



COS3023/N : TUTORIAL 1

Virtualize Operating Systems (OS) Using Virtual Machine (VM)

Lecturer : Ms. Shafrah

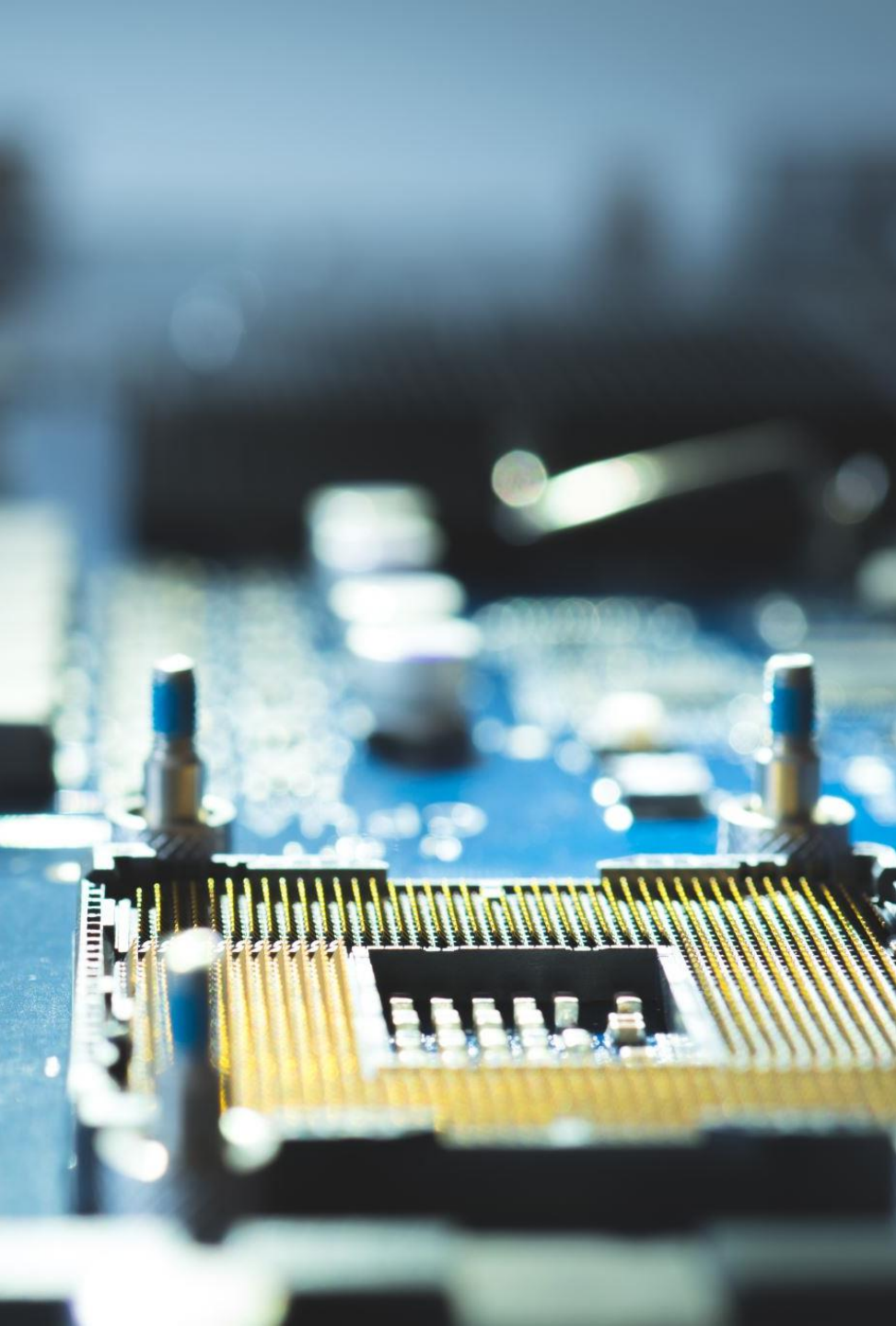


What is Virtual Machine (VM)?

- 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?

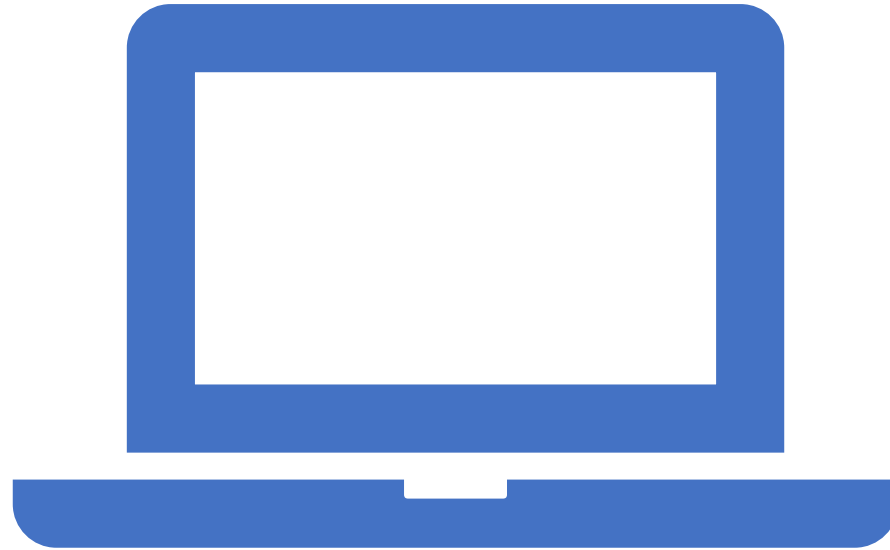
- The virtual machine runs as a process in an application window, similar to any other application, on the operating system of the physical machine.
- Key files that make up a virtual machine include a log file, NVRAM setting file, virtual disk file and configuration file.



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



The screenshot shows the VirtualBox Downloads page in a web browser. The browser's address bar displays 'virtualbox.org/wiki/Downloads'. The page features the VirtualBox logo on the left and a search bar on the right. A sidebar on the left contains links to 'About', 'Screenshots', 'Downloads', 'Documentation', 'End-user docs', 'Technical docs', 'Contribute', and 'Community'. The main content area is titled 'VirtualBox Download VirtualBox' and includes a paragraph about finding links to binaries and source code. It then lists 'VirtualBox binaries' with a disclaimer about license terms. Two paragraphs provide information about the latest VirtualBox 6.0 and 5.2 packages, including their support end dates. A section for 'VirtualBox 6.1.32 platform packages' lists links for Windows, OS X, Linux, Solaris, and Solaris 11 IPS hosts. A note mentions the GPL version 2 terms and a changelog. Another note suggests comparing SHA256 and MD5 checksums. A 'Note' section recommends upgrading guest additions. The 'VirtualBox 6.1.32 Oracle VM VirtualBox Extension Pack' section lists a link for all supported platforms. A paragraph describes support for USB 2.0 and 3.0 devices, RDP, disk encryption, NVMe, and PXE boot, with a reference to the User Manual. The page concludes with a link to the 'VirtualBox 6.1.32 Software Developer Kit (SDK)'.

virtualbox.org/wiki/Downloads

search...
Login Preferences

VirtualBox
Download VirtualBox

Here you will find links to VirtualBox binaries and its source code.

VirtualBox binaries

By downloading, you agree to the terms and conditions of the respective license.

If you're looking for the latest VirtualBox 6.0 packages, see [VirtualBox 6.0 builds](#). Please also use version 6.0 if you need to run VMs with software virtualization, as this has been discontinued in 6.1. Version 6.0 will remain supported until July 2020.

If you're looking for the latest VirtualBox 5.2 packages, see [VirtualBox 5.2 builds](#). Please also use version 5.2 if you still need support for 32-bit hosts, as this has been discontinued in 6.0. Version 5.2 will remain supported until July 2020.

VirtualBox 6.1.32 platform packages

- [Windows hosts](#)
- [OS X hosts](#)
- [Linux distributions](#)
- [Solaris hosts](#)
- [Solaris 11 IPS hosts](#)

The binaries are released under the terms of the GPL version 2.

See the [changelog](#) for what has changed.

You might want to compare the checksums to verify the integrity of downloaded packages. *The SHA256 checksums should be favored as the MD5 algorithm must be treated as insecure!*

- [SHA256 checksums, MD5 checksums](#)

Note: After upgrading VirtualBox it is recommended to upgrade the guest additions as well.

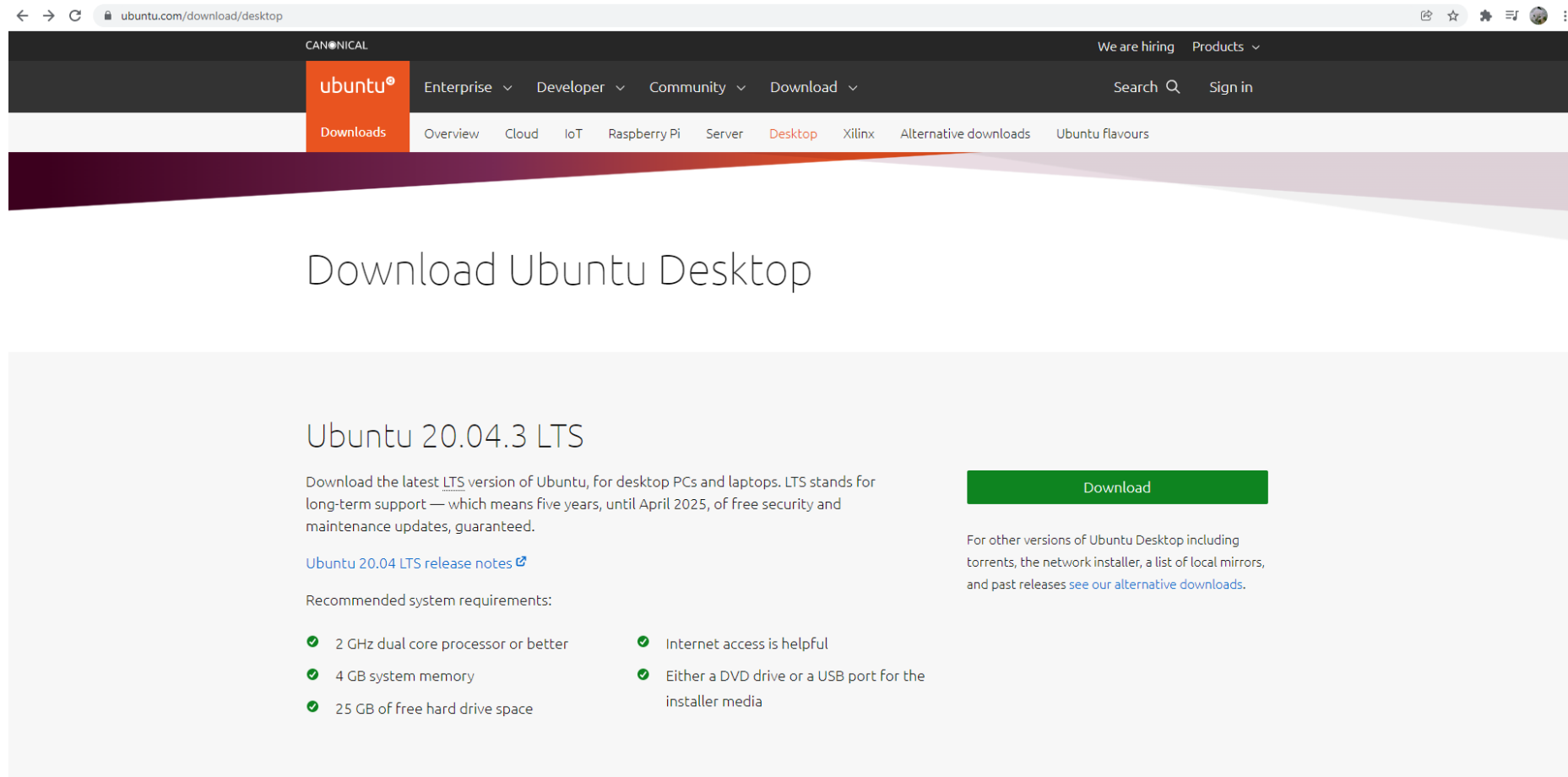
VirtualBox 6.1.32 Oracle VM VirtualBox Extension Pack

