CMSE 202 - Fall 2020
Set-up Guide Mac

Table of Contents

- Installing Python for this Course
  - If you have Anaconda on your computer already
    - Let's make sure Anaconda is updated to the latest version
    - Also let's check to make sure that Anaconda is in your path
    - If any of the above fail, remove anaconda and reinstall. To remove Anaconda follow these steps
    - Catalina Update
  - If you don't have a fully functioning up-to-date installation of Anaconda
- Setting up the terminal with Git
  - Check to see if you already have Git
    - Git download
    - (Optional) Helpful Commands and Shortcuts
      - Setting up Finder
      - Knowing Where You Are
      - Useful Commands
- Setting up Spyder (Text Editor/Python IDE)
- MSU's JupyterHub Interface
  - Connecting to the engineering JupyterHub server
  - Getting Jupyter notebook files into JupyterHub
  - Making a copy of Jupyter notebooks from JupyterHub and turning them in
- Course Communication with Slack
  - Slack usage rules

As this is a course in computational modeling and data science, you will be completing all of your assignments using your computer! However, in order to do so there are a number of things you need to set up before the course starts. If you run into issues during this setup process make sure to document the error you encountered and send an email to your Professor to let them know that you ran into a problem.

MAKE SURE TO COMPLETE ALL OF THE SECTIONS LISTED IN THIS DOCUMENT BEFORE YOU COME TO CLASS

Installing Python for this Course

You need to have a functioning and **current** Anaconda Python installation on your computer for this course. If you have a past installation, you are expected to make sure it is up-to-date. In addition to making sure your installation is updated, you should also ensure that the Anaconda installation is in your default path.

If you have Anaconda on your computer already

(If you do not have Anaconda click here)

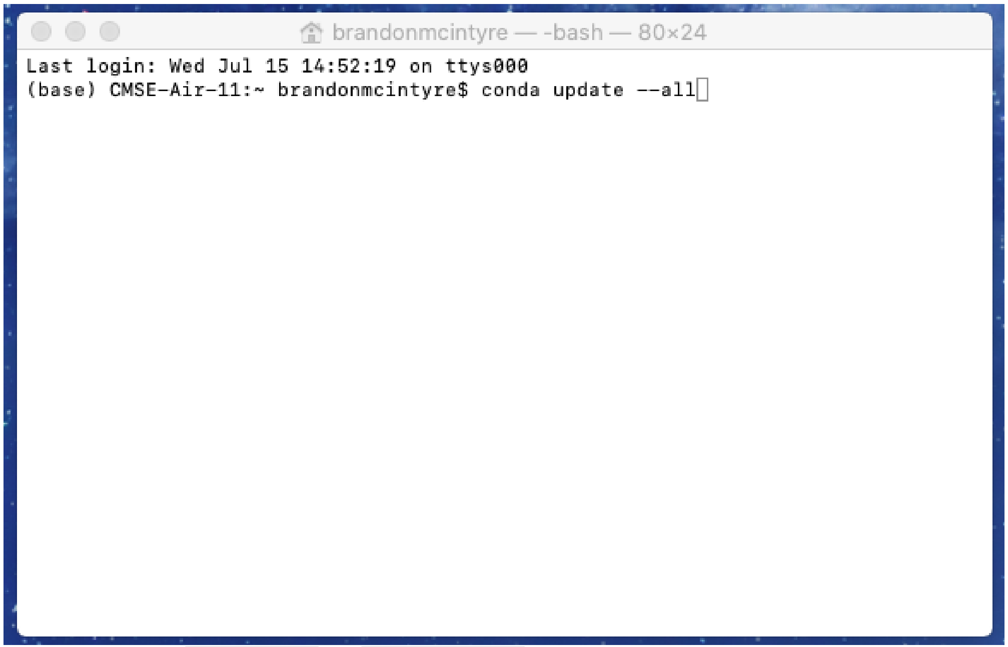
NOTE 1: If you had Anaconda installed previous to updating to macOS Catalina (Released October 7, 2019) or beyond, your installation is most likely broken. There is a way to repair (https://www.anaconda.com/blog/how-to-restore-anaconda-after-macos-catalina-update) Anaconda but this is experimental and quite a bit of work. It is much easier to just reinstall Anaconda. Follow this section here if this applies to you.

NOTE 2: If you did not have Anaconda installed previous to updating to macOS Catalina (Released October 7, 2019) you can install Anaconda just fine. However, go to this section here and complete only step 2.

NOTE 3: As a general rule of thumb, do not upgrade your OS mid-way during the semester or school year as things like the above can happen. Always be prepared for OS updates to break applications.

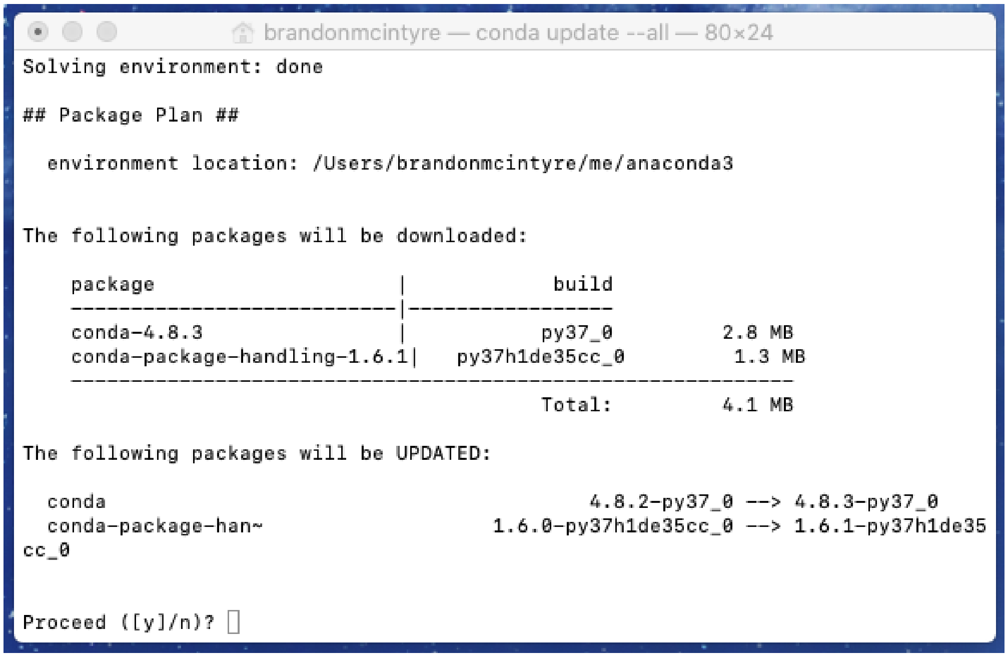
Let's make sure Anaconda is updated to the latest version:

1. Be connected to the internet
2. Find your terminal and update Anaconda.



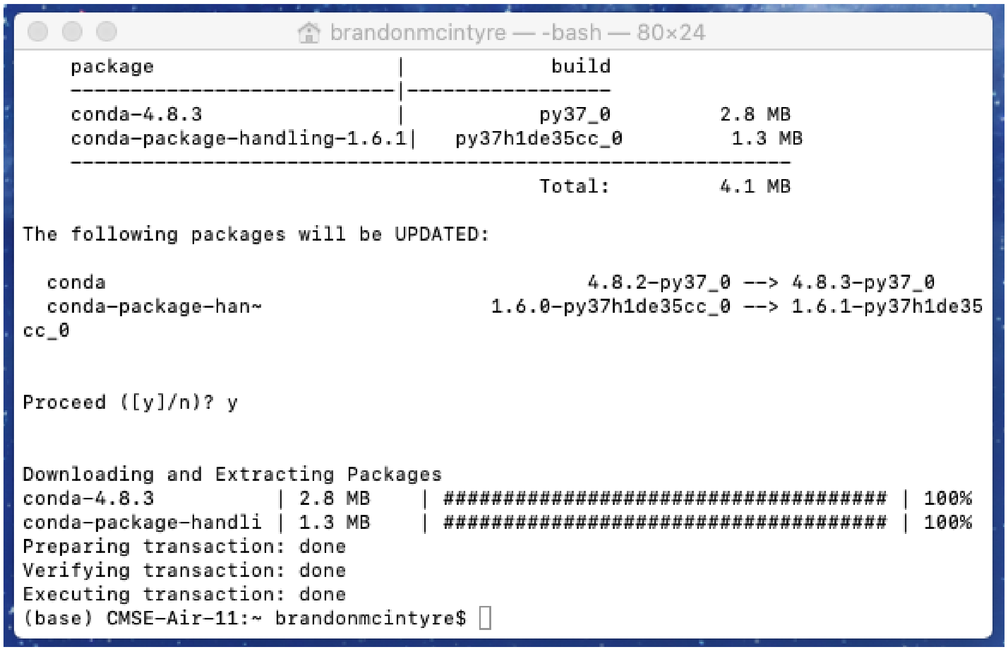
```
Last login: Wed Jul 15 14:52:19 on ttys000
(base) CMSE-Air-11:~ brandonmcintyre$ conda update --all
```

Using Spotlight by pressing `command` + `space-bar` or simply use the search bar in the top right corner search `terminal` and press `Enter` . Then type in the command `conda update --all` and press `Enter` . This command will update anaconda.



```
Solving environment: done

## Package Plan ##

  environment location: /Users/brandonmcintyre/me/anaconda3


The following packages will be downloaded:

    package                    |            build
    ---------------------------|-----------------
    conda-4.8.3                |           py37_0         2.8 MB
    conda-package-handling-1.6.1|   py37h1de35cc_0         1.3 MB
    ------------------------------------------------------------
                                           Total:         4.1 MB

The following packages will be UPDATED:

  conda                                        4.8.2-py37_0 --> 4.8.3-py37_0
  conda-package-han~                   1.6.0-py37h1de35cc_0 --> 1.6.1-py37h1de35
cc_0


Proceed ([y]/n)? 
```

To continue type y and press enter.

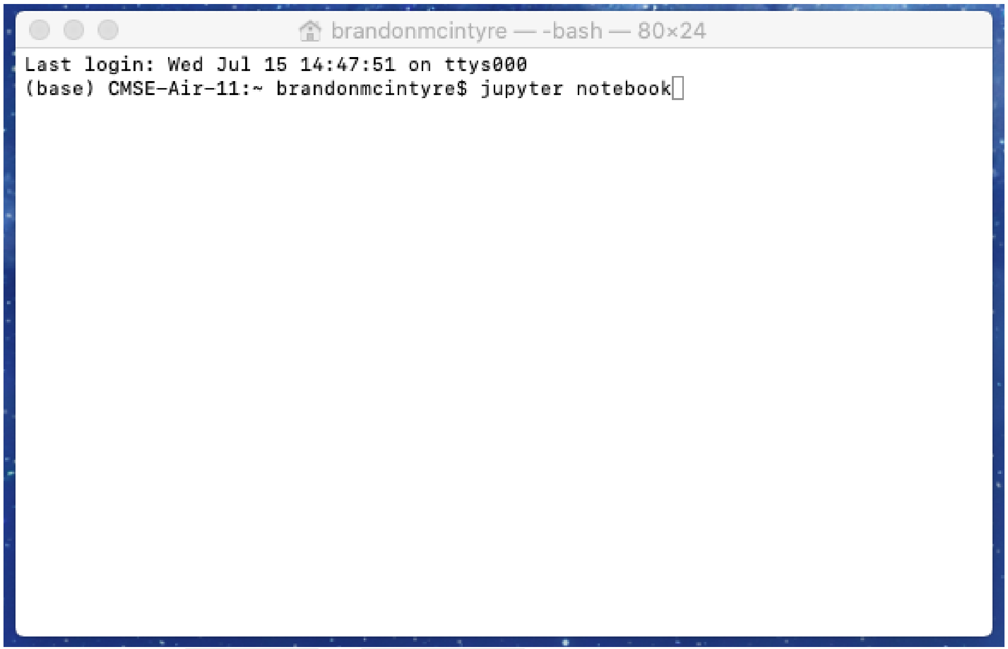


```
    package                    |            build
    ---------------------------|-----------------
    conda-4.8.3                |           py37_0         2.8 MB
    conda-package-handling-1.6.1|   py37h1de35cc_0         1.3 MB
    ------------------------------------------------------------
                                           Total:         4.1 MB

The following packages will be UPDATED:

  conda                                        4.8.2-py37_0 --> 4.8.3-py37_0
  conda-package-han~                   1.6.0-py37h1de35cc_0 --> 1.6.1-py37h1de35
cc_0


Proceed ([y]/n)? y


Downloading and Extracting Packages
conda-4.8.3          | 2.8 MB    | ##################################### | 100% 
conda-package-handli | 1.3 MB    | ##################################### | 100% 
Preparing transaction: done
Verifying transaction: done
Executing transaction: done
(base) CMSE-Air-11:~ brandonmcintyre$ 
```

If all goes well you should be all updated.

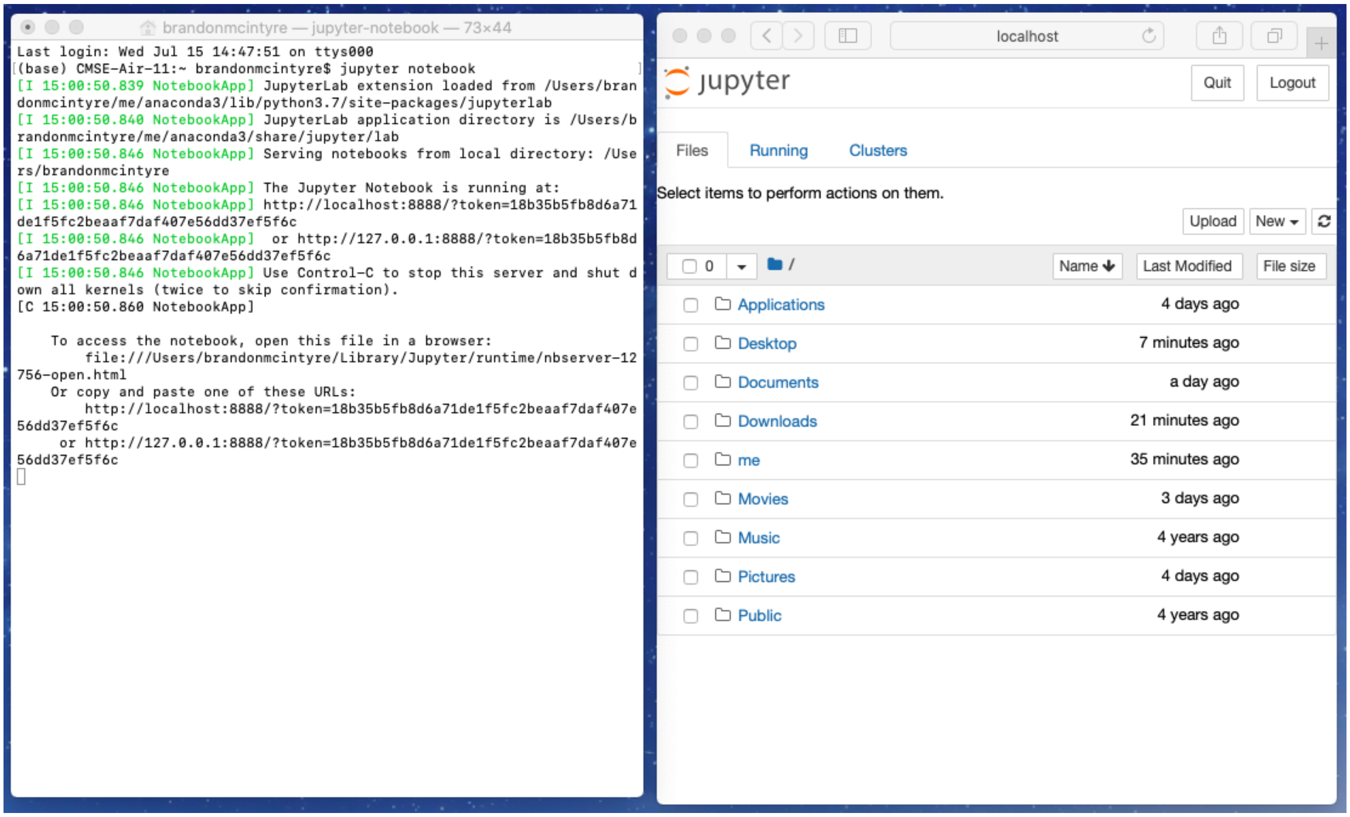
Also let's check to make sure that Anaconda is in your path.

1. Have anaconda installed on system.
2. Open up the terminal and run Jupyter Notebook.



```
Last login: Wed Jul 15 14:47:51 on ttys000
(base) CMSE-Air-11:~ brandonmcintyre$ jupyter notebook
```

Using Spotlight by pressing `command` + `space-bar` or simply use the search bar in the top right corner search `terminal` and press `Enter`. Then type in `jupyter notebook` and press `Enter`.

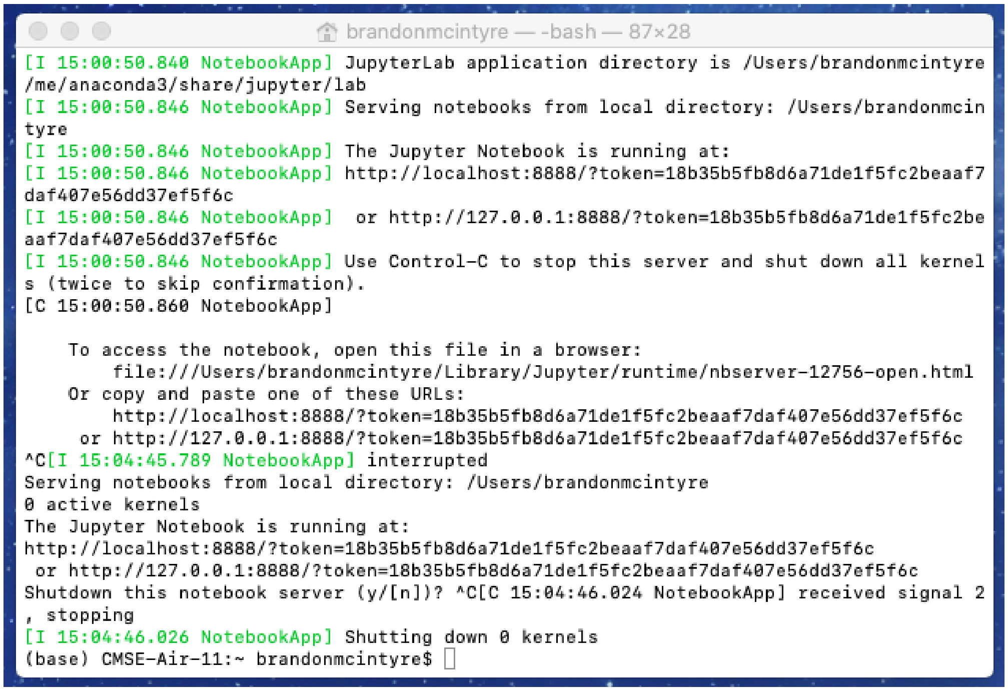


```
Last login: Wed Jul 15 14:47:51 on ttys000
(base) CMSE-Air-11:~ brandonmcintyre$ jupyter notebook
[I 15:00:50.839 NotebookApp] JupyterLab extension loaded from /Users/bran
donmcintyre/me/anaconda3/lib/python3.7/site-packages/jupyterlab
[I 15:00:50.840 NotebookApp] JupyterLab application directory is /Users/b
randonmcintyre/me/anaconda3/share/jupyter/lab
[I 15:00:50.846 NotebookApp] Serving notebooks from local directory: /Use
rs/brandonmcintyre
[I 15:00:50.846 NotebookApp] The Jupyter Notebook is running at:
[I 15:00:50.846 NotebookApp] http://localhost:8888/?token=18b35b5fb8d6a71
de1f5fc2beaaf7daf407e56dd37ef5f6c
[I 15:00:50.846 NotebookApp]  or http://127.0.0.1:8888/?token=18b35b5fb8d
6a71de1f5fc2beaaf7daf407e56dd37ef5f6c
[I 15:00:50.846 NotebookApp] Use Control-C to stop this server and shut d
own all kernels (twice to skip confirmation).
[C 15:00:50.860 NotebookApp]

    To access the notebook, open this file in a browser:
        file:///Users/brandonmcintyre/Library/Jupyter/runtime/nbserver-12
756-open.html
    Or copy and paste one of these URLs:
        http://localhost:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e
56dd37ef5f6c
     or http://127.0.0.1:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e
56dd37ef5f6c
```

Select items to perform actions on them.

Name	Last Modified	File size
□ Applications	4 days ago	
□ Desktop	7 minutes ago	
□ Documents	a day ago	
□ Downloads	21 minutes ago	
□ me	35 minutes ago	
□ Movies	3 days ago	
□ Music	4 years ago	
□ Pictures	4 days ago	
□ Public	4 years ago	

This should launch a jupyter notebook tab on a web browser and the terminal should look like this.

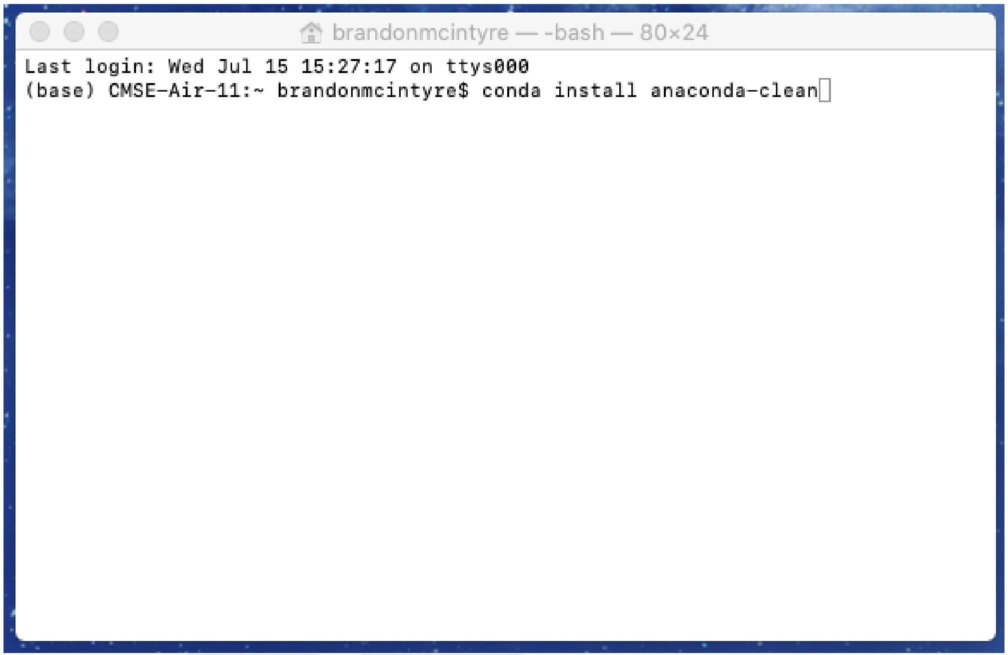


```
[I 15:00:50.840 NotebookApp] JupyterLab application directory is /Users/brandonmcintyre
/me/anaconda3/share/jupyter/lab
[I 15:00:50.846 NotebookApp] Serving notebooks from local directory: /Users/brandonmcin
tyre
[I 15:00:50.846 NotebookApp] The Jupyter Notebook is running at:
[I 15:00:50.846 NotebookApp] http://localhost:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7
daf407e56dd37ef5f6c
[I 15:00:50.846 NotebookApp]  or http://127.0.0.1:8888/?token=18b35b5fb8d6a71de1f5fc2be
aaf7daf407e56dd37ef5f6c
[I 15:00:50.846 NotebookApp] Use Control-C to stop this server and shut down all kernel
s (twice to skip confirmation).
[C 15:00:50.860 NotebookApp]

    To access the notebook, open this file in a browser:
        file:///Users/brandonmcintyre/Library/Jupyter/runtime/nbserver-12756-open.html
    Or copy and paste one of these URLs:
        http://localhost:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e56dd37ef5f6c
     or http://127.0.0.1:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e56dd37ef5f6c
^C[I 15:04:45.789 NotebookApp] interrupted
Serving notebooks from local directory: /Users/brandonmcintyre
0 active kernels
The Jupyter Notebook is running at:
http://localhost:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e56dd37ef5f6c
 or http://127.0.0.1:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e56dd37ef5f6c
Shutdown this notebook server (y/[n])? ^C[C 15:04:46.024 NotebookApp] received signal 2
, stopping
[I 15:04:46.026 NotebookApp] Shutting down 0 kernels
(base) CMSE-Air-11:~ brandonmcintyre$ 
```

To exit jupyter notebook close the tab on the web browser, and go to the terminal window and type `control` + `c` twice in a row.

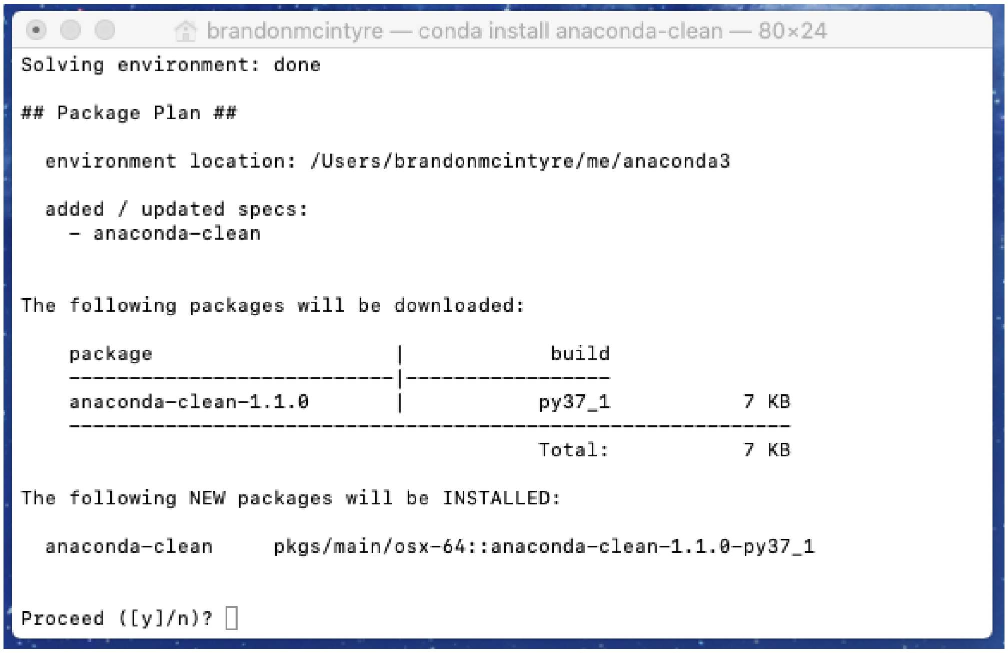
If any of the above fail, remove anaconda and reinstall. To remove Anaconda follow these steps.

