



National Textile University

Department of Computer Science

Subject:

Operating System

Submitted to:

Sir Naseer

Submitted by:

Ayema

Reg number:

23-NTU-CS-1142

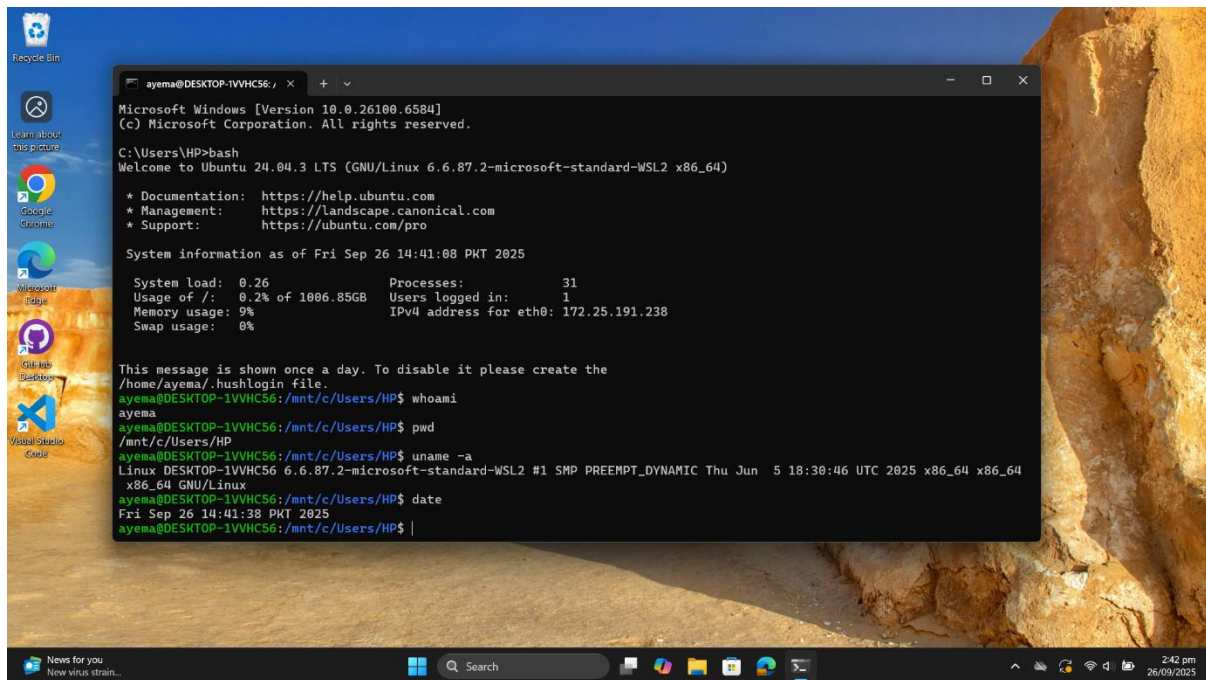
Lab no. :

