



# National Textile University

## Department of Computer Science

**Subject:**

Operating System

**Submitted to:**

Sir Naseer

**Submitted by:**

Ayema

**Reg number:**

23-NTU-CS-1142

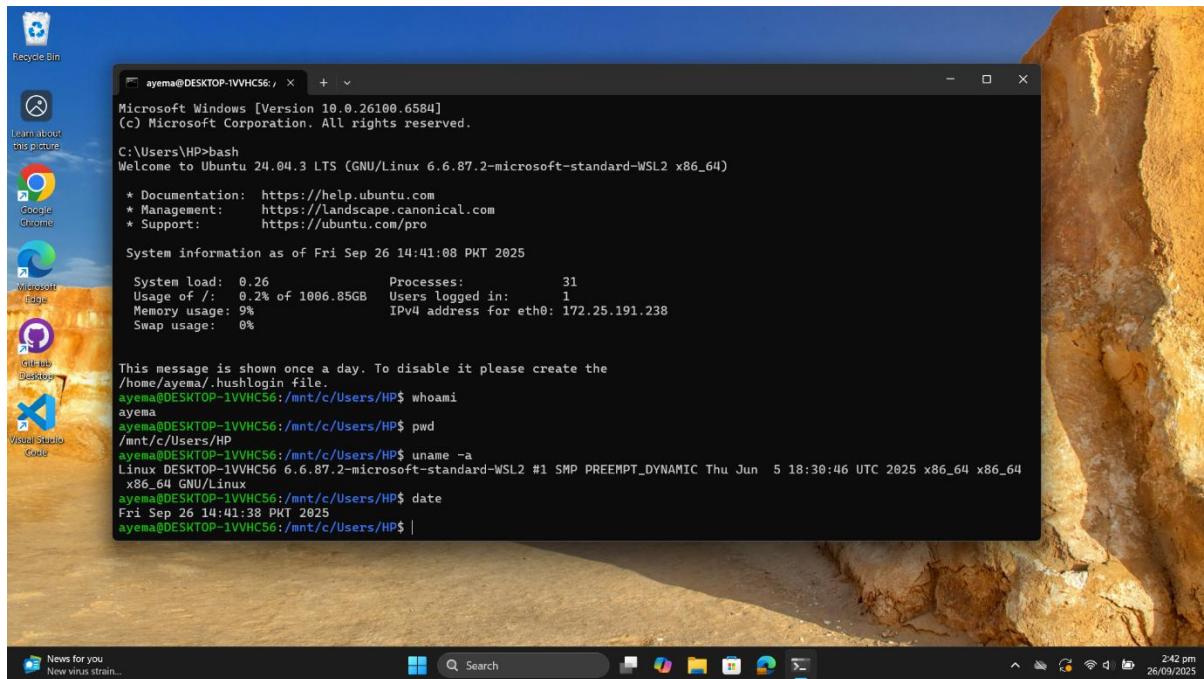
**Lab no. :**

02 Labwork

**Semester:** 5Th

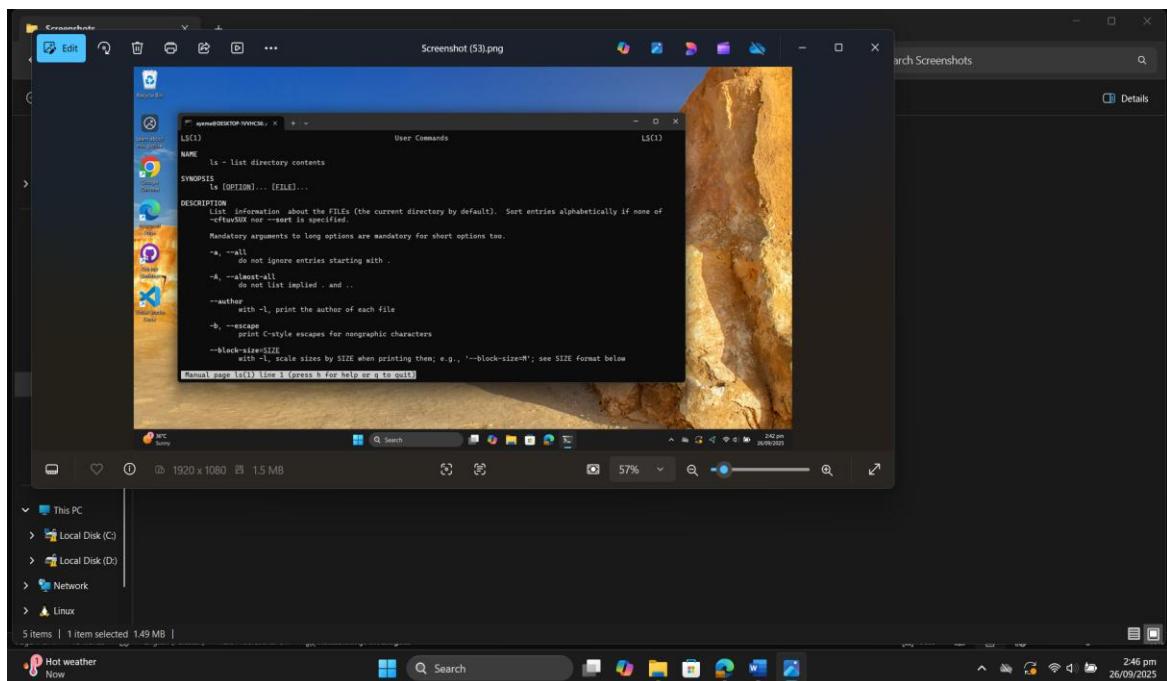
# Part 1: LINUX Environment Orientation

## 1.1 Understanding the Linux environment



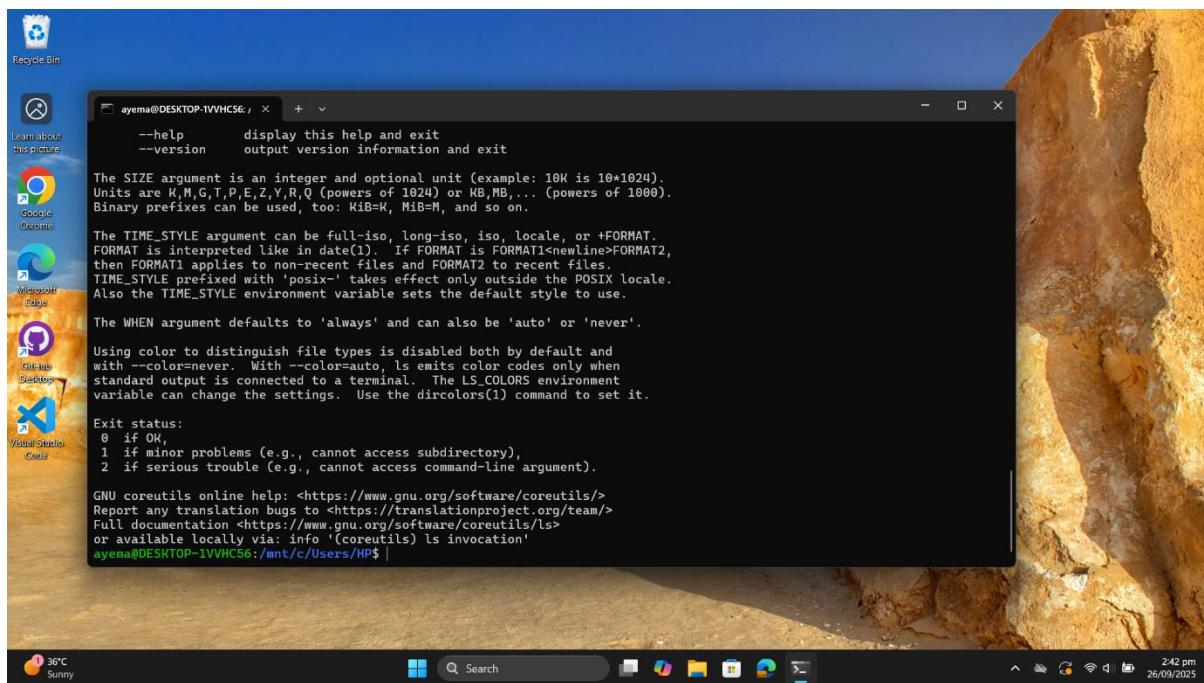
## 1.2 Getting help in Linux

### 1. Man Is #Manual pages



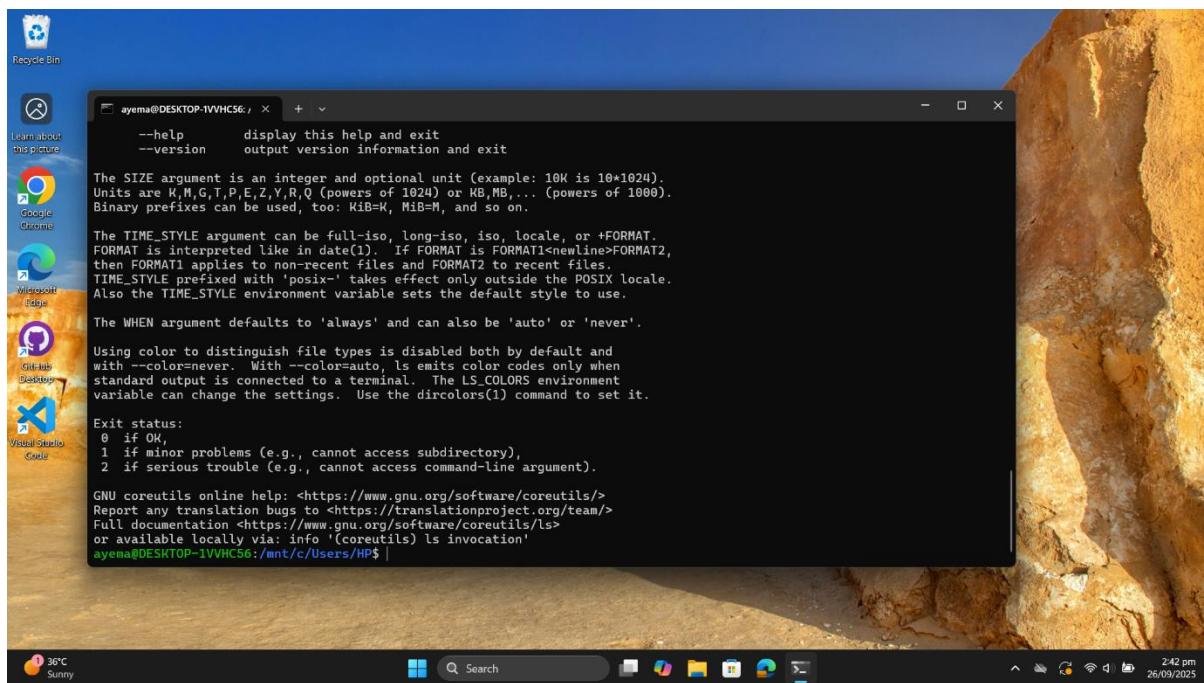
## 2. Ls—help

#Build-in help

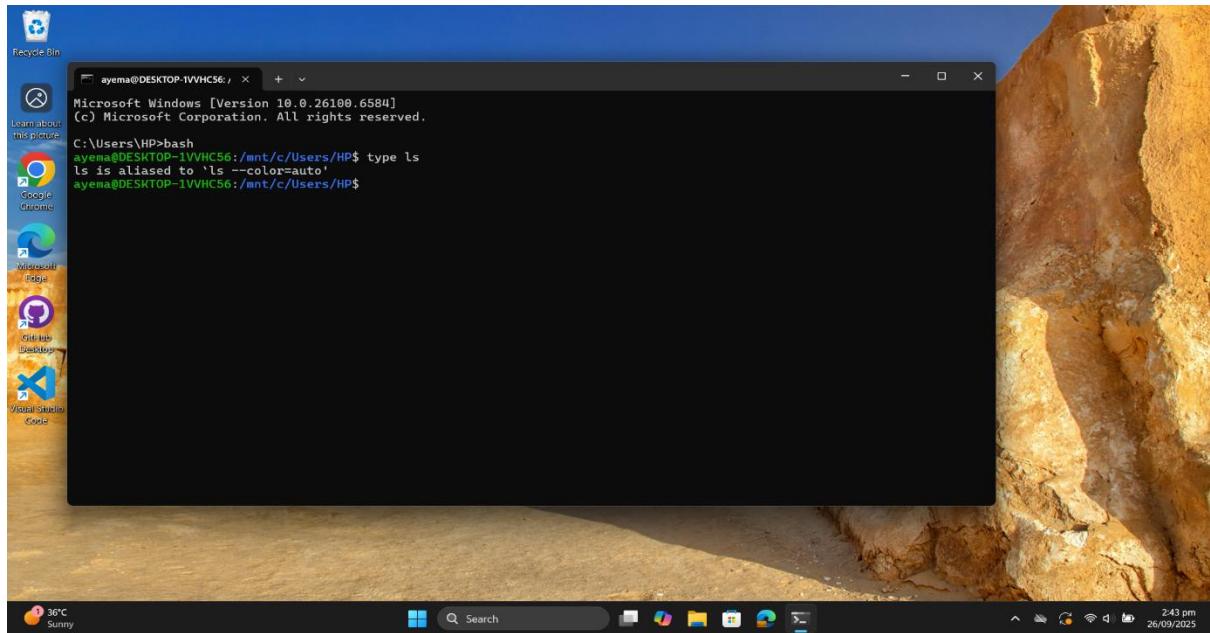


## 3. Which is

#location of command



## 4. Type ls #Command type information

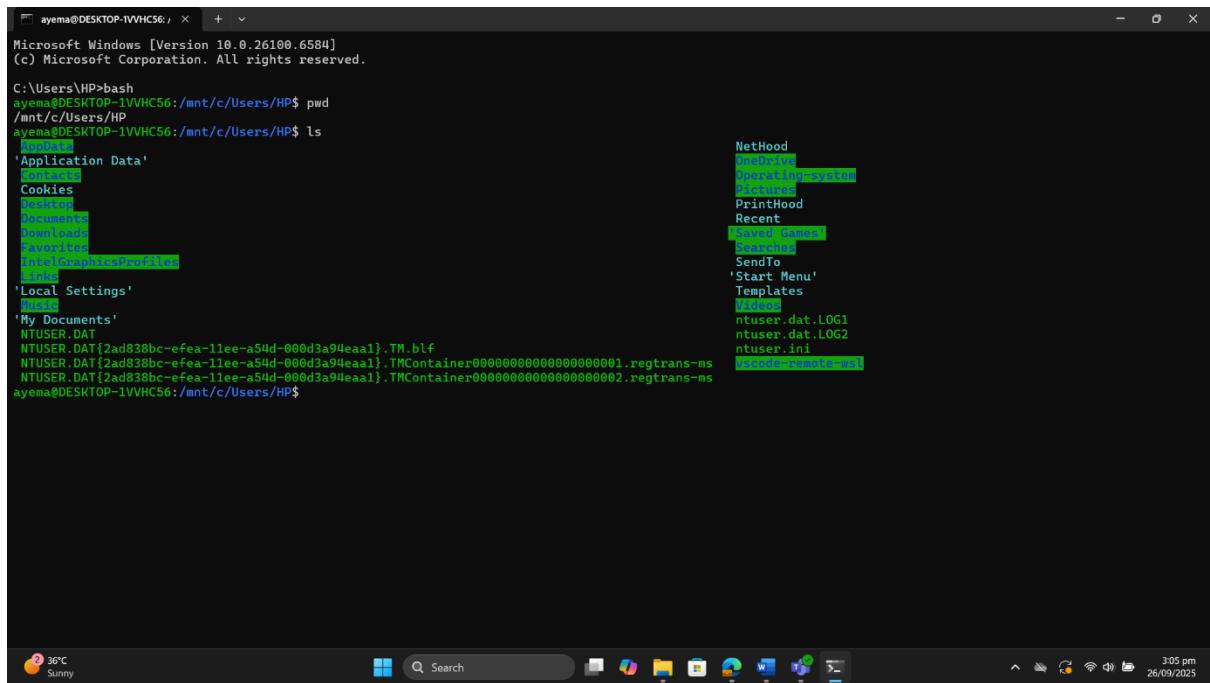


## Part 2: File System Navigation

### 2.1 Understanding Linux Directory Structure

The command is used below are:

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



- **ls -l** # Long format

```
ayema@DESKTOP-1VHCS6: ~ + 
'My Documents'
NTUSER.DAT
NTUSER.DAT[2ad838bc-efea-l1ee-a54d-000d3a94eaal].TM.blf
NTUSER.DAT[2ad838bc-efea-l1ee-a54d-000d3a94eaal].TMContainer00000000000000000000000000000001.regtrans-ms
NTUSER.DAT[2ad838bc-efea-l1ee-a54d-000d3a94eaal].TMContainer00000000000000000000000000000002.regtrans-ms
ayema@DESKTOP-1VHCS6: /mnt/c/Users/HP$ ls -l
total 21508
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 AppData
lwxrwxrwx 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 Contacts
lwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Cookies -> /mnt/c/Users/HP/AppData/Local/Microsoft/Windows/INetCookies
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 IntelGraphicsProfiles
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Links
lwxrwxrwx 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
drwxrwxrwx 1 ayema ayema 4096 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-l1ee-a54d-000d3a94eaal].TM.blf
-rwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-l1ee-a54d-000d3a94eaal].TMContainer00000000000000000000000000000001.regtrans-ms
-rwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-l1ee-a54d-000d3a94eaal].TMContainer00000000000000000000000000000002.regtrans-ms
lwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 NetHood -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Network Shortcuts
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 OneDrive
drwxrwxrwx 1 ayema ayema 4096 Sep 18 23:46 Operating-system
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Pictures
drwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 PrintHood -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Printer Shortcuts
lwxrwxrwx 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 26 03:52 Searches
drwxrwxrwx 1 ayema ayema 4096 Sep 18 21:00 SendTo -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/SendTo
lwxrwxrwx 1 ayema ayema 60 Jul 26 03:52 'Start Menu' -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Start Menu
lwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Templates -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Templates
drwxrwxrwx 1 ayema ayema 4096 Aug 29 13:58 Videos
-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 vscode-remote-wsl
ayema@DESKTOP-1VHCS6: /mnt/c/Users/HP$
```

36°C Sunny 26/09/2025 3:06 pm

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

```
ayema@DESKTOP-1VHCS6: ~ + 
'drwxrwxrwx 1 ayema ayema 4096 Sep 18 21:09 vscode-remote-wsl'
ayema@DESKTOP-1VHCS6: /mnt/c/Users/HP$ ls -la
total 21508
drwxrwxrwx 1 ayema ayema 4096 Sep 19 14:44 .
dr-xr-xr-x 1 ayema ayema 4096 Jul 26 04:08 ..
-rwxrwxrwx 1 ayema ayema 126 Sep 18 23:07 .gitconfig
drwxrwxrwx 1 ayema ayema 4096 Sep 15 14:06 .gitcode
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 AppData
