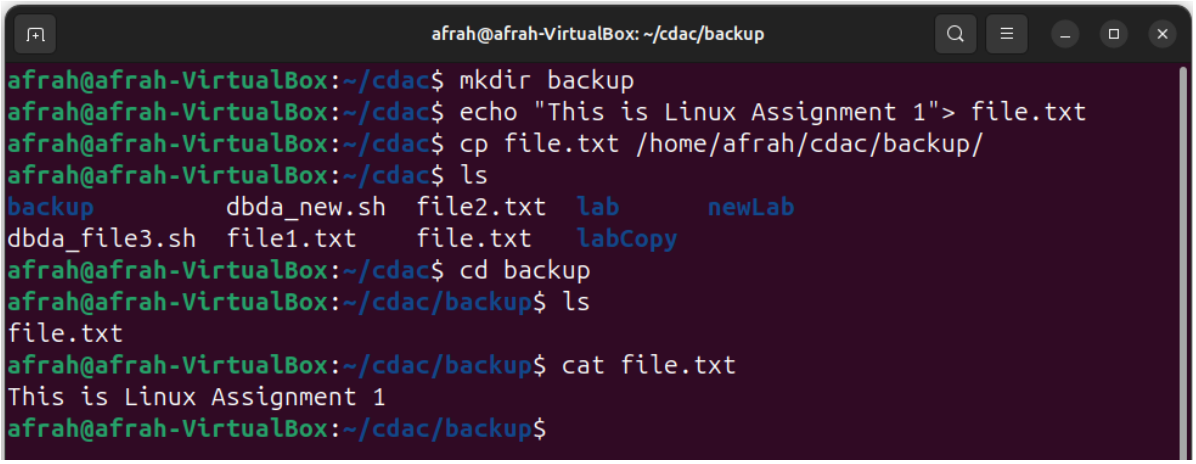
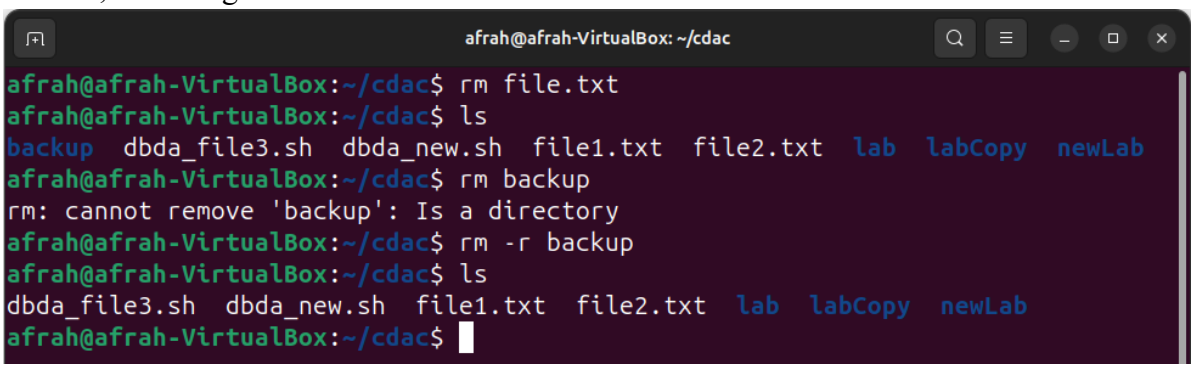
Assignment 1

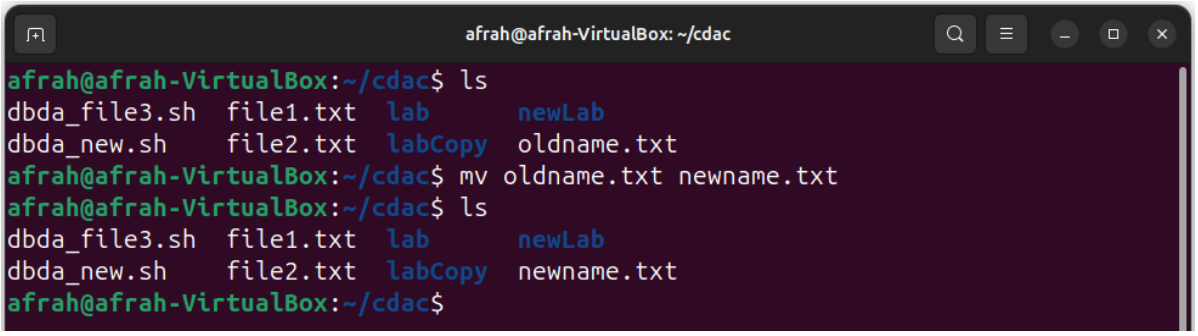
1. **How do you use the "cp" command to copy a file named "file.txt" from the current directory to a directory named "backup"?**
   Command: cp file.txt /home/afrah/cdac/backup
   This copies file.txt from current directory into the backup directory.



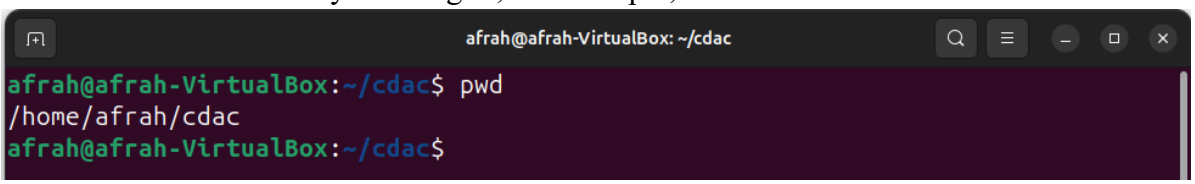
2. **What is the difference between the "rm" and "rm -r" commands in Linux?**
   "rm" command is used to remove a single file. Whereas, "rm -r" is used to remove non-empty directories. The -r (recursive) flag recursively removes directories along with its content, including files and sub-directories.



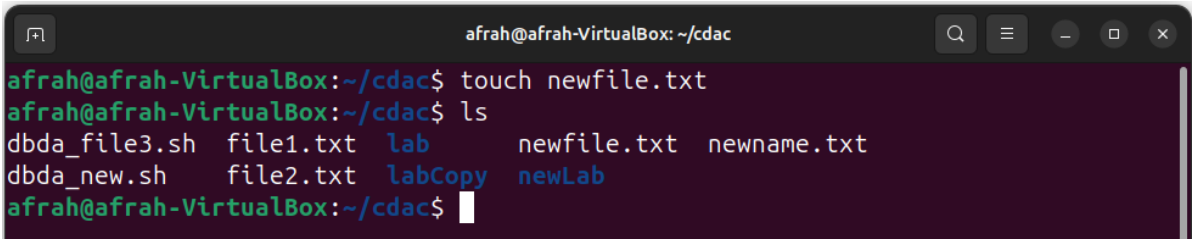
3. **How do you use the "mv" command to rename a file named "oldname.txt" to "newname.txt"?**
   Command: mv oldname.txt newname.txt
   This renames the file



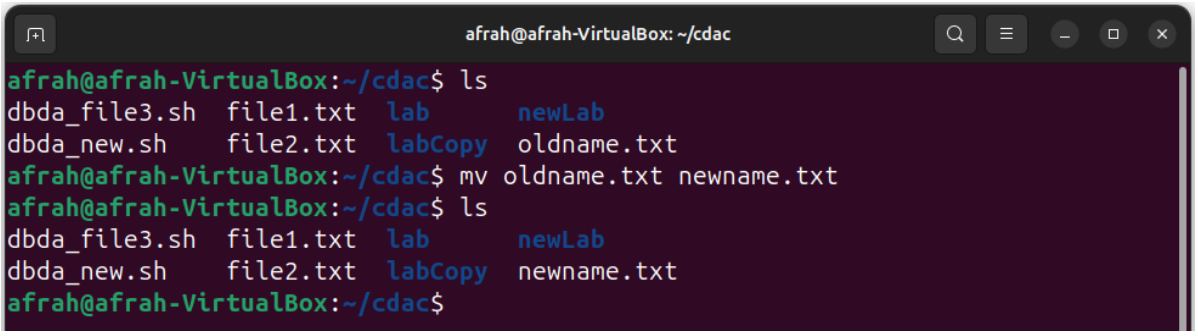
4. **What does the "pwd" command do in Linux?**
   The command "pwd" (present working directory") displays the current working directory which the user is currently working in, for example, /home/afrah/linux-lab



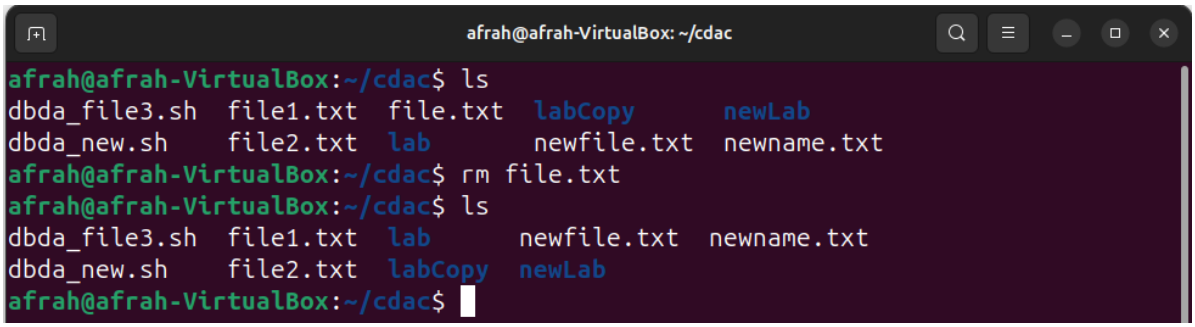
5. **How do you create a new empty file named "newfile.txt" in the current directory using the command line?**
   Command: touch newfile.txt
   This creates an empty file named newfile.txt



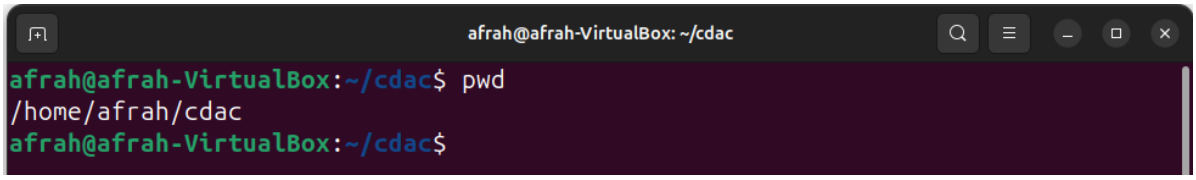
6. **How do you rename a file named "oldname.txt" to "newname.txt" using the command line?**
   Command: mv oldname.txt newname.txt
   This renames the file



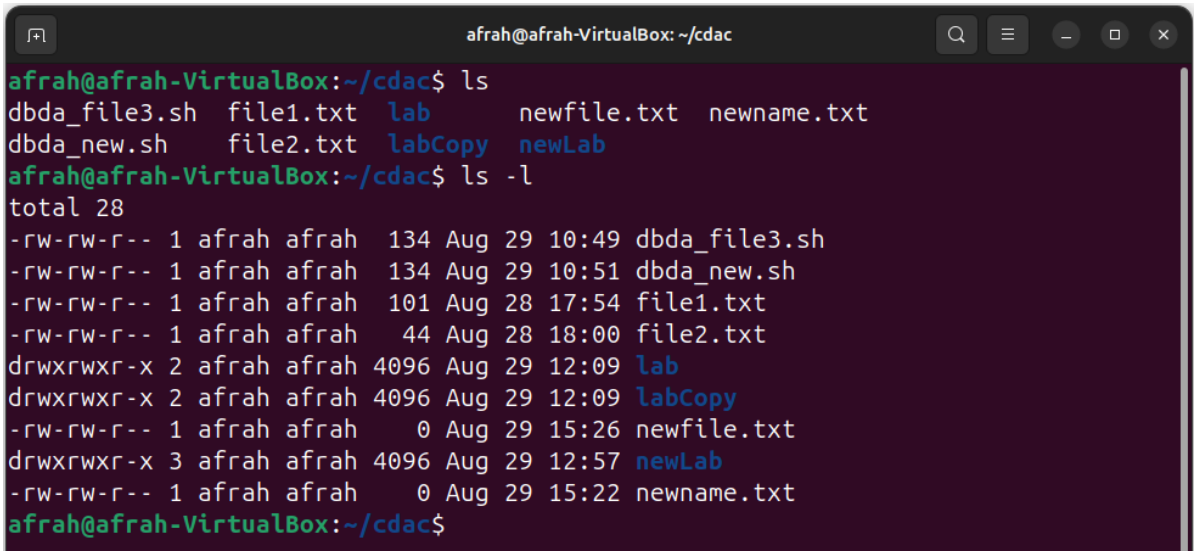
7. **How do you remove a file named "file.txt" from the current directory using the command line?**
   Command: rm file.txt
   Deletes file.txt from current directory



8. **Use a command to show the current working directory**
   Command: pwd
   Displays the current working directory



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.



