Virtual Machine (VM) and Robotic Operating System (ROS) Setup

For Windows computers/OS

For ECE 417 Spring 2022 by Sarah Meyer-Waldo

Estimated Time:

Total download time: 2 hours

Total setup time: 1 hour

Total estimated time: 3 hours

What you need:

Download the VM VirtualBox Installer based on your current operating system from here: https://www.oracle.com/virtualization/technologies/vm/downloads/virtualbox-downloads.html

> Note: a virtual machine allows us to run a 'window' of a different computer operating system without changing the settings or OS on our own computer. Essentially, a mini computer on our base computer.

Download the Ubuntu Operating System desktop image file from here: https://releases.ubuntu.com/20.04/

> Note: Ubuntu is a 'flavor' of linux based OS. There are over 600 flavors, including CentOS, Fedora, and others. Linux refers to a family of open-source Unix-like OS based on the linux kernel (the lowest level of an OS, in control of hardware)

This Guide:

The download instructions for ROS on an ubuntu VM on a Windows base OS are made from a combination of the following two links:

1. http://wiki.ros.org/Installation/Ubuntu
2. https://varhowto.com/install-ros-noetic-ubuntu-20-04/

Helpful Links:

The ROS wiki page with instructions for different base OS:

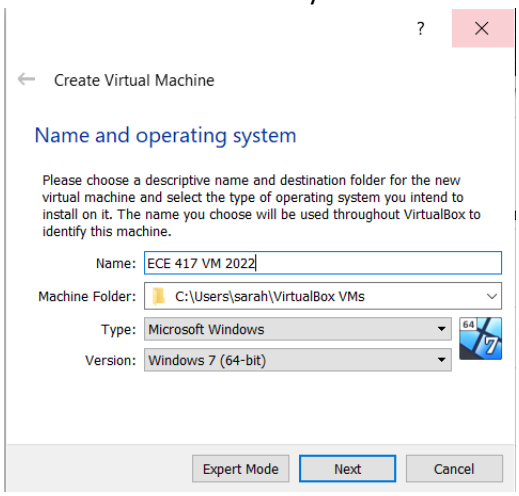
http://wiki.ros.org/ROS/Installation

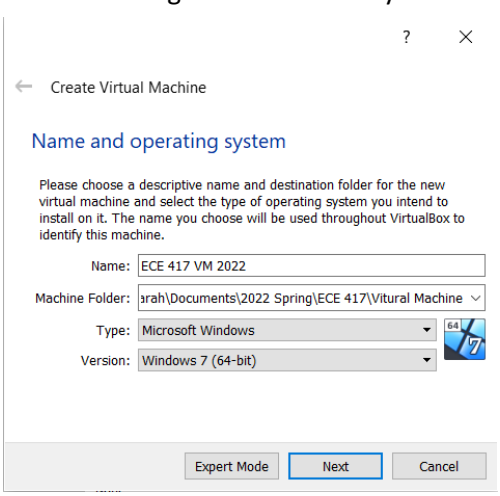
1. Begin the download of the Ubuntu iso file. This could take over an hour.
2. Download VirtualBox and launch installer, accept all default preferences

3. To setup a virtual machine from the VirtualBox Manager, click the green Add button

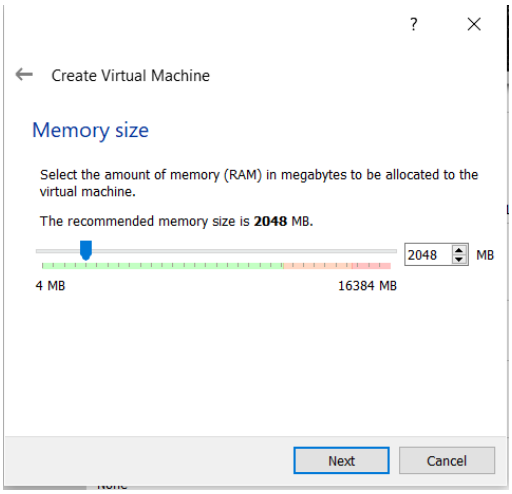
4. Create a virtual machine. The Type refers to the Operating System of your computer, most likely Windows

   The default location is in your user folder. Feel free to change the location to your class folder:

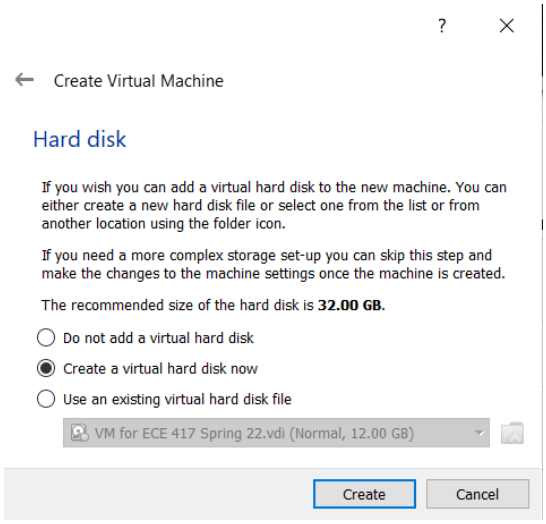




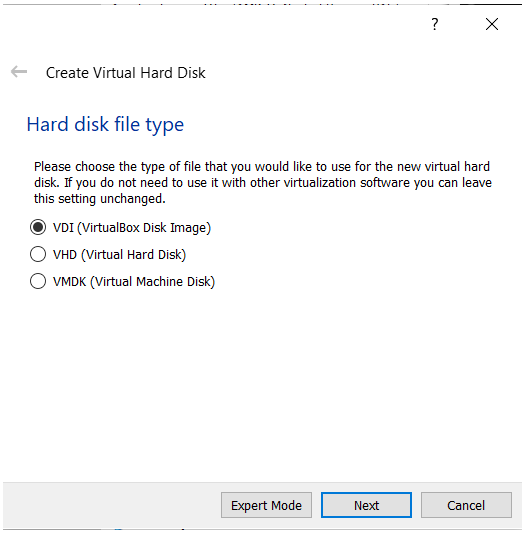
5. Memory size default is okay:



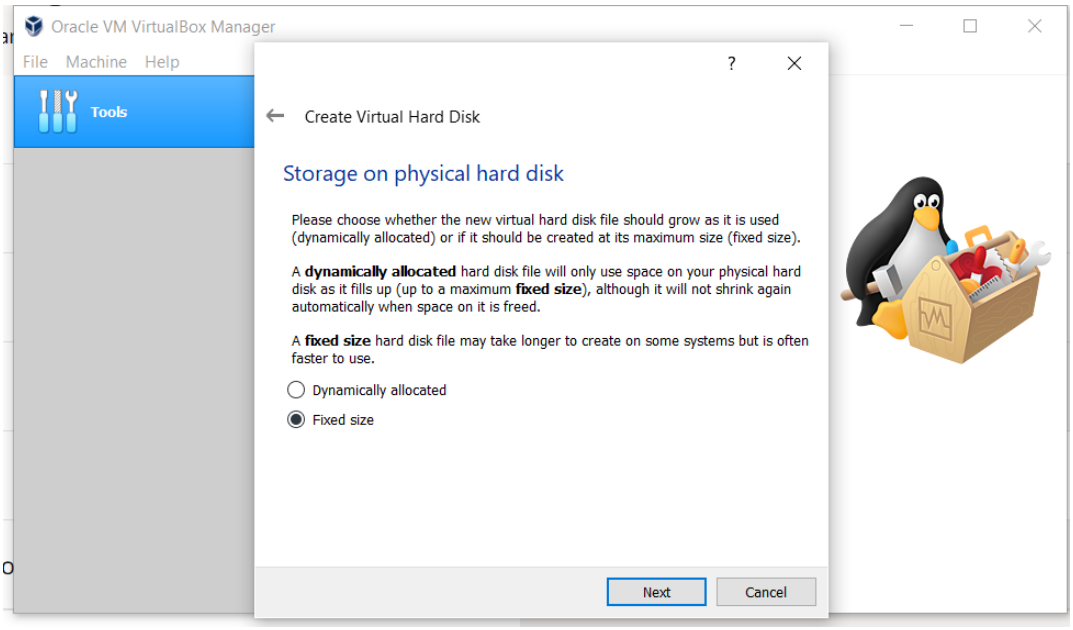
6. Create a new virtual hard disk



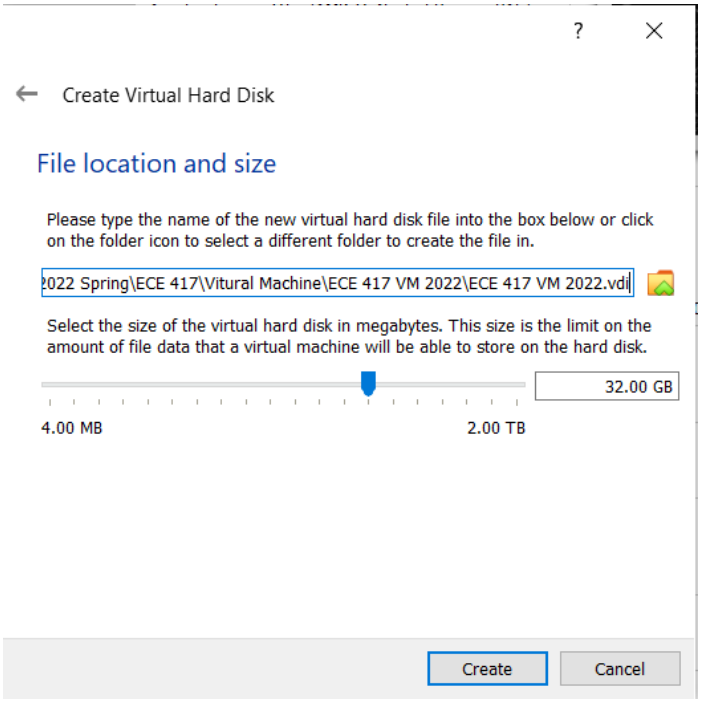
7. Since we downloaded a desktop image file for Ubuntu, verify that the VDI disk file type is selected:



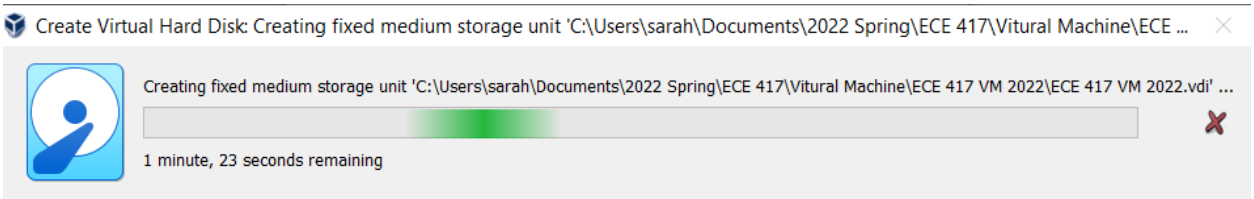
8. Select Fixed Size for the hard disk



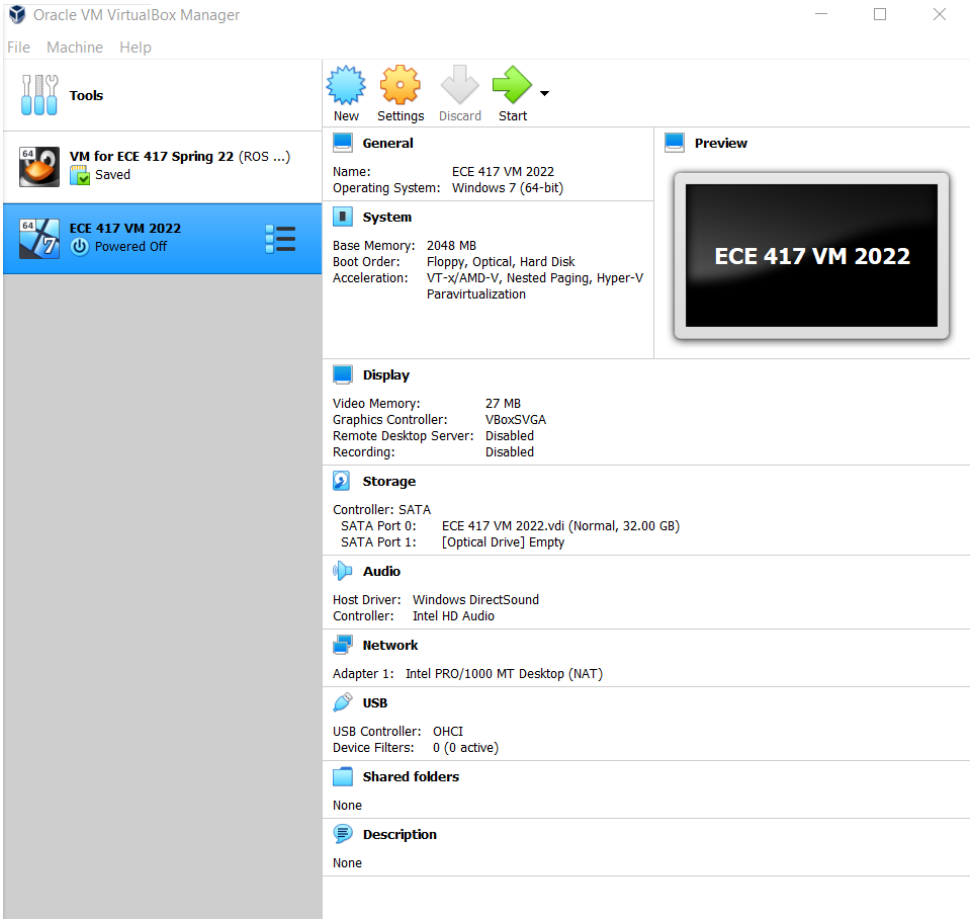
9. Leave the file location and size defaults and click Create



