**Classification and functions of operating system**

Name

Institution

Date

**Operating system**

An operating system is a program that, once loaded into a computer, acts as a resource manager. This includes tasks such as managing the computer's processes, memory and files. It acts as an interface between the user and the hardware of the computer or other similar electronic device such as smart phones (Geeksforgeeks, 2023)

 It is one of the most important software for the functioning of computers. It helps the user to communicate with the computer without being able to speak its language. These include Windows, Linux and Apple OX S (Vaskor, 2023).Operating systems vary and are classified according to their functionality. The classification and functions are listed below.

**Classification of operating systems**

The first class is the batch operating system. In this type of OS, the CPU takes jobs in batches for further processing. The user and OS do not interact directly with the computer system. The jobs in a batch have similar requirements and are therefore routed through the system simultaneously to increase processing speed. The operator has the task of sorting the jobs that have the same requirements. This OS saves a lot of time because large amounts of data can be processed in less time. In addition, the idle time is very low with a batch operating system (Geeksforgeeks, 2023).

Another class is the multi-tasking operating system. This is also called time-sharing OS. It allows people at different workstations to use a computer system simultaneously. Thus, multiple programs are processed simultaneously because two or more CPUs are used in a single system. If one of the CPUs cannot run a program, the other takes over and processes it, improving the performance of the computer system. Linux and Windows 200 are good examples of this system OS. This system is more reliable compared to batch processing OS due to parallel processing (India CSR, 2023).

The third class is the multiprogramming operating system. In this OS, the use of CPU is more efficient. This is because multiple jobs can be executed simultaneously in one CPU. The OS can quickly switch to the CPU to handle another job if the job currently being executed requires a slow output or input or memory operation, so a lot can be done in a given time. This maximizes the total amount of work that can be done by a computer in a given time interval (Vaskor, 2023).

Another classification of operating system is the distributed operating system. With this OS, different computer systems with their own processors and memory units communicate with each other through a common communication network. One advantage of this OS is that a user can remotely access a file or software located in another device in the distributed system. If one of the devices in the system fails, it does not mean that the others will also fail, since each device is independent (Gkbooks, 2023).

The fifth classification is the network operating system. This system runs on a server. It provides shared access to files and various other network functions. All configurations of each user in the system are known to all users in the network, hence the name "tightly coupled systems"(Geeksforgeeks, 2023).

Lastly, we have the Real-time operating system. The response time to input is very low in this OS. Examples of real- time OS are robots and missile systems. Real-time OS is further divided into hard and soft real-time OS. The difference is that hard real-time OS is used when the time requirements in an application are very strict, while soft real-time is used when the time constraint in an application is less strict (Geeksforgeeks, 2023).

**Functions of the operating system**

A computer’s operating system in a computer has much important functions. First, it manages the memory of the computer. The operating system allocates memory to programs and frees it when necessary. It also decides which program gets this resource first when multiprogramming (Gkbooks, 2023).

 It also performs process scheduling in a multiprogramming environment. It manages the CPU, assigning different tasks and ensuring that each task has sufficient processing time. In addition, the operating system tracks the status of running processes through traffic control. When a process is no longer needed, the operating system releases the processor's allocation (Vaskor, 2023).

The third function of the OS is device management. The operating system assigns and de-allocates all devices connected to the computer system and tracks them through input/output control.

Another function of the operating system is file management. It manages the file system through activities such as naming files, sharing files, and protecting them. It also organizes files for efficient use. All information about these files is organized and stored in an orderly manner. (Geeksforgeeks,2023).

The operating system is a Command Interpreter. The operating system is the interface between the computer’s applications and hardware, and the user. This is possible through the graphical user interface (GUI). (Gkbooks, 2023)

Also, the OS has the function of booting the computer. The operating system is used to cold or warm boot a computer. Cold booting involves turning on a computer after it has been turned off. Warm booting refers to restarting a computer (Geeksforgeeks, 2023).

The OS also has the function of securing the data and information on a computer by protecting such from unauthorized access and malware threats.

 Communication between computers on a network is managed by the OS as well. It also allocates and coordinates resources among the various users of a computer system. ( IndiaCSR, 2023).

Another function of the OS is job accounting. The OS keeps track of all resources used for a particular job and/or a particular user or group of users. In multiprogramming, it decides which application should run first and for how long (Vaskor, 2023).

The operating system performs secondary storage management as well. Computer systems have primary, secondary and cache levels of storage .Primary and cache levels store information and data which require a running program for them to be referenced. (Gkbooks, 2023)

Lastly, the OS ensures networking. The OS provides shared access to files and various other network functions in a networking operating system. The processors in the network only communicate through the OS (Gkbooks, 2023).

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