



The New Penguin
DICTIONARY of
COMPUTING

Dick Pountain

AN A-Z OF COMPUTING
JARGON AND CONCEPTS

The New Penguin Dictionary of Computing

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1

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only a source and a destination address and a block length as operands. See more under **BLOCK MOVE**.

block move A class of processor **INSTRUCTION** that moves the contents of a whole series of memory locations to a new location as a single operation, given only the source and destination addresses and the block length as operands. A block move instruction is typically more efficient than a loop containing single-word move instructions, because the processor's internal datapaths do not need to be reconfigured after each value is transferred, and the hardware can be designed, at minimal transistor cost, to automatically increment the source and destination addresses without affecting the general registers. An equivalent instruction that leaves the original data in place is called a **BLOCK COPY**. Block move operations assume a particular significance in computer **GRAPHICS** where they are continually employed to move **BITMAPS** from one place to another, and so a great deal of effort has been expended on optimizing their performance. See also **BIT BLOCK TRANSFER**.

block structured A **PROGRAMMING LANGUAGE** that supports the grouping of code statements into units called blocks, which may be wholly separate or wholly nested within one another, but may not overlap; variables may be declared local to a block, their **SCOPE** being confined to that block and any nested within it. Subprograms such as **PROCEDURES** and **FUNCTIONS** also behave as blocks.

A typical block-structured language is **PASCAL**, which indicates blocks by surrounding them with the keywords **BEGIN...END** and permits procedure declarations to be nested within one another. However, most modern languages incorporate some degree of block structuring – for example **C**, **C++** and **JAVA** support blocks within functions, delimited by the braces { and }, but do not permit nested function definitions. Block-structured languages offer control structures such as **IF...THEN...ELSE...ENDIF** and **REPEAT...UNTIL** and **WHILE...ENDWHILE** in which control must flow through clearly delimited blocks, and discourage the use of unstructured jumps such as **GOTO** or **BREAK**.

Block structure makes it easier for humans to reason about the workings of a program, and allows a language **COMPILER** to manage

memory economically by allocating local variables temporarily on a **STACK**.

blow Used as in to 'blow an EPROM': to program the contents of an erasable read-only memory chip.

Blue Screen of Death The text-mode error message screen, showing white text on a blue background, that appears when any Microsoft Windows system encounters a **FATAL ERROR** condition; it signifies that Windows cannot run and the computer must be rebooted.

Bluetooth A short-range radio technology that enables portable devices such as personal organizers, mobile telephones and domestic equipment to connect to a computer network such as the **INTERNET** without the need for cables. Bluetooth is being developed by a consortium including 3Com, Ericsson, IBM, Intel, Lucent, Microsoft, Motorola, Nokia and Toshiba. The name comes from the nickname of a 10th-century Danish king Harald Bluetooth.

Bluetooth wireless transmitter/receiver chips can be built into many kinds of device: they operate in the 2.4 GHz (Industry, Science and Medicine) waveband, and the sending and receiving devices need not be within line of sight to establish a connection, but must be within the total range of 10–30 metres. Bluetooth supports both **POINT-TO-POINT** and **MULTIPOINT** types of connection, under which up to seven slave devices may be controlled from a single master: software controls and identity codes within each chip allow the owner to select which pieces of equipment will communicate.

Sample applications for Bluetooth technology include advanced cordless telephones, 'roving' connections to a company network within a building, Internet access from a hand-held computer, or automatic synchronization of a hand-held computer with a desktop computer whenever it comes within range. See also **WI-FI**, **WIRELESS COMMUNICATIONS**.

BMP, .BMP A bitmapped **GRAPHICS FILE FORMAT** invented by Microsoft for use in its Windows operating system that uses **.BMP** as its normal file extension. The original **.BMP** format used a 4- or 8-bit **PALETTE** stored in the file along with an array of index values representing the **PIXELS**, which was fast and efficient for

code), and its elimination was one of the chief objectives of the STRUCTURED PROGRAMMING movement. See also SUBPROGRAM, PROCEDURE, PROCEDURE CALL, CONDITIONAL BRANCH.

Gouraud shading An algorithm employed in 3D GRAPHICS to fool the eye into seeing as a smoothly curving surface an object that is actually constructed from a mesh of polygons. Gouraud's algorithm requires the colour at each vertex of a polygon to be supplied as data, from which it INTERPOLATES the colour of every PIXEL inside the polygon: this is a relatively fast procedure, and may be made faster still if implemented in a hardware GRAPHICS ACCELERATOR chip. See also PHONG SHADING, RAY TRACING, RADIOSITY, TEXTURE MAPPING.

