**The Classification and Function of Operating System**

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According to Odun-Ayo et al., (2021, p. 56), an Operating System is an interface between a user and computer hardware. It's a piece of software that handles hardware devices and acts as a bridge between an application software and hardware of the computer. The classification and functions of operating systems (OS) represent a cornerstone in the field of computing, providing a framework to understand the diverse array of OS designs and functionalities (*Anna Kobusińska*, n.d.). Extensive research in this domain has unraveled various criteria for classification, ranging from the purpose and user interface to architectural considerations and network capabilities. While existing literature offers valuable insights into the broad landscape of operating systems, there is still a notable gap in the exploration of emerging paradigms and the evolving demands of modern computing environments.

**Classification of Operating System**

Operating systems can be classified based on multiple factors, such as the number of users they support, the number of tasks they can perform at a given time, the type of interaction they allow with the system, and the type of environment they work in (*Operating Systems: Functions, Types, Examples | StudySmarter*, n.d.). In terms of user capacity, operating systems can be categorized as either Single-User or Multi-User. A Single-User OS permits only one user to operate the machine at any given time, ensuring exclusive access. On the other hand, a Multi-User OS facilitates concurrent use by multiple individuals, allowing simultaneous engagement with the device by different users (Casseau et al., 2021).

Regarding the number of tasks, operating systems fall into two categories: Single-Tasking and Multi-Tasking. Single-Tasking OS is designed to manage only one task at a time, whereas Multi-Tasking OS has the capability to handle multiple tasks concurrently, enabling efficient multitasking and simultaneous execution of various processes. Also, operating systems can be classified based on user interaction, falling into either Command-Line Interface (CLI) or Graphical User Interface (GUI) categories. A Command-Line Interface OS necessitates the manual input of commands, whereas a Graphical User Interface OS facilitates user interaction through visual elements such as icons, providing an intuitive and visually guided user experience (IEEE Xplore, n.d.).

Furthermore, according to Casseau et al., (2021,p 60) ,operating systems can be classified based on their environment, encompassing Real-Time, Distributed, Network, Mobile, and Embedded systems. Real-Time OS ensures real-time responsiveness and is commonly employed in embedded systems. Distributed OS utilizes multiple central processors for coordinated processing. Network OS manages and oversees interconnected computers within a network. Mobile OS is specifically designed for mobile devices, catering to the unique requirements of smartphones and tablets (Casseau et al., 2021). Embedded OS, on the other hand, is customized for compact devices such as digital watches and MP3 players, showcasing the adaptability of operating systems to diverse technological environments. This comprehensive classification framework elucidates the diverse functionalities and adaptability of operating systems in the ever-evolving landscape of computing.

**Functions of Operating System**

The operating system performs diverse tasks crucial for smooth computing. Among these functions is processor management, where, in a multi-programming environment, the OS uses process scheduling to determine the sequence and duration of processor access for various tasks. It efficiently assigns tasks to the processor, monitors process statuses, and deallocates the processor upon task completion, ensuring optimal utilization in a streamlined manner (Solanki & Paliwal, 2018).

Another function of operating system is memory management. Memory management is crucial in efficiently overseeing primary memory to load and execute programs. It tracks memory usage, controls process access order and duration in multiprogramming, and allocates/deallocates memory, optimizing system performance and preventing conflicts among concurrent processes (Singh, 2019). Another key function is device management, where the operating system supervises device communication through drivers. It manages connected devices, assigns Input/Output controllers, determines process access, and efficiently allocates/deallocates devices, ensuring seamless functioning, task execution, and communication with requesting processes.

Additionally, operating system manages file systems, organizing data into directories for efficient navigation. Essential file management tasks, such as tracking file locations, user access settings, and status, are overseen by the OS. It handles file operations like creation, deletion, transfer, copy, and storage, ensuring data integrity and security against unauthorized access (Odun-Ayo et al., 2021). Likewise, the operating system acts as an intermediary between users and computer hardware, offering a user interface through commands or a graphical interface, facilitating interactions with applications and the underlying machine hardware.

Besides, operating system ensures security with password protection and measures like login protection, an active firewall, and secure system memory to prevent unauthorized access and maintain data integrity (Odun-Ayo et al., 2021). In addition, it plays a vital role in optimizing system performance by efficiently allocating CPU time, memory, and I/O devices to processes, ensuring fair resource utilization. Process scheduling is a critical function, preventing any task from monopolizing the CPU, enabling effective multitasking (Solanki & Paliwal, 2018).

Moreover, operating system serves as a network manager, orchestrating internet traffic by overseeing data packaging and transmission. Additionally, it acts as a settings and security guard, enabling users to configure Wi-Fi or Ethernet settings, monitor network performance, and optimize internet speed (Singh, 2019). Further to this, the operating system is accountable for job accounting, tracking time and resources utilized by tasks and users, as well as error detection to prevent system malfunctions. Moreover, it collaborates with other software and users by allocating interpreters, compilers, and assemblers to different users within the computer system.

In conclusion, the varied classifications and functions of operating systems are tailored to meet the diverse requirements of different computing environments. As technology advances, operating systems are poised to assume a pivotal role in influencing the trajectory of future computing. A comprehensive grasp of their classifications and functions is indispensable for developers, administrators, and users alike.

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