

Necessary Packages By Week

Note: it is possible a few others might be added, but this should get you started.

PLEASE NOTE this is assuming you have installed Python & Jupyter Notebook using Anaconda. You are welcome to use JupyterLab instead of Jupyter Notebooks, however we *will not support JupyterLab ourselves in this class.*

See https://github.com/jnaiman/IS-452AO-Fall2019/blob/master/installation_directions.md for more details about installing Anaconda (you can skip the PyCharm installation part).

Make sure you see the same plots as are saved in this plot - if something doesn't display this means something has gone wrong. Note: anything with randomly selected numbers will look a little different.

Please do not worry if you run into some things you have trouble installing -- we will help you debug in class!

Week01:

```
In [1]: import matplotlib
import matplotlib.pyplot as plt
```

```
In [2]: import datetime
```

The below is to make inline plots (you may not end up needing this!):

```
In [3]: %matplotlib inline
```

The NumPy library is for numerical analysis and using vectors/matrices:

```
In [4]: import numpy as np
```

Let's make a quick plot:

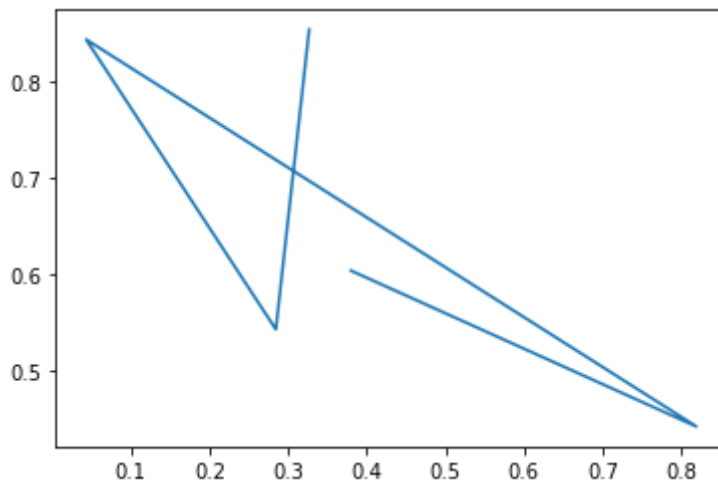
```
In [5]: x = np.random.random(5)
x
```

```
Out[5]: array([0.37993295, 0.81904843, 0.04334162, 0.28456481, 0.32685889])
```

```
In [6]: y = np.random.random(5)
y
```

```
Out[6]: array([0.60410345, 0.44306169, 0.84283845, 0.54339307, 0.85299333])
```

```
In [7]: plt.plot(x,y)  
plt.show()
```



Your plot may look different since it is using different numbers!

This is a library for importing and manipulating images.

```
In [8]: import PIL.Image as Image
```

Week 02

```
In [9]: import csv  
import collections
```

Note: the above should be already installed in your Python distribution.

```
In [10]: import pandas as pd
```

Testing reading with pandas:

```
In [11]: data = pd.read_csv("https://uiuc-ischool-dataviz.github.io/spring2019online/week02/data.csv")
```

```
In [12]: data
```

Out[12]:

	Agency Name	Location Name	Address	City	Zip code	County	Congress Dist	Congressional Full Name
0	Department of Natural Resources	Anderson Lake Conservation Area - Fulton County	Anderson Lake C.a.	Astoria	61501	Fulton	17	Cheri Bustos
1	Department of Natural Resources	Anderson Lake Conservation Area - Fulton County	Anderson Lake C.a.	Astoria	61501	Fulton	17	Cheri Bustos
2	Department of Natural Resources	Anderson Lake Conservation Area - Fulton County	Anderson Lake C.a.	Astoria	61501	Fulton	17	Cheri Bustos
3	Department of Natural Resources	Anderson Lake Conservation Area - Fulton County	Anderson Lake C.a.	Astoria	61501	Fulton	17	Cheri Bustos
4	Department of Natural Resources	Anderson Lake Conservation Area - Fulton County	Anderson Lake C.a.	Astoria	61501	Fulton	17	Cheri Bustos
...
8857	Department of Transportation	Belvidere Maintenance Storage Facility - Boone...	9797 Illinois Rte. 76	Belvidere	61008	Boone	16	Adan Kinzinger
8858	Department of Transportation	Belvidere Maintenance Storage Facility - Boone...	9797 Illinois Rte 76	Belvidere	61008	Boone	16	Adan Kinzinger
8859	Department of Transportation	Quincy Maintenance Storage Facility	800 Koch's Lane	Quincy	62305	Adams	18	Darin M LaHood
8860	Illinois Community College Board	Illinois Valley Community College - Oglesby	815 North Orlando Smith Avenue	Oglesby	61348	LaSalle	16	Adan Kinzinger
8861	Department of Military Affairs	Peoria Army Aviation Support Facility	2323 S. Airport Rd	Peoria	61607	Peoria	17	Cheri Bustos

8862 rows x 22 columns

```
In [13]: import scipy
import scipy.misc
import scipy.cluster
```

Week 03

Note: you may have to refresh your browser and/or close and reopen your notebook.

You may have to do this for a few of these packages (e.g. bqplot, pyodide, etc).

```
In [14]: import ipywidgets
```

Test a widget:

```
In [15]: ipywidgets.IntSlider()
```

IntSlider(value=0)

If the above doesn't give you an interactive slider, you may want to try:

```
In [16]: from IPython.display import display
w = ipywidgets.IntSlider()
display(w)
```

IntSlider(value=0)

If it still doesn't work, you may have to install the jupyter notebook extensions by hand by uncommenting the below and then refreshing/restarting your jupyter notebook:

```
In [17]: #!/jupyter nbextension enable --py widgetsnbextension

### Note, you may have to use instead:
#!/jupyter nbextension enable --py widgetsnbextension --sys-prefix
```

Also, try this interactive plot with a selectable dropdown menu.

```
In [18]: @ipywidgets.interact(style = plt.style.available)
def make_plot(style):
    with plt.style.context(style):
        plt.plot(x,y)

interactive(children=(Dropdown(description='style', options=('Solarize_Light
2', '_classic_test_patch', 'bmh', ...
```

```
In [19]: import json
```

```
In [66]: !pip install palettable
```

Collecting palettable

Downloading palettable-3.3.0-py2.py3-none-any.whl (111 kB)

111.8/111.8 KB 3.2 MB/s eta 0:00:00

Installing collected packages: palettable

Successfully installed palettable-3.3.0

WARNING: You are using pip version 22.0.4; however, version 22.3.1 is available.

You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pip install --upgrade pip' command.

```
In [67]: import palettable
```

```
In [68]: from PIL import Image
```

```
In [69]: import IPython.display
import io
from mpl_toolkits.mplot3d import Axes3D
import matplotlib.cm
import matplotlib.transforms as mpt
```

Week 04

```
In [70]: import matplotlib.dates as mdates
```

```
In [71]: import PIL.ImageFilter as ImageFilter
```

```
In [43]: !pip install --pre bqplot
```

Collecting bqplot

Downloading bqplot-0.12.36-py2.py3-none-any.whl (1.2 MB)

1.2/1.2 MB 6.1 MB/s eta 0:00:00

0:0100:01

Requirement already satisfied: numpy<2.0.0,>=1.10.4 in /Users/john/miniconda3/lib/python3.8/site-packages (from bqplot) (1.22.3)

Requirement already satisfied: ipywidgets<9,>=7.5.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from bqplot) (7.6.5)

Collecting traitlets>=0.0.6

Downloading traitlets-0.2.1-py2.py3-none-any.whl (8.6 kB)

Requirement already satisfied: traitlets>=4.3.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from bqplot) (5.1.1)

Requirement already satisfied: pandas<2.0.0,>=1.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from bqplot) (1.2.4)

