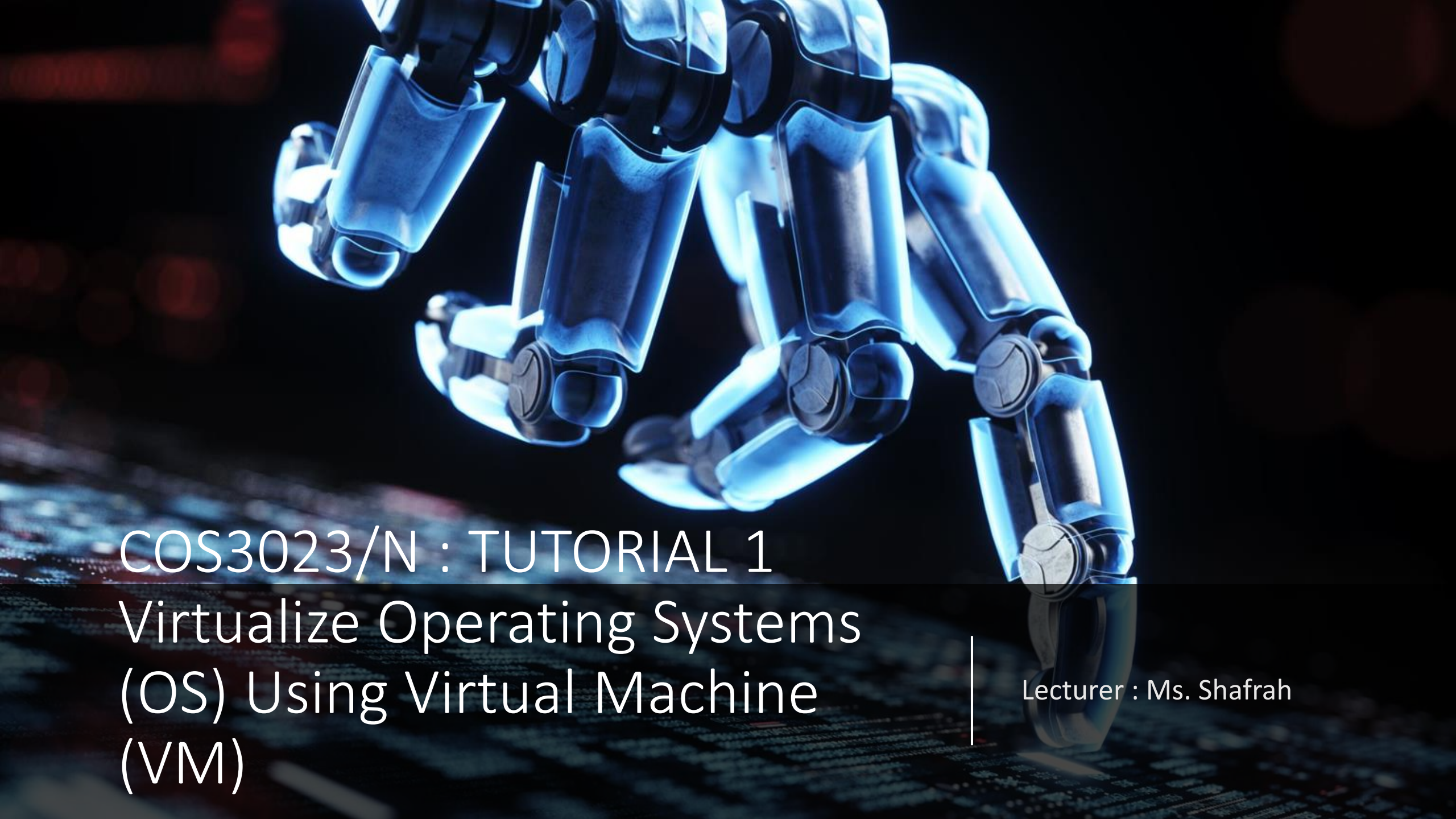


COS3023/N : TUTORIAL 1
Virtualize Operating Systems (OS) Using Virtual Machine (VM)

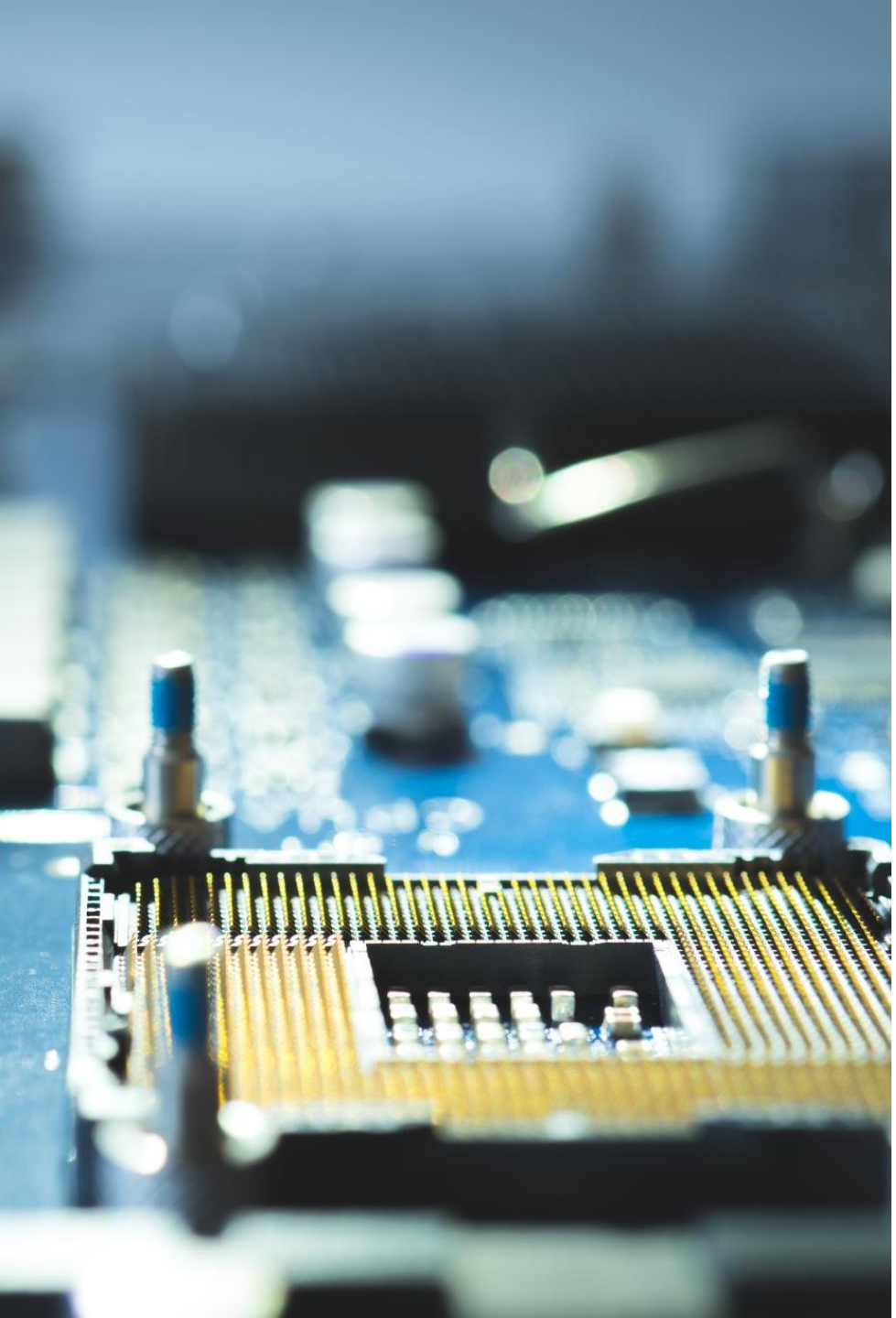
Lecturer : Ms. Shafrah

What is Virtual Machine (VM)?

- Operating system (OS) or application environment that is installed on software, which imitates dedicated hardware.
- The end user has the same experience on a VM as they would on dedicated hardware.

Why use a VM?

- To allow a business to run an operating system that behaves like a separate computer in an app window on a desktop.
- To accommodate different levels of processing power needs.
- To run software that requires a different operating system.
- To test applications in a safe, sandboxed environment.
- To be used for server virtualization, which enables IT teams to consolidate their computing resources and improve efficiency.
- To perform specific tasks considered too risky to carry out in a host environment, such as accessing virus-infected data or testing operating systems.
    - Since the virtual machine is separated from the rest of the system, the software inside the virtual machine cannot tamper with the host computer.



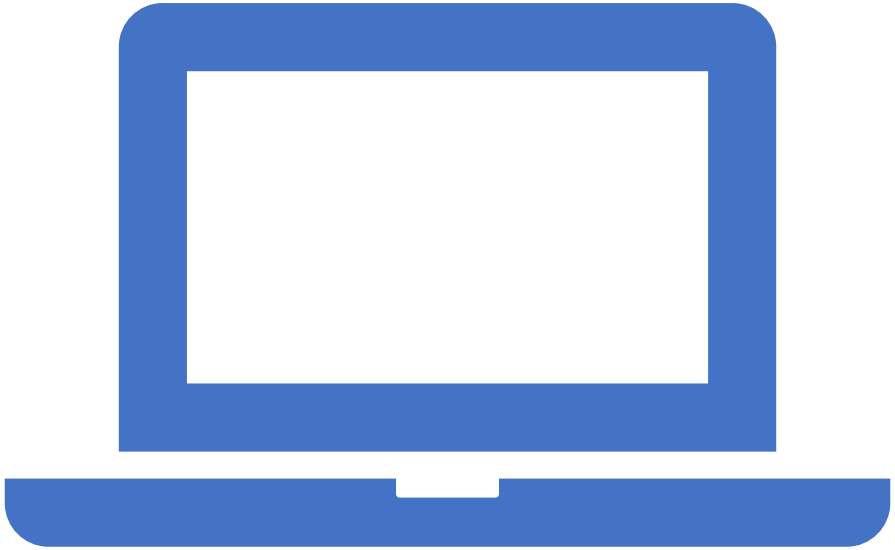
How do virtual machines work?

- The virtual machine runs as a process in an application window, similar to any other application, on the operating system of the physical machine.
- Key files that make up a virtual machine include a log file, NVRAM setting file, virtual disk file and configuration file.

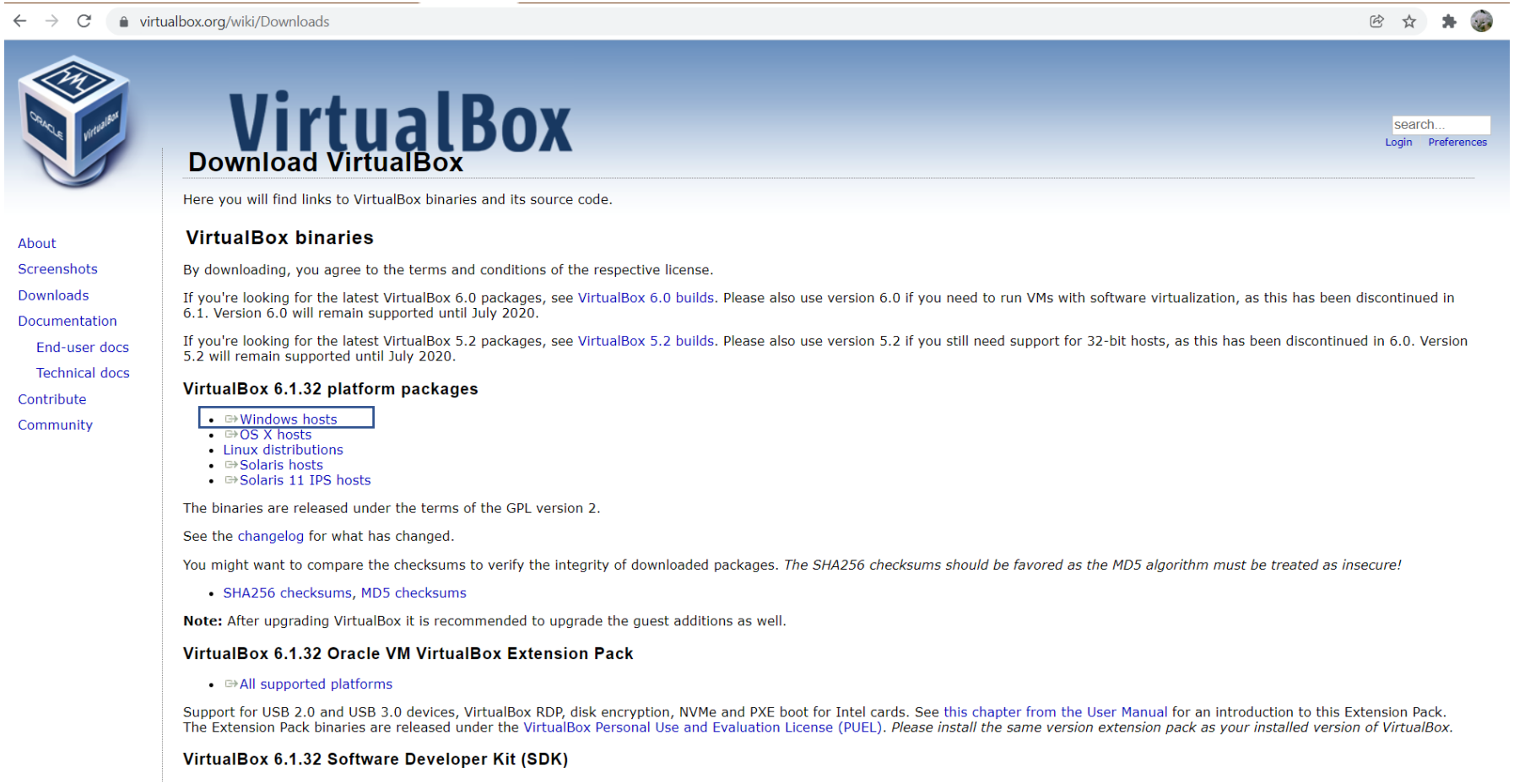
Questions

- Describe differences between Windows 10 and Windows 11?
- What is an Operating System (OS)?
- What are the examples of OS? Describe the differences.
- What are the advantages and disadvantages of VM?
- What are 5 types of virtualization?

