Question No. 1. Discuss in detail with the help of examples that why we call Operating system as a resource manager?

Ans:

Operating System

An Operating System is a collection of programs and utilities. It acts as an interface between user and computer. It creates the user-friendly environment. Another main operating system function is resource management. The operating system collects all the resources in the network environment and allocates the resources to requesting process in an efficient manner.

Operating System as a Resource Manager

A computer has many resources (Hardware and Software), which may be required to complete a task. The commonly required resources are Input/Output devices, Memory file storage space, CPU (Central Processing Unit) time and so on. The operating system acts as the manager of these resources and allocates them to specific programs and users as necessary for their tasks. Therefore, we can say an operating system is a resource allocator. This is the main features of an operating system.

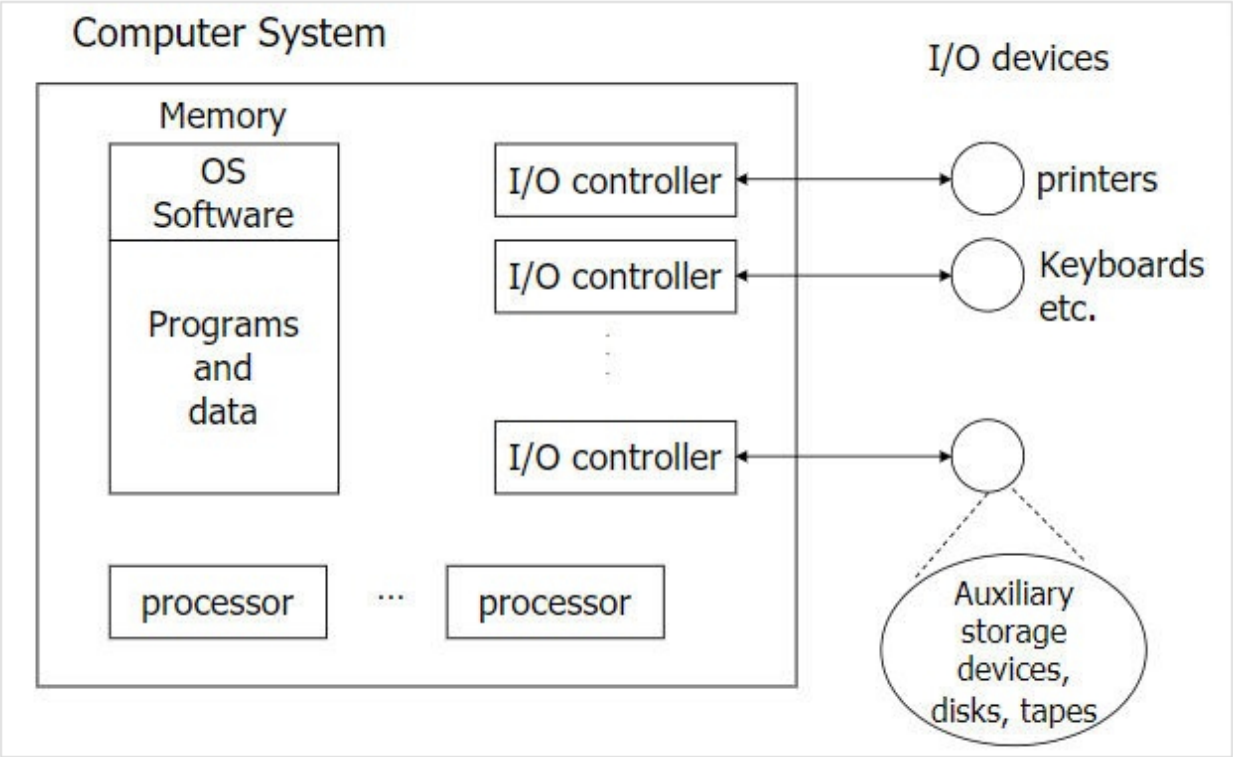
Example:

Let us understand how the operating system works as a Resource Manager.

- Now-a-days all modern computers consist of processors, memories, timers, network interfaces, printers, and so many other devices.
- The operating system provides for an orderly and controlled allocation of the processors, memories, and I/O devices among the various programs in the bottom-up view.
- Operating system allows multiple programs to be in memory and run at the same time.
- Resource management includes multiplexing or sharing resources in two different ways: in time and in space.
- In time multiplexed, different programs take a chance of using CPU. First one tries to use the resource, then the next one that is ready in the queue and so on. For example: Sharing the printer one after another.

