Microsoft

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, *Baudot 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-mall[1] *(noun)*
e-mall[2] *(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.

Future Printings and Editions

Every effort has been made to ensure the accuracy and completeness of this book. If you find an error, think that an entry does not contain enough information, or seek an entry that does not appear in this edition, please let us know. Address your letter to: Dictionary Editor, Microsoft Press, One Microsoft Way, Redmond, WA 98052-6399. Or send e-mail to mspcd@microsoft.com.

Numbers and Symbols

$0.02 *n. See* my two cents.

& *n.* **1.** UNIX command suffix for running the preceding command as a background process. *See also* background[1]. **2.** In UNIX, a root user command suffix for starting a daemon that is to remain running after logout. *See also* daemon. **3.** The default character used to designate a character entity (special character) in an HTML or SGML document. *See also* HTML, SGML. **4.** In spreadsheet programs, an operator for inserting text into a formula specifying the relationship between cells.

***** *n.* **1.** A character used in applications and programming languages to signify multiplication. **2.** In Windows, MS-DOS, OS/2, and other operating systems, a wildcard character that can be used in place of one or more characters, as in *.*, which represents any combination of a filename and an extension. *See also* ?, *.*, wildcard character. **3.** In the C and C++ programming languages, the character used to dereference a pointer to a class or structure. *See also* dereference, pointer (definition 1).

. *n.* A file specification using the asterisk (star) wildcard, which means any combination of filename and extension in operating systems such as MS-DOS. *See also* asterisk (definition 2), wildcard character.

.. *n.* MS-DOS and UNIX syntax for the parent directory. A single dot refers to the current directory.

/ *n.* **1.** A character used to separate parts of a directory path in UNIX and FTP or parts of an Internet address (URL) in Web browsers. **2.** A character used to flag switches or parameters that control the execution of a program invoked through a command-line interface. *See also* command-line interface.

// *n.* Notation used with a colon to separate the URL protocol (such as http or ftp) from the URL host machine name, as in http://www.yahoo.com. *See also* URL.

: *n.* Colon, a symbol used after the protocol name (such as http or ftp) in a URL. *See also* URL.

<> *n.* **1.** Angle brackets, a pair of symbols used to enclose a keyword, comprising a tag in an HTML, SGML, or XML document. *See also* HTML, SGML, XML. **2.** In an Internet Relay Chat (IRC) or multiuser dungeon (MUD), a set of symbols used to designate some action or reaction, as in <chuckle>. *See also* emotag, IRC, MUD. **3.** A pair of symbols used to enclose a return address in an e-mail header.

> *n.* **1.** Right angle bracket, a symbol used in some operating systems, such as MS-DOS and UNIX, to direct the output resulting from some command into a file. **2.** A symbol commonly used in e-mail messages to designate text included from another message.

? *n.* In some operating systems and applications, a wildcard character often used to represent any other single character. The question mark is one of two wildcard characters supported by the MS-DOS, Windows NT, and OS/2 operating systems. *See also* *.

@ *n.* The separator between account names and domain names in Internet e-mail addresses. When spoken, @ is read as "at." Therefore, user@host.com would be read as "user at host dot com."

**** *n.* Back slash, a character used to separate directory names in MS-DOS and UNIX path specifications. When used as a leading character, it means that the path specification begins from the topmost level for that disk drive. *See also* path (definition 5).

0.07-micron *n.* A manufacturing technology with which 400 million transistors, with an effective channel length 1000 times thinner than a human hair, can be placed on a single chip. The extremely small sizes and faster speeds of 0.07-micron products can be used to create improved-performance microprocessors that may extend clock speeds beyond 10 GHz. Possible applications of 0.07-micron technology range from tiny hearing aids that can be implanted in the ear to hard disk drives that read gigabits of data per second.

0 wait state *n. See* zero wait state.

100Base-FX *n.* An Ethernet standard for baseband LANs (local area networks) using fiber optic cable carrying 100 Mbps (megabits per second). *Also called:* Fast Ethernet. *See also* Ethernet (definition 1).

100Base-T *n.* An Ethernet standard for baseband LANs (local area networks) using twisted-pair cable carrying 100 Mbps (megabits per second). The 100Base-T standard is comprised of 100Base-T4 (four pairs of medium-grade to high-grade twisted-pair cable) and 100Base-TX (two pairs of high-grade twisted-pair cable). *Also called:* Fast Ethernet. *See also* Ethernet (definition 1).

100Base-T4 *n. See* 100Base-T.

100Base-TX *n. See* 100Base-T.

100Base-VG *n.* An Ethernet standard for baseband LANs (local area networks) using voice-grade twisted-pair cable carrying 100 Mbps (megabits per second). Unlike other Ethernet networks, 100Base-VG relies on an access method called demand priority, in which nodes send requests to hubs, which in turn give permission to transmit based on the priority levels included with the requests. *Also called:* 100Base-VG-AnyLAN. *See also* Ethernet (definition 1).

100Base-VG-AnyLAN *n. See* 100Base-VG.

100Base-X *n.* Descriptor used for any of three forms of 100 Mbps Ethernet networks: 100Base-T4, 100Base-TX, or 100Base-FX. *Also called:* Fast Ethernet. *See also* 100Base-T, 100Base-FX, Ethernet (definition 1).

101-key keyboard *n.* A computer keyboard modeled after the enhanced keyboard; introduced by IBM for the IBM PC/AT. The 101-key keyboard and the enhanced keyboard are similar in the number and function of their keys; they may differ in the way the keys are laid out, the amount of tactile feedback expressed when a key is pressed, and the shape and feel of the keycaps. *See also* enhanced keyboard.

1024x768 *n.* A standard super VGA computer display having a resolution of 1024 columns of pixels by 768 rows of pixels. *See also* SVGA.

10Base2 *n.* The Ethernet and IEEE 802.3 standard for baseband LANs (local area networks) using a thin coaxial cable (3/16 inch) up to 200 meters long and carrying 10 Mbps (megabits per second) in a bus topology. A network node is connected to the cable by a BNC connector on the adapter card. *Also called:* Cheapernet, thin Ethernet, ThinNet, ThinWire. *See also* BNC connector, bus network, coaxial cable, Ethernet (definition 1), IEEE 802.x.

10Base5 *n.* The Ethernet and IEEE 802.3 standard for baseband LANs (local area networks) using a thick coaxial cable (3/8 inch) up to 500 meters long and carrying 10 Mbps (megabits per second) in a bus topology. A network node is equipped with a transceiver that plugs into a 15-pin AUI connector on the adapter card and taps into the cable. This form of Ethernet is generally used for network backbones. *Also called:* thick Ethernet, ThickNet, ThickWire. *See also* coaxial cable, Ethernet (definition 1), IEEE 802.x.

10Base-F *n.* The Ethernet standard for baseband LANs (local area networks) using fiber-optic cable carrying 10 Mbps (megabits per second) in a star topology. All nodes are connected to a repeater or to a central concentrator. A node is equipped with a fiber-optic transceiver that plugs into an AUI connector on the adapter card and attaches to the cable with an ST or SMA fiber-optic connector. The 10Base-F standard comprises 10Base-FB for a backbone, 10Base-FL for the link between the central concentrator and a station, and 10Base-FP for a star network. *See also* Ethernet (definition 1), fiber optics, star network.

10Base-FB *n. See* 10Base-F.

10Base-FL *n. See* 10Base-F.

10Base-FP *n. See* 10Base-F.

10Base-T *n.* The Ethernet standard for baseband LANs (local area networks) using twisted-pair cable carrying 10 Mbps (megabits per second) in a star topology. All nodes are connected to a central hub known as a multiport repeater. *See also* Ethernet (definition 1), star network, twisted-pair cable.

12-hour clock *n.* A clock that expresses the time within a 12-hour range, returning to 1:00 after 12:59 AM or PM. *Compare* 24-hour clock.

1.2M *adj.* Short for **1.2-m**egabyte. Refers to the storage capacity for high-density 5.25-inch floppy disks.

1394 *n. See* IEEE 1394.

14.4 *n.* A modem with a maximum data transfer rate of 14.4 Kbps (kilobits per second).

1.44M *adj.* Short for **1.44-m**egabyte. Refers to the storage capacity for high-density 3.5-inch floppy disks.

16-bit *adj. See* 8-bit, 16-bit, 32-bit, 64-bit.

16-bit application *n.* An application written to run on a computer with a 16-bit architecture or operating system, such as MS-DOS or Windows 3.*x*.

16-bit color *adj.* Of, pertaining to, or characteristic of a display that can produce 2^{16} (65,536) distinct colors. *Compare* 24-bit color, 32-bit color.

16-bit machine *n.* A computer that works with data in groups of 16 bits at a time. A computer may be considered a 16-bit machine either because its microprocessor operates internally on 16-bit words or because its data bus can transfer 16 bits at a time. The IBM PC/AT and similar models based on the Intel 80286 microprocessor are 16-bit machines in terms of both the word size of the microprocessor and the size of the data bus. The Apple Macintosh Plus and Macintosh SE use a microprocessor with a 32-bit word length (the Motorola 68000), but they have 16-bit data buses and are generally considered 16-bit machines.

16-bit operating system *n.* An operating system, now outdated, that can work with 2 bytes, or 16 bits, of information at one time. A 16-bit operating system, such as MS-DOS and Microsoft Windows 3.*x*, reflects the functionality of a 16-bit processor because the software and the chip must work together so closely. The main advantage of a 16-bit operating system over its earlier 8-bit predecessors (such as CP/M-80) was its ability to address more memory and use a larger (16-bit) bus. Sixteen-bit operating systems have since been eclipsed by 32-bit operating systems—such as the Macintosh operating system, Microsoft Windows NT, and Windows 9x—and by 64-bit operating systems, such as some versions of UNIX. *See also* 32-bit operating system.

/16 network *n.* IP address class B. This class has 16,382 networks available and more than sixty-five thousand hosts available. *See also* host, IP address classes, network.

1999 problem *n.* **1.** A variation on the Year 2000 problem in computer systems that have two-digit years in date fields and are used by companies and organizations in which the fiscal year 2000 begins before the end of calendar year 1999. These computer systems may interpret the fiscal year as the year 1900. **2.** A potential problem, if not corrected, with date fields in older code that were (sometimes) used to hold values with special meaning. For example, the date 9/9/99 was often used as an expiration date meaning "keep this information forever" or, worse, "destroy this document immediately."

1NF *n.* Short for **first n**ormal **f**orm. *See* normal form (definition 1).

2000 time problem *n. See* Year 2000 problem.

2038 limit *n.* A consideration in some PCs that use a signed 32-bit integer to represent date and time. Because such systems determine date and time as the number of seconds elapsed since midnight, January 1, 1970, they can handle a maximum of 2^{31} seconds, a number that will be reached at 3:14:07 a.m. on January 19, 2038. When the elapsed seconds exceed that maximum value, the clock will overflow, resulting in an incorrect date and time and, potentially, causing disruptions. Some organizations have defined Year 2000 compliant to mean a system that will have the correct date/time and do proper date handling up through the year 2038, although this is not universal. The extent of the potential problem, of course, is directly related to the number of such system solutions still in operation at the time. *See also* Year 2000 compliant.

24-bit color *n.* RGB color in which the level of each of the three primary colors in a pixel is represented by 8 bits of information. A 24-bit color image can contain over 16 million different colors. Not all computer monitors support 24-bit color, especially older models. Those that do not may use 8-bit color (256 colors) or 16-bit color (65,536 colors). *Also called:* true color. *See also* bit depth, pixel, RGB. *Compare* 16-bit color, 32-bit color.

24-hour clock *n.* A clock that expresses the time within a 24-hour range, from 0000 (midnight) to 2359 (one minute before the following midnight). *Compare* 12-hour clock.

2.4 kernel *n.* Update of the core of the Linux OS, released at the end of 2000. Features in the 2.4 kernel emphasize support for new buses, devices, and controllers; increased USB support; improved Web server performance; and increased symmetrical multiprocessing scalability.

/24 network *n.* IP address class A. This class has more than two million networks available and 254 hosts available. *See also* host, IP address classes, network.

256-bit *adj.* Having a data path that is 256 bits wide.

286 *n. See* 80286.

287 *n. See* 80287.

28.8 *n.* A modem with a maximum data transfer rate of 28.8 Kbps (kilobits per second).

2-digit year *n.* The capacity for storing only the last two digits of the year in a date. In such systems, the century for the date is not stored. *See also* two-digit date storage.

2G *n.* Acronym for **2**nd **G**eneration. The second generation of digital wireless technology, as defined by the International Telecommunications Union (ITU). Second generation technology delivers data transmission at speeds from 9.6 Kbps (kilobits per second) to 19.2 Kbps. Second generation technology provides greater data transmission capabilities and more efficient voice transmission than the analog technology first developed for wireless telecommunications.

2NF *n.* Short for **second n**ormal **f**orm. *See* normal form (definition 1).

2-nines availability *n. See* two-nines availability.

2.PAK *n.* An artificial intelligence programming language.

32-bit *adj. See* 8-bit, 16-bit, 32-bit, 64-bit.

32-bit application *n.* An application written to run on a computer with a 32-bit architecture or operating system, such as Mac OS or Windows 9x.

32-bit clean *adj.* **1.** Refers to Macintosh hardware designed to run in 32-bit mode, which can address up to 1 gigabyte of physical RAM under System 7. This includes all present Macintosh computers; some older models used 16-bit addressing. **2.** Refers to software written for 32-bit operation.

32-bit color *n.* RGB color that is similar to 24-bit color, with 8 additional bits used to allow for faster transfer of an image's color. *See also* bit depth, RGB. *Compare* 16-bit color, 24-bit color.

32-bit driver *n.* A software subsystem that controls either a hardware device (device driver) or another software subsystem. The 32-bit versions of this software take full advantage of the instruction sets of the 486 and Pentium processors for improved speed. *See also* driver, instruction set.

32-bit machine *n.* A computer that works with data in groups of 32 bits at a time. The Apple Macintosh II and higher models are 32-bit machines, in terms of both the word size of their microprocessors and the size of the data buses, as are computers based on the Intel 80386 and higher-level microprocessors.

32-bit operating system *n.* An operating system in which 4 bytes, or 32 bits, can be processed at one time. Windows 95, Windows 98, Windows NT, Linux, and OS/2 are examples. *See also* instruction set, protected mode.

33.6 *n.* A modem with a maximum data transfer rate of 33.3 Kbps (kilobits per second).

34010, 34020 *n.* Graphics coprocessors from Texas Instruments (TI), used mainly in high-end PC graphics boards, which have become a de facto standard for programmable graphics processors. Although both chips use 32-bit registers, the 34010 uses a 16-bit data bus and the 34020 uses a 32-bit bus. The 34020 is compatible with the earlier 34010, and both chips work with TIGA (Texas Instruments Graphical Architecture), a TI standard that allows a single application driver to be used with all boards based on the standard. *See also* de facto standard, TIGA, video graphics board.

3.5-inch floppy disk *n.* 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 3.5-inch floppy 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.

360K *adj.* Short for **360-k**ilobyte. The storage capacity for standard 5.25-inch floppy disks.

.386 *n.* A file extension for virtual device drivers under Windows 3.1. *See also* virtual device driver.

386 *n. See* 80386DX.

386BSD *n.* A version of BSD UNIX, different from BSD386 from Berkeley Software Development, Inc. Freely distributable, 386BSD was released in 1992 and is available in two newer versions: NetBSD and FreeBSD. *See also* BSD UNIX, FreeBSD, NetBSD.

386DX *n. See* 80386DX.

386SL *n. See* 80386SL.

386SX *n. See* 80386SX.

387 *n. See* 80387.

387SX *n. See* 80387SX.

3-D or **3D** *adj.* **1.** Short for **three-d**imensional. Of, pertaining to, or being an object or image having or appearing to have all three spatial dimensions (length, width, and depth). **2.** Having the illusion of depth or varying distances, as in 3-D audio.

3-D array *n. See* three-dimensional array.

3-D audio *n.* Short for **three-d**imensional **audio**. Recorded as stereo sound, 3-D audio enables the listener to feel immersed in the sound and to determine its exact location (up, down, left, right, forward, or backward). This technology is commonly used in video games and virtual-reality systems, as well as in some Internet applications. *Also called:* 3-D sound, binaural sound.

3-D graphic *n.* Any graphical image that depicts one or more objects in three dimensions—height, width, and depth. A 3-D graphic is rendered on a two-dimensional medium; the third dimension, depth, is indicated by means of perspective and by techniques such as shading or gradient use of color.

3-D metafile *n.* A device-independent file for storing a 3-D display. *See also* metafile.

3DMF *n. See* QuickDraw 3-D.

3-D model *n. See* three-dimensional model.

3-D sound *n. See* 3-D audio.

3-finger salute *n. See* three-finger salute.

3G *n.* Acronym for **3**rd **G**eneration. The third generation of digital wireless technology, as defined by the International Telecommunications Union (ITU). Third generation technology is expected to deliver data transmission speeds between 144 Kbps (kilobits per second) and 2 Mbps (megabits per second), compared to the 9.6 Kbps to 19.2 Kbps offered by second generation technology. Western Europe and Japan lead the world in adoption of 3G technology and services.

3GL *n.* Short for **third-g**eneration **l**anguage. A high-level programming language that was designed to run on the third generation of computer processors, built on integrated circuit technology roughly from 1965 to 1970. C, FORTRAN, Basic, and Pascal are examples of third-generation languages still in use today. *See also* high-level language, integrated circuit. *Compare* 4GL, low-level language.

3NF *n.* Short for **third n**ormal **f**orm. *See* normal form (definition 1).

3-nines availability *n. See* three-nines availability.

3Station *n.* A diskless workstation developed by Bob Metcalfe at 3Com Corporation. *See also* diskless workstation.

400 *n.* HTTP status code—Bad Request. A Hypertext Transfer Protocol message from an HTTP server indicating that a client request cannot be completed because the syntax of the request is incorrect. *See also* HTTP server (definition 1), HTTP status codes.

401 *n.* HTTP status code—Unauthorized. A Hypertext Transfer Protocol message from an HTTP server indicating that a client request cannot be completed because the transaction requires an Authorization header, which was not supplied. *See also* HTTP server (definition 1), HTTP status codes.

402 *n.* HTTP status code—Payment Required. A Hypertext Transfer Protocol message from an HTTP server indicating that a client request cannot be completed because the transaction requires a payment, and no ChargeTo header was supplied. *See also* HTTP server (definition 1), HTTP status codes.

403 *n.* HTTP status code—Forbidden. A Hypertext Transfer Protocol message from an HTTP server indicating that a client request cannot be completed because access is restricted. *See also* HTTP server (definition 1), HTTP status codes.

404 *n.* HTTP status code—Not Found. A Hypertext Transfer Protocol message from an HTTP server indicating that a client request cannot be completed because the server is unable to find an address that matches the URL requested. *See also* HTTP server (definition 1), HTTP status codes, URL.

486 *n. See* i486DX.

486DX *n. See* i486DX.

486SL *n. See* i486SL.

486SX *n. See* i486SX.

4-digit year *n.* The capacity for storing all four digits of the year in a date in hardware or firmware products.

4GL *n.* Short for **fourth-g**eneration **l**anguage. A programming language designed to mimic human language. The designation is often used to specify languages used with relational databases and is intended to imply that such languages are a step up from standard high-level programming languages such as C, Pascal, and COBOL. *See also* application development language, high-level language. *Compare* 3GL, assembly language.

4GL architecture *n.* *See* two-tier client/server.

4mm tape *n.* *See* digital audio tape.

4NF *n.* Short for fourth normal form. *See* normal form (definition 1).

4-nines availability *n.* *See* four-nines availability.

5.25-inch floppy disk *n.* 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. A floppy disk 5.25 inches in diameter is encased in a flexible plastic jacket and has a large hole in the center, which fits around a spindle in the disk drive; such a disk can hold from a few hundred thousand to over one million bytes of data. *See* floppy disk.

56flex *n.* *See* K56flex.

56K[1] *adj.* Having 56 kilobits per second (Kbps) available for traffic on a communications circuit. One voice channel can carry up to 64 Kbps (called a T0 carrier); 8 Kbps are used for signaling, leaving 56 Kbps available for traffic. *See also* T-carrier.

56K[2] *n.* *See* 56-Kbps modem.

56-Kbps modem *n.* An asymmetric modem that operates over POTS (Plain Old Telephone Service) to deliver data downstream at 56 Kbps, with upstream speeds of 28.8 and 33.6 Kbps. Earlier, slower modems invoke a two-conversion transmission process: digital data from a computer is converted into analog form for transmission over the telephone wire and is then reconverted to digital data by the receiving modem. In contrast, 56-Kbps modems achieve faster speeds by converting analog data to digital data only once, typically at the telephone company's switching office near the beginning of the transmission's journey. Designed to improve download times for Internet users, 56-Kbps modems rely on a public phone network that allows for a single conversion and on the availability of a digital connection, such as ISDN or T1, at the ISP (Internet Service Provider) location that provides the actual connection to the Internet. *See also* analog data, digital data transmission, modem, POTS.

586 *n.* The unofficial name used by industry analysts and by the computer trade press to describe Intel's successor to the i486 microprocessor prior to its release. In the interest of using a name that could be trademarked, however, Intel decided to name the microprocessor Pentium. *See also* Pentium.

5NF *n.* Short for **fifth** normal form. *See* normal form (definition 1).

5-nines availability *n.* *See* five-nines availability.

5x86 *n.* Cyrix Corporation's clone of the Intel Pentium CPU. *See also* 586, 6x86, central processing unit, clone, Pentium.

601 *n.* *See* PowerPC 601.

603 *n.* *See* PowerPC 603.

604 *n.* *See* PowerPC 604.

64-bit *adj.* Of, pertaining to, or descriptive of the amount of data—64 bits, or 8 bytes—that certain computer systems or programs can process at one time.

64-bit machine *n.* A computer that works with data in groups of 64 bits at a time. A computer may be considered a 64-bit machine either because its CPU operates internally on 64-bit words or because its data bus can transfer 64 bits at a time. A 64-bit CPU thus has a word size of 64 bits, or 8 bytes; a 64-bit data bus has 64 data lines, so it ferries information through the system in sets of 64 bits at a time. Examples of 64-bit architecture include the Alpha AXP from Digital Equipment Corporation, the Ultra workstation from Sun Microsystems, Inc., and the PowerPC 620 from Motorola and IBM.

64-bit operating system *n.* An operating system in which 8 bytes, or 64 bits, can be processed at one time. For Microsoft Windows, the 64-bit operating systems are Windows XP 64-Bit Edition, the 64-bit versions of Windows .NET Enterprise Server, and Windows .NET Datacenter Server. The IBM AS/400 uses a 64-bit operating system.

6502 *n.* The 8-bit microprocessor, developed by Rockwell International, that was used in the Apple II and Commodore 64 microcomputers.

65816 *n.* A 16-bit microprocessor from Western Digital Design used in the Apple IIGS. It can emulate the 6502, providing compatibility with all old Apple II software. *See also* 6502.

6800 *n.* An 8-bit microprocessor developed by Motorola in the early 1970s. It failed to gain wide acceptance.

68000 *n.* The original microprocessor in the 680x0 family from Motorola, introduced in 1979 and used in the first Apple Macintosh computers as well as the Apple LaserWriter IISC and Hewlett-Packard's LaserJet printers. The 68000 has 32-bit internal registers but transfers data over a

16-bit data bus. With 24-bit physical addressing, the 68000 can address 16 megabytes of memory—16 times as much memory as does the Intel 8088 found in the IBM PC. In addition, the 68000's architecture, in which addressing is linear (as opposed to the 8088's segmented addressing) and in which all address registers work the same way and all data registers work the same way, makes programming more straightforward. *See also* linear addressing architecture, segmented addressing architecture.

68020 *n.* A microprocessor in the 680x0 family from Motorola, introduced in 1984. This chip has 32-bit addressing and a 32-bit data bus and is available in speeds from 16 MHz to 33 MHz. The 68020 is found in the original Macintosh II and the LaserWriter IINT from Apple.

68030 *n.* A microprocessor in the 680x0 microprocessor family from Motorola, introduced in 1987. This chip has 32-bit addressing and a 32-bit data bus and is available in speeds from 20 MHz to 50 MHz. The 68030 has built-in paged memory management, precluding the need for supplemental chips to provide that function.

68040 *n.* A microprocessor in the 680x0 family from Motorola, introduced in 1990, with 32-bit addressing and a 32-bit data bus. The 68040 runs at 25 MHz and includes a built-in floating-point unit and memory management units, including independent 4-KB instruction and data caches, which eliminate the need for supplemental chips to provide these functions. In addition, the 68040 is capable of parallel instruction execution by means of multiple independent instruction pipelines, multiple internal buses, and separate caches for both data and instructions.

68060 *n.* The latest and fastest of the 680x0 microprocessors from Motorola, introduced in 1995. This chip has 32-bit addressing and a 32-bit data bus and is available in speeds from 50 MHz to 75 MHz. There was no 68050. The 68060 is probably the last in the 680x0 series from Motorola.

6845 *n.* A programmable video controller from Motorola used in IBM's Monochrome Display Adapter (MDA) and Color/Graphics Adapter (CGA). The 6845 became such an integral part of the IBM PC and compatibles that later generations of video adapters, such as EGA and VGA, continue to support the operations of the 6845. *See also* CGA, EGA, MDA, VGA.

68881 *n.* The floating-point coprocessor from Motorola for use with the 68000 and the 68020. The 68881 provides instructions for high-performance floating-point arithmetic, a set of floating-point data registers, and 22 built-in constants including p and powers of 10. The 68881 conforms to the ANSI/IEEE 754-1985 standard for binary floating-point arithmetic. The 68881 can produce a dramatic improvement in system performance when software takes advantage of it. *See also* floating-point processor.

68K *n. See* 68000.

6x86 *n.* An 8086-compatible microprocessor designed by Cyrix Corporation. It is socket-compatible with some Pentium microprocessors from Intel and can be used in their place. *See also* 8086, microprocessor, Pentium.

740 *n. See* PowerPC 740.

750 *n. See* PowerPC 750.

7-bit ASCII *n.* A 7-bit ASCII character set used for standard UNIX mail messages. The leftover eighth bit is a parity bit used for error correction. *See also* ASCII, parity bit.

7-track *n.* A tape storage scheme that places data on seven separate, parallel tracks on 1/2-inch reel-to-reel magnetic tape. This is an old recording format used with computers that transfer data 6 bits at a time. Data is recorded as 6 data bits and 1 parity bit. Some personal computers now use the 9-track tape storage scheme. *See also* 9-track.

80286 *n.* A 16-bit microprocessor from Intel, introduced in 1982 and included in the IBM PC/AT and compatible computers in 1984. The 80286 has 16-bit registers, transfers information over the data bus 16 bits at a time, and uses 24 bits to address memory locations. The 80286 operates in two modes: real mode, which is compatible with the 8086 and supports MS-DOS, and protected mode, which enables the CPU to access 16 megabytes of memory and protects the operating system from incorrect memory accesses by ill-behaved applications, which could crash a system in real mode. *Also called:* 286. *See also* protected mode, real mode.

80287 *n.* A floating-point coprocessor from Intel for use with the 80286 family of microprocessors. Available in speeds from 6 MHz to 12 MHz, the 80287 offers the same mathematical capabilities that the 8087 coprocessor provides to an 8086-based system. Because the 80287 conforms to the 80286 memory management and protection

schemes, it can be used in both the real and protected modes of the 80286. Also, if the computer manufacturer implements support for it in the motherboard design, the 80287 can be used in a system with an 80386 microprocessor. *See also* floating-point processor.

802.x standards *n. See* IEEE 802.x.

802.11 standards *n. See* IEEE 802.11.

80386 *n. See* 80386DX.

80386DX *n.* A 32-bit microprocessor from Intel, introduced in 1985. The 80386 is a full 32-bit microprocessor; that is, it has 32-bit registers, it can transfer information over its data bus 32 bits at a time, and it can use 32 bits to address memory. Like the earlier 80286, the 80386 operates in two modes: real mode, which is compatible with the 8086 chip and supports MS-DOS, and protected mode, which allows the CPU to access 4 GB of memory directly, supports multitasking, and protects the operating system from crashing as a result of an incorrect memory access caused by an application program error. The 80386 also includes a virtual 8086 mode (also called virtual real mode), which appears to software as an 8086 but whose 1-MB effective address space can be located anywhere in physical memory under the same safeguards as in protected mode. The virtual 8086 mode is the basis for the MS-DOS prompt available inside Windows. *Also called:* 386, 386DX, 80386. *See also* protected mode, real mode, virtual real mode.

80386SL *n.* A microprocessor from Intel intended for use in laptop computers. The 80386SL has similar features to the 80386SX, but it also has capabilities for reducing its power consumption. In particular, the 80386SL can reduce its clock speed to zero when not in use and return to full speed, with the contents of all its registers intact, when called on to perform another task. *Also called:* 386SL. *See also* 80386SX, green PC, i486SL.

80386SX *n.* A microprocessor from Intel, introduced in 1988 as a low-cost alternative to the 80386DX. The 80386SX is basically an 80386DX processor limited by a 16-bit data bus. The 16-bit design allows 80386SX systems to be configured from less expensive AT-class parts, resulting in a much lower total system price. The 80386SX offers improved performance over the 80286 and access to software designed for the 80386DX. The 80386SX also offers 80386DX features such as multitasking and virtual 8086 mode. *Also called:* 386SX. *See also* 80386DX.

80387 *n.* The floating-point coprocessor introduced by Intel for use with the 80386 microprocessors. Available in speeds from 16 MHz to 33 MHz, the 80387 offers the same mathematical capabilities that the 8087 provides for an 8086-based system, as well as transcendental operations for sine, cosine, tangent, arctangent, and logarithm calculations. The 80387 conforms to the ANSI/IEEE 754-1985 standard for binary floating-point arithmetic. The 80387 operates independently of the 80386's mode, and it performs as expected regardless of whether the 80386 is running in real, protected, or virtual 8086 mode. *Also called:* 387. *See also* 80386DX, floating-point processor.

80387SX *n.* The floating-point coprocessor from Intel for use with the 80386SX microprocessor. It provides the same capabilities that the 80387 does for an 80386-based system, but it is available only in a 16-MHz version. *Also called:* 387SX. *See also* 80386SX, floating-point processor.

80486 *n. See* i486DX.

80486SL *n. See* i486SL.

80486SX *n. See* i486SX.

8080 *n.* One of the first chips capable of serving as the basis of a personal computer, introduced by Intel in 1974 and used in the Altair 8800. The 8080 provided 8-bit data operations and 16-bit addressing and influenced the design of the Z80. Furthermore, the microprocessors of the 80x86 line, which serve as the foundation for the IBM PC and all its successors and compatibles, are all based on a set of registers organized similarly to the 8080's. *See also* Altair 8800, Z80.

8086 *n.* The original microprocessor in the 80x86 family from Intel, introduced in 1978. The 8086 has 16-bit registers, a 16-bit data bus, and 20-bit addressing, allowing access to 1 megabyte of memory. Its internal registers include a set that is organized in the same way as those of the 8080. Speeds range from 4.77 MHz to 10 MHz. *See also* 8080.

8087 *n.* A floating-point coprocessor from Intel for use with the 8086/8088 and 80186/80188 microprocessors. Available in speeds from 5 MHz to 10 MHz, the 8087 offers instructions, not found in the 8086/8088 instruction sets, for performing arithmetic, trigonometric, exponential, and logarithmic operations on 16-, 32-, and 64-bit integers; 32-, 64-, and 80-bit floating-point numbers; and 18-digit BCD (binary-coded decimal) operands. With

application software that takes advantage of these instructions, the 8087 can dramatically improve system performance. The 8087 conforms to the proposed IEEE 754 standard for binary floating-point arithmetic. *See also* 8086, 8088, floating-point processor.

8088 *n.* The microprocessor on which the original IBM PC was based. Released by Intel in 1978, the 8088 is identical to the 8086 but transfers information 8 bits at a time (through an 8-bit data bus) rather than 16 bits at a time (through a 16-bit data bus). *See also* 8086, bus.

80-character line length *n.* A standard line length for text mode displays. This length, found in the earliest IBM PCs and in professional terminals of the 1970s and 1980s, is a legacy of the punched card and of mainframe operating systems in which each line in a file as displayed on a terminal appeared to the computer as a card in a deck. Graphical user interfaces support longer or shorter lines depending on the fonts chosen. A message composed with longer lines using a graphical e-mail program appears broken up and difficult to read when viewed by a user with only a terminal emulation program and a shell account.

80x86 *n. See* 8086.

82385 *n.* A cache controller chip by Intel that allows modified cache blocks to be restored to main memory in parallel with cache accesses by the CPU (or DMA). *See also* cache, central processing unit, controller, direct memory access.

8.3 *n.* The standard format for filenames in MS-DOS/Windows 3.*x*: a filename with eight or fewer characters, followed by a period ("dot"), followed by a three-character file extension. *See also* extension. *Compare* long filenames.

8514/A *n.* A graphics adapter introduced by IBM in April 1987 and withdrawn in October 1991. The 8514/A was designed to increase the capability of the VGA adapter in some of IBM's PS/2 computers from a resolution of 640 by 480 pixels with 16 simultaneous colors to a resolution of 1024 by 768 pixels (almost quadrupling the amount of information displayed on the screen) with 256 simultaneous colors. The 8514/A worked only in Micro Channel Architecture-based PS/2 computers, and it used the interlacing method for display, which can cause a perceptible flicker at higher resolutions. Therefore, it never gained widespread popularity; the SVGA (Super VGA) adapter prevailed because it was designed to work with the more prevalent ISA and EISA bus architectures. *See also* EISA, interlacing, ISA, Micro Channel Architecture, noninterlaced, SVGA, VGA.

88000 *n.* A reduced instruction set computing (RISC) chip set from Motorola, introduced in 1988 and based on the Harvard architecture. The 20-MHz 88000 set includes one 88100 CPU and at least two 88200 CMMUs (cache memory management units)—one for data memory and one for instruction memory. The 88100 RISC CPU includes both integer and floating-point processors and has thirty-two 32-bit general-purpose registers, 21 control registers, and 32-bit data paths and addresses. The 88100 is capable of addressing 4 gigabytes of external data and 1 gigabyte of 32-bit instructions in memory space. Up to four chip sets can be set up to work with the same memory in a multiprocessing configuration. *See also* central processing unit, floating-point processor, Harvard architecture, RISC.

88100 *n. See* 88000.

88200 *n. See* 88000.

8-bit, 16-bit, 32-bit, 64-bit *adj.* **1.** Capable of transferring 8, 16, 32, or 64 bits, respectively, on data bus lines. For example, the IBM Micro Channel Architecture includes one or more 32-bit data buses with additional 16-bit and 8-bit data lines. *See also* 16-bit machine, 32-bit machine, 64-bit machine, 8-bit machine. **2.** Capable of transferring 8, 16, 32, or 64 bits, respectively, on the data path of a video adapter. An *n*-bit video adapter can display up to 2^n colors. For example, an 8-bit video adapter is capable of displaying up to 256 colors; a 16-bit adapter can display up to 65,536 colors; and a 24-bit adapter can display over 16 million colors. (A 24-bit video adapter has a 32-bit data path, although the upper 8 bits are not used directly to generate color.) *See also* alpha channel.

8-bit color *n.* A display setting that holds up to 256 specific color entries. Any color palette attached to a picture is by definition an 8-bit palette.

8-bit machine *n.* A computer that works with data in groups of 8 bits at a time. A computer may be considered an 8-bit machine either because its microprocessor operates internally on 8-bit words or because its data bus can transfer 8 bits at a time. The original IBM PC was based on a microprocessor (the 8088) that worked internally on 16-bit words but transferred them 8 bits at a time. Such machines are generally called 8-bit machines because the size of the data bus limits the machine's overall speed.

8mm tape *n.* A tape cartridge format used for data backups, similar to that used for some video cameras except that the tape is rated for data storage. The capacity is 5 GB (gigabytes) or more of (optionally compressed) data.

8-N-1 *n.* Short for **8** bits, **N**o parity, **1** stop bit. Typical default settings for serial communications, such as modem transmissions.

/8 network *n.* IP address class C. This class has 126 networks available and more than sixteen million hosts available. *See also* host, IP address classes, network.

9600 *n.* A modem with a maximum data transfer rate of 9600 bps (bits per second).

99 or **9999** *n.* A number sometimes given special meaning in older programs—for example, as an end-of-file indicator or as an expiration date that actually meant "do not allow to expire." Uncorrected programs may interpret that date as an end-of-file indicator or expiration date and cause problems. *See also* 1999 problem.

9/9/99 *n. See* 99 or 9999.

9-track *n.* A tape storage scheme that places data on nine separate parallel tracks (one track for each of 8 data bits of a byte and 1 parity bit) on 1/2-inch reel-to-reel magnetic tape. *See also* 7-track.

Å *n. See* angstrom.

A

Å *n. See* angstrom.

A or **a** *n. See* ampere.

A: or **a:** *n.* In Windows and some other operating systems, the identifier used for the first, or primary, floppy disk drive. Unless otherwise specified by changing the CMOS startup instructions, this is the drive the operating system checks first for startup instructions.

AAL *n. See* ATM Adaptation Layer.

abandonware *n.* Discontinued video or computer games. Abandonware is often collected and played by computer game enthusiasts on refurbished systems or on PCs running emulator software. *See also* arcade game, emulator, MAME.

ABC *n.* **1.** Acronym for **A**tanasoff-Berry **C**omputer. The first electronic digital computer, created by John Atanasoff and Clifford Berry of Iowa State University in 1942. **2.** Acronym for **a**utomatic **b**rightness **c**ontrol. A circuit that changes the luminance of a monitor to compensate for ambient lighting conditions. **3.** An imperative language and programming environment from CWI, Netherlands. This interactive, structured, high-level language is easy to learn and use. It is not a systems-programming language, but it is good for teaching or prototyping.

Abeline *n.* A high-performance network developed by Qwest Communications, Nortel, and Cisco Systems to provide a backbone network for the Internet2 project. Abeline interconnects the gigaPoPs created by the Internet2 project and its member institutions, enabling connected institutions to develop advanced network services and applications. *See also* gigaPoP, Internet2.

abend or **ABEND** *n.* Short for **ab**normal **end**. The premature ending of a program because of program error or system failure. *See also* abort, crash[1].

ABI *n. See* application binary interface.

ABIOS *n.* Acronym for **A**dvanced Basic **I**nput/**O**utput **S**ystem. A set of input/output service routines designed to support multitasking and protected mode that were built into IBM PS/2 PCs. *See also* BIOS.

abnormal end *n. See* abend.

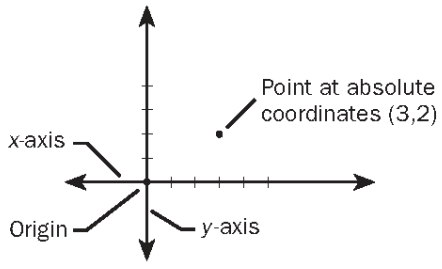
A-Bone *n.* The Asian-Pacific Internet backbone that connects users in East and South Asian countries and Australia at T1 speeds or better, without the need to send data through North American facilities. The A-Bone was launched by Asia Internet Holding Co., Ltd. in 1996. By 1998, a total of 13 countries were connected to the A-Bone's hub in Japan. A-Bone also includes links to both Europe and the United States. *See also* backbone.

abort *vb.* To terminate abruptly, often used in reference to a program or procedure in progress.

absolute address *n.* A means of specifying a precise memory location in a program by using its address (number) rather than an expression to calculate the address. *Also called:* direct address, machine address, real address. *See also* absolute coding. *Compare* relative address, virtual address.

absolute coding *n.* Program code that uses absolute addressing rather than indirect addressing. *See also* absolute address, relative address.

absolute coordinates *n.* Coordinates that are defined in terms of their distance from the origin, the point where the axes intersect. Graphs and computer graphics use absolute coordinates to locate points on a chart or display grid—for example, points in relation to the *x*- and *y*-axes on a graph or the *x*-, *y*-, and *z*-axes used to specify the location of a three-dimensional graphic object on the screen. See the illustration. *See also* Cartesian coordinates.



Absolute coordinates.

absolute link *n.* A hyperlink to the exact location of a file on a file server, the World Wide Web, or a company intranet. Absolute links use an exact path; if you move the file containing the hyperlink or a hyperlink destination, the link breaks.

absolute path *n.* A path to a file that begins with the drive identifier and root directory or with a network share and ends with the complete file name (for example, C:\docs\work\contract.txt or \\netshare\docs\work\contract.txt). *Also called:* full path. *See also* path (definition 2). *Compare* relative path.

absolute pointing device *n.* A mechanical or physical pointing device whose location is associated with the position of the on-screen cursor. For example, if the user of a graphics tablet places the pen on the upper right corner of the tablet, the cursor moves to the upper right corner of the screen or on-screen window associated with the pen. *See also* absolute coordinates. *Compare* relative pointing device.

absolute URL *n.* The full Internet address of a page or other World Wide Web resource. The absolute URL includes a protocol, such as "http," network location, and optional path and file name—for example, http://example.microsoft.com/.

absolute value *n.* The magnitude of a number, irrespective of its sign (+ or –). An absolute value is always greater than or equal to zero. For example, 10 is the absolute value of 10 and of –10. Programming languages and spreadsheet programs commonly include functions that return the absolute value of a number.

abstract[1] *adj.* **1.** In character recognition systems, of, pertaining to, or being a type of symbol that, unlike a letter or numeral, has no intrinsic meaning and must be defined before it can be interpreted. **2.** In programming, of, pertaining to, or being a data type defined by the operations that can be performed on objects of that type rather than by the properties of the objects themselves. *See also* abstract data type.

abstract[2] *n.* In information processing and library science, a summary typically consisting of a paragraph or a few paragraphs at the beginning of an investigative document, such as a scientific paper.

abstract class *n.* **1.** In object-oriented programming, a class in which no objects can be created. It is, however, used to defined subclasses, and objects are created from the subclasses. *See also* object (definition 2). *Compare* concrete class. **2.** In Java programming, a class that contains one or more abstract methods and therefore can never be instantiated. Abstract classes are defined so that other classes can extend them and make them concrete by implementing the abstract methods. *See also* class, instantiate, Java, method, object (definition 2). *Compare* concrete class.

abstract data type *n.* In programming, a data set defined by the programmer in terms of the information it can contain and the operations that can be performed with it. An abstract data type is more generalized than a data type constrained by the properties of the objects it contains—for example, the data type "pet" is more generalized than the data types "pet dog," "pet bird," and "pet fish." The standard example used in illustrating an abstract data type is the stack, a small portion of memory used to store information, generally on a temporary basis. As an abstract data type, the stack is simply a structure onto which values can be pushed (added) and from which they can be popped (removed). The type of value, such as integer, is irrelevant to the definition.The way in which the program performs operations on abstract data types is encapsulated, or hidden, from the rest of the program. Encapsulation enables the programmer to change the definition of the data type or its operations without introducing errors to the existing code that uses the abstract data type. Abstract data types represent an intermediate step between traditional programming and object-oriented programming. *See also* data type, object-oriented programming.

abstraction *n.* **1.** Broadly, the use of specialized software, such as an application programming interface (API), as a means of shielding software from device dependencies or the complexities of underlying software. For instance, hardware abstraction enables programs to focus on a task, such as communications, instead of on individual differences between communications devices. **2.** In object-oriented programming, the process of reducing an object to its essence so that only the necessary elements are represented. Abstraction defines an object in terms of its properties (attributes), behaviors (functionality), and interface (means of communicating with other objects).

abstract machine *n.* A design for a processor that is not meant for implementation but that represents a model for processing abstract machine language. Its instruction set can use instructions that more closely resemble the compiled language than the instructions used by an actual computer. It can also be used to make the implementation of the language more portable to other platforms.

abstract machine language *n.* **1.** An intermediate programming language used by an interpreter or compiler. **2.** *See* pseudocode (definition 1).

abstract syntax *n.* A data structure description that is independent of hardware structures and encodings.

Abstract Syntax Notation One *n.* The ISO standard notation for independent specification of data types and structures for syntax conversion. *Acronym:* ASN.1.*See also* data type, ISO, syntax.

abstract syntax tree *n.* A treelike representation of programs used in many integrated programming environments and structure-oriented editors.

Abstract Window Toolkit *n.* A library of Java GUIs (graphical user interfaces) that provides the connections between a Java application and the native GUI of the computer on which the application runs. *Also called:* AWT.

A/B switch box *n.* A switch box with two outputs. By flipping the switch, the user can select which to use. *See also* switch (definition 1), switch box.

AC *n. See* alternating current.

AC adapter *n.* An external power supply that converts from a 110 VAC or 220 VAC domestic electric supply ("house current" or "main power") to low-voltage DC, which is required to operate solid-state electronic equipment (such as a laptop computer) that does not include an internal power supply.

Accelerated Graphics Port *n. See* AGP.

accelerator *n.* **1.** In applications, a key or key combination used to perform a defined function. *Also called:* shortcut key. **2.** In hardware, a device that speeds or enhances the operation of one or more subsystems, leading to improved program performance. *See also* accelerator card, Windows-based accelerator.

accelerator board *n. See* accelerator card.

accelerator card *n.* A printed circuit board that replaces or augments the computer's main microprocessor, resulting in faster performance. *Also called:* accelerator board. *See also* expansion board, graphics accelerator.

acceptable use policy *n.* A statement issued by an ISP (Internet service provider) or an online information service that indicates what activities users may or may not engage in while logged into the service. For example, some providers prohibit users from engaging in commercial activity on the network. *Acronym:* AUP.*See also* ISP, online information service.

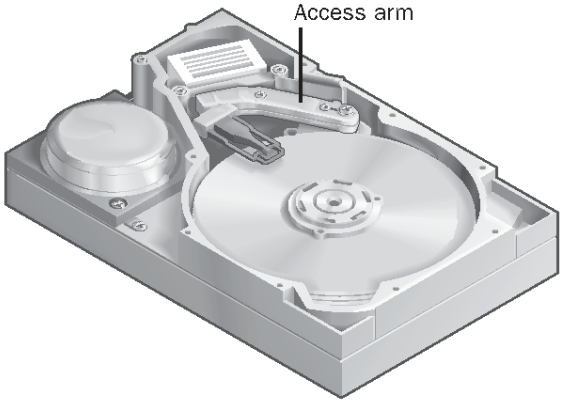
acceptance test *n.* A formal evaluation of a hardware product performed by the customer, usually at the factory, to verify that the product is performing according to specifications.

access[1] *n.* **1.** The act of reading data from or writing data to memory. **2.** Connection to the Internet or other network or system.

access[2] *vb.* To gain entry to memory in order to read or write data.

Access *n.* Microsoft's relational database–management software for the Windows desktop platform. Part of the family of Microsoft Office products, Access in its most recent version (Access 2002) supports Web technology for building, managing, and sharing data. Access 2002 also includes new and improved tools for accessing and viewing information and offers integration with Microsoft's BackOffice database product, SQL Server. *See also* Office.

access arm *n.* A mechanical arm that moves the read/write head(s) over the surface of a disk in a disk drive. See the illustration. *Also called:* head arm.



Access arm.

ACCESS.bus *n.* A bidirectional bus for connecting peripherals to a PC. The ACCESS.bus can connect up to 125 low-speed peripherals, such as printers, modems, mice, and keyboards, to the system through a single, general-purpose port. Peripherals that support the ACCESS.bus provide a connector or port connection that is similar to a phone-jack connector and are daisy-chained together. However, the PC communicates directly with each peripheral and vice versa. Connecting an ACCESS.bus device (for example, a printer) to a system results in the system

automatically identifying and configuring it for optimum performance. Peripherals can be connected while the computer is running (*hot plugging*) and are automatically assigned a unique address (auto-addressing). Developed from the I2 architecture designed jointly by Philips and Digital Equipment Corporation, the ACCESS.bus specification is controlled by the ACCESS.bus Industry Group and competes with Intel's USB. *See also* bidirectional, bus, daisy chain[1], hot plugging, input/output port, peripheral. *Compare* USB.

access code *n. See* password.

access control *n.* The mechanisms for limiting access to certain items of information or to certain controls based on users' identities and their membership in various predefined groups. Access control is typically used by system administrators for controlling user access to network resources, such as servers, directories, and files. *See also* access privileges, system administrator.

access control list *n.* A list associated with a file or a resource that contains information about which users or groups have permission to access a resource or modify the file. *Acronym:* ACL.

accessibility *n.* A quality of software, hardware, or a complete computer system that makes it usable by people with one or more physical disabilities, such as restricted mobility, blindness, or deafness.

accessibility aids *n.* Utilities that make computers easier to use for people with disabilities. Examples of accessibility aids include screen readers, speech recognition programs, and on-screen keyboards.

access key *n.* A key combination, such as ALT+F, that moves the focus to a menu, a command, or a control, without using the mouse.

access mechanism *n.* **1.** The disk drive components that move the read/write head(s) to the proper track of a magnetic disk or optical disc. *See also* disk controller. **2.** A circuit that allows one part of a computer system to send signals to another part. **3.** In programming, the means by which an application can read from or write to a resource. *Also called:* access method.

access method *n. See* access mechanism.

access number *n.* The telephone number used by a subscriber to gain access to an online service.

accessory *n. See* peripheral.

access path *n. See* search path.

access permission *n. See* permission.

access point *n.* In a wireless LAN (local area network), a transceiver that connects the LAN to a wired network. *See also* wireless LAN.

access privileges *n.* The type of operations permitted a given user for a certain system resource on a network or a file server. A variety of operations, such as the ability to access a server, view the contents of a directory, open or transfer files, and create, modify, or delete files or directories, can be allowed or disallowed by the system administrator. Assigning access privileges to users helps the system administrator to maintain security on the system, as well as the privacy of confidential information, and to allocate system resources, such as disk space. *Also called:* access rights. *See also* file protection, file server, permission, system administrator, write access.

access provider *n. See* ISP.

access rights *n. See* access privileges.

access speed *n. See* access time.

access time *n.* **1.** The amount of time it takes for data to be delivered from memory to the processor after the address for the data has been selected. **2.** The time needed for a read/write head in a disk drive to locate a track on a disk. Access time is usually measured in milliseconds and is used as a performance measure for hard disks and CD-ROM drives. *See also* read/write head, seek time, settling time, wait state. *Compare* cycle time.

account *n.* **1.** A record-keeping arrangement used by the vendor of an online service to identify a subscriber and to maintain a record of customer usage for billing purposes. **2.** The record-keeping mechanism used by networks and multiuser operating systems for keeping track of authorized users. Network accounts are created by network administrators and are used both to validate users and to administer policies—for example, permissions—related to each user.

accounting file *n.* A file generated by a printer controller that keeps track of the number of pages printed per job as well as the user that requested the print job.

accounting machine *n.* **1.** One of the earliest applications of automatic data processing, used in business accounting primarily during the 1940s and 1950s. The first accounting machines were nonelectronic and used punched cards and wires arranged in plugboard panels. **2.** A computer in which an accounting software package

starts up whenever the machine is turned on, the computer thus becoming a dedicated machine with accounting as its sole function.

account lockout *n.* A security feature in Windows XP that locks a user account if a number of failed logon attempts occur within a specified amount of time, based on security policy lockout settings. Locked accounts cannot log on.

account name *n.* The part of an e-mail address that identifies a user or an account on an e-mail system. An e-mail address on the Internet typically consists of an account name, followed by the @ (at) symbol, a host name, and a domain name. *See also* account (definition 2), domain name, e-mail address.

account policy *n.* On local area networks and multi-user operating systems, a set of rules governing whether a new user is allowed access to the system and whether an existing user's rights are expanded to include additional system resources. An account policy also generally states the rules with which the user must comply while using the system in order to maintain access privileges.

ACCU *n. See* Association of C and C++ Users.

accumulator *n.* A register used for logic or arithmetic, usually to count items or accumulate a sum. *See also* register.

accuracy *n.* The degree to which the result of a calculation or measurement approximates the true value. *Compare* precision (definition 1).

ACID *n.* Short for **A**tomicity, **C**onsistency, **I**solation, **D**urability. The four essential properties of an electronic transaction. Atomicity requires that a transaction be fully completed or else fully canceled. Consistency requires that resources used are transformed from one consistent state to another. Isolation requires all transactions to be independent of each other. Durability requires that the completed transaction be permanent, including survival through system failure. *See also* transaction.

ACIS *n.* Acronym for **A**ndy, **C**harles, **I**an's **S**ystem. An object-oriented geometric modeling toolkit owned by Spatial Technology. Designed for use as a "geometry engine" within 3-D modeling applications, ACIS provides an open architecture framework for wire-frame, surface, and solid modeling from a common, unified data structure. ACIS is generally considered the de facto standard for solids modeling in the CAM/CAE industries.

ACK *n.* Short for **ack**nowledgment. A message sent by the receiving unit to the sending station or computer indicating either that the unit is ready to receive transmission or that a transmission was received without error. *Compare* NAK.

ACL *n. See* access control list.

ACM *n. See* Association for Computing Machinery.

acoustic coupler *n.* An archaic device once used in computer communications. The coupler was a cradle-like instrument into which the headset of a telephone was placed. Its function was somewhat similar to the job now done by modems.

ACPI *n.* Acronym for **A**dvanced **C**onfiguration and **P**ower **I**nterface. An open specification developed jointly by Microsoft, Intel, and Toshiba for managing power consumption on mobile, desktop, and server computers. Unlike earlier, BIOS-based management solutions, ACPI provides a means of integrating power management through all parts of a PC, including applications, hardware, and the operating system (OS). ACPI enables an OS to control a computer's power state in response to input from the user, from an application, or from a device driver. For example, an ACPI-enabled OS could turn a CD-ROM drive, a printer, or even a television on or off as needed. ACPI is part of the industry-wide OnNow initiative that allows system manufacturers to deliver computers that start at the touch of a keyboard. *See also* plug and play, power management. *Compare* Advanced Power Management.

Acrobat *n.* A program from Adobe Systems, Inc., that converts a fully formatted document created on a Windows, Macintosh, MS-DOS, or UNIX platform into a Portable Document Format (PDF) file that can be viewed on several different platforms. Acrobat enables users to send documents that contain distinctive typefaces, color, graphics, and photographs electronically to recipients, regardless of the application used to create the originals. Recipients need the Acrobat Reader, which is available free, to view the files. Depending on version and platform, it also includes tools such as Distiller (which creates PDF files from PostScript files), Exchange (which is used for links, annotations, and security-related matters), and PDF Writer (which creates PDF files from files created with business software).

Acrobat Reader *n.* A free program produced and distributed by Adobe Systems, Inc., for displaying and printing documents that are in Portable Document Format (PDF).

ACSE *n. See* Association Control Service Element.

action query *n.* In Microsoft Access, a query that copies or changes data. Action queries include append, delete, make-table, and update queries. They are identified by an exclamation point (!) next to their name in the Database window.

action statement *n. See* statement.

activation *n.* In Sun Microsystem's J2EE network platform, the process of transferring an enterprise java bean (EJB) from secondary storage to memory. *See also* EJB, J2EE. *Compare* passivation.

activation record *n.* A data structure that represents the state of some construct (such as a procedure, a function, a block, an expression, or a module) of a running program. An activation record is useful for the run-time management of both data and sequencing. *See also* data structure.

active *adj.* Pertaining to the device, program, file, or portion of the screen that is currently operational or subject to command operations. Usually the cursor or a highlighted section shows the active element on the display screen.

Active Accessibility *n.* A Microsoft initiative, introduced in 1997, that consists of program files and conventions that make it easier for software developers to integrate accessibility aids, such as screen magnifiers or text-to-voice converters, into their application's user interface to make software easier for users with limited physical abilities to use. Active Accessibility is based on COM technologies and is supported by Windows 9x, Windows XP, Windows NT 4.0 and above, Internet Explorer 3 and above, and Office 2000 and above. *Acronym:* MSAA.*Also called:* Microsoft Active Accessibility.

active cell *n.* The highlighted cell on a spreadsheet display that is the current focus of operation. *Also called:* current cell, selected cell. *See also* range.

Active Channel *n.* A Web site described by a Channel Definition Format (CDF) file. Developers can use Active Channels to automatically download content to a user on a subscription basis, to send content to users on a regular schedule, to deliver personalized content to individual users, and to provide content to a Windows screen saver. Active Channels were introduced in Microsoft Internet Explorer 4 and can be used to deliver information through either the Internet or an intranet. *See also* pull, webcasting.

Active Client *n.* The client-side set of technologies in Microsoft's Active Platform for Web-oriented, cross-platform distributed computing. The chief features of the Active Client include support for HTML and dynamic HTML, language-independent scripting, Java applets, and ActiveX objects. Active Client is operating system–independent, so it runs on multiple platforms, including Microsoft Windows, UNIX, and Apple Macintosh. *See also* Active Platform, Active Server.

active content *n.* Material on a Web page that changes on the screen with time or in response to user action. Active content is implemented through ActiveX controls. *See also* ActiveX control.

Active data object *n.* An application programming interface (API) developed by Microsoft for applications that access databases. ADO is an easy-to-use interface to OLE Database (OLE DB), an API that accesses the data directly from a database. *Also called:* ActiveX data object.

Active Desktop *n.* The feature introduced with Microsoft's Internet Explorer 4 that enables end users to display active—that is, updateable, customizable—HTML content on the Windows desktop. Active content includes such items as channels, Web pages, ActiveX controls, and Java applets. *See also* Active Channel, ActiveX, HTML, Internet Explorer, Java.

