Installation of Linux

Session 2

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Goals:

- WSL for Windows
- VirtualBox for Windows/macOS/Linux
- Brief mention of Mac Dual Boot
- Post-installation configuration

Linux

Over 600 Linux distributions, 300 actively developped

Linux

Linux Distributions Focus

- **Ubuntu**: User-friendly, modern, based on Debian
- **Debian**: Stability, minimalism, used for servers
- Why we use Ubuntu for this course:
    - Easier to install

Installing LINUX

Installation Methods

- **WSL**: Windows Subsystem for Linux (Windows only)
- **VirtualBox**: Install Linux inside a virtual machine
- **Dual Boot (Mac)**: Native Linux installation beside macOS
- Focus today: WSL and VirtualBox

Installing LINUX

Choosing the best method

Method	Best For	Comments
WSL	Beginners on Windows	Easy, quick, non-destructive
VirtualBox	Anyone with free resources	Safe, isolated environment
Dual Boot	Advanced users with backups	High risk, full hardware use

What is WSL?

WSL: Windows Subsystem for Linux

- WSL was designed by Microsoft in partnership with Canonical, the creators of Ubuntu.
- Run Linux directly inside Windows
- No need for dual boot or VM

- WSL is not intended to run GUI (Graphical User Interface) applications
- **WSL requires a 64-bit version of Windows 10**

WSL 1 vs WSL 2

Feature	WSL 1	WSL 2
Kernel	Compatibility layer	Real Linux kernel
Performance	Slower I/O	Faster, real Linux
Docker support	No	Yes

Feature	WSL 1	WSL 2
Integration between Windows and Linux	✅	✅
Fast boot times	✅	✅
Small resource foot print compared to traditional Virtual Machines	✅	✅
Runs with current versions of VMware and VirtualBox	✅	❌
Managed VM	❌	✅
Full Linux Kernel	❌	✅
Full system call compatibility	❌	✅
Performance across OS file systems	✅	❌
systemd support	❌	✅
IPv6 support	✅	✅

WSL

You can install WSL from the command line. Open a PowerShell prompt as an Administrator and run:

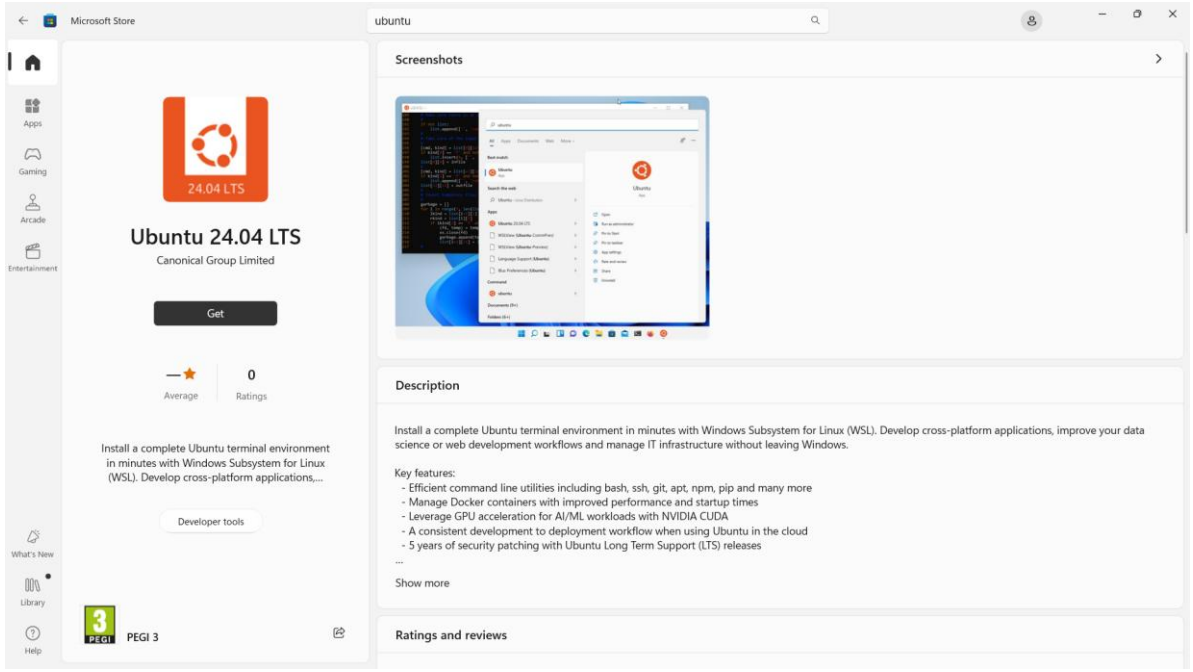
- > wsl --install (by default it is WSL2)

