



National Textile University

Department of Computer Science

Subject:
Operating System

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Reg number:
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Lab no. :
2

Semester:
5th

Operating Systems – COC 3071L

SE 5th A – Fall 2025

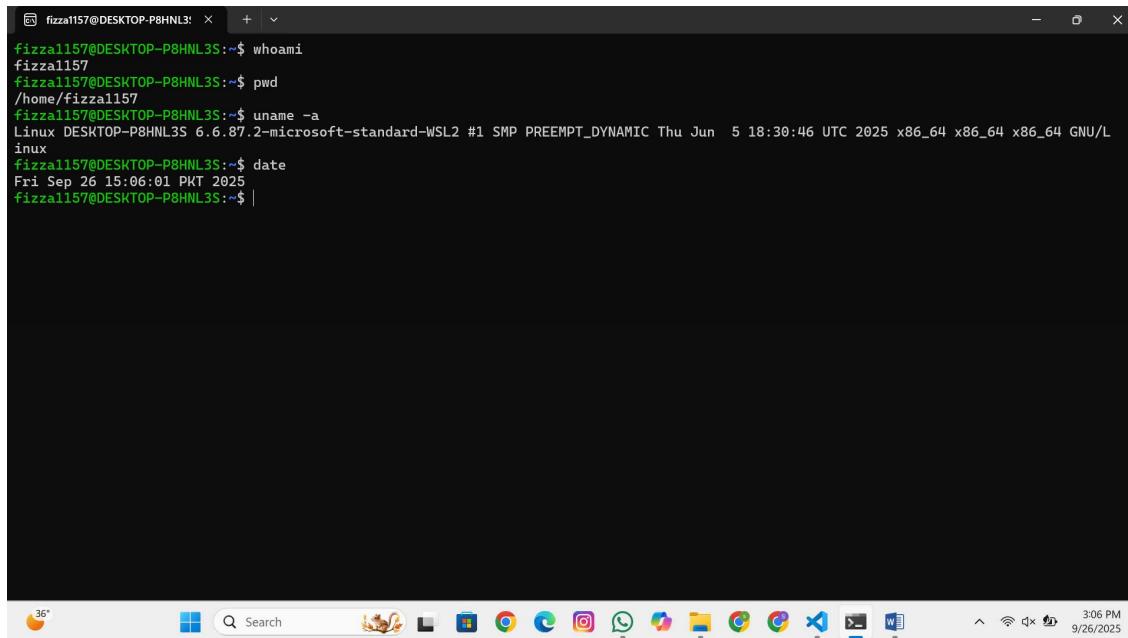
Lab 2: Linux Basics and Introduction

Part 1: Linux Environment Orientation

1.1 Understanding the Linux Environment

- Concepts to Cover:
 - What is Linux? Brief history and distributions
 - Linux vs Windows: Key differences
 - Understanding the shell (bash)
 - WSL2 as a Linux environment
- Hands-on Activity:

```
# Students open WSL2 terminal and explore
whoami          # Check current user
pwd             # Print working directory
uname -a         # System information
date            # Current date and time
```



A screenshot of a Microsoft Windows desktop environment. At the bottom is the taskbar, which includes icons for the Start button, search, task view, and various pinned applications like File Explorer, Edge, and Microsoft Word. In the center of the screen is a terminal window titled "fizza1157@DESKTOP-P8HNL3S". The window displays a command-line session where the user has run several commands: "whoami" (showing they are "fizza1157"), "pwd" (showing the current directory is "/home/fizza1157"), "uname -a" (showing system details including "Linux DESKTOP-P8HNL3S 6.6.87.2-microsoft-standard-WSL2"), and "date" (showing the date and time as "Fri Sep 26 15:06:01 PKT 2025"). The terminal window has a dark background with light-colored text.

1.2 Getting Help in Linux

- Commands to demonstrate:

```
man ls          # Manual pages
ls --help       # Built-in help
which ls        # Location of commands
type ls         # Command type information
```

```
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 (press h for help or q to quit)
```

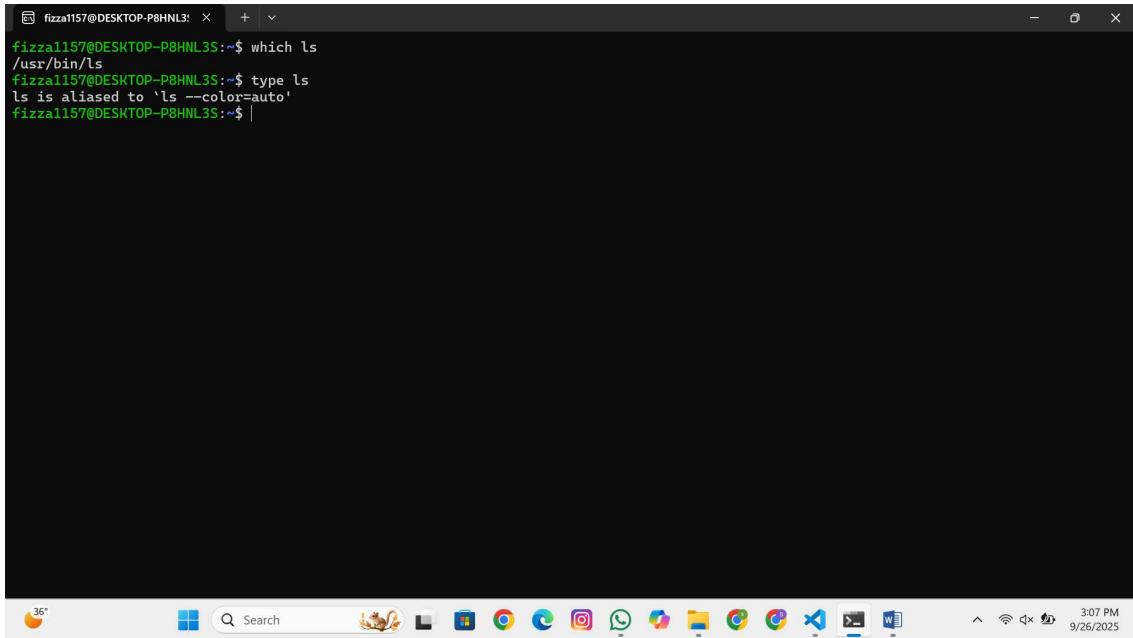
```
fizza1157@DESKTOP-P8HNL3:~$ man ls
fizza1157@DESKTOP-P8HNL3:~$ ls --help
Usage: ls [OPTION]... [FILE]...
List information about the FILEs (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

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
-c
    do not list implied entries ending with ~
    with -lt: sort by, and show, ctime (time of last
    change of file status information);
    with -l: show ctime and sort by name;
    otherwise: sort by ctime, newest first

-C
    --color[=WHEN]
-d, --directory
-D, --diretd
-f
-F, --classify[=WHEN]
    --file-type
    --format=WORD
    list entries by columns
    color the output WHEN; more info below
    list directories themselves, not their contents
    generate output designed for Emacs' diretd mode
    list all entries in directory order
    append indicator (one of */=>@!) to entries WHEN
    likewise, except do not append '*'
    across -x, commas -m, horizontal -x, long -l,
    single-column -1, verbose -l, vertical -C

    --full-time
-g
    --group-directories-first
    like -l --time-style=full-iso
    like -l, but do not list owner
```



A screenshot of a Windows desktop environment. At the top is a taskbar with various icons for applications like File Explorer, Edge, and FileZilla. Below the taskbar is a large black terminal window. The terminal window shows the following text:

```
fizza1157@DESKTOP-P8HNL3S:~$ which ls  
/usr/bin/ls  
fizza1157@DESKTOP-P8HNL3S:~$ type ls  
ls is aliased to `ls --color=auto'  
fizza1157@DESKTOP-P8HNL3S:~$ |
```

The system tray at the bottom right shows the date and time as 9/26/2025 and 3:07 PM.

