



Installation Guide

Why install a Linux distribution?

In computational biology, many developers have leaned towards creating tools using open-source programming languages such as Python and Bash. Both languages run natively in **Unix** and are often executed by command line.

Unix is a family of operating systems which, in simple terms, encompasses the foundation on multiple operating systems such as all Linux distributions, MacOS, and Android.

In order to run most bioinformatic tools, one would require to run commands from a Unix terminal.

Windows computers do not come pre-installed with the software needed to work with - or emulate - Unix. While there are workarounds to get things working in Windows, the nature of Windows means that some features will work differently, and many of these options may not be possible on work computers due to lack of administrator rights.

Installing a user-friendly Linux operating system such as Ubuntu can ease the transition from Windows to the world of Unix-based systems.

Ubuntu

There are many different Linux distributions available, each having its specific strengths. Ubuntu is one of the most popular Linux distributions, perhaps because it is easy to use and does not look like a 20-year-old graphical monstrosity. It has been around since 2004, and receives major updates every two years, interspersed with a long-term support version every four releases, guaranteeing four years of stable updates, plus a potential additional four years of extended updates.

Installing Ubuntu REPLACING existing operating system

! If you follow this installation guide completely, you **WILL** delete all contents on the computer you do the installation on. Windows will be removed and must be reinstalled with a valid key to work again.
Read further in this guide, for more information on how to install Ubuntu in parallel to existing systems.

Spare computers

If possible, it is highly encouraged to install and work from a Linux Distribution, in this case Ubuntu, as it will enable you to continue learning and using bioinformatics from this computer. Bioinformatics is almost impossible to work with, unless you run it in a dedicated Unix environment.

Old computers → perfect for testing!

If you have an old spare PC (preferably laptop) at home or at work, and it is presumed to be clean or backed up for any important files, it would be a perfect fit for this training!

Most Linux distributions supports both new and old hardware, so if you are comfortable wiping your PC of all data, this would be the optimal choice for this and future bioinformatics trainings.

Preexisting Linux or MacOS

If you have access to a computer with other Linux distributions or MacOS, you can very likely follow this course without any issues. Although this virtual training has been developed with Ubuntu in mind, the Unix terminal works similarly in each of the different distributions, even MacOS. At the time of writing, the only known difference is how to install Mamba for package management in MacOS, which you will encounter during the last module of this training.

BitLock'd / Encrypted systems

While it may seem that you are locked out of installing Ubuntu on a PC with an active encryption, you **can** actually wipe the encryption (and thus lose ALL data) from the PC, and then subsequently install Ubuntu. This is covered later in this guide.

! Do note that there is a difference on Harddisk encryption (i.e. Windows BitLocker) and a password-protected BIOS. If the BIOS is password-protected, and you don't know the password, chances are that you won't be allowed to follow this guide.

Installing Ubuntu on a Windows machine

! This guide assumes that you have a spare PC, in which you don't need Windows and don't have any important files or documents on. If you don't have a spare PC, skip the installation steps and go directly to the **"Extra resources"** section.

Windows activation Key

In case you need to restore Windows on the PC in the future, it is important that you save the activation key, which will allow you to re-install and re-activate Windows. How to find your Windows activation key is covered in the very beginning of the video guide.

For other options follow:

How to Find Your Window 10 or 11 Product Key: 4 Simple Ways

Find your Windows product key using the Command Prompt, PowerShell, or the Windows Registry Do you need to find your Windows product key? The Windows product key is necessary if you want to install Windows on a different computer or...

 <https://www.wikihow.com/Check-Your-Windows-Product-Key>



Video guide

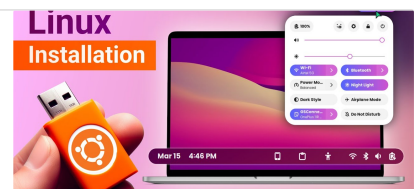
If you would like to follow a video to install Ubuntu, this guide can be helpful.

In case you run into issues return to this guide, as it provides useful information.

How to install Linux (Ubuntu) & Remove Windows

This video demonstrates the installation of Linux on your Windows PC. In this beginner-friendly tutorial, we have covered everything you need to do to install Linux on your computer. We will install Ubuntu, the most popular Linux-based operating system, on a

 <https://www.youtube.com/watch?v=hNYH7xkdYYQ>



Source

The instructions provided below are based on the following guide:

Create a bootable USB stick with Rufus on Windows | Ubuntu

Ubuntu is an open source software operating system that runs from the desktop, to the cloud, to all your internet connected things.

 <https://ubuntu.com/tutorials/create-a-usb-stick-on-windows#1-overview>

Creating an installation media

Requirements

A USB stick with at least 12 GB. Note that the USB stick will be **wiped** so make sure to properly backup its content before continuing. (Older versions of Ubuntu require less data → Ubuntu 20.04 requires an USB stick with fewer GB)

Guide

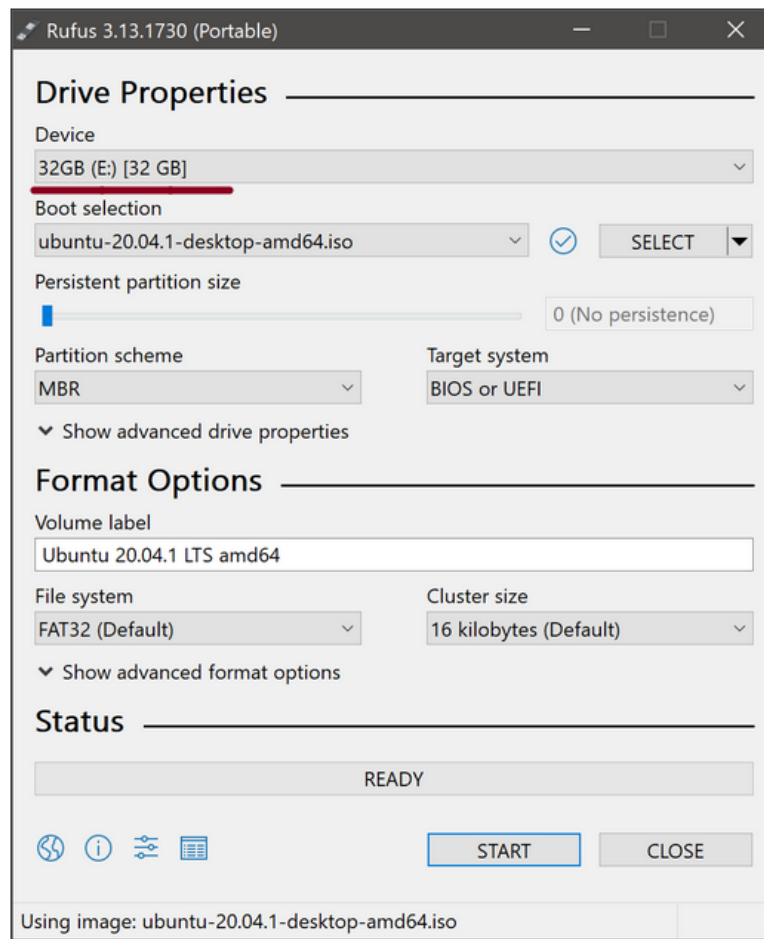
1. Within Windows, open a browser and head to <https://ubuntu.com/download>
2. Download one of the latest version of Ubuntu (e.g. LTS)
3. Download Rufus for Windows

