



National Textile University

Department of Computer Science

Subject:

Operating Systems

Submitted To:

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Registration No:

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Lab No:

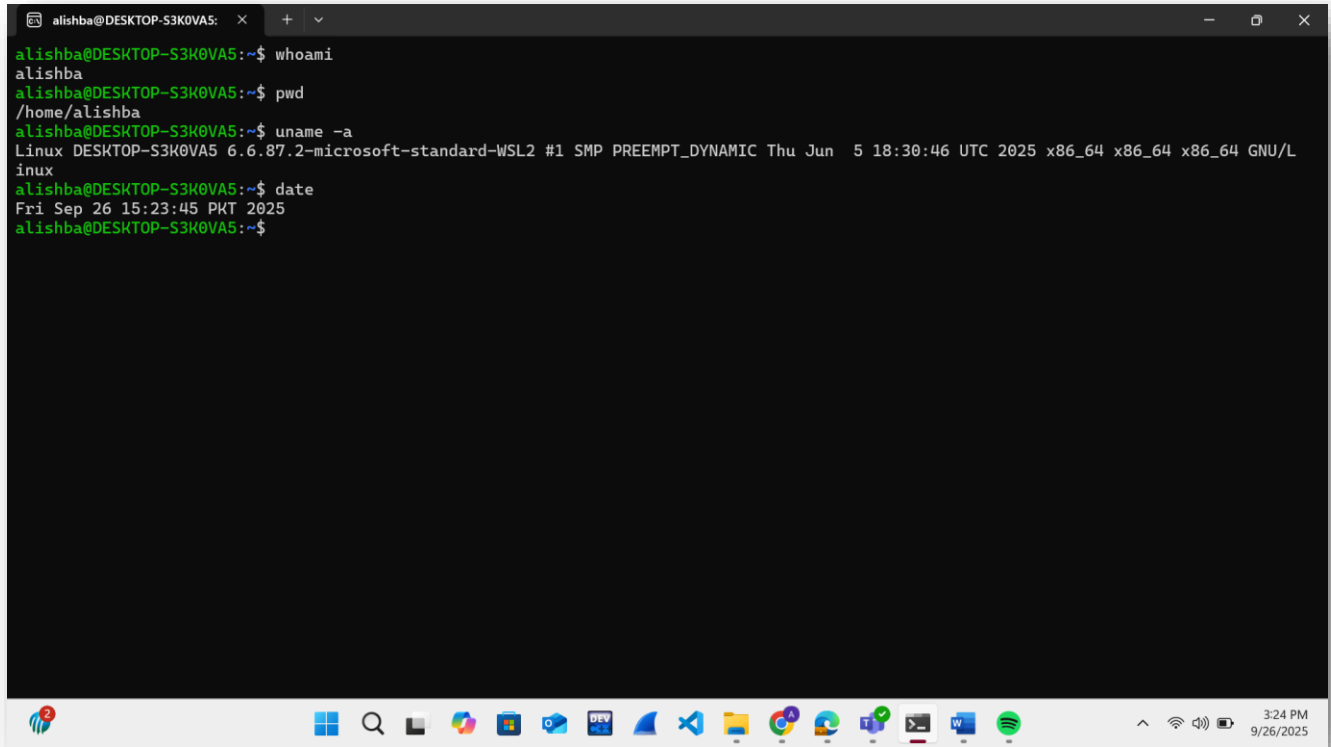
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Semester:

5th

Part 1: Linux Environment Orientation

1.1 Understanding the Linux Environment



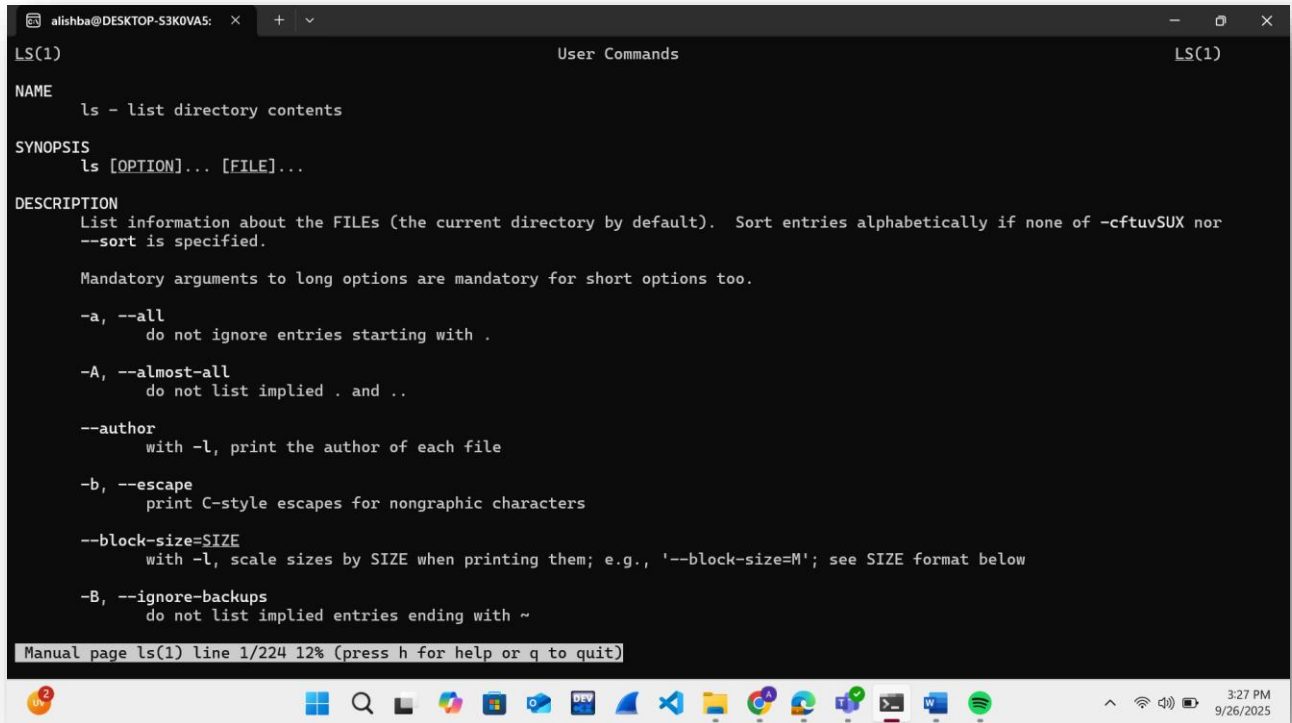
The screenshot shows a Windows terminal window titled "alishba@DESKTOP-S3K0VA5:". The terminal displays the following commands and their outputs:

```
alishba@DESKTOP-S3K0VA5:~$ whoami
alishba
alishba@DESKTOP-S3K0VA5:~$ pwd
/home/alishba
alishba@DESKTOP-S3K0VA5:~$ uname -a
Linux DESKTOP-S3K0VA5 6.6.87.2-microsoft-standard-WSL2 #1 SMP PREEMPT_DYNAMIC Thu Jun 5 18:30:46 UTC 2025 x86_64 x86_64 x86_64 GNU/L
inux
alishba@DESKTOP-S3K0VA5:~$ date
Fri Sep 26 15:23:45 PKT 2025
alishba@DESKTOP-S3K0VA5:~$
```

The terminal window is running on a Windows desktop. The taskbar at the bottom shows various application icons, including the Start button, Search, File Explorer, and several other apps. The system tray on the right indicates the time as 3:24 PM on 9/26/2025.

