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!*

PUBLISHED BY
Microsoft Press
A Division of Microsoft Corporation
One Microsoft Way
Redmond, Washington 98052-6399

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Library of Congress Cataloging-in-Publication Data
Microsoft Computer Dictionary.--5th ed.
p. cm.
ISBN 0-7356-1495-4
1. Computers--Dictionaries. 2. Microcomputers--Dictionaries.

AQ76.5. M52267 2002
004'.03--dc21 200219714

Printed and bound in the United States of America.

2 3 4 5 6 7 8 9 QWT 7 6 5 4 3 2

Distributed in Canada by H.B. Fenn and Company Ltd.

A CIP catalogue record for this book is available from the British Library.

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Body Part No. X08-41929

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).

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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-mail[1] *(noun)*
e-mail[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.

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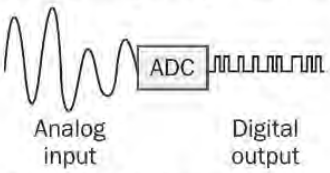
analog line *n.* A communications line, such as a standard telephone line, that carries continuously varying (analog) signals.

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.

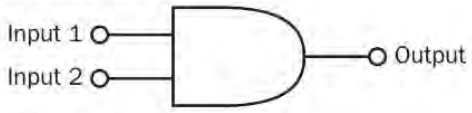
ancillary equipment *n. See* peripheral.

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.

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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.

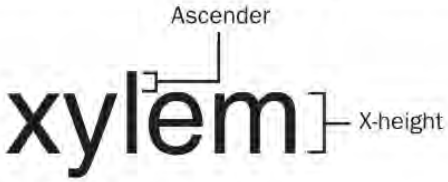
artificial life *n.* The study of computer systems that simulate some aspects of the behavior of living organisms. Artificial life includes systems in which programs intended to perform some particular task compete for survival and reproduction based on their performance; the offspring can combine pieces 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.

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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

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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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B

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

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C

COBOL *n.* Acronym for **Co**mmon **B**usiness-**O**riented **L**anguage. 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 **Co**nference on **Da**ta **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

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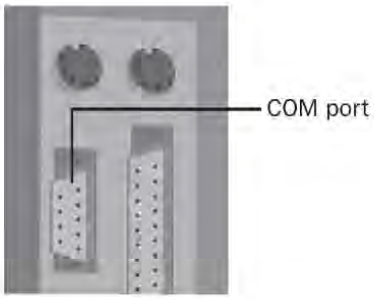
componentware *n. See* component software.

COM port or **comm port** *n.* Short for **com**munications **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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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

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

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

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

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

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

Digital Print Order Format *n. See* DPOF.

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

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

Digital Rights Management *n. See* DRM.

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

Digital Services *n. See* DS.

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

Digital Signal *n. See* DS.

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

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

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

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

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D

signatures based on a public key, which is not secret, and a private key, which is known or held only by the person generating the signature. A digital signature serves to authenticate both the identity of the signer and the integrity of the transmitted information. *Acronym:* DSS. *See also* public key encryption.

Digital Simultaneous Voice and Data *n.* A modem technology by Multi-Tech Systems, Inc., that allows a single telephone line to be used for conversation together with data transfer. This is accomplished by switching to packet-mode communications when the need for voice transfer is detected; digitized voice packets are then transferred along with data and command packets. *Acronym:* DSVD.

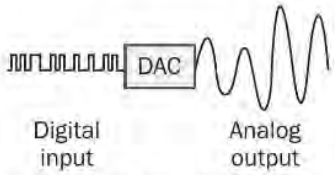
digital sort *n.* A type of ordering process in which record numbers or their key values are sorted digit by digit, beginning with the least significant (rightmost) digit. *Also called:* radix sort.

digital speech *n. See* speech synthesis.

digital subscriber line or **Digital Subscriber Line** *n. See* DSL.

Digital Subscriber Line Access Multiplexer or **Digital Subscriber Line Multiplexer** *n. See* DSLAM.

digital-to-analog converter *n.* A device that translates digital data to an analog signal. A digital-to-analog converter takes a succession of discrete digital values as input and creates an analog signal whose amplitude corresponds, moment by moment, to each digital value. See the illustration. *Acronym:* DAC. *Compare* analog-to-digital converter.



Digital-to-analog converter.

digital versatile disc *n. See* digital video disc.

digital video *n.* Video images and sound stored in a digital format. *Acronym:* DV.

digital TV or **digital television** *n.* The transmission of television signals using digital rather than the conventional analog signals. A digital TV standard for the United States was approved by the FCC in 1996. Digital TV provides a better television experience and new information services. Digital signals produce higher quality pictures and CD-quality sound, compared to the analog signals used with today's television. Digital TV can support interactive television, electronic program guides, and a variety of digital services, such as Internet channel broadcasting and data services. *Acronym:* DTV. *Compare* HDTV.

digital video disc *n.* The next generation of optical disc storage technology. With digital video disc technology, video, audio, and computer data can be encoded onto a compact disc (CD). A digital video disc can store greater amounts of data than a traditional CD. A standard single-layer, single-sided digital video disc can store 4.7 GB of data; a two-layer standard increases the single-sided disc capacity to 8.5 GB. Digital video discs can be double-sided with a maximum storage of 17 GB per disc. A digital video disc player is needed to read digital video discs; this player is equipped to read older optical storage technologies. Advocates of the digital video disc intend to replace current digital storage formats, such as laser disc, CD-ROM, and audio CD, with the single digital format of the digital video disc. *Acronym:* DVD. *Also called:* digital versatile disc. *See also* digital video disc–ROM.

digital video disc–erasable *n.* A proposed extension to the digital video disc recording format to allow multiple re-recording by a consumer. *Acronym:* DVD-E. *Also called:* digital video disc–ROM.

digital video disc–recordable *n.* A proposed extension to the digital video disc recording format to allow one-time recording by a consumer. *Acronym:* DVD-R.

digital video disc–ROM *n.* A computer-readable version of a digital video disc containing either 4.7 or 8.5 GB of storage per side, the larger if 3M's dual-layer "2P" technology is used. *Acronym:* DVD-ROM. *Also called:* digital video disc–erasable. *See also* digital video disc.

Digital Video–Interactive *n.* A hardware/software system developed by RCA, General Electric, and Intel that implements compression of digital video and audio for microcomputer applications. *Acronym:* DV-I.

Digital Video Interface *n. See* DVI.

digital video recording *n. See* DVR.

digital watermark *n.* A unique identifier embedded in a file to deter piracy and prove file ownership and quality. Digital watermarking is often used with graphics and audio files to identify the owner's rights to these works. *See also* fingerprint (definition 2).

digiterati *n. See* digerati.

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ratings for computer games and other interactive products such as Web sites, online games, and interactive chat.

e-tail *n. See* e-commerce.

e-text *n.* Short for **e**lectronic **text**. A book or other text-based work that is available on line in an electronic media format. An e-text can be read online or downloaded to a user's computer for offline reading. *See also* e-zine.

Ethernet *n.* **1.** The IEEE 802.3 standard for contention networks. Ethernet uses a bus or star topology and relies on the form of access known as Carrier Sense Multiple Access with Collision Detection (CSMA/CD) to regulate communication line traffic. Network nodes are linked by coaxial cable, by fiberoptic cable, or by twisted-pair wiring. Data is transmitted in variable-length frames containing delivery and control information and up to 1500 bytes of data. The Ethernet standard provides for baseband transmission at 10 megabits (10 million bits) per second and is available in various forms, including those known as Thin Ethernet, Thick Ethernet, 10Base2, 10Base5, 10Base-F, and 10Base-T. The IEEE standard dubbed 802.3z, or Gigabit Ethernet, operates at 10 times 100 Mbps speed. *See also* ALOHAnet, baseband, bus network, coaxial cable, contention, CSMA/CD, Gigabit Ethernet, IEEE 802 standards, twisted-pair cable. **2.** A widely used local area network system developed by Xerox in 1976, from which the IEEE 802.3 standard was developed.

Ethernet/802.3 *n.* The IEEE standard for 10- or 100-Mbps transmissions over an Ethernet network. Ethernet/802.3 defines both hardware and data packet construction specifications. *See also* Ethernet.

E-time *n. See* execution time.

etiquette *n. See* netiquette.

ETX *n. See* end-of-text.

Eudora *n.* An e-mail client program originally developed as freeware for Macintosh computers by Steve Dorner at the University of Illinois, now maintained in both freeware and commercial versions for both Macintosh and Windows by Qualcomm, Inc.

EULA *n. See* End-User License Agreement.

Euphoria *n.* Acronym for **E**nd **U**ser **P**rogramming with **H**ierarchical **O**bjects for **R**obust **I**nterpreted **A**pplications. An interpreted programming language intended for general application development and game programming on MS-DOS, Windows, and Linux platforms.

European Computer Manufacturers Association *n. See* ECMA.

European Laboratory for Particle Physics *n. See* CERN.