Rufus - Opret startbare USB-drev på den nemme måde

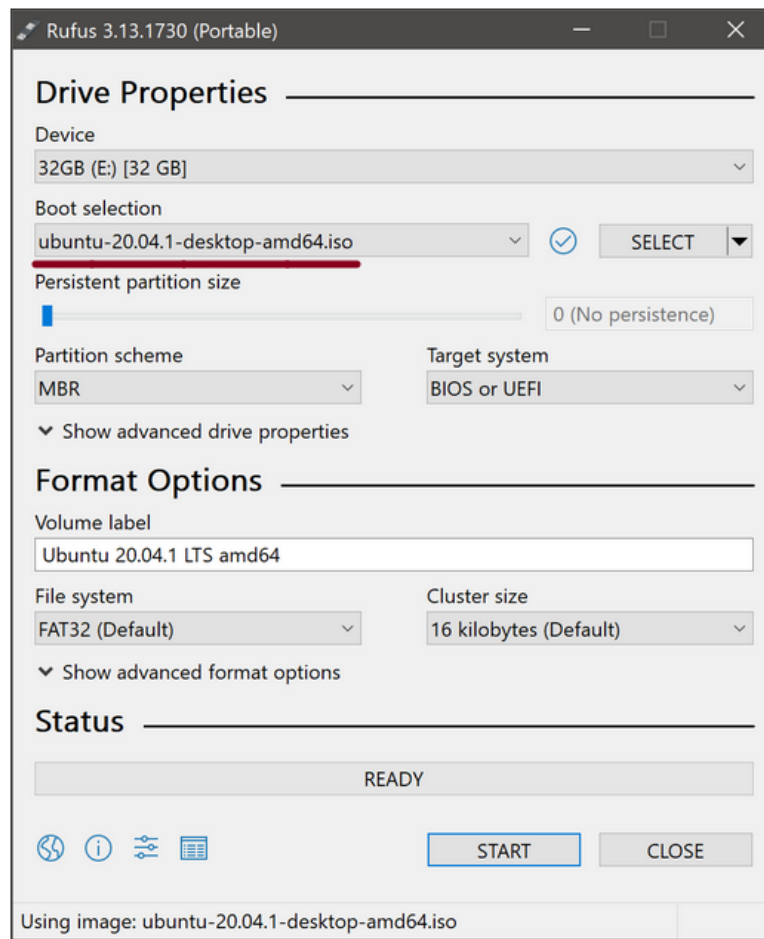
Rufus: Create bootable USB drives the easy way

 <https://rufus.ie/da/>

4. Open Rufus
 - a. Select your USB stick under the *Device* dropdown menu



- b. Browser to and select the downloaded Ubuntu .iso file in the *Boot selection*



c. #Note This will remove all data from the selected USB stick#: **Press Start**

Booting the startup media

Well... this is likely the trickiest part, as it differs between PC brands and models.

First, we would need to enter the boot menu. This is always achieved during the computer startup, before even starting Windows. Since PCs are different, you would need to know the Brand and Model number of your PC. For laptops, this information is usually engraved somewhere close to the display. Search for "Boot menu" and your model, for more details on what to do.

This guide is written on a Lenovo T14S, so I would have to google "Boot menu Lenovo T14S" to learn that the boot menu can be accessed during computer startup, if I keep pressing F12 repeatedly early during startup.

Once the boot menu has been accessed, you should select the USB stick as startup choice. This is usually NOT the top option! Now the PC should boot into Ubuntu from the USB-stick (Yes you have an entire operative system on your USB drive now!), and from there the installation can begin.

You will be greeted with a menu. Select the "Try or Install Ubuntu" option



Installation

After booting into the Ubuntu USB stick, you are presented with the following screen.

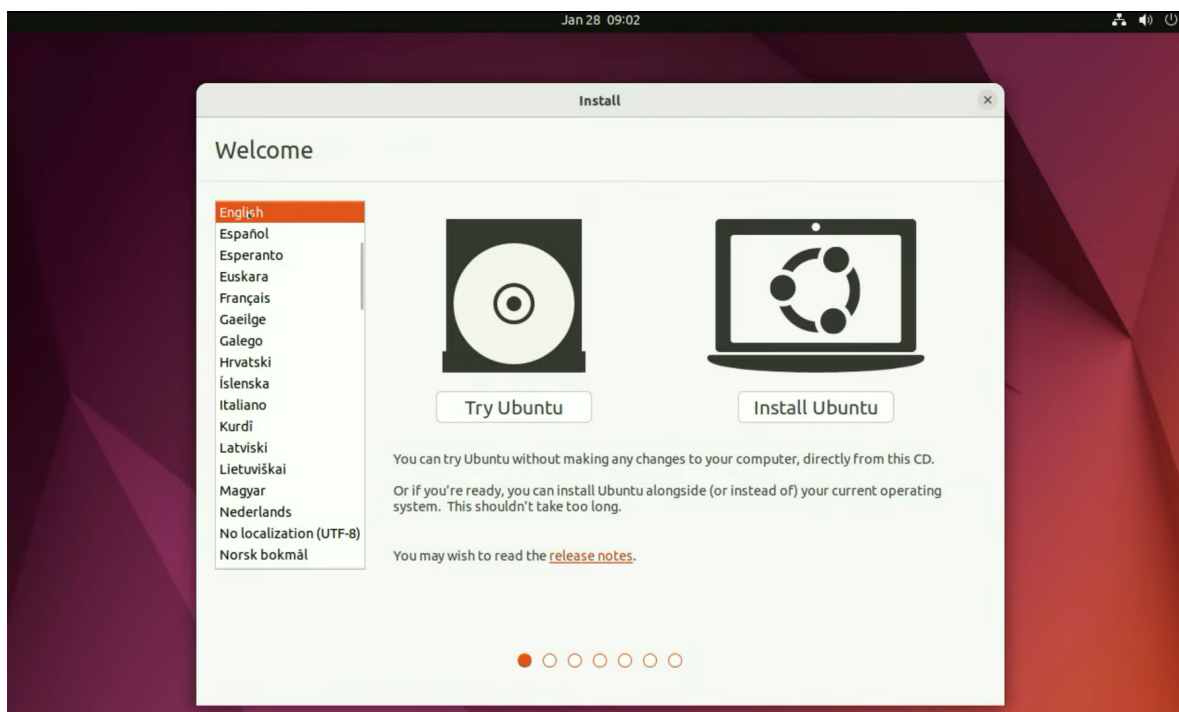


Figure 1: Selection screen



It may go without saying BUT, during this whole process, don't remove the USB drive before being specifically asked to.