- [All supported platforms](#)

Support for USB 2.0 and USB 3.0 devices, VirtualBox RDP, disk encryption, NVMe and PXE boot for Intel cards. See [this chapter from the User Manual](#) for an introduction to this Extension Pack. The Extension Pack binaries are released under the [VirtualBox Personal Use and Evaluation License \(PUEL\)](#). *Please install the same version extension pack as your installed version of VirtualBox.*

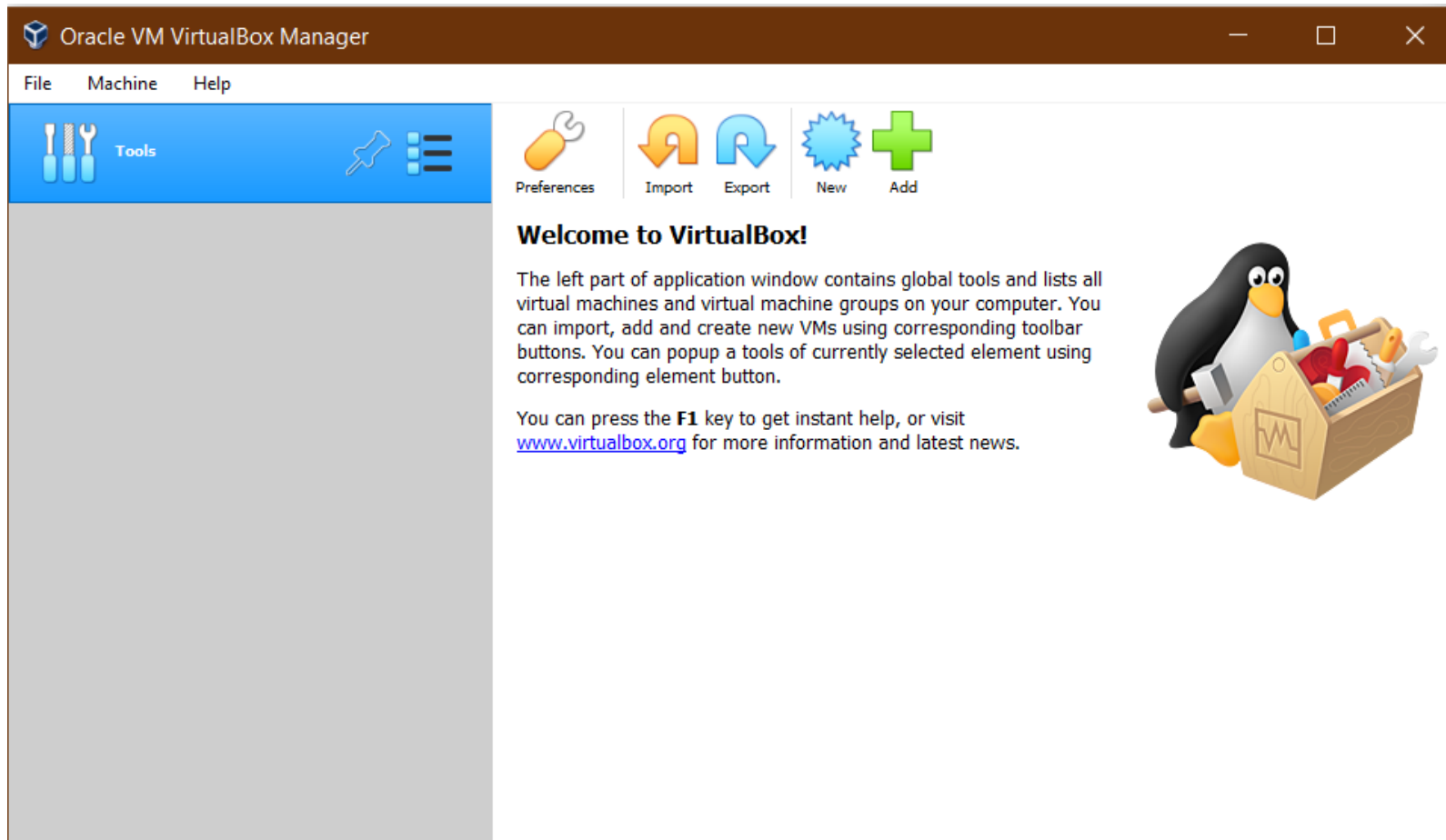
VirtualBox 6.1.32 Software Developer Kit (SDK)

Download Ubuntu



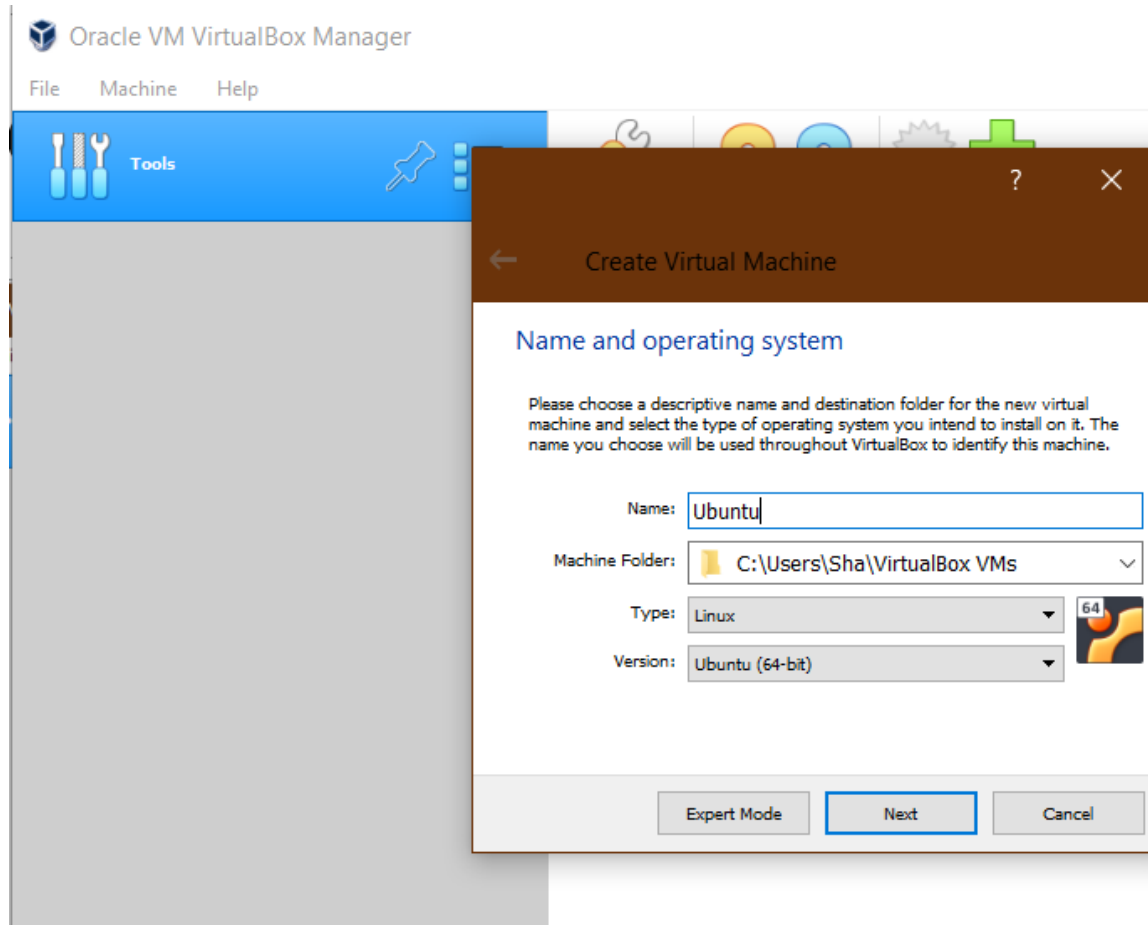
Use the same folder as VM

Install VM



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

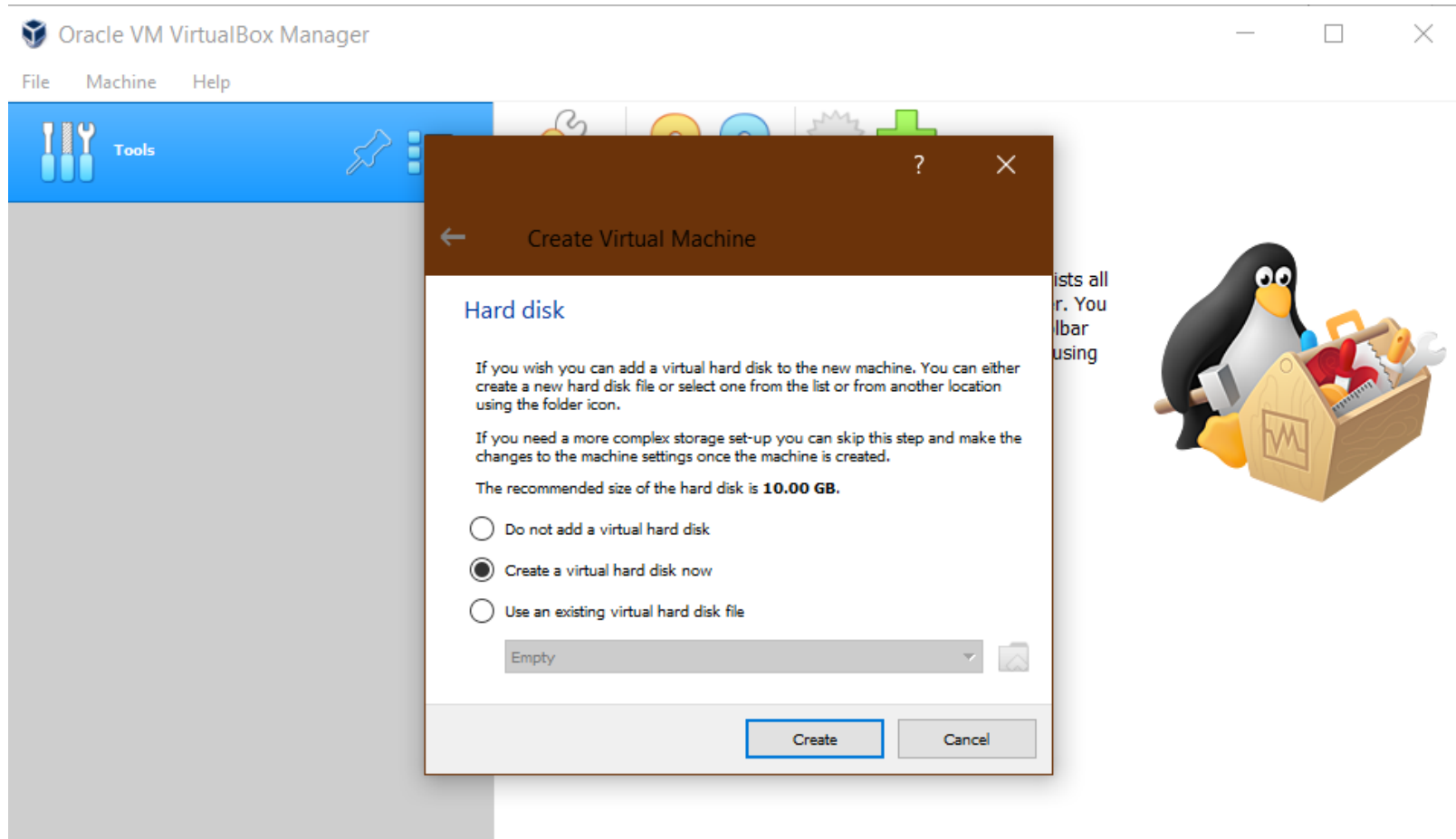
Choose OS



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.

