

Experiment [2]: [Linux file systems permissions and essential commands]

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AIM:

- [To Learn linux file systems permissions and essential commands]

Requirements:

- [Any Linux Distro, any kind of text editor (vs code, vim, notepad, nano, etc)]

Theory:

- [Basic Linux file systems permissions and essential commands]

Procedure & Observations

TASK 1: [Directory Navigation]

Task Statement:

- [Create a directory called dir1 in your home directory, then create directories dir2, dir2, and dir3. Navigate to the scripts directory and display your current path.]

Explanation:

- [Use mkdir to create the wanted directory we can use cd to navigate and use pwd to show current path]

Command(s):

```
''' mkdir dir1 cd dir1 mkdir dir2 dir3 cd dir2 pwd '''
```

Output:

```
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ mkdir dir1
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ mkdir dir2 dir3 dir4
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ cd
vaishnavii29@DESKTOP-BSKS7E4: ~$ ls
'VirtualBox VMs'  dir1  dir2  documents  file1  first.c  script.sh  scriptexp5.sh
a.out            dir11 dir3  exp2      file2  first2.c  script5.sh  test1.sh
vaishnavii29@DESKTOP-BSKS7E4: ~$ ls -l dir4
ls: cannot access 'dir4': No such file or directory
vaishnavii29@DESKTOP-BSKS7E4: ~$ cd /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ ls -l dir4
total 0
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ ls
dir1  dir2  dir3  dir4  exp2
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ mkdir -p documents/projects/linux_tutorial
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ cd /home/vaishnavii29/documents
vaishnavii29@DESKTOP-BSKS7E4: ~$ cd ~
vaishnavii29@DESKTOP-BSKS7E4: ~$ mkdir -m 755 public_folder
vaishnavii29@DESKTOP-BSKS7E4: ~$ ls
'VirtualBox VMs'  dir1  dir2  documents  file1  first.c  public_folder  script5.sh  test1.sh
a.out            dir11 dir3  exp2      file2  first2.c  script.sh      scriptexp5.sh
vaishnavii29@DESKTOP-BSKS7E4: ~$ rmdir dir4
rmdir: failed to remove 'dir4': No such file or directory
vaishnavii29@DESKTOP-BSKS7E4: ~$ cd /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$
-bash: cd: too many arguments
vaishnavii29@DESKTOP-BSKS7E4: ~$ ^C
vaishnavii29@DESKTOP-BSKS7E4: ~$ cd /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ rmdir dir4
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ ls
dir1  dir2  dir3  documents  exp2
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ rmdir dir1 dir3
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ ls
dir2  documents  exp2
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ rmdir -p path/to/empty/directories
rmdir: failed to remove 'path/to/empty/directories': No such file or directory
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ rmdir -p ^C
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ rmdir -p /mnt/c/Users/DELL/Desktop/New
RIMENTS
rmdir: failed to remove '/mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS': Permission denied
```

TASK 2: [File Creation and Content]

Task Statement:

- [Create three files in the docs directory: myfile.txt, file1.txt, file2.txt and file3.txt.]

Explanation:

- [We can use touch to create empty files and using echo “text” > file.txt to add content to a file and using cat to display file contents]

Command(s):

```
touch myfile.txt
ls
touch file1.txt file2.txt file3.txt
ls
```

Output:

```
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ touch myfile.txt
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ ls
exp2  documents  myfile.txt
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ touch file1.txt file2.txt file3.txt
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ ls
exp2  documents  file1.txt  file2.txt  file3.txt  myfile.txt
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ touch document_$(date +%Y%m%d).txt
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ touch document_$(13september2025 +%2025
13september2025: command not found
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ touch document_$(date +%2025%09%13).txt
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$ ls
%13.txt  %2025000000%09  documents  exp2  file1.txt  file2.txt  file3.txt
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/LINUX EXPERIMENTS$
```

TASK 3: [File Operations]

Task Statement:

- [Copy original.txt to the data directory.]