02 Labwork

Semester: 5Th

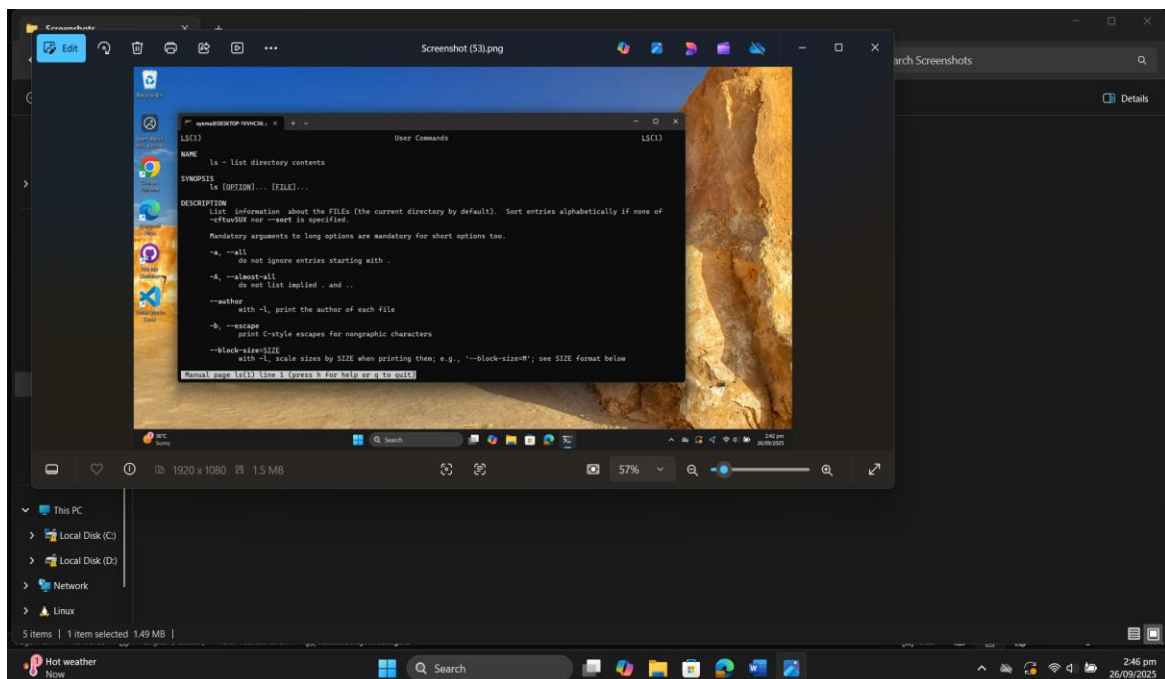
Part 1: LINUX Environment Orientation

1.1 Understanding the Linux environment



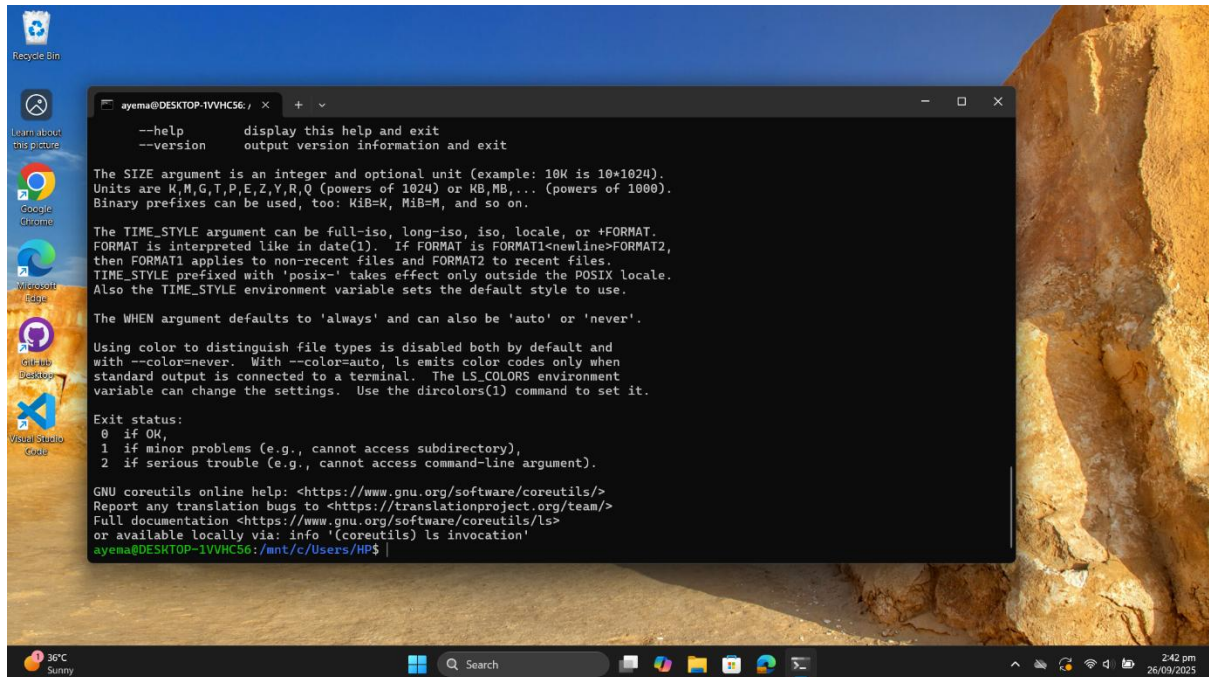
1.2 Getting help in Linux

1. Man Is #Manual pages



2. Ls—help

#Build-in help



The screenshot shows a Windows desktop with a terminal window open. The terminal window title is 'ayema@DESKTOP-1VVHC56:'. The terminal displays the help text for the 'ls' command, which includes options like --help and --version, and explains various arguments like SIZE, TIME_STYLE, and WHEN. The desktop background is a landscape image of a rocky cliff. The taskbar at the bottom shows the Windows logo, a search bar, and several application icons. The system tray on the right shows the date and time as 2:42 pm on 26/09/2025.

```
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ ls --help
--help      display this help and exit
--version   output version information and exit

The SIZE argument is an integer and optional unit (example: 10K is 10*1024).
Units are K,M,G,T,P,E,Z,Y,R,Q (powers of 1024) or KB,MB,... (powers of 1000).
Binary prefixes can be used, too: KiB=M, MiB=M, and so on.

The TIME_STYLE argument can be full-iso, long-iso, iso, locale, or +FORMAT.
FORMAT is interpreted like in date(1). If FORMAT is FORMAT1<newline>FORMAT2,
then FORMAT1 applies to non-recent files and FORMAT2 to recent files.
TIME_STYLE prefixed with 'posix-' takes effect only outside the POSIX locale.
Also the TIME_STYLE environment variable sets the default style to use.

The WHEN argument defaults to 'always' and can also be 'auto' or 'never'.

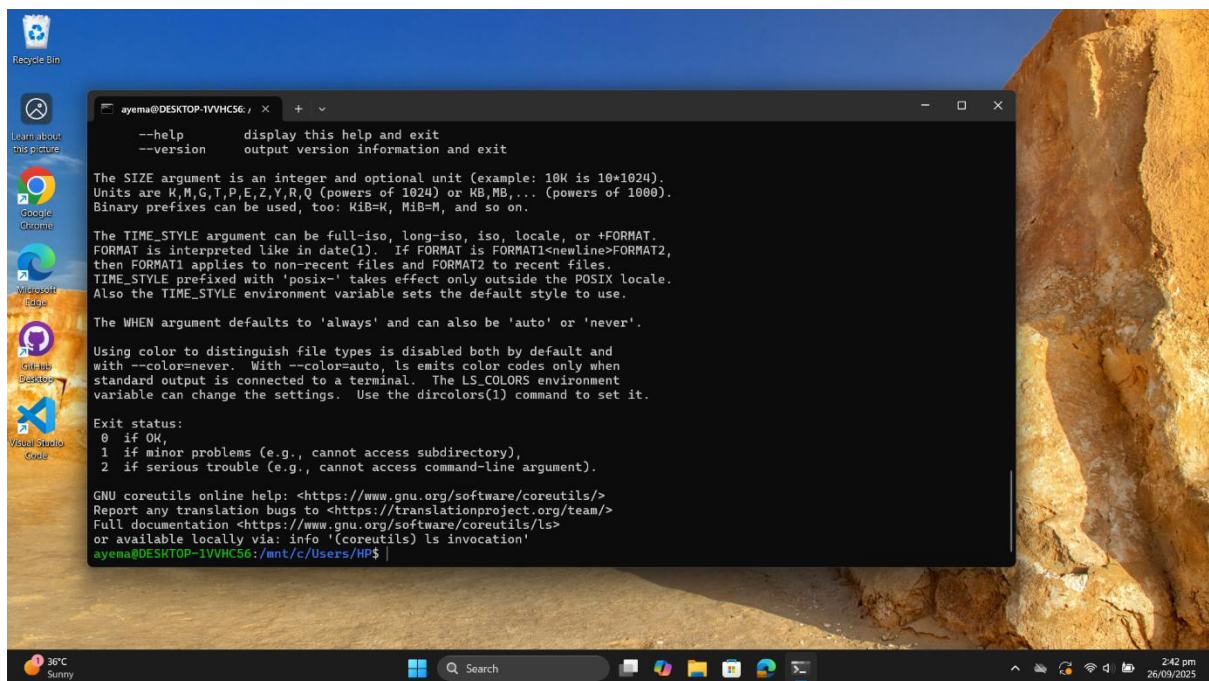
Using color to distinguish file types is disabled both by default and
with --color=never. With --color=auto, ls emits color codes only when
standard output is connected to a terminal. The LS_COLORS environment
variable can change the settings. Use the dircolors(1) command to set it.

Exit status:
 0 if OK,
 1 if minor problems (e.g., cannot access subdirectory),
 2 if serious trouble (e.g., cannot access command-line argument).

GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
Report any translation bugs to <https://translationproject.org/team/>
Full documentation <https://www.gnu.org/software/coreutils/ls>
or available locally via: info '(coreutils) ls invocation'
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$
```

3. Which is

#location of command



This screenshot is identical to the one above, showing a Windows desktop with a terminal window displaying the help text for the 'ls' command. The desktop background, taskbar, and system tray are the same.

```
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ ls --help
--help      display this help and exit
--version   output version information and exit

The SIZE argument is an integer and optional unit (example: 10K is 10*1024).
Units are K,M,G,T,P,E,Z,Y,R,Q (powers of 1024) or KB,MB,... (powers of 1000).
Binary prefixes can be used, too: KiB=M, MiB=M, and so on.

The TIME_STYLE argument can be full-iso, long-iso, iso, locale, or +FORMAT.
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TIME_STYLE prefixed with 'posix-' takes effect only outside the POSIX locale.
Also the TIME_STYLE environment variable sets the default style to use.

The WHEN argument defaults to 'always' and can also be 'auto' or 'never'.

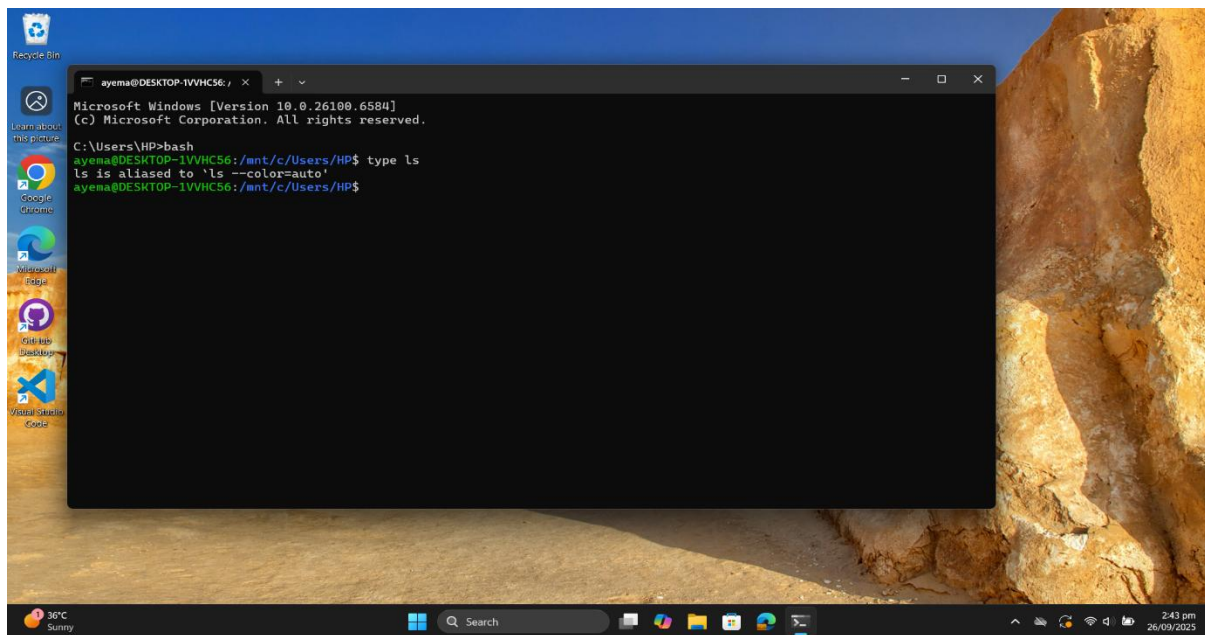
Using color to distinguish file types is disabled both by default and
with --color=never. With --color=auto, ls emits color codes only when
standard output is connected to a terminal. The LS_COLORS environment
variable can change the settings. Use the dircolors(1) command to set it.

Exit status:
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 2 if serious trouble (e.g., cannot access command-line argument).

GNU coreutils online help: <https://www.gnu.org/software/coreutils/>
Report any translation bugs to <https://translationproject.org/team/>
Full documentation <https://www.gnu.org/software/coreutils/ls>
or available locally via: info '(coreutils) ls invocation'
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$
```

4. Type ls

#Command type information



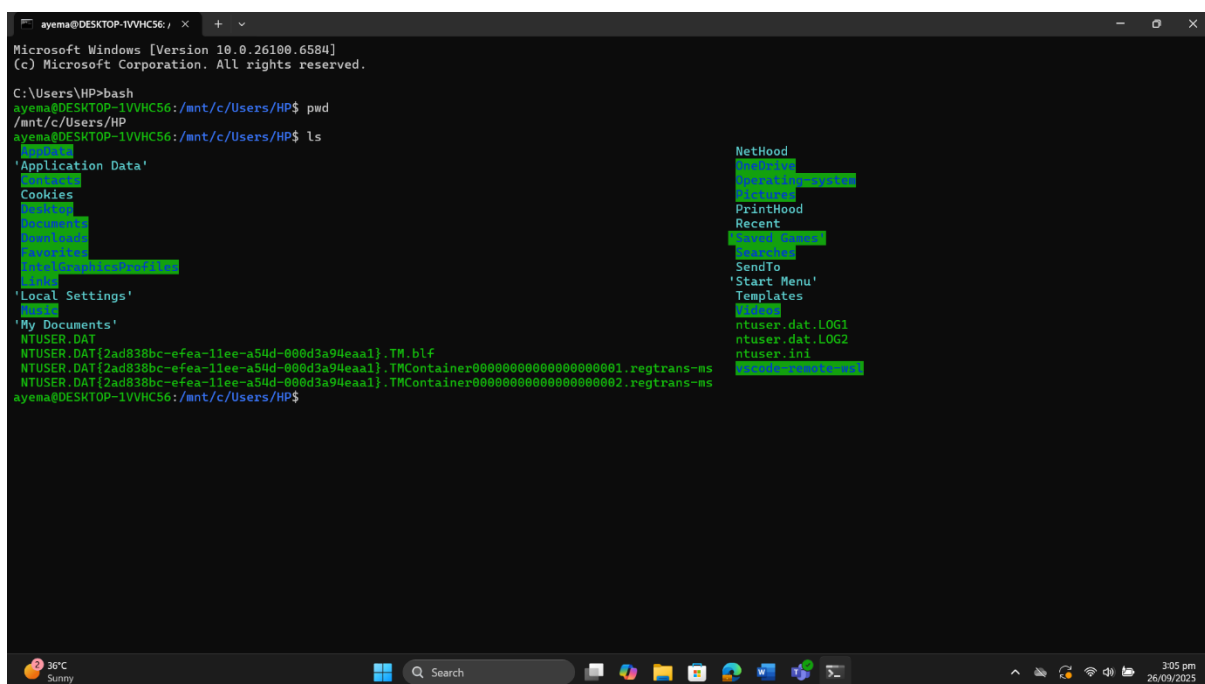
```
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ type ls
ls is aliased to `ls --color=auto'
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$
```