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.**

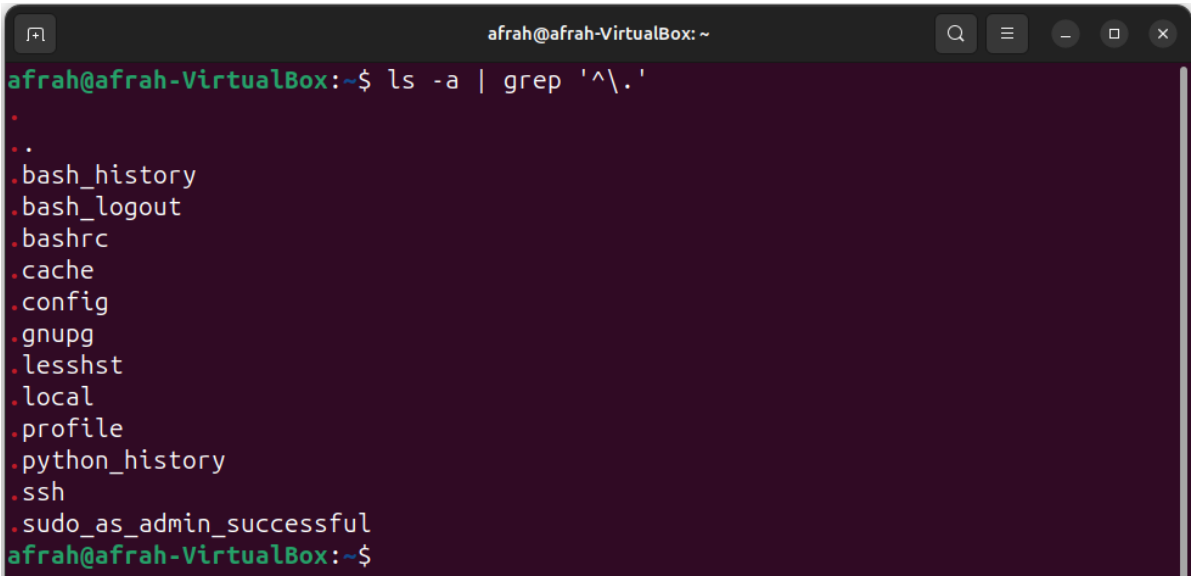
    Command: ls -a
    Hidden files start with a '.'

```
afrah@afrah-VirtualBox: ~
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

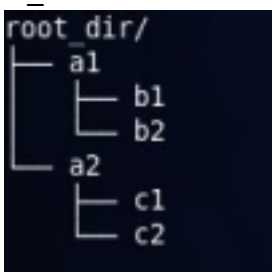
Command: ls -a | grep '^\.'

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.

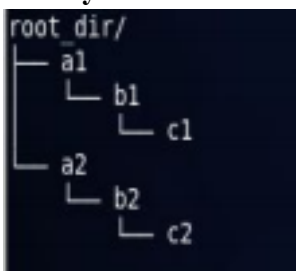


13. Make a directory and name it as cdac-dir and change the current working directory to the new directory. (Hint : use mkdir, cd commands). 3. Create following nested directories inside the current directory by invoking a single command for only one time.

Note : here root_dir is the current directory.

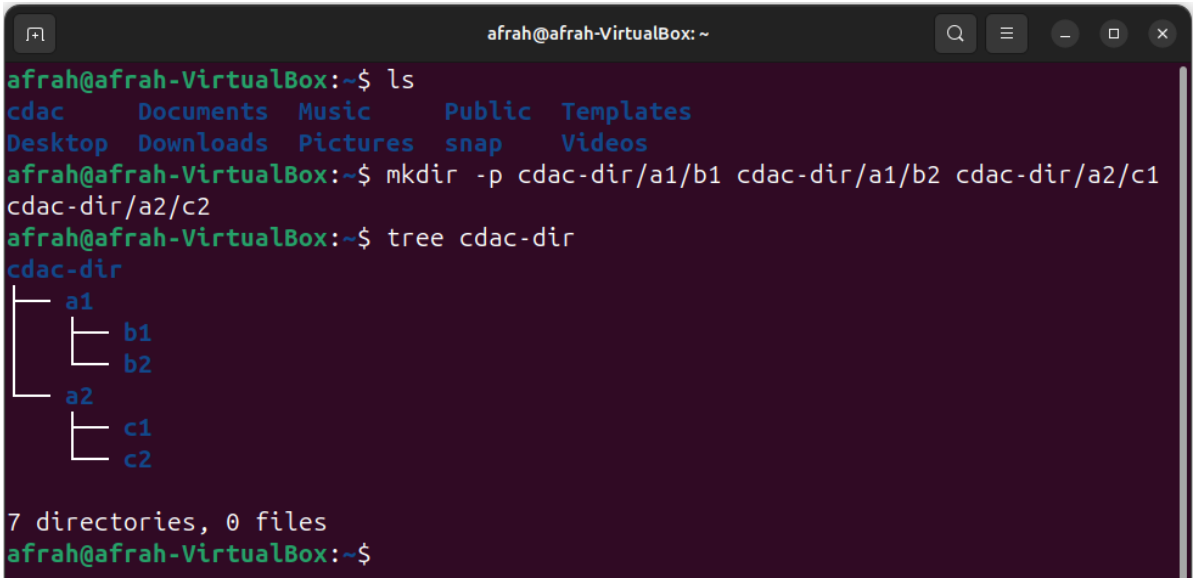


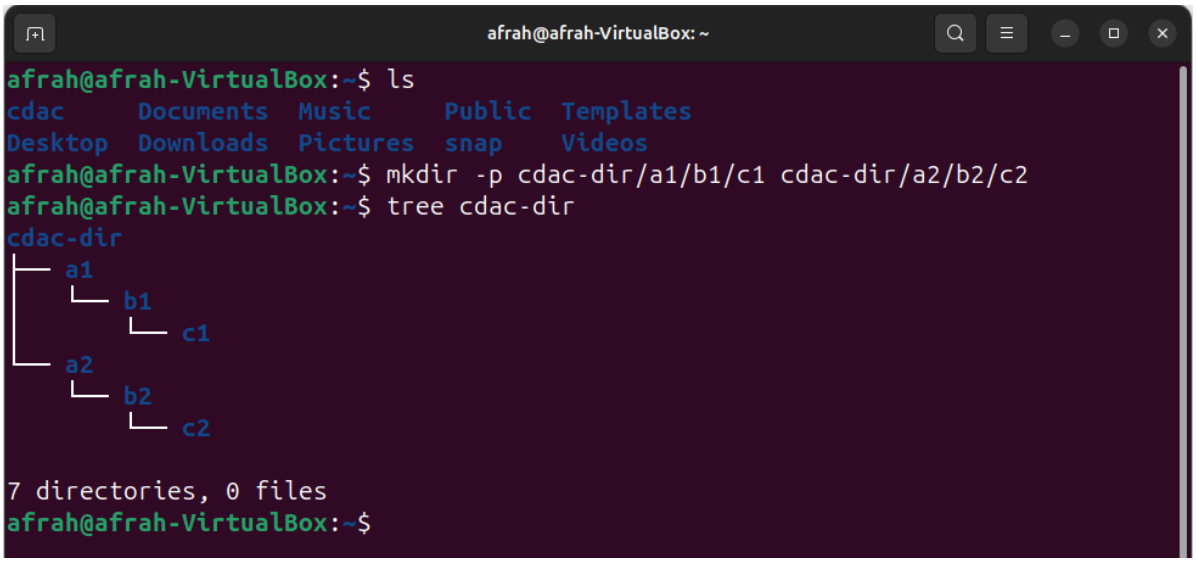
Directory structure 1



Directory structure 2

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





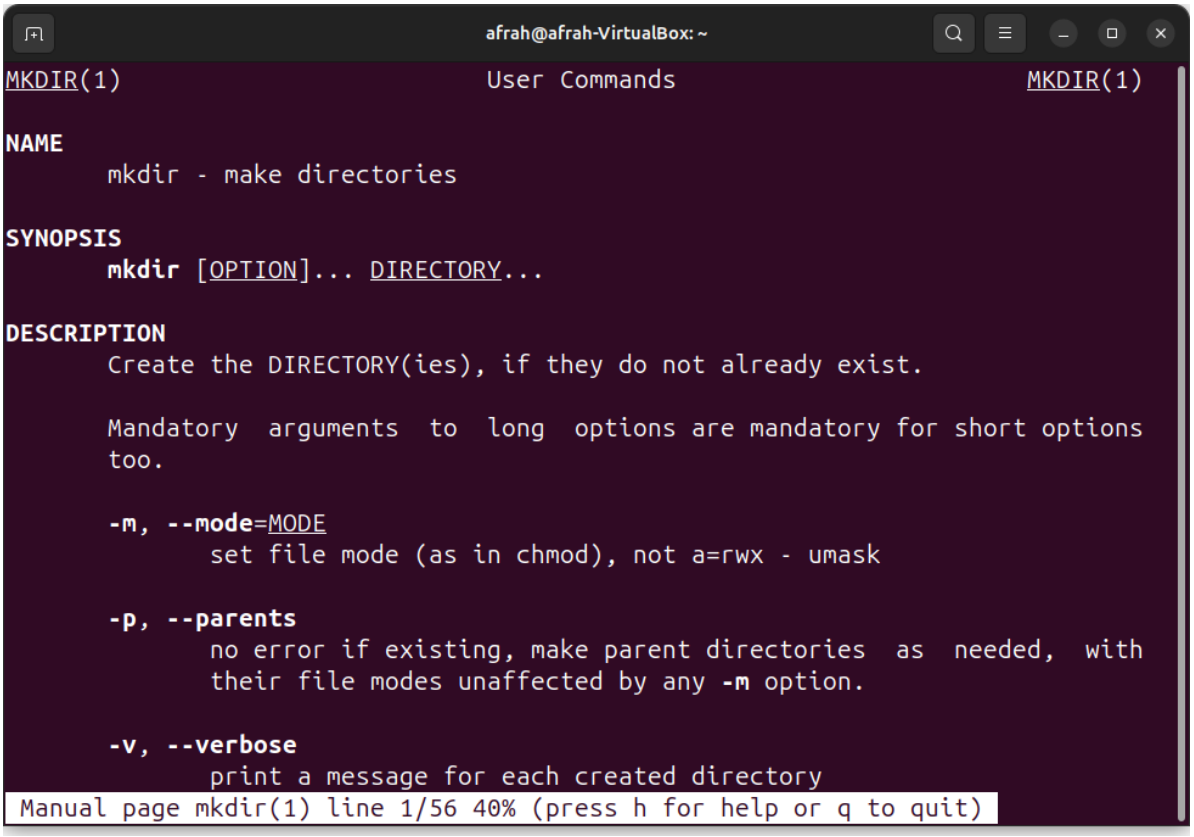
14. (Hint : explore the man page of mkdir).

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’.

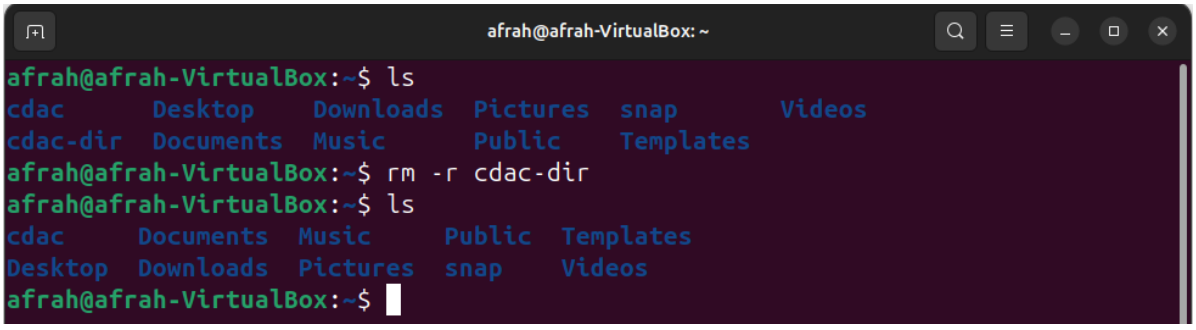


15. **List the directories(folders), then remove the cdac-dir directory and list the folders again to show that it is no longer present. (Hint : use rm, ls command)**

To list directories: ls

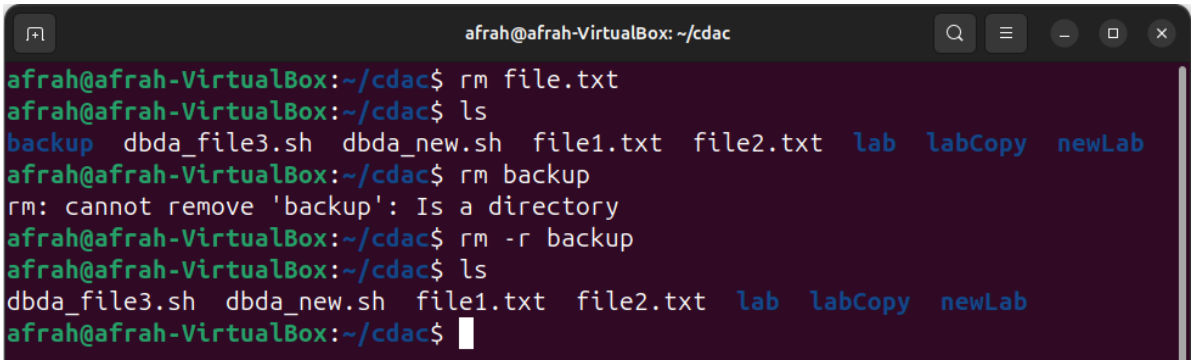
To remove a folder: rm -r cdac-dir

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



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.



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:

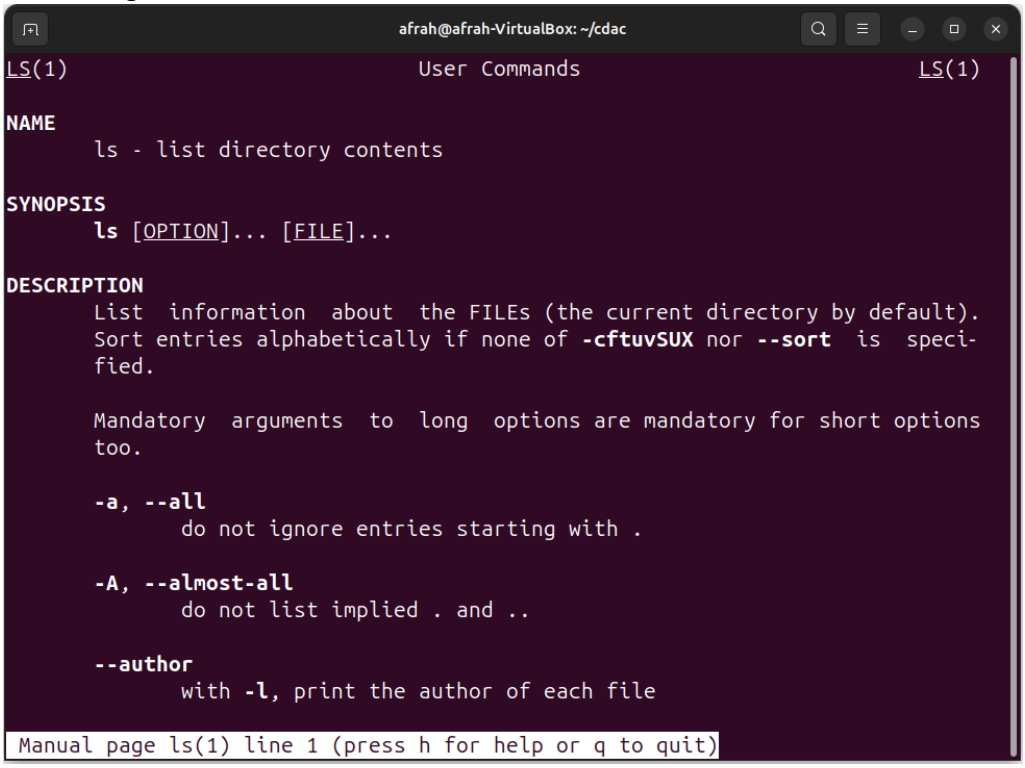
    man ls

    man ls > temp.txt

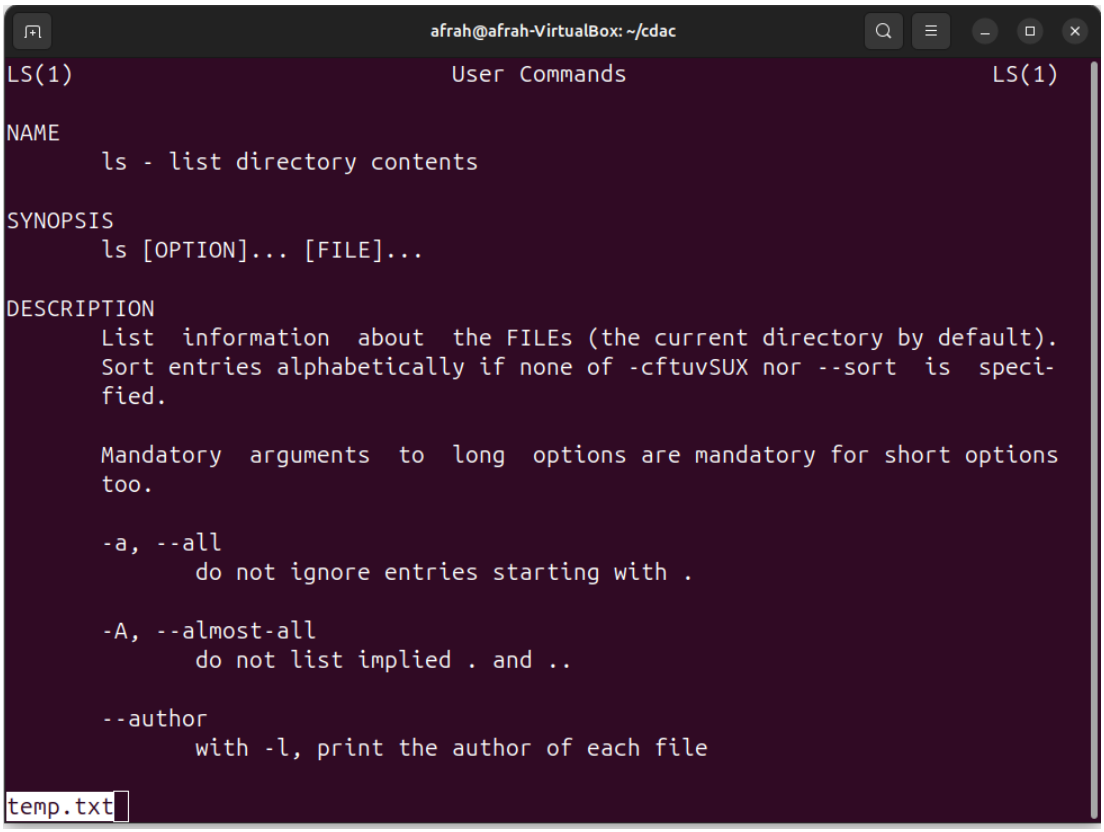
    cat temp.txt

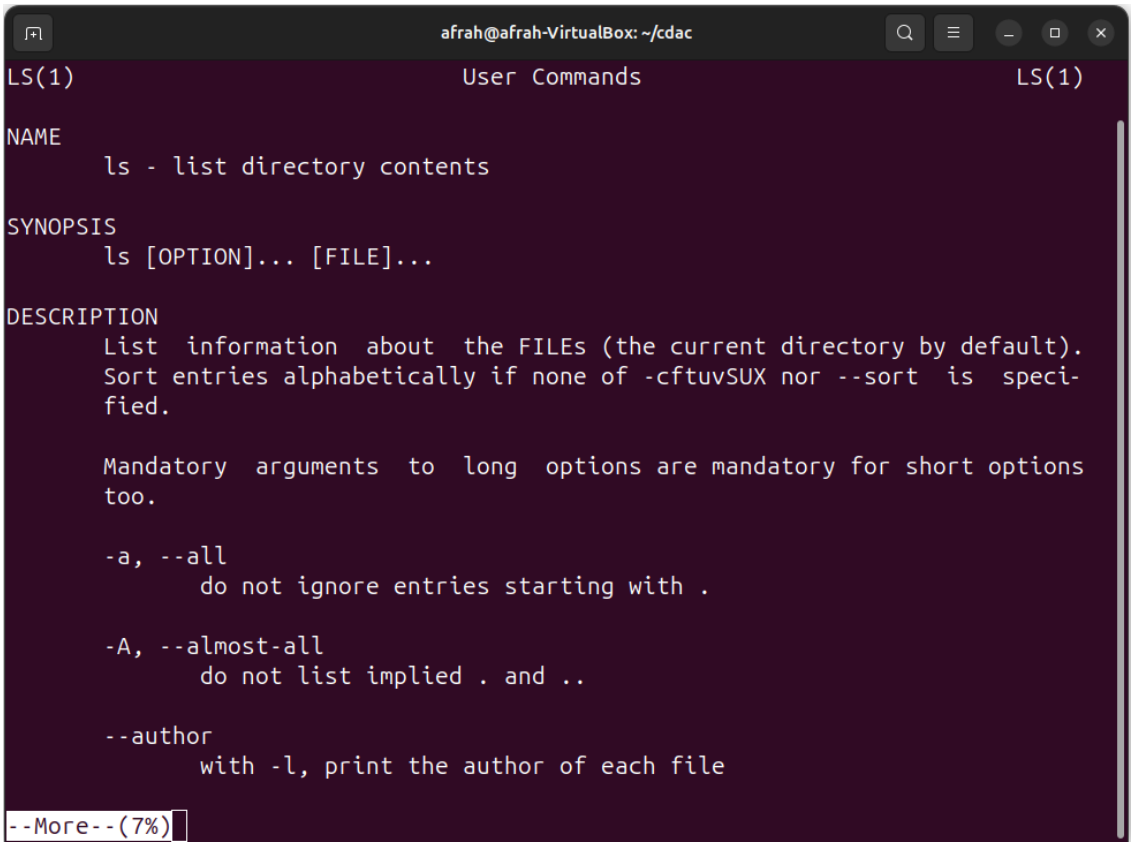
    less temp.txt

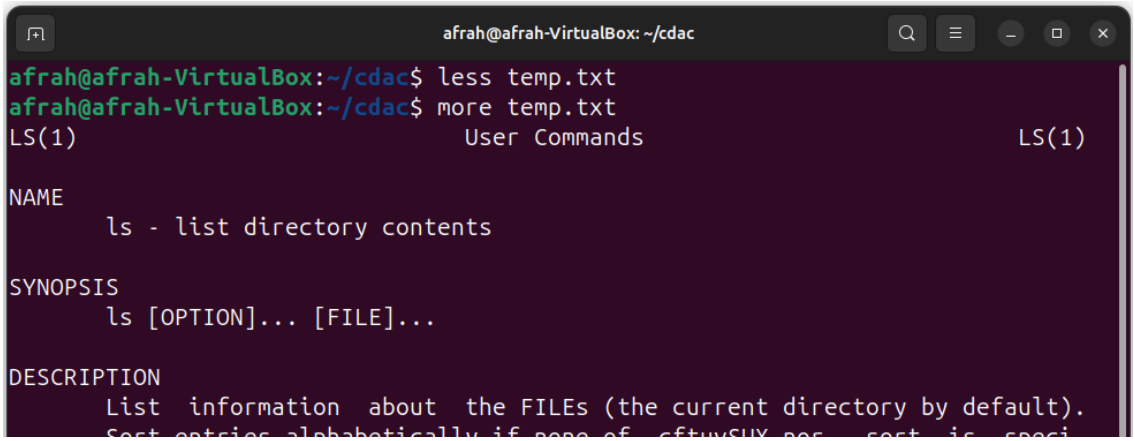
    more temp.txt




afrah@afrah-VirtualBox: ~/cdac
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 speci-
fied.

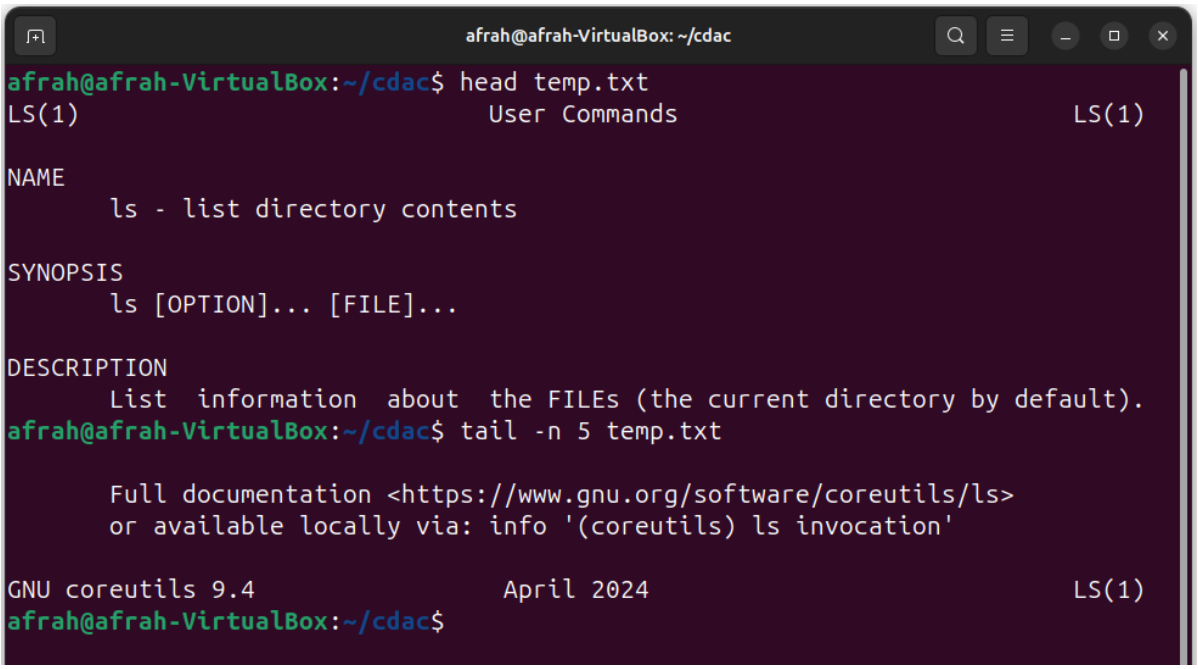

afrah@afrah-VirtualBox: ~/cdac
LS(1) User Commands LS(1)
NAME
ls - list directory contents
SYNOPSIS
ls [OPTION]... [FILE]...
DESCRIPTION
List information about the FILEs (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is speci-
fied.
Mandatory arguments 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





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



19. Copy temp.txt to another directory and rename it there.
(Hint: use cp to copy and mv command to rename).

Commands:

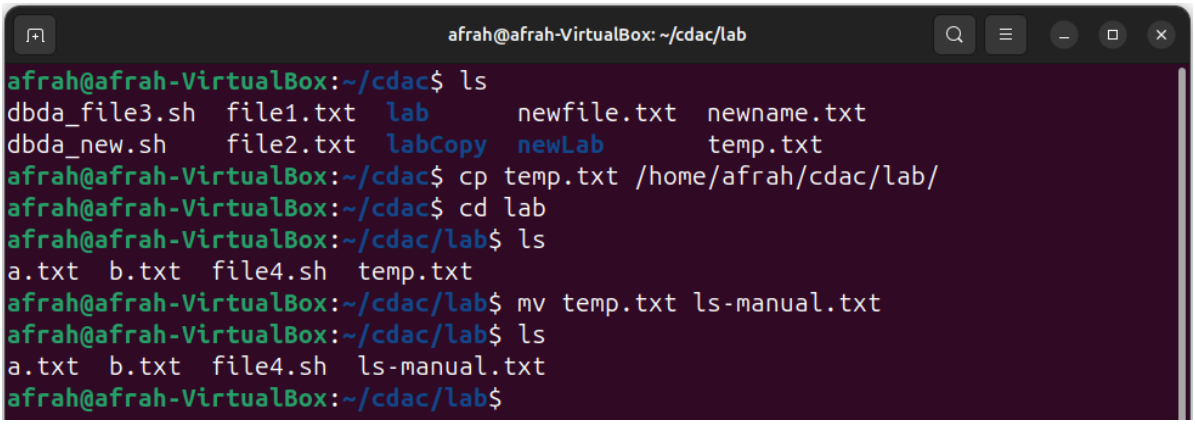
cp temp.txt /home/afrah/cdac/lab/

cd lab

ls

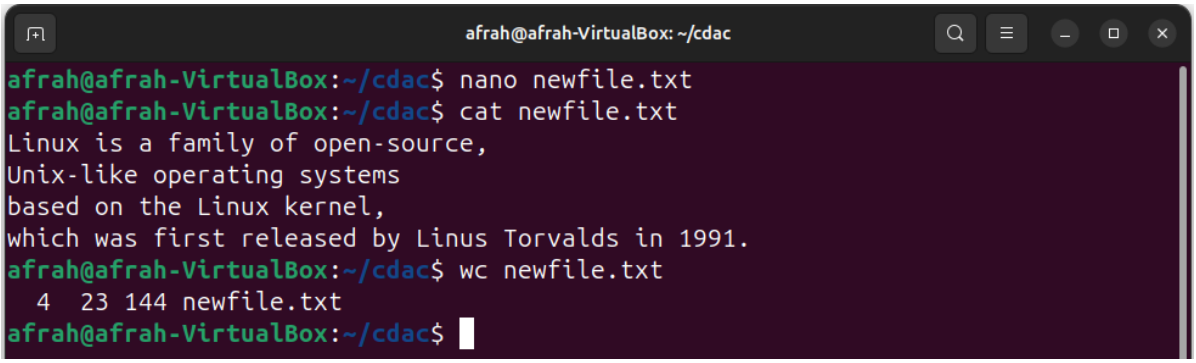
mv temp.txt ls-manual.txt