1. Make sure you have read the above notes.
2. Open up the terminal and download `anconda-clean`



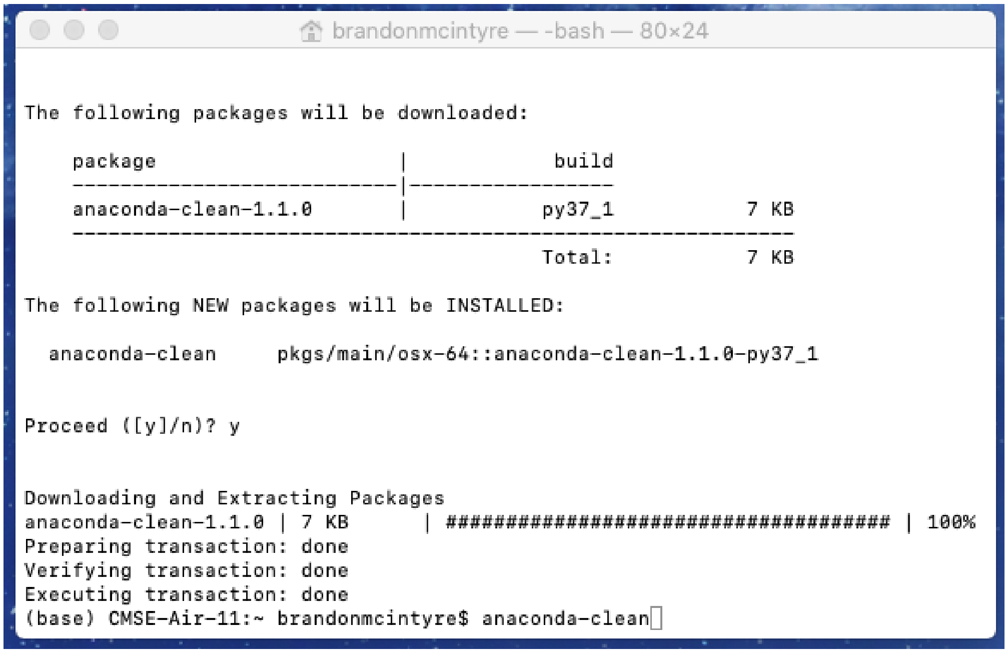
```
Last login: Wed Jul 15 15:27:17 on ttys000
(base) CMSE-Air-11:~ brandonmcintyre$ conda install anaconda-clean
```

Using Spotlight by pressing `command` + `space-bar` or simply use the search bar in the top right corner search `terminal` and press `Enter` . Then type in `conda install anaconda-clean` and press `Enter` . (If this fails, continue on with as much as you can, then reinstall)



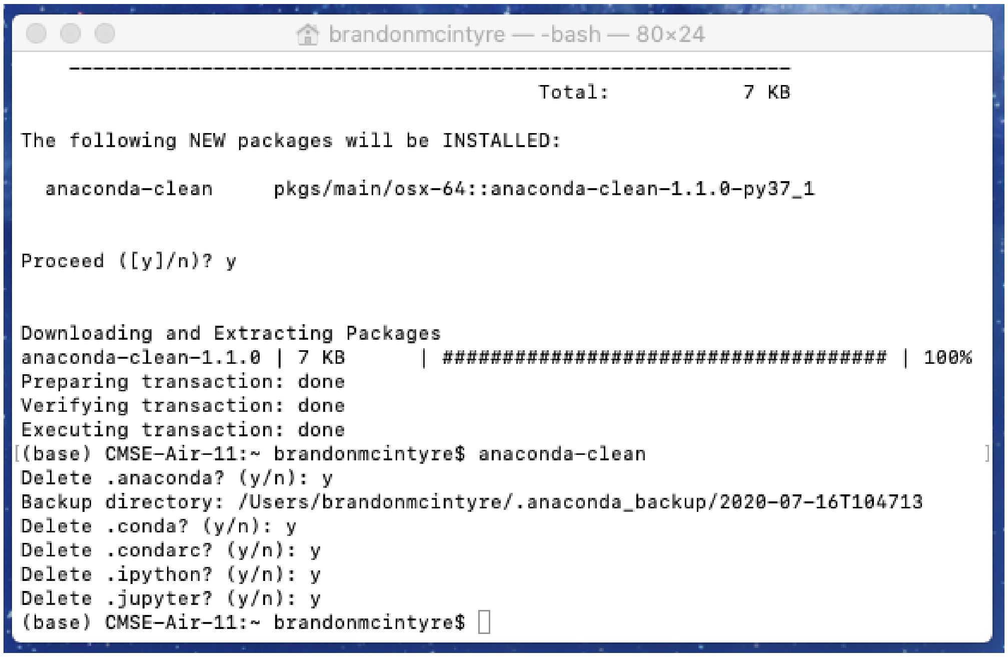
```
Solving environment: done

## Package Plan ##

  environment location: /Users/brandonmcintyre/me/anaconda3

  added / updated specs:
    - anaconda-clean


The following packages will be downloaded:

    package                    |            build
    ---------------------------|-----------------
    anaconda-clean-1.1.0       |           py37_1           7 KB
    ------------------------------------------------------------
                                           Total:           7 KB

The following NEW packages will be INSTALLED:

  anaconda-clean     pkgs/main/osx-64::anaconda-clean-1.1.0-py37_1


Proceed ([y]/n)? 
```

To continue type y and press enter.



```

The following packages will be downloaded:

    package                    |            build
    ---------------------------|-----------------
    anaconda-clean-1.1.0       |           py37_1           7 KB
    ------------------------------------------------------------
                                           Total:           7 KB

The following NEW packages will be INSTALLED:

  anaconda-clean     pkgs/main/osx-64::anaconda-clean-1.1.0-py37_1


Proceed ([y]/n)? y


Downloading and Extracting Packages
anaconda-clean-1.1.0 | 7 KB      | ##################################### | 100%
Preparing transaction: done
Verifying transaction: done
Executing transaction: done
(base) CMSE-Air-11:~ brandonmcintyre$ anaconda-clean
```

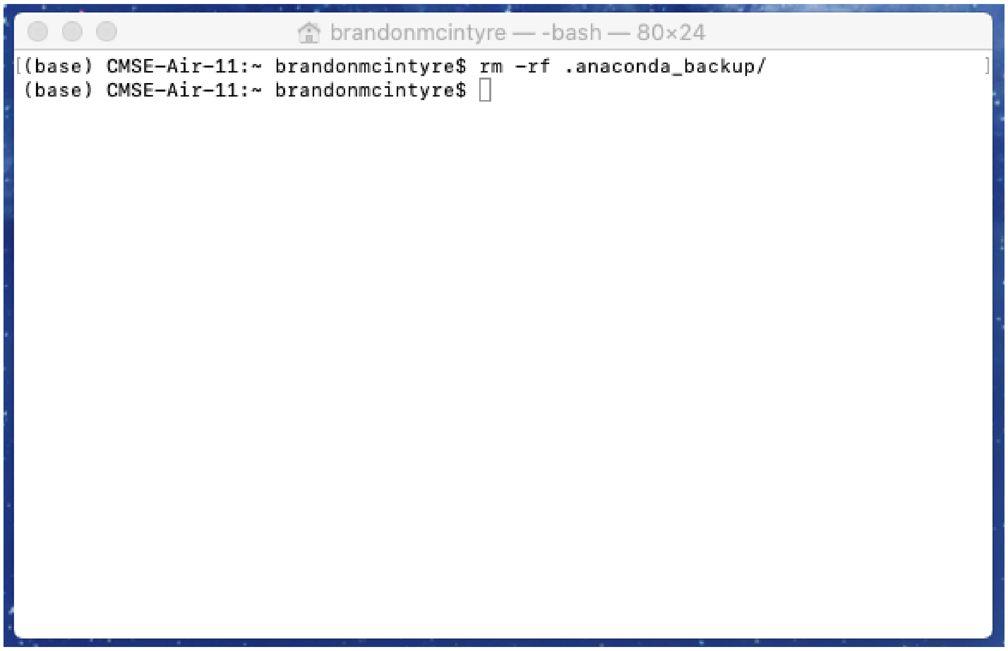
Type in the terminal `anaconda-clean --yes` and press `Enter` . (or you can run it without the `--yes` , but will have to agree to each deletion.)



```
    ------------------------------------------------------------
                                            Total:           7 KB

The following NEW packages will be INSTALLED:

  anaconda-clean     pkgs/main/osx-64::anaconda-clean-1.1.0-py37_1


Proceed ([y]/n)? y


Downloading and Extracting Packages
anaconda-clean-1.1.0 | 7 KB      | ##################################### | 100%
Preparing transaction: done
Verifying transaction: done
Executing transaction: done
[(base) CMSE-Air-11:~ brandonmcintyre$ anaconda-clean
Delete .anaconda? (y/n): y
Backup directory: /Users/brandonmcintyre/.anaconda_backup/2020-07-16T104713
Delete .conda? (y/n): y
Delete .condarc? (y/n): y
Delete .ipython? (y/n): y
Delete .jupyter? (y/n): y
(base) CMSE-Air-11:~ brandonmcintyre$ 
```

If all goes well you should not encounter any errors. This process deleted some anaconda files, but there are still some more to delete.

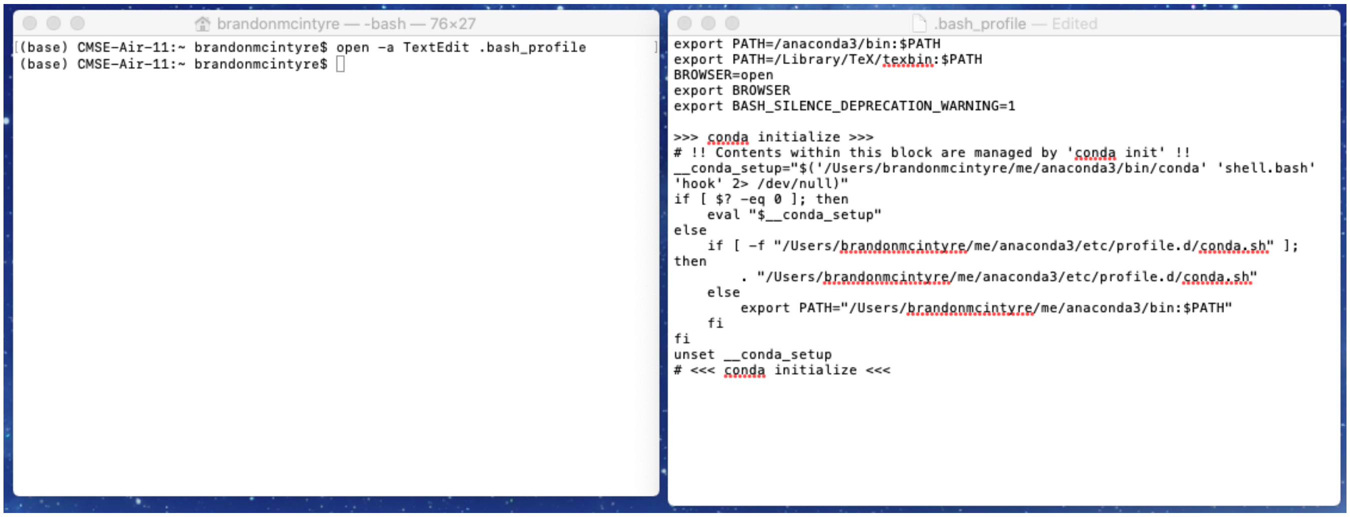
3. Delete the `.anaconda_backup` .



```
[(base) CMSE-Air-11:~ brandonmcintyre$ rm -rf .anaconda_backup/
 (base) CMSE-Air-11:~ brandonmcintyre$ 
```

We now can remove the `.anaconda_backup` by typing `rm -rf .anaconda_backup` . Then press `Enter` .

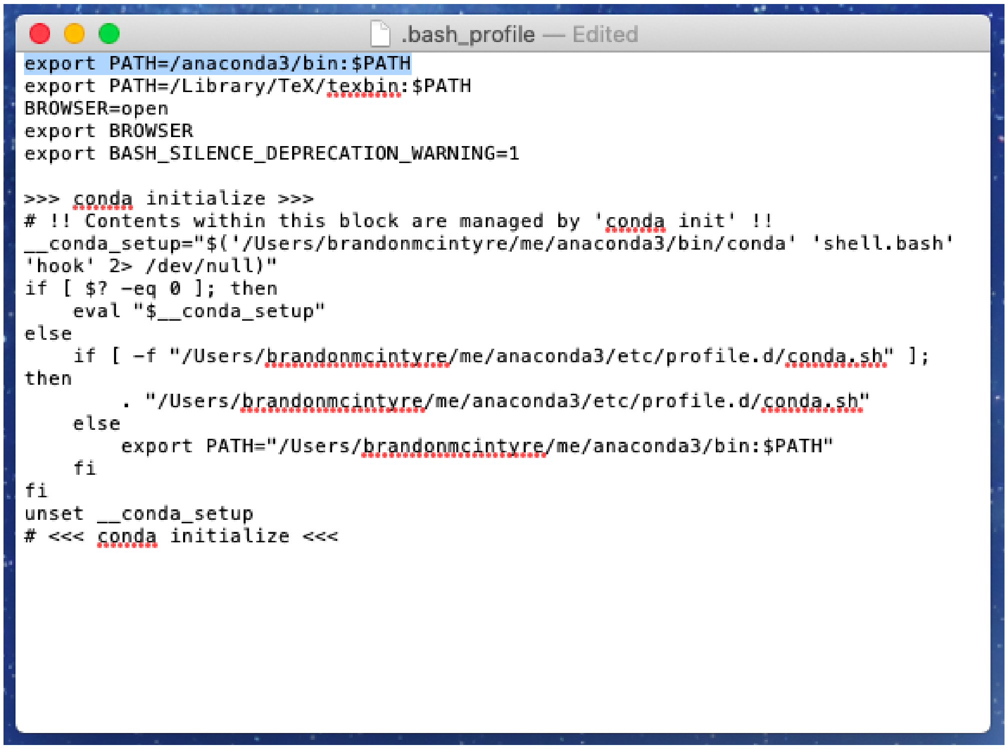
4. Edit the `.bash_profile` .



```
(base) CMSE-Air-11:~ brandonmcintyre$ open -a TextEdit .bash_profile
(base) CMSE-Air-11:~ brandonmcintyre$
```

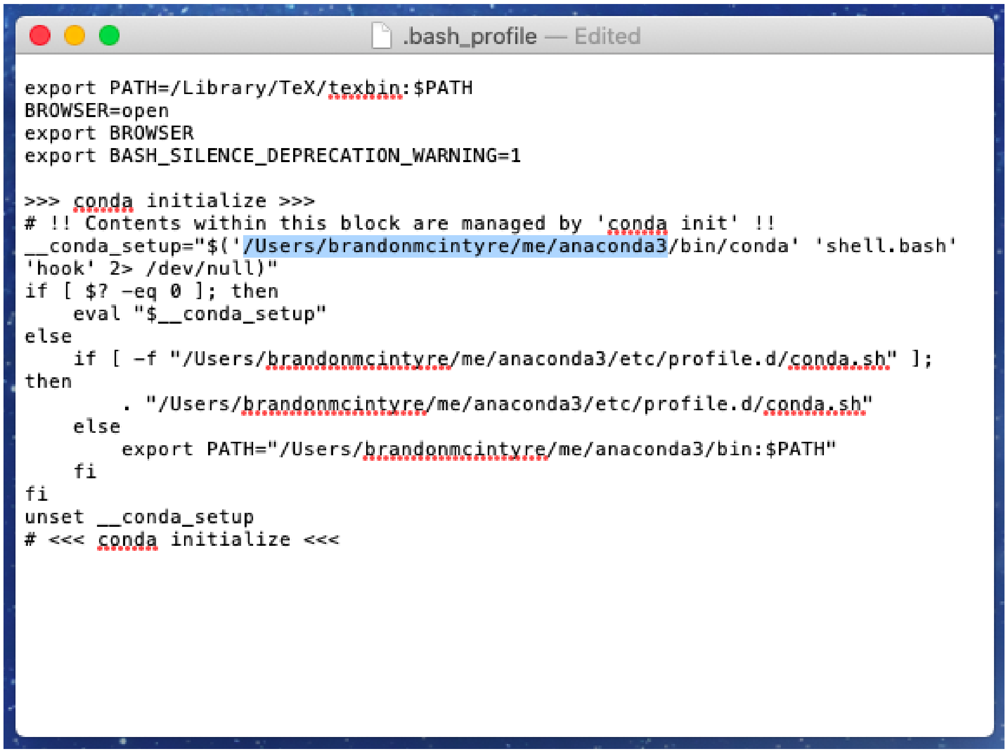
```
export PATH=/anaconda3/bin:$PATH
export PATH=/Library/TeX/texbin:$PATH
BROWSER=open
export BROWSER
export BASH_SILENCE_DEPRECATION_WARNING=1

>>> conda initialize >>>
# !! Contents within this block are managed by 'conda init' !!
__conda_setup="$('/Users/brandonmcintyre/me/anaconda3/bin/conda' 'shell.bash'
'hook' 2> /dev/null)"
if [ $? -eq 0 ]; then
    eval "$__conda_setup"
else
    if [ -f "/Users/brandonmcintyre/me/anaconda3/etc/profile.d/conda.sh" ];
then
        . "/Users/brandonmcintyre/me/anaconda3/etc/profile.d/conda.sh"
    else
        export PATH="/Users/brandonmcintyre/me/anaconda3/bin:$PATH"
    fi
fi
unset __conda_setup
# <<< conda initialize <<<
```

Next we need to edit our `.bash_profile` to remove Anaconda references. To open the file type `open -a TextEdit .bash_profile` and press `Enter` this will open the file in `TextEdit`.



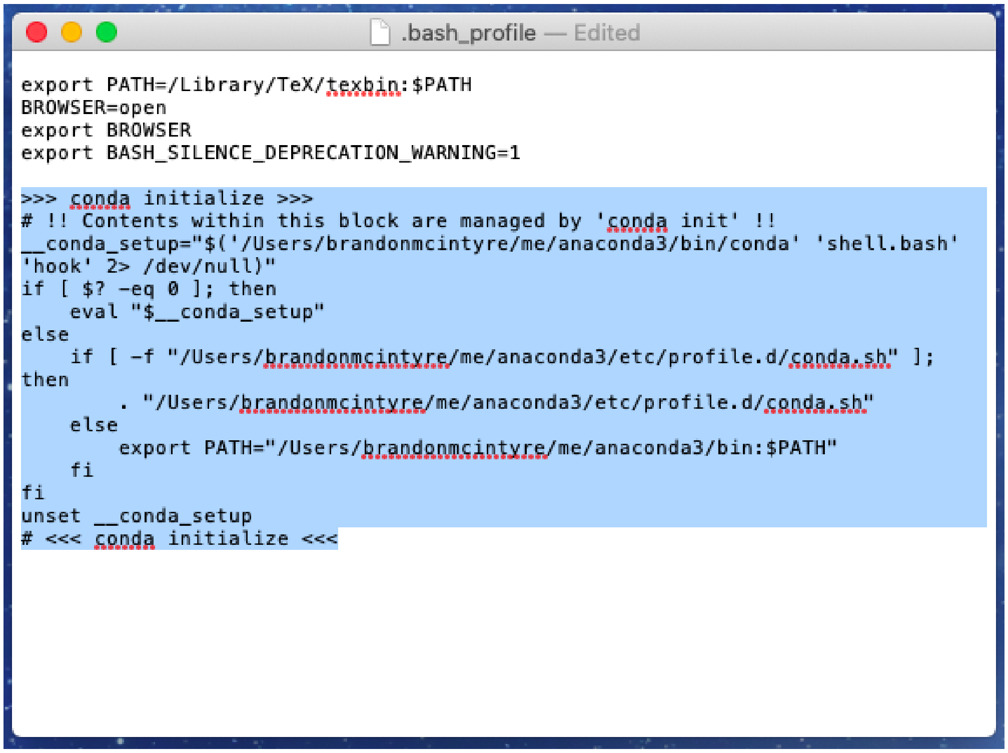
```
export PATH=/anaconda3/bin:$PATH
export PATH=/Library/TeX/texbin:$PATH
BROWSER=open
export BROWSER
export BASH_SILENCE_DEPRECATION_WARNING=1

>>> conda initialize >>>
# !! Contents within this block are managed by 'conda init' !!
__conda_setup="$('/Users/brandonmcintyre/me/anaconda3/bin/conda' 'shell.bash'
'hook' 2> /dev/null)"
if [ $? -eq 0 ]; then
    eval "$__conda_setup"
else
    if [ -f "/Users/brandonmcintyre/me/anaconda3/etc/profile.d/conda.sh" ];
then
        . "/Users/brandonmcintyre/me/anaconda3/etc/profile.d/conda.sh"
    else
        export PATH="/Users/brandonmcintyre/me/anaconda3/bin:$PATH"
    fi
fi
unset __conda_setup
# <<< conda initialize <<<
```

First you will want to delete the line, *if it exists*, that says `export PATH=[MAYBE_DIFFERENT_FOR_YOUR_SYSTEM]/anaconda3/bin:PATH`. Note that it may be different for your system but you are looking for something generally like this.



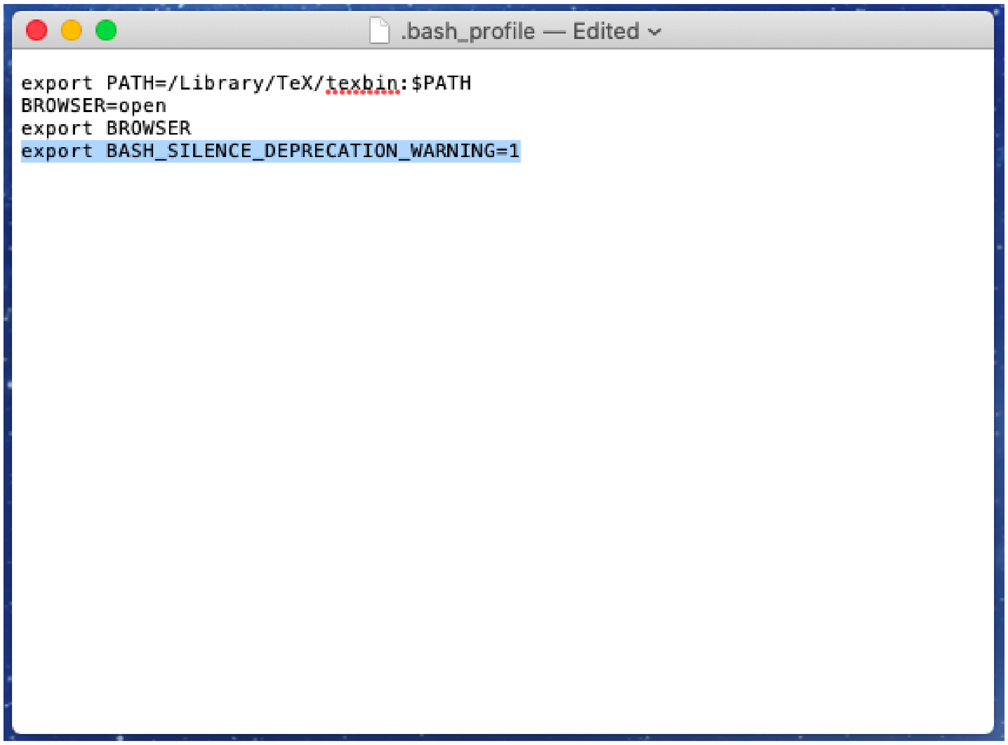
```
export PATH=/Library/TeX/texbin:$PATH
BROWSER=open
export BROWSER
export BASH_SILENCE_DEPRECATION_WARNING=1

>>> conda initialize >>>
# !! Contents within this block are managed by 'conda init' !!
__conda_setup="$('/Users/brandonmcintyre/me/anaconda3/bin/conda' 'shell.bash'
'hook' 2> /dev/null)"
if [ $? -eq 0 ]; then
    eval "$__conda_setup"
else
    if [ -f "/Users/brandonmcintyre/me/anaconda3/etc/profile.d/conda.sh" ];
then
        . "/Users/brandonmcintyre/me/anaconda3/etc/profile.d/conda.sh"
    else
        export PATH="/Users/brandonmcintyre/me/anaconda3/bin:$PATH"
    fi
fi
unset __conda_setup
# <<< conda initialize <<<
```

Next we will need to note the path to the Anaconda3 folder. You can see this here in the file. We can copy this path to our clipboard by pressing `command` + `c`. Be sure to copy only up to the end of `anaconda3`.



```
export PATH=/Library/TeX/texbin:$PATH
BROWSER=open
export BROWSER
export BASH_SILENCE_DEPRECATION_WARNING=1

>>> conda initialize >>>
# !! Contents within this block are managed by 'conda init' !!
__conda_setup="$('/Users/brandonmcintyre/me/anaconda3/bin/conda' 'shell.bash'
'hook' 2> /dev/null)"
if [ $? -eq 0 ]; then
    eval "$__conda_setup"
else
    if [ -f "/Users/brandonmcintyre/me/anaconda3/etc/profile.d/conda.sh" ];
then
        . "/Users/brandonmcintyre/me/anaconda3/etc/profile.d/conda.sh"
    else
        export PATH="/Users/brandonmcintyre/me/anaconda3/bin:$PATH"
    fi
fi
unset __conda_setup
# <<< conda initialize <<<
```

