

**Assignment 2: Basics of Linux and Open-Source Tools**

**Course: Computer Science Fundamentals & Career Pathways  
(ETCCCP105)**

**Programme: B.Tech CSE (FULL STACK  
DEVELOPMENT)**

**Semester: 1**

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**Assignment Title: Demonstrating Linux Setup, Command Usage, and Automation Through Practical Implementation**

### **1. Introduction:**

Linux is one of the most powerful and flexible operating systems used in both academics and industry. It is open-source, secure, and widely used for programming, networking, and server management.

This assignment helped me understand how Linux works and how to use it for daily tasks. I learned to install Ubuntu, use different terminal commands, write shell scripts, and upload my work to GitHub. Doing

**everything step by step made me realize how important command-line practice is for programmers.**

### **1. Linux Installation:**

I installed Ubuntu 22.04 using VirtualBox on my Windows 11 system.  
The system configuration was:

- Processor: AMD Ryzen 77445HS
- RAM: 16 GB
- Disk Space: 100 GB allocated for Ubuntu

### **Installation Steps:**

1. Downloaded the Ubuntu ISO file from the official website.
2. Installed **Oracle VirtualBox** and created a new virtual machine.
3. Allocated memory, storage, and attached the ISO file.
4. Started the VM and followed on-screen steps to install Ubuntu.
5. Created a username and password for login.

6. After installation, updated the system using the command:

All screenshots are attested below this page

## How to Install virtual box and ubuntu

A screenshot of a search results page from a dark-themed search engine. The search bar at the top contains the text "virtualbox". Below the search bar, there are tabs for "Ask", "All" (which is selected), "Images", "News", "Videos", and "Goggles". The main content area displays the official Oracle VirtualBox website. The website features a logo with a blue square containing a white 'V' and the text "Oracle VirtualBox" followed by "virtualbox.org". A brief description of VirtualBox is provided: "VirtualBox is a general-purpose full virtualization software for x86\_64 hardware (with version 7.1 additionally for macOS/Arm and with version 7.2 also for Windows/Arm), targeted at laptop, desktop, server and embedded use." Below this, there are two sections: "Downloads" and "Download VirtualBox for Linu...". The "Downloads" section includes links for "VirtualBox 7.2 (active maintenance)" and "VirtualBox 7.1 (active maintenance)...". The "Download VirtualBox for Linu..." section includes links for "Download\_Old\_Builds\_6\_1" and "The Extension Packs in this section are released under the VirtualBox Personal...".

## Powerful open source virtualization

For personal and  
enterprise use

VirtualBox is a general-purpose full virtualization software for x86\_64 hardware (with version 7.1 additionally for macOS/Arm and with version 7.2 also for Windows/Arm), targeted at laptop, desktop, server and embedded use.

[Get Started](#)

[Download](#)

Download  
VirtualBox binaries  
and platform  
packages

### VirtualBox Platform Packages

- VirtualBox 7.2.4 platform packages
-  [Windows hosts](#)
  -  [macOS / Intel hosts](#)
  -  [macOS / Apple Silicon hosts](#)
  -  [Linux distributions](#)
  -  [Solaris hosts](#)
  -  [Solaris 11 IPS hosts](#)

Platform packages are released  
under the terms of the [GPL version 3](#)

### VirtualBox Extension Pack

VirtualBox 7.2.4 Extension Pack

This VirtualBox Extension Pack Personal Use and Educational License governs your access to and use of the VirtualBox Extension Pack. It does not apply to the VirtualBox base package and/or its source code, which are licensed under version 3 of the GNU General Public License

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## VirtualBox 7.2.4 platform packages