GPF Acronym for GENERAL PROTECTION FAULT.

GPB Abbreviation of General-Purpose Interface Bus. See under HPIB.

GPL 1 Abbreviation of GENERAL PUBLIC LICENSE.
2 Abbreviation of GNU GENERAL PUBLIC LICENSE.

GPBS Abbreviation of GENERAL PACKET RADIO SERVICE.

GPS (Global Positioning System) A system originally created by the US military under which a GPS receiver can determine its latitude and longitude on, and altitude above, the Earth's surface to a precision of about 10 metres by calculating the difference in arrival time of radio signals from several SATELLITES. The GPS system consists of 24 satellites equipped with radio transmitters and atomic clocks; three or more of these satellites may be visible to any GPS receiver at one time depending on its geographic location. Portable GPS receivers are now fitted in cars and sold as consumer items for hikers and sailors, but special GPS signals reserved for military use offer a higher precision (better than 3 metres) for guiding military vehicles and missiles.

grab To capture into a computer some set of data, for example a video frame.

graceful degradation A highly desirable mode of system behaviour in which overloading manifests itself as a *gradual*, *visible* and *controllable* reduction of performance rather than as a sudden catastrophic failure.

gradient In computer graphics, a smooth and gradual variation in a colour. See also GRADIENT FILL.

gradient fill A variety of the FLOOD FILL algorithm in computer graphics that causes an area within an image to be filled not with a single colour but with a tint that varies smoothly between two specified colours. Programs that offer a gradient fill feature may also offer a choice of different geometries for the colour gradient, including linear, radial, rectangular and circular or 'sunburst' effects. More sophisticated versions also offer control over the steepness and profile of the gradient.

Graffiti A system of simplified handwritten characters employed to enter data into a computer with a PEN INTERFACE. Graffiti was the first commercially viable HANDWRITING RECOGNITION system, thanks to the success of the PALM computer family, though it was originally developed at XEROX CORPORATION (a matter which provoked a lawsuit). Graffiti characters must be entered one at a time, not as continuous handwriting, and are written in a prescribed direction.

grammar The rules that govern the way words may be combined in a language (whether natural or an artificial PROGRAMMING LANGUAGE), and hence allow well-formed sentences to be distinguished from badly formed ones. The grammar of most human languages is complex and fluid and admits of many exceptions, but programming languages have simple regular grammars that can be compactly described in a formal notation such as BACKUS-NAUR FORM. See also SYNTAX.

grammar checker A feature provided in some modern WORD PROCESSORS which checks certain aspects of the grammar of the document currently being edited, including capitalization of words, hyphenation, subject/verb agreement (for example for plurals), misuse of the apostrophe, and double negatives. Some grammar checkers such as the one in MICROSOFT WORD can also be instructed to point out problems of prose style, such as long sentences, clichés, or excessive reliance on the passive voice.

drivers over the network. Since Java code may be run on different platforms, a Java object implementing a device driver, a `PROXY` or even a whole user interface can be stored within the device that it applies to and automatically retrieved and executed on any remote computer that connects to it via the Jini lookup service.

JIT Abbreviation of `JUST-IN-TIME`.

jitter Random variation in the timings of a signal such as a clock pulse. In a packet-switched network, it refers to the random variation in the `LATENCY` of successive packets.

J-K flip-flop See under `FLIP-FLOP`.

JNI Abbreviation of `JAVA NATIVE INTERFACE`.

job control language (JCL) A type of primitive `SCRIPTING LANGUAGE` used to control `BATCH PROCESSING` jobs on `IBM MAINFRAME` computers.

Jobs, Steve (b. 1955) Co-founder, along with Steve `WOZNIAK`, of `APPLE COMPUTER INC.` Following management disputes, Jobs left Apple in 1985 and launched the innovative but commercially unsuccessful `NEXT` computer. He rejoined a troubled Apple in 1997 and returned the company to profit by commissioning the stylish and innovative `IMAC` range.

Jog Dial A one-finger input device for mobile telephones and hand-held computers invented by Sony. It consists of a cylindrical roller which, when turned, causes a cursor to move up or down a screen menu and, when pressed in, acts as the Enter command. See also `TRACK-BALL`, `TRACKPOINT`, `ARROW KEYS`.

join An operation performed on two `TABLES` in a `RELATIONAL DATABASE` that share a common field: the result is a new table that combines the contents of all the rows that have the same value in that field. The join operation is the crux of the relational model, allowing data items to be stored separately and uniquely but also to be combined as and when required. An `SQL` statement such as

```
SELECT customer.name, cus-
tomer.phone, invoice.date,
invoice.total FROM customer,
invoice WHERE customer.customer_id
= invoice.customer_id
```

extracts data from the two tables `customer` and `invoice` via the `customer_id` field which they have in common.

