Setting Up

A GUIDE TO SETTING UP YOUR VIRTUAL MACHINE FOR PYTHON

UPDATED 12/31/16

Why use a virtual machine?

Before we begin, some motivation. Python can be installed on your host OS and many of the editors, tools, and packages we use in this class might work on your host OS as well. However, there's no guarantee!

To make sure we are all using the same environment, I strongly suggest that you set up a VM as directed here. There are two advantages to this:

1. You can be sure that I will never require you to use a package or tool that is unavailable or problematic for the environment you're using.

2. If you encounter any problems in this environment, I will always be able to help you.

If you decide to install and use Python directly in your host OS X on your Mac, for instance, you will be on your own later in the semester when (not "if", "when") you run into problems.

Get A Virtual Box!

You can use whichever virtualization software you want, but Virtual Box is recommended.

Go to https://www.virtualbox.org/wiki/Downloads and choose the appropriate installer.

Follow the installation instructions and start up Virtual Box.

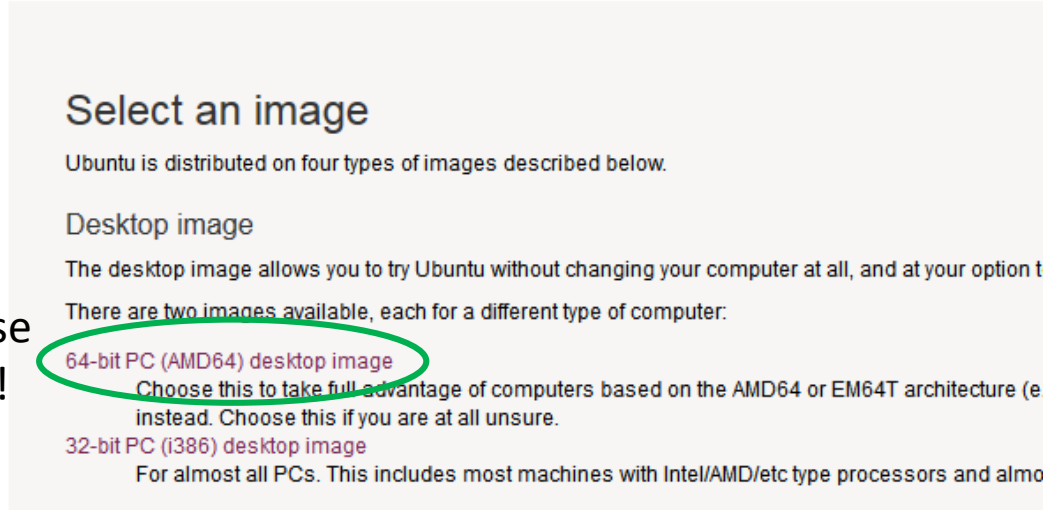
Choose a platform!

Choose an OS

You are encouraged to use Ubuntu 16.04, the latest LTS release of Ubuntu. You could alternatively use a lighter-weight Debian-based Linux distribution, but your mileage may vary.

Download the Ubuntu 16.04 iso from here: http://mirror.pnl.gov/releases/xenial/

Ubuntu 16.04.1 LTS (Xenial Xerus)



Choose me!

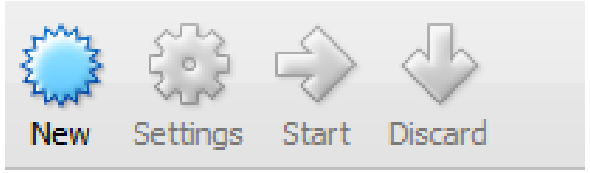
This may take some time so be prepared to just let it download for a while…

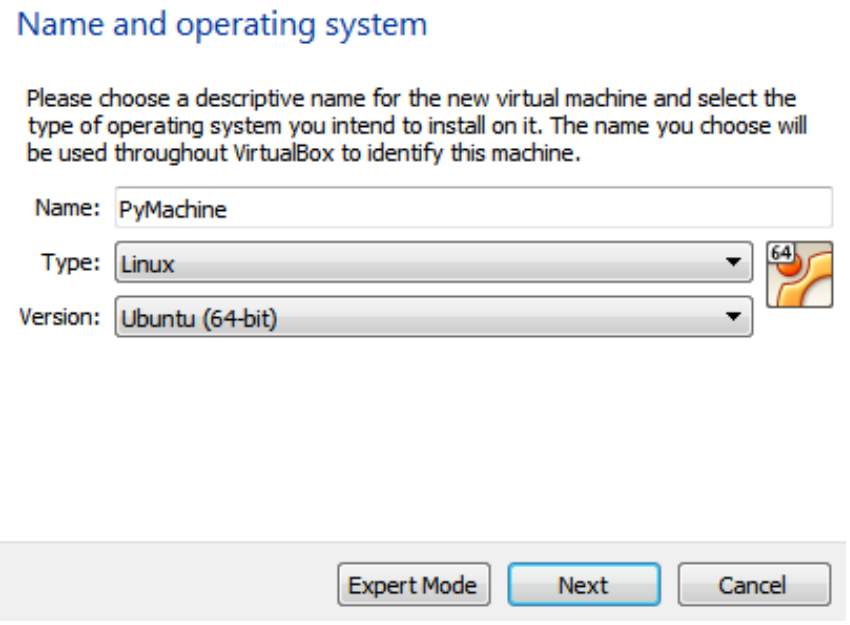
Make sure your VirtualBox version supports 64-bit Linux machines. You can check with the step on the next slide.

Set Up the VM

Now, create a virtual machine inside of Virtual Box.

