K.R MANGALAM UNIVERSITY, Gurugram

THE COMPLETE WORLD OF EDUCATION

- *Basic of Linux* & open source tool

SCHOOL OF ENGINEERING AND TECHNOLOGY

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COURSE NAME: Computer Science Fundamentals & Carrer Pathways

COURSE CODE: ETCCCPI05

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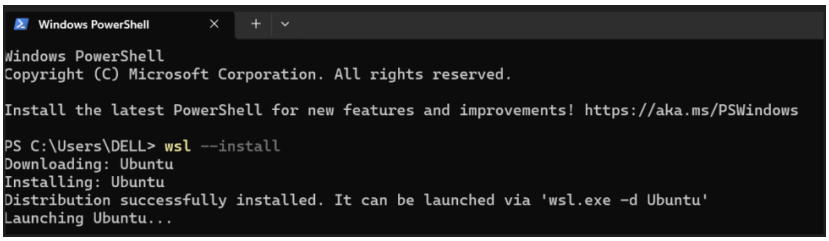
2.1) LINUX INSTALLATION

Introduction: I installed UBUNTU Linux on my system using ORACLE VIRTUAL BOX. Virtual box allows us to run Linux as Virtual Machine on top of Windows OS. This gives a safe environment to practice Linux commands without disturbing my main Windows system.

Steps:

1.Enable WSL feature

- Press Windows + R, type power shell, and click ⟹ **Run as Administrator**
- In power shell type: wsl –install
- This command install **Windows Subsystem for Linux** and **Virtual Machine Platform** automatically.
- Restart your system once installation completes.

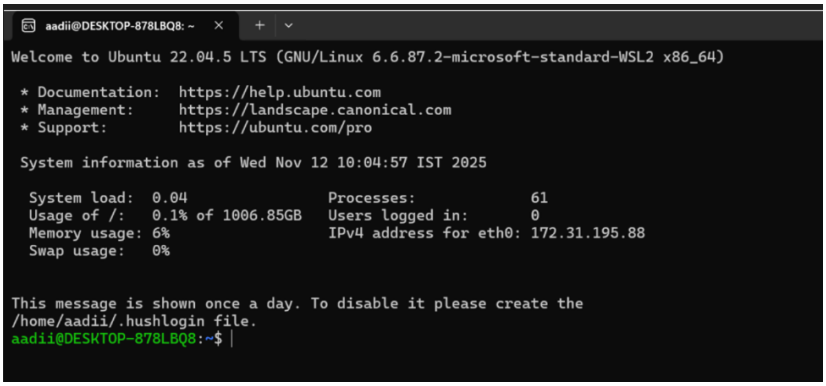


2.Download Ubuntu

- Open Microsoft store
- Search for “**Ubuntu 22.04 LTS**”
- Click **Get/install**
- Once installed, click open