You have the option to play around and try out the system if you desire. If you wish to play, press the “Try Ubuntu” button. When you are done, you can re-access the installation window through an icon on the desktop, or restart and follow the guide from section **“Booting the startup media”**.

When you are ready to install, press the **“Install Ubuntu”** button.

Local settings

Next, select your keyboard layout and click **“Continue”** when ready.

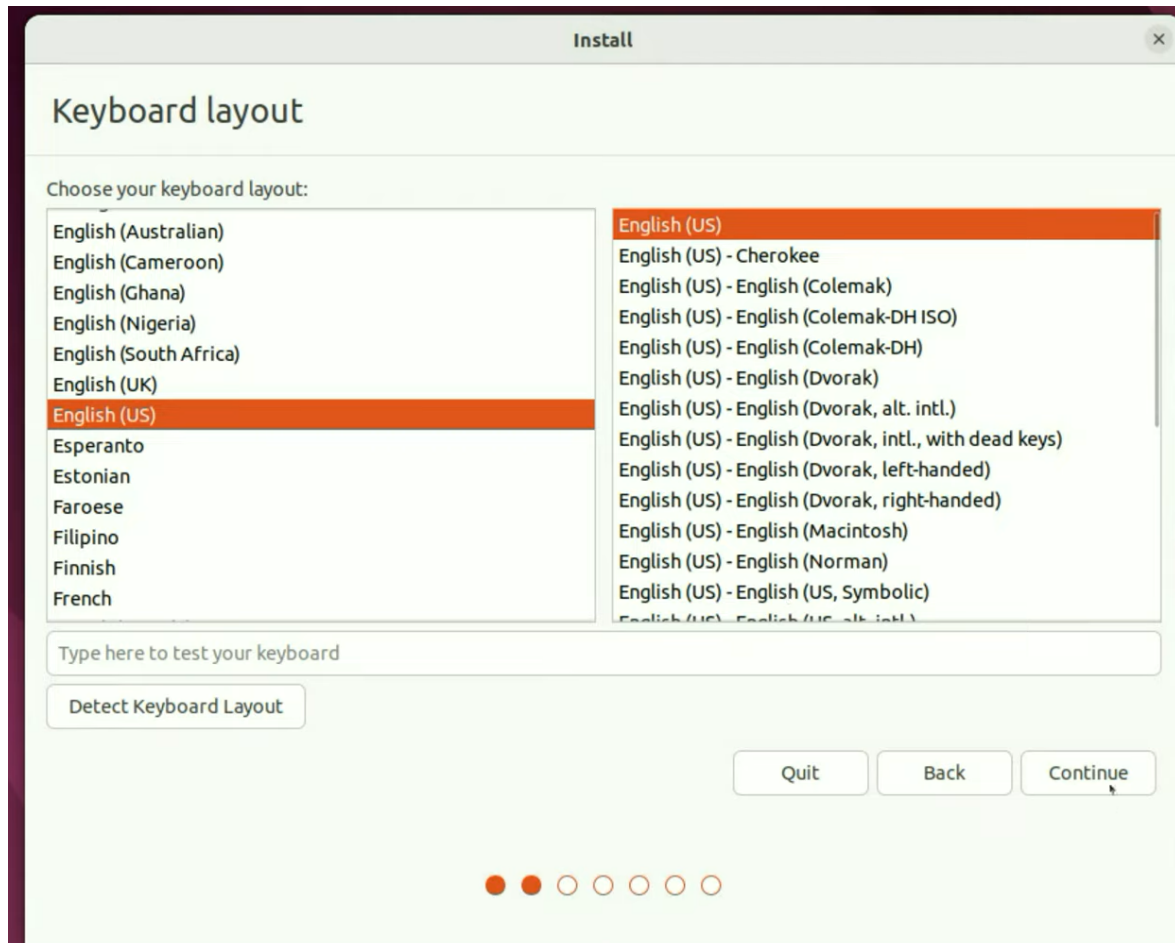


Figure 2: Local settings

Update and preinstall software options

Make sure to mark the following:

- Normal installation
- ☐ Install third-party software for graphics and Wi-Fi hardware ...

