

A Dictionary of
Computing

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fixed head

ameter of 36 inches. The size, in inches, has progressively decreased in the sequence 14, 10.5, 9, 8, 5.25, 3.5, 2.5, 1.8, 1.3. Not all manufacturers used all of these sizes but currently 3.5 inch disk drives are used throughout the industry, with capacities of many gigabytes. Portable PCs currently use 2.5 inch disk drives.

fixed head of a disk drive. A read/write head that cannot be moved relative to the center of the disk. A large number of these heads are usually incorporated into an assembly so that there is a "head per track", and such drives may be referred to by this expression. The advantage of a fixed head is that the average *access time is reduced to the time for half a revolution since there is no track seek time required. Some drives had both fixed and moveable heads but these are now obsolete.

fixed-length arithmetic *Another name for finite-length arithmetic.*

fixed-length code A *code in which a fixed number of source symbols are encoded into a fixed number of output symbols. It is usually a *block code. (The term fixed-length is used in contrast to *variable-length, whereas block code can be contrasted with *convolutional code.)

fixed point *See* FIXED-POINT THEOREM.

fixed-point notation A representation of real numbers in which the position of the *radix point is fixed. The position of the point determines the absolute precision of the representation. If the point is fixed at the right-hand end of the number then all of the fixed-point numbers are integers.

Due to a number of difficulties, fixed-point arithmetic is rarely directly supported by programming languages. However, fixed-point arithmetic is implemented and used where needed; for example, for storing and tracking monetary values, or for decoding audio format on devices that do not support floating-point arithmetic.

fixed-point theorem A theorem concerning the existence and nature of fixed points used to give solutions to equations. A **fixed point** of a *function f

$$f: X \rightarrow X$$

is an element x such that $f(x) = x$. A **least fixed point** is one that, among all the fixed points of f , is lowest in some *partial order-

ing that has been imposed on the elements of X . Specifically, if $\leq$ is a partial ordering of X then x is a least fixed point if for fixed point y we have $x \leq y$.

The most often-cited form of fixed-point theorem to do with computing is due originally to S. C. Kleene, and originated in *recursive function theory. It states that, subject to certain assumptions, notably that f is continuous, f has a least fixed point, x_f , which moreover can be characterized as the limit of a sequence $x_0, x_1, x_2, \dots$ of approximations. This abstract fact is of great relevance to the semantics of programming languages, in particular in specifying the precise meaning of constructs like *iteration, *recursion, and recursive types using *equations.

fixed-radix system (fixed-base system) *See* NUMBER SYSTEM.

fixed space (fixed pitch) *See* FONT.

fixed word length computer A computer in which data is constrained to lie within words that are all of the same length. By extension the term is sometimes used to imply that all instructions also fit within one word. *Compare* VARIABLE WORD LENGTH COMPUTER.

flag A *variable whose value indicates the attainment of some designated state or condition by an item of equipment or a program. The flag is subsequently used as a basis for conditional branching and similar decision processes. *See also* SENTINEL.

flame *Informal* 1. An angry or abusive e-mail message from one user to another. 2. A flood of e-mail messages from a large group of users to one specific user, who is judged to have offended against some standard of decent behavior. The individual messages may each be angry or abusive, but in some cases the actual messages may have no real purpose other than to overload the recipient's system, typically by sending as a mail message the entire contents of some very large data set such as the text of all the help files on a system.

flash memory A form of storage evolved from EEPROM technology wherein the data may be altered electrically. The device does not need refreshing to maintain the data, which is stored even when power is removed. Flash memory finds application in computers for storing BIOS information, in