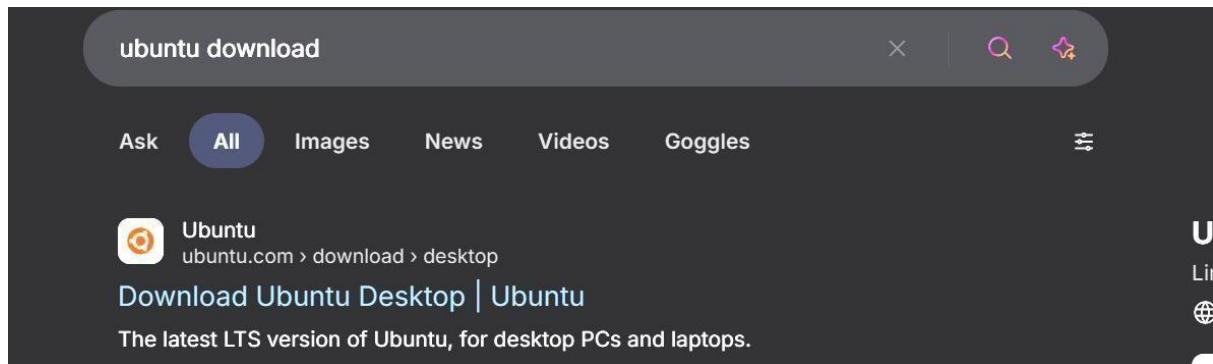


### Windows hosts

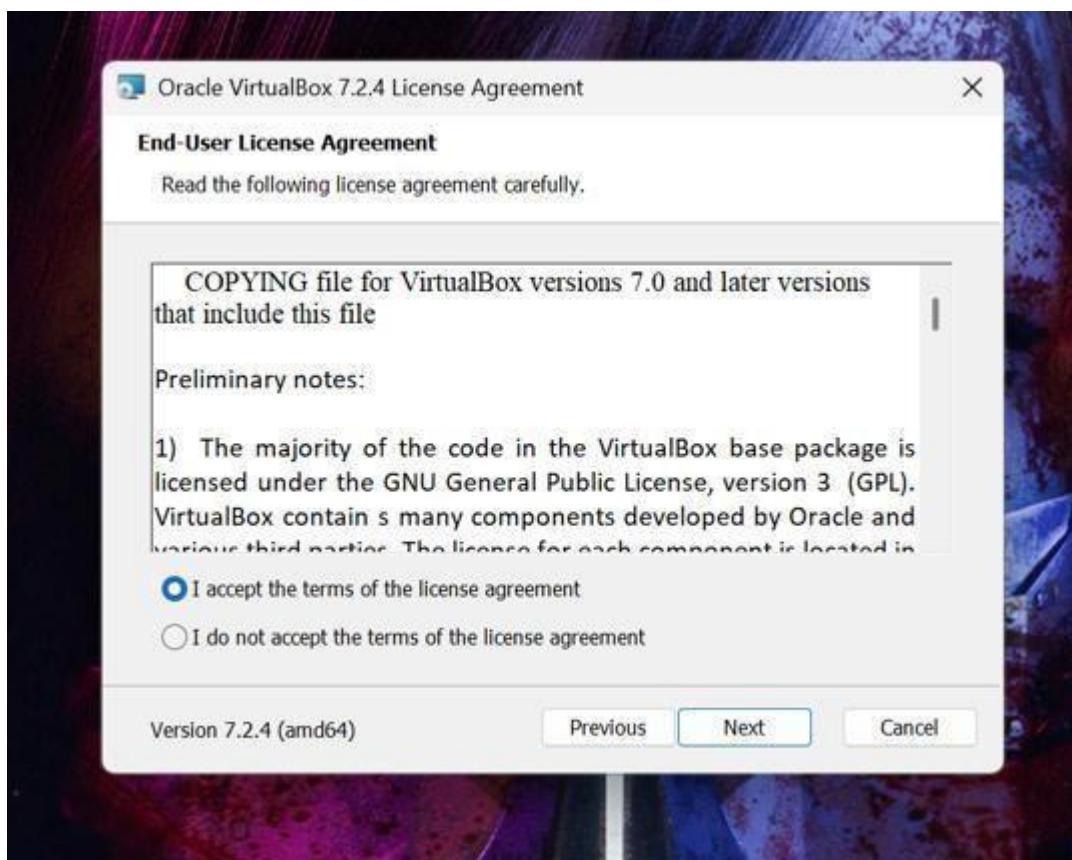