lwxrwxrwx 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 Contacts
lwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Cookies -> /mnt/c/Users/HP/AppData/Local/Microsoft/Windows/INetCookies
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 IntelGraphicsProfiles
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Links
lwxrwxrwx 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
drwxrwxrwx 1 ayema ayema 4096 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-l1ee-a54d-000d3a94eaal].TM.blf
-rwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-l1ee-a54d-000d3a94eaal].TMContainer00000000000000000000000000000001.regtrans-ms
-rwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-l1ee-a54d-000d3a94eaal].TMContainer00000000000000000000000000000002.regtrans-ms
lwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 NetHood -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Network Shortcuts
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 OneDrive
drwxrwxrwx 1 ayema ayema 4096 Sep 18 23:46 Operating-system
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:52 Pictures
drwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 PrintHood -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Printer Shortcuts
lwxrwxrwx 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 26 03:52 Searches
drwxrwxrwx 1 ayema ayema 4096 Sep 18 21:00 SendTo -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/SendTo
lwxrwxrwx 1 ayema ayema 60 Jul 26 03:52 'Start Menu' -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Start Menu
lwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Templates -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Templates
drwxrwxrwx 1 ayema ayema 4096 Aug 29 13:58 Videos
-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 vscode-remote-wsl
ayema@DESKTOP-1VHCS6: /mnt/c/Users/HP$
```