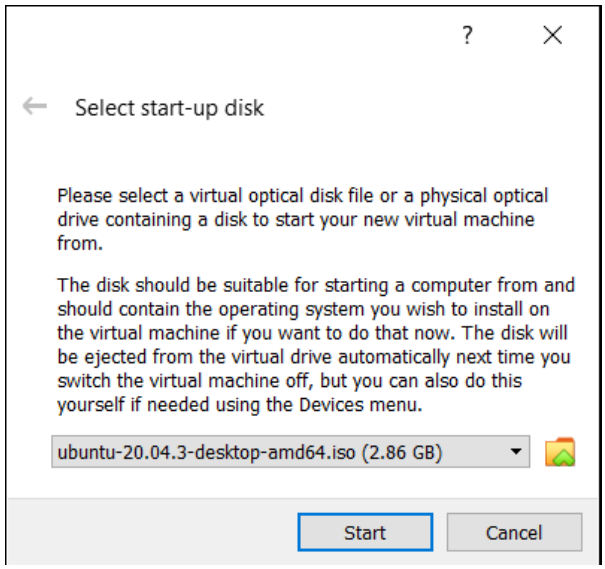
10. This may take a while. Estimates are 3 minutes.



11. On your base machine, move the downloaded iso file into your class folder or wherever you saved the VM's virtual hard drive
12. From VirtualBox Manager, start the VM by double clicking it in the left-hand toolbar.