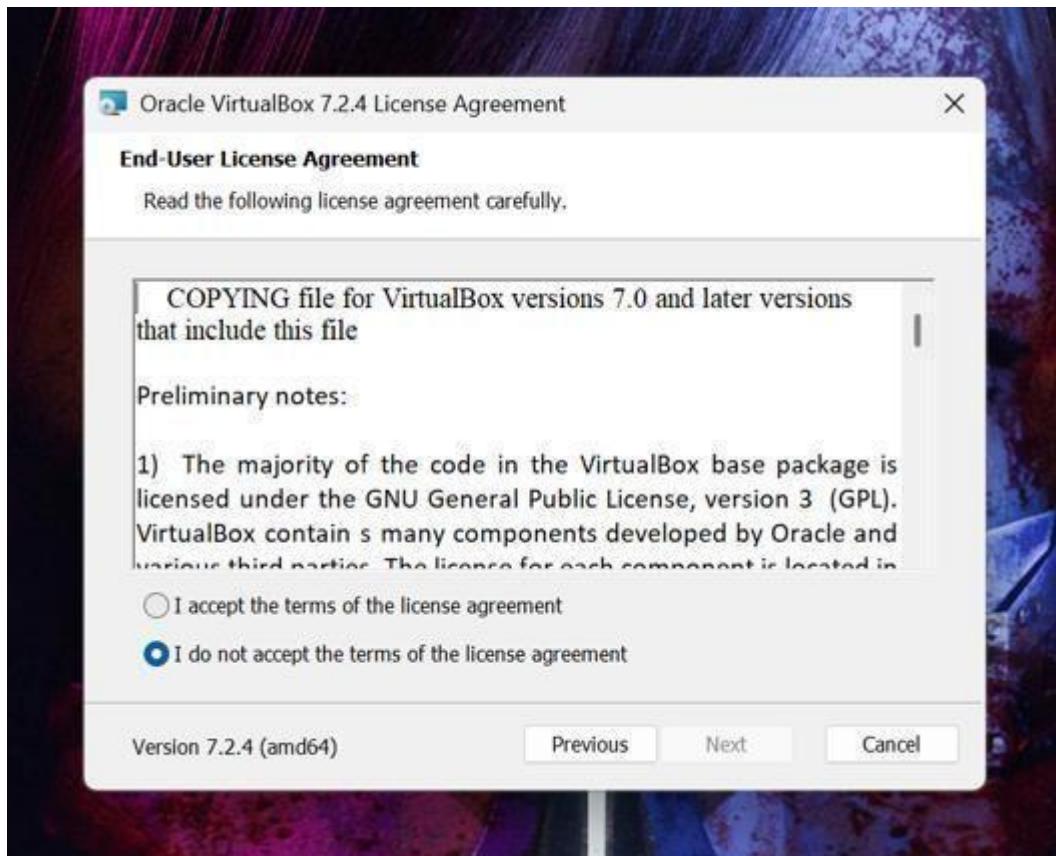
## Powerful open source virtualization

