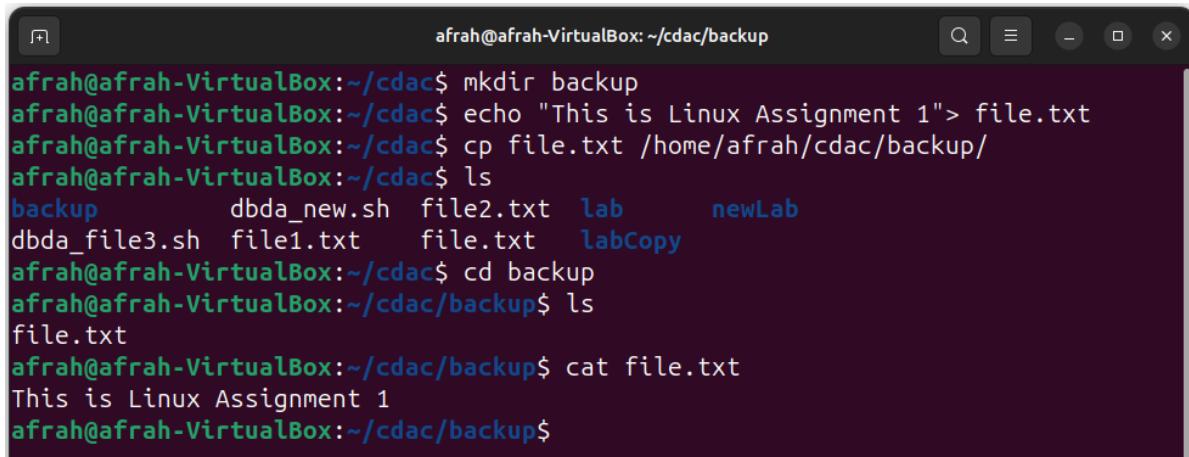


Assignment 1

1. How do you use the "cp" command to copy a file named "file.txt" from the current directory to a directory named "backup"?

Command: cp file.txt /home/afrah/cdac/backup

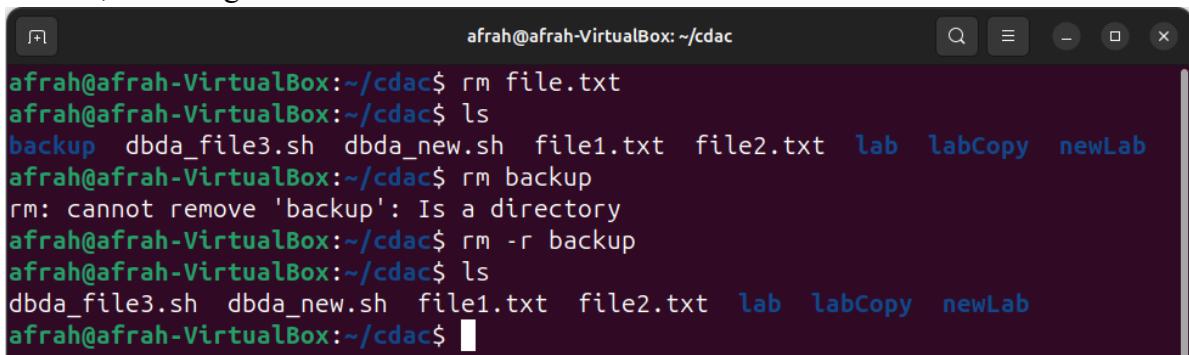
This copies file.txt from current directory into the backup directory.



```
afrah@afrah-VirtualBox:~/cdac$ mkdir backup
afrah@afrah-VirtualBox:~/cdac$ echo "This is Linux Assignment 1">> file.txt
afrah@afrah-VirtualBox:~/cdac$ cp file.txt /home/afrah/cdac/backup/
afrah@afrah-VirtualBox:~/cdac$ ls
backup      dbda_new.sh  file2.txt  lab      newLab
dbda_file3.sh  file1.txt  file.txt   labCopy
afrah@afrah-VirtualBox:~/cdac$ cd backup
afrah@afrah-VirtualBox:~/cdac/backup$ ls
file.txt
afrah@afrah-VirtualBox:~/cdac/backup$ cat file.txt
This is Linux Assignment 1
afrah@afrah-VirtualBox:~/cdac/backup$
```

2. What is the difference between the "rm" and "rm -r" commands in Linux?

"rm" command is used to remove a single file. Whereas, "rm -r" is used to remove non-empty directories. The -r (recursive) flag recursively removes directories along with its content, including files and sub-directories.

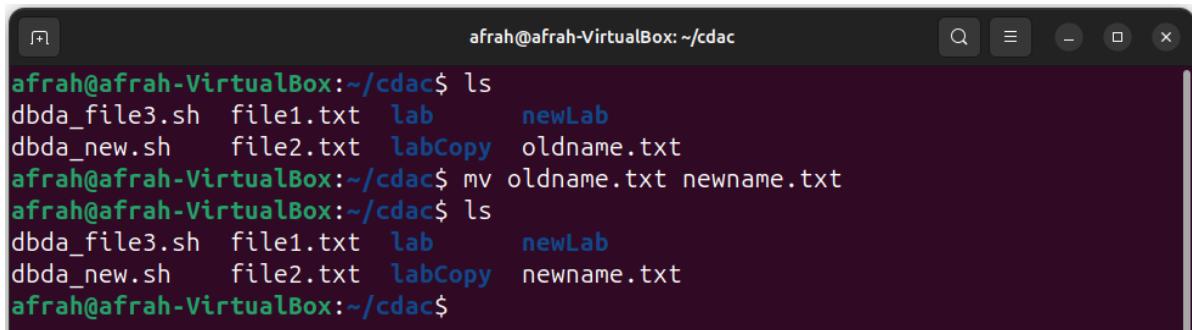


```
afrah@afrah-VirtualBox:~/cdac$ rm file.txt
afrah@afrah-VirtualBox:~/cdac$ ls
backup  dbda_file3.sh  dbda_new.sh  file1.txt  file2.txt  lab  labCopy  newLab
afrah@afrah-VirtualBox:~/cdac$ rm backup
rm: cannot remove 'backup': Is a directory
afrah@afrah-VirtualBox:~/cdac$ rm -r backup
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh  dbda_new.sh  file1.txt  file2.txt  lab  labCopy  newLab
afrah@afrah-VirtualBox:~/cdac$
```

3. How do you use the "mv" command to rename a file named "oldname.txt" to "newname.txt"?

Command: mv oldname.txt newname.txt

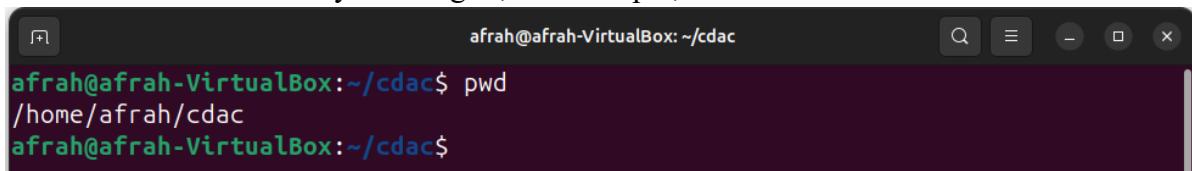
This renames the file



```
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh  file1.txt  lab      newLab
dbda_new.sh    file2.txt  labCopy   oldname.txt
afrah@afrah-VirtualBox:~/cdac$ mv oldname.txt newname.txt
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh  file1.txt  lab      newLab
dbda_new.sh    file2.txt  labCopy   newname.txt
afrah@afrah-VirtualBox:~/cdac$
```

4. What does the "pwd" command do in Linux?

The command “pwd” (present working directory”) displays the current working directory which the user is currently working in, for example, /home/afrah/linux-lab

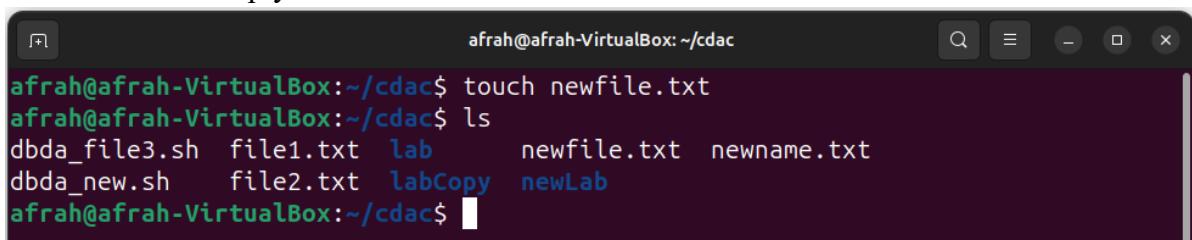


```
afrah@afrah-VirtualBox:~/cdac$ pwd
/home/afrah/cdac
afrah@afrah-VirtualBox:~/cdac$
```

5. How do you create a new empty file named "newfile.txt" in the current directory using the command line?

Command: touch newfile.txt

This creates an empty file named newfile.txt

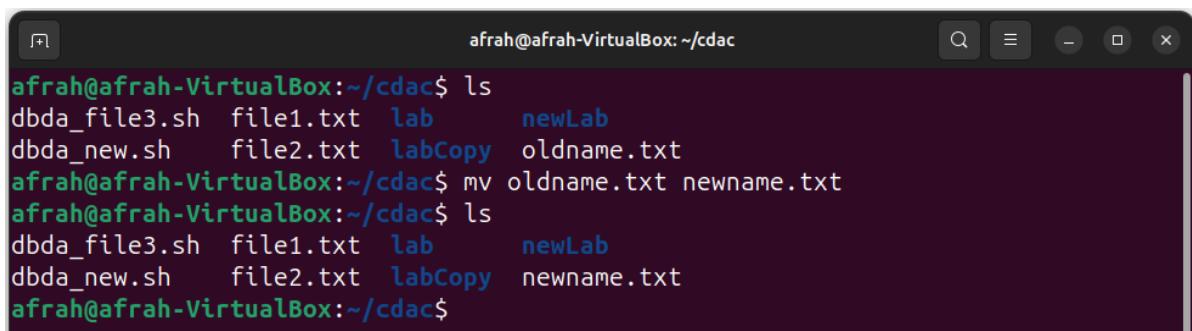


```
afrah@afrah-VirtualBox:~/cdac$ touch newfile.txt
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh  file1.txt  lab      newfile.txt  newname.txt
dbda_new.sh    file2.txt  labCopy   newLab
afrah@afrah-VirtualBox:~/cdac$
```

6. How do you rename a file named "oldname.txt" to "newname.txt" using the command line?

Command: mv oldname.txt newname.txt

This renames the file



```
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh  file1.txt  lab      newLab
dbda_new.sh    file2.txt  labCopy   oldname.txt
afrah@afrah-VirtualBox:~/cdac$ mv oldname.txt newname.txt
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh  file1.txt  lab      newLab
dbda_new.sh    file2.txt  labCopy   newname.txt
afrah@afrah-VirtualBox:~/cdac$
```

7. How do you remove a file named "file.txt" from the current directory using the command line?

Command: rm file.txt

Deletes file.txt from current directory

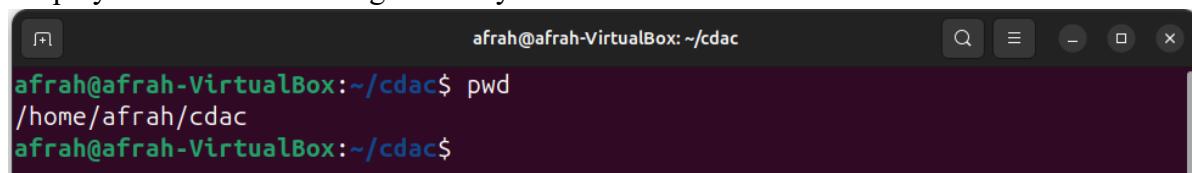


```
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh  file1.txt  file.txt  labCopy      newLab
dbda_new.sh    file2.txt  lab        newfile.txt  newname.txt
afrah@afrah-VirtualBox:~/cdac$ rm file.txt
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh  file1.txt  lab        newfile.txt  newname.txt
dbda_new.sh    file2.txt  labCopy    newLab
afrah@afrah-VirtualBox:~/cdac$
```

8. Use a command to show the current working directory

Command: pwd

Displays the current working directory

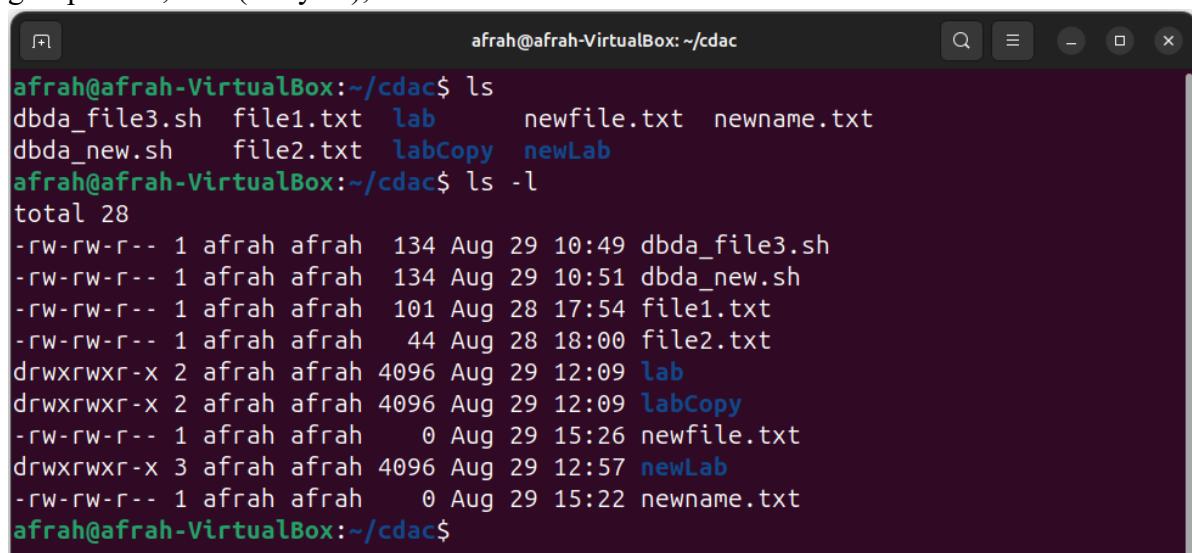


```
afrah@afrah-VirtualBox:~/cdac$ pwd
/home/afrah/cdac
afrah@afrah-VirtualBox:~/cdac$
```

9. List the directory contents in the short and long format

Short format – ls

Long format – ls -l (includes details like permissions, number of links, owner name, group name, size (in bytes), modification date & time and name.



```
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh  file1.txt  lab        newfile.txt  newname.txt
dbda_new.sh    file2.txt  labCopy    newLab
afrah@afrah-VirtualBox:~/cdac$ ls -l
total 28
-rw-rw-r-- 1 afrah afrah 134 Aug 29 10:49 dbda_file3.sh
-rw-rw-r-- 1 afrah afrah 134 Aug 29 10:51 dbda_new.sh
-rw-rw-r-- 1 afrah afrah 101 Aug 28 17:54 file1.txt
-rw-rw-r-- 1 afrah afrah  44 Aug 28 18:00 file2.txt
drwxrwxr-x 2 afrah afrah 4096 Aug 29 12:09 lab
drwxrwxr-x 2 afrah afrah 4096 Aug 29 12:09 labCopy
-rw-rw-r-- 1 afrah afrah     0 Aug 29 15:26 newfile.txt
drwxrwxr-x 3 afrah afrah 4096 Aug 29 12:57 newLab
-rw-rw-r-- 1 afrah afrah     0 Aug 29 15:22 newname.txt
afrah@afrah-VirtualBox:~/cdac$
```

10. Explore attributes given in long format e.g. file type, file permissions, file size, file owner etc.

ls -l displays lists in long format which includes file type, file permissions, number of links, file size, file owner name, group name, modification date & time and file name.

File type: ‘-’ indicates file, ‘d’ indicates directory

File permissions: -rwxrwxr--, read, write and execute permissions

Number of links

Owner and group name

File size in bytes

Modification date and time

```
afrah@afrah-VirtualBox:~/cdac$ ls -l
total 28
-rw-rw-r-- 1 afrah afrah 134 Aug 29 10:49 dbda_file3.sh
-rw-rw-r-- 1 afrah afrah 134 Aug 29 10:51 dbda_new.sh
-rw-rw-r-- 1 afrah afrah 101 Aug 28 17:54 file1.txt
-rw-rw-r-- 1 afrah afrah 44 Aug 28 18:00 file2.txt
drwxrwxr-x 2 afrah afrah 4096 Aug 29 12:09 lab
drwxrwxr-x 2 afrah afrah 4096 Aug 29 12:09 labCopy
-rw-rw-r-- 1 afrah afrah 0 Aug 29 15:26 newfile.txt
drwxrwxr-x 3 afrah afrah 4096 Aug 29 12:57 newLab
-rw-rw-r-- 1 afrah afrah 0 Aug 29 15:22 newname.txt
afrah@afrah-VirtualBox:~/cdac$
```

11. List all files along with hidden files in the current working directory.

Command: ls -a

Hidden files start with a ‘.’

```
afrah@afrah-VirtualBox:~$ ls -a
.
..
.cache    Downloads   .profile      .sudo_as_admin_successful
..        cdac       .gnupg      Public        Templates
.bash_history .config    .local      .python_history Videos
.bash_logout  Desktop   Music       snap
.bashrc     Documents  Pictures   .ssh
afrah@afrah-VirtualBox:~$
```

12. list only hidden files in the directory

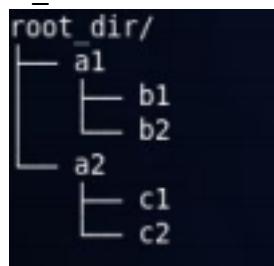
Command: ls -a | grep '^.'