Joint Academic Network See `JANET`.

Joint Photographic Experts Group See `JPEG`.

Josephson junction An electronic circuit that once showed promise for creating high-speed computer `LOGIC GATES`. It consists of a pair of superconducting metal electrodes separated by a thin insulating film. When cooled to near absolute zero in liquid helium, the current through the junction becomes extremely sensitive to the strength of the surrounding electrical or magnetic field. Fabrication problems prevented commercial application of Josephson devices in computing, but similar technology is employed to make the `SQUID` (superconducting quantum interference device) used in some brain scanners. See also `SUPERCONDUCTOR`, `TRANSISTOR`, `CMOS`, `ECL`.

journal A special file into which some software systems write every transaction that takes place so that, in the event of a system `CRASH`, the status of all recent changes is preserved. A journal saves time when recovering from a crash by eliminating the need to check the whole system for consistency; as the journal's contents can be used to identify any transactions that had not completed. Some `MAINFRAME` operating systems incorporate a journal within their `FILE SYSTEM` that permits the reversal of disk activity such as copying or deleting files.

journalling The recording of all the transactions and changes made within some software system, to assist with recovery from errors: see more under `JOURNAL`.

joystick An `INPUT DEVICE` that consists of a hand-held stick, pivoted at one end, which transmits its angle in two dimensions to a personal computer or `GAMES CONSOLE`. Joysticks are used mainly for controlling games and so typically contain a trigger and several push-buttons for firing weapons. Most `IBM-compatible PCs` have a 15-pin joystick port, called the game port, on their motherboard, and for those that do not, many `SOUND CARDS` are fitted with one.

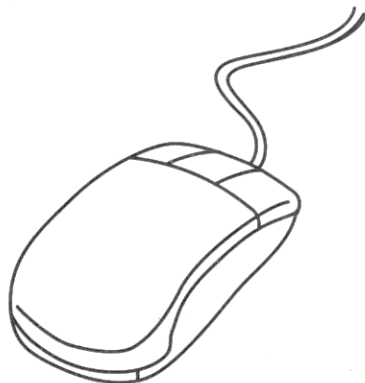
JPEG, JPG 1 Joint Photographic Experts Group, the committee that designed the `IMAGE COM-`

descendants are still used in the PALM range of hand-held organizers.

Motorola Corporation A major US manufacturer of WIRELESS COMMUNICATION systems, semiconductors and other electronic systems and services, which started in the 1930s making car radios, hence the name. Its many product lines include cellphones, pagers, automotive, defence and space electronics, computers, satellite communications systems, and two-way radio systems for police and emergency services. The company is known in the computer industry as the second most important maker of MICROPROCESSORS after INTEL, creating the MOTOROLA 68000 family of chips used in the original Apple MACINTOSH (and still used in the PALM range of pocket computers). It collaborated with IBM to make the POWERPC chip family used in modern Macintoshes.

mount To insert a removable storage device into a FILE SYSTEM so that its contents become visible.

mouse A computer INPUT DEVICE consisting of a small box or puck held in the hand; moving this in a horizontal plane causes a small pointer symbol on the computer screen to make matching movements. The upper surface of the mouse contains one or more buttons that the user may press or 'click' to select the screen object being pointed to. The invention of the mouse is credited to Doug ENGELBART in 1963, though a commercial version did not go on sale until 1982.



Most mice are still mechanical, driven by a ball-bearing that rolls over a special rubber MOUSE MAT to generate a signal that is transmitted to the computer over a connecting

wire. Some mice, however, are optical, using a laser to read a grid pattern printed on the mouse mat, and some newer designs are cordless, eschewing the connecting wire in favour of a wireless infra-red link.

mouse ball A large ball-bearing deployed inside a mechanical MOUSE that translates the linear motion of the mouse into a rotary motion of two internal sensor wheels that generate streams of x and y coordinates. See also OPTICAL MOUSE.