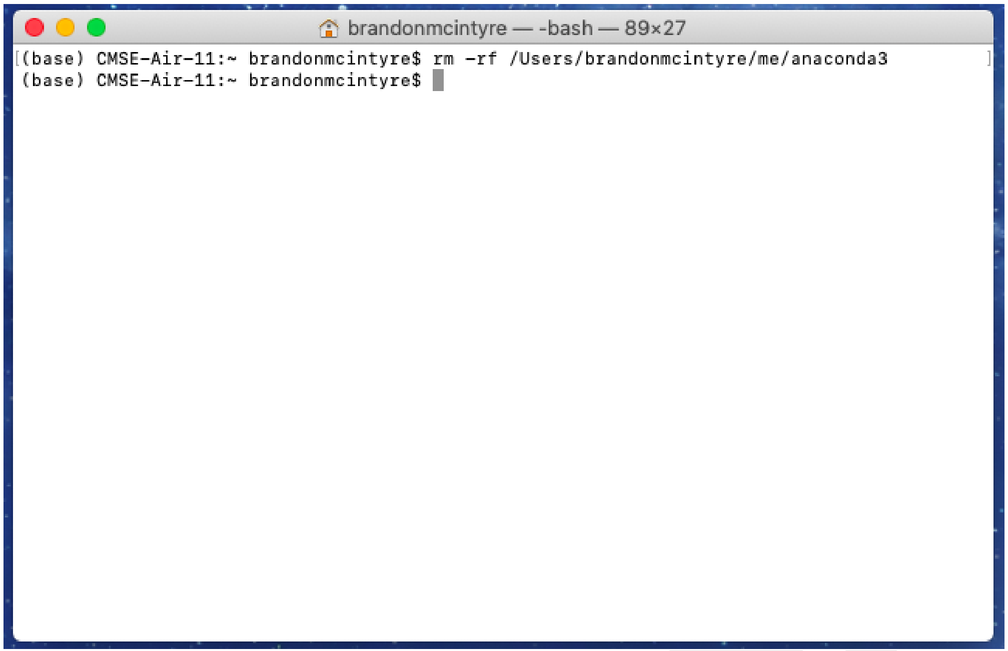
Now we will need to delete the `conda initalize` block.



```
export PATH=/Library/TeX/texbin:$PATH
BROWSER=open
export BROWSER
export BASH_SILENCE_DEPRECATION_WARNING=1
```

The file should now be cleared of what is needed. (*Note: If you are on on macOS Catalina notice the last line in this file. This is what you need to silence the warning you get when booting up the Terminal if you are using `bash` (which is what was recommended). You can put this line in there if you would like to silence this warning*)

5. Using the path that you copied from the previous, we need to delete `Anaconda3` folder.



```
(base) CMSE-Air-11:~ brandonmcintyre$ rm -rf /Users/brandonmcintyre/me/anaconda3
(base) CMSE-Air-11:~ brandonmcintyre$ 
```

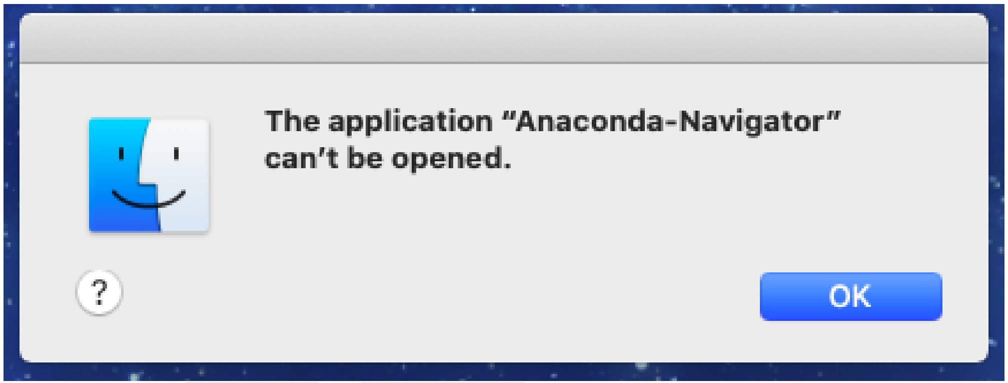
Go back to the terminal and type the following `rm -rf` then press `command` + `v`. When done it should look like the following `rm -rf /Users/brandonmcintyre/me/anaconda3`, but be aware the path that was copied over will be different for you. Then press `Enter`. This might take a few moments to run, be paitent.

6. Congrats, you are done. Now you can re-install Anaconda.

Catalina Update

This section is only for if you are running macOS Catalina or later

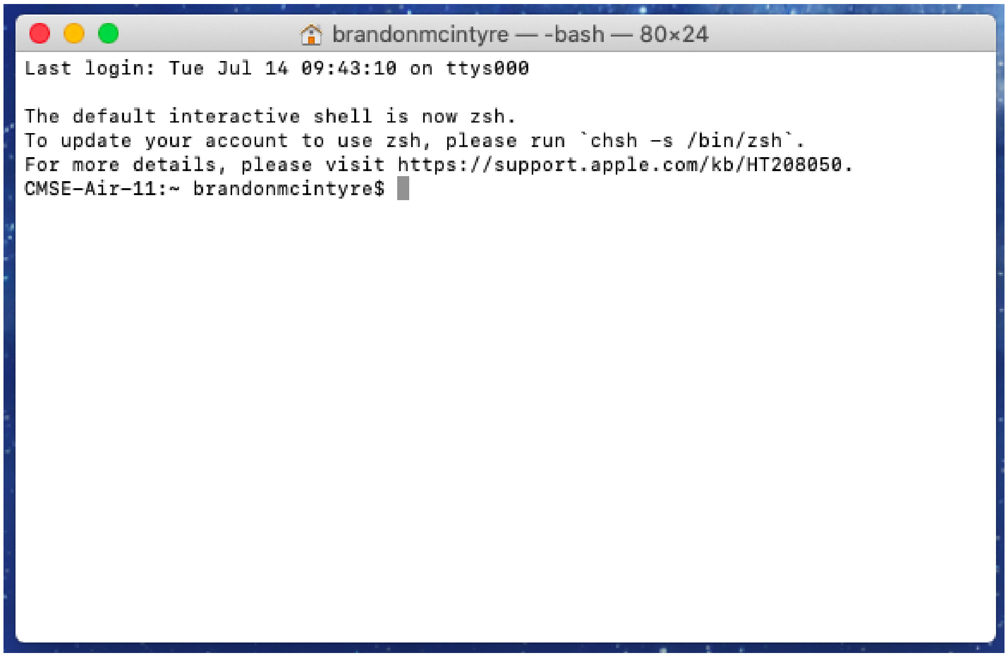
1. Make sure Anaconda is broken by trying to open `Anaconda-Navigator`.



The application "Anaconda-Navigator" can't be opened.

Using Spotlight by pressing `command` + `space-bar` or simply use the search bar in the top right corner search `Anaconda-Navigator` and press `Enter`. If you recive this prompt, your Anaconda is broken.

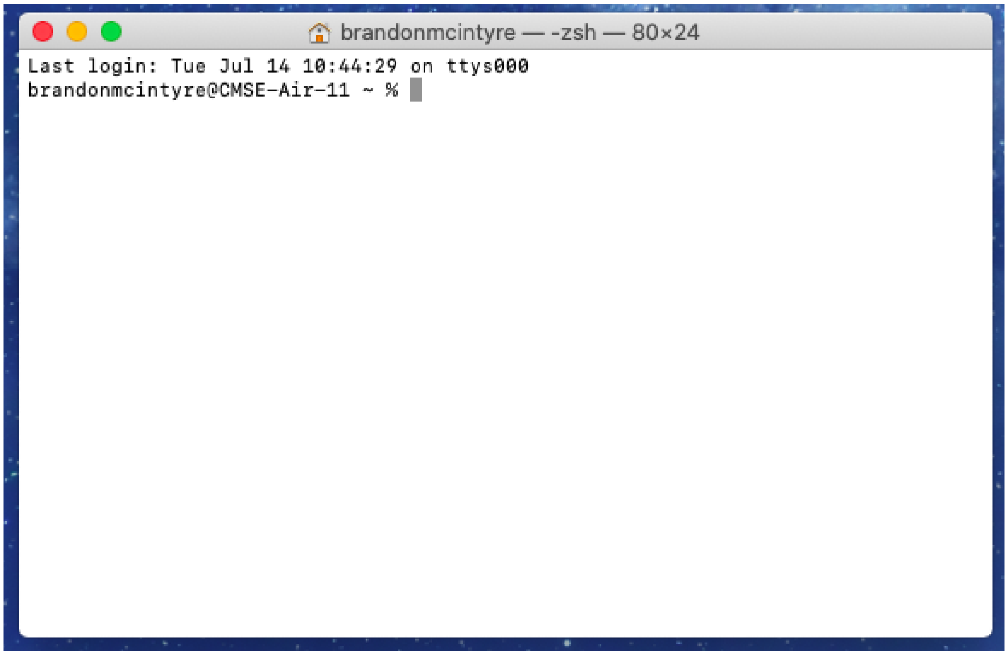
2. Open the terminal and see if you notice the warning "The default interactive shell is now zsh". Using Spotlight by pressing `command` + `space-bar` or simply use the search bar in the top right corner search `terminal` and press `Enter`. If you *do not* see the warning, and the top of the terminal says something like this `[YOUR_USERNAME_HERE] - -zsh - [SIZE_OF_WINDOW]` skip to the next step 2a.



```
Last login: Tue Jul 14 09:43:10 on ttys000

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit https://support.apple.com/kb/HT208050.
CMSE-Air-11:~ brandonmcintyre$ 
```

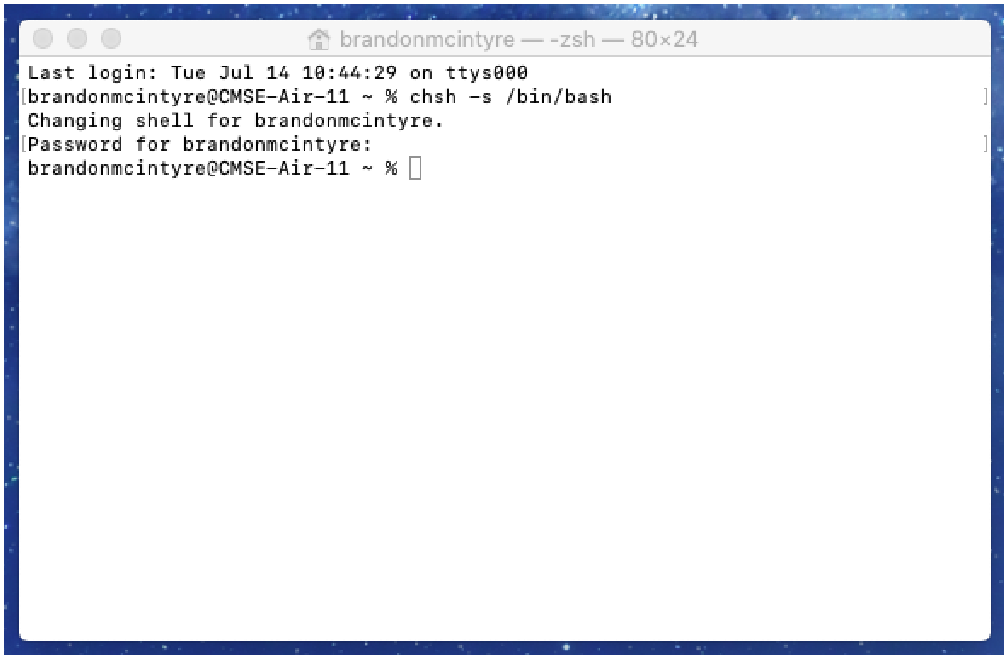
The warning means that the default "shell" terminal macOS Catalina uses has changed from `bash` to `zsh`. The "shell" is basically the program you give commands to that gives commands to the computer. This warning will always pop up everytime terminal is started. You can do a few things about this: do nothing, remove the warning (https://www.saintlad.com/hide-default-interactive-shell-is-now-zsh-in-terminal-on-macos/), or change your shell to `zsh` at your own risk as we will be using `bash` in this course. (If you do change your shell it will change the configuration files you use, which if you follow this guide (https://scriptingosx.com/2019/06/moving-to-zsh-part-2-configuration-files/) you can transfer the `.bashrc` and like files to the appropiate `.zshrc` like files. If you want to change back to the `bash` shell you can run the command `chsh -s /bin/bash`.) Move to step 3 after deciding on your option.

2a.



```
Last login: Tue Jul 14 10:44:29 on ttys000
brandonmcintyre@CMSE-Air-11 ~ %
```

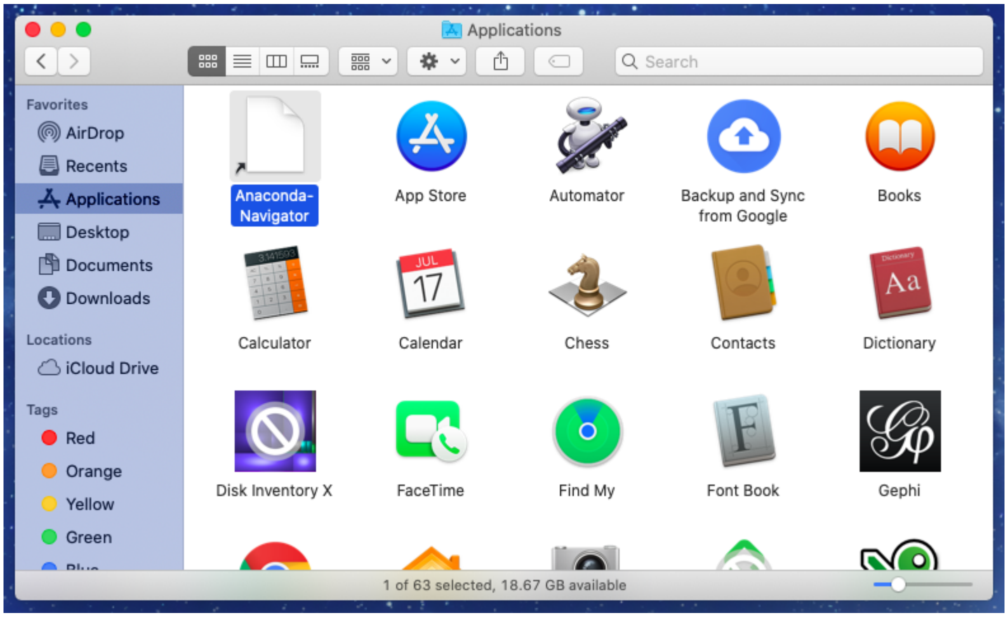
Currently, you are running the `zsh` shell. This is either because you changed it yourself, or you created a new user account on a MAC that is running macOS Catalina. The "shell" is basically the program you give commands to that gives commands to the computer. You may stay on this shell at your at your own risk as we will be using the `bash` shell in this course. (If you *do not* change your shell you will be using different configuration files, which if you [follow this guide (https://scriptingosx.com/2019/06/moving-to-zsh-part-2-configuration-files/)](https://scriptingosx.com/2019/06/moving-to-zsh-part-2-configuration-files/) you can transfer `.bashrc` settings and like files to the appropiate `.zshrc` settings and like files).



```
Last login: Tue Jul 14 10:44:29 on ttys000
brandonmcintyre@CMSE-Air-11 ~ % chsh -s /bin/bash
Changing shell for brandonmcintyre.
Password for brandonmcintyre:
brandonmcintyre@CMSE-Air-11 ~ %
```

If you want to change to the `bash` shell you can type `chsh -s /bin/bash` in the Terminal and pressing `Enter`. You will then be prompted to enter the password to the user account. Then close and re-open terminal and you should notice the warning in which case you can go back to step 2.

3. Move the `Anaconda-Navigator` in the `Applications` folder into the trash.



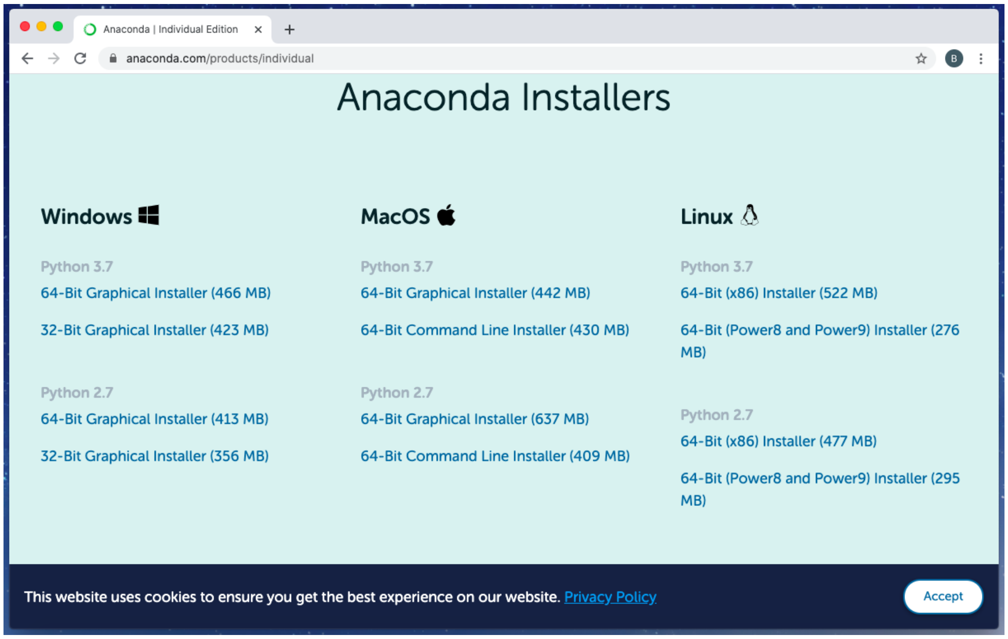
Open up `finder` and navigate to the `Applications` folder by clicking on the folder in the navigation pane on the left hand side of the `finder` window. Then click and drag the `Anaconda-Navigator` to the `Trash` in the bottom right hand corner of the screen. If `Anaconda-Navigator` is also in your dock, you can also move that to the `trash` .

4. Follow the steps to install Anaconda.

If you don't have a fully functioning up-to-date installation of Anaconda

Instructions for downloading Anaconda (Python 3.7.x):

1. Go to the Anaconda Download webpage: (https://www.anaconda.com/download/)
2. Use the `download` button under the `Your data science toolkit` (or just scroll until you see `Anaconda Installers`)


Anaconda | Individual Edition
anaconda.com/products/individual
Accept

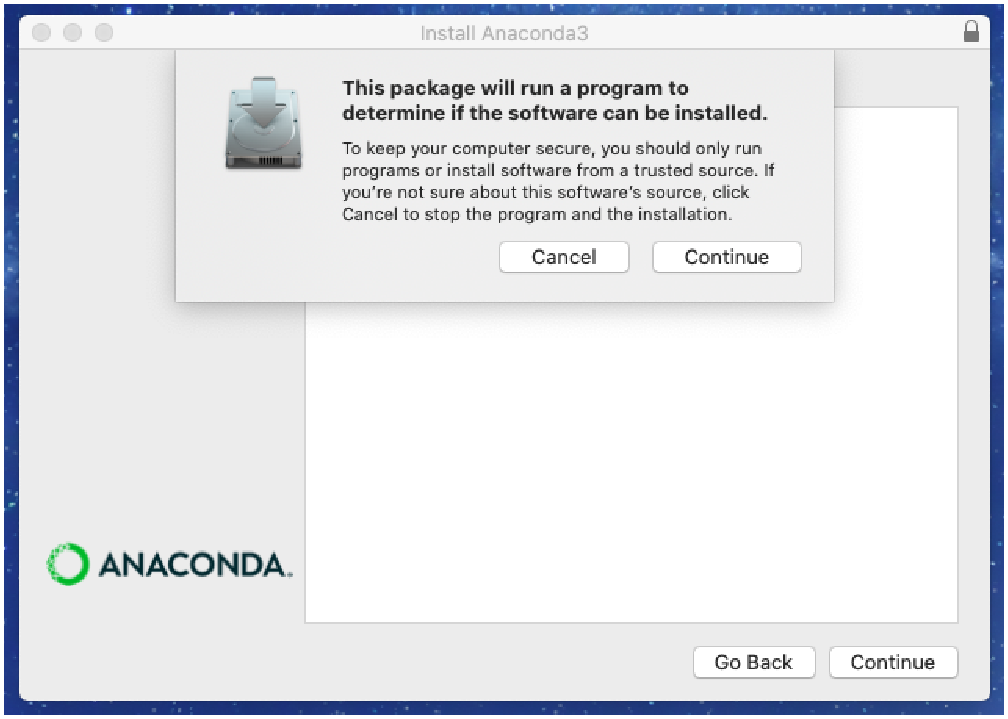
Anaconda Installers

Windows	MacOS	Linux
Python 3.7	Python 3.7	Python 3.7
64-Bit Graphical Installer (466 MB)	64-Bit Graphical Installer (442 MB)	64-Bit (x86) Installer (522 MB)
32-Bit Graphical Installer (423 MB)	64-Bit Command Line Installer (430 MB)	64-Bit (Power8 and Power9) Installer (276 MB)
Python 2.7	Python 2.7	Python 2.7
64-Bit Graphical Installer (413 MB)	64-Bit Graphical Installer (637 MB)	64-Bit (x86) Installer (477 MB)
32-Bit Graphical Installer (356 MB)	64-Bit Command Line Installer (409 MB)	64-Bit (Power8 and Power9) Installer (295 MB)

This website uses cookies to ensure you get the best experience on our website. Privacy Policy

3. Download the Python 3.7 version, you'll notice there is a "Graphical" and "Command Line" installer. This guide covers the Graphical, but feel free to use the Command Line if you wish.

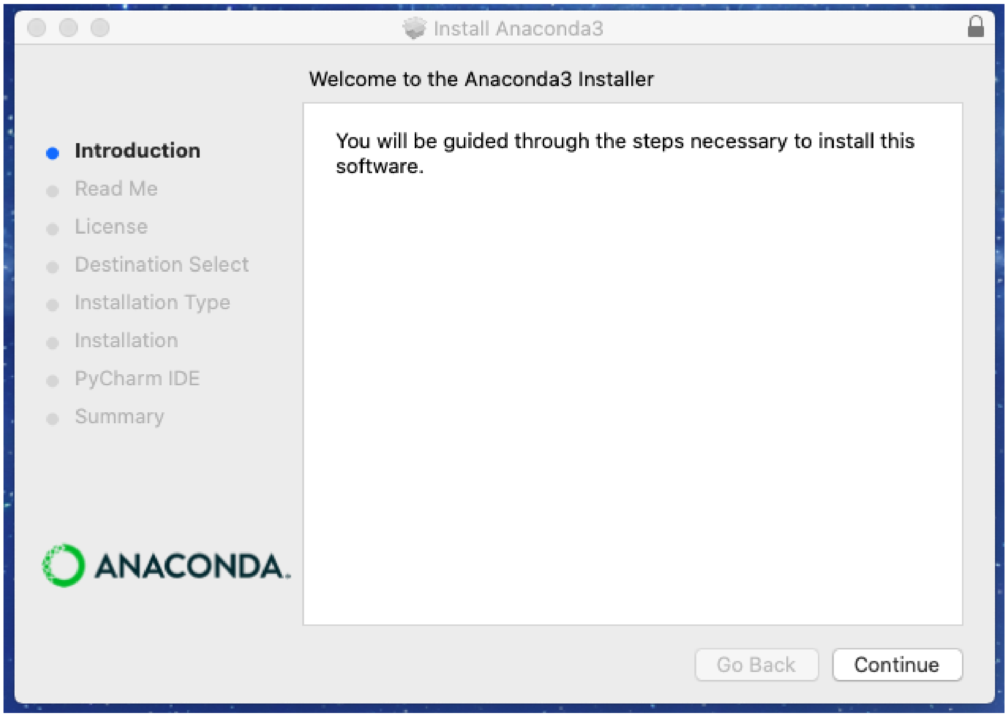
4. After downloading, run the `Anaconda3` installer that popped into the dock (or you can open it from the `Downloads` folder as well).



This package will run a program to determine if the software can be installed.

To keep your computer secure, you should only run programs or install software from a trusted source. If you're not sure about this software's source, click Cancel to stop the program and the installation.

Press the `Continue` button

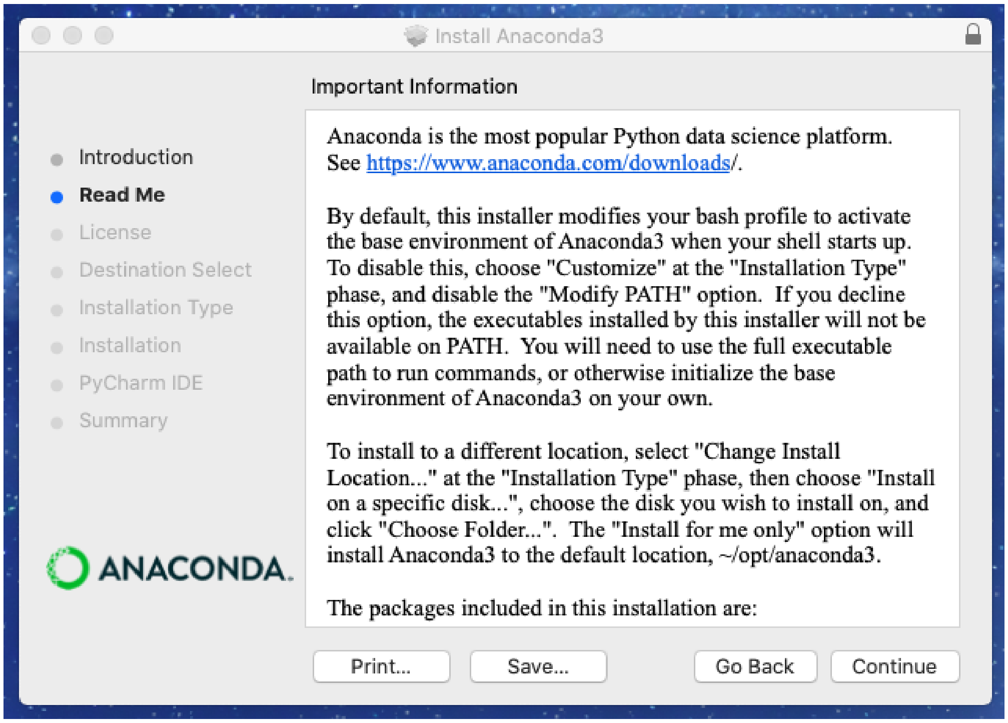


Welcome to the Anaconda3 Installer

- Introduction
- Read Me
- License
- Destination Select
- Installation Type
- Installation
- PyCharm IDE
- Summary

You will be guided through the steps necessary to install this software.