The use of | (pipe) is to connect two commands where one command's output acts as input for the other command. Here, output of ls -a is used as input for grep '^.', using grep command with a regular expression which filters the output to list files that begins with a '.'. This displays only the hidden files in the directory.

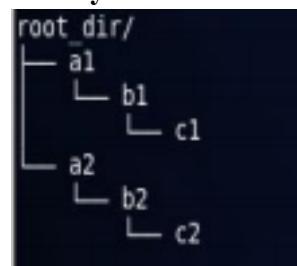
```
afrah@afrah-VirtualBox:~$ ls -a | grep '^.'
.
..
.bash_history
.bash_logout
.bashrc
.cache
.config
.gnupg
.lesshst
.local
.profile
.python_history
.ssh
.sudo_as_admin_successful
afrah@afrah-VirtualBox:~$
```

13. Make a directory and name it as cdac-dir and change the current working directory to the new directory. (Hint : use mkdir, cd commands). 3. Create following nested directories inside the current directory by invoking a single command for only one time.

Note : here root_dir is the current directory.



Directory structure 1



Directory structure 2

mkdir is used to create directories. -p makes parent directories as needed.

```
afrah@afrah-VirtualBox:~$ ls
cdac    Documents  Music    Public  Templates
Desktop  Downloads  Pictures  snap    Videos
afrah@afrah-VirtualBox:~$ mkdir -p cdac-dir/a1/b1 cdac-dir/a1/b2 cdac-dir/a2/c1
cdac-dir/a2/c2
afrah@afrah-VirtualBox:~$ tree cdac-dir
cdac-dir
└── a1
    ├── b1
    └── b2
   └── a2
        ├── c1
        └── c2

7 directories, 0 files
afrah@afrah-VirtualBox:~$
```

```
afrah@afrah-VirtualBox:~$ ls
cdac    Documents  Music    Public  Templates
Desktop  Downloads  Pictures  snap    Videos
afrah@afrah-VirtualBox:~$ mkdir -p cdac-dir/a1/b1/c1 cdac-dir/a2/b2/c2
afrah@afrah-VirtualBox:~$ tree cdac-dir
cdac-dir
└── a1
    └── b1
        └── c1
   └── a2
        └── b2
            └── c2

7 directories, 0 files
afrah@afrah-VirtualBox:~$
```

14. (Hint : explore the man page of mkdir).

mkdir is used to create directories. Syntax: mkdir directory_name

Multiple directories can be created at the same time, example: mkdir dir1 dir2 dir3

The -p flag can be used to create nested directories as needed.

For example, mkdir -p a/b/c, will create directories ‘a’, ‘b’ and ‘c’, if they do not exists, with ‘a’ being the parent directory, with ‘b’ inside it and ‘c’ inside ‘b’.

```

MKDIR(1)                               User Commands                               MKDIR(1)

NAME
    mkdir - make directories

SYNOPSIS
    mkdir [OPTION]... DIRECTORY...

DESCRIPTION
    Create the DIRECTORY(ies), if they do not already exist.

    Mandatory arguments to long options are mandatory for short options
    too.

    -m, --mode=MODE
        set file mode (as in chmod), not a=rwx - umask

    -p, --parents
        no error if existing, make parent directories as needed, with
        their file modes unaffected by any -m option.

    -v, --verbose
        print a message for each created directory

```

Manual page mkdir(1) line 1/56 40% (press h for help or q to quit)

15. List the directories(folders), then remove the cdac-dir directory and list the folders again to show that it is no longer present. (Hint : use rm, ls command)

To list directories: ls

To remove a folder: rm -r cdac-dir

Then, again use ls to check if the directory has been removed or not.

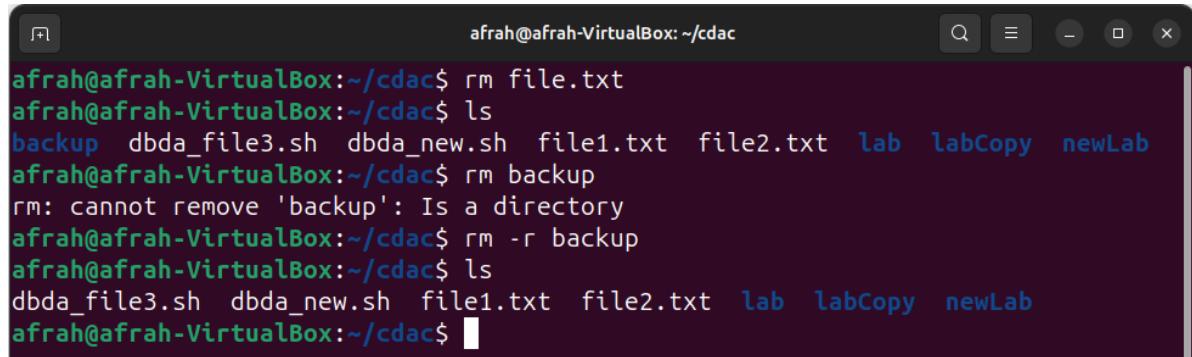
```

afrah@afrah-VirtualBox:~$ ls
cdac    Desktop    Downloads  Pictures  snap      Videos
cdac-dir  Documents  Music     Public    Templates
afrah@afrah-VirtualBox:~$ rm -r cdac-dir
afrah@afrah-VirtualBox:~$ ls
cdac    Documents  Music     Public    Templates
Desktop  Downloads  Pictures  snap      Videos
afrah@afrah-VirtualBox:~$ 

```

16. Question-2.

“rm” command is used to remove a single file. Whereas, “rm -r” is used to remove non-empty directories. The -r (recursive) flag recursively removes directories along with its content, including files and sub-directories.

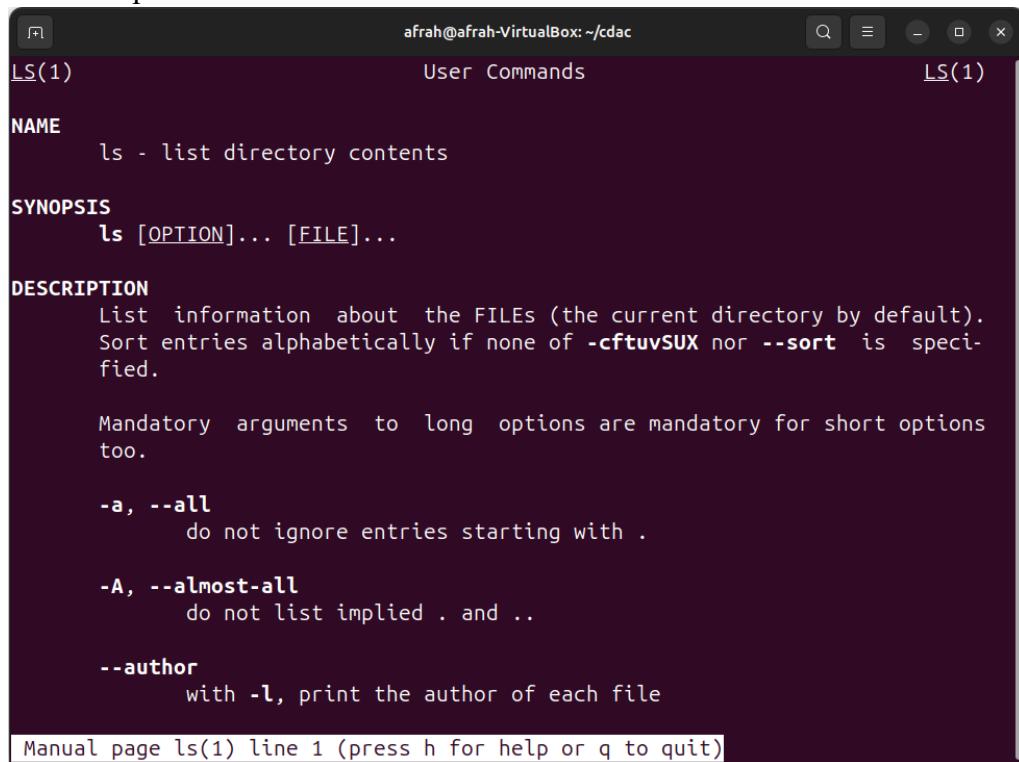


```
afrah@afrah-VirtualBox:~/cdac$ rm file.txt
afrah@afrah-VirtualBox:~/cdac$ ls
backup dbda_file3.sh dbda_new.sh file1.txt file2.txt lab labCopy newLab
afrah@afrah-VirtualBox:~/cdac$ rm backup
rm: cannot remove 'backup': Is a directory
afrah@afrah-VirtualBox:~/cdac$ rm -r backup
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh dbda_new.sh file1.txt file2.txt lab labCopy newLab
afrah@afrah-VirtualBox:~/cdac$ 
```

- 17. Display the man-page for ls, but redirect the output into temp.txt, then use the cat, less, and more commands to display the new file.**

Commands:

```
man ls
man ls > temp.txt
cat temp.txt
less temp.txt
more temp.txt
```



```
LS(1) User Commands LS(1)

NAME
ls - list directory contents

SYNOPSIS
ls [OPTION]... [FILE]...

DESCRIPTION
List information about the FILEs (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

Mandatory arguments to long options are mandatory for short options too.

-a, --all
do not ignore entries starting with .

-A, --almost-all
do not list implied . and ..

--author
with -l, print the author of each file

Manual page ls(1) line 1 (press h for help or q to quit)
```

```
afrah@afrah-VirtualBox:~/cdac$ man ls > temp.txt
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh  file1.txt  lab      newfile.txt  newname.txt
dbda_new.sh    file2.txt  labCopy   newLab     temp.txt
afrah@afrah-VirtualBox:~/cdac$ cat temp.txt
LS(1)                               User Commands                               LS(1)

NAME
ls - list directory contents

SYNOPSIS
ls [OPTION]... [FILE]...

DESCRIPTION
List information about the FILES (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.
```

```
LS(1)                               User Commands                               LS(1)

NAME
ls - list directory contents

SYNOPSIS
ls [OPTION]... [FILE]...

DESCRIPTION
List information about the FILES (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

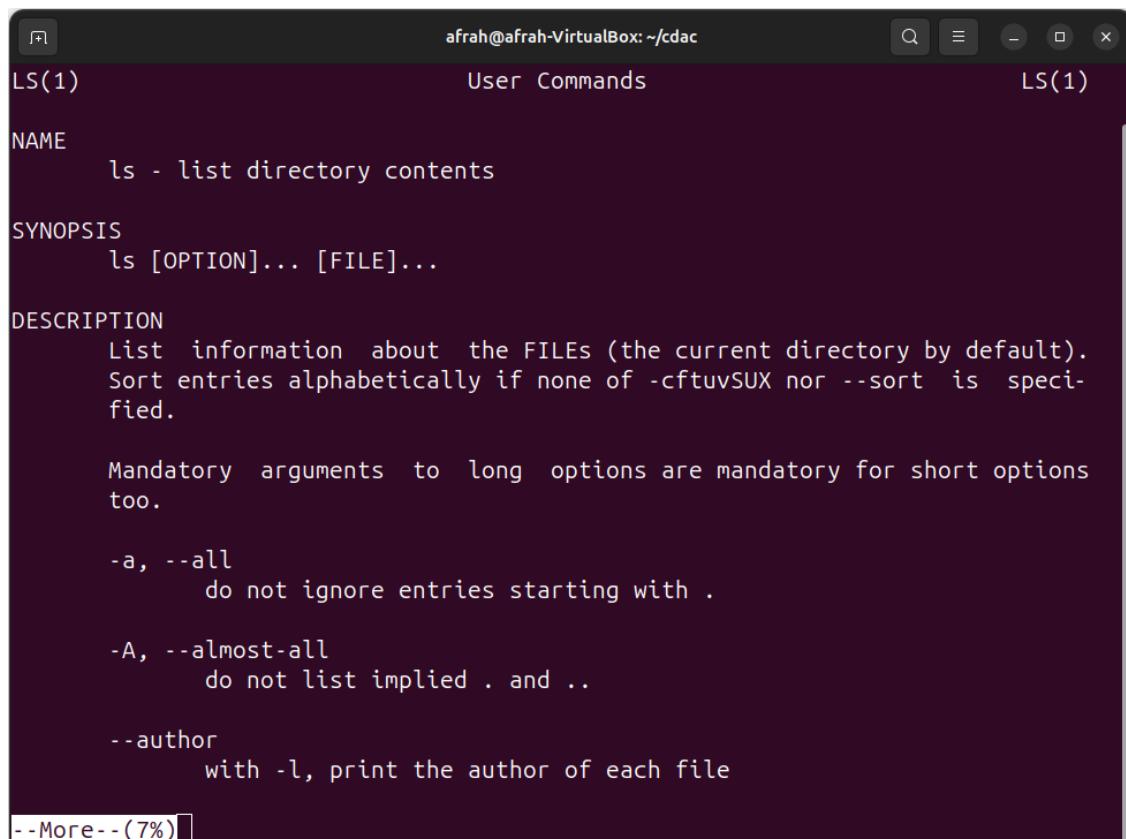
Mandatory arguments to long options are mandatory for short options
too.

-a, --all
      do not ignore entries starting with .

-A, --almost-all
      do not list implied . and ..

--author
      with -l, print the author of each file

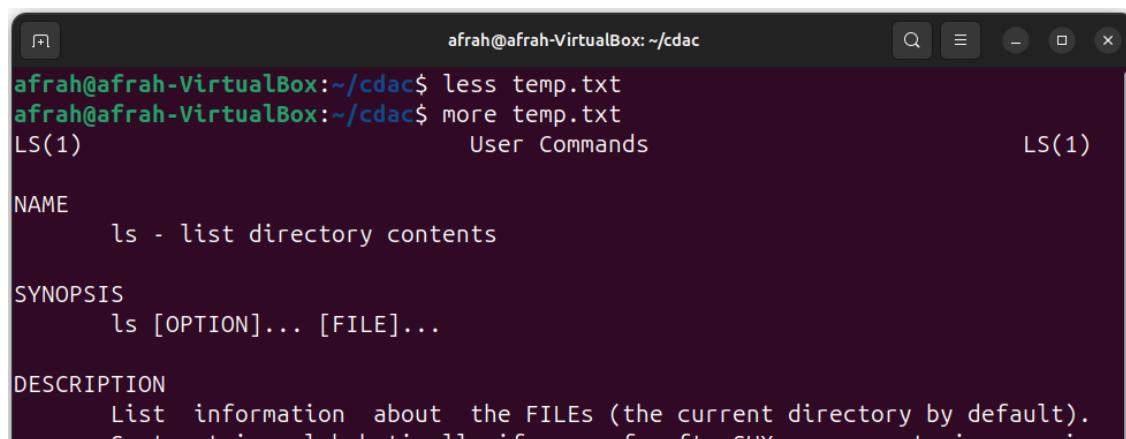
temp.txt
```



The terminal window shows the man page for the `ls` command. The title bar reads "afrah@afrah-VirtualBox: ~/cdac". The window title is "User Commands". The page content includes:

- NAME**: `ls` - list directory contents
- SYNOPSIS**: `ls [OPTION]... [FILE]...`
- DESCRIPTION**:
 - List information about the FILEs (the current directory by default). Sort entries alphabetically if none of `-cftuvSUX` nor `--sort` is specified.
 - Mandatory arguments to long options are mandatory for short options too.
 - a, --all**: do not ignore entries starting with `.`
 - A, --almost-all**: do not list implied `.` and `..`
 - author**: with `-l`, print the author of each file

At the bottom of the page, there is a link labeled "`--More--(7%)`".



The terminal window shows the user navigating through a file named `temp.txt`. The title bar reads "afrah@afrah-VirtualBox: ~/cdac". The window title is "User Commands". The user has run the `less` command to view the file, and then switched to the `more` command to continue viewing it. The page content is identical to the one in the first screenshot, showing the man page for the `ls` command.

18. Display the initial 10 lines and final 5 lines of temp.txt with the obvious Linux commands. (Hint: use head and tail commands).

