

OVER
10,000
ENTRIES

Microsoft

Computer Dictionary

Fifth Edition

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



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Introduction

The *Microsoft Computer Dictionary, Fifth Edition* is designed to be a comprehensive and authoritative source of definitions for computer-related terms and abbreviations. The dictionary includes terms drawn from a wide variety of topics relevant to computer users, including software, hardware, networking, data storage, graphics, games, information processing, the Internet and the World Wide Web, gaming, history, jargon and slang, organizations, programming, and standards.

Although this book covers nearly every aspect of computing, it does not include entries on most companies or on most makes and models of computers, nor does it contain entries on most application software products. The few exceptions to this rule of thumb are key companies and products that have a historical or universal importance within the computing industry.

This dictionary emphasizes terminology that the average computer user will encounter in documentation, online help, computer manuals, marketing and sales materials, the popular media, and the computer trade press. Because most computer users operate personal computers and desktop systems at home, work, or both, the majority of the entries in this dictionary cover the terminology used in describing and working with these systems. However, some specialized or highly technical language is included that pertains to areas of industry, academia, software and hardware development, and research. These terms have been included because they have a bearing on more common computer terminology or because they are of historical significance.

Changes in the Fifth Edition

The fifth edition of the *Microsoft Computer Dictionary* has been revised and expanded to include over 10,000 entries, reflecting the many advances in the computer field and

including several areas that have come into prominence in the public eye, such as networking, Web authoring, and new technologies, such as .NET. The content from the Year 2000 appendix has been integrated into the body of the dictionary and a new appendix on emoticons and instant messaging symbols has been added.

Order of Presentation

Entries are alphabetized by letter. Spaces are ignored, as are characters such as hyphens and slashes; for example, *Baud-dot code* falls between *baud* and *baud rate*, and *machine-independent* falls between *machine identification* and *machine instruction*. Numbers and symbols are located at the beginning of the book and are listed in ascending ASCII order. If an entry begins with a letter or letters but contains a number, it is listed alphabetically, according to the initial letter(s), and then according to ASCII order. Thus, V20 precedes V.2x, and both precede VAB.

Entries

Entries are of two types: main entries, which contain full definitions, and synonymous cross-references, which contain *See* references to the appropriate main entries. Synonymous cross-references are generally secondary or less common ways of referring to a main entry. The definition at the main entry can be substituted as a definition for the synonymous cross-reference.

Format

Information in each main entry is presented in a consistent format: entry name in boldface, spelling variants (if any), part of speech, definition, illustration or table reference (if any), acronym (if any), alternative names (if any), and cross-references (if any).

Main Entries

Entries that are acronyms or abbreviations for one or more words or concatenations of two or more words have those words spelled out at the beginning of the definition. The letters in these words or phrases that make up the acronym, abbreviation, or concatenation are in boldface.

When a main entry is spelled exactly the same as another main entry, the two entries are differentiated by the use of a superscript numeral after each term. These entries are called homographs, and they are generally different parts of speech. For example,

e-mail¹ (*noun*)

e-mail² (*verb*)

Spelling Variants

When a main entry has one or more variations in the way it is spelled, each spelling variant follows the main entry, after the word *or*.

Parts of Speech

Entries are broken down into four parts of speech, in addition to prefixes, abbreviated as follows:

n. noun

vb. verb

adj. adjective

adv. adverb

Definitions

Each of the more than 10,000 entries is written in clear, standard English. Many go beyond a simple definition to provide additional detail and to put the term in context for a typical computer user. When an entry has more than one sense or definition, the definitions are presented in a numbered list, to make it easier to distinguish the particular, sometimes subtle, variations in meaning.

Illustration and Table References

Some entries have affiliated illustrations or tables that aid in defining the entry. In most cases, illustrations and tables appear on the same page as the entries to which they apply.

In some instances, however, page layout requirements have forced them to a subsequent page. Entries with illustrations or tables usually have references at the end of the definition for an entry, in the following formats:

See the illustration.

See the table.

Acronyms

Some terminology in the computer field, particularly computer standards and Internet slang, can be shortened to form acronyms. Sometimes the acronym is the more common way to refer to the concept or object; in these cases, the acronym is the main entry. In other cases, the acronym is not as commonly used as the words or phrase for which it stands. In these cases, the words or phrase constitute the main entry. The acronym is given after the definition for these entries in the following format:

Acronym:

Alternative Names

Some items or concepts in the computer field can be referred to by more than one name. Generally, though, one way is preferred. The preferred terminology is the main entry. Alternative names are listed after any acronyms; otherwise they are listed after the definition in the following format:

Also called:

Cross-References

Cross-references are of three types: *See*, *See also*, and *Compare*. A *See* reference is used in an entry that is a synonymous cross-reference and simply points to another entry that contains the information sought. A *See also* reference points to one or more entries that contain additional or supplemental information about a topic and follows any acronyms or alternative names after the definition. A *Compare* reference points to an entry or entries that offer contrast and follows any *See also* references; otherwise it follows any acronyms or alternative names after the definition.

B

erty techniques that rely on measurable, individual biological stamps to recognize or verify an individual's identity. For example, fingerprints, handprints, or voice-recognition might be used to enable access to a computer, to a room, or to an electronic commerce account. Security schemes are generally categorized into three levels: level 1 relies on something the person carries, such as an ID badge with a photo or a computer cardkey; level 2 relies on something the person knows, such as a password or a code number; and level 3, the highest level, relies on something that is a part of the person's biological makeup or behavior, such as a fingerprint, the pattern of blood vessels in a retina, or a signature. *See also* fingerprint reader, handwriting recognition (definition 1), voice recognition.

bionics *n.* The study of living organisms, their characteristics, and the ways they function, with a view toward creating hardware that can simulate or duplicate the activities of a biological system. *See also* cybernetics.

BIOS *n.* Acronym for **basic input/output system**. On PC-compatible computers, the set of essential software routines that tests hardware at startup, starts the operating system, and supports the transfer of data among hardware devices, including the date and time. The operating system date is initialized from the BIOS or Real Time Clock date when the machine is booted. Many older PCs, particularly those dating before 1997, have BIOSs that store only 2-digit years and thus may have suffered from Year 2000 problems. The BIOS is stored in read-only memory (ROM) so that it can be executed when the computer is turned on. Although critical to performance, the BIOS is usually invisible to computer users. *See also* AMI BIOS, CMOS setup, Phoenix BIOS, ROM BIOS. *Compare* Toolbox.

BIOS test *n.* A test to see if a PC will make the transition to the year 2000 and keep the correct date. The test can range from resetting the system time in the BIOS and

rebooting to running a program or software routine specially designed to uncover Year 2000 problems.

bipartite virus *n.* *See* multipartite virus.

bipolar *adj.* **1.** Having two opposite states, such as positive and negative. **2.** In information transfer and processing, pertaining to or characteristic of a signal in which opposite voltage polarities represent on and off, true and false, or some other pair of values. *See also* nonreturn to zero. *Compare* unipolar. **3.** In electronics, pertaining to or characteristic of a transistor having two types of charge carriers. *See also* transistor.

BIS *n.* *See* business information system.

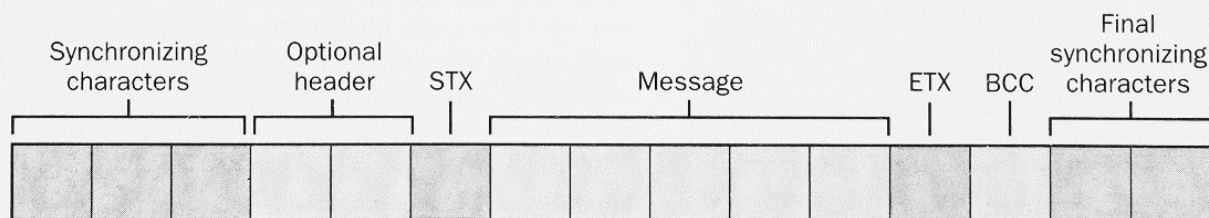
BISDN *n.* *See* broadband ISDN.

bistable *adj.* Of, pertaining to, or characteristic of a system or device that has two possible states, such as on and off. *See also* flip-flop.

bistable circuit *n.* Any circuit that has only two stable states. The transition between them must be initiated from outside the circuit. A bistable circuit is capable of storing 1 bit of information.

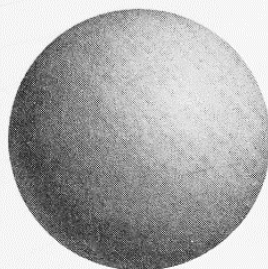
bistable multivibrator *n.* *See* flip-flop.