It is recommended to reboot your machine after this initial installation to complete the setup.

wsl -l -v check the version of the installed WSL

Install Ubuntu WSL

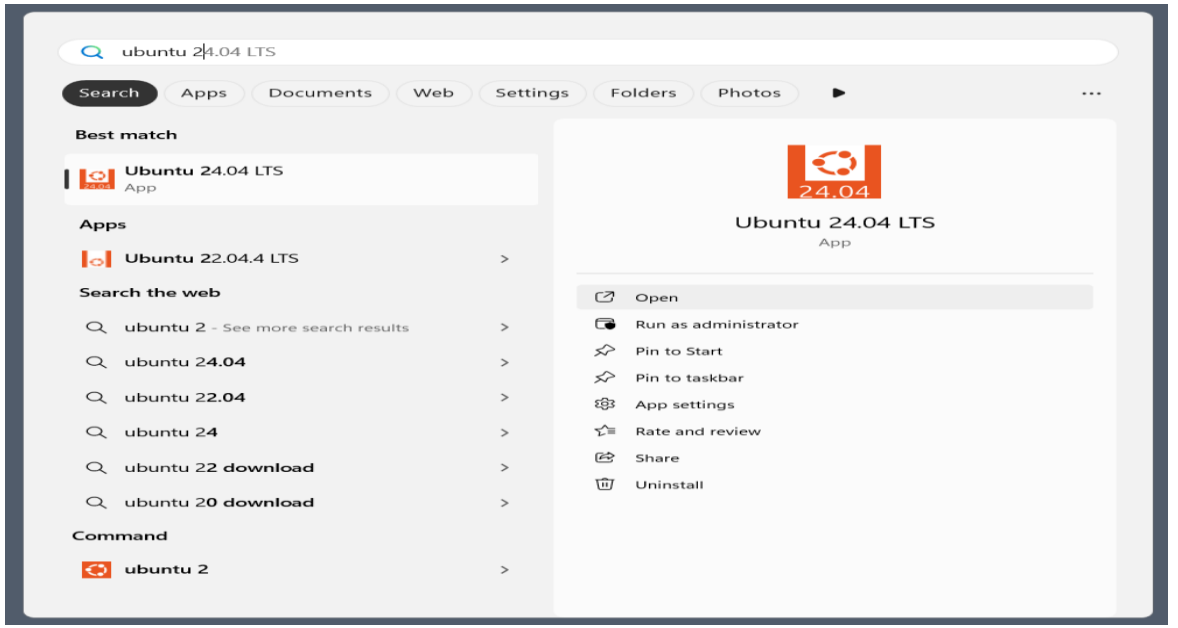
Find the distribution you prefer on the Microsoft Store and then click **Get**.



Or directly from the terminal: > wsl --install -d Ubuntu-24.04

Install Ubuntu WSL

Ubuntu will then be installed on your machine. Once installed, you can either launch the application directly from the Microsoft Store or search for Ubuntu in your Windows search bar



Or from the terminal: > ubuntu2404.exe

Uninstall Ubuntu WSL

Check the version:

wsl --list

Then

wsl --unregister NAME

What is a VirtualBox?

- VirtualBox is a cross-platform virtualization application.

- It runs on your existing Intel or AMD-based computers. It works on Windows, Mac, Linux or Solaris operating systems.

- **Enhanced Security and Stability:** Since each VM operates in its own environment, issues in one VM won't affect the others.

- It extends the capabilities of your existing computer so that it can run multiple operating systems (inside multiple virtual machines) at the same time.

- You can run Windows and Linux on your Mac via versa.

- You can install and run as many virtual machines as you like -- the only practical limits are disk space, memory and CPU.

