Atharva Vasant Angre **Practical1** **2023510001**

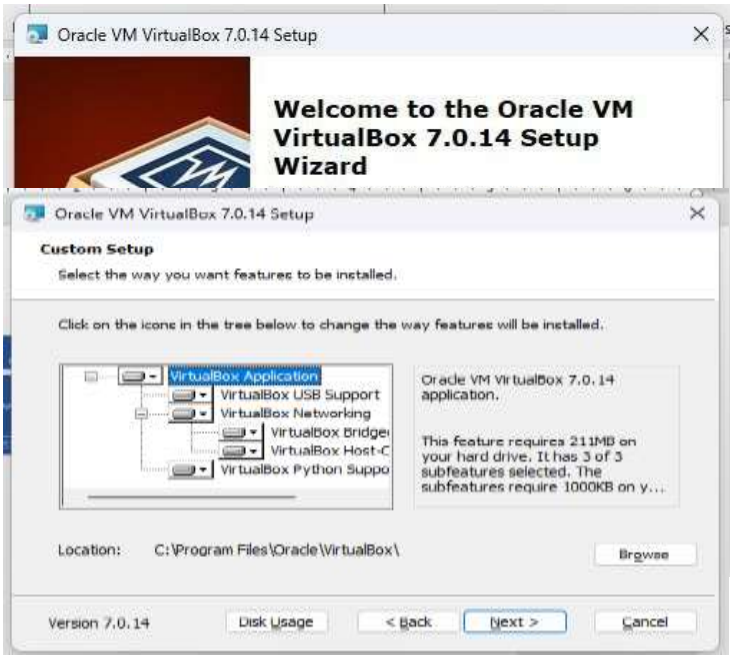
Aim:

1. To show installation of Ubuntu
2. To run commands in the CLI
3. To understand the file structure of Linux

Tools Used:

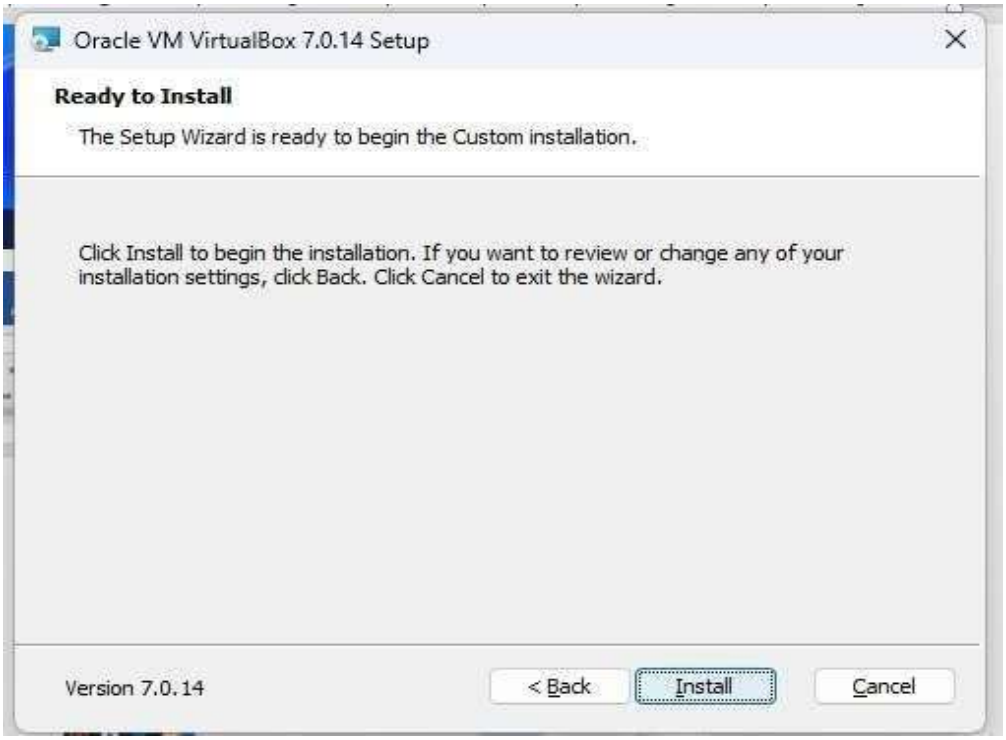
- Virtualbox to install ubuntu
- Linux CLI Solution: Installation of Ubuntu:

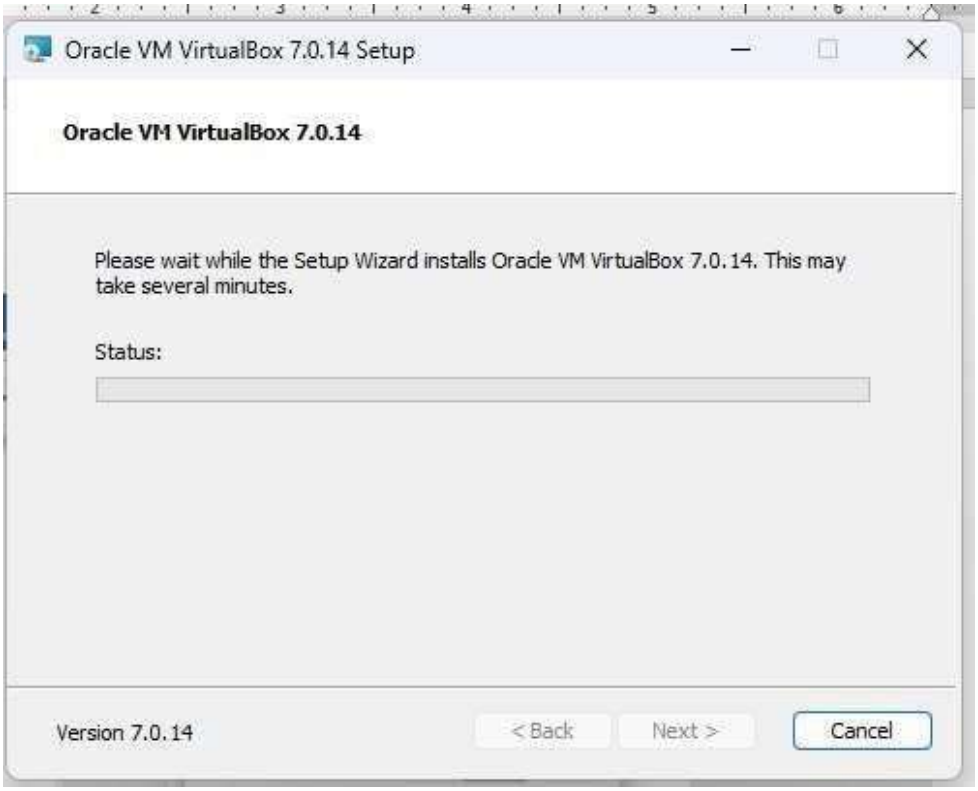
Solution:
Installation of Ubuntu:




