

- **Appreciate the functionality, features and tools of OS.**

An operating system (OS) is a programme that manages all of the other application programmes in a computer after being loaded into the computer by a boot programme.

The operating system is used by application programmes to request services via a defined application programme interface (API). Furthermore, users can interact with the operating system directly via a user interface, such as a command-line interface (CLI) or a graphical user interface (GUI) (Bigelow, 2021).

According to Power and Ford (2009), you will need two types of software to use your computer (or any other computerised device). These are programmes and system software. Applications are programmes that allow you to write documents, surf the web, or play games. The computer system is managed by system software, and an operating system is another name for system software. Numerous operating systems are available, but they all share a typical architecture (or structure). They must face the same challenges and carry out the same essential functions. For instance, here are some of the key functionalities, features, and tools of an operating system (OS):

1. **Process Management:** The operating system manages the creation, execution, and termination of processes. It allocates CPU time, memory, and I/O devices to each process.
2. **Memory Management:** The operating system allocates and deallocates memory to different processes, ensuring that each process has sufficient memory to execute its tasks.
3. **File Management:** The operating system provides a system that organises and manages files on the computer's storage devices. It allows users to create, delete, copy, move, and access files and directories.

4. **Device Management:** The operating system manages the communication between the computer and its devices, such as printers, scanners, and external storage devices. It ensures that devices are initialised, configured, and appropriately controlled.
5. **Security:** The operating system provides various security features to protect the computer from unauthorised access, malware, and other threats. It includes authentication, authorisation, and encryption.
6. **User Interface:** The operating system provides a graphical user interface (GUI) or command-line interface (CLI) for users to interact with the computer. It allows users to run applications, access files, and configure system settings.
7. **Networking:** The operating system provides networking functionality to allow computers to communicate with each other over a network. It includes protocols such as TCP/IP, DHCP, and DNS.
8. **System Tools:** The operating system provides various tools that allow users to manage and monitor system performance, configure system settings, and troubleshoot problems. Examples include a task manager, system monitor, and control panel.

Overall, operating system functionalities, features, and tools make it an essential component of modern computing systems.

- **Identify the privileged operating system that is most suitable to accomplish a task.**

Selecting the most suitable operating system for a specific task depends on various factors, such as the task's requirements, the computer's hardware configuration, and

the user's preferences. For instance, here are some examples of operating systems that are suitable for specific tasks:

1. **Windows:** Windows is a popular operating system widely used for general-purpose computing tasks such as office work, web browsing, multimedia playback, and gaming. It supports various hardware configurations and has a large ecosystem of applications and games.
2. **macOS:** macOS is an operating system developed by Apple that is used on Apple's computers. It suits graphic design, video editing, and audio production tasks. It has a sleek and user-friendly interface is known for its stability and performance.
3. **Linux** is a free and open-source operating system widely used for server-side tasks such as web hosting, database management, and cloud computing. It is highly customisable and can be configured to run on various hardware configurations.
4. **Android:** Android is an operating system for mobile devices such as smartphones and tablets. It is suitable for mobile gaming, social media, and productivity tasks, and it has a large ecosystem of mobile applications and supports a wide range of hardware configurations.
5. **iOS:** iOS is an operating system developed by Apple that is used on iPhones and iPads. It is suitable for mobile gaming, social media, and productivity tasks, and it has a user-friendly interface known for its security and privacy features.

In general, the choice of the operating system depends on the specific task and the hardware configuration of the computer or device. It is essential to evaluate the task's

requirements and choose an operating system that can provide the necessary features and performance.

- **Demonstrate the data storage and data access support OS can provide.**

Operating systems (OS) support data storage and access through various file systems, storage devices, and input/output (I/O) mechanisms (CDW, 2022). Here are some examples of how OS can provide data storage and data access support:

1. **File Systems:** OS provides a file system that organises and manages files on storage devices. The file system provides a hierarchical directory structure that allows users to organise their files and directories. The file system also provides permissions and access controls, allowing users to control who can access and modify their files.
2. **Storage Devices:** OS provides support for various storage devices such as hard disk drives (HDD), solid-state drives (SSD), and network-attached storage (NAS). OS can manage the allocation and deallocation of storage space on these devices and ensure that data is stored securely.
3. **I/O Mechanisms:** OS provides I/O mechanisms that allow programs to read and write data to storage devices. These mechanisms include system calls such as `open()`, `read()`, `write()`, and `close()`, as well as device drivers that enable communication with specific devices.
4. **Caching:** OS can use caching to improve data access performance. Caching involves storing frequently accessed data in memory or on a fast storage device like an SSD. This reduces the need to access slower storage devices such as HDDs, improving overall system performance.

5. **Virtual Memory:** OS can use virtual memory to provide the illusion of a more significant amount of memory than is physically available. Virtual memory allows programs to access data stored on a disk as if in memory. This improves system performance by reducing the need to access slow disk storage.

Operating systems provide a wide range of data storage and access support. The specific features and mechanisms the OS provides depend on the specific OS and its configuration. However, OS generally provides a flexible and robust platform for storing and accessing data.

References:

Bigelow, S. (2021). *What is an Operating System (OS)? Definition, Types and Examples*. [online] WhatIs.com. Available at:

<https://www.techtarget.com/whatis/definition/operating-system-OS>.

Power, R. & Ford, R. (2009). *Operating System Fundamentals*. [online]

ResearchGate. Available at:

https://www.researchgate.net/publication/339413127_Operating_System_Fundamentals.

CDW (2022). *What is Data Storage? - Data Storage Types & Attributes | CDW*.

[online] www.cdw.com. Available at:

<https://www.cdw.com/content/cdw/en/articles/datacenter/what-is-data-storage.html>.