can be mounted, and a vertical stem, which the user can move in any direction to control the movement of an object on the screen; the stem may also have control buttons. The buttons activate various software features, generally produc-

programmable logic array, gate array, very-large-scale integration. **2.** Acronym for linear inferences per second. A measure of speed for some types of artificial-intelligence machines and expert systems. *See also* artificial intelligence, expert system. *See* Lightweight Internet Person Schema.

liquid crystal display *n.* A type of display that uses a liquid compound having a polar molecular structure, sandwiched between two transparent electrodes. When an electric field is applied, the molecules align with the field, forming a crystalline arrangement that polarizes the light passing through it. A polarized filter laminated over the electrodes blocks polarized light. In this way, a grid of electrodes can selectively "turn on" a cell, or a pixel, containing the liquid crystal material, turning it dark. In some types of liquid crystal displays, an electroluminescent panel is placed behind the screen to illuminate it. Other types of liquid crystal displays are capable of reproducing color. *Acronym:* LCD. *See also* supertwist display, twisted nematic display.

liquid crystal display printer *n.* *See* LCD printer.

liquid crystal shutter printer *n.* *See* LCD printer.

LISP *n.* Short for **List Processing**. A list-oriented programming language developed in 1959–60 by John McCarthy and used primarily to manipulate lists of data. LISP is heavily used in research and academic circles and is considered the standard language for artificial-intelligence research. *See also* artificial intelligence. *Compare* Prolog.

list *n.* A multi-element data structure that has a linear (first, second, third, . . .) organization but that allows elements to be added or removed in any order. Queues, dequeues, and stacks are simply lists with restrictions on adding and removing elements. *See also* deque, element (definition 1), linked list, queue, stack.

list box *n.* A control in Windows that enables the user to choose one option from a list of possibilities. The list box appears as a box, displaying the currently selected option, next to a button marked with a down-arrow. When the user clicks on the button, the list appears. The list has a scroll bar if there are more options than the list has room to show.

listing *n.* A printed copy of program source code. Some compilers and assemblers produce optional assembly listings during compilation or assembly. Such listings of code often have additional informa-

tion such as line numbers, nested block depth, and cross-reference tables. *See also* assembly listing.

list processing *n.* The maintenance and manipulation of multi-element data structures. This involves adding and deleting elements, writing data into elements, and traversing the list. List processing is the basis of the artificial-intelligence programming language LISP. *See also* LISP, list, node (definition 1).

LISTSERV *n.* One of the most popular commercial mailing list managers, marketed by L-SOFT International in versions for BITNET, UNIX, and Windows. *See also* mailing list, mailing list manager.

literal *n.* A value, used in a program, that is expressed as itself rather than as a variable's value or the result of an expression. Examples are the numbers 25 and 32.1, the character *a*, the string *Hello*, and the Boolean value TRUE. *See also* constant, variable.

lithium ion battery *n.* An energy storage device based on the conversion of chemical to electrical energy in "dry" chemical cells. Despite the higher cost, the laptop industry is quickly adopting lithium ion batteries because of their increased storage capacity over both nickel cadmium and nickel metal hydride batteries, in response to the demand for greater power brought on by higher processor speeds and the use of devices such as CD-ROM drives. *Compare* nickel cadmium battery, nickel metal hydride battery.

little endian *adj.* Of, pertaining to, or being a method of storing a number so that the least significant byte appears first in the number. For example, given the hexadecimal number A02B, the little endian method would cause the number to be stored as 2BA0. The little endian method is used by Intel microprocessors. *Also called* reverse byte ordering. *Compare* big endian.

live *adj.* **1.** Of or relating to real-world data or a program working with it, as opposed to test data. **2.** Of or relating to audio or video that is transmitted from one site to another as it is being produced, as opposed to being recorded before broadcast time. *See also* synchronous transmission. **3.** Capable of being manipulated by a user to cause changes in a document or part of a document.

Live3D *n.* A Netscape proprietary Virtual Reality Modeling Language (VRML) plug-in for Web browsers that allows users to view and interact with a virtual-reality world. *See also* VRML.

memory size *n.* The memory capacity of a computer, usually measured in megabytes. *See also* megabyte, memory.

memory scrubbing *n.* **1.** In mainframe computers, the process of a computer reading its own memory during idle periods in order to find and fix errors. **2.** The process of examining and correcting errors as data is transferred from memory to the CPU of a computer.

memory typewriter *n.* An electric typewriter with internal memory and typically a one-line liquid crystal display for viewing the contents of that memory. Memory typewriters can usually hold one page of text at a time, to which small modifications can be made. Memory typewriters usually do not retain the contents of memory when power is turned off.

menu *n.* A list of options from which a user can make a selection in order to perform a desired action, such as choosing a command or applying a particular format to part of a document. Many application programs, especially those that offer a graphical interface, use menus as a means of providing the user with an easily learned, easy-to-use alternative to memorizing program commands and their appropriate usage.

menu bar *n.* A rectangular bar displayed in an application program's on-screen window, often at the top, from which menus can be selected by the user. Names of available menus are displayed in the menu bar; choosing one with the keyboard or with a mouse causes the list of options in that menu to be displayed.

menu-driven *adj.* Using menus to present choices of commands and available options. Menu-driven programs are usually considered friendlier and easier to learn than programs with a command-line interface. *Compare* command-line interface.

menu item *n.* A choice on a menu, selectable by either the keyboard or a mouse. In some instances, a menu item that is not available (that is, not appropriate) for a given situation is "grayed" (dimmed in comparison to the valid menu choices).

merge *vb.* To combine two or more items, such as lists, in an ordered way and without changing the basic structure of either. *Compare* concatenate.

merged transistor logic *n.* *See* integrated injection logic.

merge sort *n.* A sorting technique that combines several sorted (input) lists into a single sorted (output)

list. *See also* bubble sort, insertion sort, quicksort, sort algorithm.

mesa *n.* An area of a germanium or silicon wafer that was protected during the etching process and is therefore higher than the surrounding etched areas. *See also* photolithography.

mesh network *n.* A communications network having two or more paths to any node.

message *n.* **1.** In communications, a unit of information transmitted electronically from one device to another. A message can contain one or more blocks of text as well as beginning and ending characters, control characters, a software-generated header (destination address, type of message, and other such information), and error-checking or synchronizing information. A message can be routed directly from sender to receiver through a physical link, or it can be passed, either whole or in parts, through a switching system that routes it from one intermediate station to another. *See also* asynchronous transmission, block (definition 4), control character (definition 1), frame (definition 1), frame (definition 2), header (definition 2), message switching, network, packet (definition 1), packet switching, synchronous transmission. **2.** In software, a piece of information passed from the application or operating system to the user to suggest an action, indicate a condition, or inform that an event has occurred. **3.** In message-based operating environments, such as Windows, a unit of information passed among running programs, certain devices in the system, and the operating environment itself.

message header *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 *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.

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

message reflection *n.* In object-oriented programming environments, such as Visual C++, OLE, and ActiveX, a function that allows a control to handle its

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object-oriented design *n.* A modular approach to creating a software product or computer system, in which the modules (objects) can be easily and affordably adapted to meet new needs. Object-oriented design generally comes after object-oriented analysis of the product or system and before any actual programming. *See also* object (definition 2), object-oriented analysis.

object-oriented graphics *n.* Computer graphics that are based on the use of graphics primitives, such as lines, curves, circles, and squares. Object-oriented graphics, used in applications such as computer-aided design and drawing and illustration programs, describe an image mathematically as a set of instructions for creating the objects in the image. This approach contrasts with the use of bitmapped graphics, in which a graphic is represented as a group of black-and-white or colored dots arranged in a certain pattern. Object-oriented graphics enable the user to manipulate objects as units. Because objects are described mathematically, object-oriented graphics can be layered, rotated, and magnified relatively easily. *Also called* structured graphics. *See also* graphics primitive. *Compare* bitmapped graphics, paint program.

object-oriented interface *n.* A user interface in which elements of the system are represented by visible screen entities, such as icons, that are used to manipulate the system elements. Object-oriented display interfaces do not necessarily imply any relation to object-oriented programming. *See also* object-oriented graphics.

object-oriented operating system *n.* An operating system based on objects and designed in a way that facilitates software development by third parties, using an object-oriented design. *See also* object (definition 2), object-oriented design.

object-oriented programming *n.* A programming paradigm in which a program is viewed as a collection of discrete objects that are self-contained collections of data structures and routines that interact with other objects. *Acronym:* OOP. *See also* C++, object (definition 2), Objective-C.

object-relational server *n.* A database server that supports object-oriented management of complex data types in a relational database. *See also* database server, relational database.

object request broker *n.* *See* ORB.

object wrapper *n.* In object-oriented applications, a means of encapsulating a set of services provided by a non-object-oriented application so that the encapsulated services can be treated as an object. *See also* object (definition 2).

oblique *adj.* Describing a style of text created by slanting a roman font to simulate italics when a true italic font isn't available on the computer or printer. *See also* font, italic, roman.

OC3 *n.* Short for **optical carrier 3**. One of several optical signal circuits used in the SONET high-speed fiber-optic data transmission system. OC3 carries a signal of 155.52 Mbps, the minimum transmission speed for which SONET and the European standard, SDH, are fully interoperable. *See also* SONET.

OCR *n.* *See* optical character recognition.

octal *n.* The base-8 number system consisting of the digits 0 through 7, from the Latin *octo*, meaning "eight." The octal system is used in programming as a compact means of representing binary numbers. *See* Appendix E. *See also* base (definition 2).

octet *n.* A unit of data that consists of exactly 8 bits, regardless of the number of bits a computer uses to represent a small amount of information such as a character. *Compare* byte.

