Linux Assignment

1. What is Linux?

* Linux is an open-source, Unix-like operating system kernel that serves as the foundation for a wide variety of operating systems called Linux distributions (or "distros"). It was originally created by Linus Torvalds in 1991.
* Benefits of Linux:

1. Free and open source
2. Customizable
3. Secure and stable
4. Active community support
5. Good for developers, system admins, and privacy-conscious users
6. What is the difference between Hard Link & Soft Link?

* The difference between a Hard Link and a Soft Link (Symbolic Link) in Linux lies in how they reference files and how they behave when the original file is modified or deleted.
* A Hard Link is a direct reference (pointer) to the same inode (data on disk) as the original file.

Key Features:

1. Both the original file and the hard link share the same inode number.
2. If you delete the original file, the hard link still works (data remains).
3. Changes to the contents of one appear in the other—they are essentially the same file.
4. Cannot link directories (except by root in special cases).
5. Cannot cross file systems or partitions.

* A Soft Link is more like a shortcut or pointer to the original file path, not the file's data.

Key Features:

1. Has a different inode from the original file.
2. If the original file is deleted, the soft link becomes a broken link (dangling).
3. Can link to directories.
4. Can cross file systems or partitions.
5. Often used for shortcuts or aliases.
6. What is a Kernel in Linux?

* In Linux, the kernel is the core component of the operating system. It acts as a bridge between the system's hardware and the software (applications and services). The kernel is responsible for managing system resources and ensuring smooth operation of all processes.
* Functions of the Linux kernel:

| Function | Description |
| --- | --- |
| Process Management | Controls which processes run, for how long, and manages multitasking. |
| Memory Management | Allocates and frees memory for programs. Handles virtual memory and paging. |
| Device Drivers | Talks to hardware devices like keyboards, disks, and network cards. |
| System Calls | Provides an interface for applications to request services (e.g., read a file). |
| File System Management | Manages data storage and retrieval on disk. Supports many file systems like ext4, XFS, etc. |
| Networking | Handles communication over networks (e.g., via TCP/IP). |

1. How do you create a user account?

* In Linux, you can create a new user account using the useradd or adduser command
* Example:

Basic Command to Create a User: sudo useradd <username>

Create a User with a Home Directory: sudo useradd -m <username>

Add User to a Group: sudo usermod -aG sudo <username>

Using adduser (Debian/Ubuntu): sudo adduser <username>

1. What is the ‘grep’ command used for in Linux?

* The grep command in Linux is used to search for text patterns within files or input. It's one of the most powerful and commonly used tools for text processing and searching.
* GREP stands for = Global Regular Expression Print
* Usage: grep "pattern" filename

1. Step1: Create user p1

Step2: He should be part of 3 groups g1,g2,g3.

Step3: Whenever he creates a file automatically in the group section of file grp g1 should come.

* Step 1:

sudo useradd -m p1

* Step 2:

sudo groupadd g1

sudo groupadd g2

sudo groupadd g3

sudo usermod -aG g1,g2,g3 p1

groups p1

* Step 3:

sudo usermod -g g1 p1

1. Step1: Create directory /tmp/bg as root user and create files inside it.

Step2: “abhi” should be the owner of the directory. He should be able to create files and delete files inside the directory and also he should be able to add content to all files inside the directory.

* Step 1:

sudo mkdir /tmp/bg

sudo touch /tmp/bg/file1 /tmp/bg/file2

* Step 2:

sudo useradd -m abhi

sudo chown -R abhi /tmp/bg

* Step 3:

sudo chmod u+rwx /tmp/bg

sudo chmod u+rw /tmp/bg/\*

1. You suspect that a particular process is consuming excessive CPU resources on your Linux server. How would you identify and terminate this process?

* Step 1: Identify the High-CPU Process

top

Press P to sort by CPU usage (descending).

Look for the process with the highest %CPU.

* Step 2: Terminate the Process

sudo kill <PID>

* Step 3: Confirm It's Gone

ps -p <PID>