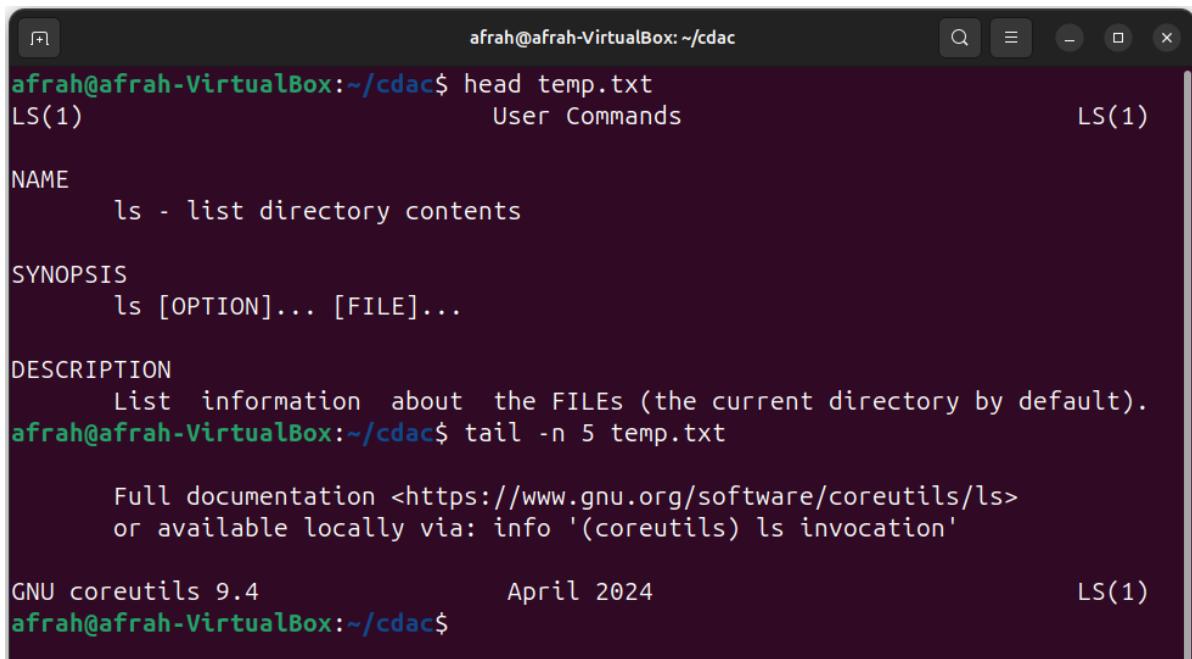
head and tail commands are used to view the beginning and end lines of the file.

Default number of lines are 10.

Command:

`head temp.txt`

`tail -n 5 temp.txt`



```
afrah@afrah-VirtualBox:~/cdac$ head temp.txt
LS(1)                               User Commands                               LS(1)

NAME
    ls - list directory contents

SYNOPSIS
    ls [OPTION]... [FILE]...

DESCRIPTION
    List information about the FILEs (the current directory by default).
afrah@afrah-VirtualBox:~/cdac$ tail -n 5 temp.txt

    Full documentation <https://www.gnu.org/software/coreutils/ls>
    or available locally via: info '(coreutils) ls invocation'

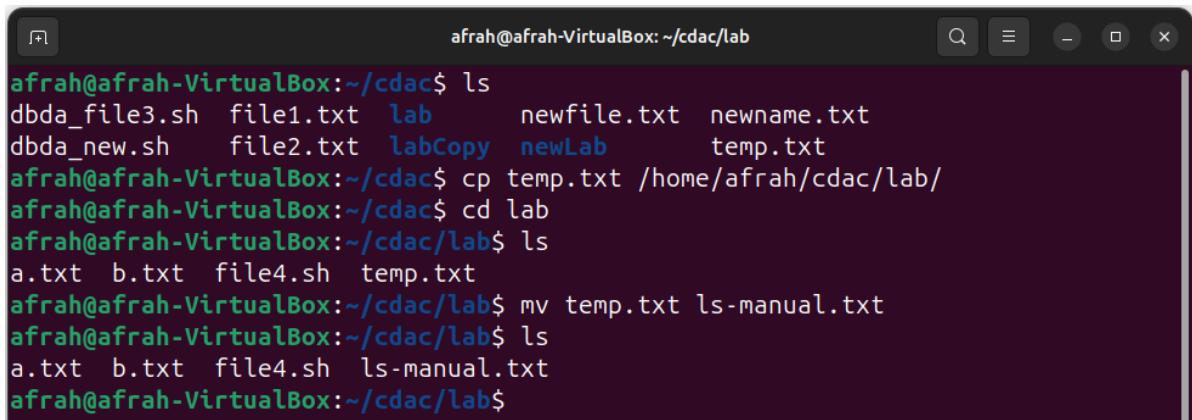
GNU coreutils 9.4                      April 2024                         LS(1)
afrah@afrah-VirtualBox:~/cdac$
```

19. Copy temp.txt to another directory and rename it there.

(Hint: use cp to copy and mv command to rename).

Commands:

```
cp temp.txt /home/afrah/cdac/lab/
cd lab
ls
mv temp.txt ls-manual.txt
ls
```

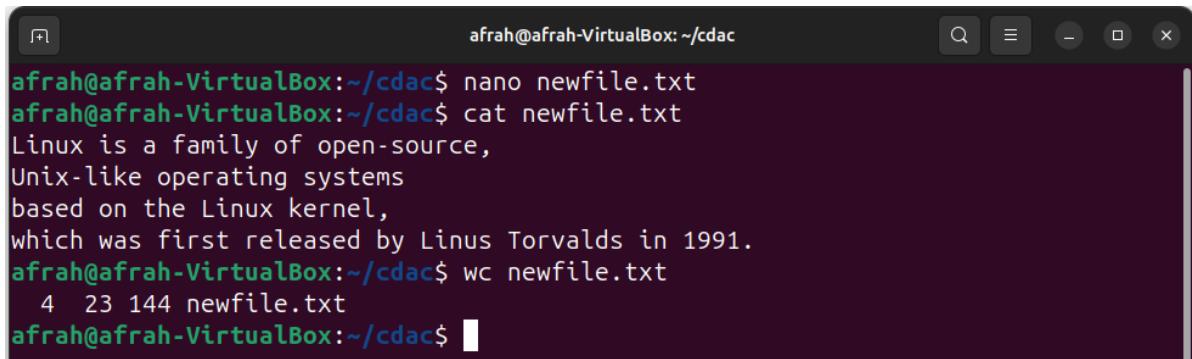


```
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_file3.sh  file1.txt  lab      newfile.txt  newname.txt
dbda_new.sh     file2.txt  labCopy  newLab       temp.txt
afrah@afrah-VirtualBox:~/cdac$ cp temp.txt /home/afrah/cdac/lab/
afrah@afrah-VirtualBox:~/cdac$ cd lab
afrah@afrah-VirtualBox:~/cdac/lab$ ls
a.txt  b.txt  file4.sh  temp.txt
afrah@afrah-VirtualBox:~/cdac/lab$ mv temp.txt ls-manual.txt
afrah@afrah-VirtualBox:~/cdac/lab$ ls
a.txt  b.txt  file4.sh  ls-manual.txt
afrah@afrah-VirtualBox:~/cdac/lab$
```

20. Display the number of lines, words and characters in file using Linux command (Hint: use wc command).

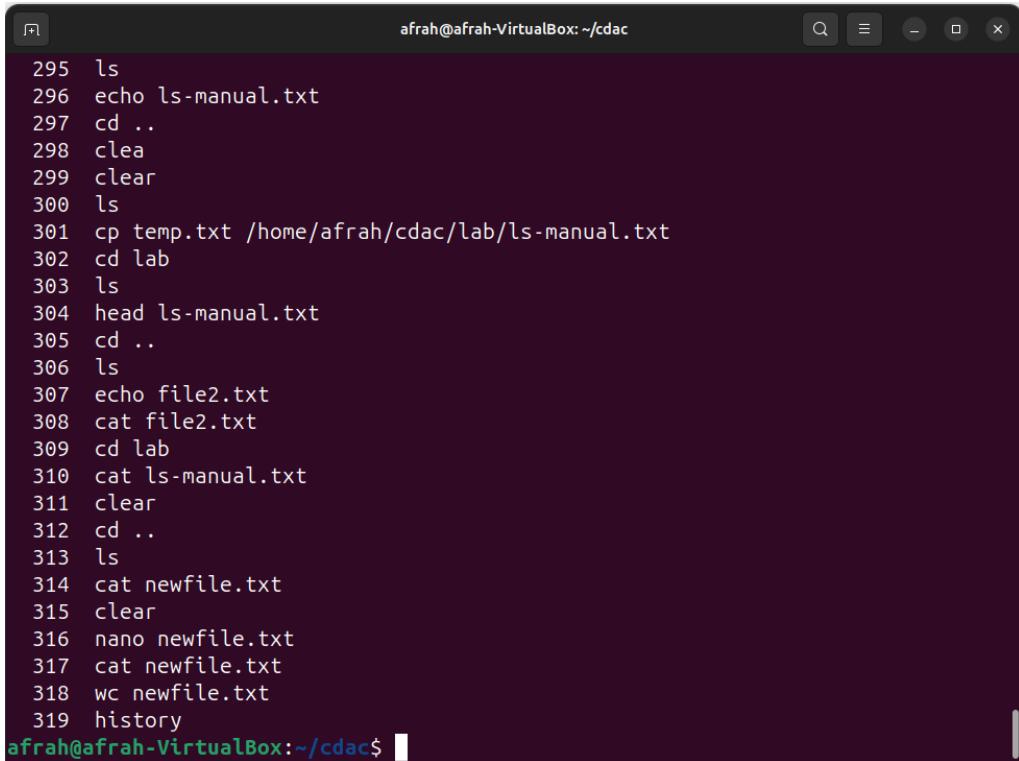
wc command is used to display number of lines, words and character in a file.

The first number represents the number of lines, the second is for number of words and third is for number of characters.



```
afrah@afrah-VirtualBox:~/cdac$ nano newfile.txt
afrah@afrah-VirtualBox:~/cdac$ cat newfile.txt
Linux is a family of open-source,
Unix-like operating systems
based on the Linux kernel,
which was first released by Linus Torvalds in 1991.
afrah@afrah-VirtualBox:~/cdac$ wc newfile.txt
    4 23 144 newfile.txt
afrah@afrah-VirtualBox:~/cdac$
```

- 21. Use history command to display the last 10 commands used. (Hint: use history command).**

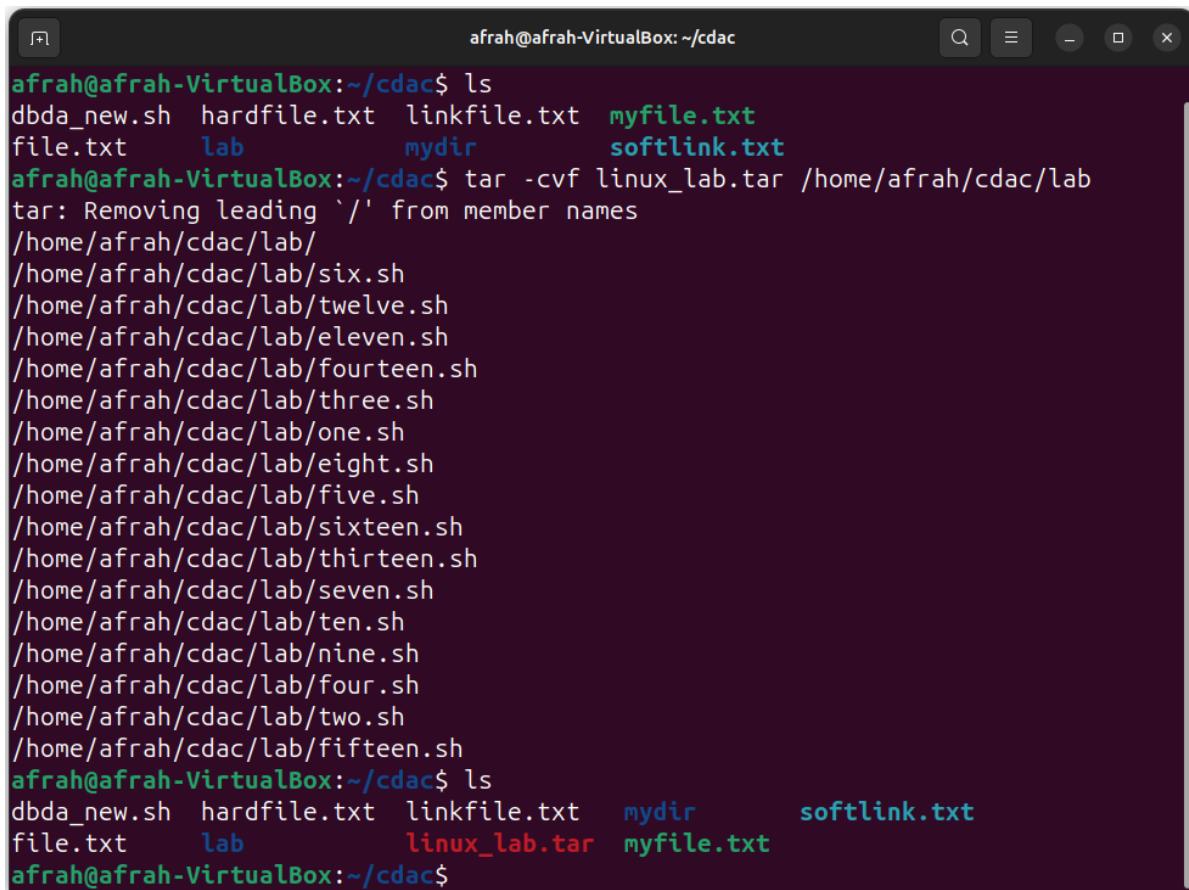


```
295 ls
296 echo ls-manual.txt
297 cd ..
298 clea
299 clear
300 ls
301 cp temp.txt /home/afrah/cdac/lab/ls-manual.txt
302 cd lab
303 ls
304 head ls-manual.txt
305 cd ..
306 ls
307 echo file2.txt
308 cat file2.txt
309 cd lab
310 cat ls-manual.txt
311 clear
312 cd ..
313 ls
314 cat newfile.txt
315 clear
316 nano newfile.txt
317 cat newfile.txt
318 wc newfile.txt
319 history
afrah@afrah-VirtualBox:~/cdac$
```

- 22. Create a tar archive file of any directory present in your home directory. (Hint: use tar command)**

tar command is used to create an archive of any directory or file.

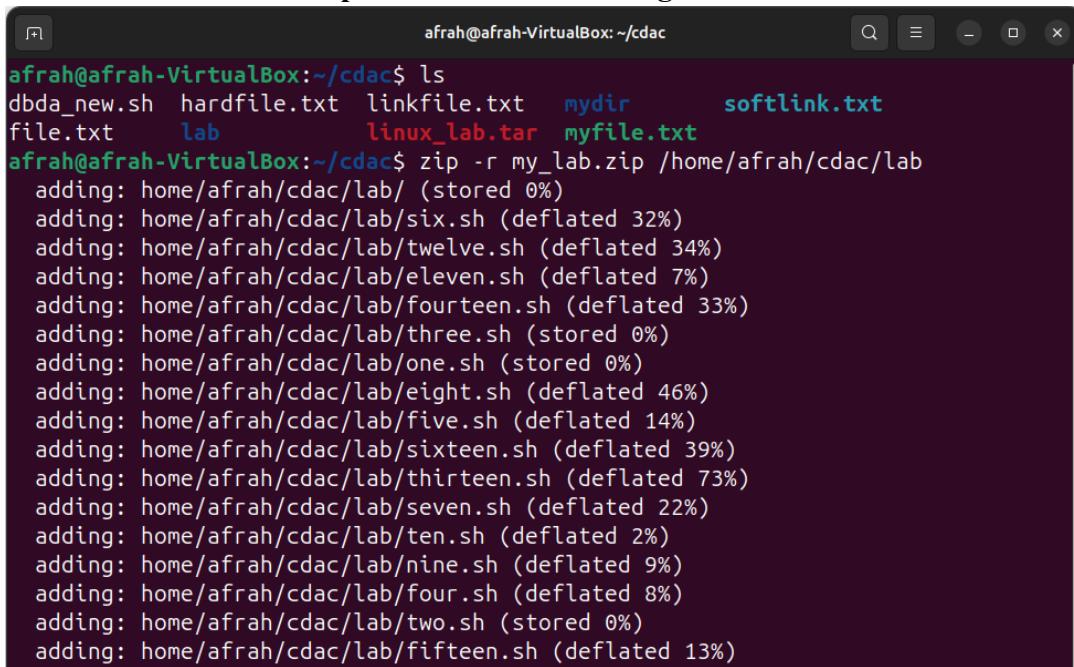
Command: tar -cvf lnx_lab.tar /home/afrah/cdac/lab



```

afrah@afrah-VirtualBox:~/cdac$ ls
dbda_new.sh  hardfile.txt  linkfile.txt  myfile.txt
file.txt      lab          mydir        softlink.txt
afrah@afrah-VirtualBox:~/cdac$ tar -cvf linux_lab.tar /home/afrah/cdac/lab
tar: Removing leading `/' from member names
/home/afrah/cdac/lab/
/home/afrah/cdac/lab/six.sh
/home/afrah/cdac/lab/twelve.sh
/home/afrah/cdac/lab/eleven.sh
/home/afrah/cdac/lab/fourteen.sh
/home/afrah/cdac/lab/three.sh
/home/afrah/cdac/lab/one.sh
/home/afrah/cdac/lab/eight.sh
/home/afrah/cdac/lab/five.sh
/home/afrah/cdac/lab/sixteen.sh
/home/afrah/cdac/lab/thirteen.sh
/home/afrah/cdac/lab/seven.sh
/home/afrah/cdac/lab/ten.sh
/home/afrah/cdac/lab/nine.sh
/home/afrah/cdac/lab/four.sh
/home/afrah/cdac/lab/two.sh
/home/afrah/cdac/lab/fifteen.sh
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_new.sh  hardfile.txt  linkfile.txt  mydir        softlink.txt
file.txt      lab          linux_lab.tar  myfile.txt
afrah@afrah-VirtualBox:~/cdac$
```