Requirement already satisfied: ipython-genutils<0.2.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.5.0->bqplot) (0.2.0)

Requirement already satisfied: ipykernel>=4.5.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.5.0->bqplot) (6.9.1)

Requirement already satisfied: jupyterlab-widgets>=1.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.5.0->bqplot) (1.0.0)

Requirement already satisfied: widgetsnbextension<=3.5.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.5.0->bqplot) (3.5.2)

Requirement already satisfied: nbformat>=4.2.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.5.0->bqplot) (5.3.0)

Requirement already satisfied: ipython>=4.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.5.0->bqplot) (8.2.0)

Requirement already satisfied: python-dateutil>=2.7.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from pandas<2.0.0,>=1.0.0->bqplot) (2.8.2)

Requirement already satisfied: pytz>=2017.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from pandas<2.0.0,>=1.0.0->bqplot) (2021.3)

Requirement already satisfied: nest-asyncio in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.5.0->bqplot) (1.5.5)

Requirement already satisfied: appnope in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.5.0->bqplot) (0.1.2)

Requirement already satisfied: tornado<7.0,>=4.2 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.5.0->bqplot) (6.1)

Requirement already satisfied: jupyter-client<8.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.5.0->bqplot) (7.2.2)

Requirement already satisfied: matplotlib-inline<0.2.0,>=0.1.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.5.0->bqplot) (0.1.2)

Requirement already satisfied: debugpy<2.0,>=1.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.5.0->bqplot) (1.5.1)

Requirement already satisfied: pickleshare in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqplot) (0.7.5)

Requirement already satisfied: decorator in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqplot) (5.1.1)

Requirement already satisfied: jedi>=0.16 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqplot) (0.18.1)

Requirement already satisfied: prompt-toolkit!=3.0.0,!<3.1.0,>=2.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqplot) (3.0.20)

Requirement already satisfied: backcall in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqplot) (0.2.0)

Requirement already satisfied: pexpect>4.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqplot) (4.8.0)

Requirement already satisfied: pygments>=2.4.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqplot) (2.11.2)

Requirement already satisfied: setuptools>=18.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqplot) (61.2.0)

Requirement already satisfied: stack-data in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqplot) (0.2.0)

Requirement already satisfied: jsonschema>=2.6 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbformat>=4.2.0->ipywidgets<9,>=7.5.0->bqplot) (4.4.0)

Requirement already satisfied: fastjsonschema in /Users/john/miniconda3/lib/python3.8/site-packages (from nbformat>=4.2.0->ipywidgets<9,>=7.5.0->bqplot) (2.15.1)

Requirement already satisfied: jupyter-core in /Users/john/miniconda3/lib/python3.8/site-packages (from nbformat>=4.2.0->ipywidgets<9,>=7.5.0->bqplot) (4.9.2)

Requirement already satisfied: six>=1.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from python-dateutil>=2.7.3->pandas<2.0.0,>=1.0.0->bqplot) (1.16.0)

Requirement already satisfied: notebook>=4.4.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from widgetsnbextension~=3.5.0->ipywidgets<9,>=7.5.0->bqplot) (6.4.8)

Requirement already satisfied: parso<0.9.0,>=0.8.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jedi>=0.16->ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqplot) (0.8.3)

Requirement already satisfied: importlib-resources>=1.4.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=2.6->nbformat>=4.2.0->ipywidgets<9,>=7.5.0->bqplot) (5.2.0)

Requirement already satisfied: attrs>=17.4.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=2.6->nbformat>=4.2.0->ipywidgets<9,>=7.5.0->bqplot) (21.4.0)

Requirement already satisfied: pyparsing!=0.17.0,!0.17.1,!0.17.2,>=0.14.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=2.6->nbformat>=4.2.0->ipywidgets<9,>=7.5.0->bqplot) (0.18.0)

Requirement already satisfied: entrypoints in /Users/john/miniconda3/lib/python3.8/site-packages (from jupyter-client<8.0->ipykernel>=4.5.1->ipywidgets<9,>=7.5.0->bqplot) (0.4)

Requirement already satisfied: pyzmq>=22.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from jupyter-client<8.0->ipykernel>=4.5.1->ipywidgets<9,>=7.5.0->bqplot) (22.3.0)

Requirement already satisfied: nbconvert in /Users/john/miniconda3/lib/python3.8/site-packages (from notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.5.0->bqplot) (6.4.4)

Requirement already satisfied: terminado>=0.8.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.5.0->bqplot) (0.13.1)

Requirement already satisfied: Jinja2 in /Users/john/miniconda3/lib/python3.8/site-packages (from notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.5.0->bqplot) (3.0.3)

Requirement already satisfied: argon2-cffi in /Users/john/miniconda3/lib/python3.8/site-packages (from notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.5.0->bqplot) (21.3.0)

Requirement already satisfied: Send2Trash>=1.8.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.5.0->bqplot) (1.8.0)

Requirement already satisfied: Prometheus-client in /Users/john/miniconda3/lib/python3.8/site-packages (from notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.5.0->bqplot) (0.13.1)

Requirement already satisfied: ptyprocess>=0.5 in /Users/john/miniconda3/lib/p

```

python3.8/site-packages (from pexpect>4.3->ipython>=4.0.0->ipywidgets<9,>=7.5.0
->bqplot) (0.7.0)
Requirement already satisfied: wcwidth in /Users/john/miniconda3/lib/python3.
8/site-packages (from prompt-toolkit!=3.0.0,!3.0.1,<3.1.0,>=2.0.0->ipython>=
4.0.0->ipywidgets<9,>=7.5.0->bqplot) (0.2.5)
Requirement already satisfied: asttokens in /Users/john/miniconda3/lib/python
3.8/site-packages (from stack-data->ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqpl
ot) (2.0.5)
Requirement already satisfied: executing in /Users/john/miniconda3/lib/python
3.8/site-packages (from stack-data->ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqpl
ot) (0.8.3)
Requirement already satisfied: pure-eval in /Users/john/miniconda3/lib/python
3.8/site-packages (from stack-data->ipython>=4.0.0->ipywidgets<9,>=7.5.0->bqpl
ot) (0.2.2)
Requirement already satisfied: zipp>=3.1.0 in /Users/john/miniconda3/lib/pytho
n3.8/site-packages (from importlib-resources>=1.4.0->jsonschema>=2.6->nbformat
>=4.2.0->ipywidgets<9,>=7.5.0->bqplot) (3.7.0)
Requirement already satisfied: argon2-cffi-bindings in /Users/john/miniconda3/
lib/python3.8/site-packages (from argon2-cffi->notebook>=4.4.1->widgetsnbexten
sion~3.5.0->ipywidgets<9,>=7.5.0->bqplot) (21.2.0)
Requirement already satisfied: MarkupSafe>=2.0 in /Users/john/miniconda3/lib/p
ython3.8/site-packages (from jinja2->notebook>=4.4.1->widgetsnbextension~3.5.
0->ipywidgets<9,>=7.5.0->bqplot) (2.0.1)
Requirement already satisfied: mistune<2,>=0.8.1 in /Users/john/miniconda3/li
b/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension
~3.5.0->ipywidgets<9,>=7.5.0->bqplot) (0.8.4)
Requirement already satisfied: bleach in /Users/john/miniconda3/lib/python3.8/
site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~3.5.0->ipy
widgets<9,>=7.5.0->bqplot) (4.1.0)
Requirement already satisfied: jupyterlab-pygments in /Users/john/miniconda3/l
ib/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextensio
n~3.5.0->ipywidgets<9,>=7.5.0->bqplot) (0.1.2)
Requirement already satisfied: pandocfilters>=1.4.1 in /Users/john/miniconda3/
lib/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextensi
on~3.5.0->ipywidgets<9,>=7.5.0->bqplot) (1.5.0)
Requirement already satisfied: testpath in /Users/john/miniconda3/lib/python3.
8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~3.5.0->i
pywidgets<9,>=7.5.0->bqplot) (0.5.0)
Requirement already satisfied: beautifulsoup4 in /Users/john/miniconda3/lib/py
thon3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~3.
5.0->ipywidgets<9,>=7.5.0->bqplot) (4.11.1)
Requirement already satisfied: defusedxml in /Users/john/miniconda3/lib/python
3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~3.5.0-
>ipywidgets<9,>=7.5.0->bqplot) (0.7.1)
Requirement already satisfied: nbclient<0.6.0,>=0.5.0 in /Users/john/miniconda
3/lib/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbexten
sion~3.5.0->ipywidgets<9,>=7.5.0->bqplot) (0.5.13)
Requirement already satisfied: cffi>=1.0.1 in /Users/john/miniconda3/lib/pytho
n3.8/site-packages (from argon2-cffi-bindings->argon2-cffi->notebook>=4.4.1->w
idgetsnbextension~3.5.0->ipywidgets<9,>=7.5.0->bqplot) (1.15.0)
Requirement already satisfied: soupsieve>1.2 in /Users/john/miniconda3/lib/pyt
hon3.8/site-packages (from beautifulsoup4->nbconvert->notebook>=4.4.1->widgets
nbextension~3.5.0->ipywidgets<9,>=7.5.0->bqplot) (2.3.1)
Requirement already satisfied: webencodings in /Users/john/miniconda3/lib/pyth
on3.8/site-packages (from bleach->nbconvert->notebook>=4.4.1->widgetsnbextensi
on~3.5.0->ipywidgets<9,>=7.5.0->bqplot) (0.5.1)
Requirement already satisfied: packaging in /Users/john/miniconda3/lib/python
3.8/site-packages (from bleach->nbconvert->notebook>=4.4.1->widgetsnbextension
~3.5.0->ipywidgets<9,>=7.5.0->bqplot) (21.3)
Requirement already satisfied: pycparser in /Users/john/miniconda3/lib/python