BISYNC *n.* Short for **binary synchronous communications protocol**. A communications standard developed by IBM. BISYNC transmissions are encoded in either ASCII or EBCDIC. Messages can be of any length and are sent in units called frames, optionally preceded by a message header. BISYNC uses synchronous transmission, in which message elements are separated by a specific time interval, so each frame is preceded and followed by special characters that enable the sending and receiving machines to synchronize their clocks. STX and ETX are control characters that mark the beginning and end of the message text; BCC is a set of characters used to verify the accuracy of transmission. *See the illustration.* *Also called:* BSC.



BISYNC. The structure of a BISYNC frame.

3-D-rendered sphere



3-D-rendered sphere with bump mapping



Bump mapping. A 3-D-rendered sphere showing bump mapping.

bundle *vb.* To combine products for sale as a lot. Frequently, operating system software and some widely used applications are bundled with a computer system for sale.

bundled software *n.* **1.** Programs sold with a computer as part of a combined hardware/software package. **2.** Smaller programs sold with larger programs to increase the latter's functionality or attractiveness.

burn *vb.* **1.** To write data electronically into a programmable read-only memory (PROM) chip by using a special programming device known variously as a PROM programmer, PROM blower, or PROM blaster. *Also called:* blast, blow. *See also* PROM. **2.** To create read-only memory compact discs (CD-ROMs). **3.** To write data electronically on a flash memory chip or a PC Card Type III. Unlike PROM chips or CD-ROM, flash memory media can be burned, or flashed, repeatedly with new information. *Also called:* flash.

burn in *vb.* **1.** To keep a new system or device running continuously so that any weak elements or components will fail early and can be found and corrected before the system becomes an integral part of the user's work routine. Such a test is often performed at the factory before a device is shipped. **2.** To make a permanent change in the phosphor coating on the inside of a monitor screen by leaving the monitor on and keeping a bright, unchanging image on the screen for extended periods. Such an image will remain visible after the monitor is turned off. Burning in was a danger with older PC monitors; it is no longer a concern with most new PC monitors. *Also called:* ghosting.

burst¹ *n.* Transfer of a block of data all at one time without a break. Certain microprocessors and certain buses have features that support various types of burst transfers. *See also* burst speed (definition 1).

burst² *vb.* To break fanfold continuous-feed paper apart at its perforations, resulting in a stack of separate sheets.

burster *n.* A device used to burst, or break apart at the perforations, fanfold continuous-feed paper.

burst extended-data-out RAM *n.* *See* BEDO DRAM.

burst mode *n.* A method of data transfer in which information is collected and sent as a unit in one high-speed transmission. In burst mode, an input/output device takes control of a multiplexer channel for the time required to send its data. In effect, the multiplexer, which normally merges input from several sources into a single high-speed data stream, becomes a channel dedicated to the needs of one device until the entire transmission has been sent. Burst mode is used both in communications and between devices in a computer system. *See also* burst¹.

burst rate *n.* *See* burst speed (definition 1).

burst speed *n.* **1.** The fastest speed at which a device can operate without interruption. For example, various communications devices (as on networks) can send data in bursts, and the speed of such equipment is sometimes measured as the burst speed (the speed of data transfer while the burst is being executed). *Also called:* burst rate. **2.** The number of characters per second that a printer can print on one line without a carriage return or linefeed. Burst speed measures the actual speed of printing, without consideration of the time taken to advance paper or to move the print head back to the left margin. Almost always, the speed claimed by the manufacturer is the burst speed. By contrast, *throughput* is the number of characters per second when one or more entire pages of text are being printed and is a more practical measurement of printer speed in real-life situations.

bursty *adj.* Transmitting data in spurts, or bursts, rather than in a continuous stream.

bus *n.* A set of hardware lines (conductors) used for data transfer among the components of a computer system. A bus is essentially a shared highway that connects different parts of the system—including the processor, disk-drive controller, memory, and input/output ports—and enables them to transfer information. The bus consists of specialized groups of lines that carry different types of information. One group of lines carries data; another carries memory addresses (locations) where data items are to be found; yet another carries control signals. Buses are characterized by the number of bits they can transfer at a single

B

time, equivalent to the number of wires within the bus. A computer with a 32-bit address bus and a 16-bit data bus, for example, can transfer 16 bits of data at a time from any of 2^{32} memory locations. Most PCs contain one or more expansion slots into which additional boards can be plugged to connect them to the bus.

bus enumerator *n.* A device driver that identifies devices located on a specific bus and assigns a unique identification code to each device. The bus enumerator is responsible for loading information about the devices onto the hardware tree. *See also* bus, device driver, hardware tree.

bus extender *n.* **1.** A device that expands the capacity of a bus. For example, IBM PC/AT computers used a bus extender to add onto the earlier PC bus and allow the use of 16-bit expansion boards in addition to 8-bit boards. *See also* bus. **2.** A special board used by engineers to raise an add-on board above the computer's cabinet, making it easier to work on the circuit board.

business graphics *n.* *See* presentation graphics.

business information system *n.* A combination of computers, printers, communications equipment, and other devices designed to handle data. A completely automated business information system receives, processes, and stores data; transfers information as needed; and produces reports or printouts on demand. *Acronym:* BIS. *See also* management information system.

business logic *n.* A set of rules and calculations built into a business information application. The application uses business logic to sort incoming information and respond accordingly. Business logic functions as a set of guidelines that ensure the application's actions conform to the specific needs of a business.

business software *n.* Any computer application designed primarily for use in business, as opposed to scientific use or entertainment. In addition to the well-known areas of word processing, spreadsheets, databases, and communications, business software for microcomputers also encompasses such applications as accounting, payroll, financial planning, project management, decision and support systems, personnel record maintenance, and office management.

Business Software Alliance *n.* International organization of computer software companies that promotes the interests of the software industry. This alliance focuses on educating the public on the importance of software, advancing free and open world trade, and supporting legislation opposing software piracy and Internet theft. The Business Software Alliance has offices in the United States, Europe, and Asia, with members in more than 60 nations around the world. *Acronym:* BSA.

business-to-business *n.* *See* B2B.

business-to-consumer *n.* *See* B2C.

bus mastering *n.* In modern bus architectures, the ability of a device controller card—a network adapter or a disk controller, for example—to bypass the CPU and work directly with other devices to transfer data into and out of memory. Enabling devices to take temporary control of the system bus for data transfer and bus mastering frees the CPU for other work. This in turn improves performance in tasks, such as video replay and multiple-user queries to large databases, that require simultaneous data access and intensive processing. The technology known as direct memory access (DMA) is a well-known example of bus mastering. *See also* bus, controller, direct memory access. *Compare* PIO.

bus mouse *n.* A mouse that attaches to the computer's bus through a special card or port rather than through a serial port. *See also* mouse. *Compare* serial mouse.

bus network *n.* A topology (configuration) for a LAN (local area network) in which all nodes are connected to a main communications line (bus). On a bus network, each node monitors activity on the line. Messages are detected by all nodes but are accepted only by the node(s) to which they are addressed. A malfunctioning node ceases to communicate but does not disrupt operation (as it might on a ring network, in which messages are passed from one node to the next). To avoid collisions that occur when two or more nodes try to use the line at the same time, bus networks commonly rely on collision detection or token passing to regulate traffic. *See the illustration. Also called:* bus topology, linear bus. *See also* collision detection, contention, CSMA/CD, token bus network, token passing. *Compare* ring network, star network.



Web page, including such features as providing a form that users can fill out, image maps that contain links to other Web pages or resources, and links that users can click on to send e-mail to a specified address. ActiveX controls and Java applets can provide much the same functionality as CGI scripts, through different means. *See also* CGI (definition 1), cgi-bin, image map, Perl. *Compare* ActiveX control, Java applet.

CGM *n.* *See* Computer Graphics Metafile.

chad *n.* The paper removed when a hole is punched in a card, in a tape, or at the perforated edge of continuous-form paper—the computer equivalent of a doughnut hole.

chaining *n.* **1.** In computers, the linking of two or more entities so that they are dependent upon one another for operation. **2.** In programming, the linking of two or more programs so that the first program causes the second program to begin executing. **3.** In programming, linking program statements so that each statement, except for the first, relies on the previous statement for input. **4.** With batch files, linking two or more batch files so that the completion of the first batch file causes the second batch file to begin executing. **5.** With data storage, linking two or more individual units of storage. For example, a single file on a disk may actually be stored on several different sectors of the disk, each of which points to the next sector containing a piece of that file. These sectors are said to be chained together, or, more literally, to be a chain of clusters. **6.** *See* daisy chaining.

chain printer *n.* *See* line printer.

chalkware *n.* *See* vaporware.

