LINUX PROGRAMMING

ASSIGNMENT-6

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1. Which command is used to list the contents of a directory? Justify with proper example.

A.

In Linux, the command to list the contents of a directory is the ls command.

- 'ls' means List directory contents.
- It refers to the command's usage of listing the file and directory names in the current directory or in a specified directory.
- By default, ls will list the contents of the current working directory.

The ls command has a variety of options to customize its output:

- -l - Long listing format.
- -a - Include hidden files.
- -h - Human-readable sizes.
- -t - Sort by modification time.
- -r - Reverse order while sorting.
- -R - List subdirectories recursively.
- -S - Sort by file size.

The ls command is the standard and most used Linux command to list directory contents. It provides flexible options to view files in different formats, including detailed views, hidden files, and sorted listings.

```
saidatta@Saidatta:~$ ls
bashrc  Desktop    Music     python.py                 students
cupp    Documents  Pictures  snap                      Templates
demo    Downloads  Public    SocialMediaHackingToolkit  Videos
saidatta@Saidatta:~$ ls -l
total 60
-rw-rw-r-- 1 saidatta saidatta    1 Sep 16 16:14 bashrc
drwxrwxr-x 4 saidatta saidatta 4096 Sep  9 11:07 cupp
drwxrwxr-x 2 saidatta saidatta 4096 Sep 18 14:38 demo
drwxr-xr-x 3 saidatta saidatta 4096 Aug 28 14:18 Desktop
drwxr-xr-x 2 saidatta saidatta 4096 Sep 18 18:40 Documents
drwxr-xr-x 3 saidatta saidatta 4096 Oct 10 14:15 Downloads
drwxr-xr-x 2 saidatta saidatta 4096 Aug 25 14:52 Music
drwxr-xr-x 3 saidatta saidatta 4096 Sep 21 21:12 Pictures
drwxr-xr-x 2 saidatta saidatta 4096 Aug 25 14:52 Public
drwxrwxr-x 2 saidatta saidatta 4096 Aug 28 14:33 python.py
drwx------ 6 saidatta saidatta 4096 Sep 11 14:03 snap
drwxrwxr-x 8 saidatta saidatta 4096 Sep  8 21:50 SocialMediaHackingToolkit
drwxrwxr-x 2 saidatta saidatta 4096 Oct 10 14:11 students
drwxr-xr-x 2 saidatta saidatta 4096 Aug 25 14:52 Templates
drwxr-xr-x 2 saidatta saidatta 4096 Aug 25 14:52 Videos
saidatta@Saidatta:~$ ls -a
.               cupp       Music                     .ssh
..              demo       Pictures                  students
.bash_history   Desktop    .profile                  .sudo_as_admin_successful
.bash_logout    Documents  Public                    Templates
.bashrc         Downloads  .python_history           Videos
bashrc          .gnupg     python.py
.cache          .lesshst   snap
.config         .local     SocialMediaHackingToolkit
saidatta@Saidatta:~$
```

2. Write the command to create a new directory named 123test_dir?

A.

To create a new directory with the name 123test_dir in Linux, you will want to use the command mkdir.

- mkdir --- means make directory.
- 123test_dir --- is the name of the new directory you want to create.

This command will create a new folder with the name 123test_dir in the current working directory.

```
saidatta@Saidatta:~$ mkdir 123test_dr
saidatta@Saidatta:~$ ls
123test_dr  bashrc  cupp  demo  Desktop  Documents  Downloads  Music  Pictures
Public  python.py  snap  SocialMediaHackingToolkit  students  Templates  Videos
saidatta@Saidatta:~$
```

3. What is the purpose of the sed command? Justify with proper example.

A.

sed stands for Stream Editor. It processes text line by line and can perform operations like find-and-replace, deletion, insertion, or printing. It's super useful for quickly editing text in files without opening them manually.

- Example: Replace all occurrences of "Linux" with "Unix" in file.txt:
- sed 's/Linux/Unix/g' file.txt
- Here s means substitute, and g means "replace globally in each line."
- Another example: Delete line 3 from a file:
- sed '3d' file.txt

So, sed is basically like a robot editor—you tell it the rule, and it applies it automatically across the file.

4. Which distinct command is used to display one-line descriptions of any commands?

A.

The command that will present a one-line description of any command in Linux is the whatis command.