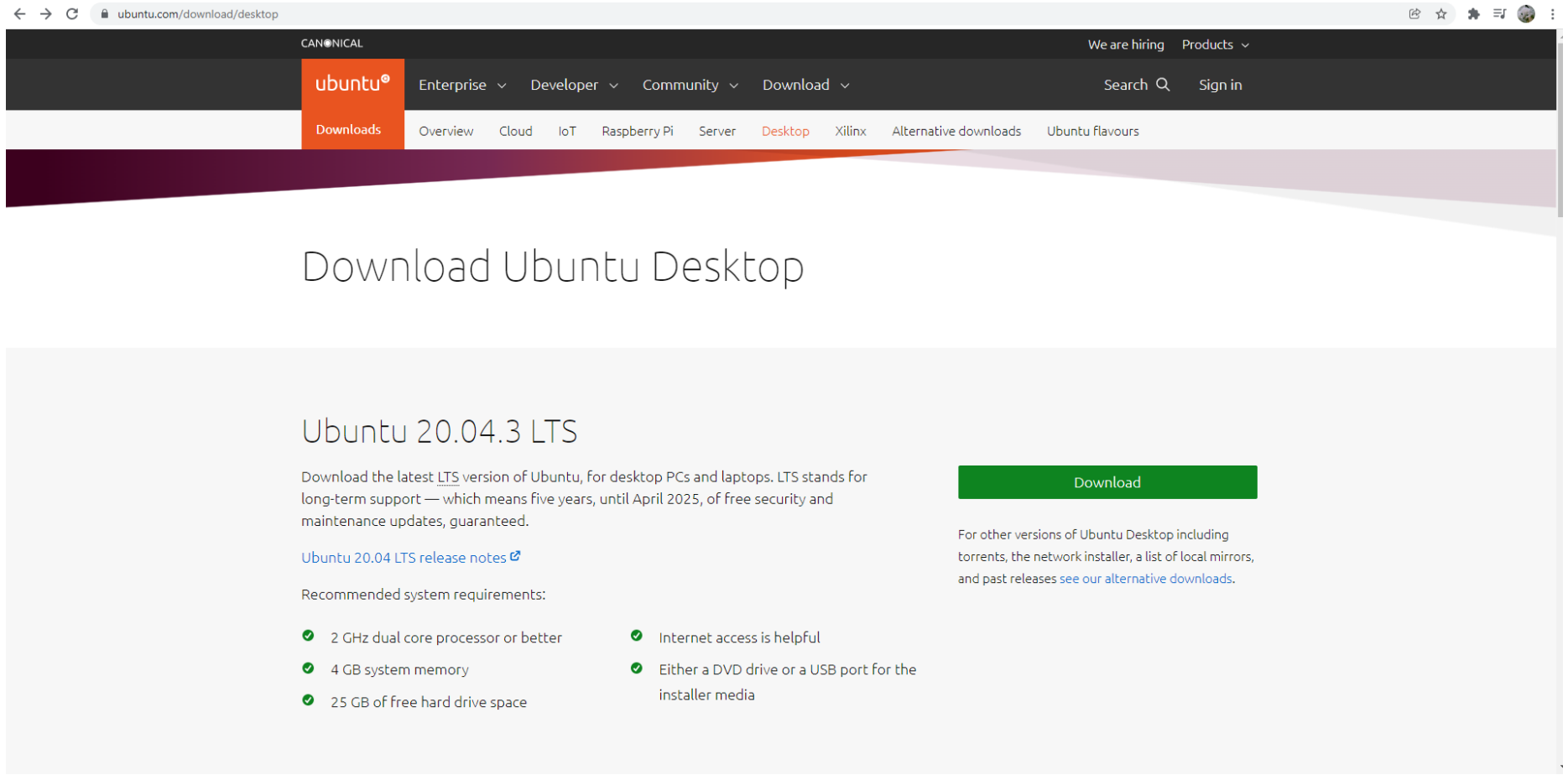
How to Set up a VM



Download VM from VirtualBox

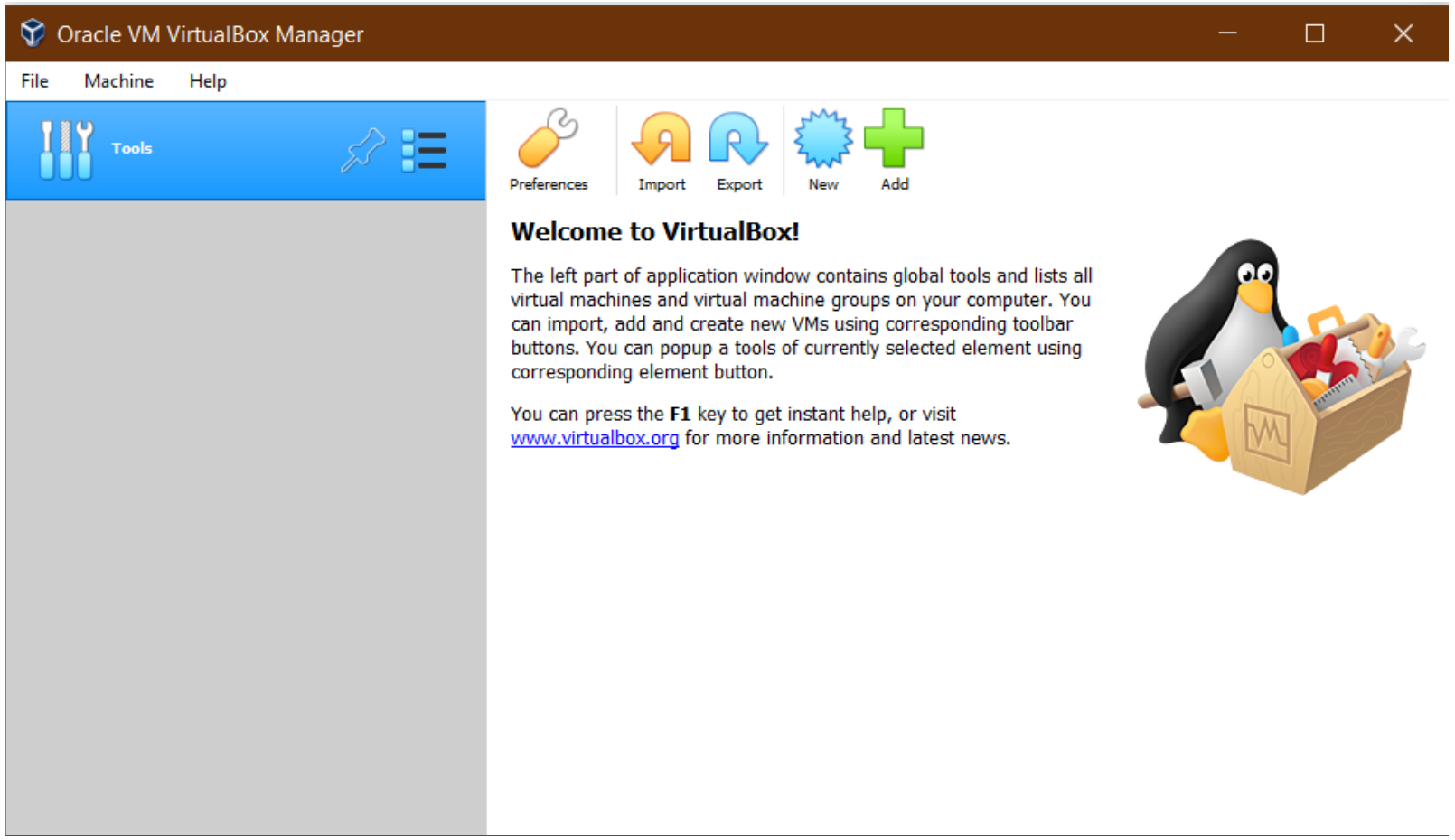


Download Ubuntu



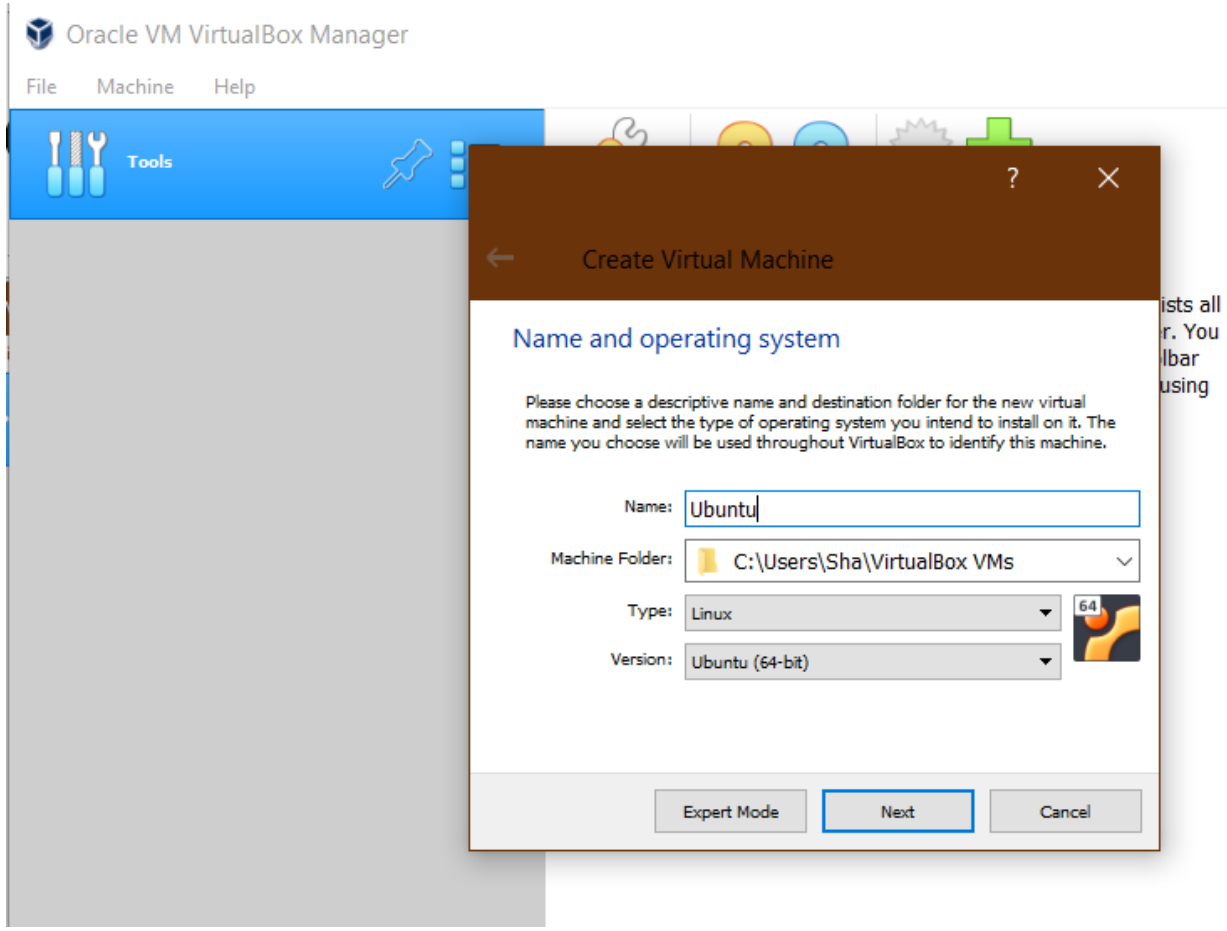
Use the same folder as VM

Install VM


Oracle VM VirtualBox Manager
File
Machine
Help
Tools
Preferences
Import
Export
New
Add
Welcome to VirtualBox!
The left part of application window contains global tools and lists all virtual machines and virtual machine groups on your computer. You can import, add and create new VMs using corresponding toolbar buttons. You can popup a tools of currently selected element using corresponding element button.
You can press the F1 key to get instant help, or visit www.virtualbox.org for more information and latest news.