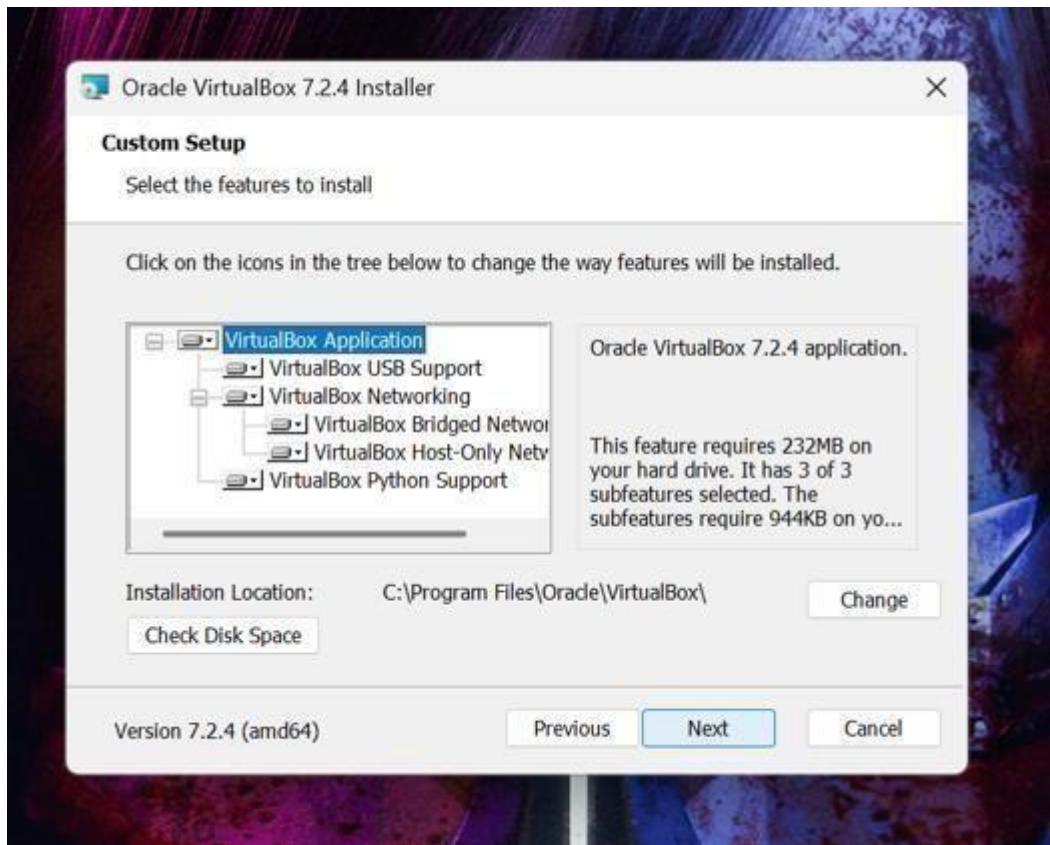
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