S.B. JAIN INSTITUTE OF TECHNOLOGY MANAGEMENT & RESEARCH, NAGPUR

Practical 02

Aim: To understand and demonstrate the use of basic commands in different operating systems (Windows, Linux, and UNIX) for managing files, directories, permissions, and user interactions through a terminal or command-line interface.

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❖ Aim:

To understand and demonstrate the use of basic commands in different operating systems (Windows, Linux, and UNIX) for managing files, directories, permissions, and user interactions through a terminal or command-line interface.

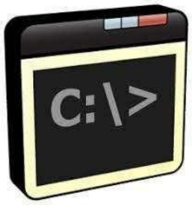
❖ Objectives:

1. To learn and practice fundamental command-line operations for file and directory management.
2. To explore and utilize user and permission management commands effectively.
3. To enhance system administration skills by working with commands across different operating systems.

❖ Requirements:

Hardware Requirements:

- **Processor**: Multi-core CPU, Intel Core i3 (3.0 GHz) or higher
- **RAM**: Minimum 4 GB (8 GB recommended for optimal performance)
- **Storage**: 100 GB HDD or SSD (Solid State Drive) for faster access
- **Network Interface**: Ethernet or Wi-Fi adapter for connectivity



Software Requirements:

- **Operating System**: Windows 10/11, Linux (Ubuntu 20.04/CentOS 8), UNIX-based OS
- **Command-line Interface**: PowerShell or Command Prompt (Windows), Terminal (Linux/UNIX)
- **Text Editor**: Nano, Vim, or Visual Studio Code for file editing
- **Administrative Privileges**: Superuser (Linux/UNIX) or Administrator (Windows) access

❖ Theory:

In system administration, command-line interfaces (CLI) are essential tools for managing and interacting with operating systems like Windows, Linux, and UNIX. Commands allow users to perform various tasks such as navigating directories, managing files, controlling permissions, and monitoring system performance. Each operating system provides a set of built-in commands, such as ‘man’, ‘ls’, ‘cd’, ‘mkdir’, and ‘chmod’, to facilitate efficient system management. Understanding these commands and their syntax is crucial for automating tasks, enhancing security, and ensuring optimal system functionality. This practical aims to develop foundational skills in executing and applying basic commands across different platforms.

❖ Commands:

1. **Display User Manual of a Command**
   - Functionality: Shows the manual page with details about a command’s usage, options, and arguments.
   - Syntax: man <command>
   - Example: man ls

2. **Change Current Working Directory**.
   - Functionality: Changes the terminal’s current working directory.
   - Syntax: cd <directory-path>
   - Example: cd /home/user/Documents.

3. **List Contents of the Current Directory.**
   - Functionality: Lists all files and directories in the current location.
   - Syntax: ls
   - Example: ls

4. **Read/Modify/Concatenate Text Files.**
   - Functionality: Displays or manipulates file content.
   - Syntax:
     - Read: cat <filename>
     - Modify: ‘nano <filename>
     - Concatenate: cat <file1> <file2> > <outputfile>

5. **Create a New Directory**.
   - Functionality: Creates a new directory at the specified path.
   - Syntax: mkdir <directory-name
   - Example: mkdir newdir

6. **Display Current Working Directory.**
   - Functionality: Prints the current directory path.
   - Syntax: pwd
   - Example: pwd

7. **Write Arguments to Standard Output.**
   - Functionality: Prints the provided string or variables.
   - Syntax: echo <arguments>
   - Example: echo Hello World

8. **Remove a File**.
 - Functionality: Deletes a specified file.
 - Syntax: rm <filename>
 - Example: rm file.txt

9. **Delete a Directory.**
 - Functionality: Removes an empty directory.
 - Syntax: rmdir <directory-name>
 - Example: rmdir olddir

10. **Copy a File or Directory.**
 - Functionality: Copies a file or directory to a destination.
 - Syntax: cp <source> <destination>
 - Example: cp file.txt backup/

11. **Switch to Root User.**
 - Functionality: Gains root privileges temporarily.
 - Syntax: sudo su
 - Example: sudo s

12. **Move Files or Directories.**
 - Functionality: Moves or renames files and directories.
 -Syntax: mv <source> <destination>
 - Example: mv file.txt newdir/

13. **Search for a String in a File.**
 - Functionality: Searches for a specific word or pattern in a file.
 - Syntax: grep "<string>" <file>
 - Example: grep "error" log.txt

14. **Print Top N Lines of a File.**
 - Functionality: Displays the first N lines of a file.
 - Syntax: head -n <N> <file>
 - Example: ‘head -n 10 file.txt’

15. **Print Last N Lines of a File.**
 - Functionality: Displays the last N lines of a file.
 - Syntax: tail -n <N> <file>
 - Example: ‘tail -n 10 file.txt

16. **Remove Read Permission from Owner.**
 - Functionality: Revokes the owner's read permission for a file.
 - Syntax: chmod u-r <filename>
 - Example: chmod u-r file.txt