Part 2: File System Navigation

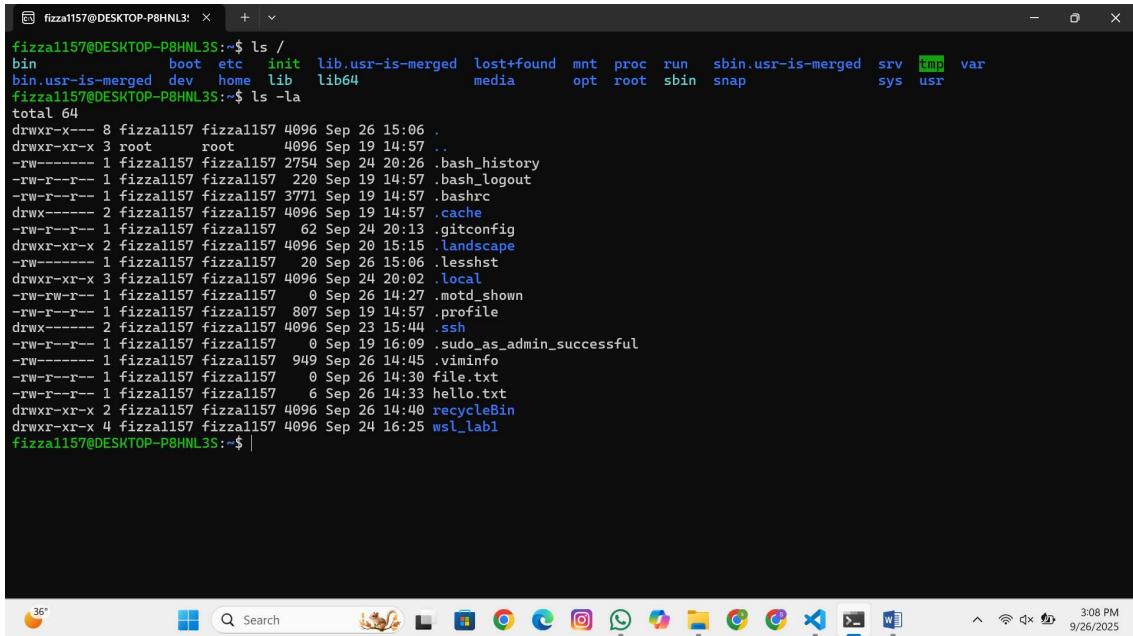
2.1 Understanding Linux Directory Structure

- **Concepts to Cover:**

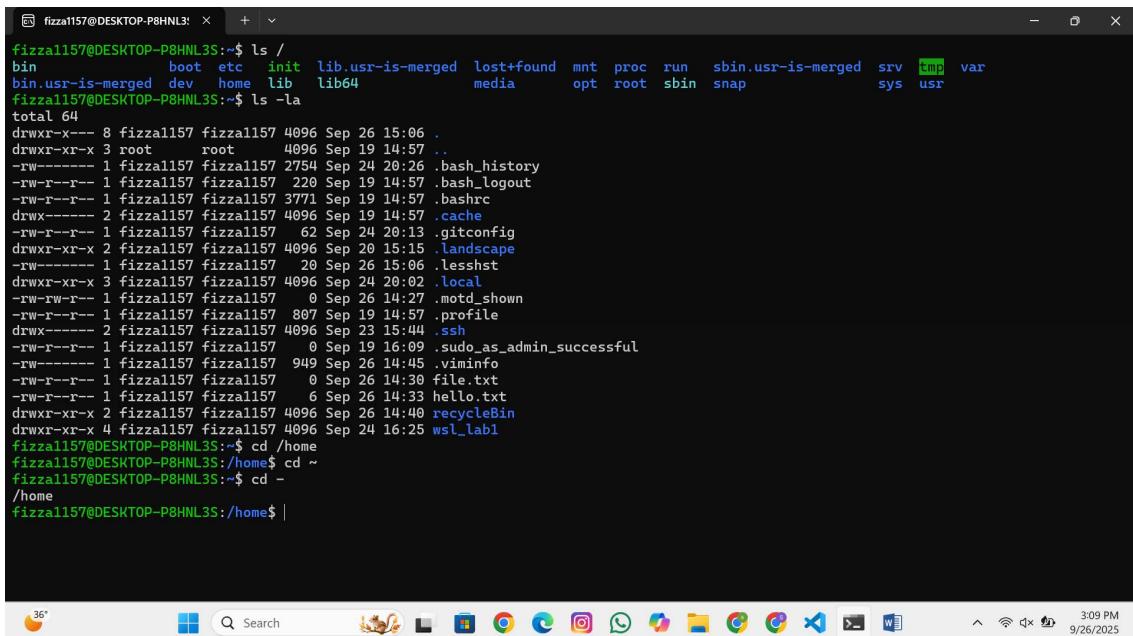
- Root directory (/)
- Important directories: /home, /usr, /etc, /var, /tmp
- Absolute vs relative paths
- Hidden files and directories

- **Demonstration:**

```
ls /          # Root directory contents
ls -la        # Long listing with hidden files
cd /home     # Change directory
cd ~         # Home directory shortcut
cd -         # Previous directory
```



```
fizza1157@DESKTOP-P8HNL3S:~$ 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  
fizza1157@DESKTOP-P8HNL3S:~$ ls -la  
total 64  
drwxr-x---  8 fizza1157 fizza1157 4096 Sep 26 15:06 .  
drwxr-xr-x  3 root     root    4096 Sep 19 14:57 ..  
-rw-----  1 fizza1157 fizza1157 2754 Sep 24 20:26 .bash_history  
-rw-r--r--  1 fizza1157 fizza1157 220 Sep 19 14:57 .bash_logout  
-rw-r--r--  1 fizza1157 fizza1157 3771 Sep 19 14:57 .bashrc  
drwx----- 2 fizza1157 fizza1157 4096 Sep 19 14:57 .cache  
-rw-r--r--  1 fizza1157 fizza1157 62 Sep 24 20:13 .gitconfig  
drwxr-xr-x  2 fizza1157 fizza1157 4096 Sep 20 15:15 .landscape  
-rw-----  1 fizza1157 fizza1157 20 Sep 26 15:06 .lessht  
drwxr-xr-x  3 fizza1157 fizza1157 4096 Sep 24 20:02 .local  
-rw-rw-r--  1 fizza1157 fizza1157 0 Sep 26 14:27 .motd_shown  
-rw-r--r--  1 fizza1157 fizza1157 807 Sep 19 14:57 .profile  
drwx----- 2 fizza1157 fizza1157 4096 Sep 23 15:44 .ssh  
-rw-r--r--  1 fizza1157 fizza1157 0 Sep 19 16:09 .sudo_as_admin_successful  
-rw-----  1 fizza1157 fizza1157 949 Sep 26 14:45 .vmlininfo  
-rw-r--r--  1 fizza1157 fizza1157 0 Sep 26 14:30 file.txt  
-rw-r--r--  1 fizza1157 fizza1157 6 Sep 26 14:33 hello.txt  
drwxr-xr-x  2 fizza1157 fizza1157 4096 Sep 26 14:40 recycleBin  
drwxr-xr-x  4 fizza1157 fizza1157 4096 Sep 24 16:25 wsl_labl  
fizza1157@DESKTOP-P8HNL3S:~$ |
```



```
fizza1157@DESKTOP-P8HNL3S:~$ 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  
fizza1157@DESKTOP-P8HNL3S:~$ ls -la  
total 64  
drwxr-x---  8 fizza1157 fizza1157 4096 Sep 26 15:06 .  
drwxr-xr-x  3 root     root    4096 Sep 19 14:57 ..  
-rw-----  1 fizza1157 fizza1157 2754 Sep 24 20:26 .bash_history  
-rw-r--r--  1 fizza1157 fizza1157 220 Sep 19 14:57 .bash_logout  
-rw-r--r--  1 fizza1157 fizza1157 3771 Sep 19 14:57 .bashrc  
drwx----- 2 fizza1157 fizza1157 4096 Sep 19 14:57 .cache  
-rw-r--r--  1 fizza1157 fizza1157 62 Sep 24 20:13 .gitconfig  
drwxr-xr-x  2 fizza1157 fizza1157 4096 Sep 20 15:15 .landscape  
-rw-----  1 fizza1157 fizza1157 20 Sep 26 15:06 .lessht  
drwxr-xr-x  3 fizza1157 fizza1157 4096 Sep 24 20:02 .local  
-rw-rw-r--  1 fizza1157 fizza1157 0 Sep 26 14:27 .motd_shown  
-rw-r--r--  1 fizza1157 fizza1157 807 Sep 19 14:57 .profile  
drwx----- 2 fizza1157 fizza1157 4096 Sep 23 15:44 .ssh  
-rw-r--r--  1 fizza1157 fizza1157 0 Sep 19 16:09 .sudo_as_admin_successful  
-rw-----  1 fizza1157 fizza1157 949 Sep 26 14:45 .vmlininfo  
-rw-r--r--  1 fizza1157 fizza1157 0 Sep 26 14:30 file.txt  
-rw-r--r--  1 fizza1157 fizza1157 6 Sep 26 14:33 hello.txt  
drwxr-xr-x  2 fizza1157 fizza1157 4096 Sep 26 14:40 recycleBin  
drwxr-xr-x  4 fizza1157 fizza1157 4096 Sep 24 16:25 wsl_labl  
fizza1157@DESKTOP-P8HNL3S:~$ cd /home  
fizza1157@DESKTOP-P8HNL3S:/home$ cd ~  
fizza1157@DESKTOP-P8HNL3S:~/home$ |
```