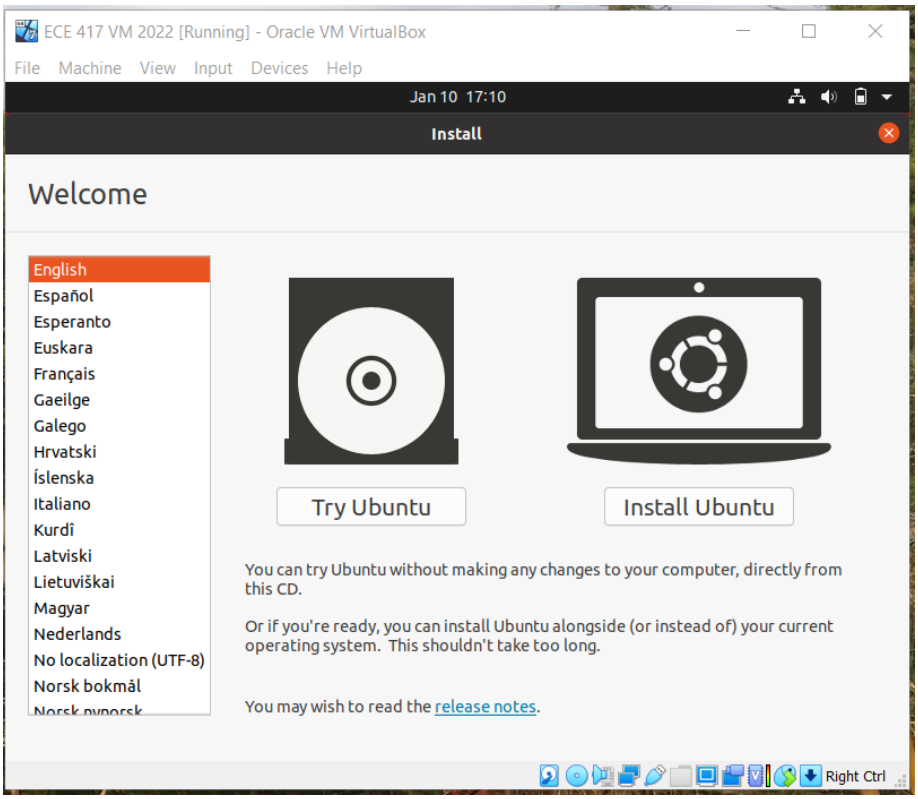


13. Select the Ubuntu iso file for the start-up disk

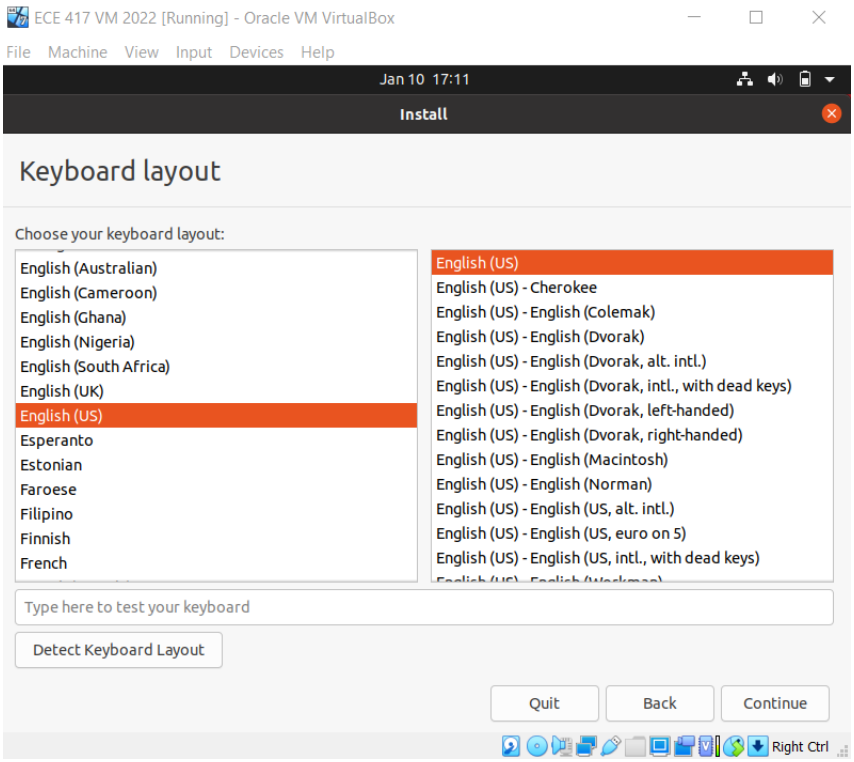


Ubuntu OS will begin startup. This may take a few minutes.

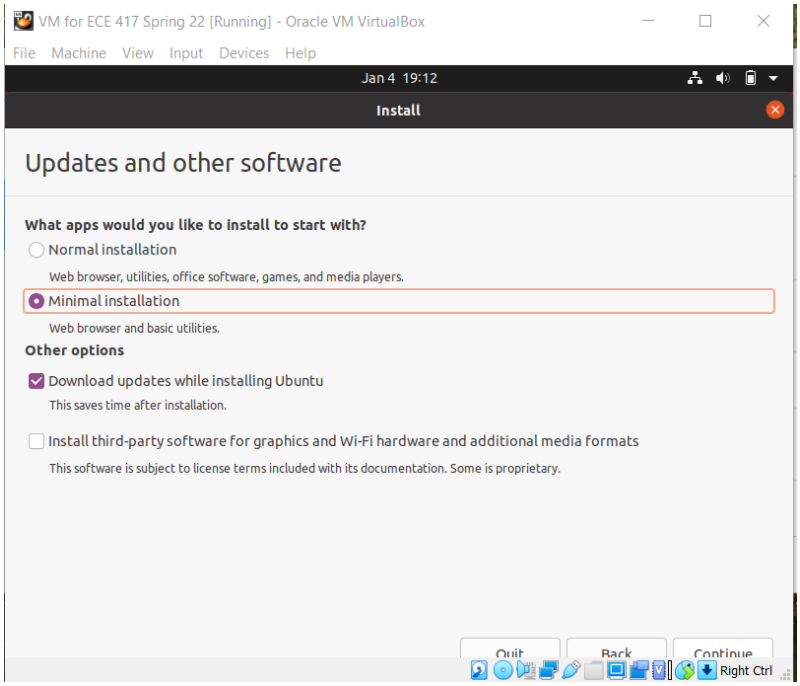
14. Verify your preferred language is selected
15. Click Install Ubuntu



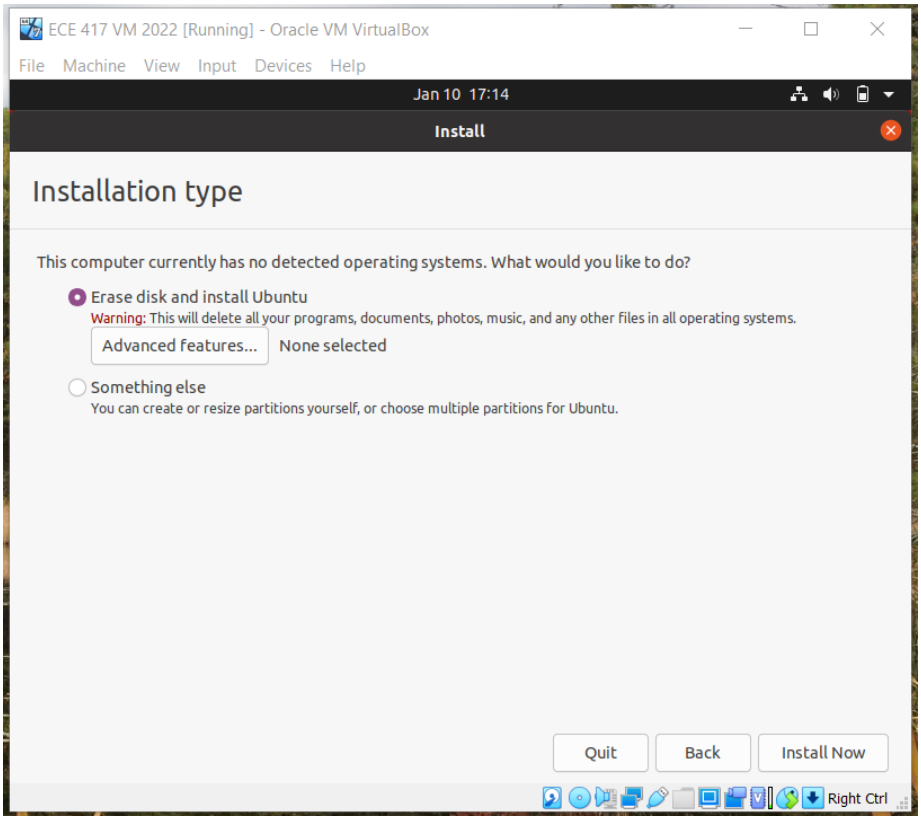
16. Verify your preferred language and dialect are selected and click continue



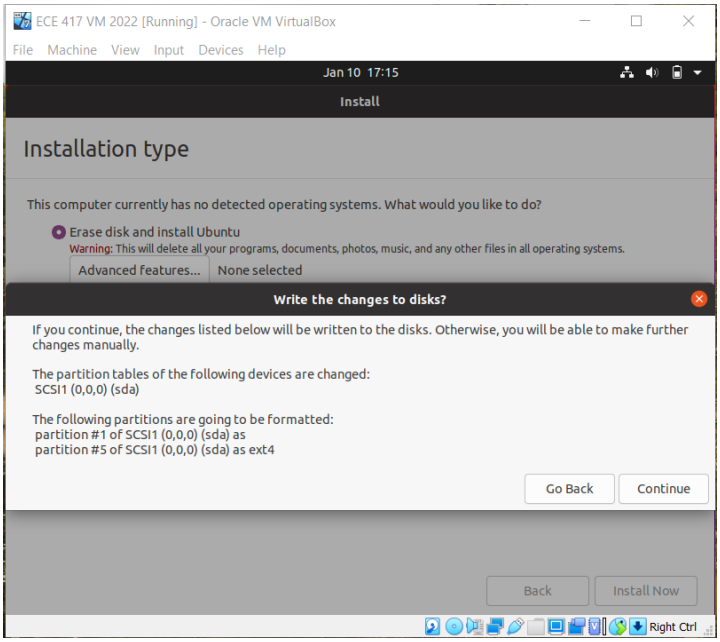
17. Select Minimal Installation and Download Updates while installing