17. **Change Specific Permissions.**
 - Functionality: Sets or removes specific file permissions.
 -Syntax: chmod u+r,w-x,g+w <filename>
 - Example: chmod u+r,w-x,g+w file.txt

18. **Add Write Permission to Owner, None to Others**.
 -Functionality: Allows write access for the owner only.
 - Syntax: chmod u+w,o-rwx <filename>
 - Example: chmod u+w,o-rwx file.txt

19. **Assign Permissions to Users.**
 - Functionality: Modifies file access for users, groups, and others.
 - Syntax: chmod u+rwx,g+rx,o+r <filename>
 - Example: ‘chmod u+rwx,g+rx,o+r file.txt

20. **Assign R/W/X to Others.**
 - Functionality: Gives read, write, and execute permissions to others.
 - Syntax: chmod o+rwx <filename>
 - Example: chmod o+rwx file.txt

21. **Remove All Permissions from All Users.**
 - Functionality: Clears all permissions on a file.
 - Syntax: ‘chmod a-rwx <filename>
 - Example: ‘chmod a-rwx file.txt

22. **Remove Read Permission Using Absolute Mode.**
 - Functionality: Uses numeric mode to restrict read access.
 - Syntax: chmod 700 <filename>
 - Example: chmod 700 file.txt

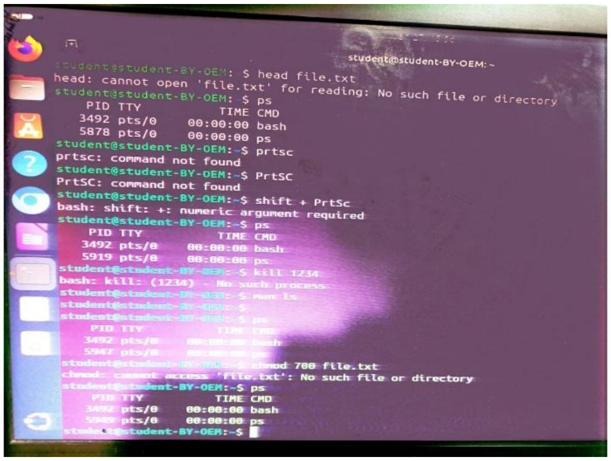
23. **Set R/W for Owner, None for Group/Other.**
 - Functionality: Assigns permissions in numeric mode.
 - Syntax: chmod 600 <filename>
 - Example: chmod 600 file.txt’

24. **Add Execute for Owner, Read for Group/Others.**
 - Functionality: Adds execution and read access.
 - Syntax: chmod u+x,g+r,o+r <filename>

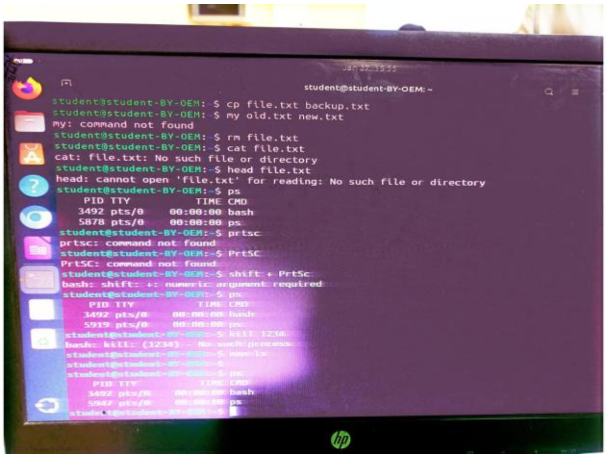
- Example: chmod u+x,g+r,o+r file.txt

25. **Add Execute Permission to All Users.**
    - Functionality: Enables execution by everyone.
    - Syntax: chmod a+x <filename>
    - Example: chmod a+x script.sh

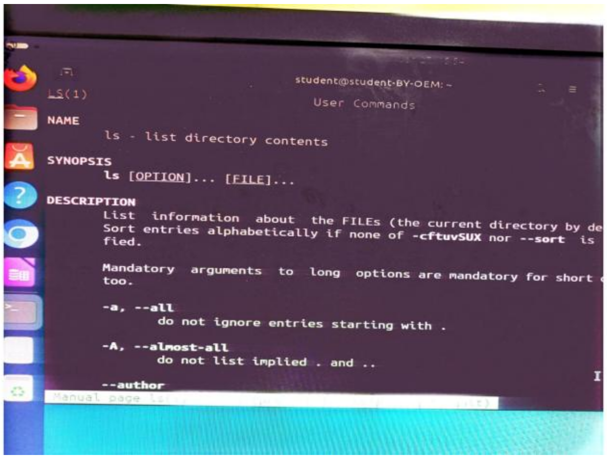
Output:



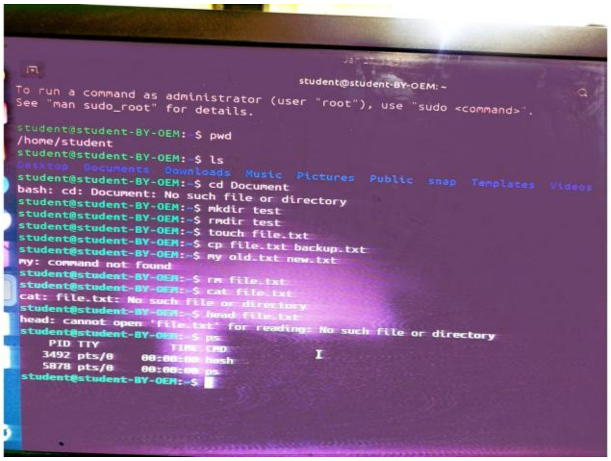
```
student@student-BY-OEM:~$ head file.txt
head: cannot open 'file.txt' for reading: No such file or directory
student@student-BY-OEM:~$ ps
    PID TTY          TIME CMD
   3492 pts/0    00:00:00 bash
   5878 pts/0    00:00:00 ps
student@student-BY-OEM:~$ prtsc
prtsc: command not found
student@student-BY-OEM:~$ PrtSC
PrtSC: command not found
student@student-BY-OEM:~$ shift + PrtSc
bash: shift: +: numeric argument required
student@student-BY-OEM:~$ ps
    PID TTY          TIME CMD
   3492 pts/0    00:00:00 bash
   5919 pts/0    00:00:00 ps
student@student-BY-OEM:~$ kill 1234
bash: kill: (1234) - No such process
student@student-BY-OEM:~$ man ls
student@student-BY-OEM:~$
student@student-BY-OEM:~$ ps
    PID TTY          TIME CMD
   3492 pts/0    00:00:00 bash
   5947 pts/0    00:00:00 ps
student@student-BY-OEM:~$ chmod 700 file.txt
chmod: cannot access 'file.txt': No such file or directory
student@student-BY-OEM:~$ ps
    PID TTY          TIME CMD
   3492 pts/0    00:00:00 bash
   5949 pts/0    00:00:00 ps
student@student-BY-OEM:~$
```



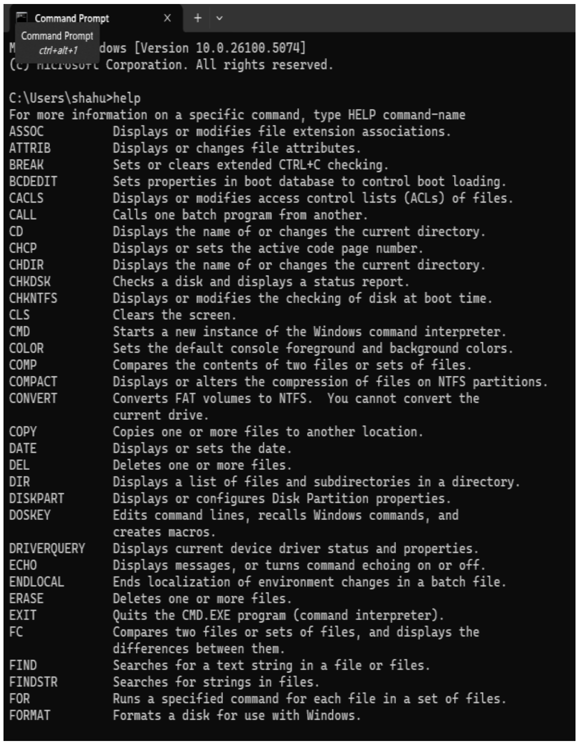
```
student@student-BY-OEM:~$ cp file.txt backup.txt
student@student-BY-OEM:~$ my old.txt new.txt
my: command not found
student@student-BY-OEM:~$ rm file.txt
student@student-BY-OEM:~$ cat file.txt
cat: file.txt: No such file or directory
student@student-BY-OEM:~$ head file.txt
head: cannot open 'file.txt' for reading: No such file or directory
student@student-BY-OEM:~$ ps
    PID TTY          TIME CMD
   3492 pts/0    00:00:00 bash
   5878 pts/0    00:00:00 ps
student@student-BY-OEM:~$ prtsc
prtsc: command not found
student@student-BY-OEM:~$ PrtSC
PrtSC: command not found
student@student-BY-OEM:~$ shift + PrtSc
bash: shift: +: numeric argument required
student@student-BY-OEM:~$ ps
    PID TTY          TIME CMD
   3492 pts/0    00:00:00 bash
   5919 pts/0    00:00:00 ps
student@student-BY-OEM:~$ kill 1234
bash: kill: (1234) - No such process
student@student-BY-OEM:~$ man ls
student@student-BY-OEM:~$
student@student-BY-OEM:~$ ps
    PID TTY          TIME CMD
   3492 pts/0    00:00:00 bash
   5947 pts/0    00:00:00 ps
student@student-BY-OEM:~$
```



