



**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: B.TECH CSE (CORE)

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COURSE NAME: Computer Science Fundamentals &  
Carrer Pathways

COURSE CODE: ETCCCP105

FACULATY: MR. RAJESH SIR

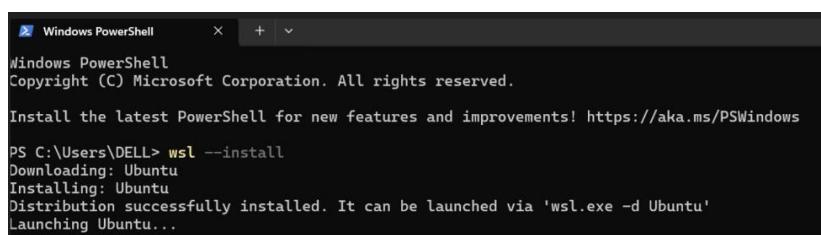
## 2.1) LINUX INSTALLATION

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.



```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

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

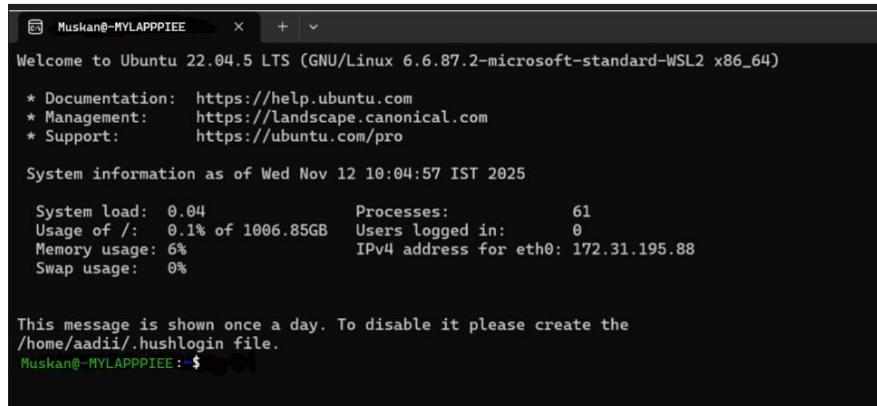
PS C:\Users\DELL> wsl --install
Downloading: Ubuntu
Installing: Ubuntu
Distribution successfully installed. It can be launched via 'wsl.exe -d Ubuntu'
Launching Ubuntu...
```

## 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:



```
Muskan@MYLAPPPIEE ~ + 
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.6.87.2-microsoft-standard-WSL2 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

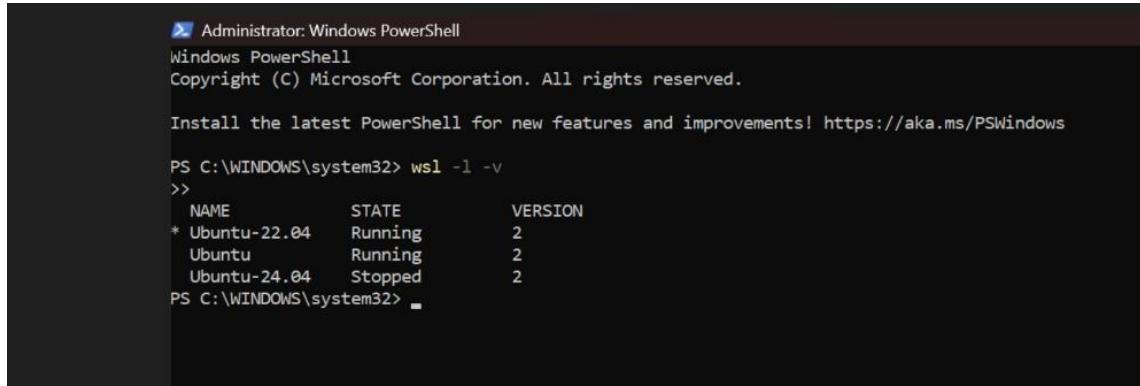
System information as of Wed Nov 12 10:04:57 IST 2025

  System load:  0.04           Processes:      61
  Usage of /:   0.1% of 1006.85GB  Users logged in:  0
  Memory usage: 6%
  Swap usage:   0%

This message is shown once a day. To disable it please create the
/home/aadii/.hushlogin file.
Muskan@MYLAPPPIEE:$
```

## 4. Verify installation

- To confirm Ubuntu is installed and running, type:



```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

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

PS C:\WINDOWS\system32> wsl -l -v
>>
  NAME      STATE      VERSION
* Ubuntu-22.04  Running     2
  Ubuntu      Running     2
  Ubuntu-24.04  Stopped     2
PS C:\WINDOWS\system32>
```