If you have access to the internet, you can just as well consider to mark

- ☐ Download update while installing Ubuntu

Hit **“Continue”**

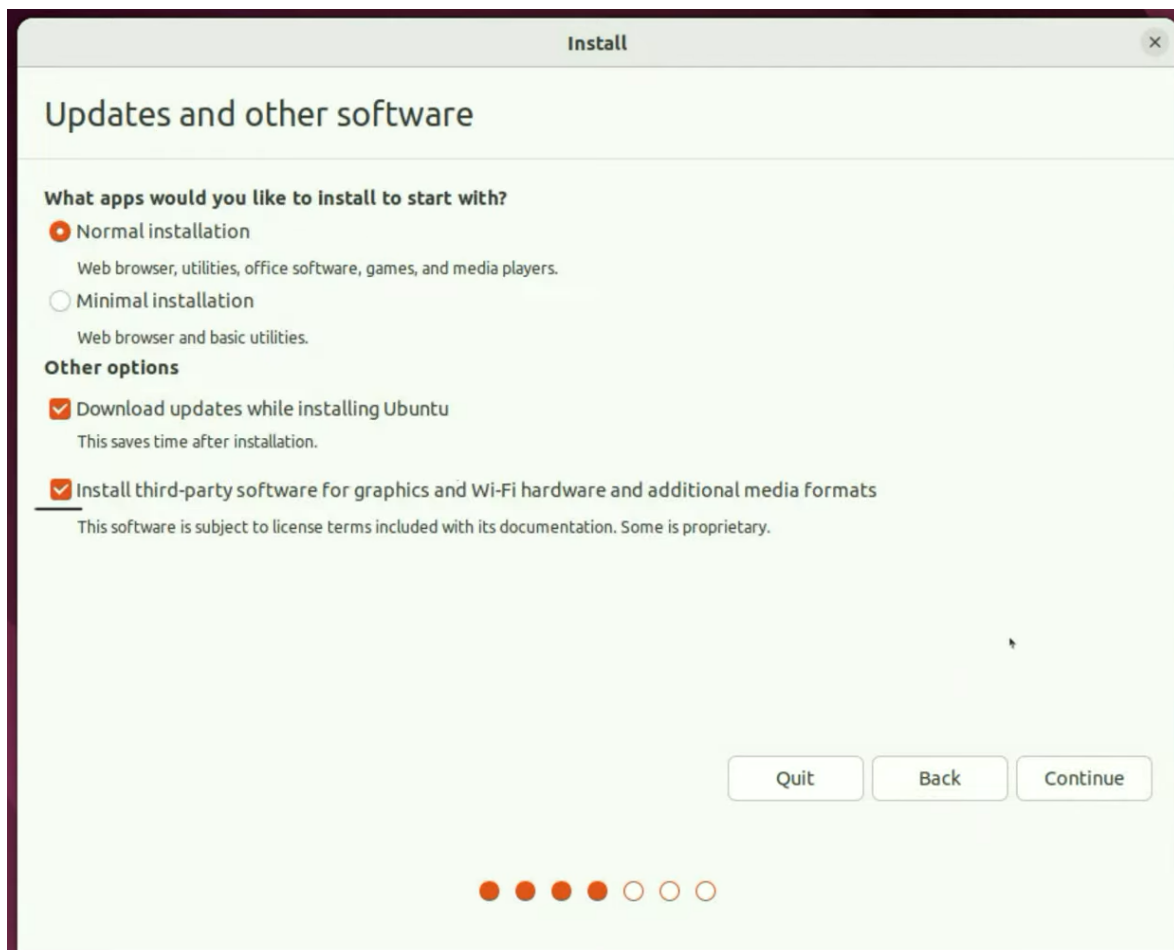


Figure 3: Update and additional software options.

Installation option

While there are possibilities for selecting other options, this guide will go with the option

- Erase disk and install Ubuntu



Beware that this option WILL remove everything on the hard disk selected for the installation

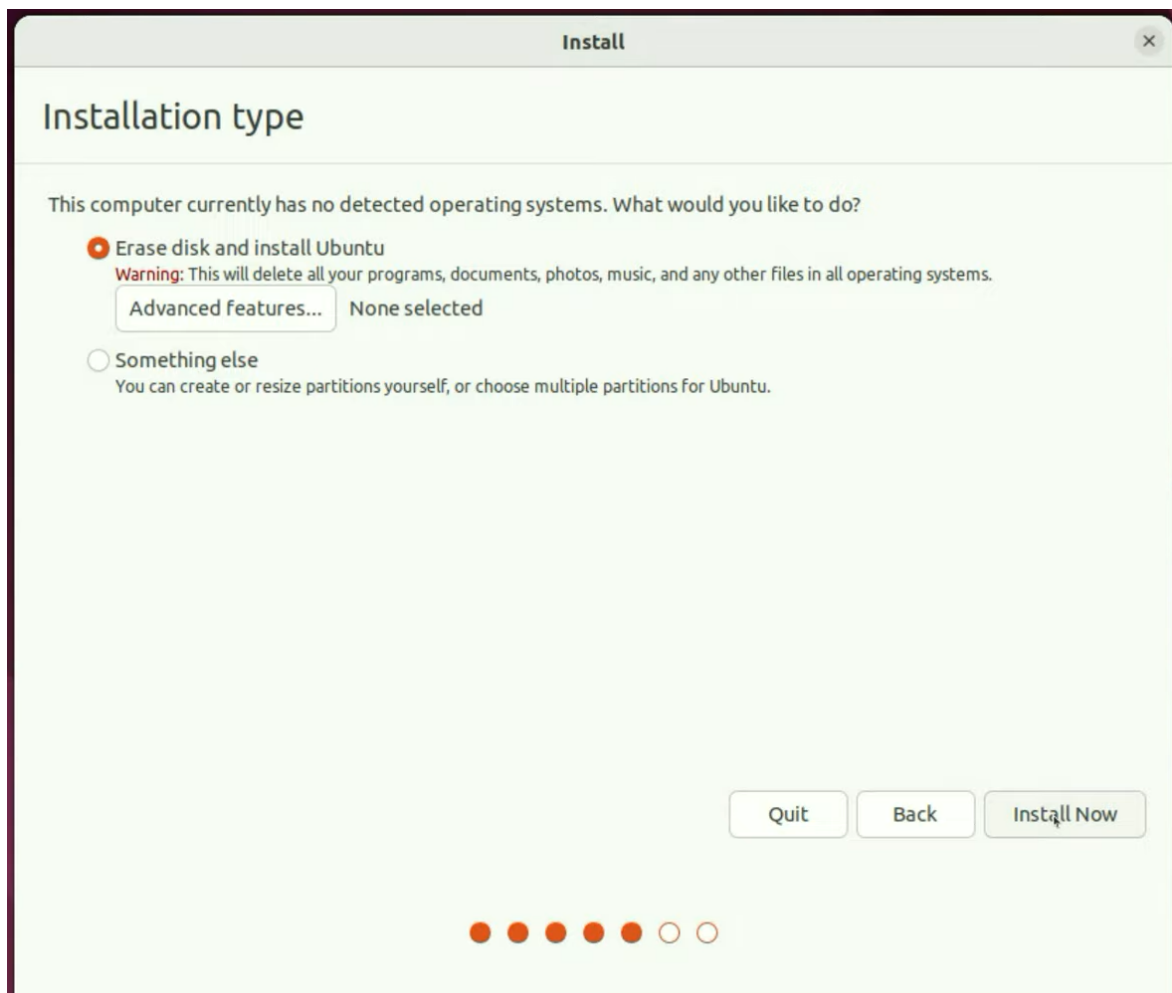


Figure 4: Installation type, choosing `Install Ubuntu alongside other partitions` (option not shown here), will install Ubuntu alongside the preexisting system (e.g. Windows) → Not guaranteed to work in all cases. Press **"Install Now"**, You should immediately be informed by a pop-up message where you must press **"Continue"**:

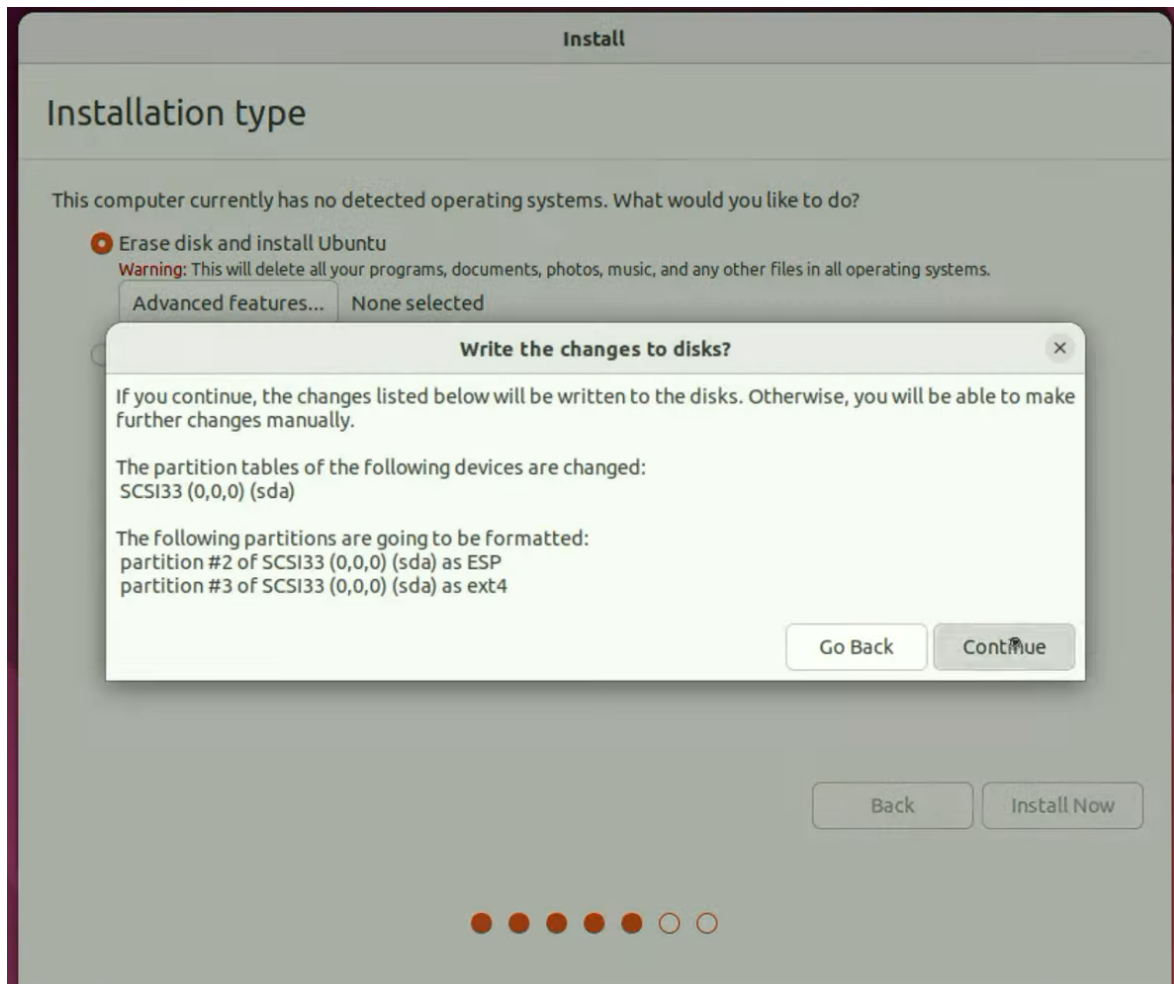


Figure 5: Final warning requests your approval to commit changes to the harddisk.

User settings

While installing, you will be prompted to set up your user. Select the country or region you desire, and press "Continue"

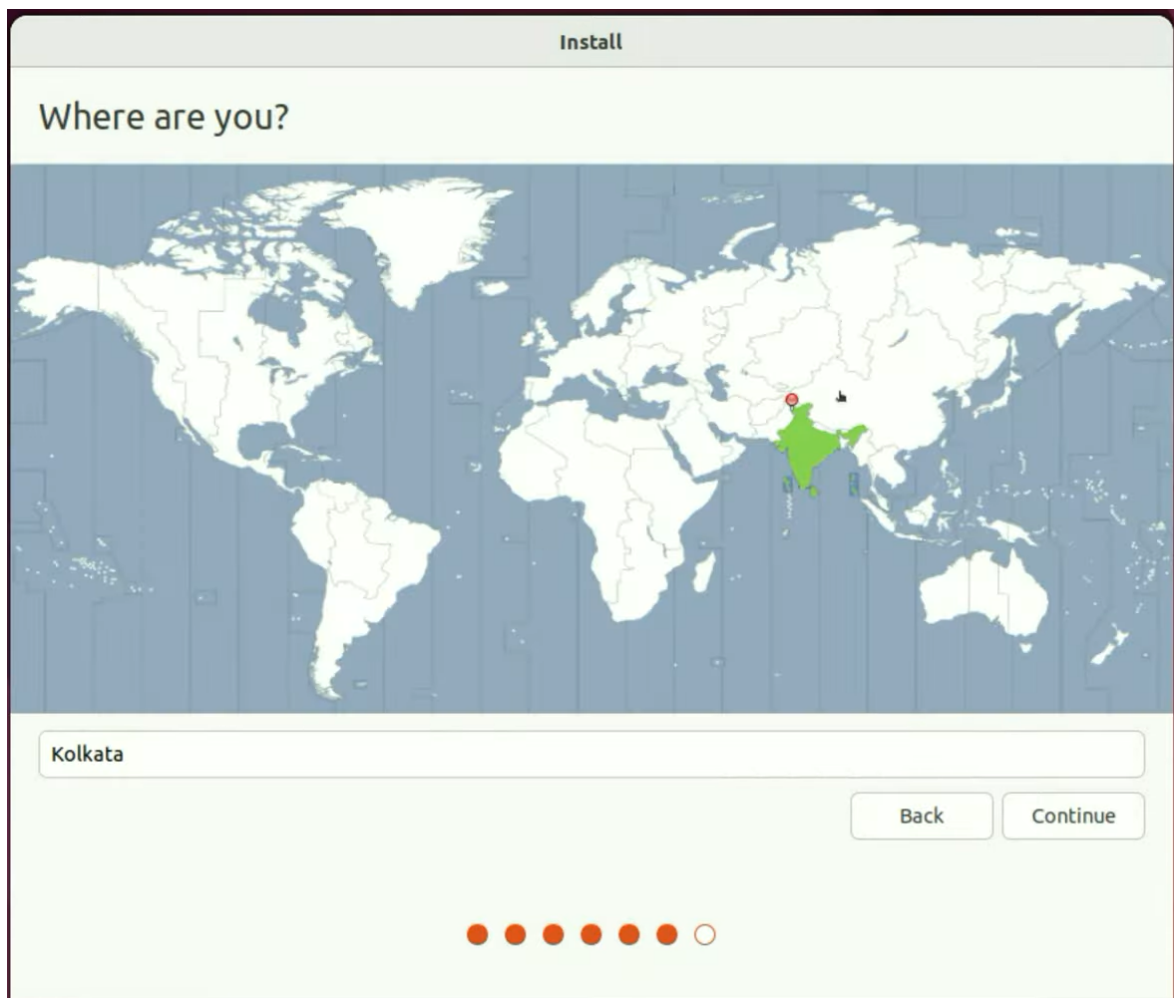


Figure 6: Country selection affects time and date

Fill out information on your user.