1.2 Getting Help in Linux

- *man ls*



The screenshot shows a Windows terminal window titled "alishba@DESKTOP-53K0VAS: x". The terminal displays the manual page for the `ls` command, titled "LS(1)". The content is as follows:

```
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.

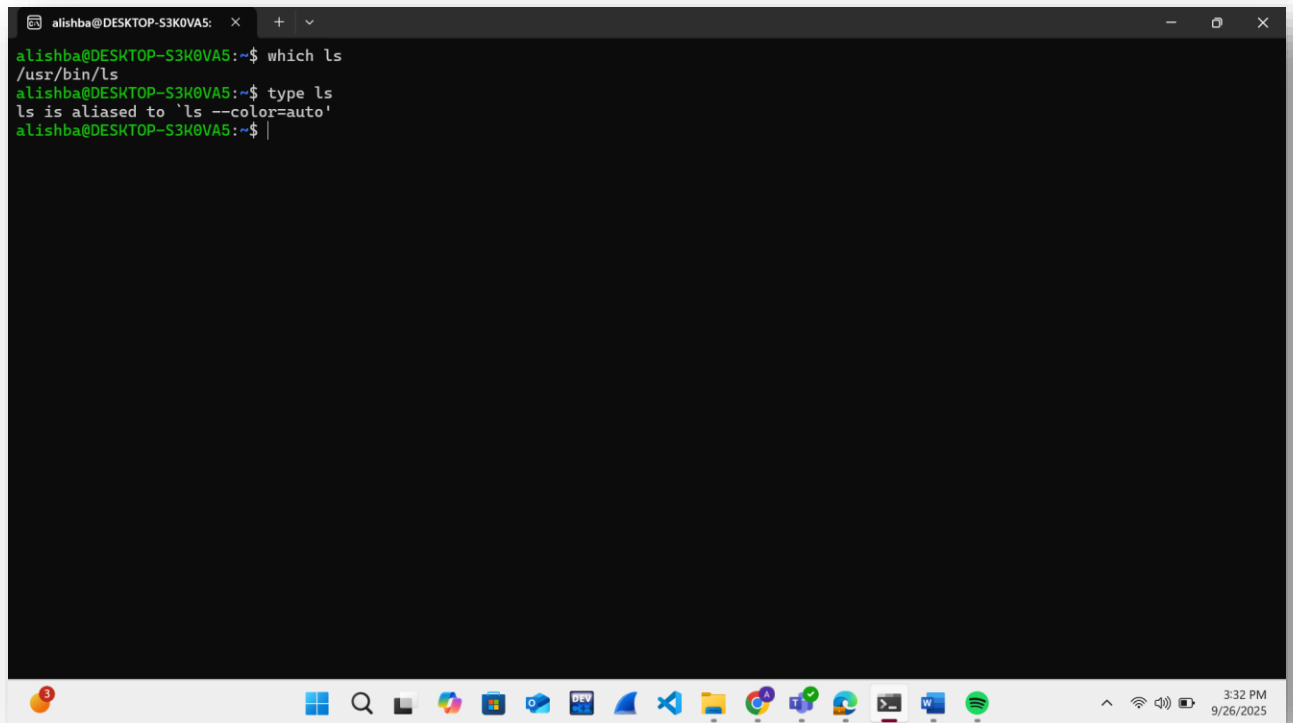
  Mandatory arguments to long options are mandatory for short options too.

  -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
  -b, --escape
      print C-style escapes for nongraphic characters
  --block-size=SIZE
      with -l, scale sizes by SIZE when printing them; e.g., '--block-size=M'; see SIZE format below
  -B, --ignore-backups
      do not list implied entries ending with ~

Manual page ls(1) line 1/224 12% (press h for help or q to quit)
```

The terminal window has a taskbar at the bottom with various application icons and a system tray showing the time as 3:27 PM on 9/26/2025.

- *which ls & type ls*

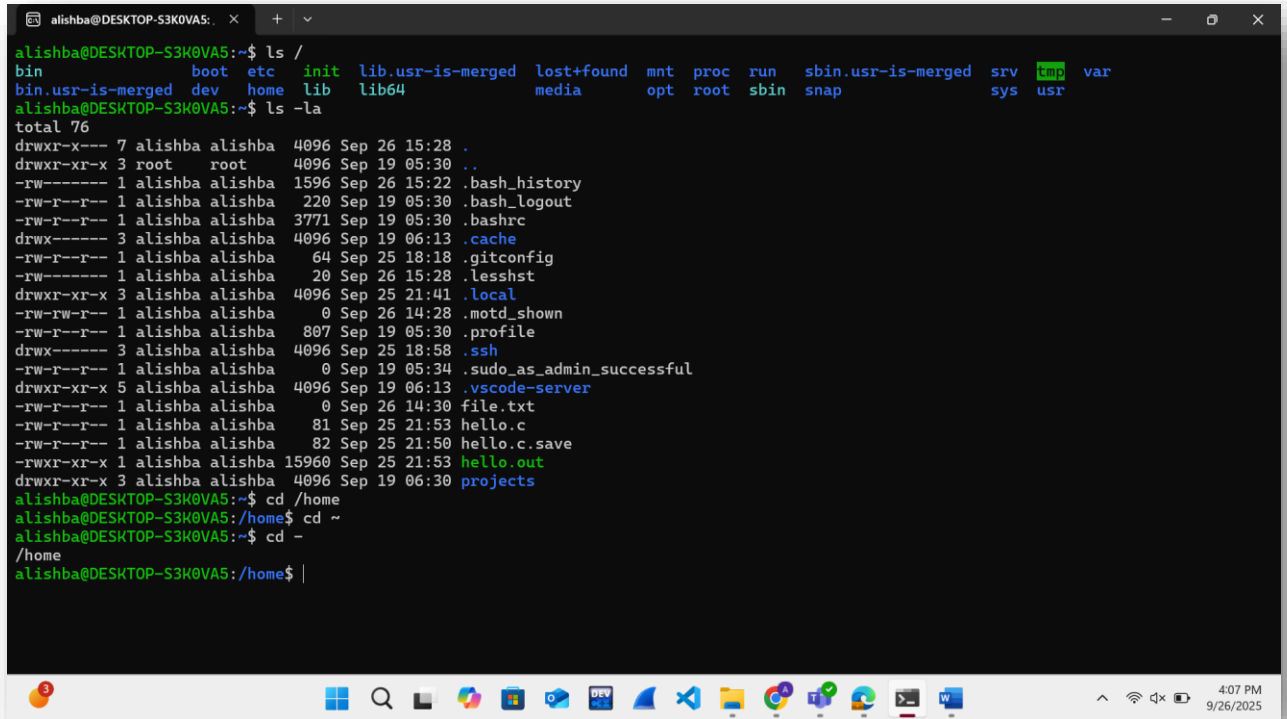


```
alishba@DESKTOP-S3K0VA5: ~$ which ls
/usr/bin/ls
alishba@DESKTOP-S3K0VA5: ~$ type ls
ls is aliased to `ls --color=auto'
alishba@DESKTOP-S3K0VA5: ~$
```