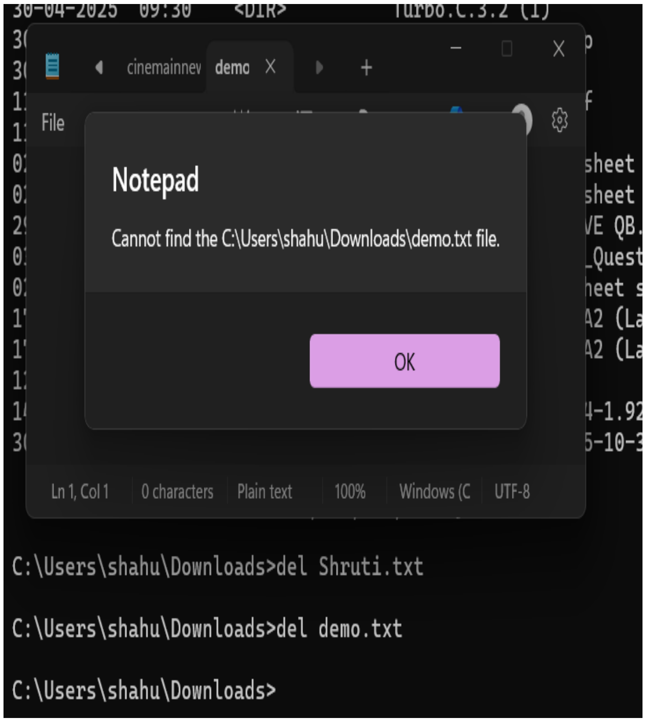
```
LS(1)                        User Commands

NAME
       ls - list directory contents

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

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

       Mandatory  arguments  to  long  options are mandatory for short 
       too.

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

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

       --author
 Manual page ls
```



```
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

student@student-BY-OEM:~$ pwd
/home/student
student@student-BY-OEM:~$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  snap  Templates  Videos
student@student-BY-OEM:~$ cd Document
bash: cd: Document: No such file or directory
student@student-BY-OEM:~$ mkdir test
student@student-BY-OEM:~$ rmdir test
student@student-BY-OEM:~$ touch file.txt
student@student-BY-OEM:~$ cp file.txt backup.txt
student@student-BY-OEM:~$ my old.txt new.txt
my: command not found
student@student-BY-OEM:~$ rm file.txt
student@student-BY-OEM:~$ cat file.txt
cat: file.txt: No such file or directory
student@student-BY-OEM:~$ head file.txt
head: cannot open 'file.txt' for reading: No such file or directory
student@student-BY-OEM:~$ ps
    PID TTY          TIME CMD
   3492 pts/0    00:00:00 bash
   5878 pts/0    00:00:00 ps
student@student-BY-OEM:~$
```



```
M        dows [Version 10.0.26100.5074]
(c) Microsoft Corporation. All rights reserved.

C:\Users\shahu>help
For more information on a specific command, type HELP command-name
ASSOC          Displays or modifies file extension associations.
ATTRIB         Displays or changes file attributes.
BREAK          Sets or clears extended CTRL+C checking.
BCDEDIT        Sets properties in boot database to control boot loading.
CACLS          Displays or modifies access control lists (ACLs) of files.
CALL           Calls one batch program from another.
CD             Displays the name of or changes the current directory.
CHCP           Displays or sets the active code page number.
CHDIR          Displays the name of or changes the current directory.
CHKDSK         Checks a disk and displays a status report.
CHKNTFS        Displays or modifies the checking of disk at boot time.
CLS            Clears the screen.
CMD            Starts a new instance of the Windows command interpreter.
COLOR          Sets the default console foreground and background colors.
COMP           Compares the contents of two files or sets of files.
COMPACT        Displays or alters the compression of files on NTFS partitions.
CONVERT        Converts FAT volumes to NTFS.  You cannot convert the
               current drive.
COPY           Copies one or more files to another location.
DATE           Displays or sets the date.
DEL            Deletes one or more files.
DIR            Displays a list of files and subdirectories in a directory.
DISKPART       Displays or configures Disk Partition properties.
DOSKEY         Edits command lines, recalls Windows commands, and
               creates macros.
DRIVERQUERY    Displays current device driver status and properties.
ECHO           Displays messages, or turns command echoing on or off.
ENDLOCAL       Ends localization of environment changes in a batch file.
ERASE          Deletes one or more files.
EXIT           Quits the CMD.EXE program (command interpreter).
FC             Compares two files or sets of files, and displays the
               differences between them.
FIND           Searches for a text string in a file or files.
FINDSTR        Searches for strings in files.
FOR            Runs a specified command for each file in a set of files.
FORMAT         Formats a disk for use with Windows.
```

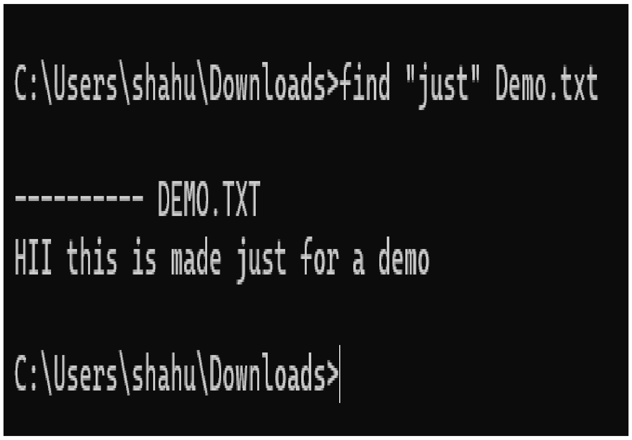


```
30-04-2025  09:30    <DIR>          Turbo.C.3.2 (1)
```

