

# Subject: Introduction to Operating System

## Unit #1: OVERVIEW OF AN OPERATING SYSTEM

### Q1. DEFINE WHAT IS AN OPERATING SYSTEM?

Ans: **Operating System:** An **operating system** (OS) is a set of programs that manage computer hardware resources and provide common services for application software.

The operating system is the most important type of system software in a computer system. A user cannot run an application program on the computer without an operating system. For hardware functions such as input and output and memory allocation, the operating system acts as an intermediary between application programs and the computer hardware. Operating systems are found on almost any device that contains a computer—from cellular phones and video game consoles to supercomputers and web servers

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### Q2. DEFINE DIFFERENT TYPES OF AN OPERATING SYSTEM.

Ans: There are two main types of an operating system;

1. Desktop Operating System
2. Mobile / Tablet Operating System

#### 1. DESKTOP OPERATING SYSTEM

- i. Batch Operating System
- ii. Real Time Operating System
- iii. Multiprogramming Operating System
- iv. Multiprocessing Operating System
- v. Multitasking Operating System
- vi. Network Operating System
- vii. Time Sharing Operating System
- viii. Distributed Operating System

#### 2. MOBILE / TABLET OPERATING SYSTEM

- i. Android
  - a. What is android system
  - b. What is Version & Upgrades
- i. **BATCH PROCESSING SYSTEM:** is that type of operating system which collects jobs in batches before being processed by the CPU. A job is a piece of work usually consisting of a program and the data to be run. All the jobs are stored in job queue until the computer is ready to process them. Once the CPU gets ready and fetches a job from job queue, then there is no interaction of the user with the computer to interrupt the processing of the job until its completion.

Batches of jobs are formed by collecting jobs during working hours and then executed during the evening time or at the end of each day or whenever the computer is available. Once a batch job begins, it continues until it is completed or until an error occurs. IBM's OS 360 is a batch processing operating system.

**EXAMPLES:** Payroll system and preparation of electricity bills, telephone and credit card bills are processed under the batch processing systems. In each of these systems the individual wages, calls, units

consumed and transactions performed are batched together and at the end of each month the total bill is calculated.

- ii. **REAL TIME OPERATING SYSTEMS** are those operating system which give quick response to users requests without delaying them. Unlike batch processing operating system, real time operating systems produce immediate response to user's requests as they are input to the system.

These systems process the users input immediately therefore systems supports high degree of interactivity and as a result they can be widely used in critical environments, such as traffic control system, radar system and missiles systems etc.

Real time operating systems are of two types;

**Hard-real time operating system:** guarantees the solution in the specified time constraint.

**Soft-real time operating system:** if the deadlines are missed by some amount of time they are acceptable.

- iii. **MULTIPROGRAMMING OPERATING SYSTEM:** A type of operating system which allows running of multiple computer programs simultaneously on a single processor. In multiprogramming operating systems, several programs, called jobs are active at the same time in the main memory (RAM) of the computer. This means that multiple jobs are loaded into RAM and executed by a single processor.

**EXAMPLE:** For example, you may be typing in MS-Word, Listening to music while in background Internet Explorer is downloading some pages form the internet.

Windows 7, Vista, XP and Linux provides multiprogramming environment.

- iv. **MULTIPROCESSING OPERATING SYSTEM:** The use of two or more central processing units (CPUs) within a single computer system is called multiprocessing. A multiprocessing system can be run multiple tasks in parallel on multiple CPU's and thus there should be an operating system to control such parallel executions. Multiprocessor operating systems are the operating systems that perform this task. As multiprocessing operating systems executes multiple tasks in parallel, therefore a single process can be divided into small independent units, called threads and executed in parallel on multiple processors giving birth to the concept of multithreading.

The most commonly used multithreading systems are symmetric multiprocessing and asymmetric multiprocessing. In symmetric multiprocessing systems all the CPU's are equal but in asymmetric multiprocessing systems there is one master CPU controlling other CPUs called slave CPUs.

- v. **MULTITASKING OPERATING SYSTEM:** In a modern computer system, the word "multitasking" is employed. It's a logical extension of the multiprogramming system that allows numerous applications to run simultaneously. Multitasking in an OS enables a user to execute multiple computer tasks at the same time. Processes that hold common processing resources, such as a CPU, are known as many tasks. The operating system remembers where you are in these jobs and lets you switch between them without data being lost.

- vi. **NETWORK OPERATING SYSTEM (NOS):** A Network Operating System (NOS) is a type of software that manages and controls network resources in a computer network. It provides the necessary functionality to allow computers and devices to communicate, share resources, and access services in a networked environment.

**EXAMPLES:** of Network Operating Systems include Windows Server, Linux distributions such as Ubuntu Server, Novell NetWare, and macOS Server. These NOSs offer various functionalities and cater to different types of networks, such as small home networks, large enterprise networks, and specialized network environments.

- vii. **TIME SHARING OPERATING SYSTEM:** A type of operating system which slice processor (CPU) time into small fixed time slices and assign the processes to the CPU for what that time slice to be executed. If the process is completed in its allotted time slice, it quits the system and CPU is assigned to the new process waiting on the top of the ready queue. If the time slice expires and the process still remains incomplete, it is added at the back of the ready queue for its next turn.

This technique of sharing the CPU time is termed as time sharing, because the time of the processor is shared among multiple jobs residing in main memory (RAM). Multiple users access the system simultaneously through their terminals and the operating system interleaves the execution of each program in a short burst of time called time slice.

- viii. **DISTRIBUTED OPERATING SYSTEM:** A Distributed Operating System (DOS) is an operating system that runs on multiple machines and allows them to work together as a single cohesive system. Unlike traditional operating systems that primarily focus on managing resources within a single computer, a distributed operating system extends its functionality to manage resources across a network of computers.

**EXAMPLES:** Examples of Distributed Operating Systems include Amoeba, Distributed UNIX, Google's Distributed File System (GFS), and Apache.

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### Q3. WHAT IS MOBILE OR TABLET OPERATING SYSTEM?

Ans: Mobile or tablet operating systems are specifically designed to run on mobile devices such as smartphones, tablets, and other handheld devices. These operating systems provide a user interface optimized for touch input, efficient resource utilization, and support for various mobile-specific features. Examples: Android: Developed by Google, iOS: Developed by Apple, BlackBerry OS.

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### Q4. WHAT IS ANDRIOD SYSTEM?

Ans: Android is an open-source operating system primarily designed for mobile devices such as smartphones and tablets. It was developed by Google and is now one of the most widely used mobile operating systems globally. Android is built on the Linux kernel and offers a customizable and flexible platform for device manufacturers and application developers.