OCX *n.* Short for **OLE custom control**. A software module based on OLE and COM technologies that, when called by an application, produces a control that adds some desired feature to the application. OCX technology is portable across platforms, works on both 16-bit and 32-bit operating systems, and can be used with many applications. It is the successor to VBX (Visual Basic custom control) technology, which supported only Visual Basic applications, and is the basis for ActiveX controls. OCXs have, in fact, been superseded by ActiveX controls, which are much smaller and therefore work much better over the Internet. *See also* ActiveX control, COM (definition 2), control (definition 2), OLE, VBX, Visual Basic.

ODBC *n.* Acronym for **open database connectivity**. In the Microsoft WOSA (Windows Open System Architecture) structure, an interface providing a common language for Windows applications to gain access to a database on a network. *See also* WOSA.

ODBMG *n.* *See* Object Database Management Group.

odd parity *n.* *See* parity.

Hewlett-Packard, and IBM), formed in 1988, that promotes standards and specifications for programs operating under UNIX and licenses software (as source code) to its members. OSF's products include the Distributed Computing Environment, the graphical user interface Motif, and the OSF/1 operating system (a variant of UNIX).

OSI *n.* See ISO/OSI reference model.

OSI protocol stack *n.* The set of protocols based on—and corresponding to—the ISO/OSI reference model.

OSI reference model *n.* See ISO/OSI reference model.

OSPF *n.* Acronym for **Open Shortest Path First**. A routing protocol for IP networks, such as the Internet, that allows a router to calculate the shortest path to each node for sending messages. The router sends information on the nodes it is linked to, called link-state advertisements, to other routers on the network to accumulate link-state information to make its calculations. See also communications protocol, node (definition 2), path (definition 1), router.

OTOH *n.* Acronym for **on the other hand**. A short-hand expression often used in e-mail, Internet news, and discussion groups.

Outbox *n.* In many e-mail applications, the default mailbox where the program stores outgoing messages. See also e-mail¹ (definition 1), mailbox. Compare Inbox.

indent *n.* See hanging indent.

outer join *n.* In database management, an operator in relational algebra. An outer join performs an extended join operation in which the tuples (rows) in one relation (table) that have no counterpart in the second relation appear in the resulting relation concatenated with all null values. Compare inner join.

outline font *n.* A font (type design) stored in a computer or printer as a set of outlines for drawing each of the alphabetic and other characters in a character set. Outline fonts are templates rather than actual patterns of dots and are scaled up or down to match a particular type size. Such fonts are most often used for printing, as is the case with most PostScript fonts on a PostScript-compatible laser printer and TrueType fonts. Compare bitmapped font, screen font, stroke font.

out-of-band signaling *n.* Transmission of some signals, such as control information, on frequencies out-

side of the bandwidth available for voice or data transfer on a communications channel. Compare in-band signaling.

output¹ *n.* The results of processing, whether sent to the screen or printer, stored on disk as a file, or sent to another computer in a network.

output² *vb.* To send out data by a computer or sound by a speaker.

output area *n.* See output buffer.

output-bound *n.* See input/output-bound.

output buffer *n.* A portion of memory set aside for temporary storage of information, leaving main memory for storage, display, printing, or transmission. See also buffer¹.

output channel *n.* See channel (definition 1), input/output channel.

output stream *n.* A flow of information that leaves a computer system and is associated with a particular task or destination. In programming, an output stream can be a series of characters sent from the computer's memory to a display or to a disk file. Compare input stream.

outsourcing *n.* The assignment of tasks to independent contractors, such as individual consultants or service bureaus. Tasks such as data entry and programming are often performed via outsourcing.

OverDrive *n.* A type of microprocessor from Intel designed to replace a computer's existing i486SX or i486DX microprocessor. The OverDrive is functionally identical to Intel's i486DX2 microprocessor, but it is an end-user product, whereas the i486DX2 is sold only to computer manufacturers who build it into their own systems. Upgrading a system with an OverDrive processor differs from system to system; and some systems might not be able to support an OverDrive processor. See also i486DX, i486SL, i486SX, microprocessor. Compare i486DX2.

overflow *n.* 1. Generally, the condition that occurs when data resulting from input or processing requires more bits than have been provided in hardware or software to store the data. Examples of overflow include a floating-point operation whose result is too large for the number of bits allowed for the exponent, a string that exceeds the bounds of the array allocated for it, and an integer operation whose result contains too many bits for the register into which it is to be stored. See also overflow error. Compare underflow.

Polish notation *n.* See prefix notation.

polling *n.* See autopoling.

polling cycle *n.* The time and sequence required for a program to poll each of its devices or network nodes. See also autopoling.

polygon *n.* Any two-dimensional closed shape composed of three or more line segments, such as a hexagon, an octagon, or a triangle. Computer users encounter polygons in graphics programs.

polyline *n.* An open shape consisting of multiple connected segments. Polylines are used in CAD and other graphics programs. See also CAD.

polymorphism *n.* In an object-oriented programming language, the ability to redefine a routine in a derived class (a class that inherited its data structures and routines from another class). Polymorphism allows the programmer to define a base class that includes routines that perform standard operations on groups of related objects, without regard to the exact type of each object. The programmer then redefines the routines in the derived class for each type, taking into account the characteristics of the object. See also class, derived class, object (definition 2), object-oriented programming.

Pong *n.* The first commercial video game, a table tennis simulation, created by Nolan Bushnell of Atari in 1972.

pop *vb.* To fetch the top (most recently added) element of a stack, removing that element from the stack in the process. Compare push (definition 1).

POP \pop\ *n.* See point of presence, Post Office Protocol.

POP3 \pop-thrē\ *n.* Acronym for **Post Office Protocol 3**. This is the current version of the Post Office Protocol standard in common use on TCP/IP networks. See also Post Office Protocol, TCP/IP.

populate *vb.* 1. To put chips in the sockets of a circuit board. 2. To import prepared data into a database from a file using a software procedure rather than by having a human operator enter individual records.

pop-up Help *n.* An online help system whose messages appear as pop-up windows when the user clicks on a topic or area of the screen about which help is desired. Typically, a special form of click, such as clicking the right mouse button or Option-clicking, will activate pop-up Help, if it is available. See also balloon help.

pop-up menu or **popup menu** *n.* In a graphical user interface, a menu that appears on-screen when a user selects a certain item. Pop-up menus can appear anywhere on the screen and generally disappear when the user selects an item in the menu. Also called popup. Compare drop-down menu, pull-down menu.

pop-up messages *n.* The messages that appear when pop-up Help is used.

pop-up window *n.* A window that appears when an option is selected. Typically, the window remains visible until the mouse button is released.

port¹ *n.* 1. An interface through which data is transferred between a computer and other devices (such as a printer, mouse, keyboard, or monitor), a network, or a direct connection to another computer. The port appears to the CPU as one or more memory addresses that it can use to send or receive data. Specialized hardware, such as in an add-on circuit board, places data from the device in the memory addresses and sends data from the memory addresses to the device. Ports may also be dedicated solely to input or to output. Ports typically accept a particular type of plug used for a specific purpose. For example, a serial data port, a keyboard, and a high-speed network port all use different connectors, so it's not possible to plug a cable into the wrong port. Also called input/output port. 2. See port number.

port² *vb.* 1. To change a program in order to be able to run it on a different computer. 2. To move documents, graphics, and other files from one computer to another.

portable *adj.* 1. Capable of running on more than one computer system or under more than one operating system. Highly portable software can be moved to other systems with little effort, moderately portable software can be moved only with substantial effort, and nonportable software can be moved only with effort similar to or greater than the effort of writing the original program. 2. Light enough, rugged enough, and free enough of encumbering external connections to be carried by a user.

portable computer *n.* Any computer designed to be moved easily. Portable computers can be characterized by size and weight. See the table.

Portable Digital Document *n.* See PDD.

Portable Distributed Objects *n.* Software from NeXT, running under UNIX, that supports an object model in which objects to be stored at various

P

types, and variables, that usually performs a single task. A procedure can usually be called (executed) by other procedures, as well as by the main body of the program. Some languages distinguish between a procedure and a function, with the latter (the function) returning a value. *See also* function, parameter, procedural language, routine, subroutine.

procedure call *n.* In programming, an instruction that causes a procedure to be executed. A procedure call can be located in another procedure or in the main body of the program. *See also* procedure.

process¹ *n.* A program or part of a program; a coherent sequence of steps undertaken by a program.

process² *vb.* To manipulate data with a program.

process-bound *adj.* Limited in performance by processing requirements. *See also* computation-bound.

process color *n.* A method of handling color in a document in which each block of color is separated into its subtractive primary color components for printing: cyan, magenta, and yellow (as well as black). All other colors are created by blending layers of various sizes of halftone spots printed in cyan, magenta, and yellow to create the image. *See also* color model, color separation (definition 1). *Compare* spot color.

processing *n.* The manipulation of data within a computer system. Processing is the vital step between receiving data (input) and producing results (output)—the task for which computers are designed.

processor *n.* *See* central processing unit, microprocessor.

Processor Direct Slot *n.* *See* PDS (definition 1).

Processor Input/Output *n.* *See* PIO.