Click Machine -> New -> Next

Create virtual Hard Disk

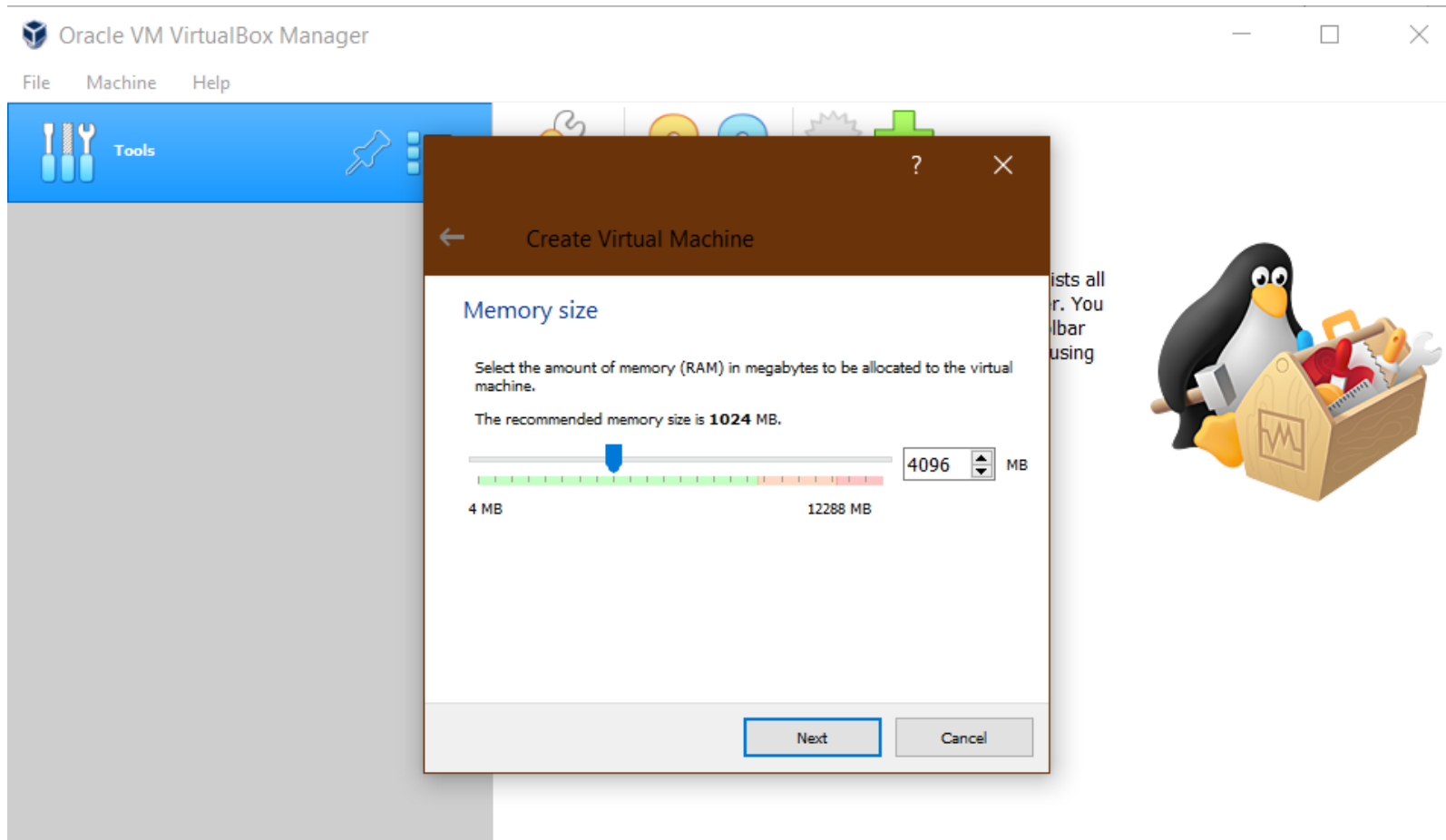


Click Create

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

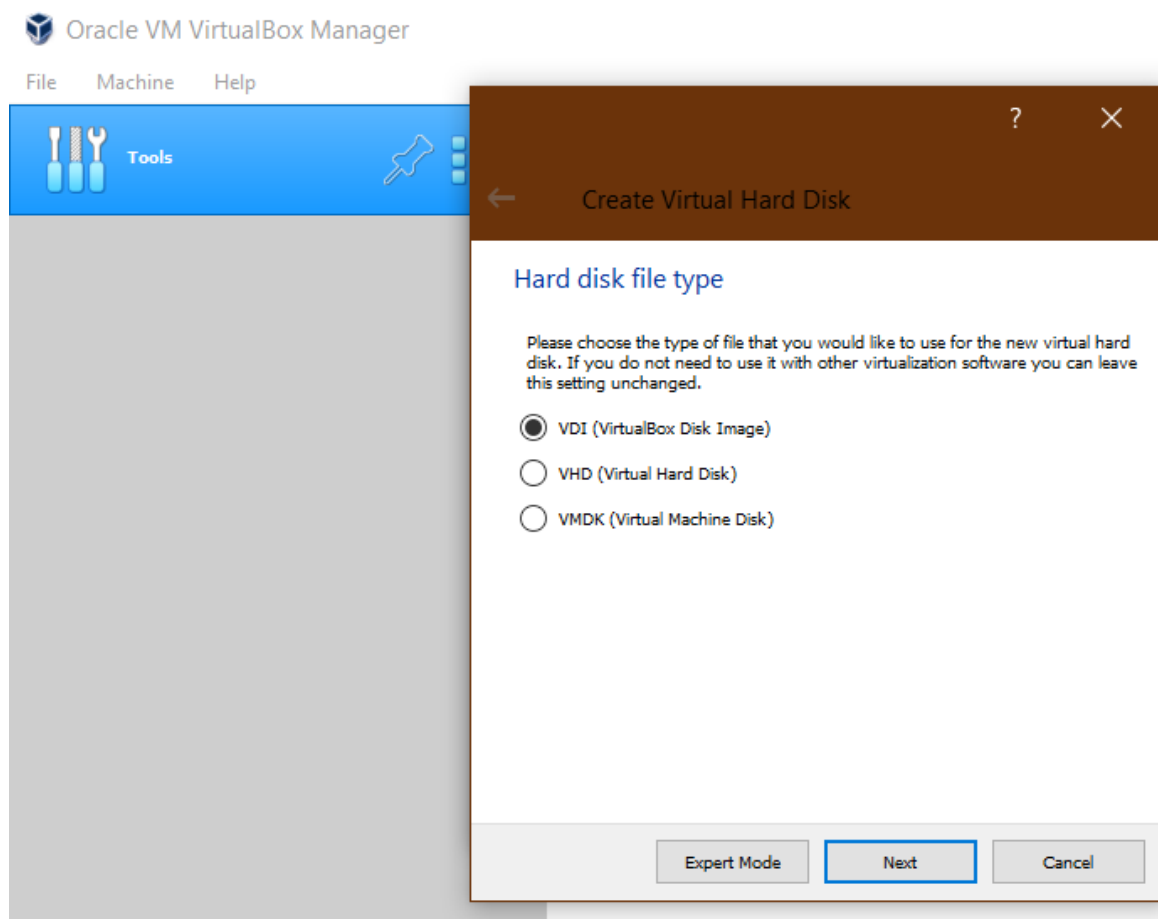


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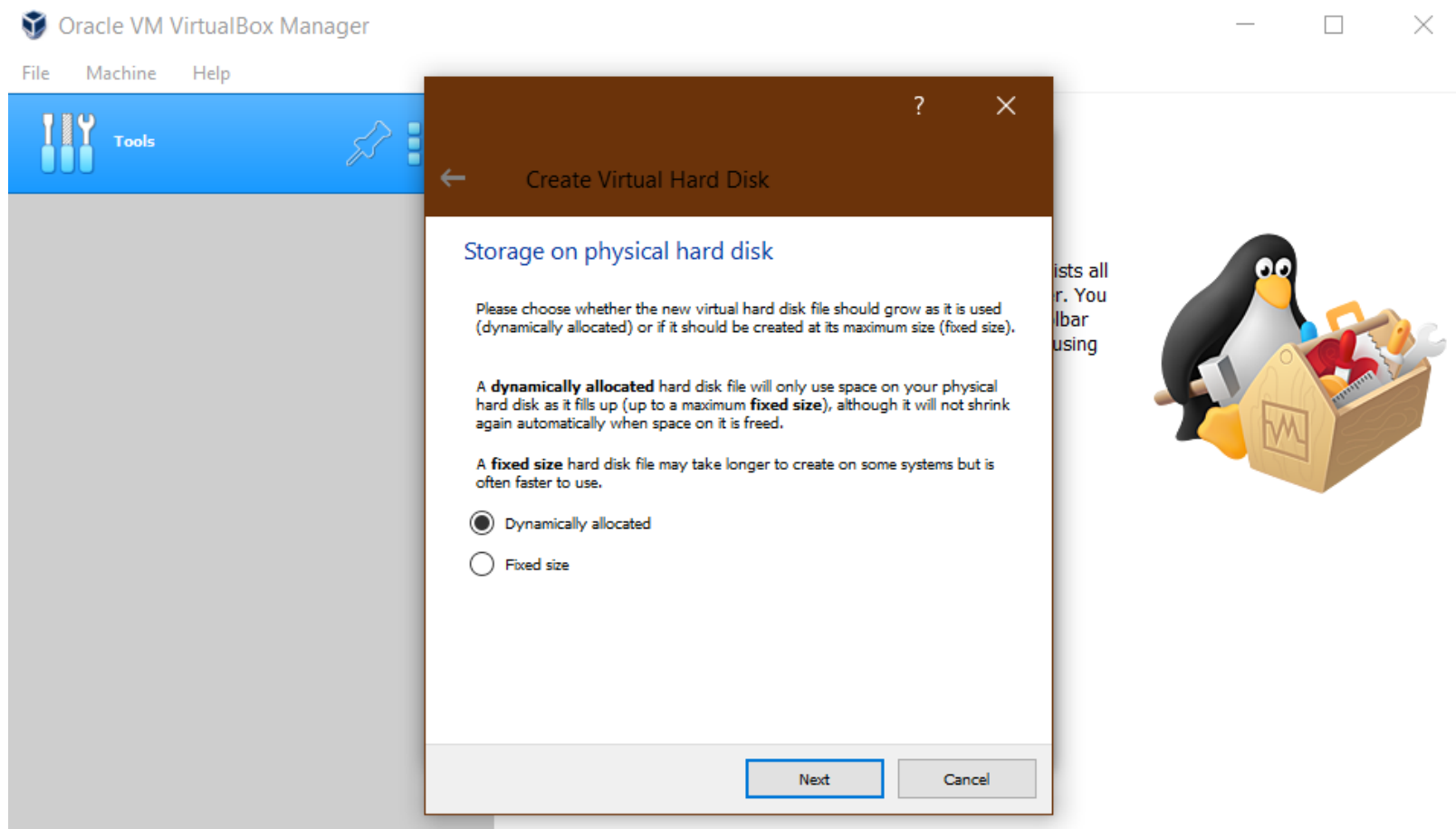
Use the slider or type the value of RAM you want to give the VM in megabytes. Since computers calculate bytes differently than humans, multiply the GB of RAM you're providing by **1,024**. So if you want 4GB of RAM in the VM, enter **4,096**, not **4,000**.