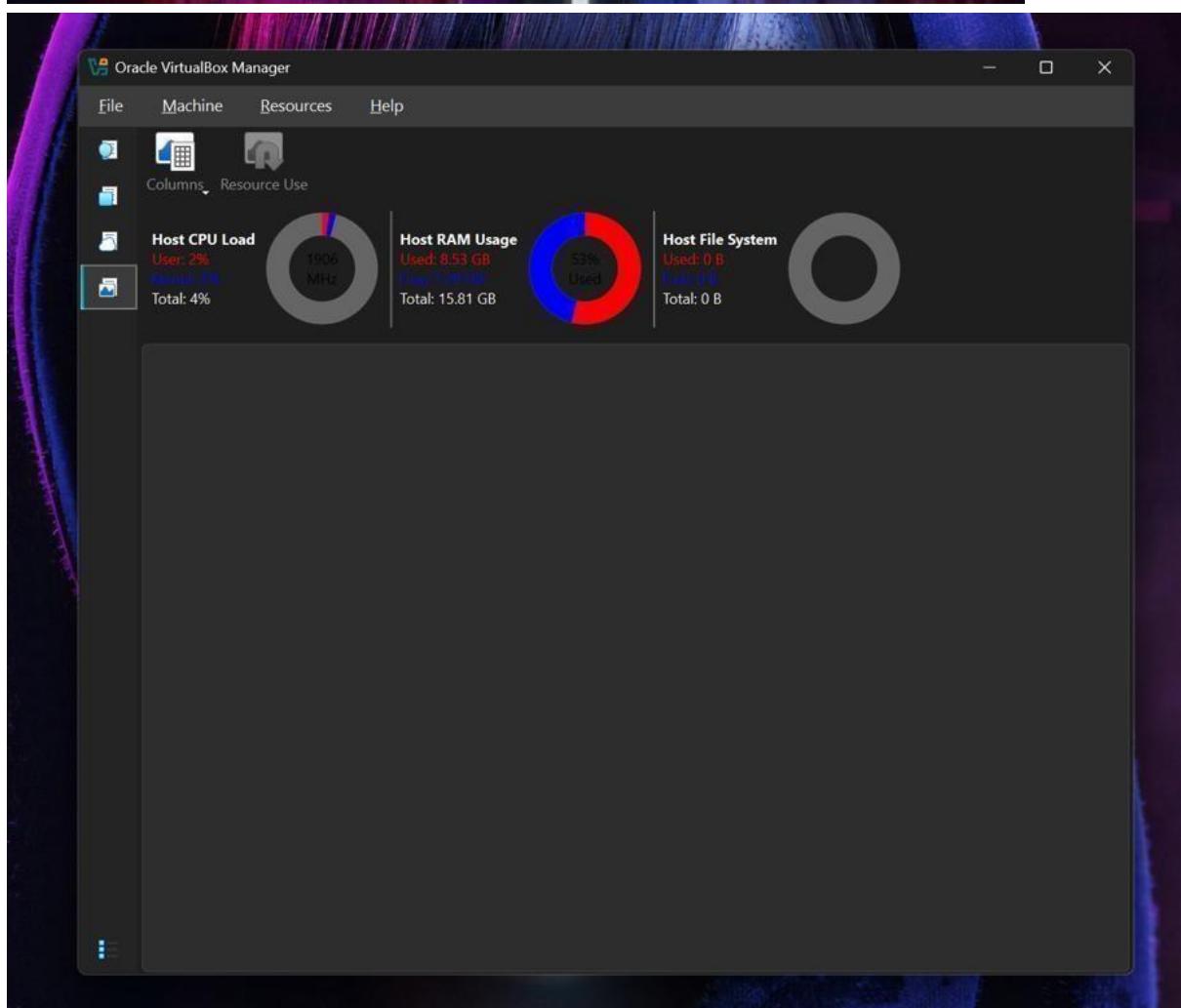
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