Part 2: File System Navigation

2.1 Understanding Linux Directory Structure

The command is used below are:

- **pwd** # Present working directory
- **ls** # List directory content



```
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ pwd
/mnt/c/Users/HP
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ ls
'Application Data'      NetHood
'Cookies'               Recent
'Local Settings'        SendTo
'My Documents'          'Start Menu'
NTUSER.DAT              Templates
NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94eaa1].TM.blf
NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94eaa1].TMCContainer000000000000000001.regtrans-ms
NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94eaa1].TMCContainer000000000000000002.regtrans-ms
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$
```


- **ls -l** # Long format

```

ayema@DESKTOP-1VHC56: ~
'My Documents'
NTUSER.DAT
NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94ea1].TM.blf
NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94ea1].TMContainer000000000000000001.regtrans-ms
NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94ea1].TMContainer000000000000000002.regtrans-ms
ayema@DESKTOP-1VHC56: /mnt/c/Users/HP$ ls -l
total 21500
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 AppData
lrwxrwxrwx 1 ayema ayema 31 Jul 26 03:52 'Application Data' -> /mnt/c/Users/HP/AppData/Roaming
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 .config
lrwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Cookies -> /mnt/c/Users/HP/AppData/Local/Microsoft/Windows/NetCookies
drwxrwxrwx 1 ayema ayema 4096 Sep 18 23:07 Desktop
drwxrwxrwx 1 ayema ayema 4096 Sep 23 18:49 Documents
drwxrwxrwx 1 ayema ayema 4096 Sep 21 19:37 Downloads
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Favorites
drwxrwxrwx 1 ayema ayema 4096 Sep 22 06:17 LocalizedResources
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Links
lrwxrwxrwx 1 ayema ayema 29 Jul 26 03:52 'Local Settings' -> /mnt/c/Users/HP/AppData/Local
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Music
lrwxrwxrwx 1 ayema ayema 25 Jul 26 03:52 'My Documents' -> /mnt/c/Users/HP/Documents
-rwxrwxrwx 1 ayema ayema 13631488 Sep 22 06:14 NTUSER.DAT
-rwxrwxrwx 1 ayema ayema 65536 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94ea1].TM.blf
-rwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94ea1].TMContainer000000000000000001.regtrans-ms
lrwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94ea1].TMContainer000000000000000002.regtrans-ms
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 NetHood -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Network Shortcuts
drwxrwxrwx 1 ayema ayema 4096 Sep 18 23:46 Personalization
drwxrwxrwx 1 ayema ayema 4096 Sep 18 21:00 PrintHood
lrwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 PrintHood -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Printer Shortcuts
drwxrwxrwx 1 ayema ayema 56 Jul 26 03:52 Recent -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Recent
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Saved Games
drwxrwxrwx 1 ayema ayema 4096 Jul 25 16:42 Searches
lrwxrwxrwx 1 ayema ayema 56 Jul 26 03:52 SendTo -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/SendTo
drwxrwxrwx 1 ayema ayema 68 Jul 26 03:52 Start Menu -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Start Menu
drwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Templates -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Templates
-rwxrwxrwx 1 ayema ayema 4096 Aug 29 13:50 Windows
-rwxrwxrwx 1 ayema ayema 3825664 Jul 26 03:52 ntuser.dat.LOG1
-rwxrwxrwx 1 ayema ayema 3442688 Jul 26 03:52 ntuser.dat.LOG2
-rwxrwxrwx 1 ayema ayema 20 Jul 26 03:52 ntuser.ini
drwxrwxrwx 1 ayema ayema 4096 Sep 18 21:09 Windows-logs
ayema@DESKTOP-1VHC56: /mnt/c/Users/HP$

```

- **ls -la** # Include hidden files

```

ayema@DESKTOP-1VHC56: ~
drwxrwxrwx 1 ayema ayema 4096 Sep 18 21:09 .vscode-logs
ayema@DESKTOP-1VHC56: /mnt/c/Users/HP$ ls -la
total 21500
drwxrwxrwx 1 ayema ayema 4096 Sep 19 14:44 .
drwxrwxrwx 1 ayema ayema 4096 Jul 26 04:00 ..
-rwxrwxrwx 1 ayema ayema 126 Sep 18 23:07 .gitconfig
drwxrwxrwx 1 ayema ayema 4096 Sep 15 14:06 .vscode
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 AppData
lrwxrwxrwx 1 ayema ayema 31 Jul 26 03:52 'Application Data' -> /mnt/c/Users/HP/AppData/Roaming
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 .config
lrwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Cookies -> /mnt/c/Users/HP/AppData/Local/Microsoft/Windows/NetCookies
drwxrwxrwx 1 ayema ayema 4096 Sep 18 23:07 Desktop
drwxrwxrwx 1 ayema ayema 4096 Sep 23 18:49 Documents
drwxrwxrwx 1 ayema ayema 4096 Sep 21 19:37 Downloads
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Favorites
drwxrwxrwx 1 ayema ayema 4096 Sep 22 06:17 LocalizedResources
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Links
lrwxrwxrwx 1 ayema ayema 29 Jul 26 03:52 'Local Settings' -> /mnt/c/Users/HP/AppData/Local
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Music
lrwxrwxrwx 1 ayema ayema 25 Jul 26 03:52 'My Documents' -> /mnt/c/Users/HP/Documents
-rwxrwxrwx 1 ayema ayema 13631488 Sep 22 06:14 NTUSER.DAT
-rwxrwxrwx 1 ayema ayema 65536 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94ea1].TM.blf
-rwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94ea1].TMContainer000000000000000001.regtrans-ms
lrwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94ea1].TMContainer000000000000000002.regtrans-ms
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 NetHood -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Network Shortcuts
drwxrwxrwx 1 ayema ayema 4096 Sep 18 23:46 Personalization
drwxrwxrwx 1 ayema ayema 4096 Sep 18 21:00 PrintHood
lrwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 PrintHood -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Printer Shortcuts
drwxrwxrwx 1 ayema ayema 56 Jul 26 03:52 Recent -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Recent
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Saved Games
drwxrwxrwx 1 ayema ayema 4096 Jul 25 16:42 Searches
lrwxrwxrwx 1 ayema ayema 56 Jul 26 03:52 SendTo -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/SendTo
drwxrwxrwx 1 ayema ayema 68 Jul 26 03:52 Start Menu -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Start Menu
drwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Templates -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Templates
-rwxrwxrwx 1 ayema ayema 4096 Aug 29 13:50 Windows
-rwxrwxrwx 1 ayema ayema 3825664 Jul 26 03:52 ntuser.dat.LOG1
-rwxrwxrwx 1 ayema ayema 3442688 Jul 26 03:52 ntuser.dat.LOG2
-rwxrwxrwx 1 ayema ayema 20 Jul 26 03:52 ntuser.ini
drwxrwxrwx 1 ayema ayema 4096 Sep 18 21:09 Windows-logs
ayema@DESKTOP-1VHC56: /mnt/c/Users/HP$

