

Cybersecurity Bootcamp Virtualization Guide

»  Use the left side of this document to access the table of contents for easy navigation

» It's recommended you bookmark this document for quick access

Virtual Machine Download and Setup

You will use a local virtual machine for several units of our program, **beginning with Terminal Week and through the Linux weeks.**

You should have already downloaded and installed VirtualBox as part of pre-work. If you haven't, that will be the first step.

Following that you will install a tool called Vagrant, which you'll use to set up the virtual machine for the bootcamp.

The steps below can feel intimidating, especially if you are new to the command line.

The following is a quick recap of what both tools do for you throughout the Cybersecurity Bootcamp:

- **VirtualBox:** is software that creates and manages **virtual machines**, or **guest** machines. It handles the virtualized sharing of the **host** machine's system resources.
 - For example, your computer, or host machine, may have a total of 16 GB of RAM. **VirtualBox** can then be configured to allocate 4 GB of RAM to a specific virtual machine. When Virtualbox is running that virtual machine, those 4 GB of RAM will be unavailable to your host machine until that virtual machine is properly shut down. Tools such as Vagrant allow us to use the command line to manage VirtualBox.
- **Vagrant:** is a powerful tool that helps us create VirtualBox virtual machines. It also allows us to easily get the latest virtual machine updates developed by the curriculum team.

By Week 2, Day 3, you only need to make sure that you have the correct versions of

VirtualBox and Vagrant installed. Additionally, Windows users should make sure that they have Git Bash installed.

In Week 2, Day 3, your instructor will demonstrate how to download the virtual machine. If you run into any issues, please use office hours afterwards to make sure that you have everything set up prior to Week 3, Day 1.

IT IS ABSOLUTELY IMPERATIVE THAT YOU HAVE YOUR VIRTUAL MACHINES SET UP PRIOR TO UNIT 3! IF YOU ARE UNFAMILIAR WITH OR RELATIVELY NEW TO THE COMMAND LINE, PLEASE BE PREPARED TO TROUBLESHOOT AND WORK WITH YOUR INSTRUCTORS.

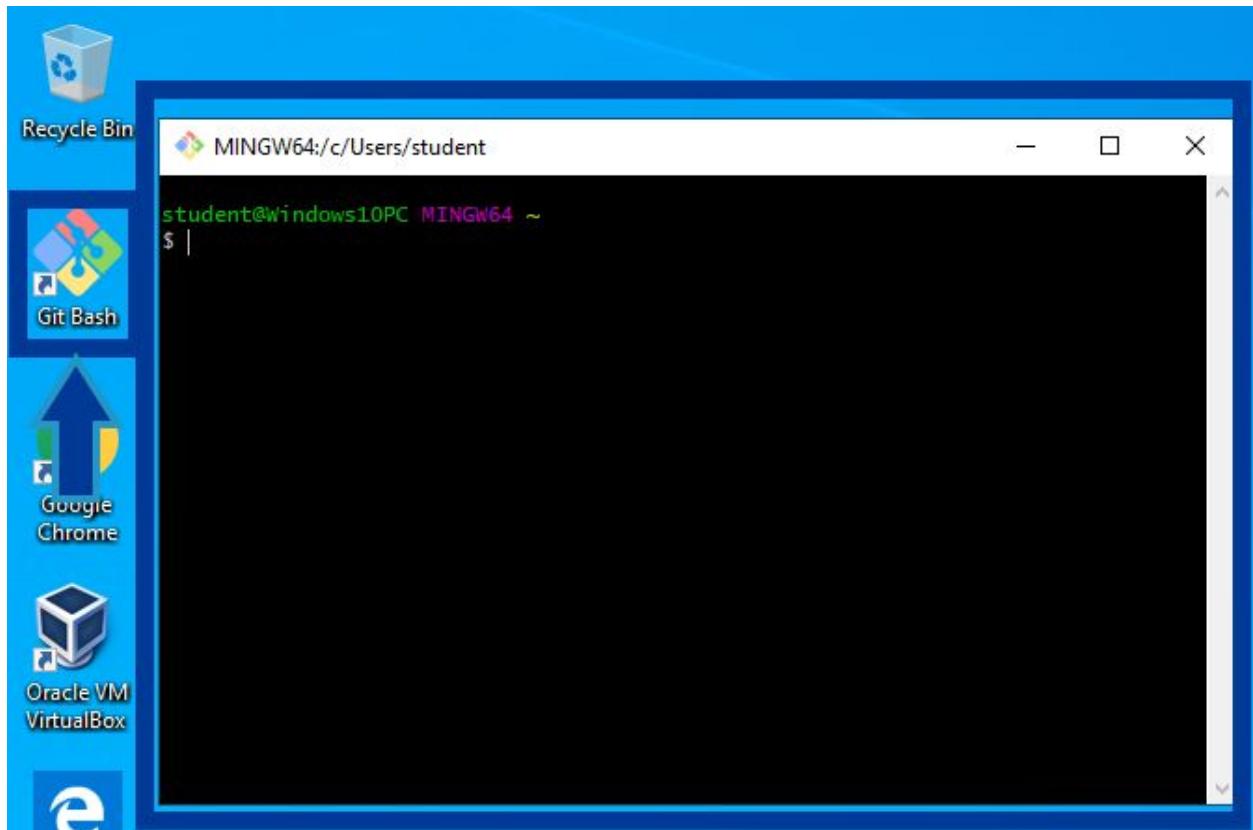
REMEMBER THAT **INSTALLS AND TROUBLESHOOTING ARE COMMON TASKS IN SECURITY**, AND THIS SET-UP EXERCISE WILL BE YOUR FIRST EXPOSURE TO THIS. BE READY AND WILLING TO LEARN!

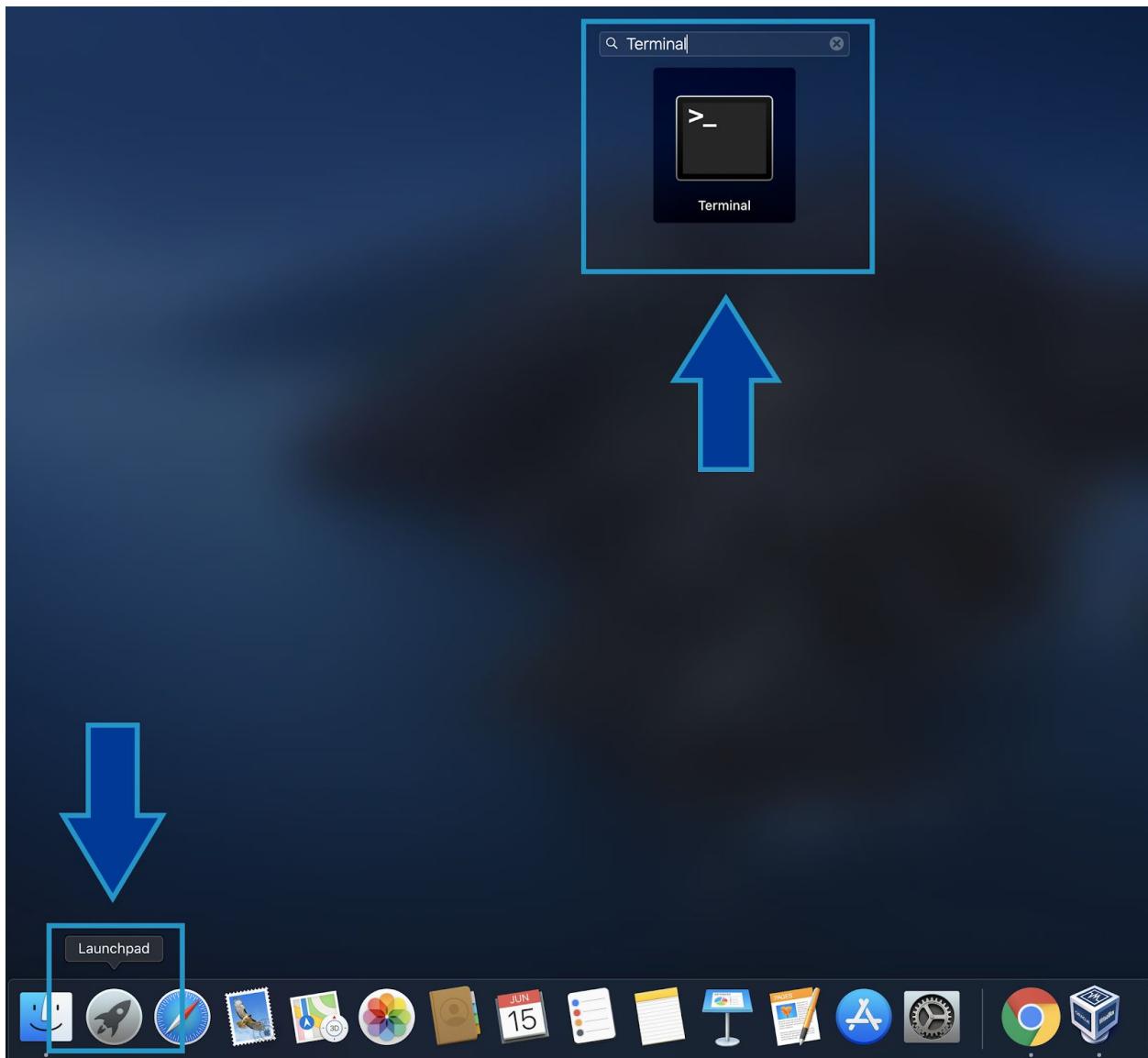
Downloading & Running the Machine

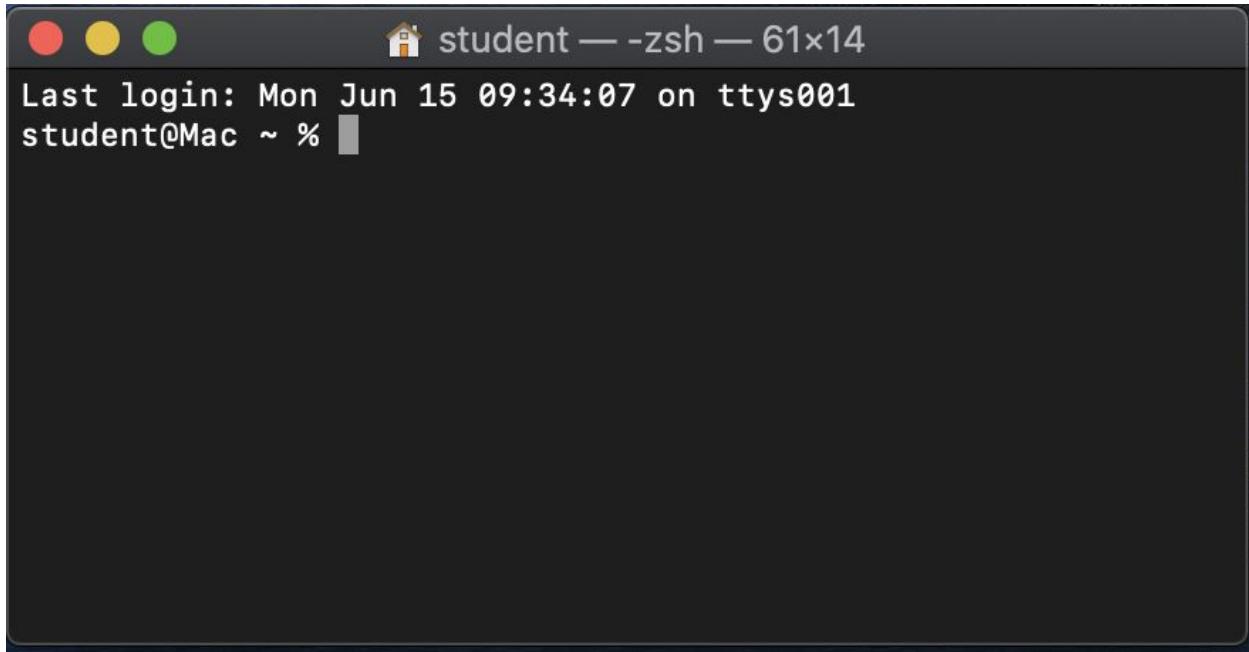
Windows and Mac Users

Windows users will need to install Git Bash. Please go here to download Git Bash if you haven't already done so in pre-work: <https://gitforwindows.org/>

Mac users will use Terminal. You can open Terminal by clicking on the Launchpad at the bottom left of your screen. Type in Terminal and press enter in order to open it.







```
student — zsh — 61x14
Last login: Mon Jun 15 09:34:07 on ttys001
student@Mac ~ %
```

VirtualBox

You must first download VirtualBox, which you will use to launch your virtual machine.

Download and install **VirtualBox** from here:
<https://www.virtualbox.org/wiki/Downloads>

- Select the appropriate installer for your operating system. For example, if you're using a Windows computer, you'll want to click the link that says **Windows hosts** as shown below. If you're using a Mac, you'll want to click on **OS X hosts**.

Note: be sure that the VirtualBox version you download matches a version that Vagrant supports: <https://www.vagrantup.com/docs/providers/virtualbox>

- For example, if Vagrant reports that it can support VirtualBox versions **6.1.x**, then VirtualBox version **6.1.10** should be compatible.
- Vagrant currently supports all VirtualBox **6.1.x** versions (meaning **6.1.1**, **6.1.2**, **6.1.5**, etc. are all supported).

HashiCorp

Learn how Vagrant fits into the HashiCorp Stack

Vagrant

Intro Docs VMWare Community

Filter...

VirtualBox

Overview

- > Installation
- > Commands (CLI)
- > Vagrant Share
- > Vagrantfile
- > Boxes
- > Provisioning

Vagrant comes with support out of the box for [VirtualBox](#), a free, cross-platform consumer virtualization product.

The VirtualBox provider is compatible with VirtualBox versions 4.0.x, 4.1.x, 4.2.x, 4.3.x, 5.0.x, 5.1.x, 5.2.x, 6.0.x, and [6.1.x](#). Other versions are unsupported and the provider will display an error message. Please note that beta and pre-release versions of VirtualBox are not supported and may not be well-behaved.