36°C Sunny 26/09/2025 3:10 pm

- **ls -lh**

# Human readable sizes

```

ayema@DESKTOP-IVVHC56: ~ + 
drwxrwxrwx 1 ayema ayema 4096 Aug 29 13:50 Videos
-rw-rw-rwx 1 ayema ayema 3825664 Jul 26 03:52 ntuser.dat.LOG1
-rw-rw-rwx 1 ayema ayema 3442688 Jul 26 03:52 ntuser.dat.LOG2
-rw-rw-rwx 1 ayema ayema 20 Jul 26 03:52 ntuser.ini
drwxrwxrwx 1 ayema ayema 4096 Sep 18 21:09 vcard-remote-ms
total 21M
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 ApplicationData
lwxrwxrwx 1 ayema ayema 31 Jul 26 03:52 'Application Data' -> /mnt/c/Users/HP/AppData/Roaming
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 Cookies
lwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Cookies -> /mnt/c/Users/HP/AppData/Local/Microsoft/Windows/NetCache
drwxrwxrwx 1 ayema ayema 4.0K Sep 18 23:07 Downloads
drwxrwxrwx 1 ayema ayema 4.0K Sep 23 18:49 Documents
drwxrwxrwx 1 ayema ayema 4.0K Sep 21 19:37 Downloads
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 Favorites
drwxrwxrwx 1 ayema ayema 4.0K Sep 22 06:17 GraphicsProfiles
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 Local
lwxrwxrwx 1 ayema ayema 29 Jul 26 03:52 'Local Settings' -> /mnt/c/Users/HP/AppData/Local
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:52 Local ->
lwxrwxrwx 1 ayema ayema 25 Jul 26 03:52 'My Documents' -> /mnt/c/Users/HP/Documents
-rw-rw-rwx 1 ayema ayema 13M Sep 22 06:14 NTUSER.DAT
drwxrwxrwx 1 ayema ayema 64K Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94eaal].TM.blf
-rw-rw-rwx 1 ayema ayema 512K Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94eaal].TMContainer000000000000000000000001.retrans-ms
drwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 NetworkDrive -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Network Shortcuts
drwxrwxrwx 1 ayema ayema 4.0K Jul 26 03:54 OperatingSystem
drwxrwxrwx 1 ayema ayema 4.0K Sep 18 23:46 Pictures
drwxrwxrwx 1 ayema ayema 4.0K Sep 18 21:00 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 4.0K Jul 26 03:52 SavedGames
drwxrwxrwx 1 ayema ayema 4.0K Jul 25 16:42 Searches
lwxrwxrwx 1 ayema ayema 56 Jul 26 03:52 SendTo -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/SendTo
lwxrwxrwx 1 ayema ayema 60 Jul 26 03:52 'Start Menu' -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Start Menu
lwxrwxrwx 1 ayema ayema 59 Jul 26 03:52 Templates -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Templates
drwxrwxrwx 1 ayema ayema 4.0K Aug 29 13:50 Videos
-rw-rw-rwx 1 ayema ayema 3.7M Jul 26 03:52 ntuser.dat.LOG1
-rw-rw-rwx 1 ayema ayema 3.3M Jul 26 03:52 ntuser.dat.LOG2
-rw-rw-rwx 1 ayema ayema 4.0K Sep 18 21:09 vcard-remote-ms
ayema@DESKTOP-IVVHC56: ~ + 

```

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

```

ayema@DESKTOP-IVVHC56: ~ + 
Windows PowerShell
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PS C:\Users\HP> bash
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ cd
ayema@DESKTOP-IVVHC56:~$ cd ..
ayema@DESKTOP-IVVHC56:/home$ cd ~
ayema@DESKTOP-IVVHC56:~$ cd /
ayema@DESKTOP-IVVHC56:/$ 

```

## 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

The screenshot shows a Windows desktop with a WSL terminal window open. The terminal window displays the command history and the creation of files and directories:

```
* aymen@DESKTOP-1VHNC56:~/Operating-system-1$ mkdir mylab2
* aymen@DESKTOP-1VHNC56:~/Operating-system-1$ mkdir -p test/sub/dir
* aymen@DESKTOP-1VHNC56:~/Operating-system-1$ touch file1.txt file2.txt file3.txt
* aymen@DESKTOP-1VHNC56:~/Operating-system-1$ echo "Hello Linux!" > hello.txt
* aymen@DESKTOP-1VHNC56:~/Operating-system-1$
```

Below the terminal, a file explorer window shows the directory structure:

- mylab2
  - test
  - sub
  - dir
- file1.txt
- file2.txt
- file3.txt
- hello.txt
- README.md

- **cat hello.txt**

The screenshot shows a Windows desktop with a WSL terminal window open. The terminal window displays the command history and the creation of files and directories, followed by the content of the hello.txt file:

```
* aymen@DESKTOP-1VHNC56:~/Operating-system-1$ mkdir mylab2
* aymen@DESKTOP-1VHNC56:~/Operating-system-1$ mkdir -p test/sub/dir
* aymen@DESKTOP-1VHNC56:~/Operating-system-1$ touch file1.txt file2.txt file3.txt
* aymen@DESKTOP-1VHNC56:~/Operating-system-1$ echo "Hello Linux!" > hello.txt
* aymen@DESKTOP-1VHNC56:~/Operating-system-1$ cat hello.txt
Hello Linux!
```

Below the terminal, a file explorer window shows the directory structure:

- mylab2
  - test
  - sub
  - dir
- file1.txt
- file2.txt
- file3.txt
- hello.txt
- README.md

- **less hello.txt**

```
Operating-system-1 [WSL: Ubuntu-24.04]
File Edit Selection View Go Run Terminal Help ← → PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS less - Operating-system-1 + ... ×
OPERATING-SYSTEM-1 (WSL: UBUNTU-24.04)
mylab2
└── test / sub / dir
    ├── file1.txt
    ├── file2.txt
    ├── file3.txt
    └── hello.txt
        └── Hello Linux!
            └── (ELB)
README.md

WSL: Ubuntu-24.04 36°C Sunny Search 3:26 pm 26/09/2025
```

## 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**

```
Operating-system-1 [WSL: Ubuntu-24.04]
File Edit Selection View Go Run Terminal Help ← → PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS less - Operating-system-1 + ... ×
OPERATING-SYSTEM-1 (WSL: UBUNTU-24.04)
mylab2
└── mylab2_backup
    ├── file1.txt
    ├── file2.txt
    ├── file3.txt
    └── hello.txt
        └── backup.txt
            └── renamed.txt
        README.md

WSL: Ubuntu-24.04 36°C Sunny Search 3:29 pm 26/09/2025
```

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

A screenshot of the Visual Studio Code interface running in a Windows host environment. The terminal window shows the command `rm renamed.txt` being run, which removes a file from the current directory. The Explorer sidebar shows a folder structure with a 'test/sub/dir' folder containing several text files. The status bar at the bottom indicates it's a WSL session for Ubuntu-24.04.

- **rm -r mylab2\_backup** # Remove directory

A screenshot of the Visual Studio Code interface running in a Windows host environment. The terminal window shows the command `rm -r mylab2_backup` being run, which removes a directory from the current directory. The Explorer sidebar shows a folder structure with a 'test/sub/dir' folder containing several text files. The status bar at the bottom indicates it's a WSL session for Ubuntu-24.04.

- `rmdir empty_directory` # Remove empty directory

The screenshot shows the Visual Studio Code interface running in a Windows Subsystem for Linux (WSL) environment. The title bar indicates the window is titled "Operating-system-1 [WSL: Ubuntu-24.04]". The left sidebar contains icons for Explorer, Problems, Output, Debug Console, Terminal, and Ports. The Explorer view shows a file tree with a folder named "test/sub/dir" containing files like "file1.txt", "file2.txt", "file3.txt", "hello.txt", and "README.md". The terminal view displays the following command-line session:

```
ayem@DESKTOP-1VVC56:~/Operating-system-1$ rm renamed.txt
ayem@DESKTOP-1VVC56:~/Operating-system-1$ rm -r mylab2_backup
ayem@DESKTOP-1VVC56:~/Operating-system-1$ rmdir empty_directory
rmdir: failed to remove 'empty_directory': No such file or directory
ayem@DESKTOP-1VVC56:~/Operating-system-1$ rmdir empty_directory
rmdir: failed to remove 'empty_directory': No such file or directory
ayem@DESKTOP-1VVC56:~/Operating-system-1$ 
ayem@DESKTOP-1VVC56:~/Operating-system-1$ 
ayem@DESKTOP-1VVC56:~/Operating-system-1$ 
```

