



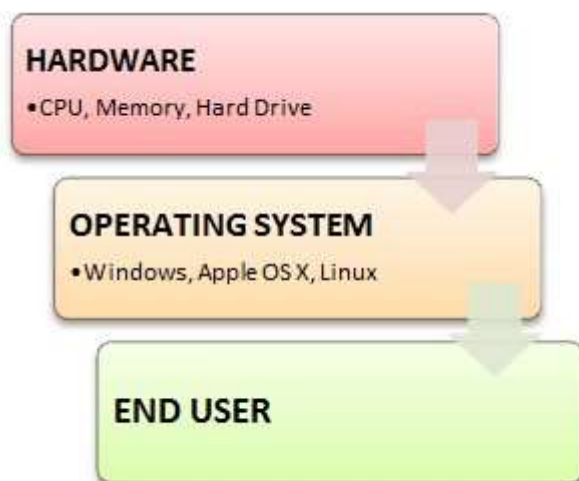
Operating System -Review Paper

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Introduction –

OPERATING SYSTEM



An operating system (OS) is a group of programmes that controls computer hardware resources and offers shared services for software applications. A computer system's operating system is a crucial part of the system software. An operating system is typically needed for application programmes to work. Operating systems that use time-sharing plan activities to make the most of the system's resources. They may also contain accounting software to allocate costs for processing time, mass storage, printing, and other resources. Although application code is typically run directly by hardware and frequently makes a system call to an OS function or is interrupted by it, the operating system serves as a bridge between programmes and computer hardware for hardware functions like input and output and memory allocation.

There are typically four different types of operating systems, divided into groups based on the sorts of machines they operate and the kinds of applications they support. These are the categories:

Types of operating system

Real-time operating system (RTOS) -

Machines, research instruments, and industrial systems are all controlled by real-time operating systems. Since the system will be a "sealed box" when it is deployed for use, an RTOS typically has extremely limited user interface functionality and no end-user utilities. An RTOS's management of computer resources is a crucial component in ensuring that each time an action is performed, it is completed in exactly the same amount of time. In a complicated machine, a component moving faster simply because more system resources are available could be just as disastrous as if the component didn't move at all because the system is overloaded.

Single-user, single task – As the name suggests, this operating system is made to enable a single user to efficiently complete a single task at a time. An effective illustration of a contemporary single-user, single-task operating system is the Palm OS for Palm handheld computers.

Single-user, multi-tasking - Today, the majority of people utilise single-user, multi-tasking operating systems on their desktop and laptop computers. Both the Windows and MacOS platforms from Microsoft and Apple are examples of operating systems that permit a single user to run many programmes simultaneously. It's completely feasible, for instance, for a Windows user to be using a word processor to write a note, download a file from the Internet, and print the contents of an email message.

Multi-user - A multi-user operating system enables multiple users to access the resources of the machine at once. In order to prevent problems with one user from affecting the entire community of users, the operating system must ensure that the needs of the many users are balanced and that each of the programmes they are using has enough and independent resources. Multi-user operating systems include UNIX, VMS, and mainframe operating systems like MVS.

It's critical to distinguish between single-user operating systems that support networking and multi-user operating systems. Both Windows 2000 and Novell Netware can support hundreds or thousands of networked users, yet neither of these operating systems actually supports multiple users. For Windows 2000 or Netware, the only "user" is the system administrator.

Functions of an operating system

Start -up of the computer

Booting is the process of turning on or restarting a computer. A computer that has been totally shut off is called a "cold boot." A warm boot is the procedure of restarting the computer by utilising the operating system.

Carries out simple computing operations

The operating system manages the numerous peripheral devices, including the mouse, keyboard, and printers, among other fundamental computer activities. For instance, the majority of operating systems today support plug-and-play, which means a device like a printer will be instantly recognised and set up without any user input. Provides

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Performs basic computer tasks

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A user interface

The user interface is how a user communicates with software. The two primary forms of user interfaces are: command line and a graphical user interface (GUI) (GUI). When using a command line interface, the user types instructions into the operating system to carry out particular operations. DOS is an illustration of a command line interface (disk operating system). When using a graphical user interface, the user navigates through windows, icons, and menus by using a mouse. Windows Handles system resources or Windows Vista are two examples of graphical user interfaces.

The operating system also manages system resources including the memory of the computer and how different apps and external devices share the time of the central processor unit (CPU). The CPU is continuously being fought over by programmes and input techniques, who also need memory, storage, and input/output bandwidth. In order to maximise the functionality of the overall right, the operating system makes sure that each programme receives the resources it requires.

Provides file management

The management and structuring of files and directories (folders) saved to or retrieved from a computer disc is also handled by the operating system. The user can create files and directories, change the names of files, copy and move files, and delete files using the file management system. Through the type of file system, the operating system keeps track of where files are located on the hard drive. File Allocation Table (FAT) and New Technology File System are the two primary types of file systems (NTFS)..