Active Directory *n.* A Microsoft technology, part of the Active Platform, that is designed to enable applications to find, use, and manage directory resources (for example, user names, network printers, and permissions) in a distributed computing environment. Distributed environments are usually heterogeneous collections of networks that often run proprietary directory services from different providers. To simplify directory-related activities associated with locating and administering network users and resources, Active Directory presents applications with a single set of interfaces that eliminates the need to deal with differences between and among these proprietary services. Active Directory is a component of the Windows Open Services Architecture (WOSA). *See also* directory service, WOSA.

Active Directory Services Interface *n.* An administrative tool known as a Microsoft Management Console (MMC) snap-in that allows administrators to manage objects in the domain. *Acronym:* ADSI.

active file *n.* The file affected by a current command—typically a data file.

Active Framework for Data Warehousing *n.* A data warehousing solution developed by Microsoft and Texas Instruments that represents Microsoft's standard for managing metadata. *Acronym:* AFDW.*See also* ActiveX, metadata.

active hub *n.* **1.** The central computer that regenerates and retransmits all signals in an active star network. *See also* active star. **2.** A type of hub used on ARCnet networks that both regenerates (boosts) signals and passes them along. *Compare* intelligent hub, passive hub.

active-matrix display *n.* A liquid crystal display (LCD) made from a large array of liquid crystal cells using active-matrix technology. The active matrix is a method of addressing an array of simple LC cells—one cell per pixel. In its simplest form there is one thin-film transistor (TFT) for each cell. Voltage applied selectively to these cells produces the viewable image. Active-matrix displays are often used in laptop and notebook computers because of their shallow depth and are notable for their high-quality color displays, which are viewable from wider angles than images produced by most passive-matrix displays. *Also called:* TFT, TFT display, TFT LCD. *See also* liquid crystal display, TFT. *Compare* passive-matrix display.

ActiveMovie *n.* Former name for the DirectX component now known as DirectShow. *Also called:* DirectShow. *See also* DirectX.

Active Platform *n.* A Microsoft development platform that offers a standardized approach to incorporating Internet and distributed computing technologies in client/server applications. Microsoft Windows 9x, Microsoft Windows NT, and Microsoft Internet Explorer 4.*x* (and later) provide the basis for the Active Platform. On the client side, users are given a consistent interface that enables them to easily access both local and remote information. On the server side, developers can take advantage of the tools and technologies that span the client and the server. Active Platform supports development of the modular object-oriented programs known as component software and allows creation of cross-platform applications that can run on multiple chips and operating systems. Active Platform includes support for HTML and the creation of small programs in several languages through client-side scripting. *See also* Active Desktop, Active Server, ActiveX.

active program *n.* The program currently in control of a microprocessor.

Active Server *n.* The server-based component of Microsoft's Active Platform. Comprised of a set of technologies that includes DCOM (distributed component object model), Active Server Pages, Microsoft Transaction Server, and message queues, Active Server provides support for developing component-based, scalable, high-performance Web applications on Microsoft Windows NT servers. Active Server is designed to allow developers to concentrate on creating Internet and intranet software in a variety of languages without having to focus on the intricacy of the network itself. *See also* Active Desktop, Active Platform, Active Server Pages, ActiveX.

Active Server Pages *n.* A Web-oriented technology developed by Microsoft that is designed to enable server-side (as opposed to client-side) scripting. Active Server Pages are text files that can contain not only text and HTML tags as in standard Web documents, but also commands written in a scripting language (such as VBScript or JavaScript) that can be carried out on the server. This server-side work enables a Web author to add interactivity to a document or to customize the viewing or delivery of information to the client without worrying about the platform the client is running. All Active Server Pages are saved with an .asp extension and can be accessed like standard URLs through a Web browser, such as Microsoft Internet Explorer or Netscape Navigator. When an Active Server Page is requested by a browser, the server carries out any script commands embedded in the page, generates an HTML document, and sends the document back to the browser for display on the requesting (client) computer. Active Server Pages can also be enhanced and extended with ActiveX components. *Acronym:* ASP.*See also* Active Server, ActiveX.

active star *n.* A form of the star network topology in which the central computer actively regenerates and retransmits all signals. *See also* star network.

ActiveStore *n.* A Microsoft initiative, introduced in 1998, for supporting integration of applications used in retail environments regardless of the developing vendor. ActiveStore provides a common user interface, base system services (such as security and crash recovery), common access to data across applications, and communication between applications.

ActiveSync *n.* A Microsoft program that manages synchronization of information, including e-mail, schedules, and application files, between a handheld PC and a desktop computer.

active vision *n.* A branch of computer vision research that believes robotic vision problems can be solved by allowing a robot to collect and analyze a sequence of images dynamically from changing viewpoints. Not unlike human or animal vision, active vision uses the information derived from multiple viewpoints to gain a greater depth of perception, resolve haziness, and establish relationships between the visual representation of an action and the action itself. Active vision systems may be characterized by simple image-processing algorithms, little or no calibration, and fast real-time hardware. *See also* artificial intelligence, computer vision, robotics.

active window *n.* In an environment capable of displaying multiple on-screen windows, the window containing the display or document that will be affected by current cursor movements, commands, and text entry. *See also* graphical user interface. *Compare* inactive window.

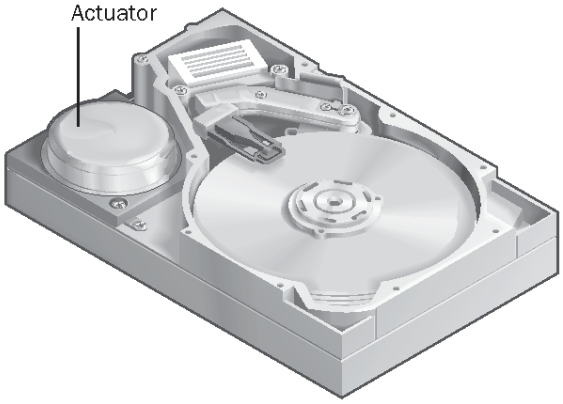
ActiveX *n.* A set of technologies that enables software components to interact with one another in a networked environment, regardless of the language in which the components were created. ActiveX, which was developed by Microsoft in the mid 1990s and is currently administered by the Open Group, is built on Microsoft's Component Object Model (COM). Currently, ActiveX is used primarily to develop interactive content for the World Wide Web, although it can be used in desktop applications and other programs. ActiveX controls can be embedded in Web pages to produce animation and other multimedia effects, interactive objects, and sophisticated applications. *See also* ActiveX control, COM. *Compare* applet, plug-in (definition 2).

ActiveX control *n.* A reusable software component based on Microsoft's ActiveX technology that is used to add interactivity and more functionality, such as animation or a popup menu, to a Web page, applications, and software development tools. An ActiveX control can be written in any of a number of languages, including Java, C++, and Visual Basic. *See also* ActiveX. *Compare* helper program.

activity ratio *n.* The number of records in use compared with the total number of records in a database file. *See also* database, record[1].

ACTOR *n.* An object-oriented language developed by The Whitewater Group, Ltd., designed primarily to facilitate Microsoft Windows programming. *See also* object-oriented programming.

actuator *n.* A disk drive mechanism for moving the read/write head(s) to the location of the desired track on a disk. See the illustration. *See also* disk drive, stepper motor, voice coil.



Actuator.

Ada *n.* A high-level programming language designed under the direction of the U.S. Department of Defense (DoD) in the late 1970s and intended to be the primary language for DoD software development. Originally based on Pascal, Ada supports real-time operations and multitasking. The language was named after Augusta Ada Byron, who assisted Charles Babbage in developing programs for his Analytical Engine, the first mechanical computer, in the nineteenth century. *See also* multitasking, Pascal, real-time.

adapter or **adaptor** *n.* A printed circuit board that enables a personal computer to use a peripheral device, such as a CD-ROM drive, modem, or joystick, for which it does not already have the necessary connections, ports, or circuit boards. Commonly, a single adapter card can have more than one adapter on it. *Also called:* interface card. *See also* controller, expansion board, network adapter, port[1], video adapter.

adapter card or **adaptor card** *n. See* adapter.

adaptive answering *n.* The ability of a modem to detect whether an incoming call is a fax or a data transmission and respond accordingly. *See also* modem.

adaptive delta pulse code modulation *n.* A class of compression encoding and decoding algorithms used in audio compression and other data compression applications. These algorithms store digitally sampled signals as a series of changes in value, adapting the range of the change with each sample as needed, thus increasing the effective bit resolution of the data. *Acronym:* ADPCM. *See also* pulse code modulation. *Compare* adaptive differential pulse code modulation.

adaptive differential pulse code modulation *n.* A digital audio compression algorithm that stores a sample as the difference between a linear combination of previous samples and the actual sample, rather than the measurement itself. The linear combination formula is modified every few samples to minimize the dynamic range of the output signal, resulting in efficient storage. *See also* pulse code modulation. *Compare* adaptive delta pulse code modulation.

adaptive load balancing *n. See* load balancing.

adaptive routing *n. See* dynamic routing.

adaptive system *n.* An artificial intelligence system that is capable of altering its behavior based on certain features of its experience or environment. *See also* expert system.

ADB *n. See* Apple Desktop Bus.

ADC *n. See* analog-to-digital converter.

A-D converter *n. See* analog-to-digital converter.

adder *n.* **1.** A component of the CPU (central processing unit) that adds two numbers sent to it by processing instructions. *See also* central processing unit. **2.** A circuit that sums the amplitudes, or strength, of two input signals. *See also* full adder, half adder.

add-in *n. See* add-on.

addition record *n.* **1.** A file that describes new record entries (such as a new customer, employee, or product) in a database so that they can later be scrutinized and posted. **2.** A record in a change file specifying a new entry. *See also* change file.

add-on *n.* **1.** A hardware device, such as an expansion board or chip, that can be added to a computer to expand its capabilities. *Also called:* add-in. *See also* open architecture (definition 2). **2.** A supplemental program that can extend the capabilities of an application program. *See also* utility program.

address[1] *n.* **1.** A number specifying a location in memory where data is stored. *See also* absolute address, address space, physical address, virtual address. **2.** A name or token specifying a particular computer or site on the Internet or other network. **3.** A code used to specify an e-mail destination.

address[2] *vb.* To reference a particular storage location.

addressable cursor *n.* A cursor programmed so that it can be moved to any location on the screen, by means of the keyboard or a mouse.

address book *n.* **1.** In an e-mail program, a reference section listing e-mail addresses and individuals' names. **2.** As a Web page, an informal e-mail or URL phone book.

address bus *n.* A bus consisting of 20 to 64 separate hardware lines that is used to carry the signals specifying memory locations for data. *See also* bus.

address classes *n.* Predefined groupings of Internet addresses with each class defining networks of a certain size. The range of numbers that can be assigned for the first octet in the IP address is based on the address class. Class A networks (values 1 to 126) are the largest, with more than 16 million hosts per network. Class B networks (128 to 191) have up to 65,534 hosts per network, and Class C networks (192 to 223) can have up to 254 hosts per network.

address decoder *n.* An electronic device that converts a numeric address to the electrical signals needed to select a specific memory location on one or more RAM chips.

addressing *n.* The process of assigning or referring to an address. In programming, the address is typically a value specifying a memory location. *See also* address[1].

address mapping table *n.* A table used by routers or DNS (Domain Name System) servers to obtain the corresponding IP (Internet Protocol) address of a text name of a computer resource, such as the name of a host computer on the Internet. *Acronym:* AMT. *See also* DNS server, IP address, router.

address mark *n. See* index mark.

address mask *n.* A number that, when compared by the computer with a network address number, will block out

all but the necessary information. For example, in a network that uses XXX.XXX.XXX.YYY and where all computers within the network use the same first address numbers, the mask will block out XXX.XXX.XXX and use only the significant numbers in the address, YYY. *See also* address[1] (definition 2).

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

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

address munging *n.* The practice of modifying an e-mail address in posts to newsgroups or other Internet forums to foil computer programs that gather e-mail addresses. The host name in an e-mail address is altered to create a fictitious address in such a way that a human can still easily determine the correct address. For example, a person with an e-mail address of Jane@myispoffers-usersfreeemail.com could modify, or "mung," her address to read Jane@remove-this-to-reply-myispoffersusers-freeemail.com. Address munging is generally used to prevent delivery of unsolicited junk e-mail or spam. *Also called:* munging. *See also* address[1] (definition 2), host name, mung, spam.

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

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

Address Resolution Protocol *n. See* ARP.

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

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

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

ADJ *n.* Short for **adj**acent. A Boolean qualifier to indicate cases where two instances are adjacent to each other. In the case of a search string, "Microsoft ADJ Word" would return only instances where "Microsoft" and "Word" are adjacent in the string.

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

ADN *n. See* Advanced Digital Network.

ADO *n. See* Active data object.

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

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

ADP *n. See* data processing.

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

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

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

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

Advanced Encryption Standard *n. See* AES.

Advanced Interactive Executive *n. See* AIX.

Advanced Mobile Phone Service *n. See* AMPS.

Advanced Power Management *n.* An older power management technology used in mobile PCs before the implementation of Advanced Configuration and Power Interface (ACPI). Advanced Power Management is a software interface that functions between the BIOS power-management software that is specific to the hardware and a power-management policy driver that is run by the operating system. *Acronym:* APM.

Advanced Program-to-Program Communication *n. See* APPC.

Advanced Research Projects Agency Network *n. See* ARPANET.

Advanced RISC *n.* Short for **A**dvanced reduced instruction **s**et **c**omputing. A specification for a RISC microchip architecture and system environment designed by MIPS Computer Systems to provide binary compatibility among software applications. *See also* RISC.

Advanced RISC Computing Specification *n.* The minimum hardware requirements enabling a RISC-based system to comply with the Advanced Computing Environment standard. *See also* Advanced RISC.

Advanced RISC Machines *n. See* ARM.

Advanced SCSI Programming Interface *n.* An interface specification developed by Adaptec, Inc., for sending commands to SCSI host adapters. The interface provides an abstraction layer that insulates the programmer from considerations of the particular host adapter used. *Acronym:* ASPI.*See also* adapter, SCSI.

Advanced Streaming Format *n.* An open file format specification for streaming multimedia files containing text, graphics, sound, video, and animation. Advanced Streaming Format (ASF) does not define the format for any media streams within the file. Rather, it defines a standardized, extensible file "container" that is not dependent on a particular operating system or communication protocol, or on a particular method (such as HTML or MPEG-4) used to compose the data stream in the file. An ASF file consists of three objects: a Header object containing information about the file itself, a Data object containing the media streams, and an optional Index object that can help support random access to data within the file. The ASF specification has been submitted to the ISO (International Organization for Standardization) for consideration. *Acronym:* ASF.*See also* streaming.

adventure game *n.* A role-playing computer game in which the player becomes a character in a narrative. In order to complete the game, the player must solve problems and avoid or overcome attacks and other forms of interference from the game's environment and other characters. The first adventure game was called "Adventure." It was developed in 1976 by Will Crowther of Bolt, Baranek & Newman. *See also* arcade game, computer game, role-playing game.

AE *n.* Acronym for **a**pplication **e**ntity. In the ISO/OSI reference model, one of the two software parties involved in a communications session. *See also* ISO/OSI reference model.

A/E/C SYSTEMS conference *n.* Annual conference of the architecture, engineering, and construction industry. The conference promotes the exchange of information on new techniques and technologies used by these industries.

.aero *n.* One of seven new top-level domain names approved in 2000 by the Internet Corporation for Assigned Names and Numbers (ICANN). .aero is meant for use with air-transport industry-related Web sites. The seven new domain names became available for use in the spring of 2001.

AES *n.* Acronym for **A**dvanced **E**ncryption **S**tandard. A cryptographic algorithm specified by the National Institute of Standards and Technology (NIST) to protect sensitive information. AES is specified in three key sizes: 128, 192, and 256 bits. AES replaces the 56-bit key Data Encryption Standard (DES), which was adopted in 1976. *See also* DES.

AFC *n. See* Application Foundation Classes.

AFDW *n. See* Active Framework for Data Warehousing.

affinity *n.* For Network Load Balancing, the method used to associate client requests to cluster hosts. When no affinity is specified, all network requests are load balanced across the cluster without respect to their source. Affinity is implemented by directing all client requests from the same IP address to the same cluster host. *See also* client request, IP address.

AFIPS *n.* Acronym for **A**merican **F**ederation of **I**nformation **P**rocessing **S**ocieties. An organization formed in 1961 for the advancement of computing and information-related

concerns. The U.S. representative of the International Federation of Information Processing, AFIPS was replaced by the Federation on Computing in the United States (FOCUS) in 1990.

AFK *adv.* Acronym for **a**way **f**rom **k**eyboard. A phrase occasionally seen in live chat services on the Internet and online information services as an indication that one is momentarily unable to answer. *See also* chat[1] (definition 1).

AFP *n.* Acronym for **A**ppleTalk **F**iling **P**rotocol. A remote filing system protocol that provides a standard means for a workstation on an AppleTalk network to access and manipulate files on an AFP-implemented server. *Also called:* AppleShare File Server.

AFS *n.* Acronym for **A**ndrew **F**ile **S**ystem. A distributed file system that allows clients and servers to share resources through local-area and wide-area networks. AFS is based on a distributed file system developed at Carnegie-Mellon University, and is named for the university's founders—Andrew Carnegie and Andrew Mellon. AFS is now maintained and supplied by Transarc Corporation. *See also* distributed file system.

agent *n.* **1.** A program that performs a background task for a user and reports to the user when the task is done or some expected event has taken place. **2.** A program that searches through archives or other repositories of information on a topic specified by the user. Agents of this sort are used most often on the Internet and are generally dedicated to searching a single type of information repository, such as postings on Usenet groups. Spiders are a type of agent used on the Internet. *Also called:* intelligent agent. *See also* spider. **3.** In client/server applications, a process that mediates between the client and the server. **4.** In Simple Network Management Protocol (SNMP), a program that monitors network traffic. *See also* SNMP.

aggregated links *n. See* link aggregation.

aggregation of links *n. See* link aggregation.

AGP *n.* Acronym for **A**ccelerated **G**raphics **P**ort. A high-performance bus specification designed for fast, high-quality display of 3-D and video images. Developed by Intel Corporation, AGP uses a dedicated point-to-point connection between the graphics controller and main system memory. This connection enables AGP-capable display adapters and compatible chip sets to transfer video data directly between system memory and adapter memory, to display images more quickly and smoothly than they can be displayed when the information must be transferred over the system's primary (PCI) bus. AGP also allows for storing complex image elements such as texture maps in system memory and thus reduces the need for large amounts of memory on the adapter itself. AGP runs at 66 MHz—twice as fast as the PCI bus—and can support data transfer speeds of up to 533 Mbps. *See also* PCI local bus.

AH *n.* **A**uthentication **H**eader. A form of IP packet authentication included in the IPSec security standard. AH attaches a header to the packet with authentication information but does not encrypt the packet data, which allows its use in cases where encryption is not allowed. *See also* ESP, IPSec.

AI *n. See* artificial intelligence.

.aiff *n.* The file extension that identifies audio files in the sound format originally used on Apple and Silicon Graphics (SGI) computers.

AIFF *n.* The sound format originally used on Apple and Silicon Graphics (SGI) computers. AIFF stores waveform files in an 8-bit monaural format. *See also* waveform.

AIM *n.* Acronym for **A**merica Online **I**nstant **M**essenger. A popular instant-messaging service provided for free by America Online. With the AIM service, instant messages can be sent over an Internet connection using the AIM software or directly from a Web browser using AIM Express. *See also* America Online, instant messaging. *Compare* ICQ, .NET Messenger Service, Yahoo! Messenger.

AirPort *n.* A wireless connectivity option introduced by Apple in 1999. AirPort provides wireless network and Internet communications to all AirPort card–equipped Macintosh computers within 150 feet of an AirPort base station. AirPort was developed around the IEEE 802.11 Direct Sequence Spectrum (DSSS) industry standard and is interoperable with other 802.11-based equipment.

AirSnort *n.* A hacking tool used to gather and decrypt passwords in data sent over wireless networks. AirSnort monitors wireless transmissions and collects packets of data. When it has collected enough data, AirSnort is able to compute the encryption key used in the transmission. AirSnort takes advantage of security flaws in the Wired Equivalent Protocol (WEP) standard. *See also* password sniffing.

AIX *n.* Acronym for **A**dvanced **I**nteractive **Ex**ecutive. A version of the UNIX operating system developed and maintained by IBM for its UNIX workstations and PCs.

alarm *n.* A visual or auditory signal from a computer alerting the user to an error or a hazardous situation.

ALB *n. See* load balancing.

alert *n.* **1.** In many operating systems with GUIs (graphical user interfaces), an audible or visual alarm that signals an error or represents a warning of some sort. *See also* alert box. **2.** In programming, an asynchronous notification sent by one thread to another. The alert interrupts the recipient thread at defined points in its execution and causes it to execute an asynchronous procedure call. *See also* asynchronous procedure call, thread (definition 1).

alert box *n.* An on-screen box in a GUI (graphical user interface) that is used to deliver a message or warning. *Compare* dialog box.

Alerter service *n.* A service used by the server and other services to notify selected users and computers of administrative alerts that occur on a computer. The Alerter service requires the Messenger service. *See also* administrative alerts, Messenger service, service.

ALGOL *n.* Acronym for **Alg**orithmic Language. The first structured procedural programming language, developed in the late 1950s and once widely used in Europe.

algorithm *n.* A finite sequence of steps for solving a logical or mathematical problem or performing a task.

algorithmic language *n.* A programming language, such as Ada, Basic, C, or Pascal, that uses algorithms for problem solving.

Algorithmic Language *n. See* ALGOL.

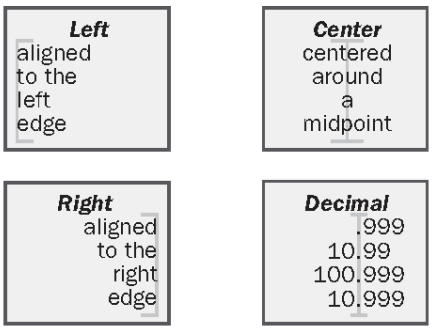
alias *n.* **1.** An alternative label for some object, such as a file or data collection. **2.** A name used to direct e-mail messages to a person or group of people on a network. **3.** A false signal that results from the digitization of an analog audio sample.

aliasing *n.* In computer graphics, the jagged appearance of curves or diagonal lines on a display screen, which is caused by low screen resolution. See the illustration.

Aliasing. *The lower resolution of the image on the right reveals the aliasing effect.*

aliasing bug *n.* A class of subtle programming errors that can arise in code that performs dynamic allocation. If several pointers address the same chunk of storage, the program may free the storage using one of the pointers but then attempt to use another one (an alias), which would no longer be pointing to the desired data. This bug is avoidable by the use of allocation strategies that never use more than one copy of a pointer to allocated core memory, or by the use of higher-level languages, such as LISP, which employ a garbage collection feature. *Also called:* stale pointer bug. *See also* alias, dynamic allocation, garbage collection.

align *vb.* **1.** In an application such as a word processor, to position lines of type relative to some point, such as the page margin. The most common types of alignment are left- and right-aligned and centered. See the illustration. **2.** To adjust some device to position it within specified tolerances, such as the read/write head relative to a track on a disk. **3.** In data handling, to store multiple-byte data units so that the respective bytes fall in corresponding locations of memory.



Align.

alignment *n.* The arrangement of objects in fixed or predetermined positions, rows, or columns. For example, the Macintosh Finder can do automatic alignment of icons in a folder or on the desktop.

Allegro *n.* Ported to a number of operating systems, Allegro is a freeware library of functions for use in programming computer games and graphics programs. It is written for the DJGPP compiler in a mixture of C and assembly language. The most recent release version is 4.0.0. *See also* assembly language, DJGPP.

allocate *vb.* To reserve a resource, such as sufficient memory, for use by a program. *Compare* deallocate.

allocation *n.* In operating systems, the process of reserving memory for use by a program.

allocation block size *n.* The size of an individual block on a storage medium, such as a hard drive, which is determined by factors such as total disk size and partitioning options.

allocation unit *n. See* cluster.

all points addressable *n.* The mode in computer graphics in which all pixels can be individually manipulated. *Acronym:* APA.*See also* graphics mode.

ALOHA *n. See* ALOHAnet.

ALOHAnet *n.* The first wireless packet-switched network and the first large network to be connected to the ARPANET. ALOHAnet was built in 1970 at the University of Hawaii by Norm Abramson and was funded by Larry Roberts. ALOHAnet enabled computers at seven campuses on four different islands to communicate bidirectionally with the central computer on Oahu using a network of radio transmitters. The ALOHA protocol was the basis for Ethernet. *See also* ARPANET, Ethernet, network.

alpha[1] *adj.* Of or pertaining to software that is ready for initial testing.

alpha[2] *n.* A software product that is under development and has enough functionality to begin testing. An alpha is usually unstable and does not have all the features or functionality that the released product is to have. *Compare* beta[2].

Alpha *n.* **1.** Digital Equipment Corporation's (DEC) line of computers built on its 64-bit RISC-based microprocessor (Alphachip). **2.** DEC's internal name for a microprocessor product introduced in February 1992 as the DECchip 21064, which evolved into DEC's current Alphachips. *See also* Alphachip, DECchip 21064.

Alpha AXP *adj.* Of, pertaining to, or characteristic of Digital Equipment Corporation's 64-bit RISC-based microprocessor technology implemented in its DECchip product. The designation AXP is used by DEC in its personal computer products to indicate that a product has a DECchip microprocessor. *See also* Alpha, DECchip 21064, RISC.

alphabet *n.* In communications and data processing, the subset of a complete character set, including letters, numerals, punctuation marks, and other common symbols as well as the codes used to represent them. *See also* ASCII, CCITT, character set, EBCDIC, ISO.

alpha blending *n.* In 3-D computer game rendering and other digital animation applications, a graphics technique for creating realistic transparent and semi-transparent images. Alpha blending combines a transparent source color with a translucent destination color to realistically simulate effects such as smoke, glass, and water.

Alpha box *n.* A computer built around the DEC's DECchip 21064 processor (called Alpha internally at Digital Equipment Corporation). *See also* DECchip 21064.

alpha channel *n.* The high-order 8 bits of a 32-bit graphics pixel used to manipulate the remaining 24 bits for purposes of coloring or masking.

Alphachip *n.* A 64-bit RISC-based microprocessor from Digital Equipment Corporation. *See also* DECchip 21064, RISC.

alphageometric *adj.* In reference to computer graphics, especially videotext and teletext systems, pertaining to or being a display method that uses codes for alphanumeric characters and creates graphics using geometric primitives. Shapes such as horizontal and vertical lines and corners are alphageometric. *See also* alphamosaic.

alphamosaic *adj.* In reference to computer graphics, especially videotext and teletext systems, pertaining to or being a display technique that uses codes for alphanumeric characters and creates graphics using rectangular arrangements of elements to form a mosaic. *See also* alphageometric.

alphanumeric *adj.* Consisting of letters or digits, or both, and sometimes including control characters, space characters, and other special characters. *See also* ASCII, character set, EBCDIC.

alphanumeric display *n.* Electronic display on a wireless phone, pager, or handheld device capable of showing both text and numbers.

alphanumeric display terminal *n.* A terminal capable of displaying characters but not graphics.

alphanumeric messaging *n.* Ability to receive messages containing text and numbers on a pager or digital wireless phone. Also known as short message service (SMS).

alphanumeric mode *n. See* text mode.

alphanumeric sort *n.* A method of sorting data, such as a set of records, that typically uses the following order: punctuation marks, numerals, alphabetic characters (with

capitals preceding lowercase letters), and any remaining symbols.

alpha test *n.* The process of user testing that is carried out on a piece of alpha software.

Altair 8800 *n.* A small computer introduced in 1975 by Micro Instrumentation Telemetry Systems (MITS) of New Mexico and sold primarily in kit form. The Altair was based on the 8-bit Intel 8080 microprocessor, had 256 bytes of random access memory, received input through a bank of switches on the front panel, and displayed output via a row of light-emitting diodes. Although it was short-lived, the Altair is considered the first successful personal computer, which was then called a home computer.

AltaVista *n.* A World Wide Web search site and portal hosted by Digital Equipment Corporation. *See also* portal.

alternate circuit-switched voice/circuit-switched data *n.* A configuration option for ISDN B (bearer) channels that enables the digital transmission of either voice or data communications between two users for the duration of a call. *Acronym:* CSV/CSD.*See also* B channel, circuit-switched data, circuit-switched voice, ISDN.

alternate key *n.* **1.** Any candidate key in a database not designated as the primary key. **2.** *See* Alt key.

alternating current *n.* Electric current that reverses its direction of flow (polarity) periodically according to a frequency measured in hertz, or cycles per second. *Acronym:* AC.*Compare* direct current.

Alt key *n.* A key included on PC and other standard keyboards that is used in conjunction with another key to produce some special feature or function and is typically marked with the letters Alt.

alt. newsgroups *n.* Internet newsgroups that are part of the alt. ("alternative") hierarchy and have the prefix alt. Unlike the seven Usenet newsgroup hierarchies (comp., misc., news., rec., sci., soc., talk.) that require formal votes among users in the hierarchy before official newsgroups can be established, anybody can create an alt. newsgroup. Therefore, newsgroups devoted to discussions of obscure or bizarre topics are generally part of the alt. hierarchy.

ALU *n. See* arithmetic logic unit.

always on *n.* An Internet connection that is maintained continuously, whether or not the computer user is on line. Always-on connections provide convenience to users who don't need to dial in or log on to access the Internet, but also provide more opportunities for hackers to attempt to access the system or use the computer to spread malicious programs.

AM *n. See* amplitude modulation.

AMD-K6 *n.* Family of x86-compatible processors introduced by Advanced Micro Devices, Inc. (AMD) in 1997. Comparable in performance to the Intel Pentium II, the AMD-K6 family is composed of Windows-compatible processors with MMX support that run 32-bit programs. They have 8.8 million transistors, include 64-KB (AMD-K6) L1 caches for faster execution, and are based on a technology known as RISC86 that converts x86 program instructions into RISC operations for execution. The AMD-K6 family ranges in speed from 166 to over 500 MHz. *See also* MMX, Pentium, RISC.

AMD-K7 *n. See* Athlon.

American Federation of Information Processing Societies *n. See* AFIPS.

American National Standards Institute *n. See* ANSI.

American Registry for Internet Numbers *n. See* ARIN.

American Standard Code for Information Interchange *n. See* ASCII.

America Online *n.* An online information service, based in Vienna, Virginia, that provides e-mail, news, educational and entertainment services, and Internet access. America Online is one of the largest American ISPs (Internet service providers). In 2000 America Online merged with media giant Time Warner Inc. to become AOL Time Warner Inc. Intended for mass-market delivery of branded content and communication services, the merged companies form a communication and media conglomerate with the Internet's largest user base and a wide range of entertainment, publishing, and cable properties. *Acronym:* AOL.

America Online Instant Messenger *n. See* AIM.

AMI BIOS *n.* A ROM BIOS developed and marketed by American Megatrends, Inc. (AMI), for use in IBM-compatible computers. A popular feature is that its configuration software is stored in the ROM chip along with the BIOS routines, so the user does not need a separate configuration disk to modify system settings, such as amount of memory installed and number and types of disk drives. *See also* BIOS, Phoenix BIOS, ROM BIOS.

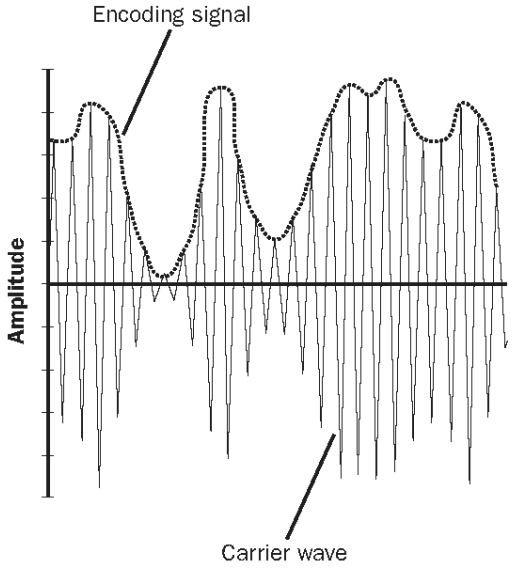
Amiga *n.* An operating system owned by Amiga, Inc. The Amiga model of desktop computer, which featured the Amiga operating system, was introduced by Commodore in 1985. The Amiga was especially strong in its ability to support sound and video, which made it popular among broadcast and multimedia producers, but it was overshadowed by the IBM Personal Computer (and its clones) and the Apple Macintosh. The ownership of the Amiga design has been through the hands of several companies in the United States and Germany.

amp *n. See* ampere.

ampere *n.* The basic unit of electric current. One ampere is equivalent to a flow of 1 coulomb per second. *Abbreviation:* a, A, amp.

amplitude *n.* A measure of the strength of a signal, such as sound or voltage, determined by the distance from the baseline to the peak of the waveform. *See also* waveform.

amplitude modulation *n.* A method of encoding information in a transmission, such as radio, using a carrier wave of constant frequency but of varying amplitude. See the illustration. *Acronym:* AM.*Compare* frequency modulation.



Amplitude modulation.

amplitude shift keying *n.* A form of amplitude modulation that uses two different wave heights to represent the binary values 1 and 0. *See also* amplitude modulation.

AMPS *n.* Acronym for **A**dvanced **M**obile **P**hone **S**ervice. The standard for analog cellular phone service, widely used in the United States and many other countries around the world. AMPS was introduced by AT&T in 1983. It relies on frequency division multiple access (FDMA) to divide frequencies in the 800 MHz to 900 MHz range into 30 KHz channels for sending and receiving calls. A form of AMPS based on a narrower bandwidth is known as N-AMPS. The comparable standard for digital cellular phones is known as D-AMPS. *See also* D-AMPS, N-AMPS.

AMPS/D-AMPS/N-AMPS *n. See* AMPS, D-AMPS, N-AMPS.

AMT *n. See* address mapping table.

Anaglyph *n.* A 3-D effect obtained by creating two overlapping images that appear as a single three dimensional image when viewed through special lenses. Anaglyph 3-D technologies are used on the Web to produce 3-D images for a variety of virtual reality, teaching, and research applications.

analog *adj.* Pertaining to or being a device or signal that is continuously varying in strength or quantity, such as voltage or audio, rather than based on discrete units, such as the binary digits 1 and 0. A lighting dimmer switch is an analog device because it is not based on absolute settings. *Compare* digital (definition 2).

analog channel *n.* A communications channel, such as a voice-grade telephone line, carrying signals that vary continuously and can assume any value within a specified range.

analog computer *n.* A computer that measures data varying continuously in value, such as speed or temperature.

analog data *n.* Data that is represented by continuous variations in some physical property, such as voltage, frequency, or pressure. *Compare* digital data transmission.

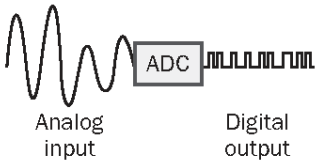
analog display *n.* A video display capable of depicting a continuous range of colors or shades rather than discrete values. *Compare* digital display.

analog line *n.* A communications line, such as a standard telephone line, that carries continuously varying (analog) signals.

analog modem *n. See* modem.

analog signal generator *n.* A device that generates continuously variable signals and is sometimes used to activate an actuator in a disk drive. *See also* actuator.

analog-to-digital converter *n.* A device that converts a continuously varying (analog) signal, such as sound or voltage, from a monitoring instrument to binary code for use by a computer. See the illustration.
Acronym: ADC.Also called: A-D converter. *See also* modem. *Compare* digital-to-analog converter.



Analog-to-digital converter.

analysis *n.* The evaluation of a situation or problem, including review from various aspects or points of view. In computing, analysis commonly involves such features as flow control, error control, and evaluation of efficiency. Often the overall problem is divided into smaller components that can be more easily dealt with. *See also* flow analysis, numerical analysis, systems analysis. *Compare* synthesis.

analysis graphics *n. See* presentation graphics.

Analytical Engine *n.* A mechanical calculating machine designed by British mathematician Charles Babbage in 1833 but never completed. It was the first general-purpose digital computer. *See also* Difference Engine.

anchor *n.* **1.** A format code in a desktop publishing or word processing document that keeps an element in the document, such as a figure or a caption or a label associated with the figure, in a certain position in the document. The anchored object is generally attached to another element in the document such as a piece of text (often a paragraph), a graphic, or a particular place in the document. As text and other objects are added to the document, the anchored object moves relative to the object to which it is anchored or remains stationary. **2.** A tag in an HTML document that defines a section of text, an icon, or other element as a link to another element in the document or to another document or file. *See also* hyperlink.

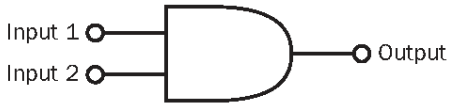
ancillary equipment *n. See* peripheral.

AND *n.* A logical operation combining the values of two bits (0, 1) or two Boolean values (false, true) that returns a value of 1 (true) if both input values are 1 (true) and returns a 0 (false) otherwise. See the table.

Table A.1 The Possible Combinations with a Boolean AND.

a	*b*	*a AND b*
0	0	0
0	1	0
1	0	0
1	1	1

AND gate *n.* A digital circuit whose output is a value of 1 only when all input values are 1. See the illustration. *See also* truth table.



AND gate.

Andrew File System *n. See* AFS.

angle bracket *n. See* <>.

angstrom *n.* A unit of measure equal to one 10-billionth (10^{-10}) of a meter or one 250-millionth of an inch. Light wavelength, for example, is commonly measured in angstroms. *Abbreviation:* Å.

animated cursors *n.* A Windows 95 and Windows NT feature that allows a series of frames, one after another, to appear at the mouse pointer location instead of a single image, thus producing a short loop of animation. The animated cursors feature is designated by the .ani suffix.

animated GIF *n.* A series of graphic images in GIF format, displayed sequentially in a single location to give the appearance of a moving picture. *See also* GIF.

animation *n.* The illusion of movement created by using a succession of static images. In computer graphics, the images can all be drawn separately, or starting and ending points can be drawn with the intervening images provided by software. *See also* 3-D graphic, surface modeling, tween, wire-frame model.

ANN *n. See* artificial neural network.

annotation *n.* A note or comment attached to some part of a document to provide related information. Some applications support voice annotations or annotations accessible by icons. *See also* comment.

annoybot *n.* A bot on an Internet Relay Chat (IRC) channel or a multiuser dungeon (MUD) that interacts with the user in an obnoxious manner. *See also* bot, IRC, MUD.

anode *n.* In electronics, the positively charged terminal or electrode toward which electrons flow. *Compare* cathode.

anonymity *n.* The ability to send an e-mail message or an article to a newsgroup without one's identity becoming known. Ordinarily, the e-mail address of the sender appears automatically in a message's header, which is created by the client software. To achieve anonymity, a message must be sent through an anonymous remailer—which, however, maintains a record of the sender's identity to enable replies. *See also* anonymous remailer.

anonymous *n.* On the Internet, the standard login name used to obtain access to a public FTP file archive. *See also* anonymous FTP.

anonymous FTP *n.* The ability to access a remote computer system on which one does not have an account, via the Internet's File Transfer Protocol (FTP). Users have restricted access rights with anonymous FTP and usually can only copy files to or from a public directory, often named */pub*, on the remote system. Users can also typically use FTP commands, such as listing files and directories. When using anonymous FTP, the user accesses the remote computer system with an FTP program and generally uses *anonymous* or *ftp* as a logon name. The password is usually the user's e-mail address, although a user can often skip giving a password or give a false e-mail address. In other cases, the password can be the word *anonymous*. Many FTP sites do not permit anonymous FTP access in order to maintain security. Those that do permit anonymous FTP sometimes restrict users to only downloading files for the same reason. *See also* FTP[1] (definition 1), logon, /pub.

anonymous post *n.* A message in a newsgroup or mailing list that cannot be traced to its originator. Generally this is accomplished by using an anonymous server for newsgroup posts or an anonymous remailer for e-mail. *See also* anonymous remailer.

anonymous remailer *n.* An e-mail server that receives incoming messages, replaces the headers that identify the original sources of the messages, and sends the messages to their ultimate destinations. The purpose of an anonymous remailer is to hide the identities of the senders of the e-mail messages.

anonymous server *n.* **1.** The software used by an anonymous remailer. *See also* anonymous remailer. **2.** Software that provides anonymous FTP service. *See also* anonymous FTP.

ANSI *n.* **1.** Acronym for **A**merican **N**ational **S**tandards **I**nstitute. A voluntary, nonprofit organization of business and industry groups formed in 1918 for the development and adoption of trade and communication standards in the United States. ANSI is the American representative of ISO (the International Organization for Standardization). Among its many concerns, ANSI has developed recommendations for the use of programming languages including FORTRAN, C, and COBOL, and various networking technologies. *See also* ANSI C, ANSI.SYS, SCSI. **2.** The Microsoft Windows ANSI character set. This set is includes ISO 8859/x plus additional characters. This set was originally based on an ANSI draft standard. The MS-DOS operating system uses the ANSI character set if ANSI.SYS is installed.

ANSI C *n.* A version of the C programming language standardized by ANSI. *See also* ANSI, K&R C.

ANSI/SPARC *n.* Acronym for **A**merican **N**ational **S**tandards **I**nstitute **S**tandards **P**lanning **a**nd **R**equirements **C**ommittee. The ANSI committee that, in the 1970s, proposed a generalized, three-schema architecture that is used as the foundation for some database management systems.

ANSI.SYS *n.* An installable device driver for MS-DOS computers that uses ANSI commands (escape sequences) to enhance the user's control of the console. *See also* ANSI, driver, escape sequence, install.

ANSI X3.30-1997 *n.* A standard entitled "Representation for Calendar Date and Ordinal Date for Information Interchange" from the American National Standards Institute (ANSI) that covers date formats. Many organizations, including the U.S. federal government, have standardized date formats using this standard to facilitate work on the Year 2000 problem.

answer mode *n.* A setting that allows a modem to answer an incoming call automatically. It is used in all fax machines. *Also called:* auto answer.

answer-only modem *n.* A modem that can receive but not originate calls.

answer/originate modem *n.* A modem that can both send and receive calls—the most common type of modem in use.

antialiasing *n.* A software technique for smoothing the jagged appearance of curved or diagonal lines caused by poor resolution on a display screen. Methods of anti-aliasing include surrounding pixels with intermediate shades and manipulating the size and horizontal alignment of pixels. See the illustration. *See also* dithering. *Compare* aliasing.

Antialiasing. *The image on the right shows the result of anti-aliasing through the use of higher resolution.*

antiglare or **anti-glare** *adj.* Pertaining to any measure taken to reduce reflections of external light on a monitor screen. The screen may be coated with a chemical (which may reduce its brightness), covered with a polarizing filter, or simply rotated so that external light is not reflected into the user's eye.

anti-replay *n.* An IP packet–level security feature that prevents packets that have been intercepted and changed from being inserted into the data stream. Anti-replay creates a security association between a source and destination computer, with each agreeing on a numbering sequence for transmitted packets. The anti-replay mechanism detects packets tagged with numbers that fall outside the accepted sequence, discards them, sends an error message, and logs the event. The anti-replay protocol is included as part of the IPSec standard. *See also* IPSec.

antistatic device *n.* A device designed to minimize shocks caused by the buildup of static electricity, which can disrupt computer equipment or cause data loss. An antistatic device may take the form of a floor mat, a wristband with a wire attached to the workstation, a spray, a lotion, or other special-purpose device. *See also* static[2], static electricity.

antivirus program *n.* A computer program that scans a computer's memory and mass storage to identify, isolate, and eliminate viruses, and that examines incoming files for viruses as the computer receives them.

anti-worm *n. See* automatic patching, do-gooder virus.

anycasting *n.* Communication between a single sender and the nearest receiver in a group. In IPv6, anycasting enables one host to initiate the updating of routing tables for a group of hosts. *See also* IPv6. *Compare* multicasting, unicast.

any key *n.* Any random key on a computer keyboard. Some programs prompt the user to "press any key" to continue. It does not matter which key the user presses. There is no key on the keyboard called Any.

any-to-any connectivity *n.* The property of an integrated computer network environment where it is possible to share data across multiple protocols, host types, and network topologies.

AOL *n. See* America Online.

AOL Instant Messenger *n. See* AIM.

AOL NetFind *n.* Resident Web-finding tool of America Online (AOL) information service. Searches by keyword and concept. Using Intelligent Concept Extraction (ICE) and Excite technology, this tool finds relationships between words and ideas; for example, between "elderly people" and "senior citizen." *See also* Excite, Intelligent Concept Extraction.

APA *n. See* all points addressable.

Apache *n.* A free open-source HTTP (Web) server introduced in 1995 by the Apache Group as an extension to, and improvement of, the National Center for Supercomputing Applications' earlier HTTPd (version 1.3). Apache is popular on UNIX-based systems, including Linux, and also runs on Windows NT and other operating systems, such as BeOS. Because the server was based on existing code with a series of patches, it became known as "A Patchy server," which led to the official name Apache. *See also* HTTPd.

Apache Group *n.* A non-profit organization of volunteers from around the world that operates and contributes to the Apache HTTP Server Project.

Apache HTTP Server Project *n.* A collaborative effort by the members of the Apache Group to design, develop, and maintain the Apache HTTP (Web) server. *See also* Apache, Apache Group.

Apache project *n. See* Apache HTTP Server Project.

APC *n. See* asynchronous procedure call.

aperture grill *n.* A type of CRT (cathode ray tube) used in computer monitors that uses thin, closely-spaced vertical wires to isolate the individual pixels. The first aperture grill CRT was the Sony Trinitron, but several other manufacturers also produce aperture grill CRTs. *See also* CRT.

APEX *n.* Acronym for **A**ssembly **P**rocess **Ex**hibition and Conference. Exhibition and conference for members of the electronics manufacturing industry. APEX features product exhibits, speeches, technical conferences, and forums on issues that affect the industry.

API *n. See* application programming interface.

APL *n.* Acronym for **A** Programming Language. A high-level language introduced in 1968 for scientific and mathematical applications. APL is a subprogram-based interpreted language that uses a large set of special characters and terse syntax and is available for use on PC-compatible machines. *See also* interpreted language.

APM *n. See* Advanced Power Management.

APNIC *n.* Acronym for **A**sian-**P**acific **N**etwork **I**nformation **C**enter, a nonprofit, voluntary membership organization covering the Asia/Pacific Rim region. APNIC, like its European counterpart RIPE and its American counterpart ARIN, devotes itself to matters related to the Internet, among them such tasks as registering new members, allocating IP addresses, and maintaining database information. *See also* ARIN, RIPE.

app *n. See* application.

APPC *n.* Acronym for **A**dvanced **P**rogram-to-**P**rogram **C**ommunication. A specification developed as part of IBM's SNA (Systems Network Architecture) model and designed to enable applications programs running on different computers to communicate and exchange data directly. APPC extends SNA to include minicomputers and PCs.

append *vb.* To place or insert as an attachment by adding data to the end of a file or database or extending a character string. *See also* file, string. *Compare* truncate.

Apple II *n.* The second computer introduced by the Apple Computer Corporation, in April 1977. The Apple II featured 4 K dynamic RAM, expandable to 48 K (with 16 K chips), and used the 6502 microprocessor. The Apple II was the first computer to offer a TV video adapter as an optional alternative to a color computer monitor. It also featured sound and eight expansion slots. *See also* 6502.

Apple Desktop Bus *n.* A serial communications pathway built into Apple Macintosh and Apple IIGS computers. Typically a flexible cord, it enables low-speed input devices, such as a keyboard or mouse, to communicate with the computer. The bus functions like a simple local area network that can connect up to 16 devices, such as light pens, trackballs, and graphics tablets, to the computer. Although there are only two external ports, more than two devices can be linked in a series called a daisy chain. *Acronym:* ADB.*See also* bus, daisy chain[2], device driver, input/output port, serial communication.

AppleDraw *n.* A shareware drawing application for Macintosh computers.

Apple Events *n.* A feature added to Mac OS System 7 that enables one application to send a command, such as save or open, to another application. *See also* Mac OS.

Apple Extended Keyboard *n.* A 105-key keyboard that works with the Macintosh SE, Macintosh II, and Apple IIGS computers. This keyboard marks Apple's first inclusion of function (F) keys, whose absence was long cited as a shortcoming of the Macintosh compared with IBM PCs and compatibles. This feature, along with other layout changes and the addition of new keys and lights, makes the Apple Extended Keyboard quite similar in form to the IBM enhanced keyboard. See the illustration. *See also* enhanced keyboard.

Apple Extended Keyboard.

Apple Filing Protocol *n. See* AFP.

Apple key *n.* A key on Apple keyboards labeled with an outline of the Apple logo. On the Apple Extended Keyboard, this key is the same as the Command key, which functions similarly to the Control key on IBM and compatible keyboards. It is generally used in conjunction with a character key as a shortcut to making menu selections or starting a macro.

Apple Macintosh *n. See* Macintosh.

Apple Newton *n. See* Newton.

AppleScript *n.* A script language developed by Apple Computer, Inc., for Macintosh computers running under the Mac OS to execute commands and automate functions. *See also* script.

AppleShare *n.* A file server software developed by Apple Computer, Inc., that works with the Mac OS and allows one Macintosh computer to share files with another on the same network. *See also* file server, Mac OS.

applet *n.* A program that can be downloaded over the Internet and executed on the recipient's machine. Applets are often written in the Java programming language and run within browser software, and they are typically used to customize or add interactive elements to a Web page.

AppleTalk *n.* An inexpensive local area network developed by Apple Computer, Inc., for Macintosh computers that can be used by Apple and non-Apple computers to communicate and share resources such as printers and file servers. Non-Apple computers must be equipped with AppleTalk hardware and suitable software. The network uses a layered set of protocols similar to the ISO/OSI reference model and transfers information in the form of packets called frames. AppleTalk supports connections to other AppleTalk networks through devices known as bridges, and it supports connections to dissimilar networks through devices called gateways. *See also* bridge, frame (definition 2), gateway.

AppleTalk Phase 2 *n.* The extended AppleTalk Internet model designed by Apple Computer, Inc., that supports multiple zones within a network and extended addressing capacity.

AppleWorks *n.* A suite of productivity applications, formerly known as ClarisWorks, distributed by Apple Computer, Inc., and shipped on the iMac computer. AppleWorks/ClarisWorks is an integrated product that includes support for word processing, spreadsheets, databases, drawing, painting, charting, and the Internet.

appliance *n.* **1.** *See* server appliance. **2.** *See* information appliance. **3.** A device with a single or limited purpose with functionality. This functionality is similar to a simple consumer appliance.

appliance server *n.* **1.** An inexpensive computing device used for specific tasks including Internet connectivity or file-and-print services. The server is usually easy to use but does not possess the capabilities or software of a typical server for general office use. **2.** *See* server appliance.

application *n.* A program designed to assist in the performance of a specific task, such as word processing, accounting, or inventory management. *Compare* utility.

application binary interface *n.* A set of instructions that specifies how an executable file interacts with the hardware

and how information is stored. *Acronym:* ABI.*Compare* application programming interface.

application-centric *adj.* Of, pertaining to, or characteristic of an operating system in which a user invokes an application to open or create documents (such as word processing files or spreadsheets). Command-line interfaces and some graphical user interfaces such as the Windows 3.*x* Program Manager are application-centric. *Compare* document-centric.

application developer *n.* An individual who designs and analyzes the appearance and operation of an application program.

application development environment *n.* An integrated suite of programs for use by software developers. Typical components of application development environments include a compiler, file browsing system, debugger, and text editor for use in creating programs.

application development language *n.* A computer language designed for creating applications. The term is usually restricted to refer to languages with specific high-level constructs geared toward record design, form layout, database retrieval and update, and similar tasks. *See also* 4GL, application, application generator.

application development system *n.* A programming environment designed for the development of an application, typically including a text editor, compiler, and linker, and often including a library of common software routines for use in the developed program.

application entity *n. See* AE.

application file *n. See* program file.

Application Foundation Classes *n.* A set of Java class libraries developed by Microsoft that provides developers with user-interface controls and graphics tools for creating and manipulating elements such as text and fonts. The Application Foundation Classes extend the capabilities of Java's Abstract Windowing Toolkit (AWT) and are used to facilitate and expedite the creation of Java applets and applications through the use of prebuilt, customizable development components. *Acronym:* AFC.*See also* Internet Foundation Classes, Java, Java Foundation Classes, Microsoft Foundation Classes.

application gateway *n.* Software running on a machine that is intended to maintain security on a secluded network yet allow certain traffic to go between the private network and the outside world. *See also* firewall.

application generator *n.* Software for generating source or machine code for running an application based on a description of the desired functionality. Limited in scope, application generators are included with some database programs and use built-in instruction sets to generate program code. *See also* application.

application heap *n.* A block of RAM used by an application to store its code, resources, records, document data, and other information. *See also* heap (definition 1), RAM.

application layer *n.* The highest layer of standards in the Open Systems Interconnection (OSI) reference model. The application layer contains signals that perform useful work for the user, such as file transfer or remote access to a computer, as opposed to lower levels, which control the exchange of data between transmitter and receiver. 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

Application layer. *The highest layer in the ISO/OSI reference model.*

application notification *n.* An application notification starts an application at a specified time or when a system event occurs. When an application starts as the result of a notification, the system specifies a command-line parameter that identifies the event that has occurred. *See also* Class A IP address, Class B IP address, Class C IP address.

application processor *n.* A processor dedicated to a single application.

application program *n. See* application.

application program interface. *n. See* application programming interface.

application programming interface *n.* A set of routines used by an application program to direct the performance of procedures by the computer's operating system. *Acronym:* API.*Also called:* application program interface.

application server *n.* **1.** A server program on a computer in a distributed network that handles the business logic between users and backend business applications or databases. Application servers also can provide transaction management, failover, and load balancing. An application server is often viewed as part of a three-tier application consisting of a front-end GUI server such as an HTTP server (first tier), an application server (middle tier), and a backend database and transaction server (third tier). *Also called:* appserver. *Compare* HTTP server (definition 1). **2.** Any machine on which an application-server program is running. *Also called:* appserver.

application service provider *n.* A third-party company or organization that hosts applications or services for individuals or business customers. The customer connects to a data center maintained by the application service provider (ASP) through Internet or private lines to access applications that would otherwise need to be housed on the customer's local servers or individual PCs. This arrangement allows the customer to free up disk space that would otherwise be taken by applications, as well as to access the most recent software updates. ASPs deliver solutions ranging from high-end applications to services for small and medium-sized businesses. *Acronym:* ASP.

application shortcut key *n.* A key or combination of keys that when pressed will quickly perform an action within an application that would normally require several user actions, such as menu selections. *Also called:* keyboard shortcut.

application software *n. See* application.

application-specific integrated circuit *n. See* gate array.

application suite *n. See* suite (definition 1).

appserver *n. See* application server.

Aqua *n.* The graphical user interface (GUI) of Macintosh OS X. Aqua was designed to maintain familiarity and a comfort level for users of the earlier Macintosh system while allowing access to newer Macintosh OS X capabilities. The Aqua GUI features updated versions of Macintosh staples such as the Finder alongside new features like the Dock, a new type of organizational tool. *See also* Dock, Macintosh OS X.

arbitration *n.* A set of rules for resolving competing demands for a machine resource by multiple users or processes. *See also* contention.

.arc *n.* The file extension that identifies compressed archive files encoded using the Advanced RISC Computing Specification (ARC) format. *See also* compressed file.

arcade game *n.* **1.** A coin-operated computer game for one or more players that features high-quality screen graphics, sound, and rapid action. **2.** Any computer game designed to mimic the style of a coin-operated arcade game, such as games marketed for the home computer. *See also* computer game.

Archie *n.* An Internet utility for finding files in public archives obtainable by anonymous FTP. The master Archie server at McGill University in Montreal downloads FTP indexes from participating FTP servers, merges them into a master list, and sends updated copies of the master list to other Archie servers each day. Archie is a shortened form of *archive*. *See also* anonymous FTP, FTP[1] (definition 1). *Compare* Jughead, Veronica.

Archie client *n. See* Archie.

Archie server *n.* On the Internet, a server that contains Archie indexes to the names and addresses of files in public FTP archives. *See also* Archie, FTP[1] (definition 1), server (definition 2).

architecture *n.* **1.** The physical construction or design of a computer system and its components. *See also* cache, CISC, closed architecture, network architecture, open architecture, pipelining, RISC. **2.** The data-handling capacity of a microprocessor. **3.** The design of application software incorporating protocols and the means for expansion and interfacing with other programs.

archive[1] *n.* **1.** A tape or disk containing files copied from another storage device and used as backup storage. **2.** A compressed file. **3.** A file directory on the Internet that is

available by File Transfer Protocol (FTP) or an Internet directory established for dissemination of stored files.

archive[2] *vb.* **1.** To copy files onto a tape or disk for long-term storage. **2.** To compress a file.

archive bit *n.* A bit that is associated with a file and is used to indicate whether the file has been backed up. *See also* back up, bit.