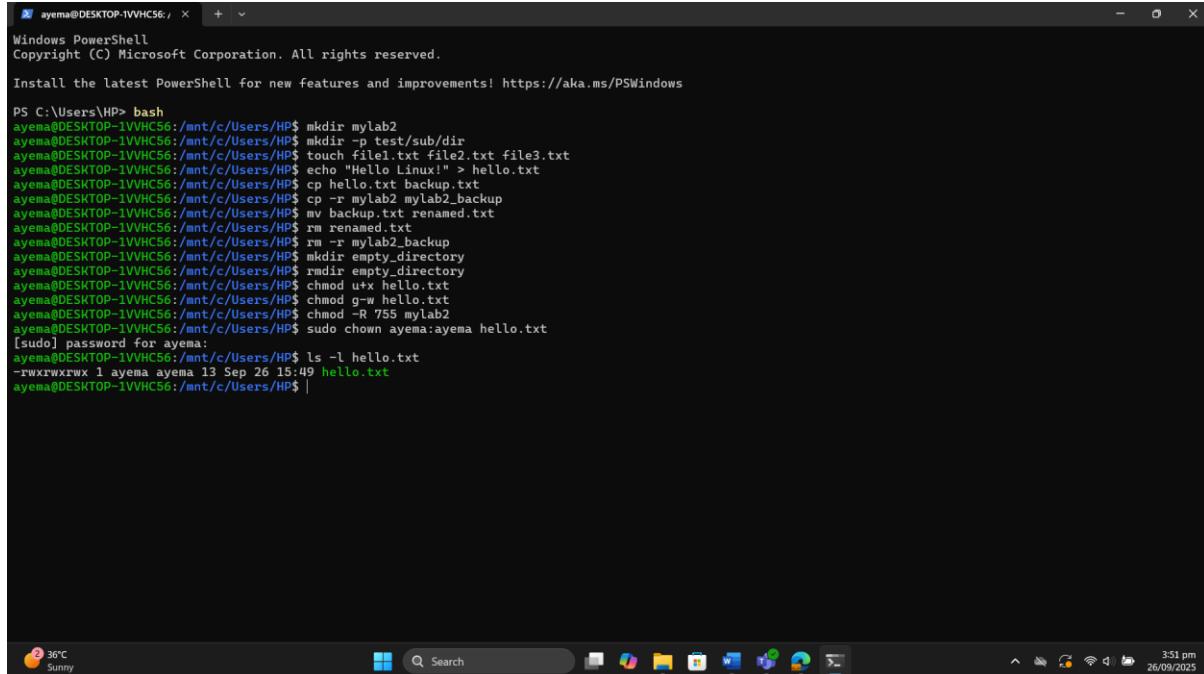
## Part 4 File and Directory Operations

## 4.1 File Permissions and Ownership

- ls -l # View permissions

```
ayema@DESKTOP-1VVHCS6: ~ + - 3:38 pm  
26/09/2025  
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-000d3a94eaal].TM.blf  
-rwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94eaal].TMContainer00000000000000000000000000000001.regrtrans-ms  
-rwxrwxrwx 1 ayema ayema 524288 Jul 26 03:52 NTUSER.DAT[2ad838bc-efea-11ee-a54d-000d3a94eaal].TMContainer00000000000000000000000000000002.regrtrans-ms  
-rwxrwxrwx 1 ayema ayema 67 Jul 26 03:52 NetHood -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/Network Shortcuts  
drwxrwxrwx 1 ayema ayema 4096 Jul 26 03:54 OneDrive  
drwxrwxrwx 1 ayema ayema 4096 Sep 18 23:46 Operating Systems  
drwxrwxrwx 1 ayema ayema 4096 Sep 18 21:08 Pictures  
drwxrwxrwx 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  
drwxrwxrwx 1 ayema ayema 56 Jul 26 03:52 SendTo -> /mnt/c/Users/HP/AppData/Roaming/Microsoft/Windows/SendTo  
drwxrwxrwx 1 ayema ayema 60 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  
drwxrwxrwx 1 ayema ayema 4096 Aug 29 13:50 Videos  
-rwxrwxrwx 1 ayema ayema 0 Sep 26 15:16 file1.txt  
-rwxrwxrwx 1 ayema ayema 67 Sep 26 15:18 hello.txt.save  
-rwxrwxrwx 1 ayema ayema 4096 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  
drwxrwxrwx 1 ayema ayema 4096 Sep 26 15:16 test  
drwxrwxrwx 1 ayema ayema 4096 Sep 18 21:09 vscode-remote-wsl  
ayema@DESKTOP-1VVHCS6:/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)



```

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PS C:\Users\HP> bash
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ mkdir mylab2
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ mkdir -p test/sub/dir
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ touch file1.txt file2.txt file3.txt
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ echo "Hello Linux!" > hello.txt
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ cp hello.txt backup.txt
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ cp -r mylab2 mylab2_backup
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ mv backup.txt renamed.txt
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ rm renamed.txt
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ rm -r mylab2_backup
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ mkdir empty_directory
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ rmdir empty_directory
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ chmod u+x hello.txt
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ chmod g-w hello.txt
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ chmod -R 755 mylab2
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ sudo chown ayema:ayema hello.txt
[sudo] password for ayema:
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ ls -l hello.txt
-rw-rwxrwx 1 ayema ayema 13 Sep 26 15:49 hello.txt
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ |

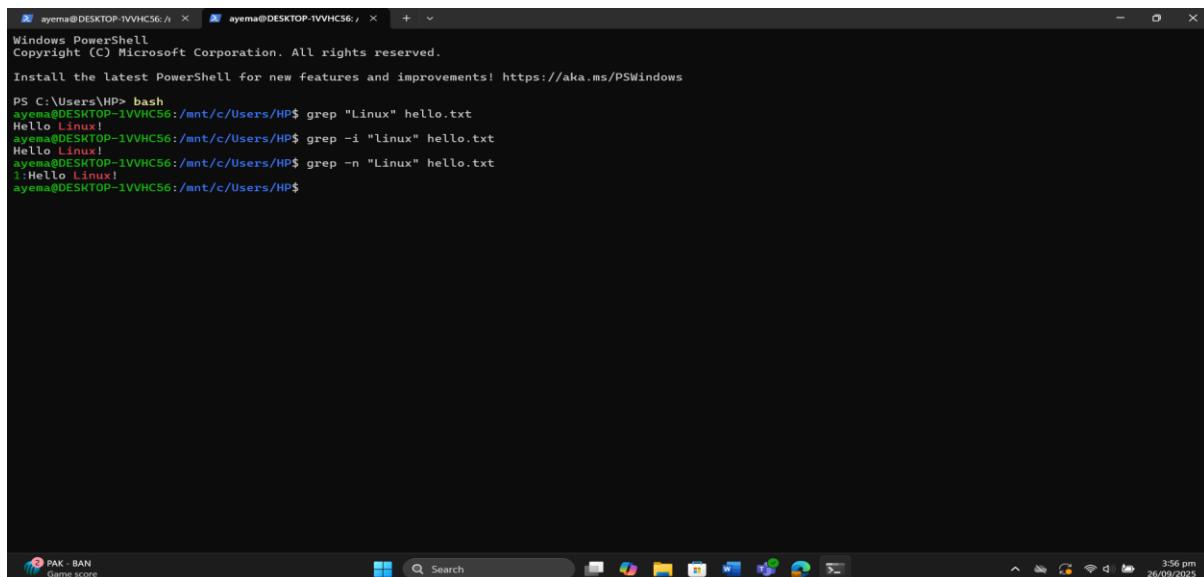
```

The screenshot shows a Windows PowerShell window with a black background and white text. It displays a sequence of commands related to file manipulation and permissions. At the end, it prompts for a password and lists the file 'hello.txt' with its permissions. The taskbar at the bottom shows various icons for system functions like battery, signal, and volume.

## 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



