CACS 201: Computer Fundamentals and Applications

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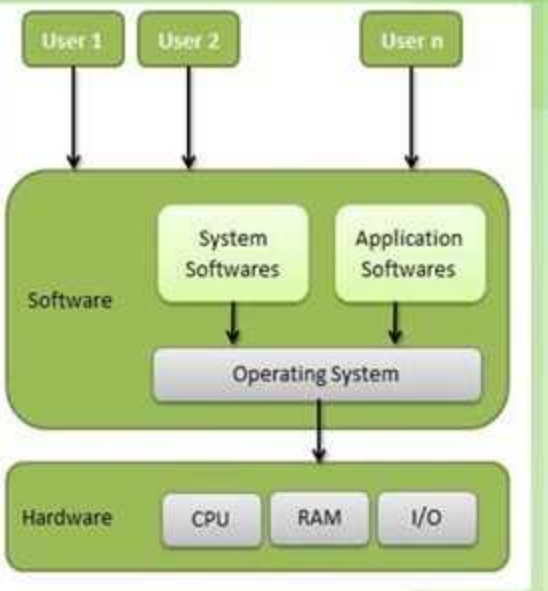
Operating System

- Introduction to Operating System
- Functions of Operating System
- Types of Operating Systems
- Open Source Operating System.

Operating System



- An operating System (OS) is software programs act as an interface or intermediary between users, computer hardware and software.
- An operating system (OS) is collection of software that manages computer hardware resources .Without a computer operating system, a computer would be useless"
- It provides users an environment in which a user can execute programs conveniently and efficiently and manage all the resources associated with it.
- It is an integrated set of specialized programs that are used to manage overall resources and operations of the computer.
- Windows XP, Windows Vista, Windows 7, Windows 8 are the operating system that belongs to Microsoft corporation and need to purchase to install in our laptop and desktop.
- Linux, Unix, Ubuntu are Open source operating system, and they are fee for use in our laptop and desktop. They are more reliable, secure and robust than the windows machine but are not user-friendly than the windows operating system.

Objectives of Operating System

OS provides user interface.

- To make a computer system convenient to use in an efficient manner.
- To hide the details of the hardware resources from the users.
- To provide users a convenient interface to use the computer system
- To act as an intermediary between the hardware and its users and making it easier for the users to access and use other resources

OS as Resource manager

- To manage the resources of a computer system.
- To keep track of who is using which resource, granting resource requests, according for resource using and mediating conflicting requests from different programs and users
- To provide efficient and fair sharing of resources among users and program.

Features/Functions of Operating System

Memory management:

- It deals with the transfer of programs in and out of memory that means organizes the use of memory between programs.
- Major activates like allocate ,re-allocate, free of memory and keep track of memory usage.

File Management:

- It allows the user to save files to a backing store.
- The file management includes create, delete file and folder, provide access to files, allocate space for files, keep backup the file and provide security to a files.

Device Management:

- It controls all input and output devices such as backing store and peripherals such as scanners and printers.
- It controls the operation like open, close, and write of the device derive.
- It communicate, control and monitor the device driver.

Processor Management:

- Processor management means allocates the processor(CPU) to a process and deallocates processor when it is no longer required.
- A process is a program in a state of execution. During execution a process can be in new, ready, running and terminated state.
- Process can be created, executed and stopped in CPU.

Features/Functions of Operating System

Process management include:

- Scheduling of processes, process synchronization manage deadlock situation.
- Deadlock is situation in where no single process do further operation.

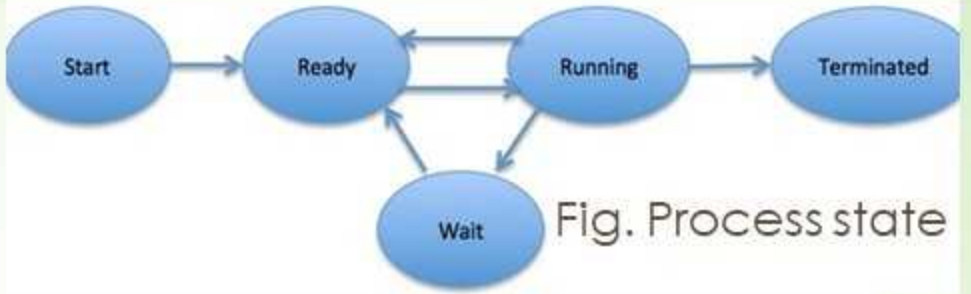


Fig. Process state

Security and Protection.