- In space multiplexing, instead of the customers taking a chance, each one gets part of the resource. For example − Main memory is divided into several running programs, so each one can be resident at the same time.

The diagram given below shows the functioning of OS as a resource manager.



References:

- ✓ *https://www.notesjam.com/2017/09/what-is-operating-system.html*
- ✓ *https://www.tutorialspoint.com/how-does-the-operating-system-act-as-a-resource-manager-and-extended-machine*

Question No. 2. Compare the structure, functions and working mechanisms of following operating systems.

i. Windows
ii. Linux
iii. Macintosh (Mac OS)

Ans:

Comparison Table Linux vs MAC vs Windows

THE BASIS OF COMPARISON	***WINDOWS***	***MAC (Macintosh)***	***LINUX***
Basic difference and history	Windows was first released in 1985. It was supposed to be a graphical user interface on top of MS-DOS. All features of MS-DOS were later integrated with Windows 95 release. It was a huge success in and led to the Windows transition.	This operating system from Apple stands older than Windows. It was first released in 1984. It began as a graphical user interface right from its inception. In 2005 the design and structure of MAC OS were changed to Intel x86 based architecture.	It was initially developed at Finnish University. It was released in 1991 and designed for GNU developers. GNU developers later integrated it into Linux. It is open to consumers, and everyone can use it as per their specifications.
File structure	Windows follows a directory structure to store the different kinds of files of the user. It has logical drives and cabinet drawers. It also has folders. Some common folders like documents, pictures, music, videos, and downloads. All	The file structure of MAC is commonly known as MAC OS X. If you go to dig into your MAC's hard disk through the finder, you will see many directories. The root directory of MAC may encounter when they visit their own MAC book. You can explore the	Linux has a completely different file structure form Windows and MAC. It was developed with a different code base. It stores data in the form of a tree. There is a single file tree, and all your drives are mounted over this tree.

	these files can be stored in these folders, and also new folders can be created. It also has files which can be a spreadsheet or an application program. It can have extensions as .txt, .jpg etc. In addition to this, Windows also provides a recycle bin where all deleted files can be stored. Recycle bin can be configured to increase its size.	file system and directory structure by going to directories like /Application, /Developer, /sbin, /tmp, etc.	
Registry	Windows registry is a master database that is used to store all settings on your computer. It is responsible for storing all user information with its passwords, and device relate information. The registry also has an editor which allows you to view all keys and values or even drivers if necessary.	MAC stores all application settings in a series of. plist files, which have the various preferences folder in MAC. This. plist file contains all properties in either plain text or binary format. These are stored at: /Library/Preferences folder	Linux also does not have a specific registry of its own. All application setting is stored on a program basis under the different users in the same hierarchy format of the files being stored. There is no centralized database for storing these details, and so periodic cleaning is also not required.
Interchangeable Interfaces	Windows interface was not interchangeable until Windows 8. Windows XP had	MAC has a facility to bridge virtual network interfaces. This can be done by going to system	Linux is easy to switch interfaces. You can switch the environment without having to

	some improvements but not par. Start menu, taskbar, system tray, and Windows Explorer.	preferences and managing the interfaces.	carry all installations. There are utilities like GNOME and KDE which help in catering to these needs. They help in focusing on different aspects.
Command terminal	A terminal or command prompt is a black box ideally used to execute commands. It is also called the Windows Command Processor. It is used to execute commands and different batch files. It can also be used for administrative functions and troubleshoot and solve all windows issues.	MAC provides a console as a terminal application. It has a console, command line, prompt and terminal. A Command-line is used to type your commands. Prompt will provide you with some information and also enable you to run commands. A terminal is an actual interface that will provide the modern graphical user interface as well. You can find the terminal at Applications -> Utilities.	Linux also provides a terminal. You can find terminal at: Applications -> System or Applications -> Utilities. In addition to this, there is also a shell prompt. The most common shell used in bash. It defines how the terminal will behave and look when it is run.

Reference:

- ✓ *https://www.educba.com/linux-vs-mac-vs-windows/*
- ✓ *https://www.freecodecamp.org/news/an-introduction-to-operating-systems/*
- ✓ *https://www.quora.com/What-is-the-differences-between-Windows-Mac-Unix-Linux-and-Solaris-Kernel*