```

- `ls -lh` # Human readable sizes

```
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ ls -lh
total 21M
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 .
drwxrwxrwx 1 ayema ayema 3825664 Jul 26 03:52 ntuser.dat.LOG1
drwxrwxrwx 1 ayema ayema 3442688 Jul 26 03:52 ntuser.dat.LOG2
drwxrwxrwx 1 ayema ayema 28 Jul 26 03:52 ntuser.ini
drwxrwxrwx 1 ayema ayema 4896 Sep 18 21:09 ntuser.dat.LOG3
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ ls -lh
total 21M
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 .
drwxrwxrwx 1 ayema ayema 31 Jul 26 03:52 'Application Data' -> /mnt/c/Users/HP/Windows/WinSxS
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 .
drwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Cookies -> /mnt/c/Users/HP/Windows/WinSxS/ContentIndex/ContentIndex
drwxrwxrwx 1 ayema ayema 4.0K Sep 18 23:07 .
drwxrwxrwx 1 ayema ayema 4.0K Sep 23 18:49 .
drwxrwxrwx 1 ayema ayema 4.0K Sep 21 19:37 .
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 .
drwxrwxrwx 1 ayema ayema 4.0K Sep 22 06:17 .
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 .
drwxrwxrwx 1 ayema ayema 29 Jul 26 03:52 'Local Settings' -> /mnt/c/Users/HP/Windows/WinSxS
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 .
drwxrwxrwx 1 ayema ayema 25 Jul 26 03:52 'My Documents' -> /mnt/c/Users/HP/Windows/WinSxS
-rwxrwxrwx 1 ayema ayema 13M Sep 22 06:14 NTUSER.DAT
-rwxrwxrwx 1 ayema ayema 64K Jul 26 03:52 NTUSER.DAT{2ad838bc-efea-11ee-a54d-000d3a94eaa1}.TM.blf
-rwxrwxrwx 1 ayema ayema 512K Jul 26 03:52 NTUSER.DAT{2ad838bc-efea-11ee-a54d-000d3a94eaa1}.TM.Container000000000000000001.regtrans-ms
-rwxrwxrwx 1 ayema ayema 512K Jul 26 03:52 NTUSER.DAT{2ad838bc-efea-11ee-a54d-000d3a94eaa1}.TM.Container000000000000000002.regtrans-ms
drwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 NetHood -> /mnt/c/Users/HP/Windows/WinSxS/ContentIndex/ContentIndex
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:54 .
drwxrwxrwx 1 ayema ayema 4.0K Sep 18 23:46 .
drwxrwxrwx 1 ayema ayema 4.0K Sep 18 21:00 .
drwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 PrintHood -> /mnt/c/Users/HP/Windows/WinSxS/ContentIndex/ContentIndex
drwxrwxrwx 1 ayema ayema 56 Jul 26 03:52 Recent -> /mnt/c/Users/HP/Windows/WinSxS/ContentIndex/ContentIndex
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 Recent -> /mnt/c/Users/HP/Windows/WinSxS/ContentIndex/ContentIndex
drwxrwxrwx 1 ayema ayema 4.0K Jul 25 16:42 .
drwxrwxrwx 1 ayema ayema 56 Jul 26 03:52 SendTo -> /mnt/c/Users/HP/Windows/WinSxS/ContentIndex/ContentIndex
drwxrwxrwx 1 ayema ayema 60 Jul 26 03:52 'Start Menu' -> /mnt/c/Users/HP/Windows/WinSxS/ContentIndex/ContentIndex
drwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Templates -> /mnt/c/Users/HP/Windows/WinSxS/ContentIndex/ContentIndex
-rwxrwxrwx 1 ayema ayema 4.0K Aug 29 13:50 .
-rwxrwxrwx 1 ayema ayema 3.7M Jul 26 03:52 ntuser.dat.LOG1
-rwxrwxrwx 1 ayema ayema 3.3M Jul 26 03:52 ntuser.dat.LOG2
-rwxrwxrwx 1 ayema ayema 28 Jul 26 03:52 ntuser.ini
drwxrwxrwx 1 ayema ayema 4.0K Sep 18 21:09 ntuser.dat.LOG3
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$
```

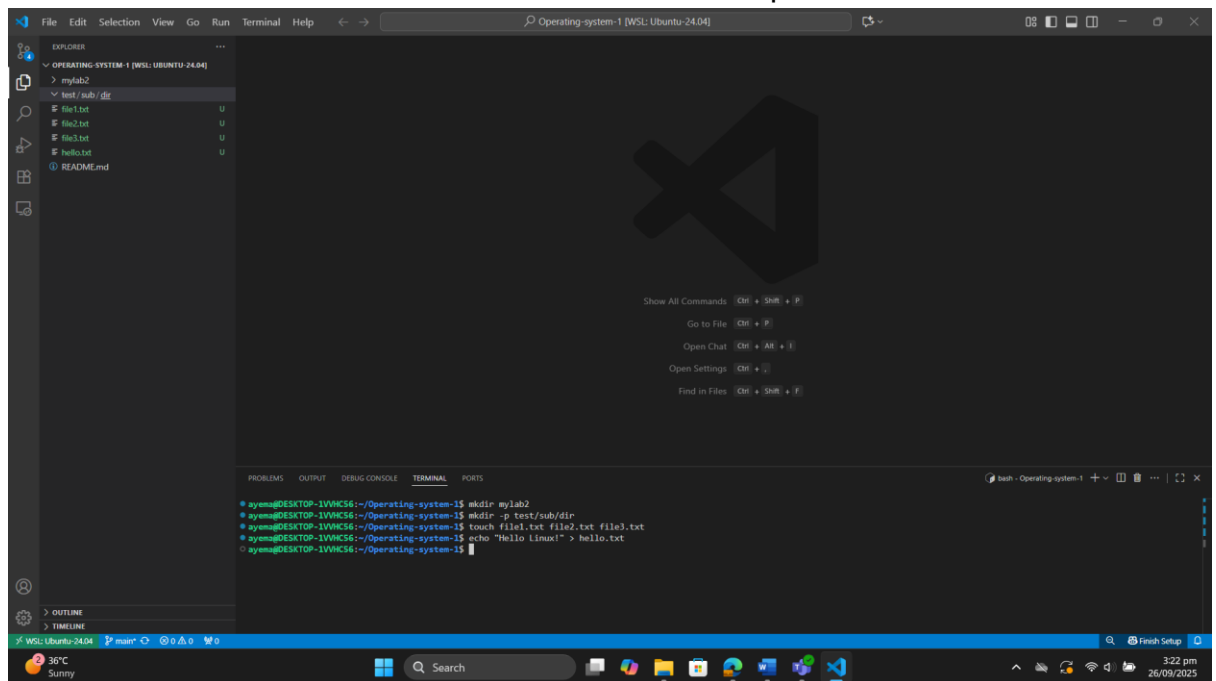
- `cd` # Change directory
- `cd ..` # Parent directory
- `cd ~` # Home directory
- `cd /` # Root directory

```
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ cd
ayema@DESKTOP-1VVHC56: ~$ cd ..
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ cd ~
ayema@DESKTOP-1VVHC56: ~$ cd /
ayema@DESKTOP-1VVHC56: /$
```