- Name will be shown during startup, when you select your user for login
- Computer name is the name that the system will call your computer (No spaces or special characters)
- Username will be the name of your account (No spaces, uppercase characters or special characters)
- Provide a meaningful password
- Decide whether you wish to click the user and provide password during login

Install

Who are you?

Your name:

Your computer's name:
The name it uses when it talks to other computers.

Pick a username:

Choose a password:

Confirm your password:

☐ Log in automatically

☒ Require my password to log in

☐ Use Active Directory
You'll enter domain and other details in the next step.

Back Continue

Progress bar: 7 dots, 6th dot is highlighted.

Figure 7: User and login information. Enable setup of a single administrative user.

Once ready, click **"Continue"** and wait for the installation to finish. Once done, click **"Restart Now"**. When ready, the final screen you'll see is the following:

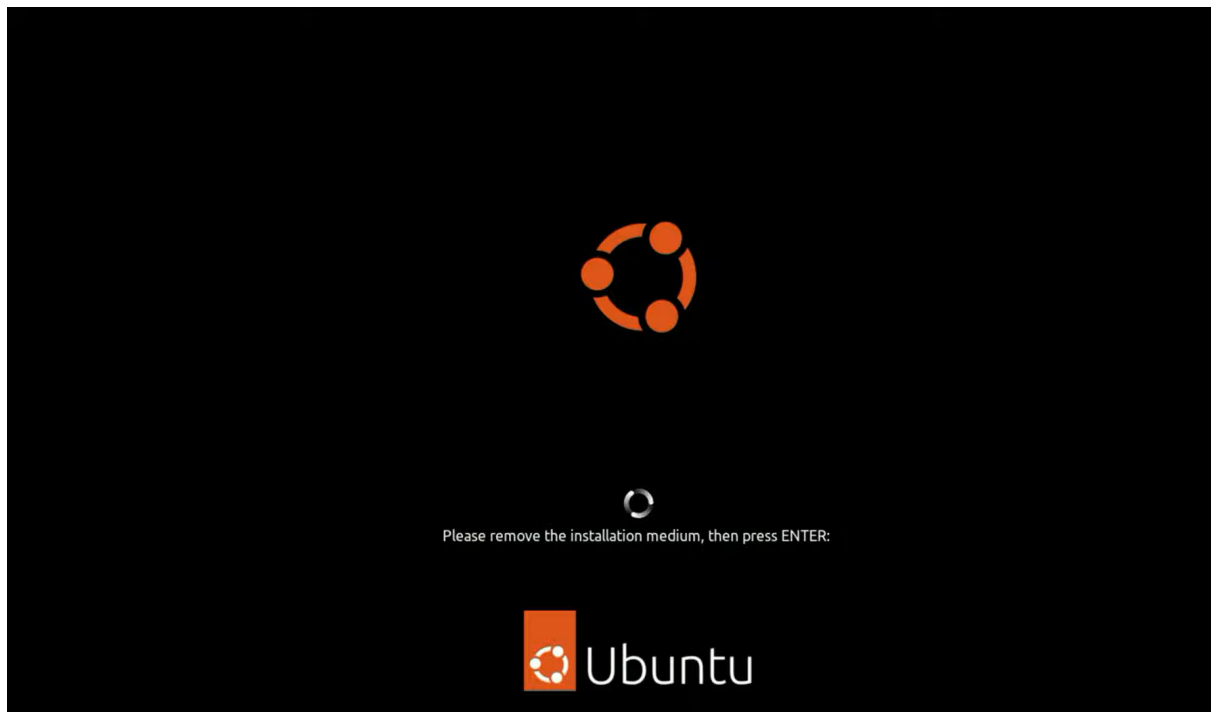


Figure 8: Ready to restart screen.

Remove the USB-stick from the PC and press **Enter**

BitLocked out

If you don't have administration rights and you have Bitlocker enabled, it's still possible to force Ubuntu installation through, it just requires a bit more elbow grease, a careful mind, and some terminal commands

First, go way back to the first window of the installation process and click the **"Try Ubuntu"**. This will close down the window and let you use the Ubuntu system.

Now we need to find the name of the hddisk you wish to install on. Mouse click in the top left corner to bring forth a search menu, type *"gparted"* and open the program.

In the top right corner, click on the drop down menu, and locate the hard disk to install Ubuntu on. You should recognize your hard disk by ensuring that the size of the disk matches your expectations.