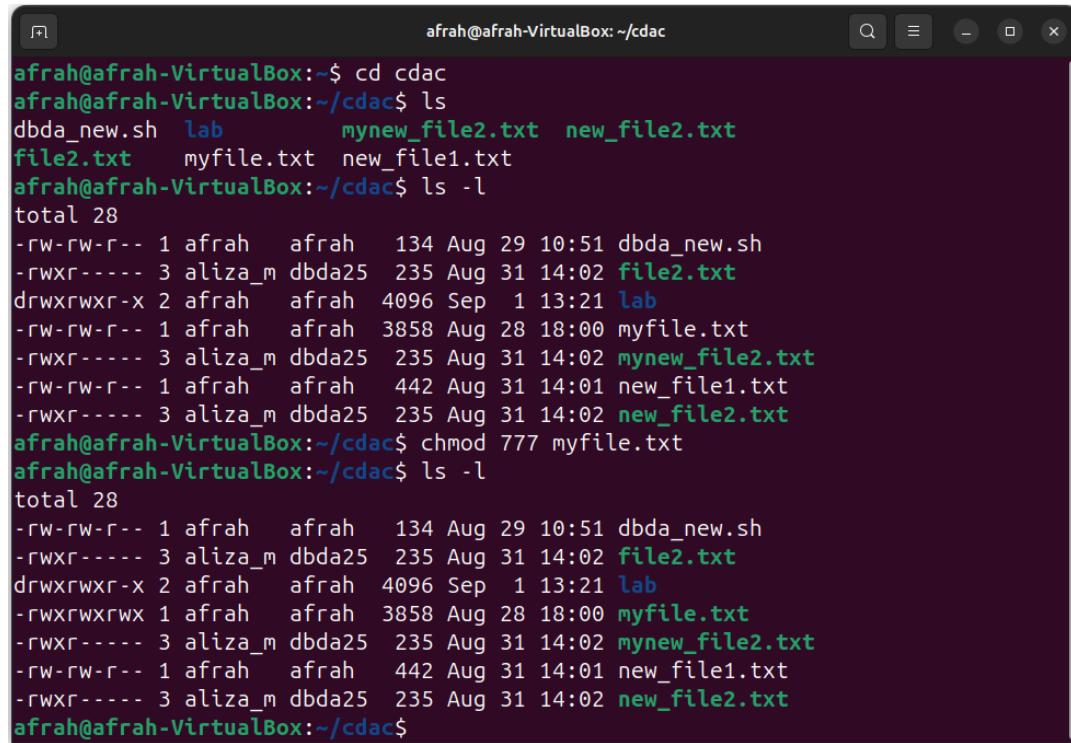
**23. Create a zip file of another directory. (Hint: use zip command) -
list the contents of the zip file without extracting.**



```

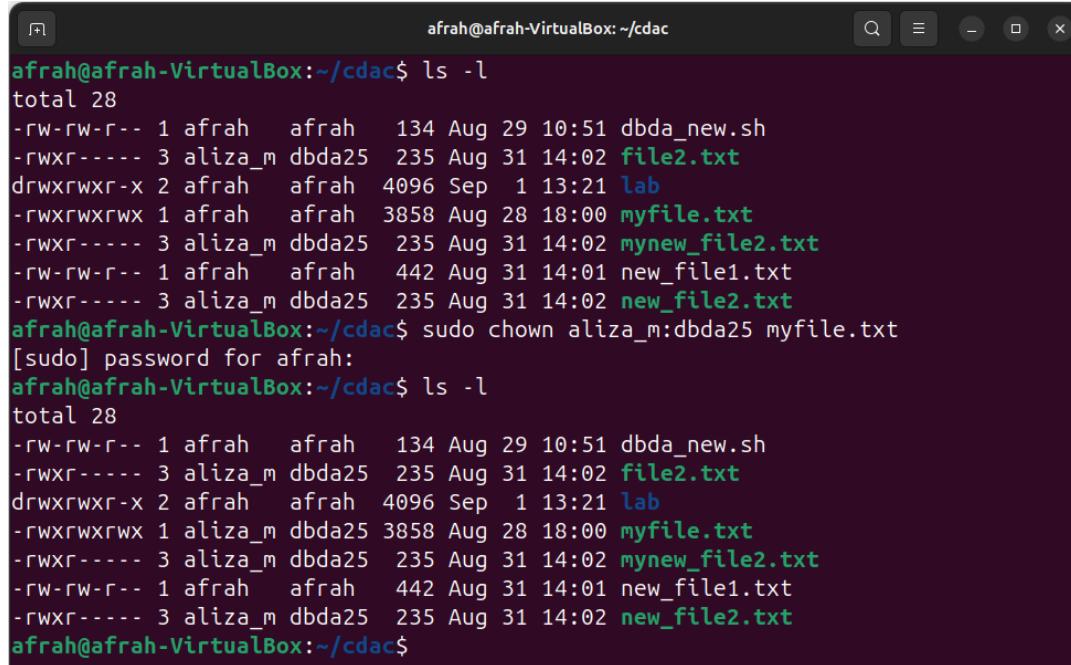
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_new.sh  hardfile.txt  linkfile.txt  mydir        softlink.txt
file.txt      lab          linux_lab.tar  myfile.txt
afrah@afrah-VirtualBox:~/cdac$ zip -r my_lab.zip /home/afrah/cdac/lab
adding: home/afrah/cdac/lab/ (stored 0%)
adding: home/afrah/cdac/lab/six.sh (deflated 32%)
adding: home/afrah/cdac/lab/twelve.sh (deflated 34%)
adding: home/afrah/cdac/lab/eleven.sh (deflated 7%)
adding: home/afrah/cdac/lab/fourteen.sh (deflated 33%)
adding: home/afrah/cdac/lab/three.sh (stored 0%)
adding: home/afrah/cdac/lab/one.sh (stored 0%)
adding: home/afrah/cdac/lab/eight.sh (deflated 46%)
adding: home/afrah/cdac/lab/five.sh (deflated 14%)
adding: home/afrah/cdac/lab/sixteen.sh (deflated 39%)
adding: home/afrah/cdac/lab/thirteen.sh (deflated 73%)
adding: home/afrah/cdac/lab/seven.sh (deflated 22%)
adding: home/afrah/cdac/lab/ten.sh (deflated 2%)
adding: home/afrah/cdac/lab/nine.sh (deflated 9%)
adding: home/afrah/cdac/lab/four.sh (deflated 8%)
adding: home/afrah/cdac/lab/two.sh (stored 0%)
adding: home/afrah/cdac/lab/fifteen.sh (deflated 13%)
```

24. Give read, write & execute permissions to your file. (Hint: use chmod command)



```
afrah@afrah-VirtualBox:~/cdac$ cd cdac
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_new.sh lab mynew_file2.txt new_file2.txt
file2.txt myfile.txt new_file1.txt
afrah@afrah-VirtualBox:~/cdac$ ls -l
total 28
-rw-rw-r-- 1 afrah afrah 134 Aug 29 10:51 dbda_new.sh
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 file2.txt
drwxrwxr-x 2 afrah afrah 4096 Sep 1 13:21 lab
-rw-rw-r-- 1 afrah afrah 3858 Aug 28 18:00 myfile.txt
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 mynew_file2.txt
-rw-rw-r-- 1 afrah afrah 442 Aug 31 14:01 new_file1.txt
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 new_file2.txt
afrah@afrah-VirtualBox:~/cdac$ chmod 777 myfile.txt
afrah@afrah-VirtualBox:~/cdac$ ls -l
total 28
-rw-rw-r-- 1 afrah afrah 134 Aug 29 10:51 dbda_new.sh
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 file2.txt
drwxrwxr-x 2 afrah afrah 4096 Sep 1 13:21 lab
-rwxrwxrwx 1 afrah afrah 3858 Aug 28 18:00 myfile.txt
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 mynew_file2.txt
-rw-rw-r-- 1 afrah afrah 442 Aug 31 14:01 new_file1.txt
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 new_file2.txt
afrah@afrah-VirtualBox:~/cdac$
```

25. Change ownership of that file. (Hint: use chown command)



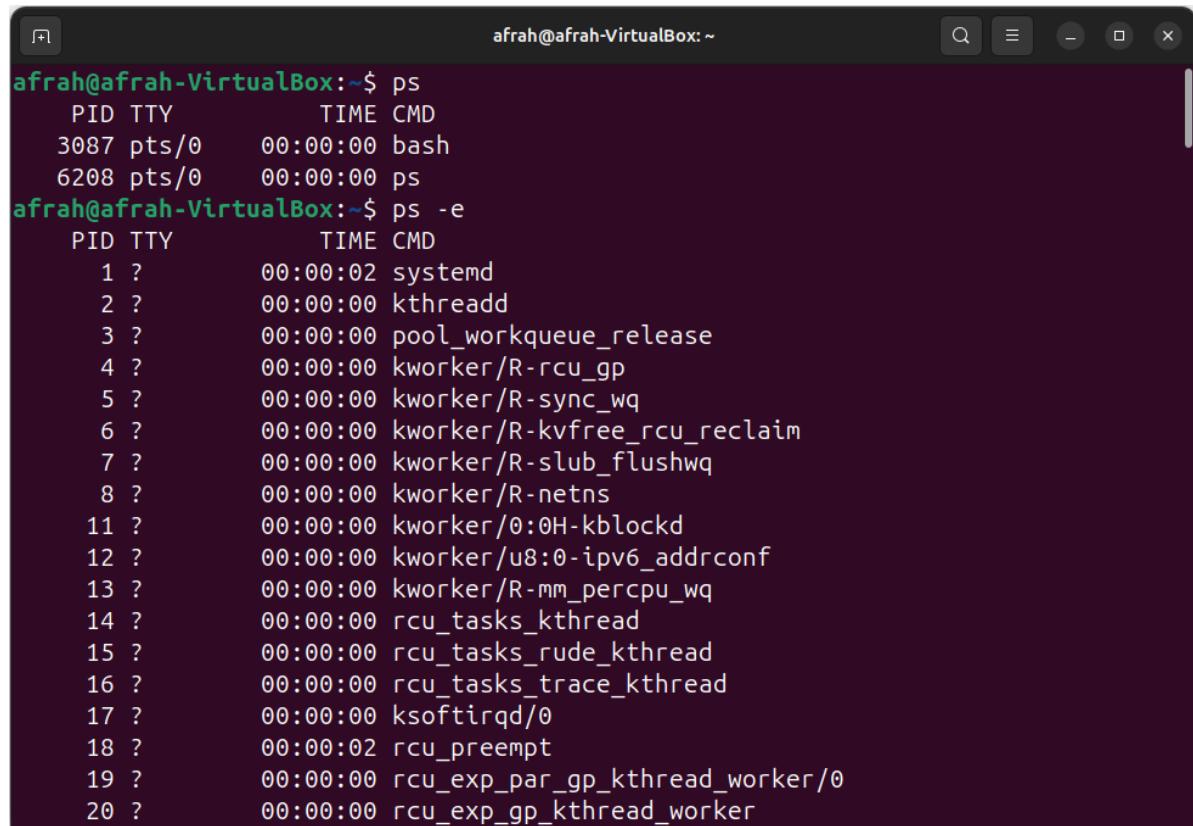
```
afrah@afrah-VirtualBox:~/cdac$ ls -l
total 28
-rw-rw-r-- 1 afrah afrah 134 Aug 29 10:51 dbda_new.sh
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 file2.txt
drwxrwxr-x 2 afrah afrah 4096 Sep 1 13:21 lab
-rwxrwxrwx 1 afrah afrah 3858 Aug 28 18:00 myfile.txt
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 mynew_file2.txt
-rw-rw-r-- 1 afrah afrah 442 Aug 31 14:01 new_file1.txt
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 new_file2.txt
afrah@afrah-VirtualBox:~/cdac$ sudo chown aliza_m:dbda25 myfile.txt
[sudo] password for afrah:
afrah@afrah-VirtualBox:~/cdac$ ls -l
total 28
-rw-rw-r-- 1 afrah afrah 134 Aug 29 10:51 dbda_new.sh
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 file2.txt
drwxrwxr-x 2 afrah afrah 4096 Sep 1 13:21 lab
-rwxrwxrwx 1 aliza_m dbda25 3858 Aug 28 18:00 myfile.txt
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 mynew_file2.txt
-rw-rw-r-- 1 afrah afrah 442 Aug 31 14:01 new_file1.txt
-rwxr----- 3 aliza_m dbda25 235 Aug 31 14:02 new_file2.txt
afrah@afrah-VirtualBox:~/cdac$
```

26. List processes running in shell, all running processes (Hint: use man page of ps command) and show top processes in decreasing order of their resource utilization (Hint: use top command).

Commands:

ps – lists current shell processes

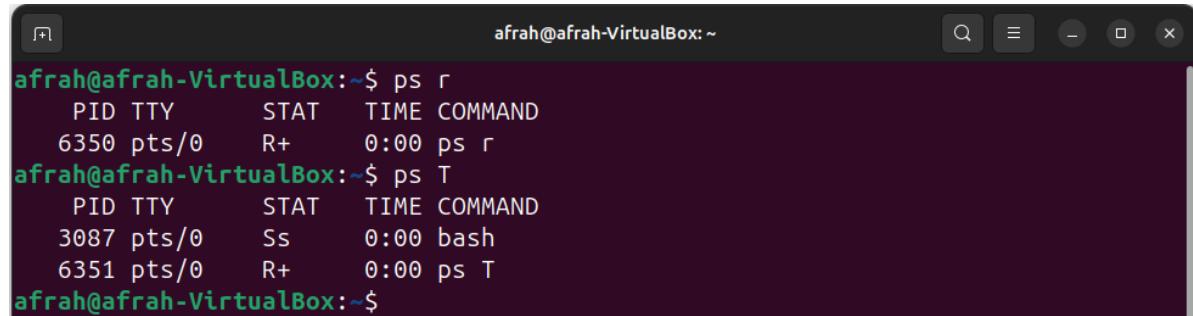
ps -e – lists every process on the system



```
afrah@afrah-VirtualBox:~$ ps
  PID TTY      TIME CMD
 3087 pts/0    00:00:00 bash
 6208 pts/0    00:00:00 ps
afrah@afrah-VirtualBox:~$ ps -e
  PID TTY      TIME CMD
    1 ?        00:00:02 systemd
    2 ?        00:00:00 kthreadd
    3 ?        00:00:00 pool_workqueue_release
    4 ?        00:00:00 kworker/R-rcu_gp
    5 ?        00:00:00 kworker/R-sync_wq
    6 ?        00:00:00 kworker/R-kvfree_rcu_reclaim
    7 ?        00:00:00 kworker/R-slub_flushwq
    8 ?        00:00:00 kworker/R-netns
   11 ?        00:00:00 kworker/0:0H-kblockd
   12 ?        00:00:00 kworker/u8:0-ipv6_addrconf
   13 ?        00:00:00 kworker/R-mm_percpu_wq
   14 ?        00:00:00 rcu_tasks_kthread
   15 ?        00:00:00 rcu_tasks_rude_kthread
   16 ?        00:00:00 rcu_tasks_trace_kthread
   17 ?        00:00:00 ksoftirqd/0
   18 ?        00:00:02 rcu_preempt
   19 ?        00:00:00 rcu_exp_par_gp_kthread_worker/0
   20 ?        00:00:00 rcu_exp_gp_kthread_worker
```

ps r – displays only running processes

ps T – lists all processes associated with the current terminal



```
afrah@afrah-VirtualBox:~$ ps r
  PID TTY      STAT   TIME COMMAND
 6350 pts/0    R+     0:00 ps r
afrah@afrah-VirtualBox:~$ ps T
  PID TTY      STAT   TIME COMMAND
 3087 pts/0    Ss     0:00 bash
 6351 pts/0    R+     0:00 ps T
afrah@afrah-VirtualBox:~$
```

top – real time CPU and memory usage, running processes, and resource usage

```
afrah@afrah-VirtualBox:~
```

```
top - 13:39:43 up 49 min, 1 user, load average: 0.02, 0.06, 0.10
Tasks: 209 total, 1 running, 208 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.2 us, 0.3 sy, 0.0 ni, 94.5 id, 0.2 wa, 0.0 hi, 4.9 si, 0.0 st
MiB Mem : 3477.3 total, 549.2 free, 1554.2 used, 1494.3 buff/cache
MiB Swap: 2739.0 total, 2739.0 free, 0.0 used. 1923.1 avail Mem

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1946 afrah 20 0 4033580 405908 162460 S 1.0 11.4 1:09.70 gnome-s+
3405 afrah 20 0 2501340 149056 86800 S 0.3 4.2 0:03.39 Privile+
3968 afrah 20 0 2424164 67772 53252 S 0.3 1.9 0:00.83 Web Cont+
4640 afrah 20 0 23204 5884 3708 R 0.3 0.2 0:00.01 top
1 root 20 0 23196 13892 9412 S 0.0 0.4 0:02.51 systemd
2 root 20 0 0 0 0 S 0.0 0.0 0:00.03 kthreadd
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 pool_wo+
4 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
5 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
6 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
7 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
8 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
11 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
12 root 20 0 0 0 0 I 0.0 0.0 0:00.03 kworker+
13 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
14 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rcu_tas+
15 root 20 0 0 0 0 I 0.0 0.0 0:00.00 rcu_tas+
```