```



```
3.8/site-packages (from cffi>=1.0.1->argon2-cffi-bindings->argon2-cffi->notebook>=4.4.1->widgetsnbextension~3.5.0->ipywidgets<9,>=7.5.0->bqplot) (2.21)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in /Users/john/miniconda3/lib/python3.8/site-packages (from packaging->bleach->nbconvert->notebook>=4.4.1->widgetsnbextension~3.5.0->ipywidgets<9,>=7.5.0->bqplot) (3.0.4)
Installing collected packages: traitletypes, bqplot
Successfully installed bqplot-0.12.36 traitletypes-0.2.1
WARNING: You are using pip version 22.0.4; however, version 22.3.1 is available.
You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pip install --upgrade pip' command.
```

```
In [44]: import bqplot
import numpy as np
```

Print out bqplot version:

```
In [45]: bqplot.__version__
```

```
Out[45]: '0.12.36'
```

You may have to do:

```
In [46]: !jupyter nbextension enable --py bqplot

### or instead
#!jupyter nbextension enable --py widgetsnbextension --sys-prefix

import bqplot
```

Enabling notebook extension bqplot/extension...
- Validating: OK

Note: it is possible you may have to refresh your browser or close and reopen anaconda and jupyter notebook after you install this.

Try out this interactive plot. You should be able to pan and zoom. Don't worry about the code right now, we'll get to it in week 03.

```
In [107... x = np.arange(100)
y = np.random.random(100) + 5

x_sc = bqplot.LinearScale()
y_sc = bqplot.LinearScale()

lines = bqplot.Lines(x = x, y = y, scales = {'x': x_sc, 'y': y_sc})

ax_x = bqplot.Axis(scale = x_sc, label = 'x value')
ax_y = bqplot.Axis(scale = y_sc, label = 'y value', orientation = 'vertical')

pz = bqplot.interacts.PanZoom( scales = {'x': [x_sc], 'y': [y_sc]} )

pz
```

```
Out[107]: PanZoom(scales={'x': [LinearScale()], 'y': [LinearScale()]})
```

Note, if the above doesn't work you can try replacing:

```
bqplot.Figure(marks = [lines], axes = [ax_x, ax_y], interaction = pz)
```

with

```
display(bqplot.Figure(marks = [lines], axes = [ax_x, ax_y],  
interaction = pz))
```

Week 05

While not strictly the importing of libraries see if you get any weird errors when you run:

```
In [50]: # %matplotlib notebook  
# %pylab  
# %matplotlib inline
```

```
In [51]: import PIL.ImageFilter as ImageFilter
```

```
In [73]: !pip install h5py
```

Collecting h5py

Downloading h5py-3.8.0-cp38-cp38-macosx_10_9_x86_64.whl (3.2 MB)

3.2/3.2 MB 14.5 MB/s eta 0:00:00

00:0100:01

Requirement already satisfied: numpy>=1.14.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from h5py) (1.22.3)

Installing collected packages: h5py

Successfully installed h5py-3.8.0

WARNING: You are using pip version 22.0.4; however, version 22.3.1 is available.

You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pip install --upgrade pip' command.

```
In [74]: import h5py
```

```
In [75]: import matplotlib.colors as colors
```

Week 06

```
In [76]: import bqplot.market_map
```

```
In [77]: import traitlets
```