The image shows a Windows terminal window with a dark background. The window title bar reads "alishba@DESKTOP-S3K0VA5: X". The terminal displays the results of two commands: "which ls" returns "/usr/bin/ls" and "type ls" returns "ls is aliased to 'ls --color=auto'". The Windows taskbar is visible at the bottom, showing various application icons and the system clock indicating 3:32 PM on 9/26/2025.

Part 2: File System Navigation

2.1 Understanding Linux Directory Structure

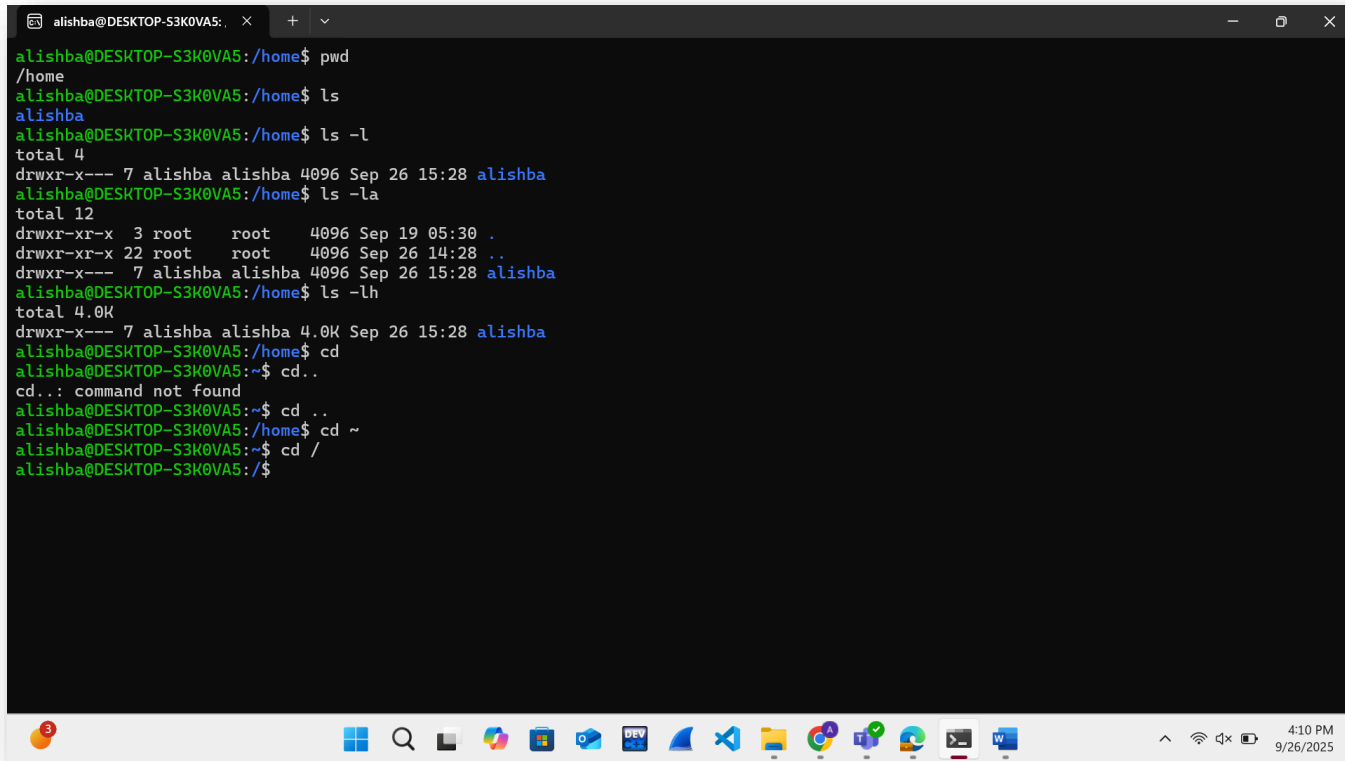


```
alishba@DESKTOP-S3K0VA5: ~$ ls /
bin          boot  etc  init  lib.usr-is-merged  lost+found  mnt  proc  run  sbin.usr-is-merged  srv  tmp  var
bin.usr-is-merged  dev  home  lib  lib64  media  opt  root  sbin  snap  sys  usr

alishba@DESKTOP-S3K0VA5: ~$ ls -la
total 76
drwxr-x--- 7 alishba alishba 4096 Sep 26 15:28 .
drwxr-xr-x 3 root    root    4096 Sep 19 05:30 ..
-rw-r----- 1 alishba alishba 1596 Sep 26 15:22 .bash_history
-rw-r----- 1 alishba alishba 220  Sep 19 05:30 .bash_logout
-rw-r----- 1 alishba alishba 3771 Sep 19 05:30 .bashrc
drwx----- 3 alishba alishba 4096 Sep 19 06:13 .cache
-rw-r----- 1 alishba alishba 64  Sep 25 18:18 .gitconfig
-rw-r----- 1 alishba alishba 20  Sep 26 15:28 .lesshist
drwxr-xr-x 3 alishba alishba 4096 Sep 25 21:41 .local
-rw-rw-r-- 1 alishba alishba 0  Sep 26 14:28 .motd_shown
-rw-rw-r-- 1 alishba alishba 807  Sep 19 05:30 .profile
drwx----- 3 alishba alishba 4096 Sep 25 18:58 .ssh
-rw-r----- 1 alishba alishba 0  Sep 19 05:34 .sudo_as_admin_successful
drwxr-xr-x 5 alishba alishba 4096 Sep 19 06:13 .vscode-server
-rw-r----- 1 alishba alishba 0  Sep 26 14:30 file.txt
-rw-r----- 1 alishba alishba 81  Sep 25 21:53 hello.c
-rw-r----- 1 alishba alishba 82  Sep 25 21:50 hello.c.save
-rwxr-xr-x 1 alishba alishba 15960 Sep 25 21:53 hello.out
drwxr-xr-x 3 alishba alishba 4096 Sep 19 06:30 projects

alishba@DESKTOP-S3K0VA5: ~$ cd /home
alishba@DESKTOP-S3K0VA5: /home$ cd ~
alishba@DESKTOP-S3K0VA5: ~$ cd -
/home
alishba@DESKTOP-S3K0VA5: /home$ |
```