Oracle VM VirtualBox 7.0.14
Warning:
Network Interfaces
Installing the Oracle VM VirtualBox 7.0.14 Networking feature will reset your network connection and temporarily disconnect you from the network.
Proceed with installation now?
Version 7.0.14
Yes
No

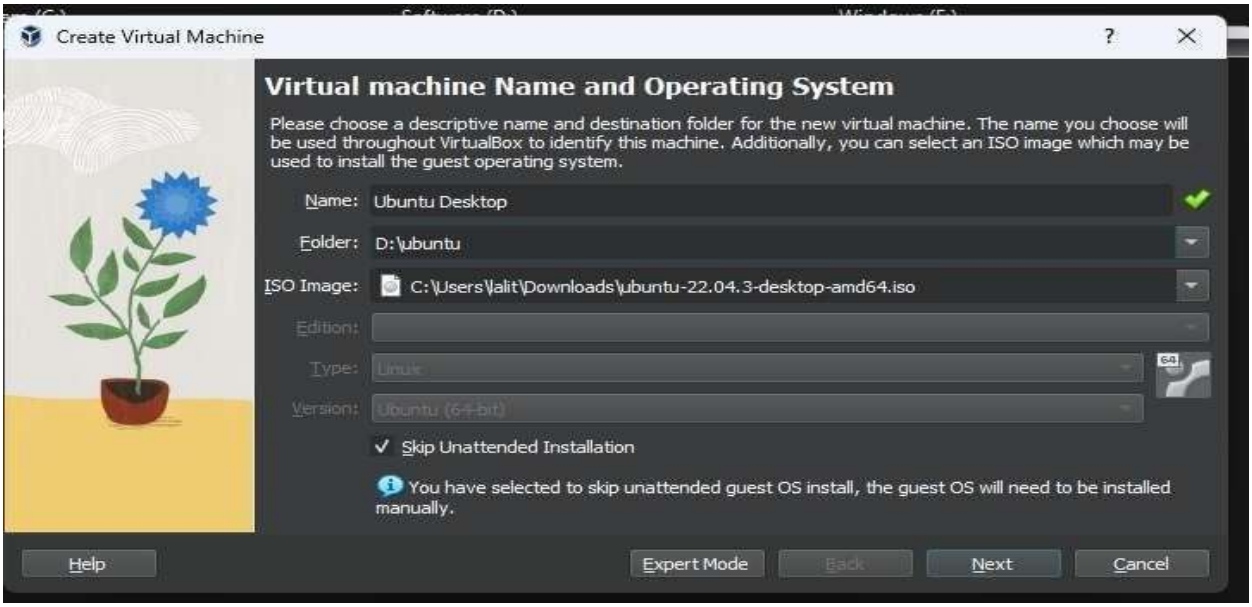

Oracle VM VirtualBox 7.0.14
Missing Dependencies
Python Core / win32api
Installing the Oracle VM VirtualBox 7.0.14 Python bindings requires the Python Core package and the win32api bindings to be installed first.
When continuing the installation of the Oracle VM VirtualBox 7.0.14 Python bindings now, those need to be set up manually later. Refer to the Oracle VM VirtualBox 7.0.14 SDK manual for more information.
Proceed with installation now?
Version 7.0.14
Yes
No


Oracle VM VirtualBox 7.0.14 Setup
Ready to Install
The Setup Wizard is ready to begin the Custom installation.
Click Install to begin the installation. If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
Version 7.0.14
< Back
Install
Cancel

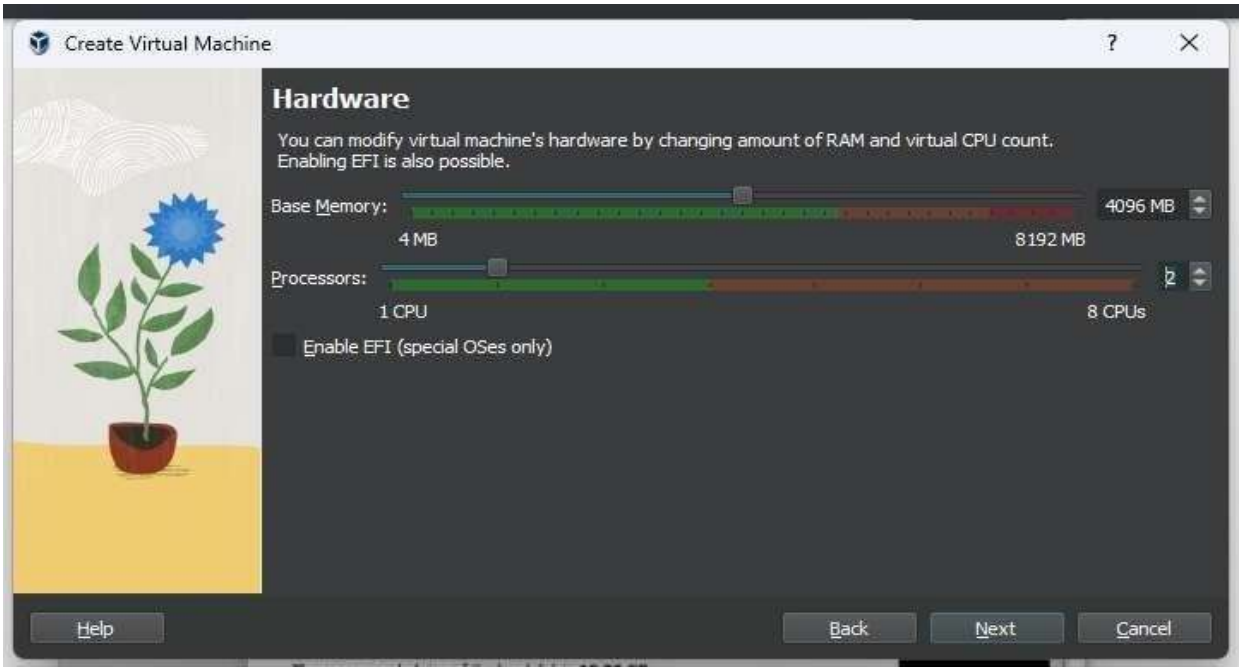

Oracle VM VirtualBox 7.0.14 Setup
Oracle VM VirtualBox 7.0.14
Please wait while the Setup Wizard installs Oracle VM VirtualBox 7.0.14. This may take several minutes.
Status:
Version 7.0.14
< Back
Next >
Cancel


Oracle VM VirtualBox 7.0.14 Setup
Oracle VM VirtualBox 7.0.14 installation is complete.
Click the Finish button to exit the Setup Wizard.
Start Oracle VM VirtualBox 7.0.14 after installation
Version 7.0.14
< Back
Finish
Cancel