VirtualBox

Download VirtualBox

Here you will find links to [VirtualBox binaries](#) and its source code.

VirtualBox binaries

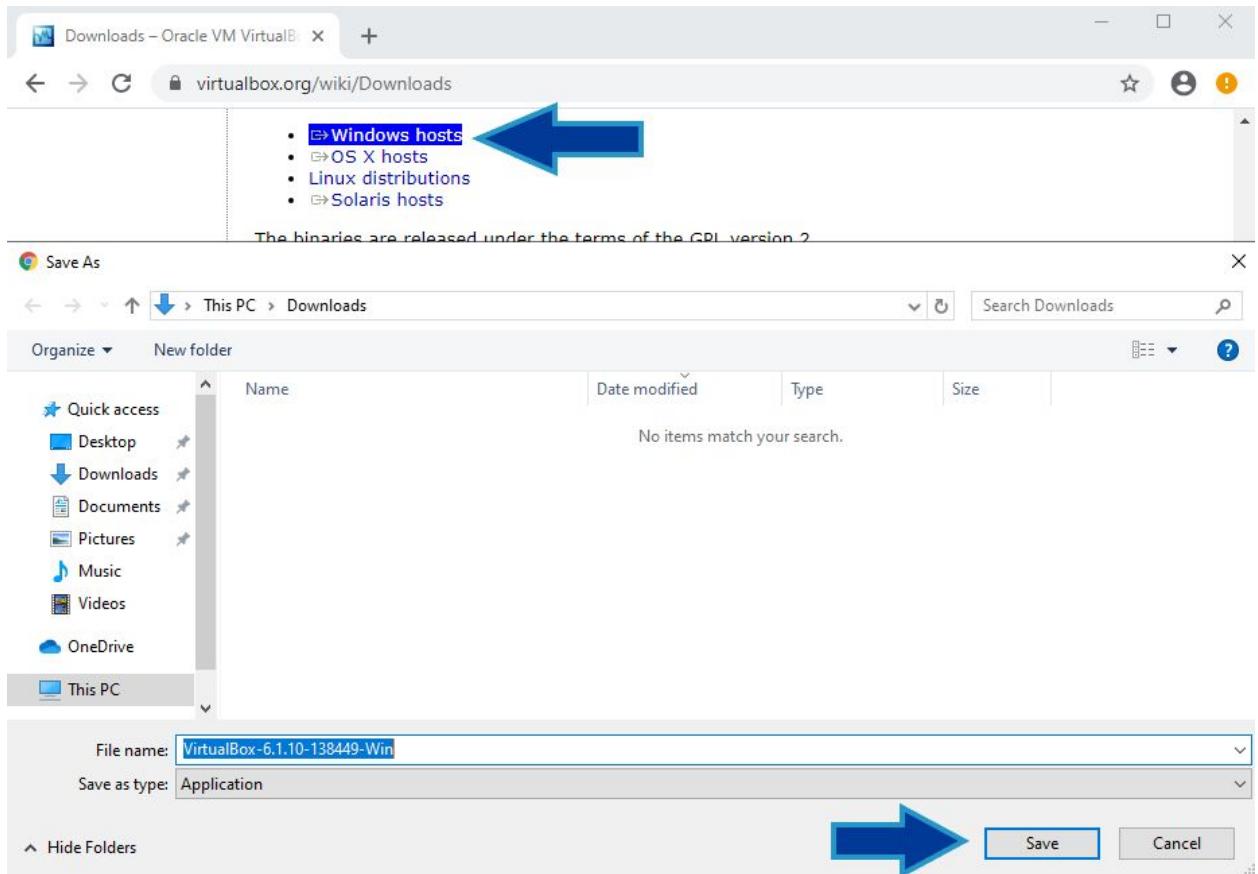
By downloading, you agree to the terms and conditions of the respective license. If you're looking for the latest VirtualBox 6.0 packages, see [VirtualBox 6.0 build](#). If you're looking for the latest VirtualBox 5.2 packages, see [VirtualBox 5.2 build](#).

VirtualBox 6.1.10 platform packages

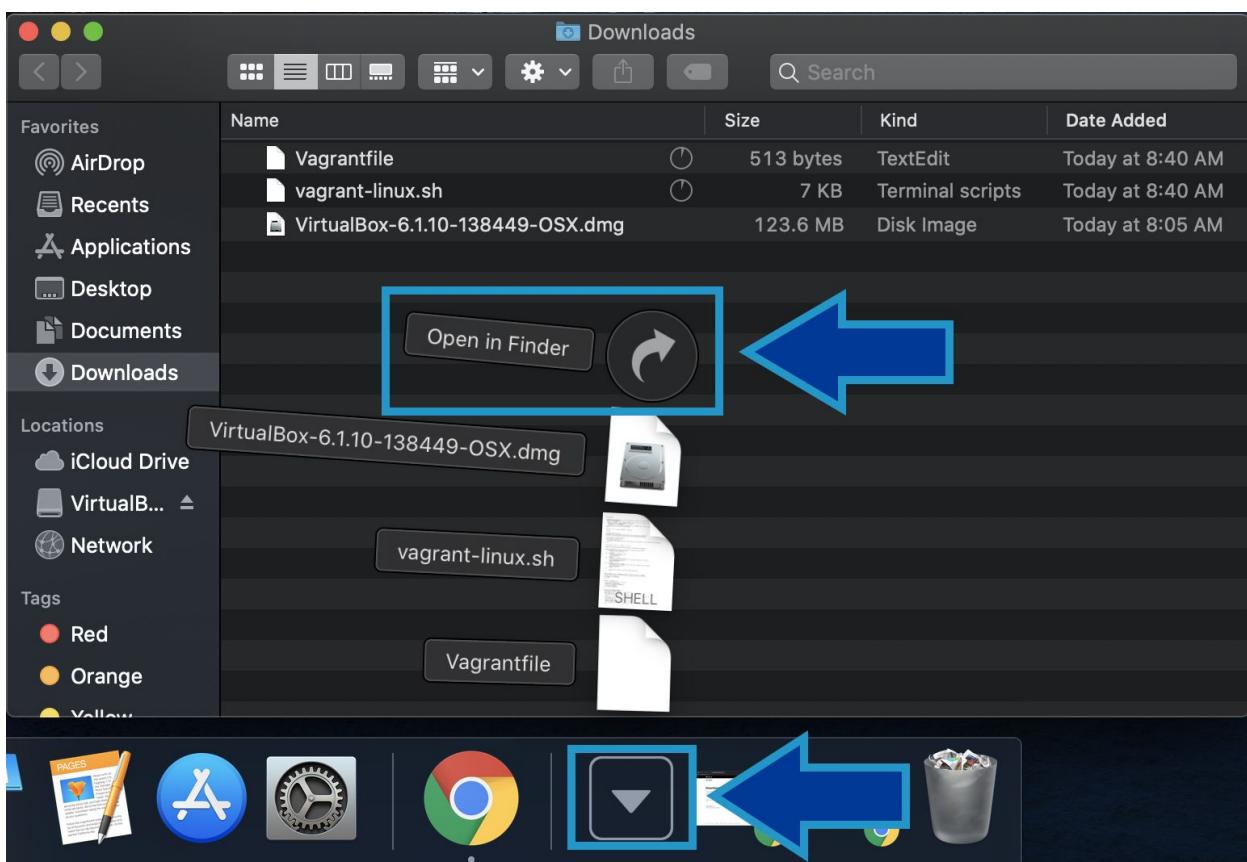
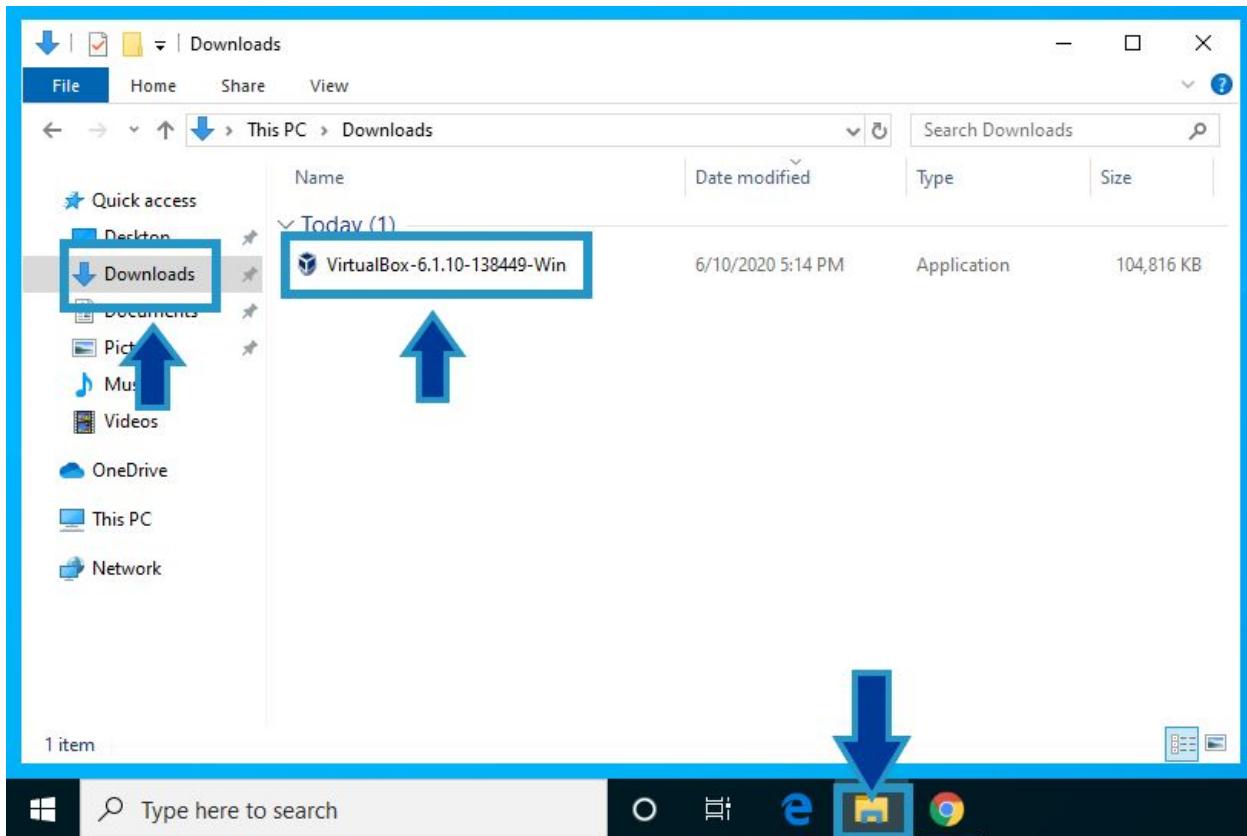
- ➡ Windows hosts
- ➡ OS X hosts
- Linux distributions
- ➡ Solaris hosts



- Your browser may prompt you to save it to your **Downloads** folder, as shown below. It may also automatically be set to download files there.



After the VirtualBox installer has been downloaded, navigate to your **Downloads** folder by opening your File Explorer on Windows (this looks like a folder at the bottom of the screen) or Downloads -> Open in Finder on Mac (the Downloads icon should be to the left of the Trash icon).



The installer should save to your **Downloads** directory.

- Open your **Downloads** folder, then double-click the installer to install VirtualBox on your system. Follow the prompts to complete the VirtualBox installation.