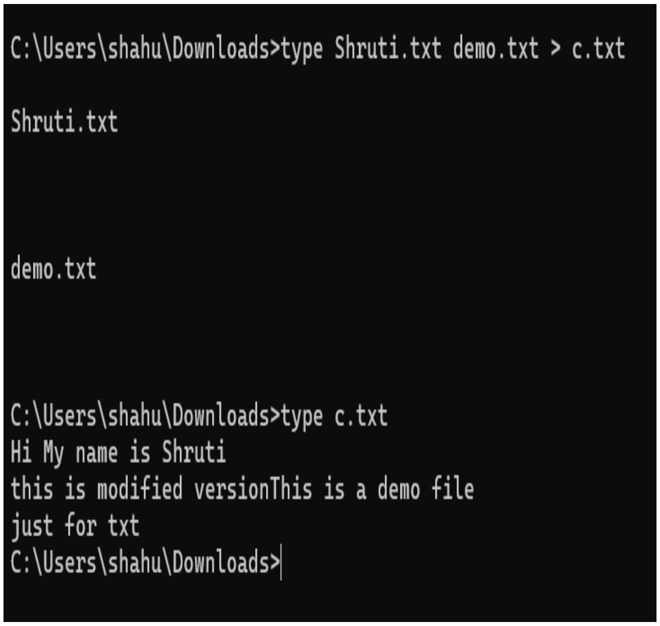
Notepad

Cannot find the C:\Users\shahu\Downloads\demo.txt file.

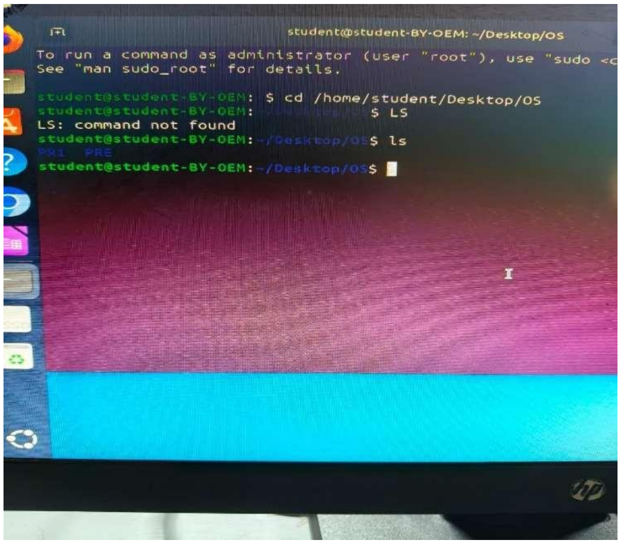
```
C:\Users\shahu\Downloads>del Shruti.txt

C:\Users\shahu\Downloads>del demo.txt

C:\Users\shahu\Downloads>
```



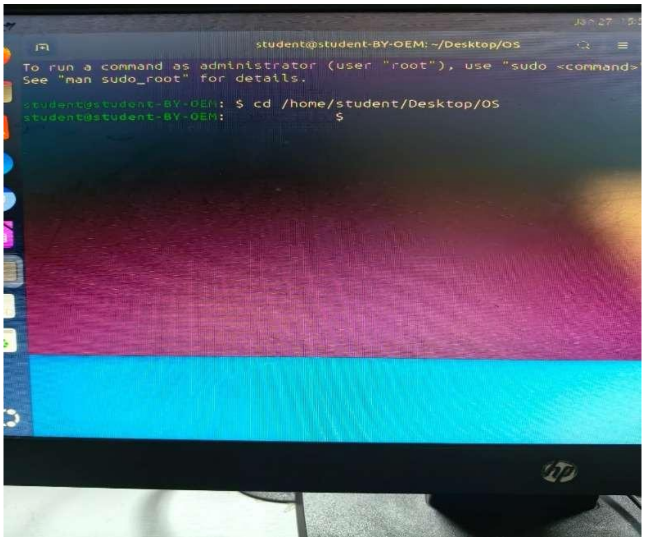
```
C:\Users\shahu\Downloads>find "just" Demo.txt

---------- DEMO.TXT
HII this is made just for a demo

C:\Users\shahu\Downloads>
```