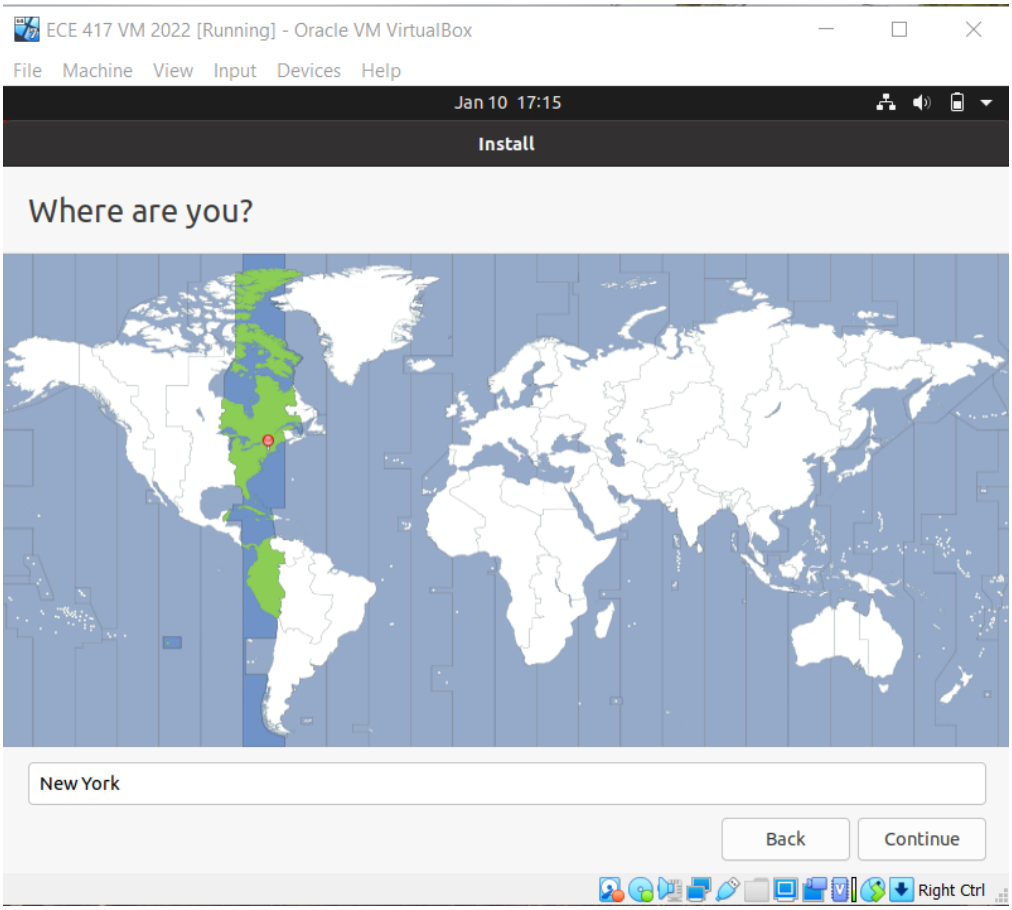
18. Select Erase disk and install Ubuntu. Since we created a new virtual hard disk, it is blank and there is nothing that will be lost.



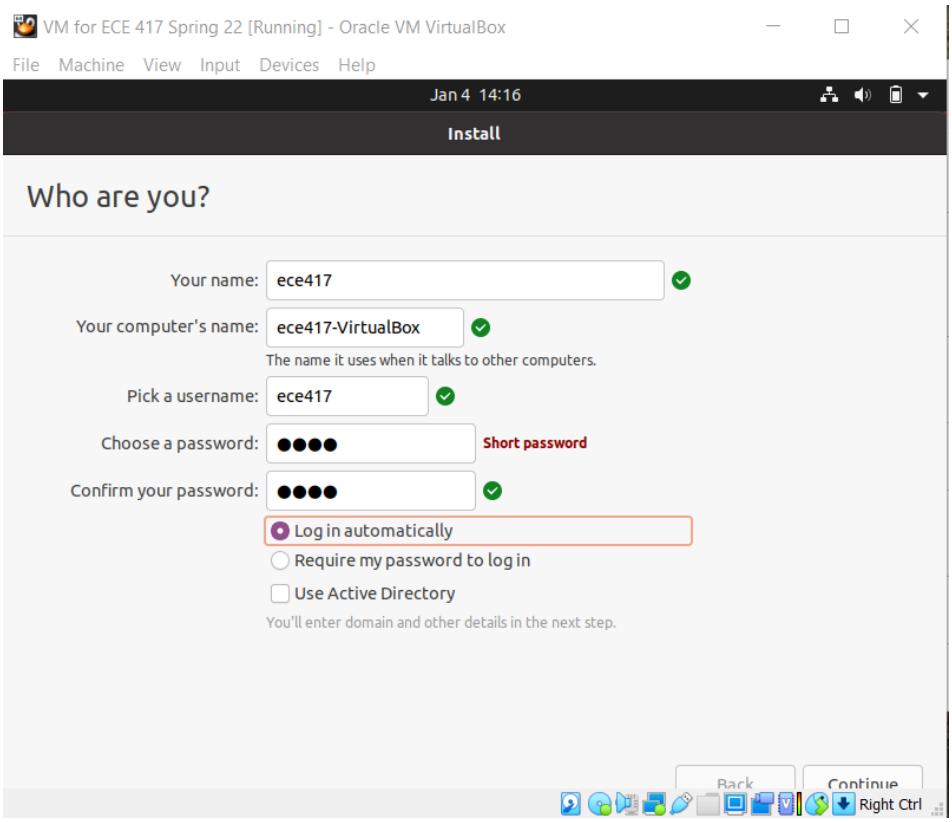
19. Press continue.