1. Click the New button up in the top left.





2. Fill in the basic information about your new virtual machine.

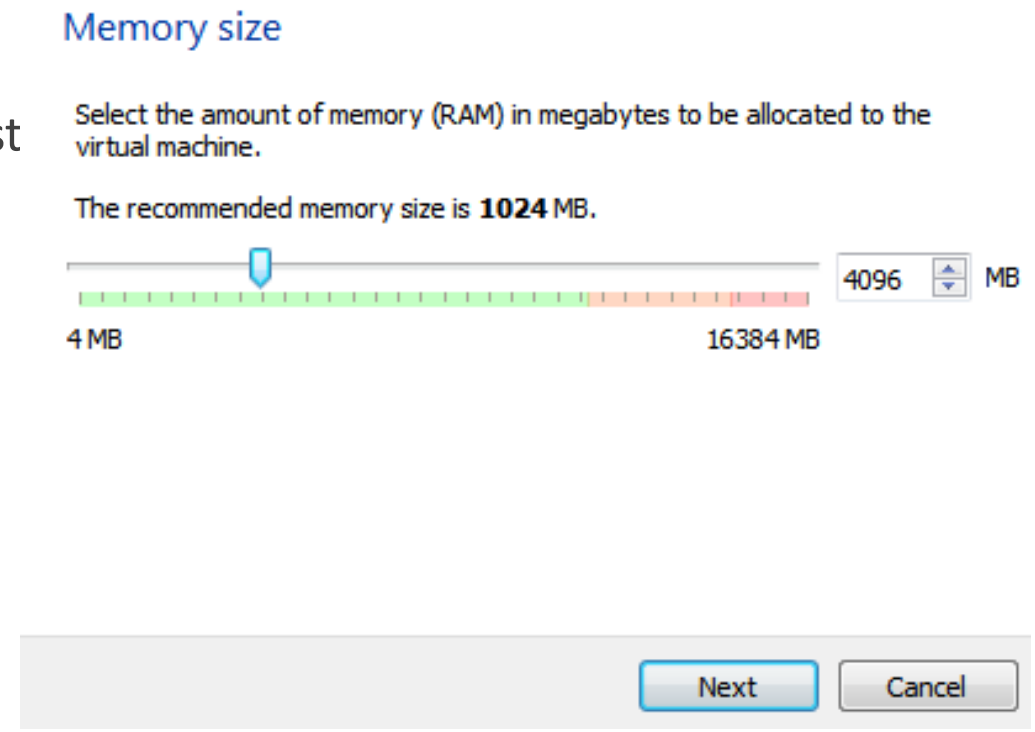
Note that 32 bit may be the only option. If this is the case, and you have a Windows machine, click here.

Set Up the VM

3. Choose the RAM capacity of your machine.

The capacity you choose will depend on the physical RAM of your host machine. You should reserve at least 2 GB if possible.

Be aware that this RAM is reserved for the running virtual machine, whether it is using all of it or not. When the machine is suspended or shut off, you won't need to worry about sharing it.



Set Up the VM

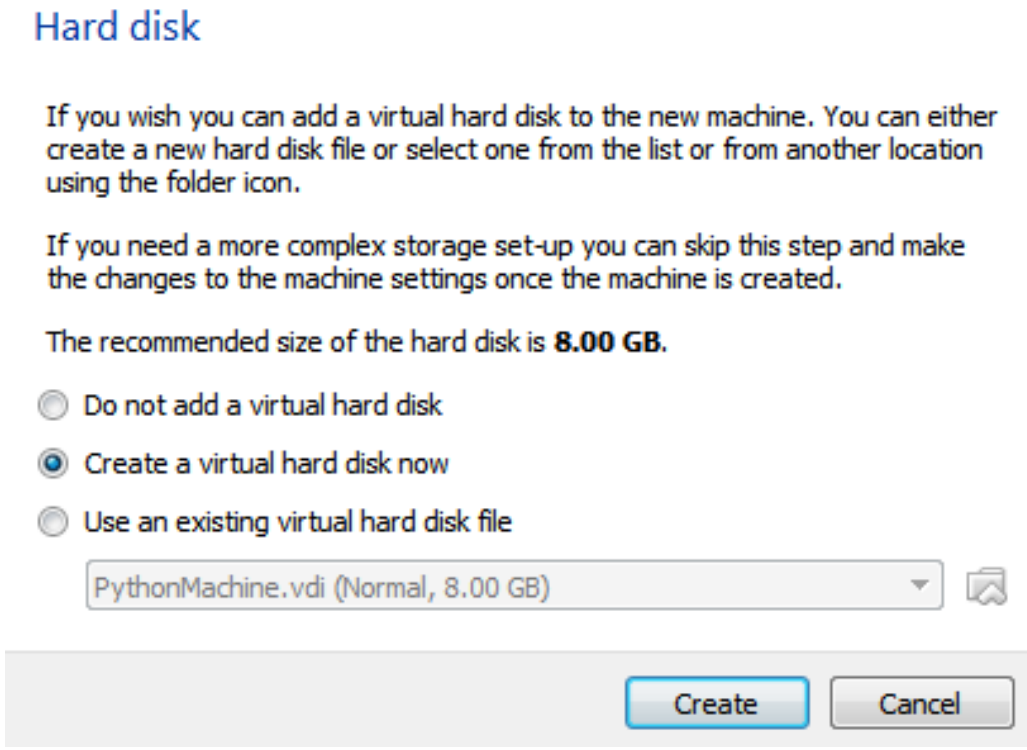
4. Create a virtual hard drive.

