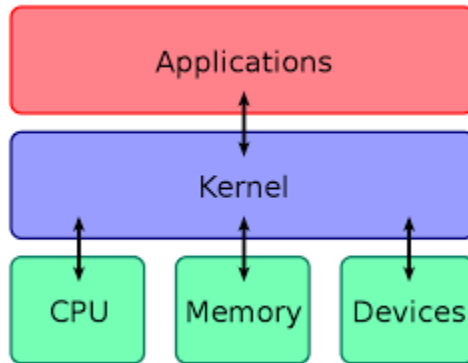


1. What is kernel? write the function of kernel.

Kernel is the core part of the OS. It is the main layer between the OS and underlying computer hardware, and it helps with tasks such as process and memory management, file systems, device control and networking.



The function of Kernel is:

- a. **Memory Management:**  
Memory space is necessary for every process. Thus, memory must be allocated and released in order for it to be executed. A Kernel is responsible for managing all of this memory.
- b. **Device Management:**  
The processes make advantage of the peripheral devices linked to the system. So, the Kernel is responsible for managing the allocation of these devices.
- c. **Resource Management:**  
A Kernel's responsibility is to distribute resources across different processes in a way that ensures that each process has equal access to the resources.
- d. **Access Computer Resource:**  
The CPU, I/O devices, and other resources are only a few of the resources that a kernel can access. It serves as a link between the user and the system's resources.

## 2. Difference between NTFS and FAT32.

Characteristics	FAT32	NTFS
Structure	Simple	Complex
Maximum number of characters supported in a file name	83	255
Maximum file size	4GB	16TB
Encryption	Not encrypted	Encrypted with Encrypting File System (EFS)
Security	Network Type Only	Both local and network type
Fault tolerance	No provision for Fault Tolerance	Automatic troubleshoot is present
Compatibility with Operating Systems	Windows 95/98/2000/2003/XP	Windows NT/2K/XP/Vista/7/8/10, macOS X, Linux
Compression	Compression is not allowed	Supports file compression
Accessing speed	Low	Relatively higher than other File Systems
User-level disk space	Not present	Present
Conversion	Allowed	Not allowed

3. Define Network topology and its types.

The network topology defines the layout of the network.

It shows how devices on the network are interconnected.

Devices on the network are termed nodes.

A network has both a physical topology and a logical topology.

- Physical Topology
- Logical Topology

Types of Topologies:

- Star
- Ring
- Mesh
- Hybrid

4. What is multiuser, multitasking, and multiprocessing system?

S.No.	Multiprogramming	Multitasking	Multithreading	Multiprocessing
1.	In multiprogramming, multiple programs execute at a same time on a single device.	In Multitasking, a single resource is used to process multiple tasks.	Multithreading is an extended form of multitasking.	In multiprocessing, multiple processing units are used by a single device.
2.	The process resides in the main memory.	The process resides in the same CPU.	More than one thread processed on a single CPU.	The process switches from one to another CPU as multiple processing units are used.
3.	It uses batch OS. The CPU is utilized completely while execution.	It is time sharing as the task assigned switches regularly.	The tasks are always further divided into sub tasks.	It carries multiple processors to execute the task.
4.	The processing is slower, as a single job resides in the main memory while execution.	Multitasking follows the concept of context switching.	It allows a single process to get multiple code segments.	A large amount of work can be done in a short period of time.

5. Difference between RISC and CISC.

<b>RISC</b>	<b>CISC</b>
It is a Reduced Instruction Set Computer.	It is a Complex Instruction Set Computer.
It emphasizes on software to optimize the instruction set.	It emphasizes on hardware to optimize the instruction set.
It is a hard wired unit of programming in the RISC Processor.	Microprogramming unit in CISC Processor.
It requires multiple register sets to store the instruction.	It requires a single register set to store the instruction.
RISC has simple decoding of instruction.	CISC has complex decoding of instruction.
Uses of the pipeline are simple in RISC.	Uses of the pipeline are difficult in CISC.
It uses a limited number of instruction that requires less time to execute the instructions.	It uses a large number of instruction that requires more time to execute the instructions.
It uses LOAD and STORE that are independent instructions in the register-to-register a program's interaction.	It uses LOAD and STORE instruction in the memory-to-memory interaction of a program.
RISC has more transistors on memory registers.	CISC has transistors to store complex instructions.
The execution time of RISC is very short.	The execution time of CISC is longer.
RISC architecture can be used with high-end applications like telecommunication, image processing, video processing, etc.	CISC architecture can be used with low-end applications like home automation, security system, etc.
It has fixed format instruction.	It has variable format instruction.
The program written for RISC architecture needs to take more space in memory.	Program written for CISC architecture tends to take less space in memory.