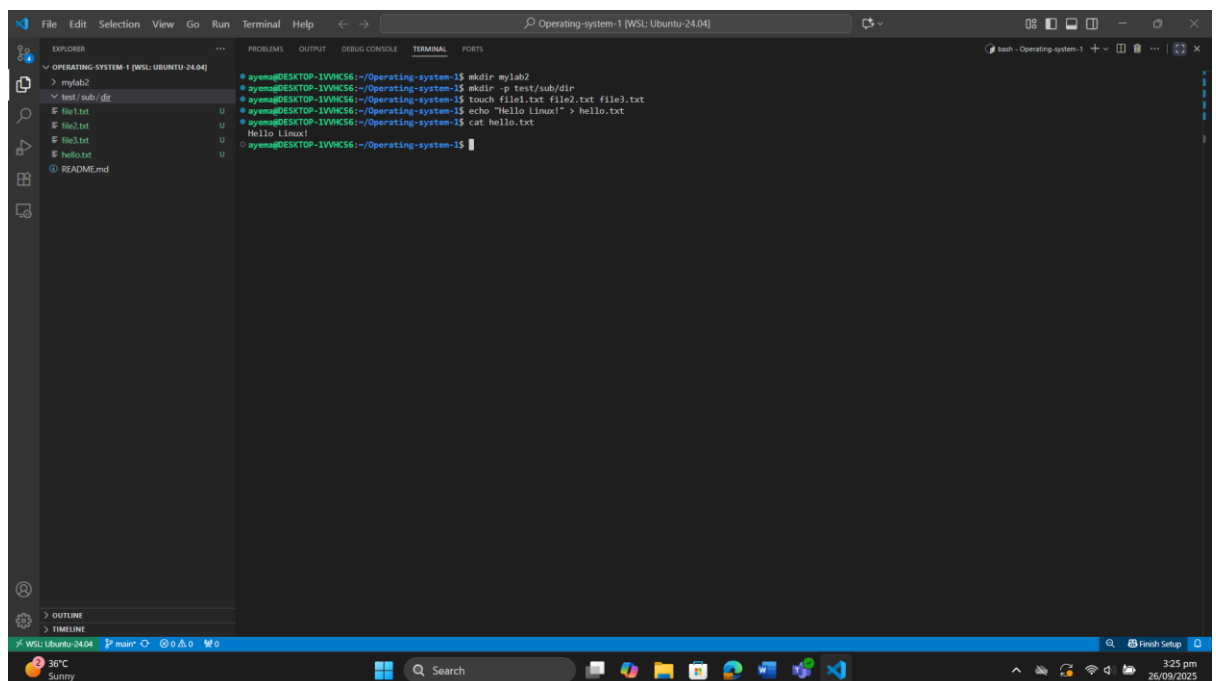
Part 3: File and Directory Operations

3.1 Creating and Managing Files/Directories

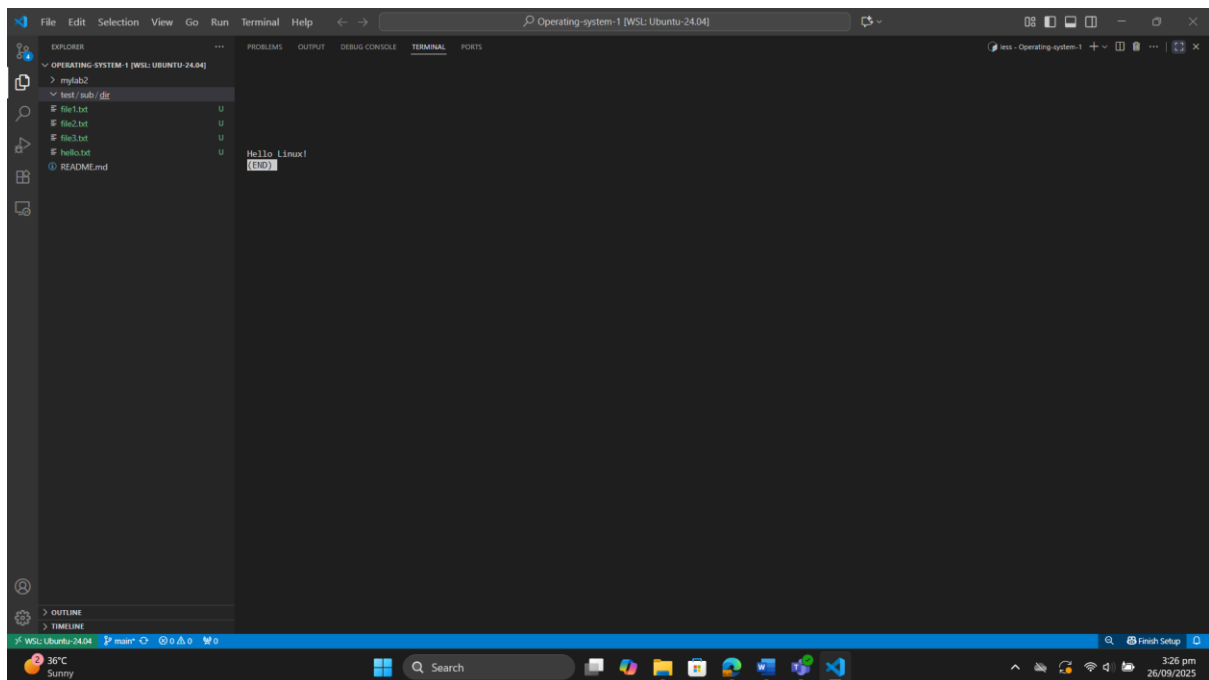
- **mkdir mylab2** # Create directory
- **mkdir -p test/sub/dir** # Create nested directories
- **touch file1.txt** # Create empty file
- **touch file2.txt file3.txt** # Multiple files
- **echo "Hello Linux!" > hello.txt** # Redirect output to file



- **cat hello.txt**

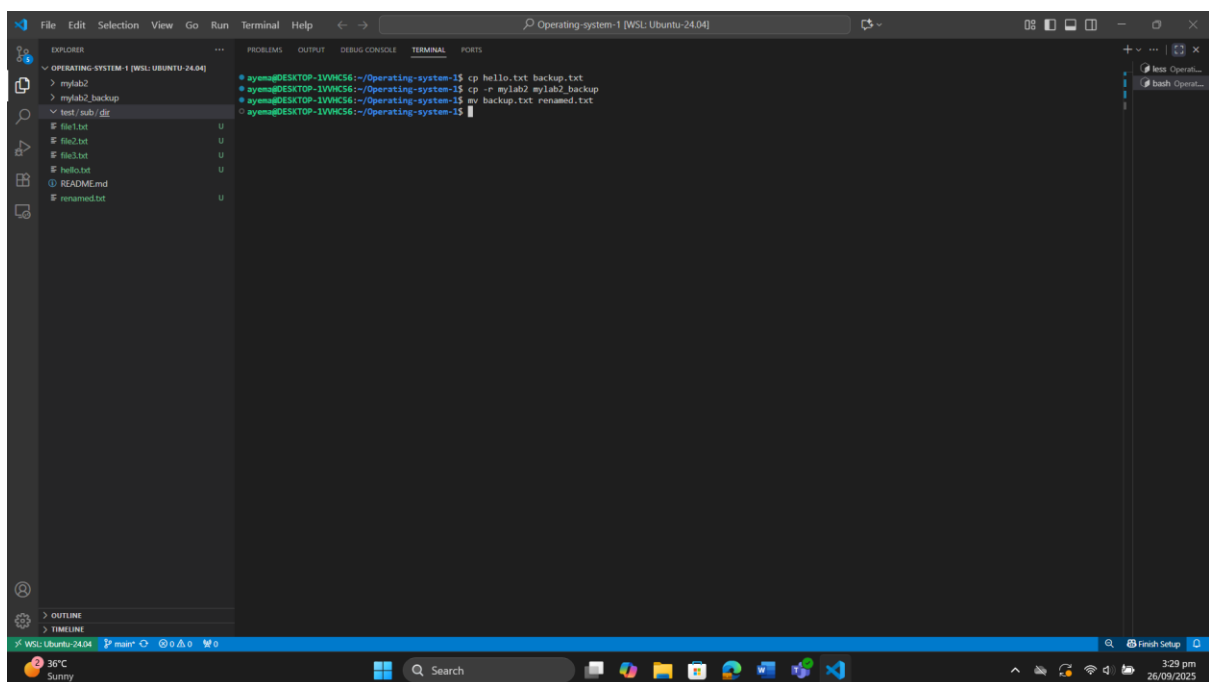


- **less hello.txt**

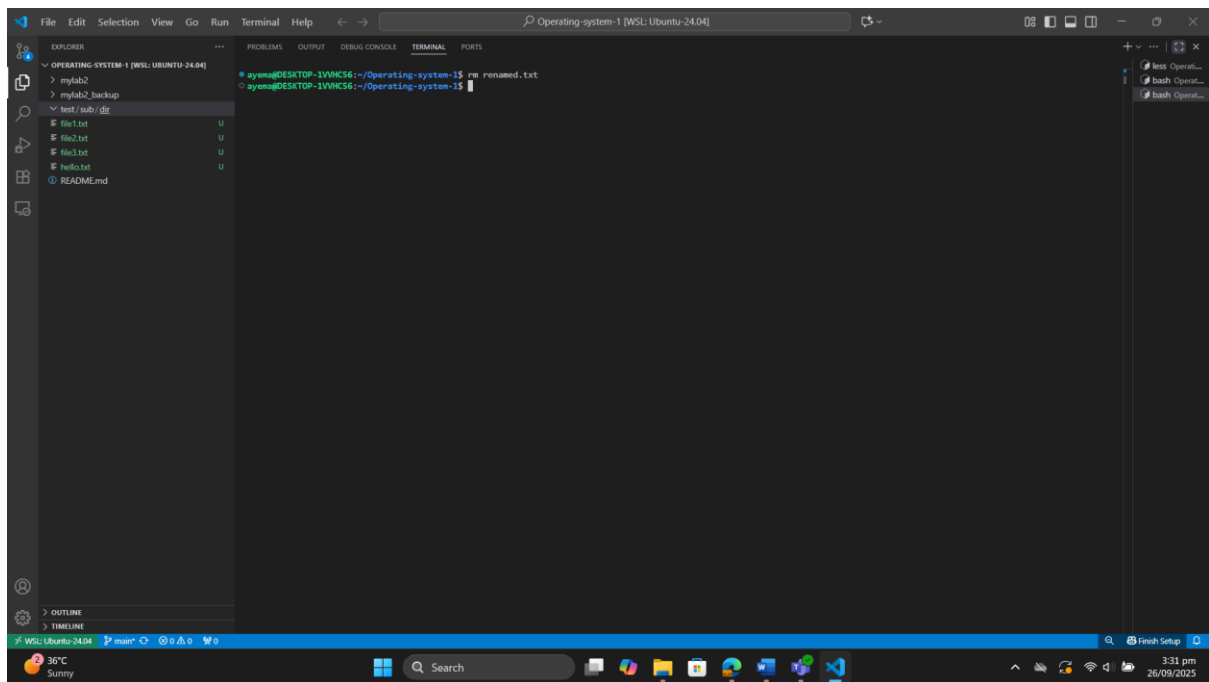


3.2 Copying, Moving, and Deleting

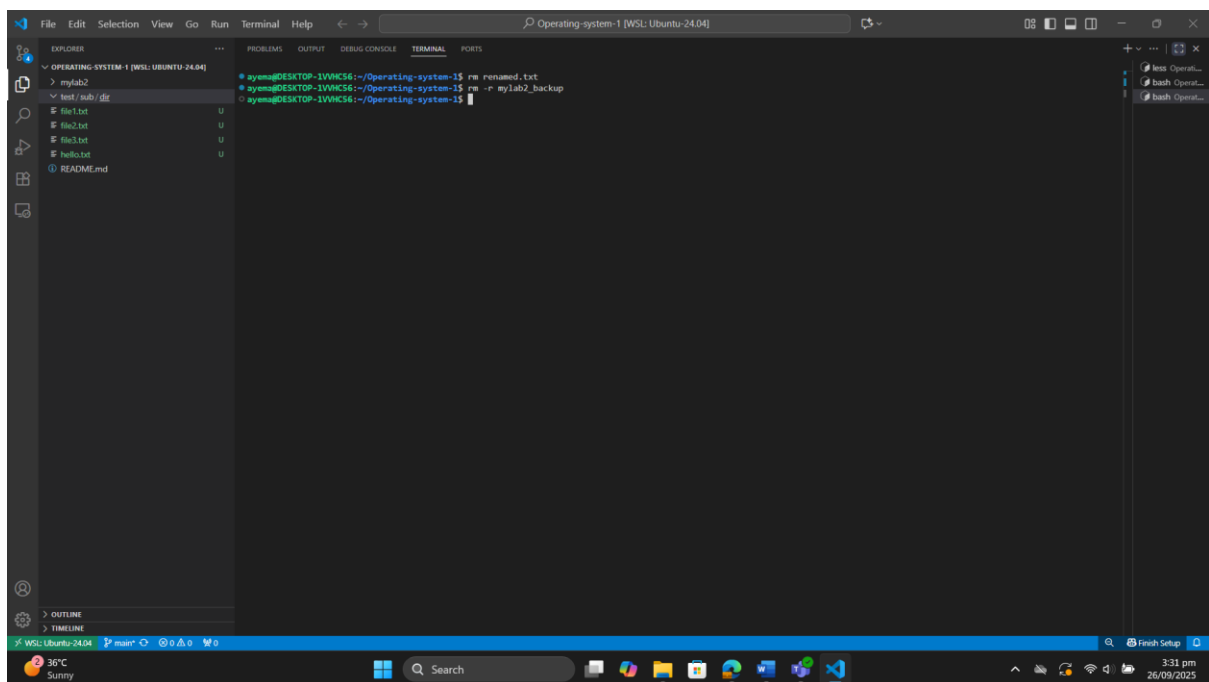
- **cp hello.txt backup.txt** # Copy file
- **cp -r mylab2 mylab2_backup** # Copy directory recursively
- **mv backup.txt renamed.txt** # Move/rename file