Explanation:

- [- We can use the cp source destination to copy files and using the mv oldname newname to rename files also using the same command mv file directory/ to move files to another directory we can also combine copy and rename: cp file.txt newdir/newname.txt]

Command(s):

```
cp original.txt backup_original.txt
cp -r dir1 dir2
cp -v dir1 dir2
cp file2 backup_file.txt
```

Output:

```
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp file1 file2
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp -v file1 file2
'file1' -> 'file2'
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp myfile.txt ~/documents/
cp: invalid option -- '/'
Try 'cp --help' for more information.
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp myfile.txt documents
cp: cannot stat 'myfile.txt': No such file or directory
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ touch myfile.txt
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp myfile.txt documents
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp -v myfile.txt documents
'myfile.txt' -> 'documents'
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp original.txt myfile.txt
cp: cannot stat 'original.txt': No such file or directory
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp original.txt backup_original.txt
cp: cannot stat 'original.txt': No such file or directory
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ touch original.txt
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp original.txt backup_original.txt
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp -r dir1 dir2
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp -v dir1 dir2
cp: -r not specified; omitting directory 'dir1'
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$ cp file2 backup_file.txt
vaishnavii29@DESKTOP-BSKS7E4: /mnt/c/Users/DELL/Desktop/New folder/linux$
```

TASK 4: [File Permissions]

Task Statement:

- [Create a shell script file called exp2. Make the file executable only for the owner.]

Explanation:

- [Using chmod u+x filename we can make the file executable for user only using ls -l to check for permissions also script files typically need executable permission to run]

Command(s):

```
touch exp2
chmod +x exp2
ls -l exp2
chmod +w exp2
ls -l exp2
chmod -w exp2
ls -l exp2
chmod 755 exp2
ls -l exp2
chmod 644 exp2
ls -l exp2
```


Output:

```
vaishnavii29@DESKTOP-BSKS7E4:~$ touch exp2
vaishnavii29@DESKTOP-BSKS7E4:~$ chmod +x exp2
vaishnavii29@DESKTOP-BSKS7E4:~$ ls -l exp2
-r-xr-xr-x 1 vaishnavii29 vaishnavii29 0 Sep 12 07:00 exp2
vaishnavii29@DESKTOP-BSKS7E4:~$ chmod +w exp2
vaishnavii29@DESKTOP-BSKS7E4:~$ ls -l exp2
-rwxr-xr-x 1 vaishnavii29 vaishnavii29 0 Sep 12 07:00 exp2
vaishnavii29@DESKTOP-BSKS7E4:~$ chmod -w exp2
vaishnavii29@DESKTOP-BSKS7E4:~$ ls -l exp2
-r-xr-xr-x 1 vaishnavii29 vaishnavii29 0 Sep 12 07:00 exp2
vaishnavii29@DESKTOP-BSKS7E4:~$ chmod 755 exp2
vaishnavii29@DESKTOP-BSKS7E4:~$ ls -l exp2
-rwxr-xr-x 1 vaishnavii29 vaishnavii29 0 Sep 12 07:00 exp2
vaishnavii29@DESKTOP-BSKS7E4:~$ chmod 644 exp2
vaishnavii29@DESKTOP-BSKS7E4:~$ ls -l exp2
ls-l: command not found
vaishnavii29@DESKTOP-BSKS7E4:~$ ls -l exp2
-rw-r--r-- 1 vaishnavii29 vaishnavii29 0 Sep 12 07:00 exp2
vaishnavii29@DESKTOP-BSKS7E4:~$ |
```

TASK 5: [File Viewing]

Task Statement:

- [Create a file called expe6.sh with numbers 1 to 20 (each on a new line). Display only the first 5 lines, then only the last 3 lines, then search for lines containing the number “1”.]