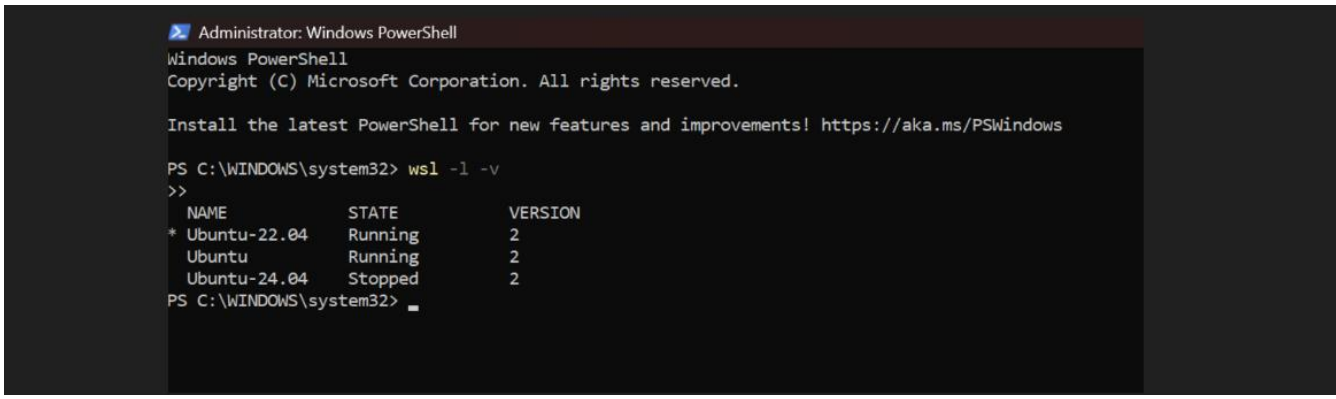
3.Set up Ubuntu for the First Time

- When you launch Ubuntu for the first time, it will show:
  “*Installing, this may take a few minutes*…”
- After setup, it asks to create:
  - Username
  - Password
- Once done, you’ll see the Ubuntu terminal prompt like:



4.Verify installation

- To confirm Ubuntu is installed and running, type:



5.Final Working Ubuntu Terminal

- You now have a fully functional Ubuntu command -line system

running inside Windows -no separate virtual machine required.

- You can directly execute Linux commands , create shell scripts, and perform all tasks safely within WSL.

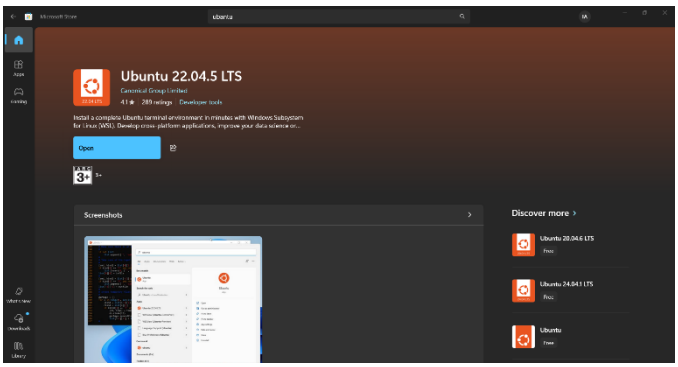
- *Hardware Configuration Details:*

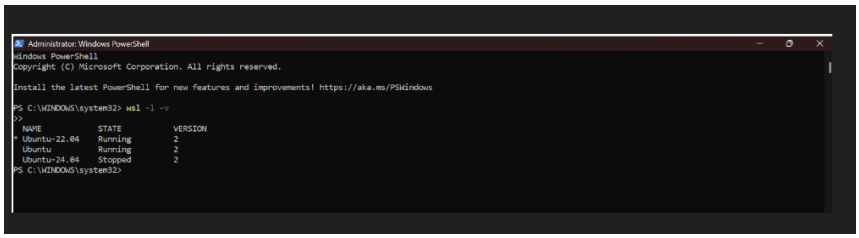
Component	Specification
System Manufacturer	HP
System Model	HP Laptop 15s-du3xxx
Processor (CPU)	11th Gen Intel® Core™ i3-1115G4@3.00GHz (4CPUs)
Installed Ram	8.00GB
System Type	64-bit operating system, x64-based processor
Graphic Card	Intel® UHD Graphic
Storage	1.14TB
Disk Allocated for Ubuntu (WSL)	Automatically managed by windows (Dynamically allocation)

Virtualization	Windows Subsystem for Linux (WSL 2) using lightweight Hyper -V backend

Final Working Ubuntu Environment

Now you have **Ubuntu 22.04 LTS** running **inside Windows using WSL 2** -a fully functional Linux terminal environment. It's ready to **execute shell commands, write and run shell scripts**, and perform all Linux operations seamlessly**, without needing a separate virtual machine.**





2.2) SHELL COMMANDS IMPLEMENTATION AND DOCUMENTATION

1.pwd command

Description:

This command shows the current folder (directory) in which I am working. It basically tells “where I am” in the Linux file system.

When I applied it:

When I applied pwd to confirm that I was in my home directory /home/vansh

2.ls command

Description:

This command lists all the files & folders present in the current directory.

When I applied it:

I applied ls to check what items were present inside my home folder & inside my test folder

3.ls -1 command

Description:

That’s a number 1,not a lowercase L) is an option for the ls command.

When I applied it:

I used ls -1 to lists the contents of a directory with exactly one file or directory per line.

