	Experiment No : 1 **Date : 2nd Feb 2025**
Title	**Linux Operating System and Installation of Linux**
Aim	To Study Linux Operating system and Installation of Linux
Hardware Requirement	Personal Computer
Software Requirement	Linux Operating System(Ubuntu) Ver 20.04
Theory	**What is an Operating System?** A program that acts as an intermediary between a user of a computer and the computerhardware. ➢ Operating system goals: ➢ Execute user programs and make solving user problems easier. ➢ Make the computer system convenient to use. ➢ Use the computer hardware in an efficient manner. **Computer System Structure** ➢ Computer system can be divided into four components: • Hardware – provides basic computing resources o CPU, memory, I/O devices ➢ Operating system • Controls and coordinates use of hardware among various applications and users ➢ Application programs – define the ways in which the system resources are used tosolve the computing problems of the users • Word processors, compilers, web browsers, database systems, video games ➢ Users • People, machines, other computers

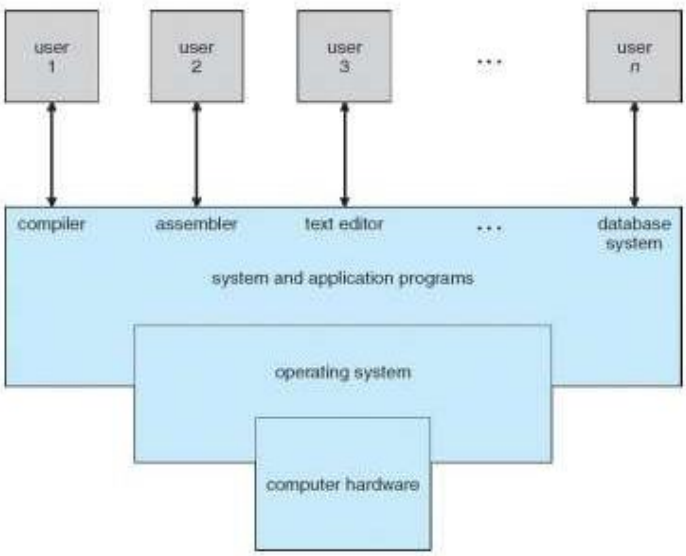

Fig.Component of Operating System

What Operating Systems Do?

- Depends on the point of view
- Users want convenience, ease of use
  - Don't care about resource utilization
- Users of dedicate systems such as workstations have dedicated resources butfrequently use shared resources from servers
- Handheld computers are resource poor, optimized for usability and battery life
- Some computers have little or no user interface, such as embedded computers indevices and automobiles

Operating System Definition

- OS is a resource allocator
  - Manages all resources
  - Decides between conflicting requests for efficient and fair resource use
- OS is a control program
  - Controls execution of programs to prevent errors and improper use of thecomputer

Function of Operation

- Memory Management
- Processor Management
- Device Management

- File Management
- Network Management
- Security
- Control over system performance
- Job accounting
- Error detecting aids
- Coordination between other software and users

Linux

- Just like Windows, iOS, and Mac OS, Linux is an operating system. In fact, one of the mostpopular platforms on the planet, Android, is powered by the Linux operating system.
- An operating system is software that manages all of the hardware resources associated withyour desktop or laptop

Linux vs Windows

Sr. No.	Key	Linux	Windows
1	Open Source	Linux is Open Source and is free to use.	Windows is not open source and is not free to use.
2	Case sensitivity	Linux file system is case sensitive.	Windows file system is case insensitive.
3	kernel type	Linux uses monolithic kernel.	Windows uses micro kernel.
4	Efficiency	Linux is more efficient in operations as compared to Windows.	Windows is less efficient in operations.
5	Path Seperator	Linux uses forward slash as path seperator between directories.	Windows uses backward slash as a path seperator.
6	Security	Linux is highly secure as compared to Windows.	Windows provides less security as compared to Linux.
7	Cost Incurred	Linux is free to use for everyone.	Windows do not come free for any user.

	8	Efficiency	In the case of operations, Linux is way more efficient than Windows.	For operations, Windows are comparatively way less efficient than Linux.	
	9	Uses in Hacking	People generally use Linux for the systems that are hacking-based.	Windows is not a very efficient OS for hacking purposes as compared to Linux	

Installation

Different ways to Install Linux

1.Bootable USB Drive

a.Universal USB Installer

b.Ubuntu ISO file (www.ubuntu.com/ download)

2.Live CD

a.Ubuntu ISO file (www.ubuntu.com/ download)

b.Write ISO file on CD

3.Virtual Box

a. Virtual Box Software

b. Source of ISO File(www.ubuntu.com/ download)

4.Remote Installation(LAN/Website)

a. LAN – ISO File(www.ubuntu.com/ download)

Distribution /Distro – based on Linux kernel

a.RedHat

b.Slackware

c.Debian

Specific use of Distros

Linux Distribution	Name	Description
	**Arch**	This **Linux Distro** is popular amongst **Developers.** It is an independently developed system. It is designed for users who go for a **do-it-yourself (DIY)**approach.
	**CentOS**	It is one of the most used Linux Distribution for **Enterprise and web servers.** It is a free enterprise class Operating system and is based heavily on **Red Hat enterprise Distro.**
	**Debian**	**Debian** is a stable and popular non-commercial Linux distribution. It is widely used as a **desktop Linux Distro** and is user-oriented. It strictly acts within the Linux protocols.

		**Fedora**	Another Linux **kernel based Distro**, Fedora is supported by the Fedora project, an endeavor by Red Hat. It is popular among **desktop users**. Its versions are known for their short life cycle.
		**Gentoo**	It is a **source based Distribution** which means that you need to configure the code on your system before you can install it. It is not for Linux beginners, but it is sure fun for **Experienced Users.**
		**LinuxMint**	It is one of the most popular **Desktop Distributions** available out there. It launched in 2006 and is now considered to be the **fourth most used Operating system** in the computing world.
		**OpenSUSE**	It is an easy to use and a good alternative to MS Windows. It can be easily set up and can also run on **small computers** with obsolete configurations.
		**RedHat enterprise**	Another popular **Enterprise based Linux Distribution** is Red Hat Enterprise.It has evolved from Red Hat Linux which was discontinued in 2004. It is a commercial Distro and very popular among its clientele.
		**Slackware**	**Slackware** is one of the oldest **Linux kernel based OS's.** It is another easy desktop Distribution. It aims at being a **'Unix like'** OS with minimal changes to its kernel.
		**Ubuntu**	This is the **third most popular desktop operating system** after Microsoft Windows and Apple Mac OS. It is based on the **Debian Linux Distribution**, and it is known as its **desktop environment.**
Installation Steps			

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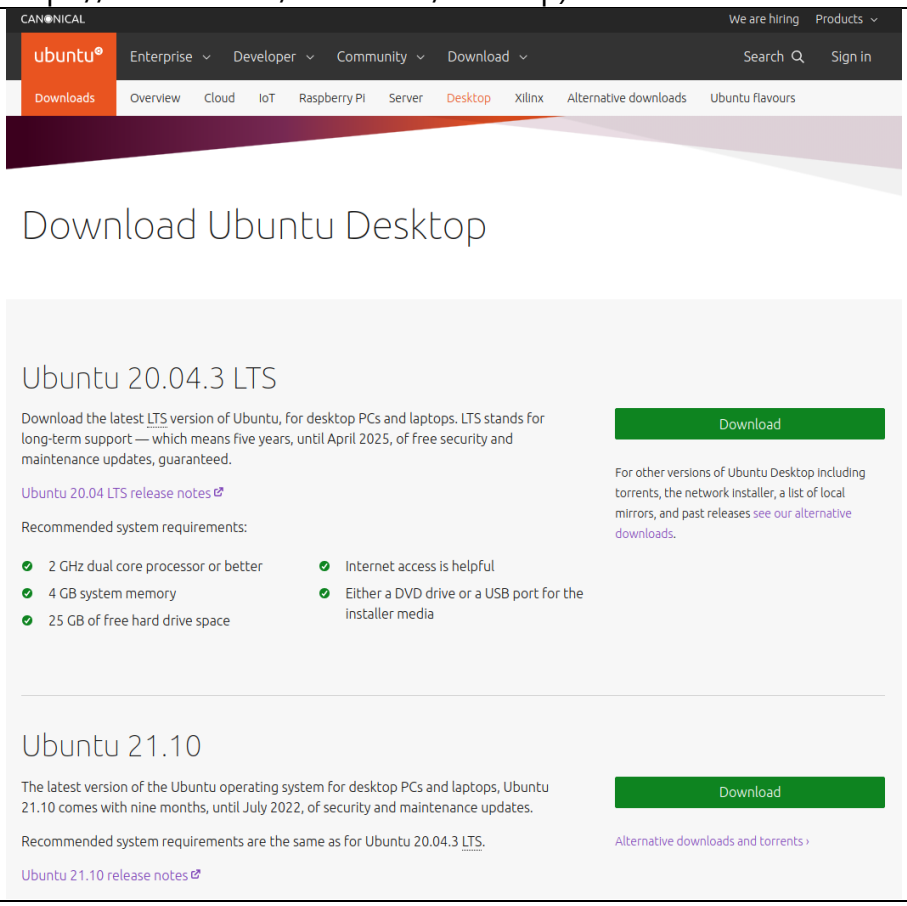
	Step-1 : Download an Ubuntu Image Download image of the Ubuntu 20.04 LTS release.(https://ubuntu.com/download/desktop)
	
	Step-2 : Create a Bootable USB stick To install Ubuntu Desktop, you need to write your downloaded ISO to a USB stick to create the installation media. This is not the same as copying the ISO, and requires some bespoke software. Use **balenaEtcher**, as it runs on Linux, Windows and Mac OS. Choose the version that corresponds to your current operating system, download and install the tool.

