What is an Operating System?
- A program which controls the execution of all other programs (applications).
- Acts as an intermediary between the user(s) and the computer.
- Objectives: – convenience, – efficiency, – extensibility.
- Similar to a government

Types of Operating System:

1) Batch Processing Operating System:

The interaction between a user and the computer does not occur in this system. The user is required to prepare jobs on punch cards in the form of batches and submit them to the computer operator. The computer operator sorts the jobs or programs and keeps similar programs or jobs in the same batch and run as a group to speed up processing. It is designed to execute one job at a time. Jobs are processed on a first-come, first-serve basis, i.e., in the order of their submission without any human intervention.

2) Time Sharing Operating System:

As the name suggests, it enables multiple users located at different terminals to use a computer system and to share the processor's time simultaneously. In other words, each task gets time to get executed, and thus all tasks are executed smoothly.

Each user gets the processor's time as they get while using a single system. The duration of time allocated to a task is called quantum or time slice; when this duration is over, OS starts the next task.

3) Distributed Operating System:

It uses or runs on multiple independent processors (CPUs) to serve multiple users and multiple real-time applications. The communication between processors is established through many communication lines such as telephone lines and high-speed buses. The processors may differ from each other in terms of size and function.

The availability of powerful microprocessor and advanced communication technology have made it possible to design, develop, and use the distributed operating system. Besides this, it is an extension of a network operating system that supports a high level of communication and integration of machines on the network.
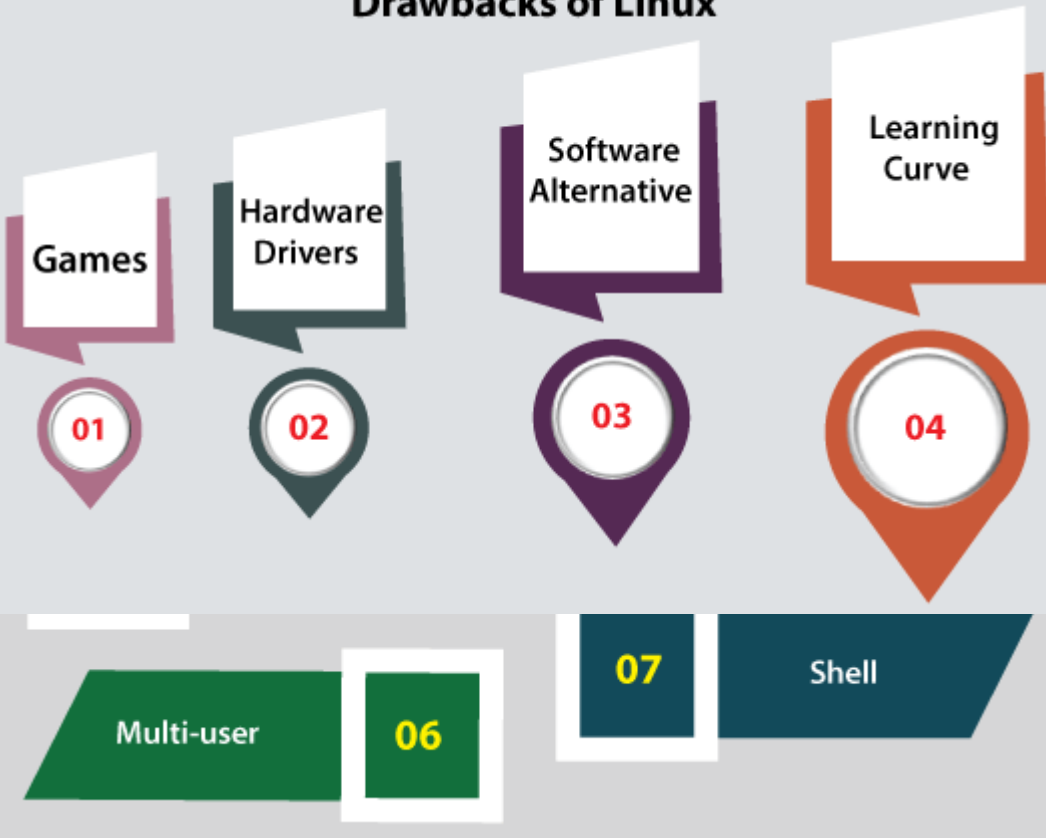
4)Network Operating System:

As the name suggests, this OS connects computers and devices to a local area network and manages network resources. The software in a NOS enables the devices of the network to share resources and communicate with each other. It runs on a server and allows shared access to printers, files, applications, files, and other networking resources and functions over a LAN. Besides this, all users in the network are aware of each other's underlying configuration and individual connections. Examples: Ms Windows Server 2003 and 2008, Linux, UNIX, Novell NetWare, Mac OS X, etc.