```

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-IVVHC56:/mnt/c/Users/HP$ grep "Linux" hello.txt
Hello_Linux!
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ grep -i "linux" hello.txt
Hello_Linux!
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ grep -n "Linux" hello.txt
1:Hello_Linux!
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ |

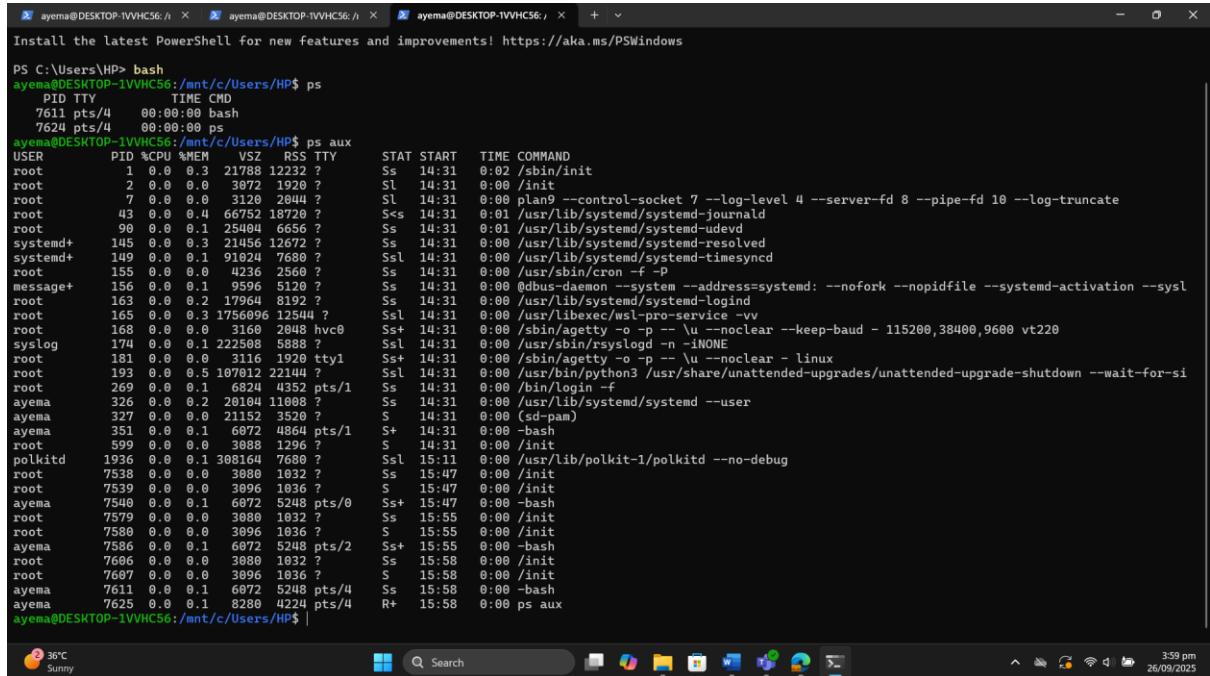
```

This screenshot shows a Windows PowerShell window with a black background and white text. It demonstrates the use of the 'grep' command with three different options: standard search, case-insensitive search, and line-numbering. The taskbar at the bottom includes a game score icon for 'PAK - BAN'.

## Part 6: Introduction to Processes

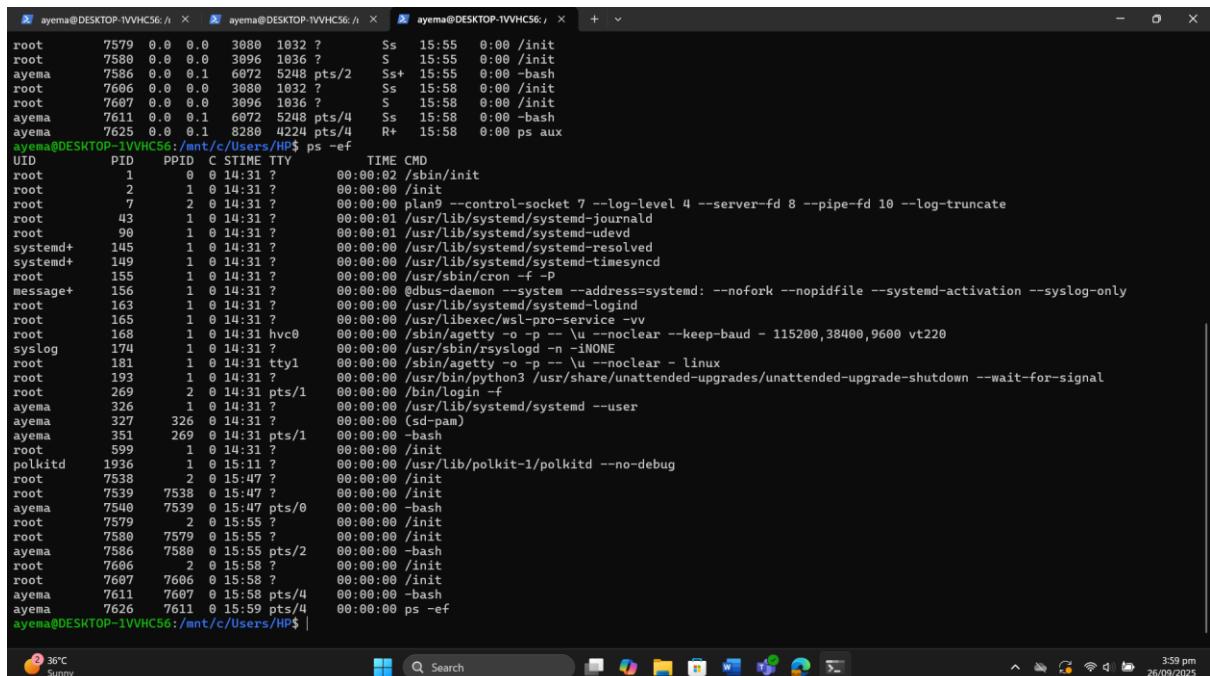
### 6.1 Understanding Processes

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



```
ayema@DESKTOP-1VVC56: /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 ?
root 2 0.0 0.0 3072 1920 ?
root 7 0.0 0.0 3120 2844 ?
root 43 0.0 0.4 66752 18720 ?
root 90 0.0 0.1 25040 6656 ?
systemd+ 145 0.0 0.2 21456 12672 ?
systemd+ 149 0.0 0.1 91024 7680 ?
root 155 0.0 0.0 4236 2560 ?
message+ 156 0.0 0.1 9596 5120 ?
root 163 0.0 0.2 17964 8192 ?
root 165 0.0 0.3 1756096 12544 ?
root 168 0.0 0.0 3160 2048 hvc0
syslog 174 0.0 0.1 222508 5888 ?
root 181 0.0 0.0 3116 1920 ttys0 ?
root 193 0.0 0.5 107812 22144 ?
root 269 0.0 0.1 6824 4352 pts/1
ayema 326 0.0 0.2 20104 11088 ?
ayema 327 0.0 0.0 21152 3520 ?
ayema 351 0.0 0.1 6072 4864 pts/1
root 599 0.0 0.0 3088 1296 ?
polkitd 1936 0.0 0.1 308164 7680 ?
root 7538 0.0 0.0 3088 1832 ?
root 7539 0.0 0.0 3096 1836 ?
ayema 7548 0.0 0.1 6072 5248 pts/0
root 7579 0.0 0.0 3088 1832 ?
root 7588 0.0 0.0 3096 1836 ?
ayema 7586 0.0 0.1 6072 5248 pts/2
root 7606 0.0 0.0 3096 1832 ?
root 7607 0.0 0.0 3096 1836 ?
ayema 7611 0.0 0.1 6072 5248 pts/4
ayema 7625 0.0 0.1 8280 4224 pts/4
ayema@DESKTOP-1VVC56: /mnt/c/Users/HP$ |
```

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