1 Double click on this icon:



VirtualBox.mpkg

2 Run the VirtualBox application from the Applications Folder:



Applications



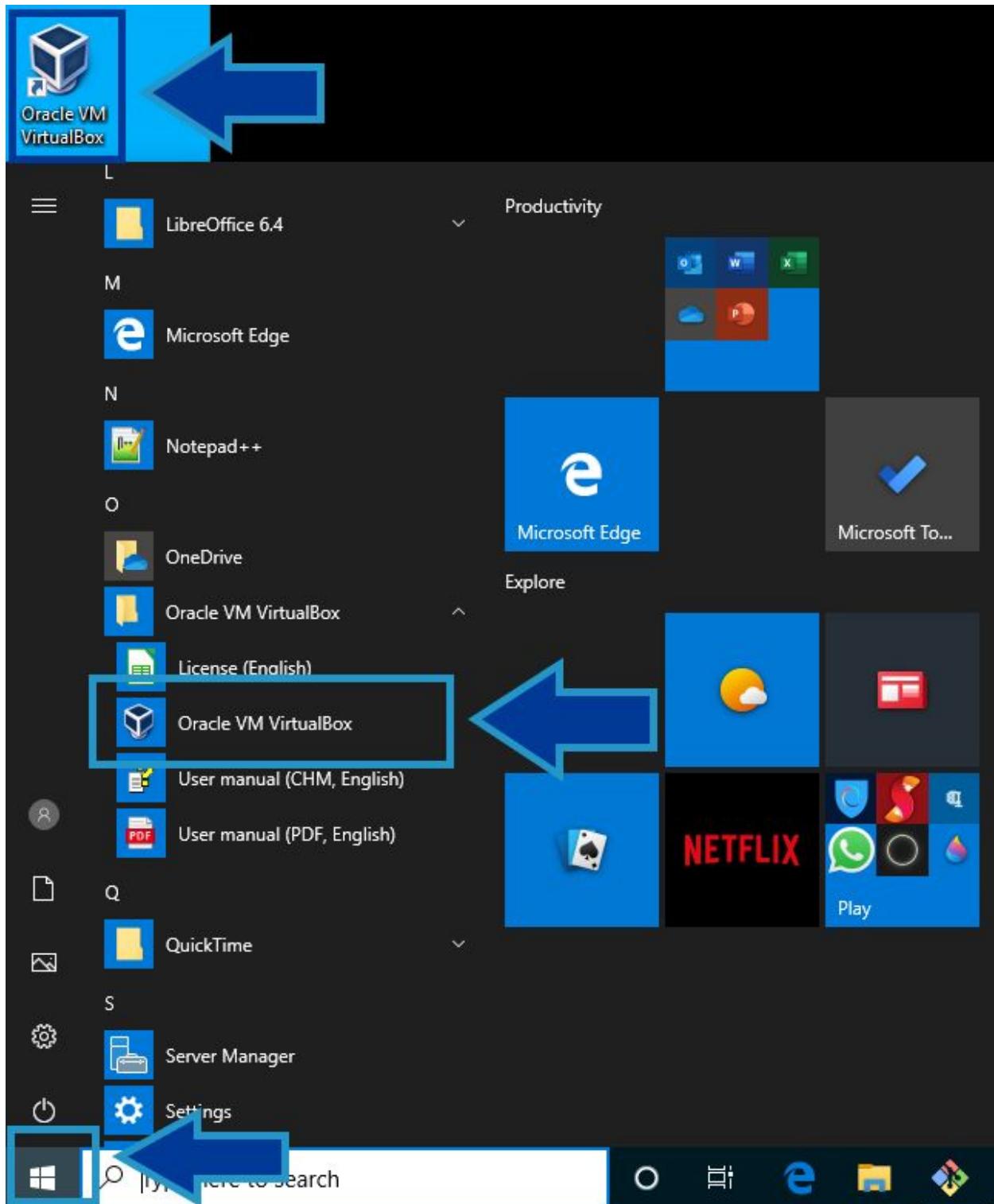
UserManual.pdf

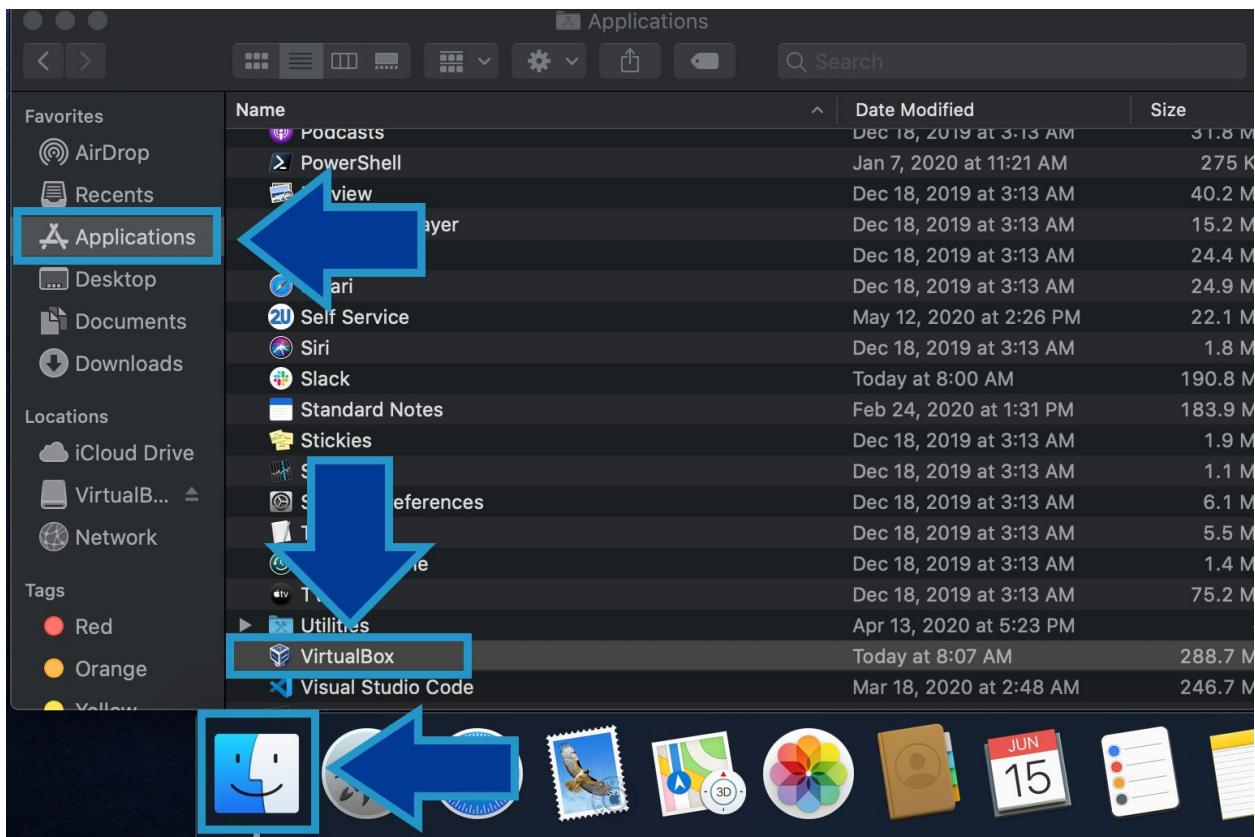


VirtualBox_Uninstall.tool

After you're done installing VirtualBox, if using Windows, launch VirtualBox by going to the **Start Menu**, then selecting the **Oracle VM VirtualBox folder -> Oracle VM VirtualBox** or by double-clicking its new icon on the desktop.

If using Mac, you'll want to click on **Finder -> Applications -> VirtualBox**.

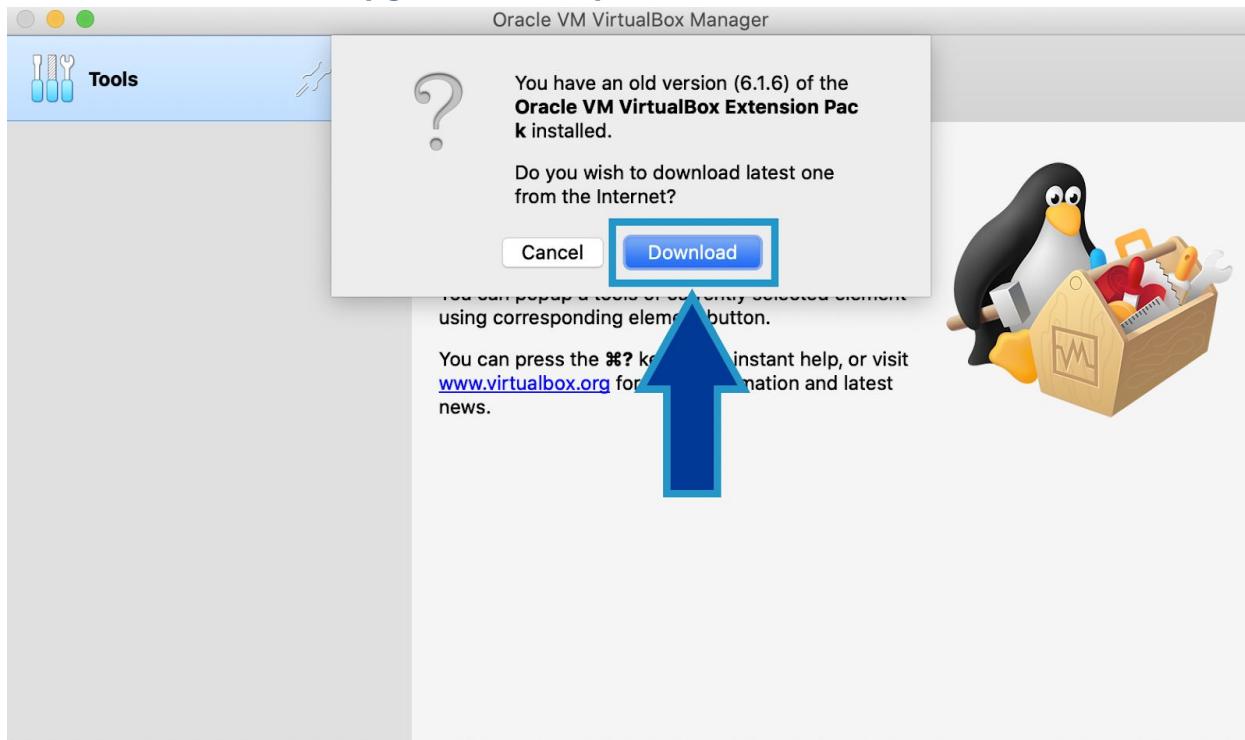




A new window that looks similar to the one below will launch. You will be able to start and stop virtual machines in this window. We may refer to this as the **VirtualBox Manager window** within the curriculum.



If prompted to update your Oracle VM Extensions Pack, simply select: **Download** -> **Download** -> **Install** -> **Upgrade** -> **Accept** the EULA -> **Delete**



Vagrant

Download and install **Vagrant** from here:

<https://www.vagrantup.com/downloads.html>

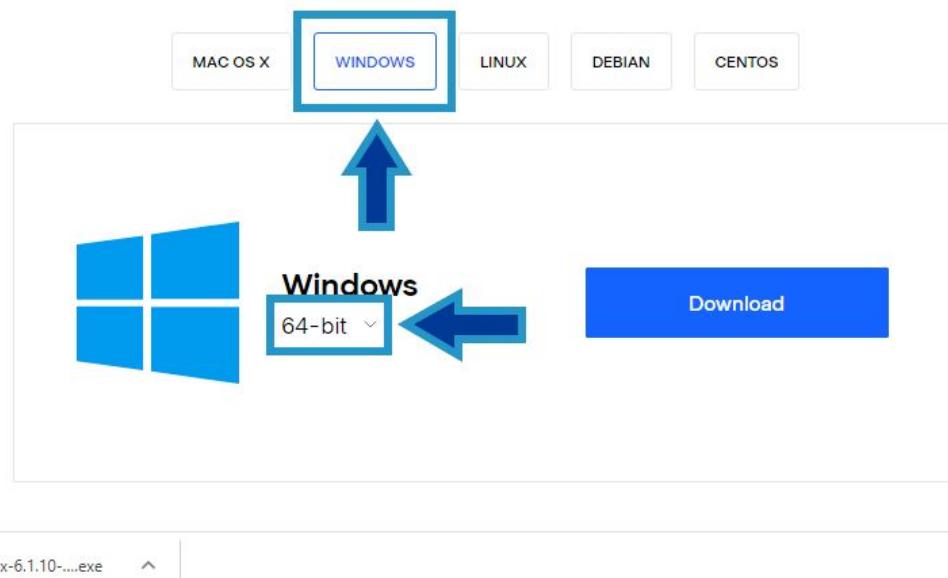
- Select the appropriate installer for your operating system.

Download Vagrant

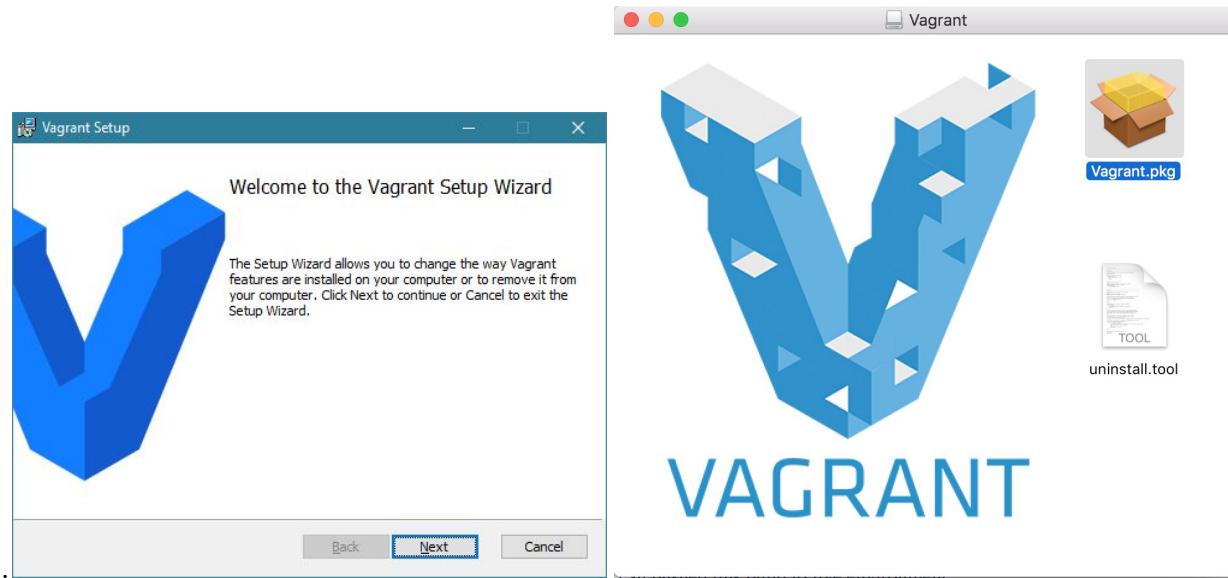
These are the available downloads for the latest version of Vagrant (2.2.9). Please download the proper package for your operating system and architecture.

» Download VMWare Utility

Continue learning with step by step tutorials at [HashiCorp Learn](#).



The Vagrant installer should save to your **Downloads** folder as well. Double-click the installer to launch it like you did with the VirtualBox installer. You can select **Next** for the prompts, unless you want to install Vagrant to a different directory. Then, finally select **Install** at the end.



You will be using Vagrant via the command line and therefore will not need to worry about launching it manually from your Start Menu / Launchpad.

Downloading the Virtual Machine

Note: Your instructor will demonstrate this during Week 2, Day 3. If you run into any issues, please use office hours after that class to ensure that you are properly set up.