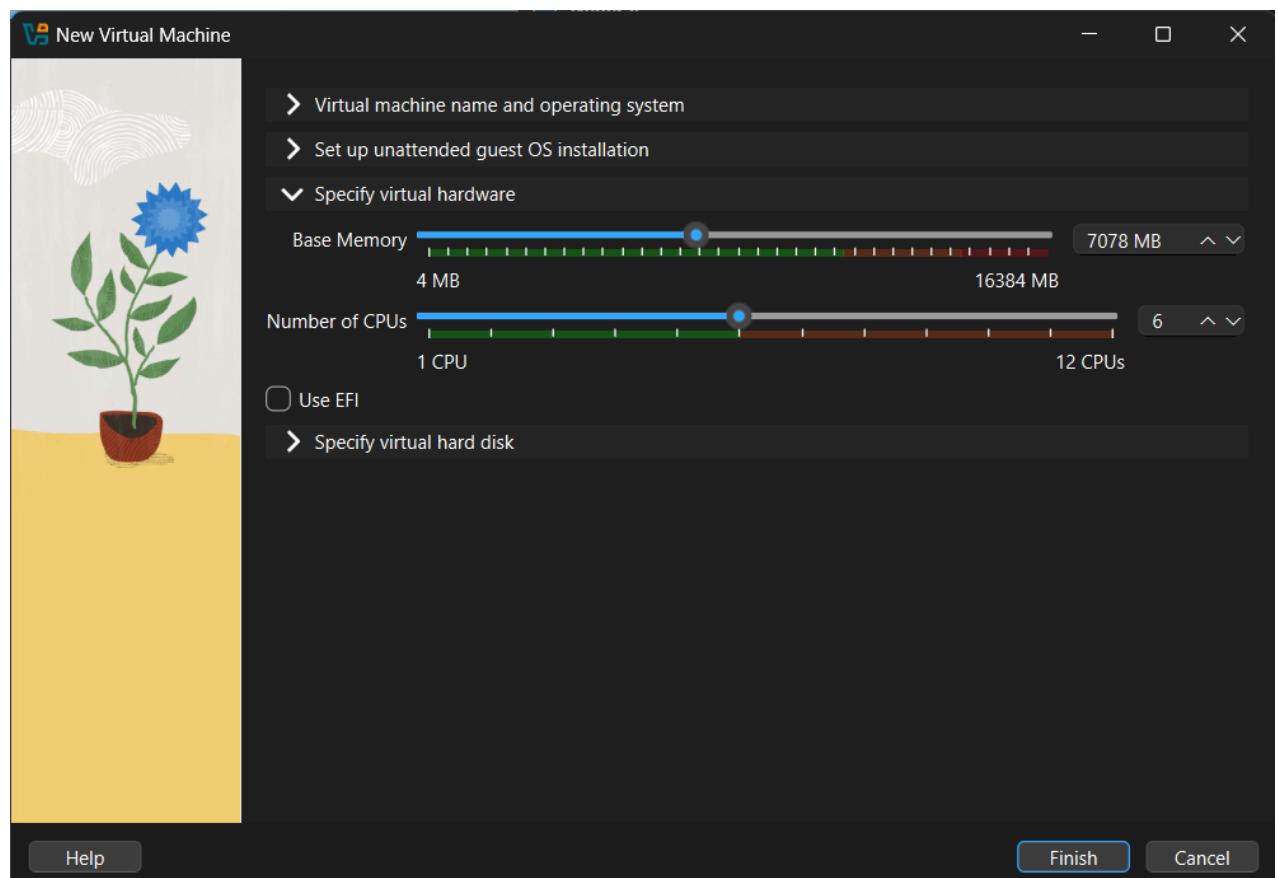
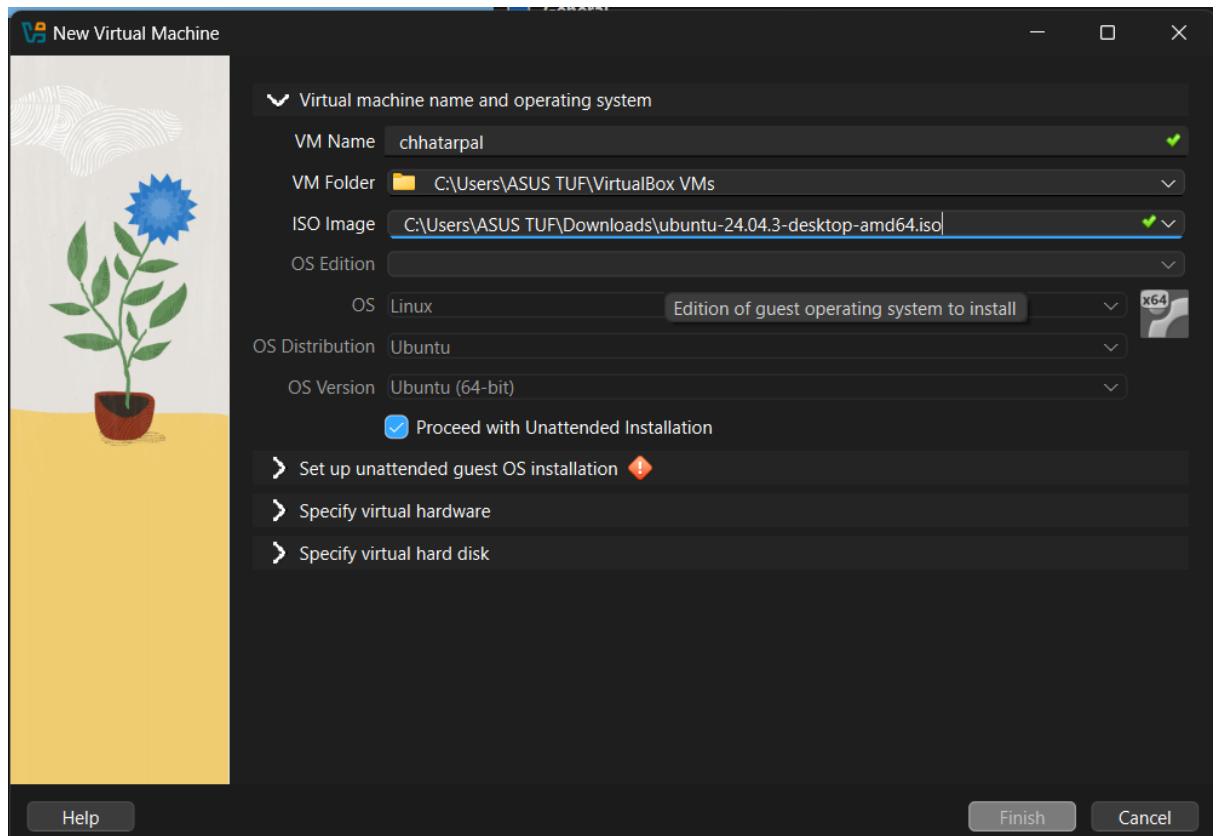