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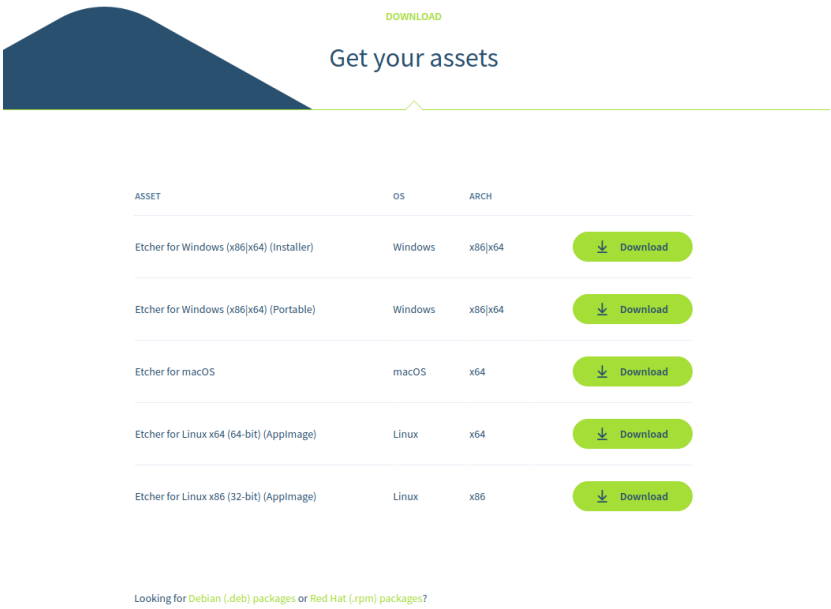
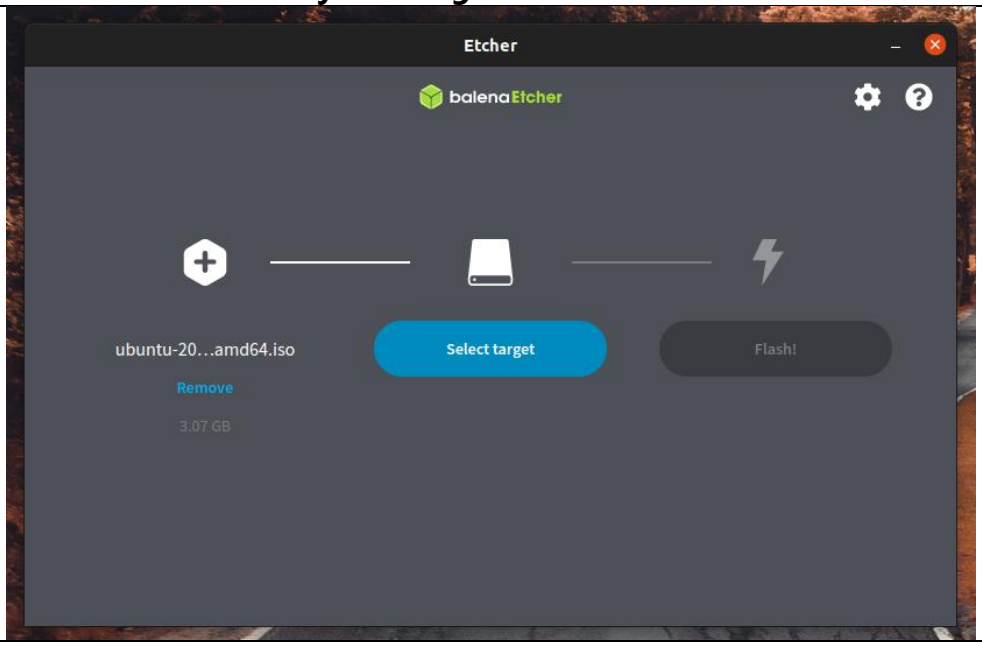
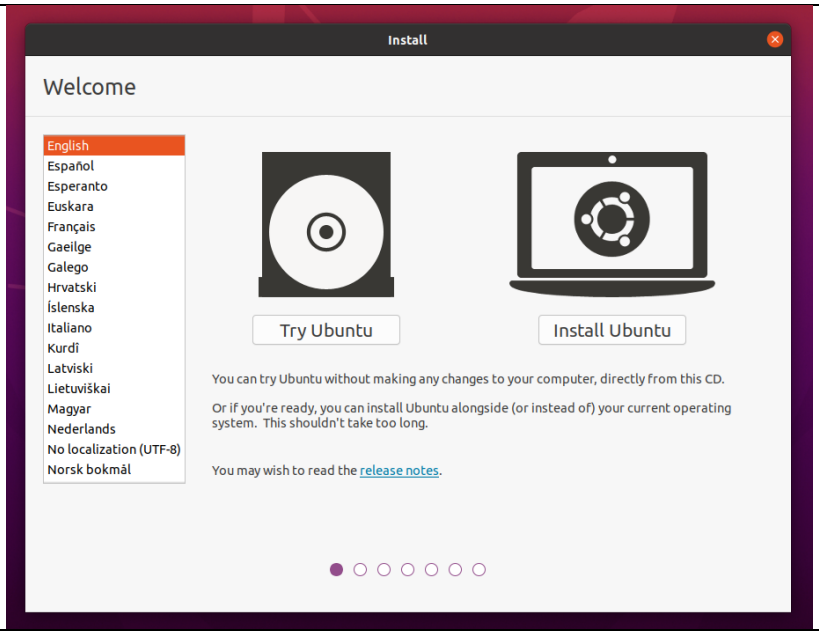


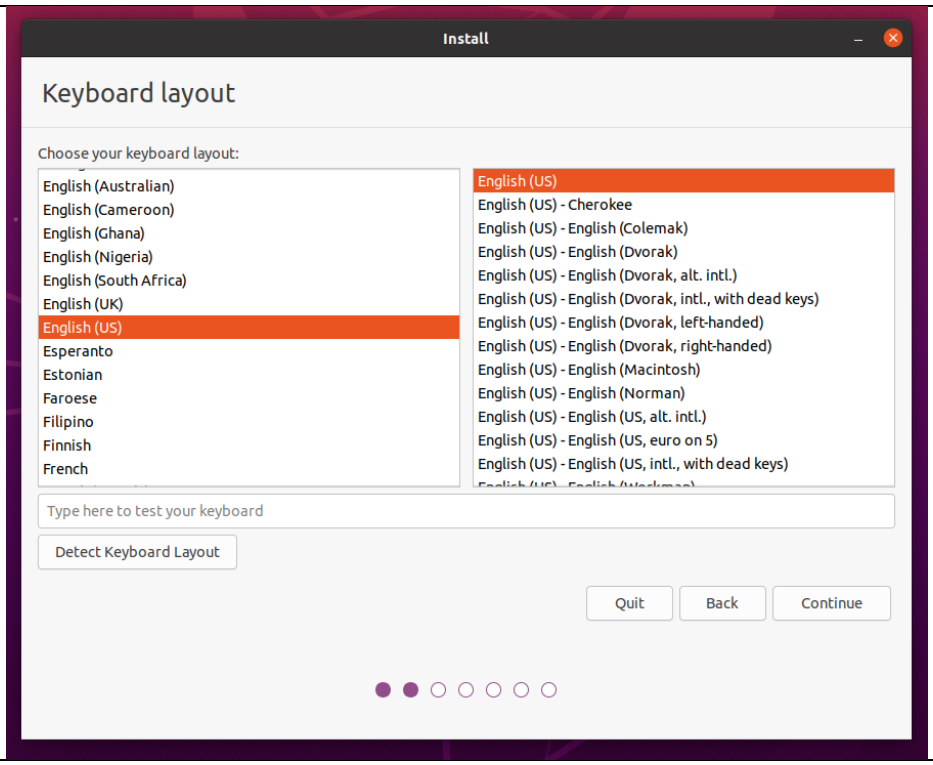
Select your downloaded ISO, choose your USB flash drive, and then click Flash! to install your image.



Installing Ubuntu from a DVD

It's also possible to install Ubuntu from a DVD instead of USB. Follow these guides to burn an Ubuntu installation DVD on Windows, MacOS or Ubuntu, then select the CD drive instead of USB device on the boot options screen in the following step.

	Step-3 : Boot from USB flash drive Insert the USB flash drive into the laptop or PC you want to use to install Ubuntu and boot or restart the device. It should recognise the installation media automatically. If not, try holding F12 during startup and selecting the USB device from the system-specific boot menu. You should now see the welcome screen inviting you to either try or install Ubuntu.
	
	To proceed, click Install Ubuntu. You will be asked to select your keyboard layout. Once you've chosen one, click Continue.