Week 07

```
In [78]: import requests
```

```
In [80]: !pip install geopandas
```

```

Collecting geopandas
  Downloading geopandas-0.12.2-py3-none-any.whl (1.1 MB)
    _____ 1.1/1.1 MB 6.5 MB/s eta 0:00:00
0:01:00:01
Requirement already satisfied: packaging in /Users/john/miniconda3/lib/python
3.8/site-packages (from geopandas) (21.3)
Collecting fiona>=1.8
  Downloading Fiona-1.8.22-cp38-cp38-macosx_10_10_x86_64.whl (26.5 MB)
    _____ 26.5/26.5 MB 5.4 MB/s eta 0:00:0
000:0100:01m
Collecting shapely>=1.7
  Downloading shapely-2.0.0-cp38-cp38-macosx_10_9_x86_64.whl (1.4 MB)
    _____ 1.4/1.4 MB 7.3 MB/s eta 0:00:000
0:0100:01
Collecting pyproj>=2.6.1.post1
  Downloading pyproj-3.4.1-cp38-cp38-macosx_10_9_x86_64.whl (8.4 MB)
    _____ 8.4/8.4 MB 8.9 MB/s eta 0:00:00:
00:0100:01
Requirement already satisfied: pandas>=1.0.0 in /Users/john/miniconda3/lib/pyt
hon3.8/site-packages (from geopandas) (1.2.4)
Requirement already satisfied: attrs>=17 in /Users/john/miniconda3/lib/python
3.8/site-packages (from fiona>=1.8->geopandas) (21.4.0)
Requirement already satisfied: six>=1.7 in /Users/john/miniconda3/lib/python3.
8/site-packages (from fiona>=1.8->geopandas) (1.16.0)
Requirement already satisfied: certifi in /Users/john/miniconda3/lib/python3.
8/site-packages (from fiona>=1.8->geopandas) (2022.9.14)
Collecting click-plugins>=1.0
  Downloading click_plugins-1.1.1-py2.py3-none-any.whl (7.5 kB)
Requirement already satisfied: click>=4.0 in /Users/john/miniconda3/lib/python
3.8/site-packages (from fiona>=1.8->geopandas) (8.0.4)
Collecting munch
  Downloading munch-2.5.0-py2.py3-none-any.whl (10 kB)
Requirement already satisfied: setuptools in /Users/john/miniconda3/lib/python
3.8/site-packages (from fiona>=1.8->geopandas) (61.2.0)
Collecting cligj>=0.5
  Downloading cligj-0.7.2-py3-none-any.whl (7.1 kB)
Requirement already satisfied: python-dateutil>=2.7.3 in /Users/john/miniconda
3/lib/python3.8/site-packages (from pandas>=1.0.0->geopandas) (2.8.2)
Requirement already satisfied: pytz>=2017.3 in /Users/john/miniconda3/lib/pyth
on3.8/site-packages (from pandas>=1.0.0->geopandas) (2021.3)
Requirement already satisfied: numpy>=1.16.5 in /Users/john/miniconda3/lib/pyt
hon3.8/site-packages (from pandas>=1.0.0->geopandas) (1.22.3)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in /Users/john/minicon
da3/lib/python3.8/site-packages (from packaging->geopandas) (3.0.4)
Installing collected packages: shapely, pyproj, munch, cligj, click-plugins, f
iona, geopandas
Successfully installed click-plugins-1.1.1 cligj-0.7.2 fiona-1.8.22 geopandas-
0.12.2 munch-2.5.0 pyproj-3.4.1 shapely-2.0.0
WARNING: You are using pip version 22.0.4; however, version 22.3.1 is availabl
e.
You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pi
p install --upgrade pip' command.

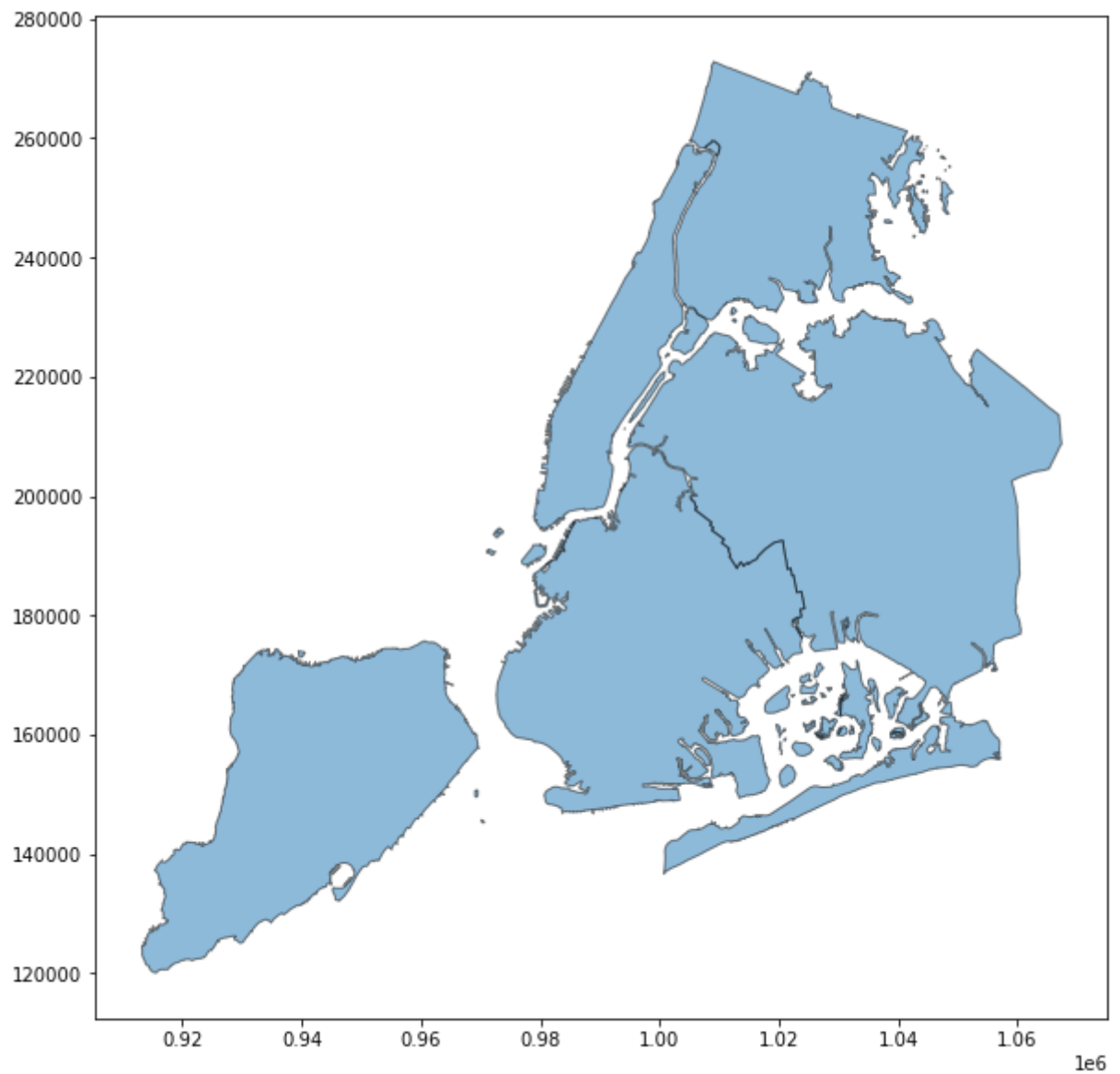
```

```
In [81]: import geopandas
```

Make a test map:

```
In [82]: df = geopandas.read_file(geopandas.datasets.get_path('nybb'))
```

```
In [83]: ax = df.plot(figsize=(10, 10), alpha=0.5, edgecolor='k')
```



```
In [85]: !pip install contextily
```

Collecting contextily

Downloading contextily-1.2.0-py3-none-any.whl (16 kB)

Collecting mercantile

Downloading mercantile-1.2.1-py3-none-any.whl (14 kB)

Requirement already satisfied: requests in /Users/john/miniconda3/lib/python3.8/site-packages (from contextily) (2.27.1)

Collecting xyzservices

Downloading xyzservices-2022.9.0-py3-none-any.whl (55 kB)

55.9/55.9 KB 1.1 MB/s eta 0:00:00
0:00:01

Requirement already satisfied: geopy in /Users/john/miniconda3/lib/python3.8/site-packages (from contextily) (2.2.0)

Requirement already satisfied: joblib in /Users/john/miniconda3/lib/python3.8/site-packages (from contextily) (1.1.0)

Requirement already satisfied: pillow in /Users/john/miniconda3/lib/python3.8/site-packages (from contextily) (9.2.0)

Collecting rasterio

Downloading rasterio-1.3.4-cp38-cp38-macosx_10_15_x86_64.whl (30.9 MB)

30.9/30.9 MB 9.4 MB/s eta 0:00:00
0:00:01

Requirement already satisfied: matplotlib in /Users/john/miniconda3/lib/python3.8/site-packages (from contextily) (3.2.2)

Requirement already satisfied: geographiclib<2,>=1.49 in /Users/john/miniconda3/lib/python3.8/site-packages (from geopy->contextily) (1.52)

Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from matplotlib->contextily) (3.0.4)

Requirement already satisfied: python-dateutil>=2.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from matplotlib->contextily) (2.8.2)

Requirement already satisfied: numpy>=1.11 in /Users/john/miniconda3/lib/python3.8/site-packages (from matplotlib->contextily) (1.22.3)

Requirement already satisfied: kiwisolver>=1.0.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from matplotlib->contextily) (1.3.2)

Requirement already satisfied: cycycler>=0.10 in /Users/john/miniconda3/lib/python3.8/site-packages (from matplotlib->contextily) (0.11.0)

Requirement already satisfied: click>=3.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from mercantile->contextily) (8.0.4)

Requirement already satisfied: click-plugins in /Users/john/miniconda3/lib/python3.8/site-packages (from rasterio->contextily) (1.1.1)

Requirement already satisfied: certifi in /Users/john/miniconda3/lib/python3.8/site-packages (from rasterio->contextily) (2022.9.14)

Requirement already satisfied: attrs in /Users/john/miniconda3/lib/python3.8/site-packages (from rasterio->contextily) (21.4.0)