Your instructor sent over two files to you, both of which you will need to download in order to set up your virtual machine:

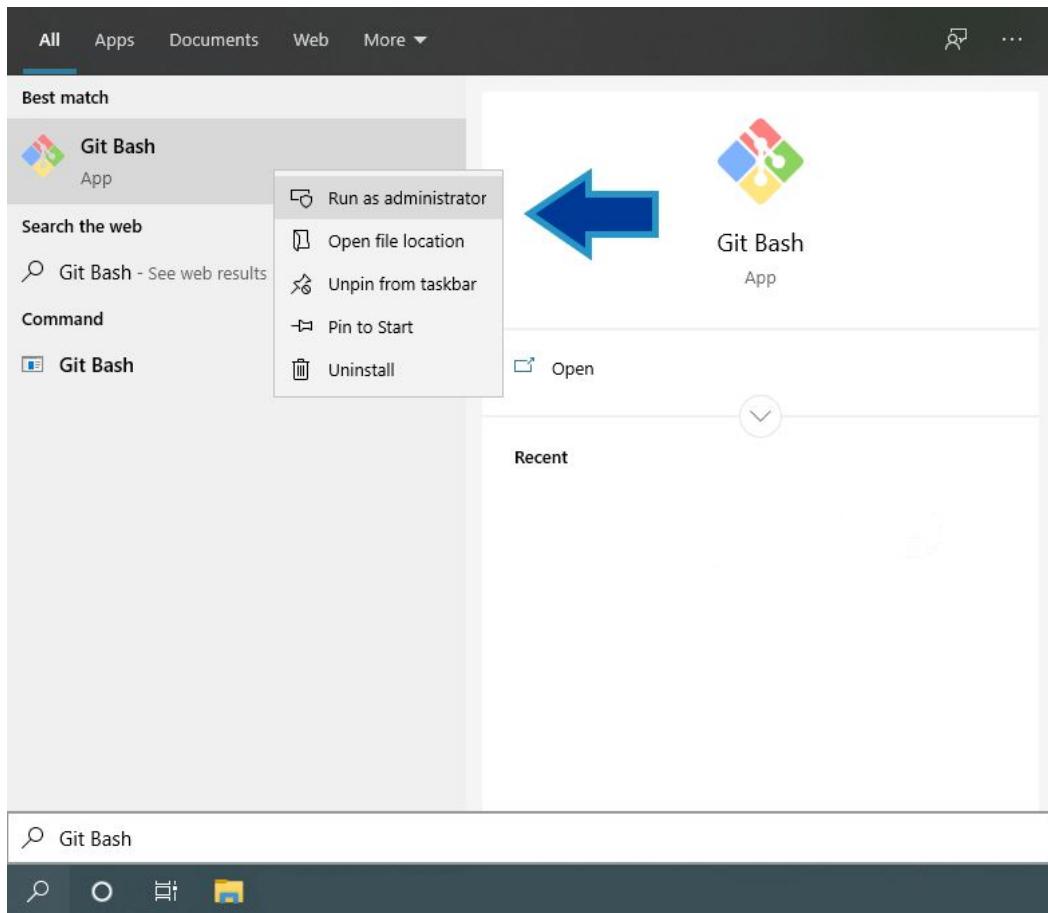
- **vagrant-linux.sh** is a script that, when run with certain arguments such as **--create**, will set up the Cybersecurity Bootcamp directories and virtual machines.
- **Vagrantfile** contains the virtual machine specifications for Vagrant. Vagrant will use this file when managing VirtualBox virtual machines.

Make sure that you save both of these files somewhere you will remember, such as the **Downloads** folder. Both of these files need to be in the same folder for the upcoming steps.

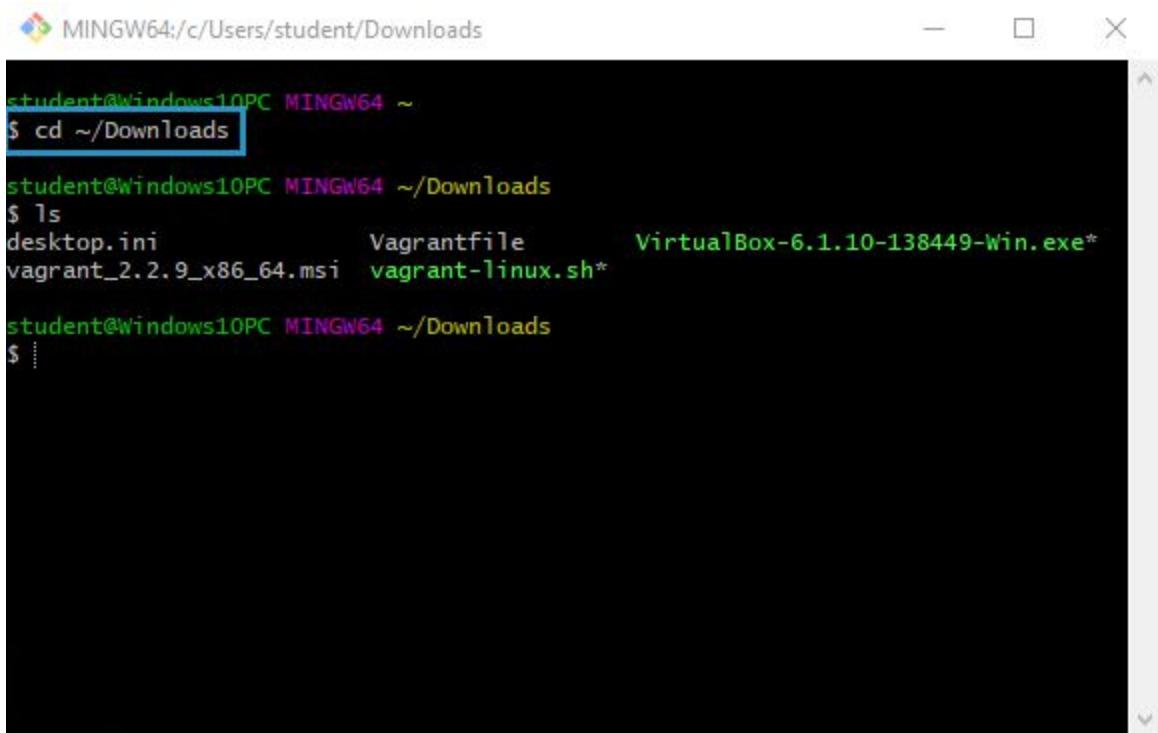
Open **Git Bash** (Windows) or **Terminal** (Mac). If you're unsure how to, please check the earlier **Downloading & Running the Machine** section.

Note: Windows users should make sure they open Git Bash as an administrator. This usually happens by default, actually, but to be sure:

- Search for **Git Bash** in the Windows search bar (bottom-left)
- Right-click **Git Bash**, then click **Run as administrator**

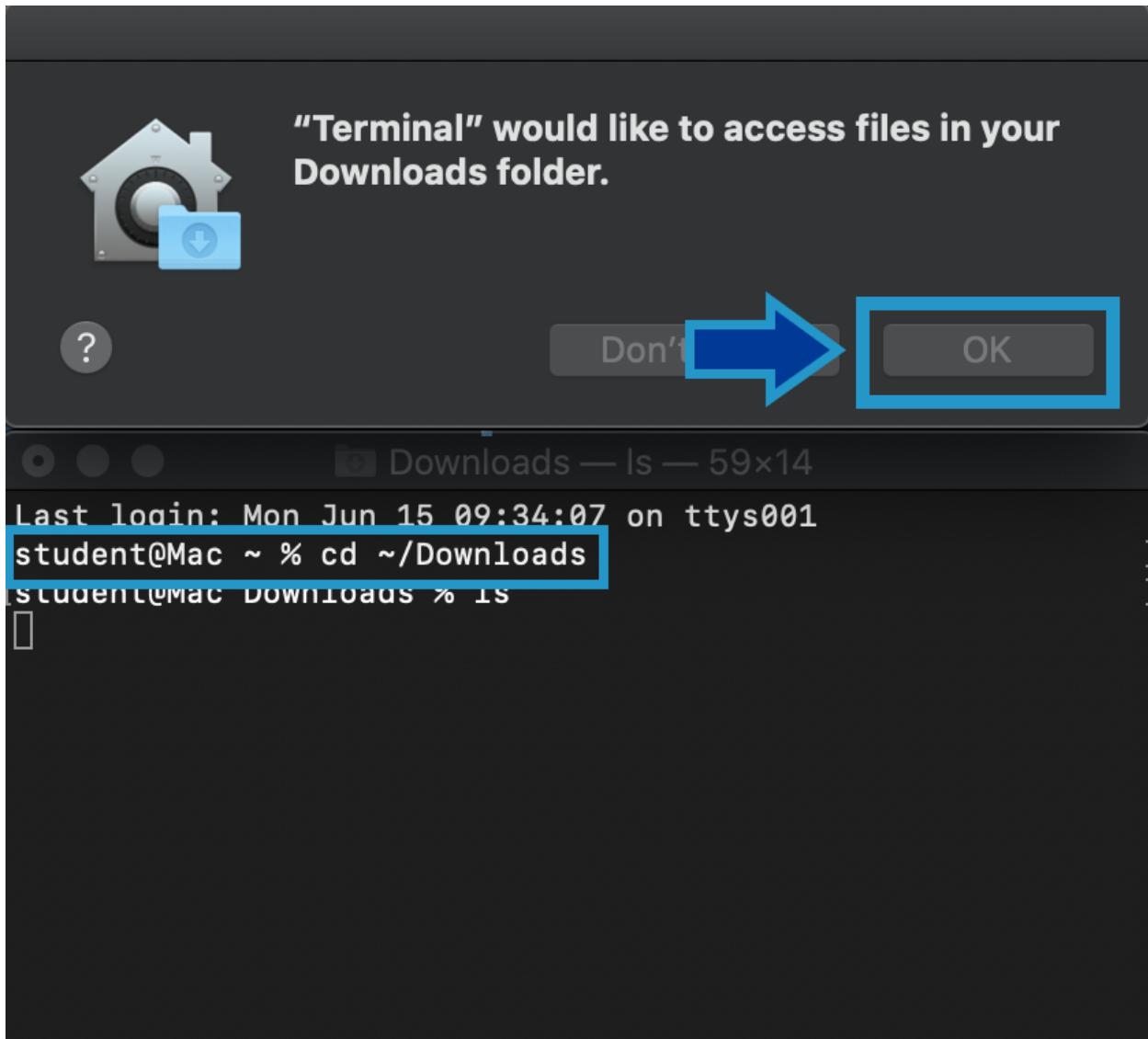


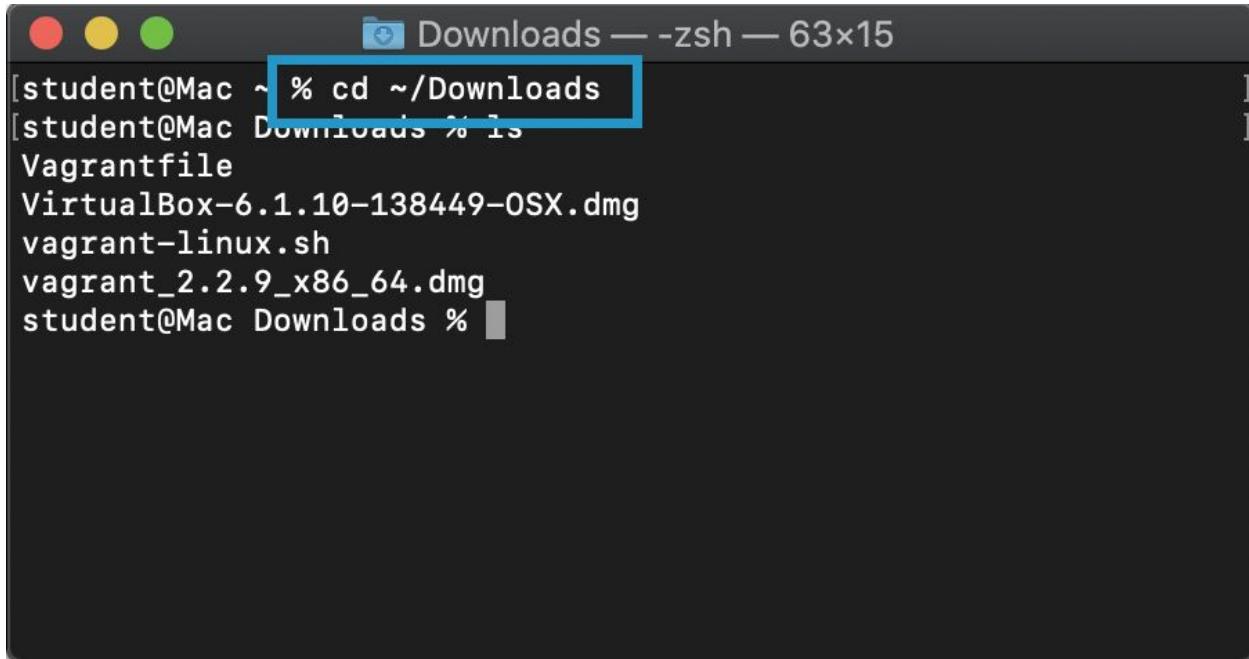
First, move to the directory where you downloaded the script and Vagrantfile. Type: **cd ~/Downloads** and press enter. You can verify the contents of this directory by typing: **ls**. Mac users, if prompted with: **“Terminal” would like to access files in your Downloads folder**, hit **“OK”** on the prompt..