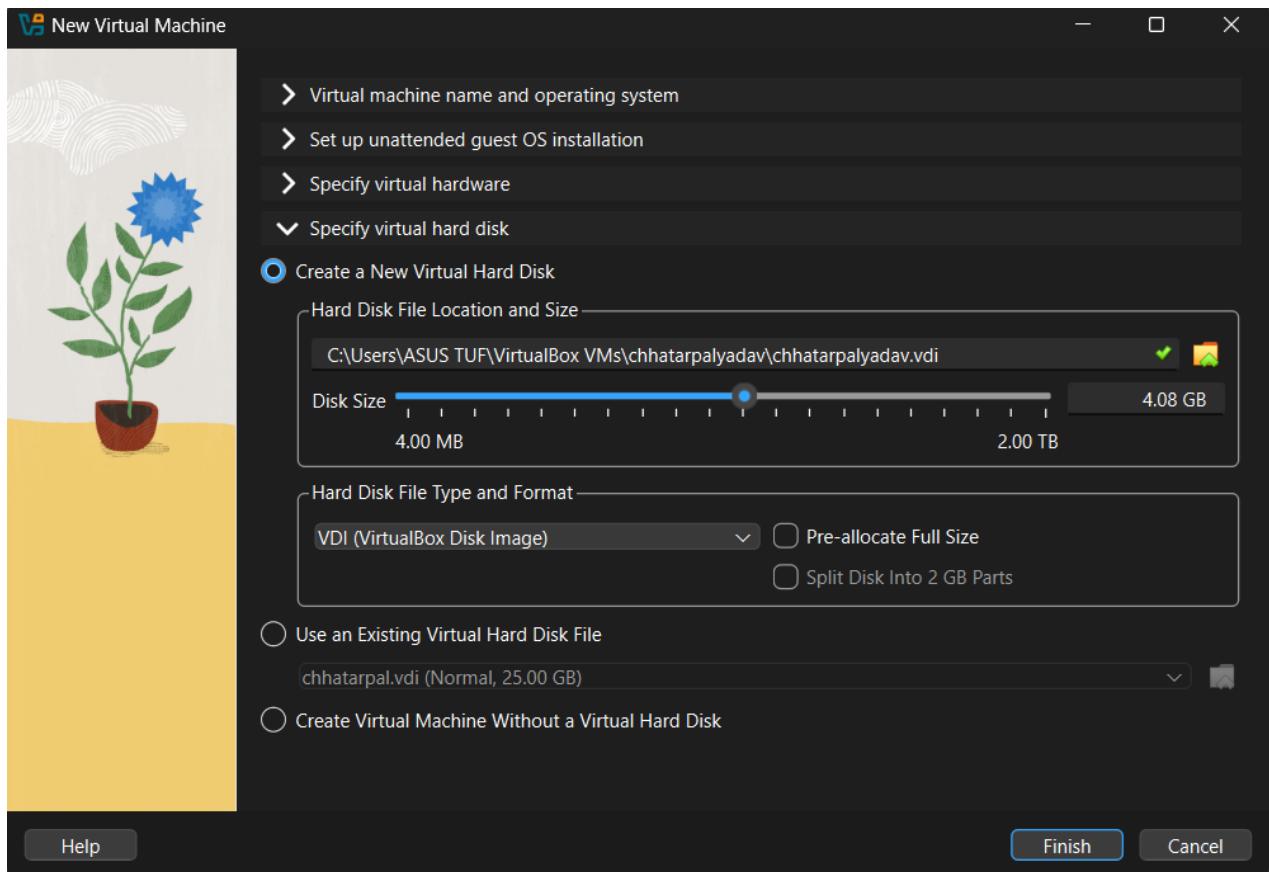
## How to setup virtual box and ubuntu











## . Shell Commands And Their Use

I performed more than 20 Linux commands and noted their use.  
Below are some examples:

Command	Syntax / Example Purpose / Description	
pwd	pwd	Shows current working directory.
ls	ls -l	Lists all files and folders in a directory.
cd	cd Documents	Changes the current directory.
mkdir	mkdir myfolder	Creates a new folder.

rmdir	rmdir myfolder	Removes an empty directory.
cp	cp file1.txt backup/	Copies a file to another location.
mv	mv file.txt newname.txt	Moves or renames a file.
rm	rm file.txt	Deletes a file.
cat	cat notes.txt	Displays contents of a file.
touch	touch newfile.txt	Creates an empty file.
chmod	chmod 755 file.sh	Changes file permissions.
chown	chown user:user file.txt	Changes file ownership.
ps	ps	Shows running processes.
<b>Command</b>	<b>Syntax / Example</b>	<b>Purpose / Description</b>
top	top	Displays system performance.
kill	kill 1234	Kills a process using its PID.
ping	ping google.com	Checks network connectivity.
ifconfig	ifconfig	Displays network interface details.
clear	clear	Clears the terminal screen.
whoami	whoami	Displays current logged-in user.
tree	tree	Shows folder structure in tree form.

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

PS C:\WINDOWS\System32> pwd
Path
---
C:\WINDOWS\System32

PS C:\WINDOWS\System32> cd
PS C:\WINDOWS\System32> ping google.com

Pinging google.com [142.250.76.78] with 32 bytes of data:
Reply from 142.250.76.78: bytes=32 time=3ms TTL=117

Ping statistics for 142.250.76.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 3ms, Average = 3ms
PS C:\WINDOWS\System32> tree
Folder PATH listing for volume OS
Volume serial number is D2FD-DB9F
C:.
|---%userprofile%
```

```
Windows PowerShell
x + v
SmbWitness
StartLayout
Storage
StorageBusCache
TroubleshootingPack
└── en-US
VMDirectStorage
VpnClient
└── en-GB
    └── en-US
Wdac
WindowsDeveloperLicense
WindowsErrorReporting
WindowsSearch
└── en
WindowsUpdate
WinHttpProxy
Schemas
└── PSMaml
SessionConfig
winevt
└── Logs
    └── TraceFormat
WinMetadata
winrm
└── 0409
zh-CN
zh-hk
zh-TW
PS C:\WINDOWS\System32> |
```

## 4. Shell Script Development

I wrote three small shell scripts as part of the assignment. Each one was tested on Ubuntu.

## a) Backup Script

**File name:** backup.sh #!/bin/bash # Script to back up a folder with timestamp

```
src="/home/user/Documents"
dest="/home/user/backup" timestamp=$(date
+%Y%m-%d_%H-%M-%S)
```

```
mkdir -p "$dest" cp -r "$src"
"$dest/backup_$timestamp"
```

```
echo "Backup completed successfully at
$timestamp."
```

## **b) CPU/ Memory Monitoring Script**

**File name:** monitor.sh #!/bin/bash # Script to log CPU and Memory usage

```
logfile="/home/user/system_usage.log"
```

```
echo "System usage on $(date)" >> $logfile top -b -
n1 | head -n 10 >> $logfile echo "-----
-----" >> $logfile
```

```
echo "System usage logged successfully."
```

## C)File download Script

**File name:** download.sh  
#!/bin/bash # Script to download a file using wget

```
url="https://example.com/sample.pdf"  
dest="/home/user/Downloads"
```

```
wget -P $dest $url
```

```
echo "File downloaded to $dest"
```

. This is the whole assignment

This assignment was a very good learning experience.

At first, using the terminal was confusing, but with practice, I started understanding how powerful it is. I learned how to automate tasks using simple scripts and how GitHub helps in saving and sharing code.

It also helped me realize the importance of open-source software in the real world. The most challenging part was writing correct syntax in shell scripts, but after testing and debugging, it became easier.