Requieremements

- **Before Installing**

- Download VirtualBox: virtualbox.org

- Download Ubuntu ISO: ubuntu.com/download

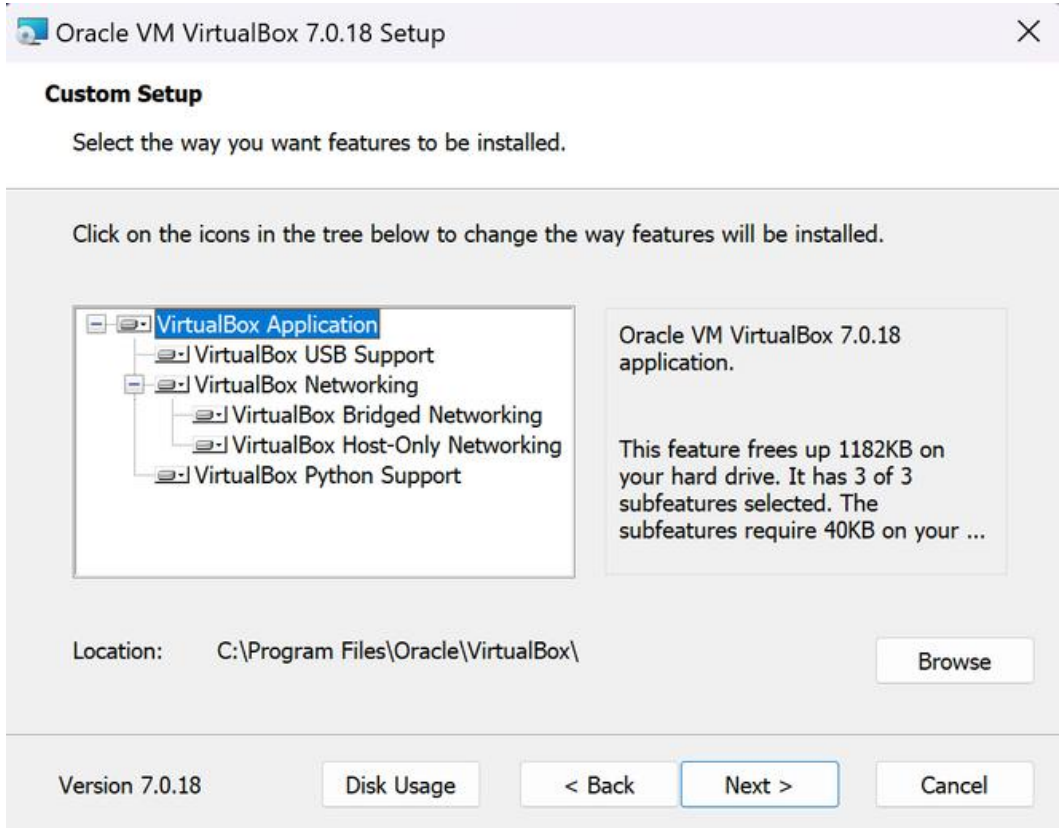
Installing VirtualBox?

- **Step 1 :** To download VirtualBox, visit the Virtualbox website and choose the right version for your OS.

Installing VirtualBox?

- **Step 2 :** Run the downloaded setup or exe file. If it asks for making changes on your device, click **Yes.**
- **Step 3:** Click **Next** on setup wizard. It will redirect you to "custom setup" dialog box where you can choose or change the features that will be going to installed on you system.

Click on **Next,** it will ask "**Proceed with the installation ?",** Click **yes** to go to next menu. Then, click on install. It will take some time to install on your system, basically depends on system to system. After that, click on finish.