Once you have VirtualBox running, click the "New" button

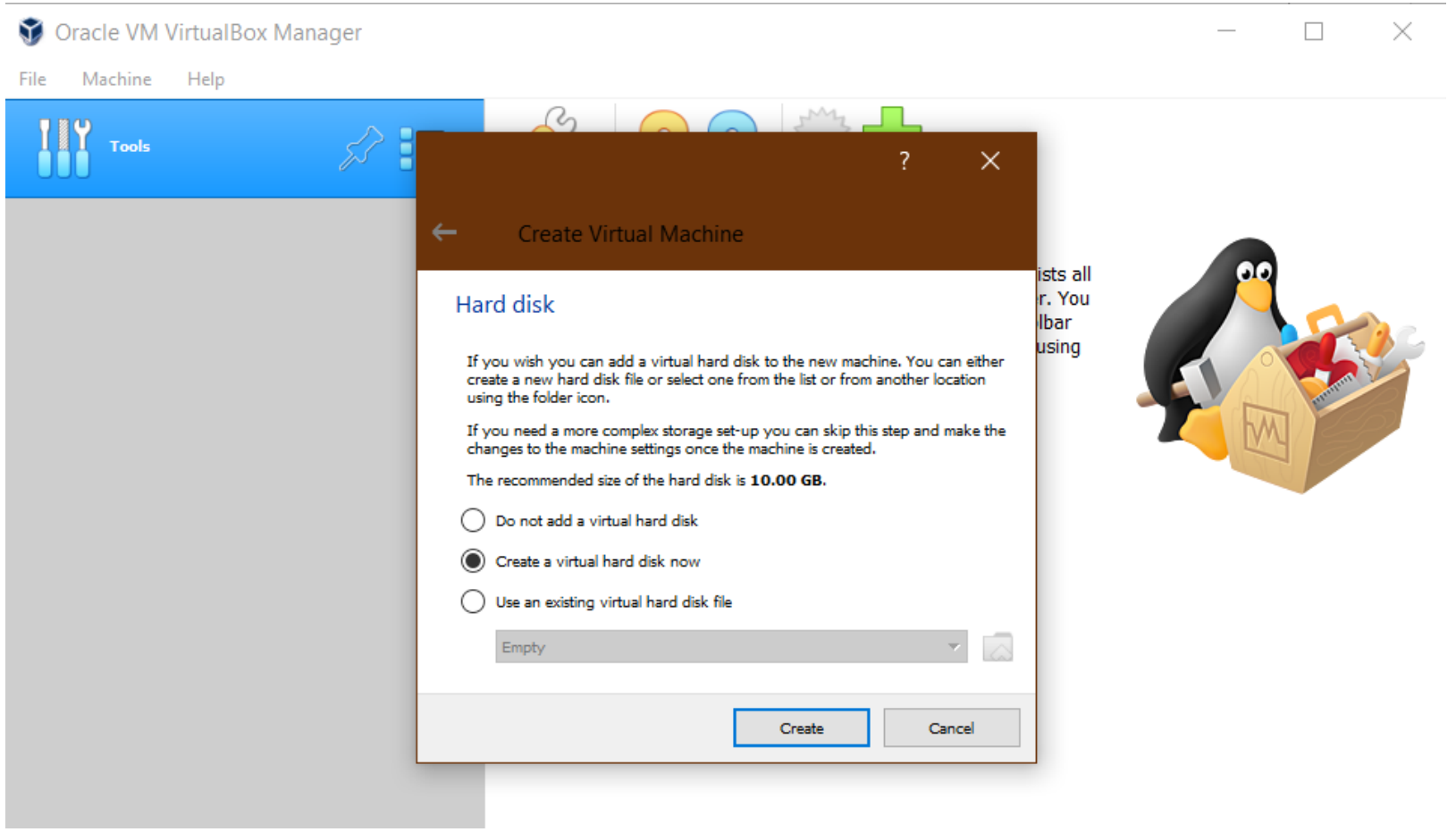
Choose OS



Click Machine -> New -> Next

Choose which OS you plan on installing. In the "Name" box, type the name of the OS you want to install. VirtualBox will guess the type and version based on the name you type in, but you can change these settings if you need to.

Create virtual Hard Disk

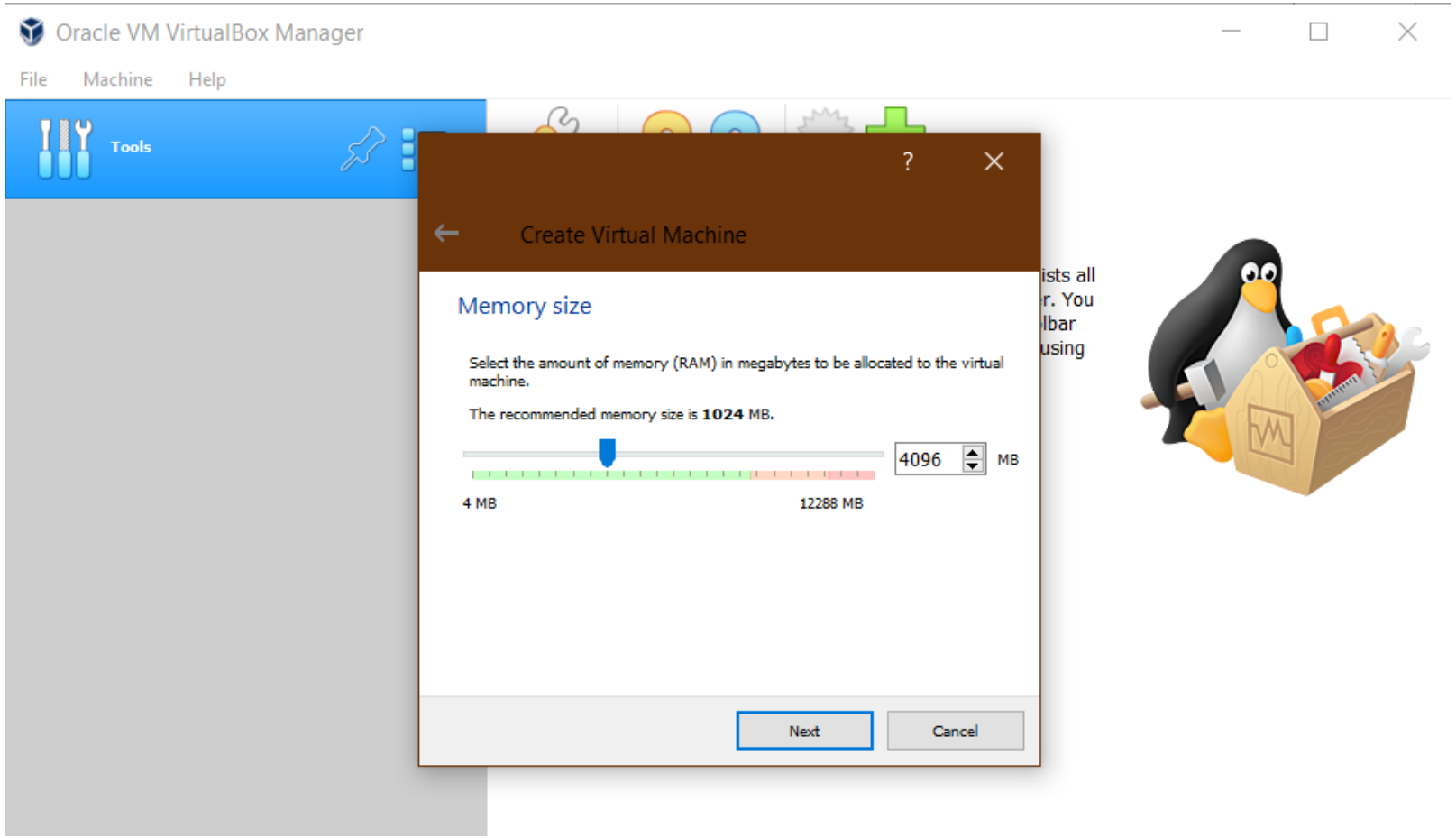


Click Create

Allocating RAM

- Picking back up on creating your VM, you'll next need to specify the amount of RAM to give the virtual OS.
- VirtualBox will provide a recommendation here, but it's probably too low. With too little RAM, your VM will suffer from poor performance.
- But give the VM too much RAM, and your host PC might become unstable.
- The exact amount to allocate depends on how much RAM you have.
- As a general rule of thumb, giving half your system RAM to the VM should suffice. Windows 10 will work well enough with 4GB of RAM