Press Ctrl+M to sort by (%MEM) memory usage

```
afrah@afrah-VirtualBox:~
```

```
top - 13:39:54 up 49 min, 1 user, load average: 0.02, 0.06, 0.09
Tasks: 209 total, 1 running, 208 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.0 us, 0.3 sy, 0.0 ni, 95.4 id, 0.0 wa, 0.0 hi, 4.3 si, 0.0 st
MiB Mem : 3477.3 total, 548.5 free, 1554.7 used, 1494.5 buff/cache
MiB Swap: 2739.0 total, 2739.0 free, 0.0 used. 1922.6 avail Mem

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1946 afrah 20 0 4033580 406124 162420 S 1.2 11.4 1:10.29 gnome-s+
3227 afrah 20 0 3056836 404012 164332 S 0.0 11.3 0:18.21 firefox
3158 afrah 20 0 1657068 261352 122176 S 0.0 7.3 0:02.71 nautilus
3962 afrah 20 0 2570628 184068 85336 S 0.0 5.2 0:02.86 Isolate+
3405 afrah 20 0 2501340 149056 86800 S 0.0 4.2 0:03.40 Privile+
2646 afrah 20 0 1112220 98244 73808 S 0.0 2.8 0:00.34 mutter-+
3617 afrah 20 0 2461500 95824 66876 S 0.0 2.7 0:00.93 WebExte+
2489 afrah 20 0 635192 79968 63964 S 0.0 2.2 0:00.41 gsd-xse+
2039 afrah 20 0 246276 68112 54948 S 0.0 1.9 0:00.26 Xwayland
4140 afrah 20 0 2424168 67840 53576 S 0.0 1.9 0:00.11 Web Cont+
4163 afrah 20 0 2424168 67788 53268 S 1.2 1.9 0:00.88 Web Cont+
3968 afrah 20 0 2424164 67772 53252 S 0.0 1.9 0:00.83 Web Cont+
2985 afrah 20 0 2959032 64812 48852 S 0.0 1.8 0:00.80 gjs
2080 afrah 20 0 832356 59876 46308 S 0.0 1.7 0:00.65 evoluti+
3079 afrah 20 0 710528 59788 44800 S 0.0 1.7 0:10.13 gnome-t+
3416 afrah 20 0 444988 46828 35252 S 0.0 1.3 0:00.16 RDD Pro+
2250 afrah 20 0 601404 42564 34500 S 0.0 1.2 0:00.24 evoluti+
```

Press Ctrl+P to sort by (% CPU) CPU usage

```

top - 13:40:21 up 50 min, 1 user, load average: 0.01, 0.05, 0.09
Tasks: 210 total, 1 running, 209 sleeping, 0 stopped, 0 zombie
%Cpu(s): 1.8 us, 3.2 sy, 0.0 ni, 90.3 id, 0.0 wa, 0.0 hi, 4.7 si, 0.0 st
MiB Mem : 3477.3 total, 555.7 free, 1547.0 used, 1495.0 buff/cache
MiB Swap: 2739.0 total, 2739.0 free, 0.0 used, 1930.4 avail Mem

PID USER PR NI VIRT RES SHR S %CPU %MEM TIME+ COMMAND
1946 afrah 20 0 4033596 406280 162460 S 9.0 11.4 1:11.41 gnome-s+
3079 afrah 20 0 710528 59788 44800 S 1.7 1.7 0:10.28 gnome-t+
2942 root 20 0 0 0 0 I 1.3 0.0 0:01.30 kworker+
3158 afrah 20 0 1657068 261736 122176 S 0.7 7.4 0:02.77 nautilus
1715 afrah 9 -11 124192 14728 9224 S 0.3 0.4 0:00.90 pipewire
4640 afrah 20 0 23204 5884 3708 R 0.3 0.2 0:00.06 top
1 root 20 0 23196 13892 9412 S 0.0 0.4 0:02.53 systemd
2 root 20 0 0 0 0 S 0.0 0.0 0:00.03 kthreadd
3 root 20 0 0 0 0 S 0.0 0.0 0:00.00 pool_wo+
4 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
5 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
6 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
7 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
8 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
11 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+
12 root 20 0 0 0 0 I 0.0 0.0 0:00.03 kworker+
13 root 0 -20 0 0 0 I 0.0 0.0 0:00.00 kworker+

```

27. Display current time and calendar (Hint: use date, cal commands) 2. Change the current date and time of the system to following 14th March 2024, 10:10 AM

date: shows current date and time, date '+%T': current time

cal / ncal: current calendar

sudo date -s '14 March 2024 10:10:00': Sets system date and time

```

afrah@afrah-VirtualBox:~$ date '+%T'
17:36:28
afrah@afrah-VirtualBox:~$ ncal
August 2025
Su 3 10 17 24 31
Mo 4 11 18 25
Tu 5 12 19 26
We 6 13 20 27
Th 7 14 21 28
Fr 1 8 15 22 29
Sa 2 9 16 23 30
afrah@afrah-VirtualBox:~$ sudo date -s '14 March 2024 10:10:00'
[sudo] password for afrah:
Thu Mar 14 10:10:00 AM IST 2024
afrah@afrah-VirtualBox:~$

```

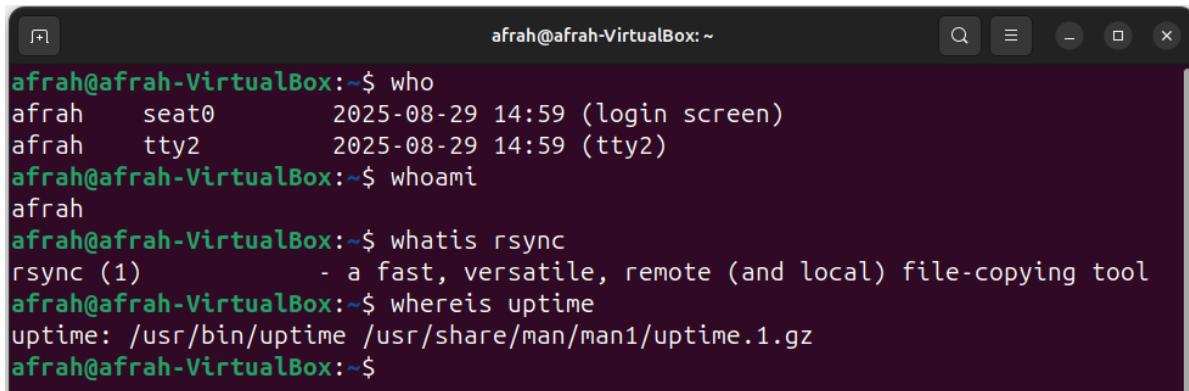
28. Explore following commands**29. who, whoami, whatis, whereis, (Hint: use man pages)**

who: logged in users with username, terminal sessions, and log in time

whoami: current username of active session

whatis <command>: gives one line description of the command

whereis<command>: displays path of binary, source and man page

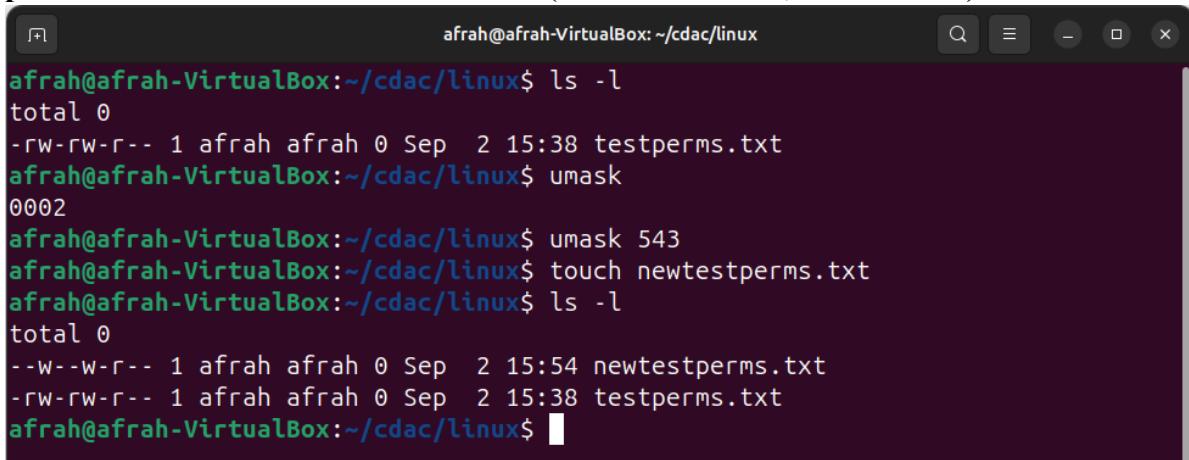


```
afrah@afrah-VirtualBox:~$ who
afrah    seat0          2025-08-29 14:59 (login screen)
afrah    tty2          2025-08-29 14:59 (tty2)
afrah@afrah-VirtualBox:~$ whoami
afrah
afrah@afrah-VirtualBox:~$ whatis rsync
rsync (1)           - a fast, versatile, remote (and local) file-copying tool
afrah@afrah-VirtualBox:~$ whereis uptime
uptime: /usr/bin/uptime /usr/share/man/man1/uptime.1.gz
afrah@afrah-VirtualBox:~$
```

30. Create one directory named linux. cd to that directory and create one file named

testperms.txt. Check the permissions of that file. Check the value of umask.

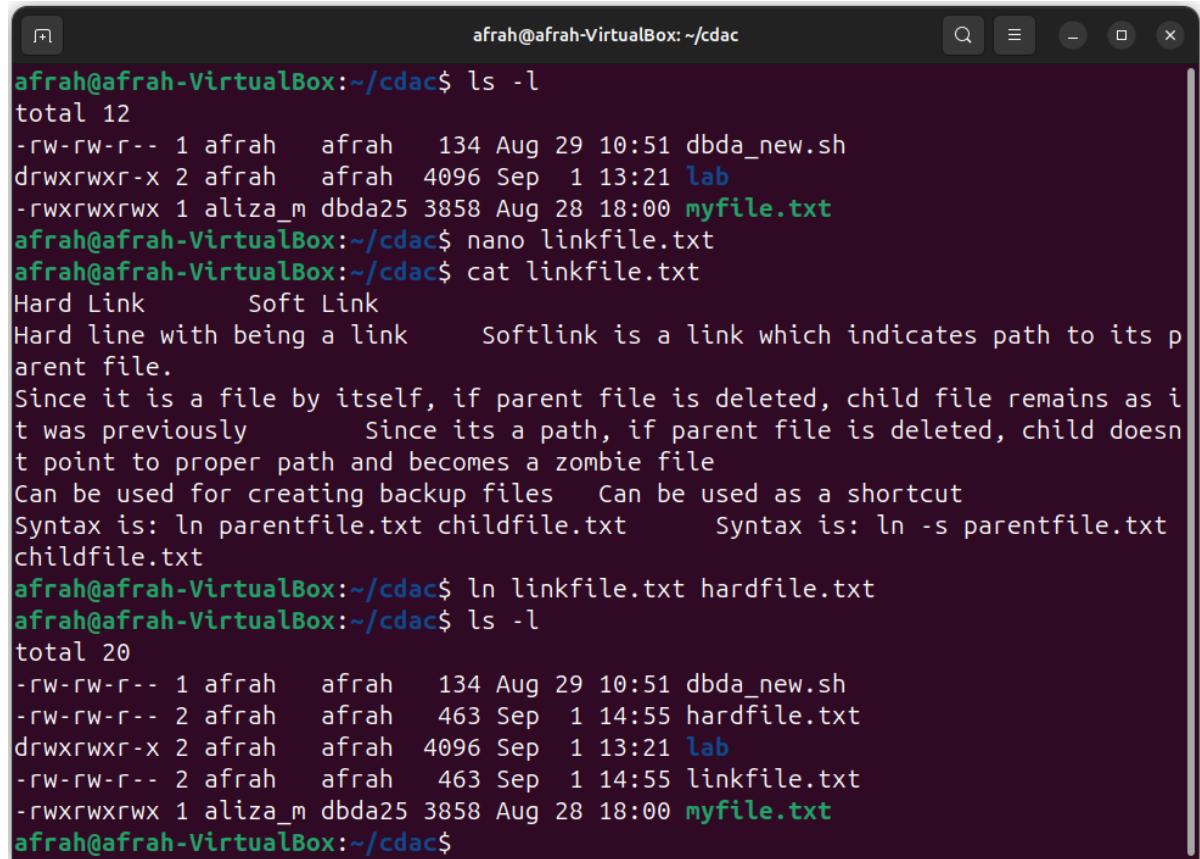
Change the value of umask and create one new file newtestperms.txt and check its permissions. Note down the difference. (Hint: use umask, ls command)



```
afrah@afrah-VirtualBox:~/cdac/linux$ ls -l
total 0
-rw-rw-r-- 1 afrah afrah 0 Sep  2 15:38 testperms.txt
afrah@afrah-VirtualBox:~/cdac/linux$ umask
0002
afrah@afrah-VirtualBox:~/cdac/linux$ umask 543
afrah@afrah-VirtualBox:~/cdac/linux$ touch newtestperms.txt
afrah@afrah-VirtualBox:~/cdac/linux$ ls -l
total 0
--w--w-r-- 1 afrah afrah 0 Sep  2 15:54 newtestperms.txt
-rw-rw-r-- 1 afrah afrah 0 Sep  2 15:38 testperms.txt
afrah@afrah-VirtualBox:~/cdac/linux$
```

31. Create a file and name it as file1.txt and create a hardlink to this file. (Hint: use ln command)

Command for creating hardlink: ln linkfile.txt hardfile.txt



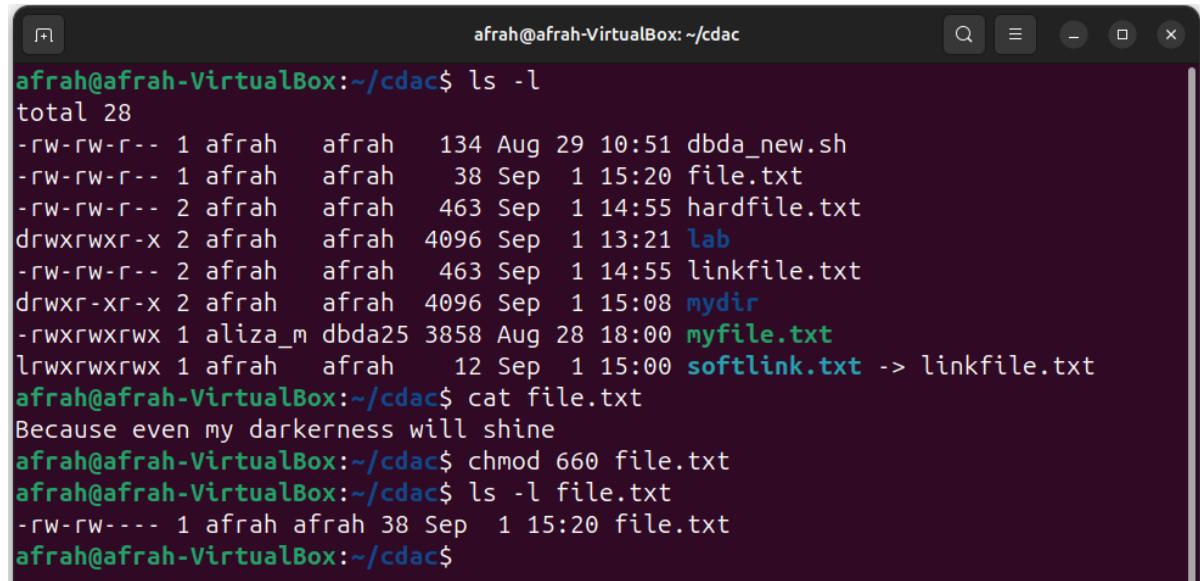
```

afrah@afrah-VirtualBox:~/cdac$ ls -l
total 12
-rw-rw-r-- 1 afrah    afrah    134 Aug 29 10:51 dbda_new.sh
drwxrwxr-x 2 afrah    afrah   4096 Sep  1 13:21 lab
-rwxrwxrwx 1 aliza_m dbda25 3858 Aug 28 18:00 myfile.txt
afrah@afrah-VirtualBox:~/cdac$ nano linkfile.txt
afrah@afrah-VirtualBox:~/cdac$ cat linkfile.txt
Hard Link      Soft Link
Hard line with being a link      Softlink is a link which indicates path to its parent file.
Since it is a file by itself, if parent file is deleted, child file remains as it was previously      Since its a path, if parent file is deleted, child doesn't point to proper path and becomes a zombie file
Can be used for creating backup files      Can be used as a shortcut
Syntax is: ln parentfile.txt childfile.txt      Syntax is: ln -s parentfile.txt childfile.txt
afrah@afrah-VirtualBox:~/cdac$ ln linkfile.txt hardfile.txt
afrah@afrah-VirtualBox:~/cdac$ ls -l
total 20
-rw-rw-r-- 1 afrah    afrah    134 Aug 29 10:51 dbda_new.sh
-rw-rw-r-- 2 afrah    afrah    463 Sep  1 14:55 hardfile.txt
drwxrwxr-x 2 afrah    afrah   4096 Sep  1 13:21 lab
-rw-rw-r-- 2 afrah    afrah    463 Sep  1 14:55 linkfile.txt
-rwxrwxrwx 1 aliza_m dbda25 3858 Aug 28 18:00 myfile.txt
afrah@afrah-VirtualBox:~/cdac$
```

32. Create a file and name it as file2.txt and create a softlink to this file.

(Hint: use ln command).