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### Q5. WHAT IS VERSION/UPDATE & UPGRADES?

SNO	VERSION / UPDATE	UPGRADES
1.	It involves minor changes.	It involves major changes.

2.	Providing enhancement of the existing functionalities or features like support to plug-ins or security updates is its objective.	The introduction of new and advanced functionalities or features to the software or applications is the objective of the upgrade.
3.	It remains the old software but some functions are changed for different purposes	It is an entirely new software based on the previous software.
4.	It is a relatively simpler task	It is a complex task to achieve.
5.	Less space is required for an update.	Upgrading takes more space on the system.

## Unit #2: FUNCTIONS OF AN OPERATING SYSTEM

### Q6. DEFINE WHAT IS OPERATING SYSTEM STRUCTURE?

Ans: Operating system structures refer to the organizational principles and components that make up an operating system. These structures provide a framework for managing and coordinating the various resources and tasks within a computer system.

### Q7. DEFINE KERNEL, SHELL AND USER-INTERFACE

**KERNEL:** In computing, the kernel is the central component of an operating system. It is a software layer that acts as an interface between the underlying hardware and the software applications running on a computer system. The kernel is responsible for managing system resources, providing essential services, and facilitating communication between hardware and software components.

**SHELL:** shell is an interface that allows users to interact with the operating system. It acts as an intermediary between the user and the operating system, enabling users to execute commands, run programs, manage files, and perform various tasks.

**USER-INTERFACE:** A user interface (UI) is the means through which a user interacts with a computer system or software application. It serves as a bridge between the user and the underlying technology, enabling users to input commands, manipulate data, and receive feedback or output from the system. The primary goal of a user interface is to provide a user-friendly and intuitive experience that facilitates efficient interaction with the system.

### Q8. EXPLAIN DIFFERENT FUNCTIONS OF AN OPERATING SYSTEM.

**FUNCTIONS OF AN OS:** There are varieties of functions of an operating system which are listed below;

1. Booting
2. The User Interface
3. Resource Management
4. Memory Management
5. File Management
6. Task Management
7. Monitoring Performance
8. Accessing the Web
9. Device Controlling
10. Security

**1- BOOTING:** Booting is a computer and booting;

- Cold Boot / Hard boot: it is called cold boot or
- Warm Boot / Soft boot: boot or soft boot.



process of starting the computer. It checks the makes it ready to work. There are two type of

When computer is turned on by on/off button hard boot.

When computer is restarted, it is called warm

**2- THE USER INTERFACE:** User interface is used to interact with computer. User interface controls how you enter data and instructions and how information is displayed on the screen. Three main types of user interfaces

- **Command-driven:-** In command-line user interface the user enter data and instructions by typing keyword or pressing special keys on keyboard.
- **Menu-Driven interface:** In menu-driven interface, the user enter data and instruction by using menu. It is easier to use.
- **Graphical User Interface:** graphical user interface is a visual environment that is used by the user to communicate with computer. It uses windows, icon,, menu and other graphical objects to issue commands.

The trend towards an easy-to-use graphical user interface (GUI), which uses icon, bars, button, boxes and images. GUI applies by the pointing devices like the electronic mouse etc.

**3- RESOURCE MANAGEMENT:** An operating system uses a variety of resource management programs to manage the hardware and networking resources of a computer system, including its CPU, memory, secondary storage devices, telecommunications processors and input/output peripherals. For example, management programs keep track of where data and programs are stored.

**4-MEMORY MANAGEMENT:** Memory management is a process of optimizing the use of main memory. RAM is used to store data and instructions temporarily during execution. Operating system allocates memory area to different programs. The allocated memory area is de-allocated when the program finishes.

**5-FILE MANAGEMENT:** An operating system contains file management programs that control the creation, deletion, and access of files of data and program. File management also keeping track of the physical location of files on magnetic disks and other secondary storage devices.

**6-TASK MANAGEMENT/JOB SCHEDULING.** The task management programs of an operating system manage the completion of the job of end users. They give each task a slice of a CPU's time and interrupt the CPU operations to substitute other tasks. Task management may involve a multitasking capability where several computing tasks can occur at the same time.

**7-MONITORING PERFORMANCE:** Operating system also monitors the performance of the computer. A performance monitor is a program that checks and reports information about different systems resources and devices. For example it monitors the processor, disk, memory, and network.

**8-ACCESSING THE WEB:** Operating system provides the facility to connect to the Web. It guides the user to set up a connection between computer and Internet Service Providers. Some operating system provides the facilities of Web browser and email program.

**9-DEAD LOCK PREVENTATION:** Deadlock prevention in operating systems refers to the set of techniques and strategies implemented to prevent the occurrence of deadlocks, which are situations where two or more processes are unable to proceed because each is waiting for a resource held by another process.

**10-SECURITY:** In security thee type of control is adopted.

I- Password II Encryption III Permissions

**I-PASSWORD** is used to restrict unauthorized user to access the system each and every user is assigned a password. In network when user is login the O.S asks for user name and password. If he is a valid user, then the user is allowed to access the system otherwise access is denied.

**II- ENCRYPTION** In encryption control in the storage of vital data in some other from i.e. if we type a text in notepad it is stored in the hard disk in other form (computer code). Changing the format of data is called encryption. In encryption user are asked for password. Which are used again in decryption of file or directory. After encryption no one can read your data, even administrator.

**III. PERMISSIONS** are assigning by owner or administrator to allow any level of access, such as read only, read/write, delete by controlling the ability of users to initiate object services.