2.2 Basic Navigation Commands



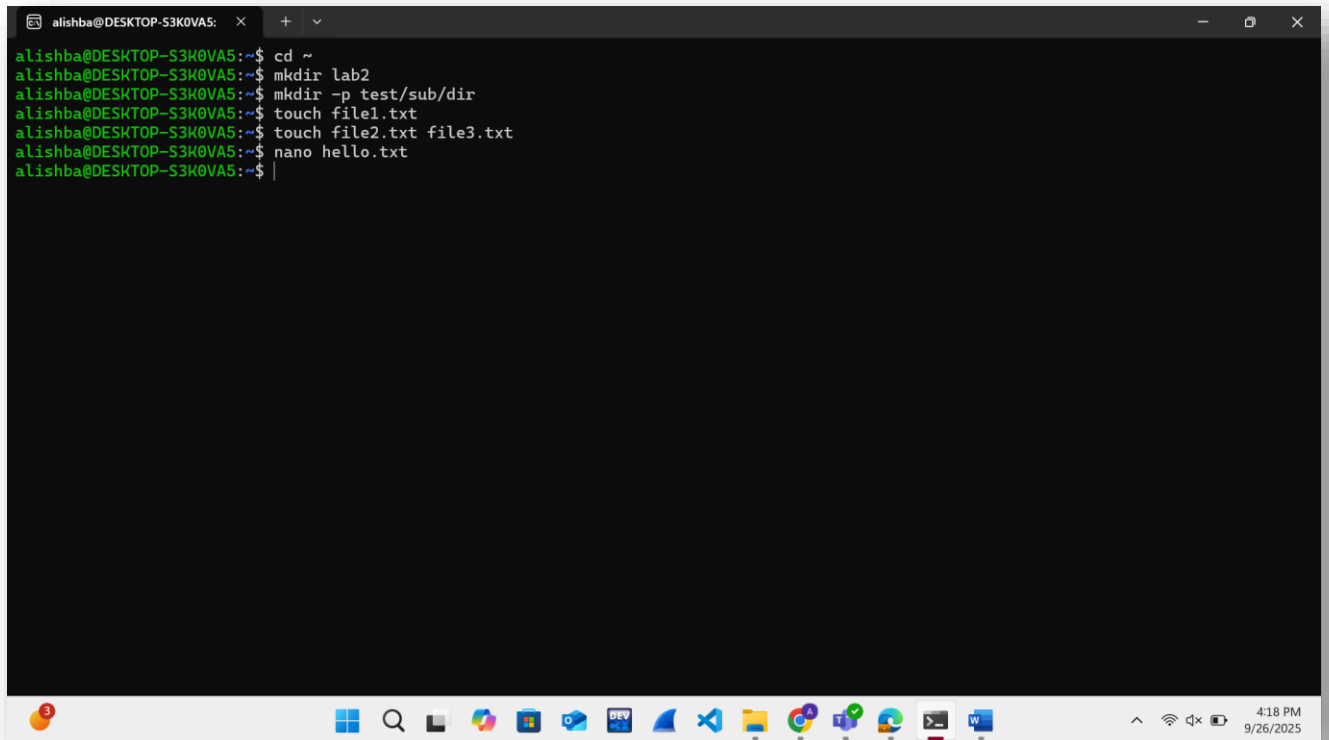
```
alishba@DESKTOP-S3K0VA5: ~$ pwd
/home
alishba@DESKTOP-S3K0VA5: /home$ ls
alishba
alishba@DESKTOP-S3K0VA5: /home$ ls -l
total 4
drwxr-x--- 7 alishba alishba 4096 Sep 26 15:28 alishba
alishba@DESKTOP-S3K0VA5: /home$ ls -la
total 12
drwxr-xr-x  3 root    root    4096 Sep 19 05:30 .
drwxr-xr-x 22 root    root    4096 Sep 26 14:28 ..
drwxr-x---  7 alishba alishba 4096 Sep 26 15:28 alishba
alishba@DESKTOP-S3K0VA5: /home$ ls -lh
total 4.0K
drwxr-x--- 7 alishba alishba 4.0K Sep 26 15:28 alishba
alishba@DESKTOP-S3K0VA5: /home$ cd
alishba@DESKTOP-S3K0VA5: ~$ cd..
cd..: command not found
alishba@DESKTOP-S3K0VA5: ~$ cd ..
alishba@DESKTOP-S3K0VA5: /home$ cd ~
alishba@DESKTOP-S3K0VA5: ~$ cd /
alishba@DESKTOP-S3K0VA5: /$
```

The image shows a terminal window titled "alishba@DESKTOP-S3K0VA5: ~" with a dark background. The terminal displays a series of commands and their outputs, demonstrating basic file navigation in a Linux environment. The commands include `pwd`, `ls`, `ls -l`, `ls -la`, `ls -lh`, and `cd` with various arguments like `..`, `~`, and `/`. The output of `ls -l` shows a directory named "alishba" with permissions `drwxr-x---`. The output of `ls -lh` shows the same directory with a size of `4.0K`. The `cd` command is used to navigate between the home directory, the parent directory (`..`), and the root directory (`/`). The Windows taskbar is visible at the bottom of the screen, showing various application icons and the system clock indicating 4:10 PM on 9/26/2025.