Press the `Continue` button.



Important Information

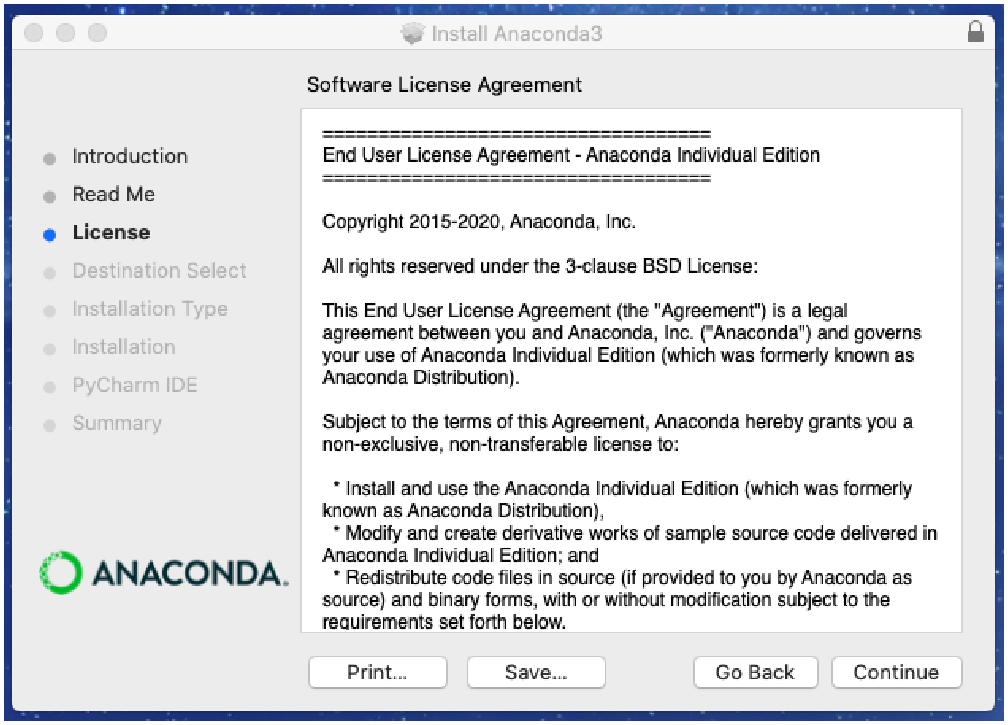
Anaconda is the most popular Python data science platform. See https://www.anaconda.com/downloads/.

By default, this installer modifies your bash profile to activate the base environment of Anaconda3 when your shell starts up. To disable this, choose "Customize" at the "Installation Type" phase, and disable the "Modify PATH" option. If you decline this option, the executables installed by this installer will not be available on PATH. You will need to use the full executable path to run commands, or otherwise initialize the base environment of Anaconda3 on your own.

To install to a different location, select "Change Install Location..." at the "Installation Type" phase, then choose "Install on a specific disk...", choose the disk you wish to install on, and click "Choose Folder...". The "Install for me only" option will install Anaconda3 to the default location, ~/opt/anaconda3.

The packages included in this installation are:

Press the `Continue` button.



Software License Agreement

===================================
End User License Agreement - Anaconda Individual Edition
===================================

Copyright 2015-2020, Anaconda, Inc.

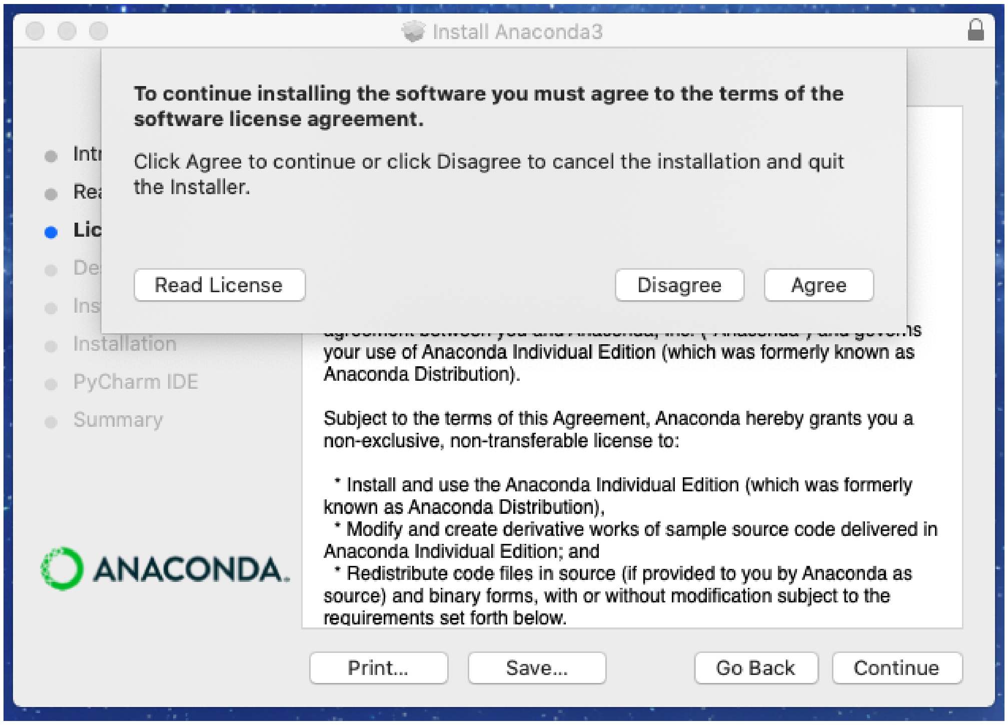
All rights reserved under the 3-clause BSD License:

This End User License Agreement (the "Agreement") is a legal agreement between you and Anaconda, Inc. ("Anaconda") and governs your use of Anaconda Individual Edition (which was formerly known as Anaconda Distribution).

Subject to the terms of this Agreement, Anaconda hereby grants you a non-exclusive, non-transferable license to:

 * Install and use the Anaconda Individual Edition (which was formerly known as Anaconda Distribution),
 * Modify and create derivative works of sample source code delivered in Anaconda Individual Edition; and
 * Redistribute code files in source (if provided to you by Anaconda as source) and binary forms, with or without modification subject to the requirements set forth below.

Press the `Continue` button.



To continue installing the software you must agree to the terms of the software license agreement.

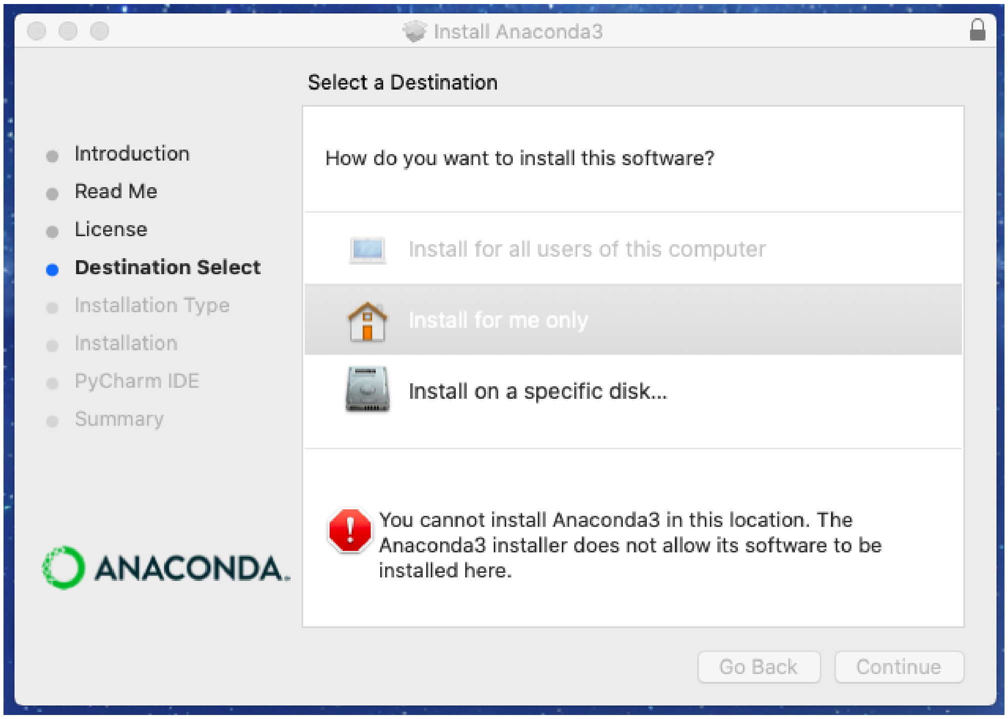
Click Agree to continue or click Disagree to cancel the installation and quit the Installer.

your use of Anaconda Individual Edition (which was formerly known as Anaconda Distribution).

Subject to the terms of this Agreement, Anaconda hereby grants you a non-exclusive, non-transferable license to:

* Install and use the Anaconda Individual Edition (which was formerly known as Anaconda Distribution),
* Modify and create derivative works of sample source code delivered in Anaconda Individual Edition; and
* Redistribute code files in source (if provided to you by Anaconda as source) and binary forms, with or without modification subject to the requirements set forth below.

Press the `Agree` button.

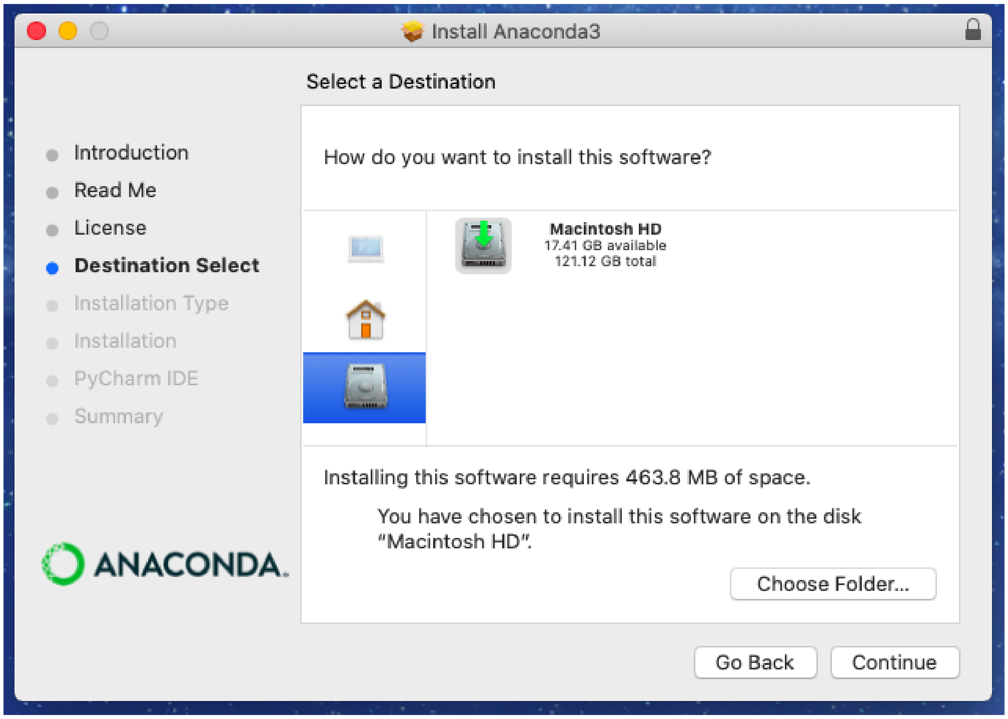


Select a Destination

How do you want to install this software?

You cannot install Anaconda3 in this location. The Anaconda3 installer does not allow its software to be installed here.

You may notice that there is an error if you are running macOS Catalina or higher. We will want to change the destination for both the sake of macOS Catalina users, and those that are running macOS Mojave or sooner in case if you ever do update to macOS Catalina. Click on `Install on a specific disk...`

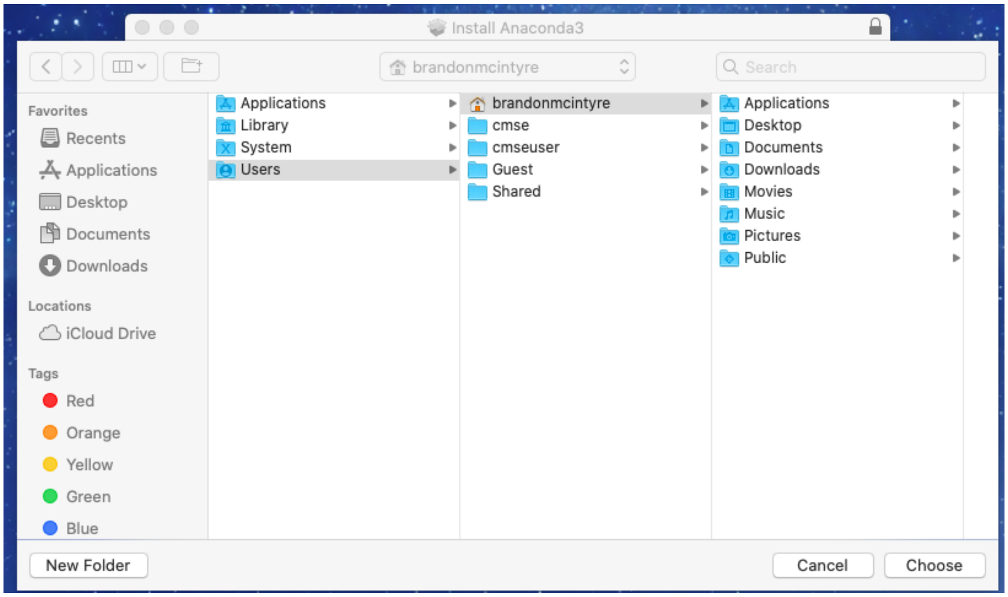


How do you want to install this software?

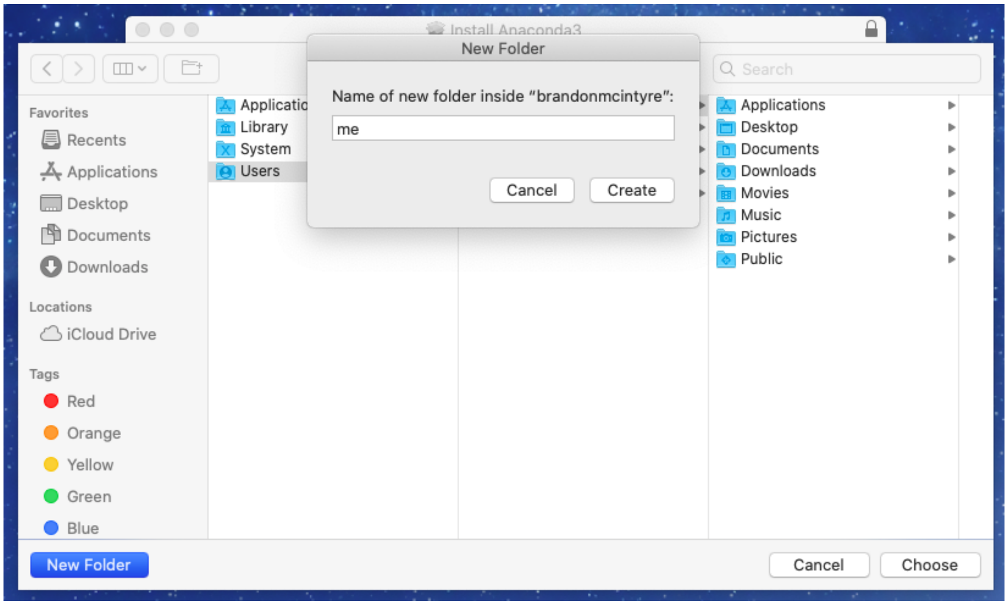
Installing this software requires 463.8 MB of space.

You have chosen to install this software on the disk "Macintosh HD".

Make sure to click and select your main harddrive (You may only have one if no other storage device is connected to the compiter). Then click the `Choose Folder...` button.



Then click on the `Users -> [YOUR_USERNAME]`. The `[YOUR_USERNAME]` should be the username of the account you are logged into. In my case this is `brandonmcintyre`. Then click in the bottom left hand corner on the `New Folder` button.

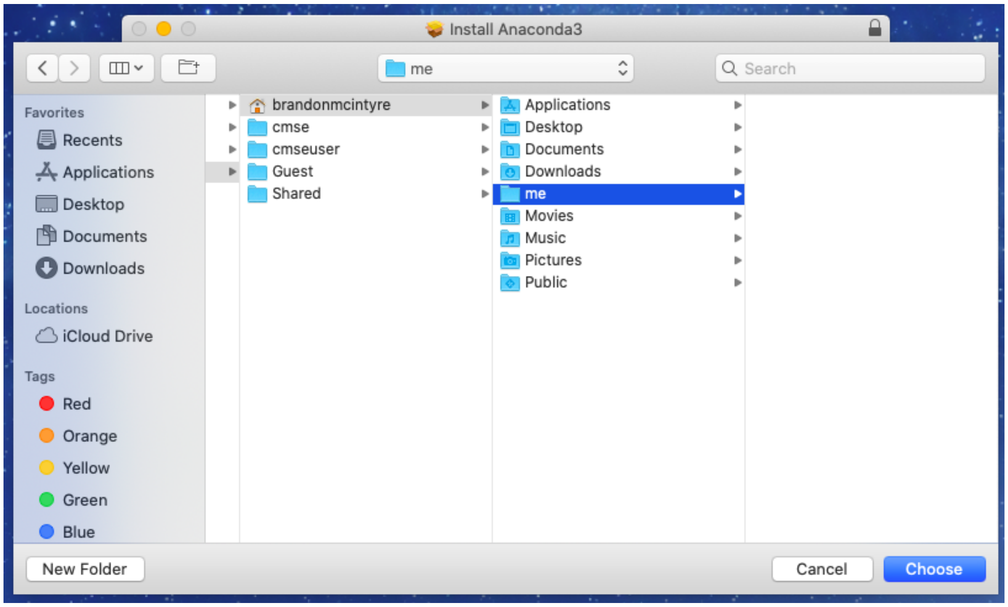


New Folder

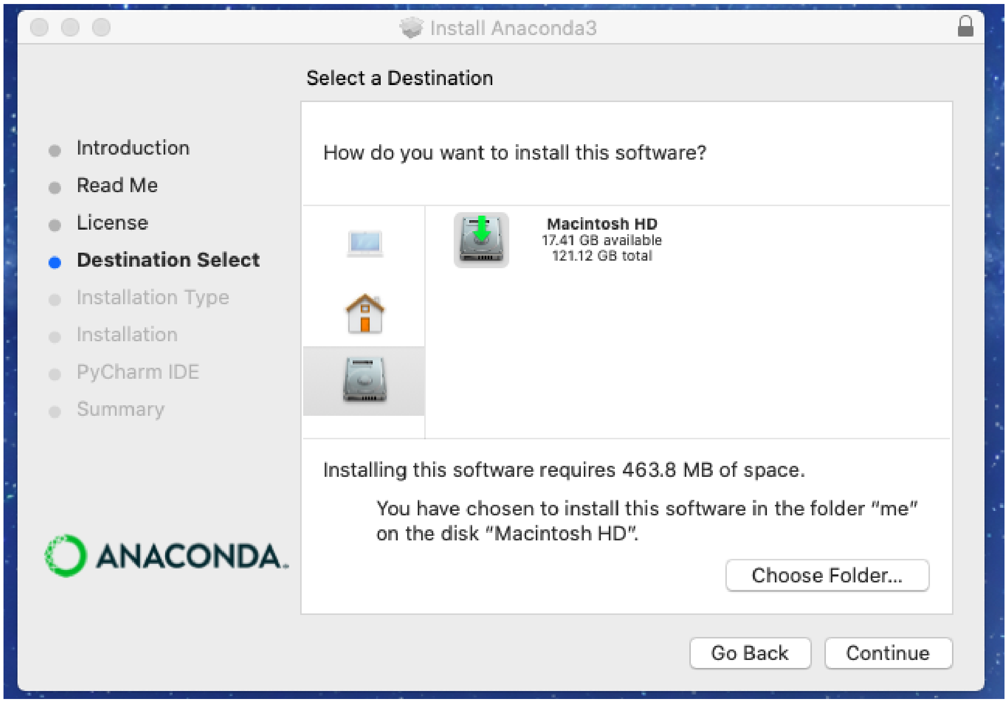
Name of new folder inside "brandonmcintyre":

me

You can enter any name you want for the folder as long as it does not have a space in it. For this tutorial we will use `me` . Then click `Create` .



If all went well the folder should be created and should be automatically selected. Now click the `Choose` button.



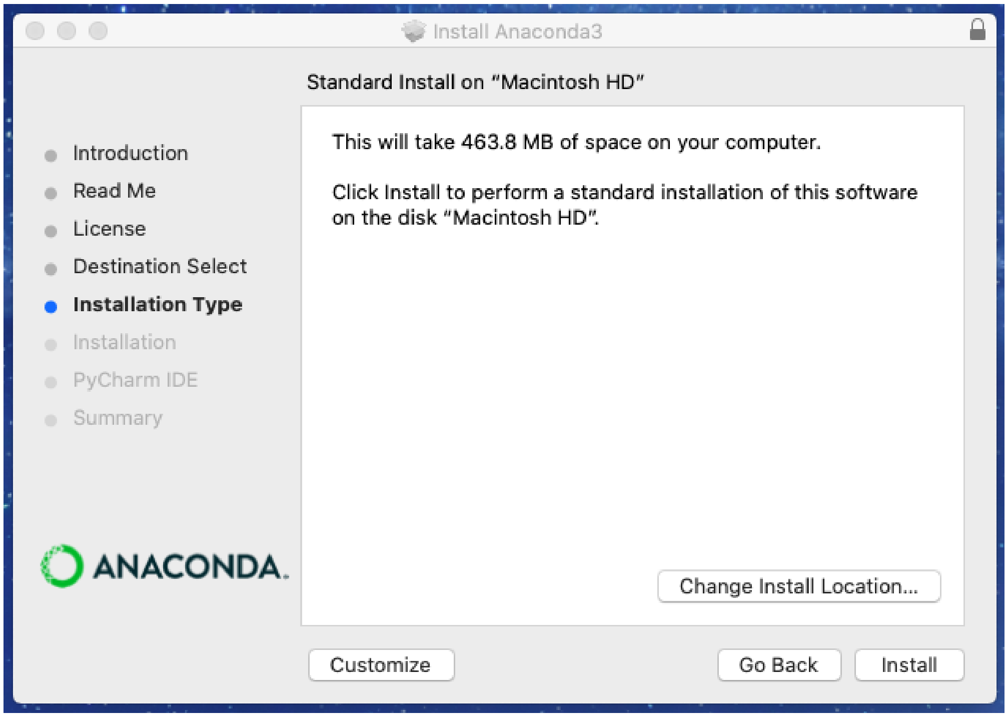
Select a Destination

How do you want to install this software?

Installing this software requires 463.8 MB of space.

You have chosen to install this software in the folder "me" on the disk "Macintosh HD".

Press the `Continue` button.

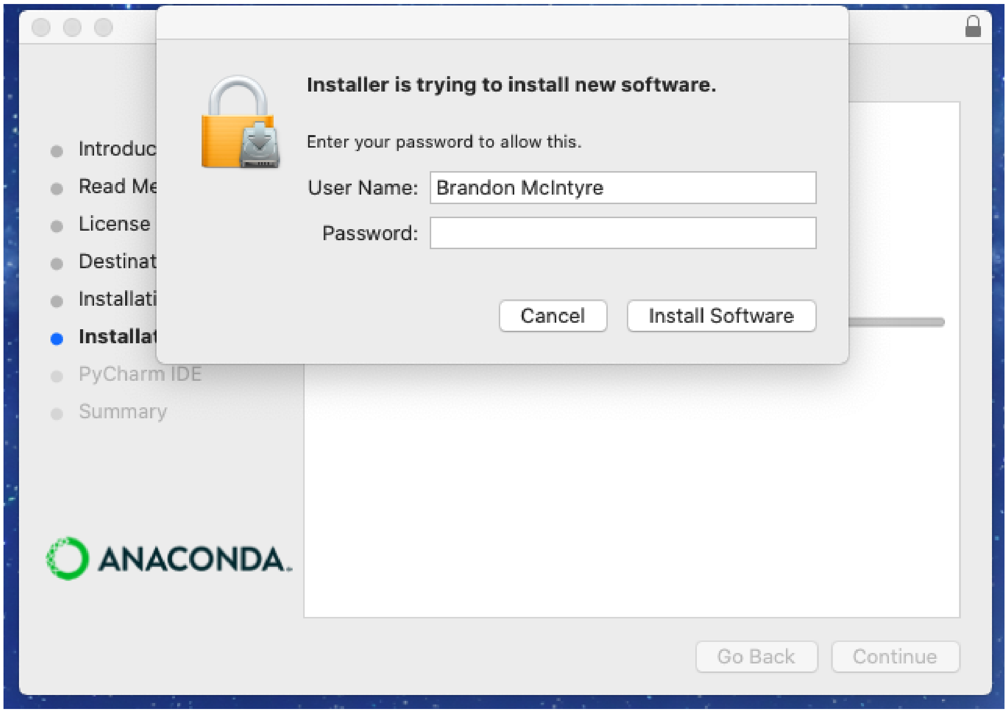


Standard Install on "Macintosh HD"

This will take 463.8 MB of space on your computer.

Click Install to perform a standard installation of this software on the disk "Macintosh HD".

Press the `Install` button.