- **rm renamed.txt** # Remove file



- **rm -r mylab2_backup** # Remove directory



- `rmdir empty_directory` # Remove empty directory

```

ayema@DESKTOP-1VVHC56:~/Operating-system-1$ rm renamed.txt
ayema@DESKTOP-1VVHC56:~/Operating-system-1$ rm -r mylab2_backup
ayema@DESKTOP-1VVHC56:~/Operating-system-1$ rmdir empty_directory
rmdir: failed to remove 'empty_directory': No such file or directory
ayema@DESKTOP-1VVHC56:~/Operating-system-1$ rmdir empty_directory
rmdir: failed to remove 'empty_directory': No such file or directory
ayema@DESKTOP-1VVHC56:~/Operating-system-1$
ayema@DESKTOP-1VVHC56:~/Operating-system-1$
ayema@DESKTOP-1VVHC56:~/Operating-system-1$

```

Part 4 File and Directory Operations

4.1 File Permissions and Ownership

- `ls -l` # View permissions

```

ayema@DESKTOP-1VVHC56:~/Operating-system-1$ ls -l
total 12
-rw-rw-rw- 1 ayema ayema 25 Jul 26 03:52 'My Documents' -> /mnt/c/Users/ayema/My Documents
-rwxrwxrwx 1 ayema ayema 13631488 Sep 22 06:14 NTUSER.DAT
-rwxrwxrwx 1 ayema ayema 65536 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94eaa1].TM.blf
-rwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94eaa1].TM.Container00000000000000000001.regtrans-ms
-rwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94eaa1].TM.Container00000000000000000002.regtrans-ms
-rwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 NetHood -> /mnt/c/Users/ayema/AppData/Roaming/Microsoft/Windows/Recent
-rwxrwxrwx 1 ayema ayema 4896 Jul 26 03:54 Recycle Bin
-rwxrwxrwx 1 ayema ayema 4896 Sep 18 23:46 Recycle Bin
-rwxrwxrwx 1 ayema ayema 4896 Sep 18 21:00 Recycle Bin
-rwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 PrintHood -> /mnt/c/Users/ayema/AppData/Roaming/Microsoft/Windows/Printers/Printers
-rwxrwxrwx 1 ayema ayema 56 Jul 26 03:52 Recent -> /mnt/c/Users/ayema/AppData/Roaming/Microsoft/Windows/Recent
-rwxrwxrwx 1 ayema ayema 4896 Jul 26 03:52 Recycle Bin
-rwxrwxrwx 1 ayema ayema 4896 Jul 25 16:42 Recycle Bin
-rwxrwxrwx 1 ayema ayema 56 Jul 26 03:52 SendTo -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/SendTo
-rwxrwxrwx 1 ayema ayema 60 Jul 26 03:52 'Start Menu' -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Start Menu
-rwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Templates -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Templates
-rwxrwxrwx 1 ayema ayema 4896 Aug 29 13:50 Recycle Bin
-rwxrwxrwx 1 ayema ayema 0 Sep 26 15:16 file1.txt
-rwxrwxrwx 1 ayema ayema 67 Sep 26 15:16 hello.txt.save
-rwxrwxrwx 1 ayema ayema 4896 Sep 26 15:16 mylab2
-rwxrwxrwx 1 ayema ayema 3551232 Jul 26 03:52 ntuser.dat.LOG1
-rwxrwxrwx 1 ayema ayema 3442688 Jul 26 03:52 ntuser.dat.LOG2
-rwxrwxrwx 1 ayema ayema 20 Jul 26 03:52 ntuser.ini
-rwxrwxrwx 1 ayema ayema 4896 Sep 26 15:16 mylab2
-rwxrwxrwx 1 ayema ayema 4896 Sep 18 21:09 mylab2_backup
ayema@DESKTOP-1VVHC56:~/mnt/c/Users/HP$

```

- `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)

```

ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ mkdir mylab2
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ mkdir -p test/sub/dir
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ touch file1.txt file2.txt file3.txt
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ echo "Hello Linux!" > hello.txt
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ cp hello.txt backup.txt
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ cp -r mylab2 mylab2_backup
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ mv backup.txt renamed.txt
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ rm renamed.txt
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ rm -r mylab2_backup
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ mkdir empty_directory
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ rmdir empty_directory
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ chmod u+x hello.txt
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ chmod g-w hello.txt
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ chmod -R 755 mylab2
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ sudo chown ayema:ayema hello.txt
[sudo] password for ayema:
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ ls -l hello.txt
-rwxrwxrwx 1 ayema ayema 13 Sep 26 15:49 hello.txt
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$

```

Part 5: Text Processing and Utilities

5.1 Essential Text Commands

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

```

ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ grep "Linux" hello.txt
Hello Linux!
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ grep -i "linux" hello.txt
Hello Linux!
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ grep -n "Linux" hello.txt
1:Hello Linux!
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$

```

Part 6: Introduction to Processes

6.1 Understanding Processes

- **ps** # Show current processes
- **ps aux** # Detailed process list

```
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$ ps
PID TTY          TIME CMD
7611 pts/4        00:00:00 bash
7624 pts/4        00:00:00 ps

ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$ ps aux
USER          PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1   0.0  0.3 21788 12232 ?        Ss   14:31   0:02 /sbin/init
root           2   0.0  0.0   3872  1920 ?        Sl   14:31   0:00 /init
root           7   0.0  0.0   3120  2044 ?        SL   14:31   0:00 plan9 --control-socket 7 --log-level 4 --server-fd 8 --pipe-fd 10 --log-truncate
root          43   0.0  0.4 66752 18720 ?        S<s  14:31   0:01 /usr/lib/systemd/systemd-journald
root          90   0.0  0.1 25404  6656 ?        Ss   14:31   0:01 /usr/lib/systemd/systemd-udev
systemd+     145   0.0  0.3 21456 12672 ?        Ss   14:31   0:00 /usr/lib/systemd/systemd-resolved
systemd+     149   0.0  0.1 91924  7680 ?        Ssl  14:31   0:00 /usr/lib/systemd/systemd-timesyncd
root         155   0.0  0.0   4236  2560 ?        Ss   14:31   0:00 /usr/sbin/cron -f -p
message+     156   0.0  0.1  9596  5120 ?        Ss   14:31   0:00 @dbus-daemon --system --address=systemd: --nofork --nopidfile --systemd-activation --sysl
root         163   0.0  0.2 17964  8192 ?        Ss   14:31   0:00 /usr/lib/systemd/systemd-logind
root         165   0.0  0.3 1756096 12544 ?       Ssl  14:31   0:00 /usr/libexec/wnsl-pro-service -vv
root         168   0.0  0.0   3160  2048 hvcb ?        Ss+  14:31   0:00 /sbin/agetty -o -p -- \u --noclear --keep-baud - 115200,38400,9600 vt220
syslog       174   0.0  0.1 222508  5888 ?        Ssl  14:31   0:00 /usr/sbin/rsyslogd -n -iNONE
root         181   0.0  0.0   3116  1920 tty1 ?        Ss+  14:31   0:00 /sbin/agetty -o -p -- \u --noclear - linux
root         193   0.0  0.5 107812 22144 ?       Ssl  14:31   0:00 /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown --wait-for-si
root         269   0.0  0.1  6824  4352 pts/1 ?        Ss   14:31   0:00 /bin/login -f
ayema        326   0.0  0.2 20104 11008 ?        Ss   14:31   0:00 /usr/lib/systemd/systemd --user
ayema        327   0.0  0.0  21152  3520 ?        S   14:31   0:00 (sd-pam)
ayema        351   0.0  0.1  6072  4864 pts/1 ?        S+   14:31   0:00 -bash
root         599   0.0  0.0  3088  1296 ?        S   14:31   0:00 /init
polkitd     1936   0.0  0.1 308164  7680 ?       Ssl  15:11   0:00 /usr/lib/polkit-1/polkitd --no-debug
root        7538   0.0  0.0  3080  1032 ?        Ss   15:47   0:00 /init
root        7539   0.0  0.0  3096  1036 ?        S   15:47   0:00 /init
ayema       7540   0.0  0.1  6072  5248 pts/0 ?       Ss+  15:47   0:00 -bash
root        7579   0.0  0.0  3080  1032 ?        Ss   15:55   0:00 /init
root        7580   0.0  0.0  3096  1036 ?        S   15:55   0:00 /init
ayema       7586   0.0  0.1  6072  5248 pts/2 ?       Ss+  15:55   0:00 -bash
root        7606   0.0  0.0  3080  1032 ?        Ss   15:58   0:00 /init
root        7607   0.0  0.0  3096  1036 ?        S   15:58   0:00 /init
ayema       7611   0.0  0.1  6072  5248 pts/4 ?       Ss   15:58   0:00 -bash
ayema       7625   0.0  0.1  8280  4224 pts/4 ?       R+   15:58   0:00 ps aux
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$
```