2.2 Basic Navigation Commands (15 minutes)

- Commands to practice:

pwd	# Present working directory
ls	# List directory contents
ls -l	# Long format
ls -la	# Include hidden files
ls -lh	# Human readable sizes
cd	# Change directory
cd ..	# Parent directory
cd ~	# Home directory
cd /	# Root directory

```
fizza1157@DESKTOP-P8HNL3S:~$ pwd
/
fizza1157@DESKTOP-P8HNL3S:~$ 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
fizza1157@DESKTOP-P8HNL3S:~$ ls -l
total 2748
lrwxrwxrwx 1 root root    7 Apr 22 2024 bin -> usr/bin
drwxr-xr-x  2 root root  4096 Feb 26 2024 bin.usr-is-merged
drwxr-xr-x  2 root root  4096 Apr 22 2024 boot
drwxr-xr-x 15 root root  3860 Sep 26 14:27 dev
drwxr-xr-x 88 root root  4096 Sep 26 14:27 etc
drwxr-xr-x  3 root root  4096 Sep 19 14:57 home
-rwxrwxrwx  1 root root 2735264 Aug  7 00:54 init
lrwxrwxrwx  1 root root    7 Apr 22 2024 lib -> usr/lib
drwxr-xr-x  2 root root  4096 Apr  8 2024 lib usr-is-merged
lrwxrwxrwx  1 root root    9 Apr 22 2024 lib64 -> usr/lib64
drwx----- 2 root root 16384 Sep 19 14:56 lost+found
drwxr-xr-x  2 root root  4096 Aug  5 21:55 media
drwxr-xr-x  6 root root  4096 Sep 19 14:56 mnt
drwxr-xr-x  2 root root  4096 Aug  5 21:55 opt
dr-xr-xr- 216 root root     0 Sep 26 14:27 proc
drwx----- 3 root root  4096 Aug  5 21:57 root
drwxr-xr-x 19 root root  560 Sep 26 14:27 run
lrwxrwxrwx  1 root root    8 Apr 22 2024 sbin -> usr/sbin
drwxr-xr-x  2 root root  4096 Mar 31 2024 sbin usr-is-merged
drwxr-xr-x  2 root root  4096 Sep 19 14:56 snap
drwxr-xr-x  2 root root  4096 Aug  5 21:55 srv
dr-xr-xr- 13 root root     0 Sep 26 14:26 sys
drwxrwxrwt  8 root root  4096 Sep 26 14:27 tmp
drwxr-xr-x 12 root root  4096 Aug  5 21:55 usr
drwxr-xr-x 13 root root  4096 Sep 19 14:56 var
fizza1157@DESKTOP-P8HNL3S:~$ ls -la
```

```
fizzal157@DESKTOP-P8HNL3S: ~ + - x
drwxrwxrwt 8 root root 4096 Sep 26 14:27 tmp
drwxr-xr-x 12 root root 4096 Aug 5 21:55 usr
drwxr-xr-x 13 root root 4096 Sep 19 14:56 var
fizzal157@DESKTOP-P8HNL3S:~/ls -la
total 2756
drwxr-xr-x 22 root root 4096 Sep 26 14:27 .
drwxr-xr-x 22 root root 4096 Sep 26 14:27 ..
lrwxrwxrwx 1 root root 7 Apr 22 2024 bin -> usr/bin
drwxr-xr-x 2 root root 4096 Feb 26 2024 bin usr-is-merged
drwxr-xr-x 2 root root 4096 Apr 22 2024 boot
drwxr-xr-x 15 root root 3860 Sep 26 14:27 dev
drwxr-xr-x 88 root root 4096 Sep 26 14:27 etc
drwxr-xr-x 3 root root 4096 Sep 19 14:57 home
-rwxrwxrwx 1 root root 2735264 Aug 7 00:54 init
lrwxrwxrwx 1 root root 7 Apr 22 2024 lib -> usr/lib
drwxr-xr-x 2 root root 4096 Apr 8 2024 lib usr-is-merged
lrwxrwxrwx 1 root root 9 Apr 22 2024 lib64 -> usr/lib64
drwx----- 2 root root 16384 Sep 19 14:56 lost+found
drwxr-xr-x 2 root root 4096 Aug 5 21:55 media
drwxr-xr-x 6 root root 4096 Sep 19 14:56 mnt
drwxr-xr-x 2 root root 4096 Aug 5 21:55 opt
dr-xr-xr-x 216 root root 0 Sep 26 14:27 proc
drwx----- 3 root root 4096 Aug 5 21:57 root
drwxr-xr-x 19 root root 560 Sep 26 14:27 run
lrwxrwxrwx 1 root root 8 Apr 22 2024 sbin -> usr/sbin
drwxr-xr-x 2 root root 4096 Mar 31 2024 sbin usr-is-merged
drwxr-xr-x 2 root root 4096 Sep 19 14:56 snap
drwxr-xr-x 2 root root 4096 Aug 5 21:55 srv
dr-xr-xr-x 13 root root 0 Sep 26 15:13 sys
drwxrwxrwt 8 root root 4096 Sep 26 14:27 tmp
drwxr-xr-x 12 root root 4096 Aug 5 21:55 usr
drwxr-xr-x 13 root root 4096 Sep 19 14:56 var
fizzal157@DESKTOP-P8HNL3S:~/
```

```
fizza1157@DESKTOP-P8HNL3S: ~ + | v
drwxr-xr-x  2 root root  4096 Aug  5 21:55 srv
dr-xr-xr-x  13 root root   0 Sep 26 15:13 sys
drwxrwxrwt  8 root root  4096 Sep 26 14:27 tmp
drwxr-xr-x  12 root root  4096 Aug  5 21:55 usr
drwxr-xr-x  13 root root  4096 Sep 19 14:56 var
fizza1157@DESKTOP-P8HNL3S:$ ls -lh
total 2.7M
lrwxrwxrwx  1 root root    7 Apr 22  2024 bin -> usr/bin
drwxr-xr-x  2 root root 4.0K Feb 26  2024 bin usr-is-merged
drwxr-xr-x  2 root root 4.0K Apr 22  2024 boot
drwxr-xr-x  15 root root 3.8K Sep 26 14:27 dev
drwxr-xr-x  88 root root 4.0K Sep 26 14:27 etc
drwxr-xr-x  3 root root 4.0K Sep 19 14:57 home
-rwxrwxrwx  1 root root 2.7M Aug  7 00:54 init
lrwxrwxrwx  1 root root    7 Apr 22  2024 lib -> usr/lib
drwxr-xr-x  2 root root 4.0K Apr  8  2024 lib usr-is-merged
lrwxrwxrwx  1 root root   9 Apr 22  2024 lib64 -> usr/lib64
drwx----- 2 root root 16K Sep 19 14:56 lost+found
drwxr-xr-x  2 root root 4.0K Aug  5 21:55 media
drwxr-xr-x  6 root root 4.0K Sep 19 14:56 mnt
drwxr-xr-x  2 root root 4.0K Aug  5 21:55 opt
dr-xr-xr-x  216 root root   0 Sep 26 14:27 proc
drwx----- 3 root root 4.0K Aug  5 21:57 root
drwxr-xr-x  19 root root  560 Sep 26 14:27 run
lrwxrwxrwx  1 root root    8 Apr 22  2024 sbin -> usr/sbin
drwxr-xr-x  2 root root 4.0K Mar 31  2024 sbin usr-is-merged
drwxr-xr-x  2 root root 4.0K Sep 19 14:56 snap
drwxr-xr-x  2 root root 4.0K Aug  5 21:55 srv
dr-xr-xr-x  13 root root   0 Sep 26 15:13 sys
drwxrwxrwt  8 root root 4.0K Sep 26 14:27 tmp
drwxr-xr-x  12 root root  4.0K Aug  5 21:55 usr
drwxr-xr-x  13 root root  4.0K Sep 19 14:56 var
fizza1157@DESKTOP-P8HNL3S:$ |
36° Search ⌂ 9/26/2025 3:14 PM
```

```
fizza1157@DESKTOP-P8HNL3S: ~ + | v
drwxr-xr-x  13 root root  4096 Sep 19 14:56 var
fizza1157@DESKTOP-P8HNL3S:$ ls -lh
total 2.7M
lrwxrwxrwx  1 root root    7 Apr 22  2024 bin -> usr/bin
drwxr-xr-x  2 root root 4.0K Feb 26  2024 bin usr-is-merged
drwxr-xr-x  2 root root 4.0K Apr 22  2024 boot
drwxr-xr-x  15 root root 3.8K Sep 26 14:27 dev
drwxr-xr-x  88 root root 4.0K Sep 26 14:27 etc
drwxr-xr-x  3 root root 4.0K Sep 19 14:57 home
-rwxrwxrwx  1 root root 2.7M Aug  7 00:54 init
lrwxrwxrwx  1 root root    7 Apr 22  2024 lib -> usr/lib
drwxr-xr-x  2 root root 4.0K Apr  8  2024 lib usr-is-merged
lrwxrwxrwx  1 root root   9 Apr 22  2024 lib64 -> usr/lib64
drwx----- 2 root root 16K Sep 19 14:56 lost+found
drwxr-xr-x  2 root root 4.0K Aug  5 21:55 media
drwxr-xr-x  6 root root 4.0K Sep 19 14:56 mnt
drwxr-xr-x  2 root root 4.0K Aug  5 21:55 opt
dr-xr-xr-x  216 root root   0 Sep 26 14:27 proc
drwx----- 3 root root 4.0K Aug  5 21:57 root
drwxr-xr-x  19 root root  560 Sep 26 14:27 run
lrwxrwxrwx  1 root root    8 Apr 22  2024 sbin -> usr/sbin
drwxr-xr-x  2 root root 4.0K Mar 31  2024 sbin usr-is-merged
drwxr-xr-x  2 root root 4.0K Sep 19 14:56 snap
drwxr-xr-x  2 root root 4.0K Aug  5 21:55 srv
dr-xr-xr-x  13 root root   0 Sep 26 15:13 sys
drwxrwxrwt  8 root root 4.0K Sep 26 14:27 tmp
drwxr-xr-x  12 root root  4.0K Aug  5 21:55 usr
drwxr-xr-x  13 root root  4.0K Sep 19 14:56 var
fizza1157@DESKTOP-P8HNL3S:$ cd
fizza1157@DESKTOP-P8HNL3S:$ cd ..
fizza1157@DESKTOP-P8HNL3S:$ cd ~
fizza1157@DESKTOP-P8HNL3S:$ cd /
fizza1157@DESKTOP-P8HNL3S:$ |
36° Search ⌂ 9/26/2025 3:15 PM
```