Prodigy Information Service *n.* An online information service founded by IBM and Sears. Like its competitors America Online and CompuServe, Prodigy offers access to databases and file libraries, online chat, special interest groups, e-mail, and Internet connectivity. *Also called* Prodigy.

product *n.* **1.** An operator in the relational algebra used in database management that, when applied to two existing relations (tables), results in the creation of a new table containing all possible ordered concatenations (combinations) of tuples (rows) from the first relation with tuples from the second. The number of rows in the resulting relation is the product of the number of rows in the two source relations. *Also*

called Cartesian product. *Compare* inner join. **2.** In mathematics, the result of multiplying two or more numbers. **3.** In the most general sense, an entity conceived and developed for the purpose of competing in a commercial market. Although computers are products, the term is more commonly applied to software, peripherals, and accessories in the computing arena.

production system *n.* In expert systems, an approach to problem solving based on an "IF this, THEN that" approach that uses a set of rules, a database of information, and a "rule interpreter" to match premises with facts and form a conclusion. Production systems are also known as rule-based systems or inference systems. *See also* expert system.

Professional Graphics Adapter *n.* A video adapter introduced by IBM, primarily for CAD applications. The Professional Graphics Adapter is capable of displaying 256 colors, with a horizontal resolution of 640 pixels and a vertical resolution of 480 pixels. *Acronym:* PGA.

Professional Graphics Display *n.* An analog display introduced by IBM, intended for use with their Professional Graphics Adapter. *See also* Professional Graphics Adapter.

profile¹ *n.* *See* user profile.

profile² *vb.* To analyze a program to determine how much time is spent in different parts of the program during execution.

Profiles for Open Systems Internetworking Technology *n.* *See* POSIT.

program¹ *n.* A sequence of instructions that can be executed by a computer. The term can refer to the original source code or to the executable (machine language) version. *Also called* software. *See also* program creation, routine, statement.

program² *vb.* To create a computer program, a set of instructions that a computer or other device executes to perform a series of actions or a particular type of work.

program card *n.* *See* PC Card, ROM card.

program cartridge *n.* *See* ROM cartridge.

program counter *n.* A register (small, high-speed memory circuit within a microprocessor) that contains the address (location) of the instruction to be executed next in the program sequence.

depend on server software to dynamically monitor the transmission. It can, however, play back only from the beginning of the file, rather than from any point, as can be the case with true streaming. *See also stream.*

PSK *n.* *See* phase-shift keying.

PSN *n.* Acronym for **packet-switching network**. *See* packet switching.

PSTN *n.* *See* Public Switched Telephone Network.

p-system *n.* An operating system based on a pseudo-machine implemented in software. A program written for the p-system is more portable than one written for a machine-dependent operating system. *See also* UCSD p-System.

P-type semiconductor *n.* Semiconductor material in which electrical conduction is carried by holes ("vacancies" left by electrons). Whether a semiconductor is N-type or P-type depends on the kind of dopant added during manufacture. A dopant with a shortage of electrons results in a P-type semiconductor. *Compare* N-type semiconductor.

pub *n.* *See* /pub.

/pub *n.* Short for **public**. A directory in an anonymous FTP archive that is accessible by the public and that generally contains files available for free download. *See also* anonymous FTP.

public directory *n.* A directory on an FTP server that is accessible by anonymous users for the purpose of retrieving or storing files. Often the directory is called /pub. *See also* anonymous FTP, FTP (definition 1), FTP server, /pub.

public domain *n.* The set of all creative works, such as books, music, or software, that are not covered by copyright or other property protection. Works in the public domain can be freely copied, modified, and otherwise used in any manner for any purpose. Much of the information, texts, and software on the Internet is in the public domain, but putting a copyrighted work on the Internet does not put it in the public domain. *Compare* proprietary.

public-domain software *n.* A program donated for public use by its owner or developer and freely available for copying and distribution. *Compare* free software, freeware, proprietary software, shareware.

public files *n.* Files with no access restrictions.

public folders *n.* The folders that are made accessible on a particular machine or by a particular user in a shared networking environment. *Compare* private folders.

public key *n.* One of two keys in public key encryption. The user releases this key to the public, who can use it for encrypting messages to be sent to the user and for decrypting the user's digital signature. *See also* public key encryption. *Compare* private key.

public key cryptography *n.* *See* public key encryption.

public key encryption *n.* An asymmetric scheme that uses a pair of keys for encryption: the public key encrypts data, and a corresponding secret key decrypts it. For digital signatures, the process is reversed: the sender uses the secret key to create a unique electronic number that can be read by anyone possessing the corresponding public key, which verifies that the message is truly from the sender. *See also* private key, public key.

public rights *n.* In the context of the Internet, the extent to which members of the public are permitted to use (and to place) information on the Internet under intellectual property law. *See also* fair use, public domain, public-domain software.

Public Switched Telephone Network *n.* The public telephone system.

puck *n.* A pointing device used with a graphics tablet. A puck, which is often used in engineering applications, is a mouselike device with buttons for selecting items or choosing commands and a clear plastic section extending from one end with cross hairs printed on it. The intersection of the cross hairs on the puck points to a location on the graphics tablet, which in turn is mapped to a specific location on the screen. Because the puck's cross hairs are on a transparent surface, a user can easily trace a drawing by placing it between the graphics tablet and the puck and moving the cross hairs over the lines of the drawing. *See also* graphics tablet, stylus.

pull *vb.* **1.** The process of retrieving data from a network server. *Compare* push (definition 2). **2.** *See* pop.

pull-down menu *n.* A menu that is pulled down from the menu bar and that remains available as long as the user holds it open. *Compare* drop-down menu.

pulse *n.* A transient signal, usually brief and with a discrete onset and offset.

quartz crystal *n.* A precisely shaped and precisely sized piece of the mineral quartz, used for its piezoelectric properties. When a voltage is applied to a quartz crystal, it vibrates at a frequency determined by its size and shape. Quartz crystals are commonly used to control the frequency of oscillator circuits such as the clocks in microcomputers. *See also* piezoelectric.

quasi-language *n.* A derogatory term for any programming language that, because of deficiencies, is not suitable for any serious work.

query¹ *n.* A specific set of instructions for extracting particular data.

query² *vb.* To extract data from a database and present it for use.

query by example *n.* A simple-to-use query language implemented on several relational database management systems. Using query by example, the user specifies fields to be displayed, intertable linkages, and retrieval criteria directly onto forms displayed on the screen. These forms are a direct pictorial representation of the table and row structures that make up the database. Thus, the construction of a query becomes a simple "checkoff" procedure from the viewpoint of the user. *Acronym:* QBE.

query language *n.* A subset of the data manipulation language; specifically, that portion relating to the retrieval and display of data from a database. It is sometimes used loosely to refer to the entire data manipulation language. *See also* data manipulation language.

question mark *n.* *See* ?

queue \kyoo\ *n.* A multi-element data structure from which (by strict definition) elements can be removed only in the same order in which they were inserted; that is, it follows a first in, first out (FIFO) constraint. There are also several types of queues in which removal is based on factors other than order of insertion—for example, some priority value assigned to each element. *See also* deque, element (definition 1). *Compare* stack.

queued access method *n.* A programming technique that minimizes input/output delays by synchronizing the transfer of information between the program and the computer's input and output devices. *Acronym:* QAM.

QuickDraw *n.* On the Macintosh, the built-in group of routines within the operating system that control the display of graphics and text. Application programs call QuickDraw for on-screen displays. *See also* Toolbox.

QuickDraw 3-D *n.* A version of the Macintosh QuickDraw library that includes routines for doing 3-D graphics calculations. *See also* QuickDraw.

quicksort *n.* An efficient sort algorithm, described by C.A.R. Hoare in 1962, in which the essential strategy is to "divide and conquer." A quicksort begins by scanning the list to be sorted for a median value. This value, called the *pivot*, is then moved to its final position in the list. Next, all items in the list whose values are less than the pivot value are moved to one side of the list, and the items with values greater than the pivot value are moved to the other side. Each resulting side is sorted the same way, until a fully sorted list results. *See also* sort algorithm. *Compare* bubble sort, insertion sort, merge sort.

QuickTime *n.* Software components developed by Apple for creating, editing, publishing, and viewing multimedia content. QuickTime, which supports video, animation, graphics, 3D, VR (virtual reality), MIDI, music, sound, and text, has been part of the Mac OS since version 7 of the operating system and is used in many Macintosh applications. Windows applications can also run QuickTime files, but require the installation of special player software. QuickTime is often used on the Web to provide Web pages with video and animation. Most Web browsers support plug-ins for running these types of files. QuickTime is also part of the new MPEG-4 specification. *See also* MPEG-4.

Quick View *n.* A feature, optionally installed as part of Windows 9x, that provides a set of file viewers for previewing the contents of files without having to start the application(s) that created them. The feature is accessed through the Quick View command, available either from the File menu or by right-clicking a filename. If the feature has been installed but the file type is not supported by a viewer, the Quick View command does not appear.

quit¹ *n.* 1. An FTP command that instructs the server to drop the current connection with the client from which it received the command. 2. A command in many applications for exiting the program.

relational algebra *n.* A collection of rules and operators that permit relations (tables) to be manipulated. Relational algebra is usually described as having the following operators: SELECT, PROJECT, PRODUCT, UNION, INTERSECT, DIFFERENCE, JOIN (or INNER JOIN), and DIVIDE. In a relational database, relational algebra is used to develop procedures to build new relations based on the existing relations.

relational calculus *n.* In database management, a nonprocedural method for manipulating relations (tables). There are two families of relational calculus: domain calculus and tuple calculus. The two families of relational calculus are mathematically equivalent to each other and to relational algebra. Using either family, one can formulate a description of a desired relation, based on the existing relations in the database.

relational database *n.* A database or database management system that stores information in tables—rows and columns of data—and conducts searches by using data in specified columns of one table to find additional data in another table. In a relational database, the rows of a table represent records (collections of information about separate items) and the columns represent fields (particular attributes of a record). In conducting searches, a relational database matches information from a field in one table with information in a corresponding field of another table to produce a third table that combines requested data from both tables. For example, if one table contains the fields EMPLOYEE-ID, LAST-NAME, FIRST-NAME, and HIRE-DATE, and another contains the fields DEPT, EMPLOYEE-ID, and SALARY, a relational database can match the EMPLOYEE-ID fields in the two tables to find such information as the names of all employees earning a certain salary or the departments of all employees hired after a certain date. In other words, a relational database uses matching values in two tables to relate information in one to information in the other. Microcomputer database products typically are relational databases. *Compare* flat-file database, inverted-list database.

relational database management system *n.* *See* relational database.

relational expression *n.* An expression that uses a relational operator such as “less than” or “greater than” to compare two or more expressions. A relational expression resolves to a Boolean (true/false) value. *See also* Boolean, relational operator.