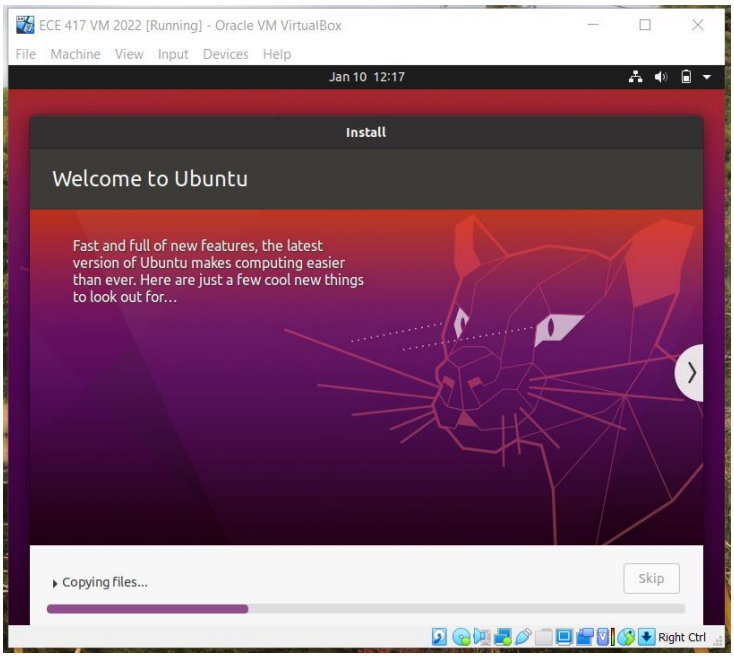
20. Select the correct time zone:



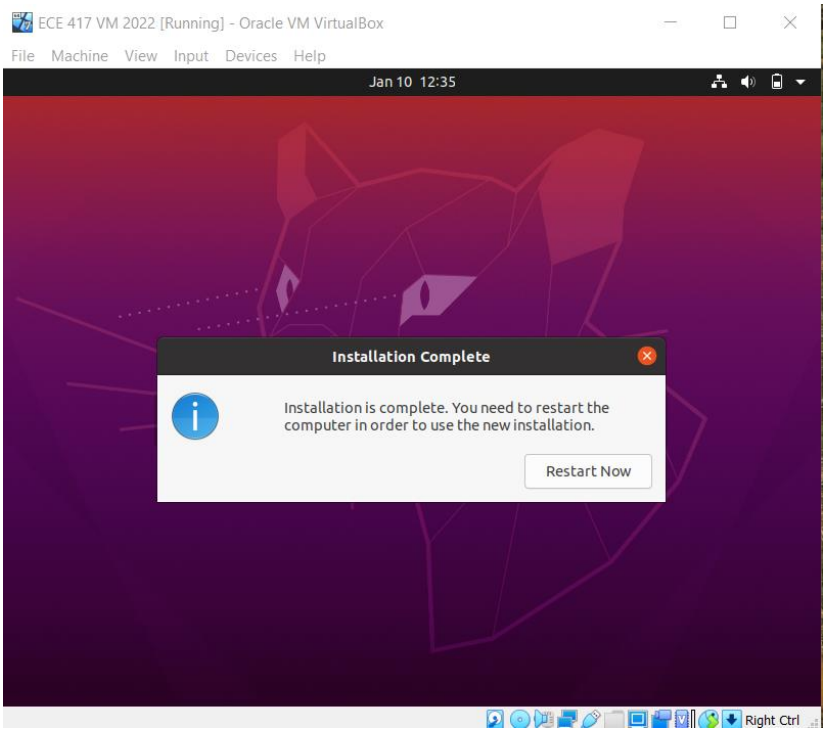
21. Create an account for the new OS. Make it easy to remember, and a password that is short and easy to input (you will have to input the password regularly for ROS setup commands). Select “Log in Automatically”. All other defaults are okay.



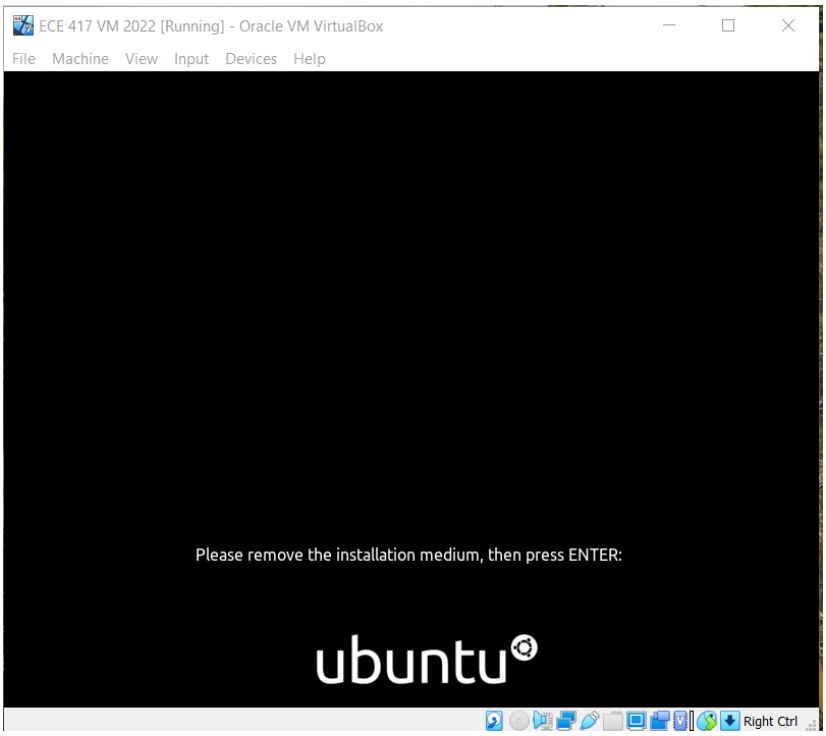
22. Wait for VirtualBox to finish setting up Ubuntu! This may take several minutes. Estimate: 17 minutes.