Part 3: File and Directory Operations

**3.1 Creating and Managing Files/Directories

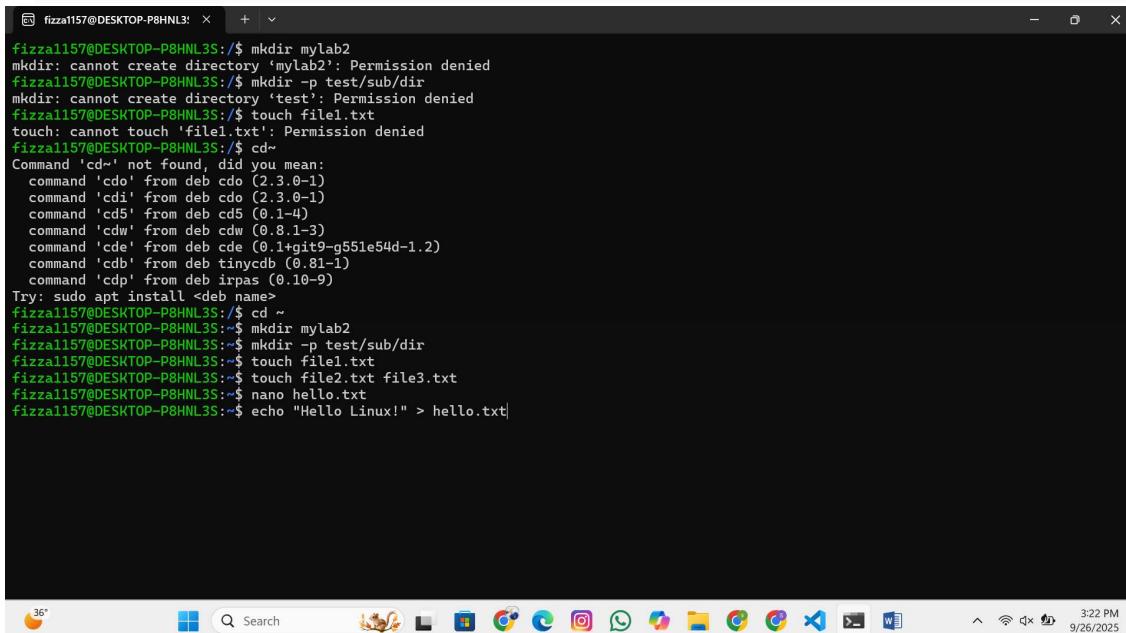
- **Commands to demonstrate:**

```
mkdir mylab2          # Create directory
mkdir -p test/sub/dir # Create nested directories
touch file1.txt       # Create empty file
touch file2.txt file3.txt # Multiple files

# Text editors introduction
nano hello.txt        # Simple text editor
# OR
echo "Hello Linux!" > hello.txt # Redirect output to file
```

- **File viewing commands:**

```
cat hello.txt         # Display file contents
less hello.txt        # Page through file
head hello.txt        # First 10 lines
```



```
fizza1157@DESKTOP-P8HNL3S:~$ mkdir mylab2
mkdir: cannot create directory 'mylab2': Permission denied
fizza1157@DESKTOP-P8HNL3S:~$ mkdir -p test/sub/dir
mkdir: cannot create directory 'test': Permission denied
fizza1157@DESKTOP-P8HNL3S:~$ touch file1.txt
touch: cannot touch 'file1.txt': Permission denied
fizza1157@DESKTOP-P8HNL3S:~$ cd-
Command 'cd-' not found, did you mean:
  command 'cdo' from deb cdo (2.3.0-1)
  command 'cdi' from deb cdo (2.3.0-1)
  command 'cd5' from deb cd5 (0.1-4)
  command 'cdw' from deb cdw (0.8.1-3)
  command 'cde' from deb cde (0.1+git9-g551e54d-1.2)
  command 'cdb' from deb tinycdb (0.81-1)
  command 'cdp' from deb irpas (0.10-9)
Try: sudo apt install <deb name>
fizza1157@DESKTOP-P8HNL3S:~$ cd ~
fizza1157@DESKTOP-P8HNL3S:~$ mkdir mylab2
fizza1157@DESKTOP-P8HNL3S:~$ mkdir -p test/sub/dir
fizza1157@DESKTOP-P8HNL3S:~$ touch file1.txt
fizza1157@DESKTOP-P8HNL3S:~$ touch file2.txt file3.txt
fizza1157@DESKTOP-P8HNL3S:~$ nano hello.txt
fizza1157@DESKTOP-P8HNL3S:~$ echo "Hello Linux!" > hello.txt|
```

```
fizza1157@DESKTOP-P8HNL3S:~$ mkdir mylab2
mkdir: cannot create directory 'mylab2': Permission denied
fizza1157@DESKTOP-P8HNL3S:~$ mkdir -p test/sub/dir
mkdir: cannot create directory 'test': Permission denied
fizza1157@DESKTOP-P8HNL3S:~$ touch file1.txt
touch: cannot touch 'file1.txt': Permission denied
fizza1157@DESKTOP-P8HNL3S:~$ cd~
Command 'cd~' not found, did you mean:
  command 'cd\o' from deb cdo (2.3.0-1)
  command 'cd\i' from deb cdo (2.3.0-1)
  command 'cd\$' from deb cdo (0.1-4)
  command 'cd\w' from deb cdw (0.8.1-3)
  command 'cde' from deb cde (0.1+git9-g551e54d-1.2)
  command 'cd\b' from deb tinyedb (0.81-1)
  command 'cd\p' from deb irpas (0.10-9)
Try: sudo apt install <deb name>
fizza1157@DESKTOP-P8HNL3S:~$ cd ~
fizza1157@DESKTOP-P8HNL3S:~$ mkdir mylab2
fizza1157@DESKTOP-P8HNL3S:~$ mkdir -p test/sub/dir
fizza1157@DESKTOP-P8HNL3S:~$ touch file1.txt
fizza1157@DESKTOP-P8HNL3S:~$ touch file2.txt file3.txt
fizza1157@DESKTOP-P8HNL3S:~$ nano hello.txt
fizza1157@DESKTOP-P8HNL3S:~$ echo "Hello Linux!" > hello.txt
fizza1157@DESKTOP-P8HNL3S:~$ cat hello.txt
Hello Linux!
fizza1157@DESKTOP-P8HNL3S:~$ less hello.txt
fizza1157@DESKTOP-P8HNL3S:~$ head hello.txt
Hello Linux!
fizza1157@DESKTOP-P8HNL3S:~$ |
```

```
36° Search
fizza1157@DESKTOP-P8HNL3S:~$ |
```

