HPC Assignment 1
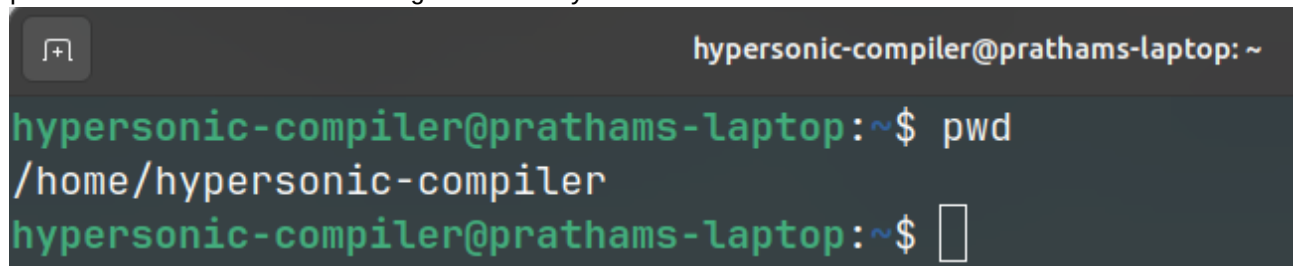
Name – Pratham Dheeraj Bhosale

Roll – 2223987

Date – 14 July 2025
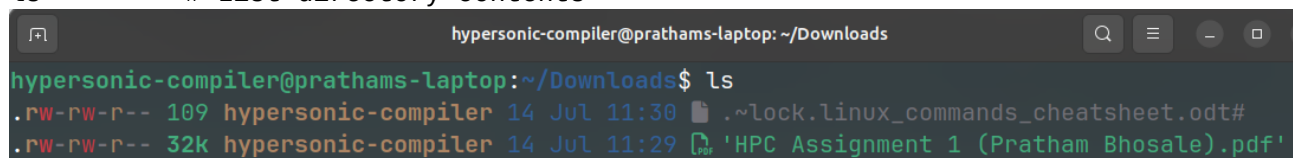
```
# Navigation Commands
pwd            # Print working directory
```
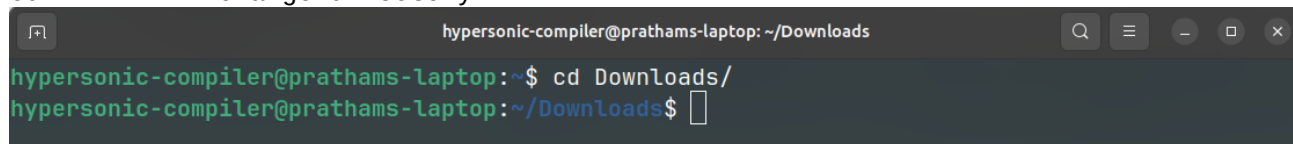


```
ls             # List directory contents
```



```
cd             # Change directory
```



```
# File and Directory Operations
touch file.txt              # Create a new file
```



```
mkdir new_folder            # Create a new directory
```



```
rm file.txt                 # Remove a file
```



```
rm -r folder_name           # Remove a directory and its contents
```

```
hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ rm -r TestFolder
hypersonic-compiler@prathams-laptop:~/Downloads$ 
```

cp source.txt destination.txt   # Copy a file

```
hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ cp file.txt ../AIEC/newfile.txt
hypersonic-compiler@prathams-laptop:~/Downloads$ 
```

cp -r source_folder/ destination_folder/   # Copy a directory

```
hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ mkdir TestFolder
hypersonic-compiler@prathams-laptop:~/Downloads$ cp -r TestFolder ../AIEC/NewTestFolder
hypersonic-compiler@prathams-laptop:~/Downloads$ 
```

mv oldname.txt newname.txt # Rename a file or move it

```
hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ touch file.txt
hypersonic-compiler@prathams-laptop:~/Downloads$ mv file.txt newfile.txt
```

Permission Management
chmod 755 file.sh   # Change file permissions

```
hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ chmod 755 file.sh
hypersonic-compiler@prathams-laptop:~/Downloads$ 
```

chown user:group file.txt   # Change file owner and group

```
hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ chown user:group file.sh
```

ls -l   # List with detailed permissions

```
hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ ls -l
.rw-rw-r-- 109 hypersonic-compiler 14 Jul 11:30  .~lock.linux_commands_cheatsheet.odt#
.rwxr-xr-x   0 hypersonic-compiler 14 Jul 11:39  file.sh
.rw-rw-r-- 32k hypersonic-compiler 14 Jul 11:29  'HPC Assignment 1 (Pratham Bhosale).pdf'
```