ls

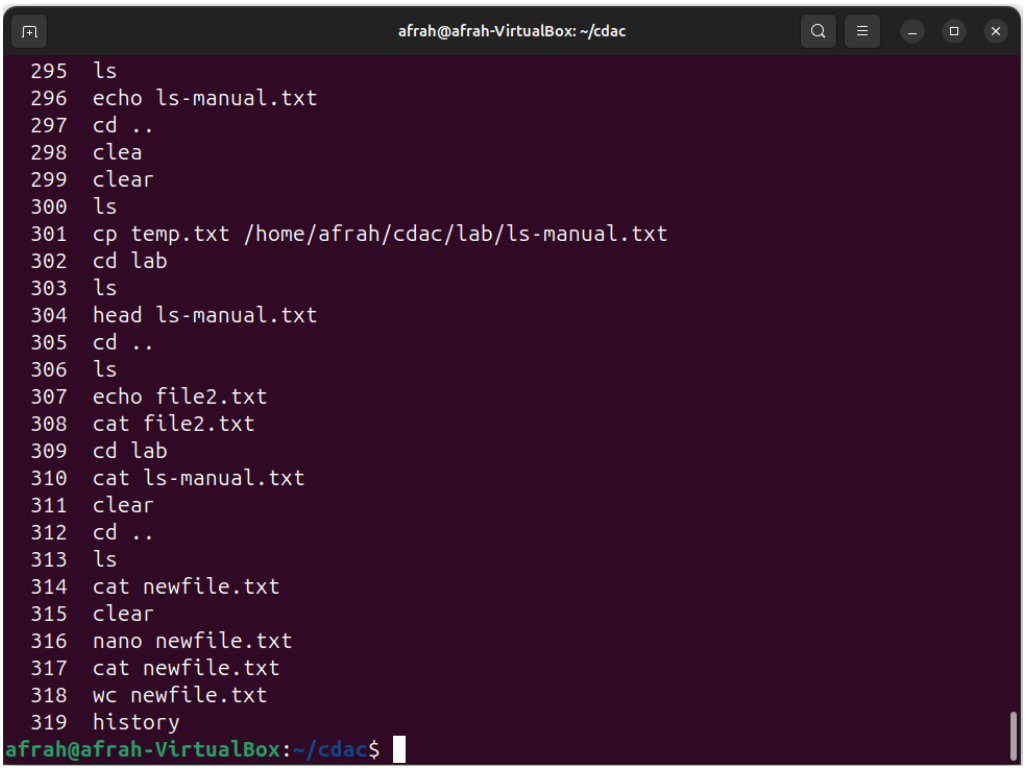


20. Display the number of lines, words and characters in file using Linux command (Hint: use wc command).

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.



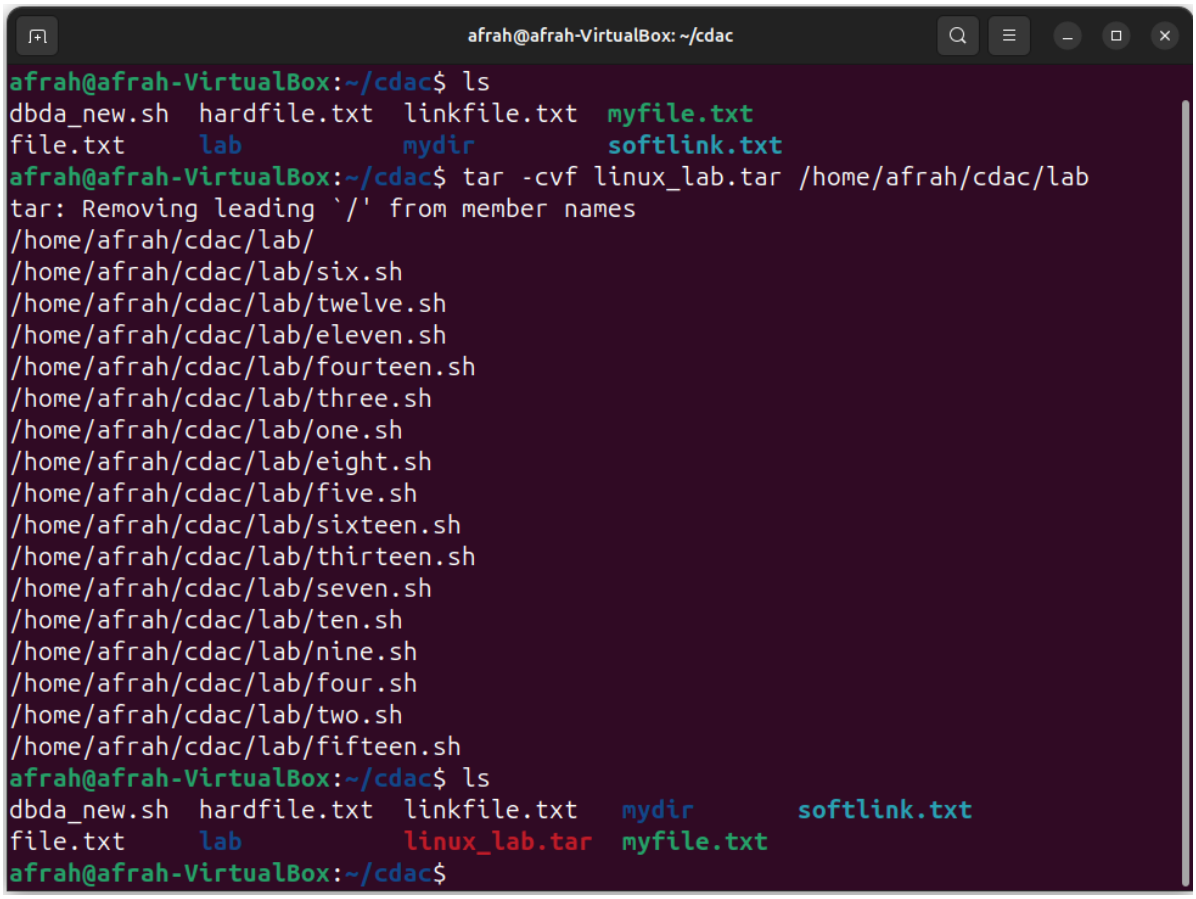
21. Use history command to display the last 10 commands used. (Hint: use history command).



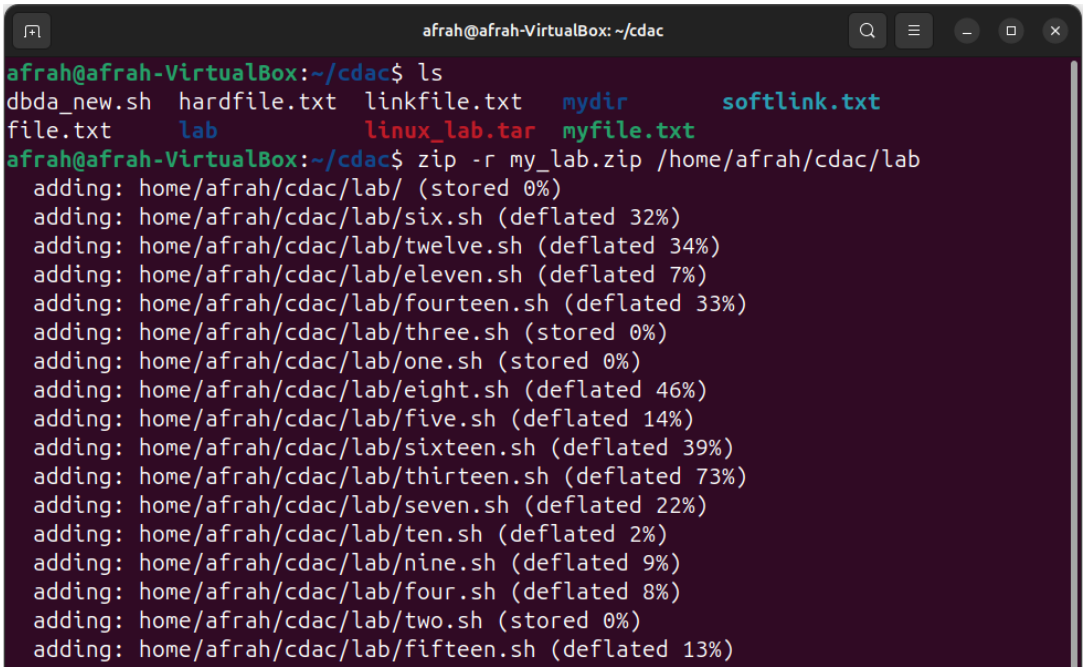
22. Create a tar archive file of any directory present in your home directory. (Hint: use tar command)

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

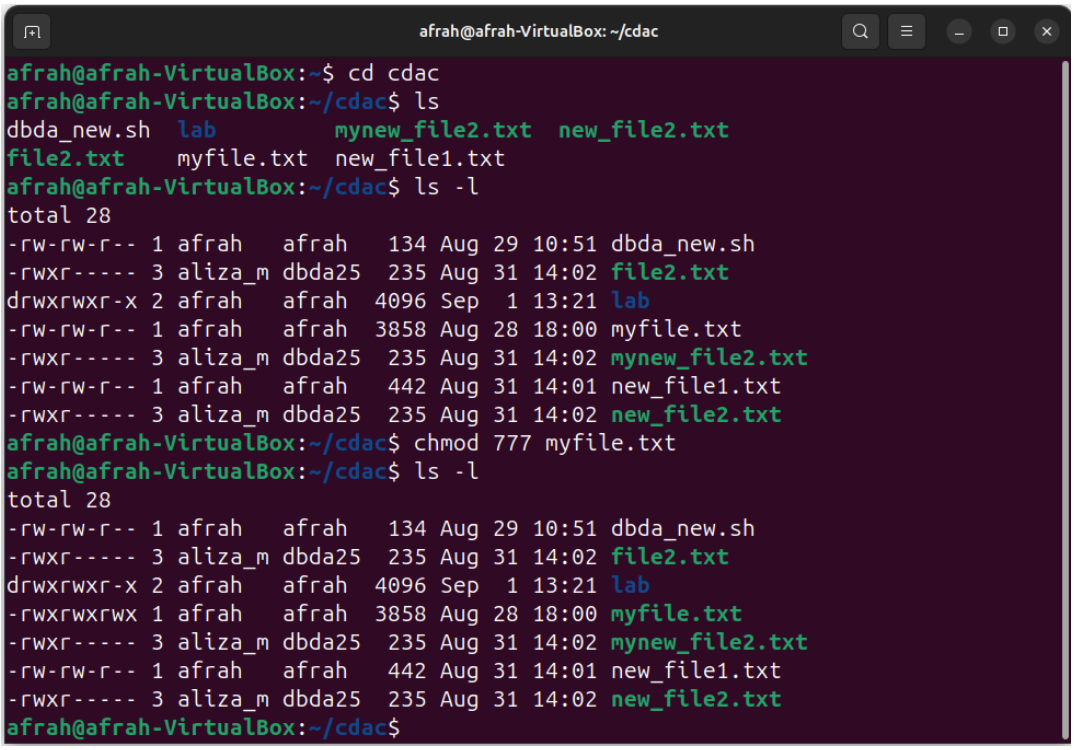
Command: tar -cvf lnux_lab.tar /home/afrah/cdac/lab



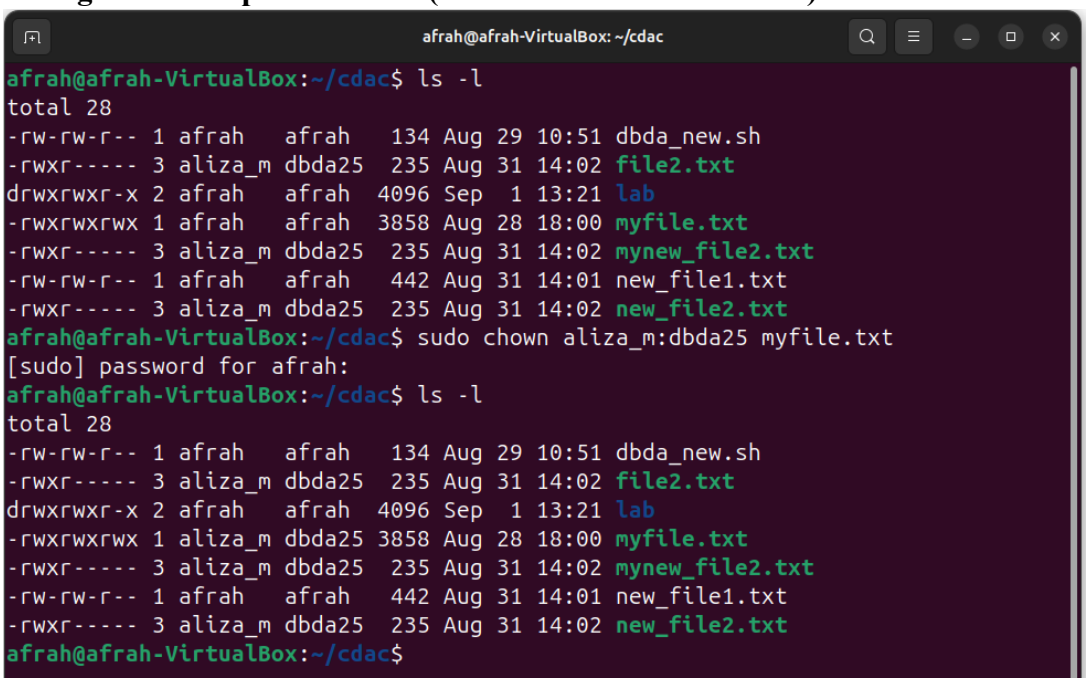
23. Create a zip file of another directory. (Hint: use zip command) - list the contents of the zip file without extracting.



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



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

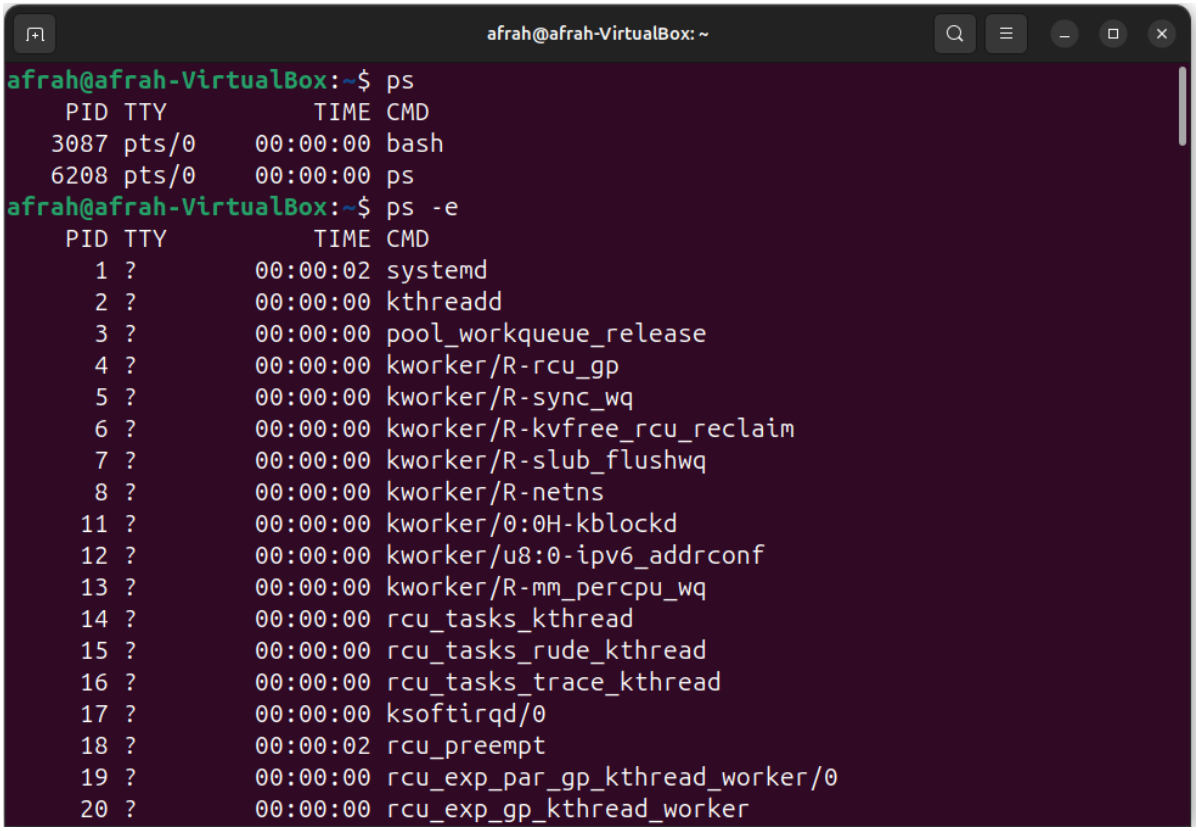


26. List processes running in shell, all running processes (Hint: use man page of ps command) and show top processes in decreasing order of their resource utilization (Hint: use top command).

Commands:

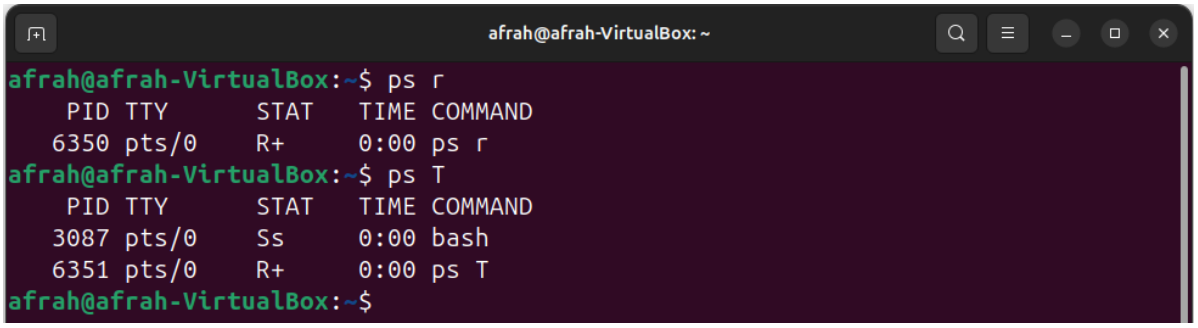
ps – lists current shell processes

ps -e – lists every process on the system

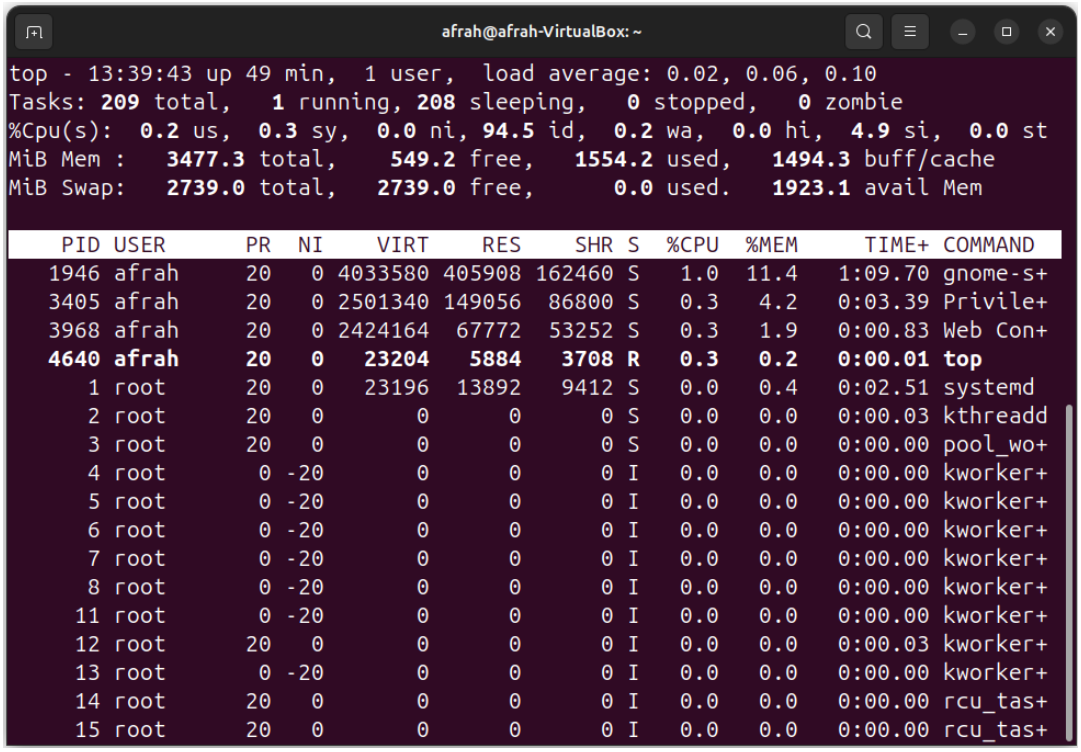


ps r – displays only running processes

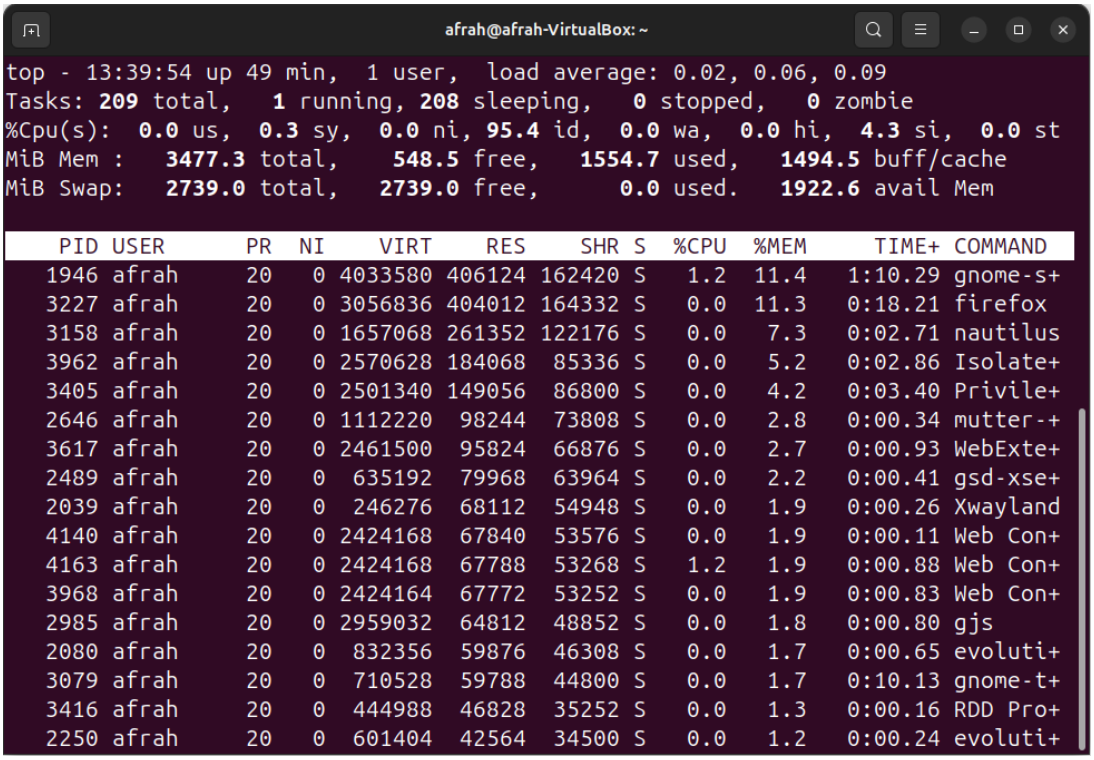
ps T – lists all processes associated with the current terminal



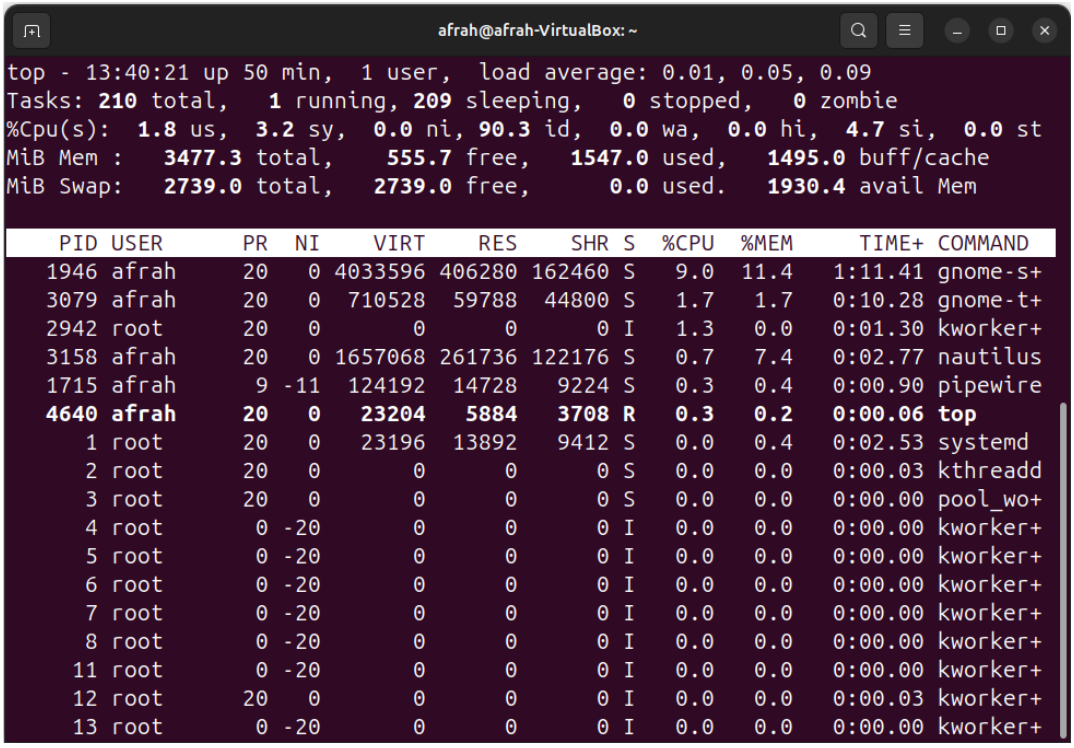
top – real time CPU and memory usage, running processes, and resource usage



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



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

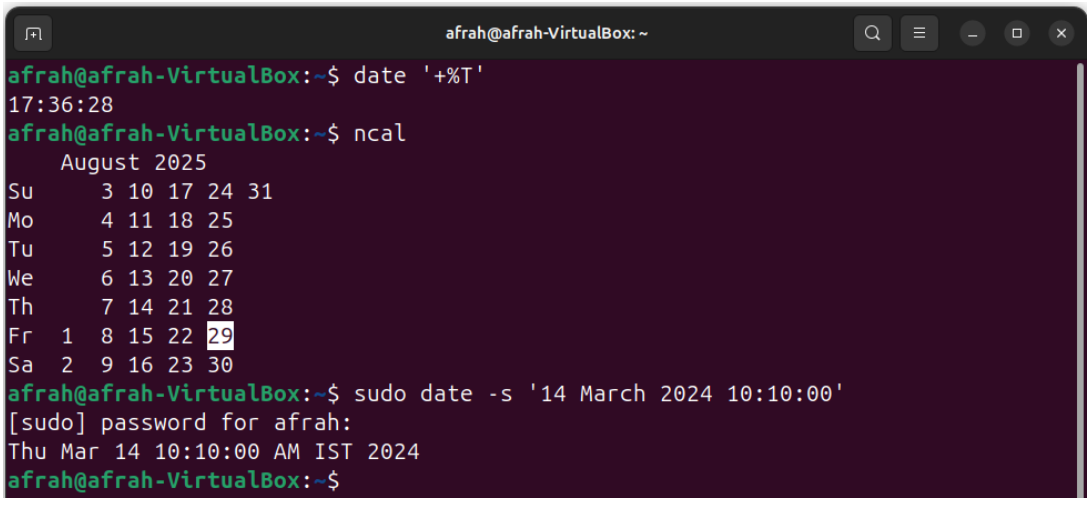


27. Display current time and calendar (Hint: use date, cal commands) 2. Change the current date and time of the system to following 14th March 2024, 10:10 AM

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



28. Explore following commands

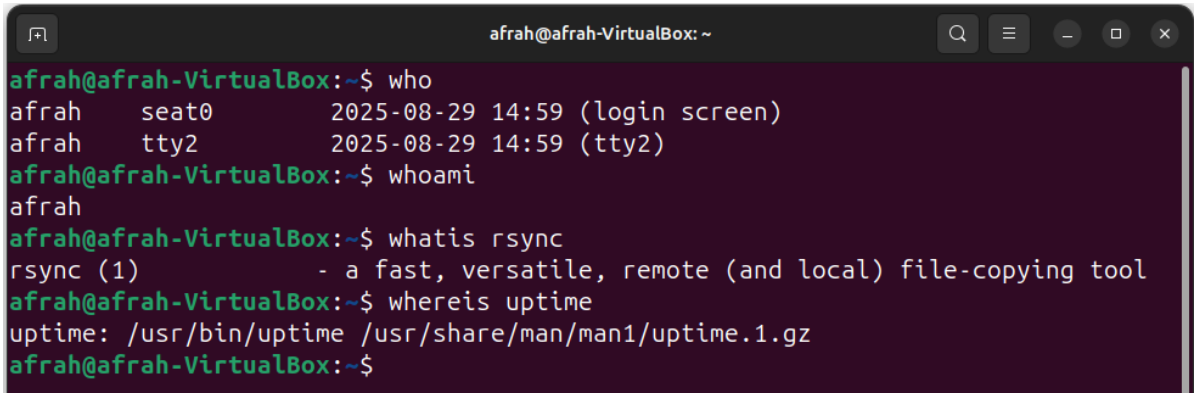
29. who, whoami, whatis, whereis, (Hint: use man pages)

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

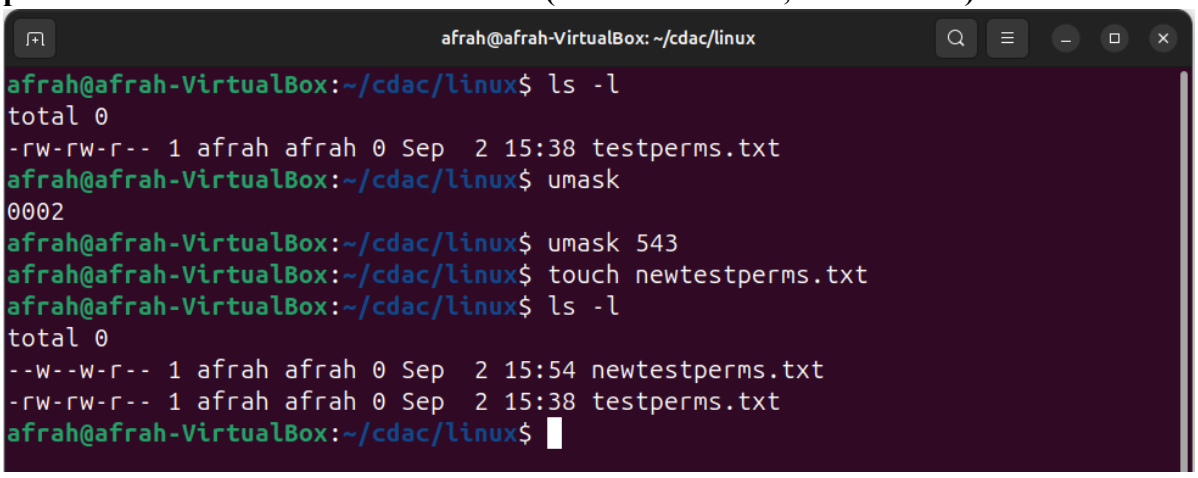
whoami: current username of active session

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

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

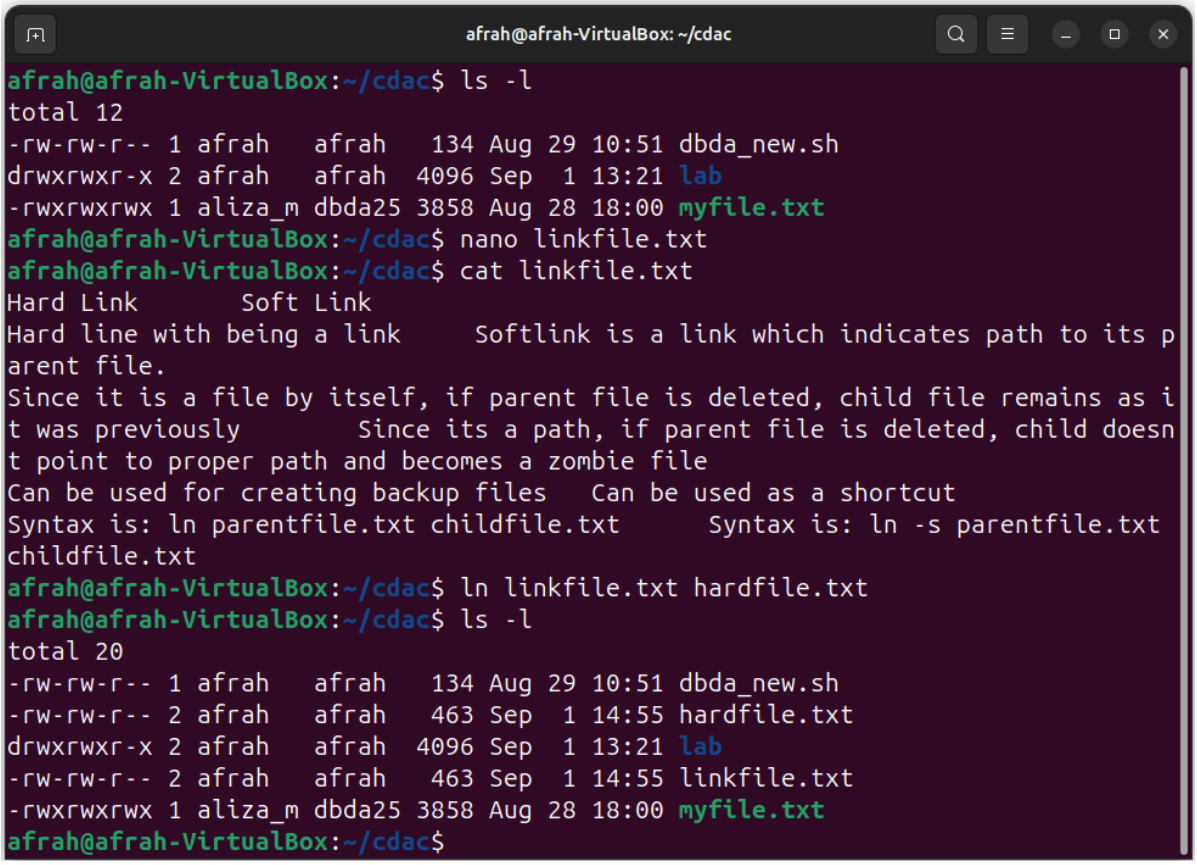


30. Create one directory named linux. cd to that directory and create one file named testperms.txt. Check the permissions of that file. Check the value of umask. Change the value of umask and create one new file newtestperms.txt and check its permissions. Note down the difference. (Hint: use umask, ls command)