If errors

- **Python core package and win32api :**

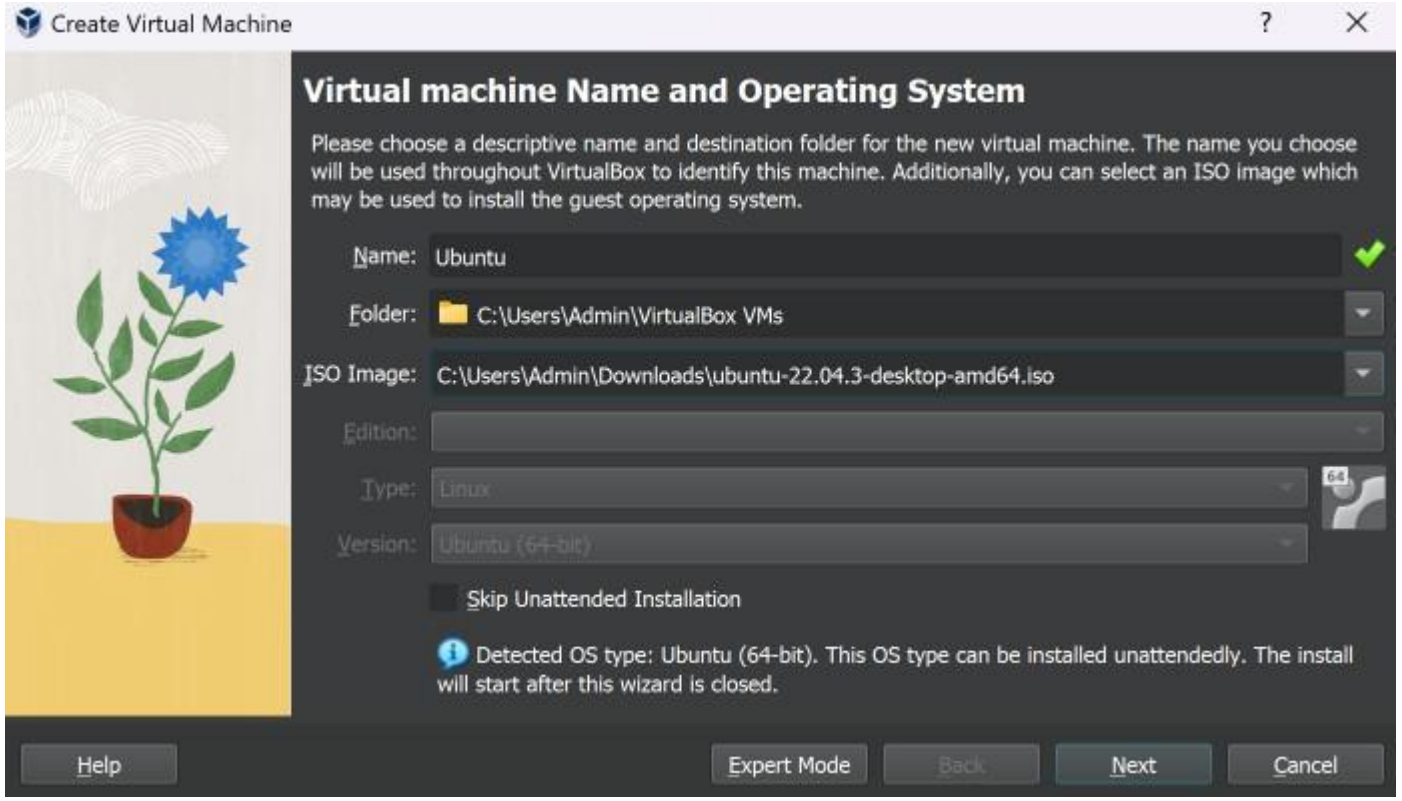
- Download Python (python.org/downloads/)
- Run the Python app and check the box to add the exe file to the PATH
- Install
- Open PowerShell/CMD and type “py –m pip install pywin32”
- Then python.ext –m pip install –upgrade pip

Installing Linux Using a Virtual Machine

- **Step 4:** Upon installation of VirtualBox onto your device, launching the application will result in the appearance of the Virtualbox Manager window.