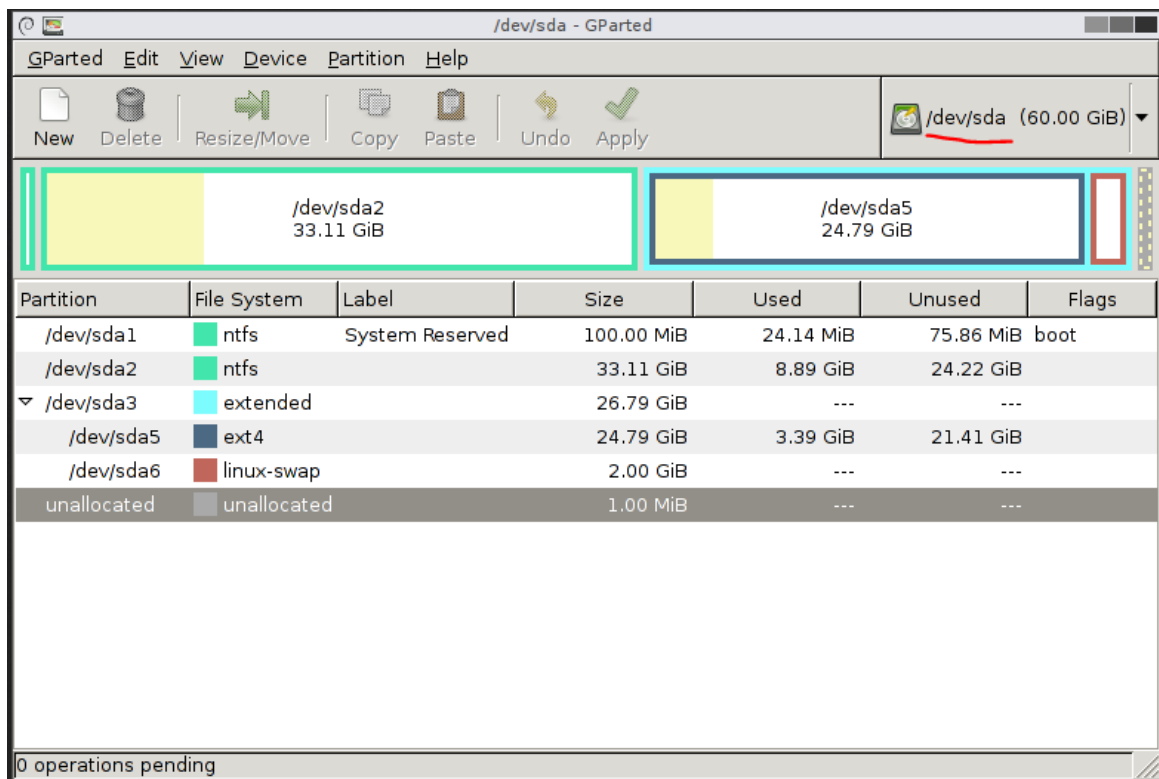


Figure 9: Partition view of the system

Make a note on the name (underlined in red).

Now click in the top left corner again and type "terminal" and open the terminal.

To remove the bitlocker, we will nuke the hard disk with zeroes, which can be done with a single command

! The following command WILL remove ALL data on the hard disk NO QUESTIONS ASKED. The data will NOT be recoverable as it will be overwritten with nothing. Proceed with caution, and don't press enter before being absolutely sure.

To nuke the BitLocker system, prepare the following code, but replace the `of=/dev/sda` part (underlined in blue) with the name of the hard disk as noted in GParted (underlined in above picture in red).

```
dd if=/dev/urandom of=/dev/sda bs=1M
```

e.g. if the name is `/dev/sdc`, then you should instead write `of=/dev/sdc` as you would otherwise remove ALL data.

When filled correctly, press enter and wait for ~10 seconds (or for the command to complete) before closing the terminal window.

Proceed with installation by re-opening the installation window from the icon on the desktop.

Installing Ubuntu ALONGSIDE existing operating system

Dual boot

Initial considerations

If extra old laptops are a limited resource, one option is to prepare a Dual Boot setup. This way you get to keep your primary operating system, while also installing Ubuntu on the same laptop. The major drawback is that you would have to dedicate disk space for both systems, and they can't really share that space, as they use different formatting on their disk space.

Optimally you would have two hard disks for each system, but since laptops are small in size, you would usually have to downsize your existing system **a lot!** before starting.

This means that a laptop with a single harddisk would have to dedicate at least 30 Gb for Windows as a bare minimum (NOT considering Windows updates, Office or any other software) and at least 25 Gb for Ubuntu → But you should provide more than that as it is such a hassle to create more space between the two existing systems.

Pros

- A fully functional and smooth running Ubuntu system alongside a functional Windows system
- Two optimized systems to cherry pick between
- A quick startup time (for Ubuntu at least)

Cons

- Is quite a hassle to set up on a single HDD, as Windows after installation and updates takes up a huge load of space (some users report up to 100+ GB!)
- Limited wiggle room in regards to resizing Windows and Ubuntu partitions if you work on a single HDD
- A slightly more complex installation process, as you would have to install Ubuntu AFTER Windows. Otherwise Windows would overwrite the existing *boot setup*. Simply speaking, a *boot setup* makes the system recognise which systems are there, and where these are located.

Guide

If you are still up for the challenge ⇒ great! In fact this is the **default** option when installing modern versions of Ubuntu. If you are lucky, it should be possible to set up your system for dual boot by selecting the

`Install Ubuntu alongside other partitions` option during installation, see Figure 10 and Figure 11 below.

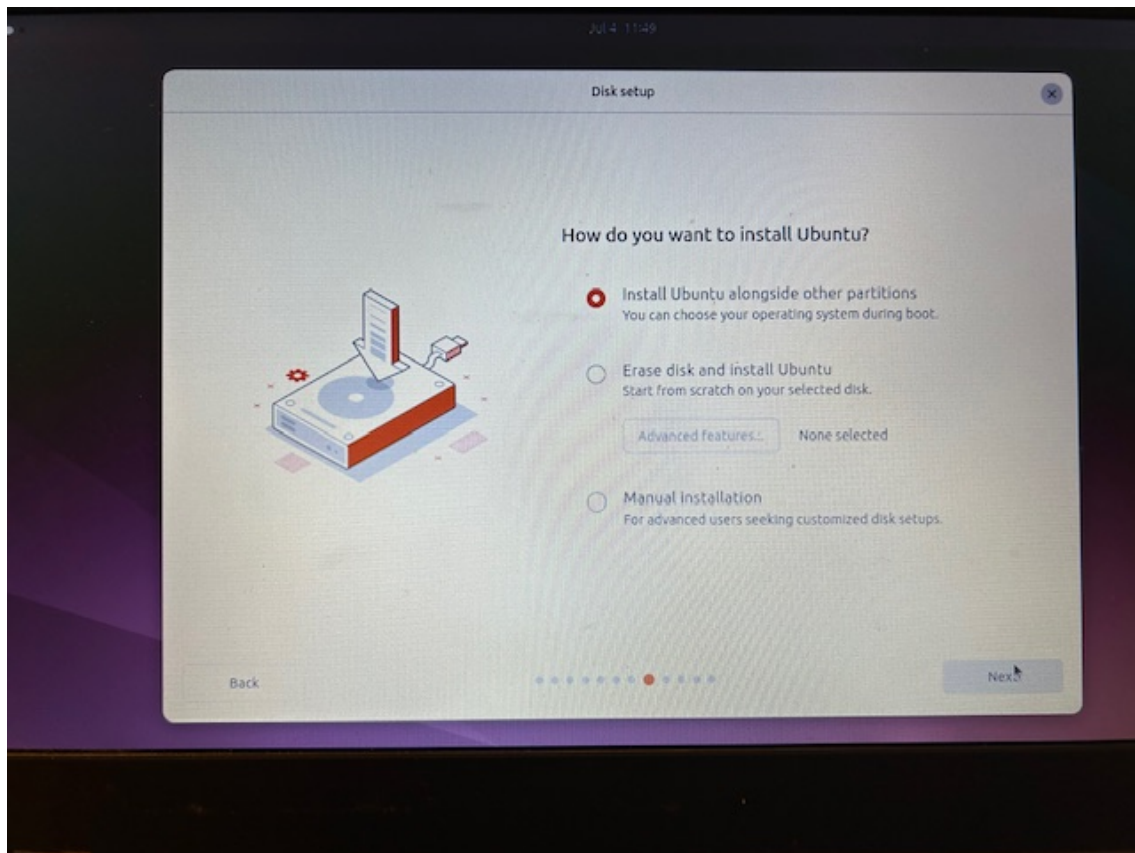


Figure 10: Selection for Dual-Boot **Install Ubuntu alongside other partitions**.