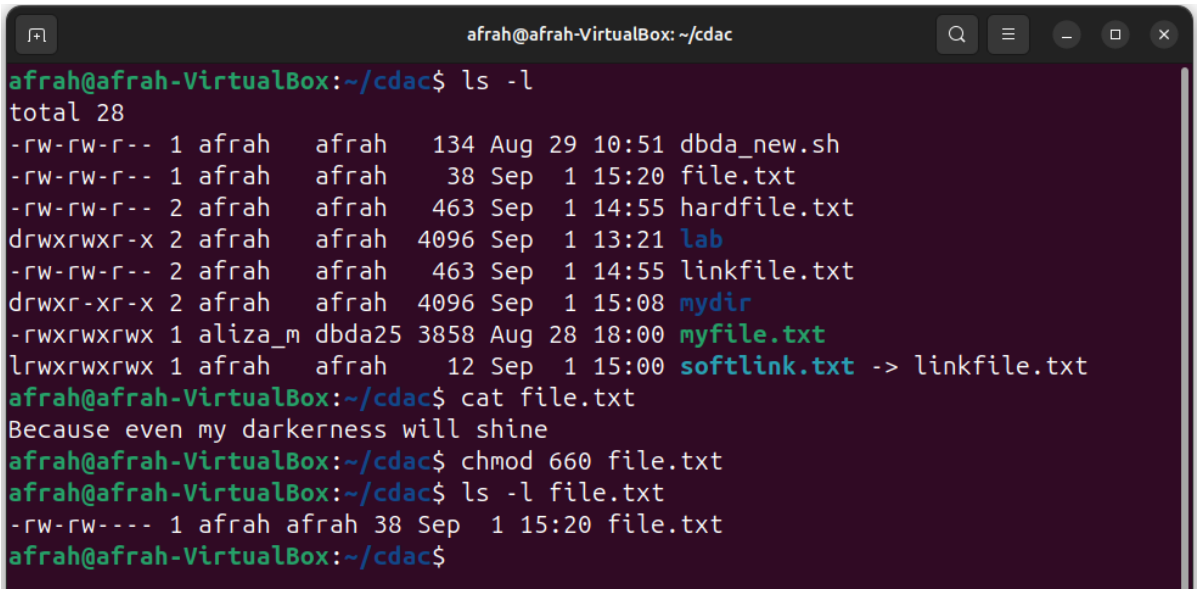
31. Create a file and name it as file1.txt and create a hardlink to this file. (Hint: use ln command)

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



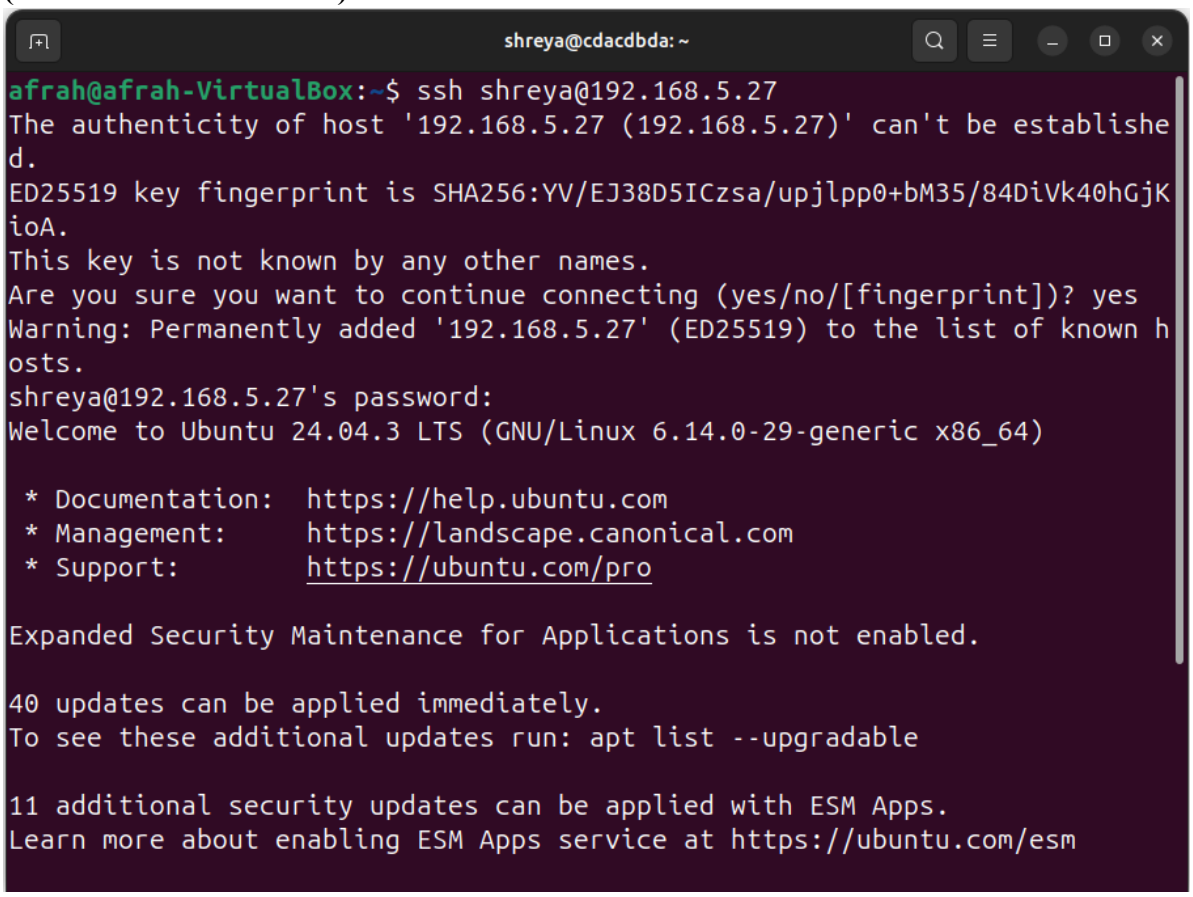
32. Create a file and name it as file2.txt and create a softlink to this file. (Hint: use ln command).

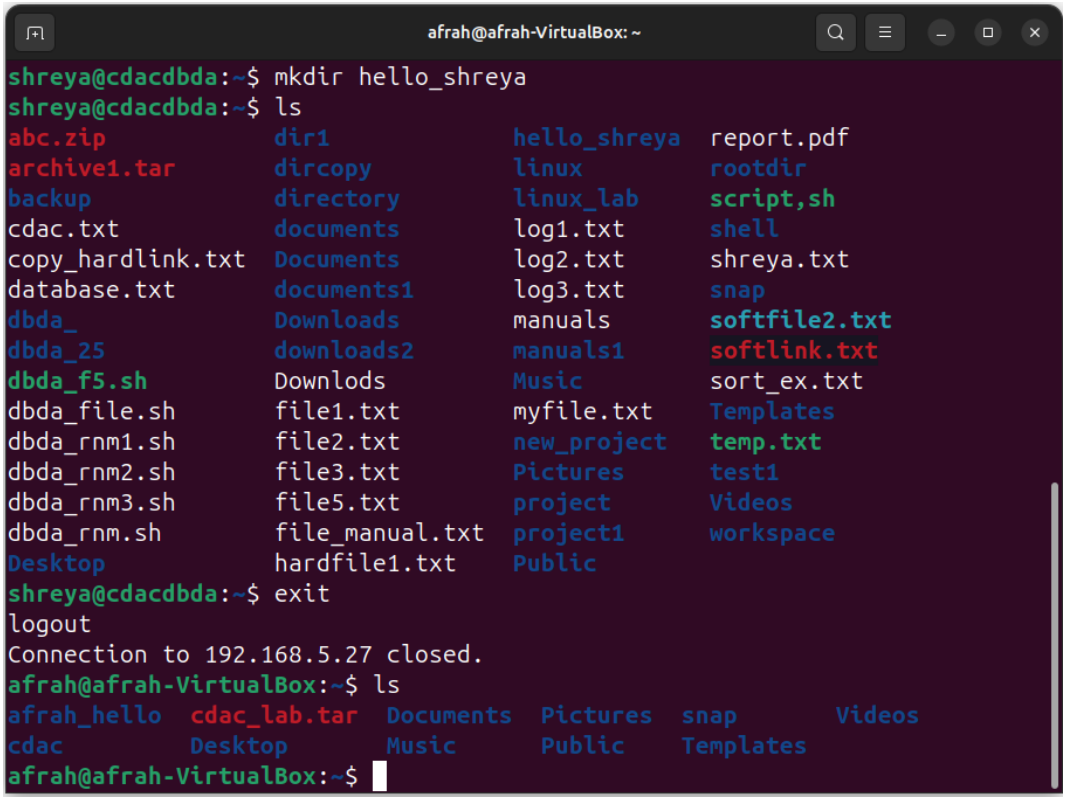
Command for softlink: ln -s linkfile.txt softlink.txt



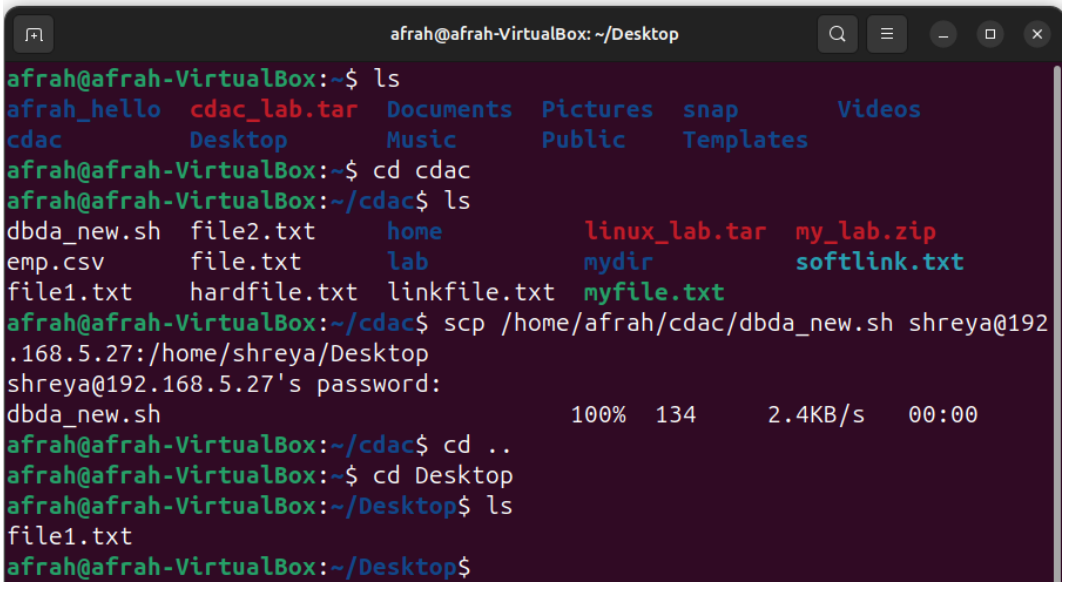
Hard Link	Soft link
Hard line with being a link.	Soft link is a link which indicates path to its parent file.
Since it is a file by itself, if parent file is deleted, child file remains as it was previously.	Since its a path, if parent file is deleted, child doesn't point tp proper path and becomes a 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)



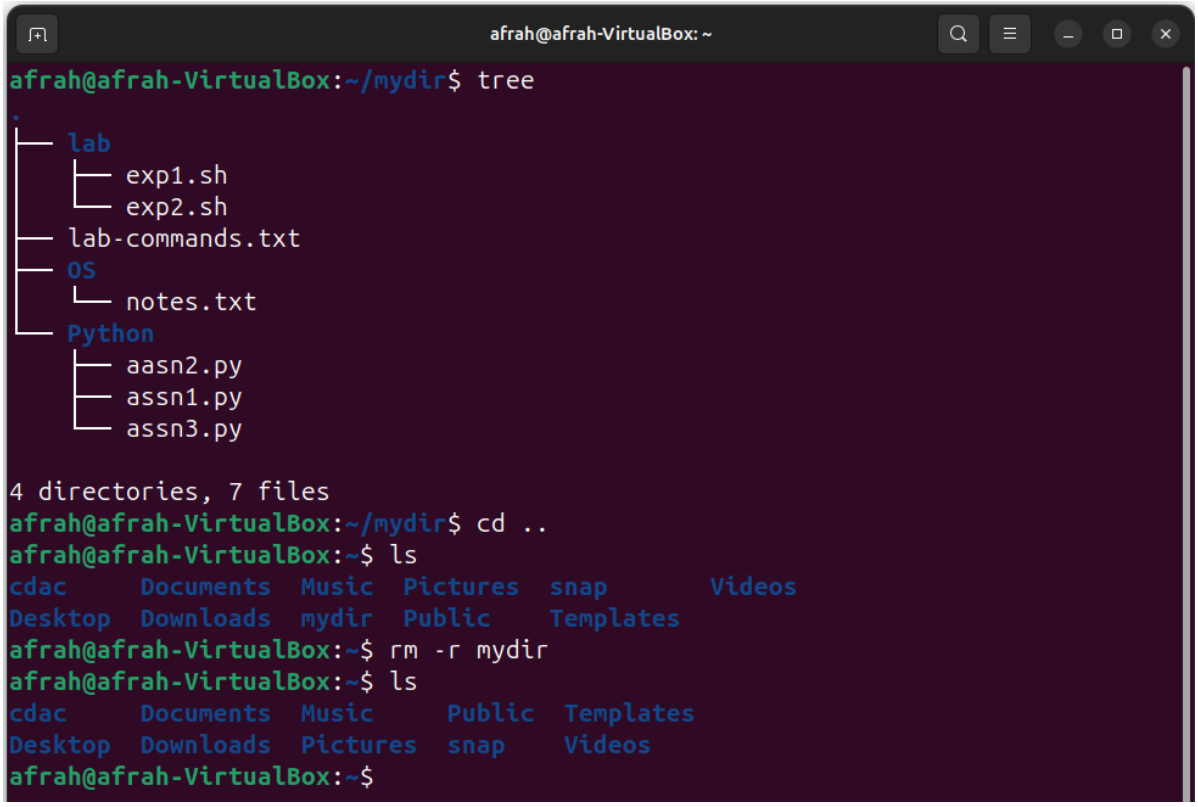


34. **Use scp using your friend's credentials to copy a file into a directory owned by your friend, inside his home directory, specify port number in scp command.**
35. **Use scp using your friend's credentials to copy directory into a directory owned by you, inside your home directory, specify port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

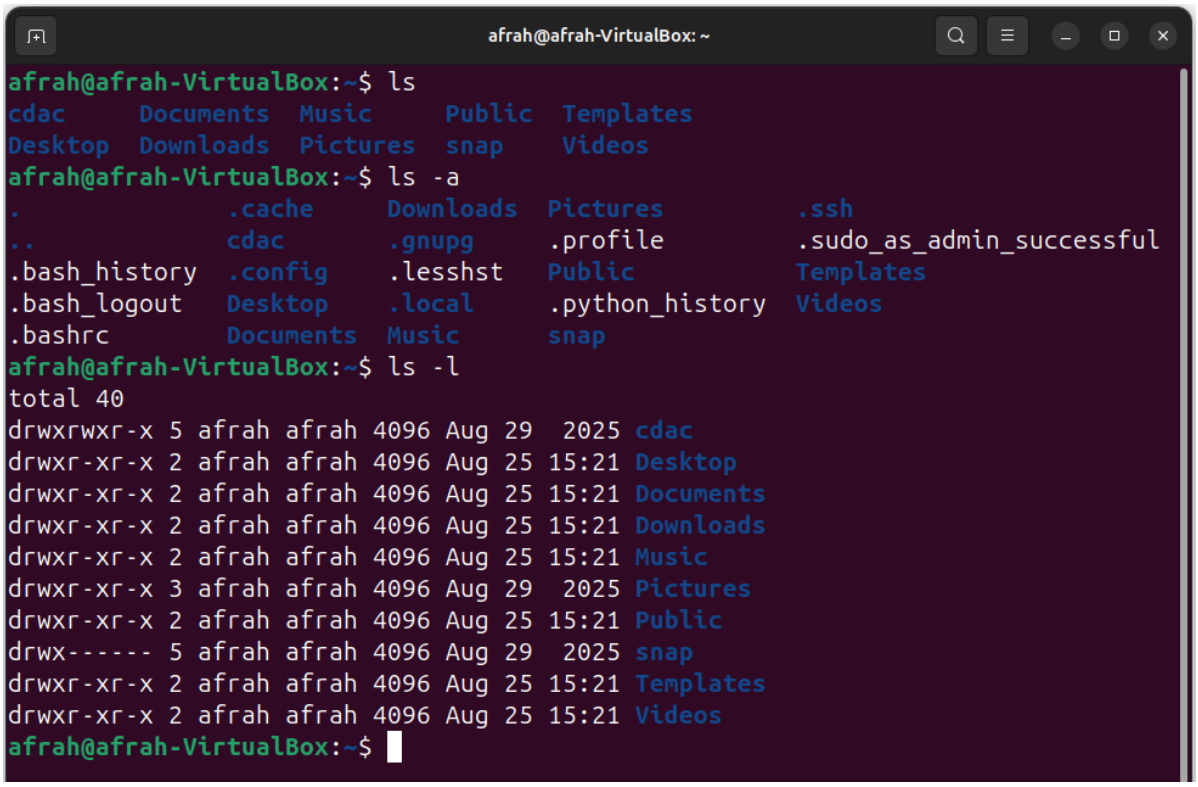


37. Connect to any publicly available **ftp** server from the terminal and try to download, upload and delete files. If you get error in any process (connect, upload, download or delete), justify the reasons behind them.(Hint: use **ftp** command) Example:
Try to access **ftp.netbsd.org**
username :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

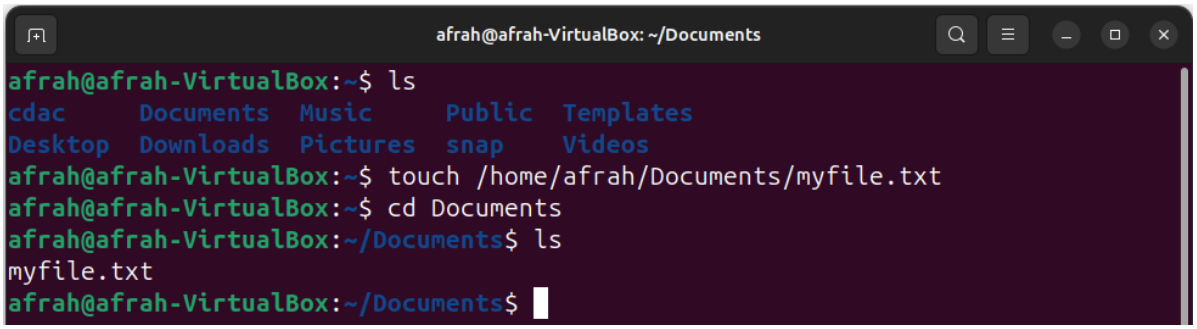


39. How do you use the "ls" command to list all files and directories in the current directory?
ls – lists files and directories
ls -a – includes hidden files
ls -l – long format with details



40. How do you create a new file named "myfile.txt" in the directory "/home/user/documents" using the command line?

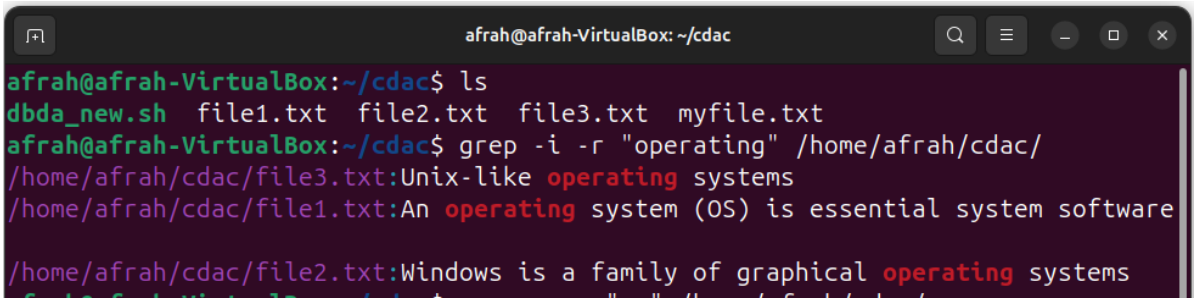
Command: touch /home/afrah/Documents/myfile.txt



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

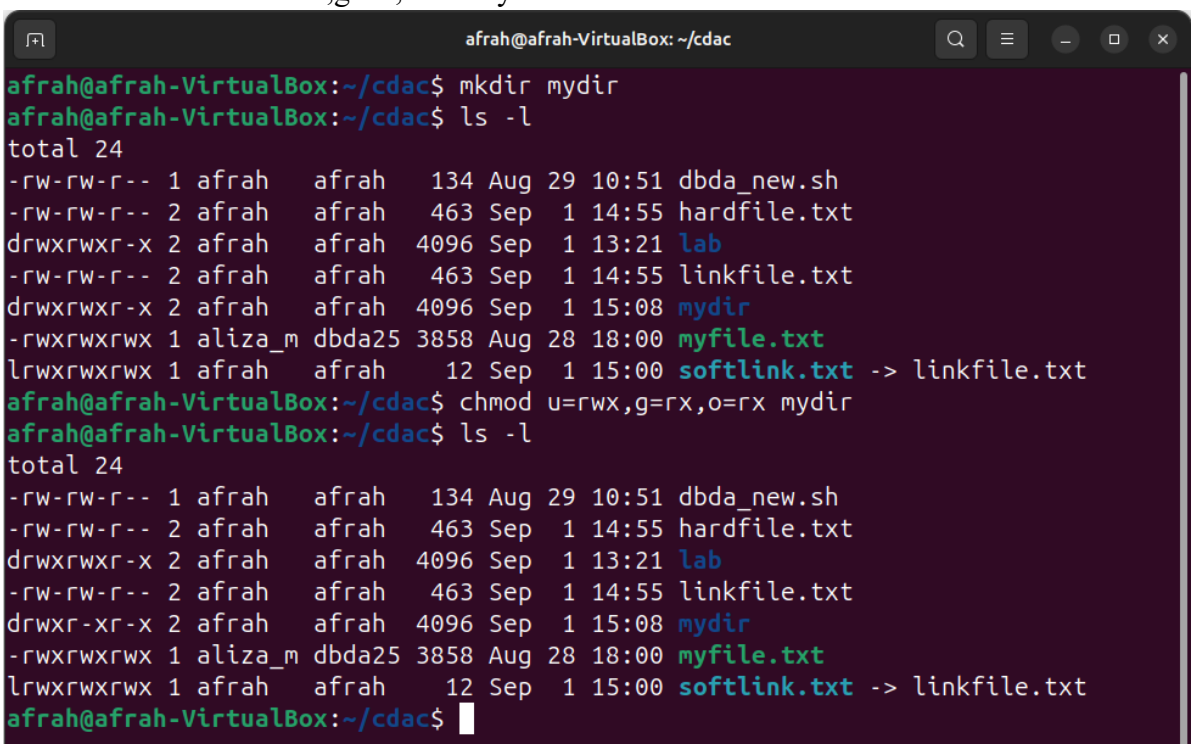
Command: grep -i -r “operating” /home/afrah/cdac/

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



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=rex,g=rx,o=rx mydir



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:~$
```