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## Unit #3: PROCESSES

### Q9. DEFINE WHAT IS PROCESS?

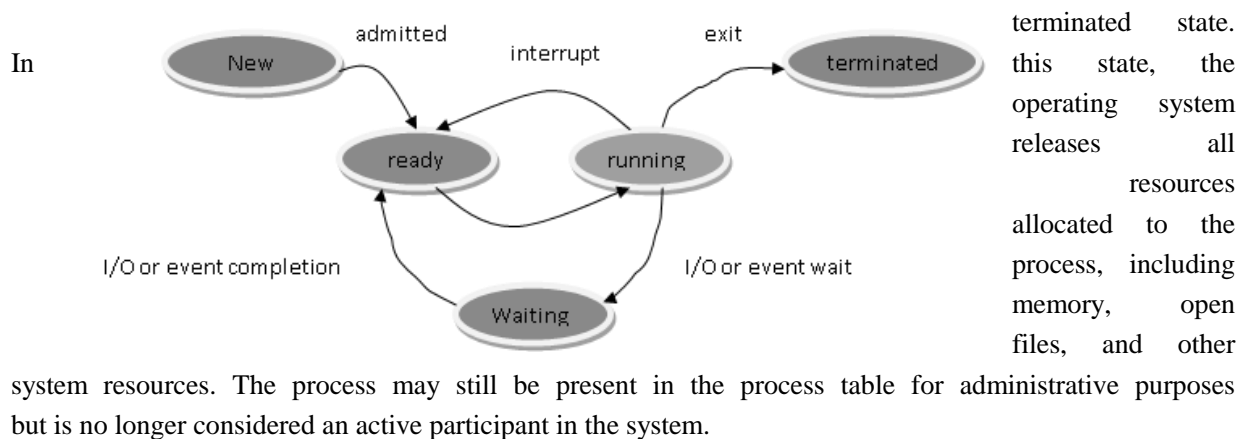
Ans: In an operating system, a process refers to a program in execution. It is an instance of a computer program that is being executed or carried out by a computer's central processing unit (CPU). A process represents the basic unit of work in an operating system and consists of the program code, data, and resources required for its execution.

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### Q10. STATE AND EXPLAIN DIFFERENT STATES OF A PROCESS.

Ans: In an operating system, a process can exist in several states, each representing a different phase of its lifecycle and its interaction with the operating system. The typical process states are as follows:

1. **New:** This is the initial state of a process when it is first created. In this state, the operating system assigns essential resources to the process, such as memory space, process identifier (PID), and other necessary data structures.
2. **Ready:** A process enters the ready state when it has been loaded into the main memory and is waiting to be assigned to the CPU for execution. Multiple processes in the ready state are typically managed by a process scheduler, which determines the order in which they will receive CPU time.
3. **Running:** When a process is assigned to the CPU for execution, it enters the running state. It actively uses the CPU to execute its instructions. In a multitasking system, the CPU time is shared among multiple running processes using scheduling algorithms.
4. **Blocked (Waiting):** A process may transition to the blocked state if it needs to wait for a particular event or resource, such as user input, completion of I/O operations, or availability of a shared resource. While in the blocked state, the process is temporarily suspended and does not consume CPU time until the event it is waiting for occurs.
5. **Terminated:** When a process completes its execution or is explicitly terminated, it enters the terminated state.







## Q11. WHAT IS PROCESS STRUCTURE?

Ans: In operating systems, process structure refers to the organization and management of processes. A process is an instance of a program in execution, and the process structure describes the data structures and mechanisms used by the operating system to manage and control processes.

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## Q12. WHAT IS PCB AND IT'S COMPONENTS?

Ans: "PCB" stands for Process Control Block. It is a data structure used by the operating system to manage and control processes (also known as tasks or threads) in a computer system. The PCB contains information about a specific process, allowing the operating system to keep track of its state and manage its execution.

The components of a PCB in the context of an operating system typically include:

1. **Process Identification:** It includes a unique identifier for the process, such as a process ID (PID), which helps the operating system distinguish between different processes.
2. **Process State:** This indicates the current state of the process, such as running, waiting, ready, or terminated.
3. **Program Counter:** It stores the address of the next instruction to be executed for the process.
4. **CPU Registers:** These registers store the contents of various CPU registers associated with the process, including general-purpose registers, program status registers, and stack pointers.
5. **Priority and Scheduling Information:** This includes the priority level assigned to the process and scheduling-related information, such as time slice or quantum, which determines how long the process can run before being preempted.
6. **Memory Management Information:** This includes information about the memory allocated to the process, such as the base address, limit, and page tables.

7. **Accounting**  
statistics about the  
execution time, and
8. **I/O Status**  
about any I/O  
process, such as the  
pending I/O

Process Id
Process state
Program counter
Register information
Scheduling information
Memory related information
Accounting information
Status information related to I/O

**Information:** This can include process, such as CPU usage, resource consumption

**Information:** It includes details operations being performed by the list of open files, device status, and requests.

### Q13. WHAT ARE OPERATIONS ON PROCESSES?

Ans:

1. Process creation
  2. Process scheduling or dispatching
  3. Blocking
  4. Preemption
  5. Termination
1. **PROCESS CREATION:** Process creation is the initial step to process execution. It implies the creation of a new process for execution.
  2. **PROCESS SCHEDULING/DISPATCHING:** Scheduling or dispatching refers to the event where the OS puts the process from ready to running state. It is done by the system when there are free resources or there is a process of higher priority than the ongoing process.
  3. **BLOCKING:** Block mode is a mode where the system waits for input-output. In process blocking operation, the system puts the process in the waiting state. When a task is blocked, it is unable to execute until the task prior to it has finished using the shared resource. Examples of shared resources are the CPU, network and network interfaces, memory, and disk.
  4. **PREEMPTION:** Preemption means the ability of the operating system to preempt a currently scheduled task in favour of a higher priority task. The resource being scheduled can be the processor or the I/O.
  5. **TERMINATION:** Ending a process is known as process termination. There are many events that may lead to process termination, some of them are:
    1. One process terminating the other process.
    2. A problem in the hardware.
    3. The process is fully executed, implying that the OS is finished.
    4. An operating system might terminate itself due to service errors.
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### Q14. DEFINE WHAT IS THREADS?

Ans: A thread refers to the smallest unit of execution within a process. A thread represents a sequence of instructions that can be scheduled and executed independently by the operating system's scheduler.

Threads exist within the context of a process and share the same memory space, file descriptors, and other resources of the process. Multiple threads within a process can execute concurrently, allowing for concurrent or parallel execution of tasks.

### **Why Do We Need Thread?**

- Creating a new thread in a current process requires significantly less time than creating a new process.
  - Threads can share common data without needing to communicate with each other.
  - When working with threads, context switching is faster.
  - Terminating a thread requires less time than terminating a process.
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## UNIT #4: INTRODUCTION TO MS-WINDOWS 10

### Q15. WHAT IS MS-WINDOWS 10?

Ans: MS-Windows 10: Windows 10 is an operating system developed by Microsoft and is part of the Windows NT family of operating systems. It is the successor to Windows 8.1 and was released to the public on July 29, 2015.