5) Real-Time Operating System:

It is developed for real-time applications where data should be processed in a fixed, small duration of time. It is used in an environment where multiple processes are supposed to be accepted and processed in a short time. RTOS requires quick input and immediate response, e.g., in a petroleum refinery, if the temperate gets too high and crosses the threshold value, there should be an immediate response to this situation to avoid the explosion. Similarly, this system is used to control scientific instruments, missile launch systems, traffic lights control systems, air traffic control systems, etc.

Drawbacks of Linux

- Games — 01
- Hardware Drivers — 02
- Software Alternative — 03
- Learning Curve — 04
- Multi-user — 06
- Shell — 07

... as an interface among the computer hardware and ... up of software that handles the resources of the ... services for computer programs.

... omponent of system software within a computer ... g system is to provide a platform where a user can ... ently.

... e of the famous versions of the UNIX OS. It is ... ee OS for several personal computer system users. Remarkably, it is a complete OS Including an **X Window System, Emacs editor, IP/TCP, GUI** (graphical user interface), etc.

Architecture of Linux system
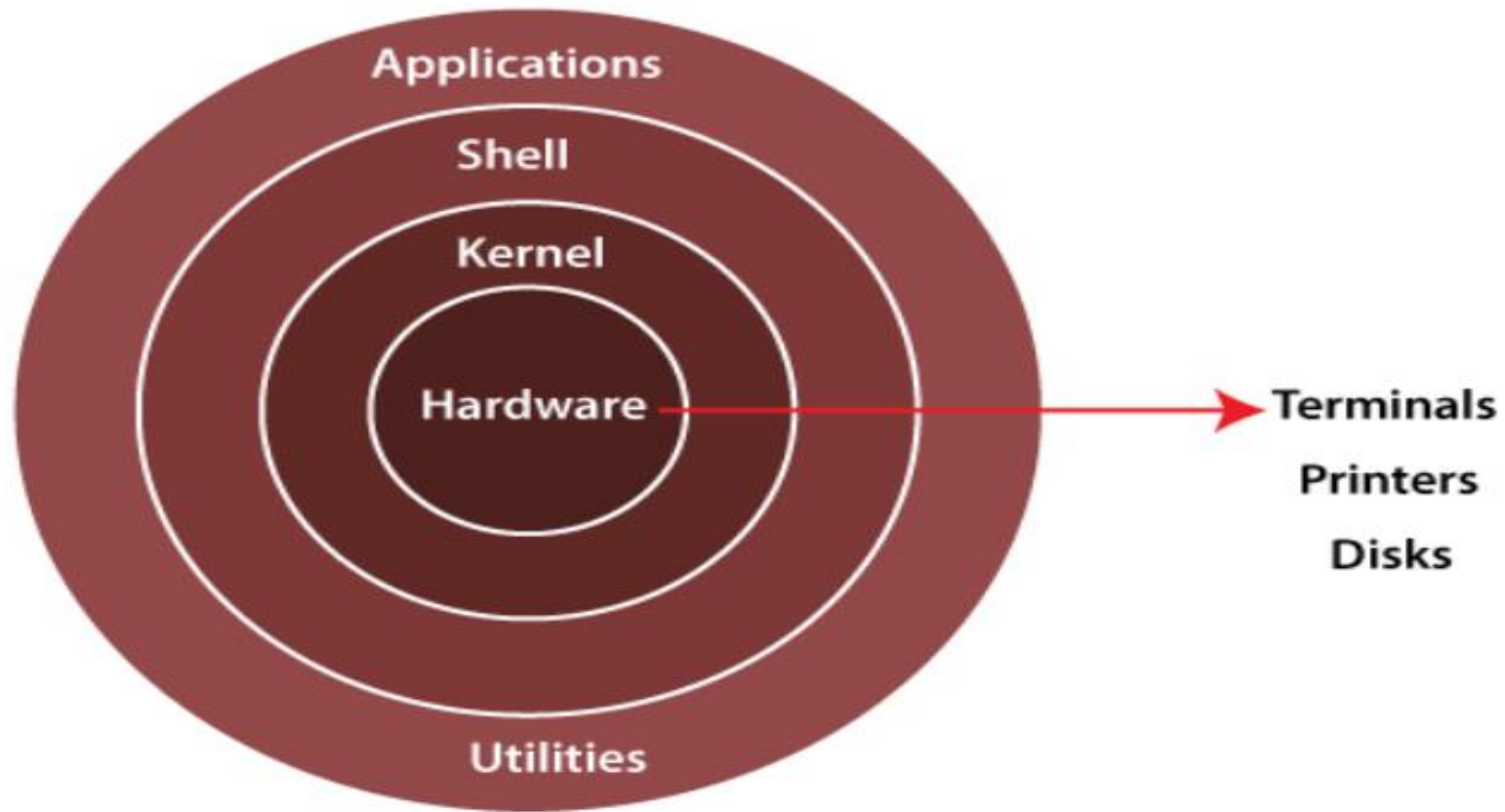
The Linux operating system's architecture mainly contains some of the components: **the Kernel, System Library, Hardware layer, System,** and **Shell utility**.