Hard Disk File Type

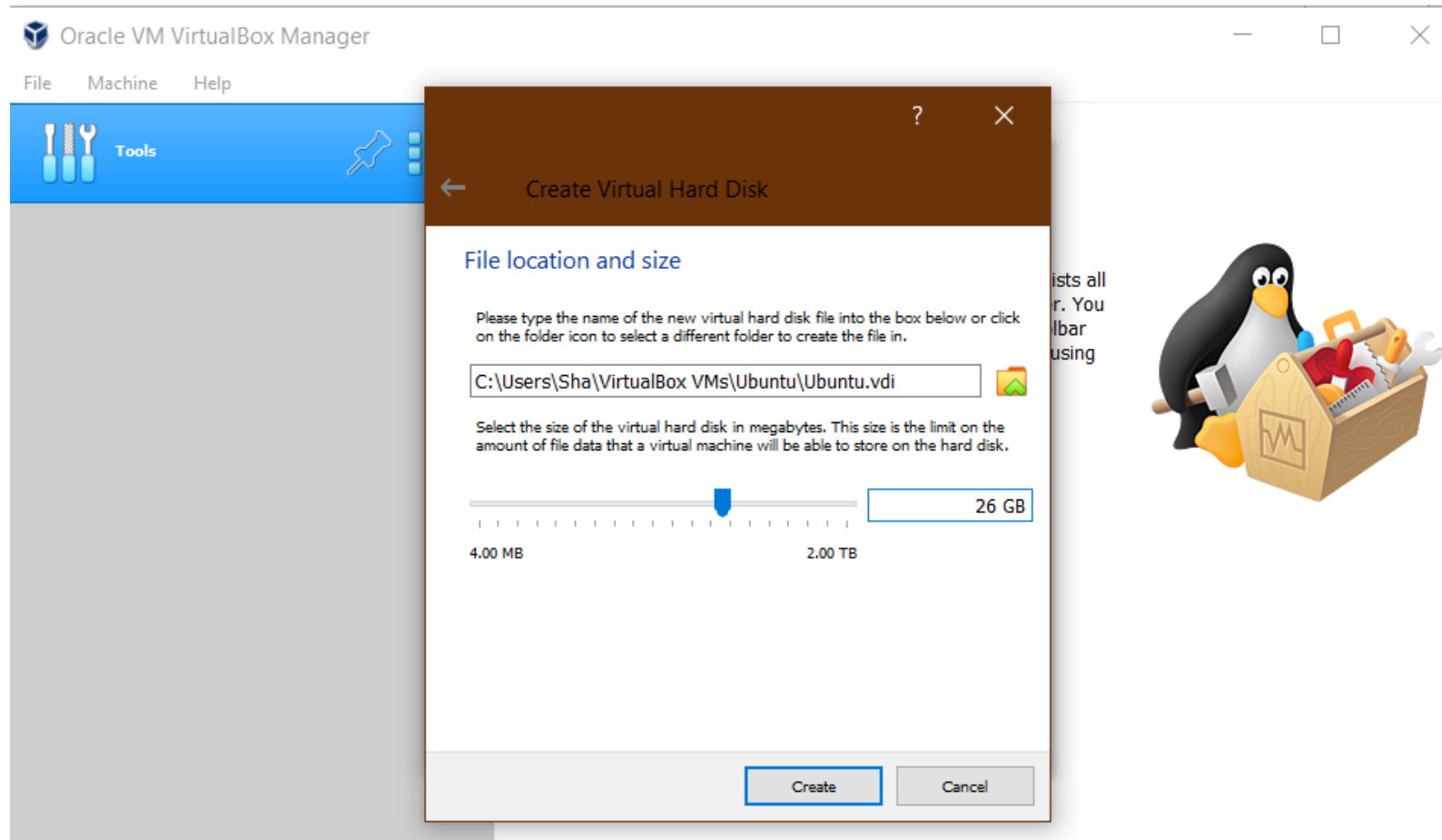


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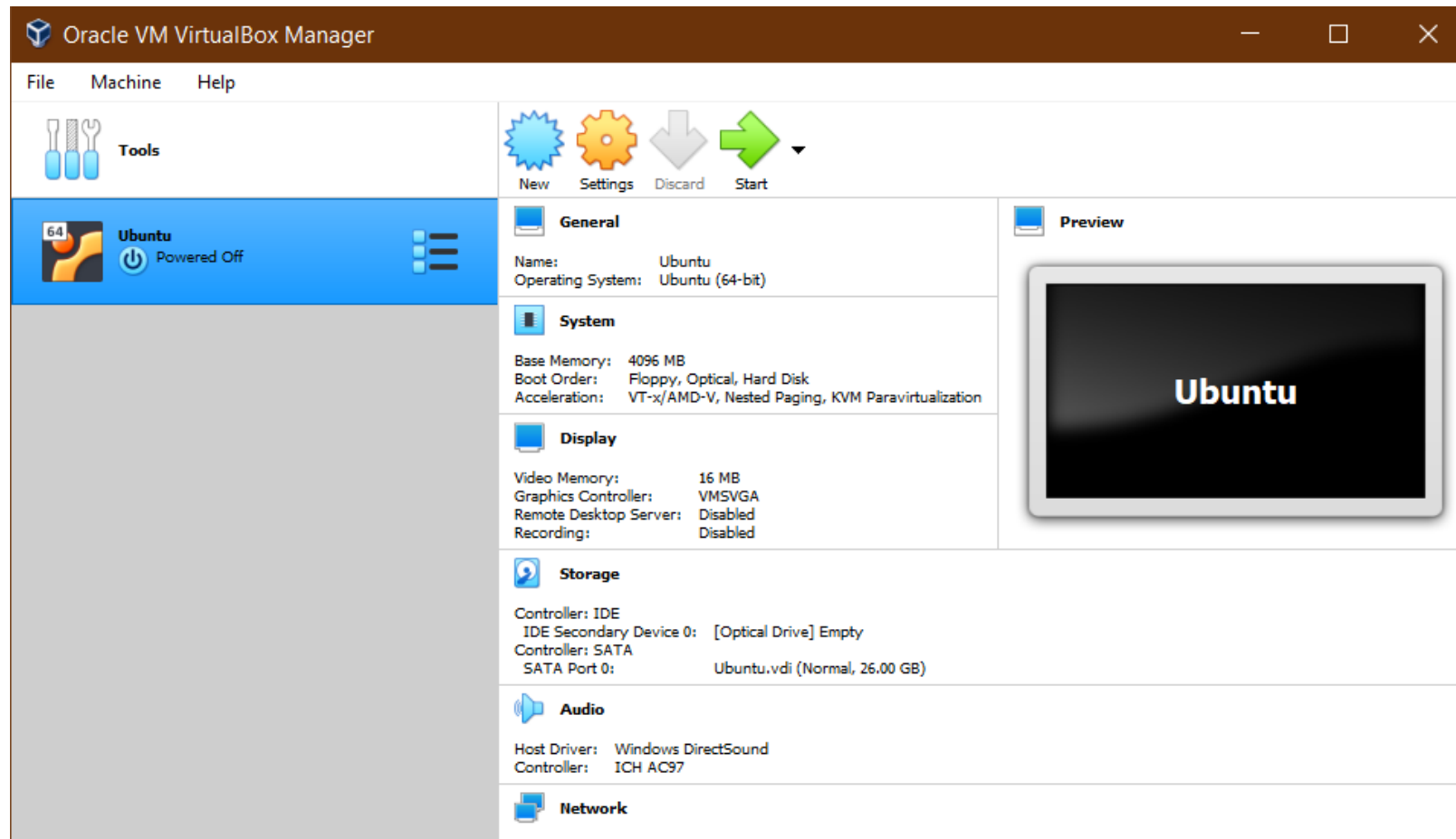
Storage on physical Hard Disk



