Assignment Linux

1. **What is Linux?**

Answer - Linux is an open-source operating system based on the Unix architecture. It is widely used for servers, desktops, mobile devices, and embedded systems due to its flexibility, security, and stability. Linux is known for being free and customizable, with many distributions (distros) like Ubuntu, Fedora, and Debian.

2. **What is the difference between Hard Link & Soft Link?**

Answer- The key differences between a Hard Link and a Soft Link (Symbolic Link) are:

- Hard Link:

- Points directly to the file's data on the disk.
- Both the original file and hard link share the same inode.
- If the original file is deleted, the hard link still works as it points to the same data.

- Soft Link (Symbolic Link):

- Points to the file's path, not the actual data.
- Has a different inode from the original file.
- If the original file is deleted, the soft link becomes broken (invalid).

3. **What is a kernel in Linux?**

Answer- The kernel in Linux is the core part of the operating system that manages system resources and communication between hardware and software. It controls processes, memory, device drivers, and system security, acting as a bridge between applications and the hardware. The Linux kernel is known for its efficiency, stability, and flexibility.

4. **How do you create a user account?**

Answer- To create a user account in Linux, you can use the `useradd` command followed by the username. Here's the basic syntax:

bash

sudo useradd <username>

To set a password for the new user, use:

bash

sudo passwd <username>

For example:

bash

sudo useradd john

sudo passwd john

This will create a user account named "john" and prompt you to set a password for the user.

5. **What is the 'grep' command used for in Linux?**

Answer - The grep command in Linux is used for searching and filtering text based on patterns. It stands for "Global Regular Expression Print." It allows you to search for specific patterns within files or input provided to it.

grep is very powerful for text processing, especially when combined with other commands in pipelines.

Basic Usage

grep 'pattern' filename.

6. **1. Step1 : Create user p1**
   2.Step2: He should be part of 3 groups g1,g2,g3.
   3.Step3: whenever he creates a file automatically in the group section of file grp g1 should come.

Answer- To achieve the tasks you've outlined on a Linux system, follow these steps:

Step 1: Create User `p1`

To create a user named `p1`, use the following command:

bash

sudo useradd p1

Then set a password for the user:

bash

sudo passwd p1

Step 2: Add User `p1` to Groups `g1`, `g2`, and `g3`

First, create the groups if they don't already exist:

bash

sudo groupadd g1

sudo groupadd g2

sudo groupadd g3

Add the user `p1` to these groups

bash

sudo usermod -aG g1,g2,g3 p1

Step 3: Set the Default Group for New Files

To ensure that new files created by `p1` have `g1` as their group, you need to set the `SGID` (Set Group ID) bit on the directory where `p1` will be creating files. This will make new files created in that directory inherit the group of the directory, which should be `g1` in this case.

1. Create a Directory (if not already existing):

bash

sudo mkdir /home/p1/shared

2. Change the Group of the Directory to `g1`:

bash

sudo chown :g1 /home/p1/shared

3. Set the SGID Bit on the Directory:

bash

sudo chmod g+s /home/p1/shared

4. Verify the Directory Permissions:

Check that the SGID bit is set correctly

bash

ls -ld /home/p1/shared

The permissions should show `rwxrws---` (where `s` indicates the SGID bit).

With these steps, any files created by `p1` in the `/home/p1/shared` directory will automatically have `g1` as their group. Adjust the directory path as necessary for your environment.

7. **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.

Answer- To accomplish the tasks, follow these steps:

Step 1: Create the Directory and File

1. Create the Directory `/tmp/bg` as the root user:

bash

sudo mkdir /tmp/bg

2. Create Files Inside the Directory:

bash

sudo touch /tmp/bg/file1.txt

sudo touch /tmp/bg/file2.txt

Step 2: Change Ownership and Set Permissions for User `abhi`

1. Change the Ownership of the Directory to the user `abhi`:

bash

sudo chown abhi:abhi /tmp/bg

2. Ensure User `abhi` Can Create, Delete, and Modify Files:

- By default, if `abhi` is the owner of the directory, they will have permissions to create, delete, and modify files within `/tmp/bg`.

- To make sure `abhi` can add and delete files as well as modify them, ensure the directory has the correct permissions:

bash

sudo chmod 755 /tmp/bg

- Explanation:

- `7` gives the owner (abhi) read, write, and execute permissions.

- `5` gives the group and others read and execute permissions.

Verify Permissions

1. Check Ownership and Permissions:

bash

ls -ld /tmp/bg

The output should indicate that `abhi` is the owner of the directory, and the permissions should allow `abhi` to read, write, and execute.

2. Verify File Creation and Modification:

Switch to the `abhi` user and attempt to create, delete, and modify files:

bash

su - abhi

cd /tmp/bg

touch newfile.txt

echo "Test content" > newfile.txt

rm newfile.txt

These steps ensure that user `abhi` has full control over the `/tmp/bg` directory and its contents.

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

Answer- To identify and terminate a process that is consuming excessive CPU resources on a Linux server, follow these steps:

1. Identify the Process

Using `top` Command

1. Run `top` to get a dynamic, real-time view of system processes:

bash

top

2. Sort by CPU Usage:

- Press `P` (uppercase) to sort processes by CPU usage.

- Look for processes at the top of the list that are consuming a large percentage of CPU.

2. Terminate the Process

Once you have identified the process and its PID (Process ID), you can terminate it.

Using `kill` Command

1. Terminate Gracefully:

bash

sudo kill <PID>

Replace `<PID>` with the actual process ID.

2. Force Termination (if the process doesn't terminate gracefully):

bash

sudo kill -9 <PID>

3. Verify Termination:

Check that the process has been terminated by running:

bash

ps -p <PID>