Windows 10 was designed to address the shortcomings of its predecessor and to provide a more unified and user-friendly experience across a wide range of devices, including desktop computers, laptops, tablets, and smartphones. It introduced several new features and improvements over previous versions of Windows, including:

1. **Start Menu:** Windows 10 reintroduced the Start Menu, which combines the traditional Start Menu from Windows 7 with the live tiles interface introduced in Windows 8, providing a more familiar and customizable user interface.
  2. **Cortana:** Cortana, a voice-activated personal assistant, was introduced in Windows 10. It can perform various tasks, such as web searches, setting reminders, and providing recommendations.
  3. **Virtual Desktops:** Windows 10 introduced a feature called Virtual Desktops, which allows users to create and switch between multiple desktop environments, providing better organization and multitasking capabilities.
  4. **Microsoft Edge:** Windows 10 introduced Microsoft Edge as the default web browser, replacing Internet Explorer. Edge offered improved performance, security features, and compatibility with modern web standards.
  5. **DirectX 12:** Windows 10 introduced DirectX 12, a graphics API that provides improved performance and efficiency for gaming and multimedia applications.
  6. **Continuum:** Continuum is a feature that allows devices with hybrid form factors, such as 2-in-1 laptops and tablets, to automatically switch between tablet and desktop modes based on the presence or absence of a keyboard or mouse.
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### Q16. HOW TO CERATE A BOOTABLE USB/DVD/CD USING RUFUS SOFTWARE?

Ans: To create a bootable USB/DVD/CD using Rufus software, follow these steps:

1. **Download Rufus:** Visit the official Rufus website (<https://rufus.ie/>) and download the latest version of Rufus for your operating system.
2. **Insert USB/DVD/CD:** Connect the USB drive or insert the DVD/CD into your computer's USB port or optical drive.
3. **Launch Rufus:** Run the Rufus software that you downloaded.
4. **Select the Device:** In the Rufus interface, under the "Device" section, select your USB drive from the drop-down menu. If you're using a DVD/CD, Rufus will automatically detect it.
5. **Choose the Bootable Image:** Under the "Boot selection" section, click on the small disk icon and browse your computer to select the bootable ISO image file you want to use. This can be an operating system installation image or any other bootable image file.

6. **Configure Settings:** Rufus offers various configuration options that you can adjust according to your needs. These include partition scheme, file system, cluster size, and more. In most cases, the default settings should work fine.
7. **Start the Process:** Once you have made the necessary selections and configurations, click on the "Start" button to initiate the process of creating the bootable USB/DVD/CD. Rufus may display a warning that all data on the USB drive will be destroyed. Ensure that you have backed up any important data before proceeding.
8. **Wait for Completion:** Rufus will format the USB drive (if required) and copy the contents of the bootable image onto the drive. The process may take a few minutes to complete.
9. **Eject and Use:** Once the process is finished, Rufus will display a "READY" message. You can then safely eject the USB drive or remove the DVD/CD from your computer.

Your USB/DVD/CD is now ready for use as a bootable device. You can use it to install an operating system.

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## Q17. WRITE DOWN STEP BY STEP PROCESS OF WINDOWS 10 INSTALLATION

Ans:

**1. Check your device meets the Windows 10 system requirements.** Below you'll find the minimum specs needed to run Windows 10, so check your device is capable:

**CPU:** 1GHz or faster processor

**RAM:** 1GB for Windows 10 32-bit or 2GB for Windows 10 64-bit

**Storage:** 32GB of space or more

**GPU:** DirectX 9 compatible or later with WDDM 1.0 driver

**Display:** 800x600 resolution or higher

**2. Use your installation media.** Insert your installation media into your device and then **access the computer's BIOS** you'll need to **press the F2, F12 or Delete keys** as your computer boots up.

**3. Change your computer's boot order.** Once you have access to your computer's BIOS you'll need to locate the settings for boot order. You need the Windows 10 installation tool to be higher up on the list than the device's current boot drive.

**4. Restart your device.** Save your settings in the BIOS and reboot your device.

**5. Complete the installation.** Your device should now load up the Windows 10 installation tool on restart. This will guide you through the rest of the installation process.

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## Q18. WRITE NOTE ON HARD DISK PARTITION.

Ans: Hard disk partitioning is the process of dividing a physical hard disk drive into multiple logical sections called partitions. Each partition acts as a separate storage unit with its own file system, allowing you to organize and manage data more effectively. Here are some key points about hard disk partitioning:

1. **Partition Types:** There are different types of partitions, such as primary partitions, extended partitions, and logical partitions. Primary partitions are the main divisions on a disk and can be used to boot an operating system. Extended partitions are containers that can hold multiple logical partitions.
2. **Master Boot Record (MBR) and GUID Partition Table (GPT):** MBR and GPT are two partitioning schemes used on hard disks. MBR is the older standard and supports up to four primary partitions or three primary partitions and one extended partition. GPT is the newer standard and supports larger disk sizes, allowing for more partitions and better data integrity features.
3. **Benefits of Partitioning:**
  - **Organization:** Partitioning helps you organize your data by creating separate sections for different purposes. For example, you can have one partition for your operating system, another for applications, and a separate one for personal files.
  - **Data Protection:** By separating your data into partitions, you can isolate and protect critical files from being affected if issues arise in other partitions. For instance, if one partition becomes corrupted or infected by malware, other partitions may remain unaffected.
  - **Multi-boot Configurations:** Partitioning is useful for setting up systems that can run multiple operating systems on the same hard drive. Each OS can have its own partition, allowing you to choose which one to boot during startup.

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## Q19. WRITE DOWN THE STEPS TO INSTALL VGA / SVGA / AGP / GAMING CARD

Ans: Installing a VGA/SVGA/AGP/Gaming card involves the following steps:

1. **Preparation:** Before you begin, make sure you have the necessary tools and equipment. This usually includes a screwdriver, and the new graphics card itself.
2. **Power off the computer:** Shut down your computer and turn off the power supply.

3. **Open the computer case:** Remove the screws or latches securing the side panel of your computer case.
  4. **Locate the expansion slot:** Identify the appropriate expansion slot for your graphics card. VGA, SVGA, AGP, and gaming cards usually require a PCI Express (PCIe) slot on modern motherboards.
  5. **Insert the new card:** Take your new VGA/SVGA/AGP/Gaming card and align it with the vacant expansion slot.
  6. **Connect power and cables:** Depending on the card's power requirements, you may need to connect additional power cables from the power supply unit (PSU) to the card.
  7. **Close the computer case:** Place the side panel back onto the case and secure it with the screws or latches you removed earlier.
  8. **Power on the computer:** Plug in the power supply and turn on the computer. The system should detect the new graphics card automatically. If required, install any drivers or software that came with the card using the provided installation disc or by downloading the latest drivers from the manufacturer's website.
  9. **Test the card:** Once the drivers are installed, verify that the new card is functioning correctly.
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#### **Q20. WRITE DOWN THE STEPS FOR INSTALLING SOUND CARD**

