EXPERIMENT NO. 1

Name: Vedant Gajendra Vankar **Div: SE IT A**

Roll No.: 352 **Sign:**

DOP: 09/01/24 **Grade:**

DOS: 23/01/24

Aim:

Case Study: Brief History of UNIX, Unix Architecture; Installation of Unix Operating System

Theory:

1. Brief History of Unix:

The Unix operating system has a rich and influential history that dates back to the late 1960s. Here is a brief overview of key milestones in the development of Unix:

1. Origins at Bell Labs (1969): Unix was conceived at Bell Labs, the research and development subsidiary of AT&T (American Telephone and Telegraph). Ken Thompson, Dennis Ritchie, and others started working on a project called Multics but later decided to create a simpler and more practical operating system, which they named Unix. The first version of Unix was written in assembly language.

2. C Language (1972): Dennis Ritchie and Ken Thompson developed the C programming language, which provided a powerful and portable tool for writing Unix. This allowed Unix to be easily ported to different hardware platforms, contributing to its widespread adoption.

3. Version 6 Unix (1975): The release of Unix Version 6 marked a significant step forward. It included improvements such as the creation of the first Unix manual, the introduction of pipes for inter-process communication, and the development of the "Unix philosophy" that emphasized modularity and simplicity.

4. Berkeley Software Distribution (BSD) (late 1970s): The University of California, Berkeley, played a crucial role in Unix's development with its BSD releases. BSD Unix added features like the vi editor, TCP/IP networking stack, and the job control system. This version of Unix became widely used in academic and research institutions.

5. System V and Commercialization (1980s): AT&T developed System III and later System V, which became the foundation for commercial Unix variants. This period saw the commercialization of Unix, with various vendors offering their versions. Sun Microsystems, Hewlett-Packard, IBM, and others played key roles in promoting Unix in the business world.

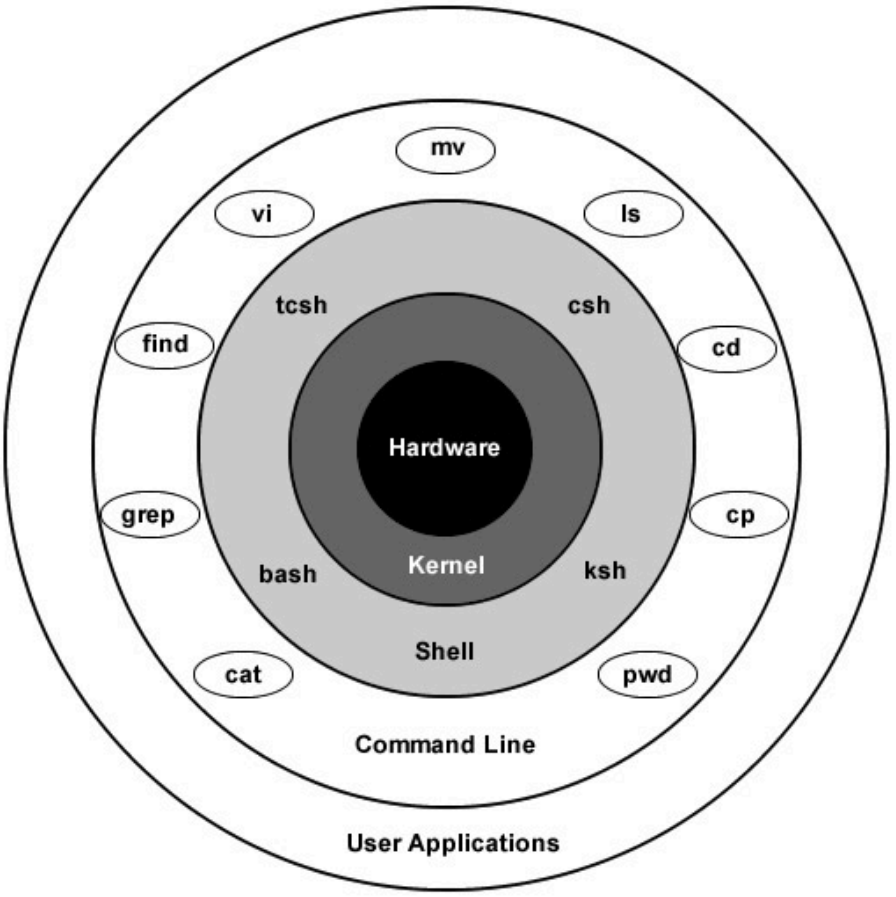
6. Open Source Movement and GNU (1983 onwards): Richard Stallman founded the Free Software Foundation and initiated the GNU (GNU's Not Unix) project with the goal of creating a free and open-source Unix-like operating system. The GNU project provided many essential components, but a kernel was still missing.