A screenshot of a terminal window titled "MINGW64:/c/Users/student/Downloads". The window shows the following command-line session:

```
student@Windows10PC MINGW64 ~
$ cd ~/Downloads
student@Windows10PC MINGW64 ~/Downloads
$ ls
desktop.ini          Vagrantfile      VirtualBox-6.1.10-138449-Win.exe*
vagrant_2.2.9_x86_64.msi  vagrant-linux.sh*
student@Windows10PC MINGW64 ~/Downloads
$
```

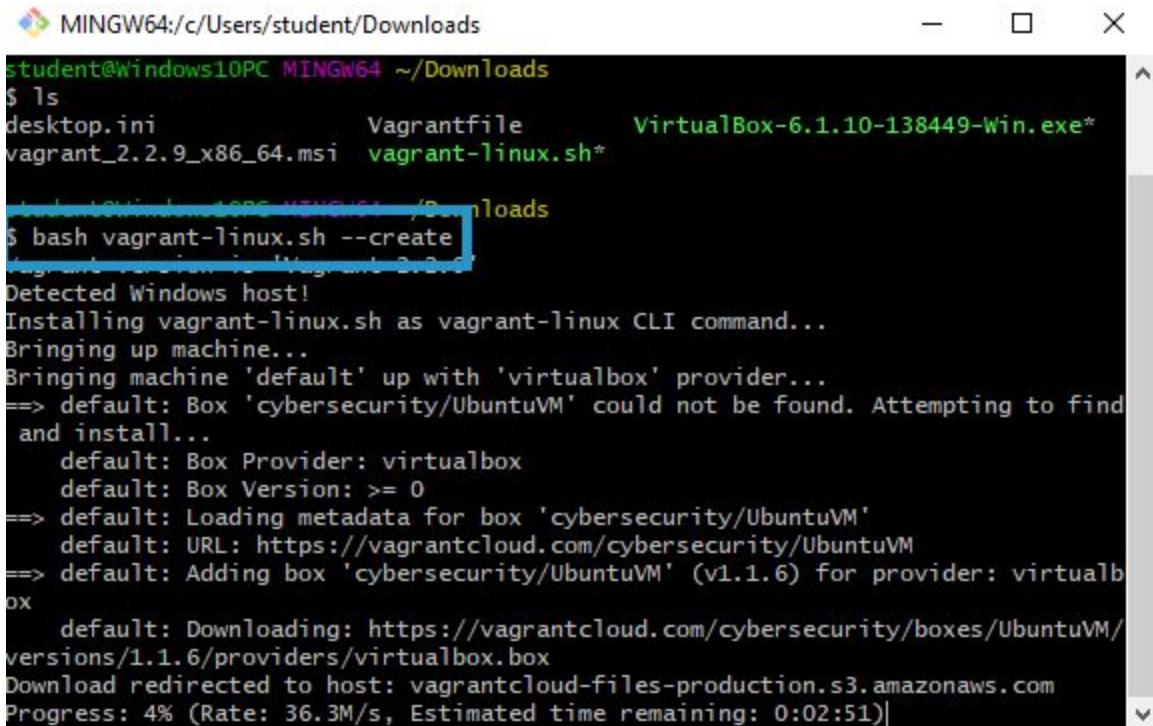




```
[student@Mac ~ % cd ~/Downloads
[student@Mac Downloads % ls
Vagrantfile
VirtualBox-6.1.10-138449-OSX.dmg
vagrant-linux.sh
vagrant_2.2.9_x86_64.dmg
student@Mac Downloads %
```

If you are using **Windows**, type in and enter the following:

```
bash vagrant-linux.sh --create
```



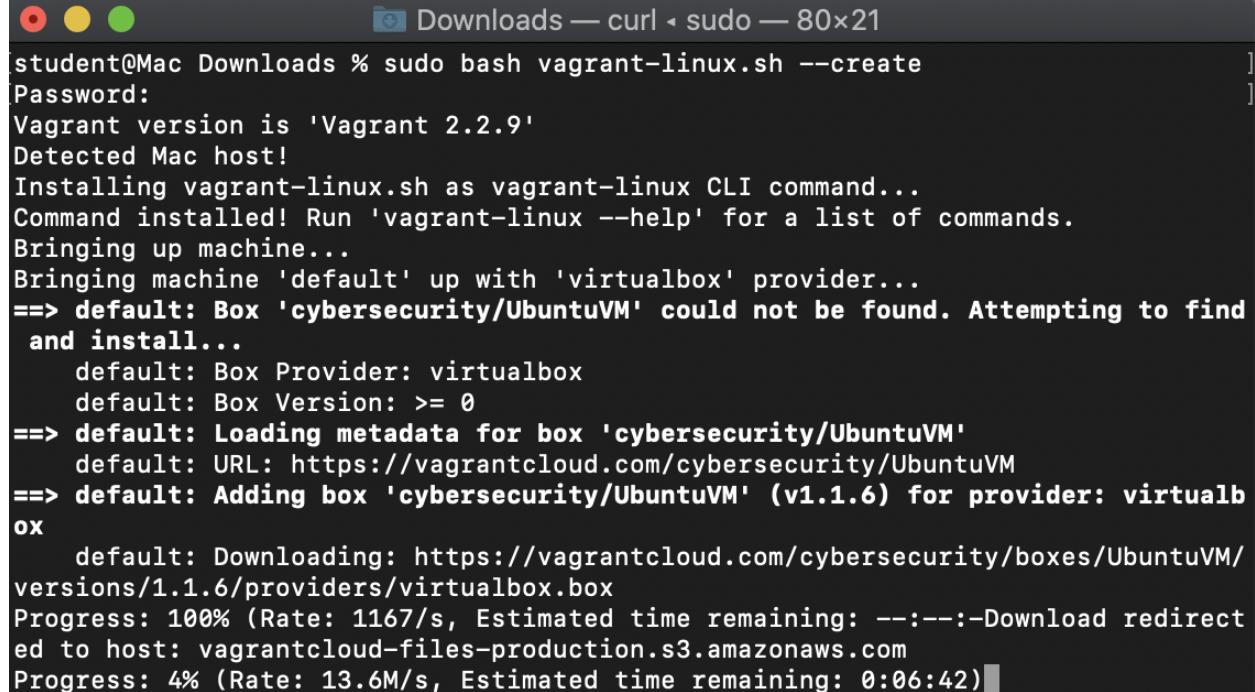
```
MINGW64:/c/Users/student/Downloads
student@Windows10PC MINGW64 ~/Downloads
$ ls
desktop.ini          Vagrantfile      VirtualBox-6.1.10-138449-Win.exe*
vagrant_2.2.9_x86_64.msi  vagrant-linux.sh*

student@Windows10PC MINGW64 ~/Downloads
$ bash vagrant-linux.sh --create
[student@student-OptiPlex-5090: ~/Downloads]
Detected Windows host!
Installing vagrant-linux.sh as vagrant-linux CLI command...
Bringing up machine...
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Box 'cybersecurity/UbuntuVM' could not be found. Attempting to find
and install...
    default: Box Provider: virtualbox
    default: Box Version: >= 0
==> default: Loading metadata for box 'cybersecurity/UbuntuVM'
    default: URL: https://vagrantcloud.com/cybersecurity/UbuntuVM
==> default: Adding box 'cybersecurity/UbuntuVM' (v1.1.6) for provider: virtualbox
    default: Downloading: https://vagrantcloud.com/cybersecurity/boxes/UbuntuVM/
versions/1.1.6/providers/virtualbox.box
Download redirected to host: vagrantcloud-files-production.s3.amazonaws.com
Progress: 4% (Rate: 36.3M/s, Estimated time remaining: 0:02:51)
```

If you are using **Mac**, type in and enter the following:

```
sudo bash vagrant-linux.sh --create
```

Mac users may need to approve a prompt to allow Terminal to access the Documents folder.



```
student@Mac Downloads % sudo bash vagrant-linux.sh --create
Password:
Vagrant version is 'Vagrant 2.2.9'
Detected Mac host!
Installing vagrant-linux.sh as vagrant-linux CLI command...
Command installed! Run 'vagrant-linux --help' for a list of commands.
Bringing up machine...
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Box 'cybersecurity/UbuntuVM' could not be found. Attempting to find and install...
    default: Box Provider: virtualbox
    default: Box Version: >= 0
==> default: Loading metadata for box 'cybersecurity/UbuntuVM'
    default: URL: https://vagrantcloud.com/cybersecurity/UbuntuVM
==> default: Adding box 'cybersecurity/UbuntuVM' (v1.1.6) for provider: virtualbox
    default: Downloading: https://vagrantcloud.com/cybersecurity/boxes/UbuntuVM/versions/1.1.6/providers/virtualbox.box
Progress: 100% (Rate: 1167/s, Estimated time remaining: --:--:--Download redirected to host: vagrantcloud-files-production.s3.amazonaws.com
Progress: 4% (Rate: 13.6M/s, Estimated time remaining: 0:06:42)
```

```

default: 22 (guest) => 2222 (host) (adapter 1)
==> default: Booting VM...
==> default: Waiting for machine to boot. This may take a few minutes...
default: SSH address: 127.0.0.1:2222
default: SSH username: vagrant
default: SSH auth method: private key
==> default: Machine booted and ready!
==> default: Checking for guest additions in VM...
==> default: Mounting shared folders...
default: /vagrant => /Users/student/Documents/Cybersecurity-Bootcamp/Linux-Module
==> default: Machine already provisioned. Run `vagrant provision` or use the `--provision` flag to force provisioning. Provisioners marked to run always will still run.
Current machine states:

default           running (virtualbox)

The VM is running. To stop this VM, you can run `vagrant halt` to
shut it down forcefully, or you can run `vagrant suspend` to simply
suspend the virtual machine. In either case, to restart it again,
simply run `vagrant up`.
Next, open up Virtual Box to see this VM running there, as well.
On Windows, press the Windows Key; type 'VirtualBox'; and hit ENTER.
On Mac, press Cmd + Space; type 'VirtualBox' and hit ENTER.
And that's it - enjoy!
You'll be able to find your bootcamp's Vagrantfile in:
/Users/student/Documents/Cybersecurity-Bootcamp/Linux-Module

```

student@Mac Downloads %

Oracle VM VirtualBox Manager

Tools

New **Settings** **Discard** **Show**

Linux-Module_def... Running

General

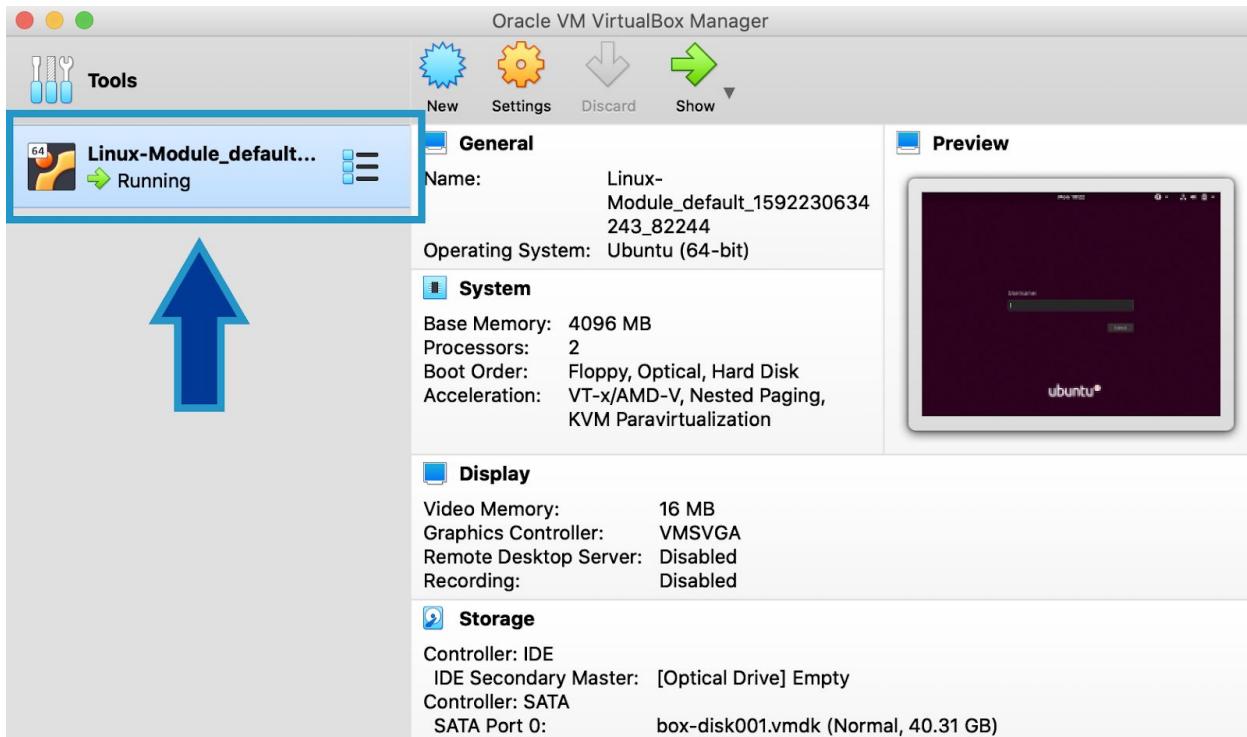
Name: Linux-Module_default_1592
230634243_82244
Operating System: Ubuntu (64-bit)

System

Base Memory: 4096 MB
Processors: 2
Boot Order: Floppy, Optical, Hard Disk
Acceleration: VT-x/AMD-V, Nested Paging, KVM Paravirtualization

Preview

This will download and start the virtual machine we will be using henceforth. It will automatically appear in the VirtualBox Manager after it is downloaded and started. Note that it could take an extended amount of time to download the virtual machine (around 5 GB in size, which could take 30 minutes or more) depending on the speed of your internet connection.