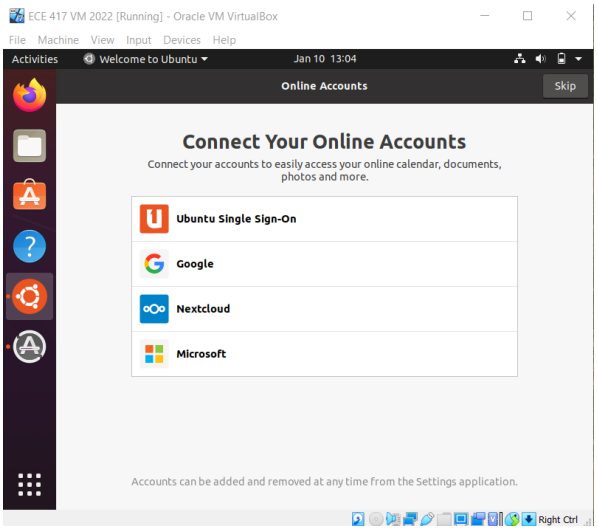
23. Restart



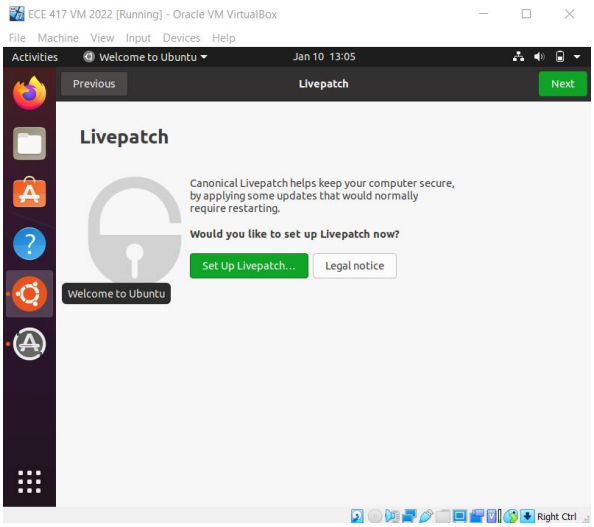
24. Click inside the window and press enter:



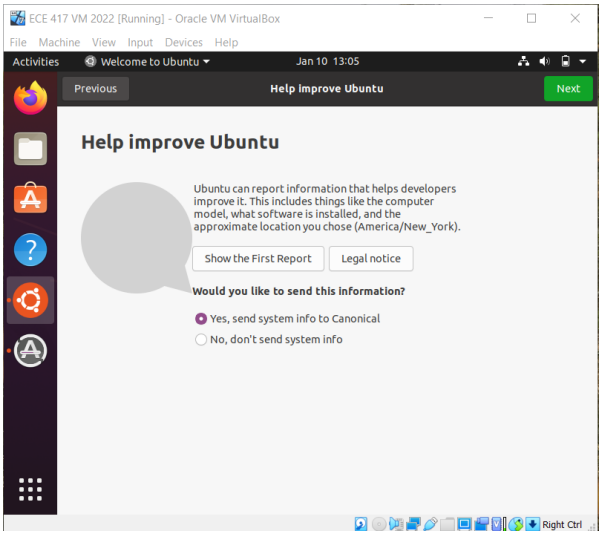
25. Skip in the upper right hand corner of Online Accounts