Ans: Installing a sound card involves the following steps:

1. **Prepare your computer:** Before you begin, make sure your computer is powered off and unplugged from the power source.
  2. **Locate an available expansion slot:** Open your computer case and identify an available PCI or PCIe slot for installing the sound card. These slots are typically white in color and longer than other slots on the motherboard.
  3. **Insert the sound card:** Line up the sound card with the slot and gently push it into the slot until it is firmly seated.
  4. **Close the computer case:** Carefully close the computer case and fasten any screws or latches to secure it in place.
  5. **Power on your computer:** Plug in your computer and power it on.
  6. **Install sound card drivers:** Once your computer boots up, insert the driver installation CD that came with the sound card into your CD/DVD drive, or download the latest drivers from the manufacturer's website. Follow the on-screen instructions to install the drivers.
  7. **Restart your computer:** After the driver installation is complete, restart your computer to finalize the installation.
  8. **Test the sound card:** Once your computer has restarted, test the sound card by playing audio or running a sound test. Connect your speakers or headphones to the appropriate ports on the sound card and ensure that sound is coming through properly.
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#### **Q21. WRITE DOWN STEPS FOR INSTALLATION OF NIC CARD.**

##### **i. WIRED**

## **ii. WIRELESS**

### **Ans: i. Wired Network Interface Card (NIC) Installation:**

1. Power off your computer and disconnect it from the power source.
2. Open the computer case. removing screws or sliding a panel.
3. Locate an available PCI or PCIe expansion slot on the motherboard.
4. Align the NIC's gold connectors with the expansion slot and gently insert it into the slot.
5. Secure the NIC in place by using the screw that held the slot cover or any provided screws.
6. Close the computer case and reconnect the power source.
7. Power on the computer and wait for the operating system to recognize the new hardware.
8. Install any necessary drivers or software that came with the NIC by following the manufacturer's instructions.
9. Once the drivers are installed, connect an Ethernet cable from the NIC's Ethernet port to the appropriate network device, such as a router or switch.

### **ii. Wireless Network Interface Card (NIC) Installation:**

1. Power off your computer and disconnect it from the power source.
2. Open the computer case. The process may vary depending on the computer model, but typically involves removing screws or sliding a panel.
3. Locate an available PCI or PCIe expansion slot on the motherboard..
4. Align the NIC's gold connectors with the expansion slot and gently insert it into the slot.
5. Secure the NIC in place by using the screw that held the slot cover or any provided screws.
6. Close the computer case and reconnect the power source.
7. Power on the computer and wait for the operating system to recognize the new hardware.
8. Install any necessary drivers or software that came with the NIC by following the manufacturer's instructions.
9. Once the drivers are installed, connect the antennas to the NIC's antenna connectors. These antennas are usually included with the wireless NIC.
10. If the computer is not already equipped with wireless capabilities, you may need to install additional software or drivers for the wireless functionality to work.

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## **Q22. WRITE DOWN THE STEPS FOR USER CREATION**

### **i. SETTING PROPERTIES**

### **ii. ASSIGNING ROLE & PERMISSIONS**

Ans: To create a user, set properties, and assign roles and permissions in Windows 10, you can follow these steps:



### **USER CREATION:**

1. Open the **Settings** app by clicking on the **Start** menu and selecting the **Settings** icon.
2. In the Settings window, click on **Accounts**.
3. Select **Family & other users** from the left sidebar.
4. Under the "Other users" section, click on the **Add someone else to this PC** button.
5. In the "How will this person sign in?" window, click on the **I don't have this person's sign-in information** link.
6. Click on the **Add a user without a Microsoft account** link.
7. In the "Create an account for this PC" window, enter the desired username and password for the new user.
8. Optionally, you can provide a password hint to assist the user in remembering their password.
9. Click on the **Next** button to create the user account.

### **SETTING PROPERTIES:**

1. After creating the user account, go back to the **Settings** app and select **Accounts**.
2. Choose **Family & other users** from the left sidebar.
3. Under the "Other users" section, click on the newly created user account.
4. In the user account settings, you can modify properties such as the account name, account type, and account picture.
5. To change the account name, click on the **Change account name** link and enter the new desired name.
6. To change the account type, click on the **Change account type** button and select either **Administrator** or **Standard user**.
7. To change the account picture, click on the **Browse for one** button and choose a picture from your computer.
8. Once you have made the desired changes, close the user account settings.

### **ASSIGNING ROLE & PERMISSIONS:**

1. Open the **Settings** app and go to **Accounts**.
  2. Select **Family & other users** from the left sidebar.
  3. Under the "Other users" section, click on the newly created user account.
  4. In the user account settings, click on the **Manage account type** button.
  5. In the account type settings, you can assign roles and permissions to the user.
  6. To assign administrator privileges, select the **Administrator** option. For standard user privileges, choose the **Standard user** option.
  7. Once you have assigned the appropriate role, close the account type settings.
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### Q23. DEFINE WHAT IS TABLET MODE

Ans: Tablet mode is a feature in Windows 10 that optimizes the user interface and functionality of the operating system for touch-enabled devices like tablets and 2-in-1 convertible laptops. When tablet mode is enabled, the traditional desktop interface is replaced with a more touch-centric interface, making it easier to interact with the device using gestures and touch controls.

In tablet mode, several changes occur to enhance the touch experience:

1. **Start Screen:** The Start menu is replaced by a Start screen that displays a full-screen grid of tiles, providing easy access to apps and content.
  2. **Taskbar:** The taskbar is minimized, making it less prominent and providing more screen space for apps.
  3. **Touch-friendly Gestures:** Gestures such as swiping from the sides to access the Action Center and the Charms menu, swiping from the top to view app commands, and swiping from the bottom to access the taskbar are enabled for easy navigation.
  4. **Virtual Keyboard:** The on-screen keyboard automatically appears when you tap on text fields or other input areas, allowing you to type using the touch keyboard.
  5. **App Scaling:** Apps are optimized for touch and designed to be easily used with fingers. Buttons, menus, and other controls are larger and spaced out to accommodate touch input.
  6. **Full-Screen Apps:** Apps typically open in full-screen mode, utilizing the entire display for a more immersive touch experience.
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### Q24. WHAT IS DUAL DESKTOP IN WINDOWS 10?