Part 3: File and Directory Operations

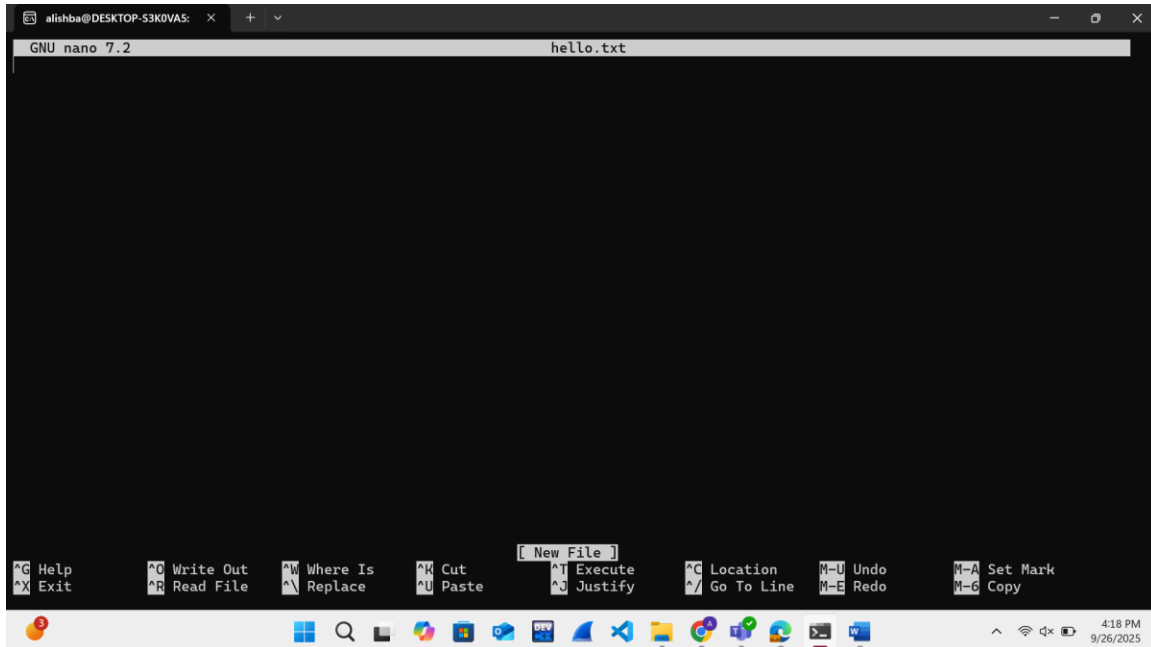
3.1 Creating and Managing Files/Directories

- **Commands for demonstration**

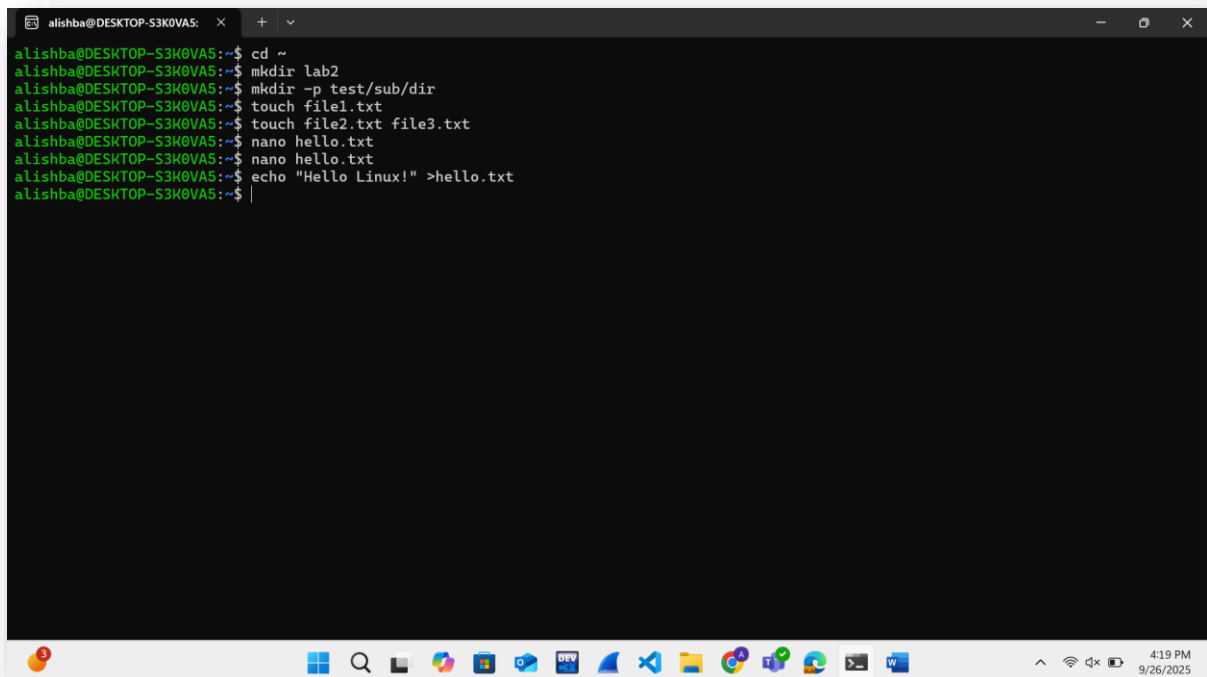
A screenshot of a Windows terminal window with a dark background. The window title bar shows 'alishba@DESKTOP-S3K0VA5:'. The terminal displays a series of Linux commands and their outputs. The commands are: 'cd ~', 'mkdir lab2', 'mkdir -p test/sub/dir', 'touch file1.txt', 'touch file2.txt file3.txt', and 'nano hello.txt'. Each command is preceded by the prompt 'alishba@DESKTOP-S3K0VA5:~\$'. The 'nano hello.txt' command is followed by a vertical cursor line. The Windows taskbar is visible at the bottom, showing various application icons and the system clock indicating 4:18 PM on 9/26/2025.

```
alishba@DESKTOP-S3K0VA5:~$ cd ~
alishba@DESKTOP-S3K0VA5:~$ mkdir lab2
alishba@DESKTOP-S3K0VA5:~$ mkdir -p test/sub/dir
alishba@DESKTOP-S3K0VA5:~$ touch file1.txt
alishba@DESKTOP-S3K0VA5:~$ touch file2.txt file3.txt
alishba@DESKTOP-S3K0VA5:~$ nano hello.txt
alishba@DESKTOP-S3K0VA5:~$ |
```