Command for softlink: ln -s linkfile.txt softlink.txt



```

afrah@afrah-VirtualBox:~/cdac$ ls -l
total 28
-rw-rw-r-- 1 afrah    afrah    134 Aug 29 10:51 dbda_new.sh
-rw-rw-r-- 1 afrah    afrah     38 Sep  1 15:20 file.txt
-rw-rw-r-- 2 afrah    afrah    463 Sep  1 14:55 hardfile.txt
drwxrwxr-x 2 afrah    afrah   4096 Sep  1 13:21 lab
-rw-rw-r-- 2 afrah    afrah    463 Sep  1 14:55 linkfile.txt
drwxr-xr-x 2 afrah    afrah   4096 Sep  1 15:08 mydir
-rwxrwxrwx 1 aliza_m dbda25 3858 Aug 28 18:00 myfile.txt
lrwxrwxrwx 1 afrah    afrah    12 Sep  1 15:00 softlink.txt -> linkfile.txt
afrah@afrah-VirtualBox:~/cdac$ cat file.txt
Because even my darkness will shine
afrah@afrah-VirtualBox:~/cdac$ chmod 660 file.txt
afrah@afrah-VirtualBox:~/cdac$ ls -l file.txt
-rw-rw---- 1 afrah afrah 38 Sep  1 15:20 file.txt
afrah@afrah-VirtualBox:~/cdac$
```

Hard Link	Soft link
Hard line with being a link.	Soft link is a link which indicates path to its parent file.
Since it is a file by itself, if parent file is deleted, child file remains as it was previously.	Since its a path, if parent file is deleted, child doesn't point tp proper path and becomes a zombie file.
Can be used for creating backup files.	Can be used as a shortcut.
Syntax is: In parentfile.ext childfile.ext	Syntax is: In -s parentfile.ext Q childfile.ext (here, -s indicates soft link)

**33. Use ssh to connect to your friend's shell by specifying port number in the ssh command. use exit command to come out of your friends shell.
(Hint: use ssh command)**

```

shreya@cdacdbda:~$ ssh shreya@192.168.5.27
The authenticity of host '192.168.5.27 (192.168.5.27)' can't be established.
ED25519 key fingerprint is SHA256:YV/EJ38D5ICzsa/upjlpp0+bM35/84DiVvk40hGjk
ioA.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.5.27' (ED25519) to the list of known hosts.
shreya@192.168.5.27's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-29-generic x86_64)

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

Expanded Security Maintenance for Applications is not enabled.

40 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

11 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

```

```

shreya@cdacdbda:~$ mkdir hello_shreya
shreya@cdacdbda:~$ ls
abc.zip          dir1           hello_shreya report.pdf
archive1.tar     dircopy        linux          rootdir
backup          directory      linux_lab    script.sh
cdac.txt         documents     log1.txt      shell
copy_hardlink.txt Documents1   log2.txt      shreya.txt
database.txt    documents1   log3.txt      snap
dbda_           Downloads     manuals      softfile2.txt
dbda_25         downloads2   Music        softlink.txt
dbda_f5.sh      Downlods     myfile.txt   sort_ex.txt
dbda_file.sh    file1.txt     new_project Templates
dbda_rnm1.sh    file2.txt     Pictures     temp.txt
dbda_rnm2.sh    file3.txt     project     test1
dbda_rnm3.sh    file5.txt     project1   Videos
dbda_rnm.sh     file_manual.txt workspace
Desktop         hardfile1.txt Public
shreya@cdacdbda:~$ exit
logout
Connection to 192.168.5.27 closed.
afrah@afrah-VirtualBox:~$ ls
afrah_hello  cdac_lab.tar  Documents  Pictures  snap      Videos
cdac        Desktop       Music      Public    Templates
afrah@afrah-VirtualBox:~$ 

```

34. Use scp using your friend's credentials to copy a file into a directory owned by your friend, inside his home directory, specify port number in scp command.
35. Use scp using your friend's credentials to copy directory into a directory owned by you, inside your home directory, specify port number in scp command
36. Use scp using your friend's credentials to copy directory into a directory owned by you, inside your home directory, specify port number in scp command

```

afrah@afrah-VirtualBox:~$ ls
afrah_hello  cdac_lab.tar  Documents  Pictures  snap      Videos
cdac        Desktop       Music      Public    Templates
afrah@afrah-VirtualBox:~$ cd cdac
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_new.sh  file2.txt    home       linux_lab.tar  my_lab.zip
emp.csv      file.txt     lab        mydir        softlink.txt
file1.txt    hardfile.txt linkfile.txt myfile.txt
afrah@afrah-VirtualBox:~/cdac$ scp /home/afrah/cdac/dbda_new.sh shreya@192.168.5.27:/home/shreya/Desktop
shreya@192.168.5.27's password:
dbda_new.sh                               100% 134      2.4KB/s  00:00
afrah@afrah-VirtualBox:~/cdac$ cd ..
afrah@afrah-VirtualBox:~$ cd Desktop
afrah@afrah-VirtualBox:~/Desktop$ ls
file1.txt
afrah@afrah-VirtualBox:~/Desktop$ 

```

- 37.** Connect to any publicly available **ftp** server from the terminal and try to download, upload and delete files. If you get error in any process (connect, upload, download or delete), justify the reasons behind them.(Hint: use **ftp** command) Example:

Try to access **ftp.netbsd.org**

username : **anonymous**

password : **anonymous**

- 38. How do you remove a directory named "mydir" and all of its contents using the command line?**

Command: `rm -r mydir`

“`rm -r`” is used to remove non-empty directories. The `-r` (recursive) flag recursively removes directories along with its content, including files and sub-directories.

```
afrah@afrah-VirtualBox:~/mydir$ tree
.
├── lab
│   ├── exp1.sh
│   └── exp2.sh
├── lab-commands.txt
└── OS
    └── notes.txt
Python
├── aasn2.py
└── assn1.py
assn3.py

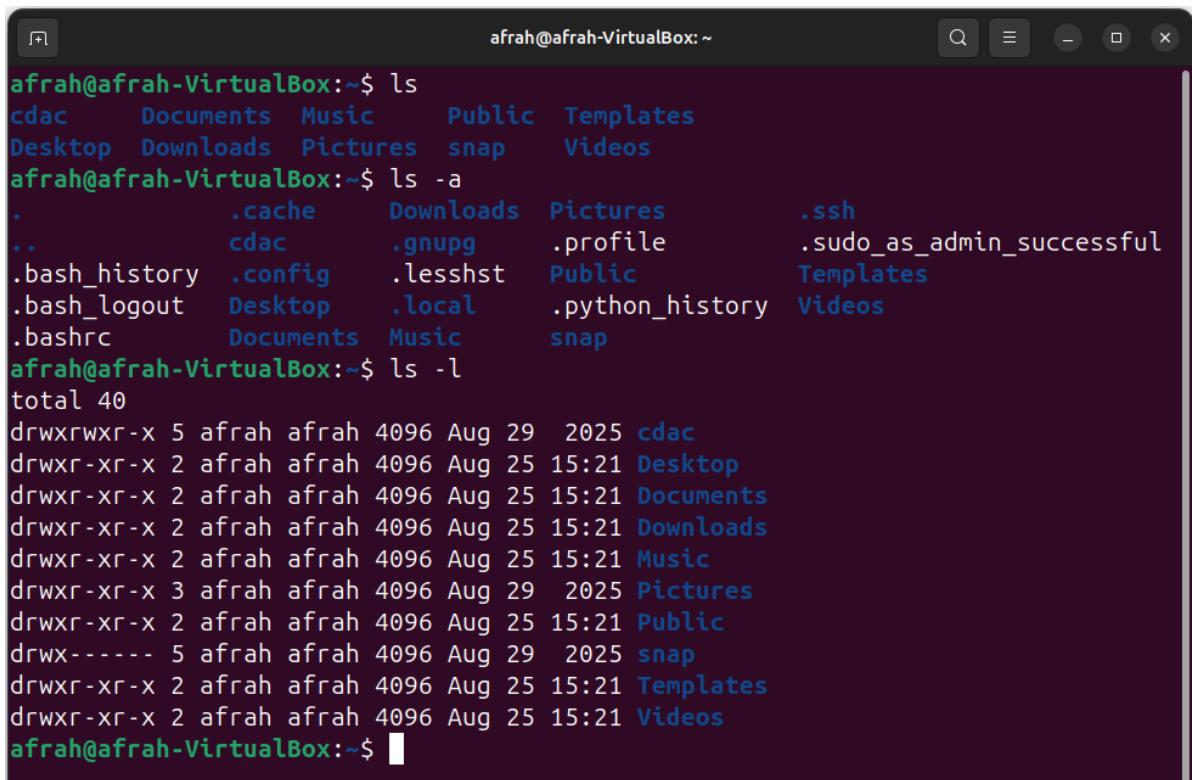
4 directories, 7 files
afrah@afrah-VirtualBox:~/mydir$ cd ..
afrah@afrah-VirtualBox:~$ ls
cdac  Documents  Music  Pictures  snap      Videos
Desktop  Downloads  mydir  Public    Templates
afrah@afrah-VirtualBox:~$ rm -r mydir
afrah@afrah-VirtualBox:~$ ls
cdac  Documents  Music      Public  Templates
Desktop  Downloads  Pictures  snap    Videos
afrah@afrah-VirtualBox:~$
```

- 39. How do you use the "ls" command to list all files and directories in the current directory?**

`ls` – lists files and directories

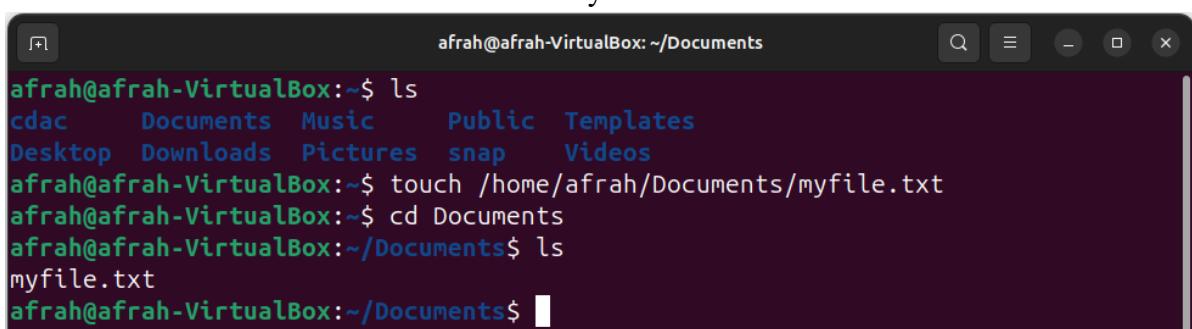
`ls -a` – includes hidden files

`ls -l` – long format with details



```
afrah@afrah-VirtualBox:~$ ls
cdac  Documents  Music  Public  Templates
Desktop  Downloads  Pictures  snap  Videos
afrah@afrah-VirtualBox:~$ ls -a
.  .cache  Downloads  Pictures  .ssh
..  cdac  .gnupg  .profile  .sudo_as_admin_successful
.bash_history  .config  .lessht  Public  Templates
.bash_logout  Desktop  .local  .python_history  Videos
.bashrc  Documents  Music  snap
afrah@afrah-VirtualBox:~$ ls -l
total 40
drwxrwxr-x 5 afrah afrah 4096 Aug 29 2025 cdac
drwxr-xr-x 2 afrah afrah 4096 Aug 25 15:21 Desktop
drwxr-xr-x 2 afrah afrah 4096 Aug 25 15:21 Documents
drwxr-xr-x 2 afrah afrah 4096 Aug 25 15:21 Downloads
drwxr-xr-x 2 afrah afrah 4096 Aug 25 15:21 Music
drwxr-xr-x 3 afrah afrah 4096 Aug 29 2025 Pictures
drwxr-xr-x 2 afrah afrah 4096 Aug 25 15:21 Public
drwx----- 5 afrah afrah 4096 Aug 29 2025 snap
drwxr-xr-x 2 afrah afrah 4096 Aug 25 15:21 Templates
drwxr-xr-x 2 afrah afrah 4096 Aug 25 15:21 Videos
afrah@afrah-VirtualBox:~$
```

- 40. How do you create a new file named "myfile.txt" in the directory "/home/user/documents" using the command line?**
- Command: touch /home/afrah/Documents/myfile.txt

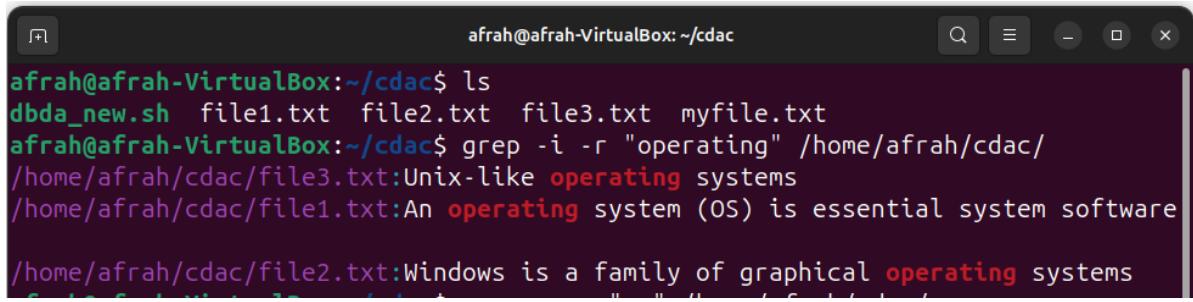


```
afrah@afrah-VirtualBox:~$ ls
cdac  Documents  Music  Public  Templates
Desktop  Downloads  Pictures  snap  Videos
afrah@afrah-VirtualBox:~$ touch /home/afrah/Documents/myfile.txt
afrah@afrah-VirtualBox:~$ cd Documents
afrah@afrah-VirtualBox:~/Documents$ ls
myfile.txt
afrah@afrah-VirtualBox:~/Documents$
```

- 41. How do you use the "grep" command to search for a specific word or phrase in multiple files at once?**