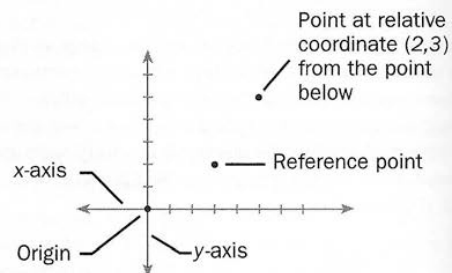
relational model *n.* A data model in which the data is organized in relations (tables). This is the model implemented in most modern database management systems.

relational operator *n.* An operator that allows the programmer to compare two (or more) values or expressions. Typical relational operators are greater than ($>$), equal to ($=$), less than ($<$), not equal to ($<>$), greater than or equal to ($>=$), and less than or equal to ($<=$). *See also* relational expression.

relational structure *n.* The record organization used in the implementation of a relational model.

relative address *n.* A location, as in a computer's memory, that is specified in terms of its distance (displacement or offset) from a starting point (base address). A relative address is typically computed by adding an offset to the base. In everyday terms, this is similar to creating the address 2001 Main Street, in which the base is the 2000 block of Main Street and the offset is 1, which specifies the first house from the beginning of the block. *Also called* indirect address.

relative coordinates *n.* Coordinates that are defined in terms of their distance from a given starting point, rather than from the origin (intersection of two axes). For example, from a starting point on the screen, a square defined by relative coordinates can be drawn as a series of lines, each representing a displacement in distance and direction from the end of the preceding point. The entire square can be redrawn at another location simply by changing the coordinates of the starting point rather than by recalculating the coordinates of each corner with reference to the origin. *See* the illustration. *Compare* absolute coordinates.



Relative coordinates.

relative movement *n.* 1. Motion whose distance and direction are relative to a starting point. For example,

servers at lower levels of the hierarchy, the DNS is able to match a "friendly" Internet address, such as microsoft.com, with its numerical counterpart, the IP address. Root servers thus contain the data needed for referrals to name servers at the highest level of the hierarchy. There are 13 root servers in the world, located in the United States, the United Kingdom, Sweden, and Japan. *Also called* root name server. *See also* DNS (definition 1), DNS server, top-level domain.

ROT13 encryption *n.* A simple encryption method in which each letter is replaced with the letter of the alphabet 13 letters after the original letter, so that A is replaced by N, and so forth; N, in turn, is replaced by A, and Z is replaced by M. ROT13 encryption is not used to protect messages against unauthorized readers; rather, it is used in newsgroups to encode messages that a user may not want to read, such as sexual jokes or spoilers. Some newsreaders can automatically perform ROT13 encryption and decryption at the touch of a key.

rotary dialing *n.* The signaling system used in telephones with rotary dials, in which each digit is associated with a set number of pulses. During dialing, these pulses, which are audible as series of clicks, momentarily turn the current in the telephone wires on and off. *Also called* pulse dialing. *Compare* touch tone dialing.

rotate *vb.* **1.** To turn a model or other graphical image so that it is viewed at a different angle. **2.** To move bits in a register to the left or to the right. The bit that moves out of the end position rotates to the newly vacated position at the opposite end of the register. *Compare* shift.

rotational delay *n.* The time required for a desired disk sector to rotate to the read/write head. *Also called* rotational latency.

rotational latency *n.* *See* rotational delay.

RO terminal *n.* Short for **read-only terminal**. A terminal that can receive data but cannot send data. Nearly all printers can be classified as RO terminals.

ROTFL *n.* *See* ROFL.

round *vb.* To shorten the fractional part of a number, 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 *n.* A sequential, cyclical allocation of resources to more than one process or device.

routable protocol *n.* A communications protocol that is used to route data from one network to another by means of a network address and a device address. TCP/IP is an example of a routable protocol.

router *n.* An intermediary device on a communications network that expedites message delivery. On a single network linking many computers through a mesh of possible connections, a router receives transmitted messages and forwards them to their correct destinations over the most efficient available route. On an interconnected set of LANs (local area networks)—including those based on differing architectures and protocols—using the same communications protocols, a router serves the somewhat different function of acting as a link between LANs, enabling messages to be sent from one to another. *See also* bridge, gateway.

routine *n.* Any section of code that can be invoked (executed) within a program. A routine usually has a name (identifier) associated with it and is executed by referencing that name. Related terms (which may or may not be exact synonyms, depending on the context) are *function*, *procedure*, and *subroutine*. *See also* function (definition 3), procedure, subroutine.

routing table *n.* In data communications, a table of information that provides network hardware (bridges and routers) with the directions needed to forward packets of data to locations on other networks. The information contained in a routing table differs according to whether it is used by a bridge or a router. A bridge relies on both the source (originating) and destination addresses to determine where and how to forward a packet. A router relies on the destination address and on information in the table that gives the possible routes—in hops or in number of jumps—between itself, intervening routers, and the destination. Routing tables are updated frequently as new or more current information becomes available. *See also* bridge, hop, internetwork, router.

row *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 spread-

in which values are represented so as to bring them into a different range—for example, to change linear feet to quarter inches on a blueprint drawing of a house. **3.** In programming, to determine the number of digits occupied by fixed-point or floating-point numbers. *See also* fixed-point notation, floating-point number.

scaling *n.* In computer graphics, the process of enlarging or reducing a graphical image—scaling a font to a desired size or scaling a model created with a CAD program, for example. *See also* CAD.

scan *vb.* **1.** In television and computer display technologies, to move an electron beam across the inner surface of the screen, one line at a time, to light the phosphors that create a displayed image. **2.** In facsimile and other optical technologies, to move a light-sensitive device across an image-bearing surface such as a page of text, converting the light and dark areas on the surface to binary digits that can be interpreted by a computer.

scan code *n.* A code number transmitted to an IBM or compatible computer whenever a key is pressed or released. Each key on the keyboard has a unique scan code. This code is not the same as the ASCII code for the letter, number, or symbol shown on the key; it is a special identifier for the key itself and is always the same for a particular key. When a key is pressed, the scan code is transmitted to the computer, where a portion of the ROM BIOS (read-only memory basic input/output system) dedicated to the keyboard translates the scan code into its ASCII equivalent. Because a single key can generate more than one character (lowercase *a* and uppercase *A*, for example), the ROM BIOS also keeps track of the status of keys that change the keyboard state, such as the Shift key, and takes them into account when translating a scan code. *Compare* key code.

scan head *n.* An optical device found in scanners and fax machines that moves across the subject being scanned, converts light and dark areas to electrical signals, and sends those signals to the scanning system for processing.

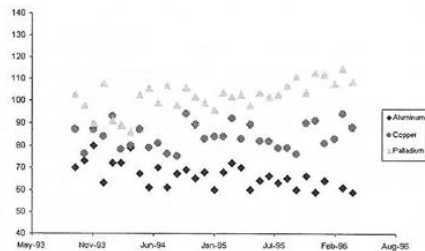
scan line *n.* **1.** One of many horizontal lines of a graphics display screen, such as a television or raster-scan monitor. **2.** A single row of pixels read by a scanning device.

scanner *n.* An optical input device that uses light-sensing equipment to capture an image on paper or

some other subject. The image is translated into a digital signal that can then be manipulated by optical character recognition (OCR) software or graphics software. Scanners come in a number of types, including flatbed (scan head passes over a stationary subject), feed (subject is pulled across a stationary scan head), drum (subject is rotated around a stationary scan head), and handheld (user passes device over a stationary subject).

scan rate *n.* *See* refresh rate.

scatter diagram *n.* A graph consisting of points whose coordinates represent values of data, often used to illustrate a correlation between one or more variables and a test group. *See* the illustration. *Also called* point chart, point diagram.



Scatter diagram.

schedule *vb.* To program a computer to perform a specified action at a specified time and date.

scheduler *n.* An operating-system process that starts and ends tasks (programs), manages concurrently running processes, and allocates system resources. *Also called* dispatcher.

scheduling algorithm *n.* An algorithm that governs the proper timing of a sequence of events in an operating system or application. For example, an effective motion graphics scheduling algorithm would be able to retrieve the graphic objects, process them, and display them without causing stutter or disruptions. *See also* algorithm.

schema \skē'mə\ *n.* A description of a database to a database management system (DBMS) in the language provided by the DBMS. A schema defines aspects of the database, such as attributes (fields) and domains and parameters of the attributes.

schematic *n.* A diagram that shows a circuit's components and the connections between them using lines and a set of standard symbols to represent various electronic components. *See* the illustration.

screen angle *n.* The angle at which the dots in a halftone screen are printed. A correct angle will minimize blur and other undesirable effects, such as moiré patterns. *See also* color separation (definition 1), halftone, moiré.

screen buffer *n.* *See* video buffer.

screen dump *n.* A duplicate of a screen image; essentially, a “snapshot” of the screen that is either sent to a printer or saved as a file.

screen flicker *n.* *See* flicker.

screen font *n.* A typeface designed for display on a computer monitor screen. Screen fonts often have accompanying PostScript fonts for printing to PostScript-compatible printers. *See also* derived font, intrinsic font. *Compare* PostScript font, printer font.

