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FLOPPY DISK

In considering the development of computing in the post-war period it's easy to assume that the techniques of Large-Scale and Very Large-Scale Integration (LSI and VLSI) have been the fuel, and the cheap mass-produced microprocessor chip the engine, of the microcomputer revolution. Of equal importance, however, has been the development of cheap, fast, dependable back-up storage — the *floppy disk*. Single-drive units costing about the same as a microcomputer that are capable of storing up to half a Megabyte of data or programs on a disk costing a couple of pounds make an over-priced electronic toy into a credible data processing system.

Inevitably in the growth of microcomputing, several disk formats have developed: the 8in diameter floppy, the 5½in mini-floppy, and the 3½in and 3¼in microfloppy. All consist of an oxide-coated thin (less than 0.5mm) flexible plastic disk, in a protective jacket. This jacket is never removed, and is pierced with a radial slot or window that gives access to the disk surface. In use the disk spins inside the jacket at around 300 rpm, while the drive read-write head moves backwards and forwards in the window. This allows reasonably fast access to every spot on the surface. Another slot in the jacket is called the *write-protect* notch: the drive unit checks that this notch is open before writing on the disk.

The read-write head is similar to a tape-recorder's; it writes by changing the alignment of the *magnetic domains* in the disk's surface, and reads by sensing those alignments. Information is written along concentric circles on the disk surface called *tracks*, divided into 20 to 40 *sectors*. High-quality, or *double-density*, disks can have up to 80 tracks, while *single-density* disks have 40. The boundaries between track sectors can be marked by photoelectrically-sensed holes — one per sector — in the inside rim of the disk, in which case the disk is *hard-sectored*. The alternative — *soft-sectored* — disks have just one index hole, which marks the start of the first sector on every track, subsequent sector boundaries being magnetically marked.

FLOWCHART

Any graphical method of representing the interactions of control or information in a program or system tends to be called a *flowchart*, though many such diagrams represent relationships rather than flows, and so should really be called 'process diagrams', or 'data graphs'. The commonest form of flowchart comprises boxes of various shapes representing program processes such as input/output, decision-making and data processing; these boxes are linked by arrowed lines that show how control passes from one process to another in the program. Most self-taught programmers use this type of flowchart, but in recent years it has been discarded by professionals and academics because it allegedly distorts or conceals program structure when used as descriptive documentation, and because it encourages badly structured program design. In general, the graphic approach is more and more discarded in favour of precise requirements specifications, data definition statements and function description languages.

FLOW CONTROL

In any real-time data communications application the receiver and the sender are likely to have different optimum transmit/receive rates; in order that slow receiving devices are not overwhelmed by fast transmissions, some *flow control* strategy must be employed, either by the transmitter, or by the transmission network controller. The simplest strategy is known as *end-to-end* control, in which the amount of data sent is limited to the capacity of the receiver. Another strategy is called *hop-by-hop* — the amount of data sent is limited at every step through the transmission network by the capacity of the node or link carrying the information.

FORMAT

Any pre-defined structure is a *format*, but in computing the term usually refers to disk or instruction formats. The former refers to the way in which the pattern of tracks and sectors is physically distributed on the surface of a magnetic disk (see page 124). Disks used by one manufacturer's disk drives may well be unreadable to other drives precisely because of this. This problem is eased somewhat by the emergence of common operating systems such as CP/M and MS-DOS: software packages written for these systems often share a common disk format. To format a disk is to prepare it for a particular disk drive; this destroys any information on the disk.

Instruction formats describe the syntax of instructions or commands. For example:

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RENUMBER startno [,endno [,inc] ]
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indicates the spelling of the command word, the nature of its possible arguments (first line number, end line number and increment), the delimiters (the comma), and the variant forms of the command (anything in square brackets is optional).

Demo Disk

The illustration shows a 5½in floppy disk, with the read-write window, the sector index hole and the write-protect notch clearly visible



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