7. Linux and the GNU/Linux System (1991 onwards): Linus Torvalds developed the Linux kernel, inspired by Unix, and combined it with the GNU components to create a complete operating system. The result was the GNU/Linux system, which gained popularity rapidly due to its open-source nature and collaborative development model.

8. Unix Today: Today, Unix has evolved into various flavors, including commercial variants like AIX, HP-UX, and Solaris, as well as open-source distributions like Linux and the BSDs. While the landscape of operating systems has diversified, Unix's principles and design concepts continue to influence modern computing systems.

2. Unix Architecture:

Unix is made up of 3 main parts: the kernel, the shell, and user commands and applications.



The kernel and shell are the heart and soul of the operating system.

The kernel ingests user input via the shell and accesses the hardware to perform things like memory allocation and file storage.

The shell is an interface that interprets the command line input and calls the necessary programs to do the work. The commands that you enter are programs themselves, so once the work is done, the command line will return to a prompt and await further input.

There are several different shells, and syntax and shortcuts vary between them. For example, the "csh" shell listed in the image above is called "C shell" and has syntax similar to the C programming language. All shells support similar basic functions.

3. How to Install Ubuntu Summary(Using VirtualBox)

- Visit https://www.virtualbox.org/wiki/Downloads

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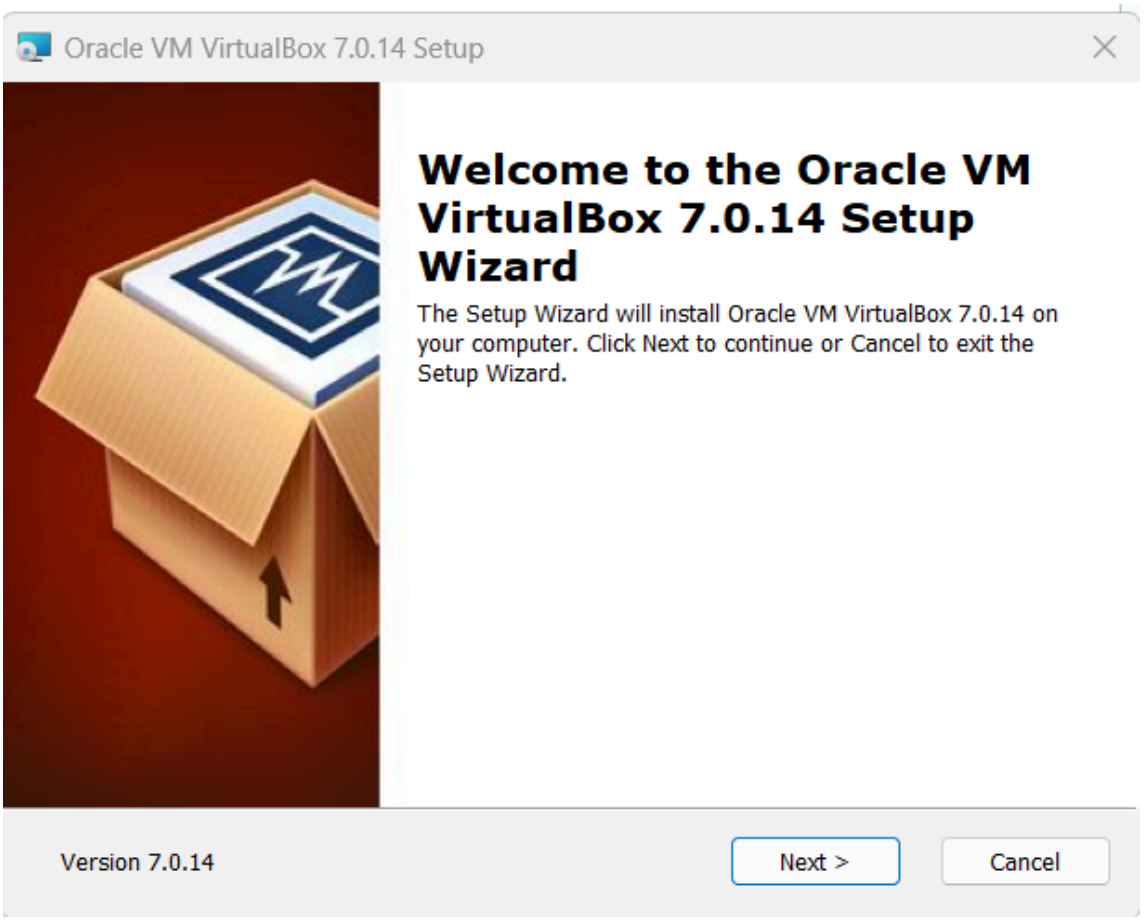
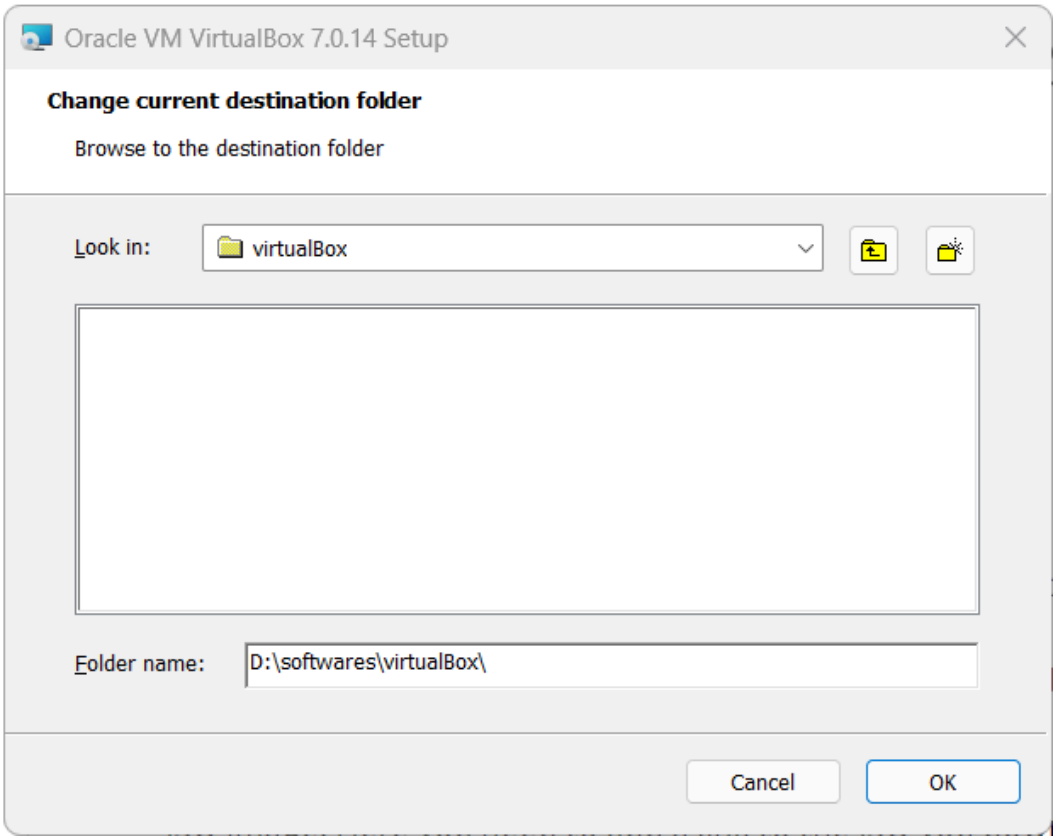
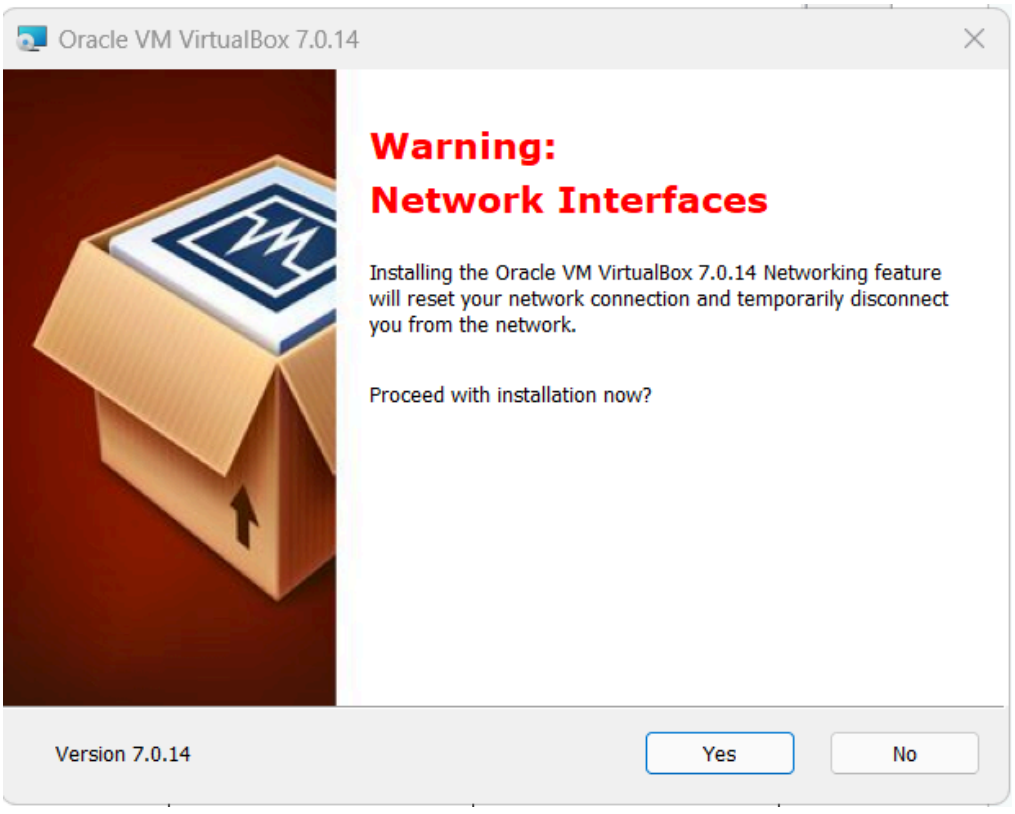
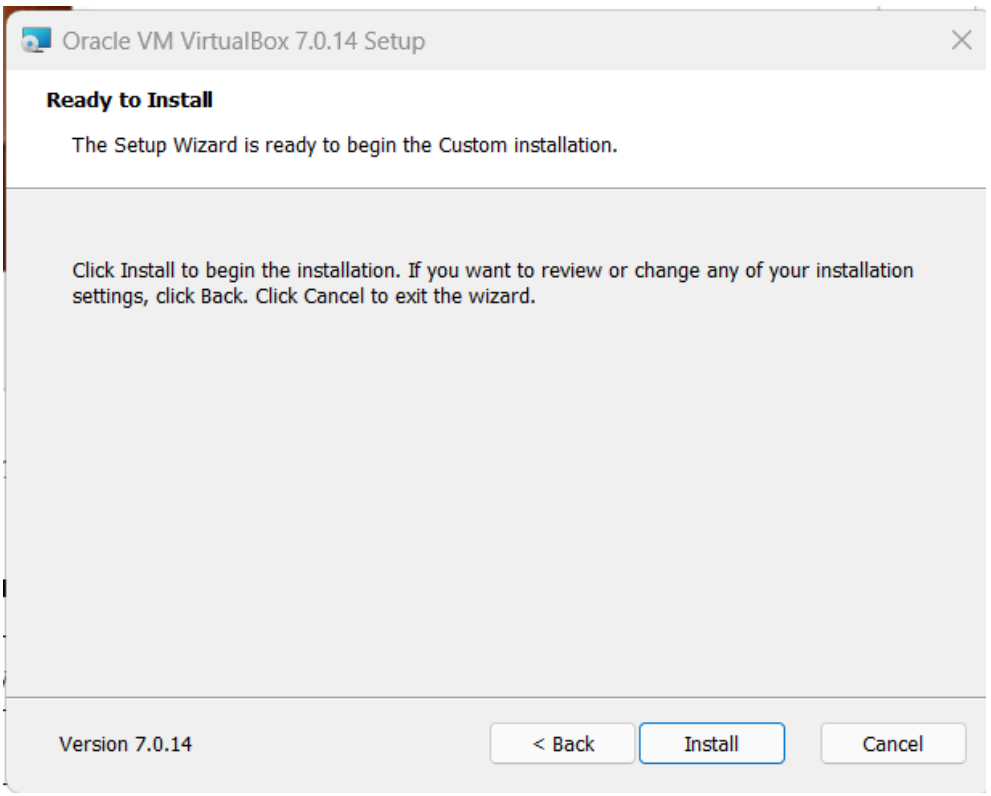
- Click on windows hosts and download the installer.
- Run the installer as administrator.
- 