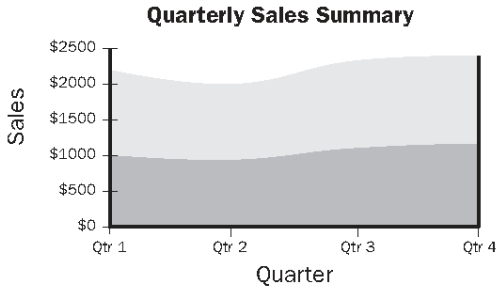
archive file *n.* A file that contains a set of files, such as a program with its documentation and example input files, or collected postings from a newsgroup. On UNIX systems, archive files can be created using the tar program; they can then be compressed using compress or gzip. PKZIP under MS-DOS and Windows and StuffIt under Mac OS create archive files that are already compressed. *See also* compress[1], gzip, PKZIP, StuffIt, tar[1].

archive site *n.* A site on the Internet that stores files. The files are usually accessed through one of the following ways: downloaded through anonymous FTP, retrieved through Gopher, or viewed on the World Wide Web. *See also* anonymous FTP, Gopher.

ARCnet *n.* Short for **A**ttached **R**esource **C**omputer **Net**work. A form of token bus network architecture for PC-based LANs developed by Datapoint Corporation. ARCnet relies on a bus or star topology and can support up to 255 nodes. Different versions run at speeds of 1.5 Mbps, 20 Mbps (ARCnet Plus), and 100 Mbps.

ARCnet Plus *n. See* ARCnet.

area chart *n.* A graphical presentation, such as of quarterly sales figures, that uses shading or coloring to emphasize the difference between the line representing one set of data points and the line representing a separate but related set of data points. See the illustration.



Area chart.

area search *n.* In information management, the examination of a group of documents for the purpose of identifying those that are relevant to a particular subject or category.

arg *n. See* argument.

argument *n.* An independent variable, used with an operator or passed to a subprogram that uses the argument to carry out specific operations. *See also* algorithm, operator (definition 1), parameter, subprogram.

ARIN *n.* Acronym for **A**merican **R**egistry for **I**nternet **N**umbers. A nonprofit organization formed to register and administer Internet Protocol (IP) addresses in North and South America. The American Registry for Internet Numbers separates the allocation of IP addresses from the administration of top-level Internet domains, such as .com and .edu. Both of these tasks were previously managed by Network Solutions, Inc., as part of the InterNIC consortium. Its international counterparts are RIPE, in Europe, and APNIC, in Asia and the Pacific Rim. *See also* APNIC, InterNIC, IP address, RIPE.

arithmetic[1] *adj.* Pertaining to the mathematical operations of addition, subtraction, multiplication, and division.

arithmetic[2] *n.* The branch of mathematics dealing with the addition, subtraction, multiplication, and division of real numbers.

arithmetic expression *n.* A series of elements, including data labels and constants as well as numbers, that are joined by arithmetic operators, such as + and –, and can be calculated to produce a value.

arithmetic logic unit *n.* A component of a microprocessor chip used for arithmetic, comparative, and logical functions. *Acronym:* ALU.*See also* gate (definition 1).

arithmetic operation *n.* Any of the standard calculations performed in arithmetic—addition, subtraction, multiplication, or division. The term is also used in reference to negative numbers and absolute values.

arithmetic operator *n.* An operator that performs an arithmetic operation: +, –,*, or /. An arithmetic operator usually takes one or two arguments. *See also* argument, binary[1], logical operator, operator (definition 1), unary.

.arj *n.* The MS-DOS file extension used with archive files created with the ARJ compression program.

ARM *n.* Short for **A**dvanced **R**ISC **M**achines. A name for any of a group of small, high-performance 32-bit RISC-based microprocessors licensed to various semiconductor manufacturers by designer ARM Limited. ARM chips are notable for their low cost and efficient use of power. They are used in a wide variety of products, including mobile phones, handheld computers, automotive and embedded solutions, and consumer electronics, including digital cameras and game systems. *See also* StrongARM.

ARP *n.* Acronym for **A**ddress **R**esolution **P**rotocol. A TCP/IP protocol for determining the hardware address (or physical address) of a node on a local area network connected to the Internet, when only the IP address (or logical address) is known. An ARP request is sent to the network, and the node that has the IP address responds with its hardware address. Although ARP technically refers only to finding the hardware address, and RARP (for Reverse ARP) refers to the reverse procedure, ARP is commonly used for both senses. *See also* IP address, TCP/IP.

ARPANET *n.* A large wide area network created in the 1960s by the U.S. Department of Defense Advanced Research Projects Agency (ARPA, renamed DARPA in the 1970s) for the free exchange of information between universities and research organizations, although the military also used this network for communications. In the 1980s MILNET, a separate network, was spun off from ARPANET for use by the military. ARPANET was the network from which the Internet evolved. *See also* ALOHAnet, Internet, MILNET.

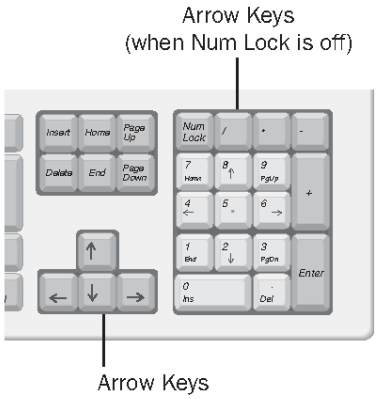
ARP request *n.* Short for **A**ddress **R**esolution **P**rotocol **request**. An ARP packet containing the Internet address of a host computer. The receiving computer responds with or passes along the corresponding Ethernet address. *See also* ARP, Ethernet, IP address, packet.

array *n.* In programming, a list of data values, all of the same type, any element of which can be referenced by an expression consisting of the array name followed by an indexing expression. Arrays are part of the fundamentals of data structures, which, in turn, are a major fundamental of computer programming. *See also* array element, index[1], record[1], vector.

array element *n.* A data value in an array.

array processor *n.* A group of interconnected, identical processors operating synchronously, often under the control of a central processor.

arrow key *n.* Any of four keys labeled with arrows pointing up, down, left, and right, used to move the cursor vertically or horizontally on the display screen or, in some programs, to extend the highlight. See the illustration.



Arrow key. *When Num Lock is off, the arrow keys on the number keypad can be used.*

ART *n.* Acronym for **A**daptive **R**esonance **T**heory. First introduced as a theory of human information processing by Stephen Grossberg, ART has evolved into several classes of self-organizing neural networks that use two layers of ideal cases to predict outcome. It is a form of cluster analysis where data is classified or matched to the previously stored pattern it most closely resembles. This data is said to *resonate* with the ideal case layer, which is then updated to reflect the new information. The constant recategorization of input results in a powerful autonomous neural network. *See also* artificial intelligence, cluster analysis, neural network.

article *n.* A message that appears in an Internet newsgroup. *Also called:* post. *See also* newsgroup.

articulation *n.* A series of adjustments applied by a synthesizer to the pitch, volume, and other parameters of an instrument sound to make it more realistic.

artifact *n.* A visible imperfection or distortion in a digital image. Artifacts may be caused by hardware/software limitations or may be a byproduct of compression.

artificial intelligence *n.* The branch of computer science concerned with enabling computers to simulate such aspects of human intelligence as speech recognition, deduction, inference, creative response, the ability to learn

from experience, and the ability to make inferences given incomplete information. Two common areas of artificial-intelligence research are expert systems and natural-language processing. *Acronym:* AI. *See also* expert system, natural-language processing.

artificial life *n.* The study of computer systems that simulate some aspects of the behavior of living organisms. Artificial life includes systems in which programs intended to perform some particular task compete for survival and reproduction based on their performance; the offspring can combine pieces of code and undergo random variations, and the programs so modified compete in turn, until an optimal solution is found.

artificial neural network *n.* A form of computer artificial intelligence that uses software based on concepts understood from biological neural networks to adaptively perform a task. *Acronym:* ANN.

AS *n. See* autonomous system.

.asc *n.* A file name extension most commonly indicating that the file contains ASCII text that can be processed by all types of word processing software, including MS-DOS Edit, Windows Notepad, Windows 9x or Windows NT WordPad, and Microsoft Word. Some systems may use this extension to indicate that a file contains image information. *See also* ASCII.

ascender *n.* The portion of a lowercase letter that extends above the main body (x-height) of the letter. See the illustration. *See also* base line, x-height. *Compare* descender.

Ascender.

ascending order *n.* The arrangement of a sequence of items from lowest to highest, such as from 1 to 10 or from A to Z. The rules for determining ascending order in a particular application can be very complicated: capital letters before lowercase letters, extended ASCII characters in ASCII order, and so on.

ascending sort *n.* A sort that results in the arrangement of items in ascending order. *See also* alphanumeric sort, ascending order. *Compare* descending sort.

ascii *n.* In an FTP client program, the command that instructs the FTP server to send or receive files as ASCII text. *See also* ASCII, FTP client. *Compare* binary[2].

ASCII *n.* Acronym for **A**merican **S**tandard **C**ode for **I**nformation **I**nterchange. A coding scheme using 7 or 8 bits that assigns numeric values to up to 256 characters, including letters, numerals, punctuation marks, control characters, and other symbols. ASCII was developed in 1968 to standardize data transmission among disparate hardware and software systems and is built into most minicomputers and all PCs. ASCII is divided into two sets: 128 characters (standard ASCII) and an additional 128 (extended ASCII). *See also* ASCII file, character, character code, control character, extended ASCII, standard ASCII. *Compare* EBCDIC.

ASCII character set *n.* A standard 7-bit code for representing ASCII characters using binary values; code values range from 0 to 127. Most PC-based systems use an 8-bit extended ASCII code, with an extra 128 characters used to represent special symbols, foreign-language characters, and graphic symbols. *See also* ASCII, character, EBCDIC, extended ASCII, standard ASCII.

ASCII EOL value *n.* The sequence of bytes that indicates the end of a line of text. For Windows and MS-DOS systems, this is the hexadecimal sequence 0D 0A or the decimal sequence 13 10. Data files imported from other kinds of computers might not display correctly if the software used is not capable of recognizing these differences and adjusting for them. *See also* ASCII, EOL.

ASCII file *n.* A document file in ASCII format, containing characters, spaces, punctuation, carriage returns, and sometimes tabs and an end-of-file marker, but no formatting information. *Also called:* ASCII file, text file, text-only file. *See also* ASCII, text file. *Compare* binary file.

ASCII transfer *n.* The preferred mode of electronic exchange for text files. In ASCII mode, character conversions to and from the network-standard character set are performed. *See also* ASCII. *Compare* binary transfer.

ASCIIZ string *n.* In programming, an ASCII string terminated by the NULL character (a byte containing the character whose ASCII value is 0). *Also called:* null-terminated string.

ASF *n. See* Advanced Streaming Format.

Asian-Pacific Network Information Center *n. See* APNIC.

ASIC *n.* Acronym for application-specific integrated circuit. *See also* gate array.

ASK *n. See* amplitude shift keying.

ASN *n.* Acronym for autonomous-system number. *See* autonomous system.

ASN.1 *n. See* Abstract Syntax Notation One.

.asp *n.* A file extension that identifies a Web page as an Active Server Page.

ASP *n.* **1.** *See* Active Server Pages. **2.** *See* application service provider.

aspect ratio *n.* In computer displays and graphics, the ratio of the width of an image or image area to its height. An aspect ratio of 2:1, for example, indicates that the image is twice as wide as it is high. The aspect ratio is an important factor in maintaining correct proportions when an image is printed, rescaled, or incorporated into another document.

ASPI *n. See* Advanced SCSI Programming Interface.

ASP.NET *n.* A set of technologies in the Microsoft .NET Framework for building Web applications and XML Web services. ASP.NET pages execute on the server and generate markup (such as HTML, WML, or XML) that is sent to a desktop or mobile browser. ASP.NET pages use a compiled, event-driven programming model that improves performance and enables the separation of application logic and user interface. ASP.NET pages and XML Web services files created using ASP.NET contain server-side (rather than client-side) logic written in Visual Basic .NET, C# .NET, or any .NET-compatible language. Web applications and XML Web services take advantage of the features of the common language runtime, such as type safety, inheritance, language interoperability, versioning, and integrated security.

ASP.NET server control *n.* A server-side component that encapsulates user-interface and related functionality. An ASP.NET server control derives directly or indirectly from the System.Web.UI.Control class. The superset of ASP.NET server controls includes Web server controls, HTML server controls, and mobile controls. The page syntax for an ASP.NET server control includes a runat="server" attribute on the control's tag. See also Web server control, HTML server control, validation server controls.

ASP.NET Web application *n.* An application that processes HTTP requests (Web requests) and executes on top of the ASP.NET runtime. An ASP.NET application can include ASP.NET pages, XML Web services, HTTP handlers, and HTTP modules.

ASR *n.* **1.** *See* automatic system reconfiguration. **2.** Acronym for Automatic Speech Recognition. Technology which allows machines to recognize and respond to human voice commands. ASR systems may be used to control a computer or to operate word processing and similar applications. Many ASR products are designed for use by users with disabilities who might have difficulty using a keyboard or mouse.

assemble *vb.* In programming, to convert an assembly language program to equivalent machine language instructions called object code. *See also* assembler, assembly language, linker, object code.

assembler *n.* A program that converts assembly language programs, which are understandable by humans, into executable machine language. *See also* assemble, assembly language, assembly listing, compiler (definition 2), machine code.

assembly *n.* A collection of one or more files that are versioned and deployed as a unit. An assembly is the primary building block of a .NET Framework application. All managed types and resources are contained within an assembly and are marked either as accessible only within the assembly or as accessible from code in other assemblies. Assemblies also play a key role in security. The code access security system uses information about the assembly to determine the set of permissions that code in the assembly is granted.

assembly cache *n.* A machine-wide code cache used for side-by-side storage of assemblies. There are two parts to the cache: the global assembly cache contains assemblies that are explicitly installed to be shared among many applications on the computer; the download cache stores code downloaded from Internet or intranet sites, isolated to the application that triggered the download so that code downloaded on behalf of one application/page does not impact other applications. *See also* global assembly cache.

assembly language *n.* A low-level programming language using abbreviations or mnemonic codes in which each statement corresponds to a single machine instruction. An assembly language is translated to machine language by the assembler and is specific to a given

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

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

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

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

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

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

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

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

Association of C and C++ Users *n.* An organization of people interested in the programming language C and its variants. Members of the association include professional programmers, manufacturers and vendors of compilers, and nonprofessional programming enthusiasts. *Acronym:* ACCU.

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

associativity *n. See* operator associativity.

asterisk *n. See* *.

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

asymmetric digital subscriber line *n. See* ADSL.

asymmetric digital subscriber loop *n. See* ADSL.

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

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

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

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

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

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

For example, two modems communicating asynchronously rely upon each sending the other start and stop signals in order to pace the exchange of information. *Compare* synchronous operation.

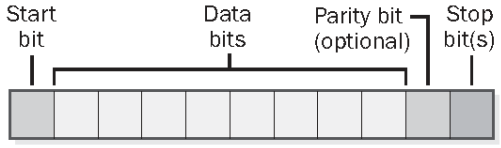
asynchronous procedure call *n.* A function call that executes separately from an executing program when a set of enabling conditions exist. After the conditions have been met, the operating system's kernel issues a software interrupt and directs the executing program to execute the call. *Acronym:* APC.*See also* function call.

Asynchronous Protocol Specification *n.* The X.445 standard. *See also* X series.

asynchronous static RAM *n.* A type of static RAM (SRAM) that is not synchronized with the system clock. Like static RAM in general, asynchronous static RAM, or async SRAM, is used in a computer's L2 cache—the special portion of memory used for storing frequently accessed information. Because this type of static RAM is not synchronized with the clock, the CPU must wait for data requested from the L2 cache. Asynchronous static RAM is faster than main memory but not as fast as synchronous burst static RAM or pipeline burst static RAM. *Also called:* async SRAM. *See also* L2 cache, static RAM. *Compare* dynamic RAM, pipeline burst static RAM, synchronous burst static RAM.

Asynchronous Transfer Mode *n. See* ATM (definition 1).

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



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

async SRAM *n. See* asynchronous static RAM.

AT&T System V *n. See* System V.

ATA *n.* Acronym for **A**dvanced **T**echnology **A**ttachment. ANSI group X3T10's official name for the disk drive interface standard for integrating drive controllers directly on disk drives. The original ATA standard is commonly known as Integrated Drive Electronics (IDE). Later ATA versions include ATA-2, ATA-3, and Ultra-ATA. See the table. *Also called:* AT attachment. *See also* direct memory access, EIDE, IDE, logical block addressing, PIO, SMART system.

Table A.2 ATA Specifications.

ATA Specification	*Also Called*	*Features*
ATA	IDE	Supports PIO (Programmed Input/Output), which transfers data through the CPU. Data transfer rates are 3.3 mbps, 5.2 mbps, and 8.3 mbps.
ATA-2	Fast ATA, Enhanced IDE (EIDE)	Supports faster PIO rates and DMA (direct memory access), which bypasses the CPU. Data transfer rates are between 4 mbps and 16.6 mbps. It also supports LBA (logical block addressing), which allows support for drives larger than 528 MB.
ATA-3		Revision of ATA-2 with SMART (self-monitoring analysis and reporting technology) for greater reliability.
Ultra-ATA	ATA-33, DMA-33, Ultra-DMA, UDMA	Supports DMA burst mode (roughly, all-at-once) data transfers of 33.3 mbps.

ATA hard disk drive card *n.* Expansion card used to control and interface with an ATA hard disk drive. These cards are usually ISA cards. *See also* ATA, ISA.

ATA/IDE hard disk drive *n.* ATA (Advanced Technology Attachment) and IDE (Integrated Drive Electronics—or numerous other interpretations) are one and the same thing: a disk drive implementation designed to integrate

the controller onto the drive itself, thereby reducing interface costs and making firmware implementations easier.

ATAPI *n.* The interface used by the IBM PC AT system for accessing CD-ROM devices.

AT Attachment *n. See* ATA.

AT bus *n.* The electric pathway used by IBM AT and compatible computers to connect the motherboard and peripheral devices. The AT bus supports 16 bits of data, whereas the original PC bus supports only 8 bits. *Also called:* expansion bus. *See also* EISA, ISA, Micro Channel Architecture.

aTdHvAaNnKcSe *n. See* TIA.

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

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

Athlon *n.* Family of x86-compatible processors introduced by Advanced Micro Devices, Inc. (AMD) in 1999. Athlon, which was code-named AMD-K7, is a successor to the AMD-K6 family. Comparable to upper-end Intel Pentium III processors in performance, Athlon is distinguished by over 22 million transistors; a fully pipelined, superscalar floating-point engine, which enhances performance of graphics and multimedia programs, Internet streaming applications, and games; a 200-MHz system bus; and a 128-KB L1 cache. Although the L2 cache is 512 KB in size, the Athlon can support L2 cache sizes up to 8 MB. The first Athlon releases featured clock speeds of 500 to 650 MHz; 800-MHz and faster versions are now available. Athlon, which runs 32-bit programs, is compatible with most PC operating systems, including Microsoft Windows, Linux, OS/2 Warp, and NetWare. *See also* AMD-K6.

ATM *n.* **1.** Acronym for **A**synchronous **T**ransfer **M**ode. A network technology capable of transmitting data, voice, audio, video, and frame relay traffic in real time. Data, including frame relay data, is broken into packets containing 53 bytes each, which are switched between any two nodes in the system at rates ranging from 1.5 Mbps to 622 Mbps (over fiber optic cable). The basic unit of ATM transmission is known as a cell, a packet consisting of 5 bytes routing information and a 48-byte payload (data). These cells are transmitted to their destination, where they are reassembled into the original traffic. During transmission, cells from different users may be intermixed asynchronously to maximize utilization of network resources. ATM is defined in the broadband ISDN protocol at the levels corresponding to levels 1 and 2 of the ISO/OSI reference model. It is currently used in LANs (local area networks) involving workstations and personal computers, but it is expected to be adopted by the telephone companies, which will be able to charge customers for the data they transmit rather than for their connect time. *See also* broadband, ISDN, ISO/OSI reference model. **2.** Acronym for **a**utomated **t**eller **m**achine. A special-purpose terminal that bank customers can use to make deposits, obtain cash, and perform other transactions. **3.** *See* Adobe Type Manager.

ATM Adaptation Layer *n.* The ATM layer that mediates between higher-level and lower-level services, converting different types of data (such as audio, video, and data frames) to the 48-byte payloads required by ATM. *Acronym:* AAL.*See also* ATM (definition 1).

ATM Forum *n.* Forum created in 1991 and including more than 750 companies related to communications and computing, as well as government agencies and research groups. The forum aims to promote Asynchronous Transfer Mode for data communication. *See also* ATM (definition 1).

Atomicity, Consistency, Isolation, Durability *n. See* ACID.

atomic operation *n.* An operation considered or guaranteed to be indivisible (by analogy with an atom of matter, once thought to be indivisible). Either the operation is uninterruptible or, if it is aborted, a mechanism is provided that ensures the return of the system to its state prior to initiation of the operation.

atomic transaction *n.* A set of operations that follow an "all or nothing" principle, in which either all of the operations are successfully executed or none of them is executed. Atomic transactions are appropriate for order entry and fulfillment or for money transfers to ensure that information is fully updated. For example, if funds are transferred between accounts on two databases, one account cannot be credited if the other is not debited by the same amount. An atomic transaction would involve both recording the credit in one database and recording the corresponding debit in the other. If any operation in the transaction fails, the transaction is aborted and any infor-

mation changes are undone. *See also* Distributed Computing Environment, TP monitor, transaction processing.

at sign *n. See* @.

attach *vb.* To include an external document, a file, or an executable program with an e-mail message.

attached document *n.* An ASCII text file or a binary file, such as a document created in a word processing system, that is included with an e-mail message as an attachment. *See also* ASCII, attachment, binary file, BinHex[1], MIME, uuencode.

attached file *n. See* attachment.

attached processor *n.* A secondary processor attached to a computer system, such as a keyboard or video subsystem processor.

Attached Resource Computer Network *n. See* ARCnet.

attachment *n.* A file that accompanies an e-mail message. As transmitted, an attached file is an exact copy of the original file located on the sender's computer. The file can be a document, an executable program, or a compressed file containing more than one item, among other types of files. The file is not part of the actual e-mail message, and it is generally encoded using uuencoding, MIME, or BinHex. Most e-mail programs automatically encode an attached document for transmission with a message. The recipient of the message must have an e-mail program capable of decoding the attached document or use a separate utility to decode it in order to read the document. Some gateways prohibit transmission of files over a certain size. Most e-mail systems permit more than one file to be attached to an e-mail message at a time.

attachment unit interface *n. See* AUI.

attenuation *n.* The weakening of a transmitted signal, such as the distortion of a digital signal or the reduction in amplitude of an electrical signal, as it travels farther from its source. Attenuation is usually measured in decibels and is sometimes desirable, as when signal strength is reduced electronically, for example, by a radio volume control, to prevent overloading.

atto- *prefix* Metric prefix meaning 10^{-18} (one quintillionth).

attract mode *n.* In commercial arcade games, when a coin-operated game is not in use, the screen will rotate through "attract mode." The aim is to both tempt prospective players and demonstrate game play or rules. Also, by constantly changing the screen image, attract mode avoids screen burn in. *See also* arcade game, burn in.

attribute *n.* **1.** In a database record, the name or structure of a field. For example, the files LASTNAME, FIRSTNAME, and PHONE would be attributes of each record in a PHONELIST database. The size of a field or the type of information it contains would also be attributes of a database record. **2.** In screen displays, an element of additional information stored with each character in the video buffer of a video adapter running in character mode. Such attributes control the background and foreground colors of the character, underlining, and blinking. **3.** In markup languages such as SGML and HTML, a name-value pair within a tagged element that modifies certain features of that element. *See also* HTML, SGML.

attribution line *n.* In newsgroups, e-mail, and other Internet-based communications, an identification line added to material quoted from earlier postings. Some mail and messaging software will add an attribution line automatically, which might read something like "News King wrote:" and usually appears immediately before the quoted text.

ATX *n.* A specification for PC motherboard architectures with built-in audio and video capabilities, introduced by Intel in 1995. ATX supports USB and full-length boards in all sockets. *See also* board, motherboard, specification, USB.

audio *adj.* Relating to frequencies within the range of perception by the human ear—from about 15 to 20,000 hertz (cycles per second). *See also* audio response, synthesizer.

audio board *n. See* sound card.

audio card *n. See* sound card.

audiocast *n.* The transmission of an audio signal using IP protocols. *See also* IP.

audio compression *n.* A method of reducing the overall loudness of an audio signal. This is accomplished by limiting the amount of apparent distortion when the signal is played back through a speaker or transmitted through a communications link.

audio output *n. See* audio response.

audio output port *n.* A circuit consisting of a digital-to-analog converter that transforms signals from the computer to audible tones. It is used in conjunction with an amplifier and a speaker. *See also* digital-to-analog converter.

audio response *n.* Any sound produced by a computer; specifically, spoken output produced by a computer in response to some specific type of input. Such output may be generated using a combination of words from a digitized vocabulary or through the synthesis of words from tables of phonemes. *See also* frequency response, phoneme.

audiotex *n.* An application allowing users to send and receive information by telephone. Users typically call an audiotex system and are presented with a series of choices or a series of questions through a voice mail system. When users select choices by pressing the buttons on the phone (rotary dial phones cannot be used for audiotex) or by speaking aloud, a database host responds by sending information to the voice mail system, which then converts the data to a spoken message for the user, or it responds by receiving and storing the information entered by the user. *Also called:* audiotext. *See also* voice mail.

audiotext *n. See* audiotex.

Audio Video Interleaved *n. See* AVI.

audiovisual *adj.* Relating to or being any material that uses a combination of sight and sound to present information.

audit *n.* In reference to computing, an examination of equipment, programs, activities, and procedures to determine how efficiently the overall system is performing, especially in terms of ensuring the integrity and security of data.

auditing *n.* The process an operating system uses to detect and record security-related events, such as an attempt to create, to access, or to delete objects such as files and directories. The records of such events are stored in a file known as a security log, whose contents are available only to those with the proper clearance. *See also* security log.

audit policy *n.* A policy that determines the security events to be reported to the network administrator.

audit trail *n.* In reference to computing, a means of tracing all activities affecting a piece of information, such as a data record, from the time it is entered into a system to the time it is removed. An audit trail makes it possible to document, for example, who made changes to a particular record and when.

AUI *n.* **1.** Acronym for attachment unit interface. A 15-pin (DB-15) connector commonly used to connect a network interface card to an Ethernet cable. **2.** *See* aural user interface.

AUI cable *n.* Short for Attachment Unit Interface cable. A transceiver cable used to connect a host adapter within a computer to an Ethernet (10base5 or 10BaseF) network. *See also* 10Base5, 10Base-F, Ethernet (definition 1), transceiver cable.

AUP *n. See* acceptable use policy.

aural user interface *n.* Voice-activated interface that allows users to issue spoken commands to electronic devices. The aural user interface is used with features such as voice recognition for computers and voice-activated dialing for wireless phones. *Acronym:* AUI.

authentication *n.* In a multiuser or network operating system, the process by which the system validates a user's logon information. A user's name and password are compared against an authorized list, and if the system detects a match, access is granted to the extent specified in the permission list for that user. *See also* logon, password, permission, user account, user name.

authentication center *n.* Secure database used to identify and prevent wireless phone fraud. Authentication centers verify whether a wireless phone is registered with a wireless carrier's network.

Authentication Header *n. See* AH.

Authenticode *n.* A security feature of Microsoft Internet Explorer. Authenticode allows vendors of downloadable executable code (plug-ins or ActiveX controls, for example) to attach digital certificates to their products to assure end users that the code is from the original developer and has not been altered. Authenticode lets end users decide for themselves whether to accept or reject software components posted on the Internet before downloading begins. *See also* ActiveX control, Internet Explorer, security.

author[1] *vb.* **1.** To create a product for implementation via computer technology. **2.** To write a computer program. **3.** To assemble multimedia components, such as graphics, text, audio, and animation, in a publication or product, for delivery on a CD-ROM or DVD or on line, to be viewed on a computer. **4.** To create Web pages. Traditionally, to author meant to write a literary work or journalistic piece; in the cyberworld, to write is "to provide content"; thus, to author in the traditional sense is to be a "content provider."

author[2] *n. See* Web author.

authoring language *n.* A computer language or application development system designed primarily for creating programs, databases, and materials for computer-aided instruction (CAI). A familiar example in relation to microcomputers is PILOT, a language used to create lessons. *See also* CAI, PILOT.

authoring software *n.* A type of computer program used for creating Web pages and other hypertext and multimedia applications. Authoring software provides a way to define relationships between different types of objects, including text, graphics, and sound, and to present them in a desired order. This type of program is sometimes known as authorware, although the latter name is generally associated with a specific product from Macromedia. *Also called:* authoring tool.

authoring system *n.* Application software that enables the operator to create and format a document for a specific kind of computer environment. An authoring system, especially for multimedia work, often consists of several applications within the framework of a single, controlling application. *See also* authoring language.

authority *n.* A DNS server responsible for resolving names and IP addresses of sites and resources on the Internet at a particular level of authority: top-level domain, second-level domain, or subdomain.

authorization *n.* In reference to computing, especially remote computers on a network, the right granted an individual to use the system and the data stored on it. Authorization is typically set up by a system administrator and verified by the computer based on some form of user identification, such as a code number or password. *Also called:* access privileges, permission. *See also* network, system administrator.

authorization code *n. See* password.

autoanswer *n. See* answer mode.

autoassociative *adj.* In data reduction or clustering, autoassociative models use the same set of variables as both predictors and targets. In autoassociative neural networks, each pattern presented serves as both the input and output pattern. Autoassociative networks are typically used for tasks involving pattern completion. *See also* artificial intelligence, cluster analysis, neural networks, operator associativity, pattern recognition.

autoattendant *adj.* A term used to describe a store-and-forward computer system that replaces the traditional switchboard operator, directing telephone calls to their correct extensions or voice mail. Autoattendant systems may implement voice prompts, touch-tone menus, or voice recognition features to send calls to their proper destinations. *Compare* interactive voice response systems.

AutoCorrect *n.* A function in Microsoft Word for Windows that automatically corrects errors and makes other substitutions as soon as a user types text. For example, AutoCorrect can be set up to fix misspellings, such as *teh* for *the*, or to change "straight" (" ") quotation marks to "smart" (“ ”) quotation marks. The user can select which AutoCorrect features to enable. *See also* smart quotes.

autodial *n.* A feature enabling a modem to open a telephone line and initiate a call by transmitting a stored telephone number as a series of pulses or tones.

AUTOEXEC.BAT *n.* A special-purpose batch file (set of commands) that is automatically carried out by the MS-DOS operating system when the computer is started or restarted. Created by the user or (in later versions of MS-DOS) by the operating system at system installation, the file contains basic startup commands that help configure the system to installed devices and to the user's preferences.

AutoIP *n.* Short for **auto**matic Internet Protocol addressing. A technique used by a device to obtain a valid IP address without a DHCP server or other IP-configuration authority. With AutoIP, a device randomly chooses an IP address from a set of reserved addresses and queries the local network to determine whether another client already is using that address. The device repeats the steps of picking and verifying until an unused address is found. AutoIP, based on an Internet Engineering Task Force (IETF) Internet Draft, is used in Universal Plug and Play (UPnP) networking. *See also* UPnP networking.

autokey *n. See* typematic.

autoload *vb.* To make some type of resource available without it having to be specifically requested. A program, for example, might autoload fonts or files as they are needed. Similarly, a CD-ROM drive might autoload audio discs or automatically start a setup program on a software CD-ROM. *See also* AutoPlay.

autoloader *n.* A device that automatically prepares a diskette, CD, or other storage medium for use.

automagic *adj.* Slang for a process performed in some unexplained (but not inexplicable) way by a computer. An automagic process might either be too complicated to explain (such as a complex spreadsheet calculation), or it might be a complex process made to appear simple to the user (such as clicking on a heading to arrange the items in a list in alphabetical or chronological order). *Compare* black box.

automata theory *n.* **1.** The study of computing processes and their capabilities and limitations; that is, how systems receive and process input and produce output. *See also* cellular automata. **2.** The study of the relationship between behavioral theories and the operation of automated devices.

automated home *n. See* smart home.

automated office *n.* A broad term used to refer to an office where work is carried out with the aid of computers, telecommunications facilities, and other electronic devices.

automated teller machine *n. See* ATM (definition 2).

automatic answering *n. See* answer mode.

automatic data processing *n. See* data processing.

automatic dialing *n. See* auto dial.

automatic error correction *n.* A process that, upon detection of an internal processing or data transmission error, invokes a routine designed to correct the error or retry the operation.

automatic IP addressing *n. See* AutoIP.

automatic patching *n.* A process in which vulnerabilities caused by a destructive computer virus infection are tracked down and corrected by a do-gooder virus or other anti-virus program. Automatic patching may be initiated by the user, or may be done by a virus entering a back door left by a malicious virus, without the consent of the user. *See also* anti-worm, do-gooder virus.

Automatic Private IP Addressing *n.* A feature of Windows XP TCP/IP that automatically configures a unique IP address from the range 169.254.0.1 through 169.254.255.254 and a subnet mask of 255.255.0.0 when the TCP/IP protocol is configured for dynamic addressing and Dynamic Host Configuration Protocol (DHCP) is not available. *Acronym:* APIPA.*See also* DHCP server, Dynamic Host Configuration Protocol (DHCP), IP address, Transmission Control Protocol/Internet Protocol (TCP/IP).

Automatic Sequence Controlled Calculator *n. See* Mark I.

automatic speech recognition *n. See* ASR (definition 2).

automatic system reconfiguration *n.* Automation of configuration by the system to accommodate some change in either the software or the hardware. *Acronym:* ASR.

Automation *n.* **1.** The implementation of a mechanical or electronic system or tool to automatically complete a task, thereby reducing or eliminating human intervention. **2.** Formerly known as OLE Automation, a Microsoft-designed technology that enables an application to expose objects and their properties for use by other applications. This allows a word processor to display and manipulate a spreadsheet program, for instance. The application that exposes an object for use is called the server; the application that manipulates the object is called the client. Automation can be either local or remote (on a computer elsewhere on a network). It is intended primarily for use by high-level languages such as Microsoft Visual Basic and Microsoft Visual C++. *See also* ActiveX control, OLE.

automonitor *n.* A process or system feature capable of assessing the status of its own internal environment.

autonomous agent *n.* A software or robotic entity that is capable of independent action in open, unpredictable environments. Often referred to as an intelligent agent, or simply agent, autonomous agents complete some kind of automatic process that can communicate with other agents or perform different kinds of directed tasks. Autonomous agents are currently being applied in areas as diverse as computer games, interactive cinema, information retrieval and filtering, user interface design, electronic commerce, auto piloting of vehicles and spacecraft, and industrial process control. *Also called:* intelligent agent. *See also* agent (definition 2).

autonomous-system number *n. See* autonomous system.

autonomous system *n.* A group of routers or networks controlled by a single administrative authority using a common Interior Gateway Protocol (IGP) for routing

packets. Each autonomous system is assigned a globally unique number called an autonomous-system number (ASN). *Acronym:* AS. *Also called:* routing domain. *See also* IGP.

Auto PC *n.* An information and entertainment system for use in automobiles. Developed by Microsoft and powered by Microsoft Windows CE (a Windows-compatible operating system designed for embedded applications), Auto PC implements speech-recognition technology to enable individuals to rely on hands-free, spoken commands for tasks such as accessing a contact database (names, addresses, numbers), calling up e-mail or traffic reports, controlling an audio system, or obtaining destination directions. The Auto PC fits into the dashboard, in the space normally occupied by a radio. *See also* voice recognition, Windows.

AutoPlay *n.* A feature in Windows 9x and later that allows it to automatically operate a CD-ROM. When a CD is inserted into a CD-ROM drive, Windows looks for a file called AUTORUN.INF on the CD. If the file is found, Windows will open it and carry out its instructions, which are usually to set up an application from the CD-ROM on the computer's hard disk or to start the application once it has been installed. If an audio CD is inserted into the drive, Windows will automatically launch the CD Player application and play it.

autopolling *n.* The process of periodically determining the status of each device in a set so that the active program can process the events generated by each device, such as whether a mouse button was pressed or whether new data is available at a serial port. This can be contrasted with event-driven processing, in which the operating system alerts a program or routine to the occurrence of an event by means of an interrupt or message rather than having to check each device in turn. *Also called:* polling. *Compare* event-driven processing, interrupt-driven processing.

autorepeat *n. See* typematic.

autoresponder *n.* E-mail utility that replies automatically to an incoming e-mail. Typically, an autoresponder sends a standard, pre-written message confirming the receipt of the original e-mail.

autorestart *n.* A process or system feature that can automatically restart the system after the occurrence of certain type of errors or a power system failure.

AUTORUN.INF *n.* A file that when present on removable media, such as CD-ROMs, triggers the AutoPlay feature in Windows 9x and Windows NT. The file, located in the root directory of the inserted medium, contains information on what action the operating system is to take on the CD-ROM—generally, an instruction to run an installation program.

autosave *n.* A program feature that automatically saves an open file to a disk or other medium at defined intervals or after a certain number of keystrokes to ensure that changes to a document are periodically saved.

autosizing *n.* The ability of a monitor to accept signals at one resolution and display the image at a different resolution. A monitor capable of autosizing maintains the aspect ratio of an image but enlarges or reduces the image to fit in the space available. *See also* monitor, resolution (definition 1).

autostart routine *n.* A process by which a system or device is automatically prepared for operation with the occurrence of powering up, or turning the system on, or some other predetermined event. *See also* AUTOEXEC.BAT, autorestart, boot[2], power up.

autostereogram *n.* A computer-generated image, popularized in books and posters, that looks like an abstract design, but which emerges as a three-dimensional picture when the user looks beyond the image, without trying to focus on the hidden picture itself. Autostereograms in which the overlying design consists of a repetitive pattern are known as Single Image Stereograms (SIS). Those in which the design looks like a random pattern of colored dots are called Single Image Random Dot Stereograms, or SIRDS. *Also called:* stereogram.

autotrace *n.* A drawing program feature that draws lines along the edges of a bitmapped image to convert the image to an object-oriented one. *See also* bitmapped graphics, object-oriented graphics.

AUX *n.* The logical device name reserved by MS-DOS for an auxiliary device, or peripheral. AUX usually refers to a system's first serial port, also known as COM1.

A/UX *n.* A version of the multiuser, multitasking UNIX operating system provided by Apple Computer for various Macintosh computers and based on the AT&T System V, release 2.2 of UNIX with some enhancements. A/UX incorporates a number of Apple features, including support for the Macintosh Toolbox, so that applications can

provide users with the graphics-based interface characteristic of that computer. *See also* System V.

auxiliary device *n. See* peripheral.

auxiliary equipment *n. See* peripheral.

auxiliary storage *n.* Any storage medium, such as disk or tape, not directly accessed by a computer's microprocessor, as is random access memory (RAM). In current usage, such media are typically referred to as *storage* or *permanent storage*, and the RAM chips that the microprocessor uses directly for temporary storage are referred to as *memory*.

availability *n.* **1.** In processing, the accessibility of a computer system or resource, such as a printer, in terms of usage or of the percentage of the total amount of time the device is needed. **2.** A measure of the fault tolerance of a computer and its programs. A highly available computer runs 24 hours a day, 7 days a week. *See also* fault tolerance.

available time *n. See* uptime.

avalanche ad *n.* One of several larger formats for online ads developed to replace traditional banner ads on the Internet. Avalanche ads are generally 120 x 800 pixels in size. *See also* skyscraper ad.

avatar *n.* In virtual-reality environments such as certain types of Internet chat rooms, a graphical representation of a user. An avatar typically is a generic picture or animation of a human of either gender, a photograph or caricature of the user, a picture or animation of an animal, or an object chosen by the user to depict his or her virtual-reality "identity." *See* superuser.

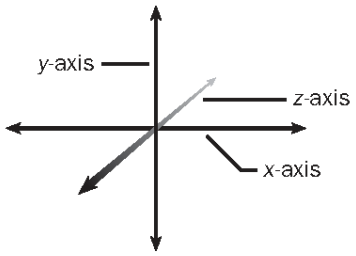
.avi *n.* The file extension that identifies an audiovisual interleaved data file in the Microsoft RIFF format.

AVI *n.* Acronym for **A**udio **V**ideo **I**nterleaved. A Windows multimedia file format for sound and moving pictures that uses the Microsoft RIFF (Resource Interchange File Format) specification.

awk *n.* A UNIX-based language designed for file processing applications, awk is a part of the POSIX Command Language and Utilities standard. It is considered a subset of PERL.

AWT *n. See* Abstract Window Toolkit.

axis *n.* In a chart or other two-dimensional system using coordinates, the horizontal line (*x*-axis) or vertical line (*y*-axis) that serves as a reference for plotting points. In a three-dimensional coordinate system, a third line (*z*-axis) is used to represent depth. See the illustration. *See also* Cartesian coordinates.



Axis.

B

b[1] *adj.* Short for **b**inary.

b[2] *n.* **1.** Short for **b**it. **2.** Short for **b**aud.

B *n.* Short for **b**yte.

B: or **b:** *n.* **1.** Identifier for a second floppy disk drive on MS-DOS and other operating systems. **2.** Identifier for a single disk drive when used as the secondary drive.

B1FF *n.* Slang for a new online user who is prone to making mistakes in e-mail, newsgroup articles, or chats that show his or her inexperience. Examples of typical mistakes made by B1FFs include sentences ending with multiple exclamation points (!!!!) and messages typed in ALL CAPS. Although it's spelled B-1(one)-F-F, the term is pronounced "bif."

B2B *n.* Short for **b**usiness-**to**-**b**usiness. The electronic exchange of products and services between businesses without the direct involvement of consumers. B2B's effects on business include streamlining purchasing, accounting, and other administrative functions; lowering transaction costs; and simplifying the sale of excess inventory. Related businesses have collaborated on the creation of Internet-based supply-chain networks.

B2C *n.* Short for **b**usiness-**to**-**c**onsumer. The direct electronic exchange of products and services between businesses and consumers. B2C's effects on business include improving the efficiency in delivering goods and services to consumers.

backbone *n.* **1.** A network of communication transmission that carries major traffic between smaller networks. The backbones of the Internet, including communications carriers such as Sprint and MCI, can span thousands of miles using microwave relays and dedicated lines. **2.** The smaller networks (compared with the entire Internet) that perform the bulk of the packet switching of Internet communication. Today these smaller networks still consist of the networks that were originally developed to make up the Internet—the computer networks of the educational and research institutions of the United States—especially NSFnet, the computer network of the National Science Foundation in Oak Ridge, Tennessee. *See also* NSFnet, packet switching. **3.** The wires that carry major communications traffic within a network. In a local area network, a backbone may be a bus. *Also called:* collapsed backbone.

backbone cabal *n.* On the Internet, a term for the group of network administrators responsible for naming the hierarchy of Usenet newsgroups and devising the procedures for creating new newsgroups. The backbone cabal no longer exists.

back door *n.* A means of gaining access to a program or system by bypassing its security controls. Programmers often build back doors into systems under development so that they can fix bugs. If the back door becomes known to anyone other than the programmer, or if it is not removed before the software is released, it becomes a security risk. *Also called:* trapdoor.

back end *n.* **1.** In a client/server application, the part of the program that runs on the server. *See also* client/server architecture. *Compare* front end. **2.** In networking, a server computer or the processing that takes place on it. **3.** The part of a compiler that transforms source code (human-readable program statements) into object code (machine-readable code). *See also* compiler (definition 2), object code, source code.

back-end processor *n.* **1.** A slave processor that performs a specialized task such as providing rapid access to a database, freeing the main processor for other work. Such a task is considered "back-end" because it is subordinate to the computer's main function. **2.** A processor that manipulates data sent to it from another processor; for example, a high-speed graphics processor dedicated to painting images on a video display operates in response to commands passed "back" to it by the main processor. *Compare* coprocessor.

background[1] *adj.* In the context of processes or tasks that are part of an operating system or program, operating without interaction with the user while the user is working on another task. Background processes or tasks are

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assigned a lower priority in the microprocessor's allotment of time than foreground tasks and generally remain invisible to the user unless the user requests an update or brings the task to the foreground. Generally, only multitasking operating systems are able to support background processing. However, some operating systems that do not support multitasking may be able to perform one or more types of background tasks. For example, in the Apple Macintosh operating system running with multitasking turned off, the Background Printing option can be used to print documents while the user is doing other work. *See also* multitasking. *Compare* foreground[1].

background[2] *n.* **1.** The color against which characters and graphics are displayed, such as a white background for black characters. *Compare* foreground[2] (definition 1). **2.** The colors, textures, patterns, and pictures that comprise the surface of the desktop, upon which icons, buttons, menu bars, and toolbars are situated. *See also* wallpaper. **3.** The colors, textures, patterns, and pictures that comprise the surface of a Web page, upon which text, icons, graphics, buttons, and other items are situated. *See also* wallpaper. **4.** The condition of an open but currently inactive window in a windowing environment. *See also* inactive window. *Compare* foreground[2] (definition 2).

background noise *n.* The noise inherent in a line or circuit, independent of the presence of a signal. *See also* noise.

background printing *n.* The process of sending a document to a printer at the same time that the computer is performing one or more other tasks.

background processing *n.* The execution of certain operations by the operating system or a program during momentary lulls in the primary (foreground) task. An example of a background process is a word processor program printing a document during the time that occurs between the user's keystrokes. *See also* background[1].

background program *n.* A program that can run or is running in the background. *See also* background[1].

background task *n. See* background[1].

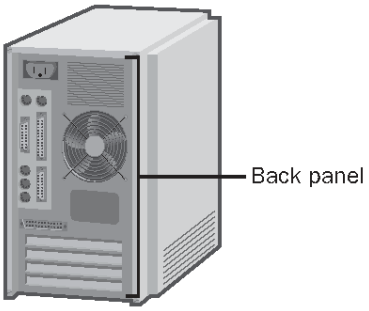
back-lit or **backlit** *adj.* Having a source of light, such as a lamp or LED behind a (usually translucent) viewing surface, in order to illuminate the surface.

back-lit display or **backlit display** *n.* Something illuminated from behind, rather than by a light source above or to the front.

BackOffice *n.* A suite of software developed by Microsoft that provides certain network services. Designed to work with Windows NT and Windows 2000, BackOffice includes such services as e-mail (Exchange), intranet capabilities (Site Server), network management (Systems Management Server), and high-end database development (SQL Server), among others.

Back Orifice *n.* A hostile application tool used by hackers to gain control of a remote computer. Back Orifice consists of client and server applications. The client application is used to control a computer running the server application. A target computer is taken over after an executable file, typically delivered by an e-mail attachment or a removable disk, is opened. Back Orifice then copies itself to the Windows System directory and transfers control to the machine running the client application. Back Orifice first appeared in the summer of 1998 and was quickly contained through updated security software. Its name is a play on words for the Microsoft BackOffice suite of servers.

back panel *n.* The panel at the rear of a computer cabinet through which most of the connections to outside power sources and peripherals are made. See the illustration.

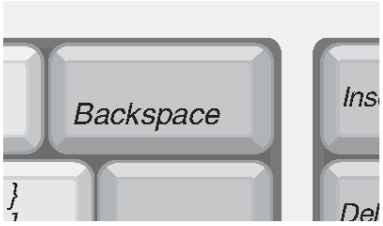


Back panel.

backplane *n.* A circuit board or framework that supports other circuit boards, devices, and the interconnections among devices, and provides power and data signals to supported devices.

backslash *n. See* \.

Backspace key *n.* **1.** A key that, on IBM and compatible keyboards, moves the cursor to the left, one character at a time, usually erasing each character as it moves. **2.** On Macintosh keyboards, a key (called the Delete key on some Macintosh keyboards) that erases currently selected text or, if no text is selected, erases the character to the left of the insertion point (cursor). See the illustration.



Backspace key.

backtracking *n.* The ability of an expert system to try alternative solutions in an attempt to find an answer. The various alternatives can be viewed as branches on a tree: in backtracking, the program follows one branch and, if it reaches the end without finding what it seeks, backs up and tries another branch.

back up *vb.* **1.** To make a duplicate copy of a program, a disk, or data. *See also* backup. **2.** To return to a previous stable state, such as one in which a database is known to be complete and consistent.

backup *n.* A duplicate copy of a program, a disk, or data, made either for archiving purposes or for safeguarding valuable files from loss should the active copy be damaged or destroyed. A backup is an "insurance" copy. Some application programs automatically make backup copies of data files, maintaining both the current version and the preceding version on disk. *Also called:* backup copy, backup file.

backup and recovery *n.* A strategy available in many database management systems that allows a database to be restored to the latest complete unit of work (transaction) after a software or hardware error has rendered the database unusable. The process starts with the latest backup copy of the database. The transaction log, or change file, for the database is read, and each logged transaction is recovered through the last checkpoint on the log. *See also* backup, checkpoint, log (definition 1).

backup and restore *n.* The process of maintaining backup files and putting them back onto the source medium if necessary.

backup copy *n. See* backup.

backup file *n. See* backup.

Backus-Naur form *n.* A metalanguage used for defining the syntax of formal languages, both for the developer of the language and for the user. A language is defined by a set of statements, in each of which a language element known as a metavariable, written in angle brackets, is defined in terms of actual symbols (called terminals) and other metavariables (including itself if necessary). See the illustration. *Acronym:* BNF. *See also* metalanguage, normal form (definition 2).

```
<number>::=<unsigned number> |
            <sign> <unsigned number>
<unsigned    number>::=<digit>|<digit>
<unsigned
                  number>
<digit>::=0|1|2|3|4|5|6|7|8|9
<sign>::=+|-
```

Backus-Naur form.

backward chaining *n.* In expert systems, a form of problem solving that starts with a statement and a set of rules leading to the statement and then works backward, matching the rules with information from a database of facts until the statement can be either verified or proved wrong. *Compare* forward chaining.

bacterium *n.* A type of computer virus that repeatedly replicates itself, eventually taking over the entire system. *See also* virus.

BAD *adj.* Acronym for **b**roken **a**s **d**esigned. Derogatory jargon for a product or device that consistently fails to work.

bad block *n.* A faulty memory location. A bad block is identified by the computer's memory controller in the self-test procedure when the computer is turned on or is rebooted. *See* bad sector.

bad sector *n.* A disk sector that cannot be used for data storage, usually because of media damage or imperfections. Finding, marking, and avoiding bad sectors on a disk is one of the many tasks performed by a computer's operating system. A disk-formatting utility can also find and mark the bad sectors on a disk.

bad track *n.* A track on a hard disk or floppy disk that is identified as containing a faulty sector and consequently is bypassed by the operating system. *See also* bad sector.

.bak *n.* An auxiliary file, created either automatically or upon command, that contains the second-most-recent version of a file and that bears the same file name, with the extension .bak. *See also* backup.

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balanced line *n.* A transmission line, such as twisted-pair cabling, that contains two conductors capable of carrying equal voltages and currents of opposite polarity and direction.

Balloon Help *n.* An on-screen help feature in the form of a cartoon dialog balloon on the Mac OS developed by Apple Computer, Inc. After activating this feature by clicking on the balloon icon on the toolbar, the user can position the cursor over an icon or other item, and a dialog balloon will appear that describes the function of the item.

balloons *n.* In print layout view or Web layout view, markup balloons show markup elements, such as comments and tracked changes, in the margins of your document. Use these balloons to easily see and respond to reviewers' changes and comments.

ball printer *n.* An impact printer that uses a small ball-shaped print head that bears fully formed characters in raised relief on its surface. The printer rotates and tilts the ball to line up characters and then strikes the ball against a ribbon. This method was used in the IBM Selectric typewriter.

band *n.* **1.** In printing graphics, a rectangular portion of a graphic sent by the computer to a printer. The technique of dividing a graphic into bands prevents a printer from having to reconstruct an entire image in memory before printing it. **2.** In communications, a contiguous range of frequencies used for a particular purpose, such as radio or television broadcasts.

bandpass filter *n.* An electronic circuit that passes signals that are within a certain frequency range (band) but blocks or attenuates signals above or below the band. *See also* attenuation. *Compare* highpass filter, lowpass filter.

bandwidth *n.* **1.** The difference between the highest and lowest frequencies that an analog communications system can pass as measured in Hertz (Hz) or cycles per second. For example, a telephone accommodates a bandwidth of 3000 Hz: the difference between the lowest (300 Hz) and highest (3300 Hz) frequencies it can carry. **2.** The data transfer capacity, or speed of transmission, of a digital communications system as measured in bits per second (bps).

bandwidth allocation *n. See* bandwidth reservation.

bandwidth brokerage *n. See* bandwidth trading.

bandwidth exchange *n. See* bandwidth trading.

bandwidth management *n.* The analysis and control of traffic on WAN (wide area network) and Internet links to prioritize bandwidth and improve quality of service (QoS). *See also* quality of service (definition 2), traffic shaping.

bandwidth on demand *n.* In telecommunications, the capability of increasing throughput, in increments, as required by the channel to be serviced. *See also* bandwidth, channel (definition 2), throughput.

bandwidth reservation *n.* Process of assigning in advance a percentage of bandwidth to each user or application served by a network. Bandwidth reservation optimizes the use of available traffic by prioritizing time-critical packets. *Also called:* bandwidth allocation, custom queuing. *See also* bandwidth management, traffic shaping.

bandwidth shaping *n. See* traffic shaping.

bandwidth test *n.* A benchmark test that determines the speed of a network connection. Bandwidth tests estimate the downstream and upstream speeds by sending a series of packets over the network and measuring how many packets are received in a given amount of time. *Also called:* throughput test. *See also* benchmark[1], throughput (definition 1).

bandwidth trading *n.* The exchange of excess bandwidth capacity. Although considered a possible commodity market, bandwidth trading currently lacks standardized contracts and instantaneous provisioning needed to simplify the trading process. *Also called:* bandwidth brokerage, bandwidth exchange.

bang *n.* The pronunciation for an exclamation point, particularly when the exclamation point is used in a file name or in a path on UNIX systems. *See also* bang path.

bang path *n.* Slang for an older form of e-mail address used in UUCP (UNIX-to-UNIX copy). A bang address supplies the path that the message needs to take to reach its destination, including the name of each host through which the message is to be passed. Exclamation points called "bangs" separate the elements of the e-mail address, such as the user account and host names. The address name!location, where "name" is the user account and "location" is the host name, would be spoken as "name bang location."

bank *n.* **1.** Any group of similar electrical devices connected together for use as a single device. For example, transistors may be connected in a row/column array inside

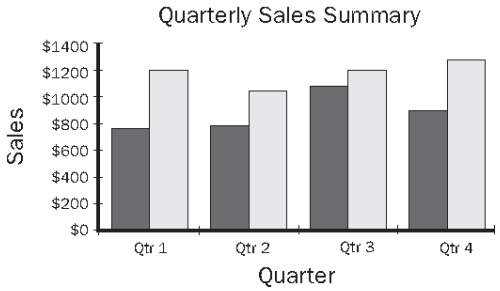
a chip to form memory, or several memory chips may be connected together to form a memory module such as a SIMM. *See also* SIMM. **2.** A section of memory, usually of a size convenient for a CPU to address. For example, an 8-bit processor can address 65,536 bytes of memory; therefore, a 64-kilobyte (64-KB) memory bank is the largest that the processor can address at once. To address another 64-KB bank of memory requires circuitry that fools the CPU into looking at a separate block of memory. *See also* bank switching, page (definition 2).

bank switching *n.* A method of expanding a computer's available random access memory (RAM) by switching between banks of RAM chips that share a range of memory addresses, which is set aside before switching begins. Only one bank is directly accessible at a time; when a bank is not active, it retains whatever is stored in it. Before another bank can be used, the operating system, driver, or program must explicitly issue a command to the hardware to make the switch. Because switching between banks takes time, memory-intensive operations take longer with bank-switched memory than with main memory. Bank-switched memory typically takes the form of an expansion card that plugs into a slot on the motherboard.

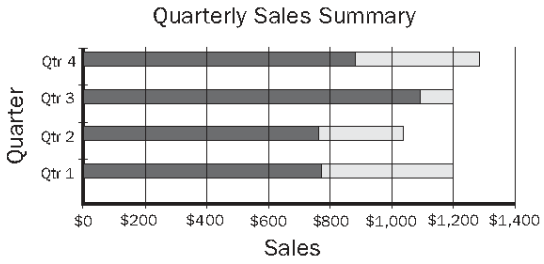
banner *n.* A section of a Web page containing an advertisement that is usually an inch or less tall and spans the width of the Web page. The banner contains a link to the advertiser's Web site. *See also* Web page, Web site.

banner page *n.* **1.** The title page that may be added to printouts by most print spoolers. Such a page typically incorporates account ID information, job length, and print spooler information, and is used primarily to separate one print job from another. *See also* print spooler. **2.** In software, an initial screen used to identify a product and credit its producers.

bar chart *n.* A type of graphic in which data items are shown as rectangular bars. The bars may be displayed either vertically or horizontally and may be distinguished from one another by color or by some type of shading or pattern. Positive and negative values may be shown in relation to a zero baseline. Two types of bar charts are common: a standard bar chart, in which each value is represented by a separate bar, and a stacked bar chart, in which several data points are "stacked" to produce a single bar. See the illustration. *Also called:* bar graph.