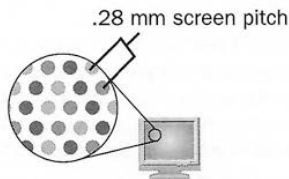
screen frequency *n.* *See* halftone.

screen grabber *n.* *See* grabber (definition 3).

screen name *n.* A name under which an America Online user is known. The screen name may be the same as the user’s real name. *See also* America Online.

screen phone *n.* A type of Internet appliance combining a telephone with an LCD display screen, a digital fax modem, and a computer keyboard, with ports for a mouse, printer, and other peripheral devices. Screen phones can be used as regular telephones for voice communications and can also be used as terminals to gain access to the Internet and other online services.

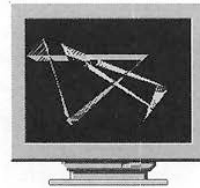
screen pitch *n.* A measurement of a computer monitor’s screen density, representing the distance between phosphors on the display. The lower the number, the more detail can be displayed clearly. For example, a .28-dot-pitch screen has better resolution than one with .32. *See the illustration. See also* phosphor.



Screen pitch.

screen saver *n.* A utility that causes a monitor to blank out or display a certain image after a specified amount of time passes without the keyboard being touched or the mouse being moved. Touching a key

or moving the mouse deactivates the screen saver. Screen savers were originally used to prevent images from becoming permanently etched on a monitor’s screen. Although modern monitors are not susceptible to this problem, screen savers remain popular for their decorative and entertainment value. *See the illustration.*



Screen saver.

screen shot *n.* An image that shows all or part of a computer display.

script *n.* A program consisting of a set of instructions to an application or utility program. The instructions usually use the rules and syntax of the application or utility. On the World Wide Web, scripts are commonly used to customize or add interactivity to Web pages. *See also* macro.

scripting language *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.

scriptlet *n.* A reusable Web page based on the features of Dynamic HTML (DHTML) that can be created with HTML text and a scripting language and then inserted as a control in another Web page or in an application. Developed by Microsoft and introduced in Internet Explorer version 4.0, scriptlets are implemented as .htm files that give developers a relatively easy, object-based means of creating components that reflect the Web metaphor and that can be used to add interactivity and functionality—for example, animation, color changes, popup menus, or drag-and-drop capability—to Web pages without requiring repeated trips to the server. *Also called* Microsoft Scripting Component. *See also* dynamic HTML. *Compare* applet.

scroll *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 *n.* See scroll bar.

scroll bar *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.

scroll box *n.* See elevator.

Scroll Lock key *n.* On the IBM PC/XT and AT and compatible keyboards, a key on the top row of the numeric keypad that controls the effect of the cursor control keys and sometimes prevents the screen from scrolling. On the enhanced and Macintosh keyboards, this key is to the right of the function keys on the top row. Many modern applications ignore the Scroll Lock setting.

scroll wheel *n.* A thumbwheel on a mouse that, when turned, enables the user to scroll or zoom without clicking the scroll bar or using the keyboard. Depending on the mouse, a scroll wheel can also double as a third mouse button. See also scroll bar.

SCSI \skuz'ē\ *n.* Acronym for Small Computer System Interface, a standard high-speed parallel interface defined by the X3T9.2 committee of the American National Standards Institute (ANSI). A SCSI interface is used to connect microcomputers to SCSI peripheral devices, such as many hard disks and printers, and to other computers and local area networks. Also called SCSI-1, SCSI I. Compare ESDI, IDE.

SCSI-1 \skuz'ē-wən\ *n.* See SCSI.

SCSI-2 \skuz'ē-tyō\ *n.* An enhanced ANSI standard for SCSI (Small Computer System Interface) buses. Compared with the original SCSI standard (now called SCSI-1), which can transfer data 8 bits at a time at up to 5 MB per second, SCSI-2 offers increased data width, increased speed, or both. A SCSI-2 disk drive or host adapter can work with SCSI-1 equipment at the older equipment's maximum speed. Also called SCSI II. See also Fast SCSI, Fast/Wide SCSI, SCSI, Wide SCSI. Compare UltraSCSI.

SCSI bus \skuz'ē bus\ *n.* A parallel bus that carries data and control signals from SCSI devices to a SCSI controller. See also bus, controller, SCSI device.

SCSI chain \skuz'ē chān\ *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\ *n.* A cable connector used to connect a SCSI device to a SCSI bus. See the illustration. See also bus, connector (definition 1), SCSI device.



SCSI connector.

SCSI device \skuz'ē də-vīs\ *n.* A peripheral device that uses the SCSI standard to exchange data and control signals with a computer's CPU. See also peripheral, SCSI.

SCSI I \skuz'ē-wən\ *n.* See SCSI.

SCSI ID \skuz'ē I-D\ *n.* The unique identity of a SCSI device. Each device connected to a SCSI bus must have a different SCSI ID. A maximum of eight SCSI IDs can be used on the same SCSI bus. See also bus, SCSI device.

SCSI II \skuz'ē-tyō\ *n.* See SCSI-2.

SCSI network \skuz'ē net'wərk\ *n.* A set of devices on a SCSI bus, which acts like a local area network. See also SCSI.

SCSI port \skuz'ē pōrt\ *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 *n.* See SCSI.

SDH *n.* See Synchronous Digital Hierarchy.

SDK *n.* Acronym for software development kit. See developer's toolkit.

SDLC *n.* Acronym for Synchronous Data Link Control, the data transmission protocol most widely used by networks conforming to IBM's Systems Network Architecture (SNA). SDLC is similar to the HDLC (High-level Data Link Control) protocol developed by the International Organization for Standardization (ISO). *See also* HDLC.

SDM *n.* *See* space-division multiplexing.

SDRAM \S'D'ram\ *n.* Acronym for synchronous DRAM. A form of dynamic random access memory (DRAM) that can run at higher clock speeds than conventional DRAM by employing a bursting technique in which the DRAM predicts the address of the next memory location to be accessed. *See also* dynamic RAM.

SDSL *n.* Acronym for symmetric (or single-line) digital subscriber line, a digital telecommunications technology that is a variation of HDSL. SDSL uses one pair of copper wire rather than two pairs of wires and transmits at 1.544 Mbps. *Compare* ADSL.

.sea *n.* A file extension for a self-extracting Macintosh archive compressed with StuffIt. *See also* self-extracting archive.

seamless integration *n.* The favorable result that occurs when a new hardware component or program blends smoothly into the overall operation of the system. It is usually the result of thoughtful design and programming.

search¹ *n.* The process of seeking a particular file or specific data. A search is carried out by a program through comparison or calculation to determine whether a match to some pattern exists or whether some other criteria have been met. *See also* binary search, hash search, linear search, search and replace, wildcard character.

search² *vb.* **1.** To look for the location of a file. **2.** To seek specific data within a file or data structure. *See also* replace.

search algorithm *n.* An algorithm designed to locate a certain element, called the target, in a data structure. *See also* algorithm, binary search, hash search, linear search.

search and replace *n.* A common process in applications such as word processors in which the user specifies two strings of characters. The process finds instances of the first string and replaces them with the second string.

search criteria *n.* The terms or conditions that a search engine uses to find items in a database. *See also* search engine.

search engine *n.* **1.** A program that searches for keywords in documents or in a database. **2.** On the Internet, a program that searches for keywords in files and documents found on the World Wide Web, newsgroups, Gopher menus, and FTP archives. Some search engines are used for a single Internet site, such as a dedicated search engine for a Web site. Others search across many sites, using such agents as spiders to gather lists of 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 and Excite. Most search engines reside on a server. *See also* agent (definition 2), FTP, Gopher, newsgroup, spider, World Wide Web.

search key *n.* **1.** The particular field (or column) of the records to be searched in a database. *See also* primary key, secondary key. **2.** The value that is to be searched for in a document or any collection of data.

search path *n.* The route followed by an operating system to find the location of a stored file. The search path begins with a drive or volume (disk) designator or a network share, continues through a chain of directories and subdirectories, if any, and ends with the filename. C:\books\dict\start.exe is an example of a search path. *Also called* access path.

search string *n.* The string of characters to be matched in a search—typically (but not necessarily) a text string.

seat¹ *n.* One workstation or computer, in the context of software licensing on a per-seat basis. *See also* license agreement, workstation (definition 1).

seat² *vb.* To insert a piece of hardware fully and position it correctly in a computer or affiliated equipment, as in seating a single inline memory module (SIMM) in its socket.

secondary channel *n.* A transmission channel in a communications system that carries testing and diagnostic information rather than actual data. *Compare* primary channel.

secondary key *n.* A field that is to be sorted or searched within a subset of the records having identical primary key values. *See also* alternate key (definition 1), candidate key. *Compare* primary key.