```
ayema@DESKTOP-1VVC56: /mnt/c/Users/HP$ ps -ef
UID PID PPID C STIME TTY TIME CMD
root 7579 0.0 0.0 3088 1832 ?
root 7588 0.0 0.0 3096 1836 ?
ayema 7586 0.0 0.1 6072 5248 pts/2
root 7606 0.0 0.0 3088 1832 ?
root 7607 0.0 0.0 3096 1836 ?
ayema 7611 0.0 0.1 6072 5248 pts/4
ayema 7625 0.0 0.1 8280 4224 pts/4
ayema@DESKTOP-1VVC56: /mnt/c/Users/HP$ |
```

```
ayema@DESKTOP-1VVC56: /mnt/c/Users/HP$ ps aux
USER PID %CPU %MEM VSZ RSS TTY STAT START TIME COMMAND
root 1 0 0 14:31 ? 00:00:02 /sbin/init
root 2 1 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-udevd
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 /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/wsl-pro-service -vv
root 168 1 0 14:31 hvc0 00:00:00 /sbin/agetty -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 ttys0 00:00:00 /sbin/agetty -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 0 0 14:31 ? 00:00:00 /usr/lib/systemd/systemd-user
ayema 327 0 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
ayema 7539 7539 0 15:47 pts/0 00:00:00 -bash
root 7579 2 0 15:55 ? 00:00:00 /init
root 7588 7579 0 15:55 ? 00:00:00 /init
ayema 7586 7588 0 15:55 pts/2 00:00:00 -bash
root 7606 7606 0 15:58 ? 00:00:00 /init
root 7607 7607 0 15:58 pts/4 00:00:00 -bash
ayema 7611 7611 0 15:59 pts/4 00:00:00 ps -ef
ayema@DESKTOP-1VVC56: /mnt/c/Users/HP$ |
```

- **pstree** # Process tree

```

ayema@DESKTOP-IVVHCS6:/ ~ ayema@DESKTOP-IVVHCS6:/ ~ ayema@DESKTOP-IVVHCS6:/ ~ + -
syslog    174      1  0 14:31 ?    00:00:00 /usr/sbin/rsyslogd -n -iNONE
root      181      1  0 14:31 ttyl   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 pts/0   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      7588     7579  0 15:55 ?    00:00:00 /init
ayema     7586     7580  0 15:55 pts/2   00:00:00 -bash
root      7686     2  0 15:58 ?    00:00:00 /init
root      7687     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-IVVHCS6:/mnt/c/Users/HP$ pstree
systemd---Relay(600)
|-2*{agetty}
|  cron
|  dbus-daemon
|-init-systemd(Ub)
|  |-SessionLeader---Relay(7540)---bash
|  |-SessionLeader---Relay(7586)---bash
|  |-SessionLeader---Relay(7611)---bash---pstree
|  |-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-udevd
|  |-unattended-upgr---{unattended-upgr}
|  |-wsl-pro-service---7*[{wsl-pro-service}]
ayema@DESKTOP-IVVHCS6:/mnt/c/Users/HP$
```

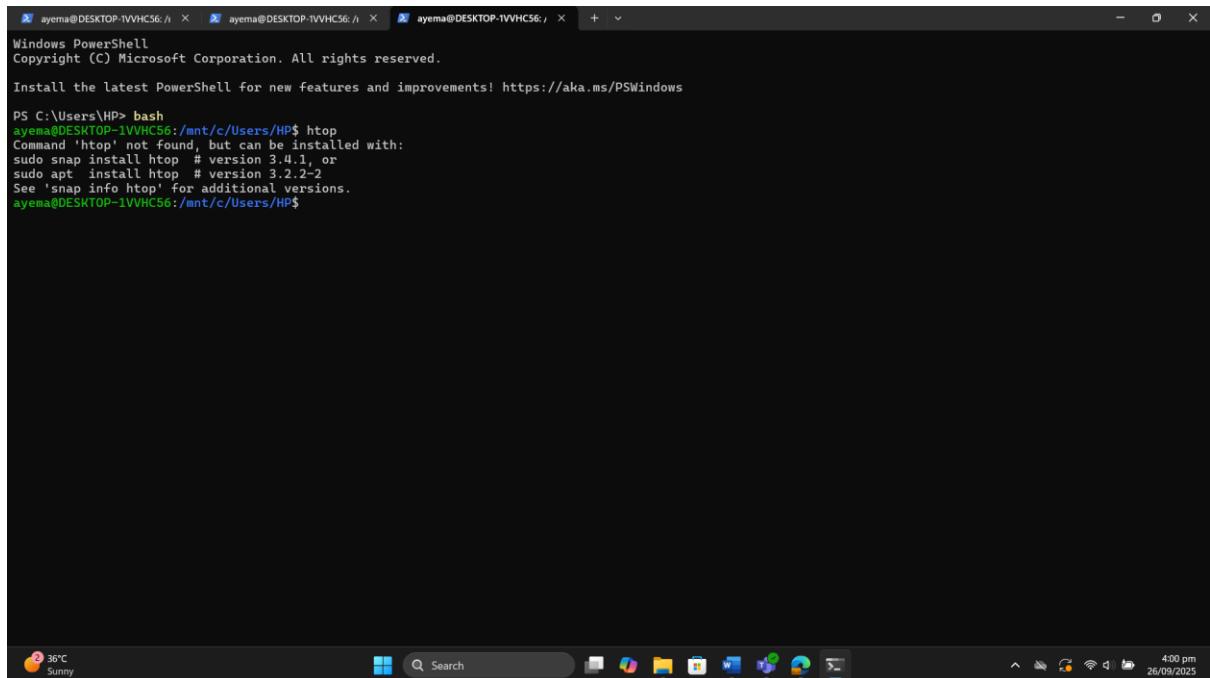
- **top** # Real-time process viewer