EUV lithography *n.* Acronym for **E**xtreme **U**ltra**V**iolet **lithography**. Manufacturing process allowing smaller circuits to be etched onto chips than is possible with traditional lithographic techniques. With this process, it is possible to economically produce chips that are much faster than those that are created using traditional processes. In EUV lithography, the image of a map of circuits to appear on a chip is bounced off a series of mirrors that condense the image. The condensed image is projected onto wafers containing layers of metal, silicon, and photosensitive material. Because EUV light has a short wavelength, extremely intricate circuit patterns can be created on the wafers.

evaluation *n.* The determination, by a program, of the value of an expression or the action that a program statement specifies. Evaluation can take place at compile time or at run time.

even parity *n. See* parity.

event *n.* An action or occurrence, often generated by the user, to which a program might respond—for example, key presses, button clicks, or mouse movements. *See also* event-driven programming.

event-driven *adj.* Of, pertaining to, or being software that accomplishes its purpose by responding to externally caused events, such as the user pressing a key or clicking a button on a mouse. For example, an event-driven data entry form will allow the user to click on and edit any field at any time rather than forcing the user to step through a fixed sequence of prompts.

event-driven processing *n.* A program feature belonging to more advanced operating-system architectures such as the Apple Macintosh operating system, Windows, and UNIX. In times past, programs were required to interrogate, and effectively anticipate, every device that was expected to interact with the program, such as the keyboard, mouse, printer, disk drive, and serial port. Often, unless sophisticated programming techniques were used, one of two events happening at the same instant would be lost. Event processing solves this problem through the creation and maintenance of an event queue. Most common events that occur are appended to the event queue for the program to process in turn; however, certain types of events can preempt others if they have a higher priority.

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Table E.1 Exclusive OR.

a	*b*	*a XOR b*
0	0	0
0	1	1
1	0	1
1	1	0

.exe *n.* In MS-DOS, a filename extension that indicates that a file is an executable program. To run an executable program, the user types the filename without the .exe extension at the prompt and presses Enter. *See also* executable program.

executable[1] *adj.* Of, pertaining to, or being a program file that can be run. Executable files have extensions such as .bat, .com, and .exe.

executable[2] *n.* A program file that can be run, such as file0.bat, file1.exe, or file2.com.

executable program *n.* A program that can be run. The term usually applies to a compiled program translated into machine code in a format that can be loaded into memory and run by a computer's processor. In interpreter languages, an executable program can be source code in the proper format. *See also* code (definition 1), compiler (definition 2), computer program, interpreter, source code.

execute *vb.* To perform an instruction. In programming, execution implies loading the machine code of the program into memory and then performing the instructions.

execute in place *n.* The process of executing code directly from ROM, rather than loading it from RAM first. Executing the code in place, instead of copying the code into RAM for execution, saves system resources. Applications in other file systems, such as on a PC Card storage device, cannot be executed in this way. *Acronym:* XIP.

execution time *n.* The time, measured in clock ticks (pulses of a computer's internal timer), required by a microprocessor to decode and carry out an instruction after it is fetched from memory. *Also called:* E-time. *See also* instruction time.

executive *n.* The set of kernel-mode components that form the base operating system for Microsoft Windows NT or later. *See also* operating system.

executive information system *n.* A set of tools designed to organize information into categories and reports. Because it emphasizes information, an executive information system differs from a decision support system (DSS), which is designed for analysis and decision making. *Acronym:* EIS. *Compare* decision support system.

exerciser *n.* A program that exercises a piece of hardware or software by running it through a large set of operations.

exit *vb.* In a program, to move from the called routine back to the calling routine. A routine can have more than one exit point, thus allowing termination based on various conditions.

expanded *adj.* A font style that sets characters farther apart than the normal spacing. *Compare* condensed.

expanded memory *n.* A type of memory, up to 8 MB, that can be added to IBM PCs. Its use is defined by the Expanded Memory Specification (EMS). Expanded memory is not accessible to programs in MS-DOS, so the Expanded Memory Manager (EMM) maps pages (blocks) of bytes from expanded memory into page frames in accessible memory areas. Expanded memory is not needed in Windows 9x, all versions of Windows NT, and Windows 2000. *See also* EEMS, EMS, Expanded Memory Manager, page frame.

Expanded Memory Manager *n.* A driver that implements the software portion of the Expanded Memory Specification (EMS) to make expanded memory in IBM and compatible PCs accessible. *Acronym:* EMM. *See also* EMS, expanded memory, extended memory.

Expanded Memory Specification *n. See* EMS.

expansion *n.* A way of increasing a computer's capabilities by adding hardware that performs tasks that are not part of the basic system. Expansion is usually achieved by plugging printed circuit boards (expansion boards) into openings (expansion slots) inside the computer. *See also* expansion board, expansion slot, open architecture (definition 2), PC Card, PCMCIA slot.

expansion board *n.* A circuit board that is plugged into a computer's bus (main data transfer path) to add extra functions or resources to the computer. Typical expansion boards add memory, disk drive controllers, video support, parallel and serial ports, and internal modems. For laptops and other portable computers, expansion boards come in credit card-sized devices called PC Cards that plug into a slot in the side or back of the computer. *Also called:* expansion board, extender board. *See also* expansion slot, PC Card, PCMCIA slot.

expansion bus *n.* A group of control lines that provide a buffered interface to devices. These devices can be located

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Usually a combination of hardware and software, a firewall prevents computers in the organization's network from communicating directly with computers external to the network and vice versa. Instead, all communication is routed through a proxy server outside of the organization's network, and the proxy server decides whether it is safe to let a particular message or file pass through to the organization's network. *See also* proxy server.

firewall sandwich *n.* The use of load-balancing appliances on both sides of Internetworked firewalls to distribute both inbound and outbound traffic among the firewalls. The firewall sandwich architecture helps to prevent firewalls from degrading network performance and creating a single point of network failure. *See also* firewall, load balancing.

FireWire *n.* A high-speed serial bus from Apple that implements the IEEE 1394 standard. *See also* IEEE 1394.

firmware *n.* Software routines stored in read-only memory (ROM). Unlike random access memory (RAM), read-only memory stays intact even in the absence of electrical power. Startup routines and low-level input/output instructions are stored in firmware. It falls between software and hardware in terms of ease of modification. *See also* RAM, ROM.

FIR port *n.* Short for **f**ast **i**nfra**r**ed **port**. A wireless I/O port, most common on a portable computer, that exchanges data with an external device using infrared light. *See also* infrared, input/output port.

FIRST *n.* Acronym for **F**orum of **I**ncident **R**esponse and **S**ecurity **T**eams. An organization within the Internet Society (ISOC) that coordinates with CERT in order to encourage information sharing and a unified response to security threats. *See also* CERT, Internet Society.

first-generation computer *n. See* computer.

first in, first out *n.* A method of processing a queue, in which items are removed in the same order in which they were added—the first in is the first out. Such an order is typical of a list of documents waiting to be printed. *Acronym:* FIFO. *See also* queue. *Compare* last in, first out.

first normal *n. See* normal form (definition 1).

fishbowl *n.* A secure area within a computer system in which intruders can be contained and monitored. A fishbowl is typically set up by a security administrator to impersonate important applications or information so that the system administrator can learn more about hackers who have broken into the network without the hacker learning more about or damaging the system. *See also* honeypot.

fitting *n.* The calculation of a curve or other line that most closely approximates a set of data points or measurements. *See also* regression analysis.

five-nines availability *n.* The availability of a system 99.999 percent of the time. *See* also high availability.

FIX *n.* Acronym for **F**ederal **I**nternet E**x**change. A connection point between the U.S. government's various internets and the Internet. There are two Federal Internet Exchanges: FIX West, in Mountain View, California; and FIX East, in College Park, Maryland. Together, they link the backbones of MILNET, ESnet (the TCP/IP network of the Department of Energy), and NSInet (NASA Sciences Internet) with NSFnet. *See also* backbone (definition 1), MILNET, NSFnet, TCP/IP.

fixed disk *n. See* hard disk.

fixed-length field *n.* In a record or in data storage, a field whose size in bytes is predetermined and constant. A fixed-length field always takes up the same amount of space on a disk, even when the amount of data stored in the field is small. *Compare* variable-length field.

fixed-pitch spacing *n. See* monospacing.

fixed-point arithmetic *n.* Arithmetic performed on fixed-point numbers. *See also* fixed-point notation.

fixed-point notation *n.* A numeric format in which the decimal point has a specified position. Fixed-point numbers are a compromise between integral formats, which are compact and efficient, and floating-point numeric formats, which have a great range of values. Like floating-point numbers, fixed-point numbers can have a fractional part, but operations on fixed-point numbers usually take less time than floating-point operations. *See also* floating-point notation, integer.

fixed space *n.* A set amount of horizontal space used to separate characters in text—often, the width of a numeral in a given font. *See also* em space, en space, thin space.

fixed spacing *n. See* monospacing.

fixed storage *n.* Any nonremovable storage, such as a large disk that is sealed permanently in its drive.

fixed-width font *n. See* monospace font.

fixed-width spacing *n. See* monospacing.