Challenge Handshake Authentication Protocol *n.* An authentication scheme used by PPP servers to validate the identity of the originator of a connection, upon connection or any time later. *Acronym:* CHAP. *See also* authentication, PPP.

change directory *n.* *See* cd.

change file *n.* A file that records transactional changes occurring in a database, providing a basis for updating a master file and establishing an audit trail. *Also called:* transaction log. *See also* addition record.

change management *n.* **1.** The process of tracking and controlling updates, revisions, and other changes to a hardware or software product or project. **2.** The process of managing change during a company's restructuring or reengineering.

channel *n.* **1.** A path or link through which information passes between two devices. A channel can be either internal or external to a microcomputer. **2.** In communications, a medium for transferring information. Depending on its type, a communications channel can carry information (data, sound, and/or video) in either analog or digital form. A communications channel can be a physical link, such as the cable connecting two stations in a network, or it can consist of some electromagnetic transmission on one or more frequencies within a bandwidth in the electromagnetic spectrum, as in radio and television, or in optical, microwave, or voice-grade communication. *Also called:* circuit, line. *See also* analog, band, bandwidth, digital, electromagnetic spectrum, frequency. **3.** A single color within a digital color space. For example, the RGB color space contains three channels—red, green, and blue—and all colors within the RGB color space are created with a combination of one or more of those three color channels. In CMYK there are four channels—cyan, magenta, yellow, and black. Color management and graphics applications rely on control and manipulation of individual color channels. *See also* color space.

channel access *n.* **1.** A method used in networked systems to gain access to the data communication channel that links two or more computers. Common methods of channel access are contention, polling, and the token ring network. *See also* channel, contention, polling, token ring network. **2.** In wireless technology, an access method such as CDMA (Code Division Multiple Access). *See also* Code Division Multiple Access.

channel adapter *n.* A device that enables hardware using two different types of communications channels to communicate.

channel aggregator *n.* *See* content aggregator.

channel capacity *n.* The speed at which a communications channel can transfer information, measured in bits per second (bps) or in baud.

Channel Definition Format *n.* A file format based on XML that describes a channel—a collection of Web pages—on a server. The Channel Definition Format is used with the Active Channel feature in Microsoft Internet Explorer to deliver selected, often personalized, information to individuals on a subscription basis. *See also* Active Channel, webcasting.

channel hop *vb.* To switch repeatedly from one IRC channel to another. *See also* IRC.

C

Compressed SLIP *n.* Short for **Compressed Serial Line Internet Protocol**. A version of SLIP using compressed Internet address information, thereby making the protocol faster than SLIP. *Acronym:* CSLIP. *See also* SLIP.

compression *n.* *See* data compression.

compressor *n.* A device that limits some aspect of a transmitted signal, such as volume, in order to increase efficiency.

CompuServe *n.* An online information service that is a subsidiary of America Online. CompuServe provides information and communications capabilities, including Internet access. It is primarily known for its technical support forums for commercial hardware and software products and for being one of the first large commercial online services. CompuServe also operates various private network services.

computational intelligence *n.* The study of the design of intelligent agents whose reasoning is based on computational methods. The central scientific goal of computational intelligence is to understand the principles that make intelligent behavior possible, in natural or artificial systems. An intelligent agent is flexible to changing environments and changing goals—it learns from experience, and it makes appropriate choices given perceptual limitations and finite computation. The central engineering goal of computational intelligence is to specify methods for the design of useful, intelligent artifacts. *See also* agents (definition 2), artificial intelligence, autonomous agent.

computation-bound *adj.* Of, pertaining to, or characteristic of a situation in which the performance of a computer is limited by the number of arithmetic operations the microprocessor must perform. When a system is computation-bound, the microprocessor is overloaded with calculations. *Also called:* CPU-bound.

compute *vb.* **1.** To perform calculations. **2.** To use a computer or cause it to do work.

computer *n.* Any device capable of processing information to produce a desired result. No matter how large or small they are, computers typically perform their work in three well-defined steps: (1) accepting input, (2) processing the input according to predefined rules (programs), and (3) producing output. There are several ways to categorize computers, including class (ranging from microcomputers to supercomputers), generation (first through fifth generation), and mode of processing (analog versus digital). *See* the table. *See also* analog, digital (definition

2), integrated circuit, large-scale integration, very-large-scale integration.

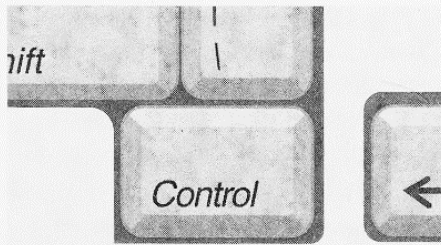
Table C.1 Ways to Categorize Computers

Class	Computers can be classified as supercomputers, mainframes, superminicomputers, minicomputers, workstations, microcomputers, or PDAs. All other things (for example, the age of the machine) being equal, such a categorization provides some indication of the computer's speed, size, cost, and abilities.
Generation	First-generation computers of historic significance, such as UNIVAC, introduced in the early 1950s, were based on vacuum tubes. Second-generation computers, appearing in the early 1960s, were those in which transistors replaced vacuum tubes. Third-generation computers, dating from the 1960s, were those in which integrated circuits replaced transistors. Fourth-generation computers, appearing in the mid-1970s, are those, such as microcomputers, in which large-scale integration (LSI) enabled thousands of circuits to be incorporated on one chip. Fifth-generation computers are expected to combine very-large-scale integration (VLSI) with sophisticated approaches to computing, including artificial intelligence and true distributed processing.
Mode of processing	Computers are either analog or digital. Analog computers, generally used in scientific pursuits, represent values by continuously variable signals that can have any of an infinite number of values within a limited range at any particular time. Digital computers, the type most people think of as computers, represent values by discrete signals—the bits representing the binary digits 0 and 1.

computer-aided design *n.* *See* CAD.

computer-aided design and drafting *n.* *See* CADD.

computer-aided design/computer-aided manufacturing *n.* *See* CAD/CAM.

C**Control key.**

controller *n.* A device that other devices rely on for access to a computer subsystem. A disk controller, for example, controls access to one or more disk drives, managing physical and logical access to the drive or drives.

control logic *n.* The electronic circuitry that generates, interprets, and uses control data.

control panel *n.* In Windows and Macintosh systems, a utility that allows the user to control aspects of the operating system or hardware, such as system time and date, keyboard characteristics, and networking parameters.

control panel device *n.* *See* cdev.

control sequence *n.* *See* control code.

control signal *n.* An electronic signal used to control internal or external devices or processes.

control statement *n.* A statement that affects the flow of execution through a program. Control statements include conditional statements (CASE, IF-THEN-ELSE), iterative statements (DO, FOR, REPEAT, WHILE), and transfer statements (GOTO). *See also* conditional statement, iterative statement, statement, transfer statement.

control strip *n.* **1.** An equipment calibration tool used to determine the corrections needed to restore accuracy by comparing recorded data against known values. **2.** A utility that groups shortcuts to commonly used items or information, such as time, battery power level, desktop items, and programs, in an easily accessible place. *See also* shortcut.

control structure *n.* A portion of a program defined by the relationship between the statements, used in structured programming. There are three basic control structures: sequence, where one statement simply follows another; selection, where program flow depends on which criteria are met; and iteration, where an action is repeated until some condition occurs.

control unit *n.* A device or circuit that performs an arbitrating or regulating function. For example, a memory

controller chip controls access to a computer's memory and is the control unit for that memory.

control variable *n.* In programming, the variable in a control statement that dictates the flow of execution. For example, the index variable in a FOR loop controls the number of times a group of statements are executed. *See also* control statement.

convenience adapter *n.* *See* port replicator.

convention *n.* Any standard that is used more or less universally in a given situation. Many conventions are applied to microcomputers. In programming, for example, a language such as C relies on formally accepted symbols and abbreviations that must be used in programs. Less formally, programmers usually adopt the convention of indenting subordinate instructions in a routine so that the structure of the program is more easily visualized. National and international committees often discuss and arbitrate conventions for programming languages, data structures, communication standards, and device characteristics. *See also* CCITT, ISO, NTSC, standard (definition 1).

conventional memory *n.* The amount of RAM addressable by an IBM PC or compatible machine operating in real mode. This is typically 640 kilobytes (KB). Without the use of special techniques, conventional memory is the only kind of RAM accessible to MS-DOS programs. *See also* protected mode, real mode. *Compare* expanded memory, extended memory.

convergence *n.* A coming together. Convergence can occur between different disciplines and technologies, as when telephone communications and computing converge in the field of telecommunications. It can also occur within a program, such as a spreadsheet, when a circular set of formulas are repeatedly recalculated (iterated), with the results of each iteration coming closer to a true solution.

conversational *adj.* Of, pertaining to, or characteristic of the mode of operation, typical of microcomputers, in which the computer user and the system engage in a dialogue of commands and system responses. *See also* interactive.

conversational interaction *n.* Interaction in which two or more parties alternately transmit and receive messages from each other. *See also* interactive processing.

conversational language *n.* Any programming language that allows the programmer to instruct the computer in a conversational mode, as opposed to more formal, structured languages. For example, in a COBOL program, in order to execute a procedure called CHECK 10 times, a

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.

data interchange format *n.* A format consisting of ASCII codes in which database, spreadsheet, and similar documents can be structured to facilitate their use by and transfer to other programs. *Acronym:* DIF. *See also* ASCII.

data item *n.* *See* data element.

data library *n.* A cataloged collection of data files on disk or in another storage medium.

data link *n.* A connection between any two devices capable of sending and receiving information, such as a

computer and a printer or a main computer and a terminal. Sometimes the term is extended to include equipment, such as a modem, that enables transmission and receiving. Such devices follow protocols that govern data transmission. *See also* communications protocol, data-link layer, DCE (definition 1), DTE.