You should choose the default option to create a new virtual hard drive.

5. Choose the default hard drive file type, VDI.

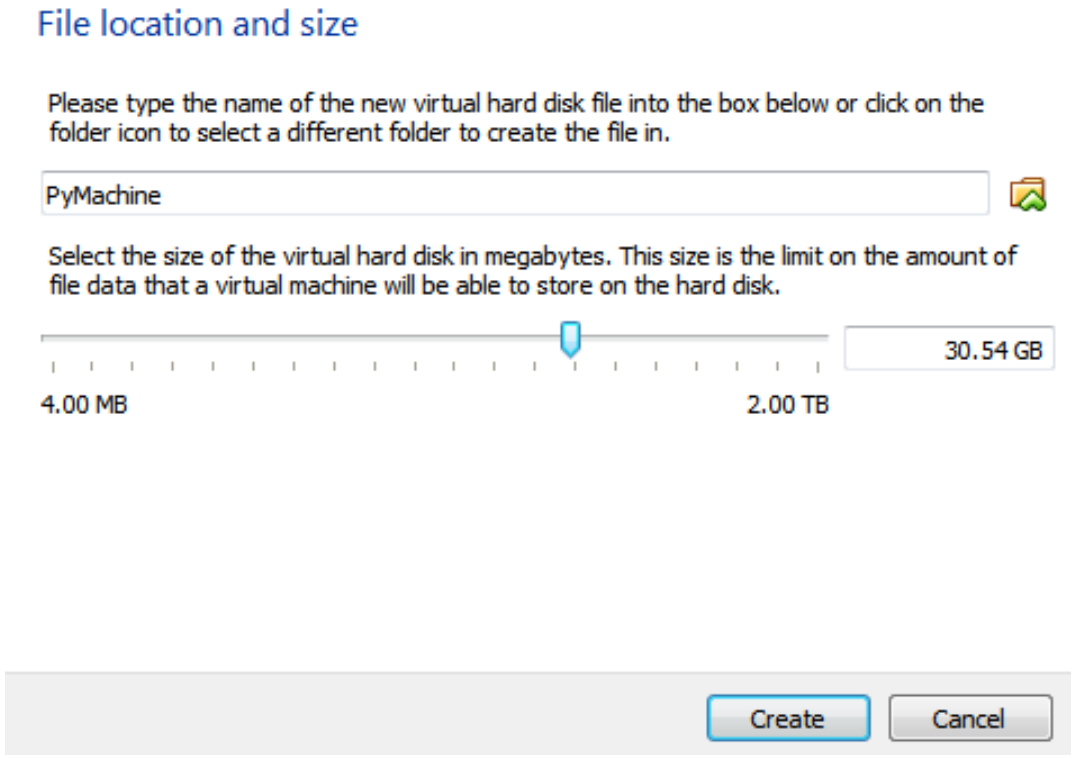
VDI stands for VirtualBox Disk Image.

6. Choose the dynamically-allocated option.



Set Up the VM

7. Finalize the hard drive. Go ahead and use the default name if you'd like, but it is recommended that you reserve at least 25 GB for the virtual hard drive.