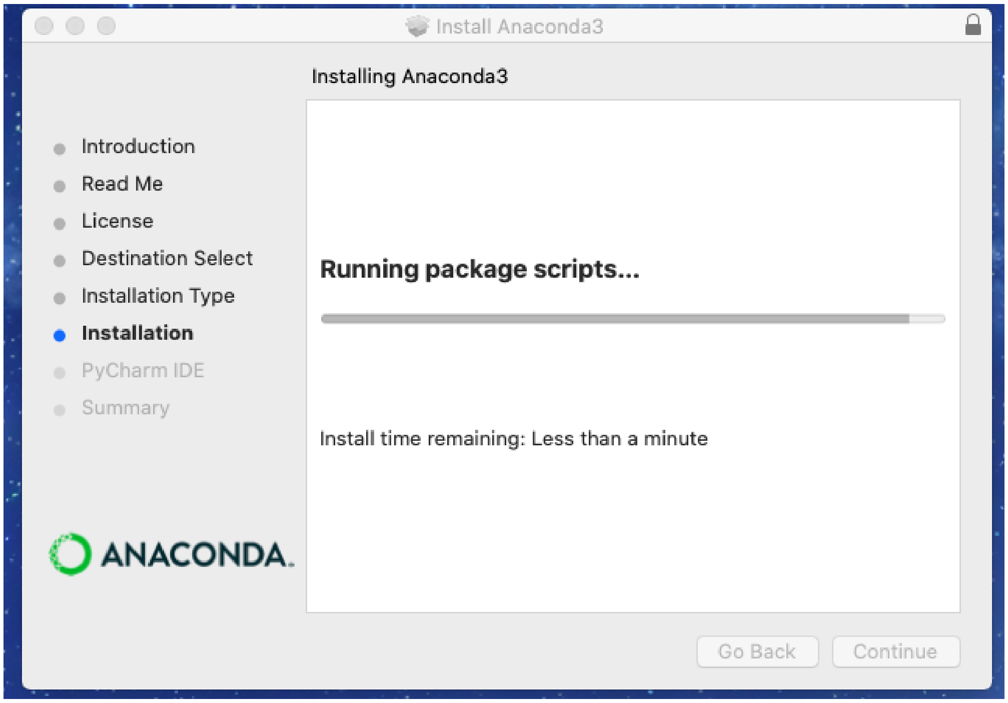
Installer is trying to install new software.

Enter your password to allow this.

User Name: Brandon McIntyre

Password:

Enter your password then click `Install Software` .

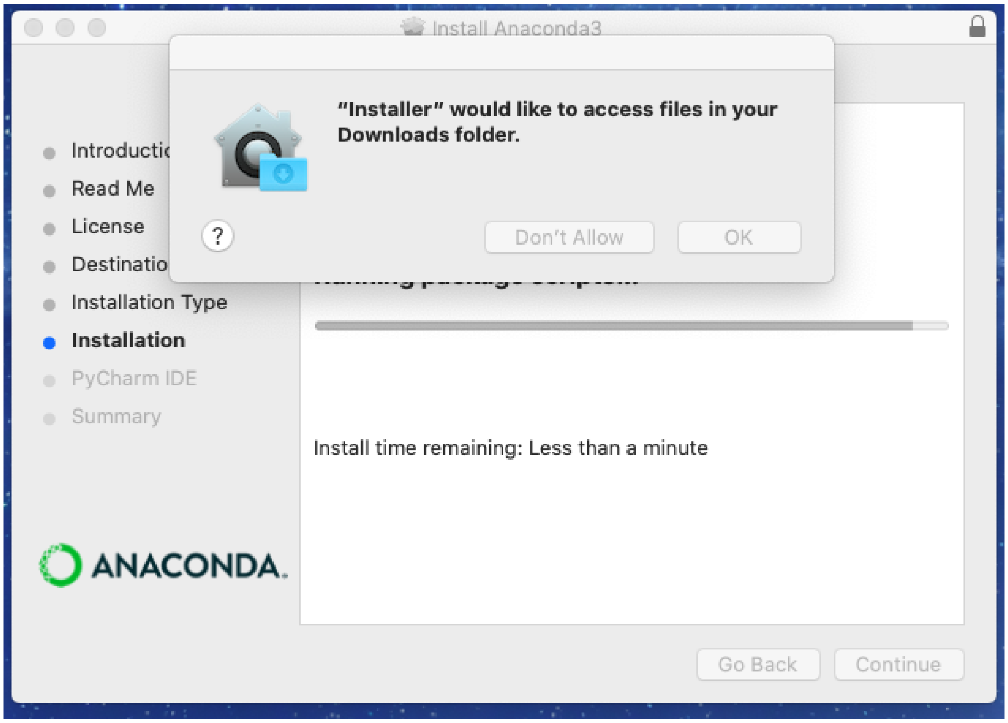


Installing Anaconda3

Running package scripts...

Install time remaining: Less than a minute

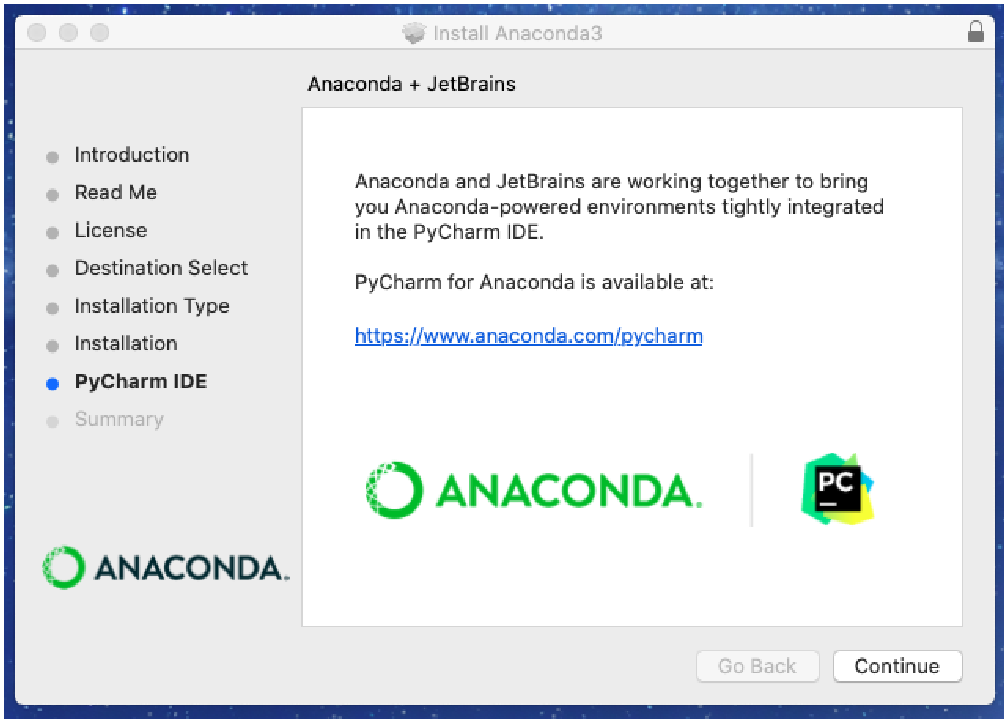
This may take a moment to install.



"Installer" would like to access files in your Downloads folder.

Install time remaining: Less than a minute

Press `OK` button to allow.



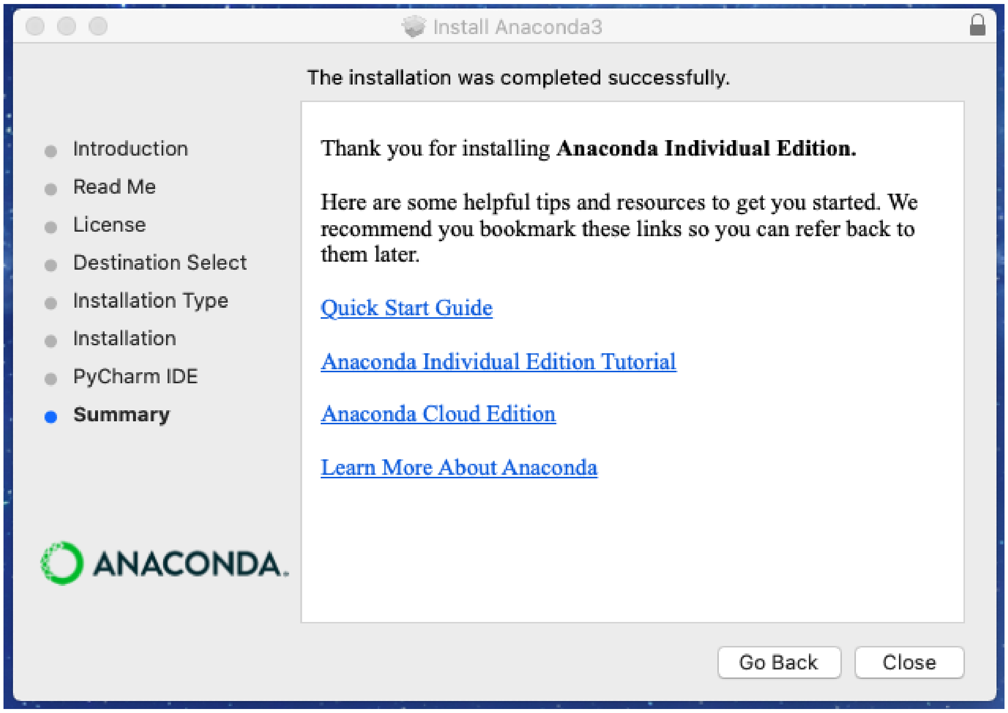
Anaconda + JetBrains

Anaconda and JetBrains are working together to bring you Anaconda-powered environments tightly integrated in the PyCharm IDE.

PyCharm for Anaconda is available at:

https://www.anaconda.com/pycharm

Press the `Continue` button.



The installation was completed successfully.

Thank you for installing **Anaconda Individual Edition.**

Here are some helpful tips and resources to get you started. We recommend you bookmark these links so you can refer back to them later.

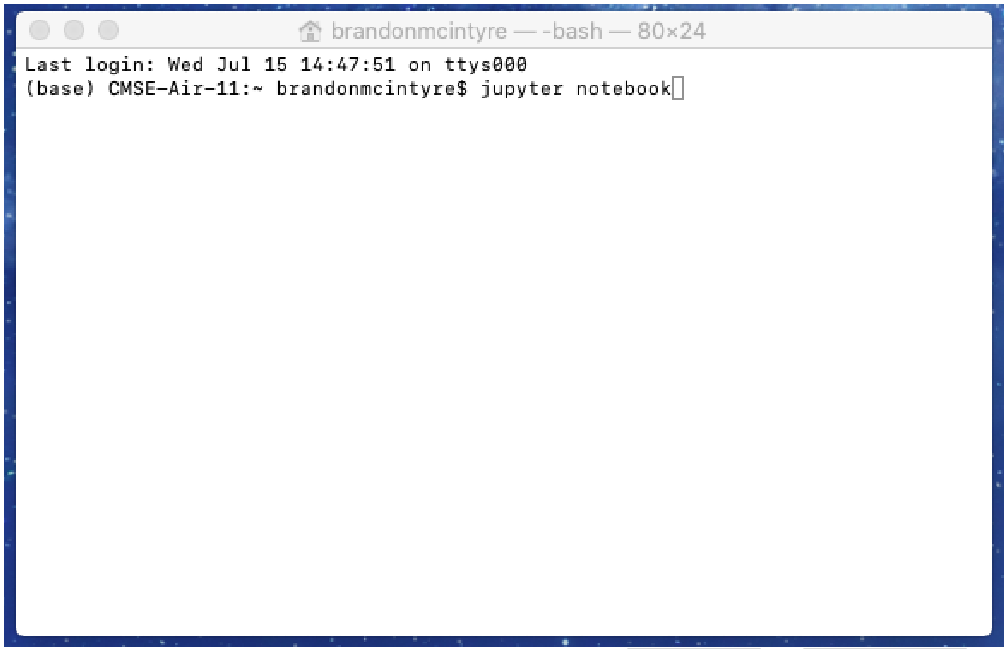
Quick Start Guide

Anaconda Individual Edition Tutorial

Anaconda Cloud Edition

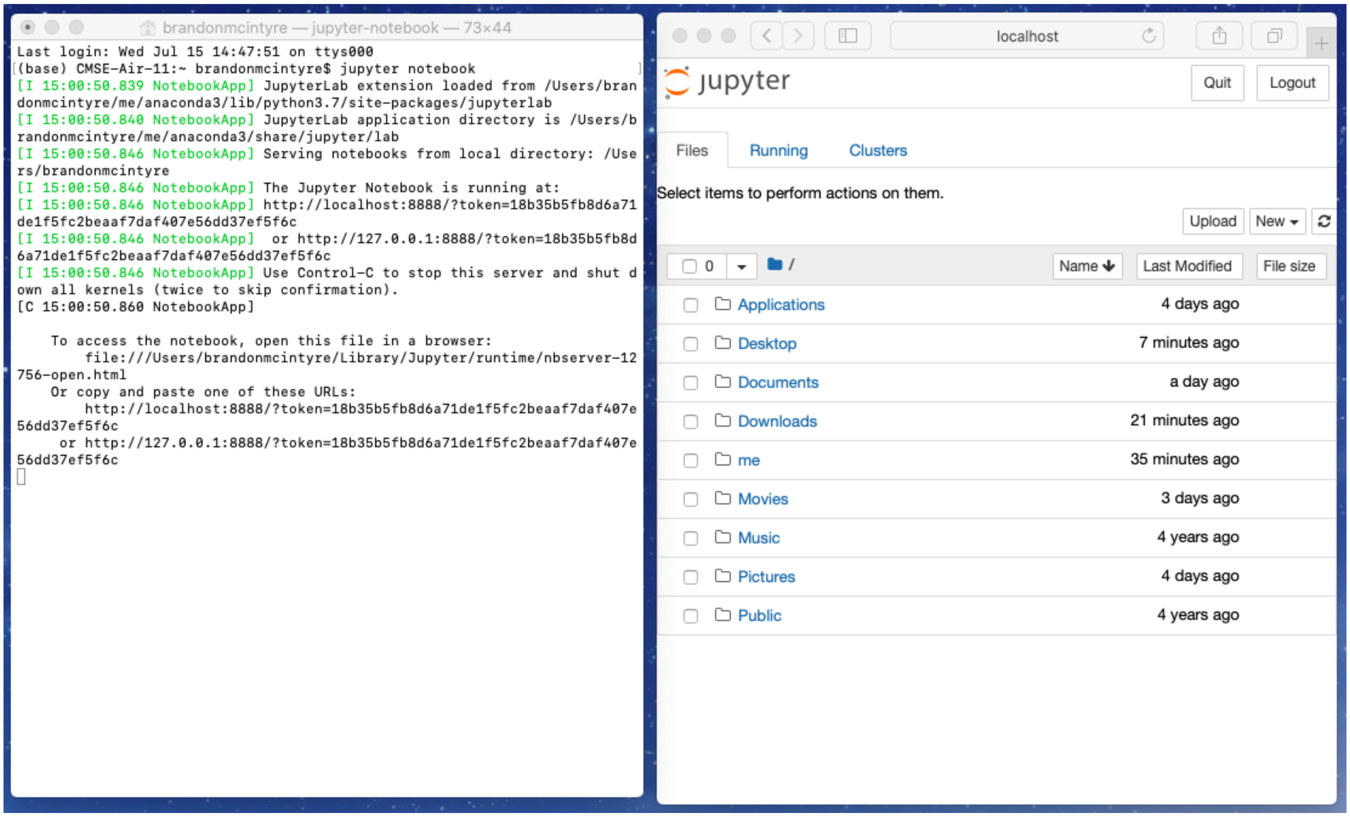
Learn More About Anaconda

Then press the `Close` button. Then to finish, press `Move to Trash` to delete the installer.

5. 

```
Last login: Wed Jul 15 14:47:51 on ttys000
(base) CMSE-Air-11:~ brandonmcintyre$ jupyter notebook
```

Open terminal on your computer by using Spotlight by pressing `command` + `space-bar` or simply use the search bar in the top right corner search `terminal` and press `Enter` . Then type `jupyter notebook` in the command line and hit enter.

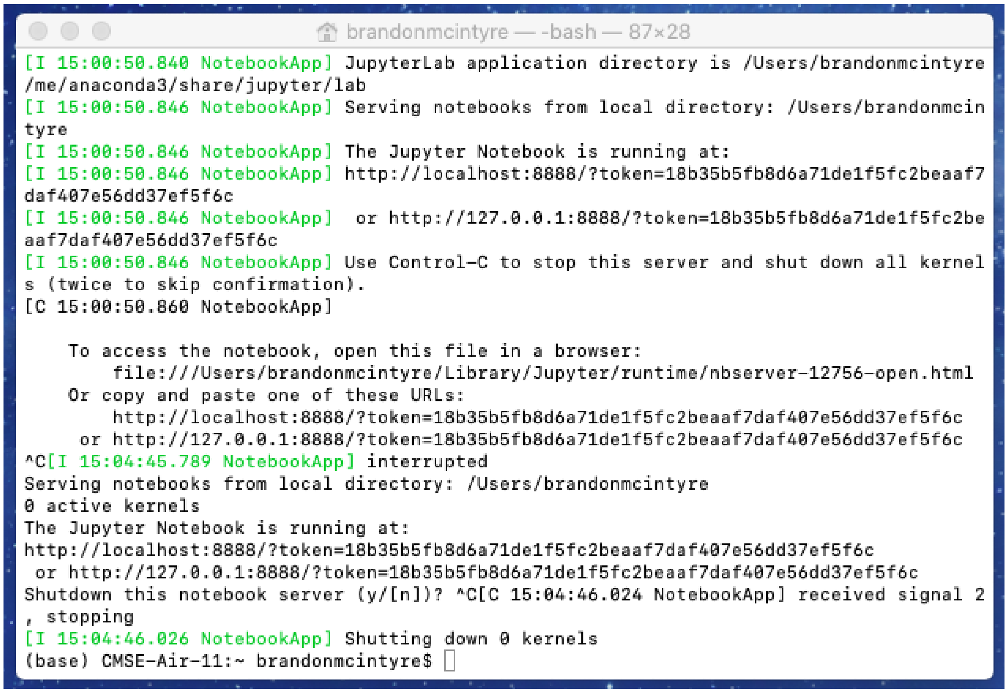


```
Last login: Wed Jul 15 14:47:51 on ttys000
(base) CMSE-Air-11:~ brandonmcintyre$ jupyter notebook
[I 15:00:50.839 NotebookApp] JupyterLab extension loaded from /Users/bran
donmcintyre/me/anaconda3/lib/python3.7/site-packages/jupyterlab
[I 15:00:50.840 NotebookApp] JupyterLab application directory is /Users/b
randonmcintyre/me/anaconda3/share/jupyter/lab
[I 15:00:50.846 NotebookApp] Serving notebooks from local directory: /Use
rs/brandonmcintyre
[I 15:00:50.846 NotebookApp] The Jupyter Notebook is running at:
[I 15:00:50.846 NotebookApp] http://localhost:8888/?token=18b35b5fb8d6a71
de1f5fc2beaaf7daf407e56dd37ef5f6c
[I 15:00:50.846 NotebookApp]  or http://127.0.0.1:8888/?token=18b35b5fb8d
6a71de1f5fc2beaaf7daf407e56dd37ef5f6c
[I 15:00:50.846 NotebookApp] Use Control-C to stop this server and shut d
own all kernels (twice to skip confirmation).
[C 15:00:50.860 NotebookApp]

    To access the notebook, open this file in a browser:
        file:///Users/brandonmcintyre/Library/Jupyter/runtime/nbserver-12
756-open.html
    Or copy and paste one of these URLs:
        http://localhost:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e
56dd37ef5f6c
     or http://127.0.0.1:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e
56dd37ef5f6c
```

Select items to perform actions on them.

□ Applications	4 days ago
□ Desktop	7 minutes ago
□ Documents	a day ago
□ Downloads	21 minutes ago
□ me	35 minutes ago
□ Movies	3 days ago
□ Music	4 years ago
□ Pictures	4 days ago
□ Public	4 years ago

This should launch a jupyter notebook tab on a web browser and the terminal should look like this.



```
[I 15:00:50.840 NotebookApp] JupyterLab application directory is /Users/brandonmcintyre
/me/anaconda3/share/jupyter/lab
[I 15:00:50.846 NotebookApp] Serving notebooks from local directory: /Users/brandonmcin
tyre
[I 15:00:50.846 NotebookApp] The Jupyter Notebook is running at:
[I 15:00:50.846 NotebookApp] http://localhost:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7
daf407e56dd37ef5f6c
[I 15:00:50.846 NotebookApp]  or http://127.0.0.1:8888/?token=18b35b5fb8d6a71de1f5fc2be
aaf7daf407e56dd37ef5f6c
[I 15:00:50.846 NotebookApp] Use Control-C to stop this server and shut down all kernel
s (twice to skip confirmation).
[C 15:00:50.860 NotebookApp]

    To access the notebook, open this file in a browser:
        file:///Users/brandonmcintyre/Library/Jupyter/runtime/nbserver-12756-open.html
    Or copy and paste one of these URLs:
        http://localhost:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e56dd37ef5f6c
     or http://127.0.0.1:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e56dd37ef5f6c
^C[I 15:04:45.789 NotebookApp] interrupted
Serving notebooks from local directory: /Users/brandonmcintyre
0 active kernels
The Jupyter Notebook is running at:
http://localhost:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e56dd37ef5f6c
 or http://127.0.0.1:8888/?token=18b35b5fb8d6a71de1f5fc2beaaf7daf407e56dd37ef5f6c
Shutdown this notebook server (y/[n])? ^C[C 15:04:46.024 NotebookApp] received signal 2
, stopping
[I 15:04:46.026 NotebookApp] Shutting down 0 kernels
(base) CMSE-Air-11:~ brandonmcintyre$ 
```

To exit jupyter notebook close the tab on the web browser, and go to the terminal window and type `control` + `c` twice in a row. Now you can close the terminal.

6. *If your anaconda installation was successful* follow the instructions above under `Installing Python for this Course -> If you have Anaconda on your computer already -> Let's make sure it is updated to the latest version` to update Anaconda and all of its packages (or follow this link).

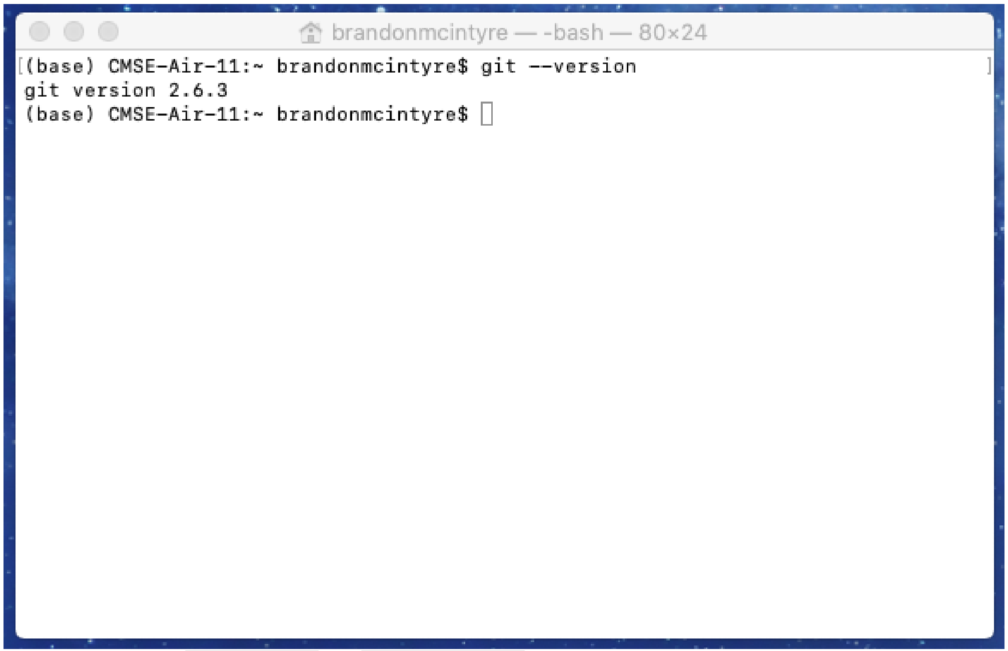
Setting up the terminal with Git

In this course, we will learn how to perform python and data analytics outside of the Anaconda enviroment. We will also learn new tools, such as as git (a version control utility that we will learn more about later), and other useful tools powered by the command line. Using the terminal will open our abilites of what we can do, and is a great way to start opening up new avenues in computing.

Unlike our Windows friends, MAC and Linux terminal automatically uses a *Unix-like* command line interpreter. This makes it a little easier on our end as we will not need to install another terminal on our machine. However, we will still need to make sure we have Git avalible on our terminals.

Check to see if you already have Git

1. Have Anaconda installed.
2. Open up terminal, and check the version of Git.

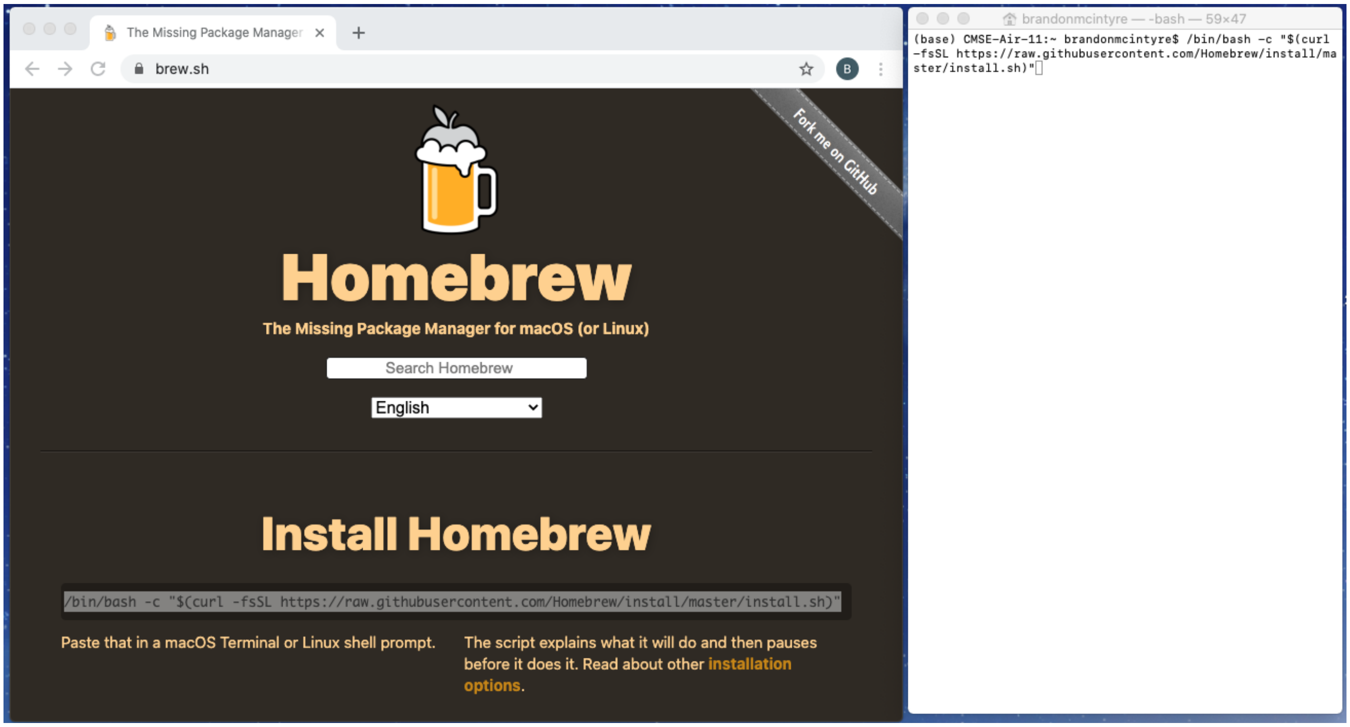


```
[(base) CMSE-Air-11:~ brandonmcintyre$ git --version
git version 2.6.3
(base) CMSE-Air-11:~ brandonmcintyre$
```

Using Spotlight by pressing `command` + `space-bar` or simply use the search bar in the top right corner search `terminal` and press `Enter` . Then type in `git --version` and press `Enter` . If you recive a version you have git installed, if recieve an error you do not have git installed. If you ran into a warning follow the instructions below. *If you want to learn some optional tools and shortcuts continue to the next section. However, if you want to skip the optional section, click here.*

Git download.