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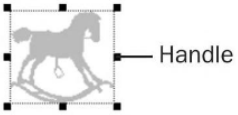
without affecting the programs. *See also* pointer. **2.** Any token that a program can use to identify and access an object such as a device, a file, a window, or a dialog box. **3.** One of several small squares displayed around a graphical object in a drawing program. The user can move or reshape the object by clicking on a handle and dragging. See the illustration. **4.** In online communication, such as chats and bulletin boards, the name a person uses to identify himself or herself. A handle is comparable to an alias or a nickname and is like those used with CB radio. **5.** A unique alphanumeric identifier of up to 10 characters assigned by InterNIC to the domain names, contacts, and network records in its domain name database. The NIC handle is used as a shorthand means of finding records and ensuring accuracy in the database. *Also called:* NIC handle.



Handle. *A computer graphic's handle.*

handler *n.* **1.** A routine that manages a common and relatively simple condition or operation, such as error recovery or data movement. **2.** In some object-oriented programming languages that support messages, a subroutine that processes a particular message for a particular class of objects. *See also* message, object-oriented programming.

handoff *n.* The process of transferring a wireless telephone signal between cell towers as a caller travels from one cell to another. A caller will not notice a smooth handoff, but an abrupt handoff can interfere with reception, with results ranging from momentary static to a disconnected call. *Also called:* handover. *See also* cell.

hands-free kit *n.* Wireless phone accessory that allows users to make calls without holding the phone. A basic kit includes a headset or an earpiece with a microphone. More elaborate sets for use in automobiles may include a power amplifier, dashboard microphone, phone cradle, and speakers.

handshake *n.* A series of signals acknowledging that communication or the transfer of information can take place between computers or other devices. A hardware handshake is an exchange of signals over specific wires (other than the data wires) in which each device indicates its readiness to send or receive data. A software handshake consists of signals transmitted over the same wires used to transfer data, as in modem-to-modem communications over telephone lines.

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

handwriting input device *n.* A tool, such as a digital pen and tablet, used to enter text by writing instead of typing. Along with writing tablets, additional devices include 3-D drawing or computer-aided design (CAD) tablets, a tablet PC, or moving a mouse on the mouse pad.

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

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

hanging indent *n.* Placement of the beginning of the first line of a paragraph farther to the left than the subsequent lines. *Also called:* outdent. *Compare* indent.

haptics *n.* The study of the sense of touch. This study has extended to the study of human interaction with computer technology through tactile means. Haptics technology is central to virtual reality gaming settings, in which computers could sense and respond to finger, hand, body, or head movements. The computer could also re-create the sense of touch by altering texture, increasing resistance, or other simulations appropriate to the user's virtual reality experience. *See also* force feedback.

hard *adj.* **1.** Permanent, fixed, or physically defined; unchangeable by the ordinary operation of a computer system. *See also* hard copy, hard error, hard return,

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Internet security *n.* A broad topic dealing with all aspects of data authentication, privacy, integrity, and verification for transactions over the Internet. For example, credit card purchases made via a World Wide Web browser require attention to Internet security issues to ensure that the credit card number is not intercepted by an intruder or copied from the server where the number is stored, and to verify that the credit card number is actually sent by the person who claims to be sending it.

Internet Security and Acceleration Server *n.* A software application from Microsoft Corporation to increase the security and performance of Internet access for businesses. Internet Security and Acceleration Server provides an enterprise firewall and high-performance Web cache server to securely manage the flow of information from the Internet through the enterprise's internal network. *Acronym:* ISA Server.

Internet Server Application Programming Interface *n. See* ISAPI.

Internet service provider *n. See* ISP.

Internet Society *n.* An international, nonprofit organization based in Reston, Virginia, comprising individuals, companies, foundations, and government agencies, that promotes the use, maintenance, and development of the Internet. The Internet Architecture Board (IAB) is a body within the Internet Society. In addition, the Internet Society publishes the *Internet Society News* and produces the annual INET conference. *Acronym:* ISOC.*See also* INET, Internet Architecture Board.

Internet Software Consortium *n.* A nonprofit organization that develops software that is available for free, via the World Wide Web or FTP, and engages in development of Internet standards such as the Dynamic Host Configuration Protocol (DHCP). *Acronym:* ISC. *See also* DHCP.

Internet SSE *n. See* SSE.

Internet Streaming Media Alliance *n. See* ISMA.

Internet synchronization *n.* **1.** The process of synchronizing data between computing and communication devices that are connected to the Internet. **2.** A feature in Microsoft Jet and Microsoft Access that allows replicated information to be synchronized in an environment in which an Internet server is configured with Microsoft Replication Manager, a tool included with Microsoft Office 2000 Developer.

Internet Talk Radio *n.* Audio programs similar to radio broadcasts but distributed over the Internet in the form of files that can be downloaded via FTP. Internet Talk Radio programs, prepared at the National Press Building in Washington, D.C., are 30 minutes to 1 hour in length; a 30-minute program requires about 15 MB of disk space. *Acronym:* ITR.

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

Internet Telephony Service Provider *n. See* ITSP.

Internet telephony *n. See* VoIP.

Internet television *n.* The transmission of television audio and video signals over the Internet.

Internet traffic distribution *n. See* ITM.

Internet traffic management *n. See* ITM.

internetwork[1] *adj.* Of or pertaining to communications between connected networks. It is often used to refer to communication between one LAN (local area network) and another over the Internet or another WAN (wide-area network). *See also* LAN, WAN.

internetwork[2] *n.* A network made up of smaller, interconnected networks.

Internetwork Packet Exchange *n. See* IPX.

Internetwork Packet Exchange/Sequenced Packet Exchange *n. See* IPX/SPX.

Internet World *n.* Series of international conferences and exhibitions on e-commerce and Internet technology sponsored by *Internet World* magazine. Major conferences include the world's largest Internet conferences, Internet World Spring and Internet World Fall.

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

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(codec) and conversion of the digitized information to packets for IP transmission. *Also called:* Internet telephony, Voice over IP (VoIP). *See also* H.323, VoIP.

IP tunneling *n.* A technique used to encapsulate data inside a TCP/IP packet for transmission between IP addresses. IP tunneling provides a secure means for data from different networks to be shared over the Internet.

IPv4 *n.* Short for **I**nternet **P**rotocol **v**ersion **4**. The current version of the Internet Protocol (IP), as compared with the next-generation IP, which is known familiarly as IPng and more formally as IPv6 (IP version 6). *See also* IP. *Compare* IPng.

IPv6 *n.* Short for **I**nternet **P**rotocol **v**ersion **6**. The next-generation Internet Protocol from the Internet Engineering Task Force (IETF), IPv6 is now included as part of IP support in many products and in the major operating systems. IPv6 offers several improvements from IPv4, most significantly an increase of available address space from 32 to 128 bits, which makes the number of available addresses effectively unlimited. Usually called IPng (next generation), IPv6 also includes support for multicast and anycast addressing. *See also* anycasting, IP, IPng.

ipvs *n.* Acronym for **IP V**irtual **S**erver. *See* LVS.

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

IPX/SPX *n.* Acronym for **I**nternetwork **P**acket E**x**change/**S**equenced **P**acket E**x**change. The network and transport level protocols used by Novell NetWare, which together correspond to the combination of TCP and IP in the TCP/IP protocol suite. IPX is a connectionless protocol that handles addressing and routing of packets. SPX, which runs above IPX, ensures correct delivery. *See also* IPX, SPX (definition 1).

IR *n. See* infrared.

IRC *n.* Acronym for **I**nternet **R**elay **C**hat. A service that enables an Internet user to participate in a conversation on line in real time with other users. An IRC channel, maintained by an IRC server, transmits the text typed by each user who has joined the channel to all other users who have joined the channel. Generally, a channel is dedicated to a particular topic, which may be reflected in the channel's name. An IRC client shows the names of currently active channels, enables the user to join a channel, and then displays the other participants' words on individual lines so that the user can respond. IRC was invented in 1988 by Jarkko Oikarinen of Finland. *See also* channel (definition 2), server (definition 2).

IrDA *n.* Acronym for **I**nfra**r**ed **D**ata **A**ssociation. The industry organization of computer, component, and telecommunications vendors who have established the standards for infrared communication between computers and peripheral devices such as printers.

IRE scale *n.* Short for **I**nstitute of **R**adio **E**ngineers **scale**. Scale to determine video signal amplitudes as devised by the Institute of Radio Engineers, which is now part of the Institute of Electrical and Electronic Engineers (IEEE). The IRE scale includes a total of 140 units, with 100 up and 40 down from zero.

IRG *n. See* inter-record gap.

IRGB *n.* Acronym for **I**ntensity **R**ed **G**reen **B**lue. A type of color encoding originally used in IBM's Color/Graphics Adapter (CGA) and continued in the EGA (Enhanced Graphics Adapter) and VGA (Video Graphics Array). The standard 3-bit RGB color encoding (specifying eight colors) is supplemented by a fourth bit (called Intensity) that uniformly increases the intensity of the red, green, and blue signals, resulting in a total of 16 colors. *See also* RGB.

IRL *n.* Acronym for **i**n **r**eal **l**ife. An expression used by many online users to denote life outside the computer realm, especially in conjunction with virtual worlds such as online talkers, IRC, MUDs, and virtual reality. *See also* IRC, MUD, talker, virtual reality.