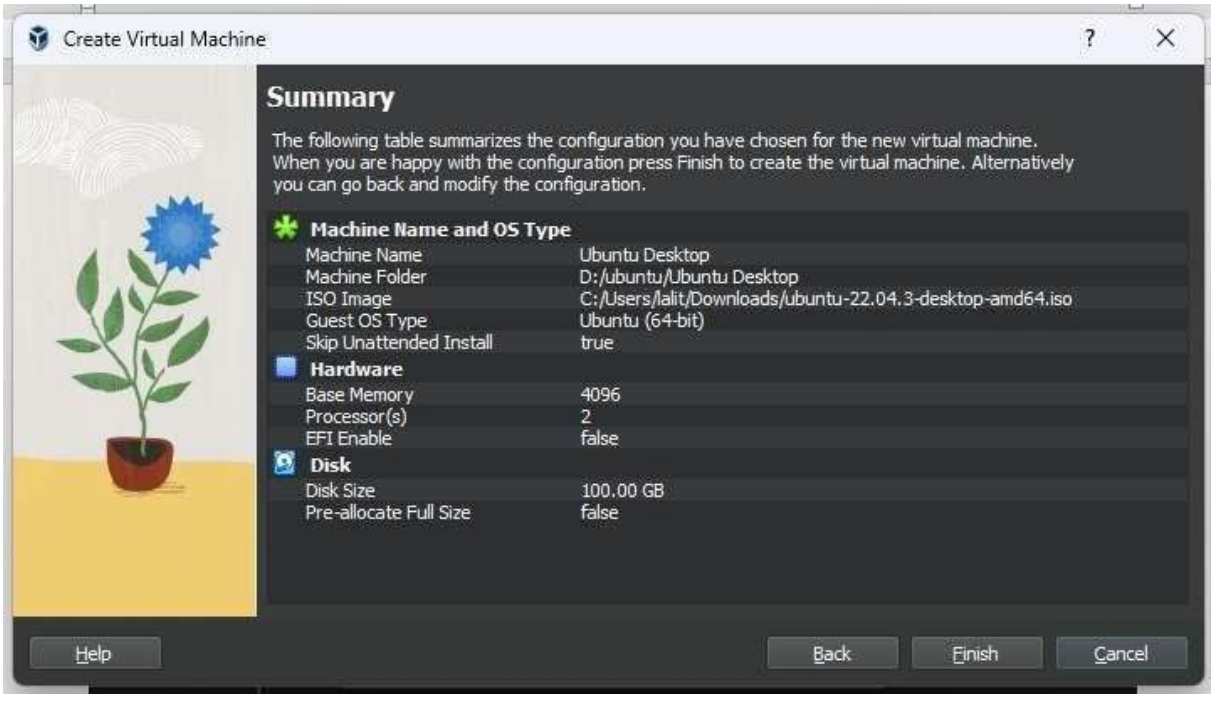

Oracle VM VirtualBox Manager
File Machine Help
Tools
Preferences
Import
Export
New
Add
Welcome to VirtualBox!
The left part of application window contains global tools and lists all virtual machines and virtual machine groups on your computer. You can import, add and create new VMs using corresponding toolbar buttons. You can popup a tools of currently selected element using corresponding element button.
You can press the F1 key to get instant help, or visit www.virtualbox.org for more information and latest news.

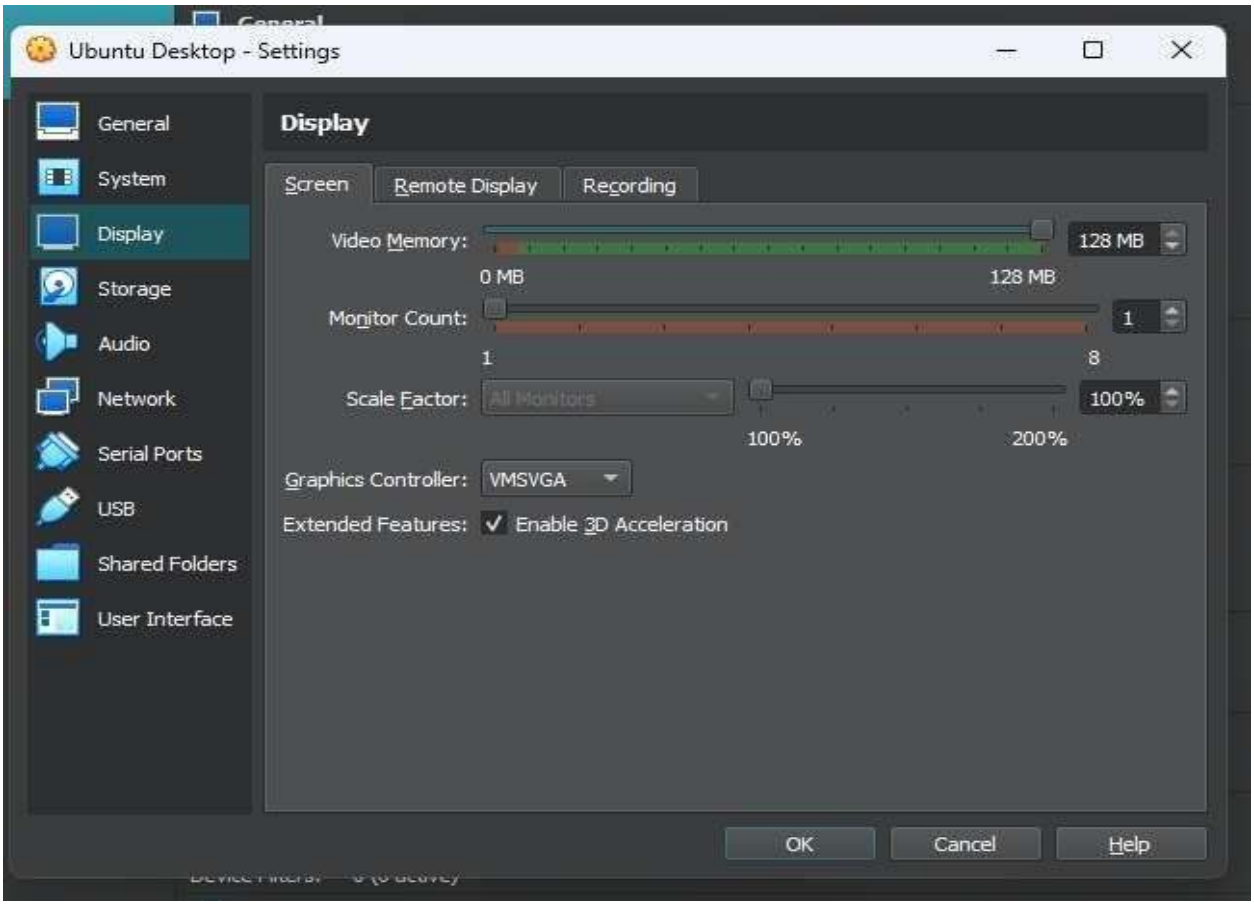

Create Virtual Machine
Virtual machine Name and Operating System
Please choose a descriptive name and destination folder for the new virtual machine. The name you choose will be used throughout VirtualBox to identify this machine. Additionally, you can select an ISO image which may be used to install the guest operating system.
Name: Ubuntu Desktop
Folder: D:\ubuntu
ISO Image: C:\Users\lalit\Downloads\ubuntu-22.04.3-desktop-amd64.iso
Edition:
Type: Linux
Version: Ubuntu (64-bit)
Skip Unattended Installation
You have selected to skip unattended guest OS install, the guest OS will need to be installed manually.
Help
Expert Mode
Back
Next
Cancel