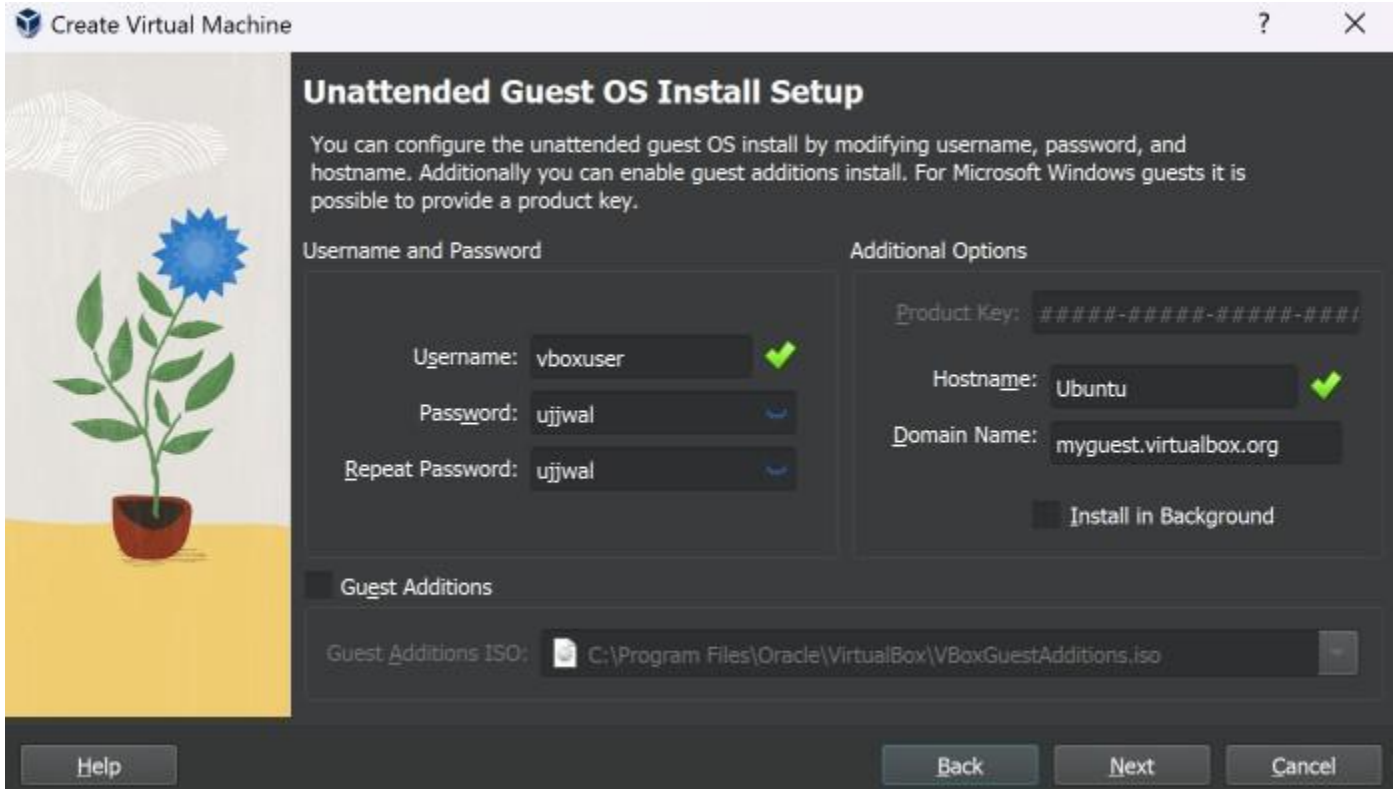
Installing Linux Using a Virtual Machine

- **Step 5:** Click on the "**New**" button to generate a new VM. You will be asked for a VM name, path to where VM files will be saved and an **ISO image**. The operating system (OS) you intend to install may be like, Windows, macOS or Linux. Also, the OS version you will install, e.g., Ubuntu or Debian, will be required.



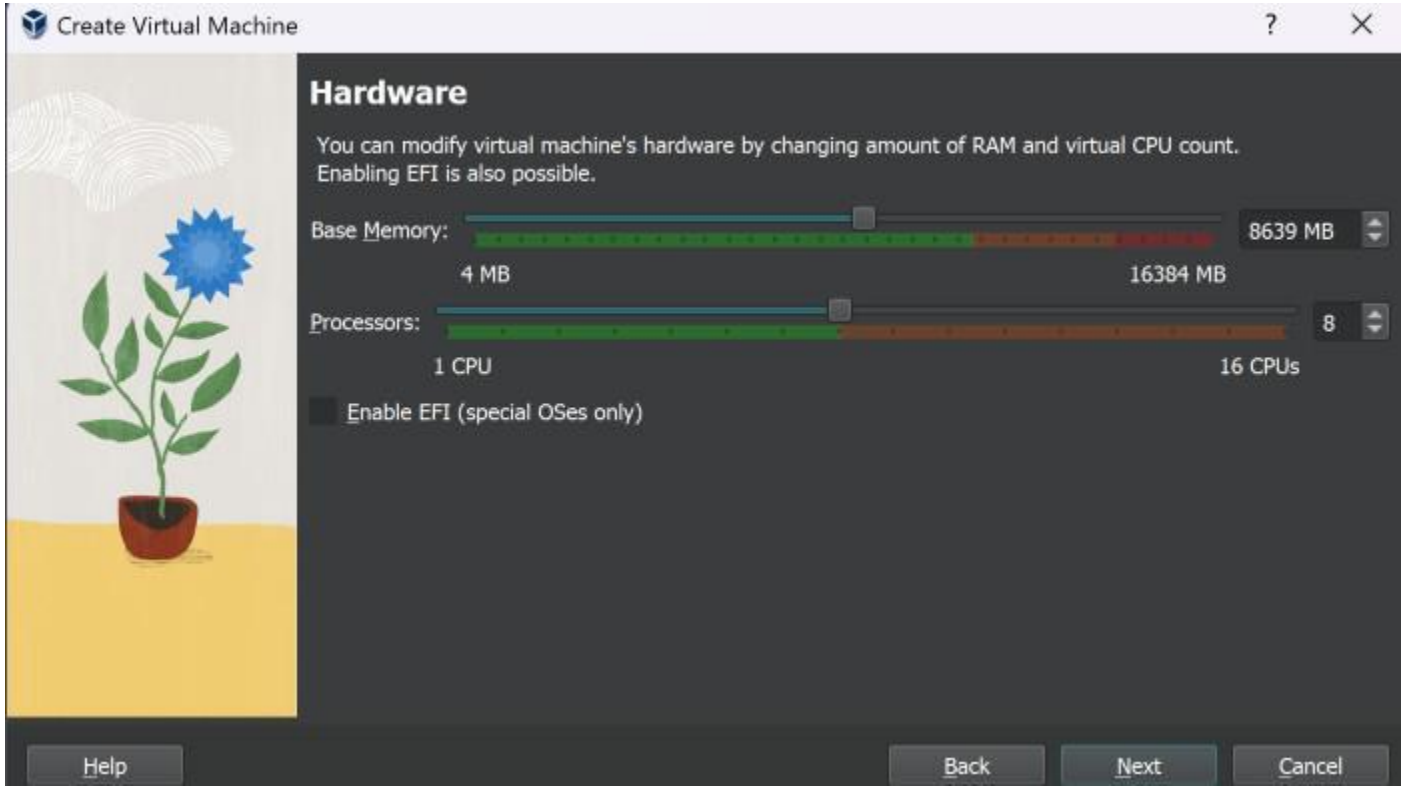
Installing Linux Using a Virtual Machine