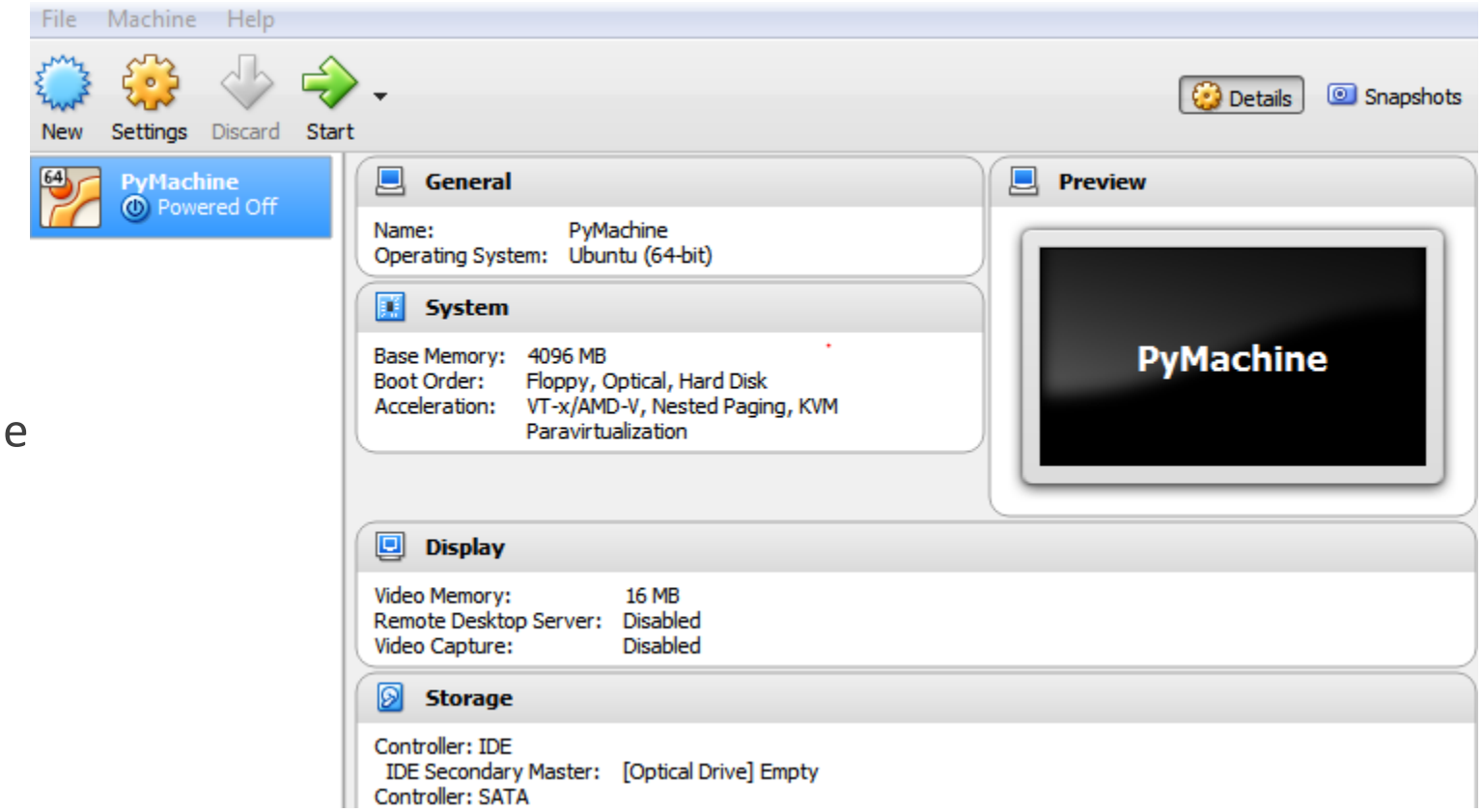
Set Up the VM

You're almost all done!

Your new virtual machine should appear in the main menu now along with some details about the machine.

We still haven't installed the OS. We've only created a new machine for the particular environment we want to create.

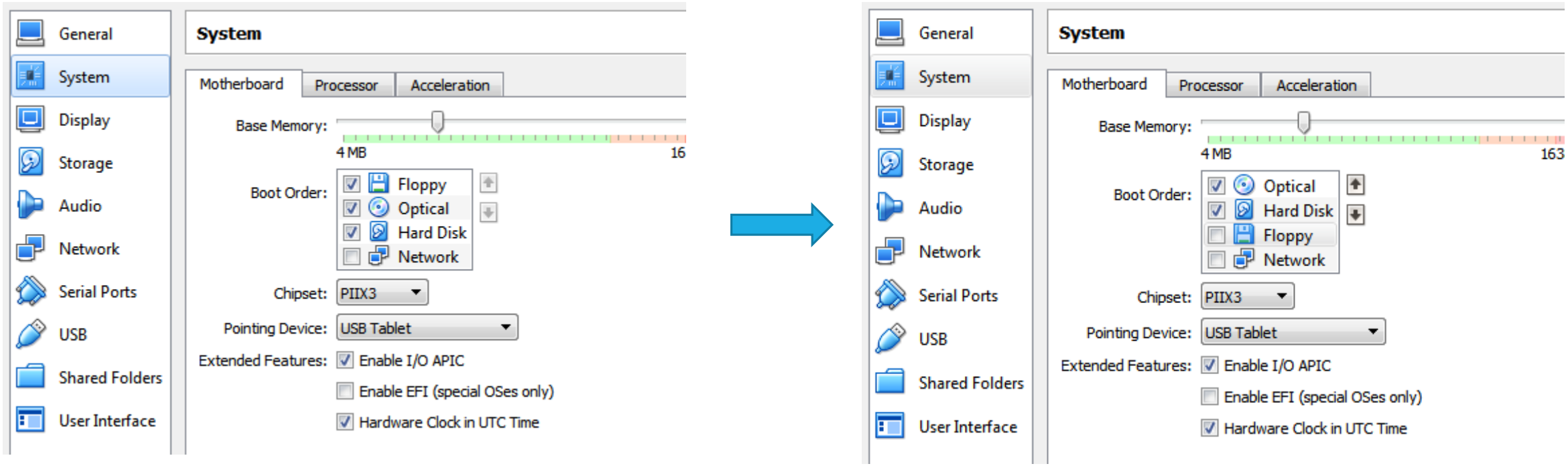
Right-click on the machine and choose Settings.