‘

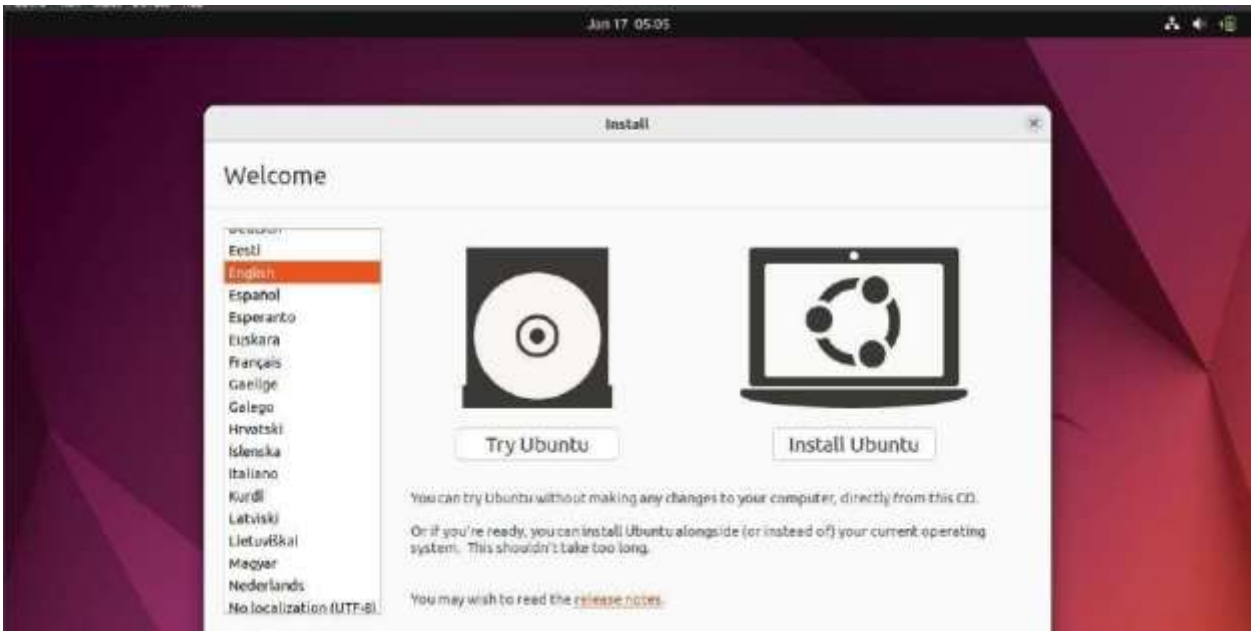

Create Virtual Machine
Hardware
You can modify virtual machine's hardware by changing amount of RAM and virtual CPU count.
Enabling EFI is also possible.
Base Memory:
4096 MB
4 MB
8192 MB
Processors:
2
1 CPU
8 CPUs
Enable EFI (special OSes only)
Help
Back
Next
Cancel

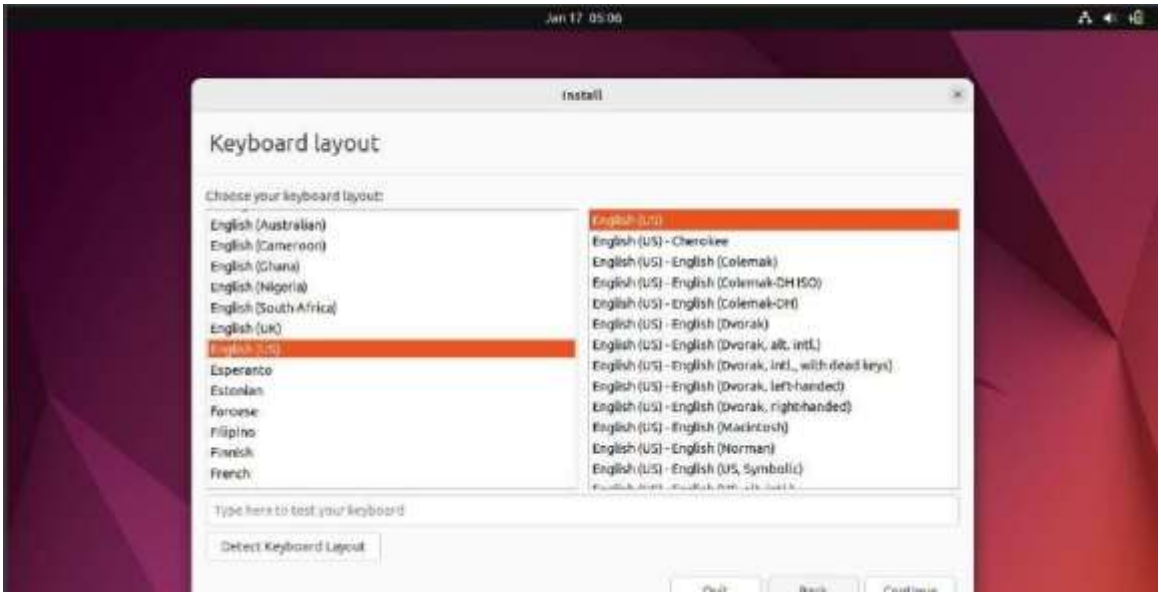

Create Virtual Machine
Virtual Hard disk
If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select an existing one. Alternatively you can create a virtual machine without a virtual hard disk.
Create a Virtual Hard Disk Now
Disk Size:
100.00 GB
4.00 MB
2.00 TB
Pre-allocate Full Size
Use an Existing Virtual Hard Disk File
Empty
Do Not Add a Virtual Hard Disk
Help
Back
Next
Cancel