Data Link Connection Identifier *n.* A virtual circuit on frame relay networks that permanently identifies the path to a particular destination. *See also* frame relay, virtual circuit.

Data Link Control *n.* *See* DLC.

data link escape *n.* In data transmission, a control character that changes the meaning of the characters immediately following it.

data-link layer *n.* The second of seven layers in the ISO/OSI reference model for standardizing computer-to-computer communications. The data-link layer is one layer above the physical layer. Its concern is packaging and addressing data and managing the flow of transmissions. It is the lowest of the three layers (data-link, network, and transport) involved in actually moving data between devices. *See the illustration. See also* ISO/OSI reference model.

ISO/OSI MODEL	
ISO/OSI Layer	Focus
Application (highest level)	Program-to-program transfer of information
Presentation	Text formatting and display, code conversion
Session	Establishing, maintaining, and coordinating communication
Transport	Accurate delivery, service quality
Network	Transport routes, message handling and transfer
Data-link	Coding, addressing, and transmitting information
Physical	Hardware connections

Data-link layer on ISO/OSI reference model.

data management *n.* The control of data from acquisition and input through processing, output, and storage. In microcomputers, hardware manages data by gathering it, moving it, and following instructions to process it. The operating system manages the hardware and ensures that

data signal *n.* The information transmitted over a line or circuit. It consists of binary digits and can include actual information or messages and other elements such as control characters or error-checking codes.

data sink *n.* **1.** Any recording medium where data can be stored until needed. **2.** In communications, the portion of a Data Terminal Equipment (DTE) device that receives transmitted data.

data source *n.* **1.** The originator of computer data, frequently an analog or digital data collection device. **2.** In communications, the portion of a Data Terminal Equipment (DTE) device that sends data.

data stream *n.* An undifferentiated, byte-by-byte flow of data.

data structure *n.* An organizational scheme, such as a record or array, that can be applied to data to facilitate interpreting the data or performing operations on it.

data switch *n.* A device in a computer system that routes incoming data to various locations.

Data Terminal Equipment *n.* See DTE.

Data Terminal Ready *n.* See DTR.

data traffic *n.* The exchange of electronic messages—control and data—across a network. Traffic capacity is measured in bandwidth; traffic speed is measured in bits per unit of time.

data transfer *n.* The movement of information from one location to another, either within a computer (as from a disk drive to memory), between a computer and an external device (as between a file server and a computer on a network), or between separate computers.

data transfer rate *n.* See data rate.

data transmission *n.* The electronic transfer of information from a sending device to a receiving device.

data type *n.* In programming, a definition of a set of data that specifies the possible range of values of the set, the operations that can be performed on the values, and the way in which the values are stored in memory. Defining the data type allows a computer to manipulate the data appropriately. Data types are most often supported in high-level languages and often include types such as real, integer, floating point, character, Boolean, and pointer. How a language handles data typing is one of its major characteristics. See also cast, constant, enumerated data type, strong typing, type checking, user-defined data type, variable, weak typing.

data validation *n.* The process of testing the accuracy of data.

data value *n.* The literal or interpreted meaning of a data item, such as an entry in a database, or a type, such as an integer, that can be used for a variable.

data warehouse¹ *n.* A database, frequently very large, that can access all of a company's information. While the warehouse can be distributed over several computers and may contain several databases and information from numerous sources in a variety of formats, it should be accessible through a server. Thus, access to the warehouse is transparent to the user, who can use simple commands to retrieve and analyze all the information. The data warehouse also contains data about how the warehouse is organized, where the information can be found, and any connections between data. Frequently used for decision support within an organization, the data warehouse also allows the organization to organize its data, coordinate updates, and see relationships between information gathered from different parts of the organization. See also database, decision support system, server (definition 1), transparent (definition 1).

data warehouse² *vb.* To acquire, collect, manage, and disseminate information gathered from various sources into a single location; or to implement an informational database used to store sharable data. Data warehousing is a four-step process: gathering data; managing the data in a centralized location; providing access to the data along with tools for interpreting, analyzing, and reporting on the data; and producing reports on the data to be used for decision making. See also downflow, inflow, metaflow, upflow.

date and time stamp *n.* See time stamp.

date counter overflow *n.* A problem that may occur in systems or programs when the value in a date variable exceeds allowable values. A date counter overflow can occur when an incremental date produces a number that the system interprets as zero or a negative number. This is likely to cause the system or program to post an error message in turn or to revert to the original starting point. Although this was largely considered a Year 2000 problem, such an error is not necessarily confined to the year 2000.

date dependency *n.* In terms of the Year 2000 problem, the need many programs have for date-related input or output data and the way dates are represented in that data. This dependency affects whether the program can run correctly when the turn of the century is reached.

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including the following stages: analysis, design and prototyping, software coding and testing, and implementation.

device *n.* A generic term for a computer subsystem. Printers, serial ports, and disk drives are often referred to as devices; such subsystems frequently require their own controlling software, called device drivers. *See also* device driver.

device address *n.* A location within the address space of a computer's random access memory (RAM) that can be altered either by the microprocessor or by an external device. Device addresses are different from other locations in RAM, which can be altered only by the microprocessor. *See also* device, input/output, RAM.

device control character *n.* *See* control character.

device controller *n.* *See* input/output controller.

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

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

Device Driver Developer Kit *n.* *See* DDK.

Device Driver Kit *n.* *See* DDK.

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

device-independent bitmap *n.* *See* DIB.

device manager *n.* A software utility that allows viewing and changing hardware configuration settings, such as

interrupts, base addresses, and serial communication parameters.

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

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

device partnership *n.* A registry key, stored on the Windows CE device, that a desktop computer uses to identify that Windows CE device when it is connected to the desktop. The key defines values for synchronization, file conversions, and backup and restore information, which enable multiple Windows CE devices to connect to the same desktop computer. A device partnership is created the first time you connect a Windows CE device to a desktop computer.

device resolution *n.* *See* resolution (definition 1).

DFP *n.* *See* digital flat panel port.

DFS *n.* *See* distributed file system.

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

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

Dhrystone *n.* A general-performance benchmarking test, originally developed by Rheinhold Weicker in 1984 to measure and compare computer performance. The test reports general system performance in dhrystones per second. It is intended to replace the older and less reliable Whetstone benchmark. The Dhrystone benchmark, like most benchmarks, consists of standard code revised periodically to minimize unfair advantages to certain combinations of hardware, compiler, and environment. Dhrystone concentrates on string handling and uses no floating-point operations. Like most benchmarking tests, it is heavily



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

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

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

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

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

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

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

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

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

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

Digital Services *n.* *See* DS.

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

Digital Signal *n.* *See* DS.

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

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

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

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

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number can be changed if the font is installed in a system already having a font with that number. *See also* font.

font page *n.* A portion of video memory reserved for holding programmer-specified character definition tables (sets of character patterns) used for displaying text on the screen on IBM Multi-Color Graphics Array video systems.

font size *n.* The point size of a set of characters in a particular typeface. *See also* point¹ (definition 1).

font suitcase *n.* A file on Macintosh computers that contains one or more fonts or desk accessories. Such files are indicated in early versions of the operating system with the icon of a suitcase marked with a capital A. From System 7.0 onward, this icon is used to denote individual fonts.

foo *n.* A string used by programmers in place of more specific information. Variables or functions in code examples intended to demonstrate syntax, as well as temporary scratch files, may all appear with the name *foo*. Likewise, a programmer may type *foo* to test a string input handler. If a second placeholder string is needed, it will often be *bar*, suggesting that the origin of both is the U.S. Army phrase FUBAR (an acronym which, in discreet language, represents Fouled Up Beyond All Recognition/Repair). However, other origins have been claimed. *Compare* fred (definition 2).