Explanation:

- [I can quickly generate a list of numbers by running `seq 1 20 > numbers.txt`. To check the first few numbers, I use `head -n 5` to see the first 5 lines, and `tail -n 3` to see the last 3 lines. If I want to find all numbers containing a “1”, I can use `grep “1”`. Alternatively, I could create the list manually by using multiple `echo` commands.]

Command(s):

```
seq 1 20 > numbers.txt
head -n 5
tail -n 3
grep "1"
```

Output:

```
vaishnavii29@DESKTOP-BSKS x + v
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ ls
archive1.tar archive2.tar 85x2  exoperim6.sh exp6.1.sh expee6.sh experi6.sh file2.gz file4.sh howe
archive1.tar.gz backup_file.txt 85x1  exp.2.sh exp6.2.sh expee6.sh expfunction.sh file3.sh file5 link.txt
archive1tar.bz2 backup_original.txt error.log exp6 exp6.sh exper6.sh exp6.sh file3.sh.gz file6 orig.txt
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ head expee6.sh
i=1
until [ $i -gt 5 ]
do
    echo "Count: $i"
    i=$((i+1))
done
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ head -n 5 expee6.sh
i=1
while [ $i -le 5 ]
do
    echo "Count: $i"
    i=$((i+1))
done
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ head -c 20 expee6.sh
i=1
while [ $i -le 5
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ tall expee6.sh
Command 'tall' not found, did you mean:
  command 'pall' from snap pall (3.0.1)
  command 'tali' from snap tali (40.9)
  command 'taql' from deb casacore-tools (3.5.0-4ubuntu2)
  command 'tali' from deb tali (1:40.9-1)
  command 'tail' from deb coreutils (9.4-2ubuntu2)
  command 'wall' from deb bsdutils (1:2.39.3-9ubuntu6.3)
  command 'talk' from deb inetutils-talk (2:2.4-3ubuntu1)
  command 'talk' from deb talk (0.17-18)
See 'snap info <snapname>' for additional versions.
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ tail expee6.sh
i=1
while [ $i -le 5 ]
do
    echo "Count: $i"
    i=$((i+1))
done
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ tail -n 15 exp.1.sh
tail: cannot open 'exp.1.sh' for reading: No such file or directory
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ tail -n 15 exp6.1.sh
i=1
while [ $i -le 5 ]
do
    echo "Count: $i"
    i=$((i+1))
done
```

TASK 6: [Text Editing]

Task Statement:

- [Using nano, create a file called config.txt with the following content:

Database=localhost Port=5432 Username=admin

Save the file and then display its contents.]

Explanation:

- [I open a file in Nano using nano file1.txt and type my content normally. Once I'm done, I press Ctrl+O to save the file and Ctrl+X to exit Nano. After that, I use cat to check the contents and make sure everything was saved correctly.]

Command(s):