mouse button A switch positioned along the front edge of a computer MOUSE beneath the user's fingers, which sends a signal to the computer when pressed. A mouse may have one, two or three buttons and the way that their button presses are interpreted depends on the make of the computer to which it is attached and the software currently running. With a two-button mouse the buttons may be referred to as the primary and secondary mouse buttons, or right and left mouse buttons. Single button mice such as those for the Apple Macintosh simulate secondary mouse button functions by pressing an additional keyboard key. See also BUTTON-PRESS, CLICK, DOUBLE-CLICK, RIGHT-CLICK.

mouse click The act of moving a MOUSE POINTER over some object on a computer screen and then pressing one of the MOUSE BUTTONS.

mouse elbow A variety of repetitive-strain injury (RSI) allegedly caused by using a computer MOUSE.

mouse mat A rectangular rubberized pad placed on a desk top to provide a suitable surface for rolling a computer MOUSE. Like tee shirts, mouse mats have become vehicles for marketing messages and wacky slogans.

mouse pointer A small cursor symbol, normally an arrow, which can be moved around the VDU screen by moving the MOUSE. It is used to point to and activate icons, buttons, menus and other interactive screen objects.

mouse wheel A thumb-wheel control fitted to a computer MOUSE input device, used to scroll a document up and down the computer screen. See also WHEEL MOUSE, INTELLIMOUSE.

whiteboard (or an easel with a flipchart) that doubles as a GRAPHICS TABLET, so that anything written on it by the lecturer is duplicated on a computer screen, possibly at remote locations via a network.

White Book 1 A standards document issued in 1994 that redefines the format for the data CD-ROM disk to make it more fully compliant with the ISO 9660 logical data format. The White Book format enhances and replaces the earlier YELLOW BOOK standard. See also RED BOOK, GREEN BOOK, ORANGE BOOK.

2 Kernighan and Ritchie's definitive textbook *The C Programming Language* which is the final authority on matters of C syntax.

white pages An Internet DIRECTORY SERVICE for locating people by name, so called by analogy with the (white) US telephone directory. It consists of a database of individual's EMAIL address, telephone numbers and postal addresses.

white paper A technical document describing the workings of a technology, rather than a specific product.

whois An Internet DIRECTORY SERVICE that enables the real names of users on remote servers to be looked up. From the Unix command line the command 'whois -h bigserver.com jo' would return the real name of the user nicknamed 'jo' on the bigserver system, assuming that the issuer of the command has the necessary security permissions to be given access to this information. Whois can also return information about the resources (such as servers, subnetworks and domains) available at a site. See also WHITE PAGES, FINGER, PING.

Wide Area Information Servers See WAIS.

wide area network See WAN.

wideband Any signal channel that simultaneously carries a large number of different frequencies. See also BROADBAND.

Wide SCSI, Wide Ultra SCSI See under SCSI.

widget An all-purpose nonsense word used by engineers and programmers to describe any small device or gadget that defies easier description. The term is often employed to stand for whole classes of real objects in

tutorial examples (particularly for DATABASES, where widget manufacturers abound). See also METASYNTACTIC VARIABLE.

The term is also widely used in discussion of GRAPHICAL USER INTERFACES, to describe visual controls such as scrollbars or buttons (possibly because it suggests a contraction of 'windows gadget'). It has, in fact, been adopted as the official name for the various visual components of the MOTIF graphical user interface for UNIX systems.

Wi-Fi The brand name (short for either wireless-fidelity or wide-fidelity) given to the IEEE 802.11b standard for wireless networking. Wi-Fi employs the ETHERNET protocols over short-range radio connections to create wireless LANs suitable for businesses and institutions located on a single site. It operates in the same 2.4 gigahertz (Industry, Science and Medicine) radio band as BLUETOOTH, but has a longer range (about 100 metres from each base station or 'access point', compared to Bluetooth's 10 metres). Some computer manufacturers, including Apple and Compaq, have begun to build Wi-Fi links into their equipment.

wildcard A special character or sequence of characters that matches any other character when performing text searches and comparisons. The term derives from card games like Poker, where a particular card such as the Joker may be deemed to stand for any card when making a hand.

Most operating systems support wildcard filenames when copying and deleting, and most WORD PROCESSORS offer them in their SEARCH-AND-REPLACE functions. A common convention, used in both MS-DOS and UNIX is to let ? stand for any single character and * stand for any sequence of characters, so that: ch?p matches chip, chop and chap, but not chit; and ch* matches chalk, cheese, chowder, but not clown.

See also REGULAR EXPRESSION, PATTERN MATCHING.

WIMP A whimsical term used to describe GRAPHICAL USER INTERFACES in the days when they were still a novelty. Short for Windows, Icons, Mouse, Pull-down menus.

Win 9x See WINDOWS 9x.