<table>
<tr><td></td><td> 
</td></tr>
<tr><td></td><td>Step-4 : Installation Setup
Next, you will be prompted to choose between the Normal installation and Minimal installation options. The minimal installation is useful for those with smaller hard drives or who don’t require as many pre-installed applications.
In Other options, you will be prompted to download updates as well as third-party software that may improve device support and performance (for example, Nvidia graphics drivers) during the installation. It is recommended to check both of these boxes.
If you are not currently connected to the internet, you will be prompted to do so at this point. Ensure you are able to remain connected throughout the installation.</td></tr>
<tr><td></td><td></td></tr>
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	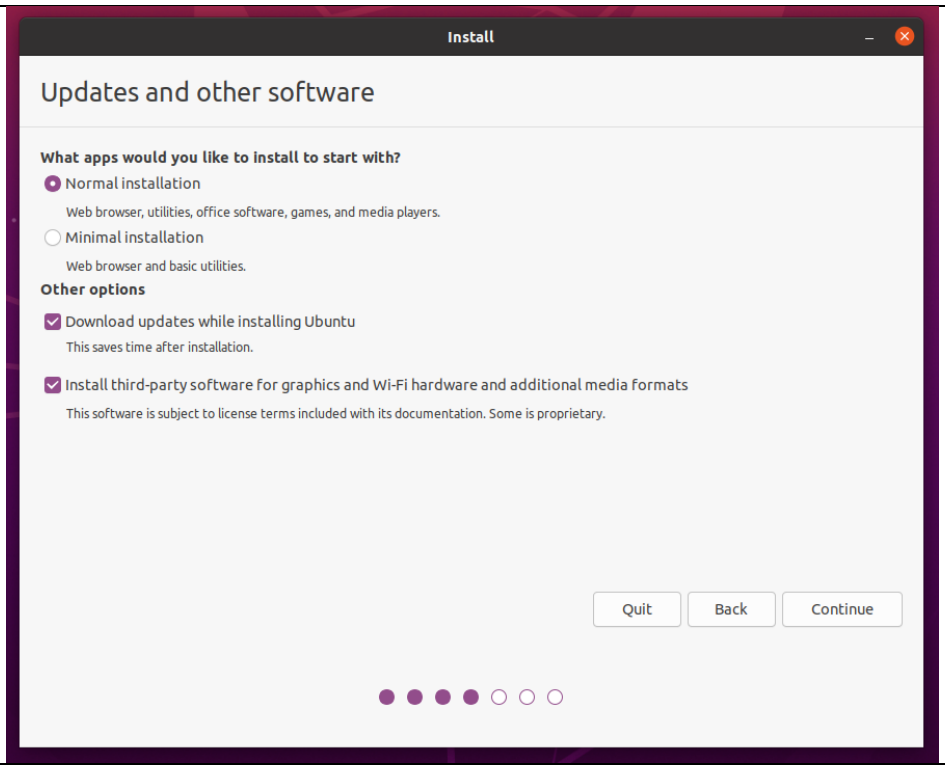
	Step-5 Drive Management This screen allows you to configure your installation. If you would like Ubuntu to be the only operating system on your device, select Erase disk and install Ubuntu.