Types of file system

1. File Allocation table (FAT)
2. New Technology file system (NTFS)

File Allocation table (FAT) uses the file allocation table which records, which clusters are used and unused and where files are located within the clusters. NTFS is a file system introduced by Microsoft and it has a number of advantages over the previous file system, named FAT32 (File Allocation Table)

Advantages of operating system

- Provides a user-friendly GUI for ease of use • Provides an environment in which a user may run programmes or applications • Allows you to hide hardware specifics by creating an abstraction
- The operating system must make sure that the computer system convenient to use
- The operating system serves as a bridge between applications and hardware components.
- It offers an intuitive interface for the computer system's resources.
- Serves as a liaison between all of the system's hardware and software.

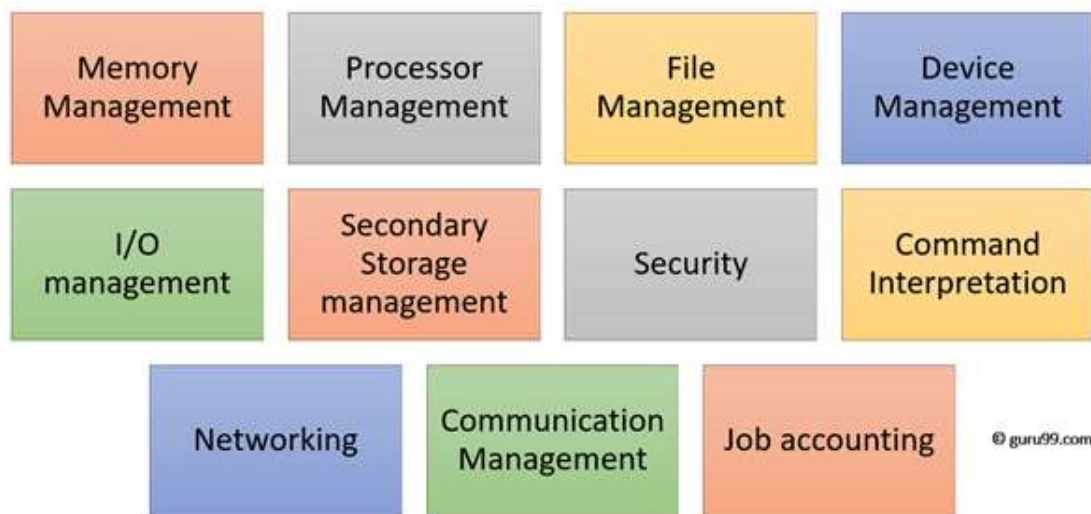
Disadvantages of Operating.

- Operating system software is fairly expensive for small size organisations, which increases strain on them.
- If any OS issue arises, you may lose all the contents that have been stored in your system. Example Windows
- Because threats might appear at any time, there is never complete security.

Functions of Operating System

Some typical operating system functions may include managing memory, files, processes, I/O system & devices, security, etc.

Below are the main functions of Operating System:



1. Process management: This feature enables the OS to add and remove processes. Additionally, it offers systems for interprocess communication and synchronisation.
2. Memory management: The memory management module manages the process of allocating and releasing memory to applications that require it.
3. File management: It controls all operations involving files, including naming, storing, organising, retrieving, sharing, and protecting them.
4. Device Management: All devices are monitored by device management. The I/O controller is a module that is also in charge of this duty. Additionally, it manages the devices' allocation and de-allocation.
5. I/O System Management: One of the key goals of any OS is to conceal from the user the quirks of that hardware.
6. System storage levels include primary storage, secondary storage, and cache storage. Secondary-Storage Management: Data and instructions must be kept in primary storage or cache in order for a running programme to refer to them.
7. Security: The security module guards a computer system's data and information against authorised access and malware threats.
8. Command interpretation: This module interprets commands from the system and uses the appropriate system resources to process them.

9. Networking: A distributed system is a collection of processors that do not share a clock, clock frequency, or any hardware components. Through the network, the processors talk to one another.

Features of Operating System (OS)

Here is a list important features of OS:

- Protected and supervisor mode
- Allows disk access and file systems Device drivers Networking Security
- Program Execution
- Memory management Virtual Memory Multitasking
- Handling I/O operations
- Manipulation of the file system
- Error Detection and handling
- Resource allocation
- Information and Resource Protection

References

1. Peterson, J. L., & Silberschatz, A. (1985). *Operating system concepts*. Addison-Wesley Longman Publishing Co., Inc..
2. Hansen, Per Brinch. *Operating system principles*. Prentice-Hall, Inc., 1973.
3. Klein, G. (2009). Operating system verification—an overview. *Sadhana*, 34(1), 27-69.
4. Stonebraker, M. (1981). Operating system support for database management. *Communications of the ACM*, 24(7), 412-418.