Collecting snuggs>=1.4.1

Downloading snuggs-1.4.7-py3-none-any.whl (5.4 kB)

Requirement already satisfied: cligj>=0.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from rasterio->contextily) (0.7.2)

Collecting affine

Downloading affine-2.4.0-py3-none-any.whl (15 kB)

Requirement already satisfied: setuptools in /Users/john/miniconda3/lib/python3.8/site-packages (from rasterio->contextily) (61.2.0)

Requirement already satisfied: charset-normalizer~=2.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from requests->contextily) (2.0.12)

Requirement already satisfied: urllib3<1.27,>=1.21.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from requests->contextily) (1.26.9)

Requirement already satisfied: idna<4,>=2.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from requests->contextily) (3.3)

Requirement already satisfied: six>=1.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from python-dateutil>=2.1->matplotlib->contextily) (1.16.0)

Installing collected packages: xyzservices, snuggs, mercantile, affine, rasterio

io, contextily

Successfully installed affine-2.4.0 contextily-1.2.0 mercantile-1.2.1 rasterio-1.3.4 snuggs-1.4.7 xyzservices-2022.9.0

WARNING: You are using pip version 22.0.4; however, version 22.3.1 is available.

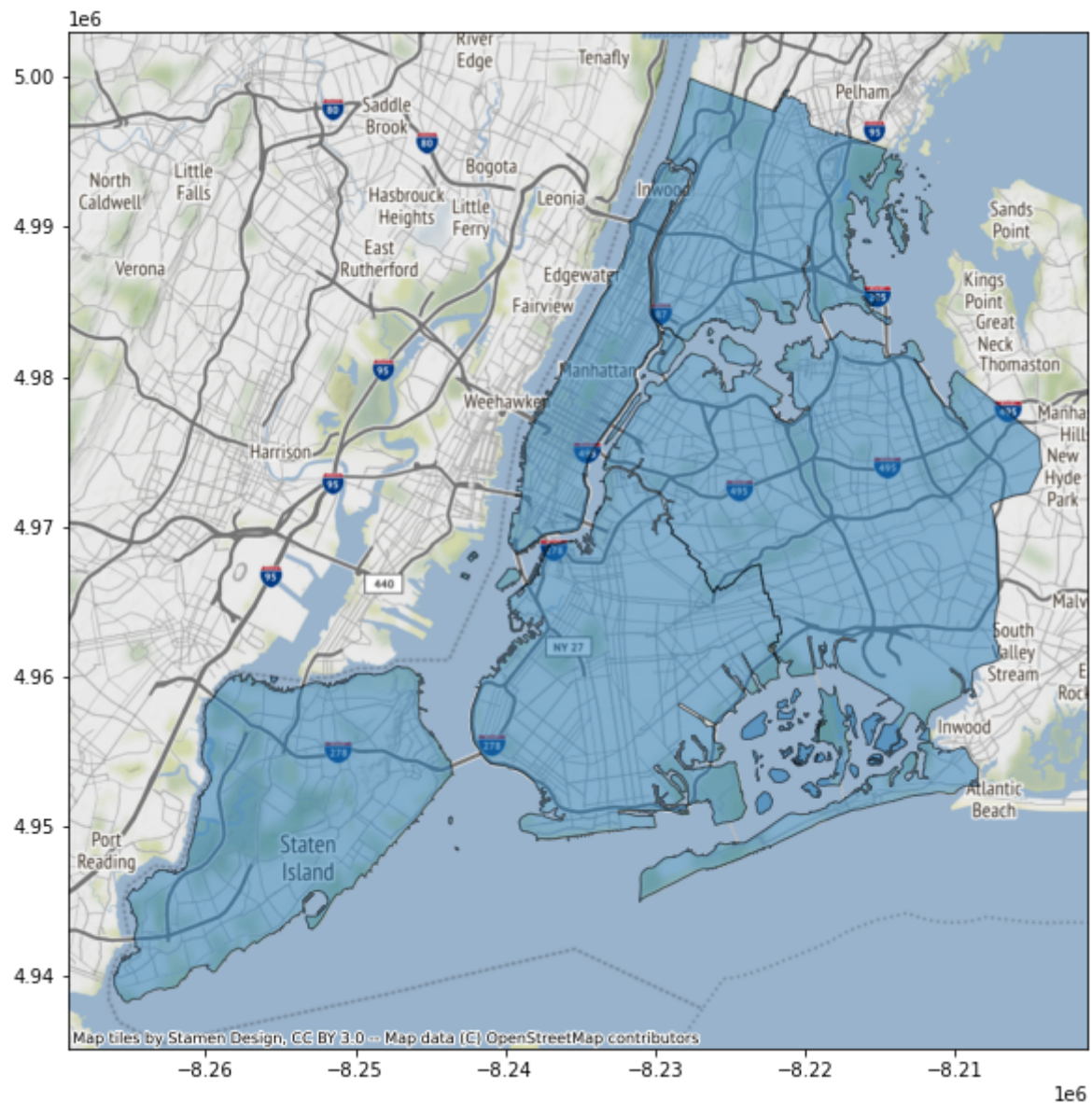
You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pip install --upgrade pip' command.

```
In [86]: import contextily as ctx
```

Make a test map with a background:

```
In [87]: df = df.to_crs(epsg=3857)

ax = df.plot(figsize=(10, 10), alpha=0.5, edgecolor='k')
ctx.add_basemap(ax)
```



Week 08

Week 09

```
In [88]: import bqplot.market_map
```

```
In [90]: !pip install webcolors
```

Collecting webcolors

Downloading webcolors-1.12-py3-none-any.whl (9.9 kB)

Installing collected packages: webcolors

Successfully installed webcolors-1.12

WARNING: You are using pip version 22.0.4; however, version 22.3.1 is available.

You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pip install --upgrade pip' command.

```
In [91]: from webcolors import rgb_to_hex
```

```
In [93]: !pip install ipyleaflet
```

Collecting ipyleaflet

Downloading ipyleaflet-0.17.2-py3-none-any.whl (3.7 MB)

3.7/3.7 MB 10.6 MB/s eta 0:00:00

00:0100:01

Requirement already satisfied: traitletypes<3,>=0.2.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipyleaflet) (0.2.1)

Requirement already satisfied: xyzservices>=2021.8.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipyleaflet) (2022.9.0)

Requirement already satisfied: ipywidgets<9,>=7.6.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipyleaflet) (7.6.5)

Collecting branca>=0.5.0

Downloading branca-0.6.0-py3-none-any.whl (24 kB)

Requirement already satisfied: jinja2 in /Users/john/miniconda3/lib/python3.8/site-packages (from branca>=0.5.0->ipyleaflet) (3.0.3)

Requirement already satisfied: jupyterlab-widgets>=1.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.6.0->ipyleaflet) (1.0.0)

Requirement already satisfied: nbformat>=4.2.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.6.0->ipyleaflet) (5.3.0)

Requirement already satisfied: ipython>=4.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.6.0->ipyleaflet) (8.2.0)

Requirement already satisfied: ipython-genutils~=0.2.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.6.0->ipyleaflet) (0.2.0)

Requirement already satisfied: widgetsnbextension~=3.5.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.6.0->ipyleaflet) (3.5.2)

Requirement already satisfied: traitlets>=4.3.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.6.0->ipyleaflet) (5.1.1)

Requirement already satisfied: ipykernel>=4.5.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipywidgets<9,>=7.6.0->ipyleaflet) (6.9.1)

Requirement already satisfied: appnope in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.6.0->ipyleaflet) (0.1.2)

Requirement already satisfied: jupyter-client<8.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.6.0->ipyleaflet) (7.2.2)