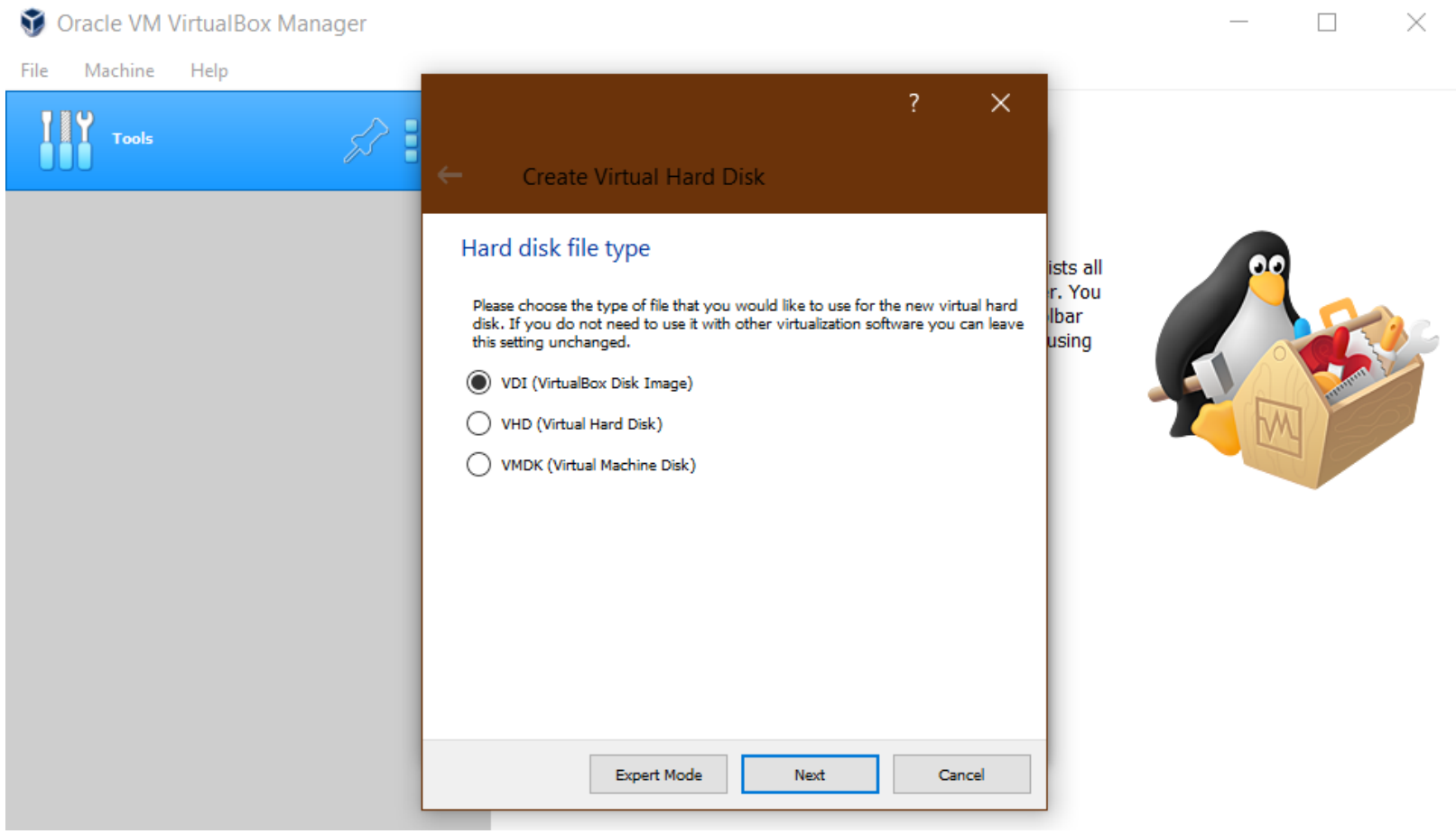
Allocating RAM



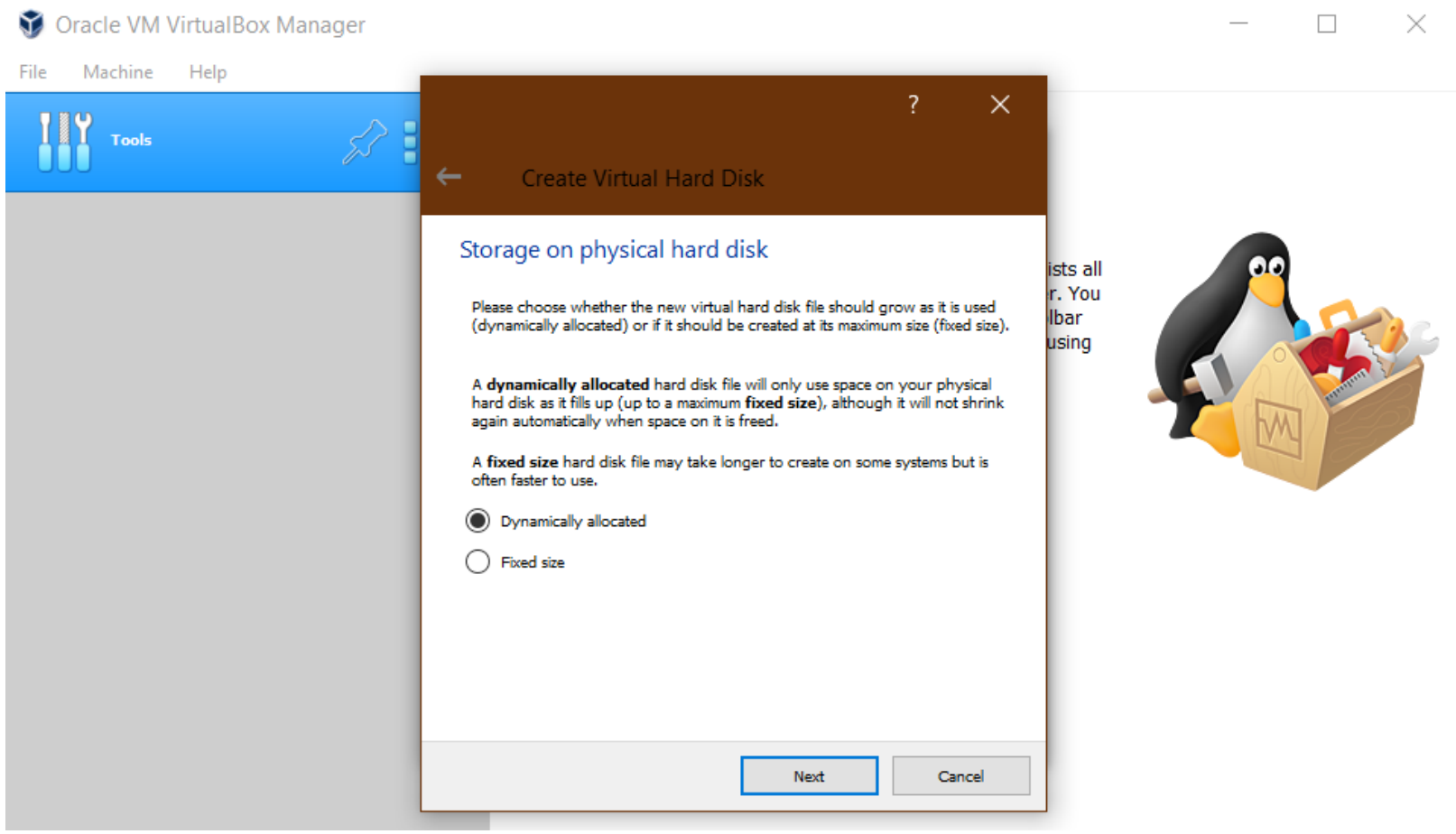
.

Use the slider or type the value of RAM you want to give the VM in megabytes. Since computers calculate bytes differently than humans, multiply the GB of RAM you're providing by **1,024**. So if you want 4GB of RAM in the VM, enter **4,096**, not **4,000**.