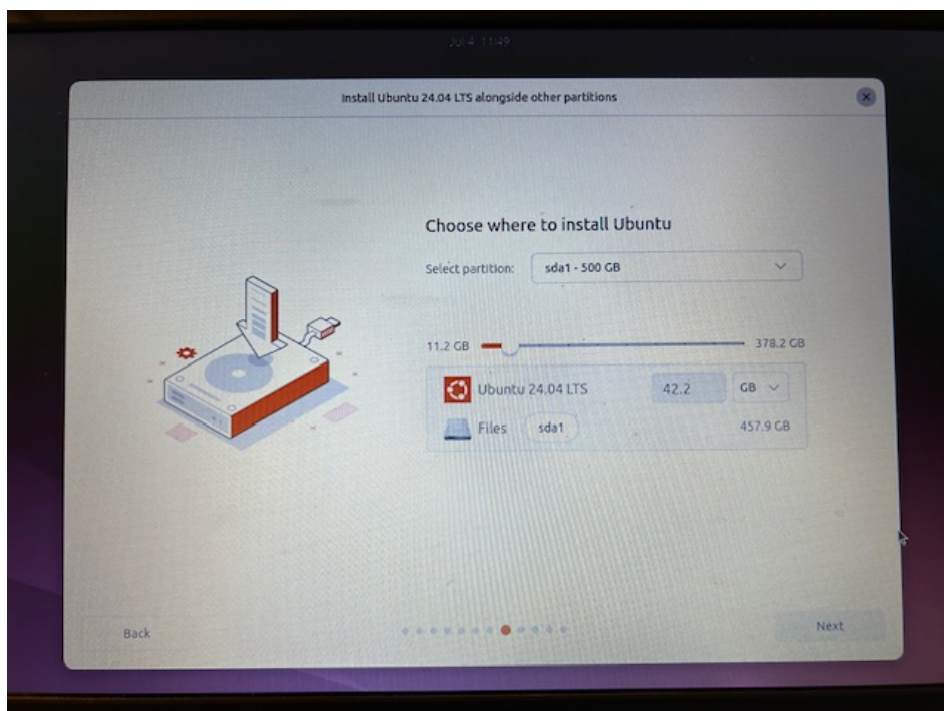


Figure 11: Select position for installing Ubuntu. In general you will be selecting which harddisk to install on. Depending on the way Windows have been set up, there is a chance that this installation won't work, in this case you can either search google for solutions, OR go the replacement option, where Windows **will** be removed and replace with Ubuntu, in that case select the **Erase disk and install Ubuntu** option.

Before starting though consider backing up your data and system. For good orders sake, here are additional guides to follow. Good luck and have fun!

A Simplified Guide to Installing Dual Boot of Windows 10 and Ubuntu for Absolute Beginners

If— just like me—you're always that one hipster who uses a PC in a coffee shop or a classroom and you have no idea how to install a...

 <https://medium.com/@kimma1261/a-simplified-guide-to-installing-dual-boot-of-windows-10-and-ubuntu-for-absolute-beginners-16c09cd21aa7>

Partition scheme	Target system
MBR	BIOS or UEFI
Show advanced drive properties	
Format Options	
Volume label	
Ubuntu 18.04 LTS amd64	
File system	Cluster size
FAT32 (Default)	4096 bytes (De

Dual Boot Ubuntu 22.04.3 and Windows 11 | The Ultimate Step-by-Step Guide

Welcome to CodeHype! In this comprehensive tutorial, we will guide you through the process of setting up a dual boot system with Ubuntu 22.04.3 and Windows 11. What makes our guide stand out is that we'll show you how to install both operating systems

 https://www.youtube.com/watch?v=bG8j-Gyz_ww



Getting things to work inside Windows

Unix within Windows

While it is possible to set up Unix emulators or a virtual Linux inside Windows, it is not within the scope of this guide or this virtual training to support these solutions. If this is your only option, be aware that things may not work the way they are shown in the virtual training!

At the end of this guide, there are links to external resources which may help you out.

Worst-case scenario: Encrypted Windows without administration rights

If you do not have access to any spare PC, you can't do without Windows, you have an encrypted setup, and you do NOT have administrator rights on your computer, you are at the mercy of your system administrators to help you.

If they are willing to help you, try discussing some of the solutions below with them.

Virtual box

Initial considerations

Setting up a virtual box is a safe way to set up and test out new operating systems, without having to make system-wide changes. Virtual boxes are enclosed systems into which you can install operating systems (such as Windows or Linux). Since it is enclosed from the rest of your system, it is completely safe to play with and destroy, as it can't affect your operating system. In (fun)fact, youtubers use Virtual Box Windows installations to scam "Windows support" phone scammers.

Unfortunately, since you are enclosing a proportion of your system, there will be strict hardware limitations to this solution, and it **will not** be a viable long-term option for using Linux.

Virtual box may be an option for you, if your laptop is being administered by others, e.g. the institute you work at. Because these computers have restrictions on what software can be installed, you may have a problem installing the Virtual Box program. In such cases, your best bet would be to contact your institutions IT support and request support for / permission to install Oracle VM VirtualBox.

Pros

- No system-wide changes required.
- No risk of data loss when playing around in the Virtual Box
- Great for testing out new system, without risking any data loss

Cons

- Limited hardware resources available, often resulting in a sluggish performance
- Not great for daily work, as it would be a slow and tedious user experience
- Slow startup time as you have to wait for Windows startup, Virtual Box startup, and then the OS startup.

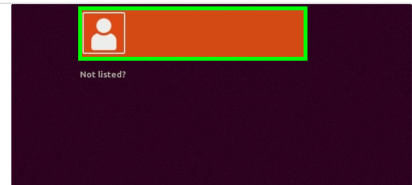
Guide

Here are a few resources (untested by me) on how to work with Virtual boxes. Good luck.

How to Install Ubuntu on VirtualBox (with Pictures) - wikiHow

This wikiHow teaches you how to install Ubuntu Linux on a computer by using VirtualBox. VirtualBox is a program which allows you to install an operating system without changing your computer's main operating system. Open the Ubuntu...

 <https://www.wikihow.com/Install-Ubuntu-on-VirtualBox>



How to use VirtualBox - Tutorial for Beginners

In this step-by-step tutorial, learn what Oracle VirtualBox is, how to install it on your computer, and how to run it. Oracle VirtualBox is a free and open-source software that allows you to create and run virtual machines on your computer. You can use it to test

 <https://www.youtube.com/watch?v=nvdmQX9UkMY>