Create Virtual Machine
Summary
The following table summarizes the configuration you have chosen for the new virtual machine. When you are happy with the configuration press Finish to create the virtual machine. Alternatively you can go back and modify the configuration.
Machine Name and OS Type
Machine Name Ubuntu Desktop
Machine Folder D:/ubuntu/Ubuntu Desktop
ISO Image C:/Users/lalit/Downloads/ubuntu-22.04.3-desktop-amd64.iso
Guest OS Type Ubuntu (64-bit)
Skip Unattended Install true
Hardware
Base Memory 4096
Processor(s) 2
EFI Enable false
Disk
Disk Size 100.00 GB
Pre-allocate Full Size false
Help
Back
Finish
Cancel

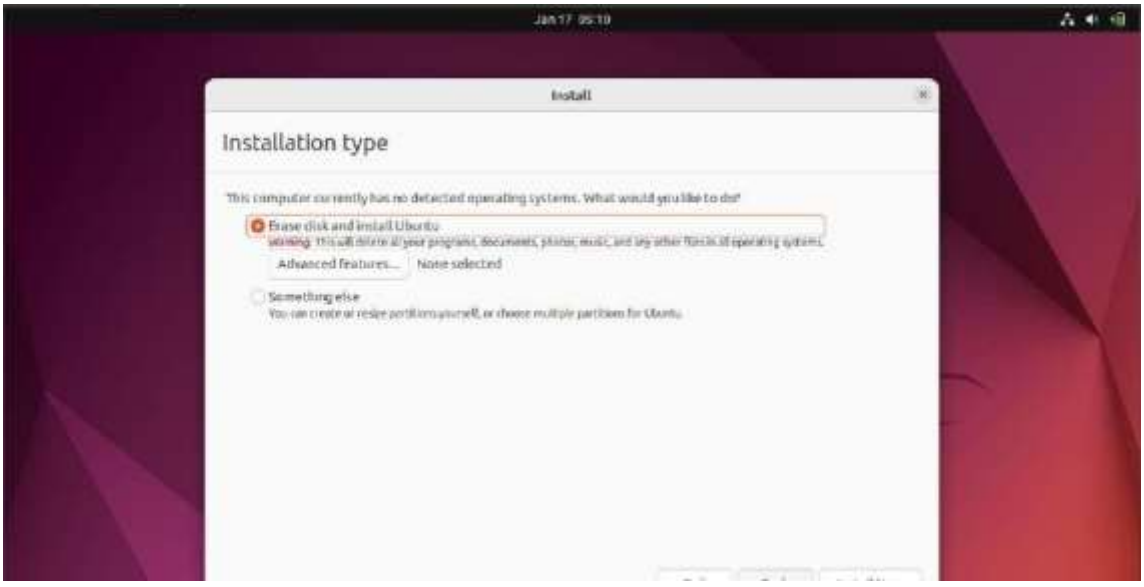

Ubuntu Desktop - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
Display
Screen
Remote Display
Recording
Video Memory:
128 MB
0 MB
128 MB
Monitor Count:
1
1
8
Scale Factor:
All Monitors
100%
100%
200%
Graphics Controller:
VMSVGA
Extended Features:
Enable 3D Acceleration
OK
Cancel
Help

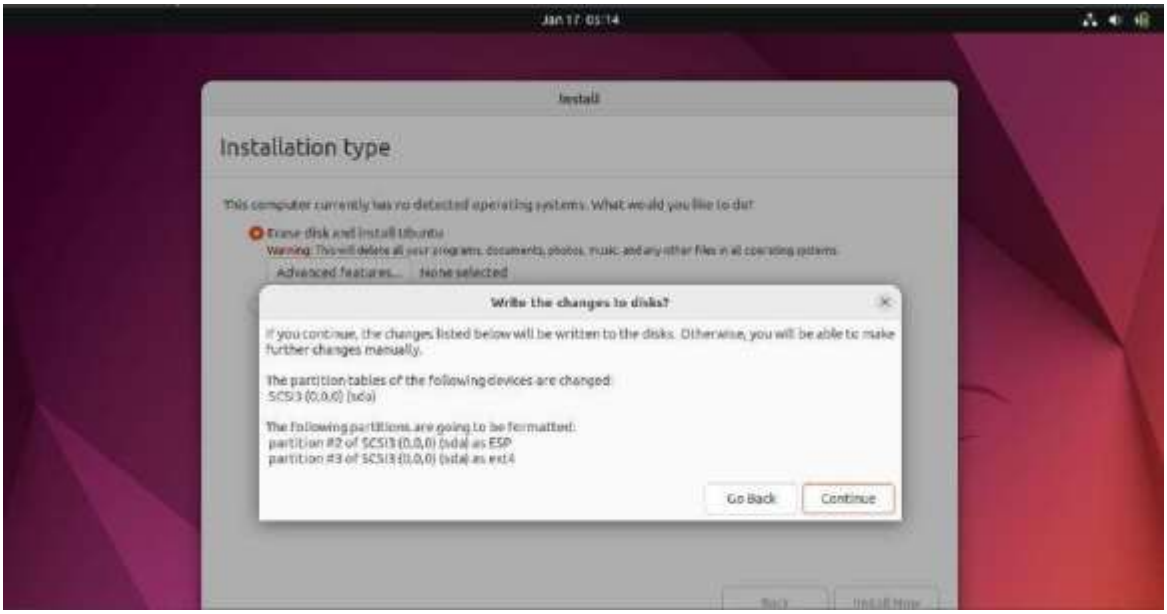

Ubuntu Desktop


Jan 17 05:05
Install
Welcome
Eesti
English
Español
Esperanto
Euskara
Français
Gaeilge
Galego
Hrvatski
Íslenska
Italiano
Kurdî
Latviski
Lietuviškai
Magyar
Nederlands
No localization (UTF-8)
Try Ubuntu
Install Ubuntu
You can try Ubuntu without making any changes to your computer, directly from this CD.
Or if you're ready, you can install Ubuntu alongside (or instead of) your current operating system. This shouldn't take too long.
You may wish to read the release notes.