```

ayema@DESKTOP-IVVHCS6:/ ~ ayema@DESKTOP-IVVHCS6:/ ~ ayema@DESKTOP-IVVHCS6:/ ~ + -
└wsl-pro-service---7*[{wsl-pro-service}]
ayema@DESKTOP-IVVHCS6:/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  3072  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 25484  6656 4992 S  0.0  0.2 0:01.68 systemd-udevd
145 systemd+  20   0 21456 12672 180496 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 1756896 12540 18368 S  0.0  0.3 0:00.25 wsl-pro-service
168 root     20   0  3160  2848 1928 S  0.0  0.1 0:00.00 agetty
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 agetty
193 root     20   0 187012 22140 13056 S  0.0  0.6 0:00.09 unattended-upgr
269 root     20   0  6824  4352 3712 S  0.0  0.1 0:00.26 login
326 ayema   20   0 20104 11088 9216 S  0.0  0.3 0:00.00 systemd
327 ayema   20   0 21152  3520 1792 S  0.0  0.1 0:00.00 (sd-pam)
351 ayema   20   0  6872  4864 3456 S  0.0  0.1 0:00.01 bash
599 root     20   0  3088  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  1832  896 S  0.0  0.0 0:00.00 SessionLeader
7539 root     20   0  3096  1836  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  1832  896 S  0.0  0.0 0:00.00 SessionLeader
7588 root     20   0  3096  1836  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  1832  896 S  0.0  0.0 0:00.00 SessionLeader
7607 root     20   0  3096  1836  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
ayema@DESKTOP-IVVHCS6:/mnt/c/Users/HP$
```

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

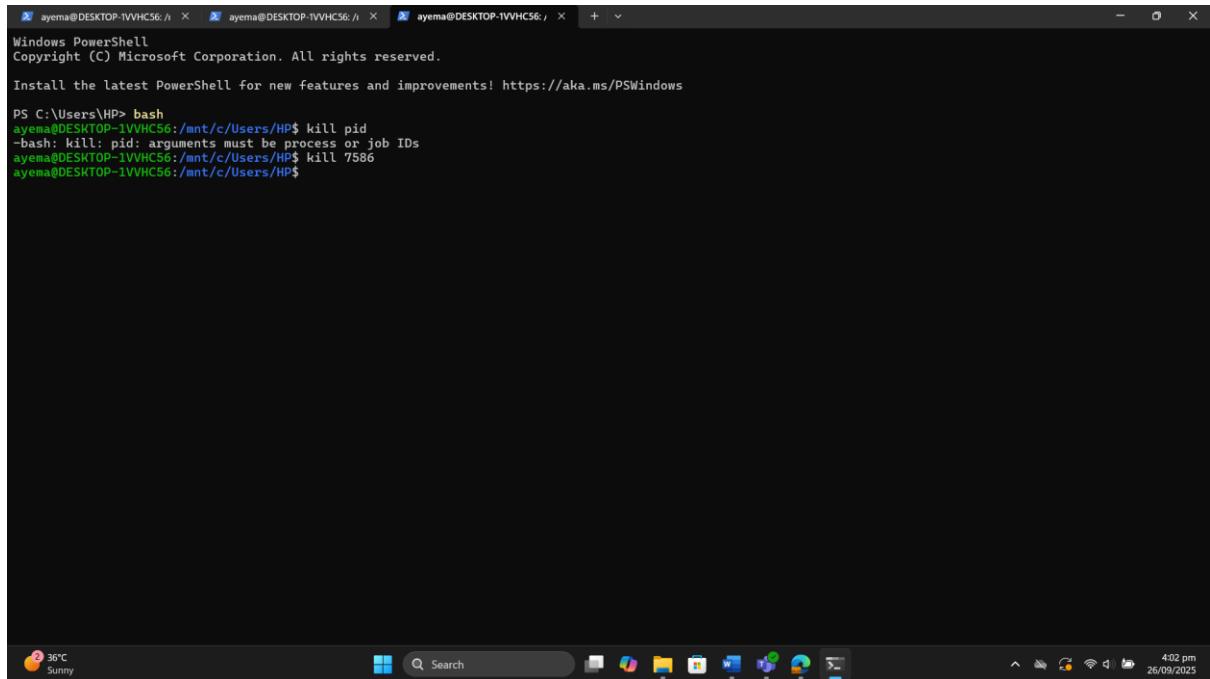


```
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\HP> bash
ayema@DESKTOP-IVVHC56:/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-IVVHC56:/mnt/c/Users/HP$
```

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

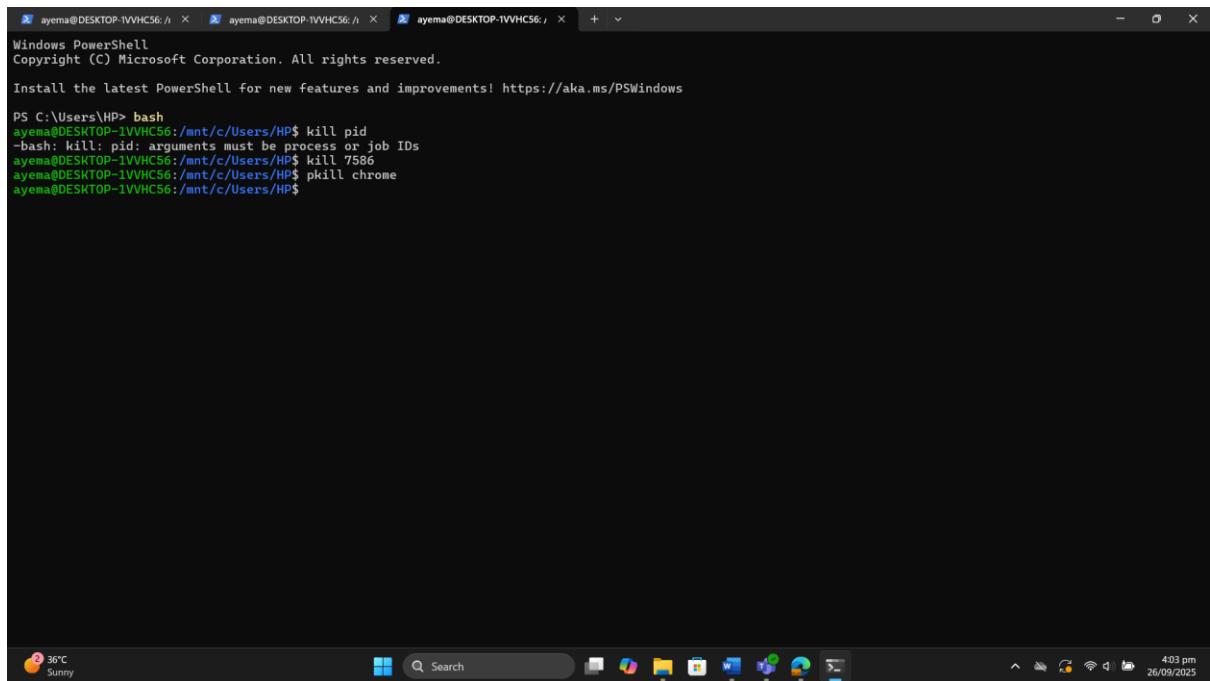


```
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PS C:\Users\HP> bash
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ kill pid
-bash: kill: pid: arguments must be process or job IDs
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ kill 7586
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$
```

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



A screenshot of a Windows desktop environment. In the center is a Windows PowerShell window titled 'Windows PowerShell' with three tabs open. The tabs show the same content: 'ayema@DESKTOP-IVVHC56: /' and 'ayema@DESKTOP-IVVHC56: /'. The content of the window is as follows:

```
Windows PowerShell
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PS C:\Users\HP> bash
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ kill pid
-bash: kill: pid: arguments must be process or job IDs
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ kill 7586
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$ pkill chrome
ayema@DESKTOP-IVVHC56:/mnt/c/Users/HP$
```

The desktop taskbar at the bottom shows various pinned icons and the system tray on the right indicating the date and time (26/09/2025) and battery level (36°C, Sunny).

## 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.