Command: grep -i -r "operating" /home/afrah/cdac/

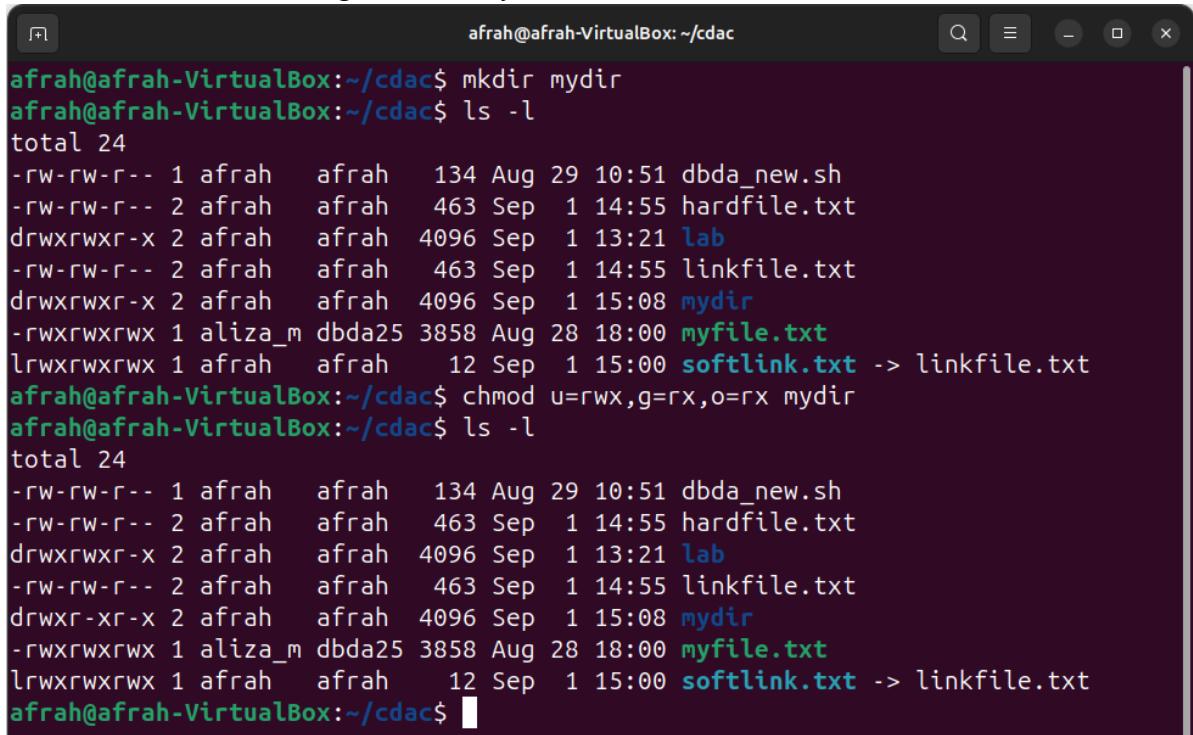
-i is used for case insensitive pattern match and -r recursively checks through every file to match the pattern



```
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_new.sh  file1.txt  file2.txt  file3.txt  myfile.txt
afrah@afrah-VirtualBox:~/cdac$ grep -i -r "operating" /home/afrah/cdac/
/home/afrah/cdac/file3.txt:Unix-like operating systems
/home/afrah/cdac/file1.txt:An operating system (OS) is essential system software
/home/afrah/cdac/file2.txt:Windows is a family of graphical operating systems
```

- 42. How do you create a new directory named "mydir" and set its permissions to read, write, and execute for the owner and read and execute for everyone else?**

Command: chmod u=rwx,g=rx,o=rx mydir



```
afrah@afrah-VirtualBox:~/cdac$ mkdir mydir
afrah@afrah-VirtualBox:~/cdac$ ls -l
total 24
-rw-rw-r-- 1 afrah    afrah    134 Aug 29 10:51 dbda_new.sh
-rw-rw-r-- 2 afrah    afrah    463 Sep  1 14:55 hardfile.txt
drwxrwxr-x 2 afrah    afrah   4096 Sep  1 13:21 lab
-rw-rw-r-- 2 afrah    afrah    463 Sep  1 14:55 linkfile.txt
drwxrwxr-x 2 afrah    afrah   4096 Sep  1 15:08 mydir
-rwxrwxrwx 1 aliza_m  dbda25 3858 Aug 28 18:00 myfile.txt
lrwxrwxrwx 1 afrah    afrah     12 Sep  1 15:00 softlink.txt -> linkfile.txt
afrah@afrah-VirtualBox:~/cdac$ chmod u=rwx,g=rx,o=rx mydir
afrah@afrah-VirtualBox:~/cdac$ ls -l
total 24
-rw-rw-r-- 1 afrah    afrah    134 Aug 29 10:51 dbda_new.sh
-rw-rw-r-- 2 afrah    afrah    463 Sep  1 14:55 hardfile.txt
drwxrwxr-x 2 afrah    afrah   4096 Sep  1 13:21 lab
-rw-rw-r-- 2 afrah    afrah    463 Sep  1 14:55 linkfile.txt
drwxr-xr-x 2 afrah    afrah   4096 Sep  1 15:08 mydir
-rwxrwxrwx 1 aliza_m  dbda25 3858 Aug 28 18:00 myfile.txt
lrwxrwxrwx 1 afrah    afrah     12 Sep  1 15:00 softlink.txt -> linkfile.txt
```

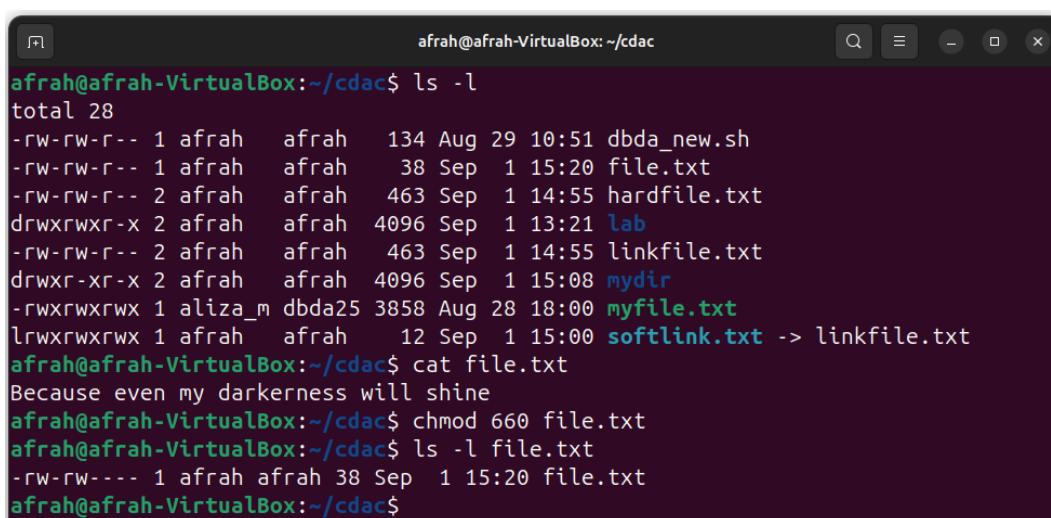
- 43. How do you use the "tar" command to create a compressed archive of all files in the current directory and its subdirectories?**

Command: tar -cvf cdac_lab.tar /home/afrah/cdac

```

afrah@afrah-VirtualBox:~$ ls
cdac  Desktop  Documents  Music  Pictures  Public  snap  Templates  Videos
afrah@afrah-VirtualBox:~$ tar -cvf cdac_lab.tar /home/afrah/cdac
tar: Removing leading '/' from member names
/home/afrah/cdac/
/home/afrah/cdac/linux_lab.tar
/home/afrah/cdac/myfile.txt
/home/afrah/cdac/file.txt
/home/afrah/cdac/linkfile.txt
tar: Removing leading '/' from hard link targets
/home/afrah/cdac/softlink.txt
/home/afrah/cdac/dbda_new.sh
/home/afrah/cdac/my_lab.zip
/home/afrah/cdac/mydir/
/home/afrah/cdac/lab/
/home/afrah/cdac/lab/six.sh
/home/afrah/cdac/lab/twelve.sh
/home/afrah/cdac/lab/eleven.sh
/home/afrah/cdac/lab/fourteen.sh
/home/afrah/cdac/lab/three.sh
/home/afrah/cdac/lab/one.sh
/home/afrah/cdac/lab/eight.sh
/home/afrah/cdac/lab/five.sh
/home/afrah/cdac/lab/sixteen.sh
/home/afrah/cdac/lab/thirteen.sh
/home/afrah/cdac/lab/seven.sh
/home/afrah/cdac/lab/ten.sh
/home/afrah/cdac/lab/nine.sh
/home/afrah/cdac/lab/four.sh
/home/afrah/cdac/lab/two.sh
/home/afrah/cdac/lab/fifteen.sh
/home/afrah/cdac/hardfile.txt
afrah@afrah-VirtualBox:~$ ls
cdac      Desktop   Music    Public   Templates
cdac_lab.tar  Documents  Pictures  snap    Videos
afrah@afrah-VirtualBox:~$
```

44. How do you use the "chmod" command to give read and write permissions to the owner and group for a file named "file.txt"?



The screenshot shows a terminal window with the following session:

```

afrah@afrah-VirtualBox:~/cdac$ ls -l
total 28
-rw-rw-r-- 1 afrah  afrah  134 Aug 29 10:51 dbda_new.sh
-rw-rw-r-- 1 afrah  afrah   38 Sep  1 15:20 file.txt
-rw-rw-r-- 2 afrah  afrah  463 Sep  1 14:55 hardfile.txt
drwxrwxr-x 2 afrah  afrah 4096 Sep  1 13:21 lab
-rw-rw-r-- 2 afrah  afrah  463 Sep  1 14:55 linkfile.txt
drwxr-xr-x 2 afrah  afrah 4096 Sep  1 15:08 mydir
-rwxrwxrwx 1 aliza_m dbda25 3858 Aug 28 18:00 myfile.txt
lrwxrwxrwx 1 afrah  afrah    12 Sep  1 15:00 softlink.txt -> linkfile.txt
afrah@afrah-VirtualBox:~/cdac$ cat file.txt
Because even my darkness will shine
afrah@afrah-VirtualBox:~/cdac$ chmod 660 file.txt
afrah@afrah-VirtualBox:~/cdac$ ls -l file.txt
-rw-rw---- 1 afrah afrah 38 Sep  1 15:20 file.txt
afrah@afrah-VirtualBox:~/cdac$
```

45. How do you find the size of a file named "file.txt" in bytes, kilobytes, and megabytes using the command line?

Command: ls -lh

-h is used for representing the size in human readable format (in kB, MB, GB)

```
afrah@afrah-VirtualBox:~/cdac$ ls -lh
total 20K
-rwxrwxrwx 1 afrah afrah 134 Aug 29 10:51 dbda_new.sh
-rw-rw-r-- 1 afrah afrah 442 Aug 31 14:01 file1.txt
-rw-rw-r-- 1 afrah afrah 235 Aug 31 14:02 file2.txt
-rw-rw-r-- 1 afrah afrah 144 Aug 29 15:55 file3.txt
-rw-rw-r-- 1 afrah afrah 3.8K Aug 28 18:00 myfile.txt
afrah@afrah-VirtualBox:~/cdac$ cd ..
afrah@afrah-VirtualBox:~$ ls -lh
total 40K
drwxrwxr-x 2 afrah afrah 4.0K Aug 31 14:02 cdac
drwxr-xr-x 2 afrah afrah 4.0K Aug 25 15:21 Desktop
drwxr-xr-x 2 afrah afrah 4.0K Aug 29 23:44 Documents
drwxr-xr-x 2 afrah afrah 4.0K Aug 28 17:56 Downloads
drwxr-xr-x 2 afrah afrah 4.0K Aug 25 15:21 Music
drwxr-xr-x 3 afrah afrah 4.0K Aug 29 15:12 Pictures
drwxr-xr-x 2 afrah afrah 4.0K Aug 25 15:21 Public
drwx----- 5 afrah afrah 4.0K Aug 29 14:59 snap
drwxr-xr-x 2 afrah afrah 4.0K Aug 25 15:21 Templates
drwxr-xr-x 2 afrah afrah 4.0K Aug 25 15:21 Videos
afrah@afrah-VirtualBox:~$
```

46. How do you use the "awk" command to extract a specific column from a comma-separated value (CSV) file and sort it in reverse order?

```
afrah@afrah-VirtualBox:~$ cd cdac
afrah@afrah-VirtualBox:~/cdac$ nano emp.csv
afrah@afrah-VirtualBox:~/cdac$ cat emp.csv
9012,Rachel,Booker,Sales
2070,Laura,Gray,Depot
9346,Mary,Smith,Finance
4623,Judi,Picoult,HR
5079,Martha,James,Planning
afrah@afrah-VirtualBox:~/cdac$ awk -F',' '{print $4}' emp.csv | sort -r
Sales
Planning
HR
Finance
Depot
Planning
Sales
afrah@afrah-VirtualBox:~/cdac$
```

47. How do you use the "sed" command to replace all occurrences of a word or phrase in a file with a different word or phrase?

Command: sed 's/Anna/Alice/g' myfile.txt | head -n 3

sed is used to show the changes made to the file only on the output stream, it doesn't overwrite the file.

s is for substitute, / is used as a delimiter, next the pattern to be changed and then the new pattern is given, g is for making global changes to all the occurrences of the pattern in a line, not only the first occurrence, last we give the filename.

```
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_new.sh  file1.txt  file2.txt  file3.txt  myfile.txt
afrah@afrah-VirtualBox:~/cdac$ sed 's/Anna/Alice/g' myfile.txt | head -n 3
The story takes place in the fictional town of Upper Darby, Rhode Island in 2004 .
Alice Fitzgerald's older sister, Kate, suffers from acute promyelocytic leukemia, a blood and bone marrow cancer. Alice was born as a savior sister specifically so she could save Kate's life through the donation of her umbilical cord blood. At first it is successful, but the cancer continues to reoccur throughout Kate's life.

Alice is usually willing to donate whatever Kate needs, but when she turns 13, she is told that she will have to donate one of her kidneys due to Kate's kidney failure. The surgery required for both Kate and Alice would be major; it is not guaranteed to work, as the stress of the operation may kill Kate anyway, and the loss of a kidney could have a serious impact on Alice's life. Alice petitions for medical emancipation with the help of lawyer Campbell Alexander, so she will be able to make her own decisions regarding her medical treatment and the donation of her kidney.
afrah@afrah-VirtualBox:~/cdac$
```

48. How do you use the "find" command to search for all files in a directory and its subdirectories that were modified within the last 24 hours?

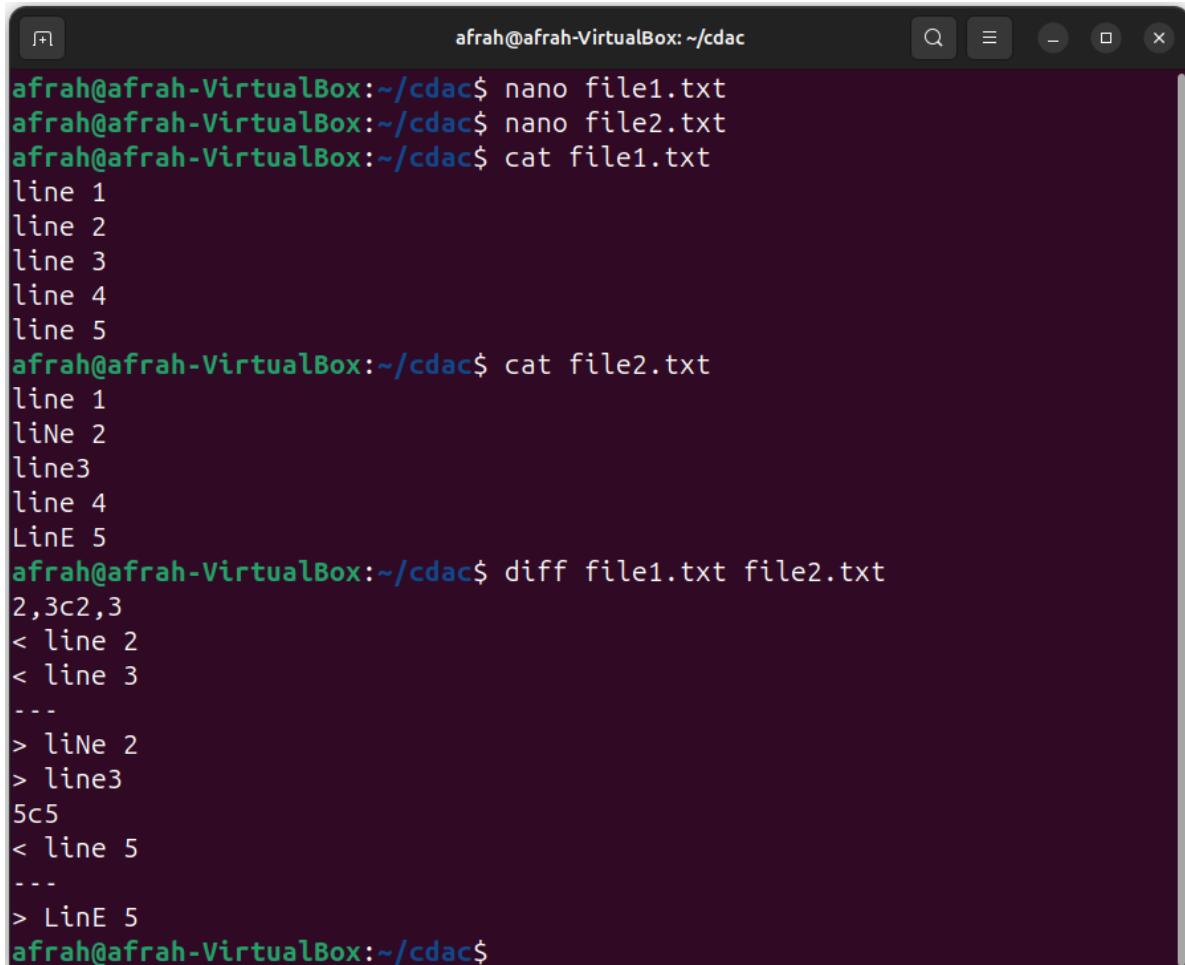
Command: find /home/afrah/cdac/ -type f -mtime 1