## 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:*

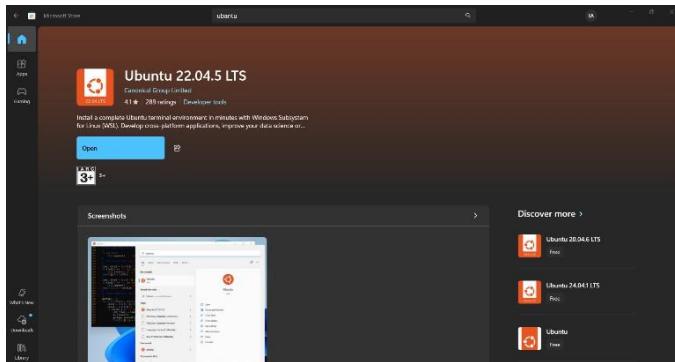
Component	Specification
System Manufacturer	HP
System Model	HP Laptop 15-fd0xxx
Processor (CPU)	13th Gen Intel(R) Core(TM) i5-1334U (1.30 GHz)
Installed Ram	16.0GB
System Type	64-bit operating system, x64-based processor
Graphic Card	Intel® UHD Graphic
Storage	512GB
Disk Allocated for Ubuntu (WSL)	Automatically 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**.

A screenshot of a Windows PowerShell window titled "Administrator: Windows PowerShell". The command "wsl -l -v" was run, resulting in the following output:

```
PS C:\WINDOWS\system32> wsl -l -v
>>
* NAME      STATE    VERSION
* Ubuntu-22_04  Running   2
* Ubuntu     Running   2
* Ubuntu-24_04  Stopped   2
PS C:\WINDOWS\system32>
```

A screenshot of a terminal window titled "Muskan@MYLAPPPIE ~ \$". The prompt "Muskan@MYLAPPPIE ~ \$" is visible at the bottom of the screen.

## 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/Muskan`

```
Muskan@MYLAPPPIEE:~$ cd  
Muskan@MYLAPPPIEE:~$ pwd  
/home/Muskan  
Muskan@MYLAPPPIEE:~$
```

### 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

```
Muskan@MYLAPPPIEE:~$ ls  
demo folder testfolder txt
```

## **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.

```
Muskan@MYLAPPPIEE:~$ ls -1  
demo  
demofolder  
folder  
testfolder  
txt
```

## **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.

```
Muskan@MYLAPPIEE:~$ tree
└── demo
    └── file1.txt
├── demofolder
└── folder
    └── testfolder
        └── txt
5 directories, 1 file
```

## 5. cd folder frame

## **Description:**

## **When I applied it:**

```
Muskan@MYLAPPIE:~$ cd foldername  
-bash: cd: foldername: No such file or directory
```

## 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.

```
Muskan@MELAPPIE:~$ mkdir myfolder
```

## 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.

```
Muskan@MYLAPPIEE:~$ touch file1.txt
```

## **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.

```
Muskan@MYLAPPIEE:~$ cp file1.txt backup/
cp: cannot create regular file 'backup/': Not a directory
```

## **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.

```
Muskan@MYLAPPIEE:~$ mv file1.txt newname.txt
```

## **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.

```
Muskan@MYLAPPIEE:~$ rm newname.txt
Muskan@MYLAPPIEE:~$ ls
```

## **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.

```
Muskan@MYLAPPIEE:~$ chmod 744 file.txt
```

## **12. sudo chown 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.

```
Muskan@MYLAPPIEE:~$ sudo chown Muskan:Muskan file.txt
Muskan@MYLAPPIEE:~$ ls -l
backup
demo
demofolder
file.txt
folder
myfolder
testfolder
```

## 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.

```
Muskan@MYLAPPIEE:~$ ps
 PID TTY      TIME CMD
 536 pts/0    00:00:00 bash
1470 pts/0    00:00:00 ps
```

## 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.

```
Muskan@MYLAPPPIE: $ top
top - 20:14:28 up 1:17, 1 user,  load average: 0.00, 0.00, 0.00
Tasks: 25 total, 1 running, 24 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 : 3789.2 total, 3354.4 free, 331.6 used, 183.2 buff/cache
MiB Swap: 1024.0 total, 1024.0 free, 0.0 used, 3383.4 avail Mem

 PID USER      PR  NI    VIRT    RES    SHR S %CPU %MEM TIME+ COMMAND
1471 Muskan   20   0    7792   3712  3072 R  0.3  0.1  0:00.29 top
  1 root     20   0   165776 10856  8040 S  0.0  0.3  0:01.14 systemd
  2 root     20   0    3072  1792  1664 S  0.0  0.0  0:00.00 init-systemd(Ub
  7 root     20   0    3088  2024  1928 S  0.0  0.1  0:00.00 init
 61 root    19  -1   47820 14544 13648 S  0.0  0.4  0:00.33 systemd-journal
 91 root     20   0   22848  5632  4480 S  0.0  0.1  0:00.43 systemd-udevd
```