Text Processing
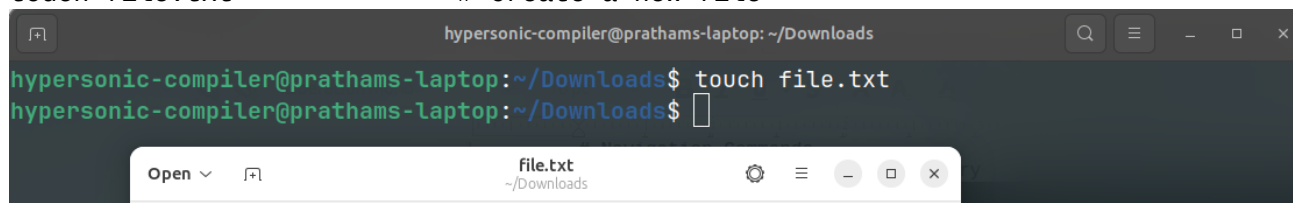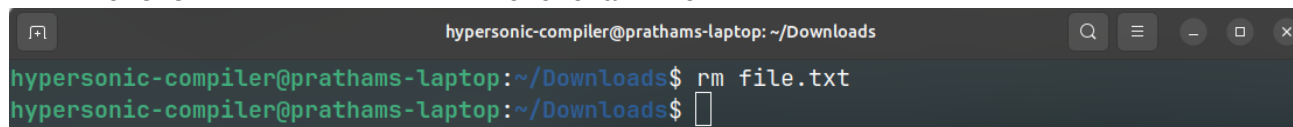cat file.txt   # Display file content

```
hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ cat file.txt
Hello World!
HPC Assignment 1
Linux Commands
```

less file.txt   # View file content page by page

```
hypersonic-compiler@prathams-laptop: ~/Downloads

Hello World!
HPC Assignment 1
Linux Commands

~
```

```
more file.txt                # Another pager for viewing files
```

hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ more file.txt
Hello World!
HPC Assignment 1
Linux Commands

```
grep 'search_term' file.txt # Search for a pattern in a file
```

hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ grep 'HPC' file.txt
HPC Assignment 1
hypersonic-compiler@prathams-laptop:~/Downloads$

```
awk '{print $1}' file.txt    # Print first column of each line
```

hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ awk '{print $1}' file.txt
Hello
HPC
Linux

```
sed 's/old/new/g' file.txt  # Replace 'old' with 'new' in a file
```

hypersonic-compiler@prathams-laptop: ~/Downloads

hypersonic-compiler@prathams-laptop:~/Downloads$ sed 's/old/new/g' file.txt
Hello World!
HPC Assignment 1
Linux Commands

```
# System Monitoring
top                          # Display running processes
```

hypersonic-compiler@prathams-laptop: ~/Downloads

top - 11:42:03 up 3:26, 1 user, load average: 0.40, 0.55, 0.73
Tasks: 411 total,   1 running, 409 sleeping,   0 stopped,   1 zombie
%Cpu(s): 0.2 us, 0.2 sy, 0.0 ni, 99.5 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 15268.3 total,   5460.4 free,   4966.4 used,   5406.1 buff/cache

```
ps aux                       # Snapshot of current processes
```

hypersonic-compiler@prathams-laptop: ~

hypersonic-compiler@prathams-laptop:~$ ps aux
USER   PID %CPU %MEM   VSZ   RSS TTY   STAT START   TIME COMMAND
root   1 0.0 0.0 24024 14340 ?   Ss   08:16   0:01 /sbin/init sp
root   2 0.0 0.0   0   0 ?   S   08:16   0:00 [kthreadd]

```
df -h                        # Disk space usage in human-readable format
```

```
hypersonic-compiler@prathams-laptop:~$ df -h
Filesystem        Size  Used Avail Use% Mounted on
tmpfs             1.5G  6.0M  1.5G   1% /run
/dev/nvme0n1p6    119G  100G   13G  90% /
```

```
du -sh folder_name          # Estimate space used by a folder
```

```
hypersonic-compiler@prathams-laptop:~$ du -sh AIEC
2.2G    AIEC
```

```
# Networking Commands
ping google.com             # Check network connectivity
```

```
hypersonic-compiler@prathams-laptop:~$ ping google.com
PING google.com (2404:6800:4009:810::200e) 56 data bytes
64 bytes from pnbomb-az-in-x0e.1e100.net (2404:6800:4009:810::200e): icmp_seq=1
ttl=117 time=8.93 ms
64 bytes from pnbomb-az-in-x0e.1e100.net (2404:6800:4009:810::200e): icmp_seq=2
ttl=117 time=25.2 ms
```

```
ifconfig                    # Display network interfaces (deprecated)
```

```
hypersonic-compiler@prathams-laptop:~$ ifconfig
```

```
ip addr                     # Display network interfaces (recommended)
```

```
hypersonic-compiler@prathams-laptop:~$ ip addr
```

```
netstat -tuln               # Network statistics
```

```
hypersonic-compiler@prathams-laptop:~$ netstat -tuln
```

```
ssh user@hostname           # Remote login

# Scripting Basics (example.sh)
#!/bin/bash
echo "Hello, World!"
read name
if [ "$name" == "Pratham" ]; then
    echo "Welcome, Pratham!"
else
    echo "Welcome, $name!"
fi

for i in {1..5}; do
    echo "Count: $i"
done

while true; do
    echo "Looping..."
    break
done
```

Exercise Questions Answers

Navigation and Basic Commands

1. `pwd`

2. `ls -a`

3. `cd ..`

File and Directory Operations

4. `mkdir projects`

5. `touch file.txt`

6. `rm sample.txt`

7. `cp report.doc backup/`

8. `mv data.csv /tmp/`

Permission Management

9. `chmod 700 script.sh`

10. `chown john document.txt`

11. Shows detailed info: permissions, owner, size, etc.

Text Processing

12. `cat notes.txt`

13. `less logfile.log`

14. `grep 'error' system.log`

15. `sed 's/foo/bar/g' textfile.txt`

System Monitoring

16. `top`

17. `ps aux`

18. `df -h`

19. `du -sh .`

Networking Commands

20. `ping www.example.com`

21. `ip addr`

22. `ssh alice@example.com`