S

seed *n.* A starting value used in generating a sequence of random or pseudorandom numbers. *See also* random number generation.

seek *n.* The process of moving the read/write head in a disk drive to the proper site, typically for a read or write operation.

seek time *n.* The time required to move a disk drive's read/write head to a specific location on a disk. *See also* access time (definition 2).

segment *n.* A section of a program that, when compiled, occupies a contiguous address space and that is usually position independent; that is, it can be loaded anywhere in memory. With Intel-based microcomputers, a native-mode segment is a logical reference to a 64-KB contiguous portion of RAM in which the individual bytes are accessed by means of an offset value. Collectively, the segment:offset values reference a single physical location in RAM. *See also* overlay¹ (definition 1), real mode, segmentation.

segmentation *n.* The act of breaking up a program into several sections, or segments. *See also* segment.

segmented addressing architecture *n.* A memory-access technique typified by Intel 80x86 processors. Memory is divided into 64-KB segments in this architecture for addressing locations under the 16-bit address scheme; 32-bit schemes can address memory in segments as large as 4 GB. *Also called* segmented instruction addressing, segmented memory architecture. *Compare* linear addressing architecture.

segmented address space *n.* An address space that is logically divided into chunks called segments. To address a given location, a program must specify both a segment and an offset within that segment. (The offset is a value that references a specific point within the segment, based on the beginning of the segment.) Because segments may overlap, addresses are not unique; there are many logical ways to access a given physical location. The Intel 80x86 real-mode architecture is segmented; most other microprocessor architectures are flat. *See also* segment. *Compare* flat address space.

segmented instruction addressing *n.* *See* segmented addressing architecture.

segmented memory architecture *n.* *See* segmented addressing architecture.

select *vb.* **1.** In general computer use, to specify a block of data or text on screen by highlighting it or

otherwise marking it with the intent of performing some operation on it. **2.** In database management, to choose records according to a specified set of criteria. *See also* sort. **3.** In information processing, to choose from a number of options or alternatives, such as subroutines or input/output channels.

selected cell *n.* *See* active cell.

selection *n.* **1.** In applications, the highlighted portion of an on-screen document. **2.** In communications, the initial contact made between a computer and a remote station receiving a message. **3.** In programming, a conditional branch. *See also* conditional branch.

selective calling *n.* The capability of a station on a communications line to designate the station that is to receive a transmission.

selector channel *n.* An input/output data transfer line used by one high-speed device at a time.

selector pen *n.* *See* light pen.

self-adapting *adj.* The ability of systems, devices, or processes to adjust their operational behavior to environmental conditions.

self-checking digit *n.* A digit, appended to a number during its encoding, whose function is to confirm the accuracy of the encoding. *See also* checksum, parity bit.

self-clocking *n.* A process in which timing signals are inserted into a data stream rather than being provided by an external source, such as in phase encoding.

self-documenting code *n.* Program source code that, through its use of a high-level language and descriptive identifiers, can be understood by other programmers without the need for additional comments.

self-extracting archive *n.* *See* self-extracting file.

self-extracting file *n.* An executable program file that contains one or more compressed text or data files. When a user runs the program, it uncompresses the compressed files and stores them on the user's hard drive. *See* the illustration.

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

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

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

S

structured query language *n.* A database sublanguage used in querying, updating, and managing relational databases—the de facto standard for database products. *Acronym:* SQL.

structured walkthrough *n.* **1.** A meeting of programmers working on different aspects of a software development project, in which the programmers attempt to coordinate the various segments of the overall project. The goals, requirements, and components of the project are systematically reviewed in order to minimize the error rate of the software under development. **2.** A method for examining a computer system, including its design and implementation, in a systematic fashion.

STT *n.* See Secure Transaction Technology.

stub *n.* A routine that contains no executable code and that generally consists of comments describing what will eventually be there; it is used as a placeholder for a routine to be written later. *Also called* dummy routine. *See also* top-down programming.

StuffIt *n.* A file compression program originally written for the Macintosh, used for storing a file on one or more disks. Originally shareware, StuffIt is now a commercial product for Macs and PCs that supports multiple compression techniques and allows file viewing. StuffIt files can be uncompressed using a freeware program, StuffIt Expander.

style sheet *n.* **1.** A file of instructions used to apply character, paragraph, and page layout formats in word processing and desktop publishing. **2.** A text file containing code to apply semantics such as page layout specifications to an HTML document. *See also* HTML document, semantics (definition 1).

stylus *n.* A pointing device used with a graphics tablet, usually attached to the tablet with a cord. *Also called* pen. *See also* graphics tablet, puck.

subclass *n.* A class in object-oriented programming that is derived from, and inherits its attributes and methods from, another class known as a superclass. *Compare* superclass.

subcommand *n.* A command in a submenu (a menu that appears when a user selects an option in a higher-level menu).

subdirectory *n.* A directory (logical grouping of related files) within another directory.

subdomain *n.* A domain, often representing an administrative or other organizational subgroup within a second-level domain. *See also* domain.

subject drift *n.* See topic drift.

subject tree *n.* A type of World Wide Web index that is organized by subject categories, many of which are broken down into subcategories, or “branches.” The lowest level of the tree consists of links to specific Web pages. An example of a World Wide Web subject tree is Yahoo! *See also* Yahoo!.

submarining *n.* A phenomenon that occurs when some part of a screen display moves more quickly than the screen can show. The object (such as the mouse pointer) disappears from the screen and reappears where it comes to rest, just as a submarine resurfaces after a dive. Submarining is especially a problem with the slowly responding passive-matrix LCD displays on many laptop computers.

submenu *n.* A menu that appears as the result of the selection of an item on another, higher-level menu.

subnet *n.* **1.** In general, a network that forms part of a larger network. **2.** In terms of the ISO/OSI reference model, the subnet comprises the layers below the transport layer—that is, the network, data link, and physical layers.

subnet mask *n.* See address mask.

subnetwork *n.* A network that is part of another, larger network.

subnotebook computer *n.* A portable computer that is smaller and lighter than a conventional laptop computer.

subportable *n.* See subnotebook computer.

subprogram *n.* A term used in some languages for routine (procedure or function) because the structure and syntax of a subprogram closely model those of a program. *See also* program, routine.

subroutine *n.* A common term for routine, likely to be used in reference to shorter, general, frequently called routines. *See also* procedure, routine.

subschemata *n.* The definition of a user view of the database (in CODASYL/DBTG systems only), roughly equivalent to the external schema of an ANSI/X3/SPARC database management system or to a view in a relational database management system. *See also* schema.

subscribe *vb.* **1.** To add a newsgroup to the list of such groups from which a user receives all new articles. **2.** To add a name to a LISTSERV distribution list. *See also* LISTSERV.

Subscriber Identity Module card *n.* See SIM card.

T

T *prefix* See *tera-*.

T1 or **T-1** *n.* A high-speed communications line that can handle digital communications and Internet access at the rate 1.544 Mbps (megabytes per second). Although originally designed by AT&T to carry multiple voice calls over standard twisted-pair telephone wiring, this high-bandwidth telephone line can also transmit text and images. T1 speed is attained through multiplexing 24 separate 64 kbps channels into a single data stream. T1 lines are commonly used by larger organizations for Internet connectivity. *Also called* T-1 carrier. *See also* T-carrier. *Compare* fractional T1, T2, T3, T4.

T.120 standard *n.* A family of International Telecommunications Union (ITU) specifications for multipoint data communications services within computer applications, such as conferencing and multipoint file transfer.

T2 or **T-2** *n.* A T-carrier that can handle 6.312 Mbps (megabits per second) or 96 voice channels. *See also* T-carrier. *Compare* T1, T3, T4.

T3 or **T-3** *n.* A T-carrier that can handle 44.736 Mbps (megabits per second) or 672 voice channels. *See also* T-carrier. *Compare* T1, T2, T4.

T4 or **T-4** *n.* A T-carrier that can handle 274.176 Mbps or 4,032 voice channels. *See also* T-carrier. *Compare* T1, T2, T3.

TA *n.* *See* terminal adapter.

tab character *n.* A character used to align lines and columns on screen and in print. Although a tab is visually indistinguishable from a series of blank spaces in most programs, the tab character and the space character are different to a computer. A tab is a single character and therefore can be added, deleted, or overtyped with a single keystroke. The ASCII coding scheme includes two codes for tab characters: a horizontal tab for spacing across the screen or page and a vertical tab for spacing down the screen or page. *See also* Tab key.

Tab key *n.* A key, often labeled with both a left-pointing and a right-pointing arrow, that traditionally (as in word processing) is used to insert tab characters into a document. In other applications, such as menu-driven programs, the Tab key is often used to move the on-screen highlight from place to place. Many database and spreadsheet programs allow the user to press the Tab key to move around within a record or between cells. The word *tab* is short for "tabulator," which was the name given to this key on typewriters, where it was used in creating tables. *See also* tab character.

table *n.* **1.** In programming, a data structure usually consisting of a list of entries, each entry being identified by a unique key and containing a set of related values. A table is often implemented as an array of records, a linked list, or (in more primitive languages) several arrays of different data types, all using a common indexing scheme. *See also* array, list, record¹. **2.** In relational databases, a data structure characterized by rows and columns, with data occupying or potentially occupying each cell formed by a row-column intersection. The table is the underlying structure of a relation. *See also* relational database. **3.** In word processing, desktop publishing, and in HTML documents, a block of text formatted in aligned rows and columns.

table lookup *n.* The process of using a known value to search for data in a previously constructed table of values—for example, using a purchase price to search a tax table for the appropriate sales tax. *See also* lookup.

tablet *n.* *See* graphics tablet.

tabulate *vb.* **1.** To total a row or column of numbers. **2.** To arrange information in table form.