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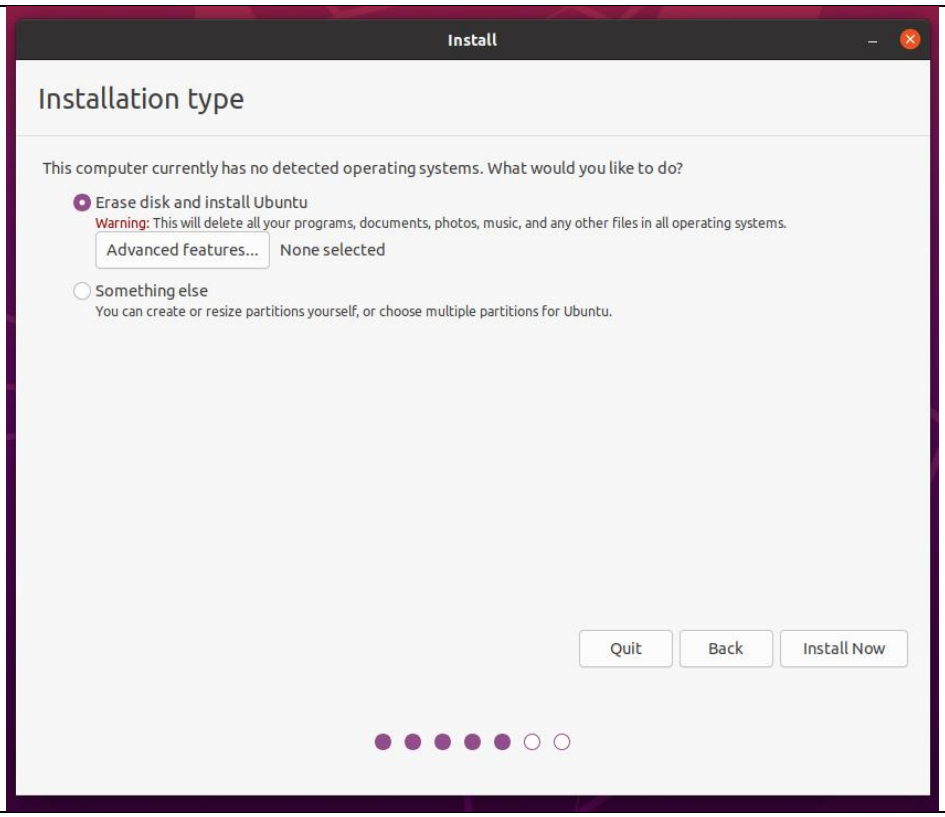
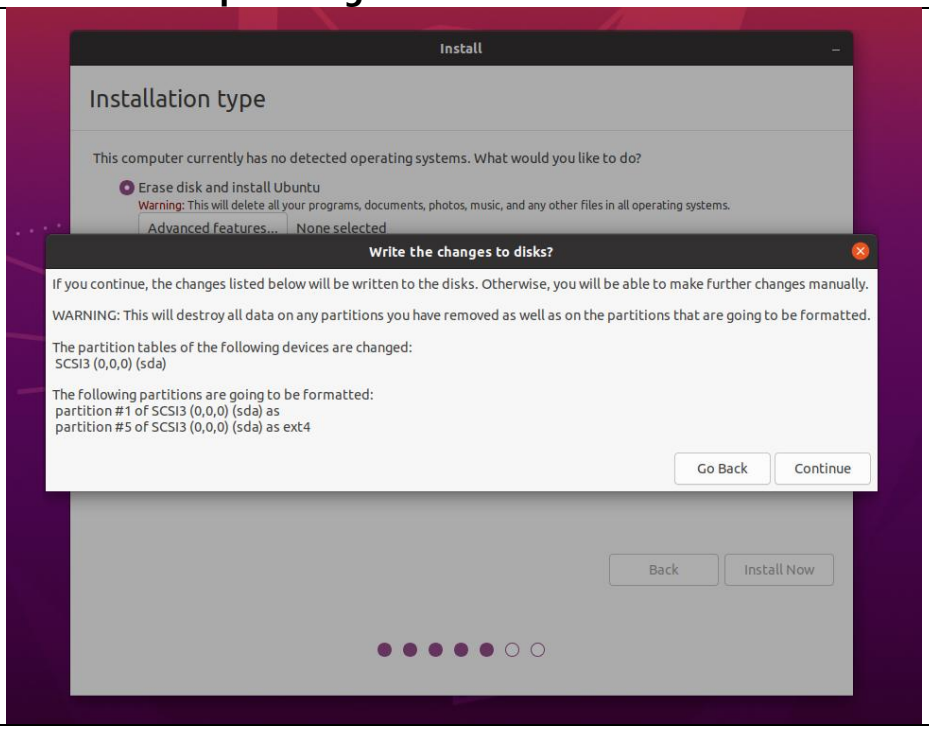
<tr><td></td><td> 
</td></tr>
<tr><td></td><td>If you are happy to continue the installation without enabling encryption, click Install Now and confirm the changes with Continue. Otherwise keep reading.</td></tr>
<tr><td></td><td> 
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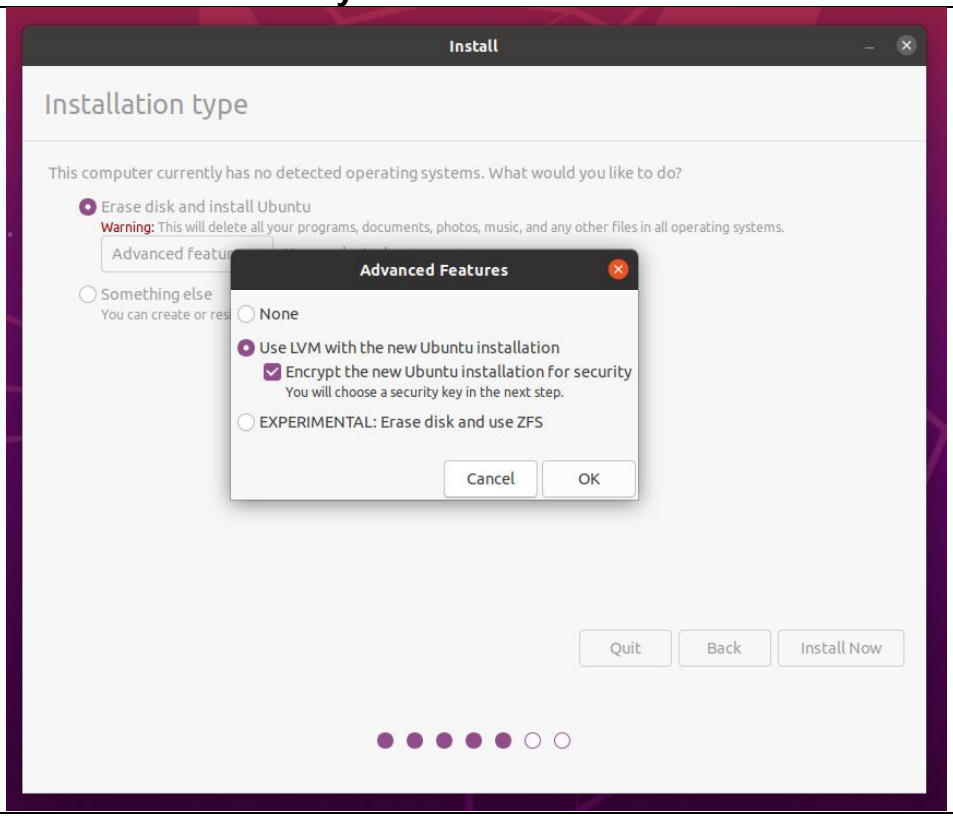
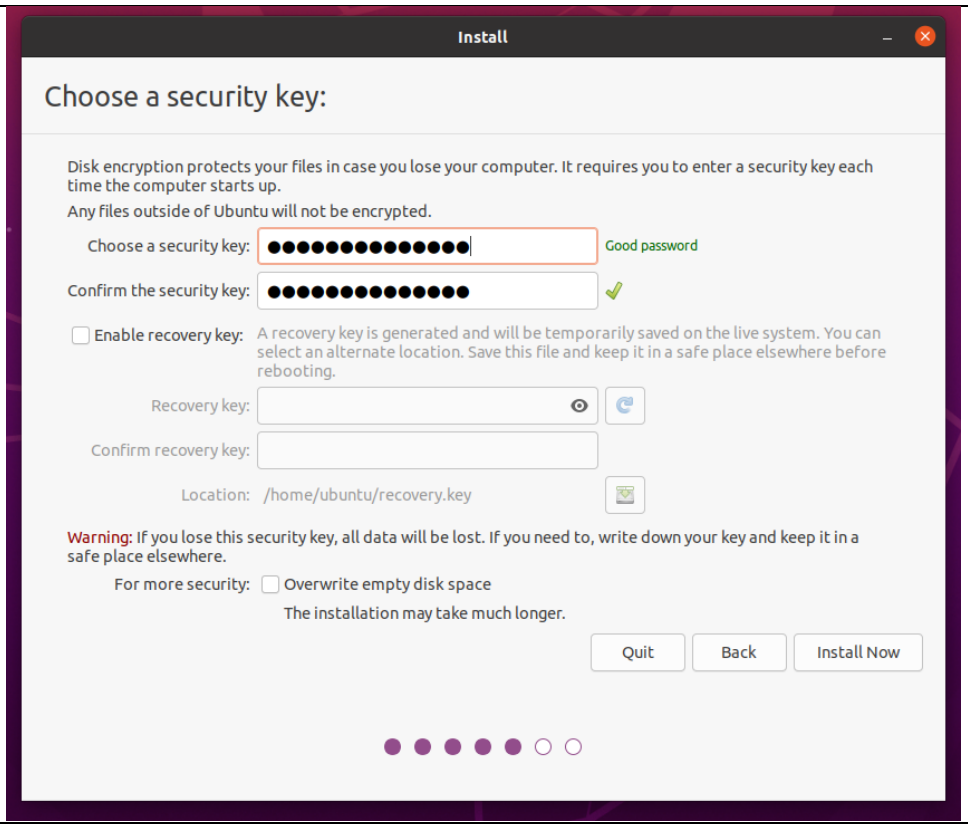
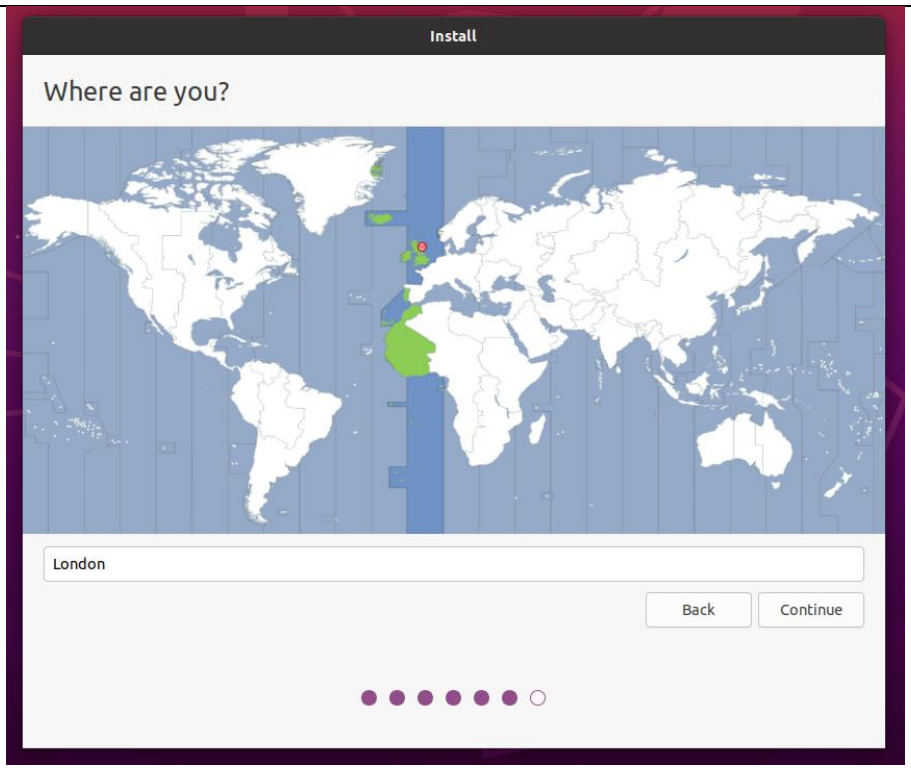
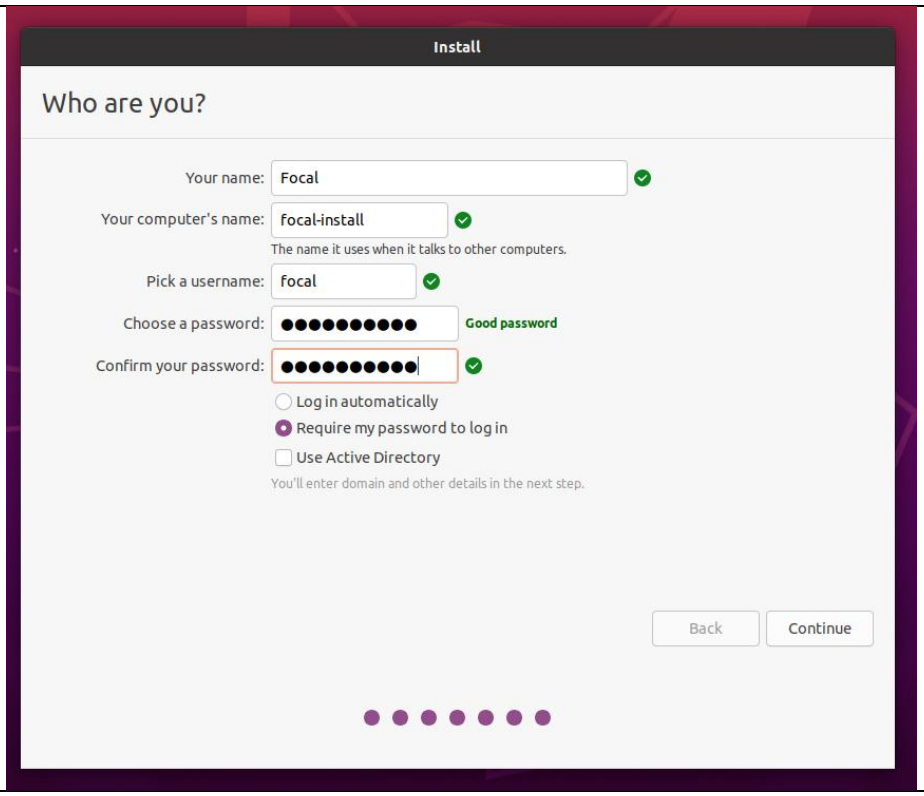
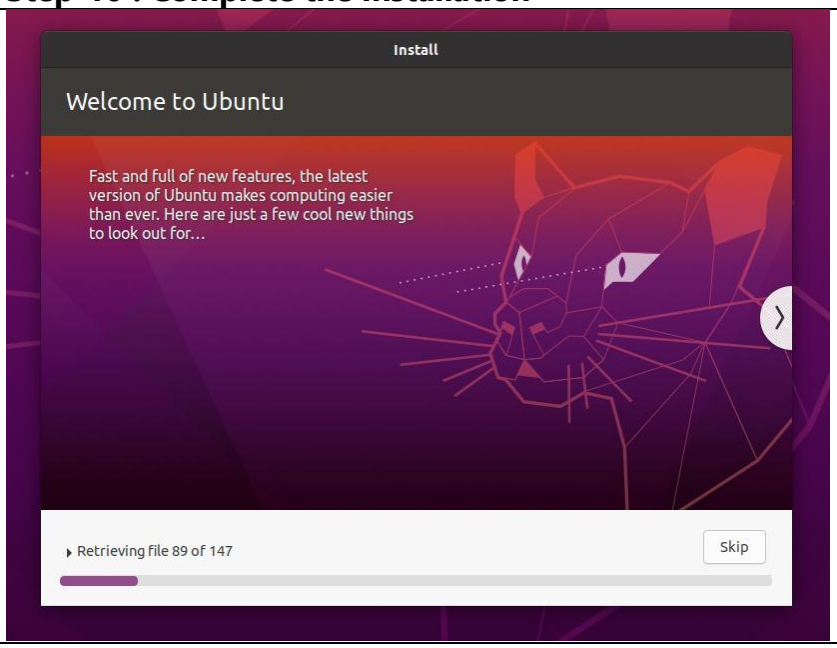
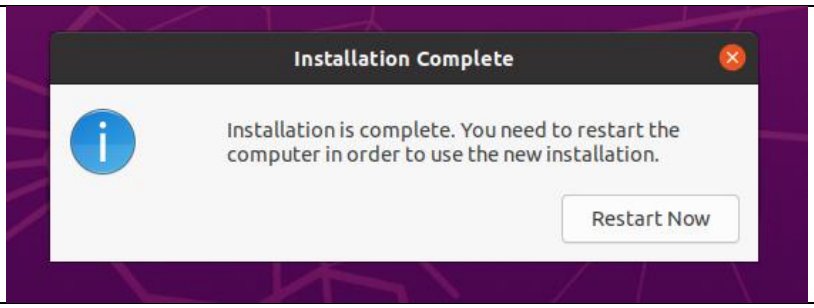
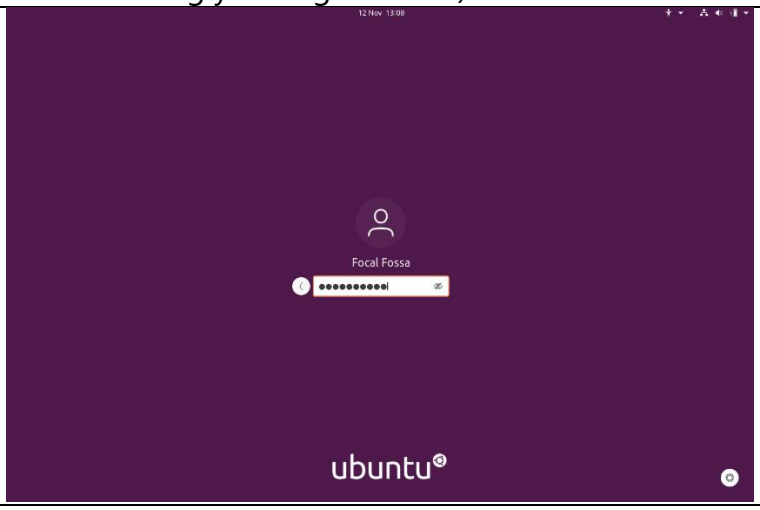
	Step-6 :(Optional) Enable Encryption If you would like to encrypt your device, select **Advanced features… > Use LVM with the new Ubuntu installation > Encrypt the new Ubuntu installation for security**.
	
