

[590029302]Exp[3]_ScriptLog

Experiment 3: Linux File Manipulation and System Manipulation I

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Aim:

- To practice Linux file manipulation commands like `touch`, `cp`, `mv`, `rm`, `cat`, `less`, `head`, `tail`.
- To explore file permissions and ownership with `ls -l`, `chmod`, `chown`, and `chgrp`.
- To search and filter files using `find` and `grep`.
- To understand archiving and compression with `tar`, `gzip`, and `gunzip`.
- To create and manage links (`ln`) for both hard and symbolic links.

Requirements

- A Linux machine with bash shell (Ubuntu/Fedora/other).
- User privileges to create, modify, and delete files and directories.
- Access to system utilities like `tar`, `gzip`, `grep`, and `find`.

Theory

Linux file management involves creating, copying, moving, removing, and viewing files. File permissions and ownership ensure secure access control. Searching and filtering tools like `grep` and `find` help locate information efficiently. Archiving with `tar` and compression with `gzip` reduce storage usage and simplify file transfer. Links (`ln`) allow multiple references to the same file data (hard links) or path references (symbolic links).

Procedure & Observations

Exercise 1: Creating and Managing Files

Task Statement:

Create files and manage timestamps using `touch`.

Command(s):

```
touch newfile.txt
touch file1.txt file2.txt file3.txt
touch -t 202401151430 dated_file.txt
```

Output:

```
tanmay@DESKTOP-350DD6R x + v
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ touch -t 2024
01151430 dated_file.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ |
```

```
tanmay@DESKTOP-350DD6R x + v
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ touch f1.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ touch f2.txt
f2.txt f3.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ ls
'[590029302]Exp[3]_ScriptLog.md' f1.txt f2.txt f3.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ |
```

Exercise 2: Copying, Moving, and Deleting Files

Task Statement:

Use `cp`, `mv`, and `rm` to copy, rename, move, and delete files and directories.

Command(s):

```
cp document.txt backup_document.txt
mv oldname.txt newname.txt
```

```
rm unwanted_file.txt
rm -r old_directory/
```

Output:

```
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ mv f1.txt file1.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ ls
'[590029302]Exp[3]_ScriptLog.md'  f2.txt  file1.txt
dated_file.txt                  f3.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ echo "Hello this is for file 1" >> file1.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ cat file1.txt
Hello this is for file 1
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ cp file1.txt f2.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ cat f2.txt
Hello this is for file 1
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ rm f3.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$
```

Exercise 3: Viewing File Contents

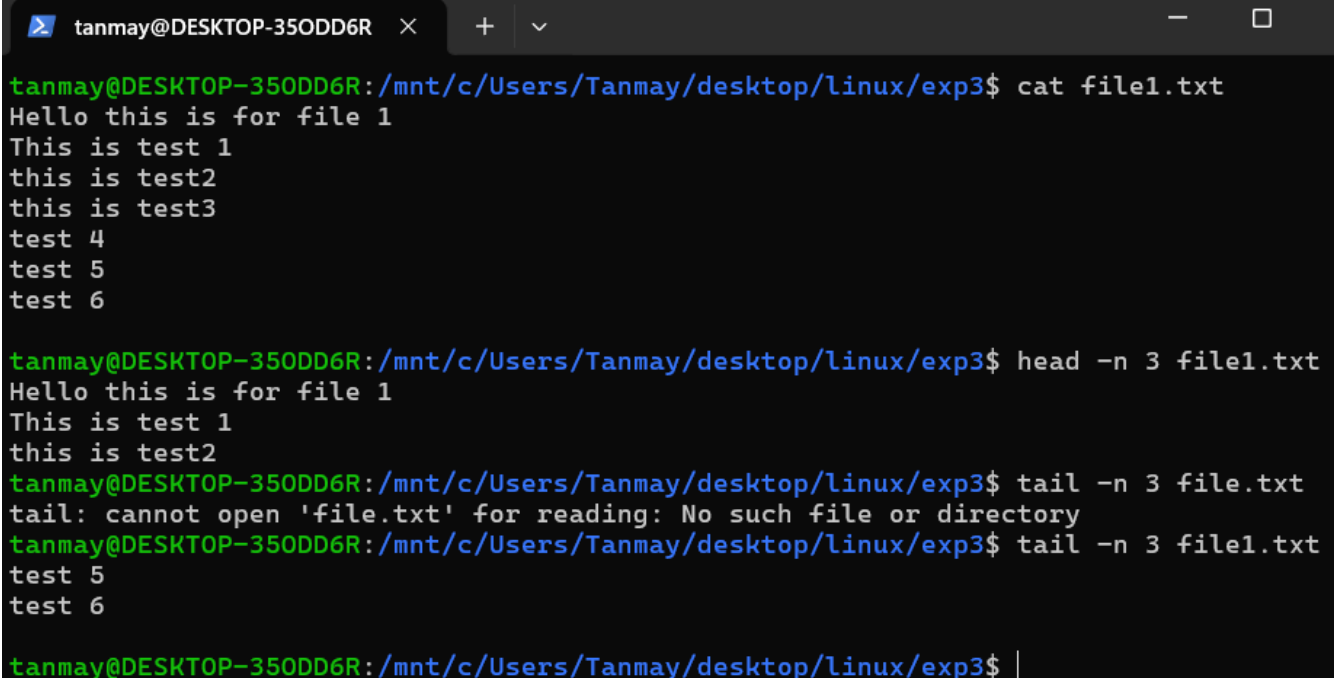
Task Statement:

Display file contents using `cat`, `less`, `head`, and `tail`.

Command(s):

```
cat filename.txt
head -n 5 filename.txt
tail -n 20 filename.txt
```

Output:



```
tanmay@DESKTOP-350DD6R x + v - □ ×
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ cat file1.txt
Hello this is for file 1
This is test 1
this is test2
this is test3
test 4
test 5
test 6

tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ head -n 3 file1.txt
Hello this is for file 1
This is test 1
this is test2

tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ tail -n 3 file.txt
tail: cannot open 'file.txt' for reading: No such file or directory
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ tail -n 3 file1.txt
test 5
test 6

tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ |
```

Exercise 4: File Permissions and Ownership

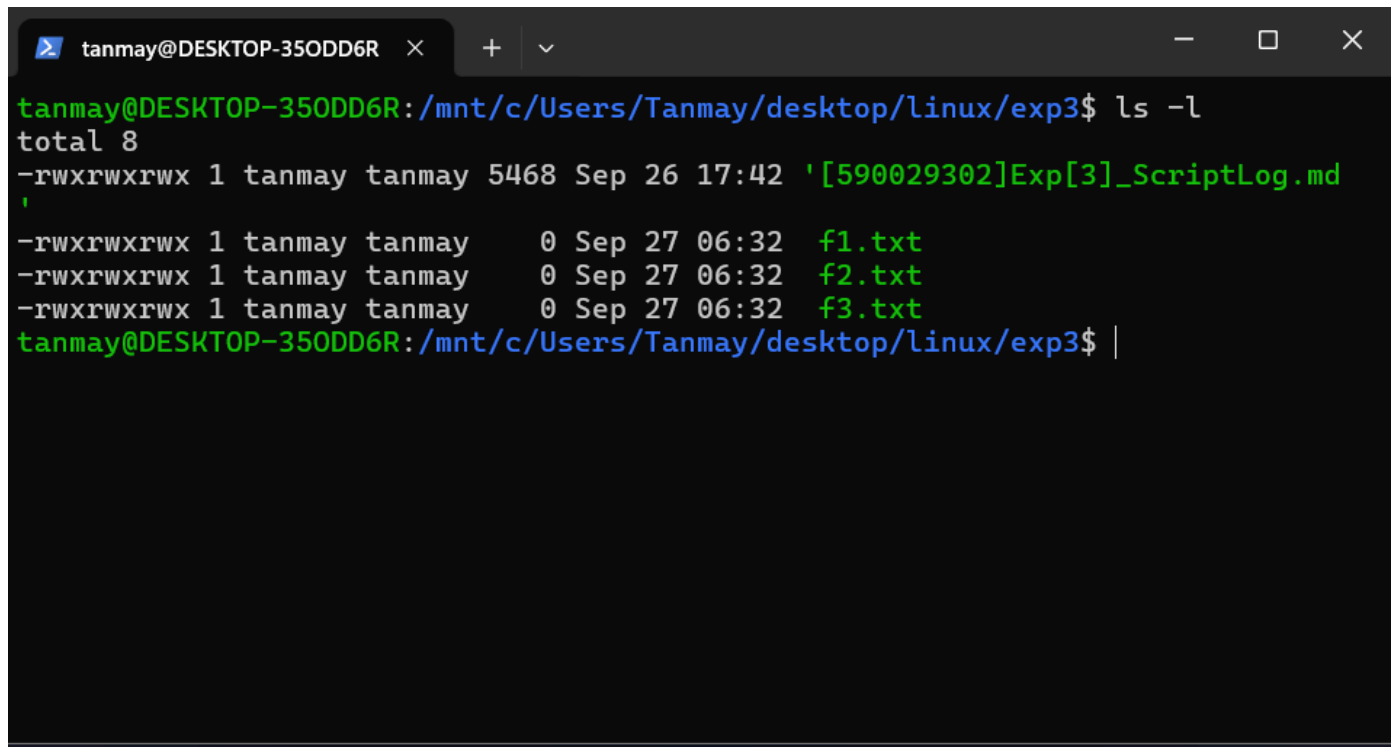
Task Statement:

Explore file permissions and ownership with `ls -l`, `chmod`, `chown`, and `chgrp`.

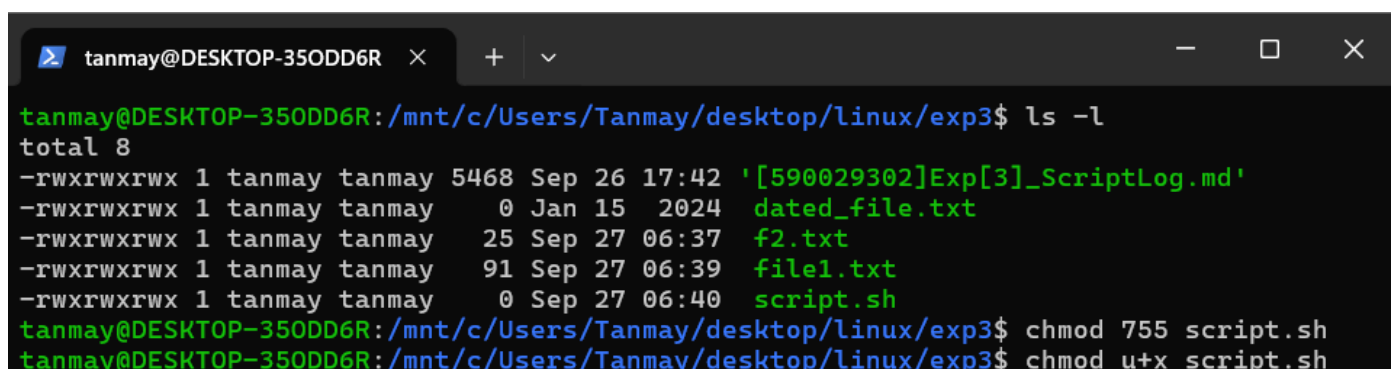
Command(s):

```
ls -l
chmod 755 script.sh
chmod u+x script.sh
```

Output:



```
tanmay@DESKTOP-350DD6R x + v
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ ls -l
total 8
-rwxrwxrwx 1 tanmay tanmay 5468 Sep 26 17:42 '[590029302]Exp[3]_ScriptLog.md'
-rwxrwxrwx 1 tanmay tanmay 0 Sep 27 06:32 f1.txt
-rwxrwxrwx 1 tanmay tanmay 0 Sep 27 06:32 f2.txt
-rwxrwxrwx 1 tanmay tanmay 0 Sep 27 06:32 f3.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ |
```



```
tanmay@DESKTOP-350DD6R x + v
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ ls -l
total 8
-rwxrwxrwx 1 tanmay tanmay 5468 Sep 26 17:42 '[590029302]Exp[3]_ScriptLog.md'
-rwxrwxrwx 1 tanmay tanmay 0 Jan 15 2024 dated_file.txt
-rwxrwxrwx 1 tanmay tanmay 25 Sep 27 06:37 f2.txt
-rwxrwxrwx 1 tanmay tanmay 91 Sep 27 06:39 file1.txt
-rwxrwxrwx 1 tanmay tanmay 0 Sep 27 06:40 script.sh
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ chmod 755 script.sh
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ chmod u+x script.sh
```

Exercise 5: File Searching with `find`

Task Statement:

Search files by name, type, size, and permissions using `find`.