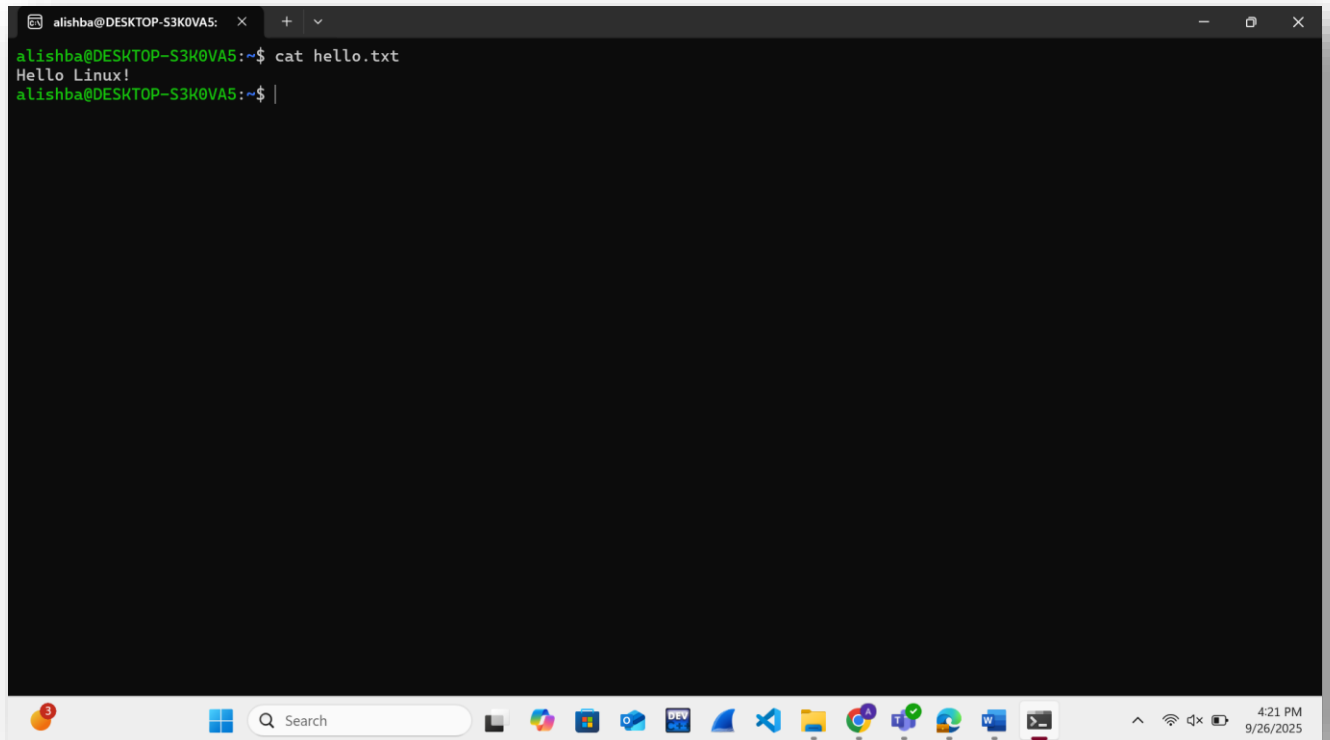

- *nano hello.txt*



- *other commands:*



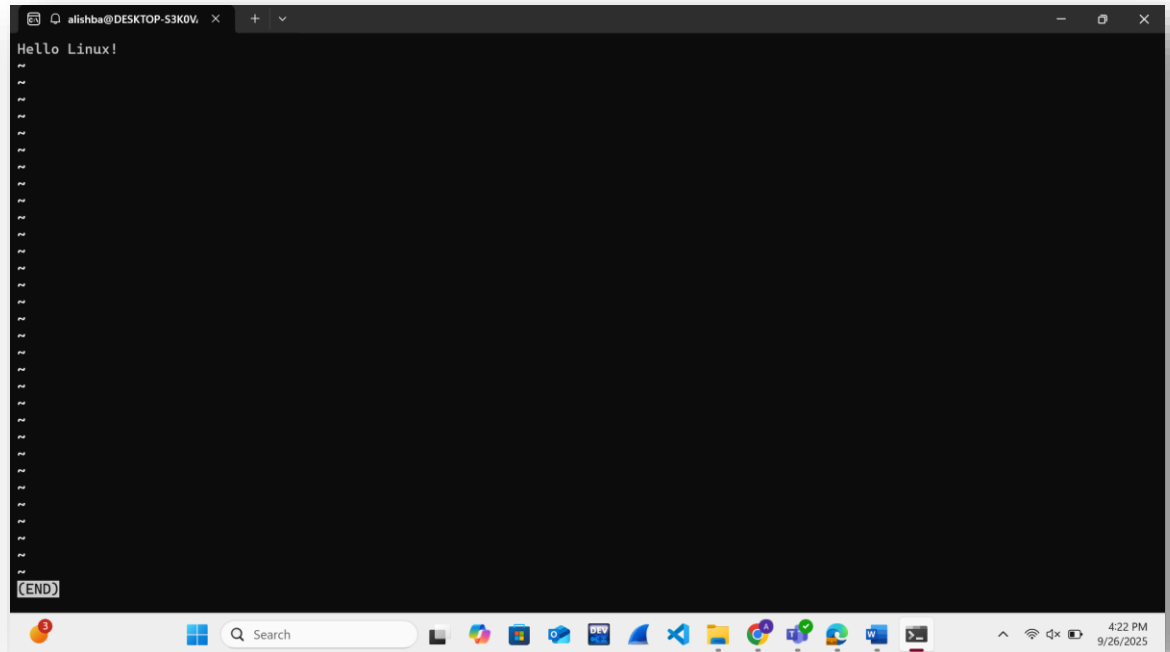
- **File viewing commands:**



The image shows a Windows desktop environment with a terminal window open. The terminal window has a title bar that reads "alishba@DESKTOP-S3K0VA5: x" and standard Windows window controls. Inside the terminal, the prompt is "alishba@DESKTOP-S3K0VA5:~\$". The user has entered the command "cat hello.txt", and the output is "Hello Linux!". The prompt is now "alishba@DESKTOP-S3K0VA5:~\$ |". The Windows taskbar is visible at the bottom, showing the Start button, a search bar, and several application icons including File Explorer, Microsoft Edge, and various utility programs. The system clock in the bottom right corner shows "4:21 PM" and "9/26/2025".