Set Up the OS

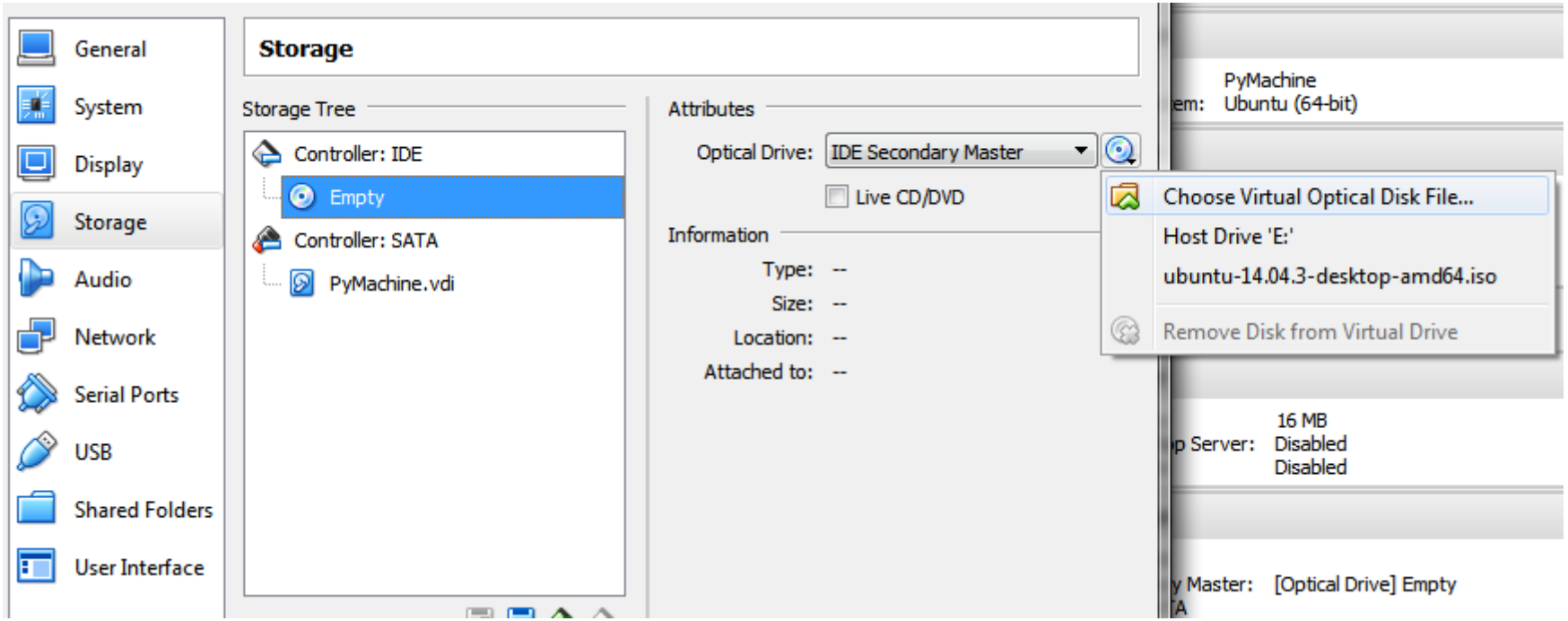
Choose System on the left side of the menu.

Uncheck Floppy and move it down in the boot order.



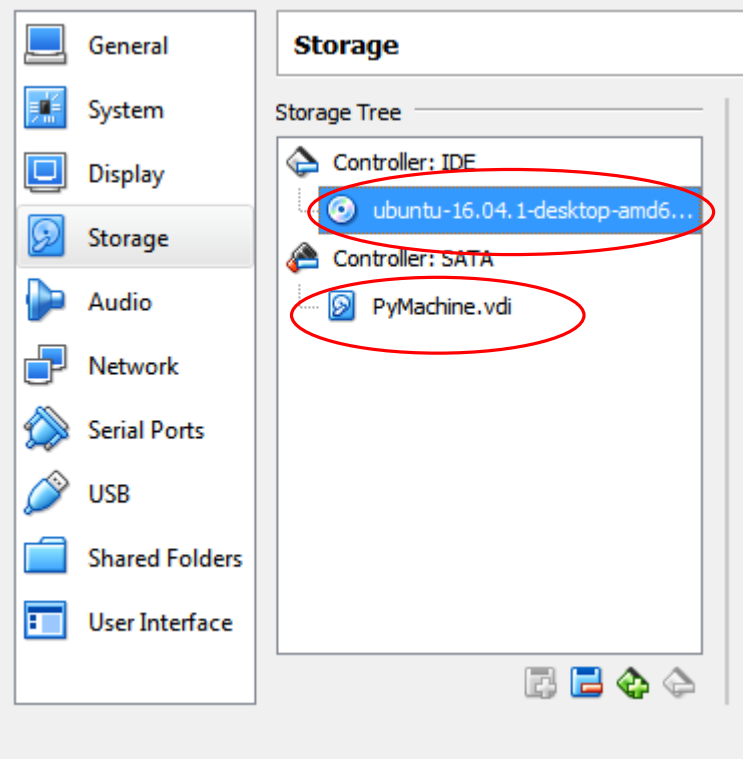
Set Up the OS

Now, choose Storage on the left-side menu. Select the Empty slot in the Controller Tree and then select *Choose Virtual Optical Disk File…* on the right-hand side as shown below.