File location & Size

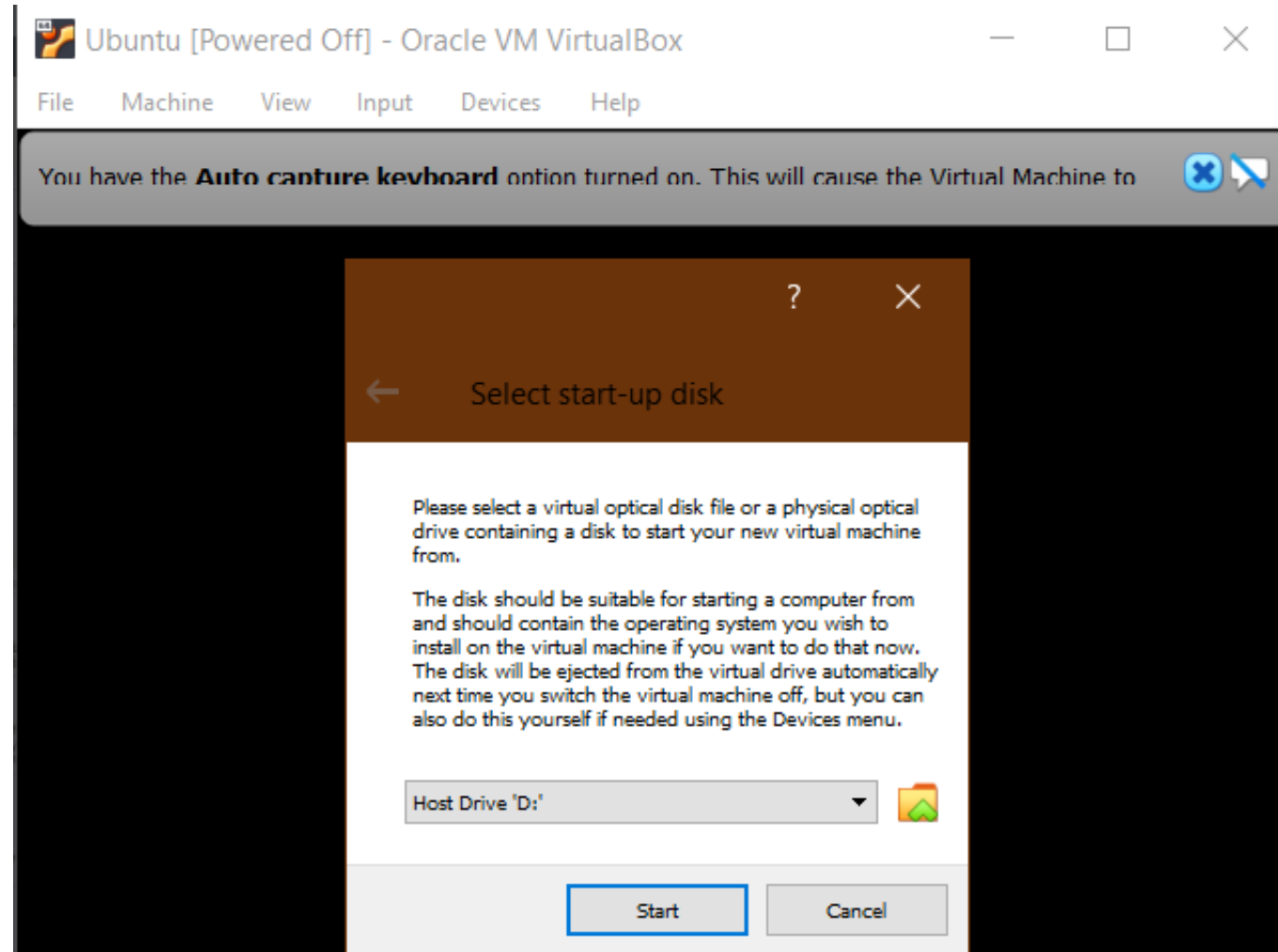


Start Ubuntu



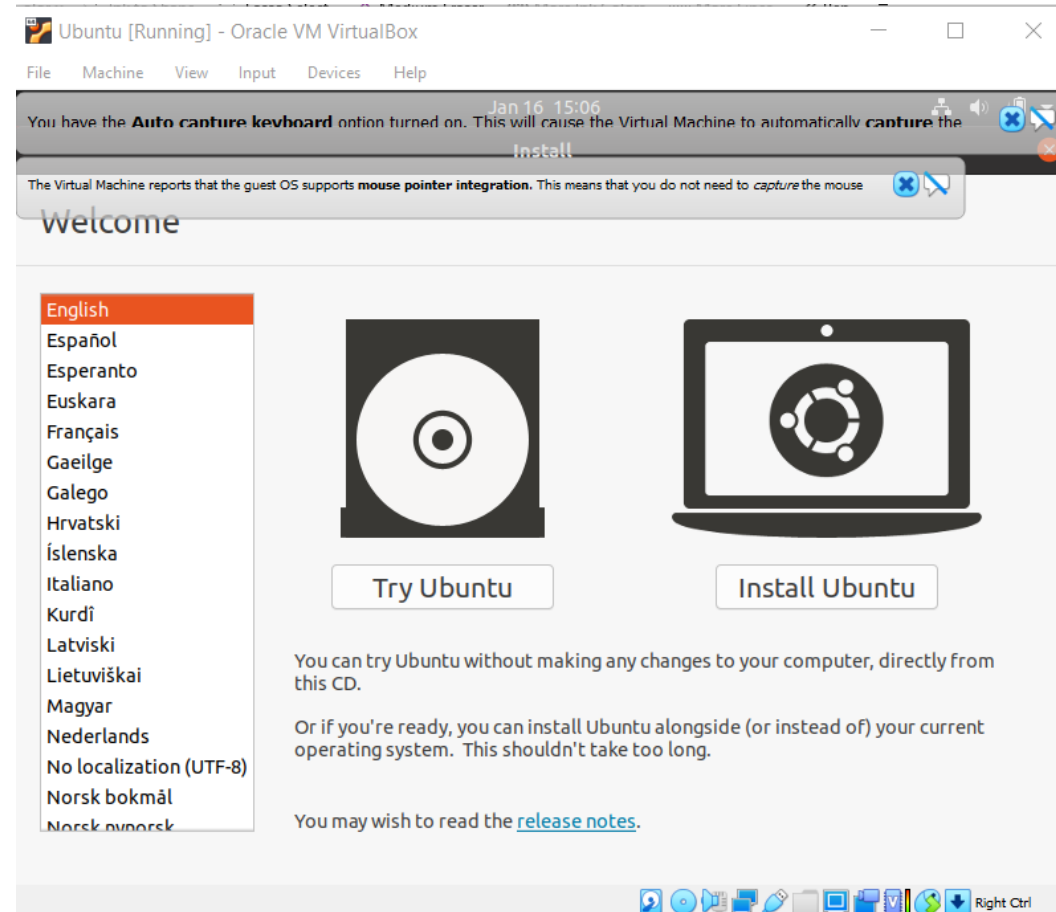
Click Start

Select Start-up Disk



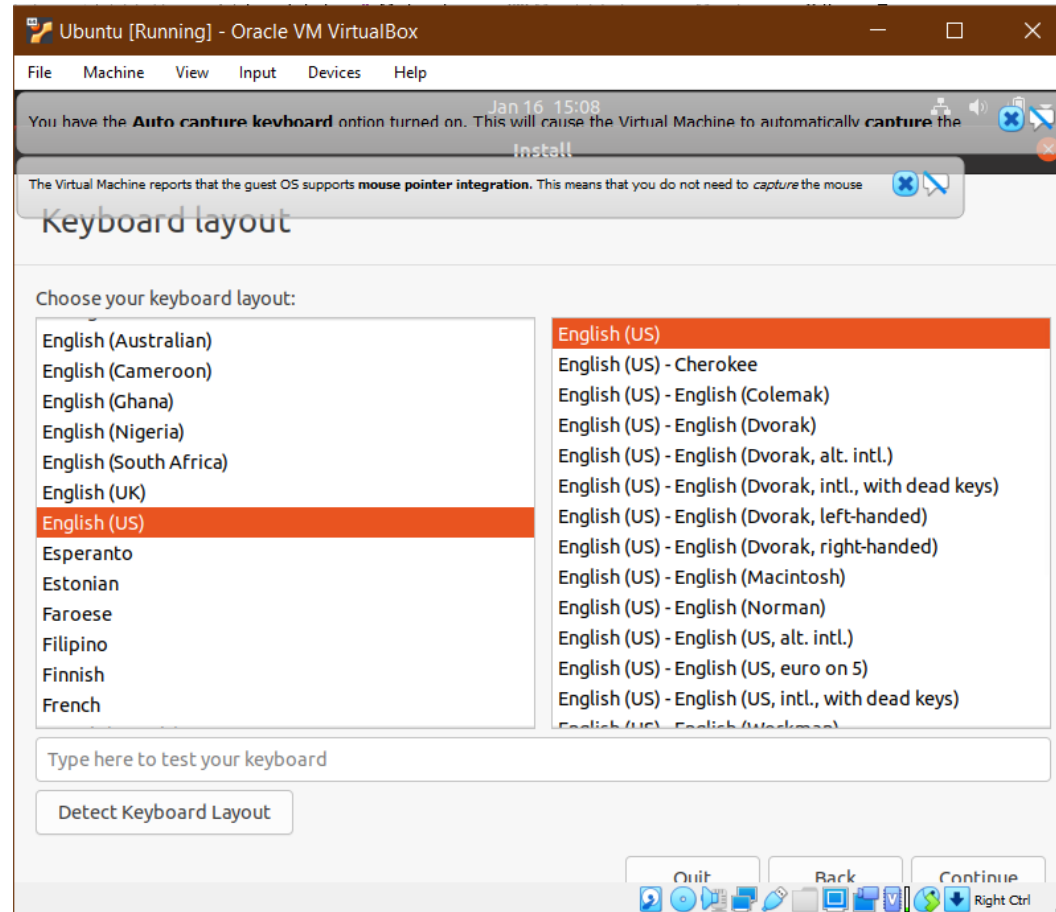