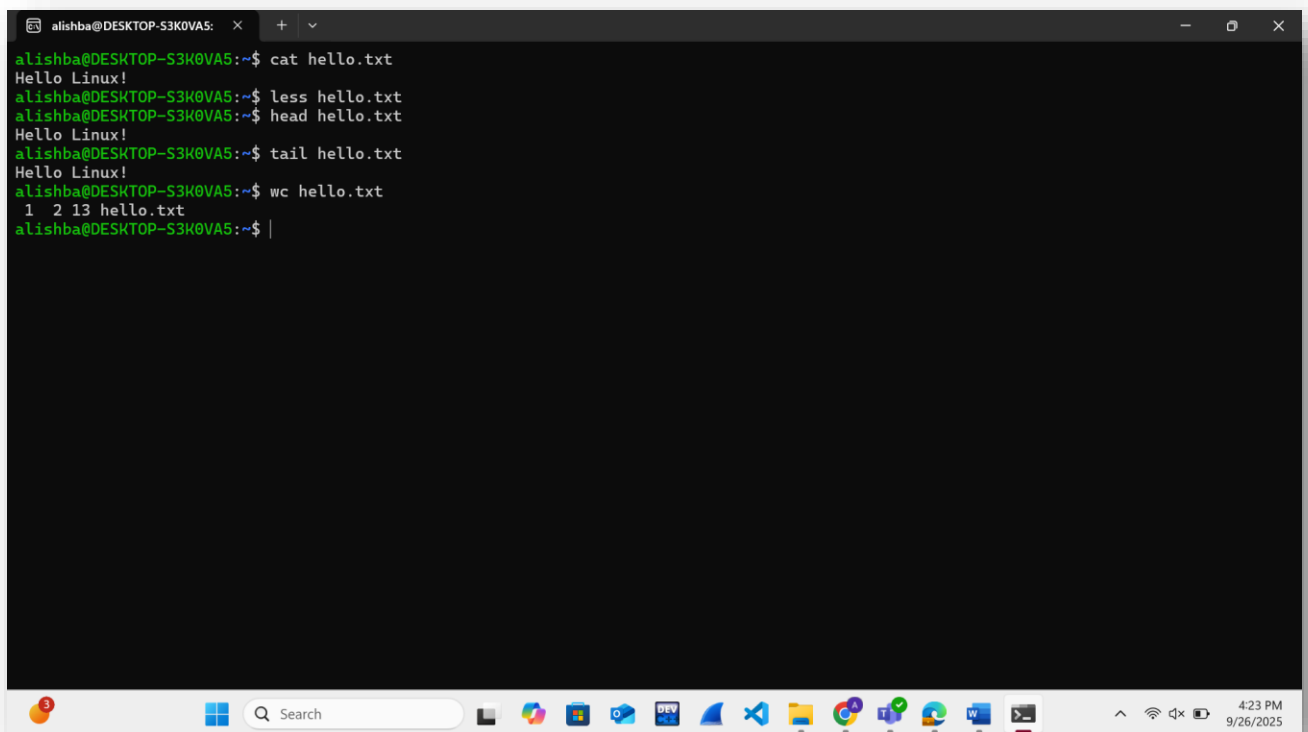
```
alishba@DESKTOP-S3K0VA5:~$ cat hello.txt
Hello Linux!
alishba@DESKTOP-S3K0VA5:~$ |
```

- *less hello.txt*



A terminal window titled 'alishba@DESKTOP-S3K0V...' displays the output of the 'less' command. The text 'Hello Linux!' is shown at the top, followed by a series of tilde characters '~' representing line breaks. At the bottom of the terminal, the text '[END]' is visible. The Windows taskbar at the bottom shows the search bar, task view button, and several application icons, with the system clock indicating 4:22 PM on 9/26/2025.

- *other commands*



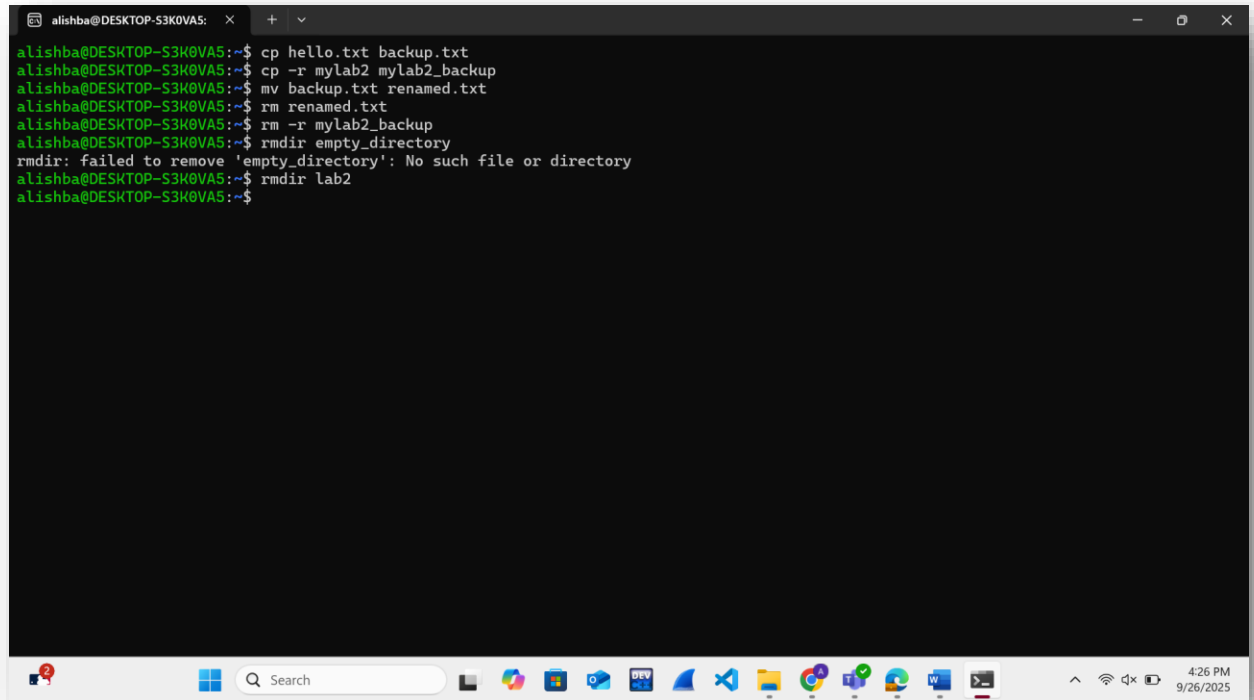
A terminal window titled 'alishba@DESKTOP-S3K0VA5:' shows a sequence of commands and their outputs. The commands and their results are as follows:

```
alishba@DESKTOP-S3K0VA5:~$ cat hello.txt
Hello Linux!
alishba@DESKTOP-S3K0VA5:~$ less hello.txt
alishba@DESKTOP-S3K0VA5:~$ head hello.txt
Hello Linux!
alishba@DESKTOP-S3K0VA5:~$ tail hello.txt
Hello Linux!
alishba@DESKTOP-S3K0VA5:~$ wc hello.txt
 1  2 13 hello.txt
alishba@DESKTOP-S3K0VA5:~$ |
```

The Windows taskbar at the bottom shows the search bar, task view button, and several application icons, with the system clock indicating 4:23 PM on 9/26/2025.