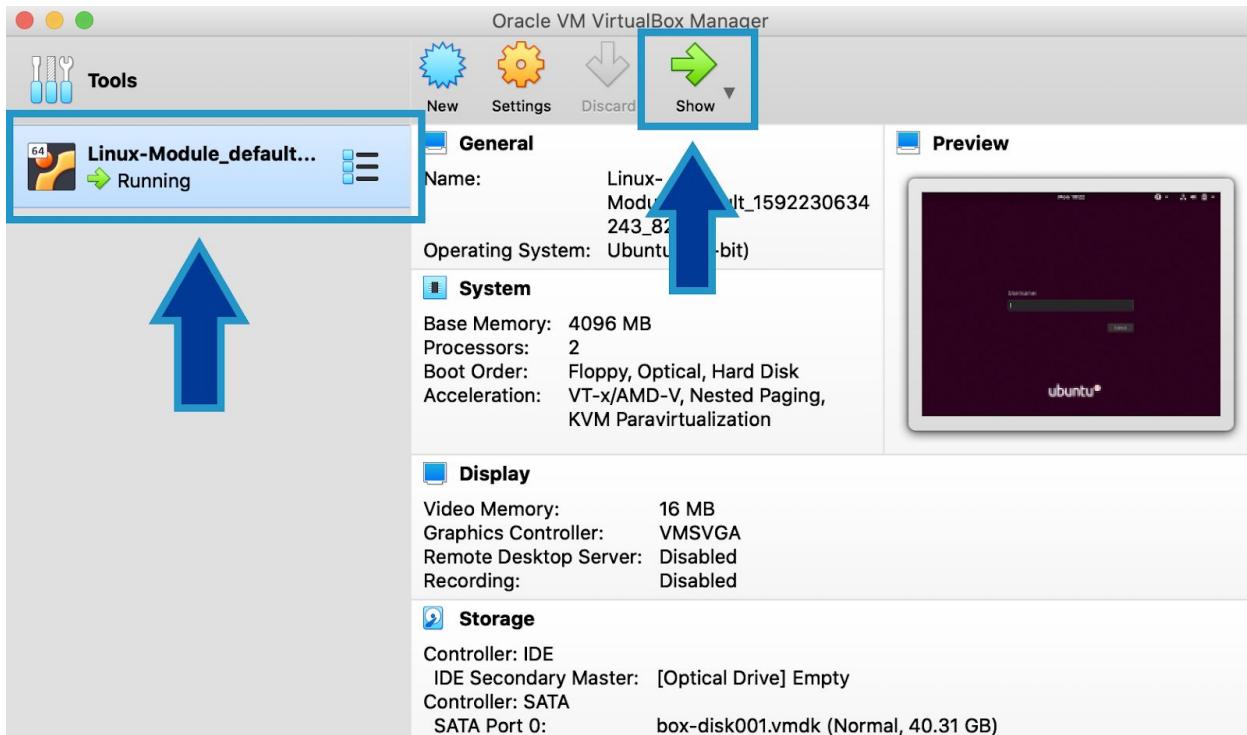
Accessing Your Virtual Machine

Note: You must have your machine downloaded in order to access it. Your instructor will demonstrate this during Week 2, Day 3, and once it has been downloaded, you can follow the steps below to access the virtual machine.

You will learn how to access your virtual machine via the command line in the upcoming units.

For now, open the VirtualBox Manager. You will see the machine you downloaded in the left hand pane.

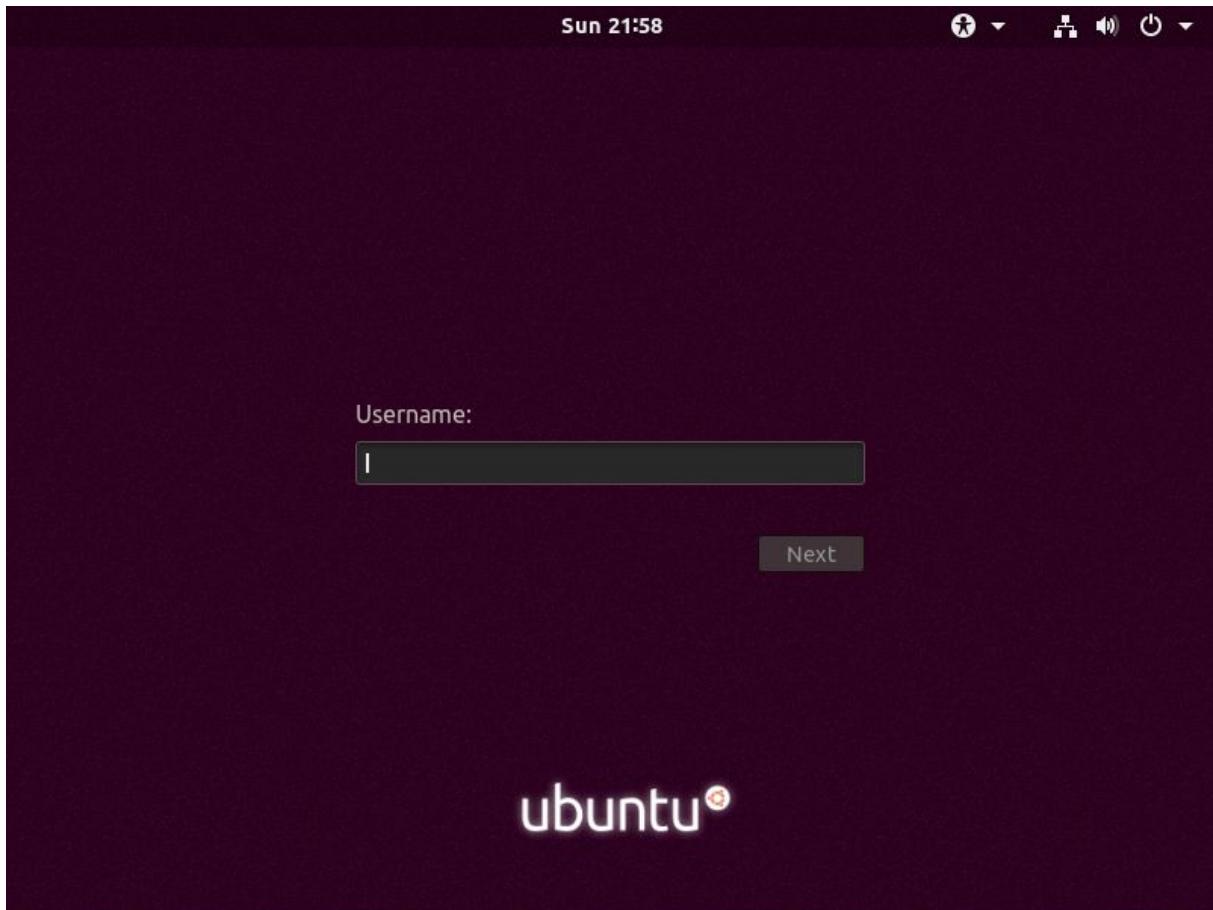
- Click the Linux virtual machine
- Then, click the **Start** icon in the top menu.
- Allow a minute or two for the machine to come up.



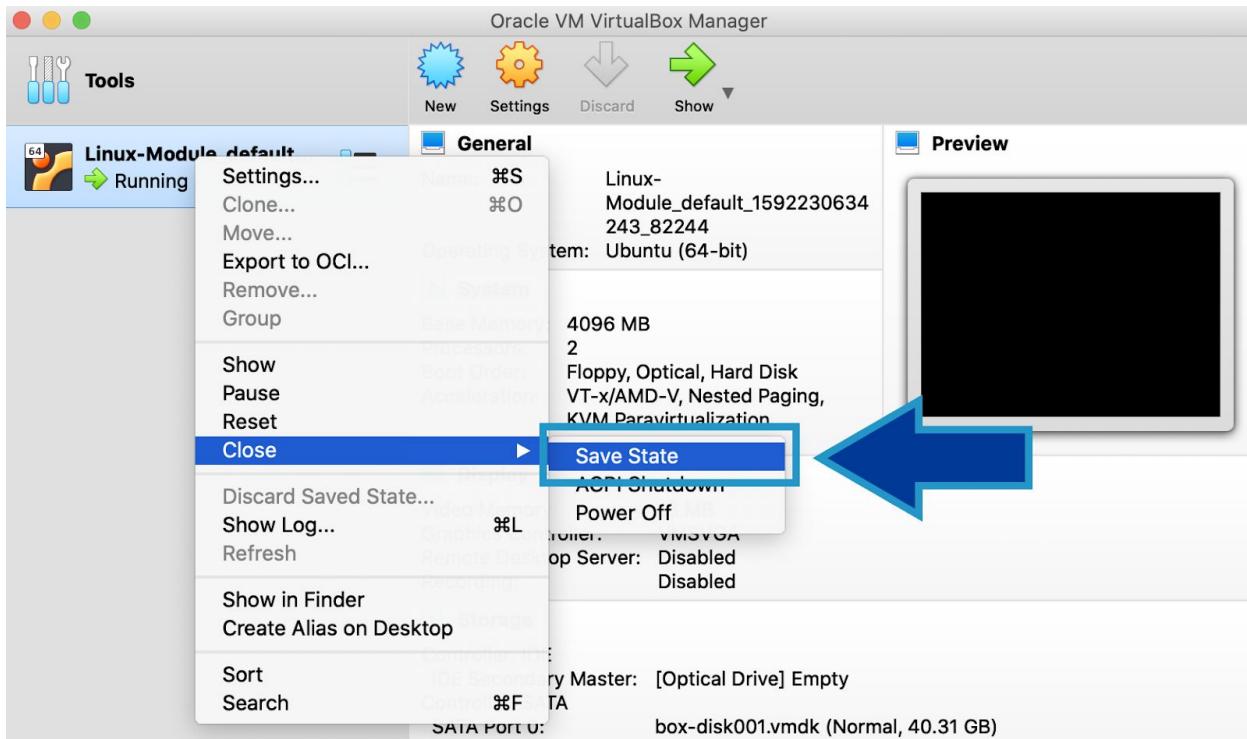
You should see the Cybersecurity Bootcamp **Linux-Module*** virtual machine (**note:** the virtual machine matches the directory name it was installed under).

Enter in the log-in credentials, when prompted:

- Username: **sysadmin**
- Password: **cybersecurity**



When you are done using the machine, you can close the window through the GUI (graphical user interface). Right-click and pick **Close**, and then select the first option, **Save State**.



What Exactly Does Vagrant Do?

Vagrant is a tool that allows teams to easily create reproducible, configurable, and portable work virtual environments with VirtualBox or other virtualization technologies, such as Hyper-V and Docker.

You will be using Vagrant in conjunction with VirtualBox extensively throughout the bootcamp, so it is important to know how to use common Vagrant commands to keep your bootcamp lab environments updated, stable, and secure (or in some cases, intentionally unsecure).

We are constantly optimizing and refining the virtual machines that you are using, and with Vagrant, we allow you, the student, to get the latest changes we have made to the virtual machine in a fast, efficient way that doesn't involve you having to reconfigure a new virtual machine. Instead, Vagrant will handle getting the latest virtual machine builds for you and making sure your virtual machines are up-to-date.

We will cover what commands to run for to make sure your machines are up to date as well as other general Vagrant commands in the next section.

If you are on a Mac computer, you will be using **Terminal**. Windows users will be using **Git Bash**.

If you are unfamiliar with these terms or the command line, do not worry! You will get familiar with them over the course of the bootcamp.

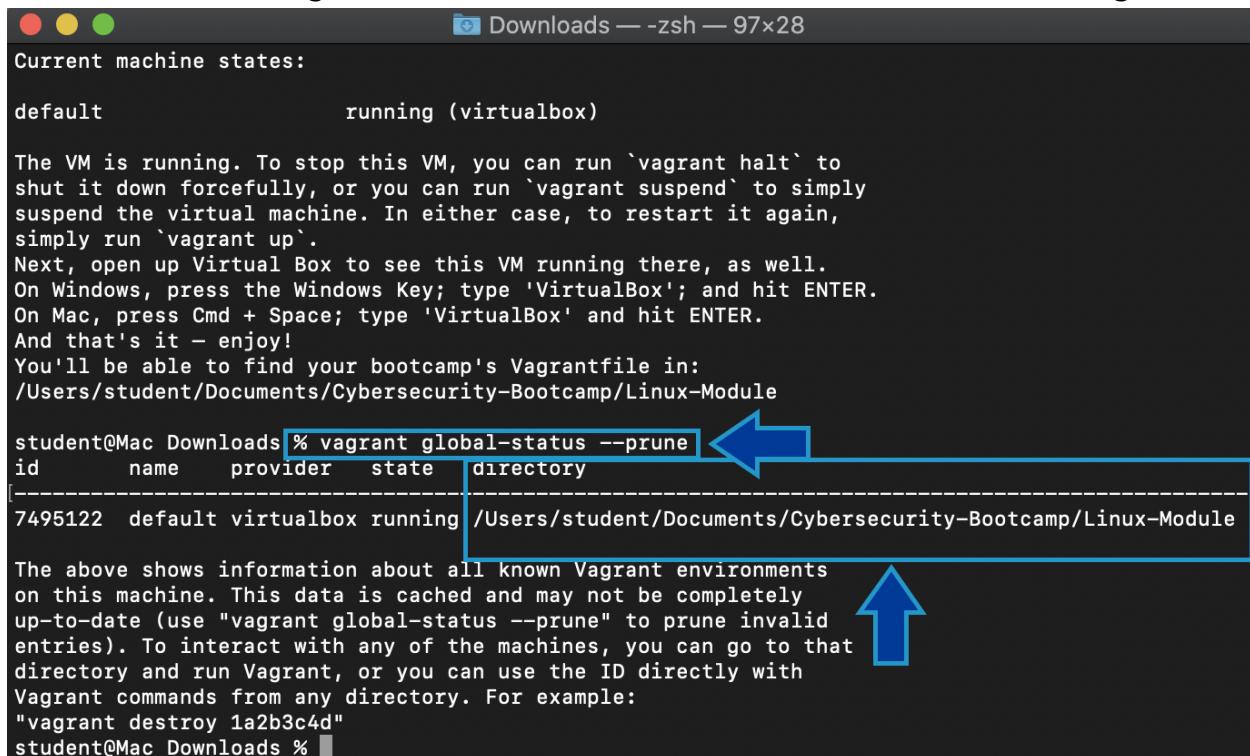
The Cybersecurity Bootcamp's Default Virtual Machine Directories

Unless your instructor directed you to set up Vagrant in another way, and depending on how far you are in the curriculum, your lab's Vagrantfiles can be found in the following directories in your computer :

- **\$HOME/Documents/Cybersecurity-Bootcamp/Linux-Module** which contains your ongoing Linux Ubuntu virtual machine that you will use for several weeks in the program
- **\$HOME/Documents/LabEnvironments/linux-scavenger** which contains a specific smaller virtual machine that you will use only for the Unit 6.3 activity.
- **Note:** After you complete the Unit 6 HW, you will have an additional Vagrantfile. You will download this during the Unit 6 HW.