- **Step 6:** For Ubuntu, VirtualBox supports creating a username, password, and specifying the hostname. You can decide to customize it or go with the defaults. Click on **Next**.



Installing Linux Using a Virtual Machine

- **Step 7:** Later on, in running your virtual machine, what you need is to allocate it some memory & CPU. Please plan to assign half of what system resources are there for utilization during functioning of your VM. For example, if there are 16GB of memory (RAM), it would be wise enough to allocate just 8GB of RAM.

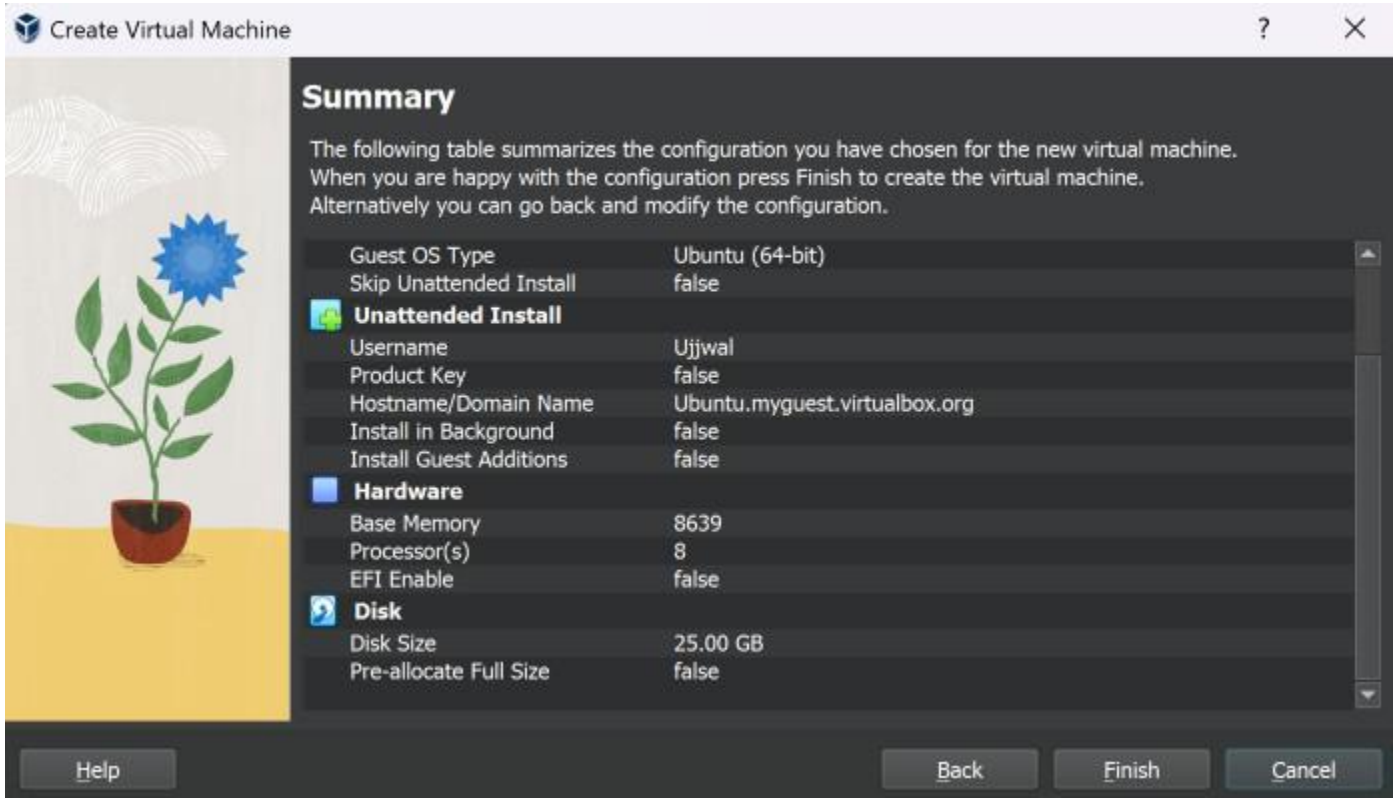


Installing Linux Using a Virtual Machine

- **Step 8:** Allocate the Hard disk size for the VM. Allocate at least 20 GB of storage**. Click** on Next.

Installing Linux Using a Virtual Machine

- **Step 9:** A summary of all of your choices is shown to you now, and it is necessary to launch and initiate the installation of the Linux OS as a virtual machine. Then Click on **Finish**.



How to remove a VM

- **Removing a Virtual Machine (VM) in VirtualBox**

1. Open VirtualBox Manager

2. Right-click the VM → **Remove**

3. Choose **Delete all files** to completely erase the virtual machine

Mac dual boot

Mac Users

- Dual Boot is possible
- More complex and risky
- Always backup first

full backup before attempting dual boot

Mac dual boot

Why dual boot?

- A **virtual machine** uses **only part** of the real computer's power.
If you have a powerful graphics card (GPU), the VM usually **cannot access it properly**.