Click Start

Install Ubuntu



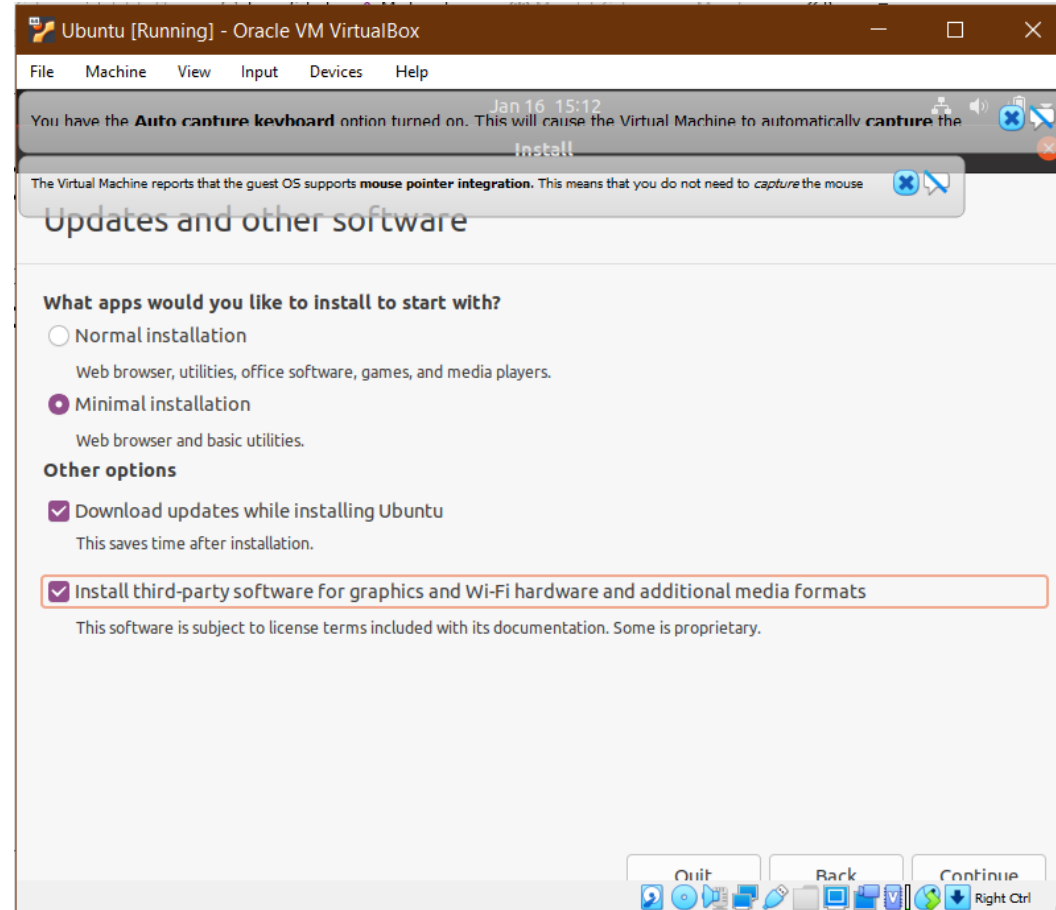
Click Install Ubuntu

Keyboard Layout



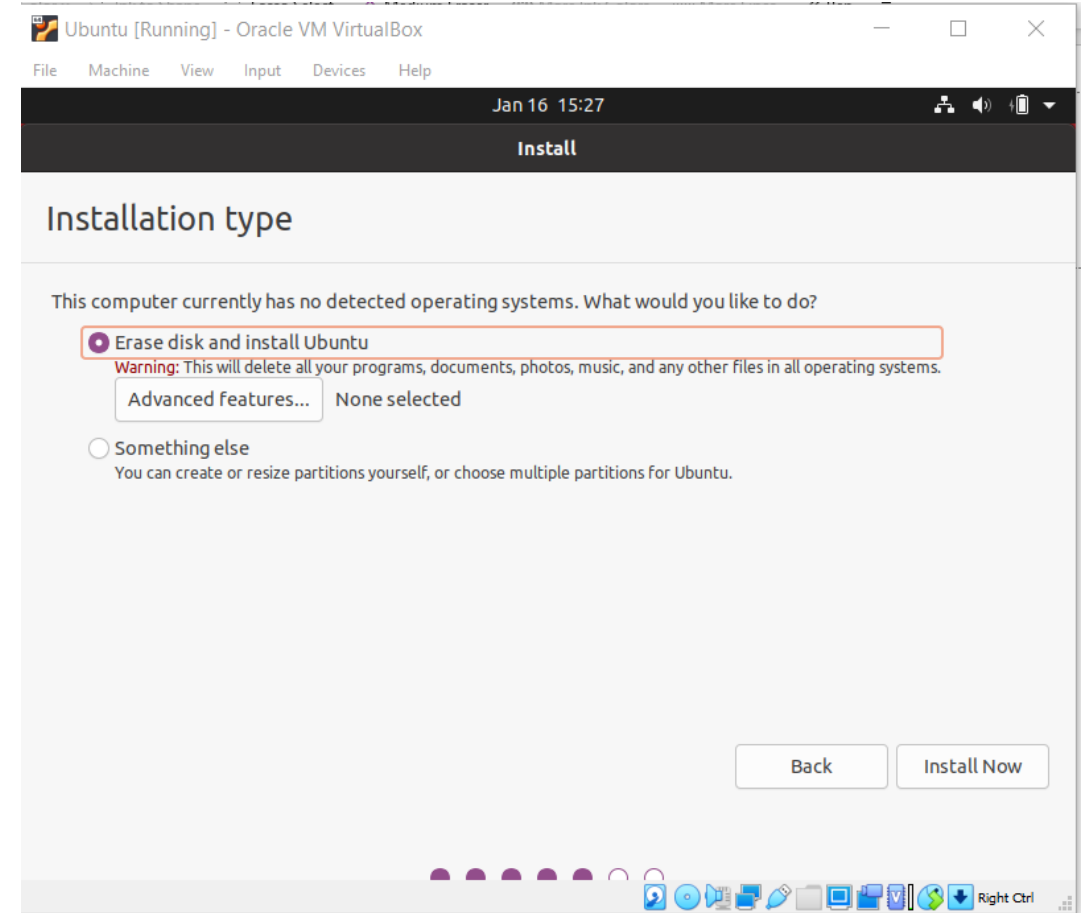
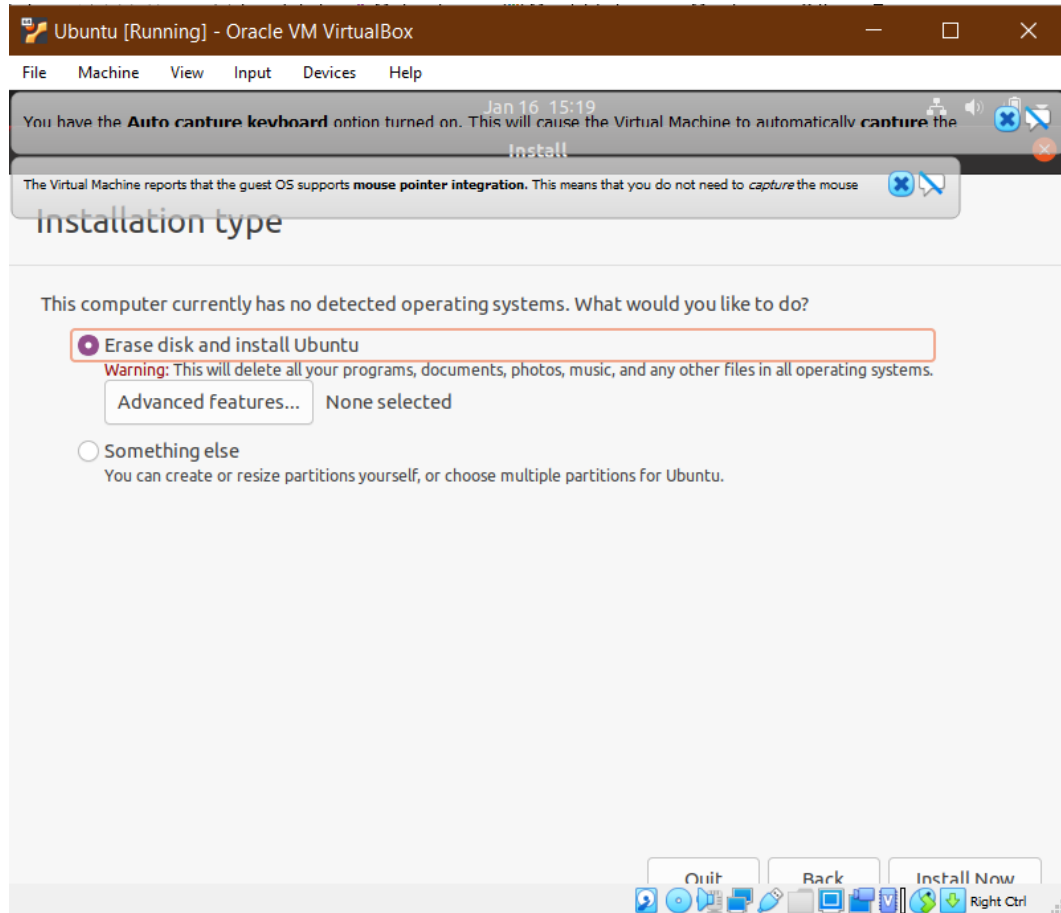
Click Continue