1. Install `Homebrew` . Visit the Homebrew main page (https://brew.sh/) for instructions on how to install `Homebrew`



Homebrew

The Missing Package Manager for macOS (or Linux)

Install Homebrew

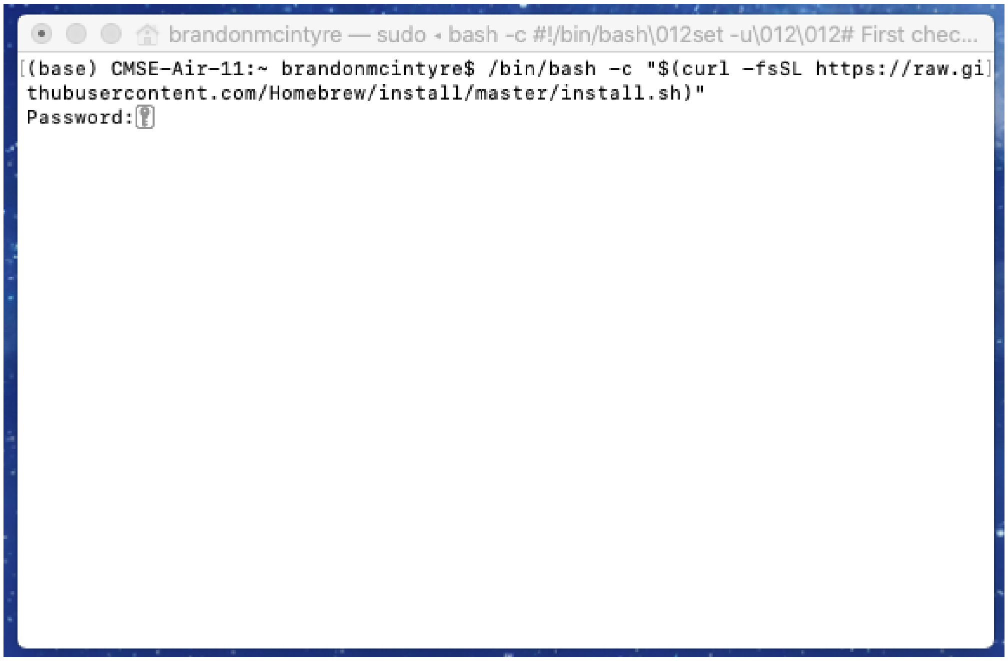
```
/bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/master/install.sh)"
```

Paste that in a macOS Terminal or Linux shell prompt.

The script explains what it will do and then pauses before it does it. Read about other installation options.

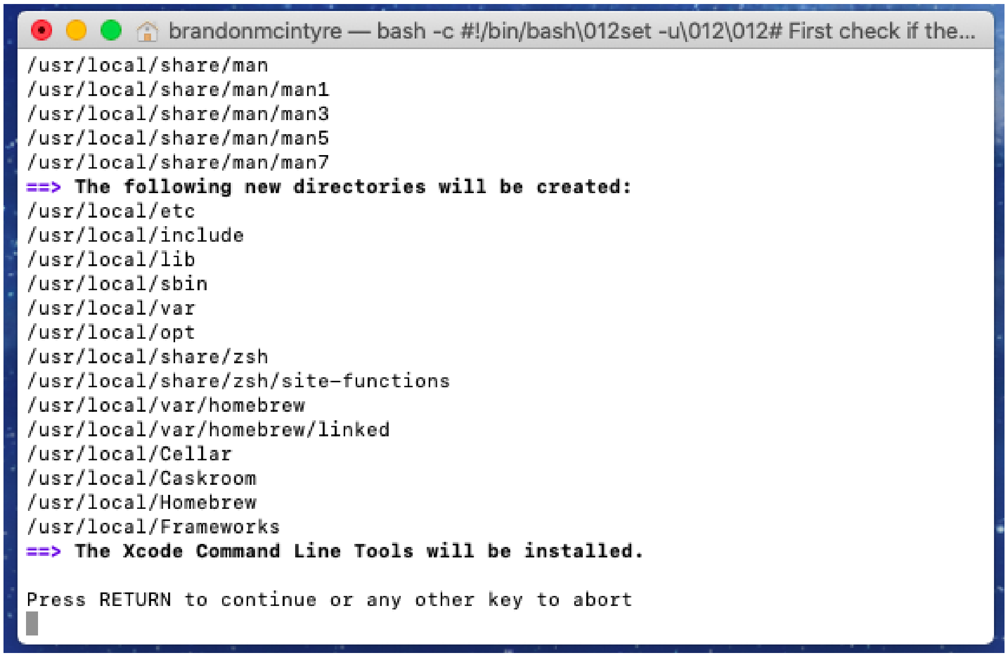
```
(base) CMSE-Air-11:~ brandonmcintyre$ /bin/bash -c "$(curl
-fsSL https://raw.githubusercontent.com/Homebrew/install/ma
ster/install.sh)"
```

Copy and paste the terminal command into the terminal and press `Enter`.


brandonmcintyre — sudo ◂ bash -c #!/bin/bash\012set -u\012\012# First chec...

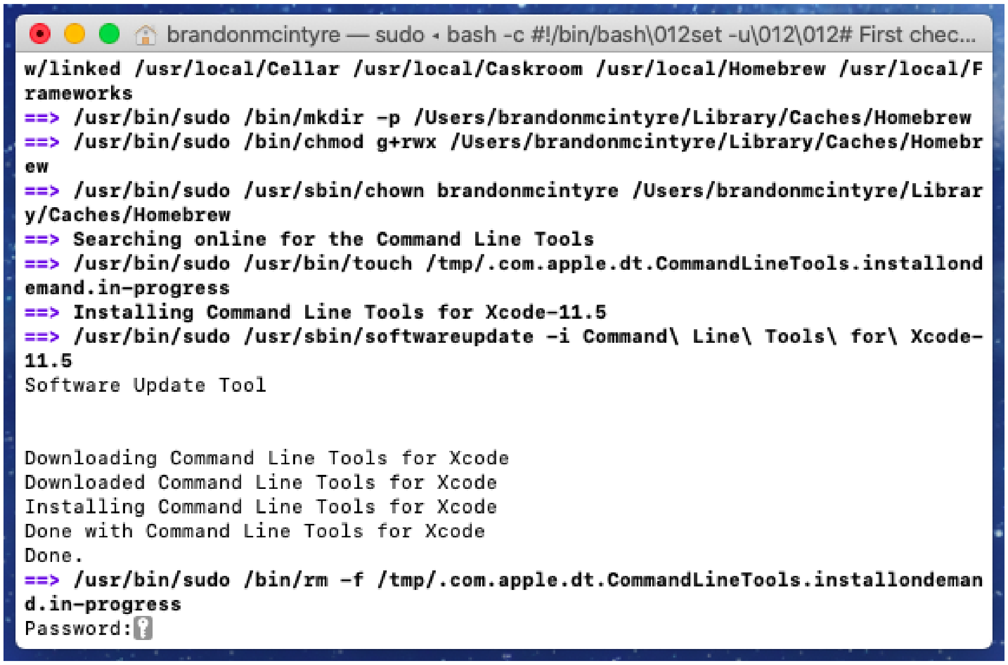
```
(base) CMSE-Air-11:~ brandonmcintyre$ /bin/bash -c "$(curl -fsSL https://raw.gi
thubusercontent.com/Homebrew/install/master/install.sh)"
Password:
```

Enter the password to your account and press `Enter`.


brandonmcintyre — bash -c #!/bin/bash\012set -u\012\012# First check if the...

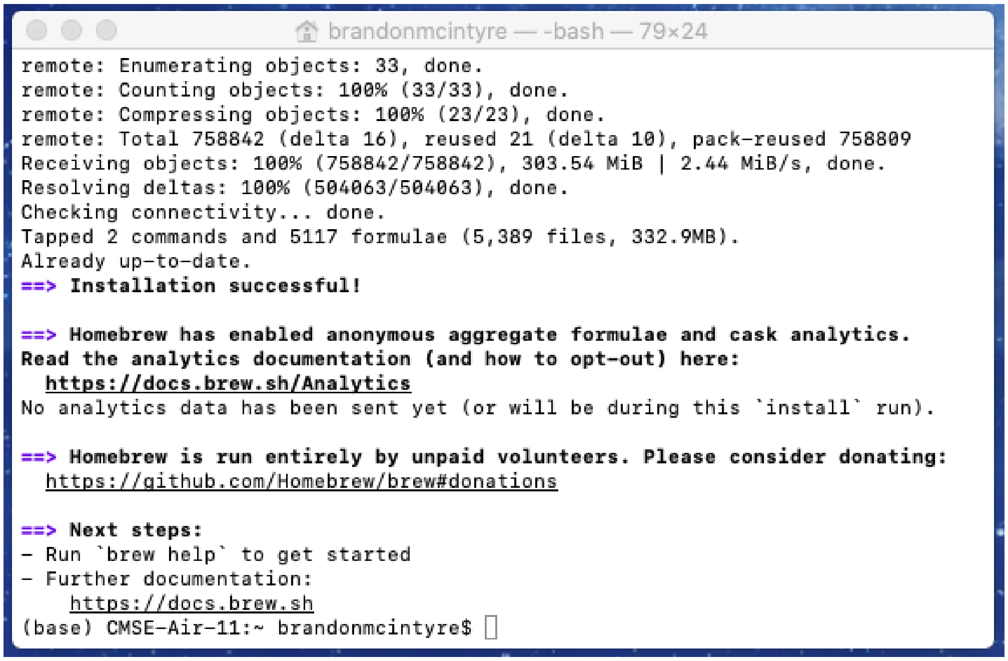
```
/usr/local/share/man
/usr/local/share/man/man1
/usr/local/share/man/man3
/usr/local/share/man/man5
/usr/local/share/man/man7
==> The following new directories will be created:
/usr/local/etc
/usr/local/include
/usr/local/lib
/usr/local/sbin
/usr/local/var
/usr/local/opt
/usr/local/share/zsh
/usr/local/share/zsh/site-functions
/usr/local/var/homebrew
/usr/local/var/homebrew/linked
/usr/local/Cellar
/usr/local/Caskroom
/usr/local/Homebrew
/usr/local/Frameworks
==> The Xcode Command Line Tools will be installed.

Press RETURN to continue or any other key to abort
```

To continue press the `Enter` button. This will take a moment to install everything necessary.


brandonmcintyre — sudo ◂ bash -c #!/bin/bash\012set -u\012\012# First chec...

```
w/linked /usr/local/Cellar /usr/local/Caskroom /usr/local/Homebrew /usr/local/F
rameworks
==> /usr/bin/sudo /bin/mkdir -p /Users/brandonmcintyre/Library/Caches/Homebrew
==> /usr/bin/sudo /bin/chmod g+rwx /Users/brandonmcintyre/Library/Caches/Homebr
ew
==> /usr/bin/sudo /usr/sbin/chown brandonmcintyre /Users/brandonmcintyre/Librar
y/Caches/Homebrew
==> Searching online for the Command Line Tools
==> /usr/bin/sudo /usr/bin/touch /tmp/.com.apple.dt.CommandLineTools.installond
emand.in-progress
==> Installing Command Line Tools for Xcode-11.5
==> /usr/bin/sudo /usr/sbin/softwareupdate -i Command\ Line\ Tools\ for\ Xcode-
11.5
Software Update Tool


Downloading Command Line Tools for Xcode
Downloaded Command Line Tools for Xcode
Installing Command Line Tools for Xcode
Done with Command Line Tools for Xcode
Done.
==> /usr/bin/sudo /bin/rm -f /tmp/.com.apple.dt.CommandLineTools.installondeman
d.in-progress
Password:
```

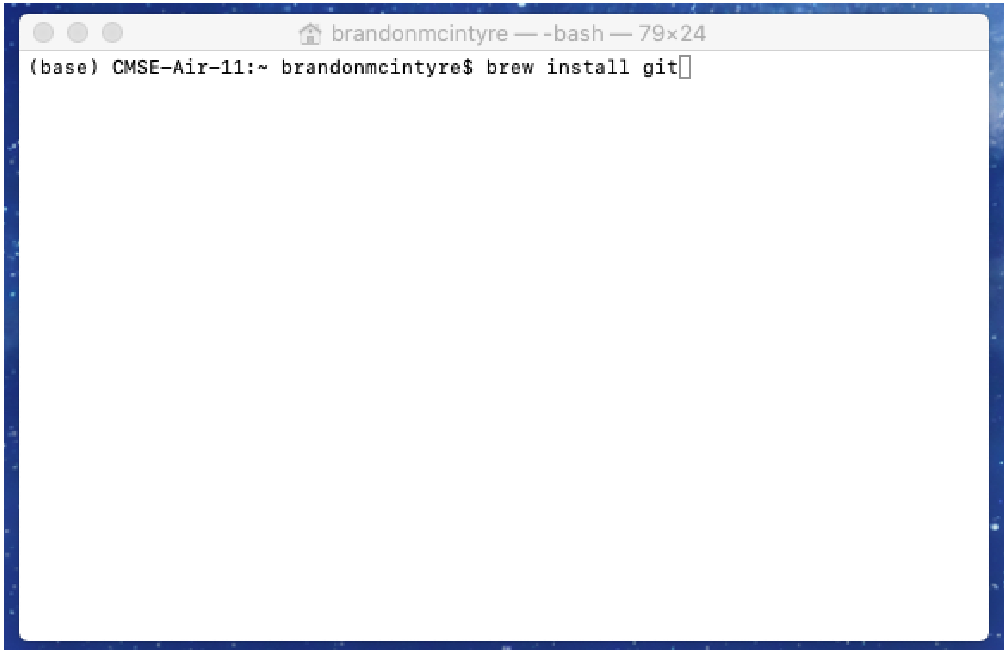
To continue enter your password. Press the `Enter` button.



```
remote: Enumerating objects: 33, done.
remote: Counting objects: 100% (33/33), done.
remote: Compressing objects: 100% (23/23), done.
remote: Total 758842 (delta 16), reused 21 (delta 10), pack-reused 758809
Receiving objects: 100% (758842/758842), 303.54 MiB | 2.44 MiB/s, done.
Resolving deltas: 100% (504063/504063), done.
Checking connectivity... done.
Tapped 2 commands and 5117 formulae (5,389 files, 332.9MB).
Already up-to-date.
==> Installation successful!

==> Homebrew has enabled anonymous aggregate formulae and cask analytics.
Read the analytics documentation (and how to opt-out) here:
  https://docs.brew.sh/Analytics
No analytics data has been sent yet (or will be during this `install` run).

==> Homebrew is run entirely by unpaid volunteers. Please consider donating:
  https://github.com/Homebrew/brew#donations

==> Next steps:
- Run `brew help` to get started
- Further documentation:
    https://docs.brew.sh
(base) CMSE-Air-11:~ brandonmcintyre$
```

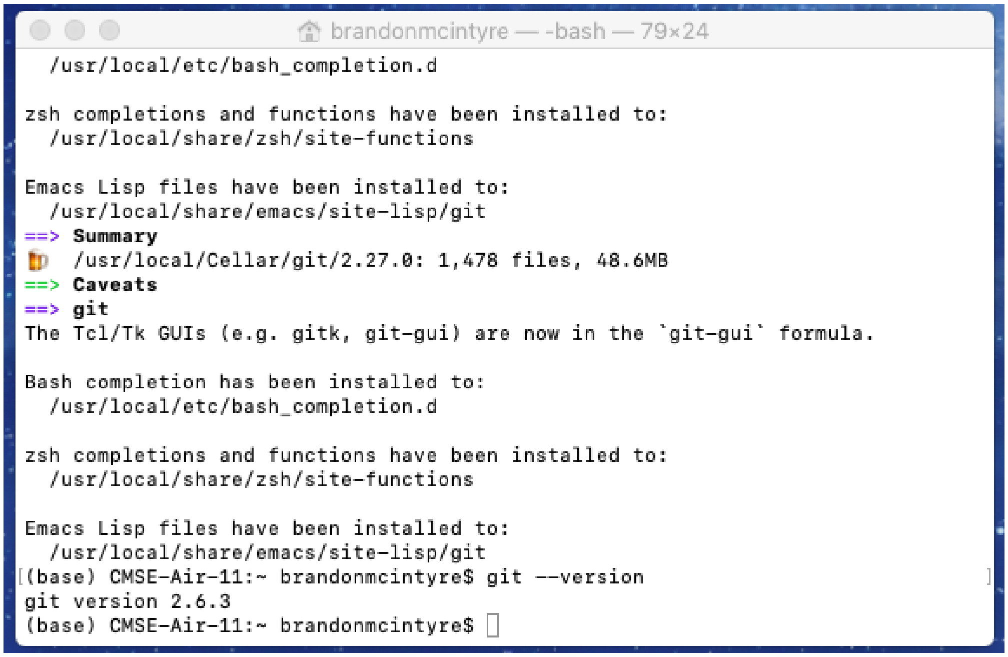
If sucessful you will now be done.

2. In the terminal install git via homebrew.



```
(base) CMSE-Air-11:~ brandonmcintyre$ brew install git
```

Type in the terminal `brew install git`. Then press `Enter`.



```
  /usr/local/etc/bash_completion.d

zsh completions and functions have been installed to:
  /usr/local/share/zsh/site-functions

Emacs Lisp files have been installed to:
  /usr/local/share/emacs/site-lisp/git
==> Summary
🍺  /usr/local/Cellar/git/2.27.0: 1,478 files, 48.6MB
==> Caveats
==> git
The Tcl/Tk GUIs (e.g. gitk, git-gui) are now in the `git-gui` formula.

Bash completion has been installed to:
  /usr/local/etc/bash_completion.d

zsh completions and functions have been installed to:
  /usr/local/share/zsh/site-functions

Emacs Lisp files have been installed to:
  /usr/local/share/emacs/site-lisp/git
(base) CMSE-Air-11:~ brandonmcintyre$ git --version
git version 2.6.3
(base) CMSE-Air-11:~ brandonmcintyre$ 
```

If successful, there should be no errors, to test type `git --version` and press `Enter` . You should then see a version.

If you want to learn some optional tools and shortcuts continue to the next section. However, if you want to skip the optional section, click here.

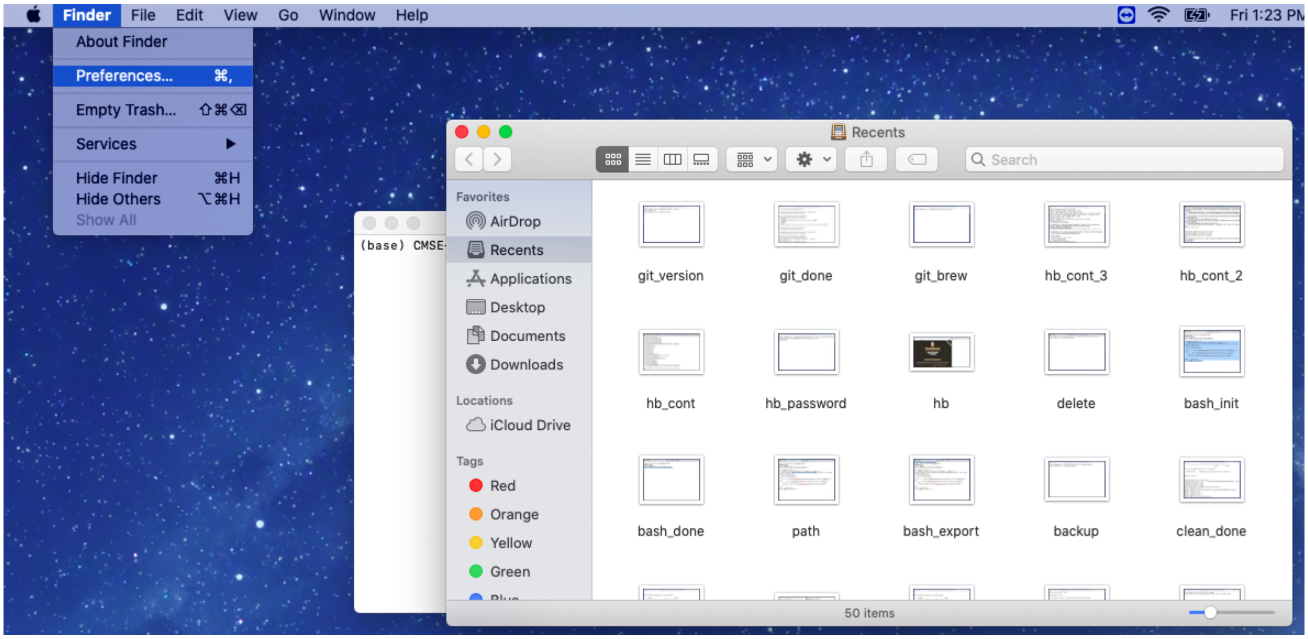
(Optional) Helpful Commands and Shortcuts

The command line is a powerful, but also complex tool. The following are some commands and shortcuts that will make using the command line on terminal easier. This is optional, but this will serve as a guide to make common actions you may need to take using the terminal in this course easier.

Setting up Finder

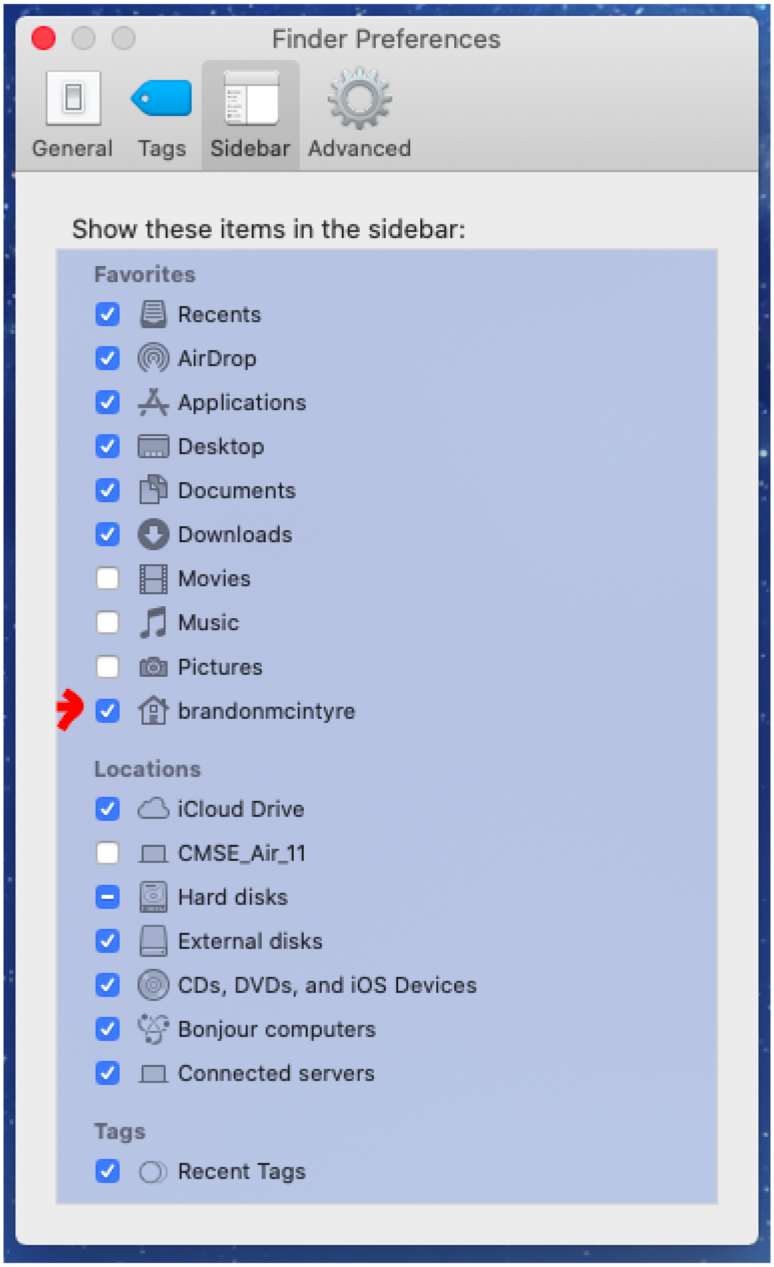
Throughout this course you will be downloading many notebooks and files and knowing how to access those is essential. When it comes to the terminal, the directory you start your session in is known as the "home directory" and is not immediately see-able from `Finder` . However, thankfully we can enable this folder in `Finder` easily.

1. Open up `Finder` and open up `Preferences...`



Open up the `Finder` program and click on `Finder` in the left hand corner. Then click `Preferences...` .