	You will be prompted to create a security key once you click Install Now.

	
	Click Install Now and confirm the changes with Continue.
	Step-7 : Choose your Location Select your location and timezone from the map screen and click Continue. This information will be detected automatically if you are connected to the internet.

	
	Step-8 : Create Your Login Details On this screen, you will be prompted to enter your name and the name of your computer as it will appear on the network. Finally, you will create a username and a strong password. You can choose to log in automatically or require a password. If you are using your device whilst travelling, it's recommended to keep automatic login disabled.

	
	Step-10 : Complete the Installation
	
	Once the installation has completed, you will be prompted to restart your machine. Click Restart Now.

	
	When you restart, you will be prompted to remove your USB flash drive from the device. Once you've done this, press **ENTER**. Enter your password on the login screen (assuming you selected that option when creating your login details).
	
	Enter your password on the login screen (assuming you selected that option when creating your login details).
	
	And that's it, welcome to your new Ubuntu Desktop!

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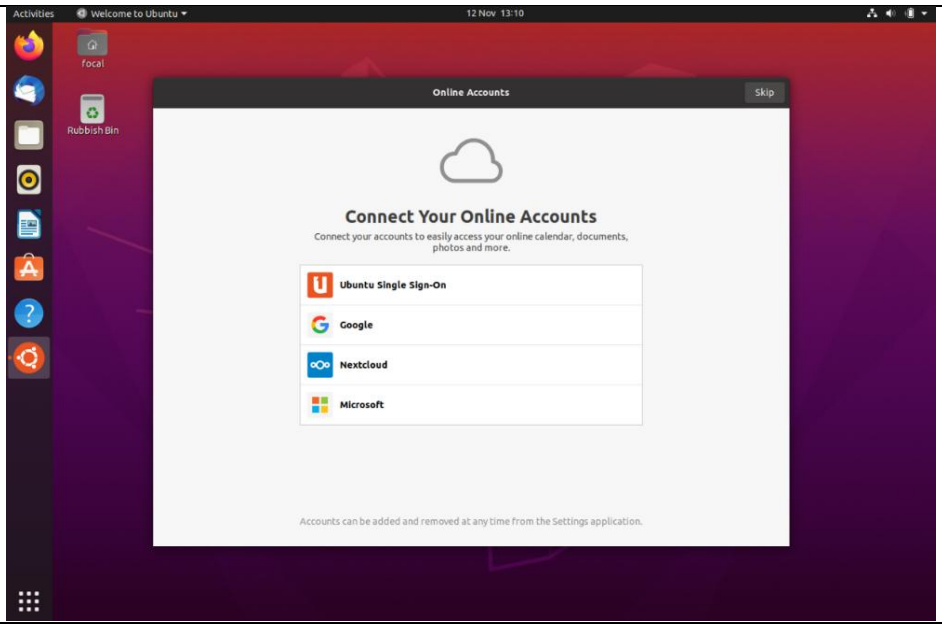
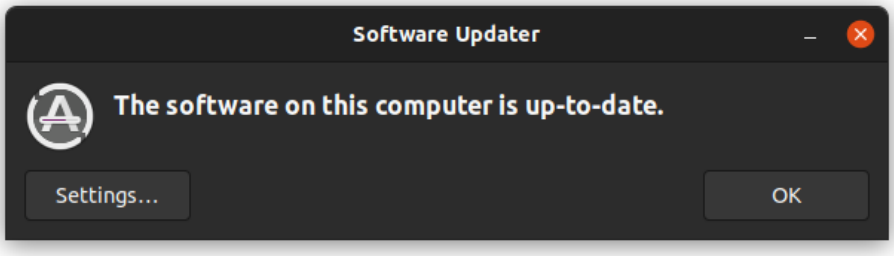
<tr><td></td><td> 
</td></tr>
<tr><td></td><td>The welcome widget will help you with some additional setup options, including:
Connecting your profile to various online accounts.
Configure Livepatch to automatically apply updates to your device (this option is only available when using a long term support [LTS] version of Ubuntu).
Opting into sending device information to Canonical to help improve Ubuntu (by default, Canonical doesn’t collect device information).
Activating location services.
Downloading additional apps from Ubuntu Software.</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td>Step-10 : Don’t forget to Update!
It’s always good practice to ensure your system is up to date, especially after a fresh install.
The easiest way to do this is via the Software Updater app. Search for Software Updater via the app menu (the icon with 9 squares in the bottom corner of your window) and it will check for updates and apply them.</td></tr>
<tr><td></td><td> 
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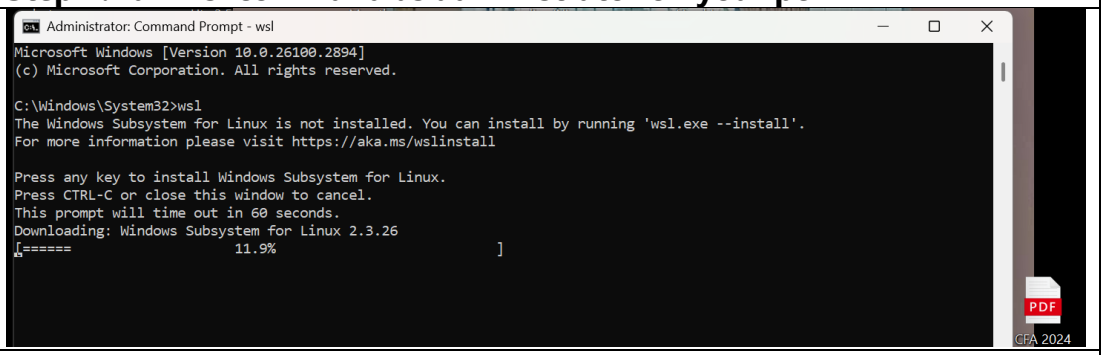
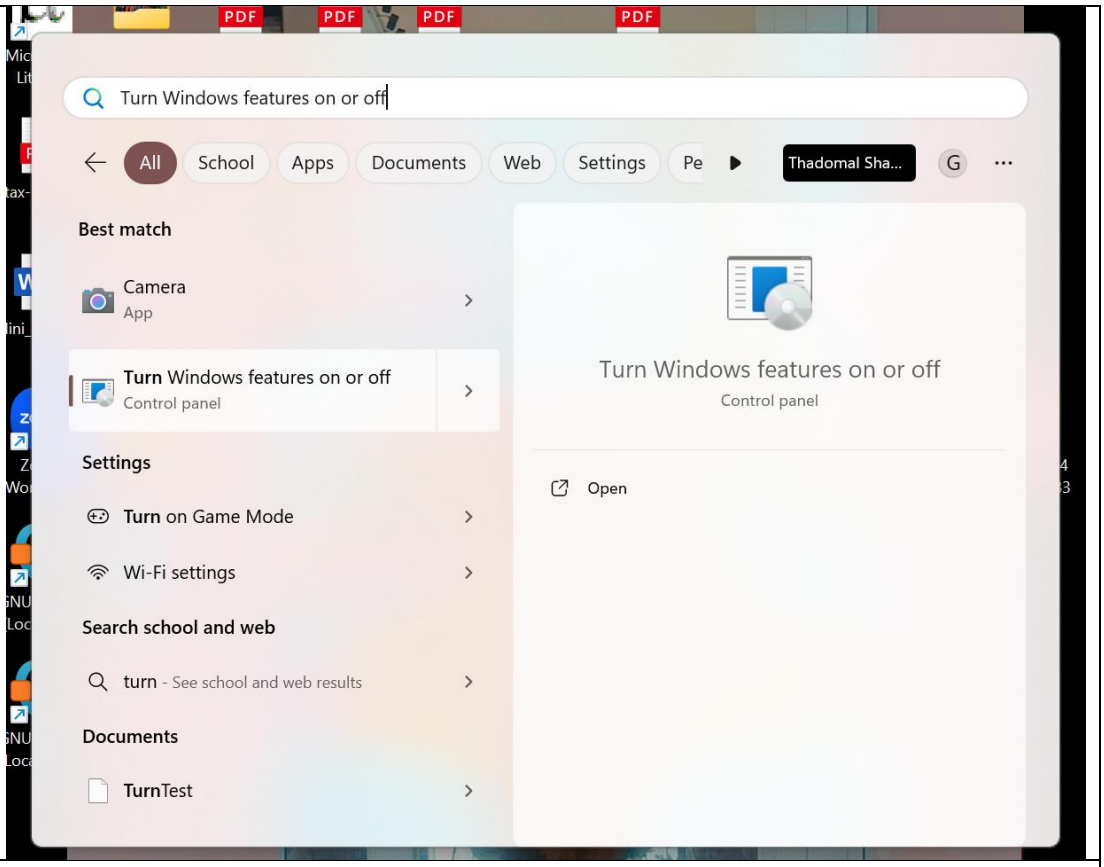
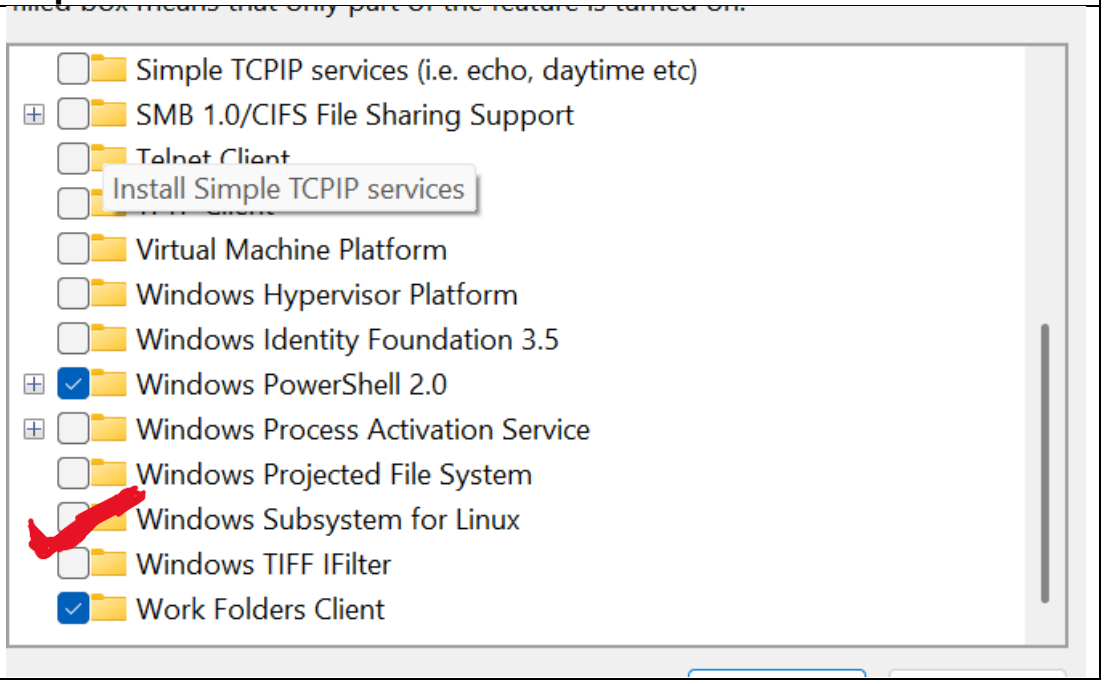
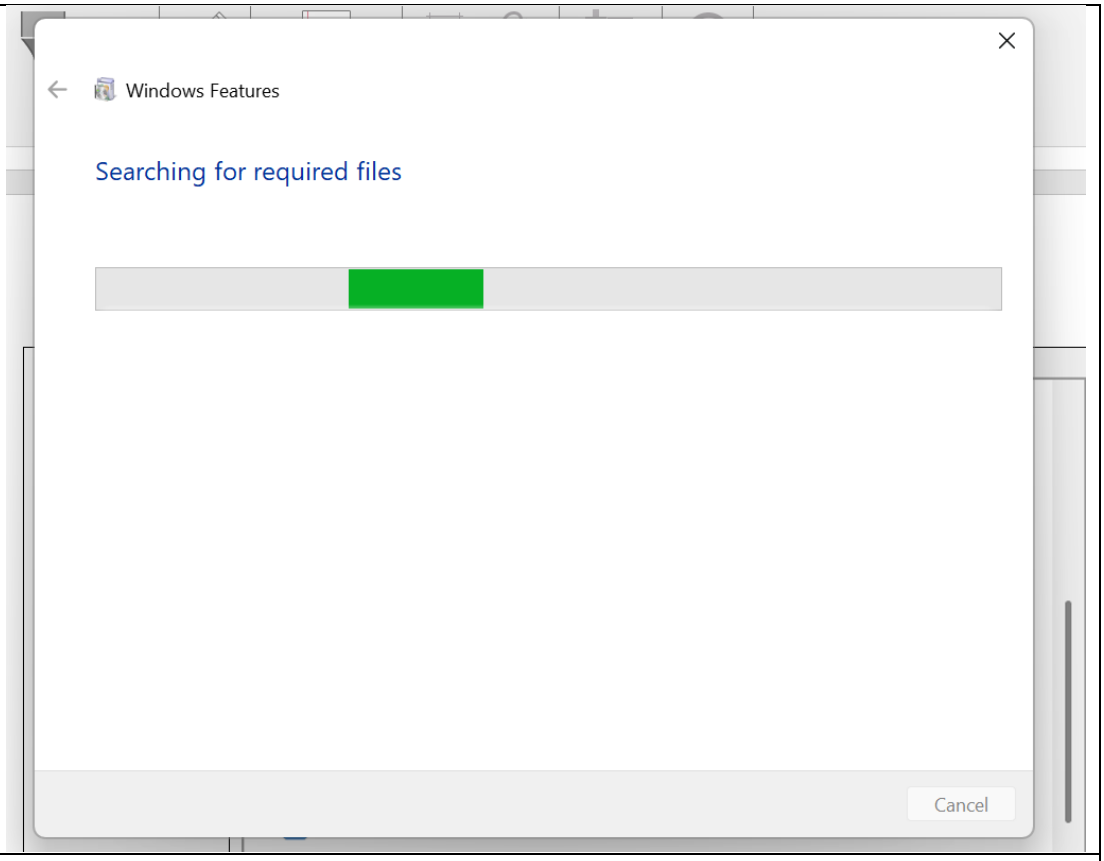
	You can also update Ubuntu using the terminal. Press CTRL+ALT+T to bring up a Terminal window (or click the terminal icon in the sidebar). Type in: **sudo apt update** You will be prompted to enter your login password. This will check for updates and tell you if there are any that need applying. To apply any updates, type: **sudo apt upgrade** Type Y, then press ENTER to confirm to finish the update process.
Installing WSL on windows Operating System	
	WSL or Windows Subsystem for Linux
	Step 1: run wsl command as administrator on your pc
	