Vertical bar chart



Stacked bar chart

Bar chart. *Two common types of bar chart.*

bar code *n.* The special identification code printed as a set of vertical bars of differing widths on books, grocery products, and other merchandise. Used for rapid, error-free input in such facilities as libraries, hospitals, and grocery stores, bar codes represent binary information that can be read by an optical scanner. The coding can include numbers, letters, or a combination of the two; some codes include built-in error checking and can be read in either direction.

bar code reader *n. See* bar code scanner.

bar code scanner *n.* An optical device that uses a laser beam to read and interpret bar codes, such as the Universal Product Codes found on grocery products and other retail items. *See also* bar code, Universal Product Code.

bare board *n.* A circuit board with no chips on it; most commonly, a memory board not populated with memory chips.

bare bones[1] *adj.* Purely functional; stripped or otherwise clean of features. Bare bones applications provide only the most basic functions necessary to perform a given task. By

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the same token, a bare bones computer provides a minimal amount of hardware or is sold at retail with no peripherals and just the operating system (and no other software).

bare bones[2] *n.* **1.** An application that provides only the most basic functions necessary to perform a given task. **2.** A computer consisting only of motherboard (equipped with CPU and RAM), cabinet, power supply, floppy disk drive, and keyboard, to which the user must add hard disk, video adapter, monitor, and any other peripherals. *See also* motherboard, peripheral.

bar graph *n. See* bar chart.

base *n.* **1.** In mathematics, a number that is raised to the power specified by an exponent. For example, in $2^3 = 2 \times 2 \times 2 = 8$, the base is 2. **2.** In mathematics, the number of digits in a particular numbering system. With microcomputers, four numbering systems are commonly used or referred to—binary, octal, decimal, and hexadecimal—and each is based on a different number of digits. The binary, or base-2, numbering system, which is used to discuss the states of a computer's logic, has two digits, 0 and 1. Octal, or base-8, has eight digits, 0 through 7. The familiar decimal, or base-10, numbering system has ten digits, 0 through 9. Hexadecimal, or base-16, has sixteen digits, 0 through 9 and A through F. When numbers are written in a particular base, the base is often subscripted and enclosed in parentheses after the number, as in 24AE(16) = 9,390. *Also called:* radix. *See also* binary[1], decimal, hexadecimal, octal. **3.** One of three terminals (emitter, base, and collector) in a bipolar transistor. The current through the base controls the current between the emitter and the collector. *See also* transistor. **4.** The insulating foundation of a printed circuit board. *See also* circuit board.

base 10 *adj. See* decimal.

base 16 *adj. See* hexadecimal.

base 2 *adj. See* binary[1].

base 8 *adj. See* octal.

base address *n.* The part of a two-part memory address that remains constant and provides a reference point from which the location of a byte of data can be calculated. A base address is accompanied by an offset value that is added to the base to determine the exact location (the absolute address) of the information. The concept is similar to a street address system. For example, "2010 Main Street" consists of a base (the 2000 block of Main Street) plus an offset (10 from the beginning of the block). Base addresses are known as segment addresses in IBM PCs and compatibles; data in these computers is identified by its position as a relative offset from the start of the segment. *See also* absolute address, offset, relative address, segment.

baseband *adj.* Of or relating to communications systems in which the medium of transmission (such as a wire or fiber-optic cable) carries a single message at a time in digital form. Baseband communication is found in local area networks such as Ethernet and Token Ring. *See also* Ethernet, fiber optics, Token Ring network. *Compare* broadband.

baseband network *n.* A type of local area network in which messages travel in digital form on a single transmission channel between machines connected by coaxial cable or twisted-pair wiring. Machines on a baseband network transmit only when the channel is not busy, although a technique called *time-division multiplexing* can enable channel sharing. Each message on a baseband network travels as a packet that contains information about the source and destination machines as well as message data. Baseband networks operate over short distances at speeds ranging from about 50 kilobits per second (50 Kbps) to 16 megabits per second (16 Mbps). Receiving, verifying, and converting a message, however, add considerably to the actual time, reducing throughput. The maximum recommended distance for such a network is about 2 miles, or considerably less if the network is heavily used. *See also* coaxial cable, multiplexing, packet (definition 2), throughput, time-division multiplexing, twisted-pair cable. *Compare* broadband network.

base class *n.* In C++, a class from which other classes have been or can be derived by inheritance. *See also* class, derived class, inheritance, object-oriented programming.

base line or **baseline** *n.* In the printing and display of characters on the screen, an imaginary horizontal line with which the base of each character, excluding descenders, is aligned. See the illustration. *See also* ascender, descender, font.

Base line.

base memory *n. See* conventional memory.

base RAM *n. See* conventional memory.

base station *n.* Transmission tower for wireless phone signals. Commonly known as cell towers, base stations also encompass the radio antennas and electronics that handle wireless calls. Base stations relay conversations into and out of the wired phone network and between wireless phones. Each base station covers a limited area known as a cell.

base style *n.* The underlying or original style on which other styles in a document are dependent. When you change a formatting element of the base style in a document, all other styles that originate from the base style will also reflect the change.

Basic or **BASIC** *n.* Acronym for **B**eginner's **A**ll-purpose **S**ymbolic **I**nstruction **C**ode, a high-level programming language developed in the mid-1960s by John Kemeny and Thomas Kurtz at Dartmouth College. It is widely considered one of the easiest programming languages to learn. *See also* True BASIC, Visual BASIC.

Basic Rate Interface *n. See* BRI.

Basic Service Set *n.* The communicating stations, or nodes, on a wireless LAN. *See also* wireless LAN.

bastion host *n.* A computer which provides security by serving as a gateway between an internal network and external systems. All outside traffic attempting to connect to the internal network is routed through the bastion host, which defends against potential attacks by intercepting and screening incoming packets. The bastion host may be part of a larger security system providing multiple layers of protection.

.bat *n.* The file extension that identifies a batch program file. In MS-DOS, .bat files are executable files that contain calls to other program files. *See also* batch file.

batch *n.* A group of documents or data records that are processed as a unit. *See also* batch job, batch processing.

batch file *n.* An ASCII text file containing a sequence of operating-system commands, possibly including parameters and operators supported by the batch command language. When the user types a batch file name at the command prompt, the commands are processed sequentially. *Also called:* batch program. *See also* AUTOEXEC.BAT, .bat.

batch file transmission *n.* The transmission of multiple files as the result of a single command. *Acronym:* BFT.

batch job *n.* A program or set of commands that runs without user interaction. *See also* batch processing.

batch processing *n.* **1.** Execution of a batch file. *See also* batch file. **2.** The practice of acquiring programs and data sets from users, running them one or a few at a time, and then providing the results to the users. **3.** The practice of storing transactions for a period of time before they are posted to a master file, typically in a separate operation undertaken at night. *Compare* transaction processing.

batch program *n.* A program that executes without interacting with the user. *See also* batch file. *Compare* interactive program.

batch system *n.* A system that processes data in discrete groups of previously scheduled operations rather than interactively or in real time.

batch total *n.* A total calculated for an element common to a group (batch) of records, used as a control to verify that all information is accounted for and has been entered correctly. For example, the total of a day's sales can be used as a batch total to verify the records of all individual sales.

battery *n.* Two or more cells in a container that produce an electrical current when two electrodes within the container touch an electrolyte. In personal computers, batteries are used as an auxiliary source of power when the main power is shut off, as a power source for laptop and notebook computers (rechargeable batteries, such as nickel cadmium, nickel metal hydride, and lithium ion, are used), and as a method to keep the internal clock and the circuitry responsible for the part of RAM that stores important system information always powered up. *See also* lead ion battery, lithium ion battery, nickel cadmium battery, nickel metal hydride battery, RAM.

battery backup *n.* **1.** A battery-operated power supply used as an auxiliary source of electricity in the event of a power failure. **2.** Any use of a battery to keep a circuit running when the main power is shut off, such as powering a computer's clock/calendar and the special RAM that stores important system information between sessions. *See also* UPS.

battery meter *n.* A device used to measure the current (capacity) of an electrical cell.

baud *n.* One signal change per second, a measure of data transmission speed. Named after the French engineer and telegrapher Jean-Maurice-Emile Baudot and originally used to measure the transmission speed of telegraph equipment, the term now most commonly refers to the data transmission speed of a modem. *See also* baud rate.

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Baudot code *n.* A 5-bit coding scheme used principally for telex transmissions, originally developed for telegraphy by the French engineer and telegrapher Jean-Maurice-Emile Baudot. Sometimes it is equated, although inaccurately, with the International Alphabet Number 2 proposed by the Comité Consultatif Internationale Télégraphique et Téléphonique (CCITT).

baud rate *n.* The speed at which a modem can transmit data. The baud rate is the number of events, or signal changes, that occur in one second—not the number of bits per second (bps) transmitted. In high-speed digital communications, one event can actually encode more than one bit, and modems are more accurately described in terms of bits per second than baud rate. For example, a so-called 9600-baud modem actually operates at 2400 baud but transmits 9600 bits per second by encoding 4 bits per event (2400 x 4 = 9600) and thus is a 9600-bps modem. *Compare* bit rate, transfer rate.

bay *n.* A shelf or opening used for the installation of electronic equipment—for example, the space reserved for additional disk drives, CD-ROM drives, or other equipment in the cabinets of microcomputers. *See also* drive bay.

bayonet-Nelll-Concelman *n. See* BNC.

BBL *n.* Acronym for **b**e **b**ack **l**ater. An expression used commonly on live chat services on the Internet and online information services to indicate that a participant is temporarily leaving the discussion forum but intends to return at a later time. *See also* chat[1] (definition 1).

BBS *n.* **1.** Acronym for **b**ulletin **b**oard **s**ystem. A computer system equipped with one or more modems or other means of network access that serves as an information and message-passing center for remote users. Often BBSs are focused on special interests, such as science fiction, movies, Windows software, or Macintosh systems, and can have free or fee-based access, or a combination. Users dial into a BBS with their modems and post messages to other BBS users in special areas devoted to a particular topic, in a manner reminiscent of the posting of notes on a cork bulletin board. Many BBSs also allow users to chat online with other users, send e-mail, download and upload files that include freeware and shareware software, and access the Internet. Many software and hardware companies run proprietary BBSs for customers that include sales information, technical support, and software upgrades and patches. **2.** Acronym for **b**e **b**ack **s**oon. A shorthand expression often seen in Internet discussion groups by a participant leaving the group who wishes to bid a temporary farewell to the rest of the group.

bcc *n.* Acronym for **b**lind **c**ourtesy **c**opy. A feature of e-mail programs that allows a user to send a copy of an e-mail message to a recipient without notifying other recipients that this was done. Generally, the recipient's address is entered into a field called "bcc:" in the mail header. *Also called:* blind carbon copy. *See also* e-mail[1] (definition 1), header (definition 1). *Compare* cc.

BCD *n. See* binary-coded decimal.

bCentral *n.* A Web site for small businesses that provides online subscription services for customer management, financial management, and e-commerce. BCentral is part of the Microsoft .NET initiative. *See also* MSN, .NET.

B channel *n.* Short for **b**earer **channel**. One of the 64-Kbps communications channels that carry data on an ISDN circuit. A BRI (Basic Rate Interface) ISDN line has two B channels and one D (data) channel. A PRI (Primary Rate Interface) ISDN line has 23 B channels (in North America) or 30 B channels (in Europe) and one D channel. *See also* BRI, D channel, ISDN.

BCNF *n.* Acronym for **B**oyce-**C**odd **n**ormal **f**orm. *See* normal form (definition 1).

beacon *n.* On an FDDI network, a special frame generated and passed along when a node detects a problem. *See also* frame (definition 2).

beam *vb.* To transfer information from one device to another through an infrared wireless connection. The term typically refers to data sharing using handheld devices such as Palm organizers, Pocket PCs, mobile phones, and pagers.

bearer channel *n. See* B channel.

BeBox *n.* A high-performance multiprocessor computer (RISC-based PowerPC) made by Be, Inc., and loaded with Be's operating system, BeOS. Be discontinued production of the BeBox in January 1997 in order to focus on software (BeOS) development. *See also* BeOS, PowerPC, RISC.

BEDO DRAM *n.* Acronym for **B**urst **E**xtended **D**ata **O**ut **D**ynamic **RAM**. A type of EDO (extended-data-out) dynamic RAM (DRAM) that handles memory transfers in

bursts of four items in order to speed the process of returning data to a computer's CPU. BEDO DRAM takes advantage of the fact that memory requests typically refer to sequential addresses. BEDO DRAM does not function well with bus speeds above 66 MHz. However, once it has accessed the first memory address, it can process the remaining three items in the burst at 10 ns (nanoseconds) each. *Also called:* BEDO RAM. *See also* dynamic RAM, EDO DRAM.

Beginner's All-purpose Symbolic Instruction Code *n. See* Basic.

beginning-of-file *n.* **1.** A code placed by a program before the first byte in a file, used by the computer's operating system to keep track of locations within a file with respect to the first byte (character) in it. **2.** The starting location of a file on a disk relative to the first storage location on the disk. A data directory or catalog contains this location. *Acronym:* BOF. *Compare* end-of-file.

Bell communications standards *n.* A series of data transmission standards originated by AT&T during the late 1970s and early 1980s that, through wide acceptance in North America, became de facto standards for modems. Bell 103, now mostly obsolete, governed transmission at 300 bits per second (bps) with full-duplex, asynchronous communications over dial-up telephone lines using frequency-shift keying (FSK). Bell 212A governed modem operations at 1200 bps with full-duplex, asynchronous communications over dial-up telephone lines using phase-shift keying (PSK). An international set of transmission standards, known as the CCITT recommendations, has become generally accepted as the primary source of standardization, especially for communications at speeds greater than 1200 bps. *See also* CCITT V series, FSK, phase-shift keying.

Bell-compatible modem *n.* A modem that operates according to the Bell communications standards. *See also* Bell communications standards.

Bellman-Ford distance-vector routing algorithm *n.* An algorithm that helps to determine the shortest route between two nodes on a network. The Routing Information Protocol (RIP) is based on the Bellman-Ford distance-vector routing algorithm. *See also* RIP (definition 2).

bells and whistles *n.* Attractive features added to hardware or software beyond basic functionality, comparable to accessories such as electric door locks and air conditioning added to an automobile. Products, especially computer systems, without such adornments are sometimes called "plain vanilla."

benchmark[1] *n.* A test used to measure hardware or software performance. Benchmarks for hardware use programs that test the capabilities of the equipment—for example, the speed at which a CPU can execute instructions or handle floating-point numbers. Benchmarks for software determine the efficiency, accuracy, or speed of a program in performing a particular task, such as recalculating data in a spreadsheet. The same data is used with each program tested, so the resulting scores can be compared to see which programs perform well and in what areas. The design of fair benchmarks is something of an art, because various combinations of hardware and software can exhibit widely variable performance under different conditions. Often, after a benchmark has become a standard, developers try to optimize a product to run that benchmark faster than similar products run it in order to enhance sales. *See also* sieve of Eratosthenes.

benchmark[2] *vb.* To measure the performance of hardware or software.

benign virus *n.* A program that exhibits properties of a virus, such as self-replication, but does not otherwise do harm to the computer systems that it infects.

BeOS *n.* An operating system developed by Be, Inc., that runs on PowerPC systems and, until they were discontinued, the company's original BeBox computers. Designed as a "media OS," the BeOS was created to support the large file sizes and high-performance processing demands of digital media and the Internet. It is an object-oriented, multithreaded operating system and can be run on symmetric multiprocessing systems containing two or more processors. Like many other operating systems, the BeOS provides preemptive multitasking, virtual memory, and memory protection. It also provides high-performance input/output capabilities, a 64-bit file system that can support terabyte-sized files, and a number of Internet-related features including built-in mail and Web services. *See also* BeBox.

Beowulf *n.* Name for a class of virtual supercomputer created by linking numerous PCs through network connections into a single high-performance unit based on inexpensive, x86-based hardware and publicly available software, such as some versions of UNIX. This clustering technique can provide performance comparable to a traditional supercomputer at approximately 10 percent of the

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cost. The first Beowulf cluster was assembled at NASA's Goddard Space Flight Center in 1994. The origin of the name comes from Beowulf, the hero who fought and killed the monster Grendel in an eighth-century Old English saga.

Beowulf-class computing *n. See* Beowulf.

Berkeley Internet Name Domain *n. See* BIND.

Berkeley Sockets API *n. See* sockets API.

Bernoulli box *n.* A removable floppy disk drive for personal computers that uses a nonvolatile cartridge and has high storage capacity. Named after Daniel Bernoulli, an eighteenth-century physicist who first demonstrated the principle of aerodynamic lift, the Bernoulli box uses high speed to bend the flexible disk close to the read/write head in the disk drive. *See also* read/write head.

Bernoulli distribution *n. See* binomial distribution.

Bernoulli process *n.* A mathematical process involving the Bernoulli trial, a repetition of an experiment in which there are only two possible outcomes, such as success and failure. This process is used mostly in statistical analysis. *See also* Bernoulli sampling process, binomial distribution.

Bernoulli sampling process *n.* In statistics, a sequence of *n* independent and identical trials of a random experiment, with each trial having one of two possible outcomes. *See also* Bernoulli process, binomial distribution.

best of breed *adj.* A term used to describe a product that is the best in a particular category of products.

beta[1] *adj.* Of or relating to software or hardware that is a beta. *See also* beta[2]. *Compare* alpha[1].

beta[2] *n.* A new software or hardware product, or one that is being updated, that is ready to be released to users for beta testing in real-world situations. Usually betas have most or all of the features and functionality implemented that the finished product is to have. *See also* beta test. *Compare* alpha[2].

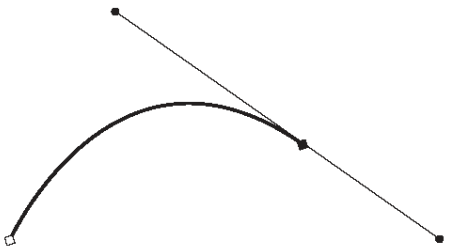
beta site *n.* An individual or an organization that tests software before it is released to the public. The company producing the software usually selects these beta sites from a pool of established customers or volunteers. Most beta sites perform this service free of charge, often to get a first look at the software and to receive free copies of the software once it is released to the public.

beta test *n.* A test of software that is still under development, accomplished by having people actually use the software. In a beta test, a software product is sent to selected potential customers and influential end users (known as beta sites), who test its functionality and report any operational or utilization errors (bugs) found. The beta test is usually one of the last steps a software developer takes before releasing the product to market; however, if the beta sites indicate that the software has operational difficulties or an extraordinary number of bugs, the developer may conduct more beta tests before the software is released to customers.

betweening *n. See* tween.

bezel *n.* In arcade games, the bezel refers to the glass located around the monitor. It is often silk-screened with artwork relating to the game. *See also* arcade game.

Bézier curve *n.* A curve that is calculated mathematically to connect separate points into smooth, free-form curves and surfaces of the type needed for illustration programs and CAD models. Bézier curves need only a few points to define a large number of shapes—hence their usefulness over other mathematical methods for approximating a given shape. See the illustration. *See also* CAD.



Bézier curve.

BFT *n. See* batch file transmission, binary file transfer.

BGP *n. See* Border Gateway Protocol.

bias *n.* **1.** A uniform or systematic deviation from a point of reference. **2.** In mathematics, an indication of the amount by which the average of a group of values deviates from a reference value. **3.** In electronics, a voltage applied to a transistor or other electronic device to establish a ref-

erence level for its operation. **4.** In communications, a type of distortion in the length of transmitted bits, caused by a lag that occurs as voltage builds up or falls off each time the signal changes from 0 to 1 or vice versa.

bidirectional *adj.* Operating in two directions. A bidirectional printer can print from left to right and from right to left; a bidirectional bus can transfer signals in both directions between two devices.

bidirectional parallel port *n.* An interface that supports two-way parallel communication between a device, such as a printer, and a computer. *See also* interface (definition 3), parallel port.

bidirectional printing *n.* The ability of an impact or inkjet printer to print from left to right and from right to left. Bidirectional printing improves speed substantially because no time is wasted returning the print head to the beginning of the next line, but it may lower print quality.

bi-endian *adj.* Of, pertaining to, or characteristic of processors and other chips that can be switched to work in big endian or little endian mode. The PowerPC chip has this ability, which allows it to run the little endian Windows NT or the big endian MacOS/PPC. *See also* big endian, little endian, PowerPC.

BIFF *n.* Short for Binary Interchange File Format. The native file format used by Microsoft Excel.

biff *n.* **1.** A BSD utility that issues a signal when new mail has arrived. Biff was named after a University of California graduate student's dog who had a habit of barking at the mailman at the time the utility was developed. **2.** *See* B1FF.

biff *vb.* To provide notification of new (incoming) e-mail.

bifurcation *n.* A split that results in two possible outcomes, such as 1 and 0 or on and off.

Big 5 *n.* Traditional Chinese encoding.

Big Blue *n.* The International Business Machines (IBM) Corporation. This nickname comes from the corporate color used on IBM's early mainframes and still used in the company logo.

big endian *adj.* Storing numbers in such a way that the most significant byte is placed first. For example, given the hexadecimal number A02B, the big endian method would cause the number to be stored as A02B, and the little endian method would cause the number to be stored as 2BA0. The big endian method is used by Motorola microprocessors; Intel microprocessors use the little endian method. The term *big endian* is derived from Jonathan Swift's *Gulliver's Travels*, in which the Big-Endians were a group of people who opposed the emperor's decree that eggs should be broken at the small end before they were eaten. *Compare* little endian.

bigint data type *n.* In an Access project, a data type of 8 bytes (64 bits) that stores whole numbers in the range of –2^63 (–9,223,372,036,854,775,808) through 2^63–1 (9,223,372,036,854,775,807).

big iron *n.* One or more large, fast, and expensive computers, such as a Cray supercomputer or a room-filling mainframe system.

big red switch *n.* The power on/off switch of a computer, thought of as a kind of interrupt or last resort. On the original IBM PC and many other computers, it was indeed big and red. Using the switch is an interrupt of last resort because it deletes all the data in RAM and can also damage the hard drive. *Acronym:* BRS.

billboard *n.* A primitive inserted into a 3-D scene that is oriented so that one face is toward the viewer. A texture, usually an animated sprite, is applied to the billboard to give the appearance of a 3-D object in the scene.

billion *n.* **1.** In American usage (as is usual with microcomputers), a thousand million, or 10^9. Computer terminology uses the prefixes *giga-* for 1 billion and *nano-* for 1 billionth. **2.** In British usage, a million million, or 10^{12}, which is a *trillion* in American usage.

billisecond *n. See* nanosecond.

bimodal virus *n. See* multipartite virus.

.bin *n.* A file name extension for a file encoded with MacBinary. *See also* MacBinary.

binary[1] *adj.* Having two components, alternatives, or outcomes. The binary number system has 2 as its base, so values are expressed as combinations of two digits, 0 and 1. These two digits can represent the logical values *true* and *false* as well as numerals, and they can be represented in an electronic device by the two states *on* and *off*, recognized as two voltage levels. Therefore, the binary number system is at the heart of digital computing. Although ideal for computers, binary numbers are usually difficult for people to interpret because they are repetitive strings of 1s

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and 0s. To ease translation, programmers and others who habitually work with the computer's internal processing abilities use hexadecimal (base-16) or octal (base-8) numbers. See Appendix E. *See also* base (definition 2), binary-coded decimal, binary number, bit, Boolean algebra, byte, cyclic binary code, digital computer, dyadic, logic circuit. *Compare* ASCII, decimal, hexadecimal, octal.

binary[2] *n.* In an FTP client program, the command that instructs the FTP server to send or receive files as binary data. *See also* FTP client, FTP server. *Compare* ascii.

binary chop *n. See* binary search.

binary-coded decimal *n.* A system for encoding decimal numbers in binary form to avoid rounding and conversion errors. In binary-coded decimal coding, each digit of a decimal number is coded separately as a binary numeral. Each of the decimal digits 0 through 9 is coded in 4 bits, and for ease of reading, each group of 4 bits is separated by a space. This format is also called 8-4-2-1, after the weights of the four bit positions, and uses the following codes: 0000 = 0; 0001 = 1; 0010 = 2; 0011 = 3; 0100 = 4; 0101 = 5; 0110 = 6; 0111 = 7; 1000 = 8; 1001 = 9. Thus, the decimal number 12 is 0001 0010 in binary-coded decimal notation. *Acronym:* BCD. *See also* base (definition 2), binary[1], binary number, decimal, EBCDIC, packed decimal, round.

binary compatibility *n.* Portability of executable programs (binary files) from one platform, or flavor of operating system, to another. *See also* flavor, portable (definition 1).

binary conversion *n.* The conversion of a number to or from the binary number system. See Appendix E. *See also* binary[1].

binary device *n.* Any device that processes information as a series of on/off or high/low electrical states. *See also* binary[1].

binary digit *n.* Either of the two digits in the binary number system, 0 and 1. *See also* bit.

binary file *n.* A file consisting of a sequence of 8-bit data or executable code, as distinguished from files consisting of human-readable ASCII text. Binary files are usually in a form readable only by a program, often compressed or structured in a way that is easy for a particular program to read. *Compare* ASCII file.

binary file transfer *n.* Transfer of a file containing arbitrary bytes or words, as opposed to a text file containing only printable characters (for example, ASCII characters with codes 10, 13, and 32–126). On modern operating systems a text file is simply a binary file that happens to contain only printable characters, but some older systems distinguish the two file types, requiring programs to handle them differently. *Acronym:* BFT.

binary format *n.* Any format that structures data in 8-bit form. Binary format is generally used to represent object code (program instructions translated into a machine-readable form) or data in a transmission stream. *See also* binary file.

binary notation *n.* Representation of numbers using the binary digits, 0 and 1. *Compare* floating-point notation.

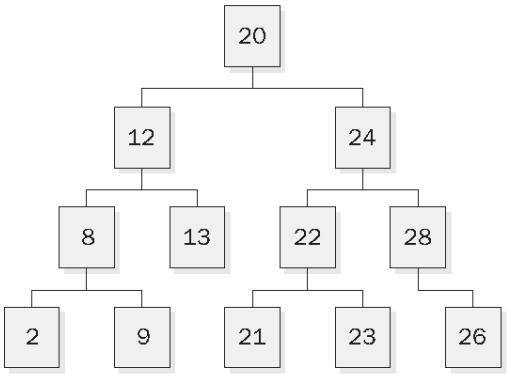
binary number *n.* A number expressed in binary form, or base 2. Binary numbers are composed of zeros and ones. See Appendix E. *See also* binary[1].

binary search *n.* A type of search algorithm that seeks an item, with a known name, in an ordered list by first comparing the sought item to the item at the middle of the list's order. The search then divides the list in two, determines in which half of the order the item should be, and repeats this process until the sought item is found. *Also called:* binary chop, dichotomizing search. *See also* search algorithm. *Compare* hash search, linear search.

binary synchronous protocol *n. See* BISYNC.

binary transfer *n.* The preferred mode of electronic exchange for executable files, application data files, and encrypted files. *Compare* ASCII transfer.

binary tree *n.* In programming, a specific type of tree data structure in which each node has at most two subtrees, one left and one right. Binary trees are often used for sorting information; each node of the binary search tree contains a key, with values less than that key added to one subtree and values greater than that key added to the other. See the illustration. *See also* binary search, tree.



Binary tree.

binaural sound *n. See* 3-D audio.

bind *vb.* To associate two pieces of information with one another. The term is most often used with reference to associating a symbol (such as the name of a variable) with some descriptive information (such as a memory address, a data type, or an actual value). *See also* binding time, dynamic binding, static binding.

BIND *n.* Acronym for **B**erkeley **I**nternet **N**ame **D**omain. A domain name server originally written for the BSD version of UNIX developed at the Berkeley campus of the University of California but now available for most versions of UNIX. As a domain name server, BIND translates between human-readable domain names and Internet-friendly, numeric IP addresses. It is widely used on Internet servers. *See also* DNS, DNS server, IP address.

Binder *n.* A Microsoft Office program that you can use to organize related documents. You can check spelling, number pages consecutively across all documents in the binder, and print the documents.

binding *n.* The process by which protocols are associated with one another and the network adapter to provide a complete set of protocols needed for handling data from the application layer to the physical layer. *See also* ISO/OSI reference model.

binding time *n.* The point in a program's use at which binding of information occurs, usually in reference to program elements being bound to their storage locations and values. The most common binding times are during compilation (compile-time binding), during linking (link-time binding), and during program execution (run-time binding). *See also* bind, compile-time binding, link-time binding, run-time binding.

BinHex[1] *n.* **1.** Short for **bin**ary to **hex**adecimal. A format for converting binary data files into ASCII text so they can be transmitted via e-mail to another computer or in a newsgroup post. This method can be used when standard ASCII characters are needed for transmission, as they are on the Internet. BinHex is used most frequently by Mac users. *See also* MIME. **2.** An Apple Macintosh program for converting binary data files into ASCII text and vice versa using the BinHex format. *Compare* uudecode[1], uuencode[1].

BinHex[2] *vb.* To convert a binary file into printable 7-bit ASCII text or to convert the resulting ASCII text file back to binary format using the BinHex program. *Compare* uudecode[2], uuencode[2].

binomial distribution *n.* In statistics, a list or a function that describes the probabilities of the possible values of a random variable chosen by means of a Bernoulli sampling process. A Bernoulli process has three characteristics: each trial has only two possible outcomes—success or failure; each trial is independent of all other trials; and the probability of success for each trial is constant. A binomial distribution can be used to calculate the probability of getting a specified number of successes in a Bernoulli process. For example, the binomial distribution can be used to calculate the probability of getting a 7 three times in 20 rolls of a pair of dice. *Also called:* Bernoulli distribution.

BioAPI *n.* An open system specification for use in biometric security and authentication technologies. BioAPI supports a wide range of biometric technology, from handheld devices to large-scale networks, and applications include fingerprint identification, facial recognition, speaker verification, dynamic signatures, and hand geometry. BioAPI was developed for the BioAPI Consortium, a group of organizations with ties to biometrics. BioAPI incorporates compatibility with existing biometric standards such as HA-API, which allows applications to operate BioAPI-compliant technologies without modification.

biometrics *n.* Traditionally, the science of measuring and analyzing human biological characteristics. In computer technology, biometrics relates to authentication and secu-

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rity 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 **b**asic **i**nput/**o**utput **s**ystem. 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.

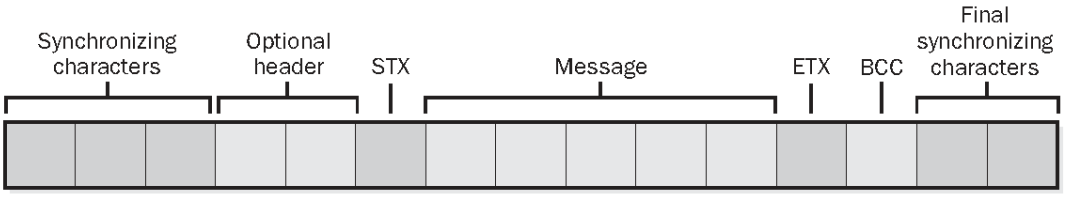
BISDN *n. See* broadband ISDN.

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 **b**inary **sync**hronous 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.*

bit *n.* Short for **b**inary digi**t**. The smallest unit of information handled by a computer. One bit expresses a 1 or a 0 in a binary numeral, or a true or false logical condition, and is represented physically by an element such as a high or low voltage at one point in a circuit or a small spot on a disk magnetized one way or the other. A single bit conveys little information a human would consider meaningful. A group of 8 bits, however, makes up a byte, which can be used to represent many types of information, such as a letter of the alphabet, a decimal digit, or other character. *See also* ASCII, binary[1], byte.

bit block *n.* In computer graphics and display, a rectangular group of pixels treated as a unit. Bit blocks are so named because they are, literally, blocks of bits describing the pixels' display characteristics, such as color and intensity. Programmers use bit blocks and a technique called bit block transfer (bitblt) to display images rapidly on the screen and to animate them. *See also* bit block transfer.

bit block transfer *n.* In graphics display and animation, a programming technique that manipulates blocks of bits in memory that represent the color and other attributes of a rectangular block of pixels forming a screen image. The image described can range in size from a cursor to a cartoon. Such a bit block is moved through a computer's video RAM as a unit so that its pixels can be rapidly displayed in a desired location on the screen. The bits can also be altered; for example, light and dark portions of an image can be reversed. Successive displays can thus be used to change the appearance of an image or to move it around on the screen. Some computers contain special graphics hardware for manipulating bit blocks on the screen independently of the contents of the rest of the screen. This speeds the animation of small shapes, because a program need not constantly compare and redraw the background around the moving shape. *Also called:* bitblt. *See also* sprite.

bitblt *n. See* bit block transfer.

bit bucket *n.* An imaginary location into which data can be discarded. A bit bucket is a null input/output device from which no data is read and to which data can be written without effect. The NUL device recognized by MS-DOS is a bit bucket. A directory listing, for example, simply disappears when sent to NUL.

bit data type *n.* In an Access project, a data type that stores either a 1 or 0 value. Integer values other than 1 or 0 are accepted, but are always interpreted as 1.

bit density *n.* A measure of the amount of information per unit of linear distance or surface area in a storage medium or per unit of time in a communications pipeline.

bit depth *n.* The number of bits per pixel allocated for storing indexed color information in a graphics file.

bit flipping *n.* A process of inverting bits—changing 1s to 0s and vice versa. For example, in a graphics program, to invert a black-and-white bitmapped image (to change black to white and vice versa), the program could simply flip the bits that compose the bit map.

bit image *n.* A sequential collection of bits that represents in memory an image to be displayed on the screen, particularly in systems having a graphical user interface. Each bit in a bit image corresponds to one pixel (dot) on the screen. The screen itself, for example, represents a single bit image; similarly, the dot patterns for all the characters in a font represent a bit image of the font. In a black-and-white display each pixel is either white or black, so it can be represented by a single bit. The "pattern" of 0s and 1s in the bit image then determines the pattern of white and black dots forming an image on the screen. In a color display the corresponding description of on-screen bits is called a pixel image because more than one bit is needed to represent each pixel. *See also* bitmap, pixel image.

bit manipulation *n.* An action intended to change only one or more individual bits within a byte or word. Manipulation of the entire byte or word is much more common and generally simpler. *See also* mask.

bitmap *n.* A data structure in memory that represents information in the form of a collection of individual bits. A bit map is used to represent a bit image. Another use of a bit map in some systems is the representation of the blocks of storage on a disk, indicating whether each block is free (0) or in use (1). *See also* bit image, pixel image.

bitmapped font *n.* A set of characters in a particular size and style in which each character is described as a unique bit map (pattern of dots). Macintosh screen fonts are examples of bitmapped fonts. See the illustration. *See also*

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downloadable font, outline font, TrueType. *Compare* PostScript font, vector font.

Bitmapped font. *Each character is composed of a pattern of dots.*

bitmapped graphics *n.* Computer graphics represented as arrays of bits in memory that represent the attributes of the individual pixels in an image (one bit per pixel in a black-and-white display, multiple bits per pixel in a color or gray-scale display). Bitmapped graphics are typical of paint programs, which treat images as collections of dots rather than as shapes. *See also* bit image, bit map, pixel image. *Compare* object-oriented graphics.

bit mask *n.* A value used with bit-wise operators (And, Eqv, Imp, Not, Or, and Xor) to test, set, or reset the state of individual bits in a bit-wise field value.

BITNET *n.* Acronym for **B**ecause **I**t's **T**ime **Net**work. A WAN (wide area network) founded in 1981 and operated by the Corporation for Research and Educational Networking (CREN) in Washington, D.C. Now defunct, BITNET provided e-mail and file transfer services between mainframe computers at educational and research institutions in North America, Europe, and Japan. BITNET used the IBM Network Job Entry (NJE) protocol rather than TCP/IP, but it could exchange e-mail with the Internet. The listserv software for maintaining mailing lists was originated on BITNET.

bit. newsgroups *n.* A hierarchy of Internet newsgroups that mirror the content of some BITNET mailing lists. *See also* BITNET.

bit-oriented protocol *n.* A communications protocol in which data is transmitted as a steady stream of bits rather than as a string of characters. Because the bits transmitted have no inherent meaning in terms of a particular character set (such as ASCII), a bit-oriented protocol uses special sequences of bits rather than reserved characters for control purposes. The HDLC (high-level data link control) defined by ISO is a bit-oriented protocol. *Compare* byte-oriented protocol.

bit parallel *adj.* Transmitting simultaneously all bits in a set (such as a byte) over separate wires in a cable. *See also* parallel transmission.

bit pattern *n.* **1.** A combination of bits, often used to indicate the possible unique combinations of a specific number of bits. For example, a 3-bit pattern allows 8 possible combinations and an 8-bit pattern allows 256 combinations. **2.** A pattern of black and white pixels in a computer system capable of supporting bitmapped graphics. *See also* pixel.

bitplane *n.* **1.** One of a set of bit maps that collectively make up a color image. Each bit plane contains the values for one bit of the set of bits that describe a pixel. One bit plane allows two colors (usually black and white) to be represented; two bit planes, four colors; three bit planes, eight colors; and so on. These sections of memory are called bit planes because they are treated as if they were separate layers that stack one upon another to form the complete image. By contrast, in a chunky pixel image, the bits describing a given pixel are stored contiguously within the same byte. The use of bit planes to represent colors is often associated with the use of a color look-up table, or color map, which is used to assign colors to particular bit patterns. Bit planes are used in the EGA and VGA in 16-color graphics modes; the four planes correspond to the 4 bits of the IRGB code. *See also* color look-up table, color map, EGA, IRGB, layering, VGA. *Compare* color bits. **2.** Rarely, one level of a set of superimposed images (such as circuit diagrams) to be displayed on the screen.

bit rate *n.* **1.** The speed at which binary digits are transmitted. *See also* transfer rate. **2.** The streaming speed of digital content on a network. Bit rate is usually measured in kilobits per second (Kbps).

bit serial *n.* The transmission of bits in a byte one after another over a single wire. *See also* serial transmission.

bit slice microprocessor *n.* A building block for microprocessors that are custom-developed for specialized uses. These chips can be programmed to handle the same tasks as other CPUs but they operate on short units of information, such as 2 or 4 bits. They are combined into processors that handle the longer words.

bits per inch *n.* A measure of data storage capacity; the number of bits that fit into an inch of space on a disk or a tape. On a disk, bits per inch are measured based on inches of circumference of a given track. *Acronym:* BPI. *See also* packing density.

bits per pixel *n.* Also known as color depth or bit depth. The term refers to the number of bits (8, 16, 24, or 32) used to store and display the color data for a single pixel. The number of bits per pixel determines the range of color available to an image. *Acronym:* bpp.

bits per second *n. See* bps.

bit stream *n.* **1.** A series of binary digits representing a flow of information transferred through a given medium. **2.** In synchronous communications, a continuous flow of data in which characters in the stream are separated from one another by the receiving station rather than by markers, such as start and stop bits, inserted into the data.

bit stuffing *n.* The practice of inserting extra bits into a stream of transmitted data. Bit stuffing is used to ensure that a special sequence of bits appears only at desired locations. For example, in the HDLC, SDLC, and X.25 communications protocols, six 1 bits in a row can appear only at the beginning and end of a frame (block) of data, so bit stuffing is used to insert a 0 bit into the rest of the stream whenever five 1 bits appear in a row. The inserted 0 bits are removed by the receiving station to return the data to its original form. *See also* HDLC, SDLC, X.25.

bit transfer rate *n. See* transfer rate.

bit twiddler *n.* Slang for someone devoted to computers, particularly one who likes to program in assembly language. *See also* hacker.

BIX *n.* Acronym for BYTE Information Exchange. An online service originated by *BYTE* magazine, now owned and operated by Delphi Internet Services Corporation. BIX offers e-mail, software downloads, and conferences relating to hardware and software.

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

biz. news groups *n.* Usenet newsgroups that are part of the biz. hierarchy and have the prefix of biz. These newsgroups are devoted to discussions related to business. Unlike most other newsgroup hierarchies, biz. newsgroups permit users to post advertisement and other marketing material. *See also* newsgroup, traditional newsgroup hierarchy.

BizTalk Server *n.* An application developed by Microsoft Corporation to streamline business processes within a large company's internal network and between business partners over the Internet. BizTalk Server enables the integration of business applications written in different computer languages and running on various operating systems.

BlackBerry *n.* A wireless handheld device that allows mobile users to send and receive e-mail, as well as view appointment calendars and contact lists. The BlackBerry features a display screen and a built-in keyboard operated by pressing the keys with the thumbs. BlackBerry's ease of use and its ability to send and receive messages silently have made it a popular device for wireless text messaging in a business environment.

black box *n.* A unit of hardware or software whose internal structure is unknown but whose function is documented. The internal mechanics of the function do not matter to a designer who uses a black box to obtain that function. For example, a memory chip can be viewed as a black box. Many people use memory chips and design them into computers, but generally only memory chip designers need to understand their internal operation.

black box testing *n.* An approach to testing software in which the tester treats the software as a black box—that is, the testing focuses on the program's functionality rather than on its internal structure. Black box testing is thus user oriented, in that the primary concern is whether the program works, not how it is constructed. Black box testing is generally performed on software that is under development. *Compare* white box testing.

black hat *n.* A hacker who operates with malicious or criminal intent. A black hat will break into a system to alter or damage data or to commit theft. *Compare* white hat.

black hole *n.* A mysterious "place" on a computer network where messages, such as e-mail and news items, disappear without a trace. The usage is derived from stellar black holes, which have such strong gravitational fields that even light cannot escape them. The term is sometimes also used to refer to projects that consume vast amounts of time with no apparent product.

blackout *n.* A condition in which the electricity level drops to zero; a complete loss of power. A number of factors cause a blackout, including natural disasters, such as a storm or an earthquake, or a failure in the power company's

equipment, such as a transformer or a power line. A blackout might or might not damage a computer, depending on the state of the computer when the blackout occurs. As with switching a computer off before saving any data, a blackout will cause all unsaved data to be irretrievably lost. The most potentially damaging situation is one in which a blackout occurs while a disk drive is reading information from or writing information to a disk. The information being read or written will probably become corrupted, causing the loss of a small part of a file, an entire file, or the entire disk; the disk drive itself might suffer damage as a result of the sudden power loss. The only reliable means of preventing damage caused by a blackout is to use a battery-backed uninterruptible power supply (UPS). *See also* UPS. *Compare* brownout.

blank[1] *n.* The character entered by pressing the spacebar. *See also* space character.

blank[2] *vb.* To not show or not display an image on part or all of the screen.

blanking *n.* The brief suppression of a display signal as the electron beam in a raster-scan video monitor is moved into position to display a new line. After tracing each scan line, the beam is at the right edge of the screen and must return to the left (horizontal retrace) to begin a new line. The display signal must be turned off during the time of the retrace (horizontal blanking interval) to avoid overwriting the line just displayed. Similarly, after tracing the bottom scan line, the electron beam moves to the top left corner (vertical retrace), and the beam must be turned off during the time of this retrace (vertical blanking interval) to avoid marking the screen with the retrace path.

blast *vb. See* burn (definition 1).

bleed *n.* In a printed document, any element that runs off the edge of the page or into the gutter. Bleeds are often used in books to mark important pages so they are easier to find. *See also* gutter.

blend[1] *n.* A photo or graphic created with a software blending process.

blend[2] *vb.* In illustration and other graphics software, to create a new combined graphic from two or more separate graphic elements. Photos, art, colors, shapes, and text may be blended together digitally. Graphic elements may be blended for artistic effect, or may be realistic enough to appear as a single photo or graphic.

blind carbon copy *n. See* bcc.

blind courtesy copy *n. See* bcc.

blind search *n.* A search for data in memory or on a storage device with no foreknowledge as to the data's order or location. *See also* linear search. *Compare* binary search, indexed search.

blink *vb.* To flash on and off. Cursors, insertion points, menu choices, warning messages, and other displays on a computer screen that are intended to catch the eye are often made to blink. The rate of blinking in a graphical user interface can sometimes be controlled by the user.

blink speed *n.* The rate at which the cursor indicating the active insertion point in a text window, or other display element, flashes on and off.

blip *n.* A small, optically sensed mark on a recording medium, such as microfilm, that is used for counting or other tracking purposes.

blit *vb.* To render a glyph/bitmap to the display. *Also called:* blitting. *See also* bit block transfer.

blitter *n.* A function that copies a bitmap from memory onto the screen.

bloatware *n.* Software whose files occupy an extremely large amount of storage space on a user's hard disk, especially in comparison with previous versions of the same product.

block[1] *n.* **1.** Generally, a contiguous collection of similar things that are handled together as a whole. **2.** A section of random access memory temporarily assigned (allocated) to a program by the operating system. **3.** A group of statements in a program that are treated as a unit. For example, if a stated condition is true, all of the statements in the block are executed, but none are executed if the condition is false. **4.** A unit of transmitted information consisting of identification codes, data, and error-checking codes. **5.** A collection of consecutive bytes of data that are read from or written to a device (such as a disk) as a group. **6.** A rectangular grid of pixels that are handled as a unit. **7.** A segment of text that can be selected and acted upon as a whole in an application. **8.** In the Java programming language, any code between matching braces constitutes a block. For example, { x = 1; }. *See also* code, Java.

block[2] *vb.* **1.** To distribute a file over fixed-size blocks in storage. **2.** To prevent a signal from being transmitted.

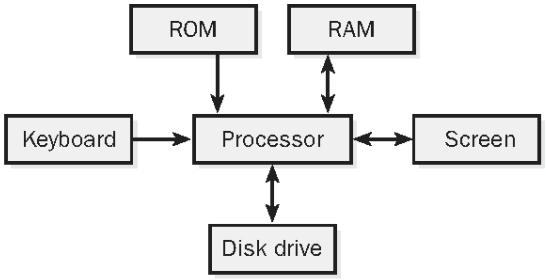
3. To select a segment of text, by using a mouse, menu selection, or cursor key, to be acted upon in some way, such as to format or to delete the segment.

block cipher *n.* A private key encryption method that encrypts data in blocks of a fixed size (usually 64 bits). The encrypted data block contains the same number of bits as the original. *See also* encryption, private key.

block cursor *n.* An on-screen cursor that has the same width and height in pixels as a text-mode character cell. A block cursor is used in text-based applications, especially as the mouse pointer when a mouse is installed in the system. *See also* character cell, cursor (definition 1), mouse pointer.

block device *n.* A device, such as a disk drive, that moves information in blocks—groups of bytes—rather than one character (byte) at a time. *Compare* character device.

block diagram *n.* A chart of a computer or other system in which labeled blocks represent principal components and lines and arrows between the blocks show the pathways and relationships among the components. A block diagram is an overall view of what a system consists of and how it works. To show the various components of such a system in more detail, different types of diagrams, such as flowcharts or schematics, are used. See the illustration. *Compare* bubble chart, flowchart.



Block diagram.

block gap *n.* The unused physical space that separates blocks of data or physical records on a tape or formatted sectors on a disk. *Also called:* IBG, interblock gap.

block header *n.* Information that appears at the beginning of a block of data and serves such purposes as signaling the beginning of the block, identifying the block, providing error-checking information, and describing such characteristics as the block length and the type of data contained in the block. *See also* header (definition 2).

blocking factor *n.* **1.** The size of the chunks in which data is transferred to or from a block device such as a disk. If fewer bytes are requested, the disk drive will still read the whole block. Common blocking factors on personal computers are 128, 256, and 512 bytes. **2.** The number of file records in one disk block. If the record length for a file is 170 bytes, a block on the disk contains 512 bytes, and records do not span blocks, then the blocking factor is 3, and each block contains 510 (170 x 3) bytes of data and 2 unused bytes.

block length *n.* The length, usually in bytes, of a block of data. Block length typically ranges from 512 bytes through 4096 kilobytes (KB), depending on the purpose for which the block is used.

block move *n.* Movement of a number of items of data together to a different location, as in reorganizing documents with a word processor or moving the contents of cell ranges in a spreadsheet. Most CPUs have instructions that easily support block moves.

block size *n.* The declared size of a block of data transferred internally within a computer, via FTP, or by modem. The size is usually chosen to make the most efficient use of all the hardware devices involved. *See also* FTP[1] (definition 1).

block structure *n.* The organization of a program into groups of statements called *blocks*, which are treated as units. Programming languages such as Ada, C, and Pascal were designed around block structure. A block is a section of code surrounded by certain delimiters (such as BEGIN and END or { and }), which signify that the intervening code can be treated as a related group of statements. For example, in C, each function is a separate block. Block structure also limits the scope of constants, data types, and variables declared in a block to that block. *See also* function (definition 2), procedure, scope (definition 1).

block transfer *n.* The movement of data in discrete blocks (groups of bytes).

blog[1] *n. See* weblog.

blog[2] *vb.* To create or maintain a weblog.

blogger *n.* One who creates or maintains a weblog.

blow *vb. See* burn (definition 1).

blow up *vb.* To terminate abnormally, as when a program crosses some computational or storage boundary and cannot handle the situation on the other side, as in, "I tried to

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draw outside the window, and the graphics routines blew up." *See also* abend, abort.

blue screen *n.* A technique used in film matte special effects, in which one image is superimposed on another image. Action or objects are filmed against a blue screen. The desired background is filmed separately, and the shot containing the action or objects is superimposed onto the background. The result is one image where the blue screen disappears.

Blue Screen of Death *n.* In a Microsoft Windows computer environment, a semi-humorous reference to the result of a fatal error in which the screen turns blue and the computer crashes. Recovery from a Blue Screen of Death error typically requires the user to reboot the computer. *Acronym:* BSOD. *Also called:* blue-screen error. *See also* fatal error.

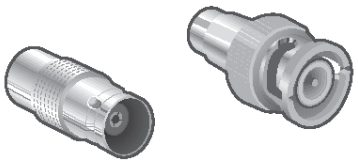
Bluetooth *n.* Technology protocol developed to wirelessly connect electronic devices such as wireless phones, personal digital assistants (PDAs), and computers. Devices equipped with Bluetooth chips can exchange information within about a 30-foot range via radio waves in the 2.45 gigahertz (GHz) spectrum. Bluetooth was developed by the Bluetooth Special Interest Group, a consortium of telecommunications, computing, consumer electronics, and related industry groups.

Bluetooth Special Interest Group *n.* A group of companies from the telecommunications, computing, and networking industries that promotes the development and deployment of Bluetooth technology. *See also* Bluetooth.

Bluetooth wireless technology *n.* A specification for radio links between mobile PCs, mobile phones, and other portable devices. These radio links are small-form factor, low cost, and short range.

.bmp *n.* The file extension that identifies raster graphics stored in bit map file format. *See also* bit map.

BNC *n.* Acronym for **b**ayonet-**N**eill-**C**oncelman. Named for Paul Neill of Bell Labs and Carl Concelman (affiliation unknown), who developed two earlier types of coaxial connectors known as the N connector and C connector, BNC is a type of connector used to join segments of coaxial cable. When one connector is inserted into another and rotated 90 degrees, they lock. BNC connectors are often used with closed-circuit television. The letters BNC are sometimes also considered an acronym for British Naval Connector. See the illustration. *Also called:* BNC connector. *See also* coaxial cable.



BNC connector. *Male (left) and female (right) BNC connector.*

BNC connector *n. See* BNC.

board *n.* An electronic module consisting of chips and other electronic components mounted on a flat, rigid substrate on which conductive paths are laid between the components. A personal computer contains a main board, called the motherboard, which usually has the microprocessor on it and slots into which other, smaller boards, called cards or adapters, can be plugged to expand the functionality of the main system, allowing connections to monitors, disk drives, or a network. *See also* adapter, card (definition 1), motherboard.

board computer *n. See* single-board.

board level *n.* A level of focus in troubleshooting and repair that involves tracking down a problem in a computer to a circuit board and replacing the board. This is in contrast to the component level, which involves repairing the board itself. In many cases board-level repairs are made in order to quickly restore the device to working condition; the boards replaced are then repaired and tested for use in later board-level repairs. *See also* circuit board.

body *n.* **1.** In e-mail and Internet newsgroups, the content of a message. The body of a message follows the header, which contains information about the sender, origin, and destination of the message. *See also* header (definition 1). **2.** In HTML, SGML, and XML, a section of a document that contains the content of the document, along with tags describing characteristics of the content—for example, format. **3.** A segment of a data packet containing the actual data.

body face *n.* A typeface suitable for the main text in a document rather than for headings and titles. Because of their readability, fonts having serifs, such as Times and Palatino, are good body faces, although sans serif faces can also be used as body text. *See also* sans serif, serif. *Compare* display face.

BOF *n.* Acronym for **b**irds **o**f a **f**eather. Meetings of special interest groups at trade shows, conferences, and conventions. BOF sessions provide an opportunity for people

working on the same technology at different companies or research institutions to meet and exchange their experiences. *See* beginning-of-file.

boilerplate *n.* Recyclable text; a piece of writing or code, such as an organization's mission statement or the graphics code that prints a software company's logo, which can be used over and over in many different documents. The size of boilerplate text can range from a paragraph or two to many pages. It is, essentially, generic composition that can be written once, saved on disk, and merged, either verbatim or with slight modification, into whatever documents or programs later require it.

boldface *n.* A type style that makes the text to which it is applied appear darker and heavier than the surrounding text. Some applications allow the user to apply a "Bold" command to selected text; other programs require that special codes be embedded in the text before and after words that are to be printed in boldface. **This sentence appears in boldface.**

bomb[1] *n.* A program planted surreptitiously, with intent to damage or destroy a system in some way—for example, to erase a hard disk or cause it to be unreadable to the operating system. *See also* Trojan horse, virus, worm.

bomb[2] *vb.* To fail abruptly and completely, without giving the user a chance to recover from the problem short of restarting the program or system. *See also* abend, bug (definition 1), crash[2] (definition 1), hang.

bonding *n.* **1.** Acronym for **B**andwidth **On** **D**emand **I**nteroperability **G**roup. **2.** The process of combining two or more ISDN B (bearer) channels to form a single channel with a bandwidth greater than the standard B channel bandwidth of 64 Kbps. Bonding two B channels, for example, provides a bandwidth of 128 Kbps, which is four times faster than a 28.8 Kbps modem. Such high-speed channels are ideal for video conferencing, imaging, and transferring large-scale data. *See also* B channel, BRI, ISDN.

bonding *vb. See* link aggregation.

bookmark *n.* **1.** A marker inserted at a specific point in a document to which the user may wish to return for later reference. **2.** In Netscape Navigator, a link to a Web page or other URL that a user has stored in a local file in order to return to it later. *See also* Favorites folder, hotlist, URL.

bookmark file *n.* **1.** A Netscape Navigator file containing the addresses of preferred Web sites. It is synonymous with the Favorites folder in Internet Explorer and the hotlist in Mosaic. *See also* Favorites folder, hotlist, Internet Explorer, Mosaic. **2.** A rendering of such a file in HTML format, generally posted on a Web page for the benefit of other people. *See also* HTML.

Boolean *adj.* Of, pertaining to, or characteristic of logical (true, false) values. Many languages directly support a Boolean data type, with predefined values for true and false; others use integer data types to implement Boolean values, usually (although not always) with 0 equaling false and "not 0" equaling true. *See also* Boolean algebra, Boolean operator.

Boolean algebra *n.* An algebra, fundamental to computer operations but developed in the mid-nineteenth century by English mathematician George Boole, for determining whether logical propositions are true or false rather than for determining the values of numerical expressions. In Boolean algebra, variables must have one of only two possible values, *true* or *false*, and relationships between these variables are expressed with logical operators, such as AND, OR, and NOT. Given these two-state variables and the relationships they can have to one another, Boolean algebra produces such propositions as **C** = *A* AND *B*, which means that *C* is *true* if and only if both *A* is *true* and *B* is *true*; thus, it can be used to process information and to solve problems. Furthermore, Boolean logic can be readily applied to the electronic circuitry used in digital computing. Like the binary numbers 1 and 0, *true* and *false* are easily represented by two contrasting physical states of a circuit, such as voltages, and computer circuits known as logic gates control the flow of electricity (bits of data) so as to represent AND, OR, NOT, and other Boolean operators. Within a computer, these logic gates are combined, with the output from one becoming the input to another so that the final result (still nothing more than sets of 1s and 0s) is meaningful data, such as the sum of two numbers. See the illustration. *See also* adder (definition 1), binary[1], Boolean operator, gate (definition 1), logic circuit, truth table.