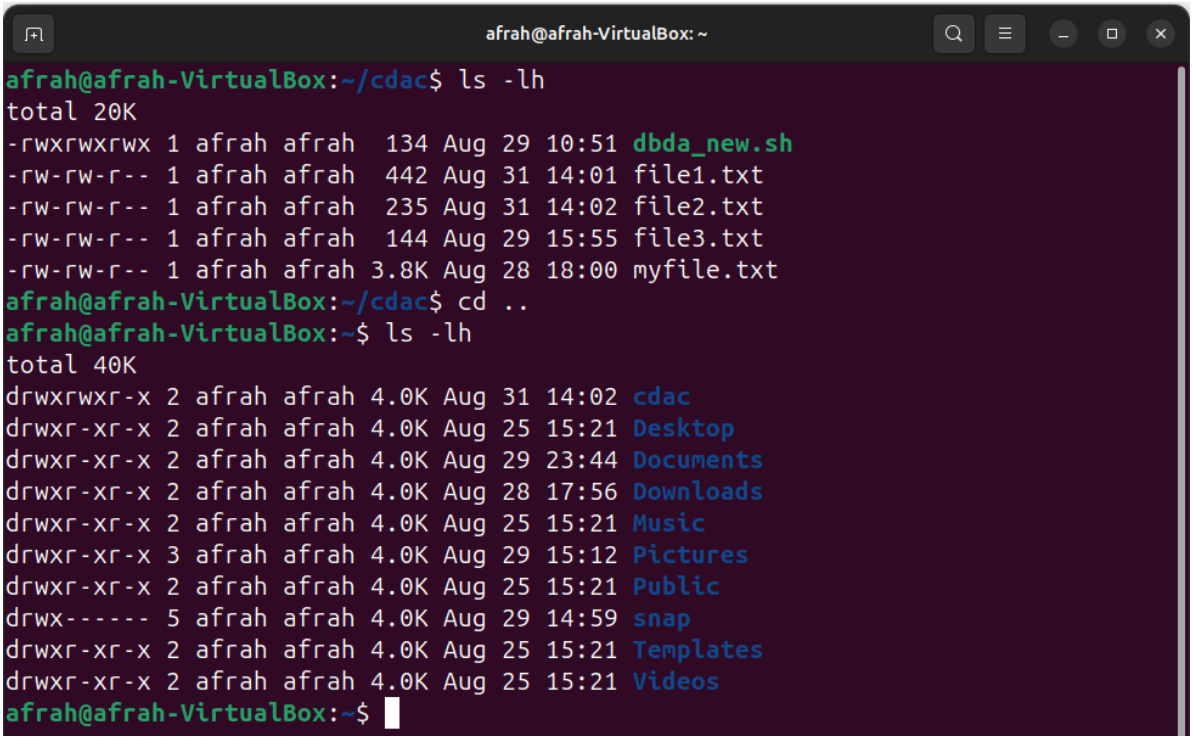
44. How do you use the "chmod" command to give read and write permissions to the owner and group for a file named "file.txt"?

```
afrah@afrah-VirtualBox: ~/cdac
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 darkerness 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$
```