	Step 2: Find the option for turn windows features on or off in Start



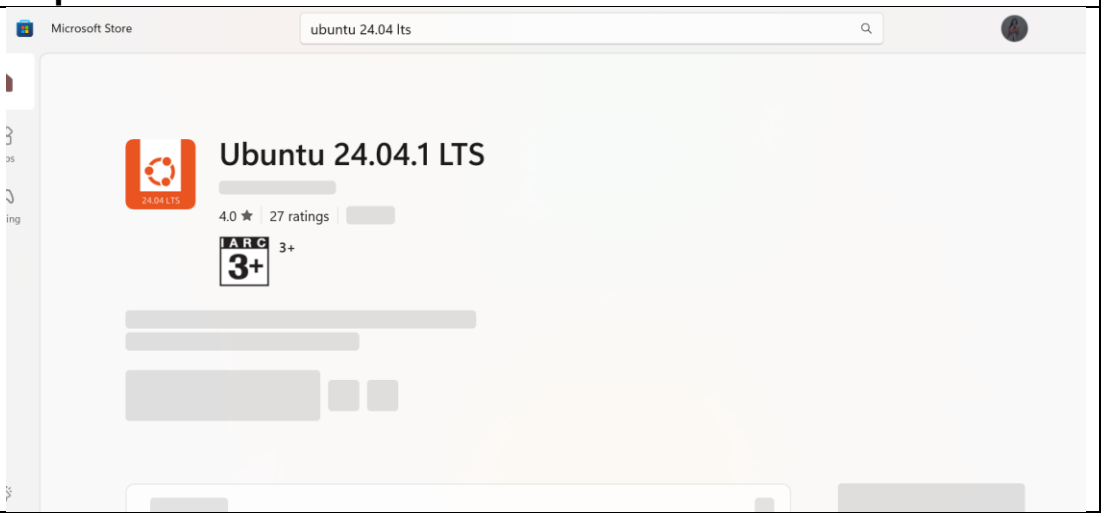
Step 3: Turn on WSL feature





Step 4: Reboot your system

Step 5: Download Ubuntu 24.04 LTS



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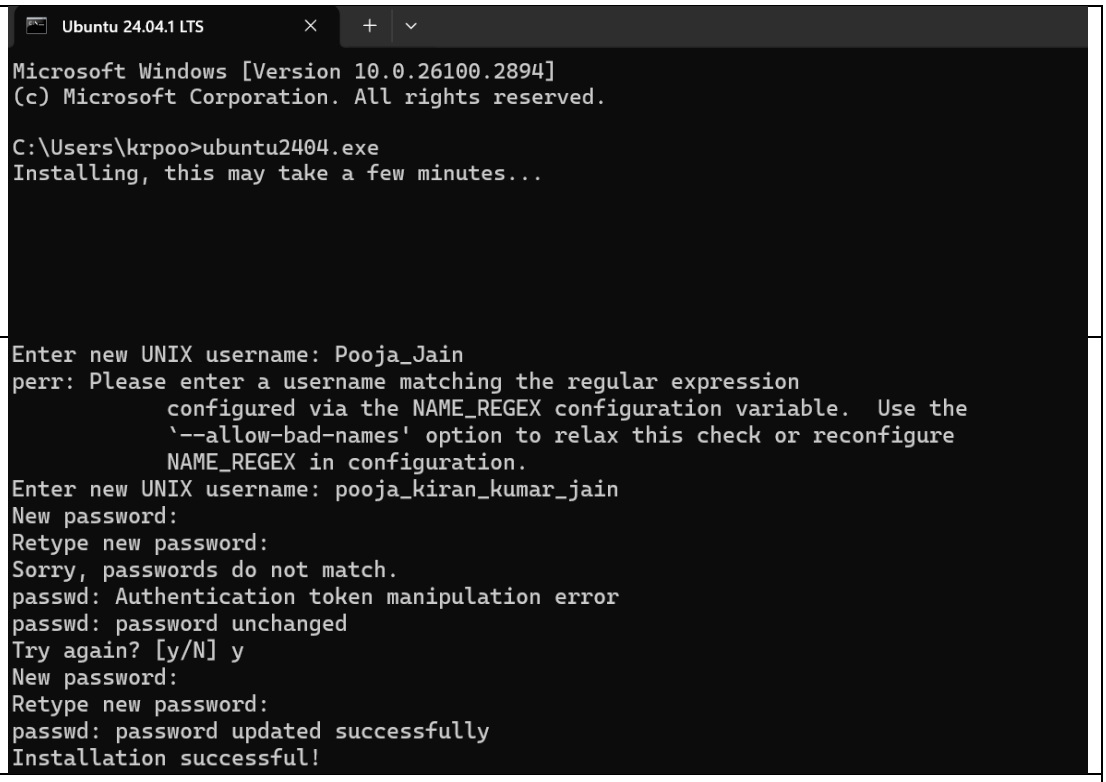

Then open Ubuntu or cmd >> ubuntu2404.exe for the Linux OS to start.