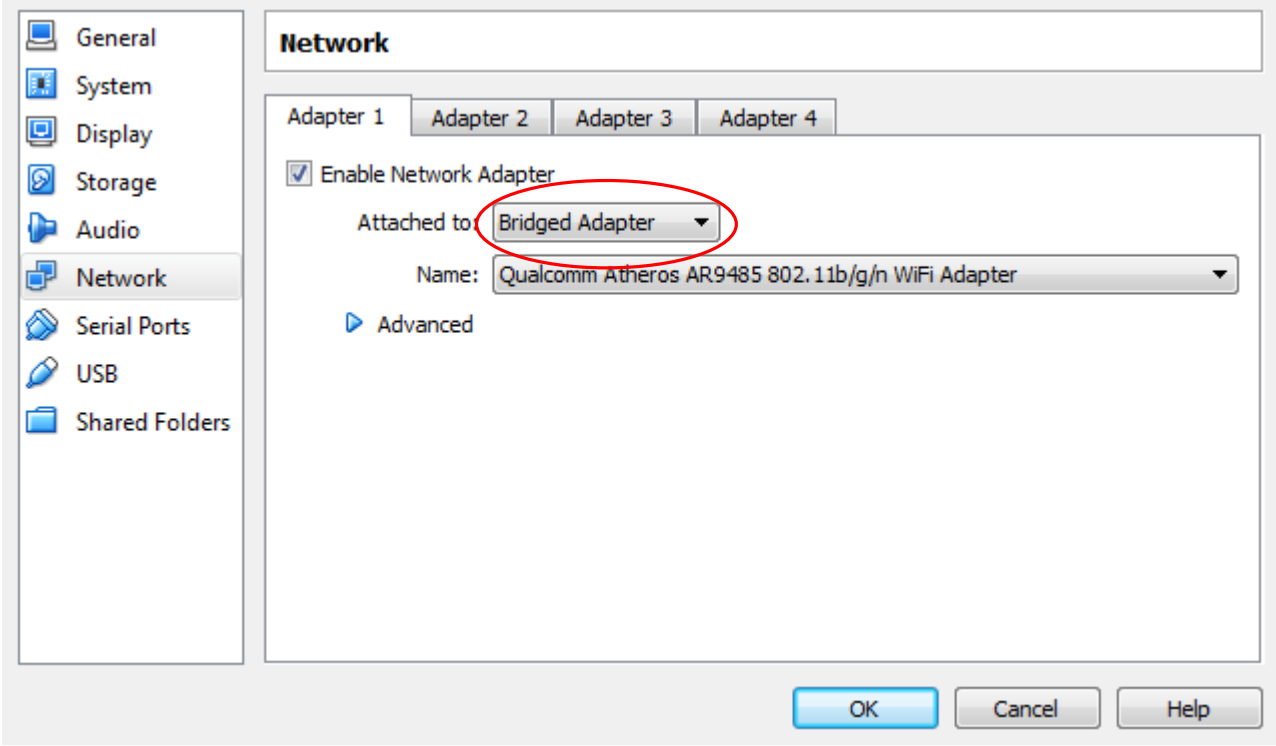
Set Up the OS

After navigating to select the iso you downloaded before, you should see your iso and newly created hard drive file selected.



Set Up the OS

Lastly, select Network on the left-side menu. Select Bridged Adaptor from the drop-down menu.



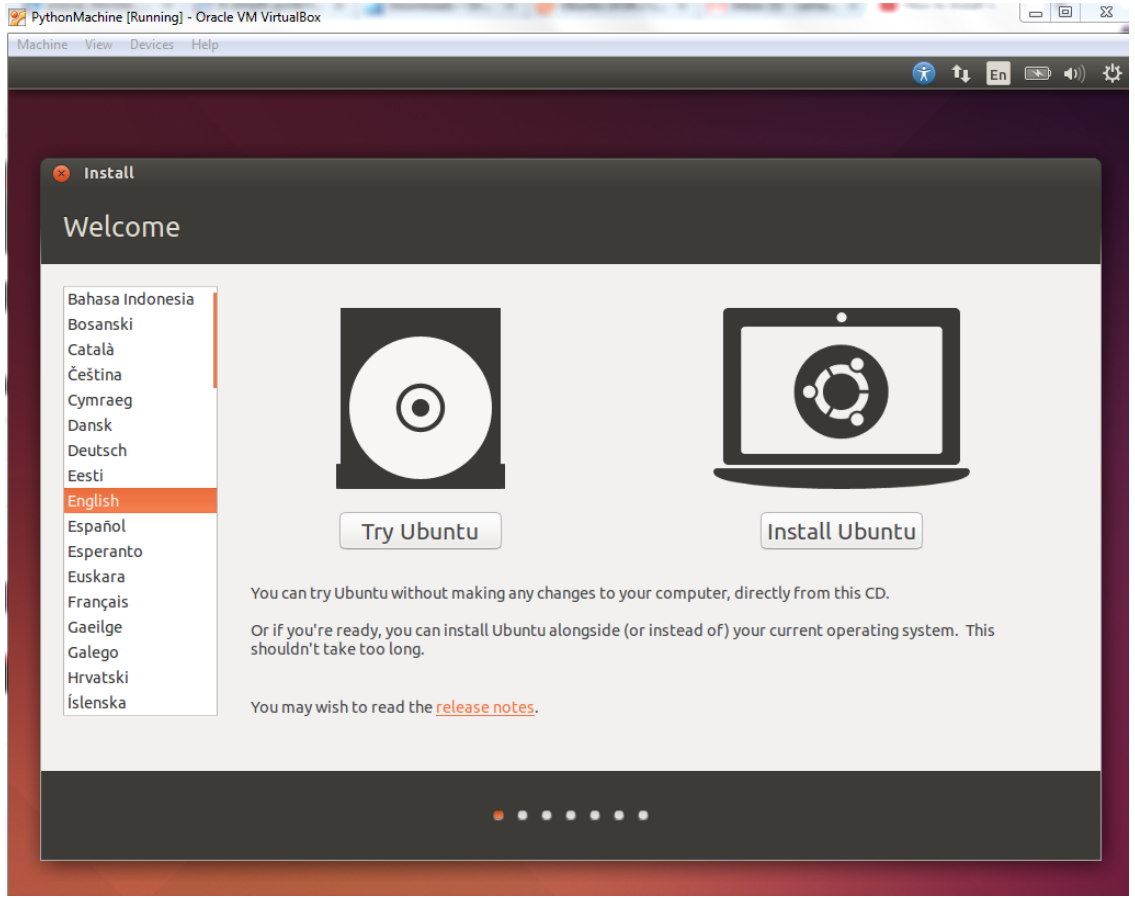
Set Up the OS

Now, exit the pop-up menu and select your virtual machine and press the Start button.

Wait for your machine to boot up. You may see some error messages but usually these are not fatal. Just give it some time.