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

footprint *n.* The surface area occupied by a personal computer or other device.

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

force feedback *n.* A technology that generates push or resistance in an input/output device. Force feedback enables an input/output device, such as a joystick or a steering wheel, to react to the user's action in appropriate response to events displayed on the screen. For example, force feedback can be used with a computer game to react to a plane rising in a steep ascent or a race car turning a tight corner. *See also* input/output device.

foreground¹ *adj.* Currently having control of the system and responding to commands issued by the user. *See also* multitasking. *Compare* background¹.

foreground² *n.* **1.** The color of displayed characters and graphics. *Compare* background² (definition 1). **2.** The condition of the program or document currently in control and affected by commands and data entry in a windowing environment. *Compare* background² (definition 4).

forest *n.* A collection of one or more domains in Microsoft Windows that share a common schema, configuration, and global catalog and are linked with two-way transitive trusts. *See also* domain, global catalog, schema, transitive trust, two-way trust.

fork¹ *n.* One of the two parts of a file recognized by the Mac OS. A Macintosh file has a data fork and a resource fork. Most or all of a typical user-produced document is in the data fork; the resource fork usually contains application-oriented information, such as fonts, dialog boxes, and menus. *See also* data fork, resource fork.

fork² *vb.* To initiate a child process in a multitasking system after a parent process has been started. *See also* multitasking.

fork bomb *n.* In UNIX-based systems, a program or shell script that locks up the system by recursively spawning copies of itself using the Unix system call "fork(2)" until they occupy all the process table entries. *Also called:* logic bomb.

FOR loop *n.* A control statement that executes a section of code a specified number of times. Actual syntax and usage vary from language to language. In most cases, the value of an index variable moves through a range of values, being assigned a different (and usually consecutive) value each time the program moves through the section of code. *See also* iterative statement, loop¹ (definition 1). *Compare* DO loop.

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

formal language *n.* A combination of syntax and semantics that completely defines a computer language. *See also* Backus-Naur form, semantics (definition 1), syntax.



inline graphics *n.* Graphics files that are embedded in an HTML document or Web page and viewable by a Web browser or other program that recognizes HTML. By avoiding the need for separate file opening operations, inline graphics can speed the access and loading of an HTML document. *Also called:* inline image.

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 stylesheet *n.* A stylesheet included within an HTML document. Because an inline stylesheet is directly associated with an individual document, any changes made to that document's appearance will not affect the appearance of other Web site documents. *Compare* linked stylesheet.

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.

Inmarsat *n.* Acronym for **I**nternational **M**aritime **S**atellite. Organization based in London, England, that operates satellites for international mobile telecommunications services in more than 80 nations. Inmarsat provides services for maritime, aviation, and land use.

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 language *n.* 1. A language to be inputted into the system through the keyboard, a speech-to-text converter, or an Input Method Editor (IME). 2. In Microsoft Windows XP, a Regional and Language Options setting that specifies the combination of the language being entered and the keyboard layout, IME, speech-to-text converter, or other device being used to enter it. This setting was formerly known as input locale.

Input Method Editor *n.* Programs used to enter the thousands of different characters in written Asian languages with a standard 101-key keyboard. An IME consists of both an engine that converts keystrokes into phonetic and ideograph characters and a dictionary of commonly used ideographic words. As the user enters keystrokes, the IME engine attempts to identify which character or characters the keystrokes should be converted into. *Acronym:* IME.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Internaut *n.* *See* cybernaut.

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

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

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

inverted list *n.* A method for creating alternative locators for sets of information. For example, in a file containing data about cars, records 3, 7, 19, 24, and 32 might contain the value “Red” in the field COLOR. An inverted list (or index) on the field COLOR would contain a record for “Red” followed by the locator numbers 3, 7, 19, 24, and 32. *See also* field, record. *Compare* linked list.

inverted-list database *n.* A database similar to a relational database but with several differences that make it much more difficult for the database management system to ensure data consistency, integrity, and security than with a relational system. The rows (records or tuples) of an inverted-list table are ordered in a specific physical sequence, independent of any orderings that may be imposed by means of indexes. The total database can also be ordered, with specified logical merge criteria being imposed between tables. Any number of search keys, either simple or composite, can be defined. Unlike the keys of a relational system, these search keys are arbitrary fields or combinations of fields. No integrity or uniqueness constraints are enforced; neither the indexes nor the tables are transparent to the user. *Compare* relational database.

inverted structure *n.* A file structure in which record keys are stored and manipulated separately from the records themselves.

inverter *n.* **1.** A logic circuit that inverts (reverses) the signal input to it—for example, inverting a high input to a low output. **2.** A device that converts direct current (DC) to alternating current (AC).

invoke *vb.* To call or activate; used in reference to commands and subroutines.

I/O *n.* *See* input/output.

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

I/O controller *n.* *See* input/output controller.

I/O device *n.* *See* input/output device.

ion-deposition printer *n.* A page printer in which the image is formed in electrostatic charges on a drum that picks up toner and transfers it to the paper, as in a laser, LED, or LCD printer, but the drum is charged using a beam of ions rather than light. These printers, used mainly in high-volume data-processing environments, typically operate at speeds from 30 to 90 pages per minute. In ion-deposition printers, toner is typically fused to paper by a method that is fast and does not require heat but leaves the paper a little glossy, making it unsuitable for business cor-

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

I/O port *n.* *See* port¹ (definition 1).

I/O processor *n.* *See* input/output processor.

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

IP *n.* Acronym for **Internet Protocol**. The protocol within TCP/IP that governs the breakup of data messages into packets, the routing of the packets from sender to destination network and station, and the reassembly of the packets into the original data messages at the destination. IP runs at the internetwork layer in the TCP/IP model—equivalent to the network layer in the ISO/OSI reference model. *See also* ISO/OSI reference model, TCP/IP. *Compare* TCP.

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

IP address classes *n.* Short for **Internet Protocol address classes**. The classes into which IP addresses were divided to accommodate different network sizes. Each class is associated with a range of possible IP addresses and is limited to a specific number of networks per class and hosts per network. *See the table.* *See also* Class A IP address, Class B IP address, Class C IP address, IP address.

computers and special-purpose devices such as digital cameras and cellular telephones.

micro-electromechanical systems *n.* See MEMS.

microelectronics *n.* The technology of constructing electronic circuits and devices in very small packages. The most significant advance in microelectronics technology has been the integrated circuit. Circuits that 40 years ago required a roomful of power-hungry vacuum tubes can now be fabricated on a silicon chip smaller than a postage stamp and require only a few milliwatts of power. *See also* integrated circuit.

microfiche *n.* A small sheet of film, about 4 by 6 inches, used for recording photographically reduced images, such as document pages, in rows and columns forming a grid pattern. The resulting images are too small to read with the naked eye, and a microfiche reader is required to view the documents. *Compare* microfilm.

microfilm *n.* A thin strip of film stored on a roll and used to record sequential data images. As with microfiche, a special device magnifies the images so that they can be read. *See also* CIM (definition 2), COM (definition 4). *Compare* microfiche.

M

microfloppy disk *n.* A 3.5-inch floppy disk of the type used with the Macintosh and with IBM and compatible microcomputers. A microfloppy disk is a round piece of polyester film coated with ferric oxide and encased in a rigid plastic shell equipped with a sliding metal cover. On the Macintosh, a single-sided microfloppy disk can hold 400 kilobytes (KB); a double-sided (standard) disk can hold 800 KB; and a double-sided high-density disk can hold 1.44 megabytes (MB). On IBM and compatible machines, a microfloppy can hold either 720 KB or 1.44 MB of information. *See also* floppy disk.

microfluidics *n.* Technology for control and manipulation of fluids on a microscopic scale using microscopic pumps and valves placed on a chip. Microfluidics devices have implications for a number of medical, pharmaceutical, genomics, and other biotechnology applications.

microform *n.* The medium, such as microfilm or microfiche, on which a photographically reduced image, called a *microimage*, is stored. A microimage usually represents text, such as archived documents. *See also* microfiche, microfilm, micrographics.

micrographics *n.* The techniques and methods for recording data on microfilm. *See also* microform.

microimage *n.* A photographically reduced image, usually stored on microfilm or microfiche, that is too small to be read without magnification. *See also* microform, micrographics.

microinstruction *n.* An instruction that is part of the microcode. *See also* microcode.

microjustification *n.* *See* microspace justification.