Requirement already satisfied: matplotlib-inline<0.2.0,>=0.1.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.6.0->ipyleaflet) (0.1.2)

Requirement already satisfied: nest-asyncio in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.6.0->ipyleaflet) (1.5.5)

Requirement already satisfied: debugpy<2.0,>=1.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.6.0->ipyleaflet) (1.5.1)

Requirement already satisfied: tornado<7.0,>=4.2 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets<9,>=7.6.0->ipyleaflet) (6.1)

Requirement already satisfied: pickleshare in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.7.5)

Requirement already satisfied: stack-data in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.2.0)

Requirement already satisfied: jedi>=0.16 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.18.1)

Requirement already satisfied: decorator in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (5.1.1)

Requirement already satisfied: prompt-toolkit!=3.0.0,!>=3.0.1,<3.1.0,>=2.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (3.0.20)

Requirement already satisfied: pexpect>4.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (4.8.0)

Requirement already satisfied: setuptools>=18.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (61.2.0)

Requirement already satisfied: pygments>=2.4.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (2.11.2)

Requirement already satisfied: backcall in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.2.0)

Requirement already satisfied: jsonschema>=2.6 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbformat>=4.2.0->ipywidgets<9,>=7.6.0->ipyleaflet) (4.4.0)

Requirement already satisfied: jupyter-core in /Users/john/miniconda3/lib/python3.8/site-packages (from nbformat>=4.2.0->ipywidgets<9,>=7.6.0->ipyleaflet) (4.9.2)

Requirement already satisfied: fastjsonschema in /Users/john/miniconda3/lib/python3.8/site-packages (from nbformat>=4.2.0->ipywidgets<9,>=7.6.0->ipyleaflet) (2.15.1)

Requirement already satisfied: notebook>=4.4.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (6.4.8)

Requirement already satisfied: MarkupSafe>=2.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jinja2->branca>=0.5.0->ipyleaflet) (2.0.1)

Requirement already satisfied: parso<0.9.0,>=0.8.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jedi>=0.16->ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.8.3)

Requirement already satisfied: attrs>=17.4.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=2.6->nbformat>=4.2.0->ipywidgets<9,>=7.6.0->ipyleaflet) (21.4.0)

Requirement already satisfied: pyparsing!=0.17.0,!>=0.17.1,!>=0.17.2,>=0.14.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=2.6->nbformat>=4.2.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.18.0)

Requirement already satisfied: importlib-resources>=1.4.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=2.6->nbformat>=4.2.0->ipywidgets<9,>=7.6.0->ipyleaflet) (5.2.0)

Requirement already satisfied: entrypoints in /Users/john/miniconda3/lib/python3.8/site-packages (from jupyter-client<8.0->ipykernel>=4.5.1->ipywidgets<9,>=7.6.0->ipyleaflet) (0.4)

Requirement already satisfied: pyzmq>=22.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from jupyter-client<8.0->ipykernel>=4.5.1->ipywidgets<9,>=7.6.0->ipyleaflet) (22.3.0)

Requirement already satisfied: python-dateutil>=2.8.2 in /Users/john/miniconda3/lib/python3.8/site-packages (from jupyter-client<8.0->ipykernel>=4.5.1->ipywidgets<9,>=7.6.0->ipyleaflet) (2.8.2)

Requirement already satisfied: argon2-cffi in /Users/john/miniconda3/lib/python3.8/site-packages (from notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (21.3.0)

Requirement already satisfied: nbconvert in /Users/john/miniconda3/lib/python3.8/site-packages (from notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (6.4.4)

Requirement already satisfied: terminado>=0.8.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.13.1)

Requirement already satisfied: Send2Trash>=1.8.0 in /Users/john/miniconda3/lib

```

b/python3.8/site-packages (from notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (1.8.0)
Requirement already satisfied: prometheus-client in /Users/john/miniconda3/lib/python3.8/site-packages (from notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.13.1)
Requirement already satisfied: ptyprocess>=0.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from pexpect>4.3->ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.7.0)
Requirement already satisfied: wcwidth in /Users/john/miniconda3/lib/python3.8/site-packages (from prompt-toolkit!=3.0.0,!<3.0.1,<3.1.0,>=2.0.0->ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.2.5)
Requirement already satisfied: asttokens in /Users/john/miniconda3/lib/python3.8/site-packages (from stack-data->ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (2.0.5)
Requirement already satisfied: executing in /Users/john/miniconda3/lib/python3.8/site-packages (from stack-data->ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.8.3)
Requirement already satisfied: pure-eval in /Users/john/miniconda3/lib/python3.8/site-packages (from stack-data->ipython>=4.0.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.2.2)
Requirement already satisfied: zipp>=3.1.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from importlib-resources>=1.4.0->jsonschema>=2.6->nbformat>=4.2.0->ipywidgets<9,>=7.6.0->ipyleaflet) (3.7.0)
Requirement already satisfied: six>=1.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from python-dateutil>=2.8.2->jupyter-client<8.0->ipykernel>=4.5.1->ipywidgets<9,>=7.6.0->ipyleaflet) (1.16.0)
Requirement already satisfied: argon2-cffi-bindings in /Users/john/miniconda3/lib/python3.8/site-packages (from argon2-cffi->notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (21.2.0)
Requirement already satisfied: pandocfilters>=1.4.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (1.5.0)
Requirement already satisfied: testpath in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.5.0)
Requirement already satisfied: jupyterlab-pygments in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.1.2)
Requirement already satisfied: beautifulsoup4 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (4.11.1)
Requirement already satisfied: nbclient<0.6.0,>=0.5.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.5.13)
Requirement already satisfied: defusedxml in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.7.1)
Requirement already satisfied: mistune<2,>=0.8.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.8.4)
Requirement already satisfied: bleach in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert->notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (4.1.0)
Requirement already satisfied: cffi>=1.0.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from argon2-cffi-bindings->argon2-cffi->notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (1.15.0)
Requirement already satisfied: soupsieve>1.2 in /Users/john/miniconda3/lib/python3.8/site-packages (from beautifulsoup4->nbconvert->notebook>=4.4.1->widgetsnbextension~=3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (2.3.1)
Requirement already satisfied: packaging in /Users/john/miniconda3/lib/python

```

```

3.8/site-packages (from bleach->nbconvert->notebook>=4.4.1->widgetsnbextension
~3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (21.3)
Requirement already satisfied: webencodings in /Users/john/miniconda3/lib/pyth
on3.8/site-packages (from bleach->nbconvert->notebook>=4.4.1->widgetsnbextensi
on~3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (0.5.1)
Requirement already satisfied: pycparser in /Users/john/miniconda3/lib/python
3.8/site-packages (from cffi>=1.0.1->argon2-cffi-bindings->argon2-cffi->notebo
ok>=4.4.1->widgetsnbextension~3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (2.21)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in /Users/john/minicon
da3/lib/python3.8/site-packages (from packaging->bleach->nbconvert->notebook>=
4.4.1->widgetsnbextension~3.5.0->ipywidgets<9,>=7.6.0->ipyleaflet) (3.0.4)
Installing collected packages: branca, ipyleaflet
Successfully installed branca-0.6.0 ipyleaflet-0.17.2
WARNING: You are using pip version 22.0.4; however, version 22.3.1 is availabl
e.
You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pi
p install --upgrade pip' command.

```

In [94]: `import ipyleaflet`

Try out the following (which may take some time to run):

In [98]: `!pip install xlrd`

```

Collecting xlrd
  Downloading xlrd-2.0.1-py2.py3-none-any.whl (96 kB)
    _____ 96.5/96.5 KB 2.3 MB/s eta 0:00:0
0ta 0:00:01
Installing collected packages: xlrd
Successfully installed xlrd-2.0.1
WARNING: You are using pip version 22.0.4; however, version 22.3.1 is availabl
e.
You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pi
p install --upgrade pip' command.