Minimal Installation



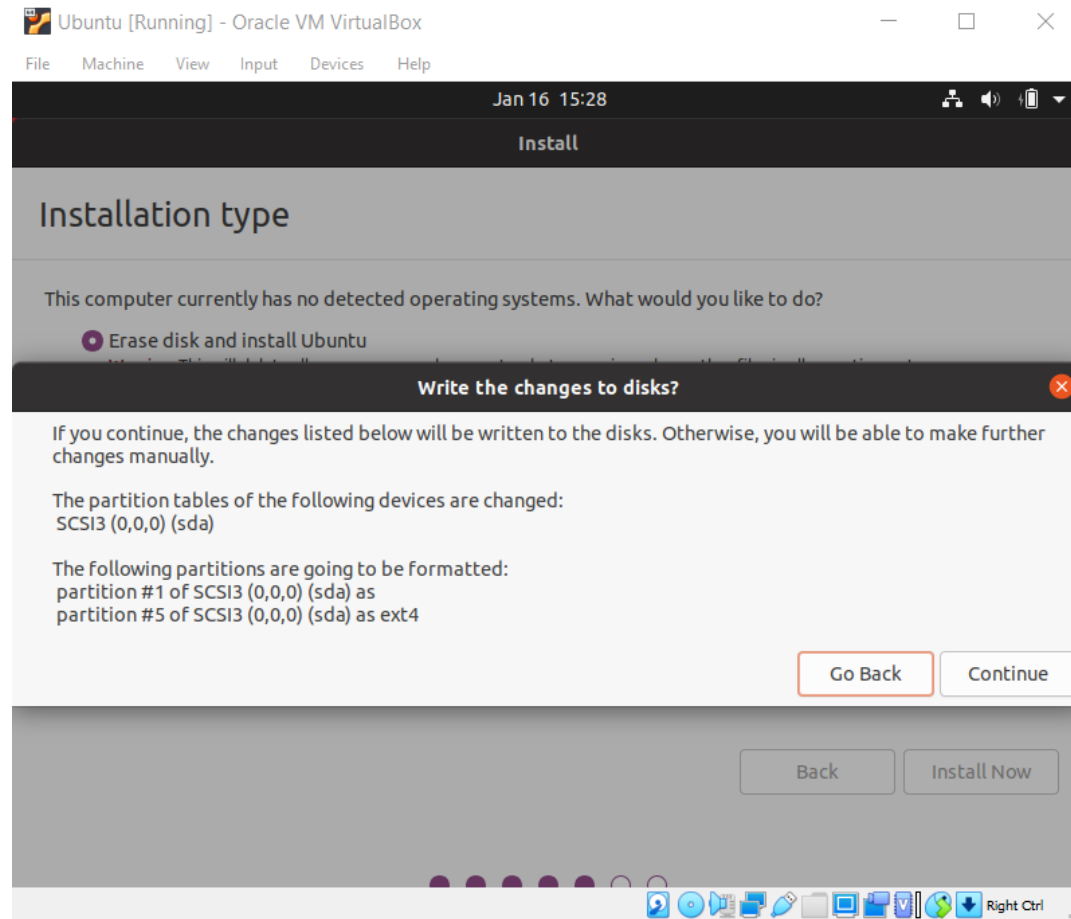
Click Continue

Installation Type

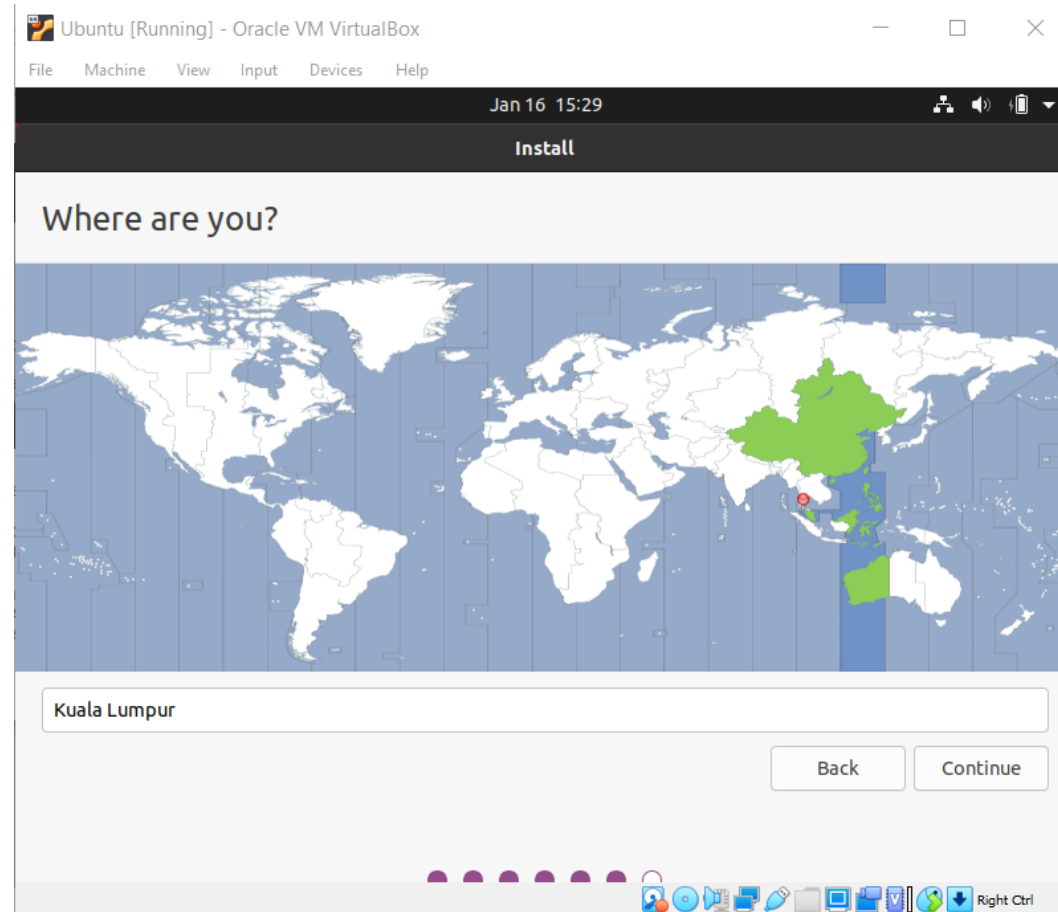


Click Install Now

Installation Type



Choose Location



Click Continue

Enter name & Set Password

Ubuntu [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

Jan 16 23:31

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: Fair password

Confirm your password: ✓

☐ Log in automatically

☒ Require my password to log in

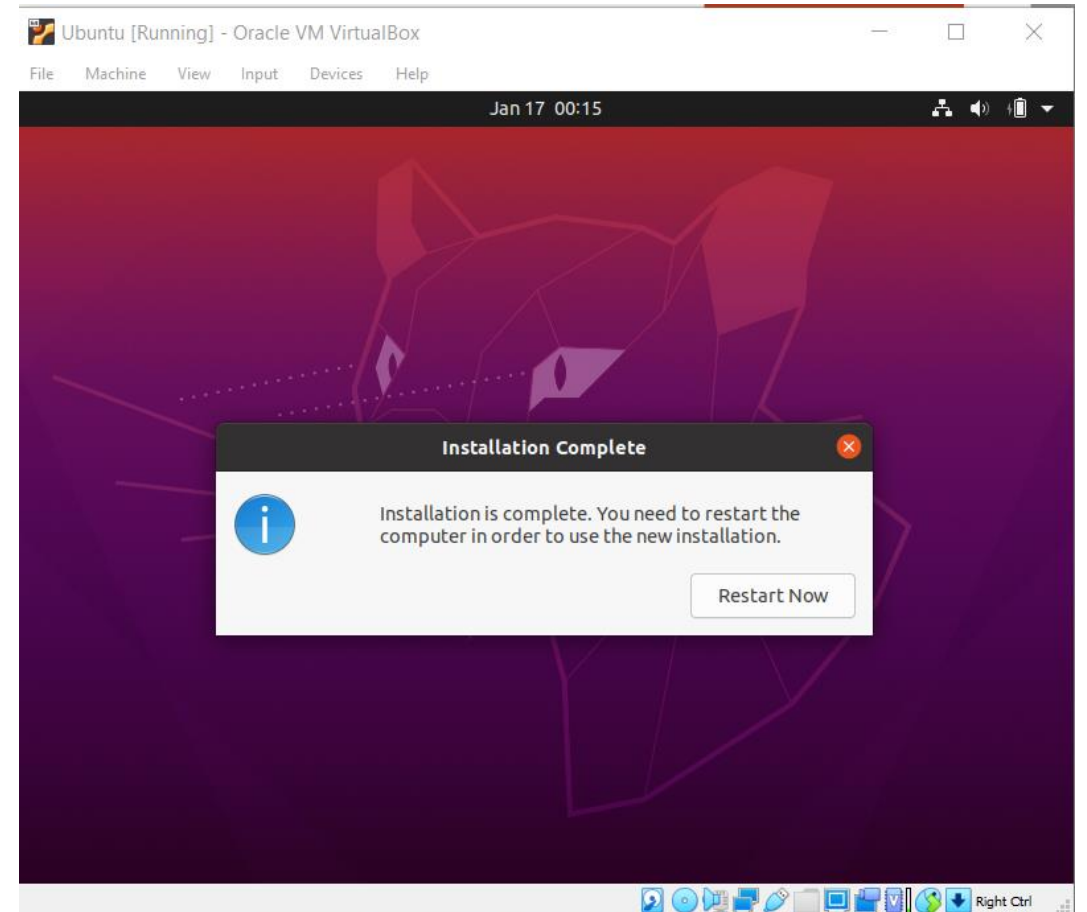
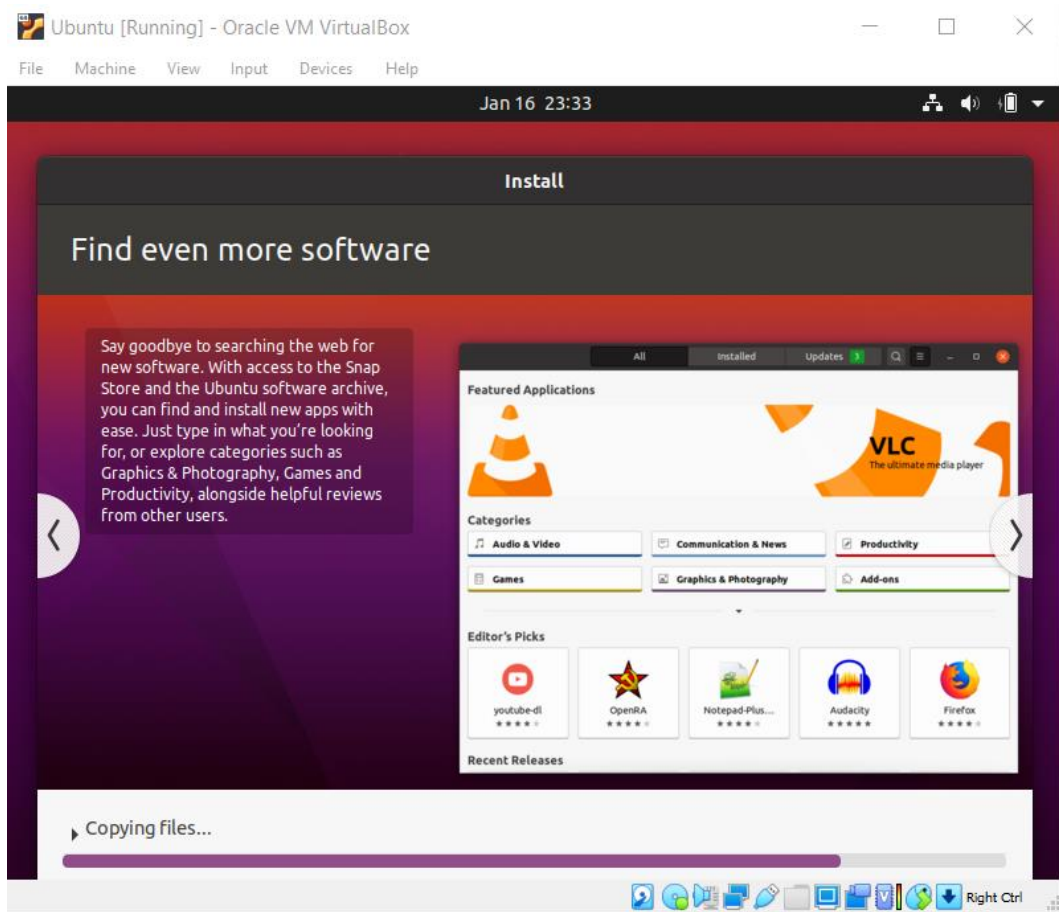
☐ Use Active Directory

You'll enter domain and other details in the next step.