4.tree command

Description:

It shows the folder structure in a tree-like format. Very useful to visualize directories and files.

When I applied it:

I created a small test structure (folders f1, f2, & then run tree to display the structure neatly.

5.cd folder frame

Description:

When I applied it:

6.mkdir command

Description:

This command creates a new directory (folder). It helps me organize files by keeping them inside separate folder.

When I applied it:

I used mkdir myfolder to create a new directory called myfolder in my current working directory.

7. touch command

Description:

This command is used to create an empty file. It’s one of the easiest ways to quickly make text or config files.

When I applied it:

I used to create an empty file called file.1txt in my current directory**.**

8. cp command

Description:

This command copies a file or folder from one place to another.

When I applied it:

I used cp to copy file.1 txt into the backup folder to check if the copy command works correctly.

9. mv command

Description:

This command can rename a file or move it to a different location.

When I applied it:

I used mv file1.txt newname.txt to rename the file and test how file renaming works in Linux.

10. rm command

Description:

This command removes (deletes) a file permanently.

When I applied it:

I used rm to delete the newname.txt file as a part of file management testing.

11.chmod 744 file.txt command

Description:

chmod is used to change the permissions of a file . Permissions decided who can read, write, or execute the file.

When I applied it:

I used chmod 744 to give(read , write, execute) permission to owner and give only read permission to the group& others.

12.sudochown user: user file.txt command

Description:

Chown changes the owner of a file or directory.

When I applied it:

I used it to change of file.txt from my user to root , just to test ownership change.

13.ps command

Description:

Shows the running processes for the current usage.

When I applied it:

To check processes are active in my Ubuntu session.

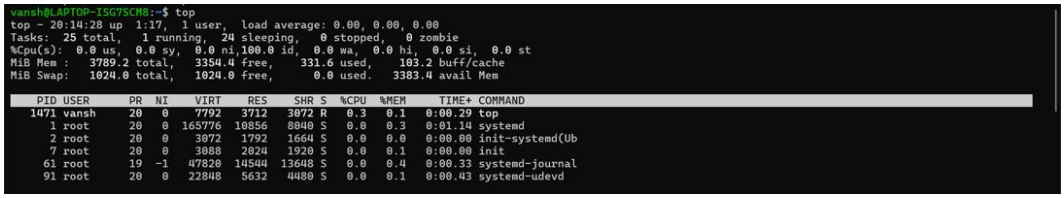
14.top command

Description:

This command shows the real time usage of CPU, memory, processes, etc.

When I applied it:

To see the system resource usage live.



15.kill<PID> command

Description:

Used to stop /terminate a running process.

When I applied it:

I tried killing a dummy background process created with kill 1478

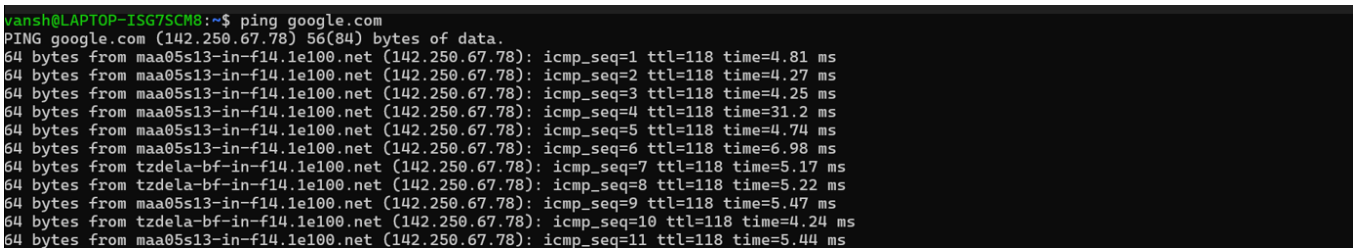
16.ping google.com command

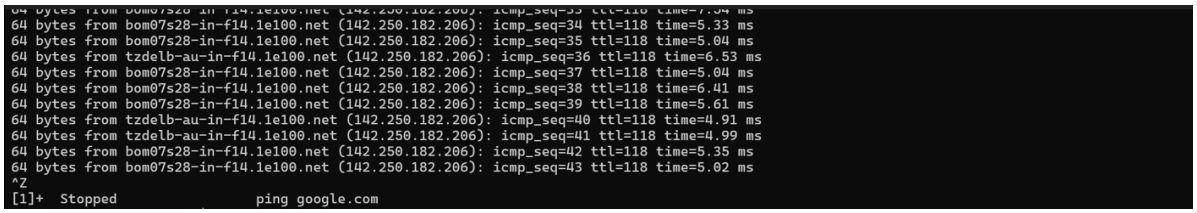
Description:

Check if your system can reach another server on the network**.**

When I applied it:

To check connectivity to google and verify networking.