Hello Linux!

hello.txt (END)

```
36° Search
fizza1157@DESKTOP-P8HNL3S:~$ |
```

```
fizza1157@DESKTOP-P8HNL3S:~$ mkdir mylab2
mkdir: cannot create directory 'mylab2': Permission denied
fizza1157@DESKTOP-P8HNL3S:~$ mkdir -p test/sub/dir
mkdir: cannot create directory 'test': Permission denied
fizza1157@DESKTOP-P8HNL3S:~$ touch file1.txt
touch: cannot touch 'file1.txt': Permission denied
fizza1157@DESKTOP-P8HNL3S:~$ cd~
Command 'cd~' not found, did you mean:
  command 'cd\o' from deb cdo (2.3.0-1)
  command 'cd\i' from deb cdo (2.3.0-1)
  command 'cd\$' from deb cdo (0.1-4)
  command 'cd\w' from deb cdw (0.8.1-3)
  command 'cde' from deb cde (0.1+git9-g551e54d-1.2)
  command 'cd\b' from deb tinyedb (0.81-1)
  command 'cd\p' from deb irpas (0.10-9)
Try: sudo apt install <deb name>
fizza1157@DESKTOP-P8HNL3S:~$ cd ~
fizza1157@DESKTOP-P8HNL3S:~$ mkdir mylab2
fizza1157@DESKTOP-P8HNL3S:~$ mkdir -p test/sub/dir
fizza1157@DESKTOP-P8HNL3S:~$ touch file1.txt
fizza1157@DESKTOP-P8HNL3S:~$ touch file2.txt file3.txt
fizza1157@DESKTOP-P8HNL3S:~$ nano hello.txt
fizza1157@DESKTOP-P8HNL3S:~$ echo "Hello Linux!" > hello.txt
fizza1157@DESKTOP-P8HNL3S:~$ cat hello.txt
Hello Linux!
fizza1157@DESKTOP-P8HNL3S:~$ less hello.txt
fizza1157@DESKTOP-P8HNL3S:~$ head hello.txt
Hello Linux!
fizza1157@DESKTOP-P8HNL3S:~$ wc hello.txt
1 2 13 hello.txt
fizza1157@DESKTOP-P8HNL3S:~$ |
```

```

tail hello.txt          # Last 10 lines
wc hello.txt           # Word count

```

3.2 Copying, Moving, and Deleting

- Commands to practice:

```

cp hello.txt backup.txt      # Copy file
cp -r mylab2 mylab2_backup  # Copy directory recursively
mv backup.txt renamed.txt   # Move/rename file
rm renamed.txt               # Remove file
rm -r mylab2_backup         # Remove directory
rmdir empty_directory        # Remove empty directory

```

```

fizza1157@DESKTOP-P8HNL3S: ~ + 
touch: cannot touch 'file1.txt': Permission denied
fizza1157@DESKTOP-P8HNL3S: ~ $ cd ~
Command 'cd~' not found, did you mean:
  command 'cd~' from deb cdo (2.3.0-1)
  command 'cd!~' from deb cdo (2.3.0-1)
  command 'cd$' from deb cdd5 (0.1-4)
  command 'cd\w' from deb cdw (0.8.1-3)
  command 'cde' from deb cde (0.1+git9-g551e54d-1.2)
  command 'cd\p' from deb tinyccdb (0.81-1)
  command 'cd\p' from deb irpas (0.10-9)
Try: sudo apt install <deb name>
fizza1157@DESKTOP-P8HNL3S: ~ $ cd ~
fizza1157@DESKTOP-P8HNL3S: ~ $ mkdir mylab2
fizza1157@DESKTOP-P8HNL3S: ~ $ mkdir -p test/sub/dir
fizza1157@DESKTOP-P8HNL3S: ~ $ touch file1.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ touch file2.txt file3.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ nano hello.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ echo "Hello Linux!" > hello.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ cat hello.txt
Hello Linux!
fizza1157@DESKTOP-P8HNL3S: ~ $ less hello.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ head hello.txt
Hello Linux!
fizza1157@DESKTOP-P8HNL3S: ~ $ wc hello.txt
 1 2 13 hello.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ cp hello.txt backup.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ cp -r mylab2 mylab2_backup
fizza1157@DESKTOP-P8HNL3S: ~ $ mv backup.txt renamed.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ rm renamed.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ rm -r mylab2_backup
fizza1157@DESKTOP-P8HNL3S: ~ $ rmdir empty_directory
rmdir: failed to remove 'empty_directory': No such file or directory
fizza1157@DESKTOP-P8HNL3S: ~ |

```

3:25 PM
9/26/2025

```

fizza1157@DESKTOP-P8HNL3S: ~ $ cd ~
fizza1157@DESKTOP-P8HNL3S: ~ $ pwd
/home/fizza1157
fizza1157@DESKTOP-P8HNL3S: ~ $ mkdir -p mylab2/project1/docs
fizza1157@DESKTOP-P8HNL3S: ~ $ mkdir -p mylab2/project1/src
fizza1157@DESKTOP-P8HNL3S: ~ $ mkdir -p mylab2/project2
fizza1157@DESKTOP-P8HNL3S: ~ $ ls
file1.txt file2.txt file3.txt hello.txt mylab2 recycleBin test wsl_lab1
fizza1157@DESKTOP-P8HNL3S: ~ $ touch mylab2/project1/docs/readme.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ touch mylab2/project1/src/main.py
fizza1157@DESKTOP-P8HNL3S: ~ $ touch mylab2/project2/notes.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ cp mylab2/project1/docs/readme.txt mylab2/project2/readme_copy.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ mv mylab2/project1/src/main.py mylab2/project1/src/app.py
fizza1157@DESKTOP-P8HNL3S: ~ $ rm mylab2/project2/notes.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ touch mylab2/project1/src/test.py
fizza1157@DESKTOP-P8HNL3S: ~ $ nano mylab2/project1/docs/readme.txt
fizza1157@DESKTOP-P8HNL3S: ~ $ ls -l mylab2/project1/docs/
total 0
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:32 readme.txt
fizza1157@DESKTOP-P8HNL3S: ~ |

```

3:35 PM
9/26/2025

Hands-on Exercise: Students create a directory structure, add files, and practice file operations.

Part 4: File Permissions and Ownership

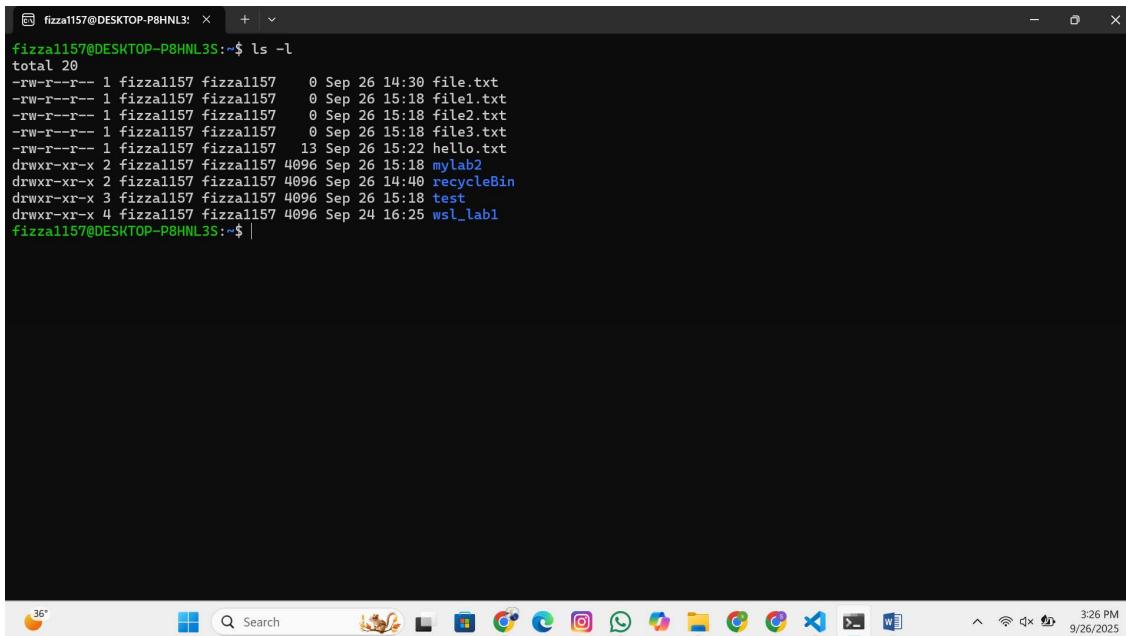
4.1 Understanding File Permissions

- Concepts to Cover:

- Permission types: read (r), write (w), execute (x)
- Permission groups: user (u), group (g), others (o)
- Numeric notation: 755, 644, etc.

