

## Assignment - 3 & 4

### \* Long question

O=1 Different between Linux cmd window os

<u>Linux</u>	<u>window</u>
It supports a wide range of hardware and is highly customizable.	windows uses a hybrid kernel, which combines features of both monolithic and microkernel designs.
this allows for high customization and adaptability.	windows is proprietary software, owned by microsoft.
The CLI is more powerful and flexible, especially for advanced users.	The GUI is more standardized and consistent across different versions of windows
It is less prone to viruses and malware compared to windows	features like windows defender and frequent security patches
It provides powerful tools like terminal shells, package managers, and configuration files for advantage users.	Advanced administration is possible via the command prompt on powershell but is less commonly used by average users.

Linux is free to use with no cost for installation or licensing.

Windows typically requires a paid license, either with the purchase of the OS itself or bundled with a new PC.

Linux can run on older hardware efficiently due to its lighter resource requirements.

Windows tends to require more system resources.

Although many distributions offer GUI options for general tasks.

Windows is primarily GUI-based, though it does have a command-line interface.

Linux offers more customization options, allowing users to modify almost every aspect of the operating system.

Windows is less customizable as most configurations are locked down by Microsoft for a more standardized user experience.

Linux distributions typically have community support, but there are commercial support options available.

Windows has official support from Microsoft with regular updates, security patches, and a more structured support model.

Q:2 Explain Linux Architecture.

→ Linux Architecture refers to the structure of the operating system, which is organized into various layers and components that work together to provide a stable, flexible, and efficient environment for users and applications. The architecture can be broadly divided into the following key layers.

### 1. Hardware Layer :

Hardware refers to the physical components of the system such as the CPU, memory, hard disk, peripherals and network devices.

### 2. Kernel :

The Linux kernel is the core of the operating system and acts as a bridge between the hardware and the user-level applications. It is responsible for resource management, process management, system calls, and hardware abstraction.

### 3. System Library Layer :

System libraries are essential components that provide functions that programs can use to interact with the kernel without needing to directly invoke system calls.

#### 4. System utility layer:

The system utility layer consists of a collection of programs or utilities that perform system-level tasks such as file management, user management, and system diagnostics.

#### 5. shell:

The shell is a commandline interface through which users interact with the kernel by typing commands. The shell interprets that user's input and communicates with the kernel to perform the desired tasks.

#### 6. User space:

User space refers to the area in memory where user-level applications run. These applications cannot directly access hardware or kernel resources.

#### 7. File system:

Linux uses a hierarchical file system to organize files and directories.

This architecture ensures modularity and separation of concerns, allowing the system to remain flexible, efficient, and scalable.

## Assignment - 5

### \* short question

Q:1 what is device management?

⇒ Device management is the process of controlling and overseeing hardware devices within an operating system. It involves tasks like configuring, monitoring and providing access to devices through device drivers, handling resource allocation, and ensuring proper communication between software and hardware.

Q:2 what is disk space management?

⇒ Disk space management is the process of organizing, allocating and monitoring storage on a disk to optimize usage, prevent data loss, and ensure efficient performance. It involves tasks like partitioning, file system management, and cleaning up unnecessary files.

Q:3 Explain disk Scheduling

⇒ Disk scheduling is the process of determining the order in which disk I/O requests are served by the operating system. The goal is to minimize disk seek time and improve

overall performance. Common algorithms includes first come first serve, shortest seek time first (SSSTF) and SCAN.

## \* Long question :

Q1 Explain system configuration service of Linux.

⇒ Key elements of system configuration in Linux include:

### 1. Configuration Files:

Linux uses plain text configuration files to manage system settings such as networking configurations, user accounts, and system services.

### 2. System Init Initialization:

The boot process is managed by configuration files, like GRUB and init systems, which determine the services to start and their order.

### 3. Package Management:

Linux distributions use package managers to install and configure software. These tools help configure system software and manage dependencies.

### 4. Graphical configuration Tools:

Some Linux distributions offer graphical configuration utilities, such as YaST in openSUSE or GNOME Control Center, which provide user-friendly

interfaces to adjust settings like network preferences, display settings, and user accounts.

#### 5. CLI Tools :

command line tools like hostnamectl for setting the system's hostname, timedatectl for configuring system time and timezone, and for modifying kernel parameters, are all part of the configuration tools available for managing the Linux system.

#### 6. Network Configuration :

configuration of network interfaces can be managed through network configuration files or utilities like on network manager daemons.

#### 7. System Monitoring and Logging :

system monitoring tools like top, htop, and dmesg help monitor system performance and behavior. Logs in also help track system events, and configuration changes can be logged there.

#### 8. User and Group Management :

Tools like and are used to configure user accounts and groups. These tools modify configuration files such as .

Q2

## Explain Linked Allocation

→ Linked allocation is a method of file storage in which each file is divided into blocks, and each block contains a pointer to the next block. In the sequence the blocks are not stored in contiguous locations on the disk; instead, they may be scattered across different locations.

Here's how it works:

- When a file is created, it is broken into fixed-size blocks.
- The first block contains the actual data and a pointer to the next block.
- Each subsequent block contains part of the file's data and a pointer to the next block in the file, continuing until the last block, which contains a null pointer to signify the end of the file.

Advantages:

1. Dynamic file size:

Files can grow or shrink

easily as new blocks can be allocated as needed without needing to move other files or reallocate space.

## 2. No external fragmentation :

since blocks can be scattered across the disk, the system does not suffer from fragmentation issues typically found with contiguous allocation.

### Disadvantages :

#### 1. slow access time :

Accessing a file requires following the chain of pointers, which can be time-consuming, especially for large files.

#### 2. overhead :

If any block in the chain is damaged or lost, the entire file can become corrupted or lost.

In summary, linked allocation is efficient in terms of space usage but comes with trade-offs in performance for file access.