IRQ *n.* Acronym for **i**nterrupt **req**uest. One of a set of possible hardware interrupts, identified by a number, on a Wintel computer. The number of the IRQ determines which interrupt handler will be used. In the AT bus, ISA, and EISA, 15 IRQs are available; in Micro Channel Architecture, 255 IRQs are available. Each device's IRQ is hardwired or set by a jumper or DIP switch. The VL bus and the PCI local bus have their own interrupt systems, which they translate to IRQ numbers. *See also* AT bus, DIP switch, EISA, interrupt, IRQ conflict, ISA, jumper, Micro Channel Architecture, PCI local bus, VL bus.

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keyboard shortcut *n. See* application shortcut key.

keyboard template *n.* A piece of plastic or heavy paper that fits over or around part of the keyboard, such as the function keys, and has information printed on it about the meanings of the keys.

keycap *n.* The plastic piece identifying a key on a keyboard.

key code *n.* A unique code number assigned to a particular key on a computer keyboard, used to tell the computer which key has been pressed or released. A key code is a special identifier for the key itself and is always the same for a particular key, regardless of the letter, number, or symbol on the key or the character generated by the key. *Compare* character code, scan code.

key escrow *n.* An approach to key recovery in which an encryption key is provided to a third party approved by a government agency so that any encrypted message can, if necessary, be decrypted and read by the government. *See also* encryption, key recovery.

key field *n.* A field in a record structure or an attribute of a relational table that has been designated to be part of a key. Any field can be keyed, or indexed, to improve or simplify the performance of retrieval and/or update operations. *See also* attribute (definition 1), field (definition 1), primary key.

key-frame *adj.* Describing animation in which starting and ending positions of an object are given, and all frames in between are interpolated by a computer to produce smooth automated animation. Most ray-traced computer animation is created using this technique. *See also* ray tracing.

key in *vb.* To enter information into a computer by typing it on the computer's keyboard.

keymaster *n.* A common host name assigned by network administrators to a gateway or router. Popularized in part by the Keymaster character in the 1984 movie "Ghostbusters." *See also* gatekeeper.

keypad *n. See* numeric keypad.

key pair *n.* A widely used encryption scheme that allows secure use of digital certificate identification. A key pair consists of a public key and a private key. The public key is shared with other individuals; the private key is known only to its owner. The public and private key form an asymmetric pair, meaning the keys on either end of a transmission are different. A message encrypted with the public key can be decrypted only with the private key, and a message encrypted with the private key can be decrypted only with the public key.

keypunch *n.* An archaic keyboard-activated device used to punch holes in predetermined locations on paper cards roughly the size of a business envelope. It was used to provide programs and data to early computing systems.

key recovery *n.* General term referring to the ability to retrieve a cryptographic key in order to decode encrypted information. Key recovery can be used to regain a lost key or, as has been publicized in recent years, can be used as a means of enabling government agencies to decode encrypted information. One method of providing for key recovery is known as key escrow. *See also* encryption, key escrow, private key.

key sort *n. See* tag sort.

keystroke *n.* The act of pressing a key on a keyboard to enter a character or initiate a command in a program. The efficiency and ease of use of certain applications is often measured in terms of how many keystrokes it takes to perform common operations. *See also* command, key (definition 1), keyboard.

keyword *n.* **1.** A characteristic word, phrase, or code that is stored in a key field and is used to conduct sorting or searching operations on records in a database. *See also* key field. **2.** Any of the set of words that composes a given programming language or set of operating-system routines. *See also* reserved word.

keyword density *n.* A measurement of the keywords on a Web page as a percentage of total text. High keyword density can increase a Web site's probability of being found by search engines, some of which use keyword density to rank a Web page's relevance to an Internet search. *See also* keyword (definition 1).

keyword-in-context *n.* An automatic search methodology that creates indexes of document text or titles. Each keyword is stored in the resulting index along with some surrounding text, usually the word or phrase that precedes or follows the keyword in the text or title. *Acronym:* KWIC.

keyword stuffing *vb. See* spamdexter.

Khornerstone *n.* A benchmark of floating-point calculation performance used to test UNIX workstations. *See also* benchmark[1], Dhrystone, floating-point operation, Whetstone.

kHz *n. See* kilohertz.

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language translation program *n.* A program that translates statements written in one programming language into another programming language (usually from one high-level language into another). *See also* high-level language.

LAN Manager *n.* An older LAN (local area network) technology developed by Microsoft and distributed by Microsoft, IBM (as IBM LAN Server), and other original equipment manufacturers. Superseded by TCP/IP networking protocols in Windows 9x, LAN Manager implemented the NetBEUI protocol and was notable for its small stack size. It was used to connect computers running the MS-DOS, OS/2, or UNIX operating systems to allow users to share files and system resources and to run distributed applications using a client/server architecture. *See also* client/server architecture, LAN, NetBEUI.

LANtastic *n.* A network operating system from Artisoft designed to support both peer-to-peer and client/server networks consisting of PCs running a mix of MS-DOS and Windows operating systems.

laptop *n.* A small, portable personal computer that runs on either batteries or AC power, designed for use during travel. Laptops have flat LCD or plasma screens and small keyboards. Most can run the same software as their desktop counterparts and can accept similar peripherals, such as sound cards, internal or external modems, floppy disks, and CD-ROM drives. Some laptops are designed to be plugged into a docking station, effectively making them desktop computers. Most have connectors for plugging in external keyboards and full-sized monitors. Older laptops weighed as much as 15 pounds; current laptops can weigh as little as 5 pounds without peripherals. While *notebook* is the current term for ultralight portable computers, these machines are also commonly referred to as laptops. *See also* portable computer. *Compare* subnotebook computer.

large model *n.* A memory model of the Intel 80x86 processor family. The large model allows both code and data to exceed 64 kilobytes, but the total of both must generally be less than 1 megabyte. Each data structure must be less than 64 kilobytes in size. *See also* memory model.

large-scale integration *n.* A term describing a chip on which circuit elements number in the thousands. *Acronym:* LSI. *See also* integrated circuit. *Compare* medium-scale integration, small-scale integration, super-large-scale integration, ultra-large-scale integration, very-large-scale integration.

laser or **LASER** *n.* Acronym for **l**ight **a**mplification by **s**timulated **e**mission of **r**adiation. A device that uses certain quantum effects to produce coherent light, which travels with greater efficiency than noncoherent light because the beam diverges only slightly as it travels. Lasers are used in computer technology to transmit data through fiberoptic cables, to read and write data on CD-ROMs, and to place an image on a photosensitive drum in laser printers.

laser engine *n. See* printer engine.

laser printer *n.* An electrophotographic printer that is based on the technology used by photocopiers. A focused laser beam and a rotating mirror are used to draw an image of the desired page on a photosensitive drum. This image is converted on the drum into an electrostatic charge, which attracts and holds toner. A piece of electrostatically charged paper is rolled against the drum, which pulls the toner away from the drum and onto the paper. Heat is then applied to fuse the toner to the paper. Finally, the electrical charge is removed from the drum, and the excess toner is collected. By omitting the final step and repeating only the toner-application and paper-handling steps, the printer can make multiple copies. The only serious drawback of a laser printer is that it offers less paper-handling flexibility than do dot-matrix printers. Both multipart forms and wide-carriage printing, for example, are better handled by line printers or dot-matrix printers. *See also* electrophotographic printers, nonimpact printer, page printer. *Compare* dot-matrix printer, ion-deposition printer, LCD printer, LED printer.

laser storage *n.* The use of optical read/write technology with metallic discs for information storage. *See also* compact disc.

LaserWriter 35 *n.* The standard set of 35 PostScript fonts for the Apple LaserWriter family of laser printers. *See also* laser printer, PostScript font.

last in, first out *n.* A method of processing a queue in which items are removed in inverse order relative to the order in which they were added—that is, the last in is the first out. *Acronym:* LIFO. *See also* stack. *Compare* first in, first out.

last mile *n.* The connection (which may in fact be more or less than one mile) between an end user's system and that of a service provider, such as a telephone company. The "last mile" connection historically has referred to the twisted-pair copper wires used between a home and the

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appreciation of a joke or other humorous occurrence. *See also* ROFL.

Long data type *n.* A fundamental data type that holds large integers. A Long variable is stored as a 32-bit number ranging in value from –2,147,483,648 to 2,147,483,647.

long filenames *n.* A feature of most current PC operating systems, including the Macintosh, Windows 9x, Windows NT, Windows 2000, and OS/2. Long filenames allow a user to assign a plain-text name to a file, rather than limiting possible names to just a few characters. Names can be over 200 characters long, include uppercase and lowercase letters, and have spaces between characters. *Compare* 8.3.

long-haul *adj.* Of, pertaining to, or being a type of modem that is able to transmit over long distances. *Compare* short-haul.

longitudinal redundancy check *n. See* LRC.

LonWorks *n.* An open standard for network automation created by the Echelon Corporation and supported by the LonMark Interoperability Association. LonWorks, introduced in 1991, can be used in building, transportation, industrial, and home applications to implement a distributed control network.