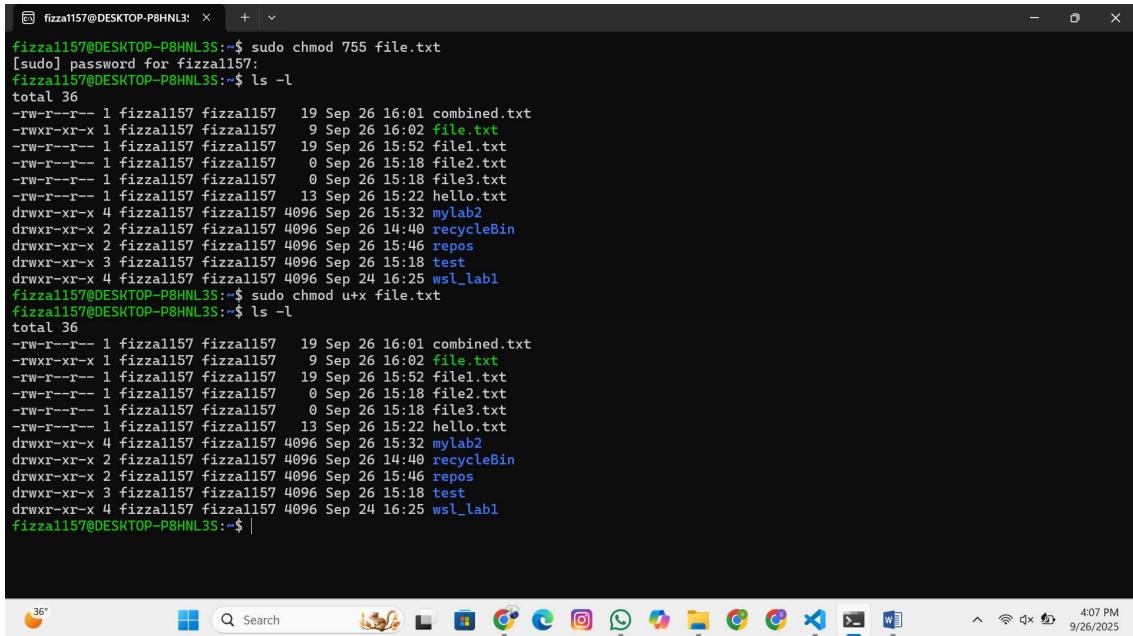
- Commands to demonstrate:

```
ls -l          # View permissions  
chmod 755 file.txt      # Change permissions (numeric)  
chmod u+x file.txt      # Add execute permission for user  
chmod g-w file.txt      # Remove write permission for group  
chown user:group file.txt # Change ownership (if applicable)
```

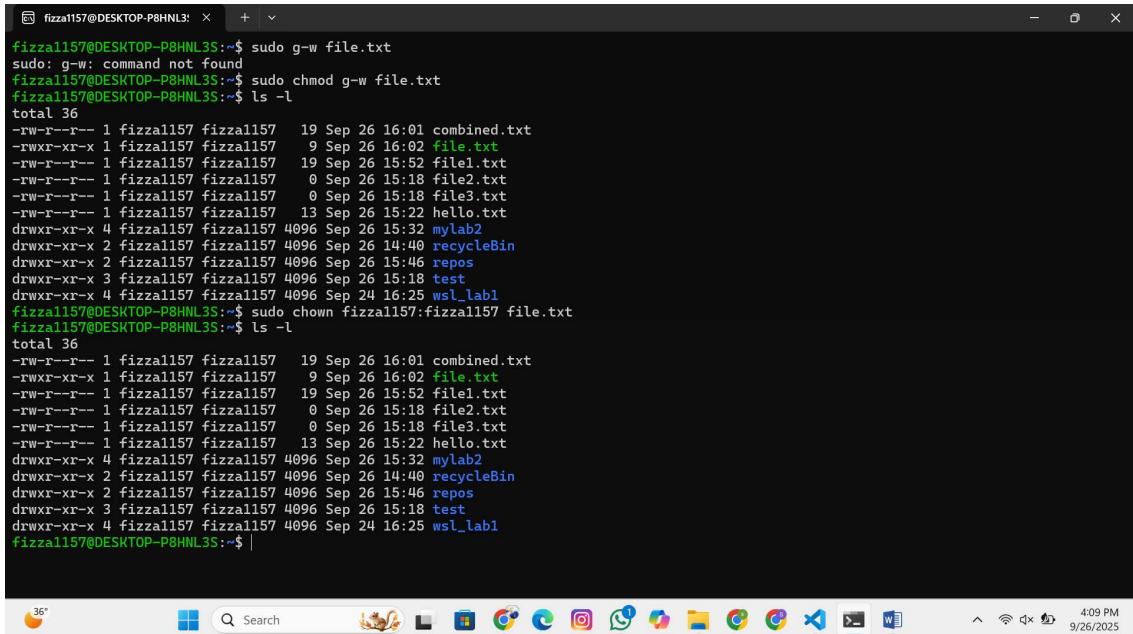


A screenshot of a Windows terminal window titled "fizza1157@DESKTOP-P8HNL3S". The window displays the output of the command "ls -l", which lists several files with their permissions, sizes, and modification dates. The terminal window is located on a desktop screen with a taskbar at the bottom containing icons for various applications like File Explorer, Edge, and FileZilla. The system tray shows the date and time as 9/26/2025 at 3:26 PM.

```
fizza1157@DESKTOP-P8HNL3S:~$ ls -l  
total 20  
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 14:30 file.txt  
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file1.txt  
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file2.txt  
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file3.txt  
-rw-r--r-- 1 fizza1157 fizza1157 13 Sep 26 15:22 hello.txt  
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 15:18 mylab2  
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 14:40 recycleBin  
drwxr-xr-x 3 fizza1157 fizza1157 4096 Sep 26 15:18 test  
drwxr-xr-x 4 fizza1157 fizza1157 4096 Sep 24 16:25 wsl_lab1  
fizza1157@DESKTOP-P8HNL3S:~$ |
```



```
fizza1157@DESKTOP-P8HNL3S:~$ sudo chmod 755 file.txt
[sudo] password for fizza1157:
fizza1157@DESKTOP-P8HNL3S:~$ ls -l
total 36
-rw-r--r-- 1 fizza1157 fizza1157 19 Sep 26 16:01 combined.txt
-rwxr-xr-x 1 fizza1157 fizza1157 9 Sep 26 16:02 file.txt
-rw-r--r-- 1 fizza1157 fizza1157 19 Sep 26 15:52 file1.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file2.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file3.txt
-rw-r--r-- 1 fizza1157 fizza1157 13 Sep 26 15:22 hello.txt
drwxr-xr-x 4 fizza1157 fizza1157 4096 Sep 26 15:32 mylab2
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 14:40 recycleBin
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 15:46 repos
drwxr-xr-x 3 fizza1157 fizza1157 4096 Sep 26 15:18 test
drwxr-xr-x 4 fizza1157 fizza1157 4096 Sep 24 16:25 wsl_labl
fizza1157@DESKTOP-P8HNL3S:~$ sudo chmod u+x file.txt
fizza1157@DESKTOP-P8HNL3S:~$ ls -l
total 36
-rw-r--r-- 1 fizza1157 fizza1157 19 Sep 26 16:01 combined.txt
-rwxr-xr-x 1 fizza1157 fizza1157 9 Sep 26 16:02 file.txt
-rw-r--r-- 1 fizza1157 fizza1157 19 Sep 26 15:52 file1.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file2.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file3.txt
-rw-r--r-- 1 fizza1157 fizza1157 13 Sep 26 15:22 hello.txt
drwxr-xr-x 4 fizza1157 fizza1157 4096 Sep 26 15:32 mylab2
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 14:40 recycleBin
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 15:46 repos
drwxr-xr-x 3 fizza1157 fizza1157 4096 Sep 26 15:18 test
drwxr-xr-x 4 fizza1157 fizza1157 4096 Sep 24 16:25 wsl_labl
fizza1157@DESKTOP-P8HNL3S:~$ |
```



```
fizza1157@DESKTOP-P8HNL3S:~$ sudo g-w file.txt
sudo: g-w: command not found
fizza1157@DESKTOP-P8HNL3S:~$ sudo chmod g-w file.txt
fizza1157@DESKTOP-P8HNL3S:~$ ls -l
total 36
-rw-r--r-- 1 fizza1157 fizza1157 19 Sep 26 16:01 combined.txt
-rwxr-xr-x 1 fizza1157 fizza1157 9 Sep 26 16:02 file.txt
-rw-r--r-- 1 fizza1157 fizza1157 19 Sep 26 15:52 file1.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file2.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file3.txt
-rw-r--r-- 1 fizza1157 fizza1157 13 Sep 26 15:22 hello.txt
drwxr-xr-x 4 fizza1157 fizza1157 4096 Sep 26 15:32 mylab2
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 14:40 recycleBin
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 15:46 repos
drwxr-xr-x 3 fizza1157 fizza1157 4096 Sep 26 15:18 test
drwxr-xr-x 4 fizza1157 fizza1157 4096 Sep 24 16:25 wsl_labl
fizza1157@DESKTOP-P8HNL3S:~$ sudo chown fizza1157:fizza1157 file.txt
fizza1157@DESKTOP-P8HNL3S:~$ ls -l
total 36
-rw-r--r-- 1 fizza1157 fizza1157 19 Sep 26 16:01 combined.txt
-rwxr-xr-x 1 fizza1157 fizza1157 9 Sep 26 16:02 file.txt
-rw-r--r-- 1 fizza1157 fizza1157 19 Sep 26 15:52 file1.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file2.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file3.txt
-rw-r--r-- 1 fizza1157 fizza1157 13 Sep 26 15:22 hello.txt
drwxr-xr-x 4 fizza1157 fizza1157 4096 Sep 26 15:32 mylab2
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 14:40 recycleBin
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 15:46 repos
drwxr-xr-x 3 fizza1157 fizza1157 4096 Sep 26 15:18 test
drwxr-xr-x 4 fizza1157 fizza1157 4096 Sep 24 16:25 wsl_labl
fizza1157@DESKTOP-P8HNL3S:~$ |
```