TACACS *n.* Acronym for Terminal Access Controller Access Control System. A network access technique in which users log into a single centralized server that contains a database of authorized accounts. After the access server authenticates the

trigger *n.* In a database, an action that causes a procedure to be carried out automatically when a user attempts to modify data. A trigger can instruct the database system to take a specific action, depending on the particular change attempted. Incorrect, unwanted, or unauthorized changes can thereby be prevented, helping to maintain the integrity of the database.

trigonometry *n.* The branch of mathematics dealing with arcs and angles, expressed in functions (for example, sine and cosine) that show relationships—for example, between two sides of a right triangle or between two complementary angles.

triple-pass scanner *n.* A color scanner that performs one scanning pass on an image for each of the three primary colors of light (red, green, and blue). *See also* color scanner.

tristimulus values *trī-stī'myə-lus val'yōōz* *n.* In color graphics, the varying amounts of three colors, such as red, blue, and green, that are combined to produce another color. *See also* color, color model.

troff *ˈT-rof* *n.* Short for typesetting **runoff**. A UNIX text formatter often used to format man pages. *See also* man pages, RUNOFF. *Compare* TeX.

Trojan horse *n.* A destructive program disguised as a game, utility, or application. When run, a Trojan horse does something harmful to the computer system while appearing to do something useful. *See also* virus, worm.

troll *vb.* To post a message in a newsgroup or other online conference in the hopes that somebody else will consider the original message so outrageous that it demands a heated reply. A classic example of trolling is an article in favor of torturing cats posted in a pet lovers' newsgroup. *See also* YHBT.

troubleshoot *vb.* To isolate the source of a problem in a program, computer system, or network and remedy it.

troubleshooter *n.* A person trained and hired to find and resolve problems or breakdowns in machinery and technical equipment or systems. Troubleshooters often work as short-term consultants or freelancers because many organizations and businesses regard troubleshooting as a short-term effort or possibly an exceptional—unplanned—part of a project or system. *See also* troubleshoot.

trouble ticket *n.* A report of a problem with a particular device or system that is tracked through the workflow process. Originally written on paper, elec-

tronic trouble tickets are featured by many workflow and help-desk applications. *See also* help desk (definition 2), workflow application.

True BASIC *n.* A version of Basic created in 1983 by John Kemeny and Thomas Kurtz, the creators of the original Basic, to standardize and modernize the language. True BASIC is a compiled, structured version of Basic that does not require line numbers. True BASIC includes advanced control structures that make structured programming possible. *See also* Basic, structured programming.

true color *n.* *See* 24-bit color.

true complement *n.* *See* complement.

TrueType *n.* An outline font technology introduced by Apple Computer, Inc., in 1991 and by Microsoft Corporation in 1992 as a means of including high-grade fonts within the Macintosh and Windows operating systems. TrueType is a WYSIWYG font technology, which means that the printed output of TrueType fonts is identical to what appears on the screen. *See also* bitmapped font, outline font, PostScript.

truncate *vb.* To cut off the beginning or end of a series of characters or numbers; specifically, to eliminate one or more of the least significant (typically rightmost) digits. In truncation, numbers are simply eliminated, unlike rounding, in which the rightmost digit might be incremented to preserve accuracy. *Compare* round.

trunk *n.* 1. In communications, a channel connecting two switching stations. A trunk usually carries a large number of calls at the same time. 2. In networking, the cable forming the main communications path on a network. On a bus network, the single cable to which all nodes connect. *See also* backbone.

truth table *n.* A table showing the value of a Boolean expression for each of the possible combinations of variable values in the expression. *See also* AND, Boolean operator, exclusive OR, NOT, OR.

TSAPI *ˈT'sa'pē* *n.* Acronym for Telephony Services Application Programming Interface. The set of standards for the interface between a large telephone system and a computer network server, developed by Novell and AT&T and supported by many telephone equipment manufacturers and software developers. *Compare* TAPI.

TSR *n.* Acronym for terminate-and-stay-resident. A program that remains loaded in memory even when it is not running, so that it can be quickly invoked for a

programming version of Basic. Visual Basic was designed for building Windows-based applications. *See also* Basic; Visual Basic, Scripting Edition; Visual Basic for Applications; visual programming.

Visual Basic for Applications *n.* A macro-language version of Visual Basic that is used to program many Windows 9x applications and is included with several Microsoft applications. *Acronym:* VBA. *See also* macro language, Visual Basic.

Visual Basic Script *n.* *See* Visual Basic, Scripting Edition.

Visual Basic, Scripting Edition *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++ *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 *n.* *See* graphical user interface.

visualization *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++ *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 *n.* A method of programming using a programming environment or language in which basic program components can be selected through menu choices, buttons, icons, and other pre-determined methods.

VLAN \V'lan\ *n.* *See* virtual LAN.

VLB¹ *adj.* *See* VESA¹.

VLB² *n.* *See* VL bus.

VL bus *n.* Short for VESA local bus. A type of local bus architecture introduced by the Video Electronics Standards Association. The VL bus specification allows up to three VL bus slots to be built into a PC

motherboard and allows for bus mastering (wherein "intelligent" adapter cards can do some processing independently of the CPU). A VL bus slot consists of a standard connector plus an additional 16-bit Micro Channel Architecture connector and must be built into the motherboard by the manufacturer. Standard connectors cannot simply be converted to VL bus slots. A non-VL bus adapter card can be used in a VL bus slot, but it cannot use the local bus and so performs as it normally would in a non-VL bus slot. *Also called* VL local bus. *See also* local bus, PCI local bus.

VLF radiation *n.* Short for very-low-frequency radiation. Electromagnetic radiation (radio) at frequencies within the range of approximately 300 Hz to 30,000 Hz (30 kHz). Computer monitors emit this type of radiation. A voluntary standard, MPR II, regulates the amount of VLF radiation that a monitor can emit. *See also* MPR II.

VLIW *n.* Acronym for Very Long Instruction Word. An architecture that combines many simple instructions into a single long instruction word that uses different registers.

VL local bus *n.* *See* VL bus.

VLSI *n.* *See* very-large-scale integration.

VM *n.* Acronym for Virtual Machine. An operating system for IBM mainframes that provides virtual-machine capability. VM was developed by IBM customers and later taken over by IBM itself under the name OS/VM. *See* virtual machine, virtual memory.

VML *n.* Acronym for Vector Markup Language. A specification for editable 2-D vector graphics in an HTML or XML document. An application of XML (Extensible Markup Language), VML uses XML tags and Cascading Style Sheets to create and place vector graphics, such as circles and squares, in an XML or HTML document, such as a Web page. These graphics, which are rendered in the native operating system, can include color and are editable in a variety of graphics programs. The specification was submitted to the W3C in 1998 by a variety of computer companies, including AutoDesk, Microsoft, Hewlett-Packard, Macromedia, and Visio. *See also* Cascading Style Sheets, XML.

voice answer back *n.* The use of sound-recorded messages by a computer in responding to commands or queries. *Acronym:* VAB.

wristwatch but which, unlike those items, is interactive, responds to commands, and carries out instructions. A wearable computer may be used like a conventional computer for data collection, storage, and retrieval, but without tying the user to a stationary location while operating the computer. The earliest wearable computers were clandestine devices used in the mid-1960s to predict the performance of roulette wheels. Today, wearable computers are used for such applications as inventory and express package tracking.

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 *n.* *See* World Wide Web.

Web address *n.* *See* URL.

Web author *n.* A person who creates content for the World Wide Web. A Web author might be a writer who produces text for a designer to include in a Web page, or such an author might be a Web designer who writes the text and also adds graphic elements and prepares the HTML code.

Web-Based Enterprise Management *n.* *See* WBEM.

Web browser *n.* Software that lets a user view HTML documents and access files and software related to those documents. Originally developed to allow users to view or "browse" documents on the World Wide Web, Web browsers can blur the distinction between local and remote resources for the user by also providing access to documents on a network, an intranet, or the local hard drive. Web browser software is built on the concept of hyperlinks, which allow users to point and click with a mouse in order to jump from document to document in whatever order they desire. Most Web browsers are also capable of downloading and transferring files, providing access to newsgroups, displaying graphics embedded in the document, playing audio and video files associated with the document, and executing small programs, such as Java applets or ActiveX controls included by programmers in the documents. Helper applications or plug-ins are required by some Web browsers to accomplish one or more of these tasks. *Also called* browser. *See also* ActiveX control, helper application, hyperlink, Internet Explorer, Java applet, Lynx, Mosaic, Netscape Navigator, plug-in.

webcasting *n.* Popular term for broadcasting information via the World Wide Web, using push and pull

technologies to move selected information from a server to a client. An emergent technology in 1997, webcasting was developed to provide users with customized content—for example, sports, news, stocks, and weather—that can be updated both regularly and automatically. Webcasting gives users the ability to specify the type of content they want to see, and it gives content providers a means of delivering such information directly to the user's desktop. *See also* pull, push (definition 2).

WebCrawler *n.* A World Wide Web search engine operated by America Online. *See also* search engine.

Web development *n.* The design and coding of World Wide Web pages.

Web directory *n.* A list of Web sites, giving the URL and a description of each. *See also* URL.

Web index *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 *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 and design of the site. *Also called* webmistress, webweaver.

webmistress *n.* *See* webmaster.

Web page *n.* A document on the World Wide Web. A Web page consists of an HTML file, with associated files for graphics and scripts, in a particular directory on a particular machine (and thus identifiable by a URL). Usually a Web page contains links to other Web pages. *See also* URL.

