Linux Basics

Operating Systems (Lab - 0)

July 28, 2025

Objective

This introduces students to basic Linux commands used for file management, navigation, permissions, and terminal-based operations. Students are expected to reproduce the given sequence, observe command behavior, and explore their use with options like `--help`.

Instructions

Each student should perform the following tasks on their Linux terminal and observe the output and effect of each command.

1 Directory and File Operations

```
# List files in the current directory
ls

# Create a new directory
mkdir BTech_3

# Create a new empty file
touch clibasics.txt

# Copy file into directory
cp clibasics.txt BTech_3/

# Move file into directory (after deleting or modifying as needed)
mv clibasics.txt BTech_3/

# Navigate into the directory
cd BTech_3

# Remove file
rm clibasics.txt
```

```
# Go back and move file again
mv clibasics.txt BTech_3/
```

2 Editing and Viewing Files

```
# Edit file using nano (basic terminal editor)
nano clibasics.txt

# View contents of file
cat clibasics.txt

# View using paging
less clibasics.txt
```

3 Permissions and Access

```
# Check full file path
pwd

# View long listing with permissions
ls -l

# Change permissions (no access)
chmod 000 clibasics.txt

# Execute-only permission
chmod 001 clibasics.txt

# Write-only permission
chmod 020 clibasics.txt

# Read-only permission
chmod 400 clibasics.txt

# All permissions (read, write, execute)
chmod 777 clibasics.txt

# Create another folder and check its permission
mkdir demo
```

4 Additional Commands

```
# Print a line to terminal (doesn't save to file)
echo "Welcome to OS"

# Explore help for `ls` and search for `size`-related options
ls --help | grep size
```

Learning Outcomes

- Familiarity with Linux CLI commands like `ls`, `cp`, `mv`, `rm`, `chmod`, `echo`, `cat`, `less`, and `nano`.
- Understanding how file and directory permissions work.
- Basic text editing in terminal.
- Navigating help options and command-line manual.

Assignments

Important Note

The following assignments are intended for learning and practice only and will not carry any marks. However, submission of these assignments is **mandatory** and should be done **along with Lab 1**. Ensure all responses are written in your own words, and include screenshots where required.

Assignment 1: Linux File Permissions and Ownership

In this assignment, you will explore how file permissions work in Linux. Each file or directory in Linux has three types of access permissions: `r` (read), `w` (write), and `x` (execute). These permissions are set separately for the file **owner**, the **group**, and **others** (everyone else). For example, read (`r`) allows viewing the content, write (`w`) allows editing, and execute (`x`) allows running a file (if it's a script or program). Permissions can be set using the `chmod` command with numbers like `777`, `644`, and `600`, where each digit represents the permission level for the owner, group, and others, respectively. Try creating a sample file and changing its permissions using these values, then observe how your ability to open or modify the file changes depending on the permissions set. Finally, write a short explanation in your own words summarizing how permissions and ownership work and what you observed during your experimentation.

Assignment 2: Understanding Linux Navigation and File Commands

This assignment is designed to help you understand basic file system navigation and file management in Linux. Start by practicing the following commands: `pwd` (shows the current directory), `ls` (lists files), `ls -l` (detailed file listing), `ls -a` (shows hidden files), `cd` (change directory), `cd ..` (move to parent directory), and `cd ~` (go to home directory). Then, explore file and directory manipulation commands like `mkdir` (create directory), `rmdir` (remove empty directory), `rm -r` (remove directory with content), `touch` (create a new file), `rm` (delete file), `cp` (copy files), and `mv` (move or rename files). After trying all these commands, write a short paragraph explaining what each command does in your own words. Also, briefly answer: What is the difference between `rm` and `rmdir`? What is the effect of using `cd ..` and `cd ~`? What do `.` and `..` represent in the Linux directory structure? Include 2-3 screenshots from your terminal showing that you tried these commands.

Assignment 3: Exploring Linux Manual and Help System

In this assignment, you will learn how to find help and documentation directly from the Linux terminal. Start by running `man ls`, `man cp`, and `man mkdir` to open manual pages, and try `ls --help` and `cp --help` to view brief command options. Write a paragraph explaining the difference between using `man` and the `--help` flag. Mention how you can search for keywords within a man page using the `/` key, for example, to find a specific option or explanation. Also, research and explain what the `-r`, `-a`, and `-l` options do when used with the `ls` command. As an additional task, try the commands `what is chmod` and `which nano`, and write what each of them returned and what it means. These tools help you quickly understand what a command does and where it is located on the system.