Part 5: Text Processing and Utilities

5.1 Essential Text Commands

- Commands to demonstrate:

```
grep "pattern" file.txt      # Search for patterns
grep -i "pattern" file.txt  # Case-insensitive search
grep -n "pattern" file.txt  # Show line numbers
```

```
fizza1157@DESKTOP-P8HNL3S:~$ ls
file.txt file1.txt file2.txt file3.txt hello.txt mylab2 recycleBin repos test wsl_labl
fizza1157@DESKTOP-P8HNL3S:~$ echo "pattern found here" >> file1.txt
grep "pattern" file1.txt
pattern found here
fizza1157@DESKTOP-P8HNL3S:~$ grep "pattern" file1.txt
pattern found here
fizza1157@DESKTOP-P8HNL3S:~$ grep -i "pattern" file1.txt
pattern found here
fizza1157@DESKTOP-P8HNL3S:~$ grep -n "pattern" file1.txt
1:pattern found here
fizza1157@DESKTOP-P8HNL3S:~$ |
```

5.2 Pipes and Redirection

- Concepts and commands:

```
ls -l | grep ".txt"           # Pipe output
cat file1.txt file2.txt > combined.txt # Redirect output
echo "new line" >> file.txt # Append to file
sort file.txt | uniq          # Chain commands
```

```
fizza1157@DESKTOP-P8HNL3S:~$ ls -l | grep ".txt"
-rwxr-xr-x 1 fizza1157 fizza1157 0 Sep 26 14:30 file.txt
-rw-r--r-- 1 fizza1157 fizza1157 19 Sep 26 15:52 file1.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file2.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file3.txt
-rw-r--r-- 1 fizza1157 fizza1157 13 Sep 26 15:22 hello.txt
fizza1157@DESKTOP-P8HNL3S:~$ cat file1.txt file2.txt > combined.txt
fizza1157@DESKTOP-P8HNL3S:~$ ls -l
total 32
-rw-r--r-- 1 fizza1157 fizza1157 19 Sep 26 16:01 combined.txt
-rwxr-xr-x 1 fizza1157 fizza1157 0 Sep 26 14:30 file.txt
-rw-r--r-- 1 fizza1157 fizza1157 19 Sep 26 15:52 file1.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file2.txt
-rw-r--r-- 1 fizza1157 fizza1157 0 Sep 26 15:18 file3.txt
-rw-r--r-- 1 fizza1157 fizza1157 13 Sep 26 15:22 hello.txt
drwxr-xr-x 4 fizza1157 fizza1157 4096 Sep 26 15:32 mylab2
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 14:40 recycleBin
drwxr-xr-x 2 fizza1157 fizza1157 4096 Sep 26 15:46 repos
drwxr-xr-x 3 fizza1157 fizza1157 4096 Sep 26 15:18 test
drwxr-xr-x 4 fizza1157 fizza1157 4096 Sep 24 16:25 wsl_labl
fizza1157@DESKTOP-P8HNL3S:~$ echo "new line" >> file.txt
fizza1157@DESKTOP-P8HNL3S:~$ sort file.txt | uniq
new line
fizza1157@DESKTOP-P8HNL3S:~$ |
```

Part 6: Introduction to Processes

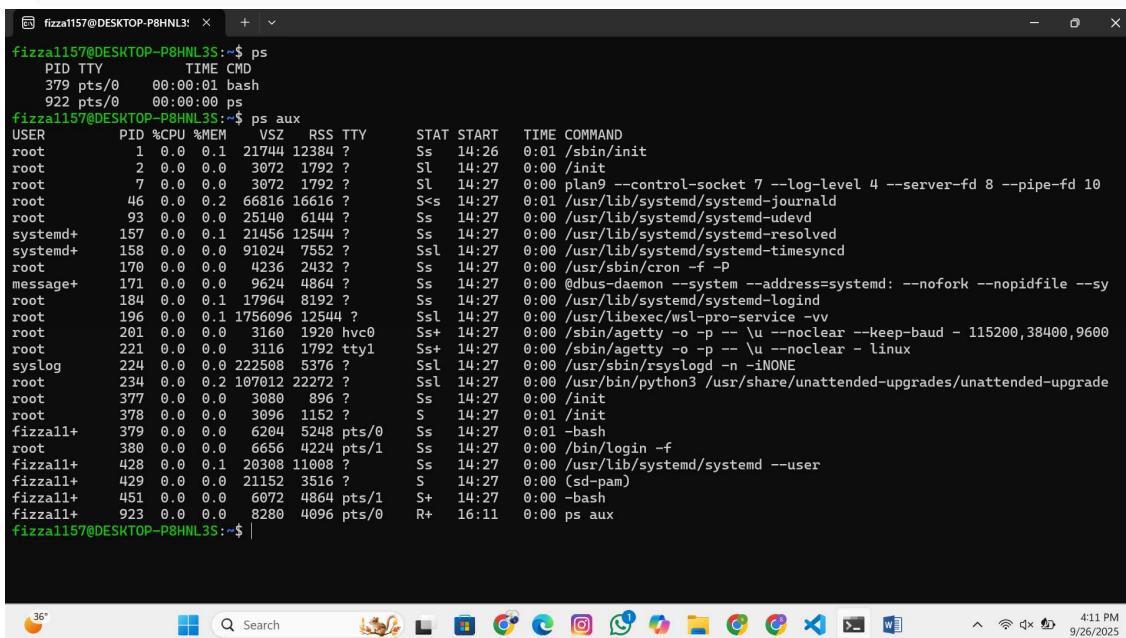
6.1 Understanding Processes

- Concepts to Cover:

- What is a process?
- Process ID (PID)
- Parent-child relationships
- Process states

