Operating system

An operating system (OS) is software, consisting of programs and data, that runs on computers and manages computer hardware resources and provides common services for efficient execution of various application software. Management tasks include scheduling resource use to avoid conflicts and interference between programs. Unlike most programs, which complete a task and terminate, an operating system runs indefinitely and terminates only when the computer is turned off.

For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between application programs and the computer hardware, although the application code is usually executed directly by the hardware, but will frequently call the OS or be interrupted by it.

Development of operating systems.

In early computers, the user typed programs onto punched tape or cards, from which they were read into the computer. The computer subsequently assembled or compiled the programs and then executed them, and the results were then transmitted to a printer. It soon became evident that much valuable computer time was wasted between users and also while jobs (programs to be executed) were being read or while the results were being printed. The earliest operating systems consisted of software residing in the computer that handled "batches" of user jobs — i.e., sequences of jobs stored on magnetic tape that are read into computer memory and executed one at a time without intervention by user or operator. Accompanying each job in a batch were instructions to the operating system (OS) detailing the resources needed by the job — for example, the amount of CPU time, the files and the storage devices on which they resided, the output device, whether the job consisted of a program that needed to be compiled before execution, and so forth. From these beginnings came the key concept of an operating system as a resource allocator. This role became more important with the rise of multiprogramming, in which several jobs reside in the computer simultaneously and share resources — for example, being allocated fixed amounts of CPU time in turn. More sophisticated hardware allowed one job to be reading data while another wrote to a printer and still another performed computations. The operating system was the software that managed these tasks in such a way that all the jobs were completed without interfering with one another.

Further work was required of the operating system with the advent of interactive computing, in which the user enters commands directly at a terminal and waits for the system to respond. Processes known as terminal handlers were added to the system, along with mechanisms like interrupts (to get the attention of the operating system to handle urgent tasks) and buffers (for temporary storage of data during input/output to make the transfer run more smoothly). A large computer can now interact with hundreds of users simultaneously, giving each the perception of being the sole user. The first personal computers used relatively simple operating systems, such as some variant of DOS (disk operating system), with the main jobs of managing the user's files, providing access to other software (such as word processors), and supporting keyboard input and screen display. Perhaps the most important trend in operating systems today is that they are becoming increasingly machine-independent Hence, users of modern, portable operating systems like UNIX, Microsoft Corporation's Windows NT, and Linux are not compelled to learn a new operating system each time they purchase a new, faster computer (possibly using a completely different processor).