microkernel *n.* **1.** In programming, the strictly hardware-dependent part of an operating system that is intended to be portable from one type of computer to another. The microkernel provides a hardware-independent interface to the rest of the operating system, so only the microkernel needs to be rewritten to port the operating system to a different platform. *See also* kernel, operating system. **2.** A kernel that has been designed with only the basic features and typically in a modular fashion.

micrologic *n.* A set of instructions, stored in binary form, or a set of electronic logic circuits that defines and governs the operation within a microprocessor.

microminiature *n.* An extremely small circuit or other electronic component, especially one that is a refinement of an already miniaturized element.

microphone *n.* **1.** A device that converts sound waves into analog electrical signals. Additional hardware can convert the microphone's output into digital data that a computer can process; for example, to record multimedia documents or analyze the sound signal. **2.** A communications program that runs on the Macintosh computer.

microphotonics *n.* Technology for directing light on a microscopic scale. Microphotonics employs tiny mirrors or photonic crystals to reflect and transmit specific wavelengths of light, which can carry digital signals. Microphotonics technology has implications for optical networks under development for the telecommunications industry. *See also* MEMS, optical switching.

microprocessor *n.* A central processing unit (CPU) on a single chip. A modern microprocessor can have several million transistors in an integrated-circuit package that can easily fit into the palm of one's hand. Microprocessors are at the heart of all personal computers. When memory and power are added to a microprocessor, all the pieces, excluding peripherals, required for a computer are present.

The most popular lines of microprocessors today are the 680x0 family from Motorola, which powers the Apple Macintosh line, and the 80x86 family from Intel, which is at the core of all IBM PC-compatible computers. *See also* 6502, 65816, 6800, 68000, 68020, 68030, 68040, 80286, 80386DX, 80386SX, 8080, 8086

microprogramming *n.* The writing of microcode for a processor. Some systems, chiefly minicomputers and mainframes, allow modification of microcode for an installed processor. *See also* microcode.

microsecond *n.* One millionth (10^{-6}) of a second.
Abbreviation: μ s.

microsite *n.* **1.** A small Web site targeted to a single message or topic and nested within a larger site. Microsites geared to promotional and sales of specific products and services may be integrated into popular Web sites by advertisers. **2.** A small Web site with a single focus. *Also called:* minisite.

Microsoft Access *n.* *See* Access.

Microsoft Active Accessibility *n.* *See* Active Accessibility.

Microsoft DOS *n.* *See* MS-DOS.

Microsoft Excel *n.* *See* Excel.

Microsoft Foundation Classes *n.* A C++ class library developed by Microsoft. The Microsoft Foundation Class library, or MFC, provides the framework and classes that make it easier and faster for programmers to build Windows applications. MFC supports ActiveX and is bundled with several C++ compilers, including Microsoft Visual C++, Borland C++, and Symantec C++. *Acronym:* MFC. *See also* ActiveX, C++. *Compare* Application Foundation Classes.

Microsoft FrontPage *n.* A program you can use to create and manage Internet and intranet sites without programming; FrontPage is available as part of one of the Microsoft Office suites or as a stand-alone product.

Microsoft intermediate language *n.* The CPU-independent instruction set into which .NET Framework programs are compiled. It contains instructions for loading, storing, initializing, and calling methods on objects.

Combined with metadata and the common type system, Microsoft intermediate language allows for true cross-language integration. Prior to execution, MSIL is converted to machine code. It is not interpreted. *Acronym:* MSIL.

Microsoft Internet Explorer *n.* *See* Internet Explorer.

Microsoft Knowledge Base *n.* *See* KB (definition 2).

Microsoft Management Console *n.* *See* MMC.

Microsoft MapPoint *n.* *See* MapPoint.

Microsoft Money *n.* *See* Money.

Microsoft MSN Explorer *n.* *See* MSN Explorer.

Microsoft MSN Messenger Service *n.* *See* .NET Messenger Service.

Microsoft .NET Messenger Service *n.* *See* .NET Messenger Service.

Microsoft Network *n.* *See* MSN.

Microsoft Office *n.* *See* Office.

Microsoft Operations Manager *n.* A server and application management solution developed by Microsoft Corporation to deliver event and performance management for the Windows 2000-based environment and .NET Enterprise Server applications. Operations management features include enterprise event log reports from across the corporate network, proactive monitoring and alert messaging, and reporting and trend analysis for problem tracking. Microsoft Operations Manager provides flexibility through sophisticated management rules, which can be customized to meet the needs of individual businesses. Microsoft Operations Manager support for management technology standards permits easy integration with other enterprise management systems.

Microsoft Outlook *n.* *See* Outlook.

Microsoft PowerPoint *n.* *See* PowerPoint.

Microsoft Project *n.* A software application developed by Microsoft Corporation to simplify the planning and management of projects. Microsoft Project includes features that help you build and manage projects, set schedules and milestones, and communicate and share ideas with team members.



modulation *n.* **1.** The process of changing or regulating the characteristics of a carrier wave vibrating at a certain amplitude (height) and frequency (timing) so that the variations represent meaningful information. **2.** In computer communications, the means by which a modem converts digital information sent by a computer to the audio form that it sends over a telephone line.

modulation standards *n.* Protocols that determine how modems convert digital data into analog signals that can be transmitted over telephone lines. Initially, Bell created modulation standards used in the United States, and the CCITT created international recommendations. The ITU-T (formerly called the CCITT) now makes recommendations generally adopted by modem manufacturers both internationally and in the United States. The ITU-TV series recommendations (such as V.34 and V.90) define data communication over the telephone network. The suffixes *-bis* and *-ter* (for example, V.32bis) indicate later versions. *See also* V.34, V.90.

module *n.* **1.** In programming, a collection of routines and data structures that performs a particular task or implements a particular abstract data type. Modules usually consist of two parts: an interface, which lists the constants, data types, variables, and routines that can be accessed by other modules or routines; and an implementation, which is private (accessible only to the module) and which contains the source code that actually implements the routines in the module. *See also* abstract data type, information hiding, Modula-2, modular programming. **2.** In hardware, a self-contained component that can provide a complete function to a system and can be interchanged with other modules that provide similar functions. *See also* memory card, SIMM.

modulo *n.* An arithmetic operation whose result is the remainder of a division operation. For example, $17 \text{ modulo } 3 = 2$ because 17 divided by 3 yields a remainder of 2. Modulo operations are used in programming.

moiré *n.* A visible wavy distortion or flickering in an image that is displayed or printed with an inappropriate resolution. Several parameters affect moiré patterns, including the size and resolution of the image, resolution of the output device, and halftone screen angle.

molecular beam epitaxy *n.* A process used in the fabrication of semiconductor devices, such as integrated circuits. A device employing molecular beam epitaxy creates thin

layers of semiconducting material by vaporizing the material and then directing a beam of molecules at the substrate on which the layer is to be formed. This technique allows very precise and very thin layers to be created.

MOM *n.* Acronym for **messaging-oriented middleware**. A class of programs that translates data and messages between applications that use one format and communications services (such as NetBIOS and TCP/IP) that expect a different format.

monadic *adj.* *See* unary.

Money *n.* Microsoft's Windows-based financial-management software for individuals, families, and small businesses. Money includes tools for managing bank accounts and investments, budgeting, tax estimating and financial planning, and paying bills.

monitor *n.* The device on which images generated by the computer's video adapter are displayed. The term *monitor* usually refers to a video display and its housing. The monitor is attached to the video adapter by a cable. *See also* CRT.

monitoring software *n.* A program or set of programs used to oversee computer-based systems and networks for the purpose of tracking usage or identifying, reporting on, and solving problems at the earliest possible stage. Monitoring software is used in a variety of areas ranging from hardware platforms and their components to operating systems, databases, Internet/intranet access, and business applications. Typically, different tools are used to monitor individual system components, though the individual monitors might feed information to a higher-level monitor in order to encompass an entire computing environment.

monitor port *n.* *See* display port.

monochrome *adj.* Of, pertaining to, or being a monitor that displays images in only one color—black on white (as on early monochrome Macintosh screens) or amber or green on black (as on early IBM and other monochrome monitors). The term is also applied to a monitor that displays only variable levels of a single color, such as a gray-scale monitor.