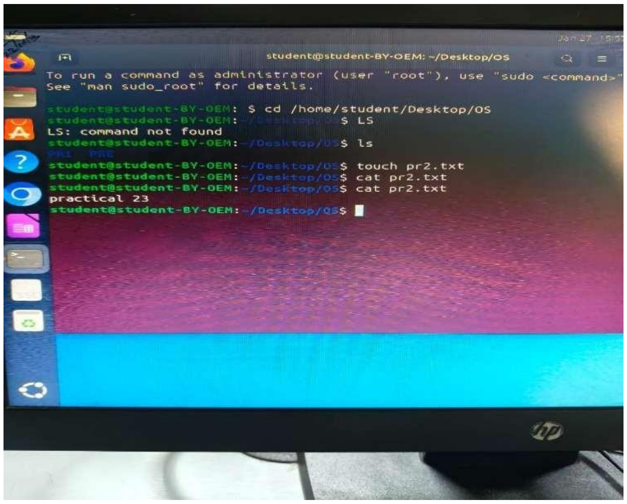
```
C:\Users\shahu\Downloads>type Shruti.txt demo.txt > c.txt

Shruti.txt



demo.txt



C:\Users\shahu\Downloads>type c.txt
Hi My name is Shruti
this is modified versionThis is a demo file
just for txt
C:\Users\shahu\Downloads>
```



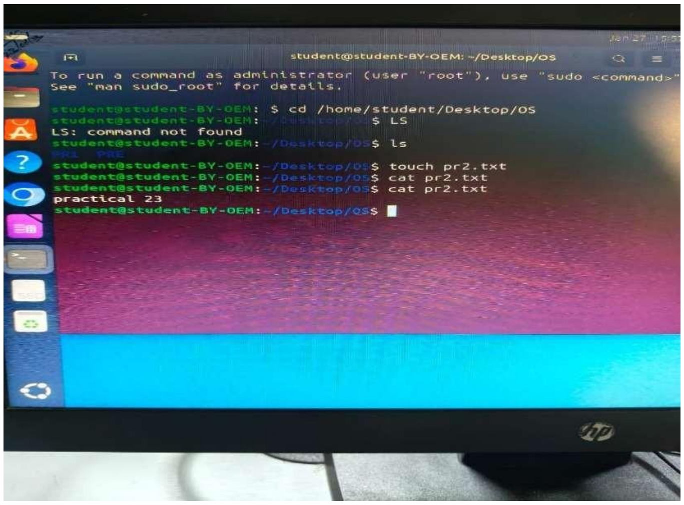
```
student@student-BY-OEM: ~/Desktop/OS
To run a command as administrator (user "root"), use "sudo <c
See "man sudo_root" for details.

student@student-BY-OEM: $ cd /home/student/Desktop/OS
student@student-BY-OEM:~/Desktop/OS$ LS
LS: command not found
student@student-BY-OEM:~/Desktop/OS$ ls
PR1  PRE
student@student-BY-OEM:~/Desktop/OS$ 
```



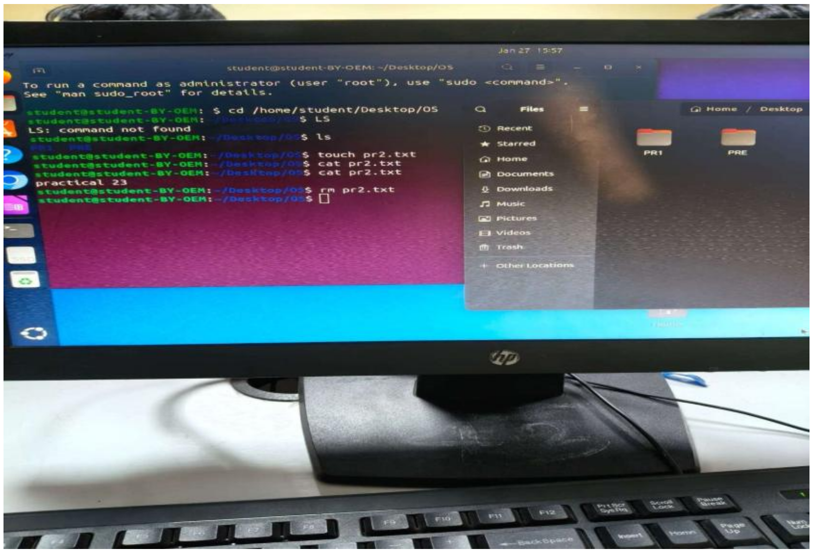
```
student@student-BY-OEM: ~/Desktop/OS
To run a command as administrator (user "root"), use "sudo <command>
See "man sudo_root" for details.

student@student-BY-OEM: $ cd /home/student/Desktop/OS
student@student-BY-OEM:~/Desktop/OS$
```