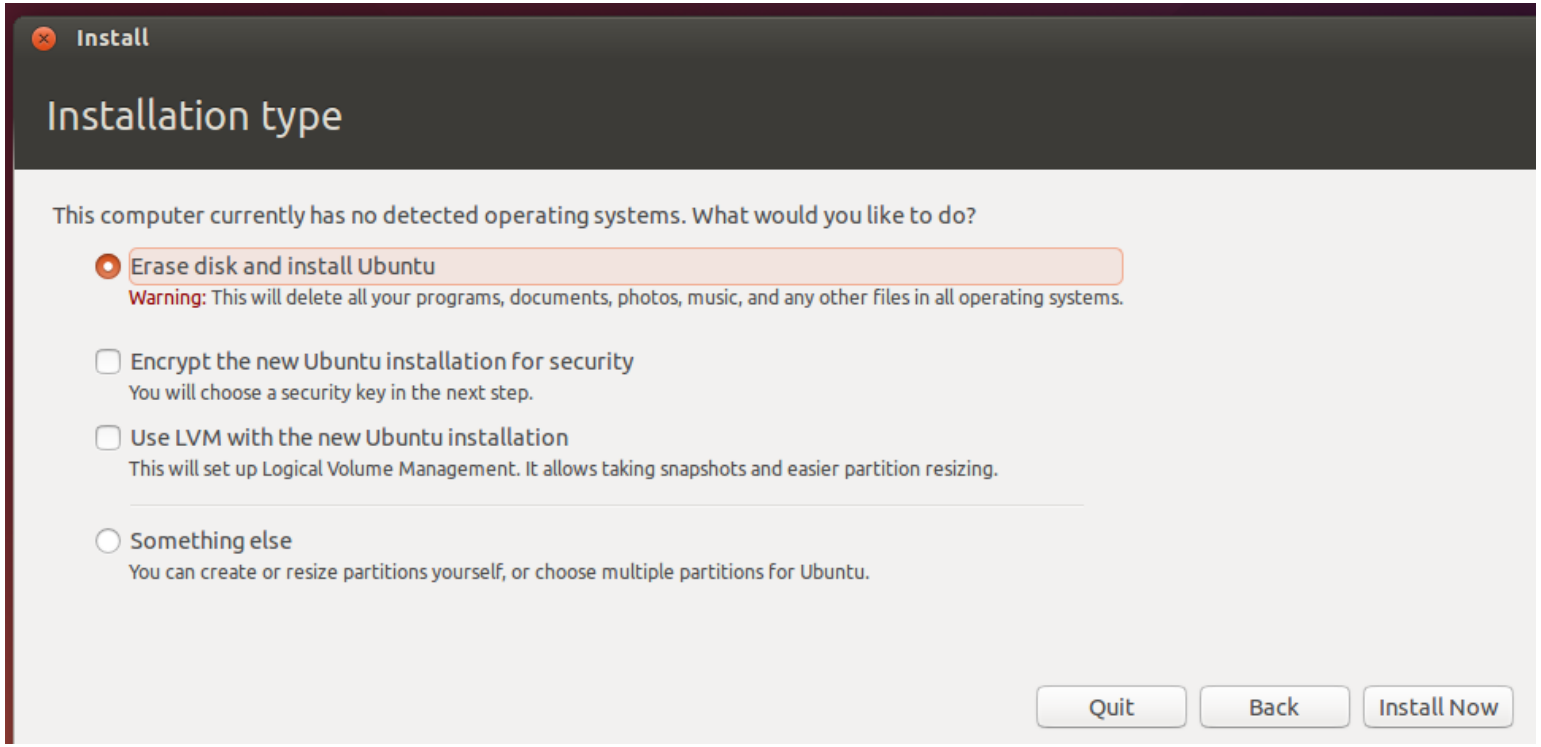
Install Ubuntu!

Note: I recommend *not* installing updates right away.



Set Up the OS

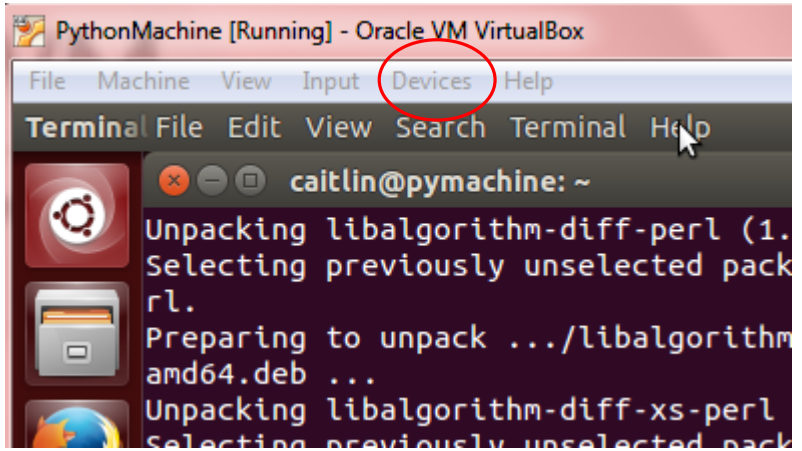
Continue with installation. Make sure you choose the option to Erase Disk and Install Ubuntu. Don’t worry! – it won’t affect your host OS. Allow the changes to the drive and install!



Supersize the VM

You may end up with a tiny screen for your VM. If this is the case, in Ubuntu pull up a terminal (ctrl-alt-t) and issue the following:

```
$ sudo apt-get update
$ sudo apt-get upgrade
$ sudo apt-get install dkms
$ sudo apt-get install build-essential
```



Go to the Devices menu, tell it to install Guest Additions, and choose the run option.

Now, restart the VM.

Resize the VM window via System Settings in Ubuntu or choose Full Screen Mode and it will resize the desktop screen. ☺

Set Up Python

You're all set! Let's turn our attention to making sure Python and some key packages are installed:

- Python 2.7.12 or Python 3.5.2

  Open up a terminal and type 'python' or 'python3' – it's already there!