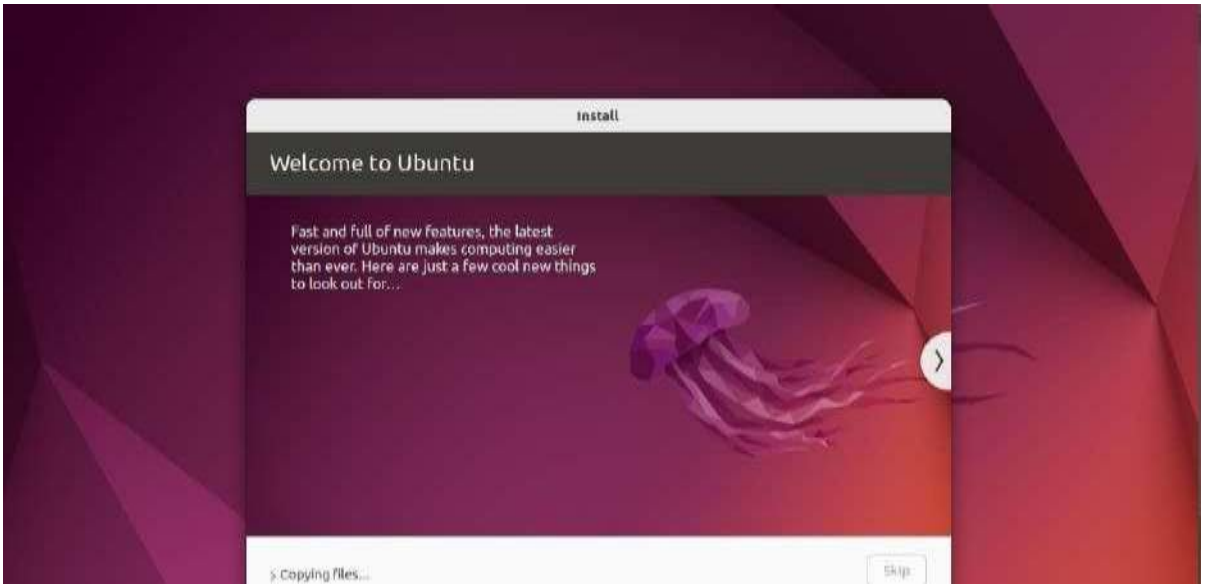

Jan 17 05:06
Install
Keyboard layout
Choose your keyboard layout:
English (Australian)
English (Cameroon)
English (Ghana)
English (Nigeria)
English (South Africa)
English (UK)
English (US)
Esperanto
Estonian
Faroese
Filipino
Finnish
French
English (US)
English (US) - Cherokee
English (US) - English (Colemak)
English (US) - English (Colemak-DH ISO)
English (US) - English (Colemak-DH)
English (US) - English (Dvorak)
English (US) - English (Dvorak, alt. intl.)
English (US) - English (Dvorak, intl., with dead keys)
English (US) - English (Dvorak, left-handed)
English (US) - English (Dvorak, right-handed)
English (US) - English (Macintosh)
English (US) - English (Norman)
English (US) - English (US, Symbolic)
Type here to test your keyboard
Detect Keyboard Layout

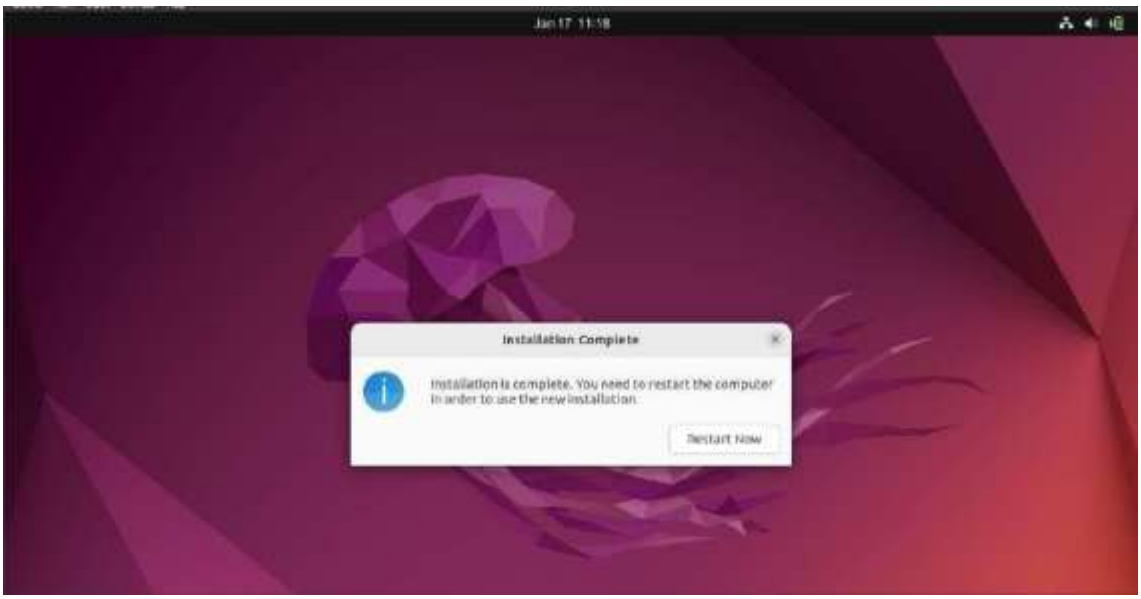

Jan 17 05:06
Install
Updates and other software
What apps would you like to install to start with?
Normal installation
Web browser, utilities, office software, games, and media players.
Minimal installation
Web browser and basic utilities.
Other options
Download updates while installing Ubuntu
This saves time after installation.
Install third-party software for graphics and Wi-Fi hardware and additional media formats
This software is subject to license terms included with its documentation. Some is proprietary.
Quit
Back
Continue


Jan 17 05:10
Install
Installation type
This computer currently has no detected operating systems. What would you like to do?
Erase disk and install Ubuntu
Advanced features...
None selected
Something else


Jan 17 05:14
Install
Installation type
This computer currently has no detected operating systems. What would you like to do?
Erase disk and install Ubuntu
Warning: This will delete all your programs, documents, photos, music, and any other files in all operating systems.
Advanced features... None selected
Write the changes to disks?
If you continue, the changes listed below will be written to the disks. Otherwise, you will be able to make further changes manually.
The partition tables of the following devices are changed:
SCSI3 (0,0,0) (sda)
The following partitions are going to be formatted:
partition #2 of SCSI3 (0,0,0) (sda) as ESP
partition #3 of SCSI3 (0,0,0) (sda) as ext4
Go Back
Continue


Install
Where are you?
Kolkata
Back
Continue


Install
Welcome to Ubuntu
Fast and full of new features, the latest version of Ubuntu makes computing easier than ever. Here are just a few cool new things to look out for...
Copying files...
Skip


Installation Complete
Installation is complete. You need to restart the computer in order to use the new installation.
Restart Now


Atharva
Ubuntu

To run commands in CL

Pwd: shows the present working directory

Ls: lists all the contents in pwd.

cd: stands for change directory & mkdir: stands for make directory

```
atharva@atharva-VirtualBox:~$ pwd
/home/atharva
atharva@atharva-VirtualBox:~$ cd DevOps
atharva@atharva-VirtualBox:~/DevOps$ ls
 DevOps_Practical2
 DevOps_Practice1
'Exp 2 sample-project-20250131'
'git hub token ghp Opt76r3Fvl3SgK98JN4cnD2YyAtHMU0w63eE.txt'
atharva@atharva-VirtualBox:~/DevOps$ mkdir DevOps_Practical1
```

Rmdir: stands for remove directory

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ mkdir dir1
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ ls
dir1
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ rmdir dir1
```

cat : it is used to view the contents of a file in the terminal window itself

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ nano text.txt
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ ls
text.txt
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ cat text.txt
Hello,My Name is Atharva Vasant Angre
```

Touch : creates a file in pwd with the given filename.