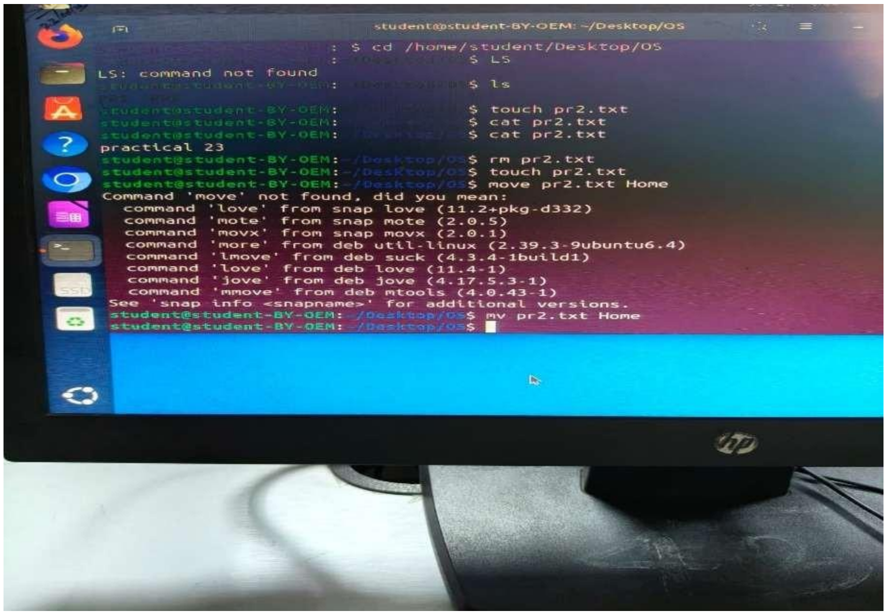
```
student@student-BY-OEM: ~/Desktop/OS
To run a command as administrator (user "root"), use "sudo <command>"
See "man sudo_root" for details.

student@student-BY-OEM: $ cd /home/student/Desktop/OS
student@student-BY-OEM:~/Desktop/OS$ LS
LS: command not found
student@student-BY-OEM:~/Desktop/OS$ ls
PR1  PRE
student@student-BY-OEM:~/Desktop/OS$ touch pr2.txt
student@student-BY-OEM:~/Desktop/OS$ cat pr2.txt
student@student-BY-OEM:~/Desktop/OS$ cat pr2.txt
practical 23
student@student-BY-OEM:~/Desktop/OS$ 
```