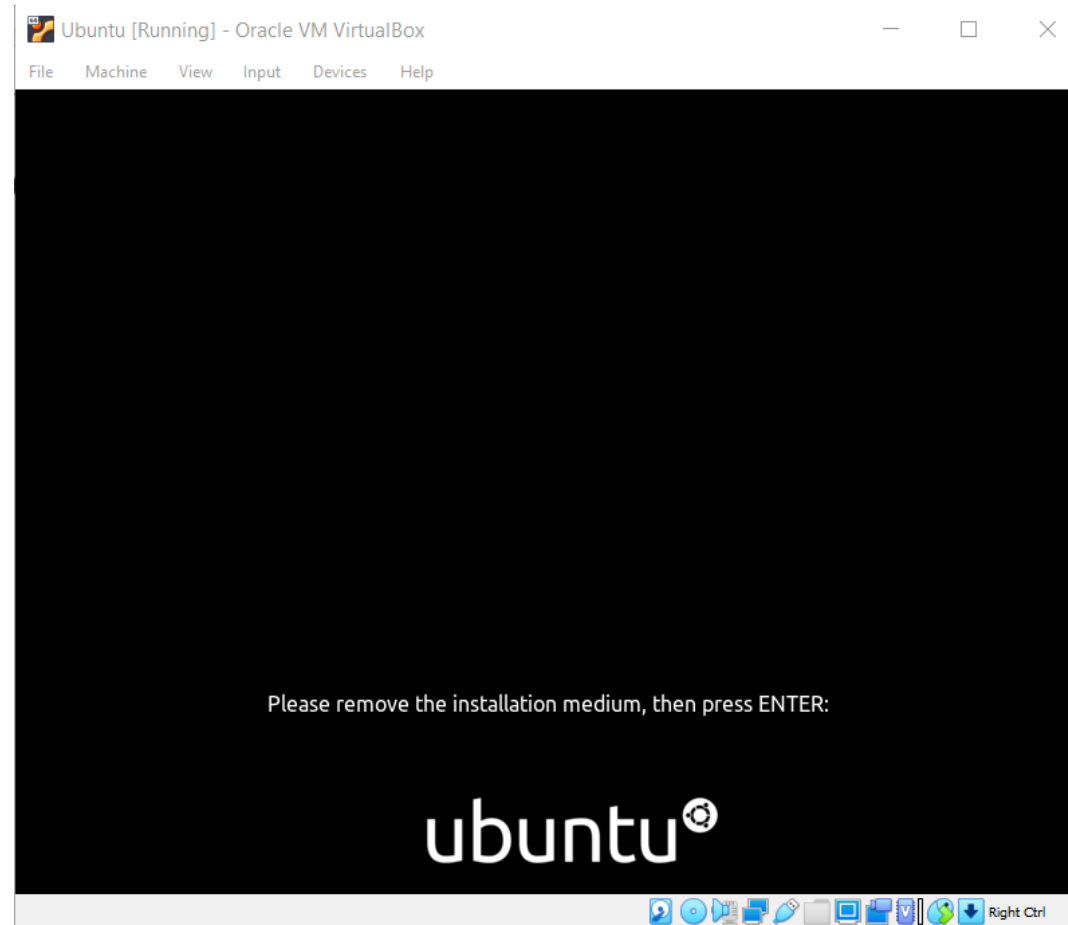
Back Continue

Right Ctrl

Installation Complete

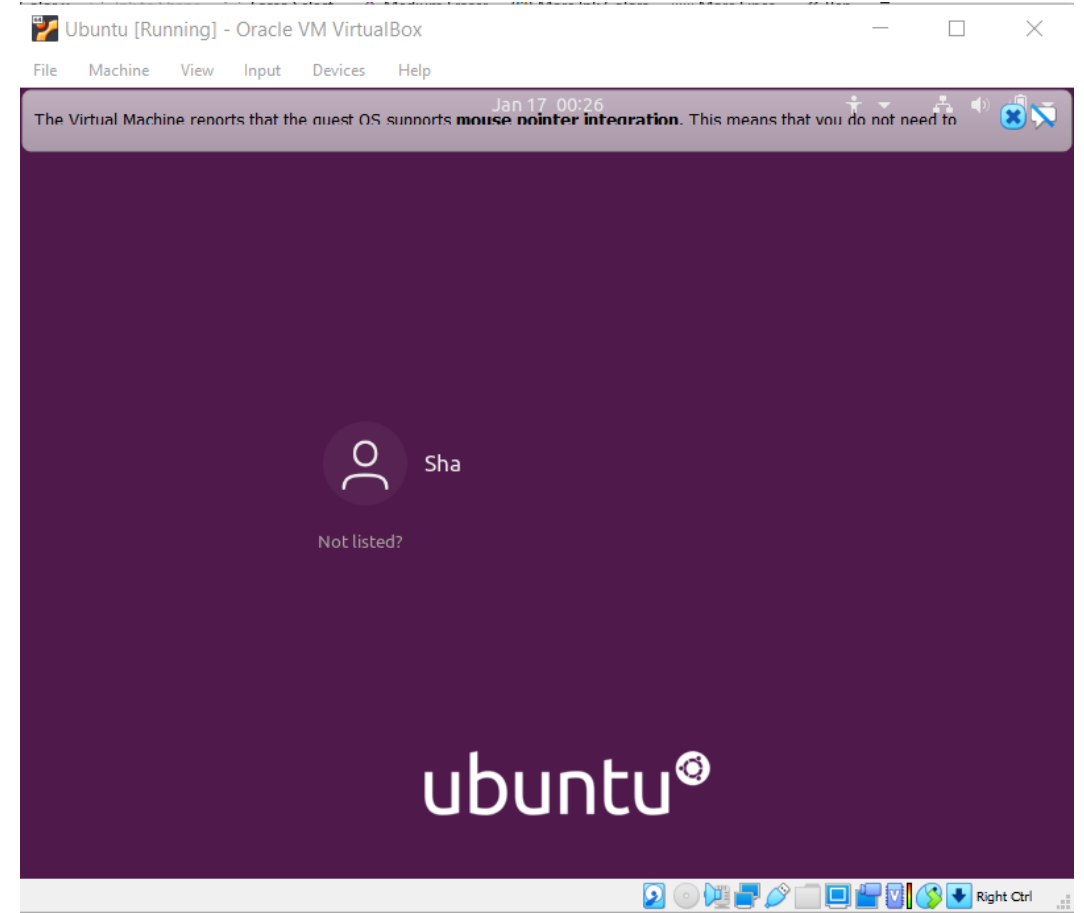
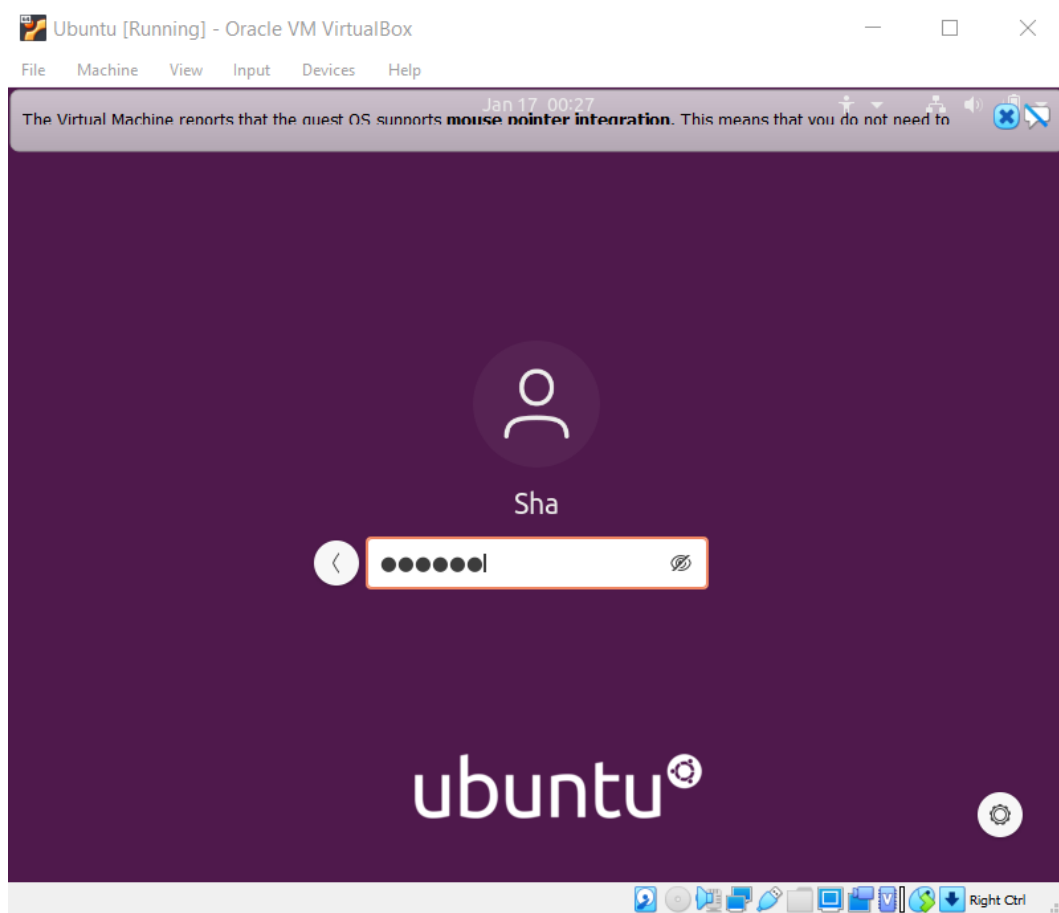


Installation Complete



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?

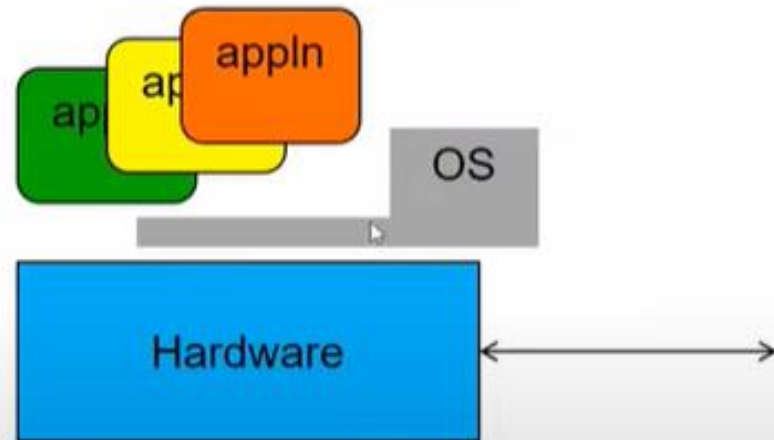


Goals for today

- 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



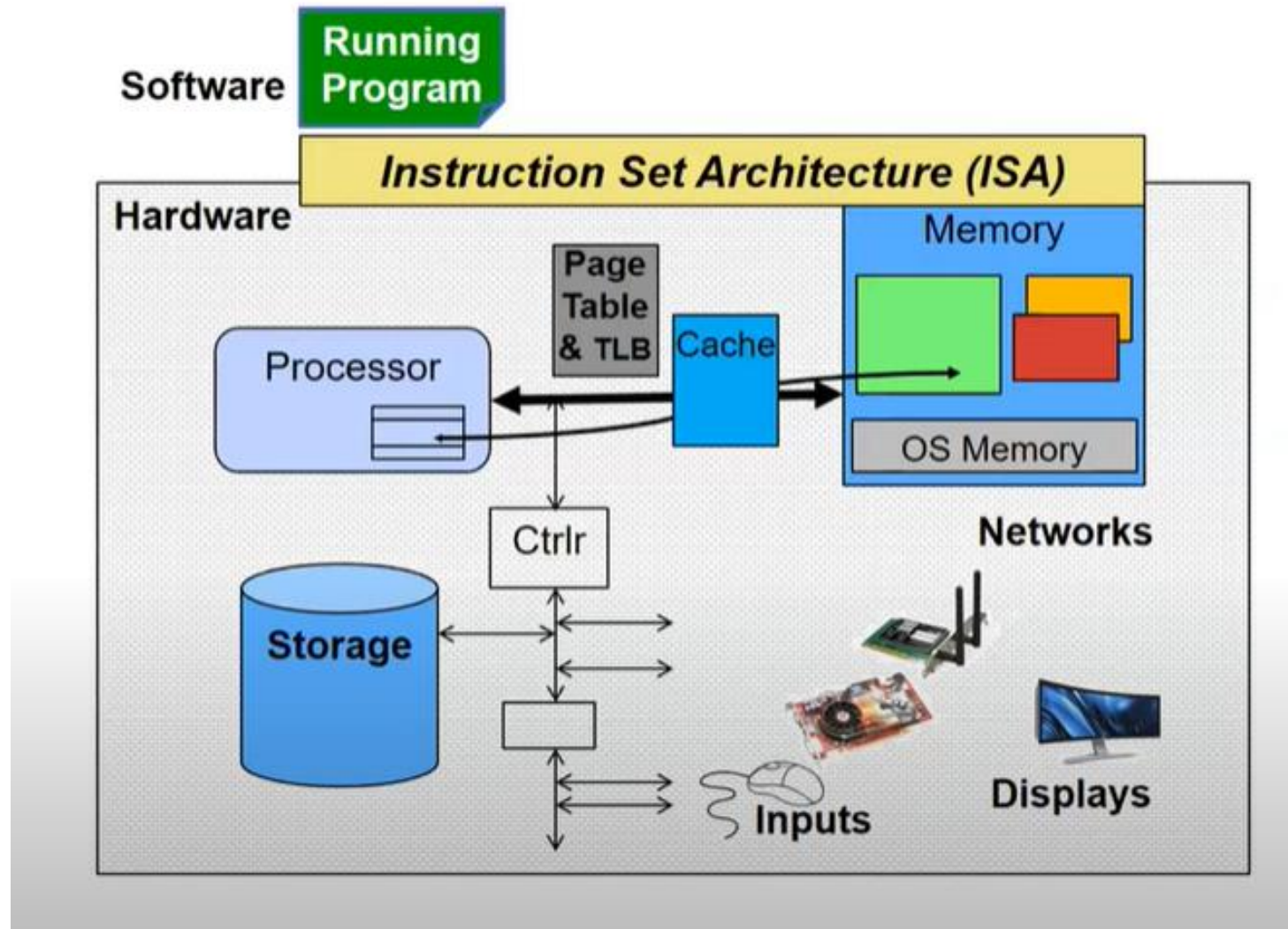
Operating System

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