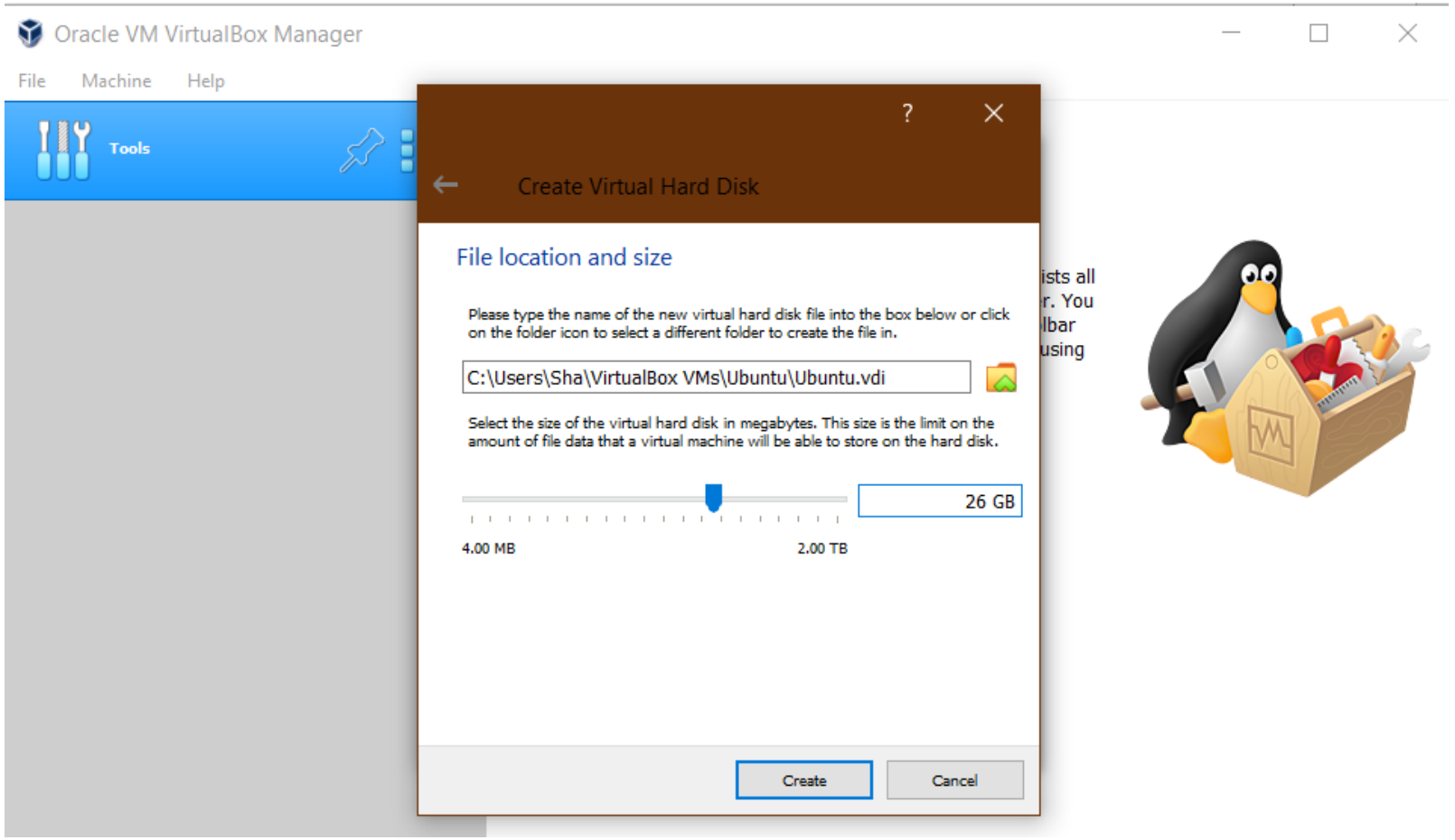
Hard Disk File Type



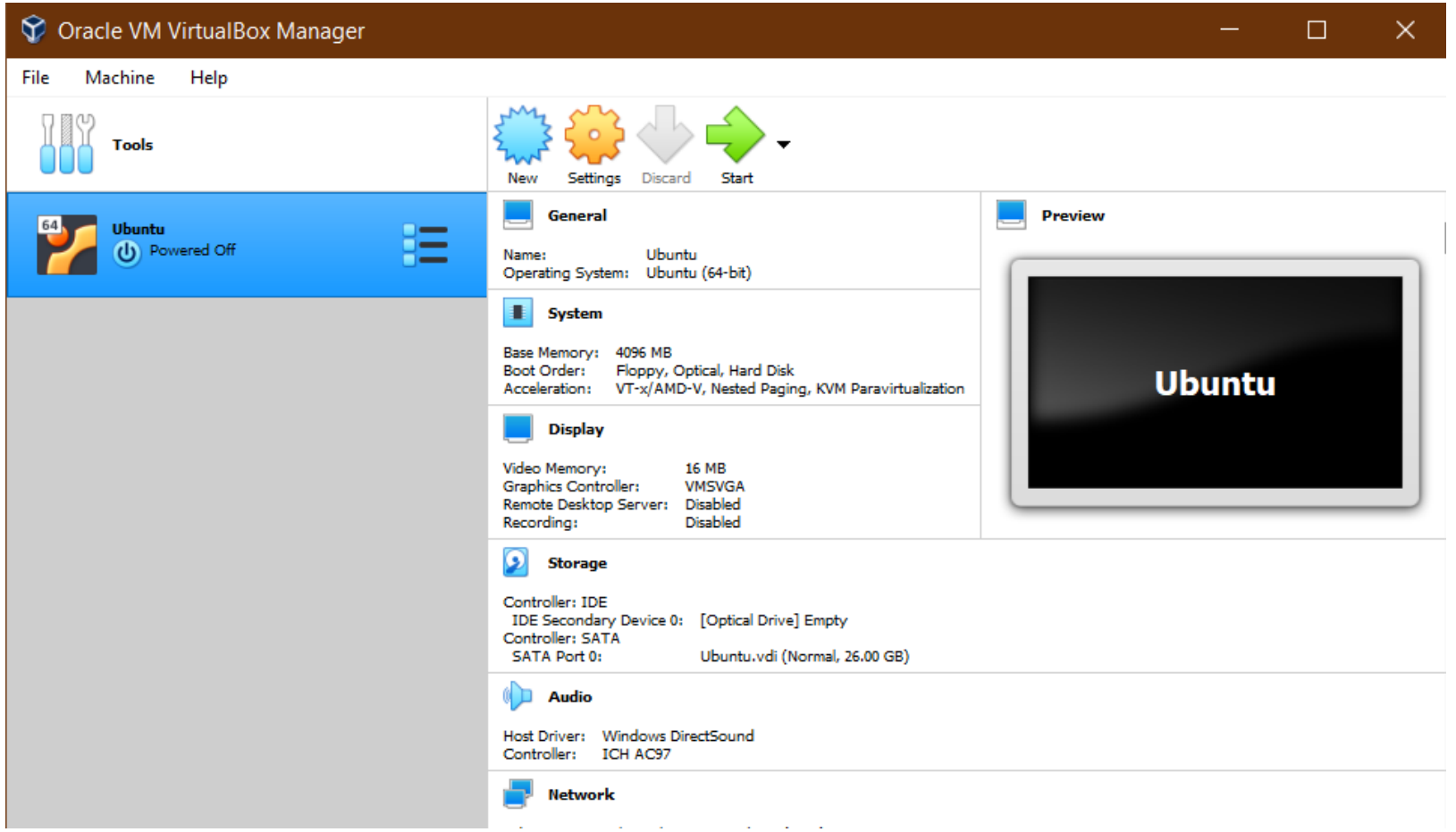
Storage on physical Hard Disk



File location & Size

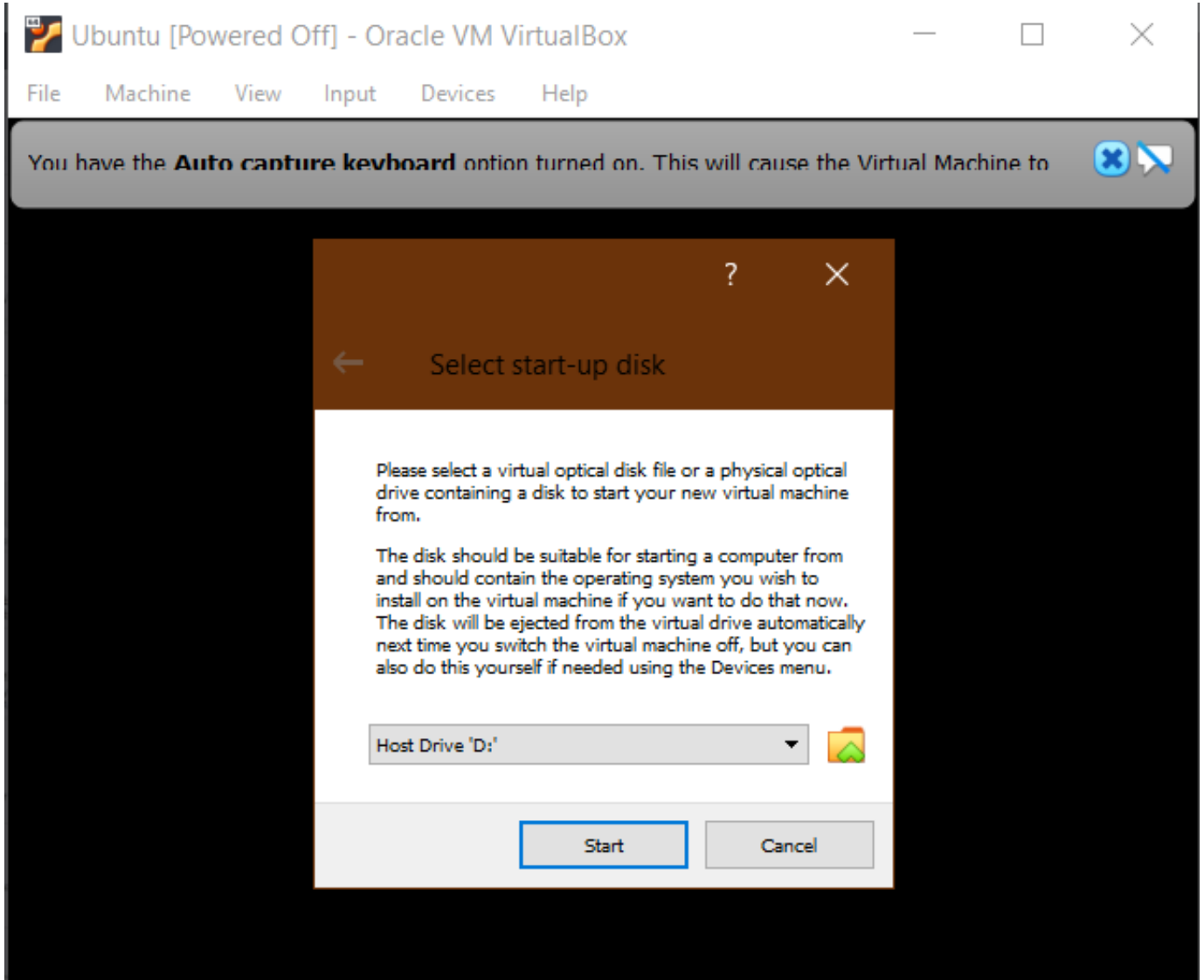


Start Ubuntu



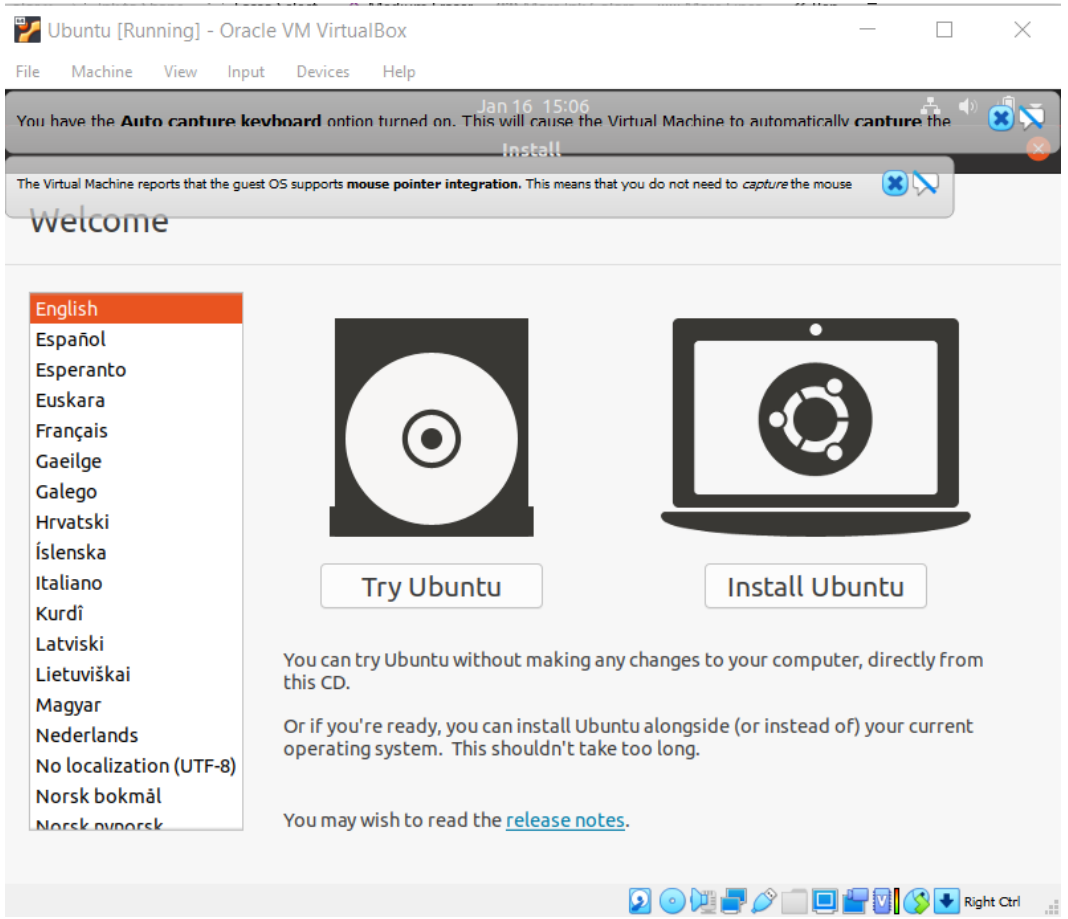
Click Start

Select Start-up Disk



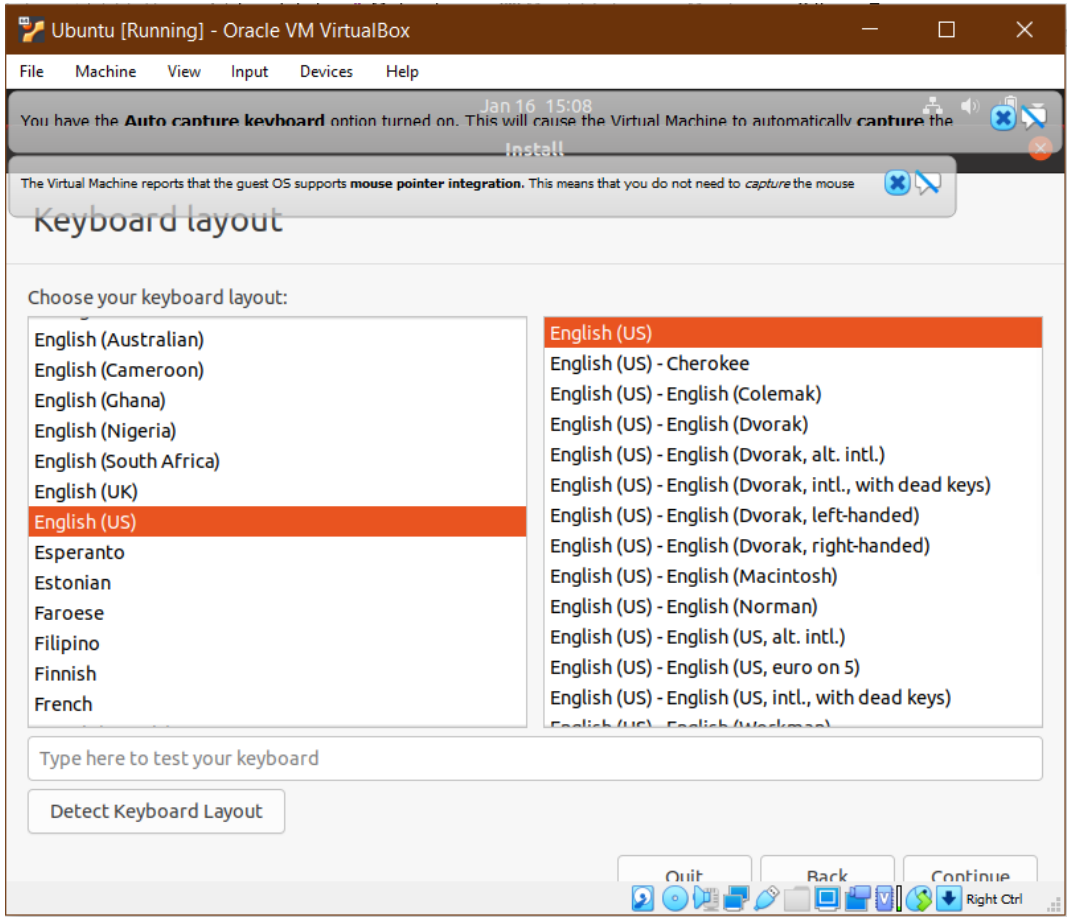
Click Start

Install Ubuntu



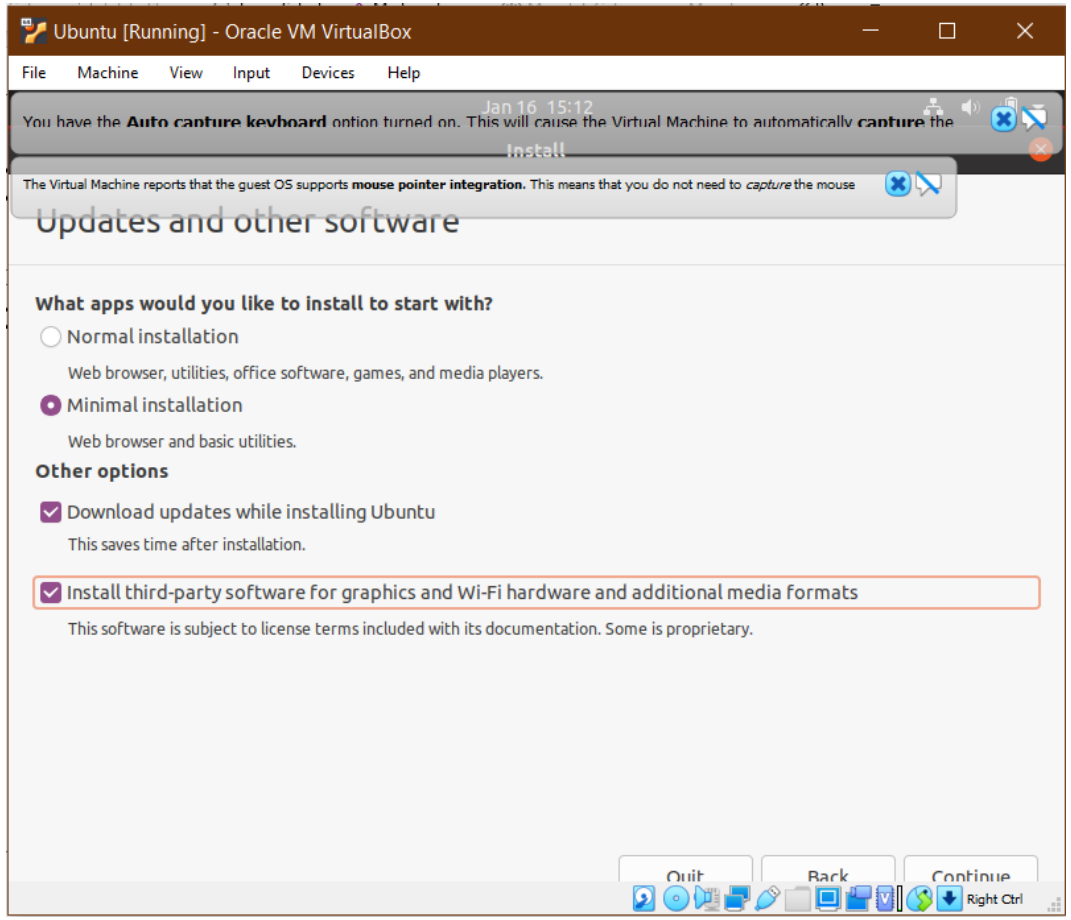
Click Install Ubuntu

Keyboard Layout



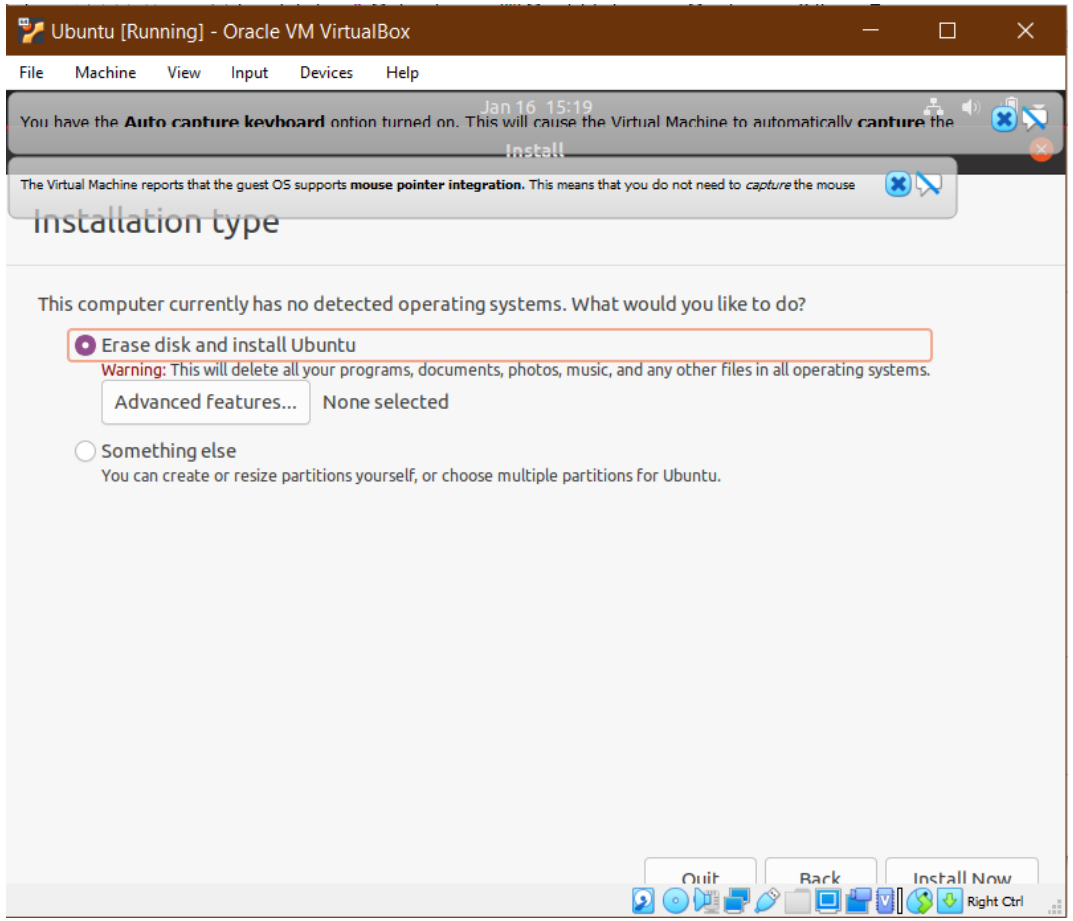
Click Continue

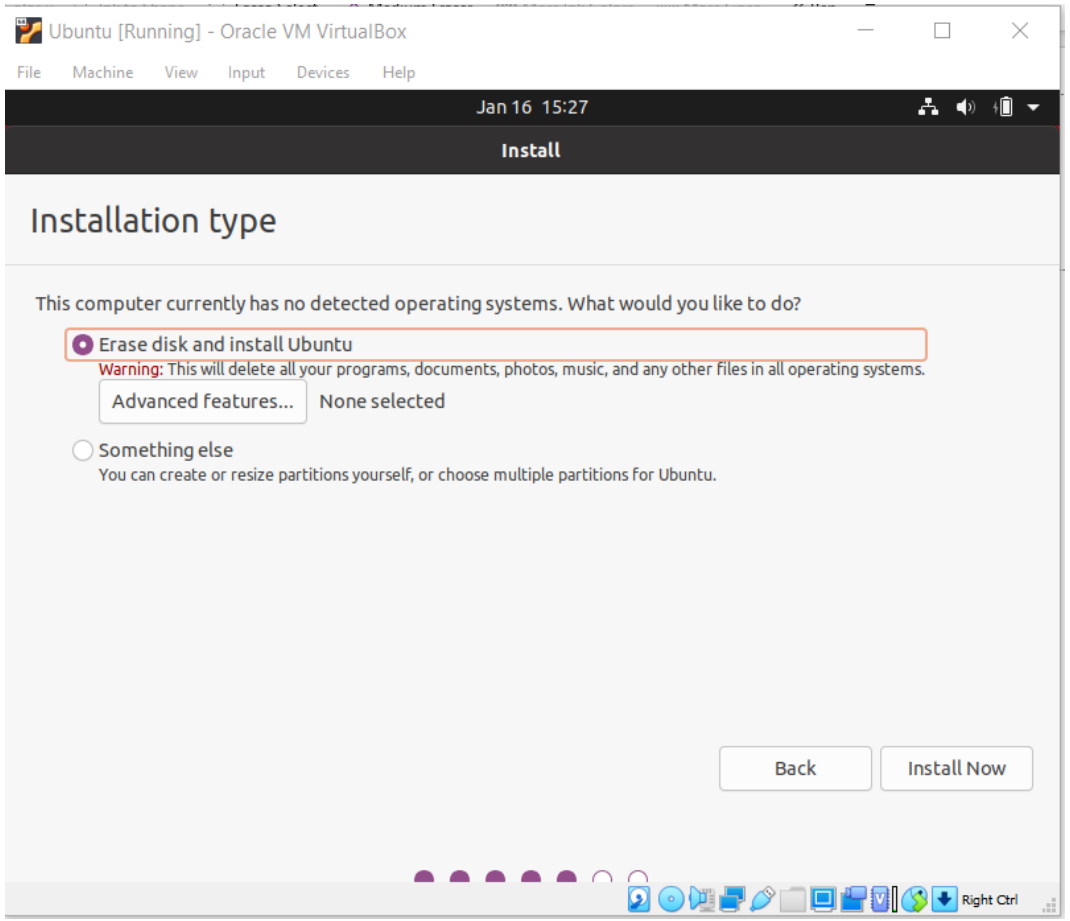
Minimal Installation



Click Continue

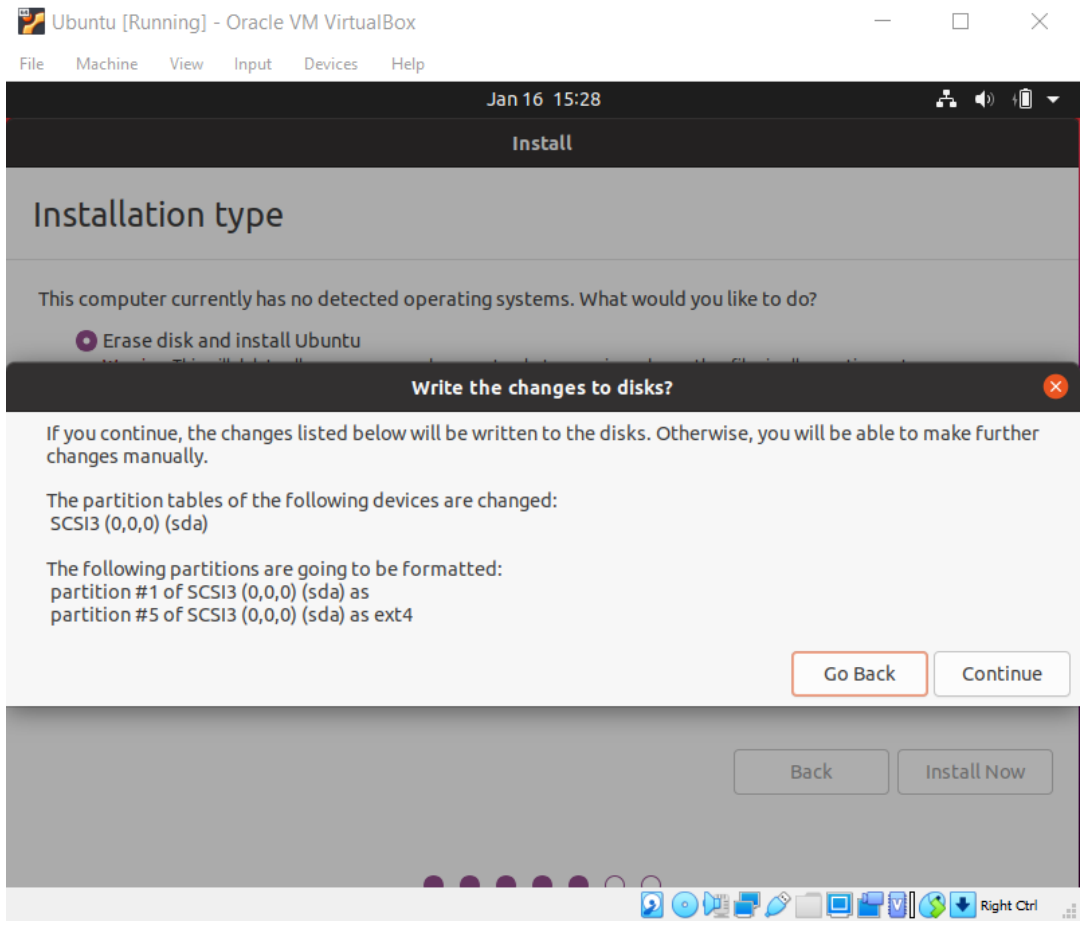
Installation Type



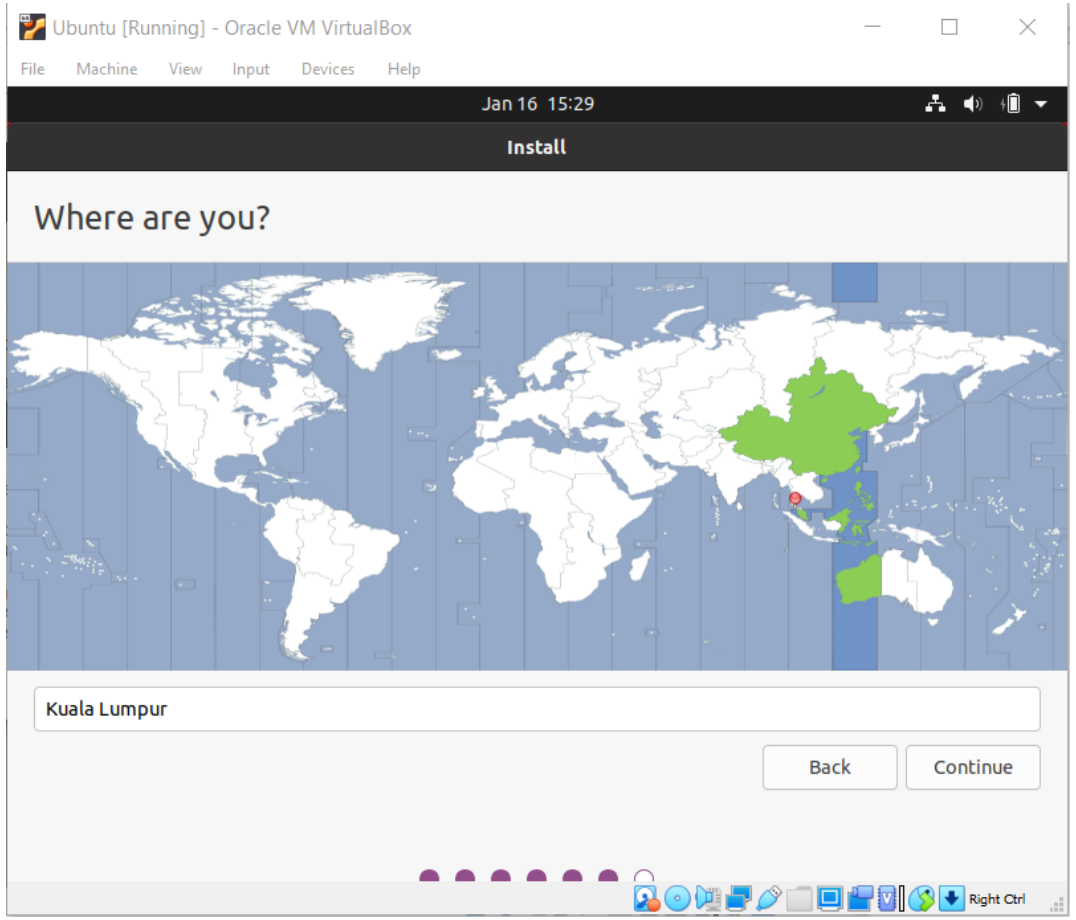


Click Install Now

Installation Type

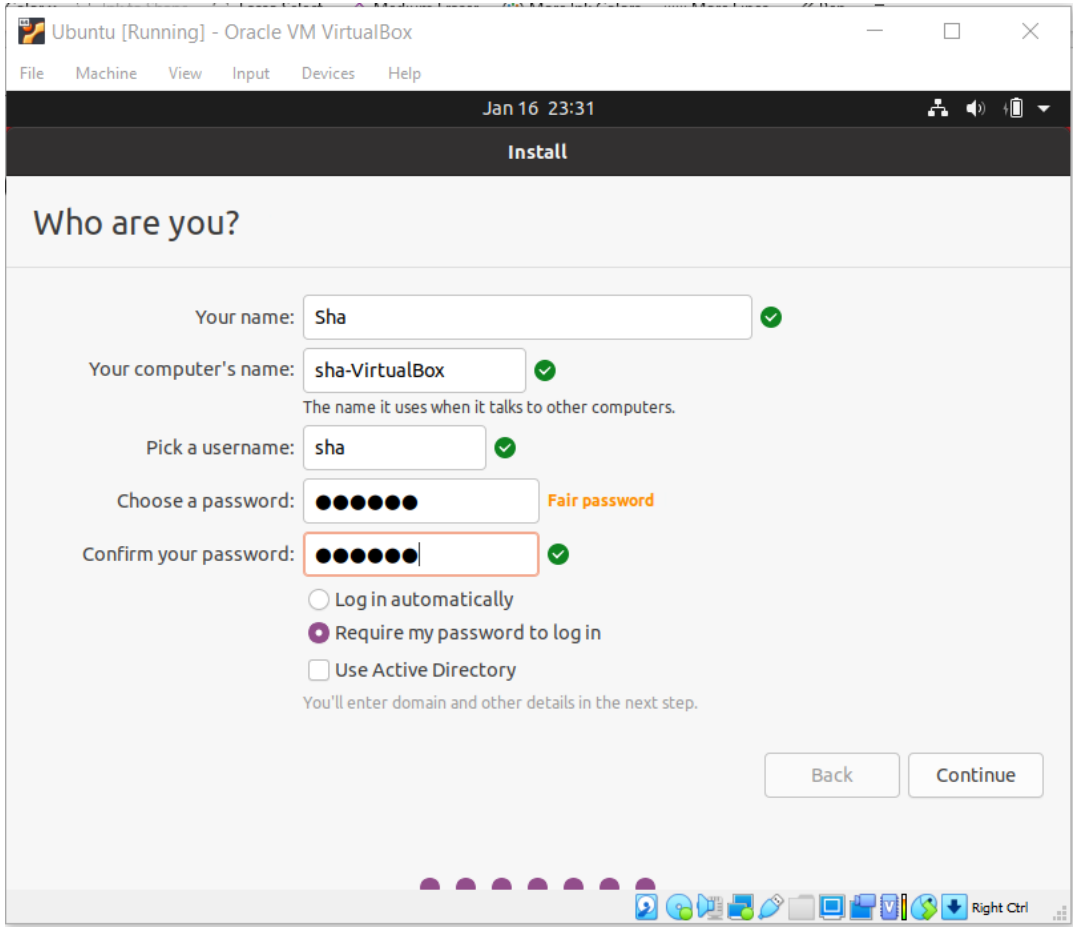


Choose Location

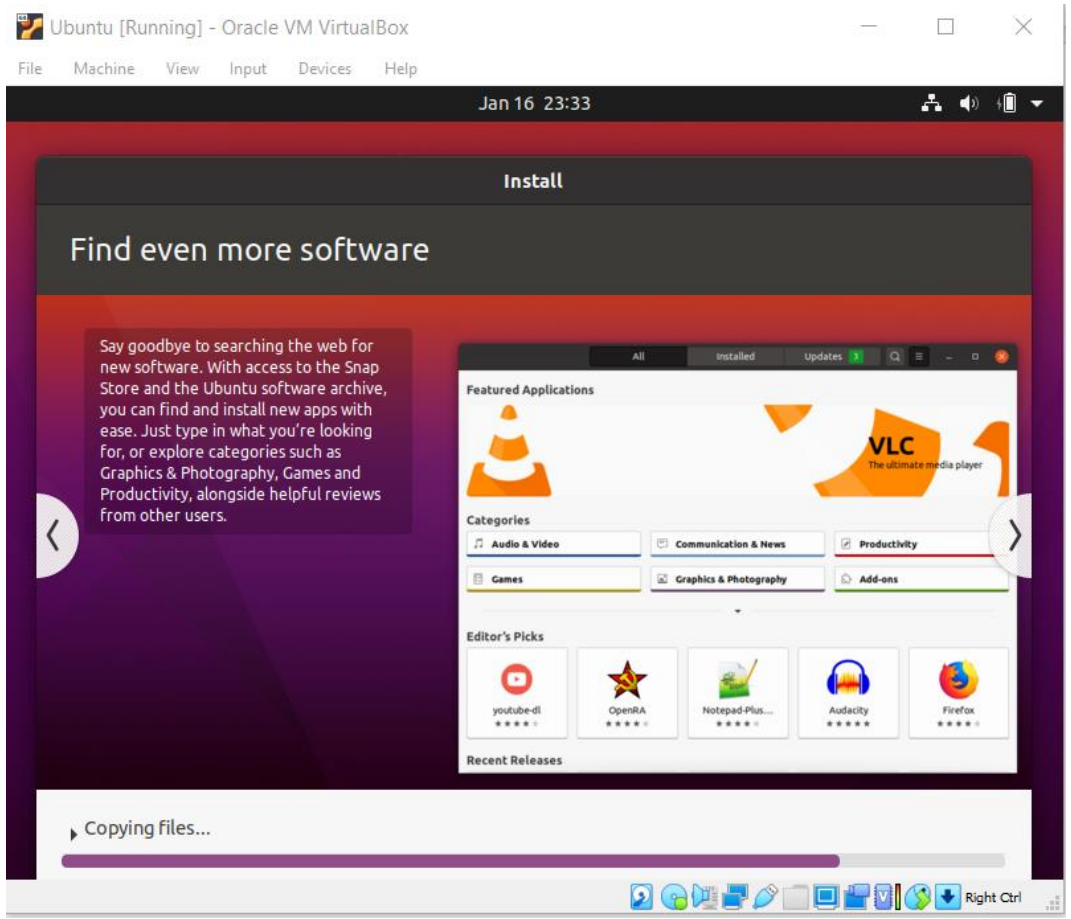


