

[590023785]Exp3_Script\[590023785]Exp3_Scrip.md

Experiment 3: Linux File Manipulation and System Manipulation I

Name: Gayatri Bhatt Roll No.: 590023785 Date: 2025-09-23

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:

```
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# vim 3ex1
.sh
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# bash 3ex
1.sh
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# |
```

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:

```
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# vim 3ex2
.sh
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# bash 3ex
2.sh
cp: cannot stat 'document.txt': No such file or directory
mv: cannot stat 'oldname.txt': No such file or directory
rm: cannot remove 'unwanted_file.txt': No such file or directory
rm: cannot remove 'old_directory/': No such file or directory
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# |
```

Exercise 3: Viewing File Contents

Task Statement:

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

Command(s):

```
cat filename.txt
less /var/log/syslog
head -n 5 filename.txt
tail -n 20 filename.txt
tail -f /var/log/syslog
```

Output:

```
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# vim 3ex3.sh
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# bash 3ex3.sh
cat: filename.txt: No such file or directory
head: cannot open 'filename.txt' for reading: No such file or directory
tail: cannot open 'filename.txt' for reading: No such file or directory
2025-09-25T04:15:23.174634+00:00 LAPTOP-JAMRNMRP wsl-pro-service[177]: #033[37mDEBUG#033[0m Updated systemd status to "Not connected: waiting to retry"
2025-09-25T04:15:41.182497+00:00 LAPTOP-JAMRNMRP systemd-resolved[125]: Clock change detected. Flushing caches.
2025-09-25T04:16:11.794383+00:00 LAPTOP-JAMRNMRP systemd-resolved[125]: Clock change detected. Flushing caches.
2025-09-25T04:16:19.962988+00:00 LAPTOP-JAMRNMRP wsl-pro-service[177]: #033[36mINFO#033[0m Daemon: connecting to Windows Agent
2025-09-25T04:16:19.963389+00:00 LAPTOP-JAMRNMRP wsl-pro-service[177]: #033[37mDEBUG#033[0m Updated systemd status to "Connecting"
2025-09-25T04:16:19.963705+00:00 LAPTOP-JAMRNMRP wsl-pro-service[177]: #033[33mWARNING#033[0m Daemon: could not connect to Windows Agent: could not get address: could not read agent port file "/mnt/c/Users/GAYA1/.ubuntupro/.address": open /mnt/c/Users/GAYA1/.ubuntupro/.address: no such file or directory
2025-09-25T04:16:19.963842+00:00 LAPTOP-JAMRNMRP wsl-pro-service[177]: #033[36mINFO#033[0m Reconnecting to Windows host in 60 seconds
2025-09-25T04:16:19.963931+00:00 LAPTOP-JAMRNMRP wsl-pro-service[177]: #033[37mDEBUG#033[0m Updated systemd status to "Not connected: waiting to retry"
2025-09-25T04:16:42.235803+00:00 LAPTOP-JAMRNMRP systemd-resolved[125]: Clock change detected. Flushing caches.
2025-09-25T04:17:01.558374+00:00 LAPTOP-JAMRNMRP CRON[734]: (root) CMD (cd / && run-parts --report /etc/cron.hourly)
2025-09-25T04:17:12.631517+00:00 LAPTOP-JAMRNMRP systemd-resolved[125]: Clock change detected. Flushing caches.
^C
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# |
```

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
sudo chown newuser:newgroup file.txt
chgrp developers project.txt
```

Output:

```

root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# vim 3ex4.sh
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# bash 3ex4.sh
total 384
drwxrwxrwx 1 gayatri10 gayatri10 4096 Sep 22 19:38 100codes
-rwxrwxrwx 1 gayatri10 gayatri10 76 Sep 24 06:34 1ex1.sh
-rwxrwxrwx 1 gayatri10 gayatri10 34 Sep 24 06:35 1ex2.sh
-rwxrwxrwx 1 gayatri10 gayatri10 55 Sep 24 06:35 1ex3.sh
-rwxrwxrwx 1 gayatri10 gayatri10 33 Sep 24 06:38 1ex4.sh
-rwxrwxrwx 1 gayatri10 gayatri10 81 Sep 24 06:39 1ex5.sh
-rwxrwxrwx 1 gayatri10 gayatri10 57 Sep 24 06:40 1ex6.sh
-rwxrwxrwx 1 gayatri10 gayatri10 58 Sep 24 12:54 1exp1.sh
-rwxrwxrwx 1 gayatri10 gayatri10 18 Sep 24 12:55 1exp2.sh
-rwxrwxrwx 1 gayatri10 gayatri10 68 Sep 24 12:56 1exp3.sh
-rwxrwxrwx 1 gayatri10 gayatri10 56 Sep 24 12:57 1exp4.sh
-rwxrwxrwx 1 gayatri10 gayatri10 103 Sep 25 04:15 3ex1.sh
-rwxrwxrwx 1 gayatri10 gayatri10 117 Sep 25 04:16 3ex2.sh
-rwxrwxrwx 1 gayatri10 gayatri10 121 Sep 25 04:16 3ex3.sh
-rwxrwxrwx 1 gayatri10 gayatri10 124 Sep 25 04:17 3ex4.sh
-rwxrwxrwx 1 gayatri10 gayatri10 127 Sep 24 20:02 3ex5.sh
-rwxrwxrwx 1 gayatri10 gayatri10 117 Sep 24 20:03 3ex6.sh
-rwxrwxrwx 1 gayatri10 gayatri10 135 Sep 24 20:05 3ex7.sh
-rwxrwxrwx 1 gayatri10 gayatri10 145 Sep 24 20:06 3ex8.sh
-rwxrwxrwx 1 gayatri10 gayatri10 33 Sep 24 12:04 4ex1.sh
-rwxrwxrwx 1 gayatri10 gayatri10 126 Sep 24 12:05 4ex2.sh
-rwxrwxrwx 1 gayatri10 gayatri10 235 Sep 24 12:06 4ex3.sh
-rwxrwxrwx 1 gayatri10 gayatri10 163 Sep 24 12:06 4ex4.sh
-rwxrwxrwx 1 gayatri10 gayatri10 61 Sep 23 17:58 6ex1.sh
-rwxrwxrwx 1 gayatri10 gayatri10 79 Sep 23 18:34 6ex2.sh
-rwxrwxrwx 1 gayatri10 gayatri10 55 Sep 23 18:35 6ex3.sh
-rwxrwxrwx 1 gayatri10 gayatri10 277 Sep 23 18:40 6ex4.sh
-rwxrwxrwx 1 gayatri10 gayatri10 88 Sep 23 18:46 6ex5.sh
-rwxrwxrwx 1 gayatri10 gayatri10 201 Sep 23 18:47 6ex6.sh
-rwxrwxrwx 1 gayatri10 gayatri10 97 Sep 23 18:49 6ex7.sh
-rwxrwxrwx 1 gayatri10 gayatri10 151 Sep 24 07:07 8ex1.sh
-rwxrwxrwx 1 gayatri10 gayatri10 229 Sep 24 07:08 8ex2.sh
-rwxrwxrwx 1 gayatri10 gayatri10 146 Sep 24 08:15 8ex3.sh
-rwxrwxrwx 1 gayatri10 gayatri10 251 Sep 24 08:16 8ex4.sh
drwxrwxrwx 1 gayatri10 gayatri10 4096 Sep 24 13:05 Experiments
-rwxrwxrwx 1 gayatri10 gayatri10 131 Aug 27 12:51 HELLO.C

```

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:

```
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# vim 3ex5.sh
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# bash 3ex5.sh
/etc/fuse.conf
/etc/ucf.conf
/etc/netconfig
/etc/libaudit.conf
/etc/apt/auth.conf.d
/etc/apt/apt.conf.d
/etc/apt/apt.conf.d/70debconf
/etc/apt/apt.conf.d/20apt-esm-hook.conf
/etc/apt/apt.conf.d/20snapd.conf
/etc/python3/debian_config
/etc/nsswitch.conf
/etc/sudo.conf
/etc/wsl.conf
/etc/systemd/system.conf
/etc/systemd/networkd.conf
/etc/systemd/journald.conf
/etc/systemd/resolved.conf
/etc/systemd/timesyncd.conf
/etc/systemd/pstore.conf
/etc/systemd/system/cloud-config.target.wants
/etc/systemd/system/cloud-init.target.wants/cloud-config.service
/etc/systemd/user.conf
/etc/systemd/sleep.conf
/etc/systemd/user/sockets.target.wants/pk-debconf-helper.socket
/etc/systemd/logind.conf
/etc/rsyslog.d/50-default.conf
/etc/rsyslog.d/21-cloudinit.conf
/etc/security/limits.conf
/etc/security/sepermit.conf
/etc/security/capability.conf
/etc/security/pam_env.conf
/etc/security/pwhistory.conf
/etc/security/group.conf
/etc/security/time.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:

```

root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# vim 3ex6.sh
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# bash 3ex6.sh
2025-08-26T13:18:10.822756+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.path - Process error reports when automatic reporting is enabled (file watch)
was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-08-26T13:18:10.822818+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.timer - Process error reports when automatic reporting is enabled (timer base
d) was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-08-26T13:18:11.137624+00:00 LAPTOP-JAMRNMRP snapd[198]: helpers.go:159: error trying to compare the snap system key: system-key missing on disk
2025-08-29T10:49:16.272562+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.path - Process error reports when automatic reporting is enabled (file watch)
was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-08-29T10:49:16.272568+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.timer - Process error reports when automatic reporting is enabled (timer base
d) was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-08-29T11:03:45.830775+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.path - Process error reports when automatic reporting is enabled (file watch)
was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-08-29T11:03:45.830781+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.timer - Process error reports when automatic reporting is enabled (timer base
d) was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-08-29T11:11:33.000205+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.path - Process error reports when automatic reporting is enabled (file watch)
was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-08-29T11:11:33.000210+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.timer - Process error reports when automatic reporting is enabled (timer base
d) was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-09-05T11:48:01.173115+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.path - Process error reports when automatic reporting is enabled (file watch)
was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-09-05T11:48:01.173127+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.timer - Process error reports when automatic reporting is enabled (timer base
d) was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-09-09T10:37:31.678133+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.path - Process error reports when automatic reporting is enabled (file watch)
was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-09-09T10:37:31.678139+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.timer - Process error reports when automatic reporting is enabled (timer base
d) was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-09-09T10:37:41.428867+00:00 LAPTOP-JAMRNMRP snapd[176]: stateengine.go:161: state ensure error: decode new commands catalog: net/http: request canceled
(Client.Timeout or context cancellation while reading body)
2025-09-09T11:30:42.240283+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.path - Process error reports when automatic reporting is enabled (file watch)
was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).
2025-09-09T11:30:42.240302+00:00 LAPTOP-JAMRNMRP systemd[1]: apport-autoreport.timer - Process error reports when automatic reporting is enabled (timer base
d) was skipped because of an unmet condition check (ConditionPathExists=/var/lib/apport/autoreport).

```

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:

```

root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# vim 3ex7.sh
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# bash 3ex7.sh
tar: Removing leading '/' from member names
tar: /home/user/documents: Cannot stat: No such file or directory
tar: Exiting with failure status due to previous errors
gzip: largefile.txt: No such file or directory
gzip: largefile.txt.gz: No such file or directory
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# |

```

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:

```
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# vim 3ex8.sh
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# bash 3ex8.sh
ln: failed to create hard link 'hardlink.txt': File exists
ln: failed to create symbolic link 'symlink.txt': File exists
1688849860437113 -rwxrwxrwx 2 gayatri10 gayatri10  6 Sep 25  2025 hardlink.txt
1688849860437113 -rwxrwxrwx 2 gayatri10 gayatri10  6 Sep 25  2025 original.txt
1688849860437121 lrwxrwxrwx 1 gayatri10 gayatri10 12 Sep 24 20:06 symlink.txt -> original.txt
root@LAPTOP-JAMRNMRP:/mnt/c/Users/GAYA1/OneDrive/Desktop/C SEM - 1# |
```

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.