- The whatis command performs a search in the manual (man) database for that command.
- It shows a one-line summary of what that command will do.
- This can be useful when you just want an easy understanding of a command and don't want to read the entire manual page.

```
saidatta@Saidatta:~$ whatis pwd
pwd (1)              - print name of current/working directory
saidatta@Saidatta:~$
```

5. Write the command to create an empty file named "notes.txt"?

A.

To create an empty file named notes.txt in Linux, you can use the touch command.

- The touch command is used to change file timestamps or create an empty file if it doesn't exist.
- It's often used to create placeholder files or update timestamps for build systems.

```
saidatta@Saidatta:~/students$ ls
file.txt  output.txt  stu1.txt  stu2.txt  stu3.txt
saidatta@Saidatta:~/students$ touch notes.txt
saidatta@Saidatta:~/students$ ls
file.txt  notes.txt  output.txt  stu1.txt  stu2.txt  stu3.txt
saidatta@Saidatta:~/students$
```

6. Differentiate between grep and awk commands with an example?

A.

grep Command:

- Used to search for specific patterns or words in a file.
- Filters all lines that match a pattern.
- A simple search utility.
- Works on full lines matching the pattern.
- Syntex: grep [pattern] [file name].
- It will give you the lines containing the pattern.

awk Command:

- Applicable for pattern matching, data processing, and reporting.
- Can perform searching, extracting, formatting, or calculations on the data.
- A real text processing language.
- Works on fields (columns) on each line of text.
- Syntex: awk ‘pattern (action)’ [file name]
- Can produce formatted output as well as perform mathematical or logical operations.

7. Write the command to give read, write, and execute permission to the owner of a file script.sh.?

A.

We can use ‘chmod’ command to change file permission.

In Linux, file permissions can also be represented using **numbers (octal values)** instead of letters.

[permission]	[symbol]	[value]
read	r	4
write	w	2
execute	x	1
No permission	-	0

Let's break down:

So chmod 700 means:

- User ---- rwx so 4+2+1 = 7.
- Group ---- 0.
- Others ---- 0.
- Owner --- read, write, execute.
- Group --- no permission.
- Others --- no permission.

```
saidatta@Saidatta:~/students$ ls
file.txt  notes.txt  output.txt  script.sh  stu1.txt  stu2.txt  stu3.txt
saidatta@Saidatta:~/students$ chmod 700 script.sh
saidatta@Saidatta:~/students$ ls -l script.sh
-rwx------ 1 saidatta saidatta 0 Oct 10 14:26 script.sh
saidatta@Saidatta:~/students$
```

8. How is chown different from chgrp? Give one example for each.

A.

‘chown’: Used to **change the owner** (user) of a file or directory.

- Changes the **owner** of the file report.txt to **user alice**.
- The group ownership remains the same.

```
saidatta@Saidatta:~/students$ ls -l script.sh
-rwx------ 1 kaushal saidatta 0 Oct 10 14:26 script.sh
saidatta@Saidatta:~/students$
```

'chgrp': Used to **change the group ownership** of a file or directory.

- Changes the **group ownership** of report.txt to **staff**.
- The file's owner remains unchanged.

```
saidatta@Saidatta:~/students$ ls -l script.sh
-rwx------ 1 kaushal vishwas 0 Oct 10 14:26 script.sh
saidatta@Saidatta:~/students$
```

9. A user complains that they cannot execute a file even though it exists in their directory. How would you troubleshoot this using ls -l, chmod, and whoami?

A.

- Run ls -l filename → check permissions. If execute (x) is missing, that explains it.
- Use whoami → see which user is running the command. If the file is owned by someone else and "others" have no execute permission, that user can't run it.
- Fix with chmod +x filename → this adds execute permission.

So, the issue usually comes down to permission bits and ownership mismatch.

10. Design a command pipeline to: find all .log files modified in the last 2 days in /var/log, display them on screen, and save the results into a file recent_logs.txt using tee command.

A.

Command used: find /var/log -name "*.log" -mtime -2 | tee recent_logs.txt

- **find /var/log** --- searches inside the /var/log directory.
- **-name "*.log"** --- finds files whose names end with .log.
- **-mtime -2** --- selects files **modified within the last 2 days**.
- **| (pipe)** --- sends the output of one command to the next.

- **tee recent_logs.txt** --- displays the result on screen **and** saves it to the file recent_logs.txt.