6. Explain the difference between Internet, Intranet and Extranet.

Point of difference	Internet	Intranet	Extranet
Accessibility of network	Public	Private	Private
Availability	Global system.	Specific to an organization.	To share information with suppliers and vendors it makes the use of public network.
Coverage	All over the world.	Restricted area upto an organization.	Restricted area upto an organization and some of its stakeholders or so.
Accessibility of content	It is accessible to everyone connected.	It is accessible only to the members of organization.	Accessible only to the members of organization and external members with logins.
No. of computers connected	It is largest in number of connected devices.	The minimal number of devices are connected.	The connected devices are more comparable with Intranet.
Owner	No one.	Single organization.	Single/ Multiple organization.
Purpose of the network	It's purpose is to share information throughout the world.	It's purpose is to share information throughout the organization.	It's purpose is to share information between members and external, members.
Security	It is dependent on the user of the device connected to network.	It is enforced via firewall.	It is enforced via firewall that separates internet and extranet.

Point of difference	Internet	Intranet	Extranet
Users	General public.	Employees of the organization.	Employees of the organization which are connected.
Policies behind setup	There is no hard and fast rule for policies.	Policies of the organization are imposed.	Policies of the organization are imposed.
Maintenance	It is maintained by ISP.	It is maintained by CIO. HR or communication department of an organization.	It is maintained by CIO. HR or communication department of an organization.
Economical	It is more economical to use.	It is less economical.	It is also less economical.
Relation	It is the network of networks.	It is derived from Internet.	It is derived from Intranet.

7. What is networking and what are its types.

Networking, also known as computer networking, is the practice of transporting and exchanging data between nodes over a shared medium in an information system.

A computer network comprises two or more computers that are connected—either by cables (wired) or WiFi (wireless)—with the purpose of transmitting, exchanging, or sharing data and resources.

Types:

PAN

LAN

MAN

WAN



8. Explain RAID with its types.

RAID is a technology that is used to increase the performance and/or reliability of data storage. The abbreviation stands for either Redundant Array of Independent Drives or Redundant Array of Inexpensive Disks.

RAID 0 – striping

RAID 1 – mirroring

RAID 5 – striping with parity

RAID 6 – striping with double parity

RAID 10 – combining mirroring and striping

**Diagram, and brief description of each RAID level.**

RAID Level	Minimum Number of Drives	Features	Advantages	Disadvantages
0	2	Striping	Performance and Capacity.	All data is lost if one drive fails.
1	2	Mirroring	Performance and Reliability.	Capacity is half of total drive size.
5	3	Striping with parity	Performance, Reliability, and Capacity.	It takes time to rebuild array if a drive fails.
6	3	Striping with double parity	Same as RAID 5 but can tolerate the loss of two drives.	It takes time to rebuild array if one or more drives fails.
10 (0+1)	4	Mirroring and Striping	Performance, Capacity, and High Reliability.	Capacity is half of total drive size.

9. What is server? Describe different roles of server.

A server is a computer program or device that provides a service to another computer program and its user, also known as the client.

In the client/server programming model, a server program awaits and fulfills requests from client programs, which might be running in the same, or other computers. A given application in a computer might function as a client with requests for services from other programs and as a server of requests from other programs.

A server role is a primary duty that a server performs.