2. Enable the your home folder in the `Sidebar` .



Show these items in the sidebar:

Favorites

- ☑ Recents
- ☑ AirDrop
- ☑ Applications
- ☑ Desktop
- ☑ Documents
- ☑ Downloads
- □ Movies
- □ Music
- □ Pictures
- ☑ brandonmcintyre

Locations

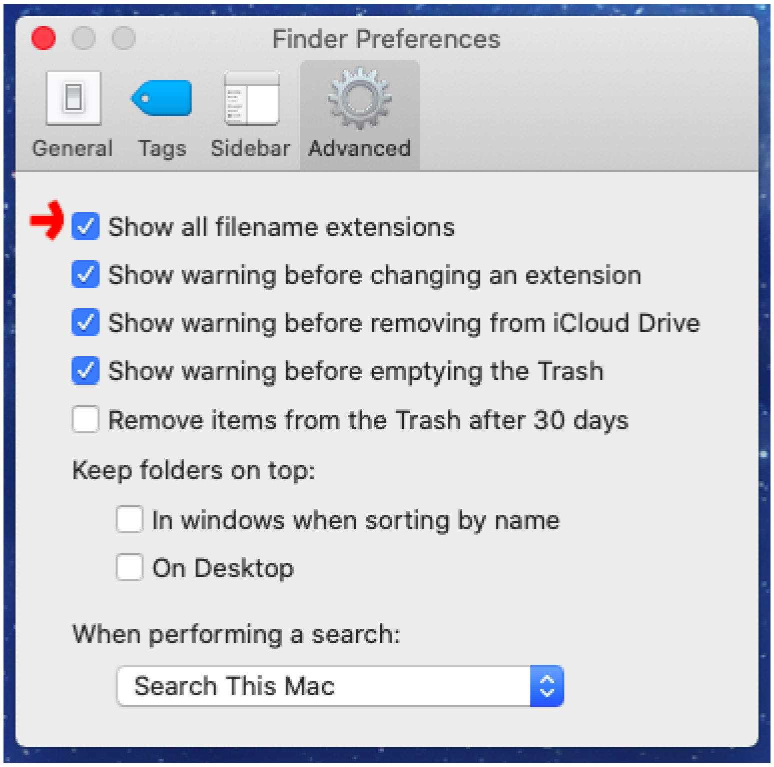
- ☑ iCloud Drive
- □ CMSE_Air_11
- ⊟ Hard disks
- ☑ External disks
- ☑ CDs, DVDs, and iOS Devices
- ☑ Bonjour computers
- ☑ Connected servers

Tags

- ☑ Recent Tags

Click on the `Sidebar` tab. Then click on the check box next your username (The icon next to it should be a house).

3. Enable the option to see file extensions in `Advanced` .



☑ Show all filename extensions

☑ Show warning before changing an extension

☑ Show warning before removing from iCloud Drive

☑ Show warning before emptying the Trash

□ Remove items from the Trash after 30 days

Keep folders on top:

□ In windows when sorting by name

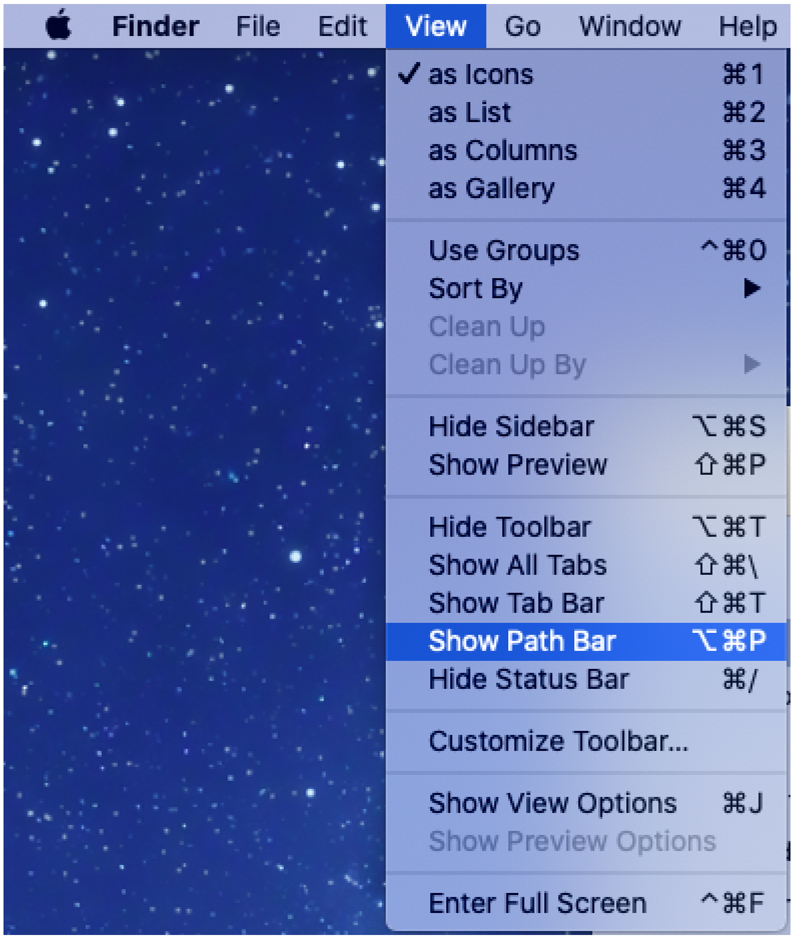
□ On Desktop

When performing a search:

Search This Mac

Click on the `Advanced` tab. Then click on the check box next to `Show all filename extensions` .

4. Close Preferences. Then enable the `Path Bar`



Close the Prefernces window, then in the upper left-hand corner click on `View` . Then click on the option `Show Path Bar` .

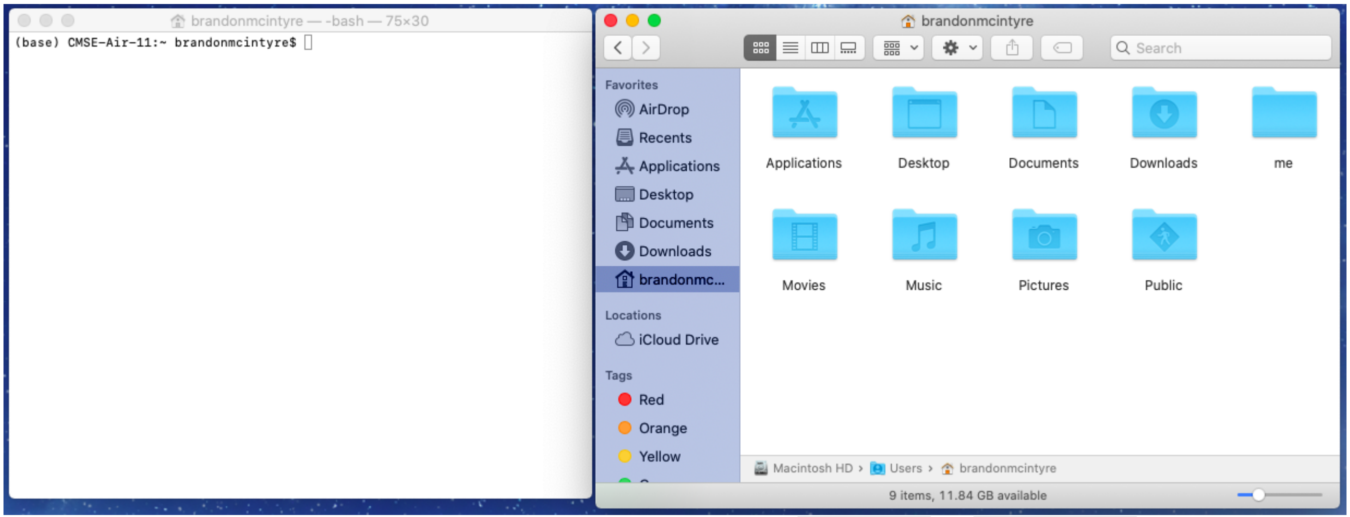
5. Continue to the next section if you want to learn how to utilize the tools you just enabled.

The above will serve useful when you need to copy or place files in your home directory, or you want to access the home folder from the `Finder` .

Knowing Where You Are

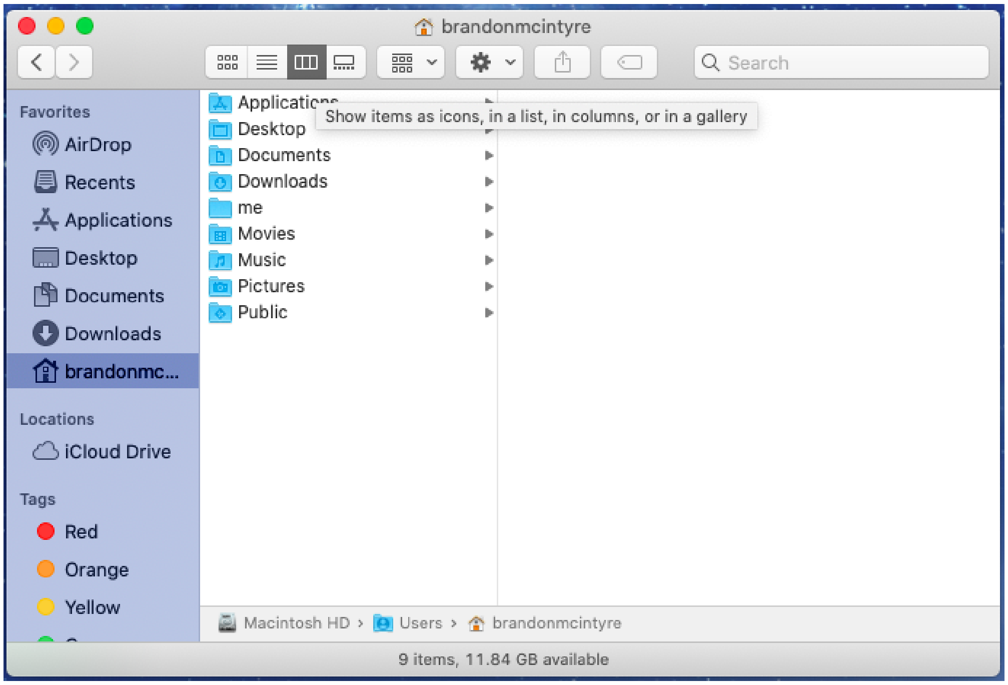
When starting up the terminal it is important to know where you are in the system. In this course we will be making and using directories/folders. Making sure we know where we are at is crucial to this process. When terminal opens it is likely you will start in what is known as your "home" directory signified by `~` . There is a slim possibly you may start in the root directory signified by `/` if settings become changed or corrupted. In this course, we will never need to do anything with the root (`/`) directory as this is a where important files for the macOS live.

1. Open up terminal, and view the home folder on `Finder` and enable column-view.



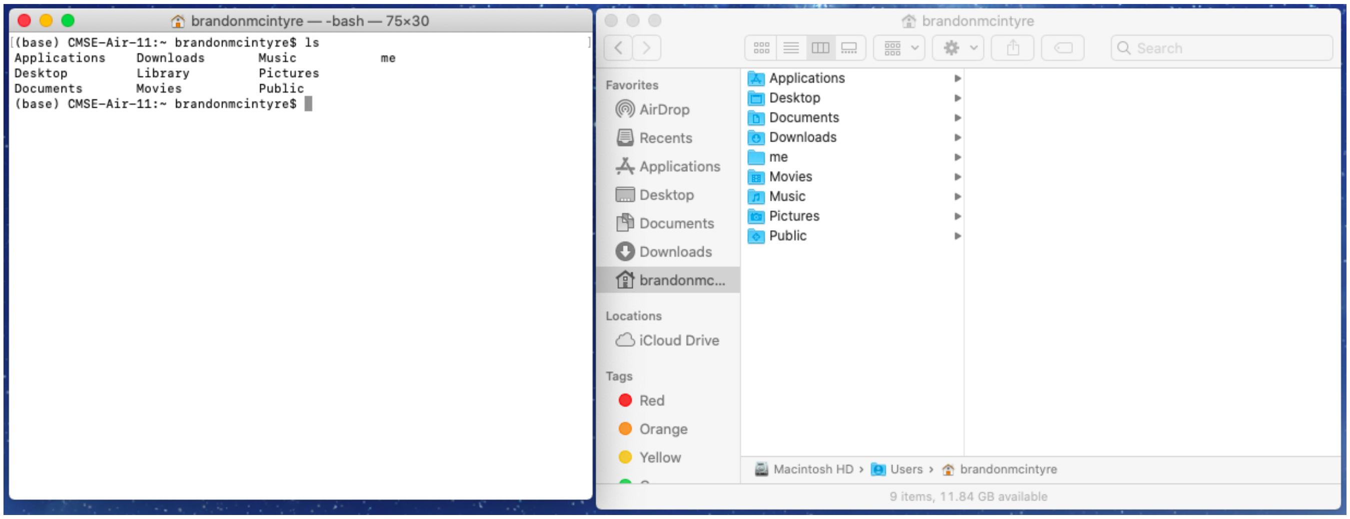
```
(base) CMSE-Air-11:~ brandonmcintyre$ 
```

Open terminal on your computer by using Spotlight by pressing `command` + `space-bar` or simply use the search bar in the top right corner search `terminal` and press `Enter` . Then re-size the window and move the `Finder` window around until you have both side-by-side. In the `Finder` click on the newly availible home folder tab. You should see all the folders in this picture.



In the finder window enable column-view by clicking on the column-view button on the top of the finder.

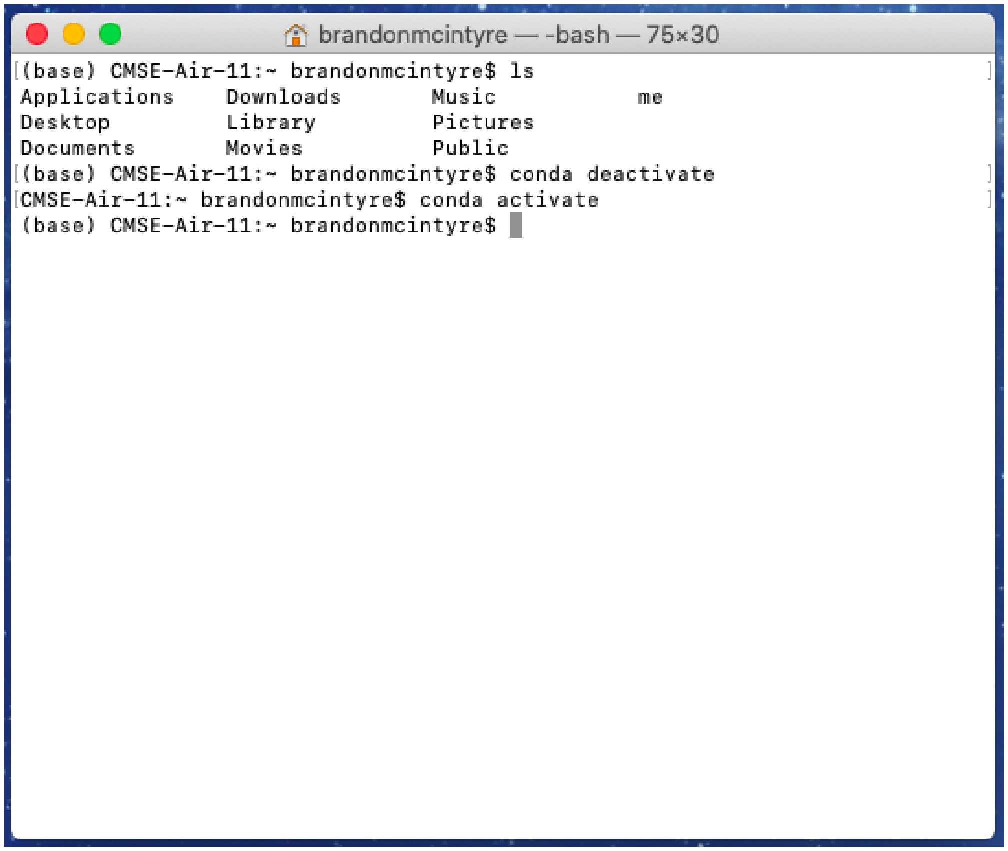
2. Use `ls` to list all the contents of the directory/folder



```
(base) CMSE-Air-11:~ brandonmcintyre$ ls
Applications    Downloads       Music           me
Desktop         Library         Pictures
Documents       Movies          Public
(base) CMSE-Air-11:~ brandonmcintyre$
```

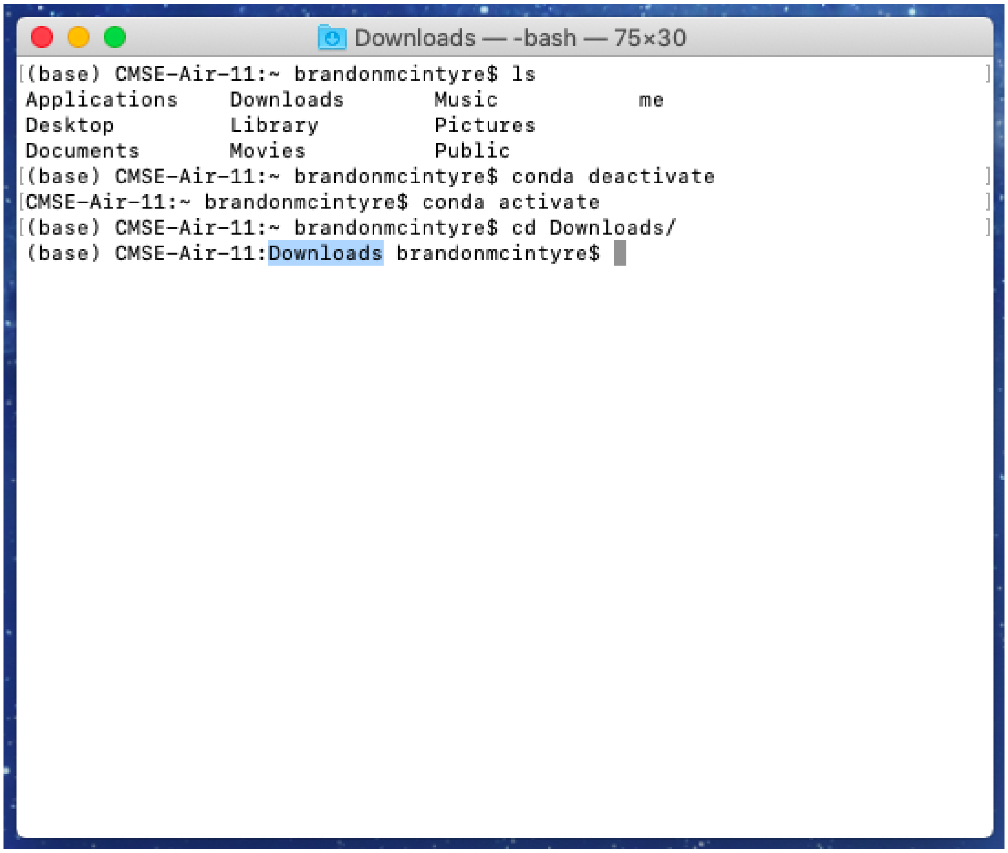
Now in the teriminal type `ls` and press `Enter`. The `ls` command lists all the contents of the directory/folder. You can see now that folder terminal starts in, is this folder that is open in the `Finder`. If you want, you can play around with this and see all of the folders you have access to from this folder by clicking on the folders/directories in the `Finder` window. You will notice that as you click on folders/directories and files the `Path Bar` on the bottom of the `Finder` window we set up earilier will change as your "path" changes.

3. Notice the terminal and change directory to `Downloads`.



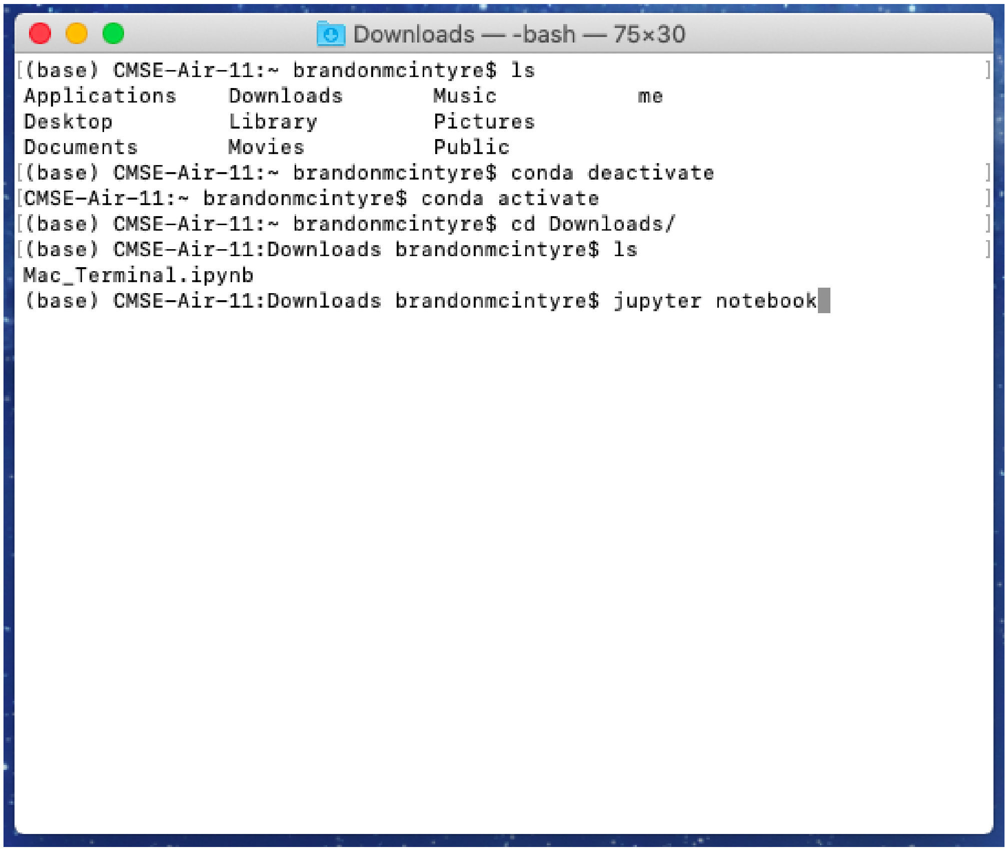
```
(base) CMSE-Air-11:~ brandonmcintyre$ ls
Applications    Downloads       Music           me
Desktop         Library         Pictures
Documents       Movies          Public
(base) CMSE-Air-11:~ brandonmcintyre$ conda deactivate
CMSE-Air-11:~ brandonmcintyre$ conda activate
(base) CMSE-Air-11:~ brandonmcintyre$
```

Take a look and you will notice that on the same line where you input your commands there is the same repeating line `(base) [COMPUTER_NAME]:[LOCATION] [USERNAME]` $. For reference the image above shows this computer having the line `(base) CMSE-Air-11:~ brandonmcintyre`$. The `(base)` is referring to the fact that the `conda` enviroment is running. This comes from the use of `Anaconda` and having this `conda (base)` running allows us to useful commands from `Anaconda`. For our purposes we can keep this enviroment active with no issues, but if you ever needed to deactivate the enviroment for any reason you can use the command `conda deactivate`. You will notice the `(conda)` will disappear meaning you are out of the enviroment. However, please note in order to use Anconda and its tools you will need this enviroment activated. In order to re-activate the Anaconda enviroment, run the the command `conda activate`. The rest of the line you can match up to the template. `[COMPUTER_NAME] = CMSE-Air-11`, `[LOCATION] = ~` (which we know is short for the home directory), `[USERNAME] = brandonmcintyre`.