- A **dual boot** uses **100%** of the computer’s resources.
- Full RAM.
- Full CPU performance.
- Full disk speed.
- Full GPU access (important for 3D, AI, games, heavy software

Mac dual boot

Requirements?

- RAM: 4 GB
- Processor: 2 GHz dual-core
- Free Storage: 30 GB
- USB Drive: 4 GB
- VGA capable of 1024×768 screen resolution
- Internet access is helpful

Playing with the terminal

- **Objective:** Get comfortable using the terminal interface (CLI) for the first time.

- **Instructions:**

1. Open your terminal
   1. On **Linux** or **macOS**: use Terminal
   2. On **Windows**: open Ubuntu via WSL, or launch your VM

2. Type and run the following commands:

-whoami

-date

-uname -a

-ls

-echo "Hello Linux"

Playing with the terminal

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2. Type and run the following commands:

-whoami # Displays your username
-date # Shows the current date and time
-uname -a # Shows system information
- -ls # Lists files in the current directory
-echo "Hello Linux" # Prints a message

Playing with the terminal

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- **Instructions:**

1.Open your terminal

1. On **Linux** or **macOS**: use Terminal
2. On **Windows**: open Ubuntu via WSL, or launch your VM

2. Type and run the following commands

3. Questions:

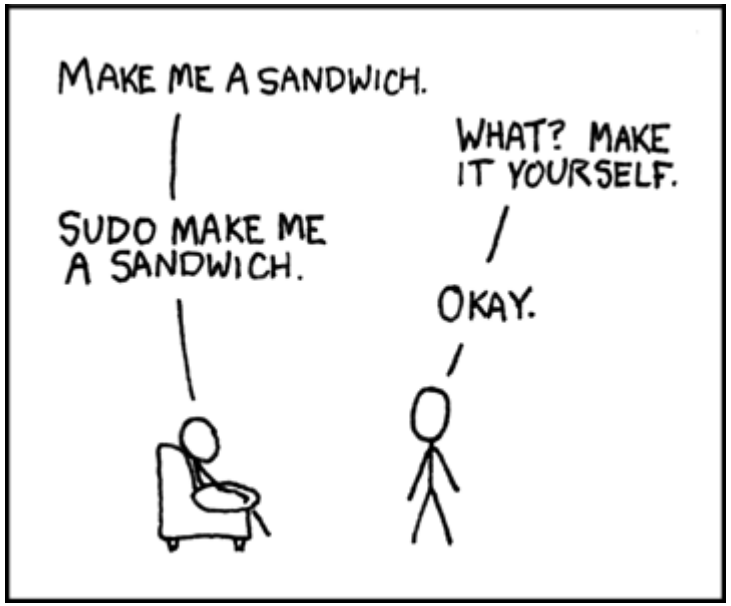
- What is the name of your system?
- Are you working inside WSL, a VM, or a native system?
- What was the most surprising output?