Ans: Dual Desktop, also known as Virtual Desktop, is a feature in Windows 10 that allows users to create multiple virtual desktop environments on a single physical screen. Each virtual desktop functions as a separate workspace, enabling users to organize their open windows and applications into different groups for better productivity and multitasking. With Dual Desktop, you can create, switch between, and manage multiple desktops independently, each with its own set of open windows and apps. Here's how it works:

1. **Creating a Virtual Desktop:**
  - Click on the **Task View** button on the taskbar (located to the right of the search bar) or use the shortcut key **Windows Key + Tab** to open the Task View interface.
  - In the Task View interface, click on the "+" button labeled **New desktop** at the top left corner.
  - A new virtual desktop will be created, and you can switch between it and the original desktop using the Task View interface.
2. **Switching Between Virtual Desktops:**
  - To switch between virtual desktops, you can use one of the following methods:
    - Click on the **Task View** button on the taskbar and select the desired virtual desktop.
    - Use the shortcut key **Windows Key + Ctrl + Left/Right Arrow** to cycle through the virtual desktops.
3. **Managing Virtual Desktops:**

- In the Task View interface, you can see a thumbnail view of all the virtual desktops at the bottom.
- You can close a virtual desktop by hovering over its thumbnail and clicking the "X" button that appears.
- You can also move windows between virtual desktops by dragging them from one desktop's thumbnail to another.

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## Q25. DEFINE NETWORK SETTINGS;

- i. **Join Workgroup**
- ii. **Connecting with DSL MODEM**
- iii. **Connecting with Hotspot**

Ans:

**i. JOIN WORKGROUP:** When it comes to network settings in Windows 10, joining a workgroup refers to connecting your computer to a local network of computers that share resources and files. Here's how to join a workgroup:

1. Press the **Windows Key + R** to open the Run dialog box.
2. Type **sysdm.cpl** and press **Enter** to open the System Properties window.
3. In the System Properties window, click on the **Computer Name** tab.
4. Click the **Change** button.
5. Select the **Workgroup** option and enter the name of the workgroup you want to join or choose an existing workgroup.
6. Click **OK** and restart your computer to apply the changes.

By joining a workgroup, you can easily share files, printers, and other resources with other computers on the same network.

**ii. CONNECTING WITH DSL MODEM:** To connect your Windows 10 computer with a DSL modem, which is a device that provides internet access via a telephone line, follow these steps:

1. Connect one end of the telephone cable to the DSL port on the modem and the other end to a telephone wall jack.
2. Connect one end of an Ethernet cable to the LAN port on the modem and the other end to the Ethernet port on your computer.
3. Power on the modem and wait for it to establish a connection.
4. On your Windows 10 computer, click on the **Start** menu and select **Settings**
5. In the Settings window, click on **Network & Internet**.
6. In the left sidebar, select **Ethernet**.
7. Under the Ethernet settings, click on the name of your Ethernet connection.
8. In the Ethernet settings, make sure **Ethernet** is set to **On**.
9. Windows will automatically obtain the IP address and other network settings from the modem.

Once the connection is established, your Windows 10 computer should be connected to the internet through the DSL modem.

**iii. CONNECTING WITH HOTSPOT:** To connect your Windows 10 computer to a mobile hotspot, which allows you to share your mobile device's internet connection, follow these steps:

1. On your mobile device, enable the mobile hotspot feature and note the network name (SSID) and password.
  2. On your Windows 10 computer, click on the **Start** menu and select **Settings**
  3. In the Settings window, click on **Network & Internet**.
  4. In the left sidebar, select **Wi-Fi**.
  5. Make sure **Wi-Fi** is set to **On**.
  6. In the list of available Wi-Fi networks, locate and select the network name (SSID) of your mobile hotspot.
  7. Enter the password for the mobile hotspot and click **Connect**.
  8. Windows will connect to the hotspot and obtain the necessary IP address and network settings.
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## **Q26. EXPLAIN UPDATES & SECURITY IN WINDOWS 10**

Ans: Updates and security in Windows 10 are essential components of the operating system that ensure your computer remains up to date with the latest features, bug fixes, and protection against security vulnerabilities.

**UPDATES:** Updates in Windows 10 are designed to keep your system running smoothly by providing bug fixes, performance improvements, and new features. Windows updates typically include the following types:

1. **Quality Updates:** These updates are released monthly and focus on fixing bugs, improving stability, and addressing security vulnerabilities in the operating system.
2. **Feature Updates:** Feature updates, also known as version updates, are released twice a year and introduce new functionality, enhancements, and improvements to Windows 10. .
3. **Driver Updates:** Driver updates are provided to ensure that your hardware components, such as graphics cards, network adapters, and printers, work properly with Windows 10.

**SECURITY:** Security is a critical aspect of Windows 10. Microsoft continuously works to enhance the security features of the operating system to protect against various threats, such as malware, viruses, and unauthorized access. Some key security features in Windows 10 include:

1. **Windows Defender Antivirus:** Windows 10 includes built-in antivirus software called Windows Defender Antivirus. It provides real-time protection against viruses, malware, and other malicious software.
  2. **Windows Firewall:** The Windows Firewall monitors and manages incoming and outgoing network traffic to protect your computer from unauthorized access.
  3. **User Account Control (UAC):** UAC helps prevent unauthorized changes to your system by notifying you and asking for confirmation whenever a program attempts to make changes that require administrative access.
  4. **Windows Hello:** Windows Hello provides biometric authentication options, such as fingerprint or facial recognition, to securely log in to your computer without relying solely on passwords.
  5. **Secure Boot:** Secure Boot ensures that only trusted and signed operating system components are loaded during the boot process, protecting against rootkits and other boot-time malware.
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## Q27. EXPLAIN MOUSE & KEYBOARD SETTINGS

Ans: Mouse and keyboard settings in Windows 10 allow you to customize and adjust the behavior, sensitivity, and functionality of your mouse and keyboard.

**MOUSE SETTINGS:** Windows 10 offers a range of options to configure mouse settings. To access these settings:

1. Click on the **Start** menu and select **Settings**.
2. In the Settings window, click on **Devices**.
3. From the left sidebar, select **Mouse**.

In the Mouse settings, you'll find various options, including:

1. **Cursor and Pointer Options:** Adjust the cursor speed, visibility, and other pointer options like pointer trails and the option to automatically hide the pointer.
2. **Button Configuration:** Customize the functions of mouse buttons, including swapping left and right buttons or enabling a shortcut for specific actions.
3. **Scrolling Options:** Configure the scrolling behavior, such as the number of lines scrolled per notch or the ability to scroll multiple lines at once.
4. **Additional Mouse Options:** Access advanced settings, such as pointer precision, double-click speed, and the ability to disable the touchpad while typing.

**KEYBOARD SETTINGS:** Windows 10 also provides options to customize keyboard settings. To access these settings:

1. Click on the **Start** menu and select **Settings**.
2. In the Settings window, click on **Devices**.
3. From the left sidebar, select **Typing**.