- Click next.

- 

- Select installation folder.
- Click ok.
- 

- Click Yes.
- Click yes if asked to install dependencies.



- Click install.
- Wait for installation.

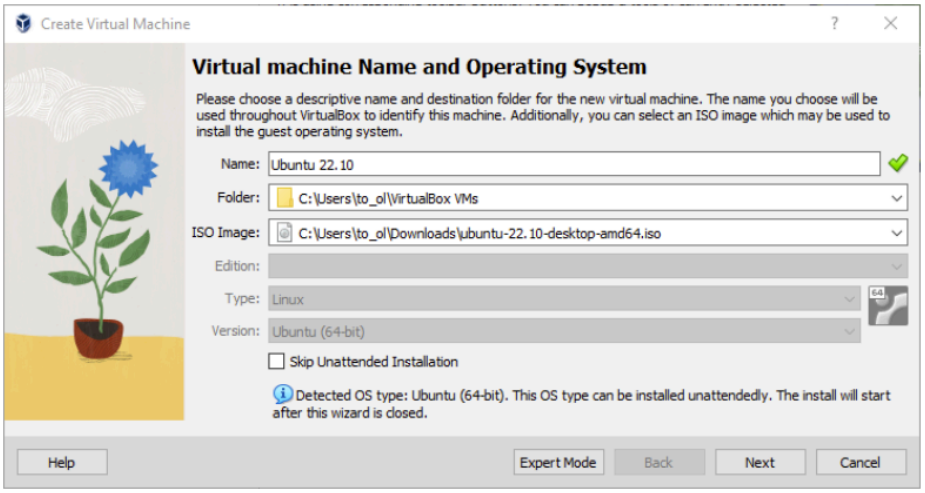
- Click finish.
- Download iso image for ubuntu.

2. Create a new virtual machine

Click **New** to create a new virtual machine. Fill in the appropriate details:

- Name: If you include the word Ubuntu in your name the Type and Version will auto-update.
- Machine Folder: This is where your virtual machines will be stored so you can resume working on them whenever you like.
- ISO Image: Here you need to add a link to the ISO you downloaded from the Ubuntu website.

We want to install Ubuntu unattendedly so we can leave the checkbox to skip unchecked.



Create a user profile

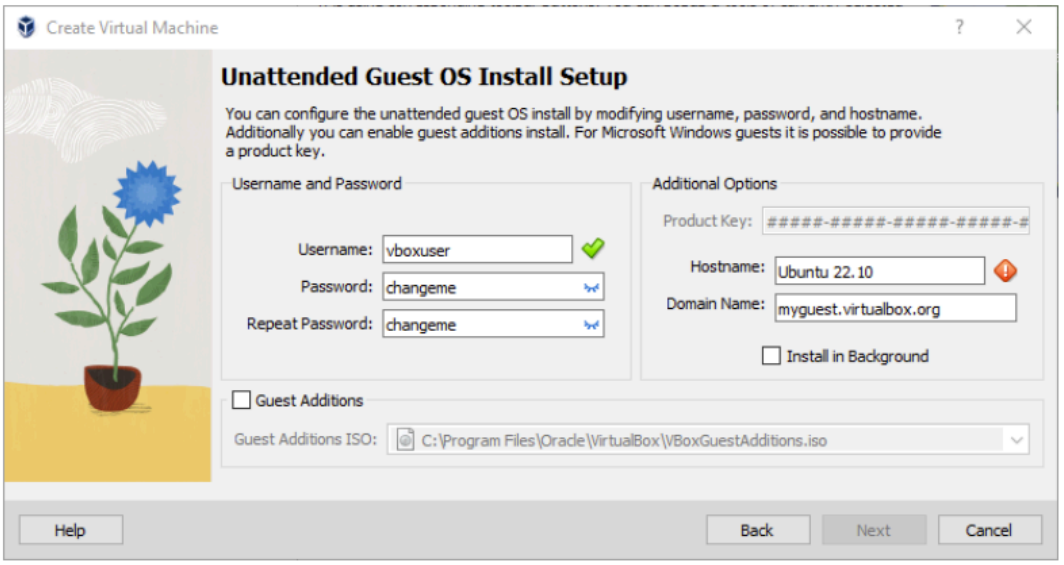
To enable the automatic install we need to prepopulate our username and password here in addition to our machine name so that it can be configured automatically during first boot.