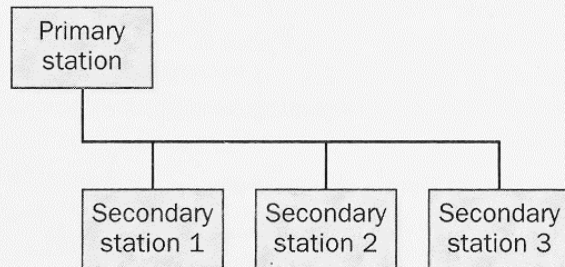
monochrome adapter *n.* A video adapter capable of generating a video signal for one foreground color or sometimes for a range of intensities in a single color, as for a gray-scale monitor.



is the same if the two are reversed—for example, 2×3 and 3×2 . In arithmetic performed by computers, however, the multiplicand is different from the multiplier because computer multiplication is usually performed as addition. Therefore, 2×3 means “add 2 three times,” whereas 3×2 means “add 3 two times.” *See also* factor. *Compare* multiplier (definition 1).

multiplier *n.* **1.** In arithmetic, the number that indicates how many times another number (the multiplicand) is multiplied. *See also* factor. *Compare* multiplicand. **2.** In computing, an electronic device independent of the central processing unit (CPU) that performs multiplication by adding the multiplicand according to the value of the digits in the multiplier.

multipoint configuration *n.* A communications link in which multiple stations are connected sequentially to the same communications line. Typically, the communications line is controlled by a primary station, such as a computer, and the stations attached to the line are secondary. *See* the illustration.



Multipoint configuration.

multiport repeater *n.* *See* active hub.

multiprocessing *n.* A mode of operation in which two or more connected and roughly equal processing units each carry out one or more processes (programs or sets of instructions) in tandem. In multiprocessing, each processing unit works on a different set of instructions or on different parts of the same process. The objective is increased speed or computing power, the same as in parallel processing and in the use of special units called *coprocessors*. *Compare* coprocessor, parallel processing.

multiprogramming *n.* A form of processing in which a computer holds more than one program in memory and works on them in round-robin fashion—that is, by sharing out the processor’s time so that each program receives some

attention some of the time. This way of working is in contrast to using the processor to run one program at a time.

Multiprotocol Label Switching *n.* *See* MPLS.

Multi-Protocol Over ATM *n.* *See* MPOA.

Multipurpose Internet Mail Extensions *n.* *See* MIME.

Multipurpose Internet Mail Extensions HTML *n.* *See* MHTML.

multiscan monitor *n.* A computer monitor capable of adapting to different video frequencies to accommodate multiple screen resolutions and to support different video adapters and graphics display methods.

Multistation Access Unit *n.* *See* MAU.

multisystem network *n.* A communications network in which two or more host computers can be accessed by network users.

multitasking *n.* A form of processing supported by most current operating systems in which a computer works on multiple tasks—roughly, separate “pieces” of work—seemingly at the same time by parceling out the processor’s time among the different tasks. Multitasking can be either cooperative or preemptive. In the former, the operating system relies on the task to voluntarily cede control to another task; in the latter, the operating system decides which task receives priority. *See also* background¹, context switching, cooperative multitasking, foreground¹, time slice.

multithreaded application *n.* A program capable of running more than one program thread simultaneously. *See also* multithreading (definition 1), thread (definition 1).

multithreading *n.* **1.** The running of several processes in rapid sequence (multitasking) within a single program. *See also* thread (definition 1). **2.** In data manipulation, a technique in which nodes in a tree data structure contain pointers to higher nodes to make traversal of the structure more efficient. *See also* thread (definition 2).

multi-tier *n.* *See* three-tier.

multiuser *n.* *See* multiuser system.

multiuser dungeon *n.* *See* MUD.

multiuser simulation environment *n.* *See* MUD.

multiuser system *n.* Any computer system that can be used by more than one person. Although a microcomputer

network database *n.* **1.** A database that runs in a network. **2.** A database containing the address of other users in the network. **3.** In information management, a type of database in which data records can be related to one another in more than one way. A network database is similar to a hierarchical database in the sense that it contains a progression from one record to another. It differs in being less rigidly structured: any single record can point to more than one other record and, conversely, can be pointed to by one or more records. In effect, a network database allows more than one path between any two records, whereas a hierarchical database allows only one, from parent (higher-level record) to child (lower-level record). *Compare* hierarchical database, relational database.

Network Data Management Protocol *n.* See NDMP.

network device driver *n.* Software that coordinates communication between the network adapter card and the computer's hardware and other software, controlling the physical function of the network adapter card.

network directory *n.* On a local area network, a directory on a disk that is located on a computer other than the one the user is operating. A network directory differs from a network drive in that the user has access to only that directory. Whether the rest of the disk is accessible to the user depends on whether he or she has been granted access rights by the network administrator. On the Macintosh, a network directory is referred to as a shared folder. *Also called:* networked directory, shared directory. *See also* network drive, shared folder.

network drive *n.* On a local area network, a disk drive whose disk is available to other computers on the network. Access to a network drive might not be allowed to all users of the network; many operating systems contain security provisions that enable a network administrator to grant or deny access to part or all of a network drive. *Also called:* networked drive. *See also* network directory.

Network Driver Interface Specification *n.* See NDIS.

networked directory *n.* *See* network directory.

networked drive *n.* *See* network drive.

networked home *n.* *See* smart home.

Network File System *n.* *See* NFS.

network information center *n.* *See* NIC (definition 2).

network interface card *n.* An expansion card or other device used to provide network access to a computer or other device, such as a printer. Network interface cards

mediate between the computer and the physical media, such as cabling, over which transmissions travel. *Acronym:* NIC. *Also called:* network adapter, network card.

Network Kernel Extension *n.* *See* NKE.

network latency *n.* The time it takes for information to be transferred between computers in a network.

network layer *n.* The third of the seven layers in the ISO/OSI reference model for standardizing computer-to-computer communications. The network layer is one level above the data-link layer and ensures that information arrives at its intended destination. It is the middle of the three layers (data-link, network, and transport) concerned with the actual movement of information from one device to another. *See* the illustration. *See also* ISO/OSI reference model.

ISO/OSI MODEL	
ISO/OSI Layer	Focus
Application (highest level)	Program-to-program transfer of information
Presentation	Text formatting and display, code conversion
Session	Establishing, maintaining, and coordinating communication
Transport	Accurate delivery, service quality
Network	Transport routes, message handling and transfer
Data-link	Coding, addressing, and transmitting information
Physical	Hardware connections

Network layer.

network meltdown *n.* *See* broadcast storm, meltdown.

network model *n.* A database structure, or layout, similar to a hierarchical model, except that records can have multiple parent records as well as multiple child records. A database management system that supports a network model can be used to simulate a hierarchical model. *See also* CODASYL, network database (definition 3). *Compare* hierarchical model.

network modem *n.* A modem that is shared by users of a network for calling an online service provider, an ISP, a service bureau, or other online source. *See also* ISP, modem online information service, service bureau (definition 2).

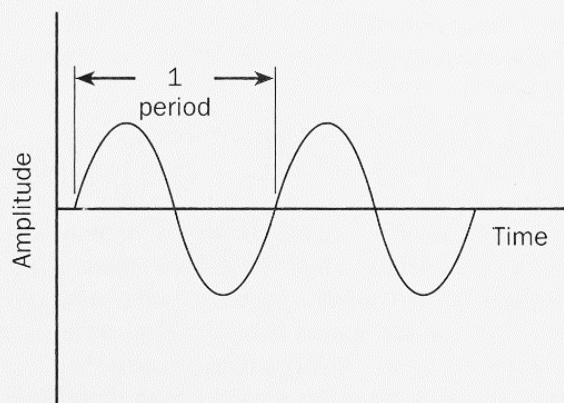
N

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

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

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

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



Period. *The period of an oscillating signal.*

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

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

peripheral device *n.* *See* peripheral.

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

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

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

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

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

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

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

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

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

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

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

pop *vb.* To fetch the top (most recently added) element of a stack, removing that element from the stack in the process. *Compare* push² (definition 1).

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

POP3 *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-under ad *n.* An advertisement on the Internet that appears in a new window in the background, behind the Web site content. Users may be unaware of the presence of pop-under ads until they close foreground windows at the end of a Web session. Pop-under ads may appear in response to a mouse click, a rollover, or after a user has spent a predetermined amount of time at a Web site. *See also* pop-up ad.

pop-up ad *n.* An advertisement on the Internet that appears in a new window in the foreground, often whenever a new page is opened within a site. Pop-up ads may appear in response to a mouse click, a rollover, or after a user has spent a predetermined amount of time at a Web site. *See also* pop-under ad.

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.