1. Kernel:- The kernel is one of the core section of an operating system. It is responsible for each of the major actions of the Linux OS. This operating system contains distinct types of modules and cooperates with underlying hardware directly. The kernel facilitates required abstraction for hiding details of low-level hardware or application programs to the system. There are some of the important kernel types which are mentioned below:

•Monolithic Kernel

•Micro kernels

•Exo kernels

•Hybrid kernels

2. System Libraries:- These libraries can be specified as some special functions. These are applied for implementing the operating system's functionality and don't need code access rights of the modules of kernel.

3. System Utility Programs:- It is responsible for doing specialized level and individual activities.

4. Hardware layer:- Linux operating system contains a hardware layer that consists of several peripheral devices like CPU, HDD, and RAM.

5. Shell:- It is an interface among the kernel and user. It can afford the services of kernel. It can take commands through the user and runs the functions of the kernel. The shell is available in distinct types of OSes. These operating systems are categorized into two different types, which are the **graphical shells** and **command-line shells**.

The graphical line shells facilitate the graphical user interface, while the command line shells facilitate the command line interface. Thus, both of these shells implement operations. However, the graphical user interface shells work slower as compared to the command-line interface shells.

There are a few types of these shells which are categorized as follows:
- Korn shell
- Bourne shell
- C shell
- POSIX shell

Linux Operating System Features

Some of the primary features of Linux OS are as follows:
- **Portable:** Linux OS can perform different types of hardware and the kernel of Linux supports the installation of any type of hardware environment.
- **Open source:** Linux operating system source code is available freely and for enhancing the capability of the Linux OS, several teams are performing in collaboration.
- **Multiprogramming:** Linux OS can be defined as a multiprogramming system. It means more than one application can be executed at the same time.
- **Multi-user:** Linux OS can also be defined as a multi-user system. It means more than one user can use the resources of the system such as **application programs, memory,** or **RAM** at the same time.

•**Hierarchical file system:** Linux OS affords a typical file structure where user files or system files are arranged.

•**Security:** Linux OS facilitates user security systems with the help of various features of authentication such as controlled access to specific files, password protection, or data encryption.

•**Shell:** Linux operating system facilitates a unique interpreter program. This type of program can be applied for executing commands of the operating system. It can be applied to perform various types of tasks such as call application programs and others.

What is computer system BIOS?

As your PC's most important startup program, BIOS, or Basic Input/Output System, is **the built-in core processor software responsible for booting up your system**. Typically embedded into your computer as a motherboard chip, the BIOS functions as a catalyst for PC functionality action.

Difference between 13-bit o.s and 64-bit o.s

32 Bit

It is the percentage of information transferred or the number of bits that make up a data element. A 32-bit register can hold 232 values. The range is represented using a binary integer. One important implication is that an operating system with 32-bit memory addresses can only access up to 4 GiB of binary memory at a time. The IBM System/360 and IBM System/370, the System/370-XA, and the Intel x86 framework are all 32-bit editions. The 68000 series and Cold Fire, etc., are 32-bit assembly language architectures used in embedded Linux.

32-bit is used to describe the condition in which information is stored, received, and interpreted. When it comes to hardware and software, this refers to how many 1s and 0s are handled to represent your data. The more bits the computer can compute, the more information it can handle at the same time.

64 Bits

The number 64 corresponds to the number of bits that may be processed or sent. The number utilized for individual components in structured data. It also refers to the term sizes used to define a computer design, storage, and CPU. The width of registration in a microcontroller is 64 bits. A 64-bit [microprocessor](#) can handle memory locations as well as data encoded by 64 bits.

The term can also represent the dimension of low-level data formats, such as float-point figures of 64-bit.

Microsoft produced a Windows XP 64-bit version for usage on 64-bit CPU systems. In a laptop format, the 64-bit shows 64-bit integer, ram address. Sixty-four bits tell the length of a register in microprocessors. The 64-bit device came from the IBM Super Processor IBM 7030 in 1961. Also available in 64-bit editions are Windows Vista, Microsoft 7, and Windows 8.