The default credentials are:

- Username: vboxuser
- Password: changeme

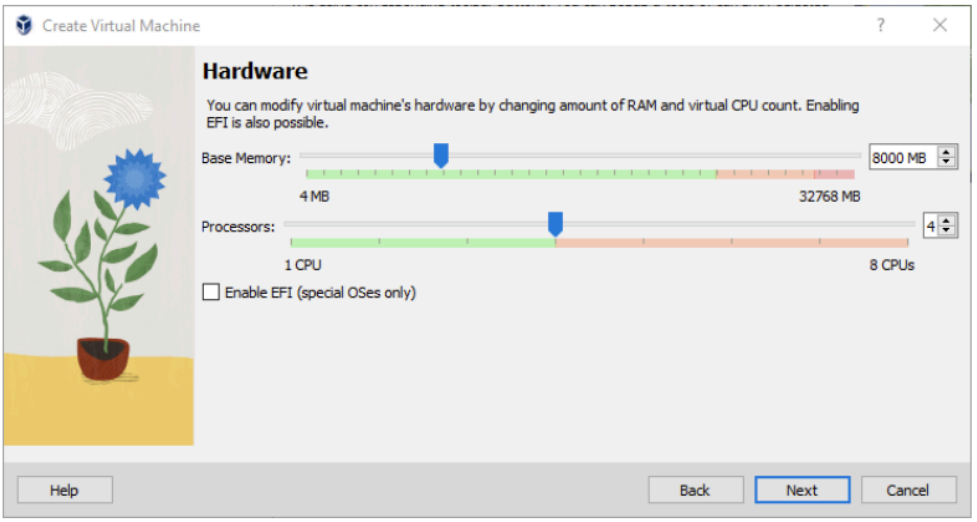
It is important to **change these values** since the defaults will create a user without sudo access.

Ensure your Hostname has no spaces to proceed!

