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1. What is an Operating System?

The operating system of a computer serves as a program that handles and manages all of the existing applications present in the computer. An operating system is a very powerful tool to have in a computer. Without the operating system, many applications in the computer will cease to function and present many errors.

1. What are the Operating System concepts?

* Software – These are the different programs present in the computer system that runs tasks and instructions given by the user. This is the intangible aspect of the computer.
* Hardware – The hardware refers to the physical components of a computer. There are external and internal hardware components. The internal components of a computer consist of the motherboard, hard drives such as Solid-State Drive, RAM and ROM and more. On the other hand, the external components of a computer consist of devices such as monitor, keyboard, mouse, keyboards, printers, scanners, and other peripherals.
* Processes – The processes refer to the instance of a program that is running. Computers from before allow processes to perform sequence of instructions once. In the modern era, computers can now handle multiple processes within the system.
* Users – The users refer to the people, devices or other applications that takes advantage of what the computer has to offer. Users can operate the programs of the computer as well as start, close, restart processes of the computer system.

1. Identify and differentiate the various typologies, as well as the features, advantages and disadvantages of Operating Systems.

There are different types of Operating System. These are:

* Batch Operating System – In this operating system, the tasks that are under the same field are grouped together as referred to the name batches. With the aid of operators of the system, the tasks that are grouped into batches are able to run.

Advantages:

1. Since the tasks are in batches, the time it takes for the system to run is reduced significantly
2. This type of operating system can be accessed and shared to other users.

Disadvantages:

1. Manual application is often done to intervene in this type of operating system
2. CPU is not fully utilized since the running time is reduced while the loading and unloading of batches are far from fast.

* Time-Sharing Operating System – In an operating system, multiple processes are being handled and in this specific OS, the processes are given a time when they will be able to start and the duration of the process as well.

Advantages:

1. Each process is given the same timetable and the opportunity to execute fairly
2. Since there are many processes, the CPU tends to be loaded but this also means that the CPU will be fully utilized.

Disadvantages:

1. In a hierarchy, processes that are of importance are not being executed first since this operating system allows equal opportunities for task to be executed

* Distributed Operating System – In this type of operating system, various systems existing here all have their own CPU, memory, and other types of resources. The systems are all interconnected over a network to allow communication.

Advantages:

1. Allows remote access for user to different systems and work accordingly.
2. The load on the host computer is being disseminated to increase the efficiency of work.
3. If there is a case of failure in one of the systems, the others will not be affected.

Disadvantages:

1. Sharing of information to other users makes it easier for other people to gain access to your data and other important information.
2. If the network communication fails to function properly, the communication with all of the systems will fail as well

* Embedded Operating System – This type of operating system is used to power devices that is not a computer and to allow said devices to function and work properly.

Advantages:

1. Since this operating system handles only a specific job, the workflow is fast.
2. Low cost to start and maintain.
3. Utilizes less resources since it is dedicated to a specific job.

Disadvantages:

1. Since it is only dedicated to a specific job, this job will be the only one the system can perform.
2. Somewhat difficult to make adjustments and upgrade the system.

* Real-Time Operating System – From the name itself, this operating system is used to handle data that are being accessed in real time. As soon as the data becomes available, the execution of the processes will start as well with no delay. There are two types of real-time operating system. The first is the hard real-time where a small delay in the system will greatly affect the system. The other one is the soft real-time where the time constraint is less rigorous.

Advantages:

1. Utilizes devices and resources optimally
2. These systems require to be minimal or error-free

Disadvantages:

1. The algorithms used in this system are complex
2. Specific device drivers are used for responding to the interrupts as soon as possible.
3. What are the important roles of Operating Systems in the operation of the computer system?

An operating system has three main functions to allow smooth operation of the computer system:

* The first one is to manage the computer's resources, such as the central processing unit, memory, disk drives, and printers. This includes the internal and external hardware, software, programs, and tasks of the computer.
* Next is to establish a user interface where the user of the computer will be able to interact with the computer system and the user will understand the flow of the system.
* Execute and provide services for applications software that is existing the computer system