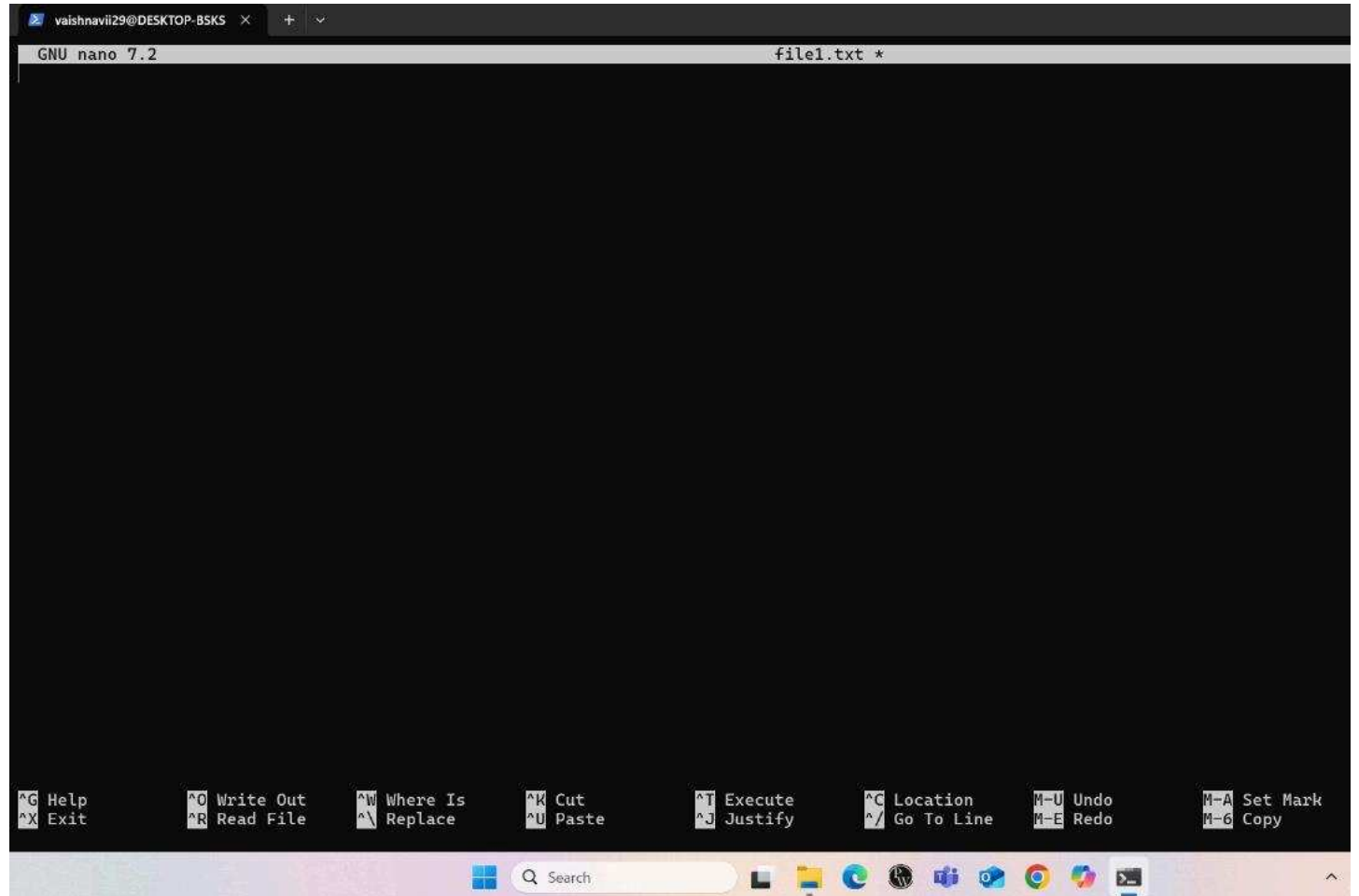
```
vim filename.txt
```

Alternatively

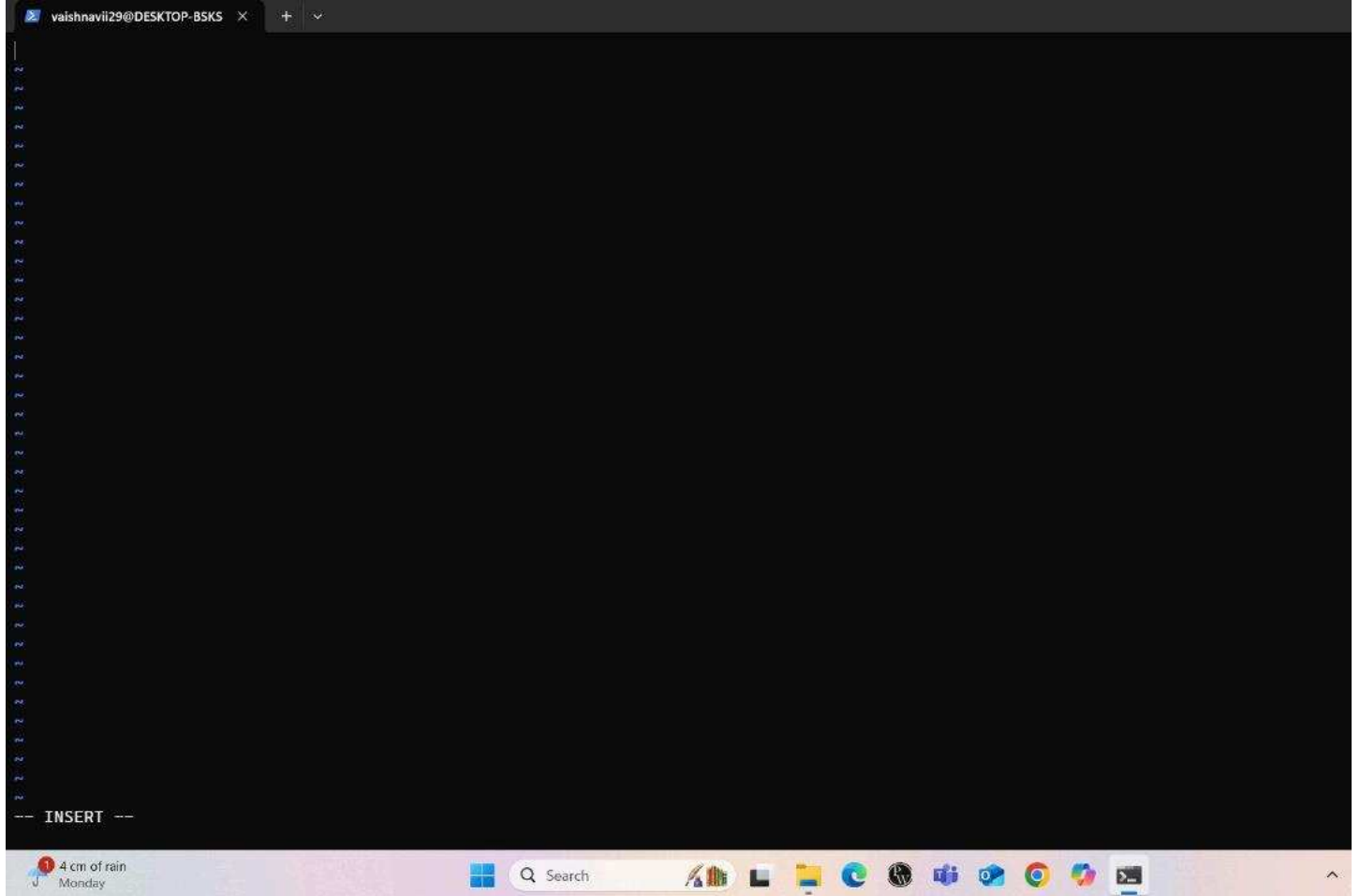
```
nano file1.txt
```

Output:

```
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New_folder/linux$ nano file1.txt
```



```
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ vim filename.txt
```



TASK 7: [System Information]

Task Statement:

- [Create a file called system_info.txt that contains: your username, current date, your current directory, and disk usage information in human-readable format.]

Explanation:

- [I can use whoami to check my username, date to see the current date, and pwd to know my current directory. To check disk usage, I use df -h. I can save the output of any command to a file by using redirection like command >> filename.txt. If I want to add labels, I use echo like this: echo "Username:" >> file.txt.]