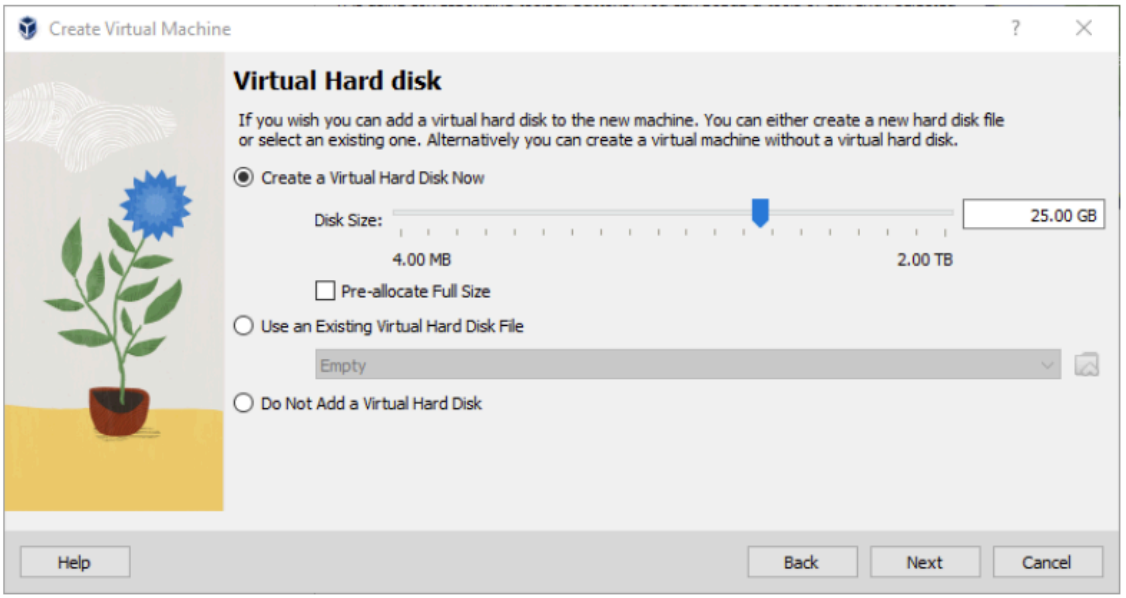


Define the Virtual Machine's resources

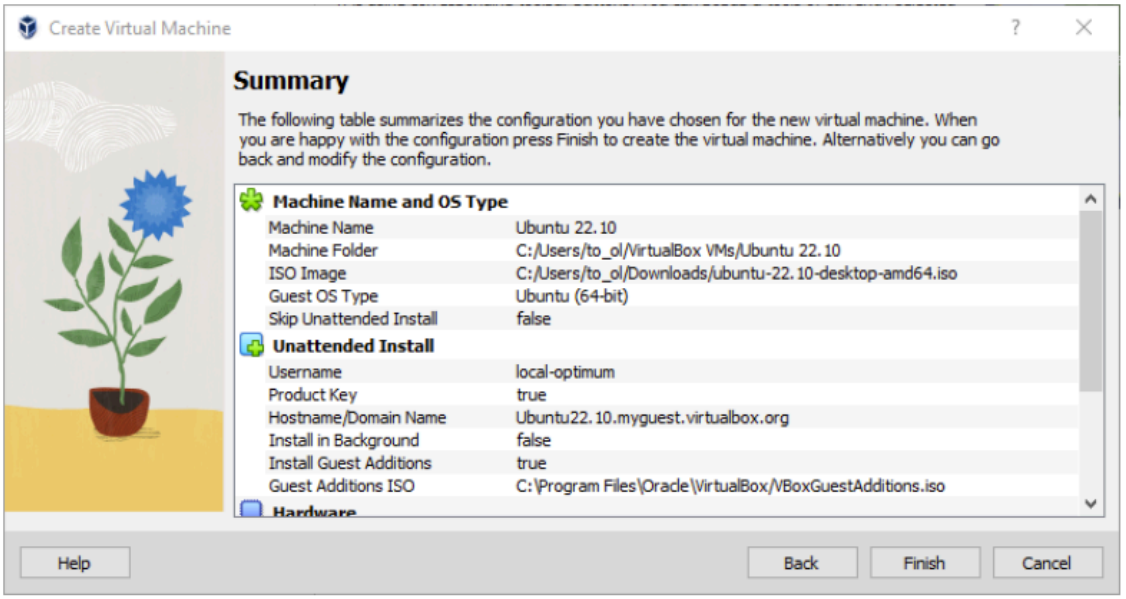
In the next section we can specifiy how much of our host machine's memory and processors the virtual machine can use. For good performance it's recommended to provide your VM with around 8GB of RAM (althought 4GB will still be usable) and 4 CPUs. Try to remain in the green areas of each slider to prevent issues with your machine running both the VM and the host OS.



Then we need to specify the size of the hard disc for the virtual machine. For Ubuntu we recommend around 25 GB as a minimum. By default the hard disk will scale dynamically as more memory is required up to the defined limit. If you want to pre-allocate the full amount, check the 'Pre-allocate Full Size' check box. This will improve performance but may take up unnecessary space.



Click **Next** to continue and view a summary of your machine setting.