Questions to be solved

Q1. Define Operating System? State Purpose of OS?Give 5 Examples.

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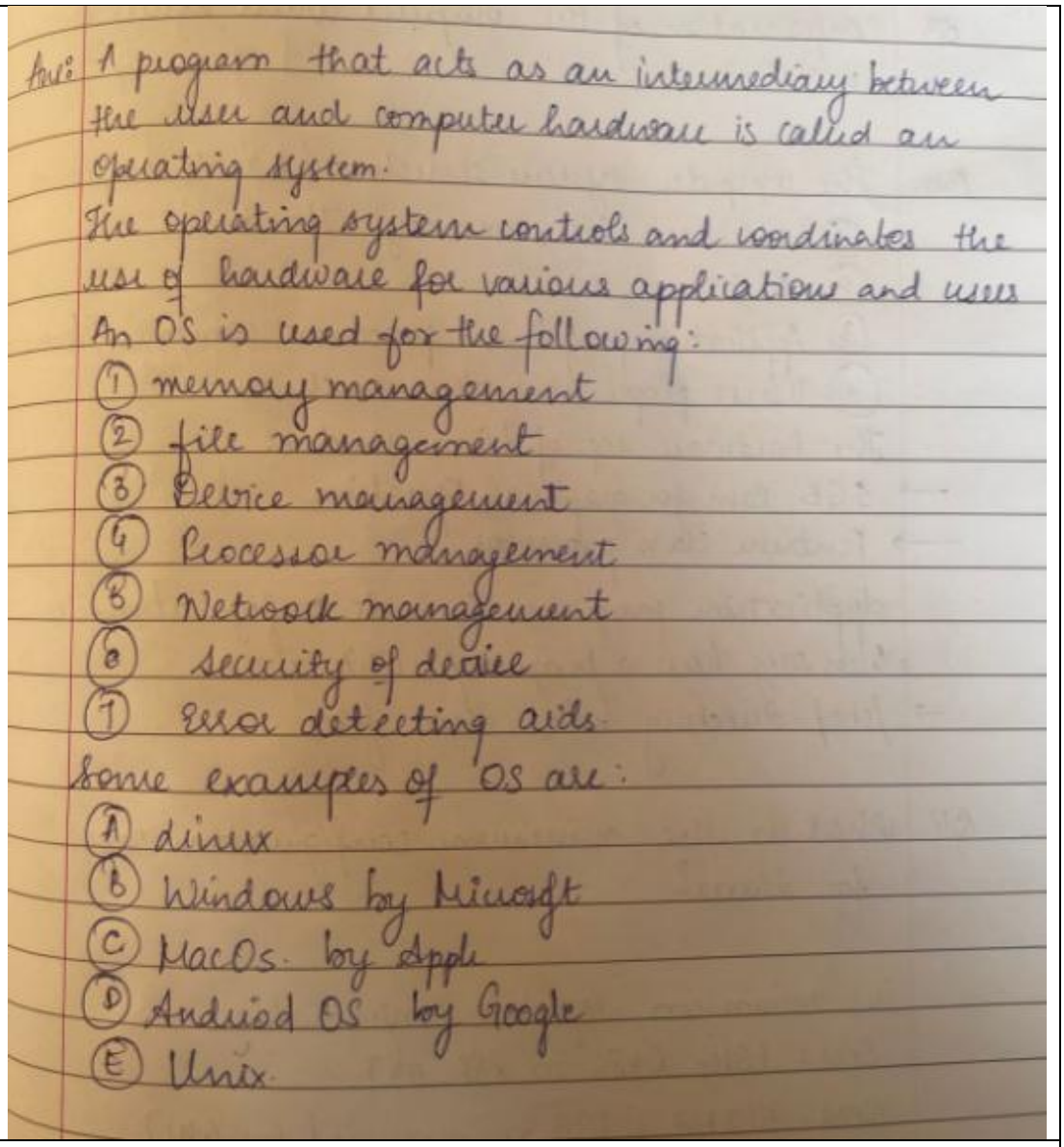
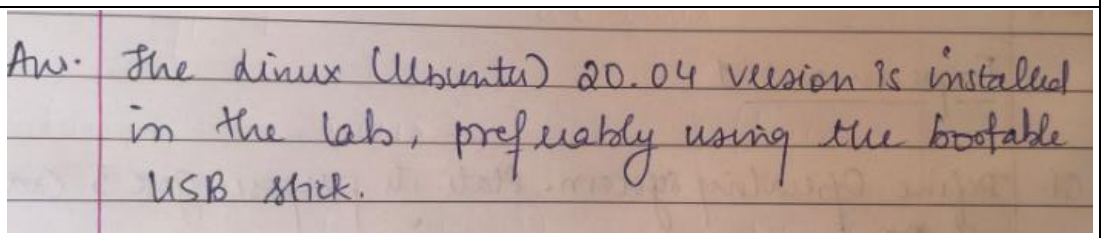
Ans	
Q2	**Which Version of Linux is installed in lab.**
Ans	
Q3.	**Give the configuration of computer in which Linux is installed**

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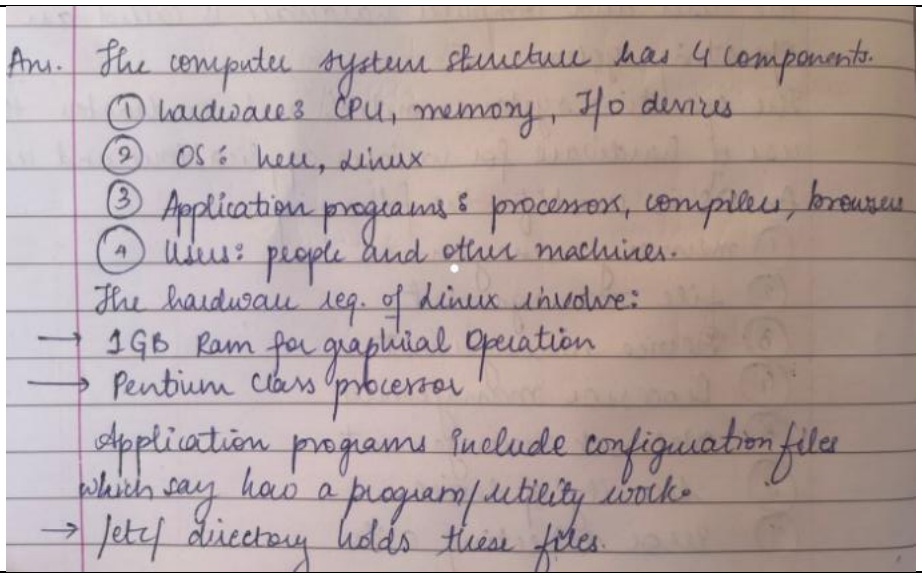
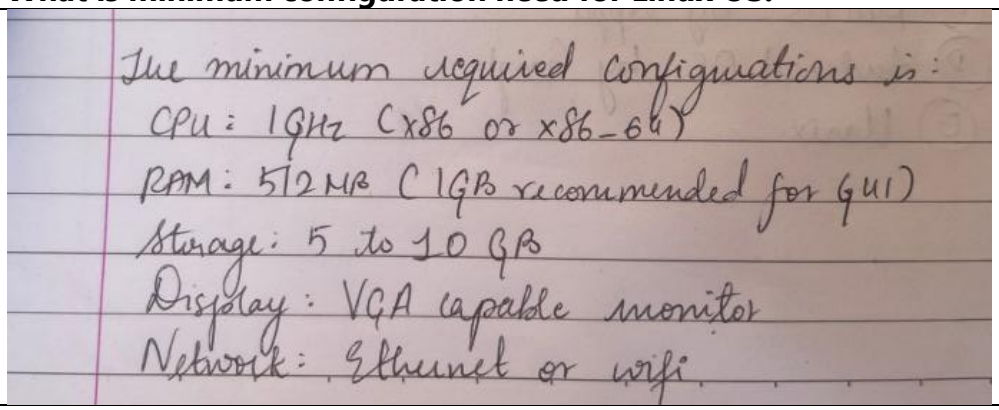
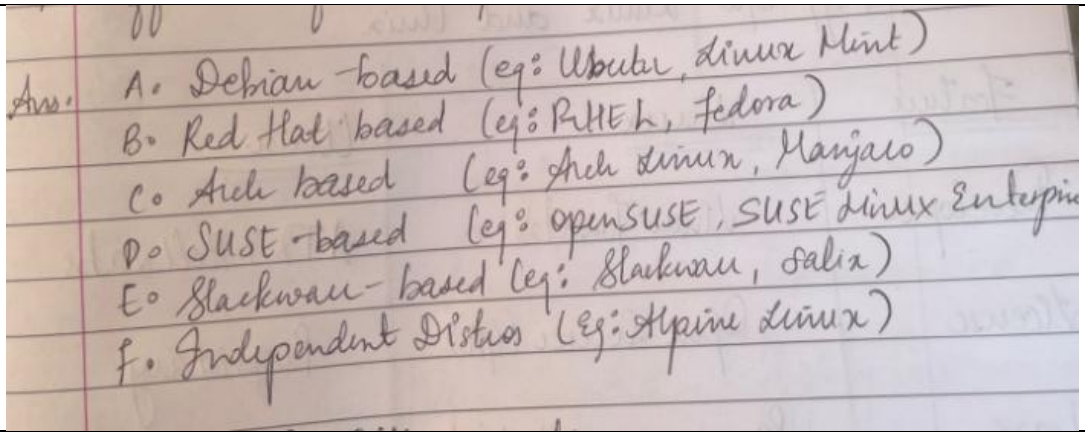
Ans	
Q4.	**What is minimum configuration need for Linux OS.**
Ans	
Q5.	**List Different Families of Linux OS**
Ans	
Q6	**What is Distro? Give example**