## 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**

```
Muskan@MYLAPPPIE:~$ kill 1478
-bash: kill: (1478) - No such process
Muskan@MYLAPPPIE:~$ ps
 PID TTY          TIME CMD
 536 pts/0        00:00:00 bash
1484 pts/0        00:00:00 ps
```

## 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.

```
Muskan@MYLAPPPIEE:~$ ping google.com
PING google.com (142.250.67.78) 56(84) bytes of data.
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=1 ttl=118 time=4.81 ms
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=2 ttl=118 time=4.27 ms
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=3 ttl=118 time=4.25 ms
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=4 ttl=118 time=31.2 ms
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=5 ttl=118 time=4.74 ms
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=6 ttl=118 time=6.98 ms
64 bytes from tzdela-bf-in-f14.1e100.net (142.250.67.78): icmp_seq=7 ttl=118 time=5.17 ms
64 bytes from tzdela-bf-in-f14.1e100.net (142.250.67.78): icmp_seq=8 ttl=118 time=5.22 ms
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=9 ttl=118 time=5.47 ms
64 bytes from tzdela-bf-in-f14.1e100.net (142.250.67.78): icmp_seq=10 ttl=118 time=4.24 ms
64 bytes from maa05s13-in-f14.1e100.net (142.250.67.78): icmp_seq=11 ttl=118 time=5.44 ms
```

```
64 bytes from b0m07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=33 ttl=118 time=4.04 ms
64 bytes from b0m07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=34 ttl=118 time=5.33 ms
64 bytes from b0m07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=35 ttl=118 time=5.04 ms
64 bytes from tzdelb-au-in-f14.1e100.net (142.250.182.206): icmp_seq=36 ttl=118 time=6.53 ms
64 bytes from b0m07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=37 ttl=118 time=5.04 ms
64 bytes from b0m07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=38 ttl=118 time=6.41 ms
64 bytes from b0m07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=39 ttl=118 time=5.61 ms
64 bytes from tzdelb-au-in-f14.1e100.net (142.250.182.206): icmp_seq=40 ttl=118 time=4.91 ms
64 bytes from tzdelb-au-in-f14.1e100.net (142.250.182.206): icmp_seq=41 ttl=118 time=4.99 ms
64 bytes from b0m07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=42 ttl=118 time=5.35 ms
64 bytes from b0m07s28-in-f14.1e100.net (142.250.182.206): icmp_seq=43 ttl=118 time=5.02 ms
^Z
[1]+  Stopped                  ping google.com
```

## 17. ipaddr command

**Description:**

Show all the network interfaces and their IP address.

**When I applied it:**

To see my WSL network details & IP.

```
Muskan@MYLAPPIEE: $ 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:fe:fb: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.

```
Muskan@MYLAPPIEE: $ 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.)
active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State      PID/Program name
cp        0      0 127.0.0.53:53           0.0.0.0:*
cp        0      0 10.255.255.254:53       0.0.0.0:*
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.

```
Muskan@MYLAPPIE:~$ whoami  
Muskan
```

## **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.

```
Muskan@MYLAPPPIEE: $ history | tail
74 ps
75 ping google.com
76 q
77 ip addr
78 netstat -tulpn
79 sudo apt install net-tools
80 netstat -tulpn
81 whoami
82 history
83 history | tail
```

## 2.3 SHELL SCRIPT DEVELOPMENT:

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

```
Muskan@MYLAPPPIEE: $ *#!/bin/bash
# Purpose: Backup a directory with timestamp
# Author: vansh
# Date: 2025-11-14

SOURCE="/home/vansh/myfolder"
TARGET="/home/vansh/backup"

TIMESTAMP=$(date +"%Y-%m-%d_%H-%M-%S")
mkdir -p "$TARGET"

cp -r "$SOURCE" "$TARGET/backup_$TIMESTAMP"
echo "Backup completed: backup_$TIMESTAMP"
bash: !/bin/bash: event not found
Backup completed: backup_2025-11-14_20-50-36
```

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

```
Muskan@MYLAPPPIEE: $ 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.

```
Muskan@MYLAPPPIEE: $ #!/bin/bash
# Purpose: Download a file using wget
# Author: Muskan
# Date: 2025-11-14
URL="https://filesamples.com/samples/document/pdf/sample1.pdf"
DEST="/home/Muskan/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/Muskan/downloads/sample1.pdf'

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

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

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

<https://github.com/muskangotnochill/Linux-Assignment>