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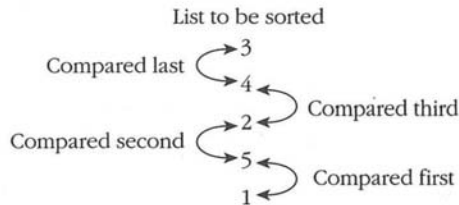**Technical Editors:** Mary DeJong, Jeff Carey, Dail Magee, Jr., Jim Fuchs, Seth McEvoy

expensive and easier to produce. *See also* flash memory.

bubble sort Also called an exchange sort. A sorting algorithm that starts at the end of a list with *n* elements and moves all the way through, testing the value of each adjacent pair of items and swapping them if they aren't in the right order. The entire process is then repeated for the remaining *n*-1 items in the list, and so on, until the list is completely sorted, with the largest value at the end of the list. See the illustration. A bubble sort is so named because the "lightest" item in a list (the smallest) will "bubble up" to the top of the list first; then the next-lightest item bubbles up to its position, and so on. *Compare* insertion sort, merge sort, quicksort; *see also* algorithm, sort.

List to be sorted

Compared last
3
4
Compared third
2
Compared second
5
Compared first
1

List after first pass	List after second pass
1	1
3	2
4	3
2	4
5	5

Bubble sort.

bucket A region of memory that is addressable as an entity and can be used to hold data—the receptacle, as opposed to the data itself. The word is often encountered in the term *bit bucket,* meaning a dumping ground to which a program can send discarded information (bits). *See also* bit bucket.

buffer An intermediate repository of data—a reserved portion of memory in which data is tem-

porarily held pending an opportunity to complete its transfer to or from a storage device or another location in memory. Some devices, such as printers or the adapters supporting them, commonly have their own buffers.

buffering The process of using a buffer or buffers to hold data that is being transferred, particularly to or from input/output (I/O) devices such as disk drives and serial ports.

buffer pool A group of memory or storage-device locations that are allocated for temporary storage, particularly during transfer operations.

bug An error in software or hardware. In software, a bug is an error in coding or logic that causes a program to malfunction or to produce incorrect results. Minor bugs—for example, a cursor that does not behave as expected—can be inconvenient or frustrating, but not damaging to information. More severe bugs can cause a program to "hang" (stop responding to commands) and might leave the user with no alternative but to restart the program, losing whatever previous work had not been saved. In either case, the programmer must find and correct the error by the process known as debugging. Because of the potential risk to important data, commercial application programs are tested and debugged as completely as possible before release. Minor bugs found after the program becomes available are corrected in the next update; more severe bugs can sometimes be fixed with special software, called patches, that circumvents the problem or in some other way alleviates its effects. In hardware, a bug is a recurring physical problem that prevents a system or set of components from working together properly. The origin of the term reputedly goes back to the early days of computing, when a hardware problem in an electromechanical computer at Harvard University was traced to a moth caught between the contacts of a relay in the machine. (Entomologists will undoubtedly be quick to note that a moth is not really a bug.) *See also* beta testing, bomb, crash, debug, debugger, hang, inherent error, logic error, semantic error, syntax error.

building-block principle *See* modular design.