3.2 Copying, Moving, and Deleting

- **Commands to practice**

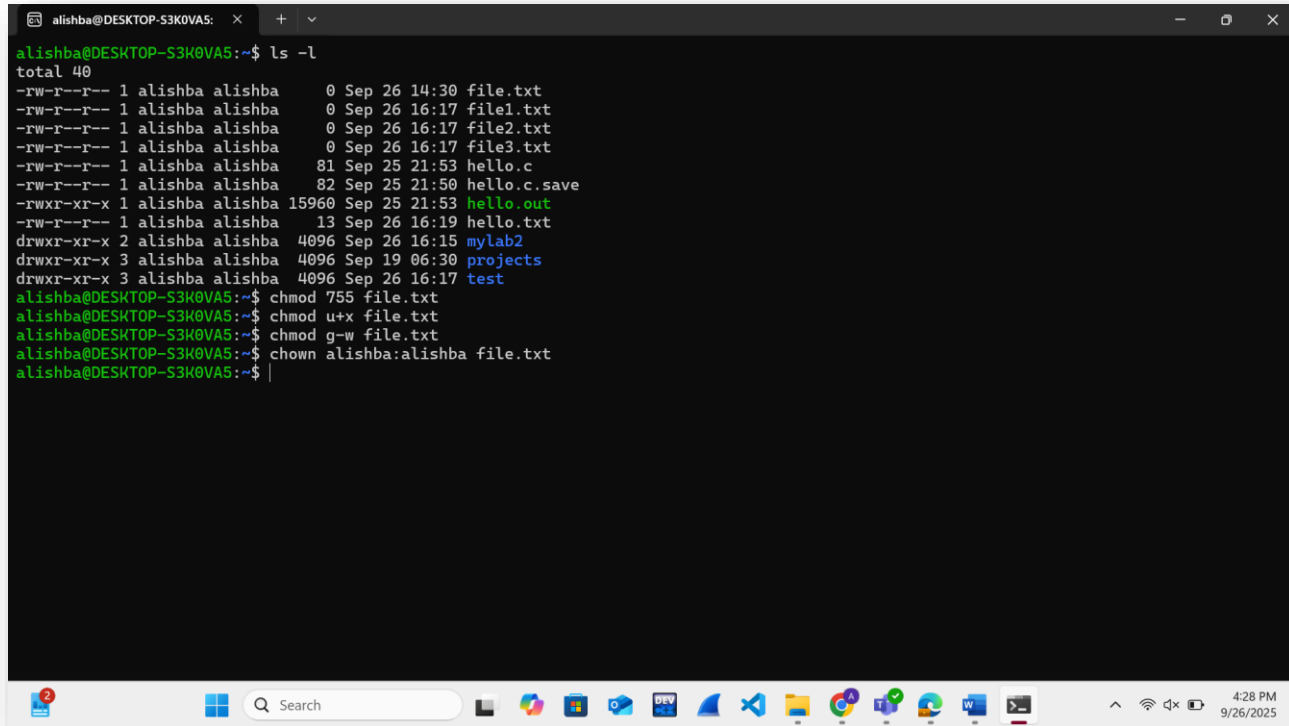


A screenshot of a Windows terminal window titled 'alishba@DESKTOP-S3K0VAS:'. The terminal displays a series of Linux commands and their outputs. The commands are: 'cp hello.txt backup.txt', 'cp -r mylab2 mylab2_backup', 'mv backup.txt renamed.txt', 'rm renamed.txt', 'rm -r mylab2_backup', 'rmdir empty_directory', and 'rmdir lab2'. The output for the 'rmdir' command shows an error: 'rmdir: failed to remove 'empty_directory': No such file or directory'. The terminal window has a dark background and is open on a Windows desktop with a taskbar at the bottom showing various application icons and the system clock.

```
alishba@DESKTOP-S3K0VAS:~$ cp hello.txt backup.txt
alishba@DESKTOP-S3K0VAS:~$ cp -r mylab2 mylab2_backup
alishba@DESKTOP-S3K0VAS:~$ mv backup.txt renamed.txt
alishba@DESKTOP-S3K0VAS:~$ rm renamed.txt
alishba@DESKTOP-S3K0VAS:~$ rm -r mylab2_backup
alishba@DESKTOP-S3K0VAS:~$ rmdir empty_directory
rmdir: failed to remove 'empty_directory': No such file or directory
alishba@DESKTOP-S3K0VAS:~$ rmdir lab2
alishba@DESKTOP-S3K0VAS:~$
```

Part 4: File Permissions and Ownership

4.1 Understanding File Permissions



A terminal window titled 'alishba@DESKTOP-S3K0VA5' showing the output of the 'ls -l' command and several 'chmod' and 'chown' commands. The terminal output is as follows:

```
alishba@DESKTOP-S3K0VA5:~$ ls -l
total 40
-rw-r--r-- 1 alishba alishba  0 Sep 26 14:30 file.txt
-rw-r--r-- 1 alishba alishba  0 Sep 26 16:17 file1.txt
-rw-r--r-- 1 alishba alishba  0 Sep 26 16:17 file2.txt
-rw-r--r-- 1 alishba alishba  0 Sep 26 16:17 file3.txt
-rw-r--r-- 1 alishba alishba 81 Sep 25 21:53 hello.c
-rw-r--r-- 1 alishba alishba 82 Sep 25 21:50 hello.c.save
-rwxr-xr-x 1 alishba alishba 15960 Sep 25 21:53 hello.out
-rw-r--r-- 1 alishba alishba 13 Sep 26 16:19 hello.txt
drwxr-xr-x 2 alishba alishba 4096 Sep 26 16:15 mylab2
drwxr-xr-x 3 alishba alishba 4096 Sep 19 06:30 projects
drwxr-xr-x 3 alishba alishba 4096 Sep 26 16:17 test
alishba@DESKTOP-S3K0VA5:~$ chmod 755 file.txt
alishba@DESKTOP-S3K0VA5:~$ chmod u+x file.txt
alishba@DESKTOP-S3K0VA5:~$ chmod g-w file.txt
alishba@DESKTOP-S3K0VA5:~$ chown alishba:alishba file.txt
alishba@DESKTOP-S3K0VA5:~$
```

The terminal window is part of a Windows desktop environment. The taskbar at the bottom shows various application icons, including a search bar, and the system tray on the right displays the time as 4:28 PM on 9/26/2025.