Web phone *n.* *See* Internet telephone.

Web rage *n.* 1. Anger or frustration related to the use or operation of the Internet. 2. An intemperate, rude, or angry posting on the Internet; a flame. 3. The latest fad to gain popularity among Web users.

Web server *n.* *See* HTTP server.

Web site *n.* A group of related HTML documents and associated files, scripts, and databases that is served up by an HTTP server on the World Wide Web. The HTML documents in a Web site generally cover one or more related topics and are interconnected through hyperlinks. Most Web sites have a home page as their starting point, which frequently functions as a table

W

of contents for the site. Many large organizations, such as corporations, will have one or more HTTP servers dedicated to a single Web site. However, an HTTP server can also serve several small Web sites, such as those owned by individuals. Users need a Web browser and an Internet connection to access a Web site. *See also* home page, HTML, HTTP server (definition 1), Web browser.

Web terminal *n.* A system containing a central processing unit (CPU), RAM, a high-speed modem or other means of connecting to the Internet, and powerful video graphics, but no hard disk, intended to be used solely as a client to the World Wide Web rather than as a general-purpose computer. *Also called* network computer.

WebTV *n.* A system that provides consumers with the ability to access the Web as well as send and receive e-mail on a television by means of a set-top box equipped with a modem. Users must have an ISP (Internet service provider) and subscribe to the WebTV Network. Developed by WebTV Networks, WebTV was purchased by Microsoft in 1996.

webweaver *n.* *See* webmaster.

webzine *n.* An electronic publication distributed primarily through the World Wide Web, rather than as an ink-on-paper magazine. *See also* ezine.

weighted code *n.* A data representation code in which each bit position has a specified inherent value, which might or might not be included in the interpretation of the data, depending on whether the bit is on or off.

welcome page *n.* *See* home page.

WELL \wel\ *n.* Acronym for Whole Earth 'Lectronic Link. A conferencing system based in San Francisco, California, that is accessible through the Internet and through dial-up access points in many major cities. The WELL attracts many computer professionals, along with other people who enjoy participating in one of the Internet's most successful virtual communities. Because of the number of journalists and other prominent people who participate in the WELL, it has substantial influence beyond its own relatively small number of subscribers.

well-behaved *adj.* 1. Of, pertaining to, or characteristic of a program that performs properly even when given extreme or erroneous input values. 2. Obeying the rules of a particular programming environment.

well-mannered *adj.* *See* well-behaved.

wetware *n.* Slang for human beings—part of the environment that also includes hardware and software. *Also called* liveware.

WFC *n.* *See* Windows Foundation Classes.

“what-if” evaluation *n.* A kind of spreadsheet evaluation in which certain values in a spreadsheet are changed in order to reveal the effects of those changes. For example, a spreadsheet user can use “what-if” evaluation to try different mortgage rates and terms to see the effect on monthly payments and on total interest paid over the life of a loan.

whatis *n.* 1. A UNIX utility for obtaining a summary of a keyword's documentation. *See also* man pages. 2. An Archie command for locating software whose description contains desired words.

What You See Before You Get It *adj.* *See* WYSBYGI.

What You See Is What You Get *adj.* *See* WYSIWYG.

wheel printer *n.* *See* daisy-wheel printer.

Whetstone \hwet'stōn\ *n.* A benchmark test that attempts to measure the speed and efficiency with which a computer carries out floating-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* benchmark¹, Dhrystone, sieve of Eratosthenes.

WHIRLWIND *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 *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 box testing *n.* A method of testing software that is based on knowledge of how the software is intended to function. Unlike black box testing, which focuses on how the software functions without reference to how it is designed, white box testing relies on detailed knowledge of the program code itself and is intended to find flaws and/or errors in its design and

window definition function *n.* A resource associated with a window in a Macintosh application. The Macintosh Window Manager calls this function to perform such actions as drawing and resizing the window. *Also called* WDEF.

windowing environment *n.* An operating system or shell that presents the user with specially delineated areas of the screen called *windows*. Windowing environments typically allow windows to be resized and moved around on the display. The Macintosh Finder, Windows, and the OS/2 Presentation Manager are all examples of windowing environments. *See also* graphical user interface, window.

window random access memory *n.* *See* WRAM.

Windows *n.* An operating system introduced by Microsoft Corporation in 1983. Windows is a multitasking graphical user interface environment that runs on MS-DOS-based computers (Windows 3x and Windows for Workgroups), and as a self-contained operating system for desktop computers (Windows 9x), workstations (Windows NT Workstation, Windows 2000 Professional), and network servers (Windows NT Server, Windows NT Enterprise Edition, Windows 2000 Server, and Windows 2000 Advanced Server). Windows provides a standard graphical interface based on drop-down menus, windowed regions on the screen, and a pointing device such as a mouse.

Windows 2000 *n.* A line of desktop operating systems and network servers announced by Microsoft in 1998. Designed to replace the NT line of products, Windows 2000 is built upon the NT kernel and features an interface that closely resembles Windows NT and Windows 9x. Included in the Windows 2000 line are Windows 2000 Professional, Windows 2000 Server, Windows 2000 Advanced Server, and Windows 2000 Datacenter Server. Windows 2000 was originally announced as Windows NT 5.0. *See also* Windows.

Windows 2000 Advanced Server *n.* Microsoft's network server for larger organizations. Designed to replace Windows NT 4.0 Enterprise Edition, it supports up to four-way SMP, large physical memories, and database-intensive work. It integrates clustering and load balancing support. *See also* SMP, Windows.

Windows 2000 Datacenter Server *n.* Microsoft's network server for larger organizations. Considered as the most powerful and functional server operating system ever offered by Microsoft, it supports up to

16-way SMP and up to 64GB of physical memory (depending on system architecture). Like Windows 2000 Advanced Server, it provides both clustering and load balancing services as standard features. It is optimized for large data warehouses, econometric analysis, large-scale simulations in science and engineering, OLTP, and server consolidation projects. *See also* OLTP, SMP, Windows.

Windows 2000 Professional *n.* Microsoft's mainstream desktop operating system for businesses of all sizes. Designed to replace Windows NT Workstation 4.0, which many people are using today as the standard business desktop, Windows 2000 Professional builds upon the interface and kernel in NT 4.0. It also includes improved security, state-of-the-art features for mobile users, industrial-strength reliability, and better performance.

Windows 2000 Server *n.* Microsoft's network server for small to medium businesses. Designed to replace Windows NT 4.0 Server, Windows 2000 Server offers improved functionality and supports new systems with up to two-way symmetric multiprocessing (SMP).

Windows 95 *n.* An operating system with a graphical user interface for 80386 and higher processors, released by Microsoft Corporation in 1995. Intended to replace Windows 3.11, Windows for Workgroups 3.11, and MS-DOS, Windows 95 is a complete operating system, rather than a shell that requires MS-DOS, as does Windows 3.x. For backward compatibility, Windows 95 can run MS-DOS software. Under Windows 95, filenames can be up to 255 characters long and may include dots and spaces. Windows 95 supports the Plug and Play method for installing and configuring hardware and can access Windows, NetWare, and UNIX networks. The minimum configuration for Windows 95 is an 80386 processor with 4 MB of RAM, but an i486 or higher processor with at least 8 MB of RAM is recommended. *See also* MS-DOS, NetWare, Plug and Play, Windows, Windows for Workgroups.

Windows 98 *n.* An operating system with a graphical user interface for i486 and higher processors, released by Microsoft Corporation in 1998. Building upon Windows 95, Windows 98 features an improved interface and has been designed to be more robust. With the Active Desktop, Windows 98 integrates

XSL *n.* Acronym for Extensible Stylesheet Language. A language for specifying stylesheets that apply formatting to complex XML data, for presentation in HTML or other formats. The proposal for XSL was submitted to the W3C (World Wide Web Consortium) in 1997. Unlike cascading style sheets (CSS), which map an XML element into a single display object, XSL can map a single XML element to more than one type of display object—for example, both an element in a list and an item in a table. Although XSL and CSS differ, they are complementary, rather than mutually exclusive formatting technologies. CSS has fewer capabilities than XSL, but CSS has been around longer than XSL and as a result has more tools and support. *See also* XML. *Compare* Cascading Style Sheets.

X terminal *n.* An intelligent display device, connected to an Ethernet network, that performs operations on request from client applications in an X Window System. *See also* Ethernet (definition 1), X Window System.

XT keyboard *n.* *See* PC/XT keyboard.

X Windows *n.* *See* X Window System.

X Window System *n.* A nonproprietary standardized set of display-handling routines, developed at MIT. Most often encountered on UNIX workstations, the X Window System is independent of hardware and

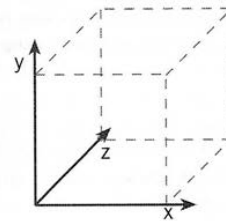
operating system. An X Window System client calls on the server, which is located on the user's workstation, to provide a window in which the client can generate a display of text or graphics. *Also called* X Windows. *See also* X Consortium.

X-Y display *n.* *See* vector display.

x-y matrix *n.* An arrangement of rows and columns with a horizontal (x) axis and a vertical (y) axis.

x-y plotter *n.* *See* plotter.

x-y-z coordinate system *n.* A three-dimensional system of Cartesian coordinates that includes a third (z) axis running perpendicular to the horizontal (x) and vertical (y) axes. The x-y-z coordinate system is used in computer graphics for creating models with length, breadth, and depth. *See the illustration. See also* Cartesian coordinates.



x-y-z coordinate system.

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