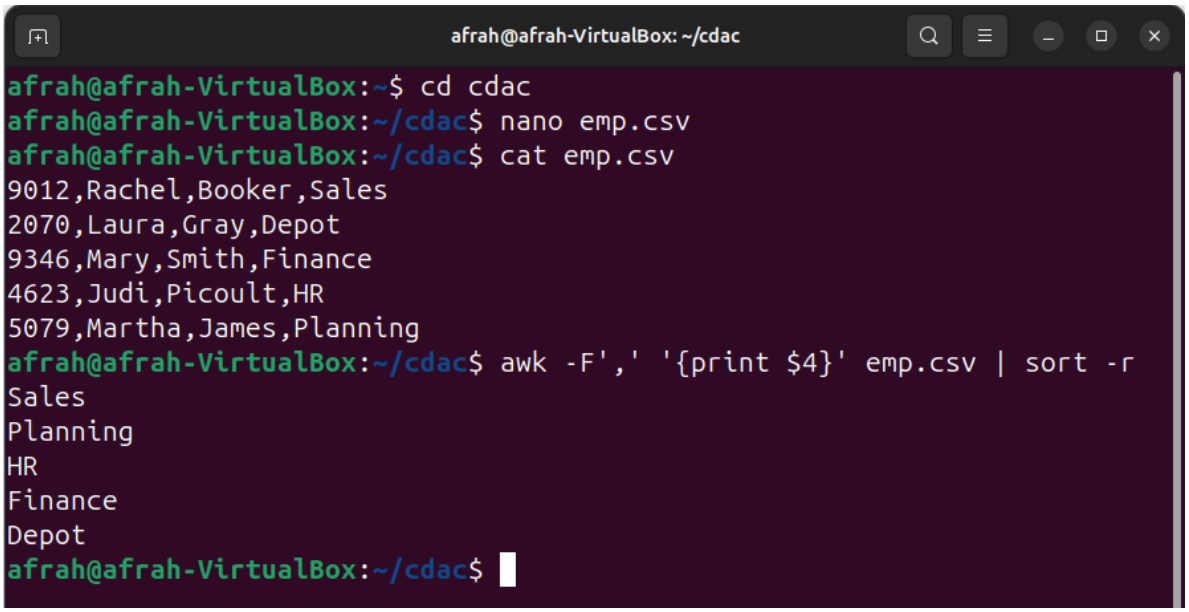
45. How do you find the size of a file named "file.txt" in bytes, kilobytes, and megabytes using the command line?