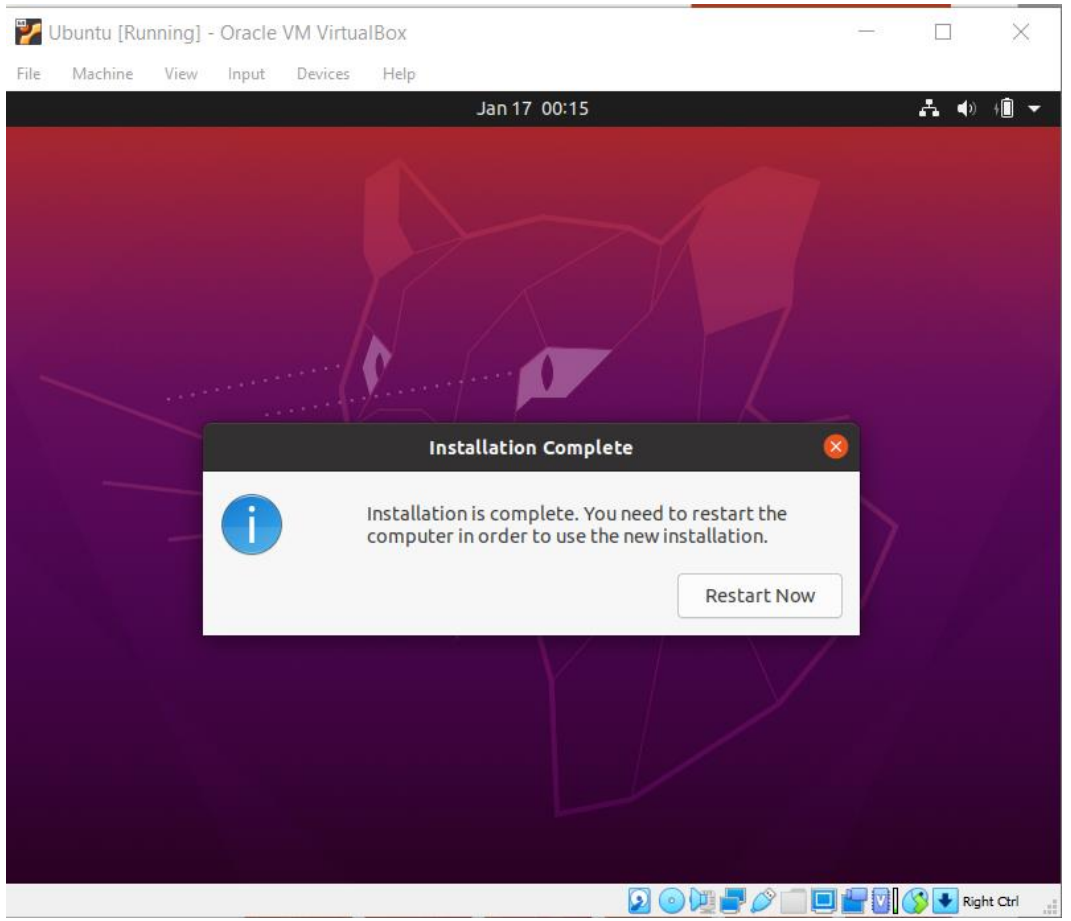
Click Continue

Enter name & Set Password

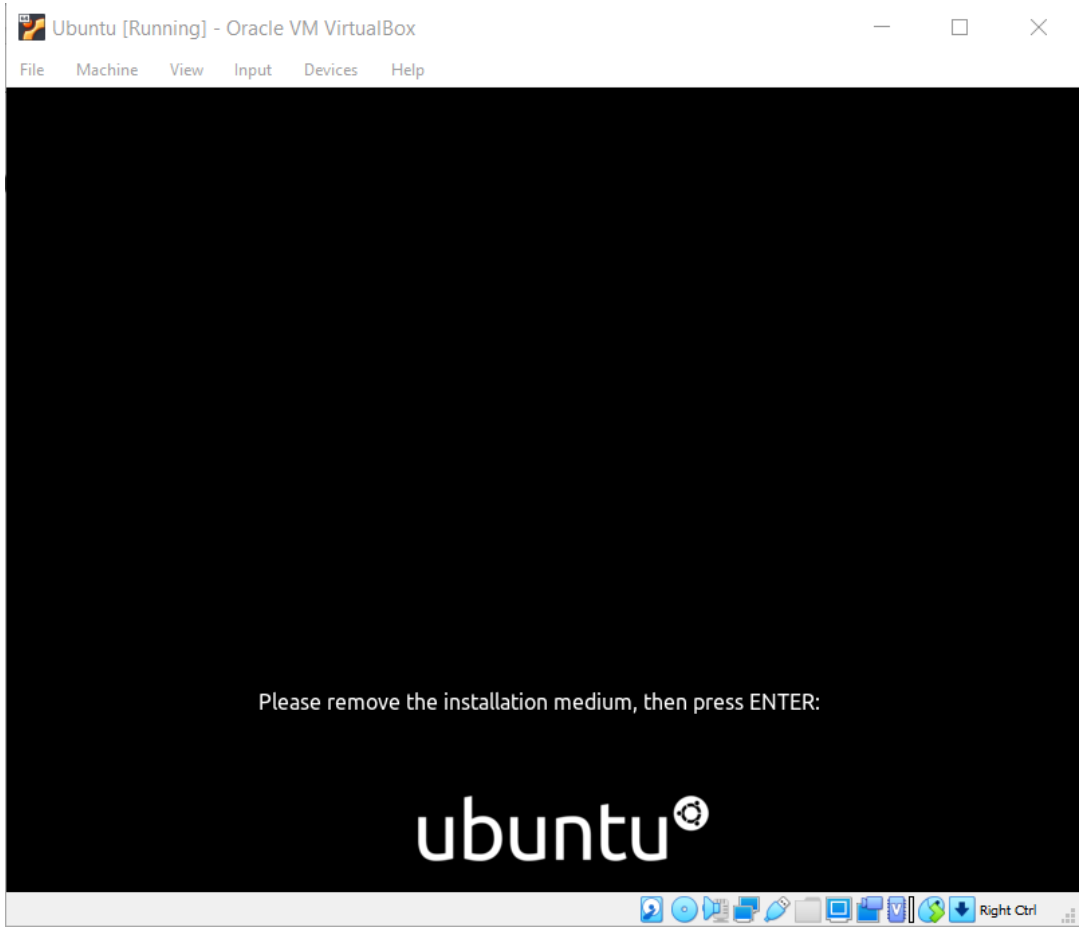


Installation Complete



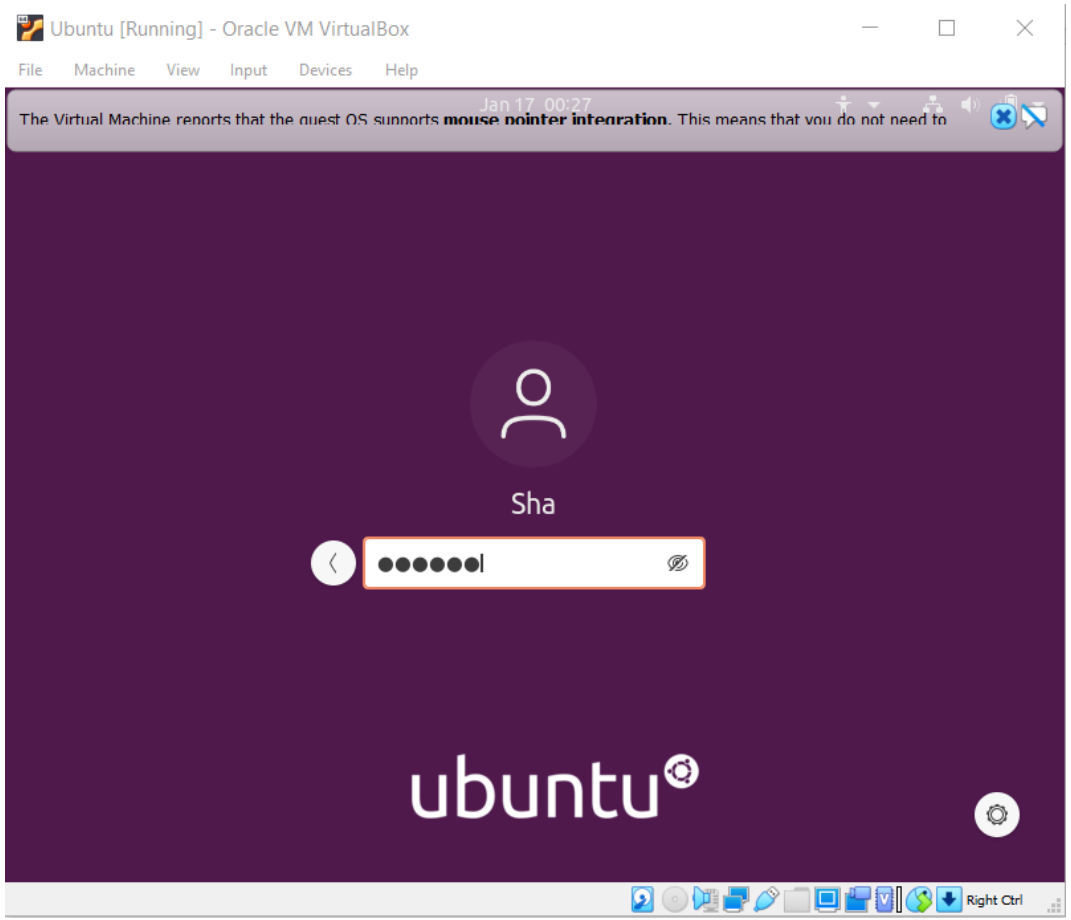


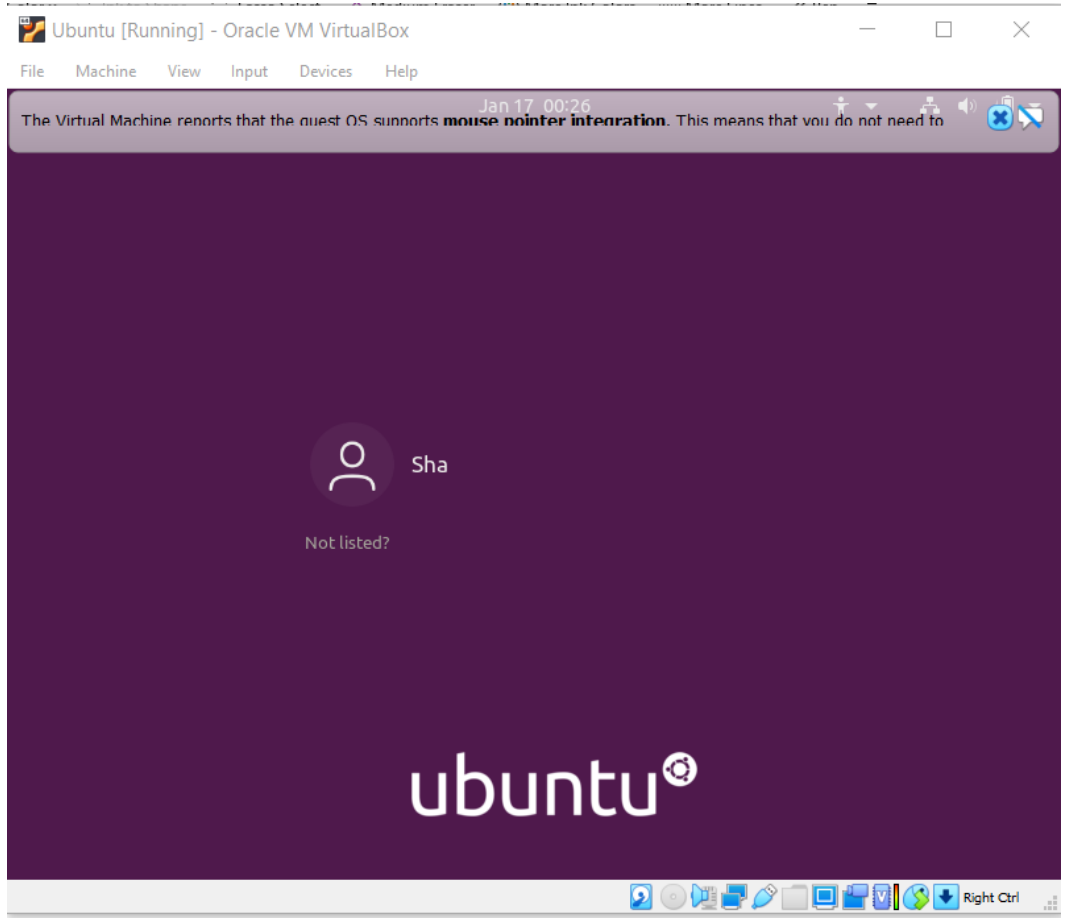
Installation Complete



Right click IDE (CD) -> remove cd -> click background (black) -> press ENTER

Enter Password





Case Project 1-1: Basic Operating System Functions

- The Lawson City and County Planning Department has recently received a new budget allocation to purchase new desktop and server systems. Because the budget has been strapped for many years, the department hasn't been able to upgrade its systems. Most of the desktop computers are running WindowsXP or Windows 7. The server systems are Windows Server 2003 and Windows Server 2008. The department has network and Internet connectivity through a combination of older wired and wireless technologies.