- it maintains security and access rights of users such as authorized user can access to programs and data in system.
- It protected the resources of system control with use of password.
- It provide basic protection like read, write, encryption and backup for the files.

Error management:

- It deals with errors and displays simple error messages so user can make corrective action over the error.

User interface or command interpreter:

- It provide user interface so that user can operate the various resources like hardware, software and other application program.

Operating System

Single user and Single Task OS:

- single user can perform a single task. For example if user is editing a document, then a document cannot be printed on the printer simultaneously. It is simple OS designed to manage one task at time. MS-DOS is an example of single user OS.

Single user and Multitasking OS:

- It allows execution of more than task or process concurrently. For this, the CPU time is divided amongst different tasks. This division of time is also called time sharing. The CPU switches rapidly between processes. Windows 95 and all later version of windows are examples of multitasking OS.

Multiuser OS:

- It is used in computer networks that allow same data and applications to be accessed by multiple users at the same time. The user can also communicate with each other. Linux, Unix, and windows 7/8/10 are examples of multiuser OS.

Multiprocessing OS:

- it has a ability to run one program in two or more than two processor. The processing takes place in parallel and is also called parallel processing.
- Each processor works on different parts of the same task or two or more different tasks. Since execution take place in parallel, they are used for high speed execution and increase the power of computer.
- Linux, Unix and windows 7/8/10 are examples of Multiprocessing OS.

Operating System

Real time OS:

- When the computer has to react within a guaranteed time to an input, a real-time operating system (RTOS) is used.
- For example, the engine management system within a car uses a real-time operating system in order to react to feedback from sensors placed throughout the engine.
- It is often dedicated to the control of systems such as industrial processes, planes and space flights.
- Examples: QNX, RTLINUX are used to control machinery, scientific instruments and industrial system.

Embedded System:

- it is embedded in a device in the ROM, they are specific to a device and are less resource intensive.
- They are used in appliances like microwave, washing machine, traffic control system.

Open sources software / Operating System

- Open source refers to a program or software in which the source code is available to the general public for use and/or modification from its original design free of charge.
- Open source code is typically created as a collaborative effort in which programmers improve upon the code and share the changes within the community.
- Basic idea behind open source: Software can evolve more quickly when people from around the world can read and contribute to the source code.
- Key elements: voluntary participation and voluntary selection of tasks.
- Participants: programmers, separated by geography, culture, and language.
- Participants: do not get any money in return.
- No license: Free and no restrictions.
- BSD-style license: Free and may create proprietary software from an open code.
- GNU General Public License: Free to use and all derivative works must also be free.
- Mozilla Public License: similar to BSD-style license and allow developers to create proprietary add-ons.

Open sources software / Operating System

Benefits:

- Cost-savings
- Access to source code
- Customizable
- Better functionality

Cost:

- Technical support and maintenance
- User training

Open source operating system

- Open source operating system is operating system that are fee for use in our laptop and desktop.
- the source code is available to the general public for use and/or modification from its original design free of charge.
- They are more reliable, secure and robust than the windows OS.
- Open source operating system are not user-friendly than the windows operating system.
- Linux, Unix, ubuntu, FreeBSD and OpenSolaris are the example of OS.
- The software being distributed must be redistributed to anyone else without any restriction.
- The source code must be made available (so that the receiving party will be able to improve or modify it).
- The license can require improved versions of the software to carry a different name or version from the original software.

Questions

1) What is operating system? Write objectives of operating system.
2) What is the relationship between operating systems and computer hardware?
3) What do you mean by Open source OS?
4) What are real-time systems? Explain the example.
5) Write down functions of operating system.
6) Explain the types of operating system.
7) What is multitasking?
8) What is process? Explain the various state of process.

Real Time Assignment

Using your own choice of resources (such as Internet, Book , magazine and newspaper articles) research and make presentation of:

- Operation system available for Desktop and laptop.
- Open Source Operating System(strength and weakness).
- Recommends the OS for Small-sized business organization.