Command: ls -lh

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



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?

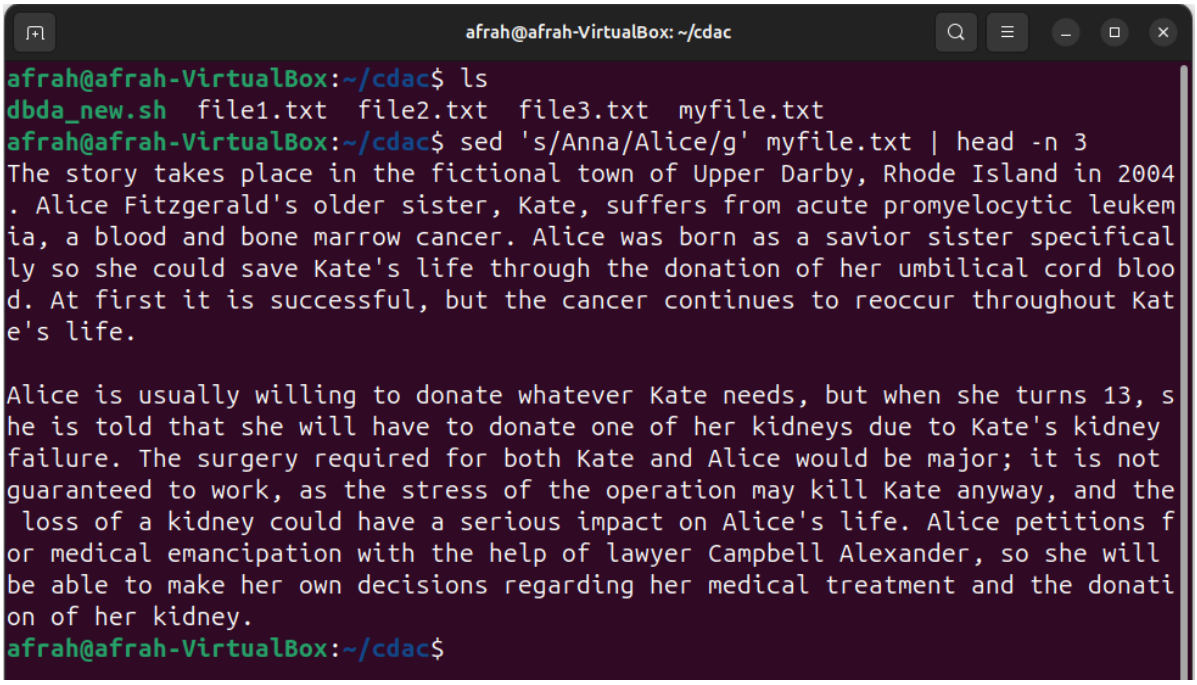


47. How do you use the "sed" command to replace all occurrences of a word or phrase in a file with a different word or phrase?

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.