If you are unsure of where your Vagrantfiles are, you can run the following command in Terminal or Git Bash

- Run **vagrant global-status --prune** to see a listing of all known installation directories. Vagrant will also check to see which machines are running.



```
Downloads — -zsh — 97x28
Current machine states:
default          running (virtualbox)

The VM is running. To stop this VM, you can run `vagrant halt` to
shut it down forcefully, or you can run `vagrant suspend` to simply
suspend the virtual machine. In either case, to restart it again,
simply run `vagrant up`.

Next, open up Virtual Box to see this VM running there, as well.
On Windows, press the Windows Key; type 'VirtualBox'; and hit ENTER.
On Mac, press Cmd + Space; type 'VirtualBox' and hit ENTER.
And that's it - enjoy!

You'll be able to find your bootcamp's Vagrantfile in:
/Users/student/Documents/Cybersecurity-Bootcamp/Linux-Module

student@Mac Downloads % vagrant global-status --prune
id      name    provider   state   directory
[----]
7495122 default  virtualbox running /Users/student/Documents/Cybersecurity-Bootcamp/Linux-Module

The above shows information about all known Vagrant environments
on this machine. This data is cached and may not be completely
up-to-date (use "vagrant global-status --prune" to prune invalid
entries). To interact with any of the machines, you can go to that
directory and run Vagrant, or you can use the ID directly with
Vagrant commands from any directory. For example:
"vagrant destroy 1a2b3c4d"
student@Mac Downloads %
```

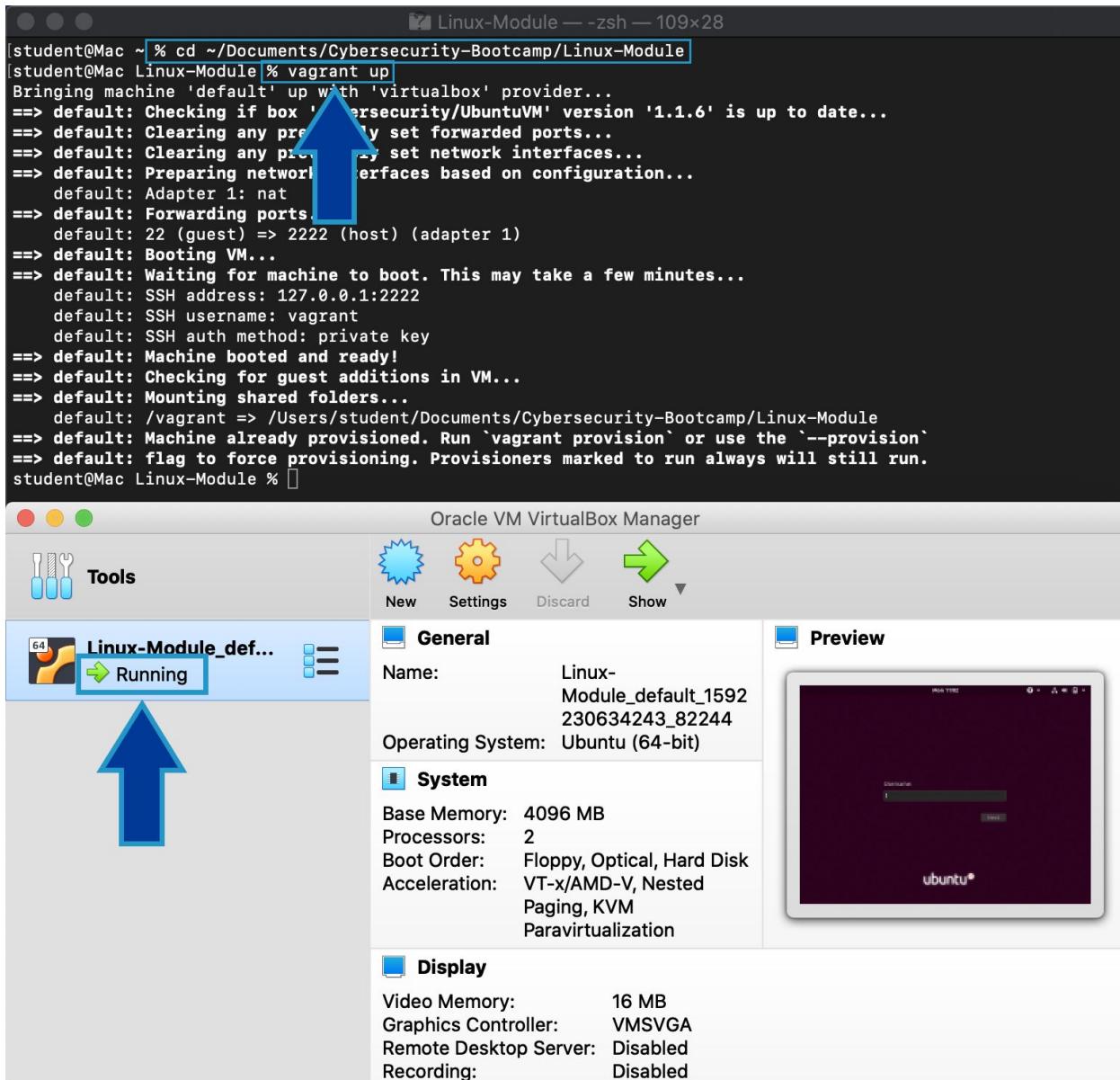
Commands for Starting, Stopping, and Updating Your Virtual Machines

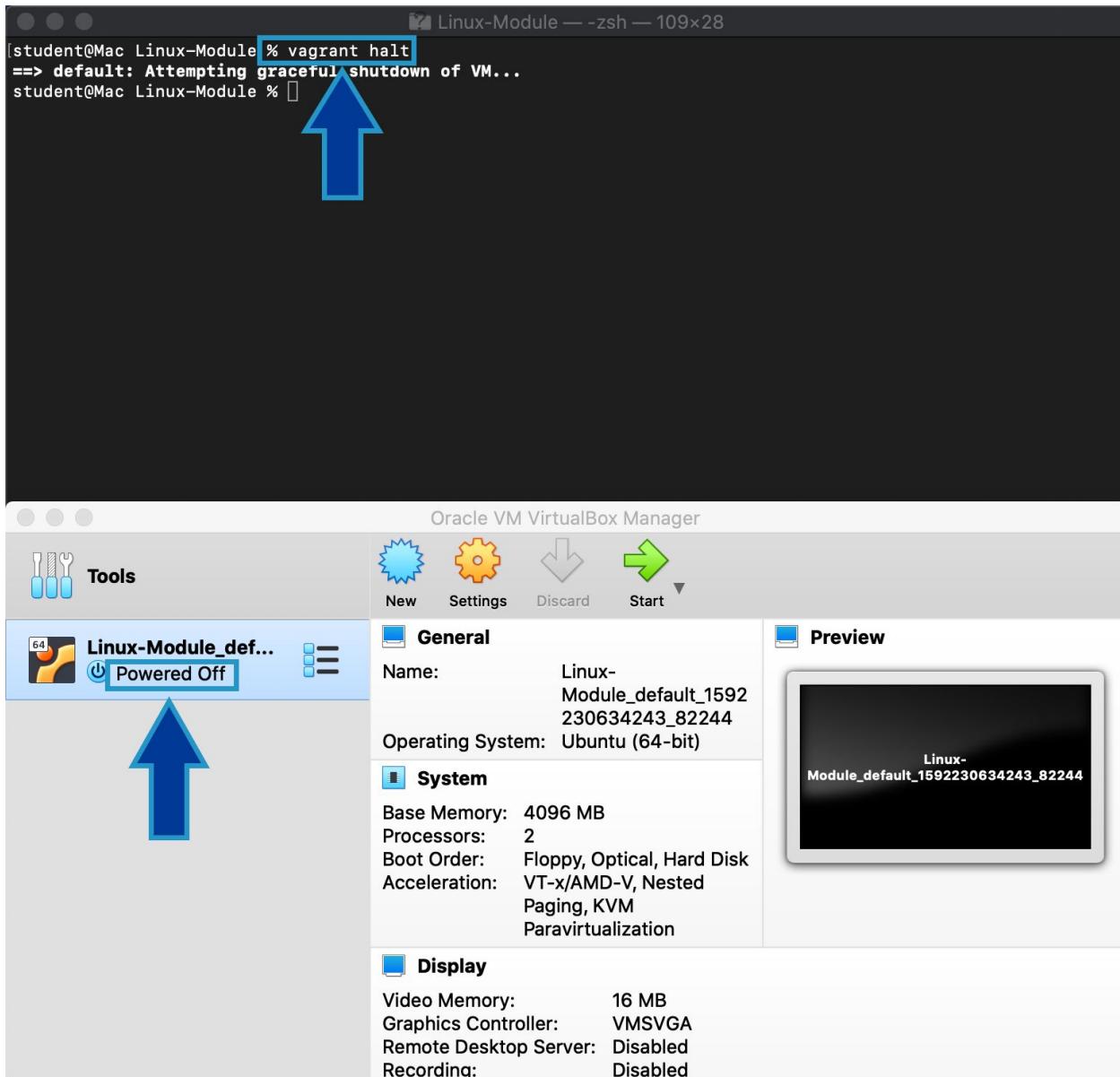
When using Vagrant commands, please make sure that you are running these commands within the directory where you have your Vagrantfile.

Starting and Shutting Down Your Vagrant Machines via Command Line

You already know how to access your virtual machine by opening up the VirtualBox Manager. You can *also* start your virtual machine via the command line. Open up Git Bash (Windows users) or Terminal (Mac users), navigate to the appropriate virtual machine directory (**cd ~/Documents/Cybersecurity-Bootcamp/Linux-Module**), and use the corresponding Vagrant commands to start or stop your virtual machine:

- Run **vagrant up** to open your virtual machine
- Run **vagrant halt** to shut down your virtual machine





Updating Your Vagrant Machines

Run the following three commands to ensure your Vagrant machines are updated.

- Run **vagrant box update** to get the most recently updated virtual machine. This might take several minutes or longer, depending on your internet connection. Once this is complete, run the below command.
- Run **vagrant destroy** within the directories that your Vagrantfiles are installed to ensure that the virtual machines are stopped and all associated files are removed.
 - After pressing enter, you will be prompted with "**Are you sure you want to destroy the 'default' VM? [y/N]**", which you will then need to

type “**y**” (to respond with “yes”) and then press enter again to finish removing the virtual machine.

- Run **vagrant up** to install and launch the newer version.
- Optionally, run **vagrant box prune** afterwards to delete all old, unused versions of the virtual machine.

```
$ vagrant box update
==> default: Checking for updates to 'cybersecurity/UbuntuVM'
    default: Latest installed version: 1.1.1
    default: Version constraints:
    default: Provider: virtualbox
==> default: Updating 'cybersecurity/UbuntuVM' with provider 'virtualbox' from
version
==> default: '1.1.1' to '1.1.5'...
==> default: Loading metadata for box
'https://vagrantcloud.com/cybersecurity/UbuntuVM?access_token=QzFrkLuXSrDBgA.at
lasv1.22jkxzzRPPhfg1jmWDfaTmr5KFywkVXT7sKowBPFGkbAVyQIuQDiKsgUZHdmeNDzBbQ'
==> default: Adding box 'cybersecurity/UbuntuVM' (v1.1.5) for provider:
virtualbox
    default: Downloading:
https://vagrantcloud.com/cybersecurity/boxes/UbuntuVM/versions/1.1.5/providers/
virtualbox.box
    default: Download redirected to host:
vagrantcloud-files-production.s3.amazonaws.com
    default:
==> default: Successfully added box 'cybersecurity/UbuntuVM' (v1.1.5) for
'vertualbox'!
```



```
$ vagrant destroy
    default: Are you sure you want to destroy the 'default' VM? [y/N] y
==> default: Destroying VM and associated drives...

$ vagrant up
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Importing base box 'cybersecurity/UbuntuVM'...
==> default: Matching MAC address for NAT networking...
==> default: Checking if box 'cybersecurity/UbuntuVM' version '1.1.5' is up to
date...
==> default: Setting the name of the VM:
Linux-Module default 1591583707084 72637
==> default: Clearing any previously set network interfaces...
==> default: Preparing network interfaces based on configuration...
    default: Adapter 1: nat
==> default: Forwarding ports...
    default: 22 (guest) => 2222 (host) (adapter 1)
==> default: Booting VM...
==> default: Waiting for machine to boot. This may take a few minutes...
    default: SSH address: 127.0.0.1:2222
    default: SSH username: vagrant
```

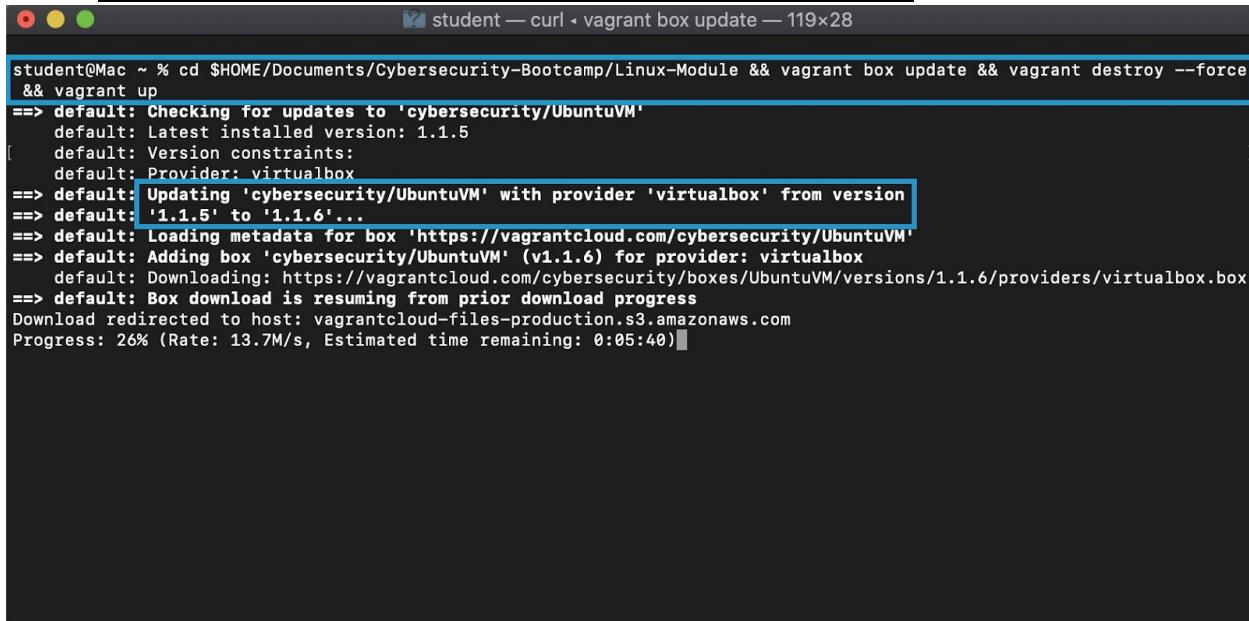
```
    default: SSH auth method: private key
==> default: Machine booted and ready!
[default] GuestAdditions 6.1.6 running --- OK.
==> default: Checking for guest additions in VM...
==> default: Mounting shared folders...
    default: /vagrant =>
```

An Alternative All-in-one-command to Update Your Vagrant Commands

Instead of running the above three commands, you can instead just run the one below command to get the latest build.