Updating your system

- **Need to be administrator:** When you install something, use **sudo**

- sudo apt update
- sudo apt upgrade

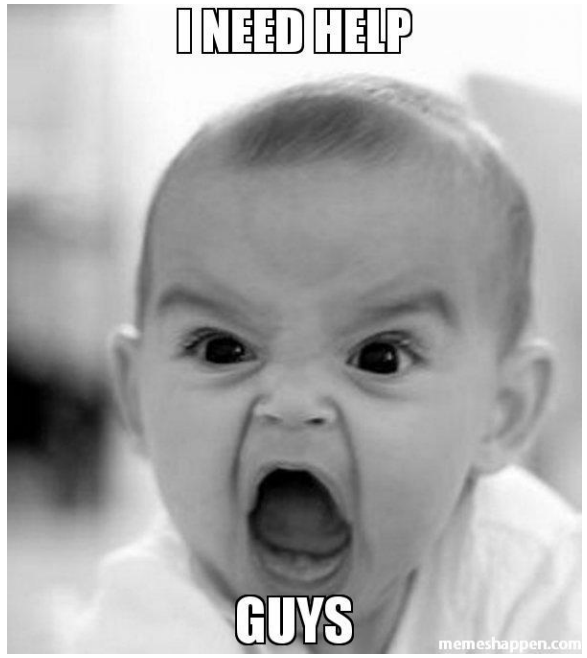
Keep your system safe, secure, and up-to date



How to find help?

Finding Help in Linux

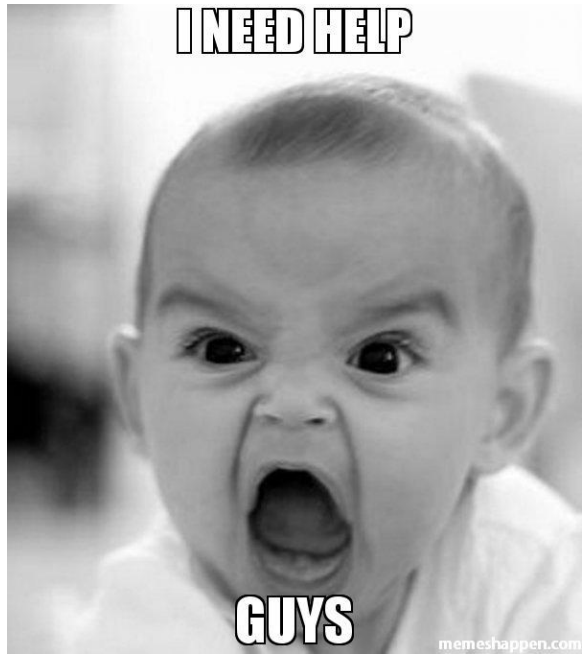
- Use man command → manuals inside terminal
- Use --help with any command
- Search online: forums, StackOverflow, AskUbuntu



How to find help?

Finding Help in Linux

- E.g: type “man cp”



Customize Your Linux System and Document Your Setup

For those who have already Linux.

- Help others students
- Small project

- Learn to personalize a Linux system without using advanced CLI commands
- Install non-essential applications
- Document the system environment, installed apps, and user experience

Customize Your Linux System and Document Your Setup

Ideas:

Desktop Personalization

- Change the desktop background (wallpaper)
- Customize basic settings: theme, icons, mouse, window behavior
- Install a new theme or icons from software center (graphical app)

Install 3 Useful Applications

- From Software Center (graphical method, **NOT CLI**), install 3 new applications they would personally use:
  - Examples: GIMP, VLC Media Player, Thunderbird, Kdenlive, Geary
- Launch and test the installed applications.

Customize Your Linux System and Document Your Setup

Ideas:

Explore directory

- ls -lh
- du -sh *