In the Typing settings, you'll find various options, including:

1. **Keyboard Layout:** Choose the keyboard layout that matches the physical layout of your keyboard, such as QWERTY or AZERTY.
  2. **Typing Suggestions:** Enable or disable autocorrect, text suggestions, and hardware keyboard suggestions.
  3. **Keyboard Shortcuts:** Customize or create new keyboard shortcuts to perform specific actions or launch applications.
  4. **On-Screen Keyboard:** Enable the on-screen keyboard, which provides a virtual keyboard that can be used with touch or a mouse.
  5. **Keyboard Repeat Rate:** Adjust the rate at which a character repeats when a key is held down.
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## Q28. HOW TO ADD URDU KEYBOARDS

Ans: To add the Urdu keyboard in Windows 10, follow these steps:

1. Click on the **Start** menu and select **Settings**.
2. In the Settings window, click on **Time & Language**.
3. From the left sidebar, select **Language**.
4. Under the "Preferred languages" section, click on the **Add a language** button.
5. In the "Add languages" window, scroll down or search for "Urdu".

6. Select "Urdu" from the list and click the **Next** button.
7. On the next screen, choose the language features you want to install. Select **Urdu** keyboard.
8. Click the **Install** button and wait for the installation to complete.
9. Once the installation is finished, you will see "Urdu" listed under the "Preferred languages" section.
10. To set Urdu as the default keyboard, click on "Urdu" and click the **Move up** button until it is at the top of the list.

You can also use the shortcut key **Windows Key + Space** to switch between installed keyboards.

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## **Q29. HOW TO INSTALLING & CONFIGURING PRINTERS & SCANNER**

Ans: To install and configure printers and scanners in Windows 10, follow these steps:

### **INSTALLING A PRINTER:**

1. Connect the printer to your computer using a USB cable or make sure it is connected to the same network.
2. Turn on the printer and ensure it has paper and ink/toner.
3. Click on the **Start** menu and select **Settings**.
4. In the Settings window, click on **Devices**.
5. From the left sidebar, select **Printers & scanners**.
6. Click on the **Add a printer or scanner** button.
7. Windows will start searching for printers and scanners. If your printer is detected, it will appear in the list.
8. Select your printer from the list and click the **Add device** button.
9. Windows will install the necessary drivers and set up the printer. Follow any on-screen instructions if prompted.
10. Once the installation is complete, your printer should be ready to use.

### **CONFIGURING PRINTER SETTINGS:**

1. Open the **Settings** window and click on **Devices**.
2. From the left sidebar, select **Printers & scanners**.
3. Under the "Printers & scanners" section, click on the name of your installed printer.
4. Here, you can access various printer settings and options. Adjust settings such as paper size, print quality, default printer, and more, according to your preferences.

### **INSTALLING A SCANNER:**

1. Connect the scanner to your computer using a USB cable or ensure it is connected to the same network.
2. Turn on the scanner and ensure it is properly powered.
3. Click on the **Start** menu and select **Settings**.
4. In the Settings window, click on **Devices**.
5. From the left sidebar, select **Printers & scanners**.
6. Scroll down to the "Scanners & Cameras" section and click on the **Add a scanner or camera** button.

7. Windows will start searching for scanners. If your scanner is detected, it will appear in the list.
  8. Select your scanner from the list and click the **Add device** button.
  9. Windows will install the necessary drivers and set up the scanner. Follow any on-screen instructions if prompted.
  10. Once the installation is complete, your scanner should be ready to use.
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## Unit #5: NETWORK CONNECTIVITY (NETWORKING)

### Q30. WHAT IS WORKGROUP? AND HOW TO CREATE IT?

Ans: Workgroup: A workgroup is a small network of computers that are connected together to facilitate communication, file sharing, and resource sharing among a group of users. It is typically used in small to medium-sized businesses or organizations where the number of users is limited, and there is no dedicated server infrastructure in place.

HOW TO CREATE IT:

1. Navigate to the **Control Panel > All Control Panel Items > System**. You will get to view basic information about your computer screen.
  2. Click on **Change Settings** under Computer name, domain, and workgroup settings to arrive at the System properties pop-up.
  3. Click on **Change** to rename this computer.
  4. Under the Computer Name/Domain Changes pop-up, you'll have the option to join the workgroup of your choice. Ensure that all the devices you want in a particular workgroup are joined to that workgroup.
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### Q31. HOW TO ASSIGN IP ADDRESS TO NIC?

Ans: To assign an IP address to a network interface card (NIC) or computer in Windows 10, you can follow these steps:

1. Open the "Settings" app: Click on the "Start" button in the bottom-left corner of the screen, and then click on "Settings" icon.
  2. Go to "Network & Internet" settings: In the Settings app, click on the "Network & Internet" option.
  3. Select the network connection: In the left sidebar, click on "Ethernet" or "Wi-Fi," depending on the type of network connection you want to configure.
  4. Access the network adapter settings: Under "Ethernet" or "Wi-Fi," click on the network connection name. It might be labeled as "Wi-Fi" or "Ethernet" followed by the network name.
  5. Open the adapter properties: In the network connection settings, click on the "Properties" button.
  6. Select "Internet Protocol Version 4 (TCP/IPv4)": In the list of network components, locate and select "Internet Protocol Version 4 (TCP/IPv4)." If you are using IPv6, you can choose "Internet Protocol Version 6 (TCP/IPv6)" instead.
  7. Configure the IP address: Click on the "Properties" button to open the TCP/IPv4 properties window.
  8. Save the settings: Click "OK" to save the changes and close the TCP/IPv4 properties window.
  9. Close the adapter properties: Click "OK" again to close the adapter properties window.
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### Q32. HOW TO SHARE FILE AND PRINTER IN WINDOWS 10?

Ans: To share files and printers in Windows 10, you can use the following steps:

1. Open the "Settings" app: Click on the "Start" button in the bottom-left corner of the screen, and then click on the "Settings" icon.
2. Go to "Network & Internet" settings: In the Settings app, click on the "Network & Internet" option.
3. Select "Sharing options": In the left sidebar, scroll down and click on "Sharing options."



4. Enable network discovery and file/print sharing: In the Sharing options, ensure that the following settings are turned on:
  - "Network discovery": Allows your computer to discover other devices on the network.
  - "File and printer sharing": Enables sharing of files and printers on your computer.