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ touch test
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ ls
test  text.txt
```

cp: copies the contents of one file to another.

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ cp text.txt test
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ ls
test  text.txt
```

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ cat test
Hello,My Name is Atharva Vasant Angre
```

echo: used to display any text on the CLI.

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ echo "Hello, MCA"
Hello, MCA
```

Hostname: displays the hostname of the machine

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ hostname
atharva-VirtualBox
```

Ping: it is used to ping any ip address of choice

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ ping 1.1.1.1
PING 1.1.1.1 (1.1.1.1) 56(84) bytes of data.
64 bytes from 1.1.1.1: icmp_seq=1 ttl=255 time=9.48 ms
64 bytes from 1.1.1.1: icmp_seq=2 ttl=255 time=9.86 ms
64 bytes from 1.1.1.1: icmp_seq=3 ttl=255 time=9.22 ms
64 bytes from 1.1.1.1: icmp_seq=4 ttl=255 time=9.82 ms
^C
--- 1.1.1.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3006ms
rtt min/avg/max/mdev = 9.222/9.594/9.857/0.262 ms
```

ln & ln -s: used to create hard links and soft links respectively
ls -ltr: lists all the files and directories with all the properties.

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ ln test gt
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ readlink test
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ ls -ltr
total 12
-rw-rw-r-- 1 atharva atharva 38 Jan 31 10:57 text.txt
-rw-rw-r-- 2 atharva atharva 38 Jan 31 10:59 test
-rw-rw-r-- 2 atharva atharva 38 Jan 31 10:59 gt
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ cat gt
Hello,My Name is Atharva Vasant Angre
```

Here you can see the content of the hardlink “gt” which was created previously

Grep: it is used to search specific texts in a file

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ cat gt | grep Atharva
Hello,My Name is Atharva Vasant Angre
```

here echo is combined with the **tee** command to insert the echo message in the hardlink file

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ echo "Hey Atharva" | tee gt
Hey Atharva
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ cat gt
Hey Atharva
```

As you can see, the contents of the the file Githubtoken has been changed too as it’s hardlink “gt” was changed

Wc: is used to show the word count of a file

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ wc test
 1  2 12 test
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ cat test
Hey Atharva
```

Here we create a file using the **touch** command and then we use the **nano** text editor to edit the contents of the file.
The **sort** command is used to sort the contents of the file in alphabetical order

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ touch days.txt
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ nano days.txt
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ sort days.txt

friday
monday
staurday
sunday
thursday
tuesday
wednesday
```

The **gzip** command is used to create a zip of any file

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ gzip days.txt
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ ls
days.txt.gz  gt  test  text.txt
```

The **gzip -dv** is used to decompress the zip file

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ gzip -dv days.txt.gz
days.txt.gz:     27.6% -- replaced with days.txt
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ cat days.txt
sunday
monday
tuesday
wednesday
thursday
friday
staurday
```

The **awk** command is used a filter where we can specify which words and contents of the file do we wish to retrieve

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ awk '/sunday/{print}' days.txt
sunday
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ awk '{print}' days.txt
sunday
monday
tuesday
wednesday
thursday
friday
staurday
```

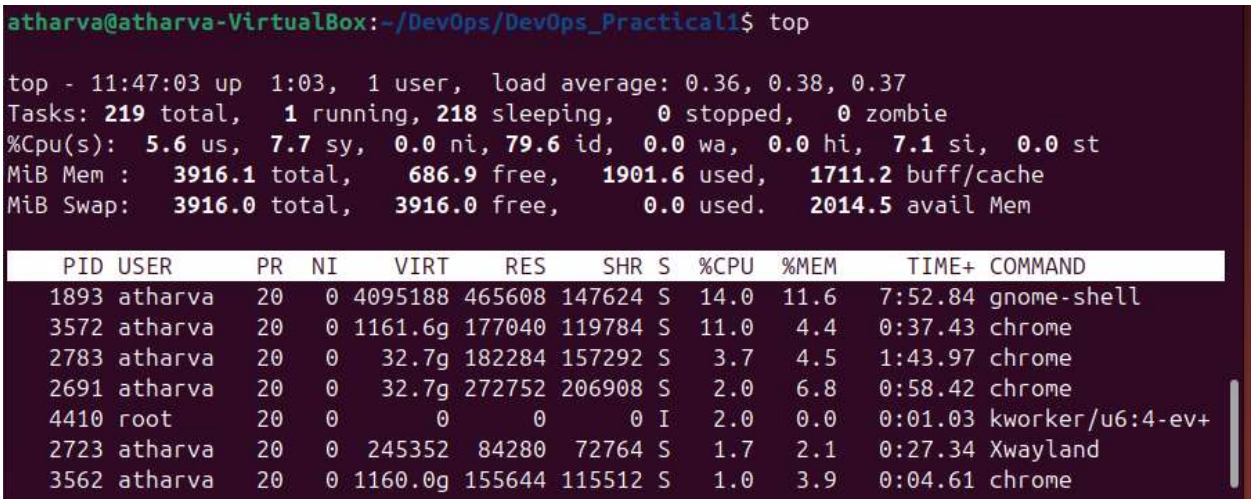
The **systemctl** command is used to show all the running process in the system, the same can be done with **htop** as well.

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ systemctl list-unit-files --type service -all
UNIT FILE                                  STATE           PRESET
accounts-daemon.service                    enabled         enabled
alsa-restore.service                       static          -
alsa-state.service                         static          -
alsa-utils.service                         masked          enabled
anacron.service                            enabled         enabled
apparmor.service                           enabled         enabled
apport-autoreport.service                  static          -
apport-coredump-hook@.service              static          -
apport-forward@.service                    static          -
apport.service                             enabled         enabled
apt-daily-upgrade.service                  static          -
apt-daily.service                          static          -
apt-news.service                           static          -
autovt@.service                            alias           -
avahi-daemon.service                       enabled         enabled
bluetooth.service                          enabled         enabled
bolt.service                               static          -
brltty-udev.service                        static          -
brltty.service                             disabled        enabled
lines 1-20...skipping...
UNIT FILE                                  STATE           PRESET
```

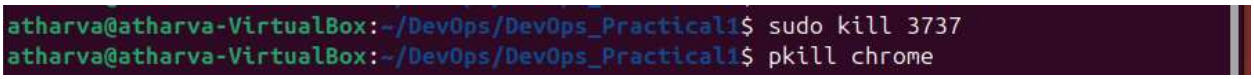
Here we use the **grep** command to filter out running processes.