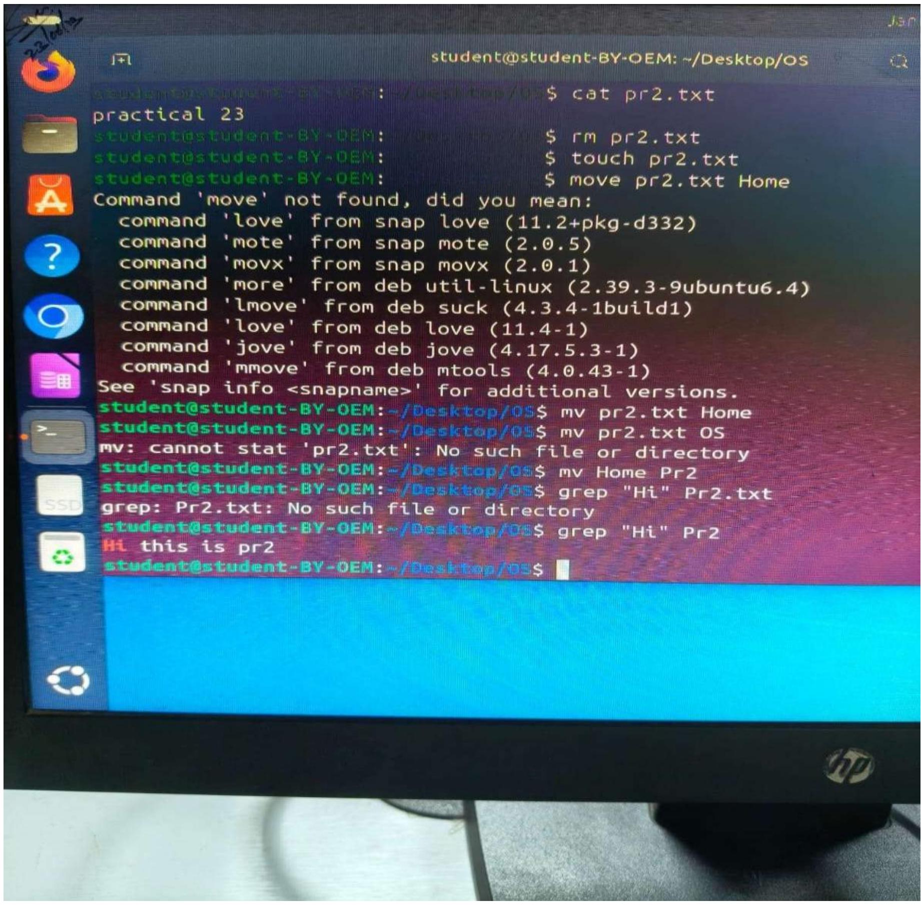
```
student@student-BY-OEM: ~/Desktop/OS
To run a command as administrator (user "root"), use "sudo <command>"
See "man sudo_root" for details.

student@student-BY-OEM: $ cd /home/student/Desktop/OS
student@student-BY-OEM:~/Desktop/OS$ LS
LS: command not found
student@student-BY-OEM:~/Desktop/OS$ ls
PR1  PRE
student@student-BY-OEM:~/Desktop/OS$ touch pr2.txt
student@student-BY-OEM:~/Desktop/OS$ cat pr2.txt
student@student-BY-OEM:~/Desktop/OS$ cat pr2.txt
practical 23
student@student-BY-OEM:~/Desktop/OS$ 
```



```
student@student-BY-OEM: ~/Desktop/OS
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

student@student-BY-OEM: $ cd /home/student/Desktop/OS
student@student-BY-OEM:~/Desktop/OS$ LS
LS: command not found
student@student-BY-OEM:~/Desktop/OS$ ls
PR1  PRE
student@student-BY-OEM:~/Desktop/OS$ touch pr2.txt
student@student-BY-OEM:~/Desktop/OS$ cat pr2.txt
student@student-BY-OEM:~/Desktop/OS$ cat pr2.txt
practical 23
student@student-BY-OEM:~/Desktop/OS$ rm pr2.txt
student@student-BY-OEM:~/Desktop/OS$ 
```



```
student@student-BY-OEM: ~/Desktop/OS
student@student-BY-OEM: $ cd /home/student/Desktop/OS
student@student-BY-OEM:~/Desktop/OS$ LS
LS: command not found
student@student-BY-OEM:~/Desktop/OS$ ls
[illegible]
student@student-BY-OEM:~/Desktop/OS$ touch pr2.txt
student@student-BY-OEM:~/Desktop/OS$ cat pr2.txt
student@student-BY-OEM:~/Desktop/OS$ cat pr2.txt
practical 23
student@student-BY-OEM:~/Desktop/OS$ rm pr2.txt
student@student-BY-OEM:~/Desktop/OS$ touch pr2.txt
student@student-BY-OEM:~/Desktop/OS$ move pr2.txt Home
Command 'move' not found, did you mean:
  command 'love' from snap love (11.2+pkg-d332)
  command 'mote' from snap mote (2.0.5)
  command 'movx' from snap movx (2.0.1)
  command 'more' from deb util-linux (2.39.3-9ubuntu6.4)
  command 'lmove' from deb suck (4.3.4-1build1)
  command 'love' from deb love (11.4-1)
  command 'jove' from deb jove (4.17.5.3-1)
  command 'mmove' from deb mtools (4.0.43-1)
See 'snap info <snapname>' for additional versions.
student@student-BY-OEM:~/Desktop/OS$ mv pr2.txt Home
student@student-BY-OEM:~/Desktop/OS$ 
```



```
student@student-BY-OEM: ~/Desktop/OS
student@student-BY-OEM:~/Desktop/OS$ cat pr2.txt
practical 23
student@student-BY-OEM:~/Desktop/OS$ rm pr2.txt
student@student-BY-OEM:~/Desktop/OS$ touch pr2.txt
student@student-BY-OEM:~/Desktop/OS$ move pr2.txt Home
Command 'move' not found, did you mean:
  command 'love' from snap love (11.2+pkg-d332)
  command 'mote' from snap mote (2.0.5)
  command 'movx' from snap movx (2.0.1)
  command 'more' from deb util-linux (2.39.3-9ubuntu6.4)
  command 'lmove' from deb suck (4.3.4-1build1)
  command 'love' from deb love (11.4-1)
  command 'jove' from deb jove (4.17.5.3-1)
  command 'mmove' from deb mtools (4.0.43-1)
See 'snap info <snapname>' for additional versions.
student@student-BY-OEM:~/Desktop/OS$ mv pr2.txt Home
student@student-BY-OEM:~/Desktop/OS$ mv pr2.txt OS
mv: cannot stat 'pr2.txt': No such file or directory
student@student-BY-OEM:~/Desktop/OS$ mv Home Pr2
student@student-BY-OEM:~/Desktop/OS$ grep "Hi" Pr2.txt
grep: Pr2.txt: No such file or directory
student@student-BY-OEM:~/Desktop/OS$ grep "Hi" Pr2
Hi this is pr2
student@student-BY-OEM:~/Desktop/OS$ 
```

- **Conclusion:** In conclusion, understanding and using essential operating system commands like **'ls', 'cd', 'cp', 'mv', and 'chmod'** enables efficient file management, navigation, and permission control. Tools like **'grep', 'head', and 'tail'** enhance data processing. Mastery of these commands improves system administration, task automation, and overall system security and performance.

- **Discussion Questions:**

1. **What is the significance of the pwd command in a Linux environment?**
2. **Explain the function of the cp command and its common options.**
3. **How does chmod 700 affect file permissions, and what does each digit represent?**
4. **Describe the difference between head and tail commands in Linux.**
5. **What is the purpose of the grep command, and how is it used with regular expressions?**

- **References**:

https://ubuntu.com/tutorials/command-line-for-beginners#1-overview
https://www.geeksforgeeks.org/25-basic-ubuntu-commands/

Date:27/01/2026

Signature
Course Coordinator
B.Tech CSE(AIML)
Sem: 4 / 2025-26