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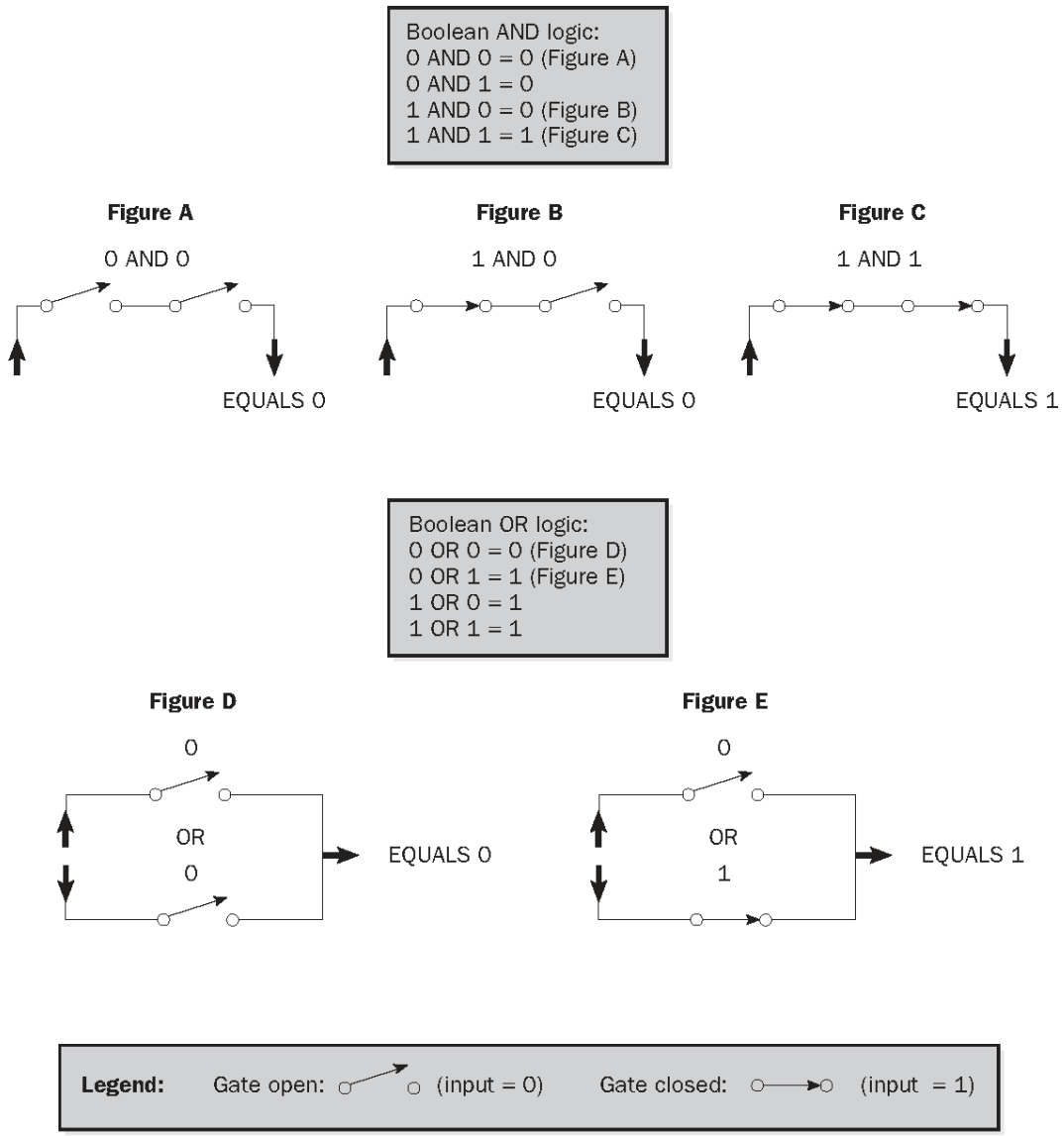

Boolean algebra. *The ways in which circuits can simulate Boolean operations. The boxed tables show the possible results of various input combinations.*

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

Boolean logic *n. See* Boolean algebra.

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

Boolean search *n.* A database search that uses Boolean operators. *See also* Boolean operator.

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

boot[1] *n.* The process of starting or resetting a computer. When first turned on (*cold boot*) or reset (*warm boot*), the computer executes the software that loads and starts the computer's more complicated operating system and prepares it for use. Thus, the computer can be said to pull itself up by its own bootstraps. *Also called:* bootstrap. *See also* BIOS, bootstrap loader, cold boot, warm boot.

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

bootable *adj.* Containing the system files necessary for booting a PC and running it. *See also* boot[2].

bootable disk *n. See* boot disk.

boot block *n.* A portion of a disk that contains the operating-system loader and other basic information that enables a computer to start up. *See also* block[1] (definition 5).

boot disk *n.* A floppy disk that contains key system files from a PC-compatible operating system and that can boot, or start, the PC. A boot disk must be inserted in the primary floppy disk drive (usually drive A:) and is used when there is some problem with starting the PC from the hard disk, from which the computer generally boots. *Also called:* bootable disk. *See also* A:, boot[2], boot drive, hard disk.

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

boot failure *n.* The inability of a computer to locate or activate the operating system and thus boot, or start, the computer. *See also* boot[2].

boot files *n.* The system files needed to start Microsoft Windows. The boot files include Ntldr and Ntdetect.com. *See also* partition boot sector.

boot loader *n. See* bootstrap loader.

BOOTP *n. See* Bootstrap Protocol.

boot partition *n.* The partition on a hard disk that contains the operating system and support files that the system loads into memory when the computer is turned on or restarted.

boot record *n.* The section of a disk that contains the operating system.

boot sector *n.* The portion of a disk reserved for the bootstrap loader (the self-starting portion) of an operating system. The boot sector typically contains a short machine language program that loads the operating system.

bootstrap[1] *n. See* boot[1].

bootstrap[2] *vb. See* boot[2].

bootstrap loader *n.* A program that is automatically run when a computer is switched on (booted). After first performing a few basic hardware tests, the bootstrap loader loads and passes control to a larger loader program, which typically then loads the operating system. The bootstrap loader typically resides in the computer's read-only memory (ROM).

Bootstrap Protocol *n.* A protocol used primarily on TCP/IP networks to configure diskless workstations. RFCs 951 and 1542 define this protocol. DHCP is a later boot configuration protocol that uses this protocol. The

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Microsoft DGCP service provided limited support for BOOTP service. *Acronym:* BOOTP. *Also called:* Boot Protocol. *See also* boot[2], DHCP, RFC, TCP/IP.

boot up *vb. See* boot[2].

border *n.* **1.** In programs and working environments that feature on-screen windows, the edge surrounding the user's workspace. Window borders provide a visible frame around a document or graphic. Depending on the program and its requirements, they can also represent an area in which the cursor or a mouse pointer takes on special characteristics. For example, clicking the mouse on a window border can enable the user to resize the window or split the window in two. **2.** In printing, a decorative line or pattern along one or more edges of a page or illustration.

Border Gateway Protocol *n.* A protocol used by NSFnet that is based on the External Gateway Protocol. *Acronym:* BGP. *See also* External Gateway Protocol, NSFnet.

boss screen *n.* A false display screen usually featuring business-related material that can be substituted for a game display when the boss walks by. Boss screens were popular with MS-DOS games, where it was difficult to switch to another application quickly. However, games designed for the Mac or Windows 9x generally don't need them because it is easy to switch to a different screen or application to hide the fact that one is playing a game.

bot *n.* **1.** Short for robot. A displayed representation of a person or other entity whose actions are based on programming. **2.** A program that performs some task on a network, especially a task that is repetitive or time consuming. **3.** On the Internet, a program that performs a repetitive or time-consuming task, such as searching Web sites and newsgroups for information and indexing them in a database or other record-keeping system (called *spiders*); automatically posting one or more articles to multiple newsgroups (often used in spamming and called *spambots*); or keeping IRC channels open. *Also called:* Internet robot. *See also* IRC, newsgroup, spam, spambot, spider.

bottom-up design *n.* A program development design methodology in which the lower-level tasks of a program are defined first; the design of the higher-level functions proceeds from the design of the lower-level ones. *See also* bottom-up programming, top-down programming. *Compare* top-down design.

bottom-up programming *n.* A programming technique in which lower-level functions are developed and tested first; higher-level functions are then built using the lower-level functions. Many program developers believe that the ideal combination is top-down design and bottom-up programming. *See also* top-down design. *Compare* object-oriented programming, top-down programming.

bounce *vb.* To return to the sender, used in reference to undeliverable e-mail.

BounceKeys *n.* A feature in Windows 9x that instructs the processor to ignore double strokes of the same key and other unintentional keystrokes.

bound[1] *adj.* Limited in performance or speed; for example, an input/output-bound system is limited by the speed of its input and output devices (keyboard, disk drives, and so on), even though the processor or program is capable of performing at a higher rate.

bound[2] *n.* The upper or lower limit in a permitted range of values.

bounding box *n. See* graphic limits.

Bourne shell *n.* The first major shell, or command interpreter, for UNIX and part of the AT&T System V release. The Bourne shell scripting language, developed at AT&T Bell Laboratories by Steve Bourne in 1979, was one of the original command languages for the UNIX operating system. While the Bourne shell lacks some features common in other UNIX shells, such as command-line editing and recall of previously issued commands, it is the one that the majority of shell scripts adhere to. *Also called:* sh. *See also* shell[1], shell script, System V, UNIX. *Compare* C shell, Korn shell.

boutique reseller *n.* A type of VAR (value-added reseller) that specializes in providing customized software, hardware, and services to vertical, or niche, markets. In the VAR environment, boutique resellers are distinguished from master resellers, or systems integrators, which offer a much wider variety of products and services. *See also* value-added reseller.

box *n.* **1.** Container for a piece of electronic equipment. **2.** Slang term for a computer; more specifically the unit holding the central processing unit, or CPU, and other "guts" of the system, as in "bet that new high-performance box really screams." *See also* central processing unit.

3. An IBM front-end processor. **4.** A rectangular—actually, diamond-shaped—symbol, usually called a decision box, used in flowcharting to represent a point at which a process branches into more than one possible outcome, as in a yes/no situation. *See also* decision box. **5.** The boundary around a graphic image on screen. *See also* graphic limits.

box-top license *n. See* shrinkwrap agreement.

Boyce-Codd normal form *n. See* normal form (definition 1).

bozo *n.* A slang term used frequently on the Internet, particularly in newsgroups, for a foolish or eccentric person.

bozo filter *n.* On the Internet, slang for a feature in some e-mail clients and newsgroup readers or a separate utility that allows the user to block, or filter out, incoming e-mail messages or newsgroup articles from specified individuals. Generally these individuals are ones that the user does not want to hear from, such as bozos. *Also called:* kill file. *See also* bozo.

BPI *n. See* bits per inch, bytes per inch.

bpp *n. See* bits per pixel.

bps *n.* Short for bits per second. The measure of transmission speed used in relation to networks and communication lines. Although bps represents the basic unit of measure, networks and communications devices, such as modems, are so fast that speeds are usually given in multiples of bps—Kbps (kilobits, or thousands of bits, per second), Mbps (megabits, or millions of bits, per second), and Gbps (gigabits, or billions of bits, per second). Speed in bps is not the same as the baud rate for a modem. *See also* baud rate.

braindamaged *adj.* Performing in an erratic or destructive manner. A braindamaged application or utility program is characterized by some or all of the following traits: a mysterious and unintuitive user interface, failure to respond predictably to commands, failure to release unused memory, failure to close open files, and use of "reserved" elements of the operating system that can result in a fatal error in a program or the operating system. Braindamaged programs are also often responsible for causing problems across local area networks. *Compare* kludge.

brain dump *n.* A large, unorganized mass of information, presented in response to a query via e-mail or a newsgroup article, that is difficult to digest or interpret.

branch *n.* **1.** A node intermediate between the root and the leaves in some types of logical tree structure, such as the directory tree in Windows or a tape distribution organization. **2.** Any connection between two items such as blocks in a flowchart or nodes in a network. *See* branch instruction.

branch instruction *n.* An assembly- or machine-level instruction that transfers control to another instruction, usually based on some condition (that is, it transfers if a specific condition is true or false). Branch instructions are most often relative transfers, jumping forward or backward by a certain number of bytes of code. *See also* GOTO statement, jump instruction.

branchpoint *n.* The location at which a given branch instruction occurs if the attendant condition (if any) is true. *See also* branch instruction.

branch prediction *n.* A technique used in some processors with an instruction called prefetch to guess whether or not a branch will be taken in a program, and to fetch executable code from the appropriate location. When a branch instruction is executed, it and the next instruction executed are stored in a buffer. This information is used to predict which way the instruction will branch the next time it is executed. When the prediction is correct (as it is over 90 percent of the time), executing a branch does not cause a pipeline break, so the system is not slowed down by the need to retrieve the next instruction. *See also* branch instruction, buffer[1], central processing unit, pipeline processing.

BRB *n.* Acronym for (I'll) be right back. An expression used commonly on live chat services on the Internet and online information services by participants signaling their temporary departure from the group. *See also* chat[1] (definition 1).

breadboard *n.* A blank, perforated board used to support prototype electronic circuits. Experimenters would put components on one side of the board and run the leads through the perforations to be connected by wires running along the underside. Today a circuit designer's breadboard is made of plastic. Its holes are small and closely spaced to accommodate the pins of chips, and connections are made by metal strips plugged into the holes. See the illustration. *Compare* wire-wrapped circuits.

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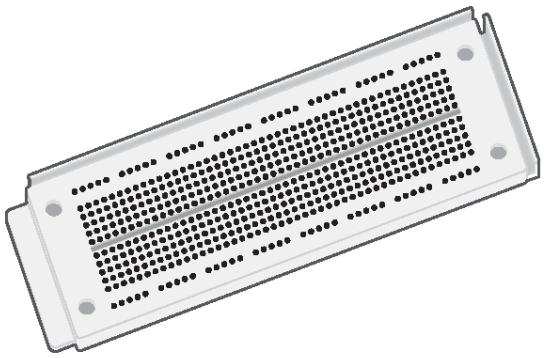
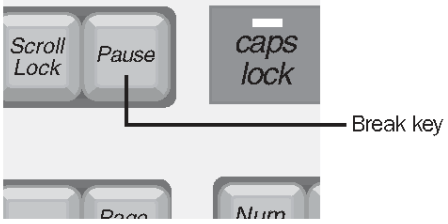


Breadboard.

break[1] *n.* **1.** Interruption of a program caused by the user pressing the Break key or its equivalent. **2.** Interruption of a communications transmission that occurs when the receiving station interrupts and takes over control of the line or when the transmitting station prematurely halts transmission. **3.** In the Java programming language, a keyword used to resume program execution at the next statement following the current statement. If the keyword is followed by a label, the program resumes at the indicated labeled statement. *See also* execute, statement.

break[2] *vb.* **1.** To interrupt execution at a given spot, usually for the purpose of debugging. *See also* breakpoint. **2.** To cause a routine, module, or program that had previously worked to cease working correctly.

Break key *n.* A key or combination of keys used to tell a computer to halt, or break out of, whatever it is doing. On IBM PCs and compatibles under DOS, pressing the Pause/Break or Scroll Lock/Break key while holding down the Ctrl key issues the break command (as does Ctrl-C). On Macintosh computers, the key combination that sends a break code is Command-period. See the illustration.



Break key.

break mode *n.* A temporary suspension of program execution while in the development environment. In break mode, you can examine, debug, reset, step through, or continue program execution.

breakout box *n.* A small hardware device that can be attached between two devices normally connected by a cable (such as a computer and a modem) to display and, if necessary, change the activity through individual wires of the cable.

breakpoint *n.* A location in a program at which execution is halted so that a programmer can examine the program's status, the contents of variables, and so on. A breakpoint is set and used within a debugger and is usually implemented by inserting at that point some kind of jump, call, or trap instruction that transfers control to the debugger. *See also* debug, debugger.

BRI *n.* Acronym for Basic Rate Interface. An ISDN subscriber service that uses two B (64 Kbps) channels and one D (64 Kbps) channel to transmit voice, video, and data signals. *See also* ISDN.

bridge *n.* In terms of the Year 2000 problem, a program, routine, or other conversion mechanism that converts date formats from 2-digit years to 4-digit years and vice versa. A bridge is used as a remedy for literally bridging the 2-digit/4-digit format gap between programs or systems.

bridge *n.* **1.** A device that connects networks using the same communications protocols so that information can be passed from one to the other. *Compare* gateway. **2.** A device that connects two LANs (local area networks), whether or not they use the same protocols, and allows information to flow between them. The bridge operates at the ISO/OSI data-link layer. *Also called:* layer switch. *See also* data-link layer. *Compare* router.

bridge page *n. See* doorway page.

bridge router *n.* A device that supports the functions of both a bridge and router. A bridge router links two segments of a local or wide area network, passing packets of data between the segments as necessary, and uses Level 2 addresses for routing. *Also called:* Brouter. *See also* bridge (definition 2), router.

bridgeware *n.* Hardware or software designed to convert application programs or data files to a form that can be used by a different computer.

Briefcase *n.* A system folder in Windows 9x used for synchronizing files between two computers, usually between desktop and laptop computers. The Briefcase can be transferred to another computer via disk, cable, or network. When files are transferred back to the original computer, the Briefcase updates all files to the most recent version.

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

British Naval Connector *n. See* BNC.

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

broadband ISDN *n.* Next-generation ISDN based on ATM (Asynchronous Transfer Mode) technology. Broadband ISDN divides information into two categories: interactive services, which are controlled by the user, and distributed (or distribution) services that can be broadcast to the user. *Acronym:* BISDN. *See also* ATM (definition 1), ISDN.

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

broadband network *n.* A local area network on which transmissions travel as radio-frequency signals over separate inbound and outbound channels. Stations on a broadband network are connected by coaxial or fiber-optic cable, which can carry data, voice, and video simultaneously over multiple transmission channels that are distinguished by frequency. A broadband network is capable of high-speed operation (20 megabits or more), but it is more expensive than a baseband network and can be difficult to install. Such a network is based on the same technology used by cable television (CATV). *Also called:* wideband transmission. *Compare* baseband network.

broadcast[1] *adj.* Sent to more than one recipient. In communications and on networks, a broadcast message is one distributed to all stations. *See also* e-mail[1] (definition 1).

broadcast[2] *n.* As in radio or television, a transmission sent to more than one recipient.

broadcast publishing point *n.* A type of publishing point that streams content in such a way that the client cannot control (start, stop, pause, fast forward, or rewind) the content. Content streamed from a broadcast publishing point can be delivered as a multicast or unicast stream. Formerly called a station.

broadcast storm *n.* A network broadcast that causes multiple hosts to respond simultaneously, overloading the network. A broadcast storm may occur when old TCP/IP routers are mixed with routers that support a new protocol. *See also* communications protocol, router, TCP/IP.

broken as designed *adj. See* BAD.

Brouter *n. See* bridge router.

brownout *n.* A condition in which the electricity level is appreciably reduced for a sustained period of time. In contrast to a blackout, or total loss of power, a brownout continues the flow of electricity to all devices connected to electrical outlets, although at lower levels than the normally supplied levels (120 volts in the United States). A brownout can be extremely damaging to sensitive electronic devices, such as computers, because the reduced and often fluctuating voltage levels can cause components to operate for extended periods of time outside the range they were designed to work in. On a computer, a brownout is characterized by a smaller, dimmer, and somewhat fluctuating display area on the monitor and potentially erratic behavior by the system unit. The only reliable means of preventing damage caused by a brownout condition is to use a battery-backed uninterruptible power supply (UPS). *See also* UPS. *Compare* blackout.

browse *vb.* To scan a database, a list of files, or the Internet, either for a particular item or for anything that seems to be of interest. Generally, browsing implies observing, rather than changing, information. In unauthorized computer hacking, browsing is a (presumably) nondestructive

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means of finding out about an unknown computer after illegally gaining entry.

browser *n. See* Web browser.

browser box *n. See* WebTV.

browser CLUT *n.* A color look-up table consisting of the 216 colors deemed safe when viewed with most Web browsers on most computer operating systems. *See also* CLUT, Web safe palette.

BRS *n. See* big red switch.

brush *n.* A tool used in paint programs to sketch or fill in areas of a drawing with the color and pattern currently in use. Paint programs that offer a variety of brush shapes can produce brushstrokes of varying width and, in some cases, shadowing or calligraphic effects.

brute force *adj.* In general, any process that essentially involves "doing it the hard way." In computer technology, however, brute force typically refers to a programming style that relies on the computer's processing power rather than on skill and planning to create or find a more elegant solution to a problem. Brute-force programming also ignores available information on how similar situations were handled in the past and might depend on outmoded design methodologies. For example, a program using brute force to crack passwords might try all the words in a dictionary (which would require huge amounts of computing power). Instead, more elegant programming would involve using special rules, history, statistics, and other available techniques or information to limit the number and types of words to try first.

BSC *n. See* BISYNC.

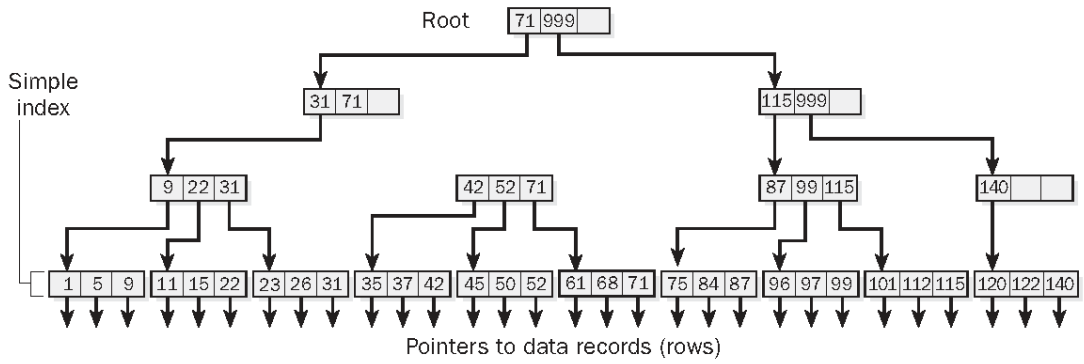
BSD/OS *n.* A version of the UNIX operating system based on BSD UNIX and sold by Berkeley Software Design, Inc. *See also* BSD UNIX.

BSD UNIX *n.* Acronym for Berkeley Software Distribution **UNIX**. A UNIX version developed at the University of California at Berkeley, providing additional capabilities such as networking, extra peripheral support, and use of extended filenames. BSD UNIX was instrumental in gaining widespread acceptance of UNIX and in getting academic institutions connected to the Internet. BSD UNIX is now being developed by Berkeley Software Design, Inc. *Also called:* Berkeley UNIX. *See also* BSD/OS, UNIX.

BSOD *n. See* Blue Screen of Death.

BSS *n. See* Basic Service Set.

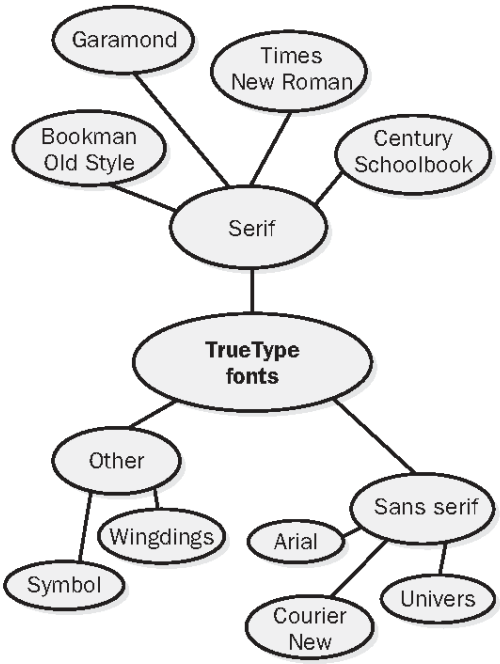
B-tree or **btree** *n.* A tree structure for storing database indexes. Each node in the tree contains a sorted list of key values and links that correspond to ranges of key values between the listed values. To find a specific data record given its key value, the program reads the first node, or root, from the disk and compares the desired key with the keys in the node to select a subrange of key values to search. It repeats the process with the node indicated by the corresponding link. At the lowest level, the links indicate the data records. The database system can thus rapidly skip down through the levels of the tree structure to find the simple index entries that contain the location of the desired records or rows. See the illustration.



B-tree. *A B-tree index structure.*

BTW or **btw** *n.* Acronym for **b**y **t**he **w**ay. An expression often used to preface remarks in e-mail and Internet newsgroup articles.

bubble chart *n.* A chart in which annotated ovals (bubbles) representing categories, operations, or procedures are connected by lines or arrows that represent data flows or other relationships among the items represented by bubbles. In systems analysis, bubble charts, rather than block diagrams or flowcharts, are used to describe the connections between concepts or parts of a whole, without emphasizing a structural, sequential, or procedural relationship between the parts. See the illustration. *Compare* block diagram, flowchart.

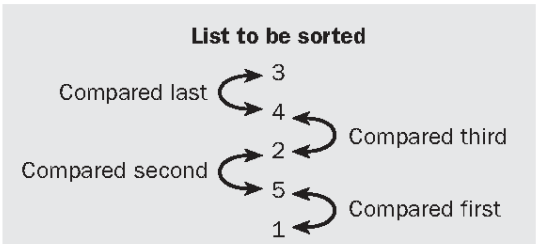


Bubble chart.

bubble-jet printer *n.* A form of nonimpact printer that uses a mechanism similar to that used by an ink-jet printer to shoot ink from nozzles to form characters on paper. A bubble-jet printer uses special heating elements to prepare the ink, whereas an ink-jet printer uses piezoelectric crystals. *See also* ink-jet printer, nonimpact printer. *Compare* laser printer.

bubble memory *n.* Memory formed by a series of persistent magnetic "bubbles" in a thin film substrate. In contrast to ROM, information can be written to bubble memory. In contrast to RAM, data written to bubble memory remains there until it is changed, even when the computer is turned off. For this reason, bubble memory has had some application in environments in which a computer system must be able to recover with minimal data loss in the event of a power failure. The use of and demand for bubble memory has all but disappeared because of the introduction of flash memory, which is less expensive and easier to produce. *See also* flash memory, nonvolatile memory.

bubble sort *n.* A sorting algorithm that starts at the end of a list with *n* elements and moves all the way through, testing the value of each adjacent pair of items and swapping them if they aren't in the right order. The entire process is then repeated for the remaining $n - 1$ items in the list, and so on, until the list is completely sorted, with the largest value at the end of the list. A bubble sort is so named because the "lightest" item in a list (the smallest) will figuratively "bubble up" to the top of the list first; then the next-lightest item bubbles up to its position, and so on. See the illustration. *Also called:* exchange sort. *See also* algorithm, sort. *Compare* insertion sort, merge sort, quicksort.



List after first pass	List after second pass
1	1
3	2
4	3
2	4
5	5

Bubble sort.

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bubble storage *n. See* bubble memory.

bucket *n.* A region of memory that is addressable as an entity and can be used as a receptacle to hold data. *See also* bit bucket.

bucket brigade attack *n. See* man-in-the-middle attack.

buffer[1] *n.* A region of memory reserved for use as an intermediate repository in which data is temporarily held while waiting to be transferred between two locations or devices. For instance, a buffer is used while transferring data from an application, such as a word processor, to an input/output device, such as a printer.

buffer[2] *vb.* To use a region of memory to hold data that is waiting to be transferred, especially to or from input/output (I/O) devices such as disk drives and serial ports.

buffer pool *n.* A group of memory or storage-device locations that are allocated for temporary storage, especially during transfer operations.

buffer storage *n.* **1.** The use of a special area in memory to hold data temporarily for processing until a program or operating system is ready to deal with it. **2.** An area of storage that is used to hold data to be passed between devices that are not synchronized or have different bit transfer rates.

bug *n.* **1.** An error in coding or logic that causes a program to malfunction or to produce incorrect results. Minor bugs, such as a cursor that does not behave as expected, can be inconvenient or frustrating, but do not damage information. More severe bugs can require the user to restart the program or the computer, losing whatever previous work had not been saved. Worse yet are bugs that damage saved data without alerting the user. All such errors must be found and corrected by the process known as *debugging*. Because of the potential risk to important data, commercial application programs are tested and debugged as completely as possible before release. After the program becomes available, further minor bugs are corrected in the next update. A more severe bug can sometimes be fixed with a piece of software called a *patch*, which circumvents the problem or in some other way alleviates its effects. *See also* beta test, bomb[2], crash[2] (definition 1), debug, debugger, hang, inherent error, logic error, semantic error, syntax error. **2.** A recurring physical problem that prevents a system or set of components from working together properly. While the origin of this definition is in some dispute, computer folklore attributes the first use of bug in this sense to a problem in the Harvard Mark I or the Army/University of Pennsylvania ENIAC that was traced to a moth caught between the contacts of a relay in the machine (although a moth is not entomologically a true bug).

buggy *adj.* Full of flaws, or bugs, in reference to software. *See also* bug (definition 1).

building-block principle *n. See* modular design.

built-in check *n. See* hardware check, power-on self test.

built-in font *n. See* internal font.

built-in groups *n.* The default groups provided with Microsoft Windows NT and Windows NT Advanced Server. A group defines a collection of rights and permissions for the user accounts that are its members. Built-in groups are therefore a convenient means of providing access to commonly used resources. *See also* group[1].

bulk eraser *n.* A device for eliminating all information from a storage medium, such as a floppy disk or a tape, by generating a strong magnetic field that scrambles the alignment of the ferrous materials in the media that encode stored data.

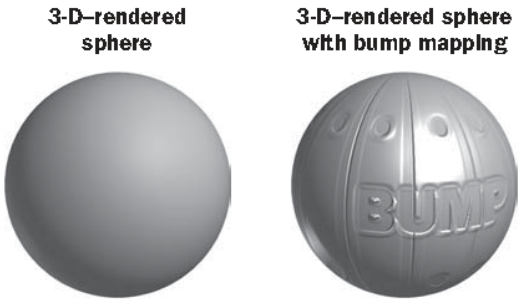
bulk storage *n.* Any medium capable of containing large quantities of information, such as tape, fixed disk, or optical disc.

bullet *n.* A typographical symbol, such as a filled or empty circle, diamond, box, or asterisk, used to set off a small block of text or each item in a list. Round and square bullets are used to set off different levels of information. *See also* dingbat.

bulletin board system *n. See* BBS.

bulletproof *adj.* Capable of overcoming hardware problems that, in another system, could lead to interruption of the task in progress.

bump mapping *n.* In 3D computer game rendering and other digital animation applications, a graphic technique in which a texture is added to the surface of an image to increase the perceived detail of the object. Bump mapping gives each pixel a texture, which is calculated by the computer's video card to respond to changes in surroundings, allowing a more realistic interpretation of objects. See the illustration.



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.

burst[1] *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).

burst[2] *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* burst[1].

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

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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.

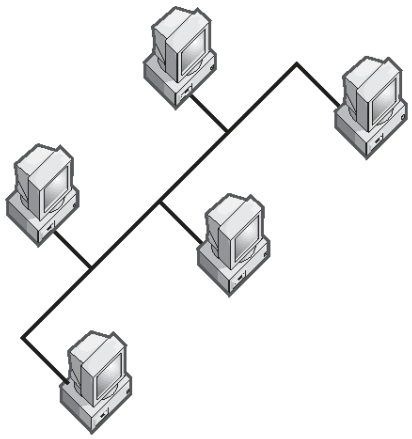
business-to-business *n. See* B2B.

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.



Bus network. *A bus network configuration.*

bus system *n.* The interface circuitry that controls the operations of a bus and connects it with the rest of the computer system. *See also* bus.

bus topology *n. See* bus network.

button *n.* **1.** A graphic element in a dialog box that, when activated, performs a specified function. The user activates a button by clicking on it with a mouse or, if the button has the focus, by hitting the Return or Enter key. **2.** On a mouse, a movable piece that is pressed to activate some function. Older mouse models have only one button; newer models typically have two or more buttons.

button bomb *n.* A button on Web pages with the image of a bomb.

button help *n.* Help information displayed via the selection of buttons or icons. Applications such as the World Wide Web, multimedia kiosks, and computer-aided instruction often use button help icons to ease system navigation.

bypass *n.* In telecommunications, the use of communication pathways other than the local telephone company, such as satellites and microwave systems.

byte *n.* Short for **b**inary **te**rm. A unit of data, today almost always consisting of 8 bits. A byte can represent a single character, such as a letter, a digit, or a punctuation mark. Because a byte represents only a small amount of information, amounts of computer memory and storage are usually given in kilobytes (1024 bytes), megabytes (1,048,576 bytes), or gigabytes (1,073,741,824 bytes).
Abbreviation: B. *See also* bit, gigabyte, kilobyte, megabyte. *Compare* octet, word.

bytecode *n.* An encoding of a computer program that a compiler produces when the original source code is processed. This encoding is in an abstract, processor-independent form that cannot be directly executed by most CPUs but is highly suitable for further analysis (for example, compiler optimization), for processing by interpreters (for example, executing Java applets within Web browsers), or for use in generation of binary instructions for the target computer's CPU. Intermediate bytecode production is a feature of the compilers for the Pascal and Java programming languages. *See also* central processing unit, compiler (definition 2), interpreter, Java, Java applet, Pascal.

BYTE Information Exchange *n. See* BIX.

byte-oriented protocol *n.* A communications protocol in which data is transmitted as a string of characters in a particular character set, such as ASCII, rather than as a stream of bits as in a bit-oriented protocol. To express control information, a byte-oriented protocol relies on control characters, most of which are defined by the coding scheme used. The asynchronous communications protocols commonly used with modems and IBM's BISYNC protocol are byte-oriented protocols. *Compare* bit-oriented protocol.

bytes per inch *n.* The number of bytes that fit into an inch of length on a disk track or a tape. *Acronym:* BPI.

C

C *n.* A programming language developed by Dennis Ritchie at Bell Laboratories in 1972. It is so named because its immediate predecessor was the B programming language. Although C is considered by many to be more a machine-independent assembly language than a high-level language, its close association with the UNIX operating system, its enormous popularity, and its standardization by the American National Standards Institute (ANSI) have made it perhaps the closest thing to a standard programming language in the microcomputer/workstation marketplace. C is a compiled language that contains a small set of built-in functions that are machine dependent. The rest of the C functions are machine independent and are contained in libraries that can be accessed from C programs. C programs are composed of one or more functions defined by the programmer; thus C is a structured programming language. *See also* C++, compiled language, library, Objective-C, structured programming.

C++ *n.* An object-oriented version of the C programming language, developed by Bjarne Stroustrup in the early 1980s at Bell Laboratories and adopted by a number of vendors, including Apple Computer, Inc. and Sun Microsystems, Inc. *See also* C, Objective-C, object-oriented programming.

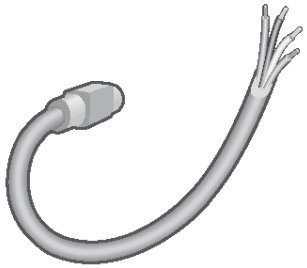
C2 *n.* A security class of the U.S. Department of Defense Trusted Computer System Evaluation Criteria (DOD 4200.28.STD). C2 is the lowest level of security in the U.S. National Computer Security Center's hierarchy of criteria for trusted computer systems, requiring user logon with password and a mechanism for auditing. The C2 level is outlined in the Orange Book. *See also* Orange Book (definition 1).

CA *n. See* certificate authority.

.cab *n.* File extension for cabinet files, which are multiple files compressed into one and extractable with the extract.exe utility. Such files are frequently found on Microsoft software (for example, Windows 9x) distribution disks.

cabinet *n.* The box in which the main components of a computer (CPU, the hard drive, floppy and CD-ROM drives, and expansion slots for peripheral devices, such as monitors) are located. *See also* CPU, expansion slot.

cable[1] *n.* A collection of wires shielded within a protective tube, used to connect peripheral devices to a computer. A mouse, a keyboard, and a printer might all be connected to a computer with cables. Printer cables typically implement a serial or a parallel path for data to travel along. See the illustration.



Cable.

cable[2] *adj.* Pertaining to the cable television (CATV) distribution system. For example, a cable modem is a modem that sends and receives digital data through a connection to a cable TV system. Because cable TV is a broadband service, it can carry data (such as an Internet connection) at a very high speed. *See also* CATV.

cable connector *n.* The connector on either end of a cable. *See also* DB connector, DIN connector, RS-232-C standard, RS-422/423/449.

cable matcher *n.* A device that allows the use of a cable that has slightly different wire connections from those required by the devices to which it is attached.

cable modem *n.* A modem that sends and receives data through a coaxial cable television network instead of telephone lines, as with a conventional modem. Cable modems, which have speeds of 500 kilobits per second (Kbps), can generally transmit data faster than current conventional modems. However, cable modems do not operate at the same rate upstream (when sending information) and downstream (when receiving information). Upstream rates vary from about 2 Mbps to 10 Mbps,

downstream rates from about 10 Mbps to 36 Mbps. *See also* coaxial cable, modem.

cable telephony *n.* Telephone service provided over a cable TV connection rather than over traditional telephone lines. Although service is delivered over cable rather than telephone wire, the end user perceives no difference between cable telephony and normal telephone service. Proponents of cable telephony see it as part of the eventual integration of Internet, television, and telephone services into a single communication/entertainment unit.

cable television *n. See* CATV.

cabling diagram *n.* A plan that shows the path of cables that attach computer system components or peripherals. Cabling diagrams are particularly important for explaining the connection of disk drives to a disk controller.

cache *n.* A special memory subsystem in which frequently used data values are duplicated for quick access. A memory cache stores the contents of frequently accessed RAM locations and the addresses where these data items are stored. When the processor references an address in memory, the cache checks to see whether it holds that address. If it does hold the address, the data is returned to the processor; if it does not, a regular memory access occurs. A cache is useful when RAM accesses are slow compared with the microprocessor speed because cache memory is always faster than main RAM memory. *See also* disk cache, wait state.

cache card *n.* An expansion card that increases a system's cache memory. *See also* cache, expansion board.

Cache-Coherent Non-Uniform Memory Access *n. See* ccNUMA.

cache farm *n.* A group of servers that save copies of Web pages to caches to fulfill successive requests without calling the pages up repeatedly from the Web server. In essence, the servers are dedicated to caching. By saving Web pages where they can be accessed without increasing traffic on the Web site, the cache farm allows higher-performance Web access for the end user and a reduction in network congestion and volume. *See also* cache.

cache memory *n. See* cache.

cache poisoning *n.* Deliberate corruption of Internet Domain Name System (DNS) information through alteration of data that equates host names with their IP addresses. Misleading information of this type, when cached (saved) by one DNS server and later passed to another, exposes DNS servers to attacks in which data sent from one host to another can be accessed or corrupted. Cache poisoning has been used to redirect network requests from a legitimate server to an alternate Web site. *See also* DNS.

CAD *n.* Acronym for computer-aided design. A system of programs and workstations used in designing engineering, architectural, and scientific models ranging from simple tools to buildings, aircraft, integrated circuits, and molecules. Various CAD applications create objects in two or three dimensions, presenting the results as wire-frame "skeletons," as more substantial models with shaded surfaces, or as solid objects. Some programs can also rotate or resize models, show interior views, generate lists of materials required for construction, and perform other allied functions. CAD programs rely on mathematics, often requiring the computing power of a high-performance workstation. *See also* CAD/CAM, I-CASE.

CAD/CAM *n.* Acronym for computer-aided design/computer-aided manufacturing. The use of computers in both the design and manufacture of a product. With CAD/CAM, a product, such as a machine part, is designed with a CAD program and the finished design is translated into a set of instructions that can be transmitted to and used by the machines dedicated to fabrication, assembly, and process control. *See also* CAD, I-CASE.

CADD *n.* A system of hardware and software similar to CAD but with additional features related to engineering conventions, including the ability to display dimension specifications and other notes. *Acronym:* CADD. *See also* CAD.

caddy *n.* A plastic carrier that holds a CD-ROM and is inserted into a CD-ROM drive. Some PCs, especially older models, have CD-ROM drives that require the use of a caddy. Most current CD-ROM drives do not require a caddy.

CAE *n.* Acronym for computer-aided engineering. An application that enables the user to perform engineering tests and analyses on designs created with a computer. In some instances, capabilities such as logic testing that are generally attributed to CAE applications are also part of CAD programs, so the distinction between CAD and CAE is not a hard-and-fast one. *See also* CAD, I-CASE.

C

CAI *n.* Acronym for computer-aided (or computer-assisted) instruction. An educational program designed to serve as a teaching tool. CAI programs typically use tutorials, drills, and question-and-answer sessions to present a topic and to test the student's comprehension. CAI programs are excellent aids for presenting factual material and for allowing students to pace their learning speed. Subjects and complexity range from beginning arithmetic to advanced mathematics, science, history, computer studies, and specialized topics. *Also called:* CAL, CAT, computer-aided learning, computer-aided teaching, computer-assisted learning, computer-assisted teaching, computer-augmented learning. *See also* I-CASE. *Compare* CBT, CMI.

CAL *n.* **1.** Acronym for computer-assisted (or computer-augmented) learning. *See* CAI. **2.** Acronym for Common Application Language. An object-oriented communications language for controlling home-networking products. CAL, originally part of the CEBus (Consumer Electronic Bus) standard for home automation, can be implemented with various communication protocols, home-networking standards, and home electronic products. *See also* CEBus, home automation.

calculator *n.* Broadly, any device that performs arithmetic operations on numbers. Sophisticated calculators can be programmed for certain functions and can store values in memory, but they differ from computers in several ways: they have a fixed set of commands, they do not recognize text, they cannot retrieve values stored in a data file, and they cannot find and use values generated by a program such as a spreadsheet.

calendar program *n.* An application program in the form of an electronic calendar, commonly used for highlighting dates and scheduling appointments. Some calendar programs resemble wall calendars, displaying dates in blocks labeled with the days of the week; others display dates day by day and enable the user to enter appointments, notes, and other memoranda. A day-of-the-week type of calendar program could, for example, be used to find out that Christmas 2003 will be on a Saturday. Depending on its capabilities, such a program might cover only the current century, or it might cover hundreds of years and even allow for the change (in 1582) from the Julian to the Gregorian calendar. A calendar/scheduler program might show blocks of dates or, like an appointment book, single days divided into hours or half hours, with room for notes. Some programs allow the user to set an alarm to go off at an important point in the schedule. Other programs can coordinate the calendars of different people on the same network so that a person entering an appointment into his or her calendar also enters the appointment into a colleague's calendar.

call[1] *n.* In a program, an instruction or statement that transfers program execution to some section of code, such as a subroutine, to perform a specific task. Once the task is performed, program execution resumes at the calling point in the program. *See also* calling sequence.

call[2] *vb.* **1.** To establish a connection through a telecommunications network. **2.** To transfer program execution to some section of code (usually a subroutine) while saving the necessary information to allow execution to resume at the calling point when the called section has completed execution. Some languages (such as FORTRAN) have an explicit CALL statement; others (such as C and Pascal) perform a call when the name of a procedure or function appears. In assembly language, there are various names for a CALL instruction. When a subroutine call occurs in any language, one or more values (known as arguments or parameters) are often passed to the subroutine, which can then use and sometimes modify these values. *See also* argument, parameter.

callback or **callback security** *n.* A security feature used to authenticate users calling in to a network. During callback, the network validates the caller's username and password, hangs up, and then returns the call, usually to a preauthorized number. This security measure usually prevents unauthorized access to an account even if an individual's logon ID and password have been stolen. *See also* authentication, preset-to callback, remote access server.

callback modem *n.* A modem that, instead of answering an incoming call, requires the caller to enter a touch-tone code and hang up so that the modem can return the call. When the modem receives the caller's code, it checks the code against a stored set of phone numbers. If the code matches an authorized number, the modem dials the number and then opens a connection for the original caller. Callback modems are used when communications lines must be available to outside users but data must be protected from unauthorized intruders.

calling sequence *n.* In a program when a subroutine call occurs, an agreement between the calling routine and the called routine on how arguments will be passed and in what order, how values will be returned, and which routine

will handle any necessary housekeeping (such as cleaning up the stack). The calling sequence becomes important when the calling and called routines were created with different compilers or if either was written in assembly language. Two common calling sequences are the C calling sequence and the Pascal calling sequence. In the C calling sequence, the calling routine pushes any arguments included in the call on the stack in reverse order (right to left) and performs any stack cleanup; this permits a varying number of arguments to be passed to a given routine. In the Pascal calling sequence, the calling routine pushes any included arguments on the stack in the order in which they appear (left to right), and the called routine is expected to clean up the stack. *See also* argument, call[1], stack.

CALL instruction *n.* A type of programming instruction that diverts program execution to a new area in memory (sequence of directives) and also allows eventual return to the original sequence of directives.

CALS *n.* Acronym for **C**omputer-Aided **A**cquisition and **L**ogistics **S**upport. A U.S. Department of Defense standard for electronic exchange of data with commercial suppliers.

CAM *n.* **1.** Acronym for **c**omputer-aided **m**anufacturing. The use of computers in automating the fabrication, assembly, and control aspects of manufacturing. CAM applies to the manufacture of products ranging from small-scale production to the use of robotics in full-scale assembly lines. CAM relates more to the use of specialized programs and equipment than it does to the use of microcomputers in a manufacturing environment. *See also* CAD/CAM, I-CASE. **2.** *See* Common Access Method.

camera-ready *adj.* In publishing, of or pertaining to the stage at which a document, with all typographic elements and graphics in place, is suitably prepared to be sent to a printing service. The printing service photographs the camera-ready copy and then uses the photograph to make plates for printing. Some applications are advertised as being able to bring documents to the camera-ready stage, eliminating the need for manual layout and pasteup of elements onto boards.

campuswide information system *n.* Information and services distributed on a college or university campus through computer networks. Campuswide information system services typically include student and faculty directories, calendars of campus events, and access to databases. *Acronym:* CWIS.

cancel *n.* A control character used in communication with printers and other computers, commonly designated as CAN. It usually means that the line of text being sent should be canceled. In ASCII, which is the basis of character sets used by most microcomputers, this is represented internally as character code 24.

cancelbot *n.* Short for **cancel** robot. A program that identifies articles in newsgroups based on a set of criteria and cancels the distribution of those articles. Although the criteria for cancellation is set by the owner of the cancelbot, most cancelbots exist to identify and eliminate spam messages posted to dozens or hundreds of newsgroups. *See also* spam.

cancel message *n.* A message sent to Usenet news servers indicating that a certain article is to be canceled, or deleted, from the server. *See also* article, news server, Usenet.

candidate key *n.* A unique identifier for a tuple (row) within a relation (database table). The candidate key may be either simple (a single attribute) or composite (two or more attributes). By definition, every relation must have at least one candidate key, but it is possible for a relation to have more than one candidate key. If there is only one candidate key, it automatically becomes the primary key for the relation. If there are multiple candidate keys, the designer must designate one as the primary key. Any candidate key that is not the designated primary key is an alternate key. *See also* key (definition 2), primary key.

canned program *n. See* canned software.

canned routine *n.* A previously written routine that is copied into a program and used as is, without modification. *See also* library routine.

canned software *n.* Off-the-shelf software, such as word processors and spreadsheet programs.

canonical form *n.* In mathematics and programming, the standard or prototypical form of an expression or a statement.

canonical name *n.* An object's distinguished name presented with the root first and without the LDAP attribute tags (such as: CN=, DC=). The segments of the name are delimited with forward slashes (/). For example, CN=MyDocuments,OU=MyOU,DC=Microsoft,DC=Com is presented as microsoft.com/MyOU/MyDocuments in canonical form. *See also* Lightweight Directory Access Protocol.

C

capacitance *n.* The ability to store an electric charge. Capacitance is measured in farads. A capacitance of 1 farad will hold 1 coulomb of charge at a potential of 1 volt. In practical use, a farad is an extremely large amount of capacitance; typical capacitors have values of microfarads (10^{-6}) or picofarads (10^{-12}). *See also* capacitor.

capacitor *n.* A circuit component that provides a known amount of capacitance (ability to store an electric charge). A capacitor typically consists of two conductive plates separated by an insulating (dielectric) material. If other factors remain constant, capacitance increases as the plates are made larger or brought closer together. A capacitor blocks direct current but passes alternating current to an extent that depends on its capacitance and on the frequency of the current. *See also* capacitance.

capacity *n.* The amount of information a computer or an attached device can process or store. *See also* computer.

caps *n.* Short for **cap**ital letters. *Compare* lowercase.

Caps Lock key *n.* A toggle key that, when on, shifts the alphabetic characters on the keyboard to uppercase. The Caps Lock key does not affect numbers, punctuation marks, or other symbols. See the illustration.

Caps Lock key.

capstan *n.* On a tape recorder, a polished metal post against which a turning rubber wheel (called a pinch roller) presses to move a length of magnetic tape placed between the wheel and the post. The capstan controls the speed of the tape as it moves past the recording head. *See also* pinch roller.

capture *vb.* In communications, to transfer received data into a file for archiving or later analysis.

capture board *n. See* video capture card.

capture card *n. See* video capture card.

Carbon *n.* Code name for the Application Program Interfaces (API) and shared libraries used to write applications for Macintosh OS X. Since Macintosh OS X is an entirely different system rather than an update of the previous Macintosh OS, Carbon bridges the gap between the systems, allowing developers to rewrite their programs to OS X without rewriting the code for the entire application. Carbon allows OS X native applications to run under earlier versions of the Macintosh OS without modification but with OS X advantages.

carbon copy *n. See* cc.

carbonize *vb.* To update a Macintosh application for OS X. Although older versions of Macintosh applications will run under OS X, only those that have been carbonized will be able to use OS X–specific advantages.

carbon ribbon *n.* A ribbon used with impact printers, especially daisy-wheel printers, and with typewriters for highest-quality output. A carbon ribbon is made of a thin strip of Mylar coated on one side with a carbon film. Characters printed with a carbon ribbon are extremely crisp and free from the fuzziness that can be associated with an inked cloth ribbon. *Also called:* film ribbon, Mylar ribbon. *See also* daisy-wheel printer. *Compare* cloth ribbon.

card *n.* **1.** A printed circuit board or adapter that can be plugged into a computer to provide added functionality or new capability. These cards provide specialized services, such as mouse support and modem capabilities, that are not built into the computer. *See also* adapter, board, printed circuit board. **2.** In programs such as the HyperCard hypertext program, an on-screen representation of an index card on which information can be stored and "filed" (saved) for future reference. *See also* hypertext. **3.** A manila card about 3 inches high by 7 inches long on which 80 columns of data could be entered in the form of holes punched with a keypunch machine. The punched holes corresponded to numbers, letters, and other characters and could be read by a computer that used a punched-card reader. *Also called:* punched card. *See also* card reader (definition 2).

card cage *n.* An enclosure area for holding printed circuit boards (cards). Most computers have an area with protective metal and mounting brackets where cards are installed. The term originally came from an external box that held rack-mounted cards or peripherals and resembled a cage.

carder *n.* A person who engages in online credit card fraud. Specifically, a carder steals credit card numbers, either to purchase merchandise (often computer-related) from Web-based stores or to trade the stolen numbers with like-minded individuals—again, over the Internet. Carders

generally obtain credit card numbers through conventional means, such as "trashing" (searching through trash) or calling individuals and posing as bank officers. *See also* hacker (definition 2).

cardinal number *n.* A number that indicates how many items there are in a set—for example, "There are 27 names on that list." *Compare* ordinal number.

card punch *n. See* keypunch.

card reader *n.* **1.** An input device used chiefly for identification purposes that reads information that has been magnetically encoded, usually in two tracks, on a plastic card, such as a credit card or an employee badge. **2.** A mechanical apparatus that reads computer data from punched cards. No longer in widespread use, card readers allow computer data to be created off line and then input to the computer for processing. This need for offline data creation was because of limited CPU resources. Reading batches of punched cards was a better use of CPU time than waiting for a human operator to key data directly into the computer's memory. *Also called:* punched-card reader.

caret *n.* The small, upward-pointing symbol (^) typically found over the 6 key on the top row of a microcomputer keyboard. In some programming languages, the caret is used as an exponentiation operator. For example, the expression 3 ^ 2 represents the number 3 raised to the second power. The caret is also used to represent the Control key on the keyboard. For example, ^Z means "hold the Control key down and press the Z key."

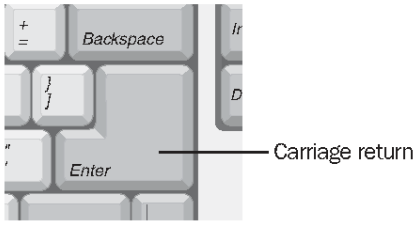
careware *n.* Software developed by an individual or a small group and distributed freely, with the proviso that users make a donation to a charity if they continue to use the software after trying it out. The charity is one usually designated by the software creator.

Carnivore *n.* Digital wiretap technology developed by the U.S. Federal Bureau of Investigation. Carnivore's purpose is to track and capture e-mail and other Internet-based communications sent from and received by a suspect. Carnivore copies all of an ISP's network traffic into a collection system where a filter sifts through all communications, disregarding all data but that related to the suspect.

carpal tunnel syndrome *n.* A form of repetitive strain injury to the wrist and hand. Making the same small motions over and over can cause swelling and scarring of the soft tissue of the wrist, which then compresses the main nerve leading to the hand. Symptoms of carpal tunnel syndrome include pain and tingling in the fingers, and in advanced cases, carpal tunnel syndrome can lead to loss of functionality of the hands. Typing at a computer keyboard without proper wrist support is a common cause of carpal tunnel syndrome. *Acronym:* CTS. *See also* repetitive strain injury, wrist support.

carriage *n.* The assembly that holds the platen of a typewriter or a typewriterlike printer. On a standard typewriter, the platen and carriage move past a fixed position within the typewriter housing, where the keys strike the paper; the platen rotates to advance the paper held in the carriage. On most impact printers for computers, however, the print head moves back and forth across a platen, which rotates but does not move horizontally; in such machines, the assembly that carries the print head is often called the print-head carriage assembly. *See also* carriage return, platen.

carriage return *n.* A control character that tells a computer or printer to return to the beginning of the current line. A carriage return is similar to the return on a typewriter but does not automatically advance to the beginning of a new line. For example, a carriage-return character alone, received at the end of the words *This is a sample line of text* would cause the cursor or printer to return to the first letter of the word *This*. In the ASCII character set, the carriage-return character has the decimal value of 13 (hexadecimal 0D). See the illustration.



Carriage return.

carrier *n.* **1.** In communications, a specified frequency that can be modulated to convey information. **2.** A company that provides telephone and other communications services to consumers.

Carrier Detect *n. See* CD (definition 2).

carrier frequency *n.* A radio-frequency signal, such as those used with modems and on networks, used to transmit information. A carrier frequency is a signal that vibrates at a fixed number of cycles per second, or hertz (Hz), and is modulated (changed) in either frequency or amplitude to enable it to carry intelligible information.

carrier sense multiple access with collision detection *n. See* CSMA/CD.

C

carrier signal *n.* *See* carrier frequency.

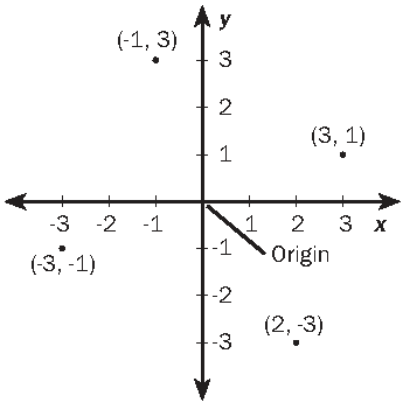
carrier system *n.* A communications method that uses different carrier frequencies to transfer information along multiple channels of a single path. Transmission involves modulating the signal on each frequency at the originating station and demodulating the signal at the receiving station.

carry *n.* In arithmetic, the process of moving a digit to the next higher position when the sum of two numbers is greater than the largest digit in the number system being used. Computers, based on logic circuits, and often able to add all digits in two numbers simultaneously (do parallel addition), perform carries in several exotic ways. For example, they perform complete carries, in which one carry is allowed to propagate—that is, to generate other carries in other digit positions. They can also perform partial carries, in which carries resulting from parallel addition are stored temporarily.

carry bit *n.* The bit, associated with an adder circuit, that indicates that an addition operation has produced a carry (as in 9 + 7). *Also called:* carry flag.

carry flag *n.* *See* carry bit.

Cartesian coordinates *n.* Points on a plane (two dimensions) or in space (three dimensions) that are located by their positions in relation to intersecting axes; named after the French mathematician René Descartes, who introduced the system in the seventeenth century. In two dimensions, points are described by their positions in relation to the two familiar axes, *x* (usually horizontal) and *y* (usually vertical). In three dimensions, a third axis, *z*, is added to the *x*- and *y*-axes. See the illustration. *See also* *x*-*y*-*z* coordinate system. *Compare* polar coordinates.



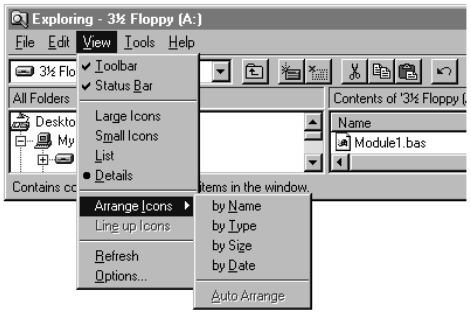
Cartesian coordinates.

Cartesian product *n.* *See* product (definition 1).

cartridge *n.* Any of various container devices that usually consist of some form of plastic housing. *See also* disk cartridge, ink cartridge, memory cartridge, ribbon cartridge, ROM cartridge, tape cartridge, toner cartridge.

cartridge font *n.* A font contained in a plug-in cartridge and used to add fonts to laser, ink-jet, or high-end dot-matrix printers. Cartridge fonts are distinguished both from internal fonts, which are contained in ROM in the printer and are always available, and from downloadable (soft) fonts, which reside on disk and which can be sent to the printer as needed. *See also* font cartridge. *Compare* internal font.

cascade *n.* **1.** Additional elements displayed by a menu item or list box from which the user can choose in order to interact with other screen elements. See the illustration. **2.** In newsgroup articles, the accumulation of quotation marks (often angle brackets) added by newsgroup readers each time an article is replied to. Most newsgroup readers will copy the original article in the body of the reply; after several replies, the original material will have several quotation marks. *See also* article, newsgroup, newsreader.



Cascade.

cascade connection *n.* *See* pipe (definition 1).

cascaded star topology *n.* A star network in which nodes connect to hubs and hubs connect to other hubs in a hierarchical (cascaded) parent/child relationship. This topology is characteristic of 100Base-VG networks.

cascading hubs *n.* A network configuration in which hubs are connected to other hubs. *See also* hub.

cascading menu *n.* A hierarchical graphical menu system in which a side menu of subcategories is displayed when the pointer is placed on the main category.