- **ps -ef** # Full format listing

```
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$ ps -ef
UID          PID    PPID  C STIME TTY          TIME CMD
root           1   0 0 14:31 ?        00:00:02 /sbin/init
root           2   0 0 14:31 ?        00:00:00 /init
root           7   2 0 14:31 ?        00:00:00 plan9 --control-socket 7 --log-level 4 --server-fd 8 --pipe-fd 10 --log-truncate
root          43   1 0 14:31 ?        00:00:01 /usr/lib/systemd/systemd-journald
root          90   1 0 14:31 ?        00:00:01 /usr/lib/systemd/systemd-udev
systemd+     145   1 0 14:31 ?        00:00:00 /usr/lib/systemd/systemd-resolved
systemd+     149   1 0 14:31 ?        00:00:00 /usr/lib/systemd/systemd-timesyncd
root         155   1 0 14:31 ?        00:00:00 /usr/sbin/cron -f -p
message+     156   1 0 14:31 ?        00:00:00 @dbus-daemon --system --address=systemd: --nofork --nopidfile --systemd-activation --syslog-only
root         163   1 0 14:31 ?        00:00:00 /usr/lib/systemd/systemd-logind
root         165   1 0 14:31 ?        00:00:00 /usr/libexec/wnsl-pro-service -vv
root         168   1 0 14:31 hvcb ?        00:00:00 /sbin/agetty -o -p -- \u --noclear --keep-baud - 115200,38400,9600 vt220
syslog       174   1 0 14:31 ?        00:00:00 /usr/sbin/rsyslogd -n -iNONE
root         181   1 0 14:31 tty1 ?        00:00:00 /sbin/agetty -o -p -- \u --noclear - linux
root         193   1 0 14:31 ?        00:00:00 /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown --wait-for-si
root         269   2 0 14:31 pts/1 ?        00:00:00 /bin/login -f
ayema        326   1 0 14:31 ?        00:00:00 /usr/lib/systemd/systemd --user
ayema        327   326 0 14:31 ?        00:00:00 (sd-pam)
ayema        351   269 0 14:31 pts/1 ?        00:00:00 -bash
root         599   1 0 14:31 ?        00:00:00 /init
polkitd     1936   1 0 15:11 ?        00:00:00 /usr/lib/polkit-1/polkitd --no-debug
root        7538   2 0 15:47 ?        00:00:00 /init
root        7539  7538 0 15:47 ?        00:00:00 /init
ayema       7540  7539 0 15:47 pts/0 ?       00:00:00 -bash
root        7579   2 0 15:55 ?        00:00:00 /init
root        7580  7579 0 15:55 ?        00:00:00 /init
ayema       7586  7580 0 15:55 pts/2 ?       00:00:00 -bash
root        7606   2 0 15:58 ?        00:00:00 /init
root        7607  7606 0 15:58 ?        00:00:00 /init
ayema       7611  7607 0 15:58 pts/4 ?       00:00:00 -bash
ayema       7626  7611 0 15:59 pts/4 ?       00:00:00 ps -ef
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$
```

- **ps tree** # Process tree

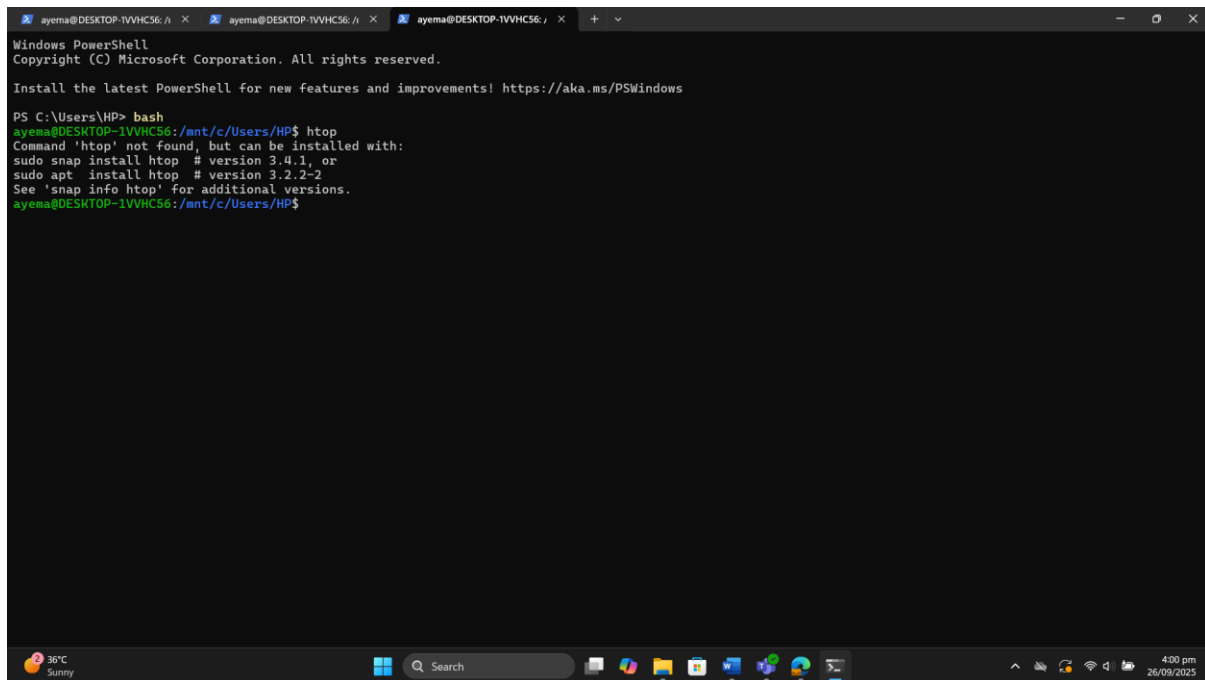
```
ayema@DESKTOP-1VVHC56: /h x ayema@DESKTOP-1VVHC56: /h x ayema@DESKTOP-1VVHC56: /h x + v
syslog      174      1  0 14:31 ?      00:00:00 /usr/sbin/rsyslogd -n -iNONE
root        181      1  0 14:31 tty1      00:00:00 /sbin/agetty -o -p -- \u --noclear - linux
root        193      1  0 14:31 ?      00:00:00 /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown --wait-for-signal
root        269      2  0 14:31 pts/1    00:00:00 /bin/login -f
ayema       326      1  0 14:31 ?      00:00:00 /usr/lib/systemd/systemd --user
ayema       327      326  0 14:31 ?      00:00:00 (sd-pam)
ayema       351      269  0 14:31 pts/1    00:00:00 -bash
root        599      1  0 14:31 ?      00:00:00 /init
polkitd     1936      1  0 15:11 ?      00:00:00 /usr/lib/polkit-1/polkitd --no-debug
root        7538      2  0 15:47 ?      00:00:00 /init
root        7539      7538  0 15:47 ?      00:00:00 /init
ayema       7540      7539  0 15:47 pts/0    00:00:00 -bash
root        7579      2  0 15:55 ?      00:00:00 /init
root        7580      7579  0 15:55 ?      00:00:00 /init
ayema       7586      7580  0 15:55 pts/2    00:00:00 -bash
root        7606      2  0 15:58 ?      00:00:00 /init
root        7607      7606  0 15:58 ?      00:00:00 /init
ayema       7611      7607  0 15:58 pts/4    00:00:00 -bash
ayema       7626      7611  0 15:59 pts/4    00:00:00 ps -ef
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ ptree
systemd
├──Relay(600)
├──2*[agetty]
├──cron
├──dbus-daemon
├──init-systemd(Ub)
│   ├──SessionLeader─Relay(7540)─bash
│   ├──SessionLeader─Relay(7586)─bash
│   ├──SessionLeader─Relay(7611)─bash─ptree
│   ├──init─[init]
│   ├──login─bash
│   └──[init-systemd(Ub)]
├──polkitd─3*[polkitd]
├──rsyslogd─3*[rsyslogd]
├──systemd─(sd-pam)
├──systemd-journal
├──systemd-logind
├──systemd-resolve
├──systemd-timesyn─[systemd-timesyn]
├──systemd-udev
├──unattended-upgr─[unattended-upgr]
└──wsl-pro-service─7*[wsl-pro-service]
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$
```