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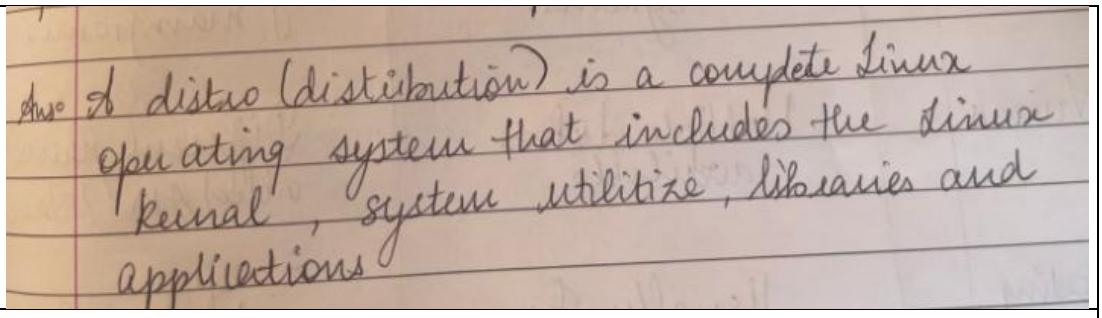
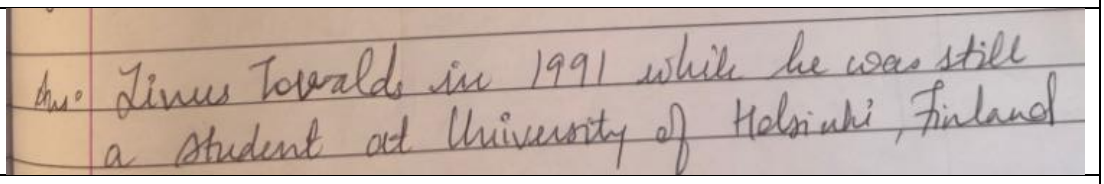
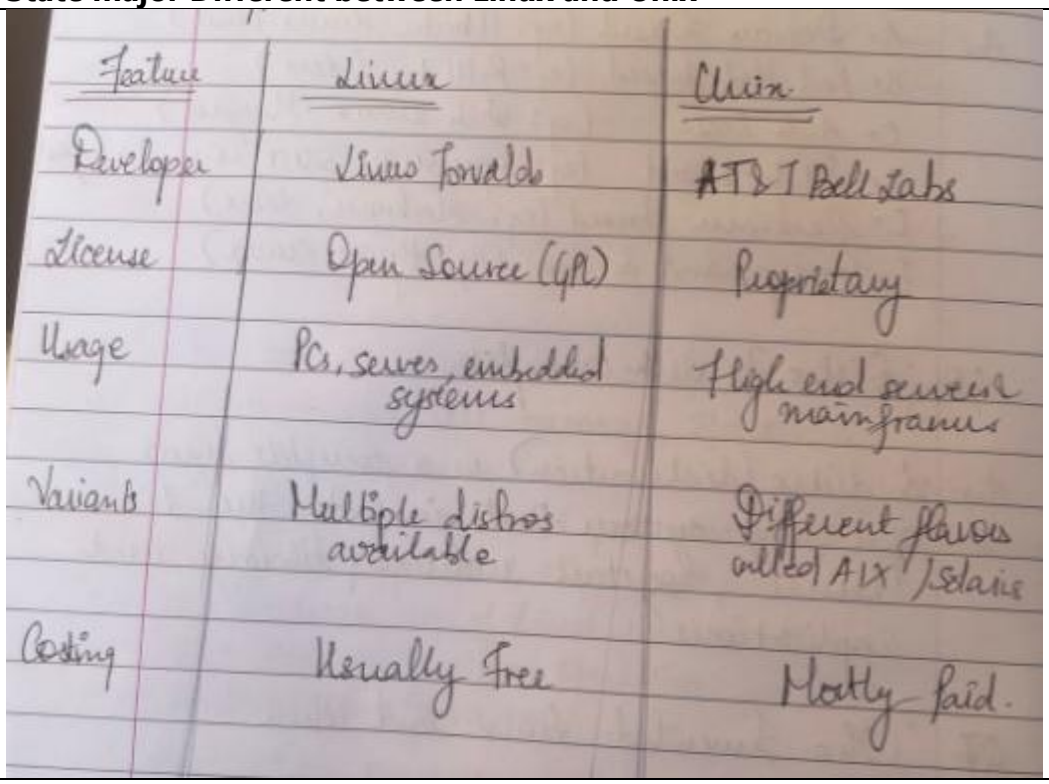
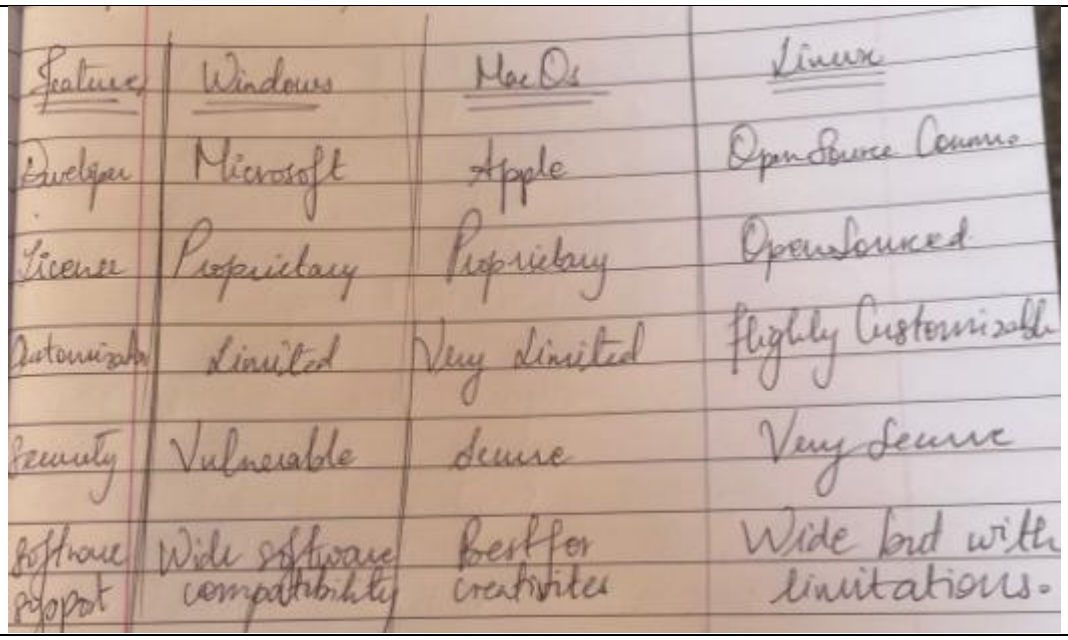
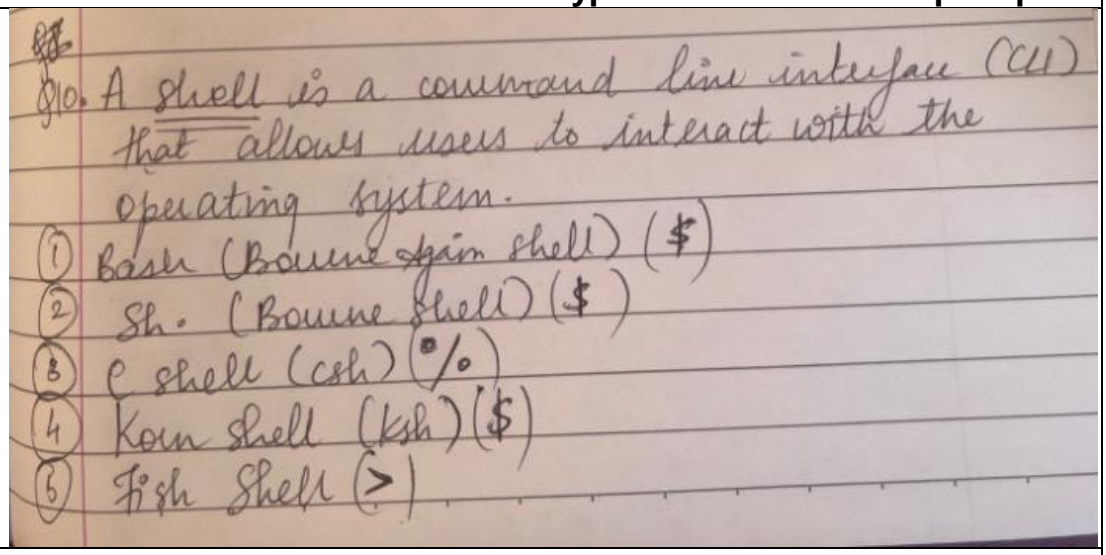
Ans	 Ans. A distro (distribution) is a complete Linux operating system that includes the Linux kernal, system utilitize, libraries and applications
Q7	**Who Invented Linux and In which Year**
Ans	 Ans. Linus Torvalds in 1991 while he was still a student at University of Helsinki, Finland
Q8	**State major Different between Linux and Unix**
Ans	
Q9.	**State Main Difference between Windows, MAC and Linux**

Ans	
Q10.	**What is Shell in Linux? List Different types of Shell with there prompt.**
Ans	
Conclusion	**Therefore, the basics of Linux OS as well as its different installations**
	were studied and successfully understood along with the subsequent
	Installation of Linux on Lab PCs as well as personal computers at home.

Pooja Kiran Kumar Jain A1 – 18

Signature	
Grade	
Date	