- Commands to demonstrate:

```
ps                      # Show current processes
ps aux                  # Detailed process list
ps -ef                 # Full format listing
pstree                 # Process tree
top                     # Real-time process viewer
htop                   # Enhanced process viewer (if available)
kill PID               # Terminate process by PID
killall process_name    # Kill processes by name
pkill pattern          # Kill processes matching pattern
```



```
fizza1157@DESKTOP-P8HNL3S:~$ ps aux
USER     PID %CPU %MEM   VSZ   RSS TTY      STAT START  TIME COMMAND
root      1  0.0  0.1 21744 12384 ?    Ss 14:26  0:01 /sbin/init
root      2  0.0  0.0  3072 1792 ?    SL 14:27  0:00 /init
root      7  0.0  0.0  3072 1792 ?    SL 14:27  0:00 plan9 --control-socket 7 --log-level 4 --server-fd 8 --pipe-fd 10
root     46  0.0  0.2 66816 16616 ?
root     93  0.0  0.0 25140 6144 ?
systemd+ 157  0.0  0.1 21454 12544 ?
systemd+ 158  0.0  0.0 91024 7552 ?
root    170  0.0  0.0 4236 2432 ?
root    184  0.0  0.1 17964 8192 ?
root    184  0.0  0.1 17964 8192 ?
root    196  0.0  0.0 1756096 12544 ?
root    201  0.0  0.0  3160 1920 hvc0
root    221  0.0  0.0  3116 1792 ttysl
syslog   224  0.0  0.0 222598 5376 ?
root    234  0.0  0.2 167612 22272 ?
root    377  0.0  0.0  3080  896 ?
root    378  0.0  0.0  3096 1152 ?
fizzall+ 379  0.0  0.0  6204 5248 pts/0
root    380  0.0  0.0 6656 4224 pts/1
fizzall+ 428  0.0  0.1 20398 11008 ?
fizzall+ 429  0.0  0.0 21152 3516 ?
fizzall+ 451  0.0  0.0  6072 4864 pts/1
fizzall+ 923  0.0  0.0  8280 4096 pts/0
fizza1157@DESKTOP-P8HNL3S:~$ |
```

```
fizza1157@DESKTOP-P8HNL3S:~$ ps -ef
UID PID PPID C STIME TTY TIME CMD
root 378 0 0 0.0 3096 1152 ? S 14:27 0:01 /init
fizza11+ 379 0 0 0.0 6204 5248 pts/0 Ss 14:27 0:01 -bash
root 380 0 0 0.0 6656 4224 pts/1 Ss 14:27 0:00 /bin/login -f
fizza11+ 428 0 0 0.1 20308 11008 ? Ss 14:27 0:00 /usr/lib/systemd/systemd --user
fizza11+ 429 0 0 0.0 21152 3516 ? S 14:27 0:00 (sd-pam)
fizza11+ 451 0 0 0.0 6072 4864 pts/1 S+ 14:27 0:00 -bash
fizza11+ 923 0 0 0.0 8280 4096 pts/0 R+ 16:11 0:00 ps aux
fizza1157@DESKTOP-P8HNL3S:~$ ps -ef
UID PID PPID C STIME TTY TIME CMD
root 1 0 14:26 ? 0:00:01 /sbin/init
root 2 1 0 14:27 ? 0:00:00 /init
root 7 2 0 14:27 ? 0:00:00 plan9 --control-socket 7 --log-level 4 --server-fd 8 --pipe-fd 10 --log-truncate
root 46 1 0 14:27 ? 0:00:01 /usr/lib/systemd/systemd-journald
root 93 1 0 14:27 ? 0:00:00 /usr/lib/systemd/systemd-udevd
systemd+ 157 1 0 14:27 ? 0:00:00 /usr/lib/systemd/systemd-resolved
systemd+ 158 1 0 14:27 ? 0:00:00 /usr/lib/systemd/systemd-timesyncd
root 170 1 0 14:27 ? 0:00:00 /usr/sbin/cron -f -p
message+ 171 1 0 14:27 ? 0:00:00 @dbus-daemon --system --address=systemd: --nofork --nopidfile --systemd-activatio
root 184 1 0 14:27 ? 0:00:00 /usr/lib/systemd/systemd-logind
root 196 1 0 14:27 ? 0:00:00 /usr/libexec/wsl-pro-service --vv
root 201 1 0 14:27 hvc0 0:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud - 115200,38400,9600 vt220
root 221 1 0 14:27 ttyl 0:00:00 /sbin/agetty -o -p -- \u --noclear - linux
syslog 224 1 0 14:27 ? 0:00:00 /usr/sbin/rsyslogd -n -iNONE
root 234 1 0 14:27 ? 0:00:00 /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown --wai
root 377 2 0 14:27 ? 0:00:00 /init
root 378 377 0 14:27 ? 0:00:01 /init
fizza11+ 379 378 0 14:27 pts/0 0:00:01 -bash
root 380 2 0 14:27 pts/1 0:00:00 /bin/login -f
fizza11+ 428 1 0 14:27 ? 0:00:00 /usr/lib/systemd/systemd --user
fizza11+ 429 428 0 14:27 ? 0:00:00 (sd-pam)
fizza11+ 451 380 0 14:27 pts/1 0:00:00 -bash
fizza11+ 924 379 0 16:11 pts/0 0:00:00 ps -ef
fizza1157@DESKTOP-P8HNL3S:~$ |
```

```
36° Search
fizza1157@DESKTOP-P8HNL3S:~$ pstree
systemd-2*[agetty]
|-cron
| dbus-daemon
|-init-systemd(Upb-----SessionLeader---Relay(379)---bash---pstree
|   |-init---{init}
|   | Login---bash
|   | {init}-systemd(Upb
|   rsyslogd---3*[{rsyslogd}]
|   systemd---(sd-pam)
|   systemd-journal
|   systemd-logind
|   systemd-resolve
|   systemd-timesyn---{systemd-timesyn}
|   systemd-udevd
|   unattended-upgr---{unattended-upgr}
|   wsl-pro-service---7*[{wsl-pro-service}]
fizza1157@DESKTOP-P8HNL3S:~$ pstree
```

```
36° Search
fizza1157@DESKTOP-P8HNL3S:~$ top
top - 16:13:07 up 1:46, 1 user, load average: 0.00, 0.00, 0.00
Tasks: 23 total, 1 running, 22 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.0 us, 0.1 sy, 0.0 ni, 99.8 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 7880.2 total, 7372.8 free, 490.4 used, 166.9 buff/cache
MiB Swap: 2048.0 total, 2048.0 free, 0.0 used. 7389.8 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+ COMMAND
930	fizza11+	20	0	9276	5504	3456	R	0.3	0.1	0:00.03 top
1	root	20	0	21744	12384	9184	S	0.0	0.2	0:01.96 systemd
2	root	20	0	3072	1792	1664	S	0.0	0.0	0:00.03 init-systemd(Upb
7	root	20	0	3072	1792	1792	S	0.0	0.0	0:00.00 init
46	root	19	-1	66816	16616	15848	S	0.0	0.2	0:01.08 systemd-journal
93	root	20	0	25140	6144	4992	S	0.0	0.1	0:00.91 systemd-udevd
157	systemd+	20	0	21456	12544	10368	S	0.0	0.2	0:00.30 systemd-resolve
158	systemd+	20	0	91024	7552	6656	S	0.0	0.1	0:00.34 systemd-timesyn
170	root	20	0	4236	2432	2304	S	0.0	0.0	0:00.06 cron
171	message+	20	0	9624	4864	4352	S	0.0	0.1	0:00.40 @dbus-daemon
184	root	20	0	17964	8192	7296	S	0.0	0.1	0:00.29 systemd-logind
196	root	20	0	1756096	12544	10240	S	0.0	0.2	0:00.82 wsl-pro-service
201	root	20	0	3160	1920	1792	S	0.0	0.0	0:00.02 agetty
221	root	20	0	3116	1792	1664	S	0.0	0.0	0:00.01 agetty
224	syslog	20	0	222508	5376	4352	S	0.0	0.1	0:00.31 rsyslogd
234	root	20	0	107012	22272	13184	S	0.0	0.3	0:00.20 unattended-upgr
377	root	20	0	3080	896	896	S	0.0	0.0	0:00.00 SessionLeader
378	root	20	0	3096	1152	1024	S	0.0	0.0	0:01.20 Relay(379)
379	fizza11+	20	0	6204	5248	3584	S	0.0	0.1	0:01.17 bash
380	root	20	0	6656	4224	3712	S	0.0	0.1	0:00.03 login
428	fizza11+	20	0	20308	11008	9088	S	0.0	0.1	0:00.24 systemd
429	fizza11+	20	0	21152	3516	1792	S	0.0	0.0	0:00.00 (sd-pam)
451	fizza11+	20	0	6072	4864	3328	S	0.0	0.1	0:00.05 bash