```

In [101... `!pip install openpyxl`

```

Collecting openpyxl
  Downloading openpyxl-3.0.10-py2.py3-none-any.whl (242 kB)
    _____ 242.1/242.1 KB 3.7 MB/s eta 0:00:
00a 0:00:01
Collecting et-xmlfile
  Downloading et_xmlfile-1.1.0-py3-none-any.whl (4.7 kB)
Installing collected packages: et-xmlfile, openpyxl
Successfully installed et-xmlfile-1.1.0 openpyxl-3.0.10
WARNING: You are using pip version 22.0.4; however, version 22.3.1 is availabl
e.
You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pi
p install --upgrade pip' command.

```

In [102... `import pandas as pd`
`# this may work...`
`#df = pd.read_excel('https://query.data.world/s/ivl45pdpubos6jpsii3djsjwm2pcjv`

`# NOTE! If you get an error here about xlrd try:`
`df = pd.read_excel('https://query.data.world/s/ivl45pdpubos6jpsii3djsjwm2pcjv',`

In [104... `df`

Out[104]:

	DRG Definition	Provider Id	Provider Name	Provider Street Address	Provider City	Provider State	Prov C
0	001 - HEART TRANSPLANT OR IMPLANT OF HEART ASS...	10033	UNIVERSITY OF ALABAMA HOSPITAL	619 SOUTH 19TH STREET	BIRMINGHAM	AL	35
1	001 - HEART TRANSPLANT OR IMPLANT OF HEART ASS...	30103	MAYO CLINIC HOSPITAL	5777 EAST MAYO BOULEVARD	PHOENIX	AZ	85
2	001 - HEART TRANSPLANT OR IMPLANT OF HEART ASS...	50108	SUTTER GENERAL HOSPITAL	2801 L STREET	SACRAMENTO	CA	95
3	001 - HEART TRANSPLANT OR IMPLANT OF HEART ASS...	50262	RONALD REAGAN U C L A MEDICAL CENTER	757 WESTWOOD PLAZA	LOS ANGELES	CA	90
4	001 - HEART TRANSPLANT OR IMPLANT OF HEART ASS...	50441	STANFORD HOSPITAL	300 PASTEUR DRIVE	STANFORD	CA	94
...
202651	988 - NON- EXTENSIVE O.R. PROC UNRELATED TO PRI...	520098	UNIVERSITY OF WI HOSPITALS & CLINICS AUTHORITY	600 HIGHLAND AVENUE	MADISON	WI	53
202652	988 - NON- EXTENSIVE O.R. PROC UNRELATED TO PRI...	520138	AURORA ST LUKES MEDICAL CENTER	2900 W OKLAHOMA AVE	MILWAUKEE	WI	53
202653	989 - NON- EXTENSIVE O.R. PROC UNRELATED TO PRI...	170104	SHAWNEE MISSION MEDICAL CENTER	9100 W 74TH STREET	SHAWNEE MISSION	KS	66
202654	989 - NON- EXTENSIVE O.R. PROC UNRELATED TO PRI...	180088	NORTON HOSPITAL/NORTON MEDICAL PAVILIONS/KOSAI...	200 EAST CHESTNUT STREET	LOUISVILLE	KY	40
202655	989 - NON- EXTENSIVE O.R. PROC	330101	NEW YORK- PRESBYTERIAN HOSPITAL	525 EAST 68TH STREET	NEW YORK	NY	10

DRG Definition	Provider Id	Provider Name	Provider Street Address	Provider City	Provider State	Prov C
UNRELATED TO PRI...						
202656 rows x 12 columns						

Week 10

In [109...

!pip install yt

```

Collecting yt
  Downloading yt-4.1.4-cp38-cp38-macosx_10_9_x86_64.whl (14.5 MB)
    _____ 14.5/14.5 MB 12.9 MB/s eta 0:00:
0000:0100:01
Collecting more-itertools>=8.4
  Downloading more_itertools-9.0.0-py3-none-any.whl (52 kB)
    _____ 52.8/52.8 KB 1.8 MB/s eta 0:00:0
0
Requirement already satisfied: pillow>=6.2.0 in /Users/john/miniconda3/lib/pyt
hon3.8/site-packages (from yt) (9.2.0)
Collecting cmyt>=0.2.2
  Downloading cmyt-1.1.3-py3-none-any.whl (30 kB)
Requirement already satisfied: packaging>=20.9 in /Users/john/miniconda3/lib/p
ython3.8/site-packages (from yt) (21.3)
Requirement already satisfied: tqdm>=3.4.0 in /Users/john/miniconda3/lib/pytho
n3.8/site-packages (from yt) (4.64.0)
Collecting tomli>=1.2.3
  Downloading tomli-2.0.1-py3-none-any.whl (12 kB)
Collecting unyt<3.0,>=2.8.0
  Downloading unyt-2.9.3-py2.py3-none-any.whl (117 kB)
    _____ 118.0/118.0 KB 3.9 MB/s eta 0:00:
00
Collecting tomli-w>=0.4.0
  Downloading tomli_w-1.0.0-py3-none-any.whl (6.0 kB)
Collecting ipywidgets>=8.0.0
  Downloading ipywidgets-8.0.4-py3-none-any.whl (137 kB)
    _____ 137.8/137.8 KB 3.6 MB/s eta 0:00:
00
Requirement already satisfied: numpy>=1.14.5 in /Users/john/miniconda3/lib/pyt
hon3.8/site-packages (from yt) (1.22.3)
Requirement already satisfied: pyparsing>=2.0.2 in /Users/john/miniconda3/lib/
python3.8/site-packages (from yt) (3.0.4)
Requirement already satisfied: matplotlib!=3.4.2,>=3.1 in /Users/john/minicond
a3/lib/python3.8/site-packages (from yt) (3.2.2)
Collecting colorspacious>=1.1.2
  Downloading colorspacious-1.1.2-py2.py3-none-any.whl (37 kB)
Requirement already satisfied: ipython>=6.1.0 in /Users/john/miniconda3/lib/py
thon3.8/site-packages (from ipywidgets>=8.0.0->yt) (8.2.0)
Collecting widgetsnbextension~=4.0
  Downloading widgetsnbextension-4.0.5-py3-none-any.whl (2.0 MB)
    _____ 2.0/2.0 MB 5.7 MB/s eta 0:00:000
0:01:00:01
Collecting jupyterlab-widgets~=3.0
  Downloading jupyterlab_widgets-3.0.5-py3-none-any.whl (384 kB)
    _____ 384.3/384.3 KB 4.9 MB/s eta 0:00:
0000:0100:01
Requirement already satisfied: ipykernel>=4.5.1 in /Users/john/miniconda3/lib/
python3.8/site-packages (from ipywidgets>=8.0.0->yt) (6.9.1)
Requirement already satisfied: traitlets>=4.3.1 in /Users/john/miniconda3/lib/
python3.8/site-packages (from ipywidgets>=8.0.0->yt) (5.1.1)
Requirement already satisfied: cycycler>=0.10 in /Users/john/miniconda3/lib/pyth
on3.8/site-packages (from matplotlib!=3.4.2,>=3.1->yt) (0.11.0)
Requirement already satisfied: kiwisolver>=1.0.1 in /Users/john/miniconda3/li
b/python3.8/site-packages (from matplotlib!=3.4.2,>=3.1->yt) (1.3.2)
Requirement already satisfied: python-dateutil>=2.1 in /Users/john/miniconda3/
lib/python3.8/site-packages (from matplotlib!=3.4.2,>=3.1->yt) (2.8.2)
Collecting sympy>=1.5
  Downloading sympy-1.11.1-py3-none-any.whl (6.5 MB)
    _____ 6.5/6.5 MB 12.2 MB/s eta 0:00:00
00:0100:01