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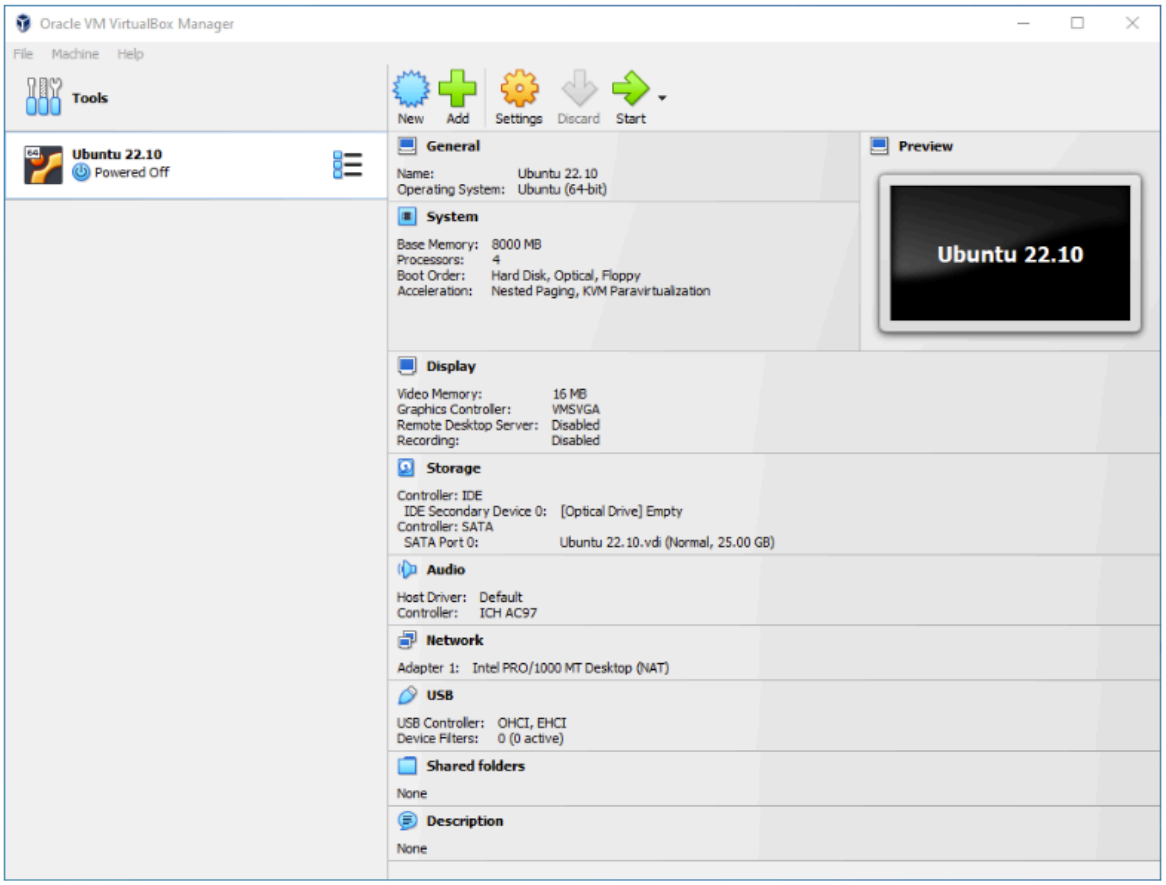
3. Install your image

Click **Start** to launch the virtual machine.



You will see a message saying 'Powering VM up …' and your desktop window will appear.

On first boot the unattended installation will kick in so do not interact with the prompt to 'Try and Install Ubuntu' and let it progress automatically to the splash screen and into the installer.

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Differentiate between different OS

	Linux	Windows	macOS
Hardware Quality	**Versatile, can run on low-spec PCs**	**Very versatile**	**Proprietary hardware,very high-end**
Cost	**Mostly free, some distros have paid versions**	**Freemium, accessing all features costs**	**Free but comes on an expensive hardware**

		approximately $150	
Software Compatibility	**Open-source substitutes for proprietary software**	**Unparalleled**	**Has its own app ecosystem**
Ease of Installation	**Requires some computing knowledge**	**Easy**	**Very easy**
Security and Stability	**The safest and most stable OS**	**Generally great, requires plenty of frequent updates**	**Very good, requires only a few periodic updates**
Ease of Use	**Ease of use determined by the distro**	**Simple to use**	**Very easy to use**

Conclusion:

Thus, we have successfully studied the installation of Ubuntu.