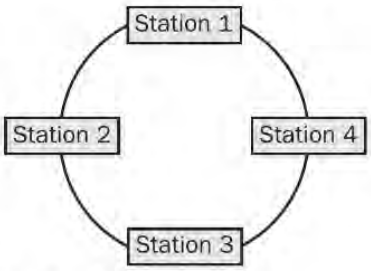
lookup *n.* A function, often built into spreadsheet programs, in which a previously constructed table of values called a lookup table is searched for a desired item of information. A lookup table consists of rows and columns of data. A lookup function examines the table either horizontally or vertically and then retrieves the data that corresponds to the argument specified as part of the lookup function.

loop[1] *n.* **1.** A set of statements in a program executed repeatedly, either a fixed number of times or until some condition is true or false. *See also* DO loop, FOR loop, infinite loop, iterative statement. **2.** A pair of wires that runs between a telephone central office and customer premises.

loop[2] *vb.* To execute a group of statements repeatedly.

loop check *n. See* echo check.

loop configuration *n.* A communications link in which multiple stations are joined to a communications line that runs in a closed loop. Generally, data sent by one station is received and retransmitted in turn by each station on the loop. The process continues until the data reaches its final destination. See the illustration. *See also* ring network.



Loop configuration.

loophole *n.* In programming, a logical failure to account for all possible situations. *See also* bug (definition 1), logic error.

loop invariant *n.* A condition that remains true while a loop iterates.

loop structure *n. See* iterative statement.

lo-res *adj. See* low resolution.

loss balancing *n.* Amplification of a signal or value to compensate for loss during a transmission or translation of a value.

lossless compression *n.* The process of compressing a file such that, after being compressed and decompressed, it matches its original format bit for bit. Text, code, and numeric data files must be compressed using a lossless method; such methods can typically reduce a file to 40 percent of its original size. *Compare* lossy compression.

lossy compression *n.* The process of compressing a file such that some data is lost after the file is compressed and decompressed. Video and sound files often contain more information than is apparent to the viewer or listener; a lossy compression method, which does not preserve that excess information, can reduce such data to as little as 5 percent of its original size. *Compare* lossless compression.

lost cluster *n.* A cluster (disk storage unit) marked by the operating system as being in use but not representing any part of any chain of stored segments of a file. A lost cluster usually represents debris resulting from incomplete data "housekeeping," as might result from the ungraceful exit (messy or abrupt termination) of an application program.

Lotus 1-2-3 *n.* An electronic spreadsheet product introduced in 1983 by Lotus Development Corporation. Notable

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

micro-electromechanical systems *n. See* MEMS.

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

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

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

M

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

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

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

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

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

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

microjustification *n. See* microspace justification.

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

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

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

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

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

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

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

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

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

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

Microsoft Access *n. See* Access.

Microsoft Active Accessibility *n. See* Active Accessibility.

Microsoft DOS *n. See* MS-DOS.

Microsoft Excel *n. See* Excel.

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

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

Microsoft intermediate language *n.* The CPU-independent instruction set into which .NET Framework programs are compiled. It contains instructions for loading, storing, initializing, and calling methods on objects. Combined with metadata and the common type system, Microsoft intermediate language allows for true cross-language integration. Prior to execution, MSIL is converted to machine code. It is not interpreted. *Acronym:* MSIL.

Microsoft Internet Explorer *n. See* Internet Explorer.

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

Microsoft Management Console *n. See* MMC.

Microsoft MapPoint *n. See* MapPoint.

Microsoft Money *n. See* Money.

Microsoft MSN Explorer *n. See* MSN Explorer.

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

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

Microsoft Network *n. See* MSN.

Microsoft Office *n. See* Office.

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

Microsoft Outlook *n. See* Outlook.

Microsoft PowerPoint *n. See* PowerPoint.

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

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

Network Data Management Protocol *n. See* NDMP.

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

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

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

Network Driver Interface Specification *n. See* NDIS.

networked directory *n. See* network directory.

networked drive *n. See* network drive.

networked home *n. See* smart home.

Network File System *n. See* NFS.

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

network interface card *n.* An expansion card or other device used to provide network access to a computer or other device, such as a printer. Network interface cards mediate between the computer and the physical media, such as cabling, over which transmissions travel. *Acronym:* NIC. *Also called:* network adapter, network card.

Network Kernel Extension *n. See* NKE.

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

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

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

Network layer.

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

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

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

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parrallaxing *n.* A 3-D animation technique, often used by computer game developers, where backgrounds are displayed using different levels of speed to achieve realism. For example, distant levels move at a slower speed than closer levels, thereby giving the illusion of depth. *See also* animation.

parse *vb.* To break input into smaller chunks so that a program can act upon the information.

parser *n.* An application or device that breaks data into smaller chunks so that an application can act on the information. *See also* parse.

partition *n.* **1.** A logically distinct portion of memory or a storage device that functions as though it were a physically separate unit. **2.** In database programming, a subset of a database table or file.

Partition Boot Sector *n.* The first sector in the system (startup) partition of a computer's bootable hard disk, or the first sector of a bootable floppy disk. On an x86-based computer, the Partition Boot Sector is read into memory at startup by the Master Boot Record. It is the Partition Boot Sector that contains the instructions required to begin the process of loading and starting the computer's operating system. *See also* Master Boot Record, partition table.

partition table *n.* A table of information in the first sector of a computer's hard disk that tells where each partition (discrete portion of storage) on the disk begins and ends. The physical locations are given as the beginning and ending head, sector, and cylinder numbers. In addition to these "addresses," the partition table identifies the type of file system used for each partition and identifies whether the partition is bootable—whether it can be used to start the computer. Although it is a small data structure, the partition table is a critical element on the hard disk.

partnership *n.* The settings on a desktop computer and Windows CE device that allow information to be synchronized, as well as copied or moved between the computer and device. The mobile device can have partnerships with up to two desktop computers. *See also* synchronization (definition 6).

Pascal *n.* A concise procedural language designed between 1967 and 1971 by Niklaus Wirth. Pascal, a compiled, structured language built upon ALGOL, simplifies syntax while adding data types and structures such as subranges, enumerated data types, files, records, and sets. *See also* ALGOL, compiled language. *Compare* C.

pASP *n. See* pocket Active Server Pages.

pass[1] *n.* In programming, the carrying out of one complete sequence of events.

pass[2] *vb.* To forward a piece of data from one part of a program to another. *See also* pass by address, pass by value.

pass by address *n.* A means of passing an argument or parameter to a subroutine. The calling routine passes the address (memory location) of the parameter to the called routine, which can then use the address to retrieve or modify the value of the parameter. *Also called:* pass by reference. *See also* argument, call[1]. *Compare* pass by value.

pass by reference *n. See* pass by address.

pass by value *n.* A means of passing an argument or a parameter to a subroutine. A copy of the value of the argument is created and passed to the called routine. When this method is used, the called routine can modify the copy of the argument, but it cannot modify the original argument. *See also* argument, call[1]. *Compare* pass by address.

passivation *n.* In Sun Microsystems's J2EE network platform, the process of "turning off" an enterprise java bean (EJB) by caching it from memory to secondary storage. *See also* Enterprise JavaBeans, J2EE. *Compare* activation.

passive hub *n.* A type of hub used on ARCnet networks that passes signals along but has no additional capability. *See also* ARCnet. *Compare* active hub, Intelligent hub.

passive-matrix display *n.* An inexpensive, low-resolution liquid crystal display (LCD) made from a large array of liquid crystal cells that are controlled by transistors outside of the display screen. One transistor controls an entire row or column of pixels. Passive-matrix displays are commonly used in portable computers, such as laptops and notebooks, because of their thin width. While these displays have good contrast for monochrome screens, the resolution is weaker for color screens. These displays are also difficult to view from any angle other than straight on, unlike active-matrix displays. However, computers with passive-matrix displays are considerably cheaper than those with active-matrix screens. See the illustration. *Also called:* dual-scan display. *See also* liquid crystal display, supertwist display, transistor, twisted nematic display. *Compare* active-matrix display.

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nications. The addition of SBC's Internet customer base made Prodigy the third largest ISP in the United States.

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

product *n.* **1.** An operator in the relational algebra used in database management that, when applied to two existing relations (tables), results in the creation of a new table containing all possible ordered concatenations (combinations) of tuples (rows) from the first relation with tuples from the second. The number of rows in the resulting relation is the product of the number of rows in the two source relations. *Also called:* Cartesian product. *Compare* inner join. **2.** In mathematics, the result of multiplying two or more numbers. **3.** In the most general sense, an entity conceived and developed for the purpose of competing in a commercial market. Although computers are products, the term is more commonly applied to software, peripherals, and accessories in the computing arena.

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

P

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

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

profile[1] *n. See* user profile.

profile[2] *vb.* To analyze a program to determine how much time is spent in different parts of the program during execution.

profiler *n.* A diagnostic tool for analyzing the run-time behavior of programs.

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

program[1] *n.* A sequence of instructions that can be executed by a computer. The term can refer to the original source code or to the executable (machine language) version. *Also called:* software. *See also* program creation, routine, statement.

program[2] *vb.* To create a computer program, a set of instructions that a computer or other device executes to perform a series of actions or a particular type of work.

program button *n.* On a handheld device, a navigation control that is pressed to launch an application. *Also called:* application button.