- Before they begin making decisions, the planning office managers ask you to make a presentation to cover the basics of operating systems. They ask you to begin the presentation by explaining basic functions that operating systems perform. Discuss and prepare the slide for the presentation.

Quick Question

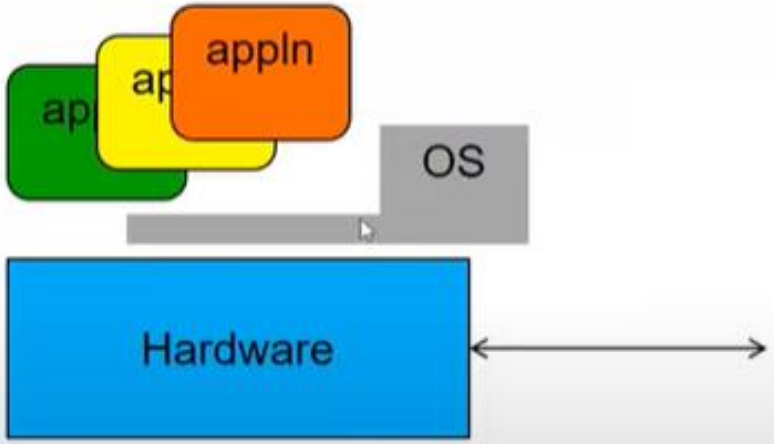
- What are the differences between Windows and uBuntu in terms of its functionalities?

Goals for today

- What is an Operating System?
  - And-what is it not?
- What makes OS so exciting?
- Why study OS?

One Definition of an OS

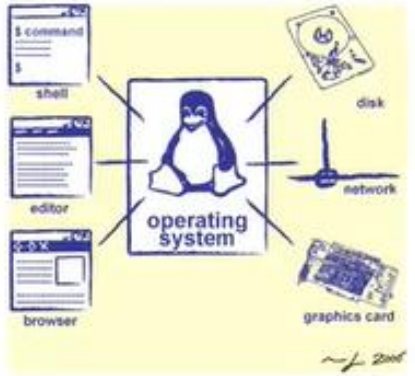
- Special layer of software that provides application software access to hardware resources
  - Convenient abstraction of complex hardware devices