Cascading Style Sheet mechanism *n. See* cascading style sheets.

cascading style sheets *n.* A Hypertext Markup Language (HTML) specification developed by The World Wide Web Consortium (W3C) that allows authors of HTML documents and users to attach style sheets to HTML documents. The style sheets include typographical information on how the page should appear, such as the font of the text in the page. This specification also directs the way in which the style sheets of the HTML document and the user's style will blend. Cascading style sheets have been proposed for the HTML 3.2 standard. *Acronym:* CSS. *Also called:* Cascading Style Sheet mechanism, CSS1. *See also* HTML, style sheet (definition 2).

cascading windows *n.* A sequence of successive, overlapping windows in a graphical user interface, displayed so that the title bar of each is visible. *Also called:* overlaid windows.

case *n.* In text processing, an indication of whether one or more alphabetic characters are capitalized (uppercase) or not (lowercase). A case-sensitive program or routine distinguishes between uppercase and lowercase letters and treats the word *cat* as totally distinct from either *Cat* or *CAT*. A case-sensitive program that also separates capitalized and lowercased words would list *Arkansas* before *aardvark* or *antimony*, even though its alphabetic position follows both lowercased words.

CASE *n.* Acronym for computer-aided software engineering. A comprehensive label for software designed to use computers in all phases of computer program development, from planning and modeling through coding and documentation. CASE represents a working environment consisting of programs and other development tools that help managers, systems analysts, programmers, and others to automate the design and implementation of programs and procedures for business, engineering, and scientific computer systems.

case-sensitive search *n.* A search in a database in which capitalization of key words must exactly match the capitalization of words in the database. A case-sensitive search for "north and south" would fail to find a database entry for "North and South."

case sensitivity *n.* Discrimination between lowercase and uppercase characters in a program or a programming language. *See also* case.

case statement *n.* In programming languages such as Ada, Pascal, and C, a type of control statement that executes one of several sets of instructions based on some key value. Case statements are used in evaluating situations that can have a number of different results. "Case" in this sense refers to a refinement of a basic IF-THEN type of conditional statement (if A is true, then do B), but a case statement functions more like a series of nested IFs (if A, then do this; else if B, then do that; else . . .). In a case evaluation, a variable (such as a number or a string of characters) is compared against one after another of a series of constants assigned by the programmer. Each constant represents a different case and defines an action to be carried out. When the program finds a constant that matches the variable, it carries out whatever action is dictated by the case in which the match occurs. *See also* constant, control statement, variable.

cassette *n.* The unit consisting of both the plastic case and the magnetic tape it contains. Cassette tapes are used for backing up large amounts of computer data.

cassette tape *n.* **1.** The tape within a cassette. **2.** The unit consisting of both the plastic cassette case and the tape it contains.

cast *n.* A programmer-specified data conversion from one type to another, such as a conversion from integer to floating point. *Also called:* coercion. *See also* data type.

CAT *n.* **1.** Acronym for computer-aided testing. A procedure used by engineers for checking or analyzing designs, especially those created with CAD programs. Computer-aided testing is also used by software developers for automated regression testing. **2.** Acronym for computer-assisted teaching or computer-aided teaching. *See* CAI. **3.** Acronym for computerized axial tomography. A medical procedure in which a computer is used to generate a three-dimensional image of a body part from a series of X-rays taken as cross sections along a single axis. *See* CAI.

catalog *n.* **1.** In a computer, a list containing specific information, such as name, length, type, and location of files or of storage space. **2.** In a database, the data dictionary. *See also* data dictionary.

catch *n.* A keyword in the Java programming language used to declare a block of statements to be executed in the event that a Java exception or runtime error occurs in a preceding "try" block. *See also* block, exception, keyword, runtime, try.

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Category 3 cable *n.* Network cable that supports frequencies up to 16 MHz and transmission speeds up to 10 Mbps (standard Ethernet). Category 3 cable has four unshielded twisted pairs (UTPs) of copper wire and RJ-45 connectors, and is used in voice and 10Base-T applications. *Also called:* Cat 3 cable.

Category 4 cable *n.* Network cable that supports frequencies up to 20 MHz and transmission speeds up to 16 Mbps. Category 4 cable has four unshielded twisted pairs (UTPs) of copper wire and RJ-45 connectors. Less popular than Category 3 and Category 5 cables, it is used primarily for token ring networks. *Also called:* Cat 4 cable.

Category 5 cable *n.* Network cable that supports frequencies up to 100 MHz and transmission speeds up to 100 Mbps (using two pairs) or 1000 Mbps (using four pairs and called gigabit over copper). Category 5 cable has four unshielded twisted pairs (UTPs) of copper wire and RJ-45 connectors, and is used for 10/100/1000 Base-T, ATM, and token ring networks. *Also called:* Cat 5 cable.

Category 5e cable *n.* Network cable that supports frequencies up to 100 MHz and transmission speeds up to 1000 Mbps (half-duplex mode) or 2000 Mbps (full-duplex mode). Category 5e cable has four unshielded twisted pairs (UTPs) of copper wire, RJ-45 connectors, and enhanced shielding to prevent signal degradation. Category 5e cable can be used for 10/100/1000 Base-T, ATM, and token ring networks. *Also called:* Cat 5e cable. *See also* duplex[2] (definition 1), half-duplex transmission.

catena *n.* A series of items in a chained list—that is, a list in which one item points to the next in sequence. *See also* linked list.

cathode *n.* **1.** The terminal or electrode that is negatively charged and from which electrons flow. **2.** The electron-emitting electrode in a vacuum tube. **3.** The negative terminal of a battery. *Compare* anode.

cathode-ray oscilloscope *n. See* oscilloscope.

cathode-ray tube *n. See* CRT.

CATV *n.* Acronym for community antenna television or cable television. A television broadcasting system that uses coaxial or fiber-optic cable to distribute a broadband signal containing many separate television program channels. CATV systems are also increasingly being used to carry digital data—for example, Internet connections—to and from subscribers.

CatXML *n.* Acronym for Catalogue XML. An open standard for using XML in catalogue information exchanges over the Internet. CatXML uses a flexible XML schema with multiple profiles that can be adapted to meet the needs of individual businesses. CatXML supports existing information structures and provides distributed query information grid models and dynamic output formats.

cavity virus *n.* A type of virus that overwrites and hides within a section of the file it has infected. A cavity virus overwrites only a part of the host file filled with a constant, allowing the file to continue to function.

CBEMA *n.* Acronym for Computer and Business Equipment Manufacturers Association. An organization of hardware vendors and manufacturers in the United States involved in standardizing information processing and related equipment.

CBL *n.* Acronym for computer-based learning. Applies to either computer-aided instruction (CAI), which focuses primarily on education, or computer-based training (CBT), which is application-specific or job-oriented teaching. *See also* CAI, CBT.

CBT *n.* Acronym for computer-based training. The use of computers and specially developed tutorial programs for teaching. CBT uses color, graphics, and other attention-getting aids to help maintain interest, and it has both simple and sophisticated applications. A software developer, for example, might include a series of CBT lessons with an application to give new users a hands-on feel for the program; a consultant might use a longer and more detailed CBT program as a tool in a management-training seminar.

cc *n.* Acronym for courtesy copy. A directive to an e-mail program to send a complete copy of a given piece of mail to another individual. The use of cc mail addressing, as opposed to directly addressing the mail to a person, generally implies that the recipient is not required to take any action; the message is for informational purposes only. In a cc directive, the fact that this recipient received the mail is printed in the mail header and is thus known to all other recipients. *Also called:* carbon copy. *See also* e-mail[1] (definition 1), header. *Compare* bcc.

CCC *n.* Acronym for Computer Controlled Character. CCC is generally used in role-playing computer games like MUD. It refers to a character that is not played by a

human player but is actually a computer-generated character built into the game itself. *See also* computer game, MUD, role-playing game.

CCD *n. See* charge-coupled device.

CCI *n. See* Common Client Interface.

CCITT *n.* Acronym for **C**omité **C**onsultatif **I**nternational **T**élégraphique et **T**éléphonique, now called the International Telecommunication Union-Telecommunication Standardization Sector (ITU-TSS, often abbreviated as ITU-T). CCITT was the organization that performed the standardization functions for the International Telecommunication Union (ITU). Following a reorganization of the ITU in 1992, CCITT ceased to exist as a separate body, although several standards are still known by the CCITT prefix. *See also* ITU.

CCITT Groups 1–4 *n.* A set of four standards recommended by the Comité Consultatif International Télégraphique et Téléphonique (International Telegraph and Telephone Consultative Committee) for the encoding and transmission of images over fax machines. Groups 1 and 2 relate to analog devices and are generally out of use. Groups 3 and 4, which deal with digital devices, are outlined below. Group 3 is a widespread standard that supports standard images of 203 horizontal dots per inch (dpi) by 98 vertical dpi and fine images of 203 horizontal dpi by 198 vertical dpi; supports two methods of data compression, one (based on the Huffman code) reducing an image to 10 to 20 percent of the original, the second (READ, for relative element address designate) compressing images to 6 to 12 percent of the original; and provides for password protection and for polling so that a receiving machine can request transmission as appropriate. Group 4, a newer standard, supports images of up to 400 dpi; supports data compression based on a beginning row of white pixels (dots), with each succeeding line encoded as a series of changes from the line before, compressing images to 3 to 10 percent of the original; does not include error-correction information in the transmission; and requires an Integrated Services Digital Network (ISDN) phone line rather than a dial-up line.

CCITT V series *n. See* V series.

CCITT X series *n. See* X series.

cc:Mail *n.* An e-mail program originally introduced by cc:mail, Inc., and currently produced by the Lotus Development Corporation. Lotus cc:Mail runs on multiple networking platforms and the Internet and is closely integrated with Lotus Notes collaborative software.

ccNUMA *n.* Acronym for **C**ache-**C**oherent **N**on-**U**niform **M**emory **A**ccess. A technology that enables many symmetric multiprocessing systems to be connected by high-speed/wide-bandwidth interconnect hardware so that they function as one machine. *See also* symmetric multiprocessing.

CCP *n.* Acronym for **C**ertificate in **C**omputer **P**rogramming. A senior-level programming credential awarded by the Institute for Certification of Computer Professionals to individuals who pass an extensive set of programming examinations.

cd *n.* Acronym for **c**hange **d**irectory. In MS-DOS, UNIX, and FTP client programs, the command that changes the current directory to the directory whose path follows *cd* in the command. *See also* directory, path (definition 5).

CD *n.* **1.** An individual compact disc, such as a CD-ROM. *See also* CD-ROM, compact disc (definition 2). **2.** Acronym for **C**arrier **D**etect, a signal sent from a modem to the attached computer to indicate that the modem is on line. *See also* DCD.

CD burner *n. See* CD recorder.

CD drive *n. See* CD-ROM drive.

CD-E *n.* Acronym for **c**ompact **d**isc-**e**rasable. A technological improvement in CDs (compact discs) whereby information can be repeatedly changed on the CD. Contemporary CDs are "write once, read many," in that the information originally written cannot be changed.

cdev *n.* Short for **c**ontrol panel **dev**ice. A Macintosh utility that allows basic system settings to be customized. In Macintosh computers running System 6, a cdev is a utility program placed in the system folder. Keyboard and mouse cdevs are preinstalled. Other cdevs are provided with software packages and utilities. In System 7, cdevs are called control panels. *See also* control panel, system folder. *Compare* INIT.

CDF *n. See* Channel Definition Format.

CDFS *n.* **1.** Acronym for **C**D-ROM **F**ile **S**ystem. A 32-bit protected-mode file system that controls access to the contents of CD-ROM drives in Windows 9x. *See also* protected mode. **2.** A designation used with UNIX computers to indicate that a file system resides on a read-only removable medium (that is a CD-ROM). This usually implies

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that the compact disc is compliant with the ISO 9660 standard. CDFS is also used as a part of commands that mount media (hard drives, tape drives, remote networked drives, and CD-ROMs) for use on a computer. *See also* CD-ROM, ISO 9660.

CD-I *n.* Acronym for compact disc-interactive. A hardware and software standard for a form of optical disc technology that can combine audio, video, and text on high-capacity compact discs. CD-I includes such features as image display and resolution, animation, special effects, and audio. The standard covers methods of encoding, compressing, decompressing, and displaying stored information. *See also* CD-ROM.

CDMA *n. See* Code Division Multiple Access.

CDN *n.* Acronym for content delivery network. A service that caches the pages of a Web site on geographically dispersed servers to enable faster delivery of Web pages. When a page is requested at a URL that is content delivery–enabled, the content delivery network routes the user's request to a cache server close to the user. *See also* content delivery.

CDP *n.* Acronym for Certificate in Data Processing. A certificate awarded by the Institute for Certification of Computer Professionals to individuals who pass a set of examinations on computers and related areas, including programming, software, and systems analysis.

CDPD *n. See* Cellular Digital Packet Data.

CD player *n.* Short for compact disc player. A device that reads the information stored on a CD. A CD player contains the optical equipment necessary for reading a disc's contents and the electronic circuitry for interpreting the data as it is read.

CD Plus *n.* A compact disc encoding format that allows mixing of audio recordings and computer data on the same CD, without the possibility of audio equipment becoming damaged by attempting to play the data sections.

CD-R *n.* Acronym for compact disc-recordable. A type of CD-ROM that can be written on a CD recorder and read on a CD-ROM drive. *See also* CD recorder, CD-ROM.

CD-R/E *adj.* Acronym for compact disc-recordable and erasable. Of or pertaining to hardware and software for interfacing computers with both CD-R (compact disc-recordable) and CD-E (compact disc-erasable) devices. *See also* CD-R.

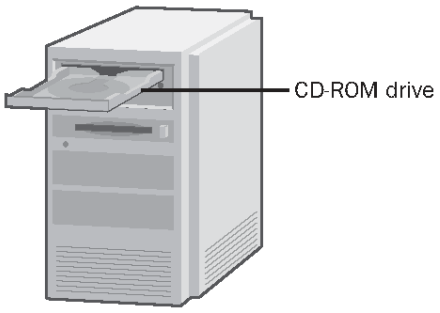
CD recorder *n.* A device used to write CD-ROMs. Because a disc can be written only once on these machines, they are used most commonly to create CD-ROMs for data archives or to produce CD-ROM masters that can be duplicated for mass distribution. *Also called:* CD-R machine, CD-ROM burner. *See also* CD-ROM.

CD-R machine *n. See* CD recorder.

CD-ROM *n.* **1.** Acronym for compact disc read-only memory. A form of storage characterized by high capacity (roughly 650 megabytes) and the use of laser optics rather than magnetic means for reading data. Although CD-ROM drives are strictly read-only, they are similar to CD-R drives (write once, read many), optical WORM devices, and optical read-write drives. *See also* CD-I, CD-R, WORM. **2.** An individual CD (compact disc) designed for use with a computer and capable of storing up to 650 megabytes of data. *See also* CD, disc.

CD-ROM burner *n. See* CD recorder.

CD-ROM drive *n.* An electromechanical device that reads data on CD-ROMs. Most CD-ROM drives have a SCSI interface, although some are connected to a PC via a controller for a disk drive. Data is read through a small laser that is focused on the surface of the CD-ROM through optical mirrors in the read/write head. A spindle and drive motor revolve the CD-ROM, so all data, which is stored in spirals from the center, can be read. CD-ROM drives vary in the access time to locate a track on the CD-ROM and the seek time to move the read/write head. See the illustration. *Also called:* CD drive. *See also* CD-ROM, compact disc.



CD-ROM drive.

CD-ROM Extended Architecture *n. See* CD-ROM/XA.

CD-ROM File System *n. See* CDFS (definition 1).

CD-ROM Jukebox *n.* A CD-ROM player that can contain up to 200 CD-ROMs and is connected to a CD-ROM drive in a personal computer or workstation. A user can request data from any of the CD-ROMs in the jukebox, and the device will locate and play the disk that contains the data. Although only one CD-ROM can be played at a time, if multiple CD-ROM jukeboxes are each connected to separate CD-ROM drives that are daisy-chained together to the computer, more than one CD-ROM can be used at a time. *See also* CD-ROM, CD-ROM drive, daisy chain.

CD-ROM/XA *n.* Short for **C**ompact **D**isc-**R**ead **O**nly **M**emory e**X**tended **A**rchitecture. An extended CD-ROM format developed by Philips, Sony, and Microsoft. CD-ROM/XA is consistent with the ISO 9660 (High Sierra) standard, with further specification of ADPCM (adaptive differential pulse code modulation) audio, images, and interleaved data. *See also* adaptive differential pulse code modulation, CD-ROM, High Sierra specification.

CD-RW *n.* Acronym for **c**ompact **d**isc-**r**e**w**ritable. The technology, equipment, software, and media used in the production of multiple-write CDs (compact discs).

CDS *n. See* Circuit Data Services.

CDV *n.* **1.** Acronym for **c**ompressed **d**igital **v**ideo. The compression of video images for high-speed transmission. **2.** Acronym for **c**ompact **d**isc **v**ideo. A 5-inch videodisc. *See also* videodisc.

CD Video *n. See* CDV (definition 2).

CeBIT *n.* One of the world's leading tradeshows for the information technology, telecommunications, and office automation industries. Held annually in Hannover, Germany, CeBIT attracts hundreds of thousands of visitors and exhibitors from more than 60 countries.

CEBus *n.* Short for **C**onsumer **E**lectronic **Bus**. CEBus is an open architecture set of specification documents that define protocols for how to make products communicate through power line wires, low voltage twisted pairs, coax, infrared, RF, and fiber optics. Anyone, anywhere can get a copy of the plans and develop products that work with the CEBus standard.

Celeron *n.* Intel's family of budget-priced microprocessors introduced in 1998. Celeron chips are based on the same P6 microarchitecture as the Pentium II processor. They include an integrated 128-KB L2 cache and support Intel's MMX technology. Celeron chips have speeds of up to 1.3 GHz in early 2002. *See also* Pentium.

cell *n.* **1.** The intersection of a row and a column in a spreadsheet. Each row and column in a spreadsheet is unique, so each cell can be uniquely identified—for example, cell B17, at the intersection of column B and row 17. Each cell is displayed as a rectangular space that can hold text, a value, or a formula. **2.** An addressable (named or numbered) storage unit for information. A binary cell, for example, is a storage unit that can hold 1 bit of information—that is, it can be either on or off. **3.** A fixed-length packet, the basic transmission unit on high-speed networks, such as ATM. *See also* ATM. **4.** Coverage area for wireless phones served by a single base station (cell tower), usually surrounded by six other cells. As a wireless phone moves across the boundary between cells, the conversation is handed from one cell to the next. Cells may be less than a half mile or more than 15 miles in radius, depending on the volume of wireless calls or the presence of large buildings or terrain that might interfere with signals.

cell animation or **cel animation** *n.* A process performed by software that emulates traditional cell animation, which uses transparent celluloid sheets ("cells" or "cels" for short) to overlay active elements in an animation frame onto a static background. Computer cell animation is quite efficient because images can be quickly reproduced and manipulated.

cell padding *n.* The space between the contents and the inside edges of a table cell.

cell reference *n.* The set of coordinates that a cell occupies on a worksheet. For example, the reference of the cell that appears at the intersection of column B and row 3 is B3.

cell relay *n.* A form of packet switching in which information is multiplexed onto a carrier and transferred in fixed-length packets (cells).

cellular automata *n.* **1.** In computer science, theoretical models of parallel computers. They enable the investigation of parallel computers without the need to actually build them. The cellular automaton is composed of a network of multiple cells, each representing a processor in the parallel computer. The cells must be identical, and they must have a finite amount of available memory. Each cell outputs a value calculated from the input values it

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

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

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

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

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

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

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

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

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

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

central office exchange service *n. See* Centrex.

central processing unit *n. See* CPU.

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

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

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

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

CERT *n.* Acronym for **C**omputer **E**mergency **R**esponse **T**eam. An organization that provides a round-the-clock

security consultation service for Internet users and provides advisories whenever new virus programs and other computer security threats are discovered.

certificate *n.* A certificate is sent when a message is digitally signed. The certificate proves the sender's identity and supplies the recipient with a public key with which to decrypt the sender's encrypted messages. *Also called:* digital certificate.

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

Certificate In Computer Programming *n. See* CCP.

Certificate In Data Processing *n. See* CDP.

certificate revocation list *n.* A document maintained and published by a certification authority that lists certificates that have been revoked. *Acronym:* CRL. *See also* certificate, certification authority.

certificate trust list *n.* A signed list of root certification authority certificates that an administrator considers reputable for designated purposes, such as client authentication or secure e-mail. *Acronym:* CTL. *See also* certificate, certificate authority, root certificate.

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

certification authority *n.* An organization that assigns encryption keys. *See also* certificate authority.

CFML *n.* Acronym for Cold Fusion Markup Language. A programming environment and proprietary, tag-based markup language for server-side processing.

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

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

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

CGI program *n. See* CGI script.

CGI script *n.* Short for Common Gateway Interface **script**. An external application that is executed by an HTTP server machine in response to a request by a client, such as a Web browser. Generally, the CGI script is invoked when the user clicks on some element in a Web page, such as a link or an image. Communication between the CGI script and the server is carried out via the CGI specification. CGI scripts can be written in many programming languages, including C, C++, and Visual Basic. However, the most commonly used language for CGI scripts is Perl because it is a small but robust language and it is common on UNIX, which is the platform on which the majority of Web sites run. CGI scripts don't necessarily need to be scripts; they can also be batch programs or compiled programs. CGI scripts are used to provide interactivity on a

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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.

channel op *n.* Short for **channel op**erator. A user on an IRC channel who has the privilege of expelling undesirable participants. *See also* IRC.

channel operator *n. See* channel op.

Channel Service Unit *n. See* DDS.

CHAP *n. See* Challenge Handshake Authentication Protocol.

character *n.* A letter, number, punctuation mark, or other symbol or control code that is represented to a computer by one unit—1 byte—of information. A character is not necessarily visible, either on the screen or on paper; a space, for example, is as much a character as is the letter *a* or any of the digits 0 through 9. Because computers must manage not only so-called printable characters but also the look (formatting) and transfer of electronically stored information, a character can additionally indicate a carriage return or a paragraph mark in a word-processed document. It can be a signal to sound a beep, begin a new page, or mark the end of a file. *See also* ASCII, control character, EBCDIC.

character cell *n.* A rectangular block of pixels that represents the space in which a given character is drawn on the screen. Computer displays use different numbers of pixels as character cells. Character cells are not always the same size for a given font, however; for proportionally spaced fonts, such as those commonly displayed on the Apple Macintosh, the height within a given font remains the same, but the width varies with each character.

character code *n.* A specific code that represents a particular character in a set, such as the ASCII character set. The character code for a given key depends on whether another key, such as Shift, is pressed at the same time. For example, pressing the A key alone normally generates the character code for a lowercase *a*. Pressing Shift plus the A key normally generates the character code for an uppercase *A*. *Compare* key code.

character definition table *n.* A table of patterns that a computer can hold in memory and use as a reference for determining the arrangement of dots used to create and display bitmapped characters on the screen. *See also* bitmapped font.

character density *n.* In printing or screen display, a measure of the number of characters per unit of area or of linear distance. *See also* pitch (definition 1).

character device *n.* **1.** A computer device, such as a keyboard or printer, that receives or transmits information as a stream of characters, one character at a time. The characters can be transferred either bit by bit (serial transmission) or byte by byte (parallel transmission) but are not moved from place to place in blocks (groups of bytes). *Compare* block device. **2.** In reference to video displays, a device that handles text but not graphics. *See also* text mode.

character entity *n.* In HTML and SGML, the notation for a special character. A character entity begins with an & (ampersand), followed by either a string of letters or of numbers, and ends with a semicolon. The special characters represented by character entities include acute and grave accents, the tilde, and Greek letters, among others. *Also called:* named entity.

character generator *n.* A program or a hardware device that translates a given character code, such as an ASCII code, into a matching pixel pattern for display on the screen. Such devices are typically limited in the number and range of styles of fonts they support, as compared to machines that support bitmapped characters. *Compare* bitmapped font.

character image *n.* A set of bits arranged in the shape of a character. Each character image exists within a rectangular grid, or *character rectangle*, that defines its height and width. *See also* bitmapped font.

characteristic *n.* In mathematics, the exponent of a floating-point number (the portion following the *E* that indicates the position of the decimal point) or the integer portion of a logarithm. *See also* floating-point notation, logarithm.

character map *n.* In text-based computer graphics, a block of memory addresses that correspond to character spaces on a display screen. The memory allocated to each character space is used to hold the description of the character to be displayed in that space. *See also* alphageometric.

character mode *n. See* text mode.

character-oriented protocol *n. See* byte-oriented protocol.

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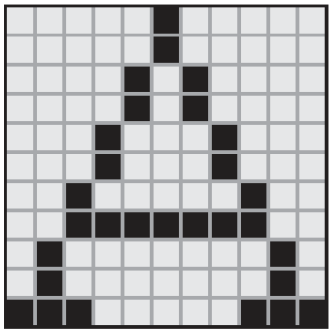
character printer *n.* **1.** A printer that operates by printing one character at a time, such as a standard dot-matrix printer or a daisy-wheel printer. *Compare* line printer, page printer. **2.** A printer that cannot print graphics, such as a daisy-wheel printer or even a dot-matrix or laser printer that lacks a graphics mode. Such a printer simply receives character codes from the controlling system and prints the appropriate characters. *Compare* graphics printer.

character recognition *n.* The process of applying pattern-matching methods to character shapes that have been read into a computer to determine which alphanumeric characters or punctuation marks the shapes represent. Because different typefaces and text treatments, such as bold and italic, can make big differences in the way characters are shaped, character recognition can be prone to error. Some systems work only with known typefaces and sizes, with no text treatments. These systems achieve very high accuracy levels, but they can work only with text specifically printed for them. Other systems use extremely sophisticated pattern-matching techniques to learn new typefaces and sizes, achieving fairly good accuracy. *See also* magnetic-ink character recognition, optical character recognition, pattern recognition (definition 1).

character rectangle *n.* The space taken up by the graphical representation (bit map) of a character. See the illustration. *See also* bit map.



Character rectangle.

character set *n.* A grouping of alphabetic, numeric, and other characters that have some relationship in common. For example, the standard ASCII character set includes letters, numbers, symbols, and control codes that make up the ASCII coding scheme.

characters per inch *n.* A measurement for the number of characters of a particular size and font that can fit into a line one inch long. This number is affected by two attributes of the type: its point size and the width of the letters in the particular font being measured. In monospace fonts, characters have a constant width; in proportional fonts, characters have varying widths. Thus, measurements of the number of characters per inch must be averaged. *Acronym:* cpi. *See also* monospace font, pitch (definition 1), proportional font.

characters per second *n.* **1.** A measure of the speed of a nonlaser printer, such as a dot-matrix or an ink-jet printer. **2.** A measure of the rate at which a device, such as a disk drive, can transfer data. In serial communications, the speed of a modem in bits per second can generally be divided by 10 for a rough determination of the number of characters per second transmitted. *Acronym:* CPS.

character string *n.* A set of characters treated as a unit and interpreted by a computer as text rather than numbers. A character string can contain any sequence of elements from a given character set, such as letters, numbers, control characters, and extended ASCII characters. *Also called:* string. *See also* ASCII, control character, extended ASCII.

character style *n.* Any attribute, such as boldface, italic, underline, or small caps, applied to a character. Depending on the operating system or program considered, the range of character styles of text might or might not include the font, which refers to the design of a group of characters in a given size. *See also* font family.

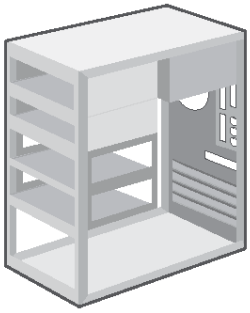
character user interface *n.* A user interface that displays only text characters. *Acronym:* CUI. *See also* user interface. *Compare* graphical user interface.

charge *n.* A property of subatomic particles, which can have either a negative charge or a positive charge. In electronics, a charge consists of either an excess of electrons (a negative charge) or a deficiency of electrons (a positive charge). The unit of charge is the *coulomb*, which corresponds to 6.26×10^{18} electrons.

charge-coupled device *n.* A device in which individual semiconductor components are connected so that the electrical charge at the output of one device provides the input to the next. The light-detecting component of digital cameras and many video cameras is a charge-coupled device. *Acronym:* CCD.

chart *n.* A graphic or diagram that displays data or the relationships between sets of data in pictorial rather than numeric form.

chassis *n.* A metal frame on which electronic components, such as printed circuit boards, fans, and power supplies, are mounted. See the illustration.



Chassis.

chat[1] *n.* **1.** Real-time conversation via computer. When a participant types a line of text and then presses the Enter key, that participant's words appear on the screens of the other participants, who can then respond in kind. Most online services support chat; on the Internet, IRC is the usual system. *See also* IRC. **2.** An Internet utility program that supports chat. IRC has largely superseded it.

chat[2] *vb.* To carry on a real-time conversation with other users by computer. *See also* IRC.

chat room *n.* The informal term for a data communication channel that links computers and permits users to "converse" by sending text messages to one another in real time. Similar to the channels provided by IRC (Internet Relay Chat), chat rooms are available through online services and some electronic bulletin board systems (BBSs). Chat rooms are often devoted to a particular subject or are conducted on a certain schedule. *See also* BBS, chat, IRC, room.

Cheapernet *n. See* 10Base2.

cheat code *n.* In computer games, a secret keyboard sequence or code that gives a player an advantage in the game. For example, cheat codes often confer more ammunition, lives, or the ability to fly or walk through obstacles. *See also* adventure games, computer games.

check bit *n.* One of a set of bits that are added to a data message at its origin and scrutinized by the receiving process to determine whether an error has occurred during transmission. The simplest example is a parity bit. *See also* data integrity, parity bit.

check box *n.* An interactive control often found in graphical user interfaces. Check boxes are used to enable or disable one or more features or options from a set. When an option is selected, an x or a check mark appears in the box. *See also* control (definition 2). *Compare* radio button.

check digit *n.* A digit added to an account number or other identifying key value and then recomputed when the number is used. This process determines whether an error occurred when the number was entered. *See also* checksum.

checkpoint *n.* **1.** A processing juncture at which the normal operation of a program or system is momentarily suspended in order to determine its environmental status. **2.** A file containing information that describes the state of the system (the environment) at a particular time.

checksum *n.* A calculated value that is used to test data for the presence of errors that can occur when data is transmitted or when it is written to disk. The checksum is calculated for a given chunk of data by sequentially combining all the bytes of data with a series of arithmetic or logical operations. After the data is transmitted or stored, a new checksum is calculated in the same way using the (possibly faulty) transmitted or stored data. If the two checksums do not match, an error has occurred and the data should be transmitted or stored again. Checksums cannot detect all errors, and they cannot be used to correct erroneous data. *See also* error-correction coding.

Cheese worm *n.* An Internet worm that patches security holes created by the Lion worm. The Cheese worm searches out and infects Linux-based systems that were previously compromised by the Lion worm, repairing vulnerabilities and closing a back door left by the earlier infection. It then uses the healed computer to scan for other vulnerable computers connected to the Internet and sends itself to them.

Chernobyl packet *n.* A form of network attack in which a data packet sent by a hacker activates every available option for the protocol in use on the receiving system. The Chernobyl packet will cause a packet storm that will eventually overload and crash the network. *Also called:* kamikaze packet.

Chernobyl virus *n. See* CIH virus.

chiclet keyboard *n.* A microcomputer keyboard used on the first version of the IBM PCjr home computer. Chiclet keys are small and square, resembling the chewing gum

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pieces, and they act like pushbuttons, without the resistance and clear feedback of traditional keys. They are also much smaller and typically are spread out, so touch typing is more difficult than on a conventional keyboard.

child *n.* **1.** A process initiated by another process (the parent). This initiating action is frequently called a *fork*. The parent process often sleeps (is suspended) until the child process stops executing. **2.** In a tree structure, the relationship of a node to its immediate predecessor. *See also* generation (definition 2), tree structure.

child directory *n. See* subdirectory.

child menu *n. See* submenu.

child process *n. See* child (definition 1).

Children's Online Privacy Protection Act *n. See* COPPA.

chimes of doom *n.* In Macintosh computers, a series of chimes that sound as a result of serious system failure.

chip *n. See* integrated circuit.

chip card *n. See* smart card.

chip set or **chipset** *n.* A collection of chips designed to function as a unit in the performance of some common task. The term is most commonly used to refer to the set of integrated circuits, such as the programmable interrupt controller, that support a CPU together with the CPU itself. Often a chip set will fit on one chip. *See also* CPU, integrated circuit, programmable interrupt controller.

choke *n. See* inductor.

choose *vb.* To pick a command or an option from within a graphical user interface, as by clicking a button in a dialog box or pulling down a menu and then releasing the mouse button on one of its options. Although *select* is often used instead of *choose* to describe the same action, *choose* is the preferred term because *select* has specific connotations within computing. *See also* select.

Chooser *n.* On the Apple Macintosh, a desk accessory that allows the user to select a printer or a device on a network, such as a file server or a printer.

Chooser extension *n.* A program that adds items to the Macintosh Chooser desk accessory. At system startup, Chooser adds to its menu of options from the extensions available in the system extensions folder. For example, if you want to use a particular printer with your Mac OS, you must have the right Chooser extension for that printer in the extensions folder when the computer is turned on. *See also* Chooser, extension (definition 4).

chroma *n.* The quality of a color that combines hue and saturation. *See also* hue, saturation.

CHRP *n. See* Common Hardware Reference Platform.

churn rate *n.* The rate of customer subscription turnover. In beeper, cell phone, and online businesses, it is common for customers to drop their monthly subscriptions, creating a churn rate as high as 2 or 3 percent per month. High churn rates are costly to companies because attracting new subscribers through advertising and promotion is expensive.

CIDR *n. See* classless interdomain routing.

CIFS *n. See* Common Internet File System.

CIH virus *n.* A highly destructive virus that first appeared in early 1998. When activated, the CIH virus code will attempt to overwrite the flash BIOS of infected machines, rendering the computer unbootable. The CIH virus is also known as the Chernobyl virus because in its original form it was set to activate on the anniversary of the Chernobyl nuclear accident. Although the CIH virus lacks stealth or sophisticated replication capabilities and is easily detected by current virus security programs, it continues to appear regularly. *Also called:* Chernobyl virus. *See also* virus.

CIM *n.* **1.** Acronym for **C**ommon **I**nformation **M**odel. A conceptual specification supported by the Desktop Management Task Force (DMTF) for applying an object-oriented, Web-based model to describing management data in an enterprise network. Part of the DMTF's Web-Based Enterprise Management initiative, CIM is a system-independent and application-independent common framework for describing and sharing management information. It is based on a three-tiered model based on schemas—sets of classes: the Core Schema covers all areas of management; Common Schemas cover specific management areas, such as networks, applications, and devices; and Extension Schemas cover specific technologies, such as operating systems and applications. CIM is supported by a number of industry vendors, including Sun, IBM, Microsoft, and Cisco. *See also* DMTF, WBEM. **2.** Acronym for **c**omputer-**i**ntegrated **m**anufacturing. The use of computers, communication lines, and specialized software to automate both the managerial functions and the operational activities involved in the manufacturing process. A common database is used in all aspects of the process, from design through assembly, accounting, and resource management. Advanced CIM

systems integrate computer-aided design and engineering (CAD/CAE), material requirements planning (MRP), and robotic assembly control to provide "paperless" management of the entire manufacturing process. **3.** Acronym for computer-input microfilm. A process in which information stored on microfilm is scanned and the data (both text and graphics) converted into codes that can be used and manipulated by a computer. Computer-input microfilm is similar to processes such as optical character recognition, in which images on paper are scanned and converted to text or graphics. *Compare* COM (definition 4).

CIP *n.* **1.** Short for Commerce Interchange Pipeline. A Microsoft technology that provides for secure routing of business data between applications over a public network such as the Internet. CIP is independent of data format and supports encryption and digital signatures, as well as various transport protocols including SMTP, HTTP, DCOM, and EDI value-added networks. Typically, data such as invoices and purchase orders travel over a network through a transmit pipeline and are read from the network by a receive pipeline that decodes and prepares the data for the receiving application. **2.** Short for Common Indexing Protocol. A protocol defined by the Internet Engineering Task Force (IETF) for enabling servers to share indexing information. CIP was developed to provide servers with a standard means of sharing information about the contents of their databases. With such sharing, a server unable to resolve a particular query would be able to route the query to other servers that might contain the desired information—for example, to find the e-mail address of a particular user on the Web.

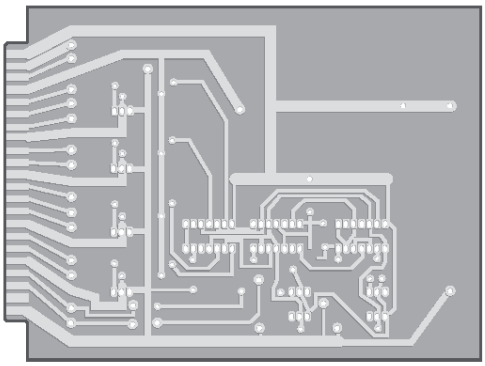
cipher *n.* **1.** A code. **2.** An encoded character. **3.** A zero.

ciphertext *n.* The scrambled or otherwise encoded text of an encrypted message. *See also* encryption.

circuit *n.* **1.** Any path that can carry electrical current. **2.** A combination of electrical components interconnected to perform a particular task. At one level, a computer consists of a single circuit; at another, it consists of hundreds of interconnected circuits.

circuit analyzer *n.* Any device for measuring one or more characteristics of an electrical circuit. Voltage, current, and resistance are the characteristics most commonly measured. Oscilloscopes are circuit analyzers.

circuit board *n.* A flat piece of insulating material, such as epoxy or phenolic resin, on which electrical components are mounted and interconnected to form a circuit. Most modern circuit boards use patterns of copper foil to interconnect the components. The foil layers may be on one or both sides of the board and, in more advanced designs, in several layers within the board. A printed circuit board is one in which the pattern of copper foil is laid down by a printing process such as photolithography. See the illustration. *See also* board, printed circuit board.



Circuit board.

circuit breaker *n.* A switch that opens and cuts off the flow of current when the current exceeds a certain level. Circuit breakers are placed at critical points in circuits to protect against damage that could result from excessive current flow, which is typically caused by component failure. Circuit breakers are often used in place of fuses because they need only to be reset rather than replaced. *Compare* surge protector.

circuit card *n. See* circuit board.

Circuit Data Services *n.* A GTE service that uses circuit switching technology to provide fast data transfer using a laptop computer and cellular telephone. *Acronym:* CDS. *See also* circuit switching.

circuit-switched data *n.* An ISDN option that can be specified for B (bearer) channels that enables an ISDN user to transmit digital data over the channel at 64 Kbps along a point-to-point, dedicated connection for the duration of a call. *Acronym:* CSD. *See also* alternate circuit-switched voice/circuit-switched data, B channel, ISDN. *Compare* circuit-switched voice.

circuit-switched voice *n.* An ISDN option that can be specified for B (bearer) channels that uses the channel to set up a point-to-point, dedicated connection for the digital transmission of voice communications for the duration of a call. *Acronym:* CSV. *See also* alternate circuit-switched

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voice/circuit-switched data, B channel, ISDN. *Compare* circuit-switched data.

circuit switching *n.* A method of opening communications lines, as through the telephone system, by creating a physical link between the initiating and receiving parties. In circuit switching, the connection is made at a switching center, which physically connects the two parties and maintains an open line between them for as long as needed. Circuit switching is typically used on the dial-up telephone network, and it is also used on a smaller scale in privately maintained communications networks. Unlike other methods of transmission, such as packet switching, it requires the link to be established before any communication can take place. *Compare* message switching, packet switching.

circular list *n.* A linked or chained list in which processing continues through all items, as in a ring, and returns to the starting point, no matter where that point is located in the list. *See also* linked list.

CIS *n.* **1.** Acronym for CompuServe Information Service *See* CompuServe. **2.** Short for contact image sensor. A light-sensitive mechanism used in scanners and fax machines. A CIS scanner reflects light from a row of light-emitting diodes (LEDs) onto a document or other object and converts the reflected light to digital images. CIS sensors are smaller and lighter than the charge-coupled devices (CCDs) traditionally used in scanners, but the image quality they produce is not as good as the image quality produced by CCDs. *See also* light-emitting diode, scanner. *Compare* charge-coupled device.

CISC *n.* Acronym for complex instruction set computing. The implementation of complex instructions in a microprocessor design so that they can be invoked at the assembly language level. The instructions can be very powerful, allowing for complicated and flexible ways of calculating such elements as memory addresses. All this complexity, however, usually requires many clock cycles to execute each instruction. *Compare* RISC.

CIX *n. See* Commercial Internet Exchange.

CKO *n.* Acronym for Chief Knowledge Officer. A corporate executive in charge of management and distribution of all the business and technical knowledge of a company. The CKO maximizes the value of stored knowledge by ensuring that employees have access, and by avoiding knowledge loss caused by technology-based changes and upgrades in databases and other storage.

ClariNet *n.* A commercial service that distributes news articles from United Press International (UPI) and other news agencies in newsgroups that are part of the clari. hierarchy. Unlike most other newsgroups, access to the clari. newsgroups is restricted to Internet service providers who pay a subscription fee to ClariNet.

clari. newsgroups *n.* Internet newsgroups maintained by ClariNet Communications, Inc. ClariNet newsgroups contain news articles obtained from the Reuters and United Press International wire services, SportsTicker, Commerce Business Daily, and other sources. Unlike most other newsgroups, ClariNet groups are only accessible through Internet service providers who purchase the service. *See also* ClariNet, ISP, newsgroup.

ClarisWorks *n. See* AppleWorks.

class *n.* **1.** In object-oriented programming, a generalized category that describes a group of more specific items, called *objects*, that can exist within it. A class is a descriptive tool used in a program to define a set of attributes or a set of services (actions available to other parts of the program) that characterize any member (object) of the class. Program classes are comparable in concept to the categories that people use to organize information about their world, such as *animal*, *vegetable*, and *mineral*, that define the types of entities they include and the ways those entities behave. The definition of classes in object-oriented programming is comparable to the definition of types in languages such as C and Pascal. *See also* object-oriented programming. **2.** For hardware, the method for grouping particular types of devices and buses according to the basic ways that they can be installed and managed by the operating system. The hardware tree is organized by device class, and Windows uses class installers to install drivers for all hardware classes.

Class A IP address *n.* A unicast IP address that ranges from 1.0.0.1 through 126.255.255.254. The first octet indicates the network, and the last three octets indicate the host on the network. *See also* Class B IP address, Class C IP address, IP address classes.

Class A network *n.* An Internet network that can define a maximum of 16,777,215 hosts. Class A networks use the first byte of an IP address to designate the network, with the first (high-order) bit set to 0. The host is designated by the last 3 bytes. Class A addressing currently allows for a maximum of 128 networks. Class A networks are best suited for sites with few networks but numerous hosts and

are usually designated for use by large government or educational institutions. *See also* host, IP address.

Class B IP address *n.* A unicast IP address that ranges from 128.0.0.1 through 191.255.255.254. The first two octets indicate the network, and the last two octets indicate the host on the network. *See also* Class A IP address, Class C IP address, IP address classes.

Class C IP address *n.* A unicast IP address that ranges from 192.0.0.1 to 223.255.255.254. The first three octets indicate the network, and the last octet indicates the host on the network. *See also* Class A IP address, Class B IP address, IP address classes.

classful IP addressing *n.* An IP addressing scheme where IP addresses are organized into classes: Class A, Class B, and Class C. *See also* IP address classes.

Classic *n.* An environment within Mac OS X that allows a user to run legacy software. Classic emulates the earlier Macintosh operating system chosen by the user and provides support for programs that aren't compatible with Mac OS X architecture. *See also* Carbon, Cocoa, Mac OS X.

classless interdomain routing *n.* An address scheme that uses aggregation strategies to minimize the size of top-level Internet routing tables. Routes are grouped with the objective of minimizing the quantity of information carried by core routers. The main requirement for this scheme is the use of routing protocols that support it, such as Border Gateway Protocol (BGP) version 4 and RIP version 2. *Acronym:* CIDR. *See also* Border Gateway Protocol, communications protocol, RIP, router, supernetting.

class library *n.* A collection of standard routines and sub-programs that a programmer can use in object-oriented programs. A typical class library for a graphical user interface might include routines for buttons and scroll bars; or a class library for a communications program might include a routine for dialing a telephone line through a modem. *See also* class, object-oriented programming.

classpath *n.* In Java programming, a classpath is an environmental variable that tells the Java Virtual Machine (JVM) and Java programs where to find class libraries, including user-defined class libraries. *See also* class, class library, Java Virtual Machine.

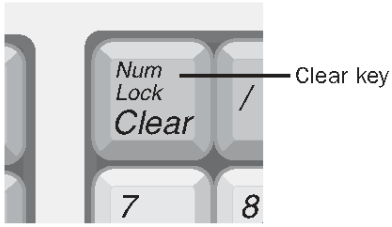
clean boot *n.* Booting or starting a computer using the minimum system files in the operating system. The clean boot is used as a troubleshooting method for isolating problems associated with software that may be calling on the same system resources at the same time, causing conflicts that lower the performance of the system, make some programs inoperable, or crash the computer. *See also* boot[1], crash[1] (definition 1), operating system.

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

clean interface *n.* A user interface with simple features and intuitive commands. *See also* user interface.

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

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



Clear key.

clear memory *vb.* A process that erases all data stored in RAM.

Clear To Send *n. See* CTS.

ClearType *n.* A Microsoft font technology that improves the resolution of text on LCD displays, such as those used on laptop computers. ClearType technology uses proprietary signal processing and the properties of LCD displays to produce clearer, more detailed characters and spacing, and thus significantly increase readability.

CLEC *n.* Acronym for Competitive Local Exchange Carrier. A company that sells access to the public switched telephone network, or other last mile network connections, in competition with a traditional telephone company. *See also* ILEC, last mile.

C

click *vb.* To press and release a mouse button once without moving the mouse. Clicking is usually performed to select or deselect an item or to activate a program or program feature. *See also* right click. *Compare* double-click, drag.

clickable maps *n. See* image map.

click rate *n. See* clickthrough rate.

clicks and mortar *n.* A business that combines an online presence with traditional "bricks and mortar" outlets.

click speed *n.* The maximum interval between the first and second time a user presses a button on a mouse or other pointing device that will still identify these actions as a double-click to the computer as opposed to two single-clicks. *See also* double-click, mouse, pointing device.

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

clickthrough *n.* The number of times that visitors to a Web site click on an advertising banner within a specified period of time. Clickthrough is one of the elements that Web site producers use to decide how much to charge advertisers. *See also* clickthrough rate.

clickthrough rate *n.* The proportion of visitors to a Web site who click on a banner advertisement there, expressed as a percentage of total visitors to the Web site. *Also called:* click rate. *See also* clickthrough.

clickwrap agreement *n.* A contract or license in software or on a Web site that sets forth conditions for use of the software or for goods and services distributed through the Web site. Users must agree to the terms in a clickwrap agreement—typically by clicking on a button that states "I Agree" or "Agree"—before they can install the software or utilize goods or services. A clickwrap agreement is an electronic version of an End-User License Agreement. *Also called:* clickwrap license. *See also* End-User License Agreement. *Compare* shrinkwrap agreement.

clickwrap license *n. See* clickwrap agreement.

client *n.* **1.** In object-oriented programming, a member of a class (group) that uses the services of another class to which it is not related. *See also* inheritance (definition 1). **2.** A process, such as a program or task, that requests a service provided by another program—for example, a word processor that calls on a sort routine built into another program. The client process uses the requested service without having to "know" any working details about the other program or the service itself. *Compare* child (definition 1), descendant (definition 2). **3.** On a local area network or the Internet, a computer that accesses shared network resources provided by another computer (called a *server*). *See also* client/server architecture, server.

client error *n.* A problem reported by the Hypertext Transfer Protocol (HTTP) client module as the result of difficulty in interpreting a command or the inability to connect properly to a remote host.

client/server architecture *n.* An arrangement used on LANs (local area networks) that makes use of distributed intelligence to treat both the server and the individual workstations as intelligent, programmable devices, thus exploiting the full computing power of each. This is done by splitting the processing of an application between two distinct components: a "front-end" client and a "back-end" server. The client component is a complete, stand-alone personal computer (not a "dumb" terminal), and it offers the user its full range of power and features for running applications. The server component can be a personal computer, a minicomputer, or a mainframe that provides the traditional strengths offered by minicomputers and mainframes in a time-sharing environment: data management, information sharing between clients, and sophisticated network administration and security features. The client and server machines work together to accomplish the processing of the application being used. Not only does this increase the processing power available over older architectures but it also uses that power more efficiently. The client portion of the application is typically optimized for user interaction, whereas the server portion provides the centralized, multiuser functionality. *See also* distributed intelligence. *Compare* peer-to-peer network.

client/server network *n. See* client/server architecture.

client-side image maps *n.* An image map that performs the processing completely within the client program (i.e., Web browser) itself. Early Web implementations of image maps (circa 1993) transmitted user mouse click coordinates to the Web server for processing. Generally client-side image maps improve the speed of response to the user. *See also* image map.

client-side program *n.* On the Internet, a program that is run on a client computer rather than on a server computer.

clip *vb.* **1.** To cut off the portion of a displayed image that lies beyond a certain boundary, such as the edge of a window. Certain graphics programs also support clipping as a means of masking everything but a certain object so that painting tools, for example, can be applied to the object alone. **2.** To cut a photograph, drawing, or other illustration from a clip art collection—either in a book or on a disk. *See also* clip art. **3.** To cut off the peaks of a signal in an electronic circuit.

clip art *n.* A collection—either in a book or on a disk—of proprietary or public-domain photographs, diagrams, maps, drawings, and other such graphics that can be "clipped" from the collection and incorporated into other documents.

clipboard *n.* **1.** A special memory resource maintained by windowing operating systems. The clipboard stores a copy of the last information that was copied or cut. A paste operation passes data from the clipboard to the current program. A clipboard allows information to be transferred from one program to another, provided the second program can read data generated by the first. Data copied using the clipboard is static and will not reflect later changes. *See also* cut and paste, DDE. *Compare* scrap. **2.** A computer that uses a pen as the primary input device. *See also* clipboard computer, pen computer.

clipboard computer *n.* A portable computer whose overall appearance and operation resembles that of a traditional clipboard. A clipboard computer has an LCD or similar flat display and has a pen for user input instead of a keyboard, mouse, or other input device; the user operates the computer by touching the pen to the display. Data entered in a clipboard computer is generally transferred to another computer via a cable or a modem. A clipboard computer is used as a traditional clipboard is used, as in field work, data collection, or meetings. *See also* pen computer, portable computer.

Clipper Chip *n.* An integrated circuit that implements the SkipJack algorithm, an encryption algorithm created by the National Security Agency that encrypts 64-bit blocks of data with an 80-bit key. The Clipper Chip is manufactured by the U.S. government to encrypt telephone data. It has the added feature that it can be decrypted by the U.S. government, which has tried unsuccessfully to make the chip compulsory in the United States. *See also* encryption.

clipping path *n.* A polygon or curve that is used to mask an area in a document. Only what is inside the clipping path appears when the document is printed. *See also* PostScript.

clip source tag *n.* Computer coding tag that locates a streaming digital media image for use on a Web page. The clip source tag includes the pathway to the image, which may be stored on a Web server, a Web site, or on the computer where the Web page is displayed.

clobber *vb.* To destroy data, generally by inadvertently writing other data over it.

clock *n.* **1.** The electronic circuit in a computer that generates a steady stream of timing pulses—the digital signals that synchronize every operation. The system clock signal is precisely set by a quartz crystal, typically at a specific frequency between 1 and 50 megahertz. The clock rate of a computer is one of the prime determinants of its overall processing speed, and it can go as high as the other components of the computer allow. *Also called:* system clock. **2.** The battery-backed circuit that keeps track of the time and date in a computer—not the same as the system clock. *Also called:* clock/calendar.

clock/calendar *n.* An independent timekeeping circuit used within a microcomputer to maintain the correct time and calendar date. A clock/calendar circuit is battery powered, so it continues running even when the computer is turned off. The time and date kept by the clock/calendar can be used by the operating system (for example, to "stamp" files with the date and time of creation or revision) and by application programs (for example, to insert the date or time in a document). *Also called:* clock, internal clock.

clock doubling *n.* A technology employed by some Intel microprocessors that enables the chip to process data and instructions at twice the speed of the rest of the system. *See also* i486DX2.

clocking *n. See* synchronization (definition 3).

clockless chip *n. See* asynchronous chip.

clock pulse *n.* An electronic pulse generated periodically by a crystal oscillator to synchronize the actions of a digital device.

clock rate *n.* The speed at which the internal clock in an electronic device oscillates. In computers, each tick (oscillation) of the clock is called a cycle, and the clock rate is measured in megahertz, or millions of cycles per second. Also called clock speed, the clock rate determines how

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quickly the CPU can execute basic instructions, such as adding two numbers, and it is used to synchronize the activities of various components in the system. Between 1981, when the IBM PC was released, and early 2002, typical clock rates for personal computers increased about 1000-fold, from 4.77 MHz to 2 GHz and faster. *Also called:* clock speed, hertz time. *See also* clock (definition 1).

clock speed *n. See* clock rate.

clock tick *n. See* CPU cycle (definition 2).

clone[1] *n.* A copy; in microcomputer terminology, a look-alike, act-alike computer that contains the same microprocessor and runs the same programs as a better-known, more prestigious, and often more expensive machine.

clone[2] *vb.* To copy or replicate the entire contents of a hard disk drive, including the operating system, configuration settings, and programs, by creating an image of the hard disk drive. Hard disk drives are often cloned for batch installation on other computers, particularly those on a network, or for use as backups.

close[1] *n.* An FTP command that instructs the client to close the current connection with a server. *See also* FTP[1] (definition 1), Web site.

close[2] *vb.* **1.** To end an application's relationship with an open file so that the application will no longer be able to access the file without opening it again. **2.** To end a computer's connection with another computer on a network.

close box *n.* In the Macintosh graphical user interface, a small box in the left corner of a window's title bar. Clicking on the box closes the window. *Compare* close button.

close button *n.* In the graphical user interface for Windows 9x, Windows NT, and the X Window System, a square button in the right corner (left corner in X Windows) of a window's title bar with an x mark on it. Clicking on the button closes the window. *Also called:* X button. *Compare* close box.

closed architecture *n.* **1.** Any computer design whose specifications are not freely available. Such proprietary specifications make it difficult or impossible for third-party vendors to create ancillary devices that work correctly with a closed-architecture machine; usually only its original maker can build peripherals and add-ons for such a machine. *Compare* open architecture (definition 1). **2.** A computer system that provides no expansion slots for adding new types of circuit boards within the system unit. The original Apple Macintosh was an example of a closed architecture. *Compare* open architecture (definition 2).

closed file *n.* A file not being used by an application. An application must open such a file before reading or writing to it and must close it afterward. *Compare* open file.

closed shop *n.* A computer environment in which access to the computer is restricted to programmers and other specialists. *Compare* open shop.

closed system *n. See* closed architecture (definition 2).

cloth ribbon *n.* An inked ribbon generally used with impact printers and typewriters. The print element strikes the ribbon and drives it against the paper so as to transfer ink; then the ribbon advances slightly to make fresh ink available. A cloth ribbon is wrapped onto a spool or loaded into a cartridge that is made to fit the printer used. Cloth ribbon, although adequate for most tasks, is sometimes replaced by film ribbon when the crispest possible output is called for. However, a cloth ribbon, which re-inks itself by capillary action, is usable for multiple impressions, unlike a film ribbon. *Compare* carbon ribbon.

CLS *n.* Acronym for **C**ommon **L**anguage **S**pecification. A subset of language features supported by the .NET common language runtime, comprised of features common to several object-oriented programming languages. CLS-compliant components and tools are guaranteed to interoperate with other CLS-compliant components and tools.

cluster *n.* **1.** An aggregation, such as a group of data points on a graph. **2.** A communications computer and its associated terminals. **3.** In data storage, a disk-storage unit consisting of a fixed number of sectors (storage segments on the disk) that the operating system uses to read or write information; typically, a cluster consists of two to eight sectors, each of which holds a certain number of bytes (characters). **4.** A group of independent network servers that operate—and appear to clients—as if they were a single unit. A cluster network is designed to improve network capacity by, among other things, enabling the servers within a cluster to shift work in order to balance the load. By enabling one server to take over for another, a cluster network also enhances stability and minimizes or eliminates downtime caused by application or system failure. *See also* client/server architecture.

cluster analysis *n.* A technique used in data mining and knowledge discovery to group observations by identifying and extracting like or similar group conditions. Cluster analysis aims to describe the structure of a complex data set. *See also* ART, data mining.

cluster controller *n.* An intermediary device that is situated between a computer and a group (cluster) of subsidiary devices, such as terminals on a network, and is used to control the cluster.

clustering *n.* The grouping of multiple servers in a way that allows them to appear to be a single unit to client computers on a network. Clustering is a means of increasing network capacity, providing live backup in case one of the servers fails, and improving data security. *See also* cluster (definition 4), server.

cluster network *n. See* cluster (definition 4).

cluster virus *n.* A type of virus that infects once but gives the appearance of infecting every application launched. A cluster virus modifies the file system so that it is loaded before any application that the user attempts to open. Because the virus is also run when running any program, it appears that every program on the disk is infected.