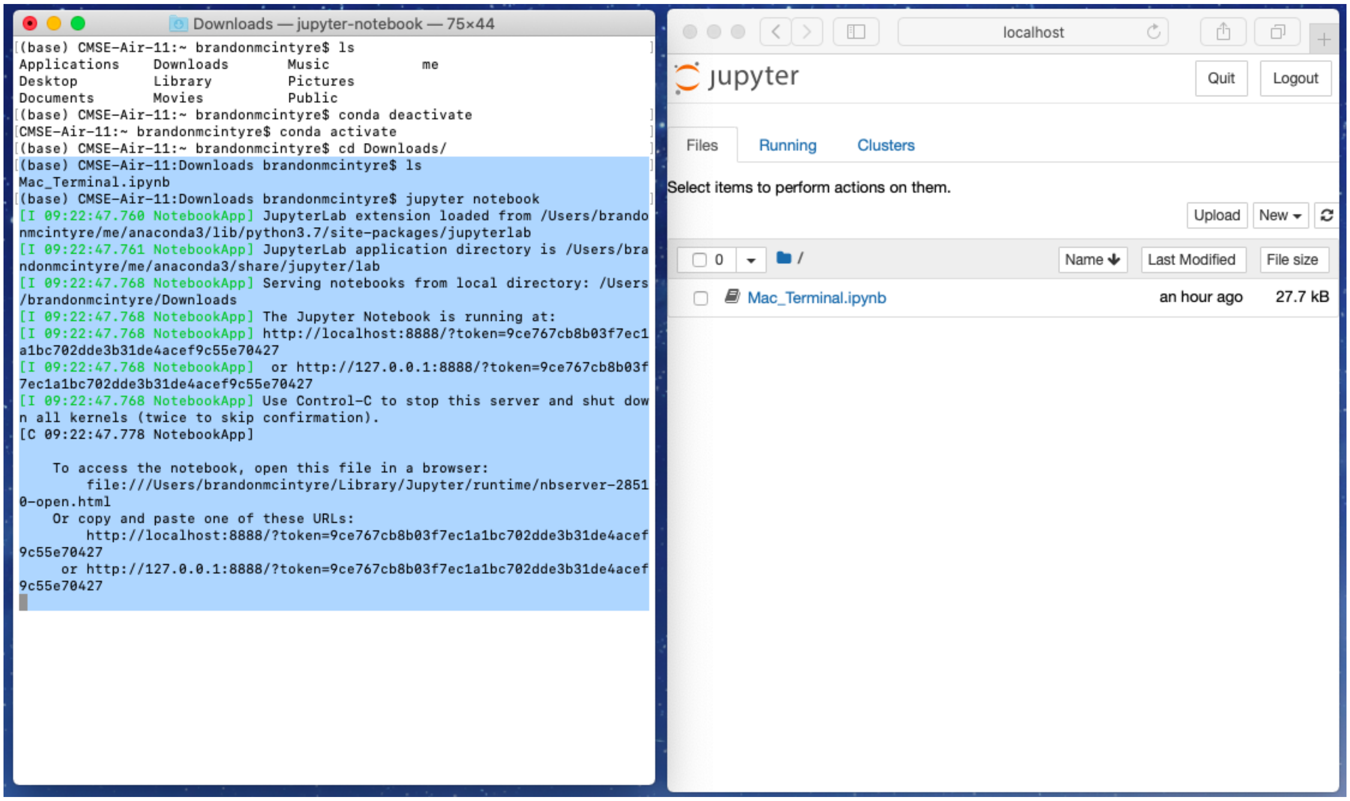
```
(base) CMSE-Air-11:~ brandonmcintyre$ ls
Applications    Downloads       Music           me
Desktop         Library         Pictures
Documents       Movies          Public
(base) CMSE-Air-11:~ brandonmcintyre$ conda deactivate
CMSE-Air-11:~ brandonmcintyre$ conda activate
(base) CMSE-Air-11:~ brandonmcintyre$ cd Downloads/
(base) CMSE-Air-11:Downloads brandonmcintyre$ 
```

Now we will use the `cd` command to "change directory" to the `Downloads` folder. To change the directory/folder to the `Downloads` folder we just need to type `cd Downloads` and press `Enter`. Notice a few things. *First*, You may be prompted to allow `Terminal.app` to have access to the `Downloads` folder, allow this. *Second*, that when typing `Downloads` if you were to hit the `Tab` key on the keyboard after typing `Down` it would auto-complete to `Downloads/`. This is a feature of the command line that will prove very useful as it can look at all the files in the directory you are in (or going to) and auto-complete if it finds the match. *Finally*, notice how the `[LOCATION]` change from `~` to `Downloads`. This is letting you know that you are now in the a new directory/folder.



```
(base) CMSE-Air-11:~ brandonmcintyre$ ls
Applications     Downloads        Music            me
Desktop          Library          Pictures
Documents        Movies           Public
(base) CMSE-Air-11:~ brandonmcintyre$ conda deactivate
CMSE-Air-11:~ brandonmcintyre$ conda activate
(base) CMSE-Air-11:~ brandonmcintyre$ cd Downloads/
(base) CMSE-Air-11:Downloads brandonmcintyre$ ls
Mac_Terminal.ipynb
(base) CMSE-Air-11:Downloads brandonmcintyre$ jupyter notebook
```

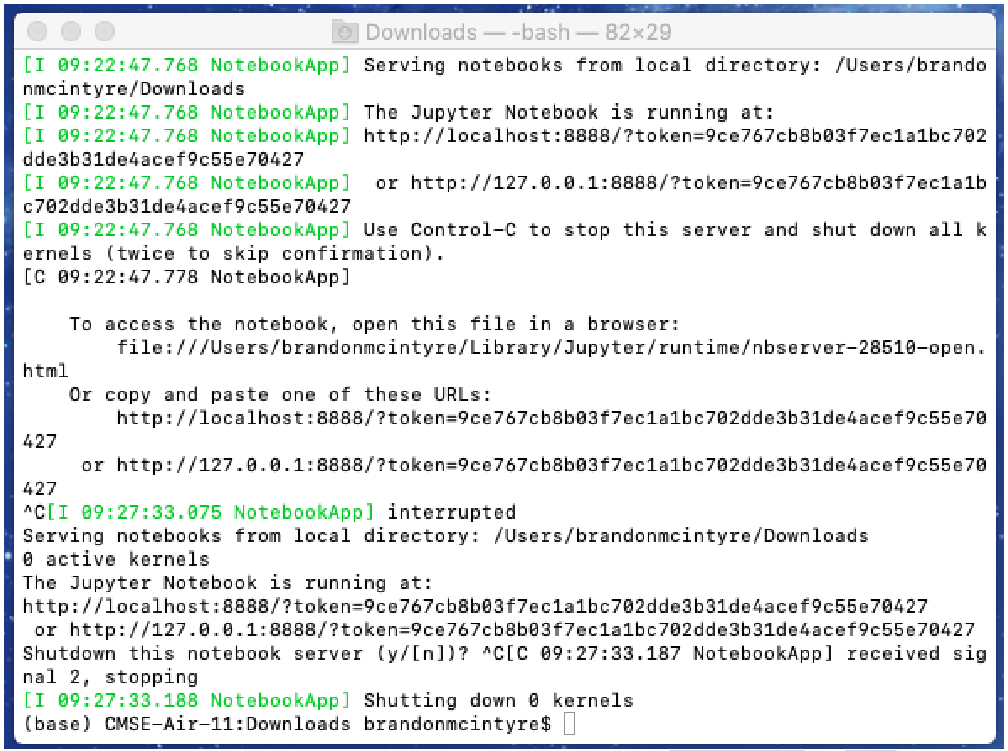
You can see all the files in the `Downloads` directory/folder by running the command `ls` and press `Enter`. Here, you may notice that in the photo there is a `.ipynb` in this directory. We can actually start up jupyter notebook in this directory from our terminal and open this file if we wish. You can do this by running the command `jupyter notebook` and pressing `Enter`. This will open Jupyter Notebook in your current directory/folder (The `Downloads` folder).



```
(base) CMSE-Air-11:~ brandonmcintyre$ ls
Applications     Downloads        Music            me
Desktop          Library          Pictures
Documents        Movies           Public
(base) CMSE-Air-11:~ brandonmcintyre$ conda deactivate
CMSE-Air-11:~ brandonmcintyre$ conda activate
(base) CMSE-Air-11:~ brandonmcintyre$ cd Downloads/
(base) CMSE-Air-11:Downloads brandonmcintyre$ ls
Mac_Terminal.ipynb
(base) CMSE-Air-11:Downloads brandonmcintyre$ jupyter notebook
[I 09:22:47.760 NotebookApp] JupyterLab extension loaded from /Users/brando
nmcintyre/me/anaconda3/lib/python3.7/site-packages/jupyterlab
[I 09:22:47.761 NotebookApp] JupyterLab application directory is /Users/bra
ndonmcintyre/me/anaconda3/share/jupyter/lab
[I 09:22:47.768 NotebookApp] Serving notebooks from local directory: /Users
/brandonmcintyre/Downloads
[I 09:22:47.768 NotebookApp] The Jupyter Notebook is running at:
[I 09:22:47.768 NotebookApp] http://localhost:8888/?token=9ce767cb8b03f7ec1
a1bc702dde3b31de4acef9c55e70427
[I 09:22:47.768 NotebookApp]  or http://127.0.0.1:8888/?token=9ce767cb8b03f
7ec1a1bc702dde3b31de4acef9c55e70427
[I 09:22:47.768 NotebookApp] Use Control-C to stop this server and shut dow
n all kernels (twice to skip confirmation).
[C 09:22:47.778 NotebookApp]

    To access the notebook, open this file in a browser:
        file:///Users/brandonmcintyre/Library/Jupyter/runtime/nbserver-2851
0-open.html
    Or copy and paste one of these URLs:
        http://localhost:8888/?token=9ce767cb8b03f7ec1a1bc702dde3b31de4acef
9c55e70427
     or http://127.0.0.1:8888/?token=9ce767cb8b03f7ec1a1bc702dde3b31de4acef
9c55e70427
```

Select items to perform actions on them.

Name	Last Modified	File size
□ Mac_Terminal.ipynb	an hour ago	27.7 kB



```
[I 09:22:47.768 NotebookApp] Serving notebooks from local directory: /Users/brando
nmcintyre/Downloads
[I 09:22:47.768 NotebookApp] The Jupyter Notebook is running at:
[I 09:22:47.768 NotebookApp] http://localhost:8888/?token=9ce767cb8b03f7ec1a1bc702
dde3b31de4acef9c55e70427
[I 09:22:47.768 NotebookApp]  or http://127.0.0.1:8888/?token=9ce767cb8b03f7ec1a1b
c702dde3b31de4acef9c55e70427
[I 09:22:47.768 NotebookApp] Use Control-C to stop this server and shut down all k
ernels (twice to skip confirmation).
[C 09:22:47.778 NotebookApp]

    To access the notebook, open this file in a browser:
        file:///Users/brandonmcintyre/Library/Jupyter/runtime/nbserver-28510-open.
html
    Or copy and paste one of these URLs:
        http://localhost:8888/?token=9ce767cb8b03f7ec1a1bc702dde3b31de4acef9c55e70
427
     or http://127.0.0.1:8888/?token=9ce767cb8b03f7ec1a1bc702dde3b31de4acef9c55e70
427
^C[I 09:27:33.075 NotebookApp] interrupted
Serving notebooks from local directory: /Users/brandonmcintyre/Downloads
0 active kernels
The Jupyter Notebook is running at:
http://localhost:8888/?token=9ce767cb8b03f7ec1a1bc702dde3b31de4acef9c55e70427
 or http://127.0.0.1:8888/?token=9ce767cb8b03f7ec1a1bc702dde3b31de4acef9c55e70427
Shutdown this notebook server (y/[n])? ^C[C 09:27:33.187 NotebookApp] received sig
nal 2, stopping
[I 09:27:33.188 NotebookApp] Shutting down 0 kernels
(base) CMSE-Air-11:Downloads brandonmcintyre$ 
```

To close down Jupyter Notebooks close the browser and then type `control` + `c` twice in a row. *Note: You can go back to the home directory/folder by typing `cd ..` and pressing `Enter`. The `..` means "parent" directory/folder. Which just means the folder that the current folder belongs to. So the `Downloads` directory/folder belongs to the home directory/folder.*

Useful Commands

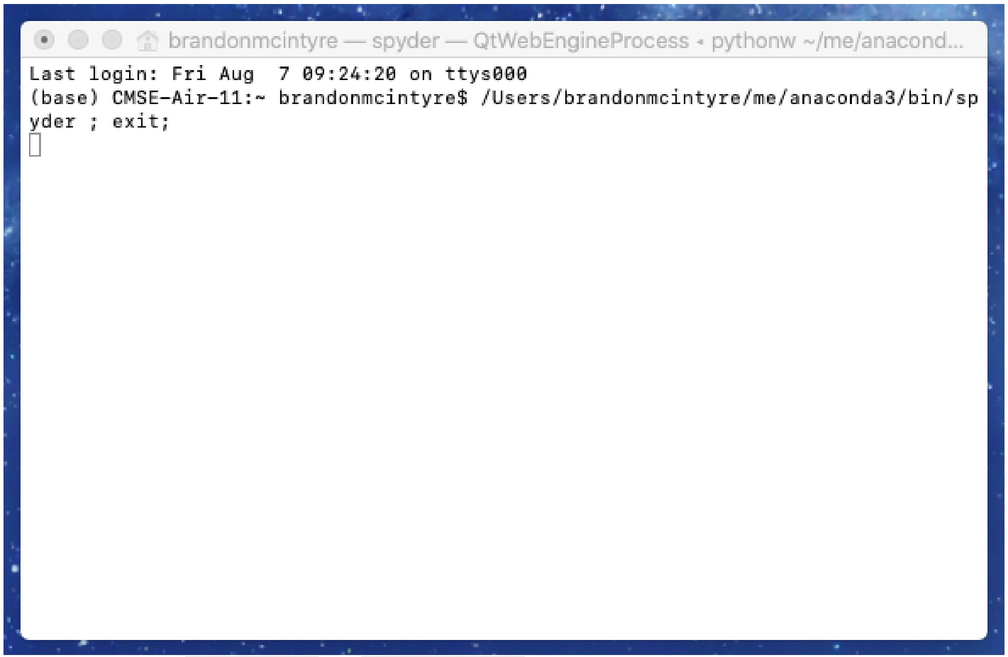
- `cd [DIRECTORY/FOLDER_NAME]` -- Will change the current directory your terminal is in to the folder specified.
- `cd ..` -- Will change the current directory your terminal is in to the the parent directory/folder of the current directory/folder.
- `open .` -- Will open up the current directory your terminal is in, in `Finder`.
- `open -a TextEdit [FILE_NAME]` -- Will open up the specified file with the `TextEdit` notepad program
- `clear` -- If you want to "clean" up the terminal to clear past commands from view, you type this command.
- `cat [FILE_NAME]` -- This will print all the contents of the specified file into the terminal for easy viewing.

Using Spyder (Text Editor/Python IDE)

Spyder is a program apart of the Anaconda distribution. It can be used to edit text files, as well as run Python code. Since it is built into Anaconda, this will be our deafult way of editing text files. There are other solutions out there such as Atom, Sublime, and many others. You are more than welcome to explore these other options, however, we will use this one as it is already pre-installed through the Anaconda.

Spyder can easily be started from one or two ways

1. Open `spyder` through using Spotlight

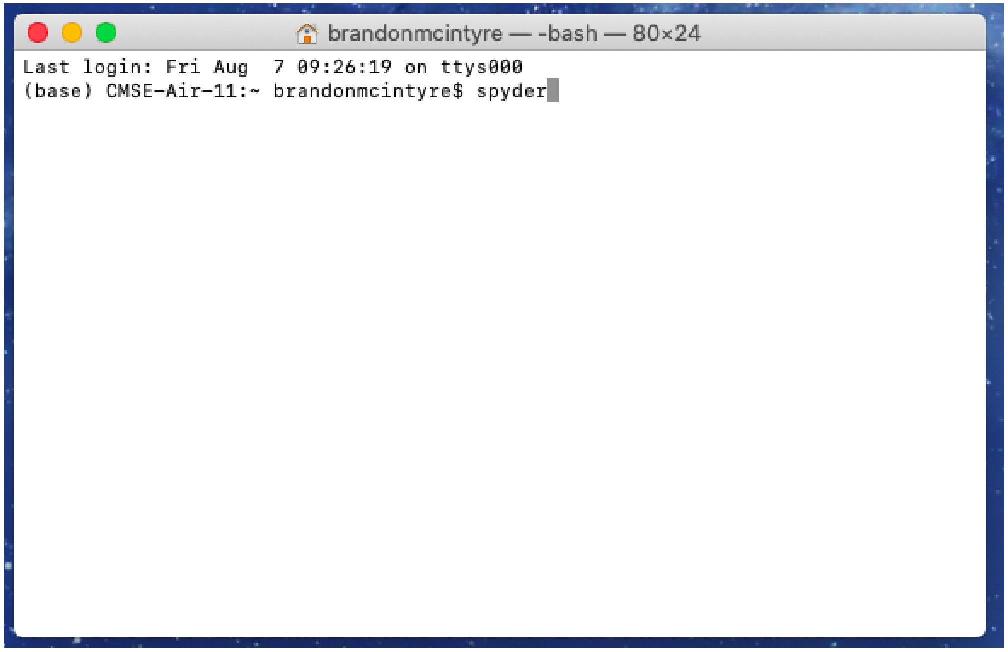


brandonmcintyre — spyder — QtWebEngineProcess ◂ pythonw ~/me/anacond...

```
Last login: Fri Aug  7 09:24:20 on ttys000
(base) CMSE-Air-11:~ brandonmcintyre$ /Users/brandonmcintyre/me/anaconda3/bin/sp
yder ; exit;
```

Using Spotlight by pressing `command` + `space-bar` or simply use the search bar in the top right corner search `spyder` and press `Enter`. It will open a up a terminal and then start the program.

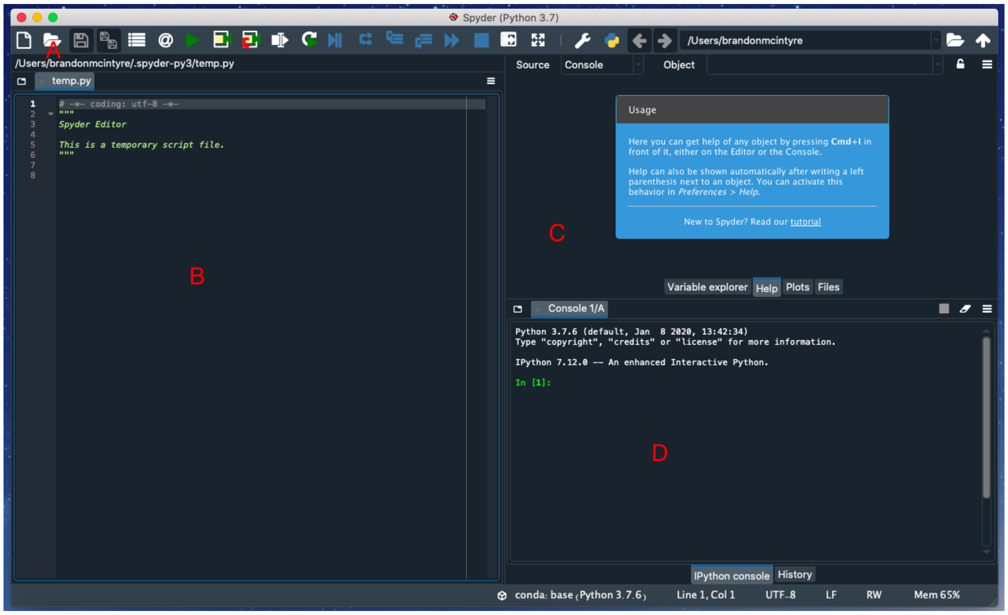
2. Using the terminal to start the program.



```
Last login: Fri Aug  7 09:26:19 on ttys000
(base) CMSE-Air-11:~ brandonmcintyre$ spyder
```

Open up terminal and type `spyder` and press enter. *Note: You can also open up files directly into spyder this way as well, you just need to include the path to the file. For example `spyder [FILE]` or `spyder [FOLDER/FILE]`.*

Once Spyder is open you should see something that looks like below. Follow the letters to learn more about these otpions



```
# -*- coding: utf-8 -*-
"""
Spyder Editor

This is a temporary script file.
"""
```

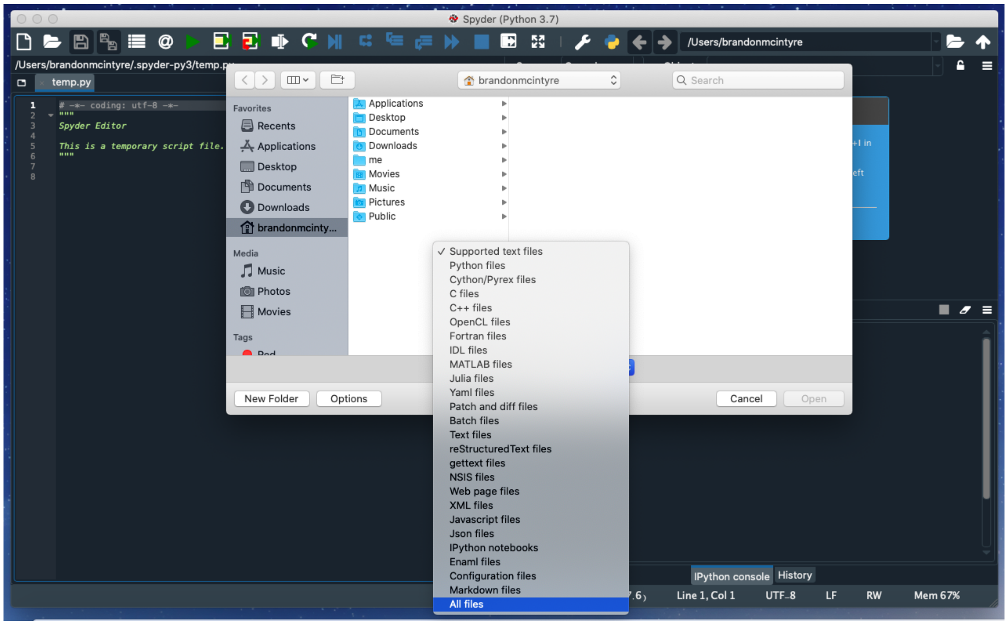
Here you can get help of any object by pressing Cmd+I in front of it, either on the Editor or the Console.

Help can also be shown automatically after writing a left parenthesis next to an object. You can activate this behavior in *Preferences > Help*.

New to Spyder? Read our tutorial

```
Python 3.7.6 (default, Jan  8 2020, 13:42:34)
Type "copyright", "credits" or "license" for more information.

IPython 7.12.0 -- An enhanced Interactive Python.

In [1]:
```

- **A.** This option you can use to open files. This is the alternative to opening files then opening them through the command line. Once you click on this icon another folder will open up.



```
# -*- coding: utf-8 -*-
"""
Spyder Editor

This is a temporary script file.
"""
```

Notice how in the photo the options to the right of the `File name:` is clicked. Make sure before trying to navigate to the file you want to open, you click on the `All files` option to be able to see/open any file. *Note: If you need to open a file that is in your home directory, and if you followed the optional guide above, you can quickly get there by using the Favorites*

- **B.** This is where the file that is opened will display.
- **C.** This is place where you can look at files, or assigned varaibles from running scripts (will learn more about this later). You can change what you see by clicking the tabs.
- **D.** This is an `iPython` console where you can run python commands and test out anything you want (will come more in handy when writing python scripts)

MSU's JupyterHub Interface

From time to time, you might run into issues with your computer. When this happens, you should use the web-hosted JupyterHub server managed by MSU. It creates a virtual environment that allows you to run simple commands and host Jupyter notebooks. To make sure that you have access to this backup option, follow the directions below. Note that there are extra steps involved that require that you upload and download you Jupyter notebooks to and from JupyterHub in order to turn them in on D2L.

Connecting to the engineering JupyterHub server

Every student enrolled in this class will be given an engineering computing account. If this is your first time using your Engineering account you will need to activate the account by going to the following website:

https://www.egr.msu.edu/decs/myaccount/?page=activate (https://www.egr.msu.edu/decs/myaccount/?page=activate)

Enter your MSU NetID. The initial password will be your APID with an @ on the end (example: A12345678@) and then you have to set a password that meets the requirements listed on the page. Verify the password. Then agree to the terms and Activate.

Once your account is activated you can access the classroom Jupyterhub server using the following instructions:

1. Open up a web browser and go to the following URL: https://jupyterhub.egr.msu.edu (https://jupyterhub.egr.msu.edu)
2. Type your engineering login name. This will be your MSU NetID.
3. Type your engineering password.

If everything is working properly you will see the main “Files” windows in the Jupyter interface.

If you ever end up working on your assignments using JupyterHub, the remaining directions should serve as a reference for how you can go about uploading and downloading Jupyter notebooks and turning them in.

Getting Jupyter notebook files into JupyterHub

IPython notebooks (also referred to as Jupyter notebooks) are files that end with the .ipynb extension. We will give you these files for all of your assignments, you will edit them and turn in the edited files in using the class Website.

You can download the ipynb assignment files from the class website (http://d2l.msu.edu (http://d2l.msu.edu)). Once you have an ipynb file you can load it into Jupyter using the “upload” button on the main “Files” tab in the JupyterHub web interface. Hitting this button will cause a file browser window to open. Just navigate to your ipynb file, select it and hit the open button.

Once you see your filename in the jupyter window you can just click on that name to start using that file.

Making a copy of Jupyter notebooks from JupyterHub and turning them in

When you are finished editing your IPython notebook and are ready to turn it in you will need to download the ipynb file from the JupyterHub interface.

1. With the notebook file open in Jupyter, go to the “File” menu, select the “Download as” menu option and then choose “iPython Notebook (.ipynb)”

2. Pick a place to save the file (The desktop is a good choice).
3. Make sure you make a copy of the .ipynb file for your own records.
4. Go to the Desire 2 Learn (http://d2l.msu.edu (http://d2l.msu.edu)) class website and upload the .ipynb file into the assignment folder.

NOTE: Video versions of these instructions are available on the CMSE YouTube channel here (https://www.youtube.com/watch?v=l7mhi4ww6tY) and here (https://www.youtube.com/watch?v=5WSQnGmz3IA).

Course Communication with Slack

We will be using Slack (http://slack.com (http://slack.com)) as our means of communicating about course content as the semester progresses. We believe that this will provide an excellent avenue to have discussions not only with course instructors, TAs, and LAs, but also between you and your fellow classmates. In order to join the Slack team that we've created for the course you should complete the following steps:

1. Go to https://cmse-courses.slack.com/signup (https://cmse-courses.slack.com/signup)
2. Once there, sign up using your @msu.edu email address. **Important**: When you create your account, use your MSU NetID as your user name. This will make it easier for your instructors to recognize you within the Slack channels.

Once you've joined the CMSE Courses Slack team, you'll need to **add yourself to two channels**. The first channel you should add yourself to is **"cmse202-f20-help"**. The second one you should add yourself to is **"cmse202-###-f20"** where "###" corresponds to the section of the course that you are enrolled in. To add yourself to these channels, click on "Channels" and search for the appropriate channel.

The "help" channel will be the place to go for any questions about assignments in the course or issues you're having with your computer or Python. We encourage you to help out other classmates when you can! The section-specific channel will be used by your instructor for important messages relevant only to your section of the course.

If you want a more streamlined experince, feel free to download slack for desktop (https://slack.com/downloads/windows).

Slack usage rules

In order to ensure that Slack is a useful tool that does not become overly time-consuming for the course instructors, TAs, or LAs, we have a list of rules for how we expect you to use Slack. They are:

1. Before you ask a question, be sure to check the other section channels to see if the question has already been answered.
2. The Slack team is primarily for you, the students, so help each other.
3. The TAs and LAs will monitor the channels, but will defer to the students to work through things. They will only enter a conversation if students are going down the wrong path and/or there are too few other students involved. However, you should not expect that the TAs or LAs will always be available. The TAs and LAs will spend a limited amount of time "logged in" to Slack and we ask that you be respectful of their time.
4. Slack is meant to be used to help you when you are stuck with a minor issue. If you are having major issues or trouble understanding the concept, go to office/helproom hours. Office/helproom hours are meant for more in-depth discussions of course content.

5. Course instructors will rarely check Slack, only to examine progress. While they may offer help, do not rely on it. Instructors will not respond to the same student twice within a 30 minute time interval.
6. Only in rare cases should you contact an instructor through a private channel. But, if you are struggling, feel free to use this option.
7. **Do not** post your solutions to out-of-class assignments directly into Slack unless prompted by an instructor.
8. Be courteous to everyone on Slack. Students who are being rude or who are excessively posting might be banned from posting on the course Slack channel