  - Protected access to shared resources
  - Security and authentication
  - Communication



Operating System

Switchboard Operator

Computer Operators



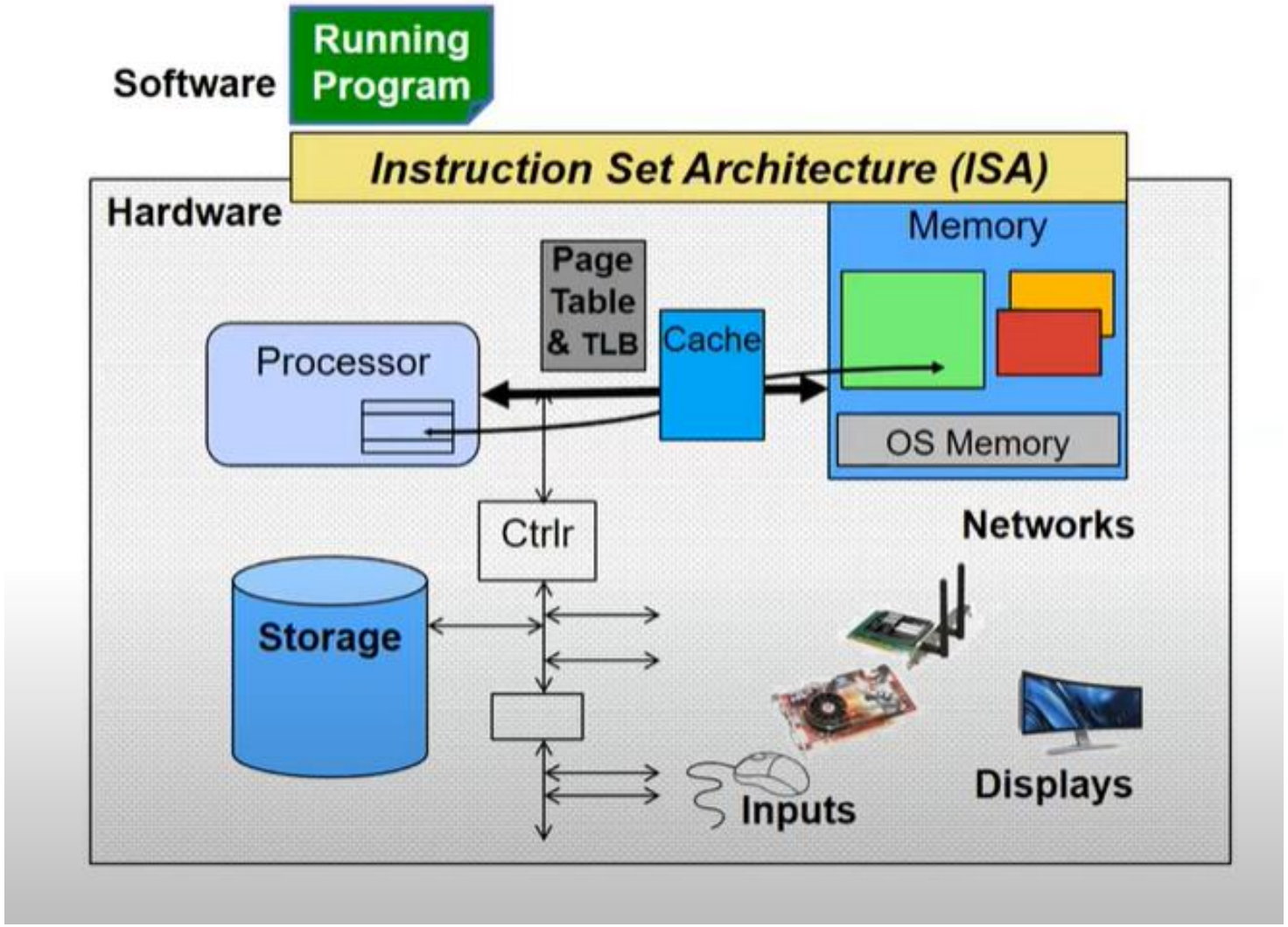
Operating System

Operating *System*

What makes something a ***system?***

- Multiple interrelated parts
  - Each potentially interacts with the others
- Robustness requires an ***engineering mindset***
  - Meticulous error handling, defending against malicious careless users
  - Treating the computer as a concrete machine, with all of its limitations and possible failure cases

Hardware/Software Interface



What is an OS?

- Illusionist
  - Provide clean, easy-to-use abstractions of physical resources
    - » Infinite memory, dedicated machine
    - » Higher level objects: files, users, messages
    - » Masking limitations, virtualization

Thank You