CLUT *n.* Acronym for Color Look Up Table. In digital graphics applications, a specific set of colors used in the creation of graphics. When a graphic is created or edited, the user may specify a CLUT that corresponds with the needs of print, Web, or other destination media. In Web design, a specific CLUT of browser-safe colors is used to be certain graphics and designs will display consistently across different platforms and with different browsers. *See also* browser CLUT, websafe palette.

CMI *n.* Acronym for computer-managed instruction. Any type of teaching that uses computers as educational tools. *See also* CAI, CBT.

CMOS *n.* **1.** Acronym for complementary metal-oxide semiconductor. A semiconductor technology in which pairs of metal-oxide semiconductor field-effect transistors (MOSFETs), one N-type and one P-type, are integrated on a single silicon chip. Generally used for RAM and switching applications, these devices have very high speed and extremely low power consumption. They are, however, easily damaged by static electricity. *See also* MOSFET, N-type semiconductor, P-type semiconductor. **2.** The battery-backed memory used to store parameter values needed to boot PCs, such as the type of disks and the amount of memory, as well as the clock/calendar time.

CMOS RAM *n.* Short for random access memory made using complementary metal-oxide semiconductor technology. CMOS chips consume extremely little power and have high tolerance for noise from the power supply. These characteristics make CMOS chips, including CMOS RAM chips, very useful in hardware components that are powered by batteries, such as most microcomputer clocks and certain types of scratchpad RAM that are maintained by the operating system. *See also* CMOS (definition 1), parameter RAM, RAM.

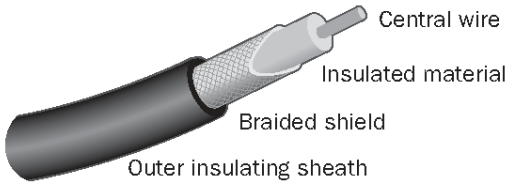
CMOS setup *n.* A system configuration utility, accessible at boot time, for setting up certain system options, such as the date and time, the kind of drives installed, and port configuration. *See also* CMOS (definition 2).

CMS *n. See* color management system.

CMY *n.* Acronym for cyan-magenta-yellow. A model for describing colors that are produced by absorbing light, as by ink on paper, rather than by emitting light, as on a video monitor. The three kinds of cone cells in the eye respond to red, green, and blue light, which are absorbed (removed from white light) by cyan, magenta, and yellow pigments, respectively. Percentages of pigments in these subtractive primary colors can therefore be mixed to get the appearance of any desired color. Absence of any pigment leaves white unchanged; adding 100 percent of all three pigments turns white to black. *Compare* CMYK, RGB.

CMYK *n.* Acronym for cyan-magenta-yellow-black. A color model that is similar to the CMY color model but produces black with a separate black component rather than by adding 100 percent of cyan, magenta, and yellow. *See also* CMY.

coaxial cable *n.* A round, flexible, two-conductor cable consisting of—from the center outwards—a copper wire, a layer of protective insulation, a braided metal mesh sleeve, and an outer shield, or jacket of PVC or fire-resistant material. The shield prevents signals transmitted on the center wire from affecting nearby components and prevents external interference from affecting the signal carried on the center wire. Coaxial cable is widely used in networks. It is the same type of wiring as that used for cable television. See the illustration. *Compare* fiberoptic cable, twisted-pair wiring.



Coaxial cable.

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COBOL *n.* Acronym for **C**ommon **B**usiness-**O**riented Language. A verbose, English-like compiled programming language developed between 1959 and 1961 and still in widespread use today, especially in business applications typically run on mainframes. A COBOL program consists of an Identification Division, which specifies the name of the program and contains any other documentation the programmer wants to add; an Environment Division, which specifies the computers being used and the files used in the program for input and output; a Data Division, which describes the format of the data structures used in the program; and a Procedure Division, which contains the procedures that dictate the actions of the program. *See also* compiled language.

cobweb site *n.* A Web site that is far out of date. *See also* Web site.

Cocoa *n.* A set of object-oriented development tools and interfaces available on Mac OS X. Cocoa contains a set of frameworks, software components, and development tools used to construct applications for Mac OS X and provides programming interfaces in Java and Objective-C. Cocoa is based on NeXT's OpenStep and is integrated with Apple technologies.

CODASYL *n.* Acronym for **C**onference on **D**ata **Sy**stems **L**anguages. An organization founded by the U.S. Department of Defense. CODASYL is dedicated to the development of data-management systems and languages, among them the widely used COBOL.

code[1] *n.* **1.** Program instructions. Source code consists of human-readable statements written by a programmer in a programming language. Machine code consists of numerical instructions that the computer can recognize and execute and that were converted from source code. *See also* data, program. **2.** A system of symbols used to convert information from one form to another. A code for converting information in order to conceal it is often called a *cipher*. **3.** One of a set of symbols used to represent information.

code[2] *vb.* To write program instructions in a programming language. *See also* program.

code access security *n.* A mechanism provided by the runtime whereby managed code is granted permissions by security policy and these permissions are enforced, limiting what operations the code will be allowed to perform. To prevent unintended code paths from exposing a security vulnerability, all callers on the call stack must be granted the necessary permissions (possibly subject to override by assertion or denial).

codec *n.* **1.** Short for **co**der/**dec**oder. Hardware that can convert audio or video signals between analog and digital forms. **2.** Short for **co**mpressor/**dec**ompressor. Hardware or software that can compress and uncompress audio or video data. *See also* compress[2], uncompress. **3.** Hardware that combines the functions of definitions 1 and 2.

code conversion *n.* **1.** The process of translating program instructions from one form into another. Code may be converted at the source-language level (for example, from C to Pascal), at the hardware-platform level (for example, from working on the IBM PC to working on the Apple Macintosh), or at the language level (for example, from source code in C to machine code). *See also* code[1] (definition 1). **2.** The process of transforming data from one representation to another, such as from ASCII to EBCDIC or from two's complement to binary-coded decimal.

Code Division Multiple Access *n.* A form of multiplexing in which the transmitter encodes the signal, using a pseudo-random sequence that the receiver also knows and can use to decode the received signal. Each different random sequence corresponds to a different communication channel. Motorola uses Code Division Multiple Access for digital cellular phones. *Acronym:* CDMA. *Also called:* spread spectrum. *See also* multiplexing, transmitter.

code page *n.* In MS-DOS versions 3.3 and later, a table that relates the binary character codes used by a program to keys on the keyboard or to the appearance of characters on the display. Code pages are a means of providing support for character sets and keyboard layouts used in different countries. Devices such as the display and the keyboard can be configured to use a specific code page and to switch from one code page (such as United States) to another (such as Portugal) at the user's request.

code profiler *n.* A tool designed to aid developers in identifying and eliminating the code inefficiencies that cause bottlenecks and degrade performance in their applications. Code profilers analyze an executing application to determine both how long functions take to execute and how often they are called. Using a code profiler is a repetitive process in that the tool must be reused after each section of inefficient code has been found and corrected.

coder *n. See* programmer.

Code Red worm *n.* A fast-spreading and pernicious Internet worm first discovered in mid-2001. The Code Red

worm propagates quickly, and any machine that was infected once is potentially vulnerable to re-infection. The Code Red worm is time sensitive, spreading in propagation mode from the 1st to the 19th of each month, attacking in flood mode from the 20th to the 27th, and finally hiding in hibernation mode until the 1st of the next month when the cycle begins again. The worm maintains a list of all computers previously infected, and all these computers will be attacked each month by every newly infected machine. This makes total eradication of the worm difficult because a single machine remaining infected from earlier propagation/attack cycles can potentially re-infect every machine on the list, and each computer might be subject to multiple attacks. At least three versions of the Code Red worm are known to exist. The Code Red worm was named for a caffeinated soft drink by the security team that first tracked the worm.

code segment *n.* **1.** A memory segment containing program instructions. **2.** A named and segregated portion of a program's code typically performing a specific class of operations. Code segments in this sense are often loaded into memory as memory segments. The main program segment is kept in memory, and auxiliary segments are loaded only when they are required.

code signing *n.* The process of adding a digital signature to additions and updates made to source code and applications published on the Internet. Code signing is intended to provide a level of security and trust to Internet software distribution. *See also* digital signature.

code snippet *n.* **1.** In a graphical user interface, programming instructions embedded in a menu option or button defined by the user. The snippet—consisting of one or more lines of source code—determines what the option or button does when chosen or clicked. **2.** A small piece of programming code that is part of a larger program. Usually the code snippet performs a specific function or task.

coding form *n.* A sheet of paper ruled with horizontal and vertical lines to aid in writing source code for older languages that have position-dependent syntax (such as FORTRAN). Most programmers now use graph paper if they use paper at all.

coercion *n. See* cast.

Coffee Pot Control Protocol *n. See* HTCPCP.

coherence *n.* **1.** In raster-scan technology, the assignment of the value of one pixel to the pixel next to it. **2.** In optics, the property of some electromagnetic waves of being in phase with one another, as in light from a laser.

cold boot *n.* A startup process that begins with turning on the computer's power. Typically, a cold boot involves some basic hardware checking by the system, after which the operating system is loaded from disk into memory. *See also* boot[1]. *Compare* warm boot.

cold fault *n.* A fatal error that occurs immediately upon or shortly after startup as a result of the misalignment of components in the system. The process of running and shutting down any computer induces a series of thermal expansions and contractions in its internal components. Over time, these changes in the dimensions of components can create a microscopic crack in a chip or loosen a pin in a socket; thus, the system crashes when cold, but the problem seems to disappear after the machine is warm. For this reason, some users leave the system unit (but not the monitor) of a computer running from day to day, rather than turn the machine on only when needed.

cold link *n.* A link established upon a request for data. Once the request is filled, the link is broken. The next time data is required, a link from the client to the server must be reestablished. In a client/server architecture, cold links are useful when the linked item consists of a large amount of data. Dynamic Data Exchange (DDE), used in applications such as Microsoft Excel, uses cold links for data exchange. *See also* client/server architecture, DDE. *Compare* hot link.

cold start *n. See* cold boot.

collaboration data object *n.* Microsoft Exchange Server technology for creating messaging and collaboration applications. A collaboration data object consists of a scripting interface added to Microsoft Messaging Application Programming Interface (MAPI). *Acronym:* CDO.

collaborative filtering *n.* A means of deriving information from the experiences and opinions of a number of people. The term was coined by Doug Terry at Xerox PARC, who first used the technique by allowing users to annotate documents as they read them and to choose which documents to read next based not only on their content but also on what others wrote about them. A common use of collaborative filtering is the creation of lists of World Wide Web pages of interest to particular people; by documenting the experiences of several people, a list of interesting Web sites can be "filtered." Collaborative filtering is also used as a marketing research tool; by keeping a

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database of opinions and ratings regarding several products, researchers can predict which new products the people contributing to the database will like.

collapsed backbone *n. See* backbone (definition 3).

collate *vb.* In data handling, to merge items from two or more similar sets to create a combined set that maintains the order or sequence of items in the original sets.

collating sort *n.* A sort that proceeds by continuous merging of two or more files to produce a certain sequence of records or data items.

collation sequence *n.* The ordering relationship (sequence) among objects that is to be established by a collating sort. *See also* collating sort.

collector *n.* The region of a bipolar transistor into which charge carriers flow under normal operating conditions. The output of the transistor is usually taken from the collector. With respect to the base and emitter, the collector is positive in an NPN transistor and negative in a PNP transistor. *See also* NPN transistor, PNP transistor. *Compare* base (definition 3), emitter.

collision *n.* The result of two devices or network workstations trying to transmit signals at the exact same time on the same channel. The typical outcome is a garbled transmission.

collision detection *n.* **1.** The process by which a node on a local area network monitors the communications line to determine when a collision has occurred; that is, when two nodes have attempted to transmit at the same time. Although network stations usually avoid collisions by monitoring the line and waiting for it to clear before transmitting, the method is not foolproof. When a collision does occur, the two nodes involved usually wait a random amount of time before attempting to retransmit. *See also* contention, CSMA/CD. **2.** The process by which a game or simulation program determines whether two objects on the screen are touching each other. This is a time-consuming, often complicated procedure; some computers optimized for graphics and games, such as the Amiga, have special hardware built in specifically to detect collisions.

colocation or **co-location** *n.* The operation of a server, router, or other device in a facility that provides a dedicated Internet connection, physical space in a secured cage, and regulated power. Colocation services often include fire detection and extinguishing, backup power, technical support, and additional security measures to ensure high availability.

color *n.* In physics, the component of the human perception of light that depends on frequency. For light of a single frequency, color ranges from violet at the high-frequency end of the visible-light band (a small portion of the total electromagnetic spectrum) to red at the low-frequency end. In computer video, color is produced by a combination of hardware and software. Software manipulates combinations of bits that represent the distinct shades of color that are destined for particular positions on the screen (characters or individual dots, called pixels). The video adapter hardware translates these bits into electrical signals, which in turn control the brightnesses of different-colored phosphors at the corresponding positions on the screen of the monitor CRT. The user's eye unites the light from the phosphors to perceive a single color. *See also* color model, color monitor, CRT, HSB, monitor, RGB, video, video adapter.

color bits *n.* A predetermined number of bits assigned to each displayable pixel that determine the pixel's color when it is displayed on a monitor. For example, two color bits are required for four colors; eight color bits are required for 256 colors. *See also* pixel image. *Compare* bit plane.

color box *n.* In the Windows NT and Windows 9x Paint accessory, a graphic screen element in the form of a paint box that is used to select foreground and background colors.

color burst *n.* A technique used to encode color in a composite video signal, originally developed so that black-and-white television monitors could display programs broadcast in color. The color burst consists of a combination of the red, green, and blue intensities (used by black-and-white displays) and two color-difference signals that determine separate red, green, and blue intensities (used by color displays). *See also* color look-up table.

color cycling *n.* A technique used in computer graphics for changing the color of one or more pixels on the screen by changing the color palette used by the video adapter rather than by changing the color bits for each pixel. For example, to cause a red circle to fade away to a black background color, the program need only change the set of signal values corresponding to "red" in the video adapter's color look-up table, periodically making it darker until it matches the black background. At each step, the apparent color of the whole circle changes instantly; it appears to fade rather than to be painted over and over. The speed at which and the degree to which the circle fades are entirely up to the programmer.

color depth *n.* The number of color values that can be assigned to a single pixel in an image. Also known as bit depth, color depth can range from 1 bit (black and white) to 32 bits (over 16.7 million colors). *See also* bit depth.

color gamut *n.* The particular range of colors that a device is able to produce. A device such as a scanner, monitor, or printer can produce a unique range of colors, which is determined by the characteristics of the device itself. *See also* rendering intent.

Color/Graphics Adapter *n. See* CGA.

colorimeter *n.* A device that evaluates and identifies colors in terms of a standard set of synthesized colors.

color look-up table *n.* A table stored in a computer's video adapter, containing the color signal values that correspond to the different colors that can be displayed on the computer's monitor. When color is displayed indirectly, a small number of color bits are stored for each pixel and are used to select a set of signal values from the color look-up table. *Also called:* color map, color table, video look-up table. *See also* color bits, palette (definition 2), pixel.

Color Look Up Table *n. See* CLUT.

color management *n.* The process of producing or reproducing accurate, consistent color across any of a variety of color input, output, and display devices. Color management includes, but is not limited to, accurate conversion of RGB input from input devices such as a scanner or a camera or from display devices such as a monitor to CMYK output for an output device such as a printer. Color management also encompasses application of a device profile, which contains information on color behavior for the printer or other device on which the image will be reproduced, and allowance for environmental variations such as humidity and lighting. *See also* CMYK, RGB.

color management system *n.* A technology designed to calibrate, characterize, and process color production and reproduction across a variety of color input, output, and display devices. *See also* color management.

color map *n. See* color look-up table.

color model *n.* Any method or convention for representing color in desktop publishing and graphic arts. In the graphic arts and printing fields, colors are often specified with the Pantone system. In computer graphics, colors can be described using any of several different color systems: HSB (hue, saturation, and brightness), CMY (cyan, magenta, and yellow), and RGB (red, green, and blue). *See also* CMY, HSB, Pantone Matching System, process color, RGB, spot color.

color monitor *n.* A video display device designed to work with a video card or an adapter to produce text or graphics images in color. A color monitor, unlike a monochrome display, has a screen coated internally with patterns of three phosphors that glow red, green, and blue when struck by an electron beam. To create colors such as yellow, pink, and orange, the three phosphors are lighted together in varying degrees. A video card that uses large groups of bits (6 or more) to describe colors and that generates analog (continuously variable) signals is capable of generating an enormous potential range of colors on a color monitor. *See also* color, color model, Cycolor.

color palette *n. See* palette (definition 1).

color plane *n. See* bit plane.

color printer *n.* A computer printer that can print full-color output. Most color printers can also produce black-and-white output.

color saturation *n.* The amount of a hue contained in a color; the more saturation, the more intense the color. *See also* color model, HSB.

color scanner *n.* A scanner that converts images to a digitized format and is able to interpret color. Depth of color depends on the scanner's bit depth—its ability to transform color into 8, 16, 24, or 32 bits. High-end color scanners, commonly used when output is to be printed, are able to encode information at a high resolution or number of dots per inch (dpi). Low-end color scanners encode information at a resolution of 72 dpi and are commonly used for computer screen images not intended for printing. *See also* resolution (definition 1), scanner.

color separation *n.* **1.** The process of printing the colors in a document as separate output files, each of which is to be printed using a different-colored ink. There are two types of color separation: spot color separation and process color separation. *See also* color model, process color, spot color. **2.** One of the output files produced by a color document, to be printed in its own color of ink.

color space *n.* A means of describing color in digital environments. RGB is the most common color space on the Web, and with other color, the most common color space viewed on computer displays, while CMYK is the main color space for desktop publishing and other digital print media.

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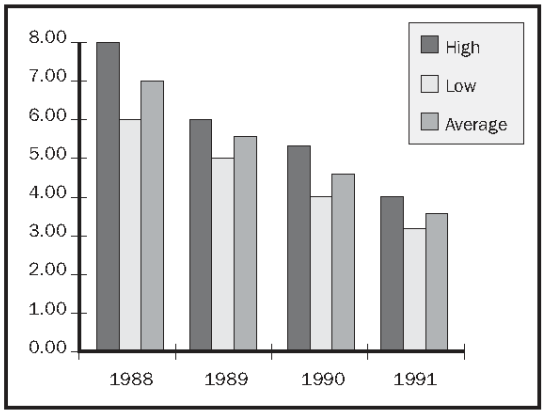
color supertwist nematic display *n. See* supertwist display.

color table *n. See* color look-up table.

column *n.* **1.** A series of items arranged vertically within some type of framework—for example, a continuous series of cells running from top to bottom in a spreadsheet, a set of lines of specified width on a printed page, a vertical line of pixels on a video screen, or a set of values aligned vertically in a table or matrix. *Compare* row. **2.** In a relational database management system, the name for an attribute. The collection of column values that form the description of a particular entity is called a *tuple* or *row*. A column is equivalent to a field in a record in a nonrelational file system. *See also* entity, field (definition 1), row, table (definition 2).

column chart *n.* A bar chart in which values are displayed and printed as vertical bars. See the illustration. *See also* bar chart.



Column chart.

.com *n.* **1.** In the Internet's Domain Name System, the top-level domain that identifies addresses operated by commercial organizations. The domain name .com appears as a suffix at the end of the address. *See also* DNS (definition 1), domain (definition 3). *Compare* .edu, .gov, .mil, .net, .org. **2.** In MS-DOS, the file extension that identifies a command file. *See also* COM (definition 3).

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

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

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

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

combinatorial explosion *n.* A condition inherent in certain types of mathematical problems in which small increases in the problem's size (number of data items or parameters of the operation) lead to enormous increases in the time required to obtain a solution. *See also* combinatorics.

combinatorics *n.* A branch of mathematics related to probability and statistics, involving the study of counting, grouping, and arrangement of finite sets of elements. Combinatorics involves the two concepts of combinations and permutations. A combination is the grouping of elements taken from a larger set without regard to the order of the elements in each group; for example, taking two elements at a time from a set of four objects (A, B, C, and D) creates six combinations of objects: AB, AC, AD, BC, BD, and

CD. A permutation is a grouping of elements taken from a larger set with regard to the order of the elements. For example, in making permutations of two objects from the same set of four objects, there would be four candidates to choose from for the first selection (A), and three left over to choose from for the second selection (B), or 12 permutations in all: AB, AC, AD, BA, BC, BD, CA, CB, CD, DA, DB, DC. *See also* combinatorial explosion.

COM callable wrapper *n.* A proxy object generated by the runtime so that existing COM applications can use managed classes, including .NET Framework classes, transparently. *Acronym:* CCW.

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

Comité Consultatif International Télégraphique et Téléphonique *n. See* CCITT.

comma-delimited file *n.* A data file consisting of fields and records, stored as text, in which the fields are separated from each other by commas. Use of comma-delimited files allows communication between database systems that use different formats. If the data in a field contains a comma, the field is further surrounded with quotation marks.

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

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

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

COMMAND.COM *n.* The command interpreter for MS-DOS. *See also* command interpreter.

command-driven *adj.* Accepting commands in the form of code words or letters, which the user must learn. *Compare* menu-driven.

command-driven system *n.* A system in which the user initiates operations by a command entered from the console. *Compare* graphical user interface.

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

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

command language *n.* The set of keywords and expressions that are accepted as valid by the command interpreter. *See also* command interpreter.

command line *n.* A string of text written in the command language and passed to the command interpreter for execution. *See also* command language.

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

command mode *n.* A mode of operation in which a program waits for a command to be issued. *Compare* edit mode, insert mode.

command processing *n. See* command-driven system.

command processor *n. See* command interpreter.

command prompt window *n.* A window displayed on the desktop used to interface with the MS-DOS operating

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system. MS-DOS commands are typed at an entry point identified by a blinking cursor. *See also* MS-DOS.

command shell *n.* *See* shell[1].

command state *n.* The state in which a modem accepts commands, such as a command to dial a telephone number. *Compare* online state.

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

comment out *vb.* To disable one or more lines of code from a program temporarily by enclosing them within a comment statement. *See also* comment, conditional compilation, nest.

Commerce Interchange Pipeline *n.* *See* CIP.

commerce server *n.* An HTTP server designed for conducting online business transactions. Data is transferred between the server and Web browser in an encrypted form to keep information such as credit card numbers reasonably secure. Commerce servers are typically used by online stores and companies that are set up for mail order business. The wares or services offered by the store or company are described and displayed in photographs on the store or company Web site and users can order directly from the site using their Web browser. A number of companies market commerce servers, including Netscape, Microsoft, and Quarterdeck. *See also* HTTP server (definition 1), Secure Sockets Layer, Web browser.

commercial access provider *n.* *See* ISP.

Commercial Internet Exchange *n.* A nonprofit trade organization of public Internet service providers. In addition to the usual representational and social activities, the organization also operates an Internet backbone router that is accessible to its members. *Acronym:* CIX. *See also* backbone (definition 1), ISP, router.

commercial off-the-shelf board *n.* A hardware board or platform that is readily available in the industry for purchase and can be used for development or test purposes. *Also called:* COTS board.

Common Access Method *n.* A standard developed by Future Domain and other SCSI vendors allowing SCSI adapters to communicate with SCSI peripherals regardless of the particular hardware used. *See also* SCSI.

Common Application Language *n.* *See* CAL.

common carrier *n.* A communications company (e.g., a telephone company) that provides service to the public and is regulated by governmental organizations.

Common Client Interface *n.* A control interface begun with the X Windows version of NCSA Mosaic whereby other programs can control the local copy of a Web browser. The X Windows and Windows versions of NCSA Mosaic can communicate with other programs via TCP/IP. The Windows version is also capable of OLE communication. *Acronym:* CCI. *See also* Mosaic, OLE, TCP/IP, X Window System.

Common Gateway Interface *n.* *See* CGI (definition 1), CGI script.

Common Hardware Reference Platform *n.* A specification describing a family of machines, based on the PowerPC processor, that are capable of booting multiple operating systems, including Mac OS, Windows NT, AIX, and Solaris. *Acronym:* CHRP. *See also* PowerPC.

Common Indexing Protocol *n.* *See* CIP.

Common Information Model *n.* *See* CIM (definition 1).

Common Internet File System *n.* A standard proposed by Microsoft that would compete directly with Sun Microsystems' Web Network File System. A system of file sharing of Internet or intranet files. *Acronym:* CIFS.

common language runtime *n.* The engine at the core of managed code execution. The runtime supplies managed code with services such as cross-language integration, code access security, object lifetime management, and debugging and profiling support.

common language runtime host *n.* An unmanaged application that uses a set of APIs, called the hosting interfaces, to integrate managed code into the application. Common language runtime hosts often require a high degree of customization over the runtime that is loaded into the process. The hosting interfaces allow common language runtime hosts to specify settings that configure the garbage collector, select the appropriate build for their

environment (server versus workstation), and so on. Common language runtime hosts often support an extensibility model that allows the end user to dynamically add new pieces of functionality, such as a new control or a user-written function. These extensions are typically isolated from each other in the process using application domains and custom security settings. Examples of common language runtime hosts include ASP.NET, Microsoft Internet Explorer, and a host to run executables launched from the Windows Shell.

Common Language Specification *n. See* CLS.

Common LISP *n.* Short for **Common List** Processing. A formalized and standardized version of the LISP programming language. Because LISP is in the public domain, a number of different versions of the language have evolved, and Common LISP was made a standard to give programmers a definitive source for LISP. *See also* LISP, programming language, standard (definition 1).

Common Object Request Broker Architecture *n. See* CORBA.

common type system *n.* The specification that determines how the runtime defines, uses, and manages types.

Common User Access *n.* A set of standards for management of user interfaces as part of IBM's Systems Application Architecture (SAA). Common User Access is designed to facilitate development of applications that are compatible and consistent across different platforms. *Acronym:* CUA. *See also* standard (definition 1), user interface.

communications *n.* The vast discipline encompassing the methods, mechanisms, and media involved in information transfer. In computer-related areas, communications involves data transfer from one computer to another through a communications medium, such as a telephone, microwave relay, satellite link, or physical cable. Two primary methods of computer communications exist: temporary connection of two computers through a switched network, such as the public telephone system, and permanent or semipermanent linking of multiple workstations or computers in a network. The line between the two is indistinct, however, because microcomputers equipped with modems are often used to access both privately owned and public-access network computers. *See also* asynchronous transmission, CCITT, channel (definition 2), communications protocol, IEEE, ISDN, ISO/OSI model, LAN, modem, network, synchronous transmission. *Compare* data transmission, telecommunications, teleprocess.

Communications Act of 1934 *n. See* FCC.

Communication Satellite Corporation *n.* Corporation created by the U.S. government to provide international satellite services for telecommunications. *Acronym:* COMSAT.

communications channel *n. See* channel (definition 2).

communications controller *n.* A device used as an intermediary in transferring communications to and from the host computer to which it is connected. By relieving the host computer of the actual tasks of sending, receiving, deciphering, and checking transmissions for errors, a communications controller helps to make efficient use of the host computer's processing time—time that might be better used for noncommunications tasks. A communications controller can be either a programmable machine in its own right or a nonprogrammable device designed to follow certain communications protocols. *See also* front-end processor (definition 2).

communications link *n.* The connection between computers that enables data transfer.

communications network *n. See* network.

communications parameter *n.* Any of several settings required in order to enable computers to communicate. In asynchronous communications, for example, modem speed, number of data bits and stop bits, and type of parity are parameters that must be set correctly to establish communication between two modems.

communications port *n. See* COM.

communications program *n.* A software program that enables a computer to connect with another computer and to exchange information. For initiating communications, communications programs perform such tasks as maintaining communications parameters, storing and dialing phone numbers automatically, recording and executing logon procedures, and repeatedly dialing busy lines. Once a connection is made, communications programs can also be instructed to save incoming messages on disk or to find and transmit disk files. During communication, these types of programs perform the major, and usually invisible, tasks of encoding data, coordinating transmissions to and from the distant computer, and checking incoming data for transmission errors.

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communications protocol *n.* A set of rules or standards designed to enable computers to connect with one another and to exchange information with as little error as possible. The protocol generally accepted for standardizing overall computer communications is a seven-layer set of hardware and software guidelines known as the OSI (Open Systems Interconnection) model. A somewhat different standard, widely used before the OSI model was developed, is IBM's SNA (Systems Network Architecture). The word *protocol* is often used, sometimes confusingly, in reference to a multitude of standards affecting different aspects of communication, such as file transfer (for example, XMODEM and ZMODEM), handshaking (for example, XON/XOFF), and network transmissions (for example, CSMA/CD). *See also* ISO/OSI model, SNA.

communications satellite *n.* A satellite stationed in geosynchronous orbit that acts as a microwave relay station, receiving signals sent from a ground-based station (earth station), amplifying them, and retransmitting them on a different frequency to another ground-based station. Initially used for telephone and television signals, communications satellites can also be used for high-speed transmission of computer data. Two factors affecting the use of satellites with computers, however, are propagation delay (the time lag caused by the distance traveled by the signal) and security concerns. *See also* downlink, uplink.

communications server *n.* A gateway that translates packets on a local area network (LAN) into asynchronous signals, such as those used on telephone lines or in RS-232-C serial communications, and allows all nodes on the LAN access to its modems or RS-232-C connections. *See also* gateway, RS-232-C standard.

communications slot *n.* On many models of the Apple Macintosh, a dedicated expansion slot for network interface cards. *Acronym:* CS.

communications software *n.* The software that controls the modem in response to user commands. Generally such software includes terminal emulation as well as file transfer facilities. *See also* modem, terminal emulation.

communications system *n.* The combination of hardware, software, and data transfer links that make up a communications facility.

Communications Terminal Protocol *n.* A terminal protocol that enables a user at a remote location to access a computer as if the remote computer were directly connected (hardwired) to the computer. *Acronym:* CTERM.

community antenna television *n. See* CATV.

COMNET Conference & Expo *n.* Conference and exposition for the communications networking industry. The conference features educational sessions and exhibitions on technical and business issues affecting communications networks.

compact disc *n.* **1.** An optical storage medium for digital data, usually audio. A compact disc is a nonmagnetic, polished metal disc with a protective plastic coating that can hold up to 74 minutes of high-fidelity recorded sound. The disk is read by an optical scanning mechanism that uses a high-intensity light source, such as a laser, and mirrors. *Also called:* optical disc. **2.** A technology that forms the basis of media such as CD-ROM, CD-ROM/XA, CD-I, CD-R, DVI, and PhotoCD. These media are all compact disc–based but store various types of digital information and have different read/write capabilities. Documentation for compact disc formats can be found in books designated by the color of their covers. For example, documentation for audio compact discs is found in the Red Book. *See also* CD-I, CD-R, CD-ROM, CD-ROM/XA, DVI, Green Book (definition 2), Orange Book (definition 2), PhotoCD, Red Book (definition 2). **3.** *See* CD.

compact disc-erasable *n. See* CD-E.

compact disc-interactive *n. See* CD-I.

compact disc player *n. See* CD player.

compact disc-recordable *n. See* CD-R.

compact disc-recordable and erasable *adj. See* CD-R/E.

compact disc-rewritable *n. See* CD-RW.

CompactFlash *n.* Plug-in memory devices designed by the CompactFlash Association for use in digital cameras and, eventually, other devices for storing and transporting digital data, sound, images, and video. CompactFlash devices are small cards 1.7 x 1.4 x 0.13 inches (43 x 36 x 3.3 mm) in size. They are based on nonvolatile flash technology, so they do not rely on batteries or other power to retain information. *See also* digital camera.

CompactFlash Association *n.* A nonprofit association that developed and promotes the CompactFlash specification. Founded in October 1995, it has a membership that includes 3COM, Eastman Kodak Company, Hewlett-Packard, IBM, and NEC, among other corporations. *See also* CompactFlash.

compaction *n.* The process of gathering and packing the currently allocated regions of memory or auxiliary storage into as small a space as possible, so as to create as much continuous free space as possible. *Compare* dispersion, file fragmentation (definition 1).

compact model *n.* A memory model of the Intel 80x86 processor family. The compact model allows only 64 kilobytes (KB) for the code of a program but up to 1 megabyte (MB) for the program's data. *See also* memory model.

CompactPCI *n.* An open bus specification for industrial computing needs developed by the PCI Industrial Computer Manufacturers Group (PICMG). CompactPCI is based on the desktop-computing PCI bus but differs in a number of respects, including a pin-and-socket connector and a design that allows for front loading and removal of cards. CompactPCI is intended for applications such as industrial automation, military systems, and real-time data acquisition. It is suitable for high-speed communications devices, such as routers, and allows for hot-plugging. *See also* hot plugging, PCI local bus.

comparator *n.* A device for comparing two items to determine whether they are equal. In electronics, for example, a comparator is a circuit that compares two input voltages and indicates which is higher.

compare *vb.* To check two items, such as words, files, or numeric values, so as to determine whether they are the same or different. In a program, the outcome of a compare operation often determines which of two or more actions is taken next.

comparison criteria *n.* A set of search conditions that is used to find data. Comparison criteria can be a series of characters that you want to match, such as "Northwind Traders", or an expression, such as ">300".

compatibility *n.* **1.** The degree to which a computer, an attached device, a data file, or a program can work with or understand the same commands, formats, or language as another. True compatibility means that any operational differences are invisible to people and programs alike. **2.** The extent to which two machines can work in harmony. Compatibility (or the lack thereof) between two machines indicates whether, and to what degree, the computers can communicate, share data, or run the same programs. For example, an Apple Macintosh and an IBM PC are generally incompatible because they cannot communicate freely or share data without the aid of hardware and/or software that functions as an intermediary or a converter. **3.** The extent to which a piece of hardware conforms to an accepted standard (for example, IBM-compatible or Hayes-compatible). In this sense, compatibility means that the hardware ideally operates in all respects like the standard on which it is based. **4.** In reference to software, harmony on a task-oriented level among computers and computer programs. Computers deemed software-compatible are those that can run programs originally designed for other makes or models. Software compatibility also refers to the extent to which programs can work together and share data. In another area, totally different programs, such as a word processor and a drawing program, are compatible with one another if each can incorporate images or files created using the other. All types of software compatibility become increasingly important as computer communications, networks, and program-to-program file transfers become near-essential aspects of microcomputer operation. *See also* downward compatibility, upward-compatible.

compatibility box *n. See* DOS box (definition 1).

compatibility mode *n.* A mode in which hardware or software in one system supports operations of software from another system. The term often refers to the ability of advanced operating systems designed for Intel microprocessors (for example, OS/2 and Windows NT) to run MS-DOS software or to the ability of some UNIX workstations and of some Apple Macintosh systems to run MS-DOS software.

Competitive Local Exchange Carrier *n. See* CLEC.

compile *vb.* To translate all the source code of a program from a high-level language into object code prior to execution of the program. Object code is executable machine code or a variation of machine code. More generally, *compiling* is sometimes used to describe translating any high-level symbolic description into a lower-level symbolic or machine-readable format. A program that performs this task is known as a *compiler*. *See also* compiler (definition 2), compile time, high-level language, machine code, source code. *Compare* interpret.

compile-and-go *adj.* Of, pertaining to, or characteristic of a development environment that automatically runs a program after compiling it. *See also* compile, execute.

compiled Basic *n.* Any version of Basic that is translated into machine code prior to execution by a compiler. Basic has traditionally been an interpreted language (translated and executed statement by statement); because compiled

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Basic generally produces faster-executing programs, it is the technology of choice for professional Basic programmers. *See also* Basic, compiled language, interpreted language.

compiled language *n.* A language that is translated into machine code prior to any execution, as opposed to an interpreted language, which is translated and executed statement by statement. *See also* compiler (definition 2). *Compare* interpreted language.

compiler *n.* **1.** Any program that transforms one set of symbols into another by following a set of syntactic and semantic rules. **2.** A program that translates all the source code of a program written in a high-level language into object code prior to execution of the program. *See also* assembler, compile, high-level language, interpreted language, language processor, object code.

compile time *n.* **1.** The amount of time required to perform a compilation of a program. Compile time can range from a fraction of a second to many hours, depending on the size and complexity of the program, the speed of the compiler, and the performance of the hardware. *See also* compiler (definition 2). **2.** The point at which a program is being compiled (i.e., most languages evaluate constant expressions at compile time but evaluate variable expressions at run time). *See also* link time, run time.

compile-time binding *n.* Assignment of a meaning to an identifier (such as a function name or a constant) in a program at the time the program is compiled rather than at the time it is run. *Compare* run-time binding.

complement *n.* Loosely, a number that can be thought of as the mirror image of another number written to the same base, such as base 10 or base 2. Complements are commonly used to represent negative numbers. Two types of complements are encountered in computer-related contexts: radix-minus-1 complements and true complements. A radix-minus-1 complement is known in the decimal system as a nine's complement and in the binary system as a one's complement. True complements are known in the decimal system as ten's complement and in binary as two's complement—a form commonly used to represent negative numbers in processing. *See also* complementary operation, nine's complement, one's complement, ten's complement, two's complement.

complementary metal-oxide semiconductor *n. See* CMOS.

complementary operation *n.* In Boolean logic, an operation that produces the opposite result from that of another operation performed on the same data. For example, if A is true, NOT A (its complement) is false. *See also* Boolean algebra.

completeness check *n.* A survey to determine that all data required in a record is present. *Compare* consistency check.

complex instruction set computing *n. See* CISC.

complex number *n.* A number of the form $a + bi$, where a and b are real numbers and i is the square root of -1, called the imaginary unit. Complex numbers can be plotted as points on a two-dimensional plane called the complex plane. The a number is plotted along the plane's horizontal axis (the real axis), and the b number is plotted along the vertical axis (the imaginary axis). *Compare* real number.

comp. newsgroups *n.* Usenet newsgroups that are part of the comp. hierarchy and have the prefix comp. These newsgroups are devoted to discussions of computer hardware, software, and other aspects of computer science. Comp. newsgroups are one of the seven original Usenet newsgroup hierarchies. The other six are misc., news., rec., sci., soc., and talk. *See also* newsgroup, traditional newsgroup hierarchy, Usenet.

component *n.* **1.** A discrete part of a larger system or structure. **2.** An individual modular software routine that has been compiled and dynamically linked, and is ready to use with other components or programs. *See also* compile, component software, link (definition 1), program, routine. **3.** In Sun Microsystem's J2EE network platform, an application-level software unit supported by a container. Components are configurable at deployment time. The J2EE platform defines four types of components: enterprise java beans, Web components, applets, and application clients. *See also* applet, container (definition 3), Enterprise JavaBeans, J2EE.

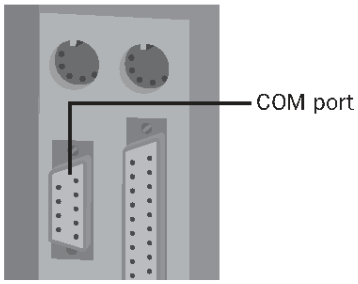
Component Object Model *n. See* COM (definition 2).

Component Pascal *n.* A Pascal derivative designed for programming software components for .NET and JVM platforms. *See also* Oberon, Pascal.

component software *n.* Modular software routines, or components, that can be combined with other components to form an overall program. A programmer can use and reuse an existing component and not have to understand its inner workings, just how to have another program or component call it and pass data to and from it. *Also called:* componentware. *See also* component, program, routine.

componentware *n. See* component software.

COM port or **comm port** *n.* Short for communications port, the logical address assigned by MS-DOS (versions 3.3 and later) and Microsoft Windows (including Windows 9x and Windows NT) to each of the four serial ports on an IBM Personal Computer or a PC compatible. COM ports also have come to be known as the actual serial ports on a PC's CPU where peripherals, such as printers, scanners, and external modems, are plugged in. See the illustration. *See also* COM (definition 1), input/output port, serial port.



COM port.

composite display *n.* A display, characteristic of television monitors and some computer monitors, that is capable of extracting an image from a composite signal (also called an *NTSC signal*). A composite display signal carries on one wire not only the coded information required to form an image on the screen but also the pulses needed to synchronize horizontal and vertical scanning as the electron beam sweeps back and forth across the screen. Composite displays can be either monochrome or color. A composite color signal combines the three primary video colors (red, green, and blue) in a color burst component that determines the shade of color displayed on the screen. Composite color monitors are less readable than either monochrome monitors or the RGB color monitors that use separate signals (and wires) for the red, green, and blue components of the image. *See also* color burst, color monitor, monochrome display, NTSC, RGB monitor.

composite key *n.* A key whose definition consists of two or more fields in a file, columns in a table, or attributes in a relation.

composite video display *n.* A display that receives all encoded video information (including color, horizontal synchronization, and vertical synchronization) in one signal. A composite video signal under NTSC (National Television System Committee) standards is generally required for television sets and videotape recorders. *See also* NTSC. *Compare* RGB monitor.

compound document *n.* A document that contains different types of information, each type created with a different application; for example, a report containing both charts (created with a spreadsheet) and text (created with a word processor) is a compound document. Although a compound document is visually a single, seamless unit, it is actually formed of discrete objects (blocks of information) that are created in their own applications. These objects can either be physically *embedded* in the destination document, or they can be *linked* to it while remaining in the originating file. Both embedded and linked objects can be edited. Linked objects, however, can be updated to reflect changes made to the source file. *See also* ActiveX, OLE, OpenDoc.

compound statement *n.* A single instruction composed of two or more individual instructions.

compress[1] *n.* A proprietary UNIX utility for reducing the size of data files. Files compressed with this utility have the extension .Z added to their names.

compress[2] *vb.* To reduce the size of a set of data, such as a file or a communications message, so that it can be stored in less space or transmitted with less bandwidth. Data can be compressed by removing repeated patterns of bits and replacing them with some form of summary that takes up less space; restoring the repeated patterns decompresses the data. Lossless compression methods must be used for text, code, and numeric data files; lossy compression may be used for video and sound files. *See also* lossless compression, lossy compression.

compressed digital video *n. See* CDV (definition 1).

compressed disk *n.* A hard disk or floppy disk whose apparent capacity to hold data has been increased through the use of a compression utility, such as Stacker or Double Space. *See also* data compression.

compressed drive *n.* A hard disk whose apparent capacity has been increased through the use of a compression utility, such as Stacker or Double Space. *See also* compressed disk, data compression.

compressed file *n.* A file whose contents have been compressed by a special utility program so that it occupies less space on a disk or other storage device than in its uncompressed (normal) state. *See also* installation program, LHARC, PKUNZIP, PKZIP, utility program.

Compressed Read-Only File System *n. See* cramfs.

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Compressed SLIP *n.* Short for **Compressed S**erial 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.

computer-aided engineering *n. See* CAE.

computer-aided instruction *n. See* CAI.

computer-aided learning *n. See* CAL.

computer-aided manufacturing *n. See* CAM (definition 1).

computer-aided testing *n. See* CAT (definition 1).

Computer and Business Equipment Manufacturers Association *n. See* CBEMA.

computer art *n.* A broad term that can refer either to art created on a computer or to art generated by a computer, the difference being whether the artist is human or electronic. When created by human beings, computer art is done with painting programs that offer a range of line-drawing tools, brushes, shapes, patterns, and colors. Some programs also offer predrawn figures and animation capabilities.

computer-assisted diagnosis *n.* The use of computers by physicians in diagnosing patient conditions. Medical application programs can help to determine the cause, symptoms, and treatment of a problem as well as to maintain a record of a patient's medical history and test results. *See also* expert system.

computer-assisted instruction *n. See* CAI.

computer-assisted learning *n. See* CAL.

computer-assisted teaching *n. See* CAI.

computer-augmented learning *n. See* CAL.

computer-based learning *n. See* CBL.

computer-based training *n. See* CBT.

computer center *n.* A centralized location that contains computers, such as mainframes or minicomputers, along with associated equipment for providing data processing services to a group of people.

computer conferencing *n.* Person-to-person interaction through the use of computers located in different places but connected through communications facilities.

computer control console *n. See* system console.

computer crime *n.* The illegal use of a computer by an unauthorized individual, either for pleasure (as by a computer hacker) or for profit (as by a thief). *See also* hacker (definition 2).

computer-dependent *adj. See* hardware-dependent.

Computer Emergency Response Team *n. See* CERT.

computer engineering *n.* The discipline that involves the design and underlying philosophies involved in the development of computer hardware.

computer family *n.* A term commonly used to indicate a group of computers that are built around the same microprocessor or around a series of related microprocessors and that share significant design features. For example, the Apple Macintosh computers, from the original Macintosh (introduced in 1984) to the Quadra, represent a family designed by Apple around the Motorola 68000, 68020, 68030, and 68040 microprocessors. Computer families tend to parallel microprocessor families, but this is not always the case. For instance, Macintoshes are no longer made with 680x0 processors, and the Macintosh family has "extended" to another generation: the Power Macs, based on the PowerPC microprocessor.

computer game *n.* A class of computer program in which one or more users interacts with the computer as a form of entertainment. Computer games run the gamut from simple alphabet games for toddlers to chess, treasure hunts, war games, and simulations of world events. The games are controlled from a keyboard or with a joystick or other device and are supplied on disks, on CD-ROMs, as game cartridges, on the Internet, or as arcade devices.

computer graphics *n.* The display of "pictures," as opposed to only alphabetic and numeric characters, on a computer screen. Computer graphics encompasses different methods of generating, displaying, and storing information. Thus, computer graphics can refer to the creation of business charts and diagrams; the display of drawings, italic characters, and mouse pointers on the screen; or the way images are generated and displayed on the screen. *See also* graphics mode, presentation graphics, raster graphics, vector graphics.

Computer Graphics Interface *n.* A software standard applied to computer graphics devices, such as printers and plotters. Computer Graphics Interface is an offshoot of a widely recognized graphics standard called GKS (Graphical Kernel System), which provides applications programmers with standard methods of creating, manipulating, and displaying or printing computer graphics. *Acronym:* CGI. *See also* Graphical Kernel System.

Computer Graphics Metafile *n.* A software standard related to the widely recognized GKS (Graphical Kernel

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System) that provides applications programmers with a standard means of describing a graphic as a set of instructions for re-creating it. A graphics metafile can be stored on disk or sent to an output device; Computer Graphics Metafile provides a common language for describing such files in relation to the GKS standard. *Acronym:* CGM. *See also* Graphical Kernel System.

computer-independent language *n.* A computer language designed to be independent of any given hardware platform. Most high-level languages are intended to be computer-independent; actual implementations of the languages (in the form of compilers and interpreters) tend to have some hardware-specific features and aspects. *See also* computer language.

computer-input microfilm *n. See* CIM (definition 2).

computer instruction *n.* **1.** An instruction that a computer can recognize and act on. *See also* machine instruction. **2.** The use of a computer in teaching. *See also* CAI.

computer-integrated manufacturing *n. See* CIM (definition 1).

computer interface unit *n. See* interface (definition 3).

computerized axial tomography *n. See* CAT (definition 3).

computerized mail *n. See* e-mail[1].

computer language *n.* An artificial language that specifies instructions to be executed on a computer. The term covers a wide spectrum, from binary-coded machine language to high-level languages. *See also* assembly language, high-level language, machine code.

computer letter *n. See* form letter.

computer literacy *n.* Knowledge and an understanding of computers combined with the ability to use them effectively. On the least specialized level, computer literacy involves knowing how to turn on a computer, start and stop simple application programs, and save and print information. At higher levels, computer literacy becomes more detailed, involving the ability of power users to manipulate complex applications and, possibly, to program in languages such as Basic or C. At the highest levels, computer literacy leads to specialized technical knowledge of electronics and assembly language. *See also* power user.

computer-managed instruction *n. See* CMI.

computer name *n.* In computer networking, a name that uniquely identifies a computer to the network. A computer's name cannot be the same as any other computer or domain name on the network. It differs from a user name in that the computer name is used to identify a particular computer and all its shared resources to the rest of the system so that they can be accessed. *Compare* alias (definition 2), user name.

computer network *n. See* network.

computer-output microfilm *n. See* COM (definition 4).

computerphile *n.* A person who is immersed in the world of computing, who collects computers, or whose hobby involves computing.

computer power *n.* The ability of a computer to perform work. If defined as the number of instructions the machine can carry out in a given time, computer power is measured in millions of instructions per second (MIPS) or millions of floating-point operations per second (MFLOPS). Power is measured in other ways too, depending on the needs or objectives of the person evaluating the machine. By users or purchasers of computers, power is often considered in terms of the machine's amount of random access memory (RAM), the speed at which the processor works, or the number of bits (8, 16, 32, and so on) handled by the computer at one time. Other factors enter into such an evaluation, however; two of the most important are how well the components of the computer work together and how well they are matched to the tasks required of them. For example, no matter how fast or powerful the computer, its speed will be hampered during operations involving the hard disk if the hard disk is slow (for example, with an access time of 65 milliseconds or higher). *See also* access time (definition 2), benchmark[1], MFLOPS, MIPS.

Computer Press Association *n.* A trade organization of journalists, broadcasters, and authors who write or report about computer technology and the computer industry.

Computer Professionals for Social Responsibility *n. See* CPSR.

computer program *n.* A set of instructions in some computer language intended to be executed on a computer so as to perform some task. The term usually implies a self-contained entity, as opposed to a routine or a library. *See also* computer language. *Compare* library (definition 1), routine.

computer-readable *adj.* Of, pertaining to, or characteristic of information that can be interpreted and acted on by a computer. Two types of information are referred to as computer-readable: bar codes, magnetic tape, magnetic-ink characters, and other formats that can be scanned in some way and read as data by a computer; and machine code, the form in which instructions and data reach the computer's microprocessor.

computer revolution *n.* The societal and technological phenomenon involving the swift development and widespread use and acceptance of computers—specifically single-user personal computers. The impact of these machines is considered revolutionary for two reasons. First, their appearance and success were rapid. Second, and more important, their speed and accuracy produced a change in the ways in which information can be processed, stored, and transferred.

computer science *n.* The study of computers, including their design, operation, and use in processing information. Computer science combines both theoretical and practical aspects of engineering, electronics, information theory, mathematics, logic, and human behavior. Aspects of computer science range from programming and computer architecture to artificial intelligence and robotics.

computer security *n.* The steps taken to protect a computer and the information it contains. On large systems or those handling financial or confidential data, computer security requires professional supervision that combines legal and technical expertise. On a microcomputer, data protection can be achieved by backing up and storing copies of files in a separate location, and the integrity of data on the computer can be maintained by assigning passwords to files, marking files read-only to avoid changes to them, physically locking a hard disk, storing sensitive information on floppy disks kept in locked cabinets, and installing special programs to protect against viruses. On a computer that many people have access to, security can be maintained by requiring personnel to use passwords and by granting only approved users access to sensitive information. *See also* bacterium, encryption, virus.

computer simulation *n. See* simulation.

computer system *n.* The configuration that includes all functional components of a computer and its associated hardware. A basic microcomputer system includes a console, or system unit, with one or more disk drives, a monitor, and a keyboard. Additional hardware, called *peripherals*, can include such devices as a printer, a modem, and a mouse. Software is usually not considered part of a computer system, although the operating system that runs the hardware is known as system software.

computer telephone integration *n.* A process allowing computer applications to answer incoming calls, provide database information on-screen at the same time the call comes in, automatically route and reroute calls by drag-and-drop, automatically dial and speed-dial outgoing calls from a computer-resident database, and identify incoming customer calls and transfer them to predetermined destinations. *See also* drag-and-drop.

Computer Telephony Expo *n. See* CT Expo.

computer typesetting *n.* Typesetting operations that are partially or totally controlled by computers. Partial control can involve the transmittal of text directly from the source to the typesetter, without a paste-up stage. Full computerization can include the digitization of all graphics, which would then also be transmitted directly to the typesetter and regenerated without paste-up.

computer users' group *n. See* user group.

computer utility *n. See* utility.

computer virus *n. See* virus.

computer vision *n.* The processing of visual information by a computer. Computer vision is a form of artificial intelligence that creates a symbolic description of images that are generally input from a video camera or sensor in order to convert the images to digital form. Computer vision is often associated with robotics. *Acronym:* CV. *See also* artificial intelligence, robotics.

Computer Vision Syndrome *n.* A change in a user's vision caused by prolonged exposure to computer monitors. Symptoms of Computer Vision Syndrome (CVS) can include blurred vision, dry, burning eyes, focusing problems, and headaches. CVS may be controlled with regular breaks from the computer, use of monitor filters or color adjustments, or adjustments to eyeglass prescriptions. *Acronym:* CVS.

COM recorder *n.* Short for computer output microfilm recorder. A device that records computer information on microfilm.

COMSAT *n. See* Communication Satellite Corporation.

CON *n.* The logical device name for *console*; reserved by the MS-DOS operating system for the keyboard and the screen. The input-only keyboard and the output-only

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screen together make up the console and represent the primary sources of input and output in an MS-DOS computer system.

concatenate *vb.* To join sequentially (for example, to combine the two strings "hello" and "there" into the single string "hello there"). *See also* character string.

concatenated data set *n.* A group of separate sets of related data treated as a single unit for processing.

concentrator *n.* A communications device that combines signals from multiple sources, such as terminals on a network, into one or more signals before sending them to their destination. *Compare* multiplexer (definition 2).

conceptual schema *n.* In a database model that supports a three-schema architecture (such as that described by ANSI/X3/SPARC), a description of the information contents and structure of a database. A conceptual schema (also known as a *logical schema*) provides a model of the total database, thus acting as an intermediary between the two other types of schemas (internal and external) that deal with storing information and presenting it to the user. Schemas are generally defined using commands from a DDL (data definition language) supported by the database system. *See also* internal schema, schema.

concordance *n.* A list of words that appear in a document, along with the contexts of the appearances.

concrete class *n.* In object-oriented programming, a class in which objects can be created. *See also* class (definition 1). *Compare* abstract class.

concurrent *adj.* Of, pertaining to, or characteristic of a computer operation in which two or more processes (programs) have access to the microprocessor's time and are therefore carried out nearly simultaneously. Because a microprocessor can work with much smaller units of time than people can perceive, concurrent processes appear to be occurring simultaneously but in reality are not.

concurrent execution *n.* The apparently simultaneous execution of two or more routines or programs. Concurrent execution can be accomplished on a single process or by using time-sharing techniques, such as dividing programs into different tasks or threads of execution, or by using multiple processors. *Also called:* parallel execution. *See also* parallel algorithm, processor, sequential execution, task, thread (definition 1), time-sharing.

concurrent operation *n. See* concurrent.

concurrent processing *n. See* concurrent.

concurrent program execution *n. See* concurrent.

Concurrent Versions System *n. See* CVS (definition 2).

condensed *adj.* Of, pertaining to, or characteristic of a font style, supported in some applications, that reduces the width of each character and then sets the characters closer together than their normal spacing. Many dot-matrix printers have a feature that causes the printer to reduce the width of each character and print them closer together, resulting in more characters fitting on a single line. *Compare* expanded.

condition *n.* The state of an expression or a variable (for example, when a result can be either true or false, or equal or not equal).

conditional *adj.* Of, pertaining to, or characteristic of an action or operation that takes place based on whether or not a certain condition is true. *See also* Boolean expression, conditional statement.

conditional branch *n.* In a program, a branch instruction that occurs when a particular condition code is true or false. The term is normally used in relation to low-level languages. *See also* branch instruction, condition code.

conditional compilation *n.* Selective compilation or translation of source code of a program based on certain conditions or flags; for example, sections of a program specified by the programmer might be compiled only if a DEBUG flag has been defined at compilation time. *See also* comment out.

conditional expression *n. See* Boolean expression.

conditional jump *n.* In a program, a jump instruction that occurs when a particular condition code is true or false. The term is normally used in relation to low-level languages. *See also* condition code, jump instruction.

conditional statement *n.* A programming-language statement that selects an execution path based on whether some condition is true or false (for example, the IF statement). *See also* case statement, conditional, IF statement, statement.

conditional transfer *n.* A transfer of the flow of execution to a given location in a program based on whether a particular condition is true. The term is usually used in relation to high-level languages. *See also* conditional statement.

condition code *n.* One of a set of bits that are set *on* (1, or true) or *off* (0, or false) as the result of previous machine instructions. The term is used primarily in assembly or

machine language situations. Condition codes are hardware-specific but usually include carry, overflow, zero result, and negative result codes. *See also* conditional branch.

conditioning *n.* The use of special equipment to improve the ability of a communications line to transmit data. Conditioning controls or compensates for signal attenuation, noise, and distortion. It can be used only on leased lines, where the path from sending to receiving computer is known in advance.

conductor *n.* A substance that conducts electricity well. Metals are good conductors, with silver and gold being among the best. The most commonly used conductor is copper. *Compare* insulator, semiconductor.

Conference on Data Systems Languages *n. See* CODASYL.