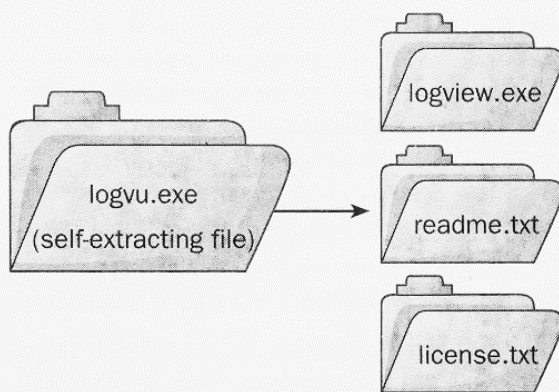
port¹ *n.* **1.** An interface through which data is transferred between a computer and other devices (such as a printer, mouse, keyboard, or monitor), a network, or a direct connection to another computer. The port appears to the CPU as one or more memory addresses that it can use to send or receive 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.** 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.

port 25 blocking *n.* An anti-spam technique adopted by many ISPs to prevent bulk mailings of unsolicited commercial e-mail. Spammers may try to use SMTP servers to relay a single commercial e-mail to multiple recipients. Port 25 blocking filters prevent this spam distribution method. Although it is a popular remedy for some spam problems, port 25 blocking may cause problems for legitimate users of non-compatible e-mail programs.

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.*



Self-extracting file.

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

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

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

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

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

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

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

CANARY — is a — BIRD
|
has
|
FEATHERS

Semantics.

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

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

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

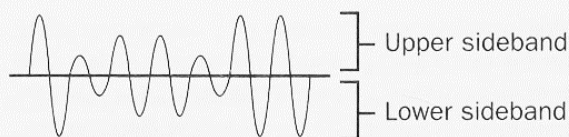
send *vb.* To transmit a message or file through a communications channel.

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

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

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

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



Sideband.

sidebar *n.* A block of text placed to the side of the main body of text in a document, often set off by a border or other graphic element.

side-by-side execution *n.* The ability to install and use multiple versions of an assembly in isolation at the same time. This can occur on the same machine, or in the same process or application domain. Side-by-side execution can apply to applications and components as well as the components of the .NET Framework. Allowing assemblies to run side-by-side is essential to support robust versioning in the common language runtime.

side effect *n.* Any change of state caused by a subroutine, such as a routine that reads a value from a file and advances the current file position.

side head *n.* A heading placed in the margin of a printed document and top-aligned with the body text, rather than being vertically aligned with text, as is a normal head.

sieve of Eratosthenes *n.* An algorithm for finding prime numbers. It is often used as a benchmark in testing the speed of a computer or programming language. *See also* benchmark¹.

.sig *n.* A file extension for a signature file for e-mail or Internet newsgroup use. The contents of this file are automatically appended to e-mail correspondence or newsgroup articles by their respective client software. *See also* signature file (definition 1).

SIG *n.* Acronym for special interest group. An e-mail online discussion group or a group of users who meet and share information, especially one of the groups supported by the Association for Computing Machinery (ACM), such as SIGGRAPH for computer graphics.

SIGGRAPH *n.* Short for Special Interest Group on Computer Graphics, a part of the Association for Computing Machinery (ACM).

sigmoid function *n.* A kind of S-shaped mathematical function arising in many dynamical systems, including neural networks, because it is the solution to a first-order differential equation. It typically maps a real value, which may be arbitrarily large in magnitude (positive or nega-

tive), to another real value, which lies within some narrow range. The sigmoid function, in neural network computation literature, is also sometimes referred to as the logistic function. The reason for its prevalence is that it is thought to resemble the probability that a true neuron generates as an action potential in response to particular input and output. *See also* artificial intelligence, neural network.

sign *n.* The character used to indicate a positive or negative number. In assembly-level programming, the sign is indicated by the sign bit accompanying the number. *See also* sign bit.

signal *n.* **1.** Any electrical quantity, such as voltage, current, or frequency, that can be used to transmit information. **2.** A beep or tone from a computer's speaker or a prompt displayed on screen that tells a user that the computer is ready to receive input.

signal converter *n.* A device or circuit that converts a signal from one form to another, such as analog to digital, or pulse code modulation to frequency modulation.

signal-to-noise ratio *n.* The amount of power, measured in decibels, by which the signal exceeds the amount of channel noise at the same point in transmission. *Abbreviation:* S/N. *See also* noise (definition 2).

signature *n.* **1.** A sequence of data used for identification, such as text appended to an e-mail message or a fax. **2.** A unique number built into hardware or software for authentication purposes.

signature block *n.* A block of text that an e-mail client or a newsreader automatically places at the end of every message or article before the message or article is transmitted. Signature blocks typically contain the name, e-mail address, and affiliation of the person who created the message or article.

signature file *n.* **1.** A file that contains information inserted by a user and automatically appended to e-mail correspondence or newsgroup articles by client software. A signature file typically contains the name or nickname of the user and might include such information as the user's e-mail address, Web page, company, or job title. **2.** A file that updates an antivirus program so that the program recognizes signatures of new viruses and removes the viruses from the user's computer. *See also* antivirus program, virus signature.

sign bit *n.* The most significant, or leftmost, bit of a number field, usually set to 1 if the number is negative.

tie together complex data structures into scripts. *See also* graphical user interface, script, scripting language.

TCM *n.* *See* trellis-coded modulation.

TCO *n.* *See* total cost of ownership.

TCP *n.* Acronym for **T**ransmission **C**ontrol **P**rotocol. The protocol within TCP/IP that governs the breakup of data messages into packets to be sent via IP (Internet Protocol), and the reassembly and verification of the complete messages from packets received by IP. A connection-oriented, reliable protocol (reliable in the sense of ensuring error-free delivery), TCP corresponds to the transport layer in the ISO/OSI reference model. *See also* ISO/OSI reference model, packet, TCP/IP. *Compare* UDP.

TCP/IP *n.* Acronym for **T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol. A protocol suite (or set of protocols) developed by the U.S. Department of Defense for communications over interconnected, sometimes dissimilar, networks. It is built into the UNIX system and has become the de facto standard for data transmission over networks, including the Internet.

TCP/IP reference model *n.* A networking model designed around the concept of internetworking—the exchange of information among different networks, often built on different architectures. The TCP/IP reference model, often called the Internet reference model, consists of four layers, the most distinctive of which is the internet-work that deals with routing messages and that has no equivalent in the ISO/OSI reference model or the SNA model. *Compare* ISO/OSI reference model, SNA.

TCP/IP stack *n.* The set of TCP/IP protocols. *See also* protocol stack, TCP/IP.

TDM *n.* *See* time-division multiplexing.

TDMA *n.* Short for **T**ime **D**ivision **M**ultiple **A**ccess. A multiplexing technology used to divide a single cellular phone channel into multiple subchannels. TDMA works by allocating separate time slots to each user. It is implemented in D-AMPS (Digital Advanced Mobile Phone Service), which relies on TDMA to divide each of the 30 analog AMPS channels into 3 separate subchannels, and GSM (Global System for Mobile Communications). *See also* D-AMPS, Global System for Mobile Communications. *Compare* AMPS, FDMA.

team Web site *n.* *See* SharePoint team Web site.

Teardrop attack *n.* An Internet-based attack that breaks a message into a series of IP fragments with overlapping offset fields. When these fragments are reassembled at

their destination, the fields don't match, causing the system to hang, reboot, or crash.

tearing *n.* A visual artifact produced when the screen refresh rate is out of sync with an application's frame rate. The top portion of one frame is displayed at the same time as the bottom portion of another frame, with a discernible tear between the two partial images.

tear-off *adj.* Capable of being dragged from an original position in a graphical user interface and placed where the user desires. For example, many graphics applications feature tear-off menus of tool palettes that can be dragged to locations other than the menu bar.

techie *n.* A technically oriented person. Typically, a techie is the person on whom a user calls when something breaks or the user cannot understand a technical problem. A techie may be an engineer or a technician, but not all engineers are techies. *See also* guru.

technical author *n.* *See* tech writer.

technobabble *n.* Language that includes incomprehensible technical terms and jargon. In ordinary conversation, many of the words in this dictionary might be considered technobabble.

technology *n.* The application of science and engineering to the development of machines and procedures in order to enhance or improve human conditions, or at least to improve human efficiency in some respect. *See also* high tech.

technophile *n.* Someone who is enthusiastic about emerging technology. *Compare* computerphile.

technophobe *n.* A person who is afraid of or dislikes technological advances, especially computers. *See also* Luddite. *Compare* technophile.

tech writer *n.* Short for technical writer. One who writes the documentation material for a hardware or software product. *Also called:* technical author. *See also* documentation.

telco *n.* Short for **t**elephone **c**ompany. A term generally used in reference to a telephone company's provision of Internet services.

telecom closet *n.* *See* wiring closet.

telecommunications *n.* The transmission and reception of information of any type, including data, television pictures, sound, and facsimiles, using electrical or optical signals sent over wires or fibers or through the air.

telecommunications closet *n.* *See* wiring closet.

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