17.ipaddr command

Description:

Show all the network interfaces and their IP address.

When I applied it:

To see my WSL network details & IP.

```
vansh@LAPTOP-ISG7SCM8:~$ ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet 10.255.255.254/32 brd 10.255.255.254 scope global lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP group default qlen 1000
    link/ether 00:15:5d:fb:20:bd brd ff:ff:ff:ff:ff:ff
    inet 172.18.80.252/20 brd 172.18.95.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::215:5dff:fefb:20bd/64 scope link
       valid_lft forever preferred_lft forever
```

18.netstat -tulnp

Description:

Displays ports that are open /listening on the system.

When I applied it:

To check active TCP/UDP ports.

```
ansh@LAPTOP-ISG7SCM8:~$ netstat -tulnp
Not all processes could be identified, non-owned process info
will not be shown, you would have to be root to see it all.)
ctive Internet connections (only servers)
roto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
cp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN      -
cp        0      0 10.255.255.254:53       0.0.0.0:*               LISTEN      -
dp        0      0 127.0.0.53:53           0.0.0.0:*                           -
dp        0      0 10.255.255.254:53       0.0.0.0:*                           -
dp        0      0 127.0.0.1:323           0.0.0.0:*                           -
dp6       0      0 ::1:323                 :::*                                -
```

19.whoami command

Description:

The whoami command in Linux is used to display the current logged-in user’s username.

When I applied it:

I used this command to show my username.

20.history command

Description:

The history command in Linux shows a list of commands that you previously entered in the terminal.

When I applied it:

I used history| tail command to get the most recent 10 commands I have executed.

2.3 SHELL SCRIPT DEVELOPMENT:

Script1: Backup Script (backup.sh)- This script compresses a directory into a time stamped.tar.gz file.

Script2: CPU and Memory Monitoring (monitor.sh)-This script lags CPU and RAM usage to a log file every few seconds:

```
vansh@LAPTOP-ISG7SCM8:~$ cat system_usage.log
----- CPU and Memory Usage on Fri Nov 14 21:13:24 IST 2025 -----

CPU Usage:

Memory Usage:
               total        used        free      shared  buff/cache   available
Mem:           3.7Gi       323Mi       3.1Gi       3.0Mi       275Mi       3.3Gi
Swap:          1.0Gi          0B       1.0Gi
```

Script3: Automated File Downloader (download.sh) -This script automatically downloads a file from internet and stores into Download folder.

```
vansh@LAPTOP-ISG7SCM8:~$ #!/bin/bash
# Purpose: Download a file using wget
# Author: vansh
# Date: 2025-11-14

URL="https://filesamples.com/samples/document/pdf/sample1.pdf"
DEST="/home/vansh/downloads"

mkdir -p "$DEST"

wget "$URL" -P "$DEST"

echo "Download completed and saved in $DEST"
--2025-11-14 21:17:23--  https://filesamples.com/samples/document/pdf/sample1.pdf
Resolving filesamples.com (filesamples.com)... 104.21.17.252, 172.67.178.244, 2606:4700:3035::ac43:b2f4, ...
Connecting to filesamples.com (filesamples.com)|104.21.17.252|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: unspecified [application/pdf]
Saving to: ‘/home/vansh/downloads/sample1.pdf’

sample1.pdf                             [ <=>                                                                ] 567.78K  --.-KB/s    in 0.02s

2025-11-14 21:17:23 (26.4 MB/s) - ‘/home/vansh/downloads/sample1.pdf’ saved [581407]

Download completed and saved in /home/vansh/downloads
```