Command(s):

```
cd scripts
touch system_info.txt
echo "Username:" >> system_info.txt
whoami >> system_info.txt
echo "Date:" >> system_info.txt
date >> system_info.txt
echo "Current Directory:" >> system_info.txt
pwd >> system_info.txt
echo "Disk Usage:" >> system_info.txt
df -h >> system_info.txt
```


Output:

```
vaishnavii29@DESKTOP-BSKS x + v
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ whoami
vaishnavii29
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ who
vaishnavii29 pts/1 2025-09-14 05:51
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ sudo apt update
[sudo] password for vaishnavii29:
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1118 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:6 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1389 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21.5 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/main Translation-en [274 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:10 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [15.2 kB]
Get:11 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1483 kB]
Get:12 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [8712 B]
Get:13 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [879 kB]
Get:14 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [195 kB]
Get:15 http://archive.ubuntu.com/ubuntu noble-updates/universe Translation-en [298 kB]
Get:16 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [52.3 kB]
Get:17 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [18.0 kB]
Get:18 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B]
Get:19 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [212 B]
Get:20 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [377 kB]
Get:21 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 c-n-f Metadata [31.0 kB]
Get:22 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [1840 kB]
Get:23 http://archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [410 kB]
Get:24 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:25 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 c-n-f Metadata [500 B]
Get:26 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Packages [41.9 kB]
Get:27 http://archive.ubuntu.com/ubuntu noble-updates/multiverse Translation-en [7064 B]
Get:28 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:29 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 c-n-f Metadata [644 B]
Get:30 http://archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7056 B]
Get:31 http://archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [19.2 kB]
Get:32 http://archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [216 B]
Get:33 http://archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Fetched 9043 kB in 10s (899 kB/s)
Reading package lists... Done
```

TASK 8: [Process and History]

Task Statement:

- [Display your command history and count how many commands you've executed. Then show the top 10 most recent commands.]

Explanation:

- [I can use history to see all the commands I've typed. To count the total number of commands, I use history | wc -l. If I want to view just the last 10 commands, I can use history 10 or history | tail -10. The wc -l command simply counts the number of lines in the output.]

Command(s):

```
history
history 10
```

Output:

```
vaishnavii29@DESKTOP-BSKS x + v
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ history
1 sudo apt install nemo && nemo
2 sudo apt update -y
3 touch first.txt
4 ls
5 sudo apt install nemo && NEMO
6 sudo apt update -y
7 touch first.txt
8 ls
9 virtualbox
10 sudo apt install virtualbox-qt
11 virtualbox
12 CR mkdir
13 mkdir -p lab3
14 rmdir lab3/
15 man
16 man man
17 touch lab3/file1
18 man mkdir
19 mkdir -p lab3
20 touch lab3/file1
21 ls
22 touch ./lab3/file1
23 nano readme.txt
24 readmefim.txt
25 vim readmefim.txt
26 whoami
27 who
28 who --help
29 uname
30 uname -a
31 df
32 history
33 history | grep "man"
34 history > hstory2.txt
35 rm hstory2.txt
36 echo $SHELL
37 vim .text.sh
38 vim .txt
39 vim .txt1.sh
40 mv .txt1.sh test1.sh

29°C
Light rain
Search
vaishnavii29@DESKTOP-BSKS x + v
568 clear
569 top
570 htop
571 sudo apt install htop
572 htop
573 clear
574 history
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ history 20
556 sudo apt update
557 clear
558 unname
559 clear
560 unname
561 unname -a
562 unname -r
563 unname -o
564 df
565 df -h
566 df -h /
567 df -h /
568 clear
569 top
570 htop
571 sudo apt install htop
572 htop
573 clear
574 history
575 history 20
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ history | grep htop
570 htop
571 sudo apt install htop
572 htop
576 history | grep htop
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ !!
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ !!
!!
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ !567
df -h /
Filesystem      Size  Used Avail Use% Mounted on
/dev/sdd        1007G  3.0G  953G   1% /
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ S|

Heavy rain
Today
Search
```

TASK 10: [Comprehensive Cleanup]

Task Statement:

- [Set the permissions of your backup.sh script to be readable, writable, and executable by owner, readable and executable by group, and readable by others. Then create a summary file that lists the total number of files and directories in your entire test_project.]