Command(s):

```
find /home -name "*.txt"
find /home -type f -size +100M
find /etc -name "*conf*"
find /tmp -type f -empty -delete
```

Output:

```
tanmay@DESKTOP-350DD6R x + v
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ find /home -name "*.txt"
/home/tanmay/LINUX/day3/historyall_ls.txt
/home/tanmay/LINUX/format.txt
/home/tanmay/LINUX/history40.txt
/home/tanmay/LINUX/Study Material/Linux Labs.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ find /home -type f -size +1M
/home/tanmay/LINUX/.git/objects/b7/bb41624f9d251309aac22015cacfa3bb030513
/home/tanmay/LINUX/Study Material/001Linux File manipulation and system manager.pdf
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ find /etc -name "*conf*"
/etc/gtk-3.0/im-multipress.conf
/etc/dconf
/etc/sysctl.d/99-sysctl.conf
/etc/sysctl.d/10-zero-page.conf
/etc/sysctl.d/10-magic-sysrq.conf
/etc/sysctl.d/10-console-messages.conf
/etc/sysctl.d/10-kernel-hardening.conf
/etc/sysctl.d/10-ipv6-privacy.conf
/etc/sysctl.d/10-network-security.conf
/etc/sysctl.d/10-pttrace.conf
/etc/apparmor.d/abstractions/dconf
/etc/apparmor.d/usr.lib.snapd.snap-confine.real
/etc/apparmor.d/local/usr.lib.snapd.snap-confine.real
/etc/ldap/ldap.conf
/etc/ld.so.conf.d
/etc/ld.so.conf.d/x86_64-linux-gnu.conf
/etc/ld.so.conf.d/ld.wsl.conf
```

Exercise 6: Pattern Searching with `grep`

Task Statement:

Search for patterns in files using `grep`.

Command(s):

```
grep "error" /var/log/syslog
grep -i "Error" logfile.txt
grep -r "function" ~/code/
grep -n "TODO" *.txt
```

Output:

```
tanmay@DESKTOP-350DD6R x + v
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ touch logfile.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ grep "error" /var/log/syslog
Sep 25 15:35:00 DESKTOP-350DD6R systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (file watch) being skipped.
Sep 25 15:35:00 DESKTOP-350DD6R systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (timer based) being skipped.
Sep 26 20:46:55 DESKTOP-350DD6R systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (file watch) being skipped.
Sep 26 20:46:55 DESKTOP-350DD6R systemd[1]: Condition check resulted in Process error reports when automatic reporting is enabled (timer based) being skipped.
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ grep -i "Error" logfile.txt
```

Exercise 7: Archiving and Compression

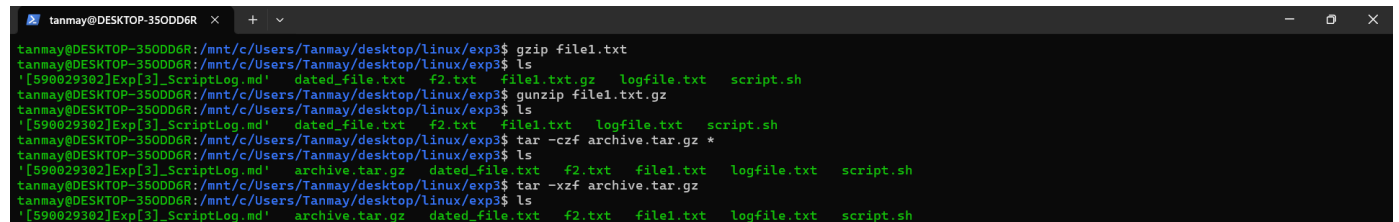
Task Statement:

Create and extract archives using `tar`, compress and decompress with `gzip`/`gunzip`.

Command(s):

```
tar -czf backup.tar.gz /home/user/documents
tar -xzf backup.tar.gz -C /restore/
gzip largefile.txt
gunzip largefile.txt.gz
```