- What is difference between Core i3 i5 and i7

Core i3 processors have two cores,
Core i5 CPUs have four and Core i7 models also have four.
Some Core i7 Extreme processors have six or eight cores. Generally speaking, we find that most applications can't take full advantage of six or eight cores, so the performance boost from extra cores isn't as great

What is Interrupt in OS?

An interrupt is a signal emitted by hardware or software when a process or an event needs immediate attention. It alerts the processor to a high-priority process requiring interruption of the current working process. In I/O devices, one of the bus control lines is dedicated for this purpose and is called the **Interrupt Service Routine** (ISR).

When a device raises an interrupt at the process, the processor first completes the execution of an instruction. Then it loads the **Program Counter** (PC) with the address of the first instruction of the ISR. Before loading the program counter with the address, the address of the interrupted instruction is moved to a temporary location. Therefore, after handling the interrupt, the processor can continue with the process.

While the processor is handling the interrupts, it must inform the device that its request has been recognized to stop sending the interrupt request signal. Also, saving the registers so that the interrupted process can be restored in the future increases the delay between the time an interrupt is received and the start of the execution of the ISR. This is called **Interrupt Latency**.

What is interrupt handling

If there is an interrupt present, then it will trigger the interrupt handler. The handler will stop the present instruction that is processing and save its configuration in a register and load the program counter of the interrupt from a location given by the interrupt vector table.
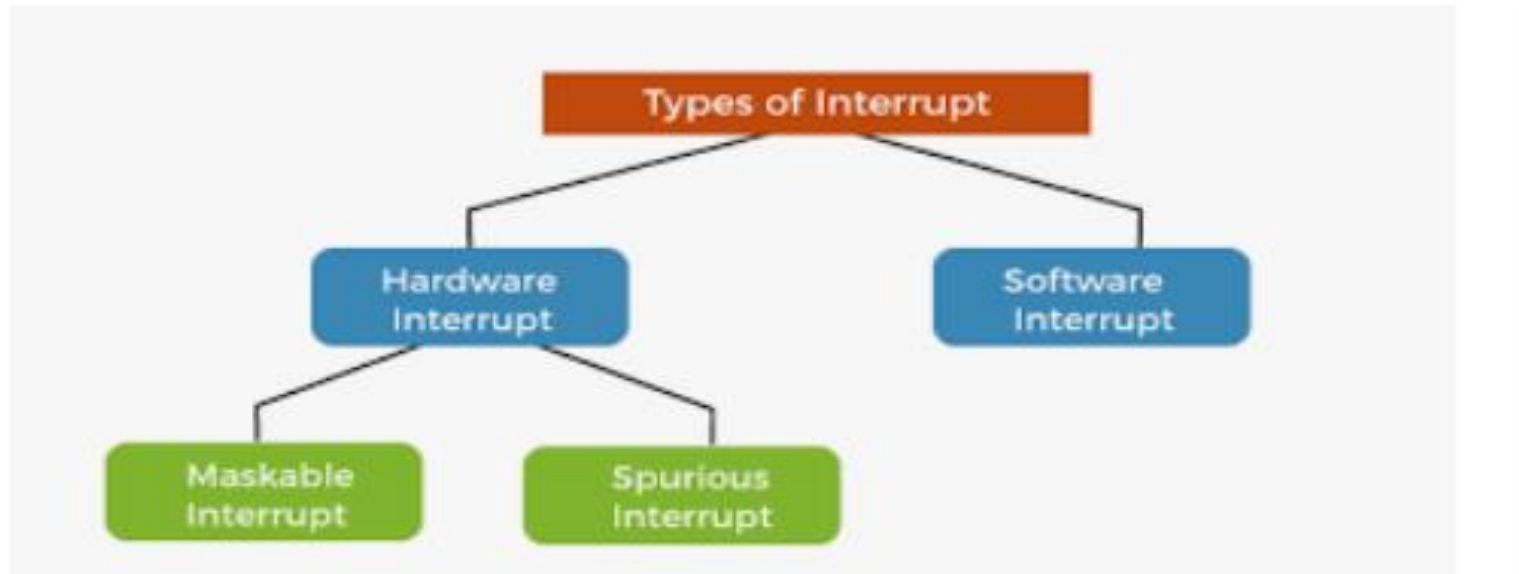
What are the common functions of interrupts

Interrupts are commonly used to service hardware timers, transfer data to and from storage (e.g., disk I/O) and communication interfaces (e.g., UART, Ethernet), handle keyboard and mouse events, and to respond to any other time-sensitive events as required by the application system