- The following command can be run to update:

```
cd $HOME/Documents/Cybersecurity-Bootcamp/Linux-Module && vagrant
box update && vagrant destroy --force && vagrant up
```



```
student@Mac ~ % cd $HOME/Documents/Cybersecurity-Bootcamp/Linux-Module && vagrant box update && vagrant destroy --force && vagrant up
==> default: Checking for updates to 'cybersecurity/UbuntuVM'
    default: Latest installed version: 1.1.5
    default: Version constraints:
    default: Provider: virtualbox
==> default: Updating 'cybersecurity/UbuntuVM' with provider 'virtualbox' from version
    default: '1.1.5' to '1.1.6'...
==> default: Loading metadata for box 'https://vagrantcloud.com/cybersecurity/UbuntuVM'
==> default: Adding box 'cybersecurity/UbuntuVM' (v1.1.6) for provider: virtualbox
    default: Downloading: https://vagrantcloud.com/cybersecurity/boxes/UbuntuVM/versions/1.1.6/providers/virtualbox.box
==> default: Box download is resuming from prior download progress
Download redirected to host: vagrantcloud-files-production.s3.amazonaws.com
Progress: 26% (Rate: 13.7M/s, Estimated time remaining: 0:05:40)
```

```
● ● ● Linux-Module — -zsh — 119x28
==> default: '1.1.5' to '1.1.6'...
==> default: Loading metadata for box 'https://vagrantcloud.com/cybersecurity/UbuntuVM'
==> default: Adding box 'cybersecurity/UbuntuVM' (v1.1.6) for provider: virtualbox
    default: Downloading: https://vagrantcloud.com/cybersecurity/boxes/UbuntuVM/versions/1.1.6/providers/virtualbox.box
==> default: Box download is resuming from prior download progress
Download redirected to host: vagrantcloud-files-production.s3.amazonaws.com
==> default: Successfully added box 'cybersecurity/UbuntuVM' (v1.1.6) for 'virtualbox'!
==> default: Destroying VM and associated drives...
Bringing machine 'default' up with 'virtualbox' provider...
==> default: Importing base box 'cybersecurity/UbuntuVM'...
==> default: Matching MAC address for NAT networking...
==> default: Checking if box 'cybersecurity/UbuntuVM' version '1.1.6' is up to date...
==> default: Setting the name of the VM: Linux-Module_default_1592237919872_26991
==> default: Clearing any previously set network interfaces...
==> default: Preparing network interfaces based on configuration...
    default: Adapter 1: nat
==> default: Forwarding ports...
    default: 22 (guest) => 2222 (host) (adapter 1)
==> default: Booting VM...
==> default: Waiting for machine to boot. This may take a few minutes...
    default: SSH address: 127.0.0.1:2222
    default: SSH username: vagrant
    default: SSH auth method: private key
==> default: Machine booted and ready!
==> default: Checking for guest additions in VM...
==> default: Mounting shared folders...
    default: /vagrant => /Users/student/Documents/Cybersecurity-Bootcamp/Linux-Module
student@Mac Linux-Module %
```

How Often Should I Update My Vagrant Virtual Machine?

You should check for updates at the end of each unit.

Use the following link to view the latest versions of the bootcamp's Ubuntu Vagrant machine, see when the version was uploaded, and check what specifically was updated:

- <https://app.vagrantup.com/cybersecurity/boxes/UbuntuVM>.



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cybersecurity / UbuntuVM Vagrant box

How to use this box with [Vagrant](#):

Vagrantfile New

```
Vagrant.configure("2") do |config|
  config.vm.box = "cybersecurity/UbuntuVM"
end
```

v1.1.6 currently released version

This version was created **2 days ago**

There isn't a description.

1 provider for this version.

virtualbox Hosted by Vagrant Cloud (5.27 GB)

Note: the version you see on the web page will likely be different than the one shown above.

If you would like to see the version of the Vagrant machine you currently have installed, you'll first need to ensure you know where they are installed. To do so, open up Git Bash or Terminal and run the following command:

- **vagrant global-status --prune**

```
$ vagrant global-status --prune
id      name      provider      state      directory
-----
-----
ddac92c  linux      virtualbox    poweroff
C:/Users/student/Documents/LabEnvironments/linux-scavenger
fb4deae  default    virtualbox    running
C:/Users/student/Documents/Cybersecurity-Bootcamp/Linux-Module
```

You should then see where your current Vagrant installations exist. Navigate to one of these directories (**~/Documents/Cybersecurity-Bootcamp/Linux-Module is the default Ubuntu virtual machine directory**) and then run the following command:

- **vagrant box outdated**

To see whether or not this machine is outdated. To update, refer to the instructions above in the **Updating Your Vagrant Machines** section.

You can then refer back to the Vagrant Cloud version to see if it is the most recent version: <https://app.vagrantup.com/cybersecurity/boxes/UbuntuVM>.

Note: While it is a best practice to have the latest Vagrant machine build, please note that when you update your machine, you will lose your progress as the box is getting replaced.

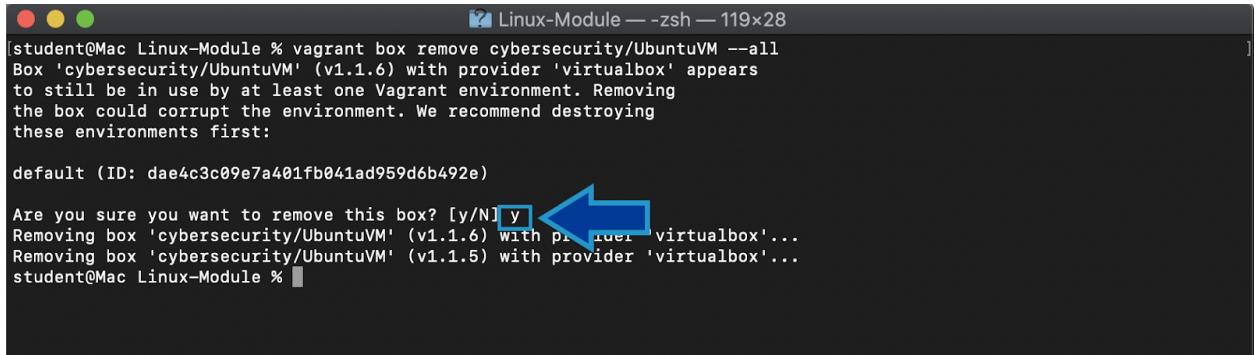
Because of this **we recommend that you update the machine at the end of each unit** as there are no dependencies from one week to the next that you must maintain in your virtual machines.

Troubleshooting

Unable to download the latest version of a Vagrant machine

If you are unable to download the bootcamp's Ubuntu Vagrant machine (which can be found at <https://app.vagrantup.com/cybersecurity/boxes/UbuntuVM>), please run the command:

- **vagrant box remove cybersecurity/UbuntuVM --all**
 - Note: this removes all versions of the Ubuntu virtual machine provided by the Cybersecurity Bootcamp.
 - You'll need to confirm the "**Are you sure you want to remove this box? [y/N]**" by entering "**y**".



```
[student@Mac Linux-Module % vagrant box remove cybersecurity/UbuntuVM --all
Box 'cybersecurity/UbuntuVM' (v1.1.6) with provider 'virtualbox' appears
to still be in use by at least one Vagrant environment. Removing
the box could corrupt the environment. We recommend destroying
these environments first:

default (ID: dae4c3c09e7a401fb041ad959d6b492e)

Are you sure you want to remove this box? [y/N] y
Removing box 'cybersecurity/UbuntuVM' (v1.1.6) with provider 'virtualbox'...
Removing box 'cybersecurity/UbuntuVM' (v1.1.5) with provider 'virtualbox'...
student@Mac Linux-Module % ]
```

Next again run:

- **vagrant destroy && vagrant up** within the directory containing your virtual machine (likely **\$HOME/Documents/Cybersecurity-Bootcamp/Linux-Module**)

If the above commands don't work, we'll want to "deep clean" your machine of all Vagrant configuration **.vagrant*** directories.

Within your virtual machine directory (**\$HOME/Documents/Cybersecurity-Bootcamp/Linux-Module**) and within your home directory (**\$HOME**), delete all **.vagrant** configuration subdirectories by doing the following:

- Navigate to the bootcamp's default virtual machine directory with
- **cd \$HOME/Documents/Cybersecurity-Bootcamp/Linux-Module**, then run
- **vagrant destroy** to remove the virtual machine, then
- **rm -r ./vagrant** to delete the Vagrant configuration subdirectory, then
- **cd \$HOME** to navigate to your home directory and
- **rm -r ./vagrant.d** to delete user-home Vagrant configuration directories.
- Go back to the bootcamp's virtual machine directory with
- **cd \$HOME/Documents/Cybersecurity-Bootcamp/Linux-Module** and then re-run
- **vagrant up** in the directory to grab the latest versions of the machine

As these steps are a little more involved, have your instructor or TA verify that these configuration directories exist with

- **ls -a \$HOME/Documents/Cybersecurity-Bootcamp/Linux-Module** and
- **ls -a \$HOME**

```
student@Mac ~ % cd $HOME/Documents/Cybersecurity-Bootcamp/Linux-Module
student@Mac Linux-Module % ls -a
.           ..          .vagrant   Vagrantfile
student@Mac Linux-Module % cd $HOME
student@Mac ~ % ls -a
.           ..          .vagrant.d  .viminfo  .zsh_history
.CFUserTextEncoding  .DS_Store  Applications  Desktop
.Trash             Documents  Downloads  Library  Movies  Pictures
                         Downloads  Library  Movies  Music  Public
                         VirtualBox VMs
student@Mac ~ %
```

If you see a '**playbook**' does not exist on the host - error

You might see **`playbook` does not exist on the host** error when running **vagrant up**.

This may be caused by an incorrectly included Vagrantfile that is embedded with the Vagrant box that is used to set up the virtual machine instance. This has been seen to be an issue with our older versions and was resolved for users by ensuring they're using the latest versions by running:

- **vagrant box remove cybersecurity/UbuntuVM --all** and then
- **vagrant destroy && vagrant up** again.

Permission issues after running **sudo vagrant up** (only for Mac users) with older **vagrant-linux.sh** script

If you had run an older version of the **vagrant-linux.sh** script, you may potentially have virtual machines installed under the **root** user on your machine. You can test this by running **sudo virtualbox** in your terminal to launch the root user's VirtualBox Manager. There should **NOT** be any virtual machines in this VirtualBox Manager window. Correctly installed virtual machines (non-root) should only show up when running **virtualbox** in the terminal **WITHOUT sudo**.

What is happening here, is that the **root** user may own your Vagrant configuration directories.

You can verify the permissions issues exist by running `ls -la $HOME`. If the owner of the `.vagrant.d` subdirectory is `root`, then you've likely been experiencing permission issues with using Vagrant commands without `sudo`.

Running `chown -R $USER: $HOME/.vagrant.d` may resolve your issues, but if it does not, you may have to do the “deep clean” process of removing all Vagrant boxes and Vagrant configuration directories.

You can also choose to continue using `sudo vagrant up` / `sudo virtualbox` for the rest of the bootcamp, but you may encounter issues with other Vagrant commands / your virtual machine.

If you want to “deep clean” permission issues caused by using `sudo vagrant up`:

- First, verify the permissions issues exist by running `ls -la $HOME`. If the owner of the `.vagrant.d` subdirectory is `root`, then you've likely been experiencing permission issues with using normal `vagrant up`.
- Next, use `vagrant global-status --prune` to check where vagrant directories exist on your machine. Then run `sudo vagrant destroy` in each of these directories to remove the virtual machines. If `vagrant global-status --prune` didn't work, just run `sudo vagrant destroy` in the default bootcamp directories listed earlier in this document.
- Next, within the same directories, you need to get rid of the `.vagrant` configuration files by running `sudo rm -rf .vagrant*`.
- Next, run `sudo rm -rf $HOME/.vagrant*` to get rid of the `root`-owned configuration directory in your user home directory.
- Lastly, re-run `vagrant up`, WITHOUT `sudo`, in each of the directories to grab the latest boxes.

If you're unsure of how to do these steps, please ask for assistance from your instructor.

Unable to copy and paste to and from the virtual machine

If you're unable to copy and paste from your virtual machine to your host, ensure that the **Shared Clipboard:Bidirectional** is set for your virtual machine by going to **Devices**, selecting **Shared Clipboard**, and then **Bidirectional**.

