LINUX

1. What is linux?

- Linux is a free, open-source operating system—the software that manages a computer's hardware and lets you run programs
- Linux is like Windows or macOS
- It's open source (anyone can view, modify, and share the code)
- It's highly customizable
- It's widely used on servers, phones, supercomputers, and embedded devices

2. What is the difference between hard link & soft link?

Hard Link

- A hard link is another filename that points to the same inode (file data).

Key points**:**

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- Shares the same inode number as the original file
- Both names are equal; no "original" vs "copy"
- File data remains until all hard links are deletedCannot link to directories (normally)
- Cannot cross different file systems

Soft Link (Symbolic Link)

- A soft link is a special file that stores the path to another file.

Key points**:**

- Has a different inode
- Acts like a shortcut
- Can link to directories
- Can cross file systems
- Becomes broken if the target is deleted or move

3. What is a kernel in linux?

- In Linux, the kernel is the core part of the operating system that directly manages the computer's hardware and system resources.
- The Linux kernel acts as a bridge between hardware and software.

What the Linux kernel does

- Manages processes (running programs)
- Manages memory (RAM and virtual memory)
- Controls hardware via device drivers
- Handles files and file systems
- Enforces security and permissions
- Provides system calls for application

4.How do you create a user account?

-Create the user

sudo adduser username

- Ask you to set a password
    - sudo useradd -m username
    - sudo passwd username
    - sudo usermod -aG sudo username
    - Check the account
    - id username

5. What is the ‘grep’ command used for in linux?

-In Linux, the grep command is used to search for text patterns inside files or command output.

grep scans input line by line and prints the lines that match a given pattern.

- Search in a file(grep "root" /etc/passwd)
- Lines ending with (grep "\.com$" file.txt)
- Lines containing “cat” or “dog”(grep "cat\|dog" file.txt)
- Lines with a digit(grep -P "\d" file.txt)

6. 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

```
sudo groupadd g2
sudo groupadd g3
[sudo] password for rekh:
rekh@DESKTOP-EB8JOHD:~$ sudo useradd -m -g g1 -G g2,g3 -s /bin/bash p1
sudo passwd p1
New password:
Retype new password:
passwd: password updated successfully
rekh@DESKTOP-EB8JOHD:~$ sudo mkdir /shared
rekh@DESKTOP-EB8JOHD:~$ sudo chown root:g1 /shared
rekh@DESKTOP-EB8JOHD:~$ sudo chmod 2770 /shared
rekh@DESKTOP-EB8JOHD:~$ id p1
uid=1005(p1) gid=1005(g1) groups=1005(g1),1006(g2),1007(g3)
rekh@DESKTOP-EB8JOHD:~$ su - p1
Password:
Welcome to Ubuntu 24.04.1 LTS (GNU/Linux 6.6.87.2-microsoft-standard-WSL2 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/pro

 System information as of Fri Jan  9 16:16:58 UTC 2026

  System load:  0.24               Processes:             35
  Usage of /:   0.2% of 1006.85GB  Users logged in:       1
  Memory usage: 9%                 IPv4 address for eth0: 172.21.24.107
  Swap usage:   0%


This message is shown once a day. To disable it please create the
/home/p1/.hushlogin file.
p1@DESKTOP-EB8JOHD:~$ touch testfile
p1@DESKTOP-EB8JOHD:~$ ls -l testfile
-rw-r--r-- 1 p1 g1 0 Jan  9 16:17 testfile
p1@DESKTOP-EB8JOHD:~$ touch testfile
```

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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.

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

- As root user, create the directory /tmp/bg:

- mkdir /tmp/bg

- Create some files inside the directory:

- touch /tmp/bg/file1
- touch/tmp/bg/file2
- touch /tmp/bg/file3

Step 2: Change ownership of the directory to user "abhi"

- Change the ownership of the directory/tmp/bg to user "abhi":

- chown abhi abhi/tmp/bg

- This will change the owner and group of the directory to "abhi".

Step 3: Set permissions for user "abhi"

- Set the permissions for user "abhi" to allow him to create. delete. and modifv files inside the directory:
- chmod 700/tmp/bg

- This will give user "abhi" full permissions (read, write, execute) on the directory.

Step 4: Verify the permissions

- Verify that user "abhi" has the correct permissions:

- ls -ld/tmp/bg

- This should show that user "abhi" is the owner of the directory and has full permissions.

Step 5: Test the permissions

- Log in as user "abhi" and test the permissions:

- touch/tmp/bg/newfile
- This should allow user "abhi" to create a new file inside the directory.
- rm/tmp/bg/newfile

- This should allow user "abhi" to delete the file.
- echo "Hello World" > /tmp/bg/file1

- This should allow user "abhi" to add content to an existing file

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

- To identify and terminate a process consuming excessive CPU resources on a Linux server:

Step 1: Identify the proces

- Open a terminal and run the top command to display real-time process information:top
- Press 1 to toggle display of individual CPU cores.
- Look for the process with the highest %CPU value.

Step 2: Verify the process

- Run the ps command with the eo option to display detailed process information:
- ps -eo pid,ppid, cmd, %cpu, %mem -sort=-%cpu
- This shows processes sorted by CPU usage in descending order.

Step 3:Terminate the process

- 1. Once you've identified the process ID (PID), use the kill command to terminate it
- kill <PID>
- Replace <PID> with the actual process ID.
- Optional: Force termination
- If the process doesn't respond to the kill command, use the -9 option to force termination:
- kill -9 <PID>
- *Alternative: Use htop*
- htop is an interactive process viewer that provides a more user-friendly interface.
- htop
- Use the arrow keys to navigate, and press F9 to kill a process