**SHARE A FOLDER:**

- i. Open File Explorer (Windows key + E).
- ii. Navigate to the folder you want to share.
- iii. Right-click on the folder and select "Properties."
- iv. In the Properties window, go to the "Sharing" tab.
- v. Click on the "Share" button.
- vi. Select the users or groups you want to share the folder with.
- vii. Choose their level of access (Read or Read/Write).
- viii. Click on the "Share" button to apply the sharing settings.

**SHARE A PRINTER:**

- i. Open the "Settings" app.
- ii. Go to "Devices" and then click on "Printers & scanners."
- iii. Select the printer you want to share and click on "Manage."
- iv. In the printer settings, scroll down and toggle on "Share this printer."
- v. You can enter a custom share name for the printer if desired.
- vi. Close the printer settings window.

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**Q33. ASSIGNING PERMISSIONS TO USERS**

Ans: Assigning permissions to users typically involves granting or restricting access to certain resources or functionalities within a system or application.

1. **IDENTIFY THE RESOURCES:** Determine which resources or functionalities within your system or application you want to grant or restrict access to. This could include files, folders, databases, features, or any other relevant components.
  2. **UNDERSTAND PERMISSION LEVELS:** Familiarize yourself with the available permission levels or roles within your system. Common permission levels include "admin," "user," "editor," "viewer," or more granular options like "read," "write," "delete," etc.
  3. **CREATE USER GROUPS OR ROLES:** If your system supports it, you can create user groups or roles that represent specific sets of permissions. This helps simplify the assignment process by applying permissions to groups instead of individual users. For example, you could have an "administrators" group with full access and a "guests" group with limited access.
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## UNIT #6: WINDOWS SERVER 2019

### Q34. DEFINW WHAT IS WINDOWS SERVER 2019?

**Ans: DEFINITION:** Windows Server 2019 is the ninth version of the Windows Server operating system by Microsoft, as part of the Windows NT family of operating systems. It is the second version of the server operating system based on the Windows 10 platform, after Windows Server 2016

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### Q35. WRITE DOWN DIFFERENCE BETWEEN CLIENT AND SERVER

**Ans: CLIENT:** A client refers to a computing device or application that requests and consumes services or resources from a server. In a client-server relationship, the client is typically the initiator of the communication. It can be a computer, smartphone, tablet, or any device that can connect to a network and make requests for data or services. Clients are often equipped with user interfaces that allow users to interact with applications and access the server's resources. They can be both hardware devices and software applications.

**SERVER:** A server, on the other hand, is a powerful computer or software application that provides services or resources to clients upon request. Servers are designed to be highly reliable, available, and capable of handling multiple client requests simultaneously. They are responsible for managing and distributing resources, processing requests, and delivering responses back to the clients. Servers are usually dedicated machines optimized for specific tasks, such as web servers, file servers, database servers, email servers, etc.

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### Q36. DEFINE ROLE & SERVICES OF CLIENT AND SERVER

In a client-server architecture, both the client and server play different roles and provide distinct services. Let's take a closer look at each:

#### CLIENT ROLE:

The client's primary role is to initiate requests for services or resources from the server. It typically provides a user interface that allows users to interact with applications and access server resources. Clients send requests to the server and receive responses containing the requested data or services. Some common client roles and services include:

**User interface:** Clients provide interfaces for users to interact with applications and access server resources.

**Data presentation:** Clients handle the presentation and display of data received from the server.

**Input validation:** Clients may perform basic validation of user input before sending requests to the server.

**Local caching:** Clients can cache data received from the server to improve performance and reduce network traffic.

**Client-side processing:** Clients may perform some processing tasks locally before sending data to the server.

**SERVER ROLE:** The server's primary role is to provide services and resources to clients upon request. It listens for incoming requests, processes them, and sends back responses containing the requested data or services. The server performs various functions and services, depending on its specific role and purpose. Some common server roles and services include:

**Resource management:** Servers manage and distribute shared resources such as files, databases, printers, or network connections.

**Data Processing:** Servers perform complex computations, data manipulation, or business logic processing based on client requests.

**Authentication and authorization:** Servers verify the identity of clients, authenticate them, and determine their access privileges to resources.

**Data storage:** Servers store and manage data in databases or file systems, making it accessible to clients upon request.

**Security:** Servers often implement security measures such as encryption, access control, and data integrity checks to protect resources and data.

**Communication and management:** Servers handle communication protocols, manage network connections, and coordinate data exchange between clients.

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### Q37. EXPLAIN PRINT & DOCUMENT SERVICES

**Ans:** Print and Document Services enables you to centralize print server and network printer tasks. With this role, you can also receive scanned documents from network scanners and route the documents to a shared network resource, Windows SharePoint Services site, or email addresses. Fax Server sends and receives faxes and allows you to manage fax resources such as jobs, settings, reports, and fax devices on your fax server.

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### Q38. DEFINE WHAT IS ACTIVE DIRECTORY (AD)?

Ans: Active Directory (AD) is Microsoft's proprietary directory service. It runs on Windows Server and enables administrators to manage permissions and access to network resources.

Active Directory stores data as objects. An object is a single element, such as a user, group, application or device such as a printer. Objects are normally defined as either resources, such as printers or computers, or security principals, such as users or groups.

#### **ACTIVE DIRECTORY'S SERVICES**

The main service in Active Directory is Domain Services (AD DS), which stores directory information and handles the interaction of the user with the domain. AD DS verifies access when a user signs into a device or attempts to connect to a server over a network. AD DS controls which users have access to each resource, as well as group policies.

- A **domain** is a group of objects, such as users or devices that share the same AD database. Domains have a domain name system
- A **tree** is one or more domains grouped together. The tree structure uses a the collection of domains in a logical hierarchy.
- A **forest** is a group of multiple trees. A forest consists of shared catalogs, directory schemas, application information and domain configurations. The schema defines an object's class and attributes in a forest. According to Microsoft, the forest is Active Directory's security boundary.
- **Organizational Units** (OUs) organize users, groups and devices. Each domain can contain its own OU. However, OUs cannot have separate namespaces, as each user or object in a domain must be unique. For example, a user account with the same username cannot be created.

#### **Q39, DEFINE DHCP , DNS AND WINS?**

Ans: **DHCP:** DHCP stands for Dynamic Host Configuration Protocol. It is a network management protocol used to automatically assign IP addresses and other network configuration parameters to devices on a network.

**DNS:** DNS stands for Domain Name System. It is a decentralized naming system used to translate human-readable domain names, like "example.com," into the numerical IP addresses that computers use to identify and communicate with each other on the internet.

**WINS:** Windows Internet Name Service (WINS) is a legacy computer name registration and resolution service that maps computer NetBIOS names to IP addresses.

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