Some common Server Roles are:

- Print Services
- Web Services
- Remote Access
- Application Server
- Email Server
- Database Server
- File Services

10. What is run levels? Mention different run level with their meanings.

*A runlevel is an operating state on a Unix and Unix-based operating system that is preset on the Linux-based system. Runlevels are numbered from zero to six. Runlevels determine which programs can execute after the OS boots up. The runlevel defines the state of the machine after boot.*

A run level is a state of init and the whole system that defines what system services are operating. Run levels are identified by numbers. Some system administrators use run levels to define which subsystems are working, e.g., whether X is running, whether the network is operational, and so on.

The different run levels are:

0 – System halt i.e the system can be safely powered off with no activity.

1 – Single user mode.

2 – Multiple user mode with no NFS (network file system).

3 – Multiple user mode under the command line interface and not under the graphical user interface.

4 – User-definable.

5 – Multiple user mode under GUI (graphical user interface) and this is the standard runlevel for most of the LINUX based systems.

6 – Reboot which is used to restart the system.

11. What is hypervisor? And Explain types of hypervisors with examples.

The hypervisor, also called the Virtual Machine Manager (VMM), is the brain of virtualization.

- is software that creates and runs virtual machines (VMs).
- A hypervisor allows one host computer to support multiple guest VMs by virtually sharing its resources, such as memory and processing.

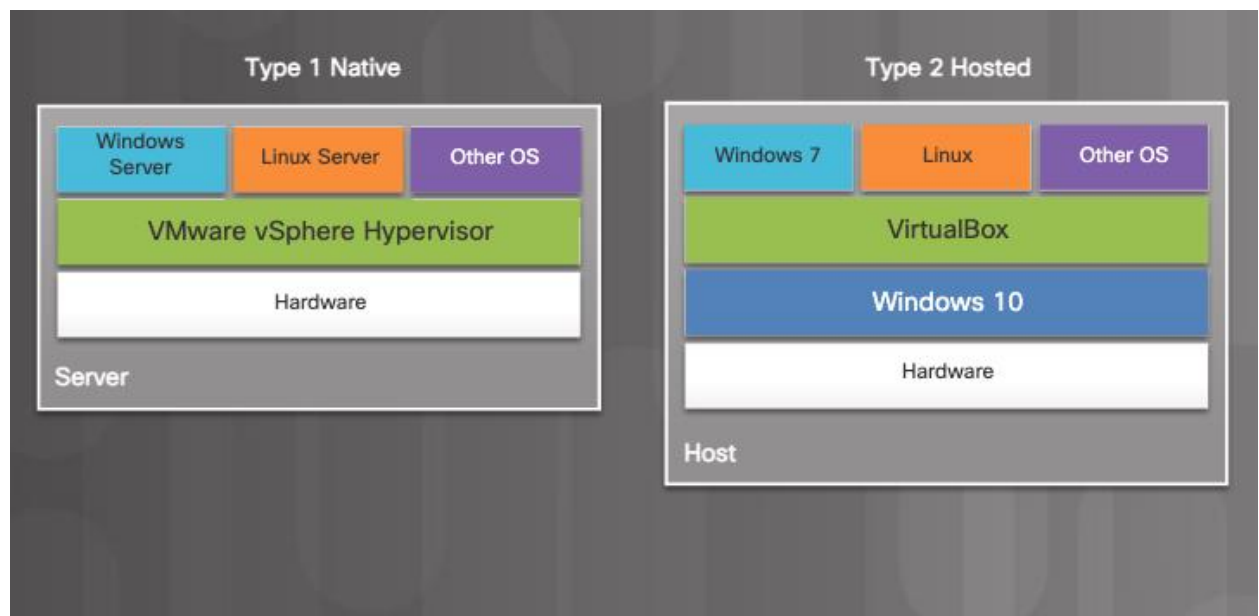
There are two types of hypervisors:

Type 1 (native) hypervisor

- Also called bare-metal hypervisor and typically used with server virtualization.
- A type 1 hypervisor acts like a lightweight operating system and runs directly on the host's hardware

Type 2 (hosted) hypervisor

- This is hosted by an OS and is commonly used with client-side virtualization.
- A type 2 hypervisor runs as a software layer on an operating system, like other computer programs.