We specify the directory where the file should be searched, the type whether it's a file (f) or directory (d), and then mtime, which represents modification time and 1 indicates within the last 1 day i.e., 24 hrs.

```
afrah@afrah-VirtualBox:~/cdac$ ls *
dbda_new.sh  file1.txt  file2.txt  file3.txt  myfile.txt

lab:
newfile.txt
afrah@afrah-VirtualBox:~/cdac$ find /home/afrah/cdac/ -type f -mtime 1
/home/afrah/cdac/file3.txt
afrah@afrah-VirtualBox:~/cdac$
```

49. How do you use the "diff" command to compare two files and show only the lines that are different between them?



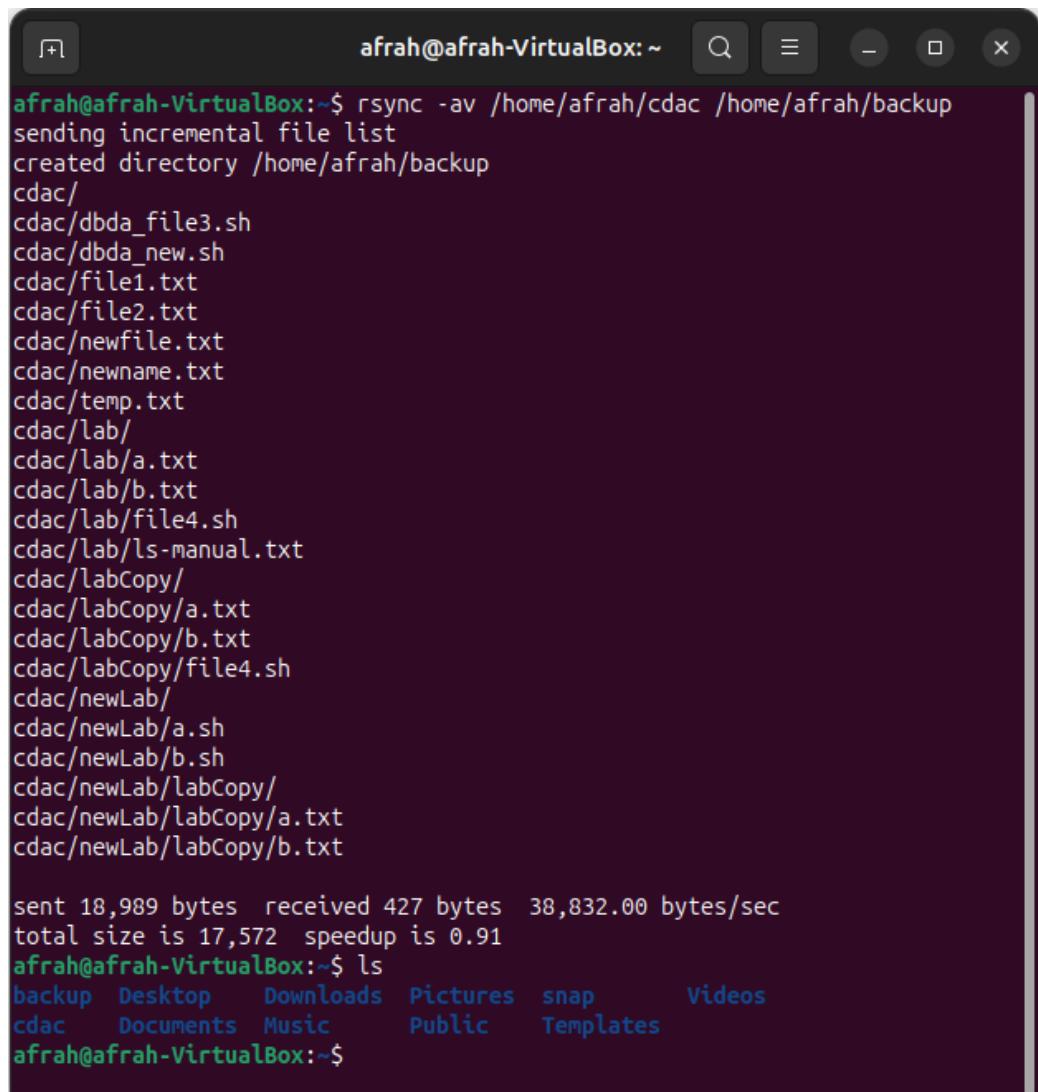
The screenshot shows a terminal window with the following session:

```
afrah@afrah-VirtualBox:~/cdac$ nano file1.txt
afrah@afrah-VirtualBox:~/cdac$ nano file2.txt
afrah@afrah-VirtualBox:~/cdac$ cat file1.txt
line 1
line 2
line 3
line 4
line 5
afrah@afrah-VirtualBox:~/cdac$ cat file2.txt
line 1
liNe 2
line3
line 4
LinE 5
afrah@afrah-VirtualBox:~/cdac$ diff file1.txt file2.txt
2,3c2,3
< line 2
< line 3
---
> liNe 2
> line3
5c5
< line 5
---
> LinE 5
afrah@afrah-VirtualBox:~/cdac$
```

50. How do you use the "rsync" command to synchronize the contents of two directories, including all subdirectories and files, while preserving file permissions and ownerships?

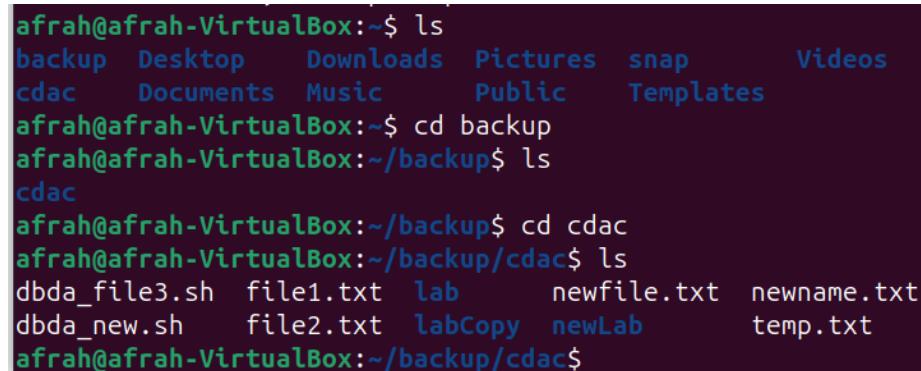
Command: rsync -av /home/afrah/cdac /home/afrah/backup

Syncs directories and files with attributes, permissions and ownerships reserved.

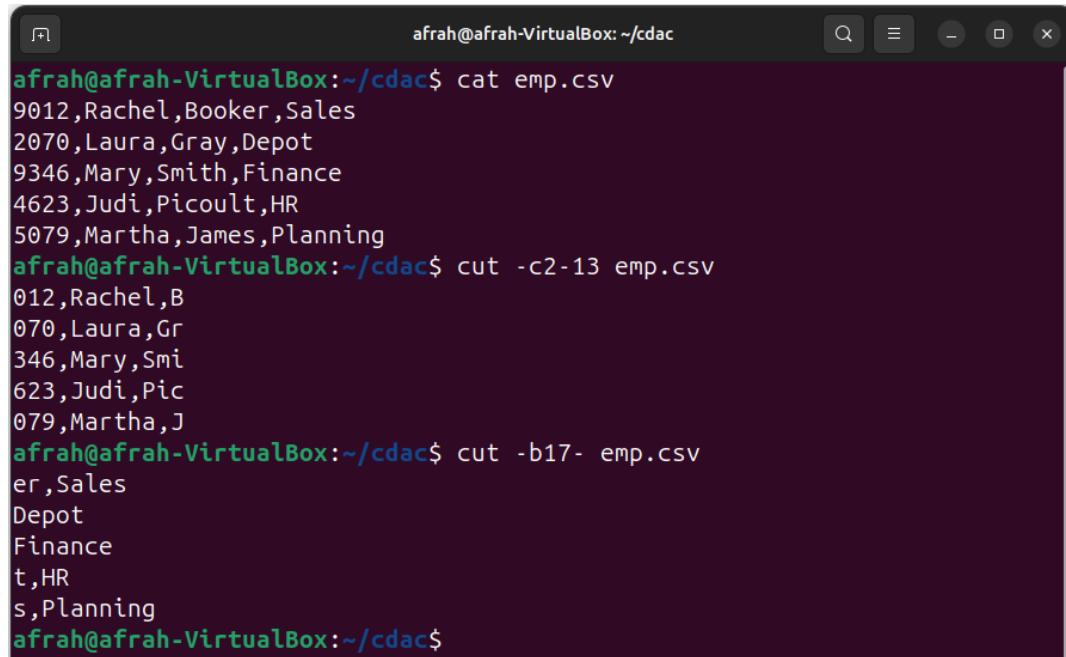


```
afrah@afrah-VirtualBox:~$ rsync -av /home/afrah/cdac /home/afrah/backup
sending incremental file list
created directory /home/afrah/backup
cdac/
cdac/dbda_file3.sh
cdac/dbda_new.sh
cdac/file1.txt
cdac/file2.txt
cdac/newfile.txt
cdac/newname.txt
cdac/temp.txt
cdac/lab/
cdac/lab/a.txt
cdac/lab/b.txt
cdac/lab/file4.sh
cdac/lab/ls-manual.txt
cdac/labCopy/
cdac/labCopy/a.txt
cdac/labCopy/b.txt
cdac/labCopy/file4.sh
cdac/newLab/
cdac/newLab/a.sh
cdac/newLab/b.sh
cdac/newLab/labCopy/
cdac/newLab/labCopy/a.txt
cdac/newLab/labCopy/b.txt

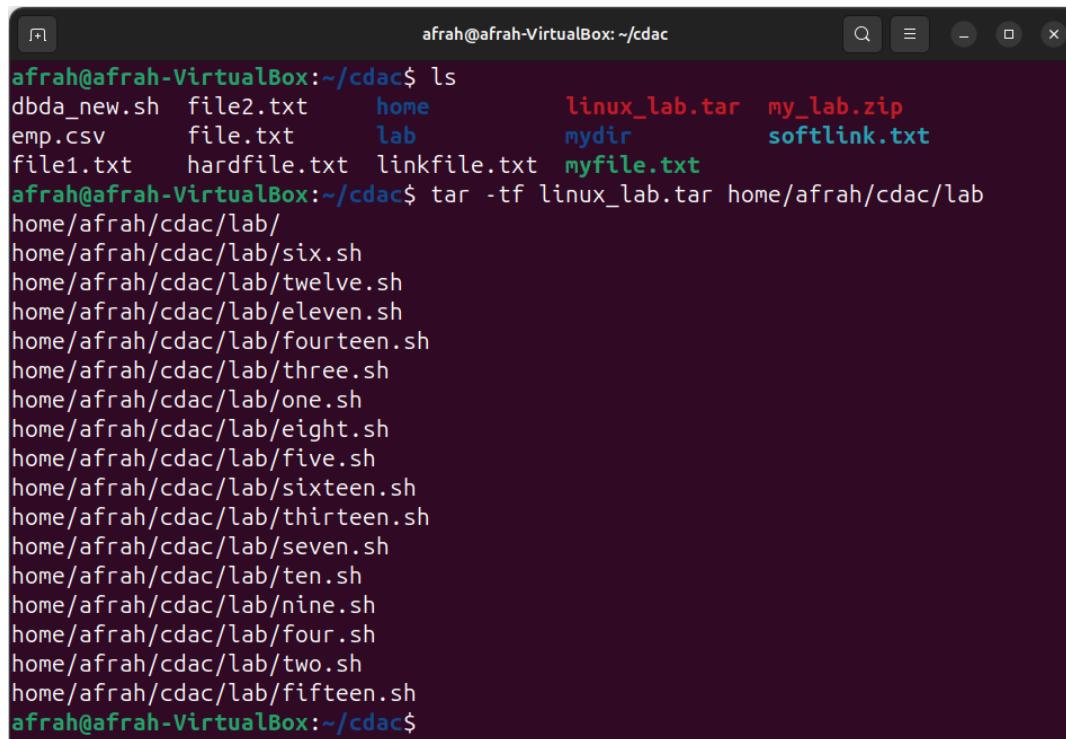
sent 18,989 bytes received 427 bytes 38,832.00 bytes/sec
total size is 17,572 speedup is 0.91
afrah@afrah-VirtualBox:~$ ls
backup Desktop Downloads Pictures snap Videos
cdac Documents Music Public Templates
afrah@afrah-VirtualBox:~$
```



```
afrah@afrah-VirtualBox:~$ ls
backup Desktop Downloads Pictures snap Videos
cdac Documents Music Public Templates
afrah@afrah-VirtualBox:~$ cd backup
afrah@afrah-VirtualBox:~/backup$ ls
cdac
afrah@afrah-VirtualBox:~/backup$ cd cdac
afrah@afrah-VirtualBox:~/backup/cdac$ ls
dbda_file3.sh file1.txt lab newfile.txt newname.txt
dbda_new.sh file2.txt labCopy newLab temp.txt
afrah@afrah-VirtualBox:~/backup/cdac$
```

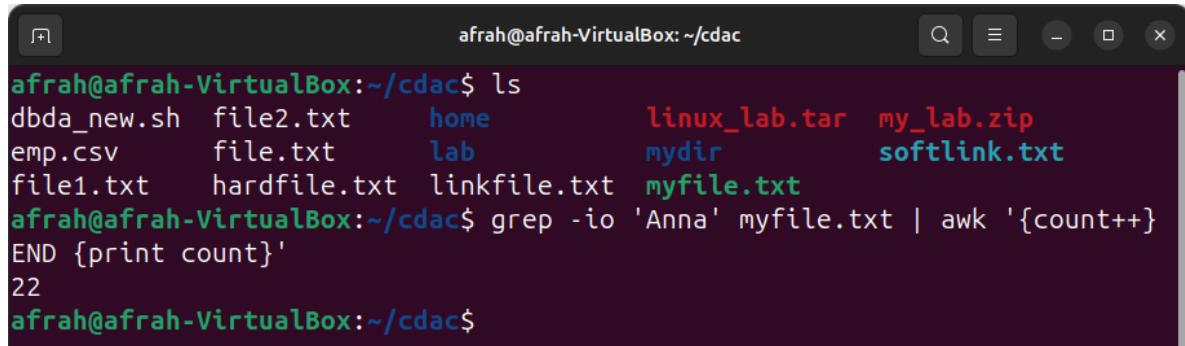
51. How do you use the "cut" command to extract a specific range of characters or bytes from a file?

```
afrah@afrah-VirtualBox:~/cdac$ cat emp.csv
9012,Rachel,Booker,Sales
2070,Laura,Gray,Depot
9346,Mary,Smith,Finance
4623,Judi,Picoult,HR
5079,Martha,James,Planning
afrah@afrah-VirtualBox:~/cdac$ cut -c2-13 emp.csv
012,Rachel,B
070,Laura,Gr
346,Mary,Smi
623,Judi,Pic
079,Martha,J
afrah@afrah-VirtualBox:~/cdac$ cut -b17- emp.csv
er,Sales
Depot
Finance
t,HR
s,Planning
afrah@afrah-VirtualBox:~/cdac$
```

52. How do you use the "tar" command to extract a specific file or directory from a compressed archive without extracting the entire archive?

```
afrah@afrah-VirtualBox:~/cdac$ ls
dbda_new.sh  file2.txt    home        linux_lab.tar  my_lab.zip
emp.csv       file.txt     lab         mydir        softlink.txt
file1.txt     hardfile.txt linkfile.txt myfile.txt
afrah@afrah-VirtualBox:~/cdac$ tar -tf linux_lab.tar home/afrah/cdac/lab
home/afrah/cdac/lab/
home/afrah/cdac/lab/six.sh
home/afrah/cdac/lab/twelve.sh
home/afrah/cdac/lab/eleven.sh
home/afrah/cdac/lab/fourteen.sh
home/afrah/cdac/lab/three.sh
home/afrah/cdac/lab/one.sh
home/afrah/cdac/lab/eight.sh
home/afrah/cdac/lab/five.sh
home/afrah/cdac/lab/sixteen.sh
home/afrah/cdac/lab/thirteen.sh
home/afrah/cdac/lab/seven.sh
home/afrah/cdac/lab/ten.sh
home/afrah/cdac/lab/nine.sh
home/afrah/cdac/lab/four.sh
home/afrah/cdac/lab/two.sh
home/afrah/cdac/lab/fifteen.sh
afrah@afrah-VirtualBox:~/cdac$
```

53. How do you use the "awk" command to count the number of occurrences of a specific word or phrase in a file?



The screenshot shows a terminal window titled 'afrah@afrah-VirtualBox: ~/cdac'. The user has run several commands:

- 'ls' command listing files: dbda_new.sh, file2.txt, home, linux_lab.tar, my_lab.zip, emp.csv, file.txt, lab, mydir, softlink.txt, file1.txt, hardfile.txt, linkfile.txt, myfile.txt.
- 'grep -io 'Anna' myfile.txt | awk '{count++}' END {print count}'' command which counts the occurrences of the word 'Anna' in 'myfile.txt'.
- The output of the awk command is '22'.