- Pip
- Pylint

```
caitlin@pymachine:~$ python
Python 2.7.12 (default, Nov 19 2016, 06:48:10)
[GCC 5.4.0 20160609] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> exit()
caitlin@pymachine:~$ python3
Python 3.5.2 (default, Nov 17 2016, 17:05:23)
[GCC 5.4.0 20160609] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>>
```

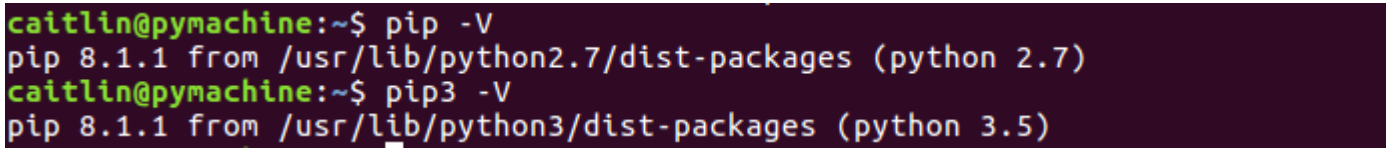
Note: if you're using an older version of Ubuntu and have trouble logging in with your Ubuntu username, try some of the actions outlined here http://askubuntu.com/questions/454576/cant-login-to-ubuntu-14-04-after-upgrade.

Set Up Python

Next we want pip, the de-facto Python package manager. To install pip, you simply need to issue the command

```
$ sudo apt-get install python-pip python3-pip
```

This will install pip 8.1.1 for python 2.7 and python 3.5. We will be using pip frequently in this class to install third –party libraries for our Python applications.



Set Up Python

Lastly, we'll grab pylint.

```
$ sudo apt-get install pylint pylint3
```

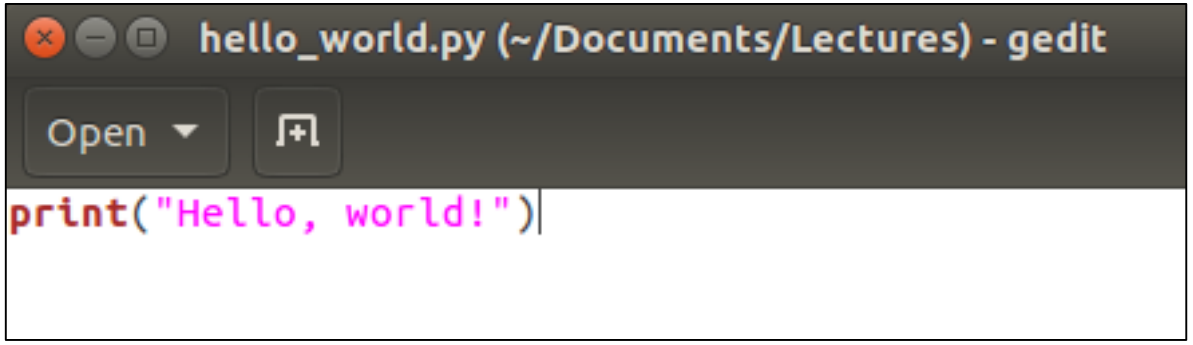
This will install pylint 1.5.2 and pylint3 1.6.4. We will be using pylint throughout the semester to make sure our code is conforming to Pythonic standards. It's important to maintain good habits while programming in Python.

Testing Our Environment

Let's create a little Python program to test everything. Open up the gedit text editor by issuing the following command:

```
$ gedit
```

Save the file as hello_world.py and type the following contents. Save the file.



Testing Our Environment

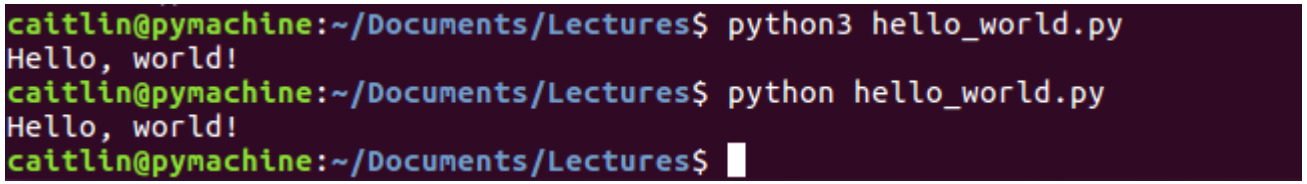
We can run our Python program through the Python interpreter by issuing

```
$ python3 hello_world.py
```

or, in this case, we can also do:

```
$ python hello_world.py
```

We're all set! ☺



Its just a little coincidence that this tiny python program works for both Python 2 and Python 3. The reason why may not be immediately obvious.

In general, it is NOT the case that Python 2 and Python 3 are interchangeable!

Testing Our Environment

You should also try running the following commands and see what you get. In particular, look at the messages at the top.

```
$ pylint3 hello_world.py

$ pylint hello_world.py
```

Appendix: Enabling 64-bit Virtualization

You may encounter an issue where VirtualBox does not allow you to set up a 64-bit virtual machine and you only have 32-bit options.

To fix this, you will need to check two things:

1. Virtualization technology is enabled.
   When powering on your machine, open up the BIOS menu and look for an option like "Intel Virtualization Technology" and make sure it's enabled.

2. Hyper-V or Windows Virtual PC are disabled.
   Look for the tool that allows you to turn Windows features on and off. Turning off these virtualization features ensures that they are not grabbing ownership of virtualization tech at start up.