```
atharva@atharva-VirtualBox:~/DevOps/DevOps_Practical1$ sudo systemctl | grep running
[sudo] password for atharva:
  proc-sys-fs-binfmt_misc.automount                                                loaded active running  Arbitrary Executable File Formats File System Automount Point
  cups.path                                                                        loaded active running  CUPS Scheduler
  init.scope                                                                       loaded active running  System and Service Manager
  session-2.scope                                                                  loaded active running  Session 2 of User atharva
  accounts-daemon.service                                                          loaded active running  Accounts Service
  avahi-daemon.service                                                             loaded active running  Avahi mDNS/DNS-SD Stack
  colord.service                                                                   loaded active running  Manage, Install and Generate Color Profiles
  cron.service                                                                     loaded active running  Regular background program processing daemon
  cups-browsed.service                                                             loaded active running  Make remote CUPS printers available locally
  cups.service                                                                     loaded active running  CUPS Scheduler
  dbus.service                                                                     loaded active running  D-Bus System Message Bus
  fwupd.service                                                                    loaded active running  Firmware update daemon
  gdm.service                                                                      loaded active running  GNOME Display Manager
```

We use the **top** command to show the list of all processes, and we can identify the process ID using this command



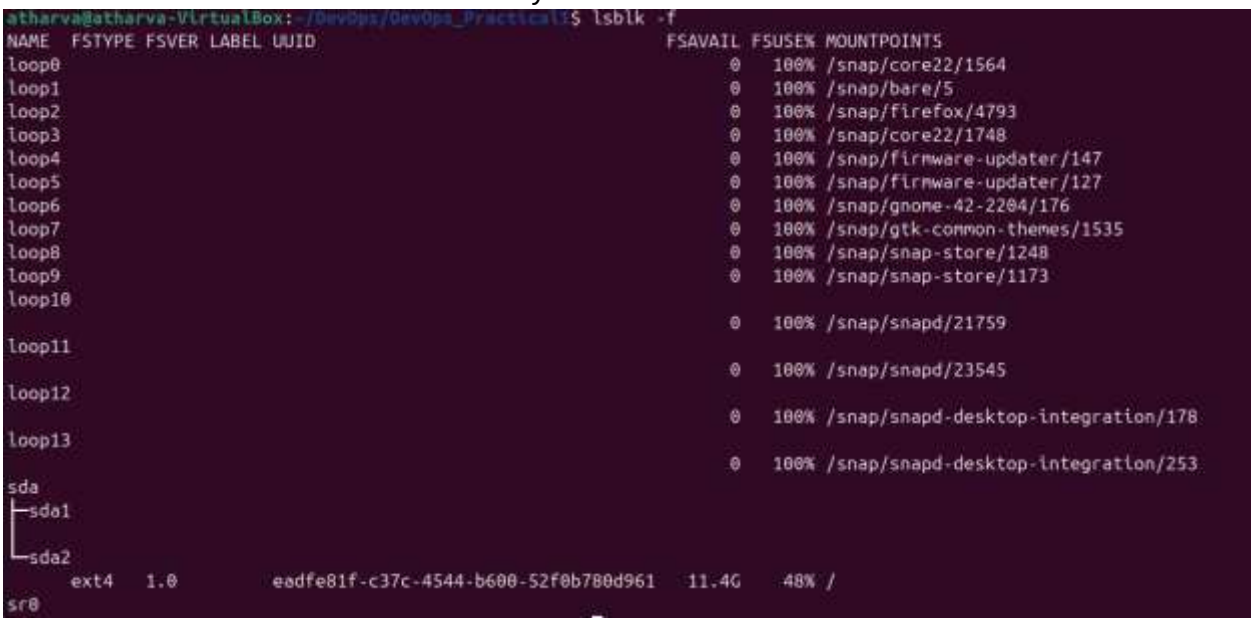
Once we identify the process we want to kill, we can use the command **sudo kill PID**, to kill the process successfully.
Processes can be killed using their name too



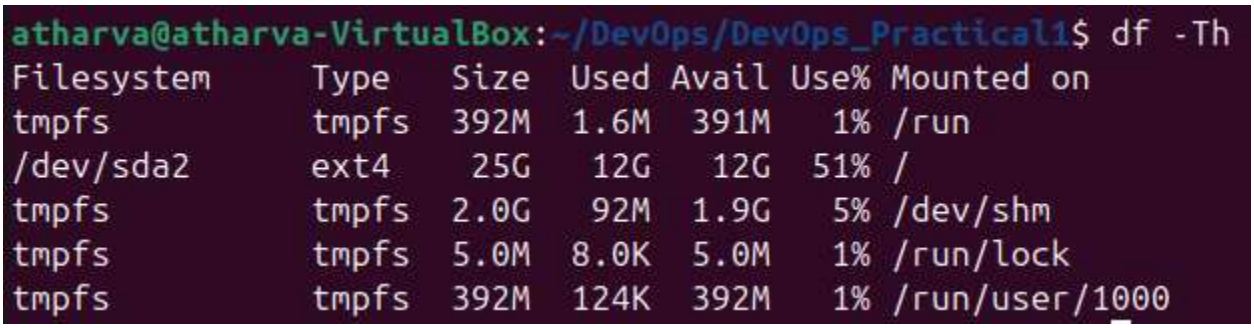
File structure of linux:
The file system in Linux follows a hierarchical structure, and it is a key component of the operating system that organizes and stores data. Here's a brief overview of the main directories and their purposes in the Linux file system:

1. / (Root Directory): The top-level directory and the starting point for the entire file system.
2. /bin (Binary Binaries): Contains essential binary executables that are required for the system to function in single-user mode.
3. /boot: Contains the Linux kernel, initial ramdisk, and other files necessary for the system boot process.
4. /dev (Device): Contains device files representing hardware devices in the system.
5. /etc (Etcetera): Houses system-wide configuration files and startup scripts.
6. /home: Home directories for user accounts are located here.
7. /lib (Library): Essential shared libraries needed by system binaries are stored in this directory.
8. /media: Mount points for removable media devices, such as USB drives.
9. /mnt (Mount): Mount points for temporary mounts by the system administrator.
10. /opt (Optional): Typically used for installing third-party software or additional packages.
11. /proc (Process): A virtual file system that provides information about running processes and system status.
12. /root: The home directory for the root user.
13. /run: A directory for system runtime data, often used by system services.
14. /sbin (System Binaries): Contains system administration binaries, usually reserved for root.
15. /srv (Service): Data for services provided by the system.
16. /tmp (Temporary): Used for temporary files that may be deleted between system reboots.
17. /usr (User): Secondary hierarchy for read-only user data and programs.
18. /var (Variable): Variable files such as log files, spool files, and temporary files.

The lsblk -f can be used to view the file system in CLI.



Same can be done using the command df -Th



Conclusion: In this practical, we see how we can install ubuntu on our systems, we also find out how to use various types of basic, filter, text editor commands and their use cases. Lastly we find out about the file system of linux and how we can view the same in the CLI