Explanation:

- [I can set permissions for backup.sh using `chmod 754 backup.sh` to give `rw-r--r--` permissions. Alternatively, I can use `chmod u=rwx,g=rx,o=r backup.sh`. To count all files, I use `find . -type f | wc -l`, and to count directories, I use `find . -type d | wc -l`. If I want to see the full directory structure recursively, I use `ls -R`. I can also combine multiple commands with `&&` or save the outputs to a summary file for later reference.]

Command(s):

```
find . -type f
find . -type d
```


Output:

```
vaishnavii29@DESKTOP-BSKS x + v
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -name file3
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -iname FILE3
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find . /home -type d -name dir_1
./dir_1
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find . /home -type f -name file3
./dir_1/file3
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -type l
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find . /home -type l-
find: Must separate multiple arguments to -type using: ','
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find . /home -type l
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -size +100M
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -size +1KB
find: invalid -size type 'B'
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -size +1k
/home
/home/vaishnavii29
/home/vaishnavii29/a.out
/home/vaishnavii29/.cache
/home/vaishnavii29/.bash_history
/home/vaishnavii29/VirtualBox VMs
/home/vaishnavii29/VirtualBox VMs/linux
/home/vaishnavii29/VirtualBox VMs/linux/linux.vbox
/home/vaishnavii29/VirtualBox VMs/linux/linux.vdi
/home/vaishnavii29/VirtualBox VMs/linux/linux.vbox-prev
/home/vaishnavii29/public_folder
/home/vaishnavii29/documents
/home/vaishnavii29/documents/projects
/home/vaishnavii29/documents/projects/linux_tutorial
/home/vaishnavii29/.scriptexp5.sh.swo
/home/vaishnavii29/.bashrc
/home/vaishnavii29/dir3
/home/vaishnavii29/dir1
/home/vaishnavii29/.landscape
/home/vaishnavii29/.local
/home/vaishnavii29/.local/share
/home/vaishnavii29/.local/share/nano
/home/vaishnavii29/.local/share/gedit
/home/vaishnavii29/.local/share/flatpak
/home/vaishnavii29/.local/share/flatpak/db
/home/vaishnavii29/.local/share/recently-used.xbel
/home/vaishnavii29/dir11

28°C
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/home/vaishnavii29/.viminfo
/home/vaishnavii29/.scriptexp5.sh.swp
/home/vaishnavii29/dir2
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -mtime -7
/home/vaishnavii29
/home/vaishnavii29/a.out
/home/vaishnavii29/.motd_shown
/home/vaishnavii29/first.c
/home/vaishnavii29/.bash_history
/home/vaishnavii29/.lesshst
/home/vaishnavii29/VirtualBox VMs
/home/vaishnavii29/VirtualBox VMs/linux
/home/vaishnavii29/VirtualBox VMs/linux/linux.vbox
/home/vaishnavii29/VirtualBox VMs/linux/linux.vdi
/home/vaishnavii29/VirtualBox VMs/linux/linux.vbox-prev
/home/vaishnavii29/public_folder
/home/vaishnavii29/documents
/home/vaishnavii29/documents/projects
/home/vaishnavii29/documents/projects/linux_tutorial
/home/vaishnavii29/first2.c
/home/vaishnavii29/dir3
/home/vaishnavii29/dir1
/home/vaishnavii29/.local/share
/home/vaishnavii29/.local/share/gedit
/home/vaishnavii29/.local/share/gedit/gedit-metadata.xml
/home/vaishnavii29/.local/share/flatpak
/home/vaishnavii29/.local/share/flatpak/db
/home/vaishnavii29/.local/share/recently-used.xbel