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

program cartridge *n. See* ROM cartridge.

program comprehension tool *n.* A software engineering tool that facilitates the process of understanding the structure and/or functionality of computer applications. *Acronym:* PCT. *Also called:* software exploration tool.

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

program creation *n.* The process of producing an executable file. Traditionally, program creation comprises three steps: (1) compiling the high-level source code into assembly language source code; (2) assembling the assembly language source code into machine-code object files; and (3) linking the machine-code object files with various data files, run-time files, and library files into an executable file. Some compilers go directly from high-level source to machine-code object, and some integrated development environments compress all three steps into a single command. *See also* assembler, compiler (definition 2), linker, program.

program encapsulation *n.* A method of dealing with programs with Year 2000 problems that entailed modifying the data with which a program worked. The input data is modified to reflect a parallel date in the past that the program can handle. When output is generated, that data is changed again, to reflect the correct date. The program itself remains unchanged.

program file *n.* A disk file that contains the executable portions of a computer program. Depending on its size and

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real-mode mapper *n.* An enhancement for Windows 3.*x* systems that allows 32-bit file system access. The real-mode mapper provides a 32-bit disk access interface to the DOS device driver chain. *Acronym:* RMM.

real number *n.* **1.** A number that can be represented in a number system with a given base, such as the decimal system, by a finite or infinite sequence of digits and a radix point. For example, 1.1 is a real number, as is 0.33333.... *See also* irrational number. *Compare* complex number, imaginary number. **2.** A data type, in a programming language such as Pascal, that is used for storing, to some limit of precision, values that include both integer and fractional parts. *See also* double-precision, single-precision. *Compare* floating-point number, integer.

RealPlayer *n.* An Internet media player and browser plug-in developed by RealNetworks, Inc., that supports playback of RealAudio and RealVideo, as well as certain other formats, after installation of appropriate plug-ins. The current version allows RealPlayer users to surf for media content directly from the player or through a Web browser. *See also* RealAudio, RealVideo.

Real Soon Now *adv.* Soon, but not really expected to be as soon as claimed. One might say, for example, that a commercial program will have some desired feature Real Soon Now if several versions ago the vendor knew of the need for the feature and has done nothing. *Acronym:* RSN.

real storage *n.* The amount of RAM memory in a system, as distinguished from virtual memory. *Also called:* physical memory, physical storage. *See also* virtual memory.

RealSystem G2 *n.* An open, standards-based platform for delivery of streaming audio and video over the Internet and other TCP/IP networks developed by RealNetworks, Inc. RealSystem G2 was introduced by RealNetworks in its audio and video players, servers, and development tools in 1998. Among other features, RealSystem G2 scales to different bandwidths, includes streaming that adjusts delivery to available bandwidth, and supports SMIL (Synchronized Multimedia Integration Language) for multimedia presentations. *See also* RealPlayer, RealVideo, SMIL, streaming.

RealSystem Producer *n.* A software application developed by RealNetworks that converts most types of video and sound files into RealMedia formats for use as streaming media over the Internet or within a corporate intranet.

RealSystem Server *n.* Software developed by RealNetworks to enable a server to broadcast streaming media. Several versions of RealSystem Server are available, designed to meet needs ranging from small intranet servers to large proxy servers.

real-time *adj.* Of, or relating to, a time frame imposed by external constraints. Real-time operations are those in which the machine's activities match the human perception of time or those in which computer operations proceed at the same rate as a physical or external process. Real-time operations are characteristic of aircraft guidance systems, transaction-processing systems, scientific applications, and other areas in which a computer must respond to situations as they occur (for example, animating a graphic in a flight simulator or making corrections based on measurements).

real-time animation *n.* Computer animation in which images are computed and updated on the screen at the same rate at which the objects simulated might move in the real world. Real-time animation allows dynamic involvement by the user because the computer can accept and incorporate keystrokes or controller movements as it is drawing the next image in the animation sequence. Arcade-style animation (such as in a flight simulator program) makes use of real-time animation in translating game plays into on-screen actions. In contrast, in animation done in virtual time, image frames are first calculated and stored and later replayed at a higher rate to achieve smoother movement. *See also* animation, bit block.

real-time clock *n.* In PCs, a circuit or other hardware element that provides the system with real-world time. Upon startup of the system, the real-time clock puts the date and time in memory, where it can then be systematically incremented by the BIOS. A real-time clock generally has a battery that is separate from the rest of the system, so it's not dependent upon the system's power source. This is not the same thing as a system clock, which synchronizes the processor. *Acronym:* RTC. *See also* clock (definition 2).

real-time conferencing *n. See* teleconferencing.

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SDMI *n. See* Secure Digital Music Initiative.

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

SDSL *n.* Acronym for **s**ymmetric (or **s**ingle-line) **d**igital **s**ubscriber **l**ine, a digital telecommunications technology that is a variation of HDSL. SDSL uses one pair of copper wires rather than two pairs of wires and transmits at 1.544 Mbps. *Compare* ADSL.

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

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

search[1] *n.* The process of seeking a particular file or specific data. A search is carried out by a program through comparison or calculation to determine whether a match to some pattern exists or whether some other criteria have been met. *See also* binary search, hash search, linear search, search and replace, wildcard character.

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

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

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

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

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

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

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

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

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

seat[2] *vb.* To insert a piece of hardware fully and position it correctly in a computer or affiliated equipment, as in seating a single inline memory module (SIMM) in its socket.

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

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

secondary service provider *n.* An Internet service provider that provides a Web presence but not direct connectivity. *See also* ISP.

secondary storage *n.* Any data storage medium other than a computer's random access memory (RAM)—typically tape or disk. *Compare* primary storage.

Second Generation *n. See* 2G.

second-level domain *n.* The level immediately beneath the top-level domain in the Internet's DNS hierarchy. *See also* domain (definition 3).

second normal form *n. See* normal form (definition 1).

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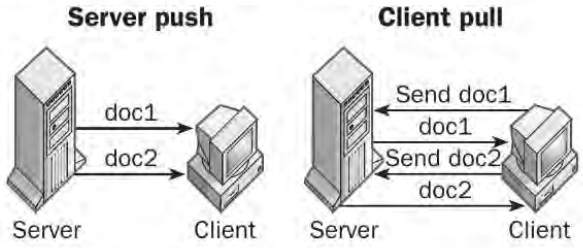
server push-pull *n.* A combination of Web client/server techniques individually called "server push" and "client pull." In server push, the server loads data to the client, but the data connection stays open. This allows the server to continue sending data to the browser as necessary. In client pull,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



Server push-pull.

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

service *n.* **1.** A customer-based or user-oriented function, such as technical support or network provision. **2.** In reference to programming and software, a program or routine that provides support to other programs, particularly at a low (close to the hardware) level. **3.** In networking, specialized, software-based functionality provided by network servers—for example, directory services that provide the network equivalent of "phone books" needed for locating users and resources. *See also* utility.

Service Advertising Protocol *n.* A method used by a service-providing node in a network (such as a file server or application server) to notify other nodes on the network that it is available for access. When a server boots, it uses the protocol to advertise its service; when the same server goes off line, it uses the protocol to announce that it is no longer available. *Acronym:* SAP. *See also* server (definition 1).

service bureau *n.* **1.** A company that provides various services related to publishing, such as prepress production, desktop publishing, typesetting, imagesetting, and optical scanning of graphics. **2.** An organization that provides data processing services and access to software packages for a fee.

service provider *n. See* ISP.

servlet or **servelet** *n.* A small Java program that runs on a server. The term is a companion to applet, a Java program that usually runs on the client. Servlets perform lightweight Web services, such as redirecting a Web user from an outdated address to the correct page—tasks traditionally handled by CGI (Common Gateway Interface) applications. Because servlets are automatically threaded and highly responsive, they execute quickly, thereby reducing system overhead. *Also called:* serverlet. *See also* applet, CGI.

servlet container *n.* In Sun Microsystems's J2EE network platform, a container that decodes requests, formats responses, and provides the network services over which requests and responses are sent. All servlet containers must support HTTP as a protocol for requests and responses, but they may also support additional request-response protocols such as HTTPS. *See also* container, HTTP, HTTPS, J2EE.

servo *n.* The part of a servomechanism, controlled by the servomechanism's feedback circuit, that produces the final mechanical output. *Also called:* servomotor. *See also* servomechanism.

servomechanism *n.* A control system in which the final output is mechanical movement. A servomechanism uses feedback to control the position, velocity, or acceleration of a mechanical component. *Also called:* servo system.

servomotor *n. See* servo.

servo system *n. See* servomechanism.

session *n.* **1.** The time during which a program is running. In most interactive programs, a session is the time during which the program accepts input and processes information. **2.** In communications, the time during which two computers maintain a connection. **3.** A specific protocol layer in the ISO/OSI reference model that manages communication between remote users or processes. *See also* ISO/OSI reference model, session layer.

session bean *n.* In the Java programming language and J2EE network platform, an enterprise bean that is created

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stream over one transmission medium. *See also* data frame, ring network. *Compare* token ring network.