Output:



```
tanmay@DESKTOP-350DD6R: /mnt/c/Users/Tanmay/desktop/linux/exp3$ gzip file1.txt
tanmay@DESKTOP-350DD6R: /mnt/c/Users/Tanmay/desktop/linux/exp3$ ls
'[590029302]Exp[3]_ScriptLog.md'  dated_file.txt  f2.txt  file1.txt.gz  logfile.txt  script.sh
tanmay@DESKTOP-350DD6R: /mnt/c/Users/Tanmay/desktop/linux/exp3$ gunzip file1.txt.gz
tanmay@DESKTOP-350DD6R: /mnt/c/Users/Tanmay/desktop/linux/exp3$ ls
'[590029302]Exp[3]_ScriptLog.md'  dated_file.txt  f2.txt  file1.txt  logfile.txt  script.sh
tanmay@DESKTOP-350DD6R: /mnt/c/Users/Tanmay/desktop/linux/exp3$ tar -czf archive.tar.gz *
tanmay@DESKTOP-350DD6R: /mnt/c/Users/Tanmay/desktop/linux/exp3$ ls
'[590029302]Exp[3]_ScriptLog.md'  archive.tar.gz  dated_file.txt  f2.txt  file1.txt  logfile.txt  script.sh
tanmay@DESKTOP-350DD6R: /mnt/c/Users/Tanmay/desktop/linux/exp3$ tar -xzf archive.tar.gz
tanmay@DESKTOP-350DD6R: /mnt/c/Users/Tanmay/desktop/linux/exp3$ ls
'[590029302]Exp[3]_ScriptLog.md'  archive.tar.gz  dated_file.txt  f2.txt  file1.txt  logfile.txt  script.sh
```

Exercise 8: Creating Links

Task Statement:

Create and test hard and symbolic links using `ln`.

Command(s):

```
echo "Hello" > original.txt
ln original.txt hardlink.txt
ln -s original.txt symlink.txt
ls -li original.txt hardlink.txt symlink.txt
```

Output:

```

tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ ln file1.txt hardlink_file1
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ ls -li
total 12
13792273858966789 -rwxrwxrwx 1 tanmay tanmay 5468 Sep 26 17:42 '[590029302]Exp[3]_ScriptLog.md'
1688849860557115 -rwxrwxrwx 1 tanmay tanmay 2247 Sep 27 06:54 archive.tar.gz
13229323905560606 -rwxrwxrwx 1 tanmay tanmay 0 Jan 15 2024 dated_file.txt
6755399441307308 -rwxrwxrwx 1 tanmay tanmay 25 Sep 27 06:37 f2.txt
5066549581083867 -rwxrwxrwx 2 tanmay tanmay 91 Sep 27 06:39 file1.txt
5066549581083867 -rwxrwxrwx 2 tanmay tanmay 91 Sep 27 06:39 hardlink_file1
21392098230036611 -rwxrwxrwx 1 tanmay tanmay 0 Sep 27 06:51 logfile.txt
2533274790687975 -rwxrwxrwx 1 tanmay tanmay 0 Sep 27 06:40 script.sh
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ ln -s file1.txt symlink_file1
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ ls -l
total 12
-rwxrwxrwx 1 tanmay tanmay 5468 Sep 26 17:42 '[590029302]Exp[3]_ScriptLog.md'
-rwxrwxrwx 1 tanmay tanmay 2247 Sep 27 06:54 archive.tar.gz
-rwxrwxrwx 1 tanmay tanmay 0 Jan 15 2024 dated_file.txt
-rwxrwxrwx 1 tanmay tanmay 25 Sep 27 06:37 f2.txt
-rwxrwxrwx 2 tanmay tanmay 91 Sep 27 06:39 file1.txt
-rwxrwxrwx 2 tanmay tanmay 91 Sep 27 06:39 hardlink_file1
-rwxrwxrwx 1 tanmay tanmay 0 Sep 27 06:51 logfile.txt
-rwxrwxrwx 1 tanmay tanmay 0 Sep 27 06:40 script.sh
lrwxrwxrwx 1 tanmay tanmay 9 Sep 27 06:56 symlink_file1 -> file1.txt
tanmay@DESKTOP-350DD6R:/mnt/c/Users/Tanmay/desktop/linux/exp3$ |

```

Result

- Successfully created, copied, moved, and deleted files.
- Practiced viewing file contents and monitoring logs.
- Explored file permissions and ownership management.
- Used `find` and `grep` to locate and filter data.
- Created archives and compressed files.
- Demonstrated both hard and symbolic links.

Challenges Faced & Learning Outcomes

- Challenge 1: Accidentally deleted files with `rm` without `-i`. Learned to use `rm -i` for safety.
- Challenge 2: Remembering numeric vs symbolic permissions in `chmod`. Fixed through repeated practice.

Learning:

- Gained practical skills with file manipulation and permission commands.
- Learned how to efficiently search files and patterns in Linux.
- Understood how to archive and compress files for better storage management.
- Understood differences between hard and symbolic links.

Conclusion

This experiment provided hands-on experience with core Linux file management, permissions, searching, archiving, and linking. These are foundational skills for effective Linux system administration and daily usage.