CONFIG.SYS *n.* A special text file that controls certain aspects of operating-system behavior in MS-DOS and OS/2. Commands in the CONFIG.SYS file enable or disable system features, set limits on resources (for example, the maximum number of open files), and extend the operating system by loading device drivers that control hardware specific to an individual computer system.

configuration *n.* **1.** In reference to a single microcomputer, the sum of a system's internal and external components, including memory, disk drives, keyboard, video, and generally less critical add-on hardware, such as a mouse, modem, or printer. Software (the operating system and various device drivers), the user's choices established through configuration files such as the AUTOEXEC.BAT and CONFIG.SYS files on IBM PCs and compatibles, and sometimes hardware (switches and jumpers) are needed to "configure the configuration" to work correctly. Although system configuration can be changed, as by adding more memory or disk capacity, the basic structure of the system—its architecture—remains the same. *See also* AUTOEXEC.BAT, CONFIG.SYS. **2.** In relation to networks, the entire interconnected set of hardware, or the way in which a network is laid out—the manner in which elements are connected.

configuration file *n.* A file that contains machine-readable operating specifications for a piece of hardware or software or that contains information on another file or on a specific user, such as the user's logon ID.

congestion *n.* The condition of a network when the current load approaches or exceeds the available resources and bandwidth designed to handle that load at a particular location in the network. Packet loss and delays are associated with congestion.

connect charge *n.* The amount of money a user must pay for connecting to a commercial communications system or service. Some services calculate the connect charge as a flat rate per billing period. Others charge a varying rate based on the type of service or the amount of information being accessed. Still others base their charges on the number of time units used, the time or distance involved per connection, the bandwidth of each connected session, or some combination of the preceding criteria. *See also* connect time.

connection *n.* A physical link via wire, radio, fiberoptic cable, or other medium between two or more communications devices.

connection-based session *n.* A communications session that requires a connection to be established between hosts prior to an exchange of data.

connectionism *n.* A model in artificial intelligence that advocates using highly parallel, specialized processes that compute simultaneously and are massively connected. Thus, the connectionist approach would not use a single high-speed processor to compute an algorithm, but would break out many simple specialized processing elements that are highly connected. Neural networks are classic examples of connectionism in that each "neuron" in the network may be assigned to a single processor. *See also* algorithm, artificial intelligence, neural network.

connectionless *adj.* In communications, of, pertaining to, or characteristic of a method of data transmission that does not require a direct connection between two nodes on one or more networks. Connectionless communication is achieved by passing, or routing, data packets, each of which contains a source and destination address, through the nodes until the destination is reached. *See also* node (definition 2), packet (definition 2). *Compare* connection-oriented.

connectionless session *n.* A communications session that does not require a connection to be established between hosts prior to an exchange of data.

connection-oriented *adj.* In communications, of, pertaining to, or characteristic of a method of data transmission that requires a direct connection between two nodes on one or more networks. *Compare* connectionless.

connection pooling *n.* A resource optimization feature of ODBC (Open Database Connectivity) 3 that results in

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more efficient sharing of database connections and objects. Connection pooling maintains open collections (pools) of database connections that can be used and reused by applications without the need to open and close a connection for each request. This is particularly important for Web-based applications. Connection pooling enables sharing among different components, maximizes performance, and minimizes the number of idle connections. *See also* ODBC.

connectivity *n.* **1.** The nature of the connection between a user's computer and another computer, such as a server or a host computer on the Internet or a network. This may describe the quality of the circuit or telephone line, the degree of freedom from noise, or the bandwidth of the communications devices. **2.** The ability of hardware devices or software packages to transmit data between other devices or packages. **3.** The ability of hardware devices, software packages, or a computer itself to work with network devices or with other hardware devices, software packages, or a computer over a network connection.

connectoid *n.* In Windows 9x and Windows NT, an icon representing a dial-up networking connection that will also execute a script for logging onto the network dialed.

connector *n.* **1.** In hardware, a coupler used to join cables or to join a cable to a device (for example, an RS-232-C connector used to join a modem cable to a computer). Most connector types are available in one of two genders—male or female. A male connector is characterized by one or more exposed pins; a female connector is characterized by one or more receptacles—sockets or jacks—designed to accept the pins on the male connector. *See also* DB connector, DIN connector. **2.** In programming, a circular symbol used in a flowchart to indicate a break, as to another page.

connect time *n.* The amount of time during which a user is actively connected to a remote computer. On commercial systems, the connect time is one means of calculating how much money the user must pay for using the system. *See also* connect charge.

consistency check *n.* A survey to verify that items of data conform to certain formats, bounds, and other parameters and are not internally contradictory. *Compare* completeness check.

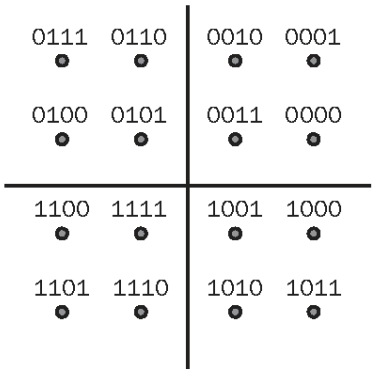
console *n.* **1.** A control unit, such as a terminal, through which a user communicates with a computer. In microcomputers, the console is the cabinet that houses the main components and controls of the system, sometimes including the screen, the keyboard, or both. With the MS-DOS operating system, the console is the primary input (keyboard) and primary output device (screen), as evidenced by the device name CON. *See also* CON, system console. **2.** *See* game console.

console game *n.* A special-purpose computer system designed specifically for the home user to play video games. A game console typically includes a CPU, one or more game controllers, audio output, and a video output that connects to a television set. Individual games and memory cards are supplied on plug-in cartridges or compact discs. Many recent versions are 128-bit systems and also include a modem for online gaming over the Internet. Well-known console games include Microsoft Xbox, Sony PlayStation 2, Nintendo GameCube, and Sega Dreamcast. *Also called:* game console. *Compare* arcade game. *See also* computer game, Dreamcast, GameCube, PlayStation, Xbox.

constant *n.* A named item that retains a consistent value throughout the execution of a program, as opposed to a variable, which can have its value changed during execution. *Compare* variable.

constant expression *n.* An expression that is composed only of constants and, hence, whose value does not change during program execution. *Compare* variable expression.

constellation *n.* In communications, a pattern representing the possible states of a carrier wave, each of which is associated with a particular bit combination. A constellation shows the number of states that can be recognized as unique changes in a communications signal and thus the maximum number of bits that can be encoded in a single change (equivalent to 1 baud, or one event). See the illustration.



Constellation.

constraint *n.* In programming, a restriction on the solutions that are acceptable for a problem.

consultant *n.* A computer professional who deals with client firms as an independent contractor rather than as an employee. Consultants are often engaged to analyze user needs and develop system specifications.

Consumer Electronics Show *n.* Annual tradeshow of the consumer electronics industry, held in Las Vegas, Nevada. CES features exhibits of the latest consumer electronics products and conference events that focus on consumer trends and business strategies. *Acronym:* CES.

contact manager *n.* A type of specialized database that allows a user to maintain a record of personal communication with others. Contact managers are widely used by salespeople and others who want to keep track of conversations, e-mail, and other forms of communication with a large number of current and prospective customers or clients. *See also* database.

container *n.* **1.** In OLE terminology, a file containing linked or embedded objects. *See also* OLE. **2.** In SGML, an element that has content as opposed to one consisting solely of the tag name and attributes. *See also* element, SGML, tag. **3.** In Sun Microsystem's J2EE network platform, an entity that provides life cycle management, security, deployment, and runtime services to components such as beans, Web components, applets, and application clients. Each type of container created (for example, EJB, Web, JSP, servlet, applet, and application client) also provides component-specific services. *See also* applet, component (definition 3), enterprise java bean, JSP, servlet.

container object *n.* An object that can logically contain other objects. For example, a folder is a container object. *See also* noncontainer object, object.

content *n.* **1.** The data that appears between the starting and ending tags of an element in an SGML, XML, or HTML document. The content of an element may consist of plain text or other elements. *See also* element (definition 2), HTML, SGML, tag (definition 3). **2.** The message body of a newsgroup article or e-mail message. **3.** The "meat" of a document, as opposed to its format or appearance.

content-addressed storage *n. See* associative storage.

content aggregator *n.* **1.** Broadly, an organization or business that groups Internet-based information by topic or area of interest—for example, sports scores, business news, or online shopping—to provide users with a means of accessing that content from a single location. **2.** In terms of push technology and multicasting, a service business that mediates between subscribers ("customers") and content providers by gathering and organizing information for broadcast over the Internet. Content aggregators supply subscribers with client software through which content providers broadcast (push) information via "channels" that allow users both to choose the kind of information they receive and to decide when they want it updated. *Also called:* channel aggregator. *See also* push, webcasting. *Compare* content provider.

content caching *n. See* content delivery.

content delivery *n.* The process of caching the pages of a Web site on geographically dispersed servers to enable faster delivery of Web pages. When a page is requested at a URL that is content-delivery enabled, the content-delivery network routes the user's request to a cache server closer to the user. Content delivery frequently is used for high-traffic Web sites or for specific high-traffic events. *Also called:* content distribution, content caching.

content distribution *n. See* content delivery.

contention *n.* On a network, competition among nodes for the opportunity to use a communications line or network resource. In one sense, contention applies to a situation in which two or more devices attempt to transmit at the same time, thus causing a collision on the line. In a somewhat different sense, contention also applies to a free-for-all method of controlling access to a communications line, in which the right to transmit is awarded to the station that wins control of the line. *See also* CSMA/CD. *Compare* token passing.

Content Management Server *n.* Automated software application developed by Microsoft Corporation to assist nontechnical users in creating, tracking, and publishing content for Web sites. A workflow system delineates the tasks each user can perform, assigns content to individuals or groups, and allows users to monitor the status of content with which they are associated.

Content Protection for Recordable Media *n. See* CPRM.

content provider *n.* **1.** Broadly, an individual, group, or business that provides information for viewing or distribution on the Internet or on private or semiprivate intranets or extranets. Content in this sense includes not only information but also video, audio, software, listings of Web sites, and product-specific materials such as online catalogs. **2.** A service business that makes Internet information

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resources available to users. Content providers include online services such as America Online and CompuServe, Internet service providers (ISPs), and an increasing number of media companies representing television, long-distance telephone, and publishing industries. *See also* ISP, online information service. *Compare* content aggregator.

Content Scrambling System *n. See* CSS.

contents directory *n.* A series of queues that contain the descriptors and addresses of routines located within a region of memory.

context-dependent *adj.* Of, pertaining to, or characteristic of a process or a set of data characters whose meaning depends on the surrounding environment.

context-sensitive help *n.* A form of assistance in which a program that provides on-screen help shows information to the user concerning the current command or operation being attempted.

context-sensitive menu *n.* A menu that highlights options as available or unavailable depending on the context in which the option is called. The menus on Windows' menu bar, for example, are context sensitive; options such as copy are grayed out if nothing is selected.

context switching *n.* A type of multitasking; the act of turning the central processor's "attention" from one task to another, rather than allocating increments of time to each task in turn. *See also* multitasking, time slice.

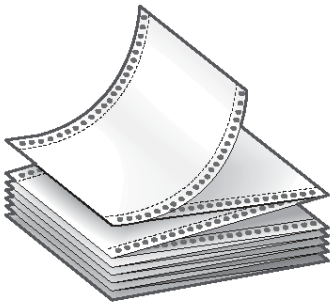
contextual search *n.* A search operation in which the user can direct a program to search specified files for a particular set of text characters.

contiguous *adj.* Having a shared boundary; being immediately adjacent. For example, contiguous sectors on a disk are data-storage segments physically located next to one another.

contiguous data structure *n.* A data structure, such as an array, that is stored in a consecutive set of memory locations. *See also* data structure. *Compare* noncontiguous data structure.

continuous carrier *n.* In communications, a carrier signal that remains on throughout the transmission, whether or not it is carrying information.

continuous-form paper *n.* Paper in which each sheet is connected to the sheets before and after it, for use with most impact and ink-jet printers and some other printing devices designed with an appropriate paper-feed mechanism. The paper usually has holes punched along each side so that it can be pulled by a tractor-feed device. See the illustration. *See also* pin feed, sprocket feed, tractor feed.



Continuous-form paper.

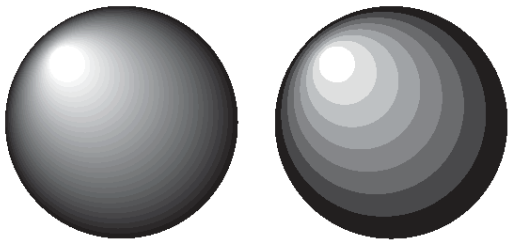
continuous processing *n.* The processing of transactions as they are input to the system. *Compare* batch processing (definition 3).

continuous speech recognition *n.* A type of automatic speech recognition (ASR) technology that responds to strings of words. Continuous speech recognition allows a user to speak in a natural voice without the need to slow down and enunciate each word separately. Continuous speech recognition software takes advantage of context in recognizing words, and thus will not operate at full efficiency if each word is spoken with distinct separation. *See also* ASR (definition 2).

continuous-tone image *n.* An image, such as a photograph, in which color or varying shades of gray are reproduced as gradients rather than as clustered or variably sized dots, as in traditional book or newspaper printing. Continuous-tone images can be viewed on an analog monitor (such as a television monitor), which accepts input as a continuously variable signal. They cannot be viewed on a digital monitor, which requires input broken into discrete units, nor can they be printed in books or newspapers, which represent illustrations as groups of dots. *See also* scan (definition 2), video digitizer. *Compare* halftone.

continuous-tone printer *n.* A printer that produces an image using smoothly blended levels of continuous ink for gradations of gray or color. *Compare* dithering.

contouring *n.* **1.** In computer graphics, such as CAD models, the representation of the surface of an object—its bumps and crannies. See the illustration. **2.** In image processing, the loss of detail that occurs in a shaded image when too few gradations of gray are used to reproduce a graphic, such as a photograph. In photography and graphic arts, this phenomenon is sometimes called *posterization.*



Contouring.

contrast *n.* **1.** The degree of difference between light and dark extremes of color on a monitor or on printed output. **2.** The control knob by which the contrast of a monitor is changed.

control *n.* **1.** Management of a computer and its processing abilities so as to maintain order as tasks and activities are carried out. Control applies to measures designed to ensure error-free actions carried out at the right time and in the right order relative to other data-handling or hardware-based activities. In reference to hardware, control of system operations can reside in a data pathway called a *control bus*. In reference to software, *control* refers to program instructions that manage data-handling tasks. **2.** In a graphical user interface, an object on the screen that can be manipulated by the user to perform an action. The most common controls are buttons, which allow the user to select options, and scroll bars, which allow the user to move through a document or position text in a window.

control break *n.* A transition in control of the computer that typically gives control of the CPU (central processing unit) to the user console or to some other program.

Control-Break *n. See* Break key.

control bus *n.* The set of lines (conductors) within a computer that carry control signals between the CPU (central processing unit) and other devices. For example, a control bus line is used to indicate whether the CPU is attempting to read from memory or to write to it; another control bus line is used by memory to request an interrupt in case of a memory error.

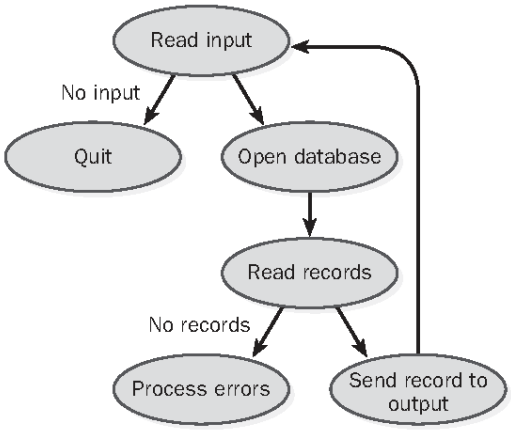
control character *n.* **1.** Any of the first 32 characters in the ASCII character set (0 through 31 in decimal representation), each of which is defined as having a standard control function, such as carriage return, linefeed, or backspace. **2.** Any of the 26 characters Control-A through Control-Z (1 through 26 in decimal representation) that can be typed at the keyboard by holding the Control key down and typing the appropriate letter. The six remaining characters with control functions, such as Escape (ASCII 27), cannot be typed using the Control key. *Compare* control code.

control code *n.* One or more nonprinting characters used by a computer program to control the actions of a device, used in printing, communications, and management of display screens. Control codes are mainly employed by programmers or by users to control a printer when an application program does not support the printer or one of its specialized features. In video, control codes are sent from a computer to a display unit to manipulate the appearance of text or a cursor on the screen. Popular video control code sets are ANSI and VT-100. *Also called:* escape sequence, setup string. *See also* control character.

control console *n. See* console.

control data *n.* Data that consists of information about timing and switching, used to synchronize and route other data or to manage the operation of a device such as a bus or a port.

control flow *n.* The tracing of all possible execution paths in a program, often represented in the form of a diagram. See the illustration.



Control flow.

Control key *n.* A key that, when pressed in combination with another key, gives the other key an alternative meaning. In many application programs, Control (labeled CTRL or Ctrl on a PC keyboard) plus another key is used as a command for special functions. See the illustration. *See also* control character (definition 2).

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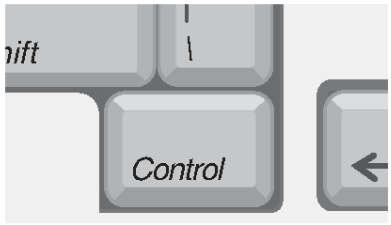

Control key.

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

program would use the following statement: PERFORM CHECK 10 TIMES.

conversational mode *n. See* conversational.

conversion *n.* The process of changing from one form or format to another; where information is concerned, a changeover that affects form but not substance. Types of conversion include data (changing the way information is represented), file (changing a file from one format to another), hardware (changing all or part of a computer system), media (transferring data from one storage media to another), software (changing a program designed for one platform so that it runs on another), and system (changing from one operating system to another).

conversion table *n.* A table listing a set of characters or numbers and their equivalents in another coding scheme. Common examples of conversion tables include ASCII tables, which list characters and their ASCII values, and decimal-to-hexadecimal tables. Several conversion tables are in Appendixes A-E.

converter *n.* Any device that changes electrical signals or computer data from one form to another. For example, an analog-to-digital converter translates analog signals to digital signals.

converter box *n. See* converter.

cookbook[1] *adj.* Of, pertaining to, or characteristic of a book or manual that presents information using a step-by-step approach. For example, a cookbook approach to programming might present a series of sample programs that the reader could analyze and adapt to his or her own needs.

cookbook[2] *n.* A computer book or manual that presents information using a step-by-step approach. Most often, *cookbook* refers to a programming guide, but it can refer to a book that shows how to accomplish specialized tasks in an application.

cooked mode *n.* One of two forms (the other being raw mode) in which an operating system such as UNIX or MS-DOS "sees" the handle, or identifier, for a character-based device. If the handle is in cooked mode, the operating system stores each character in a buffer and gives special treatment to carriage returns, end-of-file markers, and linefeed and tab characters, sending a line of data to a device, such as the screen, only after it reads a carriage-return or end-of-file character. In cooked mode, characters read from standard input are often automatically echoed (displayed) on the screen. *Compare* raw mode.

cookie *n.* **1.** A block of data that a server returns to a client in response to a request from the client. **2.** On the World Wide Web, a block of data that a Web server stores on a client system. When a user returns to the same Web site, the browser sends a copy of the cookie back to the server. Cookies are used to identify users, to instruct the server to send a customized version of the requested Web page, to submit account information for the user, and for other administrative purposes. **3.** Originally an allusion to fortune cookie, a UNIX program that outputs a different message, or "fortune," each time it is used. On some systems, the cookie program is run during user logon.

cookie filtering tool *n.* A utility that prevents a cookie on a Web browser from relaying information about the user requesting access to a Web site. *See also* cookie (definition 2).

cookies policy *n.* A statement that describes a Web site's policy regarding cookies. The policy usually defines a cookie, explains the types of cookies used by the Web site, and describes how the Web site uses the information stored in the cookies.

.coop *n.* One of seven new top-level domain names approved in 2000 by the Internet Corporation for Assigned-Names and Numbers (ICANN), .coop is meant for use with the Web sites of nonprofit cooperatives. The seven new domain names became available for use in the spring of 2001.

cooperative multitasking *n.* A type of multitasking in which one or more background tasks are given processing time during idle times in the foreground task only if the foreground task allows it. This is the primary mode of multitasking in the Macintosh operating system. *See also* background[1], context switching, foreground[1], multitasking, time slice. *Compare* preemptive multitasking.

cooperative processing *n.* A mode of operation characteristic of distributed systems in which two or more computers, such as a mainframe and a microcomputer, can simultaneously carry out portions of the same program or work on the same data. *Compare* distributed processing.

coordinate *n.* Any element in a group of references to a particular location, such as the intersection of a certain row and column. In computer graphics and displays,

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coordinates specify such elements as points on a line, the corners of a square, or the location of a pixel on the screen. In other computer applications, coordinates specify cells on a spreadsheet, data points on a graph, locations in memory, and so on. *See also* Cartesian coordinates, polar coordinates.

coordinate dimensioning *n.* A form of spatial positioning in which a point is described, relative to a fixed reference, in terms of its distance and direction along predefined axes. *See also* Cartesian coordinates, three-dimensional model, two-dimensional model.

coordinated universal time format *n. See* Universal Time Coordinate.

coordinate pair *n.* A pair of values representing the x-coordinate and y-coordinate of a point that are stored in a two-dimensional array that can contain coordinates for many points.

COPPA *n.* Acronym for **C**hildren's **O**nline **P**rivacy **P**rotection **A**ct. A U.S. federal law enacted in April 2000 and designed to protect the online privacy of children under the age of 13. COPPA requires Web sites that collect personal information from children under 13 to receive permission from parents or guardians first, and to monitor and supervise children's experiences with interactive Web elements such as chat rooms and e-mail.

copper chip *n.* A microprocessor that uses copper (rather than the more common aluminum) to connect transistors in a computer chip. Copper chip technology, which was developed by IBM and introduced in 1997, can be expected to boost the speed of a microprocessor by as much as 33 percent.

coprocessor *n.* A processor, distinct from the main microprocessor, that performs additional functions or assists the main microprocessor. The most common type of coprocessor is the floating-point coprocessor, also called a numeric or math coprocessor, which is designed to perform numeric calculations faster and better than the general-purpose microprocessors used in personal computers. *See also* floating-point processor.

copy *vb.* To duplicate information and reproduce it in another part of a document, in a different file or memory location, or in a different medium. A copy operation can affect data ranging from a single character to large segments of text, a graphics image, or from one to many data files. Text and graphics, for example, can be copied to another part of a document, to the computer's memory (by means of a temporary storage facility such as the Windows or Macintosh Clipboard), or to a different file. Similarly, files can be copied from one disk or directory to another, and data can be copied from the screen to a printer or to a data file. In most cases, a copy procedure leaves the original information in place. *Compare* cut and paste, move.

copy disk *n.* An MS-DOS command to duplicate the contents of a floppy disk on a second disk. *See also* floppy disk, MS-DOS.

copy holder *n.* An inclined clipboard or other such device designed to hold printed material so that it can be easily viewed by someone working at a computer keyboard.

copyleft *n. See* General Public License.

copy program *n.* **1.** A program designed to duplicate one or more files to another disk or directory. **2.** A program that disables or circumvents the copy-protection device on a computer program so that the software can be copied, often illegally, to another disk. *See also* copy protection.

copy protection *n.* A software lock placed on a computer program by its developer to prevent the product from being copied and distributed without approval or authorization.

copyright *n.* A method of protecting the rights of an originator of a creative work, such as a text, a piece of music, a painting, or a computer program, through law. In many countries the originator of a work has copyright in the work as soon as it is fixed in a tangible medium (such as a piece of paper or a disk file); that rule applies in the United States for works created after 1977. Registration of a copyright, or the use of a copyright symbol, is not needed to create the copyright but does strengthen the originator's legal powers. Unauthorized copying and distribution of copyrighted material can lead to severe penalties, whether done for profit or not. Copyrights affect the computer community in three ways: the copyright protection of software, the copyright status of material (such as song lyrics) distributed over a network such as the Internet, and the copyright status of original material distributed over a network (such as a newsgroup post). The latter two involve electronic media that are arguably not tangible, and legislation protecting the information disseminated through electronic media is still evolving. *See also* fair use, General Public License.

CORBA *n.* Acronym for **C**ommon **O**bject **R**equest Broker **A**rchitecture. A specification developed by the Object Management Group in 1992 in which pieces of programs (objects) communicate with other objects in other programs, even if the two programs are written in different programming languages and are running on different platforms. A program makes its request for objects through an *object request broker*, or *ORB*, and thus does not need to know the structure of the program from which the object comes. CORBA is designed to work in object-oriented environments. *See also* IIOP, object (definition 2), Object Management Group, object-oriented.

core *n.* One of the types of memory built into computers before random access memory (RAM) was available or affordable. Some people still use the term to refer to the main memory of any computer system, as in the phrase *core dump*—a listing of the raw contents of main memory at the moment of a system crash. *Compare* RAM.

core class *n.* In the Java programming language, a public class or interface that is a standard member of the language. Core classes, at minimum, are available on all operating systems where the Java platform runs. A program written entirely in the Java programming language relies only on core classes. *See also* class (definition 1), object, object-oriented programming.

core program *n.* A program or program segment that is resident in random access memory (RAM).

coresident *adj.* Of or pertaining to a condition in which two or more programs are loaded in memory at the same time.

corona wire *n.* In laser printers, a wire though which high voltage is passed to ionize the air and transfer a uniform electrostatic charge to the photosensitive medium in preparation for the laser.

coroutine *n.* A routine that is in memory at the same time as, and frequently executed concurrently with, another.

corrective maintenance *n.* The process of diagnosing and correcting computer problems after they occur. *Compare* preventive maintenance.

correspondence quality *n. See* print quality.

corruption *n.* A process wherein data in memory or on disk is unintentionally changed, with its meaning thereby altered or obliterated.

cost-benefit analysis *n.* The comparison of benefits to costs for a particular item or action. Cost-benefit analysis is often used in MIS or IS departments to determine such things as whether purchasing a new computer system is a good investment or whether hiring more staff is necessary. *See also* IS, MIS.

coulomb *n.* A unit of electrical charge equivalent to roughly 6.26×10^{18} electrons, with a negative charge being an excess of electrons and a positive charge being a deficiency of electrons.

counter *n.* **1.** In programming, a variable used to keep count of something. **2.** In electronics, a circuit that counts a specified number of pulses before generating an output. **3.** A device that keeps track of the number of visitors to a World Wide Web site.

counting loop *n.* In a program, a group of statements that are repeated, thereby incrementing a variable used as a counter (for example, a program might repeat a counting loop that adds 1 to its counter until the counter equals 10). *See also* loop[1] (definition 1).

country code *n. See* major geographic domain.

country-specific *adj.* Of, pertaining to, or characteristic of hardware or software that uses characters or conventions unique to a particular country or group of countries. *Country-specific* does not necessarily refer to spoken languages, although it does allow for special characters (such as accent marks) that are language-specific. Generally, the features considered country-specific include keyboard layout (including special-character keys), time and date conventions, financial and monetary symbols, decimal notation (decimal point or comma), and alphabetic sorting order. Such features are handled either by a computer's operating system (for example, by the Keyboard and Country commands in MS-DOS) or by application programs that offer options for tailoring documents to a particular set of national or international conventions.

courseware *n.* Software dedicated to education or training.

courtesy copy *n. See* cc.

CPA *n. See* Computer Press Association.

CPCP *n. See* HTCPCP.

cpi *n. See* characters per inch.

CP/M *n.* Acronym for **C**ontrol **P**rogram/**M**onitor. A line of operating systems from Digital Research, Inc. (DRI),

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for microcomputers based on Intel microprocessors. The first system, CP/M-80, was the most popular operating system for 8080- and Z80-based microcomputers. Digital Research also developed CP/M-86 for 8086/8088-based computers, CP/M-Z8000 for Zilog Z8000-based computers, and CP/M-68K for Motorola 68000-based computers. When the IBM PC and MS-DOS were introduced, common use of CP/M by end users dwindled. DRI continues to enhance the CP/M line, supporting multitasking with the Concurrent CP/M and MP/M products. *See also* MP/M.

CPM *n. See* critical path method.

CPRM *n.* Acronym for **C**ontent **P**rotection for **R**ecordable **M**edia. Technology developed to control the use of copyrighted digital music and video material by blocking the transfer of protected files to portable media such as zip disks and smart cards. CPRM would be added to storage devices and provide data scrambling and identification codes to block the copying of copyrighted files.

cps *n. See* characters per second.

CPSR *n.* Acronym for **C**omputer **P**rofessionals for **S**ocial **R**esponsibility. A public advocacy organization of computer professionals. CPSR was originally formed out of concern over the use of computer technology for military purposes but has extended its interest to such issues as civil liberties and the effect of computers on workers.

CPU *n.* Acronym for **c**entral **p**rocessing **u**nit. The computational and control unit of a computer. The CPU is the device that interprets and executes instructions. Mainframes and early minicomputers contained circuit boards full of integrated circuits that implemented the CPU. Single-chip central processing units, called *microprocessors*, made possible personal computers and workstations. Examples of single-chip CPUs are the Motorola 68000, 68020, and 68030 chips and the Intel 8080, 8086, 80286, 80386, and i486 chips. The CPU—or microprocessor, in the case of a microcomputer—has the ability to fetch, decode, and execute instructions and to transfer information to and from other resources over the computer's main data-transfer path, the bus. By definition, the CPU is the chip that functions as the "brain" of a computer. In some instances, however, the term encompasses both the processor and the computer's memory or, even more broadly, the main computer console (as opposed to peripheral equipment). See the illustration. *See also* microprocessor.

CPU.

CPU-bound *adj. See* computation-bound.

CPU cache *n.* A section of fast memory linking the CPU (central processing unit) and main memory that temporarily stores data and instructions the CPU needs to execute upcoming commands and programs. Considerably faster than main memory, the CPU cache contains data that is transferred in blocks, thereby speeding execution. The system anticipates the data it will need through algorithms. *Also called:* cache memory, memory cache. *See also* cache, CPU, VCACHE.

CPU cycle *n.* **1.** The smallest unit of time recognized by the CPU (central processing unit)—typically a few hundred-millionths of a second. **2.** The time required for the CPU to perform the simplest instruction, such as fetching the contents of a register or performing a no-operation instruction (NOP). *Also called:* clock tick.

CPU fan *n.* An electric fan usually placed directly on a CPU (central processing unit) or on the CPU's heat sink to help dissipate heat from the chip by circulating air around it. *See also* CPU, heat sink.

CPU speed *n.* A relative measure of the data-processing capacity of a particular CPU (central processing unit), usually measured in megahertz. *See also* CPU.

CPU time *n.* In multiprocessing, the amount of time during which a particular process has active control of the CPU (central processing unit). *See also* CPU, multiprocessing.

CR *n. See* carriage return.

crack *vb.* **1.** To gain unauthorized access to a network by breaching its security. **2.** To decipher encrypted information.

cracker *n.* A person who overcomes the security measures of a computer system and gains unauthorized access. The goal of some crackers is to obtain information ille-

gally from a computer system or use computer resources. However, the goal of the majority is only to break into the system. *See also* hacker (definition 2).

cradle *n.* A receptacle used to recharge the batteries in some handheld or palm-size PCs or PDAs (personal digital assistants). Some cradles also serve as a means to connect these smaller devices with a desktop PC. Not all of these devices require a cradle to recharge or connect to a desktop system. *Also called:* dock, docking station.

cramfs *n.* Short for **C**ompressed **R**ead-**O**nly **F**ile **S**ystem and **cram** a **f**ile**s**ystem onto a small ROM. A filesystem feature available with Linux version 2.4 systems. Cramfs are used in handheld Linux devices to compress and write applications to ROM or Flash memory.

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

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

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

crawl *vb.* To compile and organize entries for a search engine by reading Web pages and related information. Crawling is typically performed by programs called "spiders."

crawler *n. See* spider, Web browser.

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

CRC *n.* Acronym for **c**yclical (or **c**yclic) **r**edundancy **c**heck. A procedure used in checking for errors in data transmission. CRC error checking uses a complex calculation to generate a number based on the data transmitted. The sending device performs the calculation before transmission and includes it in the packet that it sends to the receiving device. The receiving device repeats the same calculation after transmission. If both devices obtain the same result, it is assumed that the transmission was error free. The procedure is known as a redundancy check because each transmission includes not only data but extra (redundant) error-checking values. Communications protocols such as XMODEM and Kermit use cyclical redundancy checking.

create method *n.* In Java programming, a method defined in the home interface and invoked by a client to create an enterprise java bean. *See also* enterprise java bean, method.

creator *n.* On the Apple Macintosh, the program that creates a file. Files are linked to their creators by creator codes; this link enables the operating system to open the creator application when a document file is opened.

credentials *n.* A set of information that includes identification and proof of identification that is used to gain access to local and network resources. Examples of credentials are user names and passwords, smart cards, and certificates.

creeping featurism *n.* The process by which features are added to a new version of a program by software developers until the program becomes unduly cumbersome and difficult to use. Generally, creeping featurism occurs as developers attempt to enhance the competitiveness of the program with each new release by adding new features.

crippled version *n.* A scaled-down or functionally reduced version of hardware or software, distributed for demonstration purposes. *See also* demo.

critical error *n.* An error that suspends processing until the condition can be corrected either by software or by user intervention (for example, an attempt to read to a nonexistent disk, an out-of-paper condition on the printer, or a checksum fault in a data message).

critical-error handler *n.* A software routine that attempts to correct or achieve a graceful exit from a critical or threatening error. *See also* critical error, graceful exit.

critical path method *n.* A means of evaluating and managing a large project by isolating tasks, milestone events, and schedules and by showing interrelationships among them. The critical path for which this method is named is a line connecting crucial events, any of which, if delayed, affects subsequent events and, ultimately, completion of the project. *Acronym:* CPM.

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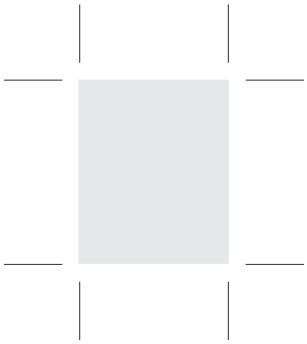
crop *vb.* In computer graphics, to cut off part of an image, such as unneeded sections of a graphic or extra white space around the borders. As in preparing photographs or illustrations for traditional printing, cropping is used to refine or clean up a graphic for placement in a document.

crop marks *n.* **1.** Lines drawn at the edges of pages to mark where the paper will be cut to form pages in the final document. See the illustration. *See also* registration marks. **2.** Lines drawn on photographs or illustrations to indicate where they will be cropped, or cut. *See also* crop.



Crop marks.

cross-assembler *n.* An assembler that executes on one hardware platform but generates machine code for another. *See also* assembler, compiler, cross-compiler, cross development.

cross-check *vb.* To check the accuracy of a calculation by using another method to verify the result. *Compare* cross-foot.

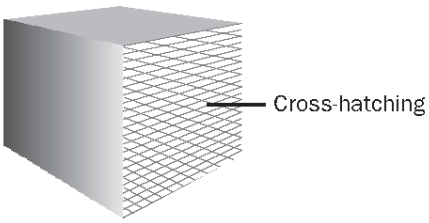
cross-compiler *n.* A compiler that executes on one hardware platform but generates object code for another. *See also* assembler, compiler (definition 2), cross-assembler, cross development.

cross development *n.* The use of one system to develop programs for a different type of system, often because the software development tools of the development system are superior to those of the target system.

cross-foot *vb.* To check the accuracy of a total, as on a ledger sheet, by adding across columns and down rows, all figures contributing to the total.

cross hairs *n.* Intersecting lines used by some computer input devices to locate a particular *x*-*y*-coordinate.

cross-hatching *n.* Shading made up of regularly spaced, intersecting lines. Cross-hatching is one of several methods for filling in areas of a graphic. See the illustration.



Cross-hatching.

cross-linked files *n.* In Windows 9x, Windows 3.*x*, and MS-DOS, a file-storage error occurring when one or more sections, or *clusters*, of the hard drive or a floppy disk have been erroneously allocated to more than one file in the file allocation table. Like lost clusters, cross-linked files can result from the ungraceful exit (messy or abrupt termination) of an application program. *See also* file allocation table, lost cluster.

crossover cable *n.* A cable used to connect two computers together for file sharing and personal networking. Crossover cables may be connected to Ethernet or FireWire ports.

cross-platform *adj.* Of, pertaining to, or characteristic of a software application or hardware device that can be run or operated on more than one system platform.

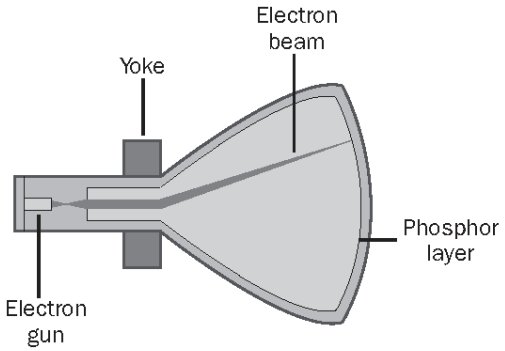
cross-post *vb.* To copy a message or news article from one newsgroup, conference topic, e-mail system, or other communications channel to another—for example, from a Usenet newsgroup to a CompuServe forum or from e-mail to a newsgroup.

cross-site scripting *n.* A security vulnerability of dynamic Web pages generated from a database in response to user input. With cross-site scripting, a malicious user introduces unwanted executable script or code into another user's Web session. Once running, this script could allow others to monitor the user's Web session, change what is displayed on the screen, or shut down the Web browser. Web sites that allow visitors to add comments or make other additions or changes to the pages are the most vulnerable to this flaw. Cross-site scripting is not restricted to the products of a particular vendor or a particular operating system. *See also* script.

crosstab query *n.* A query that calculates a sum, an average, a count, or other type of total on records, and then groups the result by two types of information—one down the left side of the datasheet and the other across the top.

crosstalk *n.* Interference caused by a signal transferring from one circuit to another, as on a telephone line.

CRT *n.* Acronym for **c**athode-**r**ay **t**ube. The basis of the television screen and the standard microcomputer display screen. A CRT display is built around a vacuum tube containing one or more electron guns whose electron beams rapidly sweep horizontally across the inside of the front surface of the tube, which is coated with a material that glows when irradiated. Each electron beam moves from left to right, top to bottom, one horizontal scan line at a time. To keep the screen image from flickering, the electron beam refreshes the screen 30 times or more per second. The clarity of the image is determined by the number of pixels on the screen. See the illustration. *See also* pixel, raster, resolution (definition 1).



CRT. *Cutaway view of a CRT.*

CRT controller *n.* The part of a video adapter board that generates the video signal, including the horizontal and vertical synchronization signals. *See also* video adapter.

cruise *vb. See* surf.

crunch *vb.* To process information. *See also* number crunching.

cryoelectronic *adj.* Involving the use of superconducting electronics kept in a cryogenic environment at very low temperatures.

crypto *n. See* cryptography.

cryptoanalysis *n.* The decoding of electronically encrypted information for the purpose of understanding encryption techniques. *See also* cryptography, encryption.

CryptoAPI *n.* An application programming interface (API) that is provided as part of Microsoft Windows. CryptoAPI provides a set of functions that allows applications to encrypt or digitally sign data in a flexible manner while providing protection for the user's sensitive private key data. Actual cryptographic operations are performed by independent modules known as cryptographic service providers (CSPs). *See also* application programming interface (API), cryptographic service provider, private key.

cryptographic service provider *n.* An independent module that performs cryptographic operations, such as creating and destroying keys. A cryptographic service provider consists of, at a minimum, a DLL and a signature file. *Acronym:* CSP.

cryptography *n.* The use of codes to convert data so that only a specific recipient will be able to read it using a key. The persistent problem of cryptography is that the key must be transmitted to the intended recipient and may be intercepted. Public key cryptography is a recent significant advance. *Also called:* crypto. *See also* code[1](definition 2), encryption, PGP, private key, public key.

CSD *n. See* circuit-switched data.

C shell *n.* One of the command-line interfaces available under UNIX. The C shell is very usable but is not on every system. *Compare* Bourne shell, Korn shell.

CSLIP *n. See* Compressed SLIP.

CSMA/CA *n.* Acronym for **C**arrier **S**ense **M**ultiple **A**ccess with **C**ollision **A**voidance, a protocol for controlling network access similar to CSMA/CD, in that nodes (stations) listen to the network and transmit only when it is free. But in CSMA/CA, nodes avoid data collisions by signaling their intention with a brief Request to Send (RTS) signal and then waiting for acknowledgment before actually transmitting.

CSMA/CD *n.* Acronym for **C**arrier **S**ense **M**ultiple **A**ccess with **C**ollision **D**etection. A network protocol for handling situations in which two or more nodes (stations) transmit at the same time, thus causing a collision. With CSMA/CD, each node on the network monitors the line and transmits when it senses that the line is not busy. If a collision occurs because another node is using the same

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opportunity to transmit, both nodes stop transmitting. To avoid another collision, both then wait for differing random amounts of time before attempting to transmit again. *Compare* token passing.

CSO *n.* Acronym for **C**omputing **S**ervices **O**ffice. An Internet directory service that matches users' own names with e-mail addresses, generally at colleges and universities. The CSO service, which can be reached through Gopher, was originally developed at the Computing Services Office at the University of Illinois.

CSO name server *n.* A facility that provides e-mail directory information through the CSO system. *See also* CSO.

CSR *n. See* continuous speech recognition.

CSS *n.* **1.** *See* cascading style sheets. **2.** Acronym for **C**ontent **S**crambling **S**ystem. An encryption feature added to DVDs distributed with approval of the MPAA. CSS looks for a matching region code on the DVD and the playback device. If the codes do not match (such as for a DVD purchased in Japan and a DVD player purchased in the United States), CSS will not allow the DVD to play. CSS also will not allow a DVD to be played on playback equipment not approved by the MPAA. *See also* deCSS, region code.

CSS1 *n. See* cascading style sheets.

CSTN display *n. See* supertwist display.

CSU *n. See* DDS.

.csv *n.* The file extension for a comma-delimited text file.

CSV *n.* **1.** *See* circuit-switched voice. **2.** *See* alternate circuit-switched voice/circuit-switched data. **3.** Acronym for **c**omma **s**eparated **v**alues. Filename extension assigned to text files containing tabular data of the sort stored in database fields. As the name indicates, individual data entries are separated by commas. *Compare* TSV.

CTERM *n. See* Communications Terminal Protocol.

CT Expo *n.* Acronym for **C**omputer **T**elephony **Expo**. Annual exposition on data and communications issues involving the computer, telecommunications, and Internet industries. Held in Los Angeles, California, CT Expo features exhibits by hundreds of companies displaying their latest products and services, as well as conferences on a range of subjects affecting computer telephony.

CTI *n.* Acronym for **c**omputer-**t**elephony **i**ntegration. The practice of using a computer to control one or more telephone and communications functions.

CTIA *n. See* Cellular Telecommunications and Internet Association.

CTIA Wireless *n.* Annual conference of the wireless data, mobile Internet, and handheld computing industries. Sponsored by the Cellular Telecommunications and Internet Association, CTIA Wireless showcases products and technical developments in the field of wireless communications and data.

CTL *n.* Short for **c**ontro**l**. *See* control character (definition 2), Control key.

CTO *n.* Acronym for **C**hief **T**echnology **O**fficer. A corporate executive in charge of managing a company's information technology (IT) architecture and other technological assets. The CTO's responsibilities may include oversight of IT centers, networks and intranet, applications, databases, Web presence, and other technological resources.

CTRL or **Ctrl** *n.* Short for **c**ontro**l**. A designation used to label the Control key on computer keyboards. *See also* control character (definition 2), Control key.

Ctrl+Alt+Delete *n.* A three-key combination used with IBM and compatible computers to restart (reboot) the machine. Pressing Ctrl+Alt+Delete (Control+Alternate+Delete) causes a warm boot in MS-DOS—the computer restarts but does not go through all of the internal checks involved when power to the system is switched on (cold boot). In Windows 9x and Windows NT, Ctrl+Alt+Delete provides a dialog box from which the user may choose to shut down the computer or end any current tasks.

Ctrl+C *n.* **1.** In UNIX, the key combination used to break out of a running process. **2.** The keyboard shortcut recognized by many programs (as in Windows) as an instruction to copy the currently selected item.

Ctrl+S *n.* **1.** On systems in which a software handshake is used between terminals and a central computer, the key combination used to suspend output. Ctrl+Q will resume output after a Ctrl-S suspension. *See also* software handshake, XON/XOFF. **2.** A keyboard shortcut recognized by many programs as an instruction to save the current document or file.

CTS *n.* Acronym for **C**lear **T**o **S**end. In serial communications, a signal sent, as from a modem to its computer, to indicate that transmission can proceed. CTS is a hardware signal sent over line 5 in RS-232-C connections. *Compare* RTS.

CUA *n. See* Common User Access.

cube *n.* An OLAP data structure. A cube contains dimensions (like Country/Region/City) and data fields (like Sales Amount). Dimensions organize types of data into hierarchies with levels of detail, and data fields measure quantities.

Cube *n.* A personal computer design introduced by Apple in 2000. The Cube featured a unique 8-by-8-by-8-inch transparent curved cube shape with the power supply outside the chassis to create a small and extremely quiet computer. The Cube offered the same G4 processor and features available on other Macintosh computers, but with fewer expansion options. Although the unique design drew notice for innovation, Apple discontinued manufacture of the Cube in 2001 after only one year of production.

CUI *n. See* character user interface.

CUL8R *n.* A fanciful shorthand notation meaning "See you later," sometimes seen in Internet discussion groups as a farewell by a participant temporarily leaving the group.

curly quotes *n. See* smart quotes.

current *n.* The flow of electric charge through a conductor, or the amount of such flow. Current is measured in amperes. *See also* ampere, coulomb. *Compare* volt.

current cell *n. See* active cell.

current directory *n.* The disk directory at the end of the active directory path—the directory that is searched first for a requested file, and the one in which a new file is stored unless another directory is specified. *See also* path (definition 2).

current drain *n.* **1.** The current taken from a voltage source by its load (the object receiving the current). *Also called:* drain. **2.** The load itself. For example, a flashlight bulb takes current from the battery; this current is the drain on the battery, and the bulb itself may also be called the drain.

current location counter *n. See* program counter.

current-mode logic *n.* A type of circuit design in which the transistors operate in unsaturated (amplifying) mode.

cursor *n.* **1.** A special on-screen indicator, such as a blinking underline or rectangle, that marks the place at which a keystroke will appear when typed. **2.** In reference to digitizing tablets, the stylus (pointer or "pen"). **3.** In applications and operating systems that use a mouse, the arrow or other on-screen icon that moves with movements of the mouse.

cursor blink speed *n.* The rate at which a cursor on a screen flashes on and off. *See also* cursor (definition 1).

cursor control *n.* The ability of a computer user to move the cursor to a specified location on the screen. Keys dedicated to cursor control include the left, right, up, and down arrow keys and certain others, such as Backspace, Home, and End. Pointing devices such as the mouse can also control cursor movements, often helping the user move the cursor long distances from place to place in a document.

cursor key *n. See* arrow key.

CUSeeMe *n.* A video conferencing program developed at Cornell University. It was the first program to give Windows and Mac OS users the ability to engage in real-time video conferencing over the Internet, but it requires a lot of bandwidth (at least 128 Kbps speed) to function properly.

custom control *n.* A control authored by a user or a third-party software vendor that does not belong to the .NET Framework class library. This is a generic term that includes user controls. A custom server control is used in Web Forms (ASP.NET pages). A custom client control is used in Windows Forms applications.

customize *vb.* To modify or assemble hardware or software to suit the needs or preferences of the user. Traditionally, hardware customizing ranges from designing an electronic circuit for a particular customer to putting together a computer facility tailored to a customer's special need. Software customizing usually means modifying or designing software for a specific customer.

custom queuing *n.* A form of queuing on Cisco routers where the wide area network (WAN) link is divided into micropipes based on a percentage of the total bandwidth available on the pipe. *See also* bandwidth reservation.

custom software *n.* Any type of program developed for a particular client or to address a special need. Certain products, such as dBASE and Lotus 1-2-3, are designed to provide the flexibility and tools required for producing tailor-made applications. *See also* CASE.

cut *vb.* To remove part of a document, usually placing it temporarily in memory so that the cut portion can be inserted (pasted) elsewhere. *Compare* delete.

cut and paste *n.* A procedure in which the computer acts as an electronic combination of scissors and glue for reorganizing a document or for compiling a document from different sources. In cut and paste, the portion of a document

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to be moved is selected, removed to storage in memory or on disk, and then reinserted into the same or a different document.

cut-through switch *n.* A network switch that routes packets immediately to the port associated with the packet's recipient. *See also* packet.

CV *n. See* computer vision.

CVS *n.* **1.** *See* Computer Vision Syndrome. **2.** Acronym for **C**oncurrent **V**ersions **S**ystem. An open-source network-transparent version control system which allows multiple developers to view and edit code simultaneously. Popular because the client-server function allows operation over the Internet. CVS maintains a single copy of the source code with a record of who initiated changes and when the changes were made. CVS was developed for the UNIX operating system and is commonly used by programmers working with Linux, Mac OS X, and other UNIX-based environments.

CWIS *n. See* campuswide information system.

cXML *n.* Acronym for **c**ommerce **XML**. A set of document definitions for Extensible Markup Language (XML) developed for use in business-to-business e-commerce. cXML defines standards for product listings, allows for electronic requests and responses between procurement applications and suppliers, and provides for secure financial transactions via the Internet.

cyber- *prefix* A prefix attached to "everyday" words in order to give them a computer-based or online meaning, as in cyberlaw (the practice of law either in relation to or through the use of the Internet) and cyberspace (the virtual online world). The prefix is derived from the word *cybernetics*, which refers to the study of mechanisms used to control and regulate complex systems, either human or machine.

cyberart *n.* The artwork of artists who use computers to create or distribute their efforts.

cybercafe or **cyber café** *n.* **1.** A coffee shop or restaurant that offers access to PCs or other terminals that are connected to the Internet, usually for a per-hour or per-minute fee. Users are encouraged to buy beverages or food to drink or eat while accessing the Internet. **2.** A virtual café on the Internet, generally used for social purposes. Users interact with each other by means of a chat program or by posting messages to one another through a bulletin board system, such as in a newsgroup or on a Web site.

cybercash *n. See* e-money.

cyberchat *n. See* IRC.

cybercop *n.* A person who investigates criminal acts committed on line, especially fraud and harassment.

cyberculture *n.* The behavior, beliefs, customs, and etiquette that characterize groups of individuals who communicate or socialize over computer networks, such as the Internet. The cyberculture of one group can be vastly different from the cyberculture of another.

Cyberdog *n.* Apple's Internet suite for Web browsing and e-mail, based on OpenDoc for easy integration with other applications. *See also* OpenDoc.

cyberlawyer *n.* **1.** An attorney whose practice involves the law related to computers and online communication, including elements of communications law, intellectual property rights, privacy and security issues, and other specialties. **2.** An attorney who advertises or distributes information over the Internet and the World Wide Web.

cyberlife *n.* In the gaming world, a technology that mimics biological DNA. *See also* digital DNA.

cybernaut *n.* One who spends copious time on line, exploring the Internet. *Also called:* Internaut. *See also* cyberspace.

cybernetics *n.* The study of control systems, such as the nervous system, in living organisms and the development of equivalent systems in electronic and mechanical devices. Cybernetics compares similarities and differences between living and nonliving systems (whether those systems comprise individuals, groups, or societies) and is based on theories of communication and control that can be applied to either living or nonliving systems or both. *See also* bionics.

cyberpunk *n.* **1.** A genre of near-future science fiction in which conflict and action take place in virtual-reality environments maintained on global computer networks in a worldwide culture of dystopian alienation. The prototypical cyberpunk novel is William Gibson's *Neuromancer* (1982). **2.** A category of popular culture that resembles the ethos of cyberpunk fiction. **3.** A person or fictional character who resembles the heroes of cyberpunk fiction.

cybersex *n.* Communication via electronic means, such as e-mail, chat, or newsgroups, for the purpose of sexual stimulation or gratification. *See also* chat[1] (definition 1), newsgroup.

cyberspace *n.* **1.** The advanced shared virtual-reality network imagined by William Gibson in his novel *Neuromancer* (1982). **2.** The universe of environments, such as the Internet, in which persons interact by means of connected computers. A defining characteristic of cyberspace is that communication is independent of physical distance.

cyberspeak *n.* Terminology and language (often jargon, slang, and acronyms) relating to the Internet (computer-connected) environment, that is, cyberspace. *See also* cyberspace.

cybersquatter *n.* A person who registers company names and other trademarks as Internet domain names in order to force the named companies or owners of the trademarks to buy them at an inflated price.

cyberwidow *n.* The spouse of a person who spends inordinate amounts of time on the Internet.

cybrarian *n.* Software used at some libraries that allows one to query a database through the use of an interactive search engine.

cycle power *vb.* To turn the power to a machine off and back on in order to clear something out of memory or to reboot after a hung or crashed state.

cycle time *n.* The amount of time between a random access memory (RAM) access and the earliest time a new access can occur. *See also* access time (definition 1).

cyclical redundancy check *n. See* CRC.

cyclic binary code *n.* A binary representation of numbers in which each number differs from the one that precedes it by one unit (bit), in one position. Cyclic binary numbers differ from "plain" binary numbers, even though both are based on two digits, 0 and 1. The numbers in the cyclic binary system represent a code, much like Morse code, whereas "plain" binary numbers represent actual values in the binary number system. Because sequential numbers differ by only 1 bit, cyclic binary is used to minimize errors in representing unit measurements. See the table.

Table C.2 Cyclic Binary Code Compared to Other Numeral Systems

Cyclic binary	*"Plain" binary*	*Decimal*
0000	0000	0
0001	0001	1
0011	0010	2
0010	0011	3
0110	0100	4
0111	0101	5
0101	0110	6
0100	0111	7
1100	1000	8
1101	1001	9

Cycolor *n.* A color printing process that uses a special film embedded with millions of capsules filled with cyan, magenta, and yellow dyes. When exposed to red, green, or blue light, the respective capsules become hard and unbreakable. The film is then pressed against specially treated paper, and the capsules that have not hardened in the previous process break, releasing their colors onto the paper. *See also* CMY.

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DA *n. See* desk accessory.

DAC *n. See* digital-to-analog converter.

DACL *n. See* discretionary access control list.

daemon *n.* A program associated with UNIX systems that performs a housekeeping or maintenance utility function without being called by the user. A daemon sits in the background and is activated only when needed, for example, to correct an error from which another program cannot recover.

daisy chain[1] *n.* A set of devices connected in series. In order to eliminate conflicting requests to use the channel (bus) to which all the devices are connected, each device is given a different priority. SCSI (**S**mall **C**omputer **S**ystem **I**nterface) and the newer USB (**U**niversal **S**erial **B**us) both support daisy-chained devices. *See also* SCSI, USB.

daisy chain[2] *vb.* To connect a series of devices, one to another, like daisies in a chain of flowers.

daisy wheel *n.* A print element consisting of a set of formed characters with each character mounted on a separate type bar, all radiating from a center hub. *See also* daisy-wheel printer, thimble, thimble printer.

daisy-wheel printer *n.* A printer that uses a daisy-wheel type element. Daisy-wheel output is crisp and slightly imprinted, with fully formed characters resembling typewriter quality. Daisy-wheel printers were standard for high-quality printing until being superseded by laser printers. *See also* daisy wheel, thimble, thimble printer.

dampIng *n.* A technique for preventing overshoot (exceeding the desired limit) in the response of a circuit or device.

D-AMPS *n.* Acronym for **D**igital **A**dvanced **M**obile Phone **S**ervice. The digital form of the analog AMPS cellular phone service. D-AMPS, sometimes spelled DAMPS, differs from AMPS in being digital and in tripling the number of available channels by using time division multiple access (TDMA) to divide each of the 30 AMPS channels into three separate channels. *See also* AMPS, FDMA, TDMA.

DAO *n. See* Data Access Objects.

DAP *n. See* Directory Access Protocol.

DaratechSUMMIT *n.* Conference on emerging engineering and technology developments in the information technology industry. The DaratechSUMMIT focuses on how information technology affects business practices and assists in manufacturing and production.

dark fiber *n.* Unused capacity in fiber-optic communications.

Darlington circuit *n.* An amplifier circuit made of two transistors, often mounted in the same housing. The collectors of the two transistors are connected, and the emitter of the first is connected to the base of the second. Darlington circuits provide high-gain amplification. *Also called:* Darlington pair.

Darlington pair *n. See* Darlington circuit.

DARPA *n. See* Defense Advanced Research Projects Agency.

DARPANET *n.* Short for **D**efense **A**dvanced **R**esearch **P**rojects **A**gency **Net**work. *See* ARPANET.

Darwin *n.* Apple Computer's open-source operating system, which forms the core of Mac OS X. Darwin is a processor-independent BSD UNIX operating system based on FreeBSD and Mach 3.0 technologies. Darwin offers advanced networking, protected memory, preemptive multitasking, and support for Macintosh and UNIX file systems. Darwin can be run on both the Power PC Macintosh and Intel processor–based computers. *See also* Mac OS X.

DAS *n. See* dual attachment station.

DASD *n.* Acronym for **d**irect **a**ccess **s**torage **d**evice. A data storage device by which information can be accessed directly, instead of by passing sequentially through all storage areas. For example, a disk drive is a DASD, but a tape unit is not, because, with a tape unit, the data is stored as a linear sequence. *See also* direct access. *Compare* sequential access.

.dat *n.* A generic file extension for a data file.

DAT *n. See* digital audio tape, dynamic address translation.