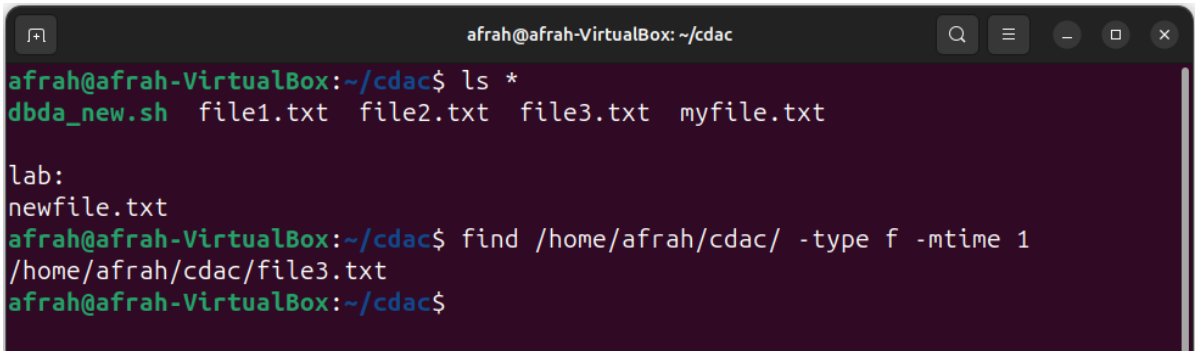
s is for substitute, / is used as a delimiter, next the pattern to be changed and then the new pattern is given, g is for making global changes to all the occurrences of the pattern in a line, not only the first occurrence, last we give the filename.



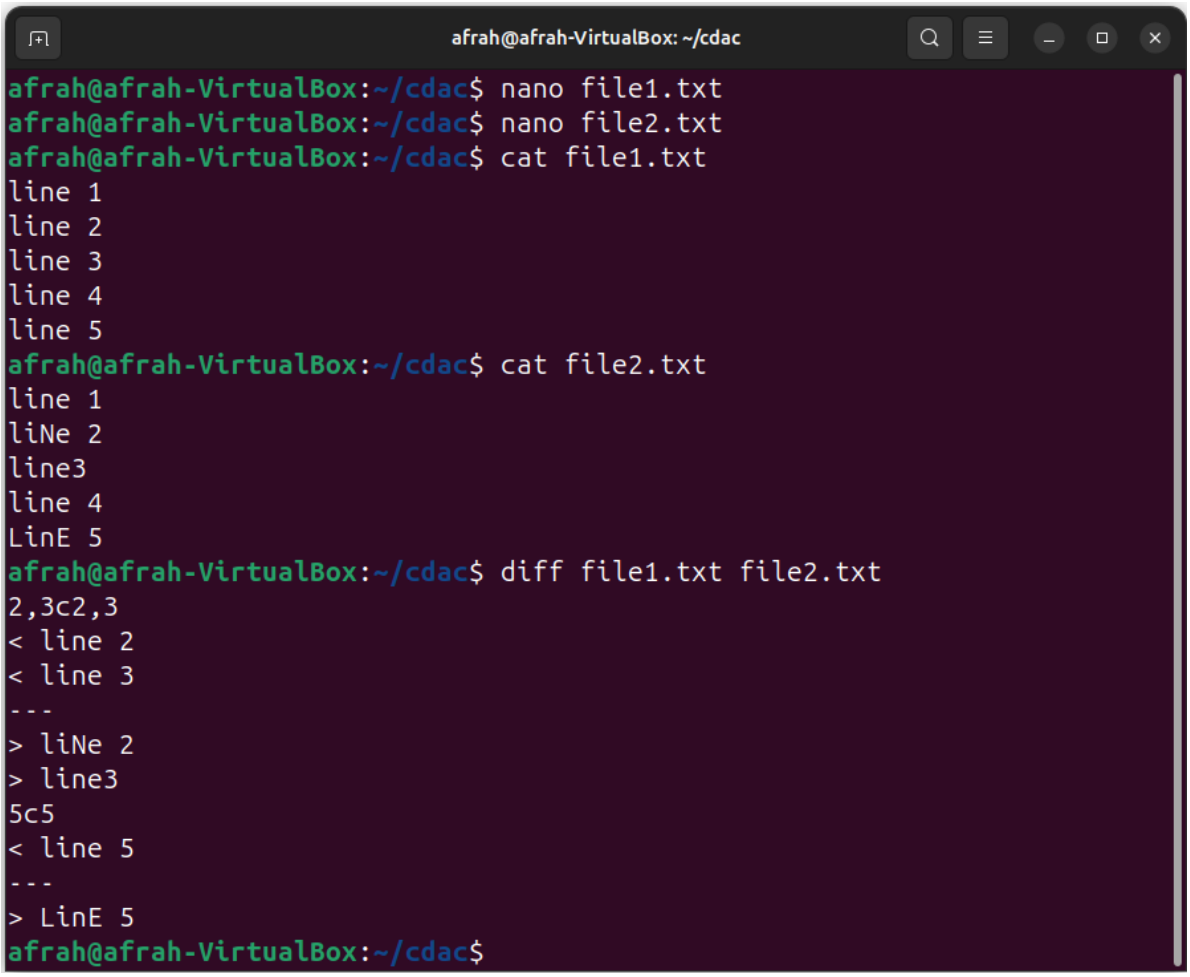
48. How do you use the "find" command to search for all files in a directory and its subdirectories that were modified within the last 24 hours?

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 with the last 1 day i.e., 24 hrs.



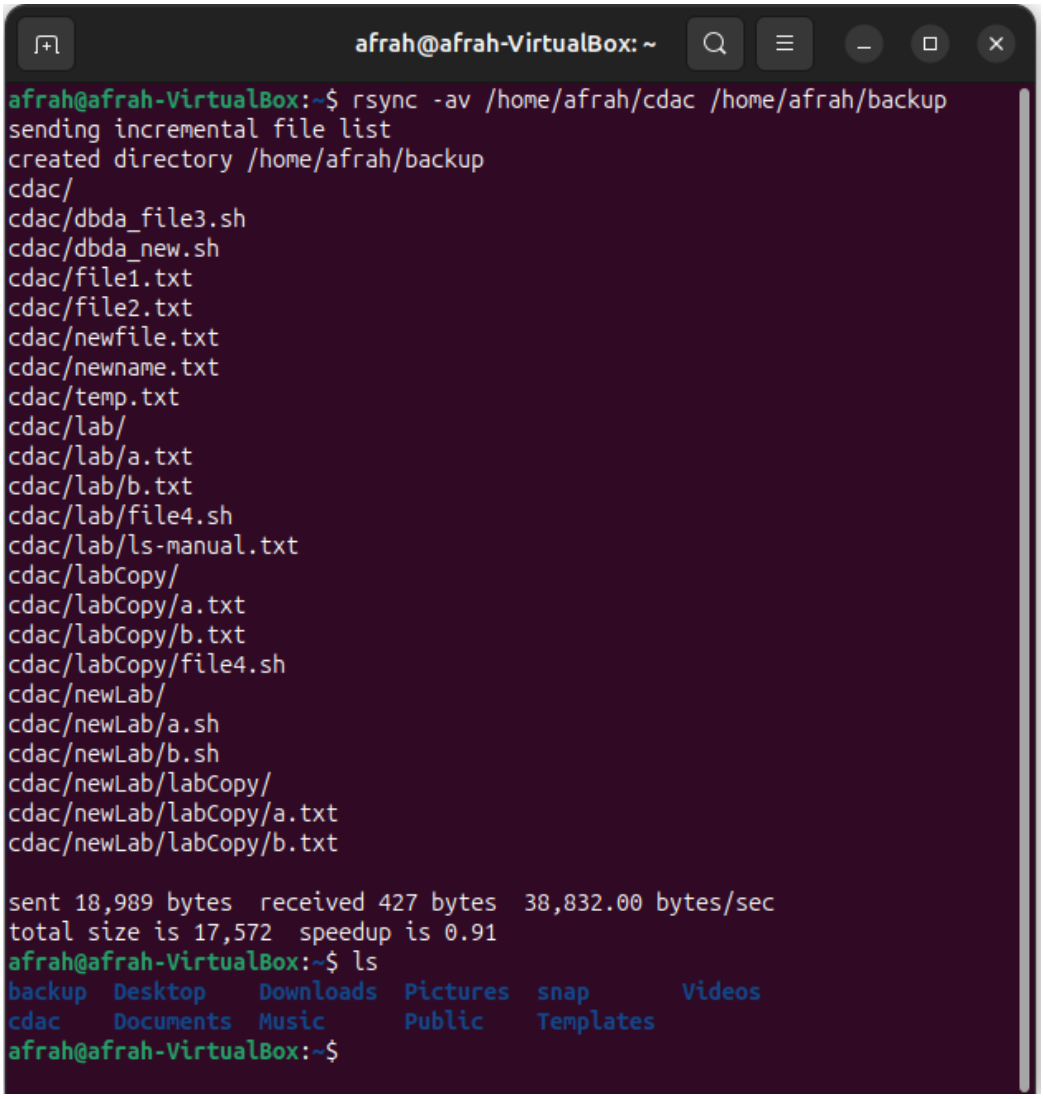
49. How do you use the "diff" command to compare two files and show only the lines that are different between them?

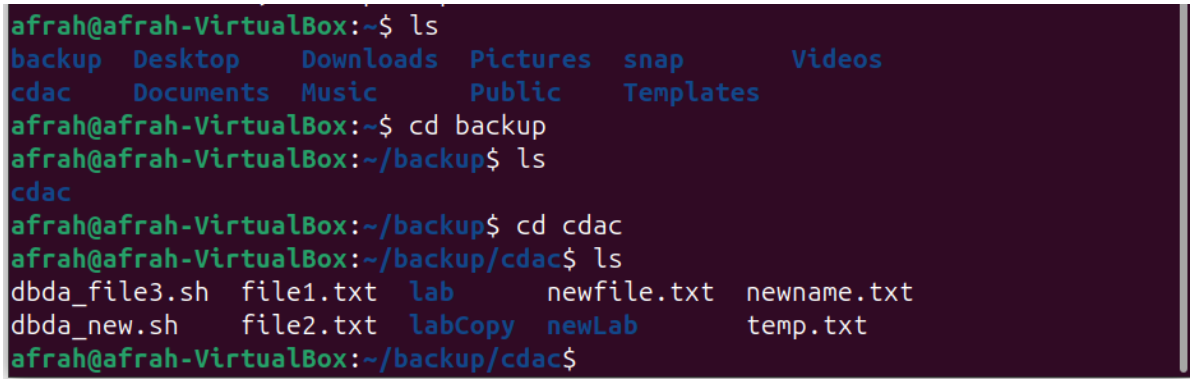


50. How do you use the "rsync" command to synchronize the contents of two directories, including all subdirectories and files, while preserving file permissions and ownerships?

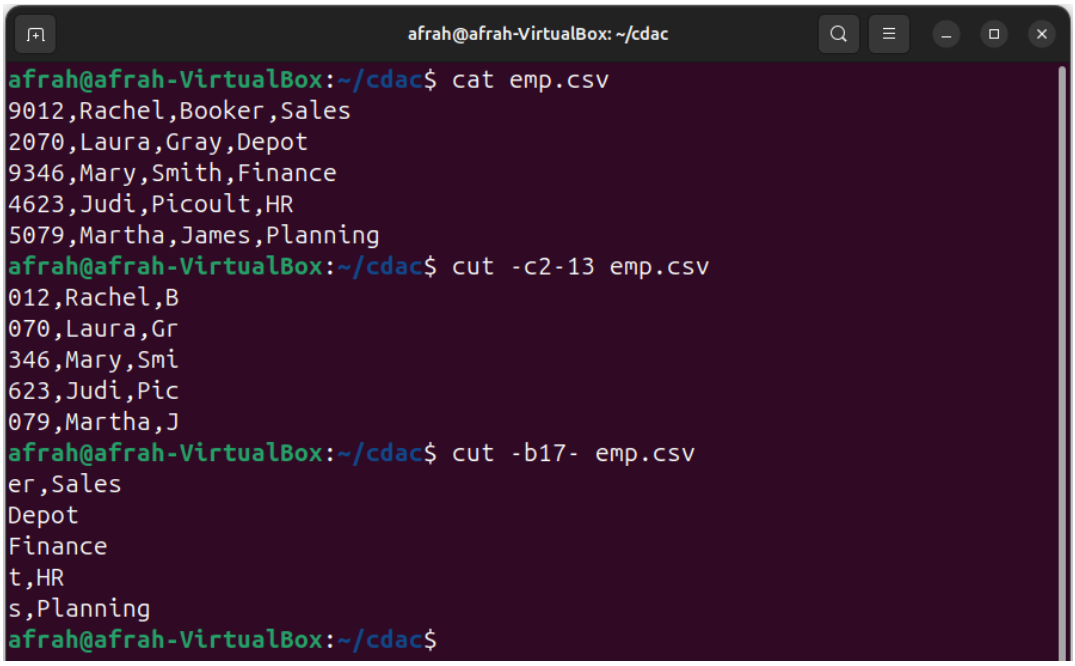
Command: rsync -av /home/afrah/cdac /home/afrah/backup

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

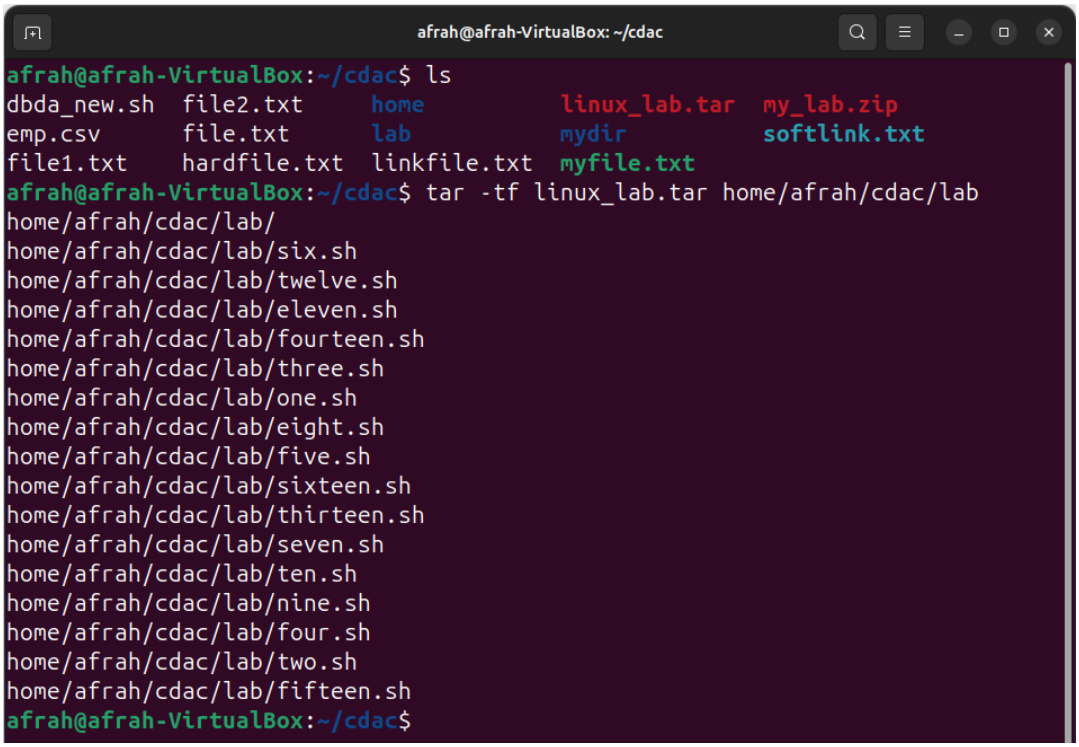

afrah@afrah-VirtualBox: ~
afrah@afrah-VirtualBox:~$ rsync -av /home/afrah/cdac /home/afrah/backup
sending incremental file list
created directory /home/afrah/backup
cdac/
cdac/dbda_file3.sh
cdac/dbda_new.sh
cdac/file1.txt
cdac/file2.txt
cdac/newfile.txt
cdac/newname.txt
cdac/temp.txt
cdac/lab/
cdac/lab/a.txt
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?



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



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