SlowKeys *n.* An accessibility feature built into Macintosh computers and available for DOS and Windows that allows the user to add a delay to the keyboard so that a key must be held down for a certain amount of time before it is accepted. This feature facilitates the use of the keyboard by individuals with poor motor control who might accidentally bump keys when moving around the keyboard.

SLSI *n. See* super-large-scale integration.

Small Business Server *n.* A software application developed by Microsoft Corporation to increase the efficiency of Web-based services for small businesses with 50 or fewer personal computers. Small Business Server provides shared Internet access, features for building Web-based customer management and customer communications tools, and additional features that increase productivity by streamlining employee access to files and applications over the Web.

small caps *n.* A font of capital letters that are smaller than the standard capital letters in that typeface.

Small Computer System Interface *n. See* SCSI.

small model *n.* A memory model of the Intel 80x86 processor family that allows only 64 kilobytes (KB) for code and 64 KB for data. *See also* memory model.

Small Office/Home Office *n. See* SOHO.

small-scale integration *n.* A concentration of fewer than 10 components on a single chip. *Acronym:* SSI. *See also* integrated circuit.

Smalltalk *n.* An object-oriented language and development system developed at Xerox Palo Alto Research Center (PARC) in 1980. Smalltalk pioneered many language and user interface concepts that are now widely used in other environments, such as the concept of an object that contains data and routines and on-screen icons that the user can choose to make the computer perform certain tasks. *See also* object-oriented programming.

smart *adj.* A synonym for intelligent. *See* intelligence.

smart cable *n. See* intelligent cable.

smart card *n.* **1.** In computers and electronics, a circuit board with built-in logic or firmware that gives it some kind of independent decision-making ability. **2.** In banking and finance, a credit card that contains an integrated circuit that gives it a limited amount of intelligence and memory.

smart card reader *n.* A device that is installed in computers to enable the use of smart cards for enhanced security features. *See also* smart card (definition 2).

smart device *n.* An electronic device capable of being networked and remotely controlled in a smart home. Smart devices can include appliances, lighting, heating and cooling systems, entertainment systems, and security systems. *See also* home automation, home network (definition 1), smart home.

smart home *n.* A home or building wired for networking and home automation. In a smart home, occupants control smart devices programmatically or on command using a home-networking communications protocol. *Also called:* automated home, digital home, e-home, Internet home, networked home, smart house, wired home. *See also* home automation, home network (definition 1).

smart house *n. See* smart home.

smart linkage *n.* A feature of programming languages that guarantees that routines will always be called with correct parameter types. *See also* link (definition 1).

smartphone *n.* A hybrid between a wireless telephone and a personal digital assistant (PDA). Smartphones integrate wireless telephones with many of the personal organizational functions of PDAs, such as calendar, calculator, database, e-mail, wireless Web access, note taking, and other programs common to lightweight palm-style computers. Smartphones may rely on a stylus, keypad, or both for data entry or may use voice recognition technology. *See also* cell, palmtop, PDA, pen computer, wireless phone.

smart quotes *n.* In word processors, a function that automatically converts the ditto marks (") produced by most computer keyboards to the inverted commas (“ and ”) used in typeset text.

SmartSuite *n.* A suite of business application programs sold by Lotus Development. Lotus SmartSuite includes six programs: Lotus 1-2-3 spreadsheet, Lotus WordPro word processor, Lotus Approach database, Lotus Freelance Graphics presentation software, Lotus Organizer time-management software, and Lotus FastSite Internet/intranet publishing tool. SmartSuite Millennium Edition 9.7 supports collaboration, Web publishing, use of Internet/intranet resources, and customizable document and project organizers. SmartSuite competes with Microsoft Office and WordPerfect Office.

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soft patch *n.* A fix or modification performed only while the code being patched is loaded into memory, so that the executable or object file is not modified in any way. *See also* patch[1].

soft return *n.* A line break inserted in a document by a word processor when the next word in the current line of text would cause the line to overflow into the margin—a movable line break. *See also* wordwrap. *Compare* hard return.

soft-sectored disk *n.* A disk, especially a floppy disk, whose sectors have been marked with recorded data marks rather than punched holes. *See also* index hole. *Compare* hard-sectored disk.

software *n.* Computer programs; instructions that make hardware work. Two main types of software are system software (operating systems), which controls the workings of the computer, and applications, such as word processing programs, spreadsheets, and databases, which perform the tasks for which people use computers. Two additional categories, which are neither system nor application software but contain elements of both, are network software, which enables groups of computers to communicate, and language software, which provides programmers with the tools they need to write programs. In addition to these task-based categories, several types of software are described based on their method of distribution. These include packaged software (canned programs), sold primarily through retail outlets; freeware and public domain software, which are distributed free of charge; shareware, which is also distributed free of charge, although users are requested to pay a small registration fee for continued use of the program; and vaporware, software that is announced by a company or individuals but either never makes it to market or is very late. *See also* application, canned software, freeware, network software, operating system, shareware, system software, vaporware. *Compare* firmware, hardware, liveware.

Software & Information Industry Association *n. See* SIIA.

software-based modem *n.* A modem that uses a general-purpose, reprogrammable digital signal processor chip and RAM-based program memory rather than a dedicated chip with the modem functions burned into the silicon. A software-based modem can be reconfigured to update and change the modem's features and functions.

software bloat *n.* A software condition caused by the addition of excessive number of possibly unnecessary features and functions as new versions of the software are released. Software bloat is generally assumed to result in long loading times and inordinate resource (memory and storage) requirements. *See also* bloatware, creeping featurism.

software conversion *n.* Changing or moving a program designed to run on one computer to run on another. Usually this involves detailed (professional) work on the program itself.

software-dependent *adj.* Of, pertaining to, or being a computer or device that is tied to a particular program or set of programs developed for it.

software development kit *n. See* developer's kit.

software engineer *n.* **1.** In general, one who works at the code level with software. Although such engineering can be considered to encompass everything from software design to management and testing, the term is generally considered more or less synonymous with *programmer*—one who actually writes the code. **2.** *See* developer.

software engineering *n.* The design and development of software. *See also* programming.

software handshake *n.* A handshake that consists of signals transmitted over the same wires used to transfer the data, as in modem-to-modem communications over telephone lines, rather than signals transmitted over special wires. *See also* handshake.

software house *n.* An organization that develops and supports software for its customers.

software IC *n. See* software integrated circuit.

software integrated circuit *n.* An existing software module that can be designed into a program, much as an integrated circuit can be designed into a logic board. *Abbreviation:* software IC. *See also* abstract data type, module (definition 1), object-oriented programming.

software interrupt *n.* A program-generated interrupt that stops current processing in order to request a service provided by an interrupt handler (a separate set of instructions designed to perform the task required). *Also called:* trap.

software package *n.* A program sold to the public, ready to run and containing all necessary components and documentation.

software piracy *n. See* piracy.

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telecommute *vb.* To work in one location (often at home) and communicate with a main office at a different location through a personal computer equipped with a modem and communications software.

telecommuter *n.* A member of the workforce who conducts business outside the traditional office setting, collaborating with business associates and colleagues through communications and computer technologies. Some workers telecommute full-time; others part-time. The telecommuting ranks include self-employed home workers, small-business entrepreneurs, and employees of large corporations or organizations. *See also* distributed workplace, SOHO.

teleconferencing *n.* The use of audio, video, or computer equipment linked through a communications system to enable geographically separated individuals to participate in a meeting or discussion. *See also* video conferencing.

telecopy *vb. See* fax.

telematics *n.* In communications technology, the linking of computers and telecommunications. Telematics technology is becoming standard in the automotive industry, with dashboard navigation systems, roadside assistance, entertainment, Internet, and cellular services available in vehicles.

telephony *n.* Telephone technology—voice, fax, or modem transmissions based on either the conversion of sound into electrical signals or wireless communication via radio waves.

Telephony API *n. See* TAPI.

telephony device *n.* A mechanism designed to translate sound into electrical signals, transmit them, and then convert them back to sound.

Telephony Service Provider *n.* A modem driver that enables access to vendor-specific equipment through a standard device driver interface. *Acronym:* TSP. *See also* Telephony Service Provider Interface.

Telephony Service Provider Interface *n.* The external interface of a service provider to be implemented by vendors of telephony equipment. A telephony service provider accesses vendor-specific equipment through a standard device driver interface. Installing a service provider allows Windows CE–based applications that use elements of telephony to access the corresponding telephony equipment. *Acronym:* TSPI. *See also* Telephony Service Provider.

teleprocess *vb.* To use a terminal or computer and communications equipment to access computers and computer files located elsewhere. *Teleprocess* is a term originated by IBM. *See also* distributed processing, remote access.

teleprocessing monitor *n. See* TP monitor.

Telescript *n.* A communications-oriented programming language, released in 1994 by General Magic, that was designed to address the need for cross-platform, network-independent messaging and abstraction of complex network protocols. *See also* communications protocol.

teletext *n.* All-text information broadcast by a television station to a subscriber's television set.