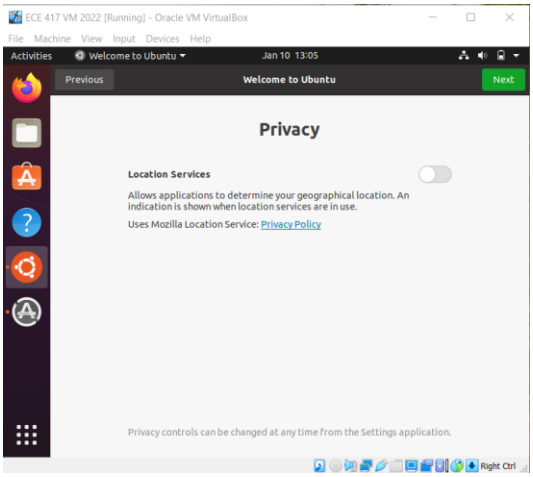
26. Click next



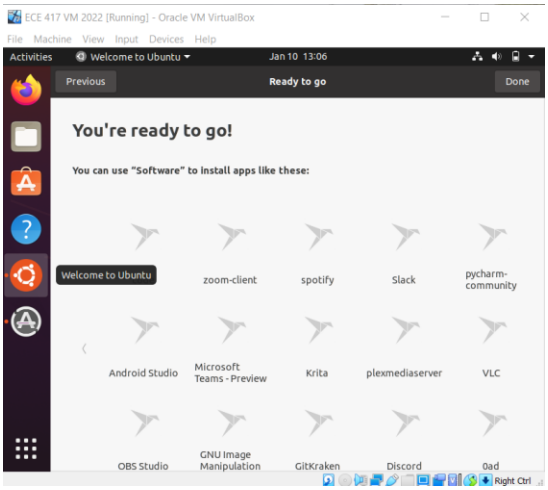
27. Click next again



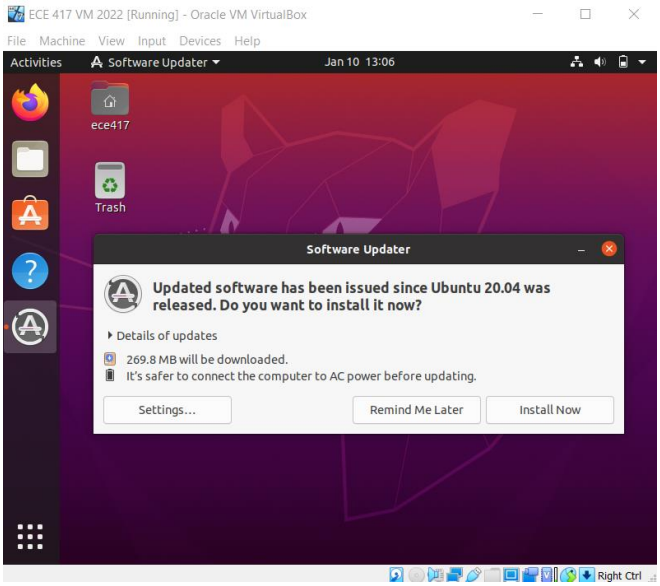
28. Leave location off



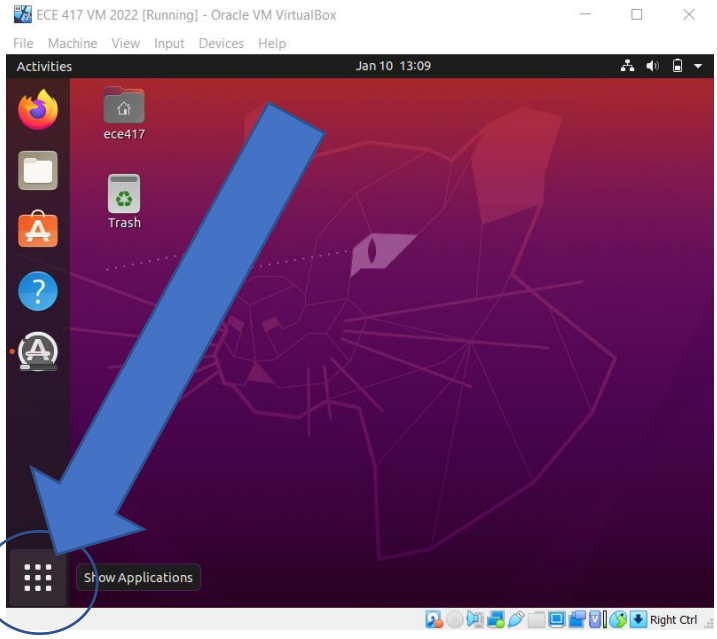
29. Press done to close



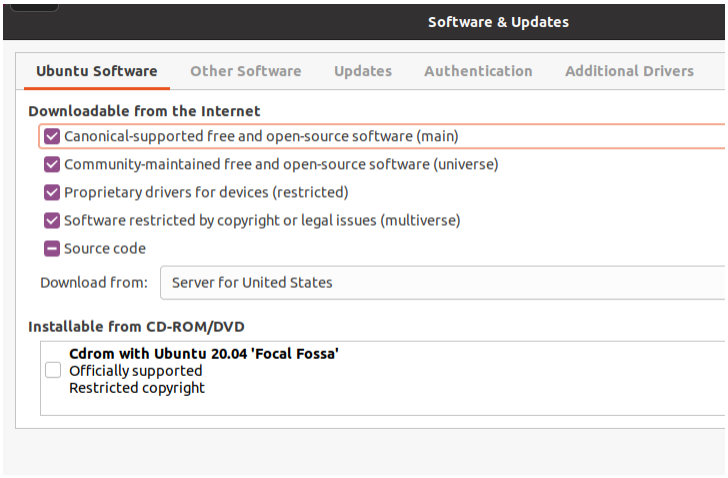
30. Feel free to update ubuntu. However you must let the update finish before downloading ROS to ensure all tools are available for the ROS download. Estimated time: 20 minutes

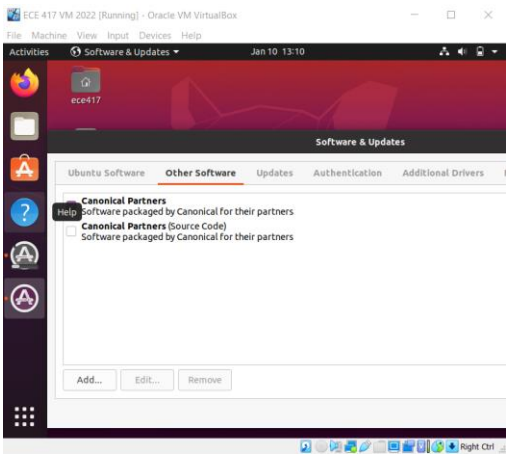


31. Open app explorer in the bottom left (9 dots) of the screen



32. Search and open up Software & Updates
    a. Make sure all repositories are enabled, and Source code is marked





33. Close and reload if prompted. Note: Ubuntu must be finished updating for this to be successful
34. Open the terminal (search in apps, recommend right click to Add to favorites)
35. Enter in the following commands, in order:

```
sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu focal main" > /etc/apt/sources.list.d/ros-focal.list'

sudo apt install curl # enter Y when prompted

curl -s https://raw.githubusercontent.com/ros/rosdistro/master/ros.asc | sudo apt-key add -

sudo apt update

sudo apt install ros-noetic-desktop-full
```

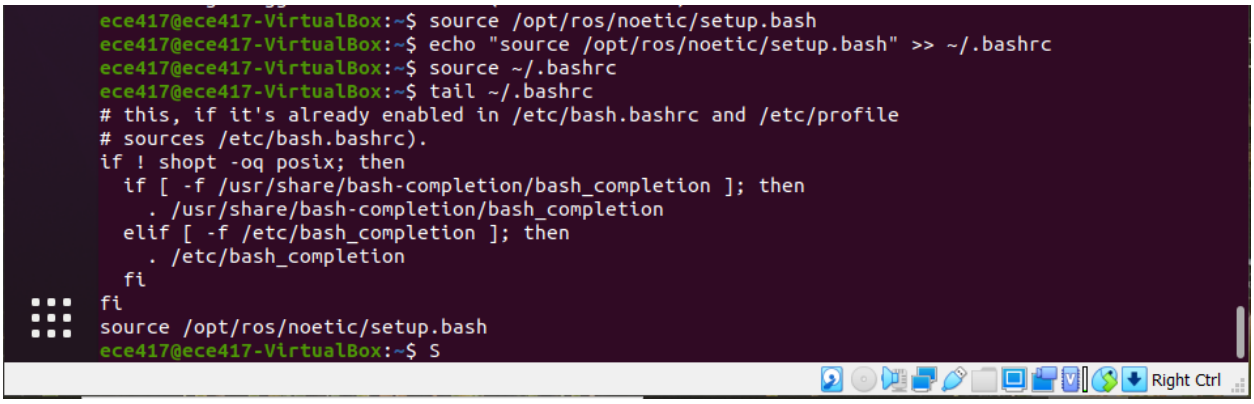
36. Wait for ROS to finish installing! Estimated time: 1 hour
37. When ROS finished installing, run the following commands:

```
source /opt/ros/noetic/setup.bash


echo "source /opt/ros/noetic/setup.bash" >> ~/.bashrc


source ~/.bashrc


tail ~/.bashrc
```



Verify you have the last line spelled correctly.

38. Run the following commands

```
sudo apt install python3-rosdep python3-rosinstall python3-rosinstall-g
enerator python3-wstool build-essential
```

```
sudo rosdep init

rosdep update
```