/home/vaishnavii29/dir11
/home/vaishnavii29/exp2
/home/vaishnavii29/.config
/home/vaishnavii29/.config/gedit
/home/vaishnavii29/.config/gedit/accels
/home/vaishnavii29/.config/htop
/home/vaishnavii29/.config/htop/htoprc
/home/vaishnavii29/.config/VirtualBox
/home/vaishnavii29/.config/VirtualBox/selectorwindow.log.2
/home/vaishnavii29/.config/VirtualBox/VBoxSVC.log.7
/home/vaishnavii29/.config/VirtualBox/VBoxSVC.log.6
/home/vaishnavii29/.config/VirtualBox/selectorwindow.log.3
/home/vaishnavii29/.config/VirtualBox/selectorwindow.log.5

28°C
Light rain
Search
```

```
vaishnavii29@DESKTOP-BSKS  x  +  v
/home/vaishnavii29/.config/QtProject.conf
/home/vaishnavii29/.viminfo
/home/vaishnavii29/dir2
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -atime +30
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -ctime -1
/home/vaishnavii29/.motd_shown
/home/vaishnavii29/.bash_history
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -perm 644
/home/vaishnavii29/.bash_logout
/home/vaishnavii29/.cache/motd.legal-displayed
/home/vaishnavii29/.profile
/home/vaishnavii29/.scriptexp5.sh.swp
/home/vaishnavii29/.bashrc
/home/vaishnavii29/first2.c
/home/vaishnavii29/file1
/home/vaishnavii29/.landscape/sysinfo.log
/home/vaishnavii29/.local/share/gedit/gedit-metadata.xml
/home/vaishnavii29/exp2
/home/vaishnavii29/.config/gedit/acclcs
/home/vaishnavii29/.config/enchant/en_US.exc
/home/vaishnavii29/.config/enchant/en_US.dic
/home/vaishnavii29/.config/QtProject.conf
/home/vaishnavii29/.scriptexp5.sh.swp
/home/vaishnavii29/.sudo_as_admin_successful
/home/vaishnavii29/file2
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -perm -644
/home
/home/vaishnavii29/.bash_logout
/home/vaishnavii29/a.out
/home/vaishnavii29/.motd_shown
/home/vaishnavii29/.scriptexp5.sh
/home/vaishnavii29/.cache/motd.legal-displayed
/home/vaishnavii29/.profile
/home/vaishnavii29/test1.sh
/home/vaishnavii29/first.c
/home/vaishnavii29/VirtualBox VMs
/home/vaishnavii29/VirtualBox VMs/linux
/home/vaishnavii29/public_folder
/home/vaishnavii29/documents
/home/vaishnavii29/documents/projects
/home/vaishnavii29/documents/projects/linux_tutorial
```



```
/home/vaishnavii29/.sudo_as_admin_successful
/home/vaishnavii29/file2
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$
vaishnavii29@DESKTOP-BSKS7E4:/mnt/c/Users/DELL/Desktop/New folder/linux$ find /home -perm /111
/home
/home/vaishnavii29
/home/vaishnavii29/a.out
/home/vaishnavii29/.scriptexp5.sh
/home/vaishnavii29/.cache
/home/vaishnavii29/test1.sh
/home/vaishnavii29/first.c
/home/vaishnavii29/VirtualBox VMs
/home/vaishnavii29/VirtualBox VMs/linux
/home/vaishnavii29/public_folder
/home/vaishnavii29/documents
/home/vaishnavii29/documents/projects
/home/vaishnavii29/documents/projects/linux_tutorial
/home/vaishnavii29/dir3
/home/vaishnavii29/dir1
/home/vaishnavii29/.landscape
/home/vaishnavii29/.local
/home/vaishnavii29/.local/share
/home/vaishnavii29/.local/share/nano
/home/vaishnavii29/.local/share/gedit
/home/vaishnavii29/.local/share/flatpak
/home/vaishnavii29/.local/share/flatpak/db
/home/vaishnavii29/dir11
/home/vaishnavii29/script5.sh
/home/vaishnavii29/.config
/home/vaishnavii29/.config/gedit
/home/vaishnavii29/.config/htop
/home/vaishnavii29/.config/VirtualBox
/home/vaishnavii29/.config/dconf
/home/vaishnavii29/.config/procps
/home/vaishnavii29/.config/enchant
/home/vaishnavii29/script.sh
/home/vaishnavii29/dir2
```