Teletype *n.* The Teletype Corporation, developer of the teletypewriter (TTY) and various other printers used with computers and communications systems. *See also* TTY.

teletype mode *n.* A mode of operation in which a computer or an application limits its actions to those characteristic of a teletypewriter (TTY). On the display, for example, teletype mode means that only alphanumeric characters can be shown, and they are simply "typed" on the screen, one letter after the other, and cannot be placed in any desired position. *See also* Teletype, TTY.

teletypewriter *n. See* TTY.

teleworker *n.* A businessperson who substitutes information technologies for work-related travel. Teleworkers include home-based and small business workers who use computer and communications technologies to interact with customers and/or colleagues. *See also* distributed workplace, SOHO.

telnet[1] *n.* **1.** A client program that implements the Telnet protocol. **2.** A protocol in the TCP/IP suite that enables individuals to log on to and use a remote computer as if they were sitting at a terminal directly connected to the machine.

telnet[2] *vb.* To access a remote computer over the Internet using the Telnet protocol. *See also* telnet[1].

Telnet *n.* A protocol that enables an Internet user to log on to and enter commands on a remote computer linked to the Internet, as if the user were using a text-based terminal directly attached to that computer. Telnet is part of the TCP/IP suite of protocols.

template *n.* **1.** In an application package, an overlay for the keyboard that identifies special keys and key combinations. **2.** In image processing, a pattern that can be used to identify or match a scanned image. **3.** In spreadsheet pro-

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title bar *n.* In a graphical user interface, a horizontal space at the top of a window that contains the name of the window. Most title bars also contain boxes or buttons for closing and resizing the window. Clicking on the title bar allows the user to move the entire window.

TLA *n.* Acronym for **t**hree-**l**etter **a**cronym. An ironic term, usually used in jest on the Internet in e-mail, newsgroups, and other online forums, referring to the large number of acronyms in computer terminology, particularly those consisting of three letters.

TLD *n. See* top-level domain.

TLS *n.* Acronym for **T**ransport **L**ayer **S**ecurity. A standard protocol that is used to provide secure Web communications on the Internet or intranets. It enables clients to authenticate servers or, optionally, servers to authenticate clients. It also provides a secure channel by encrypting communications. TLS is the latest and a more secure version of the SSL protocol. *See also* authentication, communications protocol, SSL.

TMS34010 *n. See* 34010, 34020.

TN display *n. See* twisted nematic display.

TOF *n. See* top-of-file.

toggle[1] *n.* An electronic device with two states or a program option that can be turned on or off using the same action, such as a mouse click.

toggle[2] *vb.* To switch back and forth between two states. For example, the Num Lock key on an IBM-style keyboard toggles the numeric keypad between numbers and cursor movement.

ToggleKeys *n.* A feature of Windows 9x and Windows NT 4 that sounds high and low beeps when one of the toggle keys (Caps Lock, Num Lock, or Scroll Lock) is turned on or off. *See also* typematic. *Compare* BounceKeys, FilterKeys, MouseKeys, ShowSounds, SoundSentry, StickyKeys.

token *n.* **1.** A unique structured data object or message that circulates continuously among the nodes of a token ring and describes the current state of the network. Before any node can send a message, it must first wait to control the token. *See also* token bus network, token passing, token ring network. **2.** Any nonreducible textual element in data that is being parsed—for example, the use in a program of a variable name, a reserved word, or an operator. Storing tokens as short codes shortens program files and speeds execution. *See also* Basic, parse.

token bus *n.* The IEEE 802.4 specification for token-passing networks based on a bus or tree topology. Token bus networks were designed primarily for manufacturing but the specification also corresponds to the ARCnet architecture used for LANs.

token bus network *n.* A LAN (local area network) formed in a bus topology (stations connected to a single, shared data highway) that uses token passing as a means of regulating traffic on the line. On a token bus network, a token governing the right to transmit is passed from one station to another, and each station holds the token for a brief time, during which it alone can transmit information. The token is transferred in order of priority from an "upstream" station to the next "downstream" station, which might or might not be the next station on the bus. In essence, the token "circles" through the network in a logical ring rather than a physical one. Token bus networks are defined in the IEEE 802.4 standards. *See also* bus network, IEEE 802 standards, token passing. *Compare* token ring network.

token passing *n.* A method of controlling network access through the use of a special signal, called a *token*, that determines which station is allowed to transmit. The token, which is actually a short message or a small packet, is passed from station to station around the network. Only the station with the token can transmit information. *See also* token bus network, token ring network. *Compare* collision detection, contention, CSMA/CD.

token ring *n.* Spelled with lowercase *t* and *r*, the IEEE specification 802.5 for token ring networks. *See also* token ring network.

Token Ring *n. See* Token Ring network.

token ring network *n.* A LAN (local area network) formed in a ring (closed loop) topology that uses token passing as a means of regulating traffic on the line. On a token ring network, a token governing the right to transmit is passed from one station to the next in a physical circle. If a station has information to transmit, it "seizes" the token, marks it as being in use, and inserts the information. The "busy" token, plus message, is then passed around the circle, copied when it arrives at its destination, and eventually returned to the sender. The sender removes the attached message and then passes the freed token to the next station in line. Token ring networks are defined in the IEEE 802.5 standards. *See also* IEEE 802 standards, ring network, token passing. *Compare* token bus network.

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transceiver *n.* Short for **trans**mitter/re**ceiver**. A device that can both transmit and receive signals. On LANs (local area networks), a transceiver is the device that connects a computer to the network and that converts signals to and from parallel and serial form.

transceiver cable *n.* A cable that is used to connect a host adapter within a computer to a LAN (local area network). *See also* AUI cable, LAN.

transducer *n.* A device that converts one form of energy into another. Electronic transducers either convert electric energy to another form of energy or convert nonelectric to electric energy.

transfer[1] *n.* **1.** The movement of data from one location to another. **2.** The passing of program control from one portion of code to another.

transfer[2] *vb.* To move data from one place to another, especially within a single computer. *Compare* transmit.

transfer rate *n.* The rate at which a circuit or a communications channel transfers information from source to destination, as over a network or to and from a disk drive. Transfer rate is measured in units of information per unit of time—for example, bits per second or characters per second—and can be measured either as a raw rate, which is the maximum transfer speed, or as an average rate, which includes gaps between blocks of data as part of the transmission time.

transfer statement *n.* A statement in a programming language that transfers the flow of execution to another location in the program. *See also* branch instruction, CALL statement, GOTO statement, jump instruction.

transfer time *n.* The time elapsed between the start of a data transfer operation and its completion.

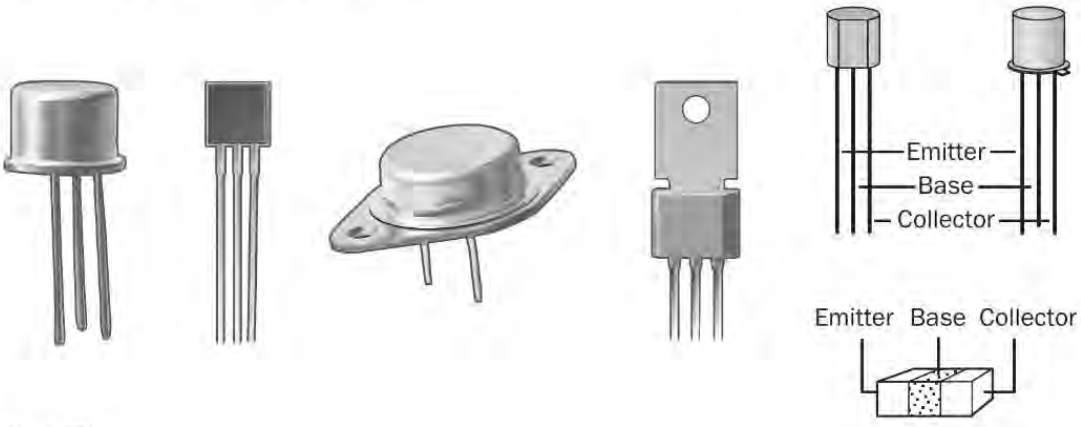
transform *vb.* **1.** To change the appearance or format of data without altering its content; that is, to encode information according to predefined rules. **2.** In mathematics and computer graphics, to alter the position, size, or nature of an object by moving it to another location (translation), making it larger or smaller (scaling), turning it (rotation), changing its description from one type of coordinate system to another, and so on.

transformer *n.* A device used to change the voltage of an alternating current signal or to change the impedance of an alternating current circuit.

transient *adj.* **1.** Fleeting, temporary, or unpredictable. **2.** Of or pertaining to the region of memory used for programs, such as applications, that are read from disk storage and that reside in memory temporarily until they are replaced by other programs. In this context, *transient* can also refer to the programs themselves. **3.** In electronics, of or pertaining to a short-lived, abnormal, and unpredictable increase in power supply, such as a voltage spike or surge. *Transient time* is the interval during which a change in current or voltage is building up or decaying.

transient suppressor *n.* A circuit designed to reduce or eliminate unwanted electrical signals or voltages.

transistor *n.* Short for **tran**sfer re**sistor**. A solid-state circuit component, usually with three leads, in which a voltage or a current controls the flow of another current. The transistor can serve many functions, including those of amplifier, switch, and oscillator, and is a fundamental component of almost all modern electronics. See the illustration. *See also* base (definition 3), FET, NPN transistor, PNP transistor.



Transistor.

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