<https://www.geeksforgeeks.org/hypervisor/>

12. Explain Remote Access with its advantages and disadvantages.

Remote access is the ability for an authorized person to access a computer or network from a geographical distance through a network connection.

With a remote access connection, employees can access the corporate remote access server and log in to the network with their regular user account.

Employees can then use all the resources that would be available from the office desktop computer.

**advantages and disadvantages**

<https://goabacus.com/advantages-and-disadvantages-of-remote-access-service/>

13. What is Active Directory? What could be the main features to consider while choosing the Network Operating System?

- Active Directory stores information about objects on the network and makes this information easy for administrators and users to find and use.
- Active Directory uses a structured data store as the basis for a logical, hierarchical organization of directory information.
- Active Directory also includes:
  - A set of rules, the schema, that defines the classes of objects and attributes contained in the directory, the constraints and limits on instances of these objects, and the format of their names.
  - A global catalog that contains information about every object in the directory. This allows users and administrators to find directory information regardless of which domain in the directory actually contains the data.
  - A replication service that distributes directory data across a network. All domain controllers in a domain participate in replication and contain a complete copy of all directory information for their domain. Any change to directory data is replicated to all domain controllers in the domain.

The **main features** to consider when selecting a NOS include:

- Performance
- Management and monitoring tools
- Security
- Scalability
- Robustness/fault tolerance

14. Define Virtual memory, device drivers and registry editor.

In computing, virtual memory (also virtual storage) is a memory management technique that provides an "idealized abstraction of the storage resources that are actually available on a given machine which creates the illusion to users of a very large (main) memory.

Virtual memory makes application programming easier by hiding fragmentation of physical memory

Virtual memory is an integral part of a modern computer architecture.

A device driver is a computer program that operates or controls a particular type of device that is attached to a computer.

A driver provides a software interface to hardware devices, enabling operating systems and other computer programs to access hardware functions without needing to know precise details about the hardware being used.

A driver communicates with the device through the computer bus or communications subsystem to which the hardware connects.

The main purpose of device drivers is to provide abstraction by acting as a translator between a hardware device and the applications or operating systems that use it.

The Windows Registry is a database that stores low-level settings for the Microsoft Windows operating system and for applications that use the registry.

The kernel, device drivers, services, Security Accounts Manager, and user interface can all use the registry.

In simple terms, the registry or Windows Registry contains information, settings, options, and other values for programs and hardware installed on all versions of Microsoft Windows operating systems.

Command - regedit

15. What is windows server and what are its types.

Windows Server is a group of operating systems designed by Microsoft that supports enterprise-level management, data storage, applications, and communications. Windows Server have focused on stability, security, networking, and various improvements to the file system.

## Complete Guide to Windows Server + Compare Differences

What You Need to Know				
Windows NT Advanced Server 3.1		First version of Windows Server	32-bit system	Supports newer server hardware
Windows NT Server 3.5		Unix connectivity	Novell Netware connectivity	Ability to use with existing networks
Windows NT Server 3.51		Stability improvements	Support for Windows 95	Remote software license management
Windows NT Server 4.0		Microsoft Internet Information Server	Terminal Server Edition	Same look and feel as Windows 95
Windows Server 2000		Support for Extensible Markup Language	Active Server Pages	Integration with Active Directory for user authentication
Windows Server 2003		Updated security features	Ability to define server roles	Inclusion of .NET environment
Windows Server 2003 R2		Active Directory Federation Services	Improved data compression	Security Configuration Wizard
Windows Server 2008		Hyper-Virtualization System	Event Viewer	Server Manager
Windows Server 2008 R2		64-bit environment	Improved group policy implementation	Remote Desktop Services
Windows Server 2012		Support for use in the Cloud	Improved Hyper-V functionality	Inclusion of Essentials edition
Windows Server 2012 R2		Updates to PowerShell	Enhanced functionality for storage	Ability to serve software to mobile devices
Windows Server 2016		Inclusion of Nano Server	Network Controller	Support for using containers
Windows Server 2019		Windows Admin Center	Hyper-converged infrastructure	Advanced Threat Protection