- top # Real-time process viewer

```
ayema@DESKTOP-1VVHC56: /h x ayema@DESKTOP-1VVHC56: /h x ayema@DESKTOP-1VVHC56: /h x + v
└─wsl-pro-service─7*[wsl-pro-service]
ayema@DESKTOP-1VVHC56: /mnt/c/Users/HP$ top
top - 15:59:53 up 1:29, 1 user, load average: 0.00, 0.00, 0.00
Tasks: 31 total, 1 running, 30 sleeping, 0 stopped, 0 zombie
%Cpu(s):  0.0 us,  0.0 sy,  0.0 ni,100.0 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem : 3758.2 total, 3221.5 free,  428.3 used, 189.6 buff/cache
MiB Swap: 1024.0 total, 1024.0 free,  0.0 used, 3329.9 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM    TIME+  COMMAND
    1 root        20   0   21788   12232   9288 S   0.0   0.3   0:02.24 systemd
    2 root        20   0   30772   1920    1792 S   0.0   0.0   0:00.68 init-systemd(Ub)
    7 root        20   0   3120    2044    1792 S   0.0   0.1   0:00.10 init
   43 root       19  -1  66752  18720  17824 S   0.0   0.5   0:01.25 systemd-journal
   90 root        20   0   25404   6656   4992 S   0.0   0.2   0:01.68 systemd-udev
  145 systemd+   20   0   21456  12672  10496 S   0.0   0.3   0:00.13 systemd-resolve
  149 systemd+   20   0   91024   7680   6784 S   0.0   0.2   0:00.35 systemd-timesyn
  155 root        20   0    4236    2560   2432 S   0.0   0.1   0:00.02 cron
  156 message+    20   0    9596    5120   4608 S   0.0   0.1   0:00.36 dbus-daemon
  163 root        20   0   17964    8192   7296 S   0.0   0.2   0:00.27 systemd-logind
  165 root        20   0  1756096  12544  10368 S   0.0   0.3   0:00.25 wsl-pro-service
  168 root        20   0    3160    2048   1920 S   0.0   0.1   0:00.00 atetty
  174 syslog      20   0  222508   5888   4608 S   0.0   0.2   0:00.65 rsyslogd
  181 root        20   0    3116    1920    1792 S   0.0   0.0   0:00.00 atetty
  193 root        20   0  107012  22144  13056 S   0.0   0.6   0:00.09 unattended-upgr
  269 root        20   0    6824   4352   3712 S   0.0   0.1   0:00.00 login
  326 ayema       20   0   20104  11008   9216 S   0.0   0.3   0:00.26 systemd
  327 ayema       20   0   21152   3520   1792 S   0.0   0.1   0:00.00 (sd-pam)
  351 ayema       20   0    6072   4864   3456 S   0.0   0.1   0:00.01 bash
  599 root        20   0    3080    1296   1152 S   0.0   0.0   0:00.03 Relay(600)
 1936 polkitd     20   0  308164   7680   6912 S   0.0   0.2   0:00.12 polkitd
  7538 root        20   0    3080    1032    896 S   0.0   0.0   0:00.00 SessionLeader
  7539 root        20   0    3096    1036    896 S   0.0   0.0   0:00.01 Relay(7540)
  7540 ayema       20   0    6072   5248   3584 S   0.0   0.1   0:00.03 bash
  7579 root        20   0    3080    1032    896 S   0.0   0.0   0:00.00 SessionLeader
  7580 root        20   0    3096    1036    896 S   0.0   0.0   0:00.00 Relay(7586)
  7586 ayema       20   0    6072   5248   3584 S   0.0   0.1   0:00.02 bash
  7606 root        20   0    3080    1032    896 S   0.0   0.0   0:00.00 SessionLeader
  7607 root        20   0    3096    1036    896 S   0.0   0.0   0:00.00 Relay(7611)
  7611 ayema       20   0    6072   5248   3584 S   0.0   0.1   0:00.02 bash
  7628 ayema       20   0    9292    5632   3456 R   0.0   0.1   0:00.01 top
```


- **htop** # Enhanced process viewer (if available)



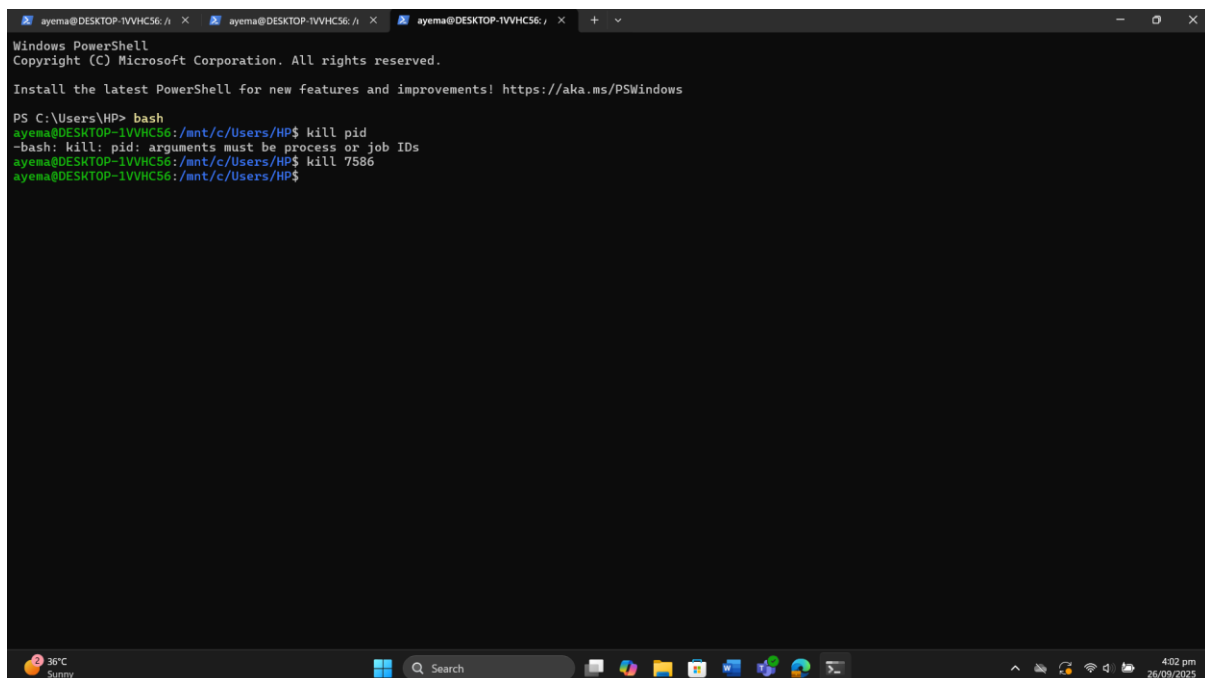
A terminal window titled 'ayema@DESKTOP-1VVHC56: /i' showing the installation of htop. The user runs 'htop' and receives a message that the command is not found but can be installed via snap or apt. The user then runs 'sudo snap install htop' and 'sudo apt install htop'.

```
ayema@DESKTOP-1VVHC56: /i
ayema@DESKTOP-1VVHC56: /i
ayema@DESKTOP-1VVHC56: /i
+
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\HP> bash
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$ htop
Command 'htop' not found, but can be installed with:
sudo snap install htop # version 3.4.1, or
sudo apt install htop # version 3.2.2-2
See 'snap info htop' for additional versions.
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$
```

- **kill PID** # Terminate process by PID
- **killall process_name** # Kill processes by name



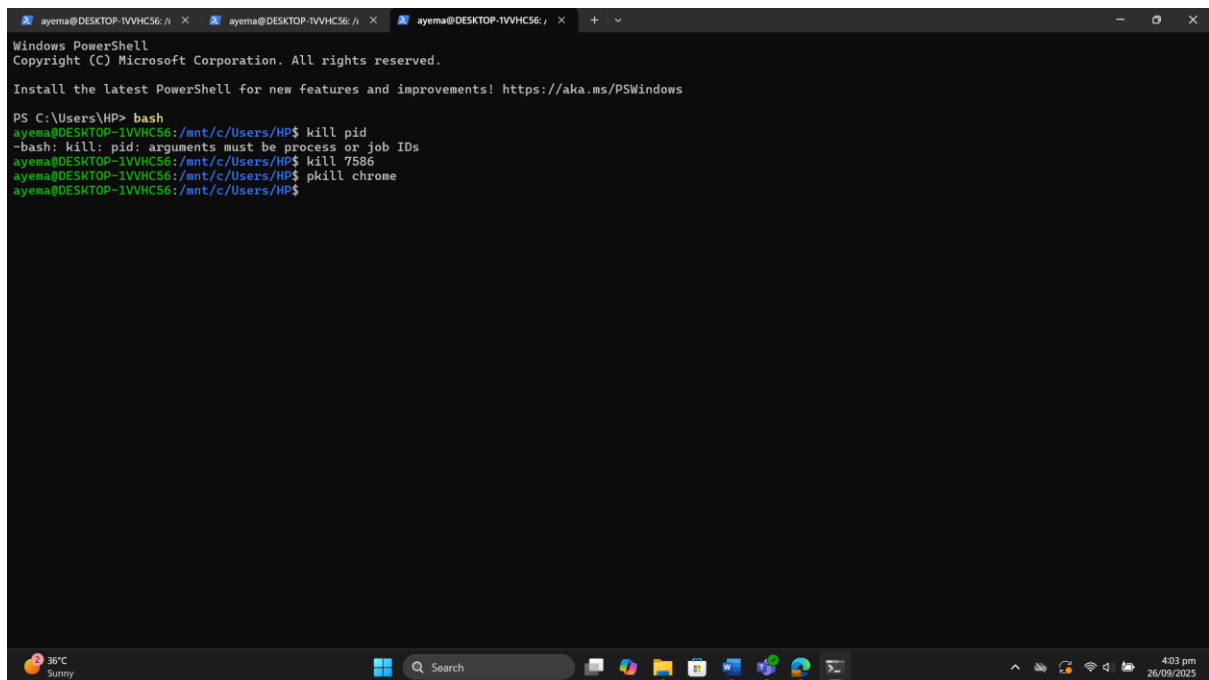
A terminal window titled 'ayema@DESKTOP-1VVHC56: /i' showing the use of the 'kill' command. The user runs 'kill pid' and receives an error message. The user then runs 'kill 7586'.

```
ayema@DESKTOP-1VVHC56: /i
ayema@DESKTOP-1VVHC56: /i
ayema@DESKTOP-1VVHC56: /i
+
Windows PowerShell
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PS C:\Users\HP> bash
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$ kill pid
-bash: kill: pid: arguments must be process or job IDs
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$ kill 7586
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$
```

- **pkill pattern # Kill processes matching patter**



```
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PS C:\Users\HP> bash
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$ kill pid
-bash: kill: pid: arguments must be process or job IDs
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$ kill 7586
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$ pkill chrome
ayema@DESKTOP-1VVHC56:/mnt/c/Users/HP$
```

REMARKS:

I learned how to create, copy, move, and delete files and folders. I also learned to check and change file permissions and ownership, search for text in files, and view and manage running processes safely.