```

Requirement already satisfied: tornado<7.0,>=4.2 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets>=8.0.0->yt) (6.1)

Requirement already satisfied: nest-asyncio in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets>=8.0.0->yt) (1.5.5)

Requirement already satisfied: appnope in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets>=8.0.0->yt) (0.1.2)

Requirement already satisfied: debugpy<2.0,>=1.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets>=8.0.0->yt) (1.5.1)

Requirement already satisfied: jupyter-client<8.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets>=8.0.0->yt) (7.2.2)

Requirement already satisfied: matplotlib-inline<0.2.0,>=0.1.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipykernel>=4.5.1->ipywidgets>=8.0.0->yt) (0.1.2)

Requirement already satisfied: backcall in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=6.1.0->ipywidgets>=8.0.0->yt) (0.2.0)

Requirement already satisfied: pygments>=2.4.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=6.1.0->ipywidgets>=8.0.0->yt) (2.11.2)

Requirement already satisfied: decorator in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=6.1.0->ipywidgets>=8.0.0->yt) (5.1.1)

Requirement already satisfied: pickleshare in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=6.1.0->ipywidgets>=8.0.0->yt) (0.7.5)

Requirement already satisfied: setuptools>=18.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=6.1.0->ipywidgets>=8.0.0->yt) (61.2.0)

Requirement already satisfied: stack-data in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=6.1.0->ipywidgets>=8.0.0->yt) (0.2.0)

Requirement already satisfied: jedi>=0.16 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=6.1.0->ipywidgets>=8.0.0->yt) (0.18.1)

Requirement already satisfied: pexpect>4.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=6.1.0->ipywidgets>=8.0.0->yt) (4.8.0)

Requirement already satisfied: prompt-toolkit!=3.0.0,!3.0.1,<3.1.0,>=2.0.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from ipython>=6.1.0->ipywidgets>=8.0.0->yt) (3.0.20)

Requirement already satisfied: six>=1.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from python-dateutil>=2.1->matplotlib!=3.4.2,>=3.1->yt) (1.16.0)

Collecting mpmath>=0.19

Downloading mpmath-1.2.1-py3-none-any.whl (532 kB)

532.6/532.6 KB 8.3 MB/s eta 0:00:00

0000:01

Requirement already satisfied: parso<0.9.0,>=0.8.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jedi>=0.16->ipython>=6.1.0->ipywidgets>=8.0.0->yt) (0.8.3)

Requirement already satisfied: entrypoints in /Users/john/miniconda3/lib/python3.8/site-packages (from jupyter-client<8.0->ipykernel>=4.5.1->ipywidgets>=8.0.0->yt) (0.4)

Requirement already satisfied: jupyter-core>=4.9.2 in /Users/john/miniconda3/lib/python3.8/site-packages (from jupyter-client<8.0->ipykernel>=4.5.1->ipywidgets>=8.0.0->yt) (4.9.2)

Requirement already satisfied: pyzmq>=22.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from jupyter-client<8.0->ipykernel>=4.5.1->ipywidgets>=8.0.0->yt) (22.3.0)

Requirement already satisfied: ptyprocess>=0.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from pexpect>4.3->ipython>=6.1.0->ipywidgets>=8.0.0->yt) (0.7.0)

Requirement already satisfied: wcwidth in /Users/john/miniconda3/lib/python3.8/site-packages (from prompt-toolkit!=3.0.0,!3.0.1,<3.1.0,>=2.0.0->ipython>=6.1.0->ipywidgets>=8.0.0->yt) (0.2.5)

Requirement already satisfied: pure-eval in /Users/john/miniconda3/lib/python

```

3.8/site-packages (from stack-data->ipython>=6.1.0->ipywidgets>=8.0.0->yt) (0.
2.2)
Requirement already satisfied: executing in /Users/john/miniconda3/lib/python
3.8/site-packages (from stack-data->ipython>=6.1.0->ipywidgets>=8.0.0->yt) (0.
8.3)
Requirement already satisfied: asttokens in /Users/john/miniconda3/lib/python
3.8/site-packages (from stack-data->ipython>=6.1.0->ipywidgets>=8.0.0->yt) (2.
0.5)
Installing collected packages: mpmath, widgetsnbextension, tomli-w, tomli, sym
py, more-itertools, jupyterlab-widgets, colorspacious, unyt, cmyt, ipywidgets,
yt
  Attempting uninstall: widgetsnbextension
    Found existing installation: widgetsnbextension 3.5.2
    Uninstalling widgetsnbextension-3.5.2:
      Successfully uninstalled widgetsnbextension-3.5.2
  Attempting uninstall: jupyterlab-widgets
    Found existing installation: jupyterlab-widgets 1.0.0
    Uninstalling jupyterlab-widgets-1.0.0:
      Successfully uninstalled jupyterlab-widgets-1.0.0
  Attempting uninstall: ipywidgets
    Found existing installation: ipywidgets 7.6.5
    Uninstalling ipywidgets-7.6.5:
      Successfully uninstalled ipywidgets-7.6.5
ERROR: pip's dependency resolver does not currently take into account all the
packages that are installed. This behaviour is the source of the following dep
endency conflicts.
ipympl 0.8.7 requires ipywidgets<8,>=7.6.0, but you have ipywidgets 8.0.4 whic
h is incompatible.
Successfully installed cmyt-1.1.3 colorspacious-1.1.2 ipywidgets-8.0.4 jupyter
lab-widgets-3.0.5 more-itertools-9.0.0 mpmath-1.2.1 sympy-1.11.1 tomli-2.0.1 t
omli-w-1.0.0 unyt-2.9.3 widgetsnbextension-4.0.5 yt-4.1.4
WARNING: You are using pip version 22.0.4; however, version 22.3.1 is availabl
e.
You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pi
p install --upgrade pip' command.

```

In [110... `import yt`

Week 11

Week 12

Week 13

Note: if this hangs or doesn't produce output — please email us and let us know. We may need to comment out this ipyvolumes stuff for this semester.

We won't be using ipyvolumes this semester as it is broken. :(

```

In [ ]: # import numpy as np
        # import ipyvolumes as ipv
        # V = np.zeros((128,128,128)) # our 3d array

```



```
# # outer box
# V[30:-30,30:-30,30:-30] = 0.75
# V[35:-35,35:-35,35:-35] = 0.0
# # inner box
# V[50:-50,50:-50,50:-50] = 0.25
# V[55:-55,55:-55,55:-55] = 0.0
# ipv.quickvolshow(V, level=[0.25, 0.75], opacity=0.03, level_width=0.1, data_n
```

Week 14

example from: <https://blog.4dcu.be/programming/2021/05/03/Interactive-Visualizations.html>

```
In [111... # test OS
import os
os.getcwd()
```

```
Out[111]: '/Users/john/Desktop/IS445'
```

```
In [113... !pip install vega_datasets
```

```
Collecting vega_datasets
  Using cached vega_datasets-0.9.0-py3-none-any.whl (210 kB)
Requirement already satisfied: pandas in /Users/john/miniconda3/lib/python3.8/
site-packages (from vega_datasets) (1.2.4)
Requirement already satisfied: python-dateutil>=2.7.3 in /Users/john/miniconda
3/lib/python3.8/site-packages (from pandas->vega_datasets) (2.8.2)
Requirement already satisfied: pytz>=2017.3 in /Users/john/miniconda3/lib/pyth
on3.8/site-packages (from pandas->vega_datasets) (2021.3)
Requirement already satisfied: numpy>=1.16.5 in /Users/john/miniconda3/lib/pyt
hon3.8/site-packages (from pandas->vega_datasets) (1.22.3)
Requirement already satisfied: six>=1.5 in /Users/john/miniconda3/lib/python3.
8/site-packages (from python-dateutil>=2.7.3->pandas->vega_datasets) (1.16.0)
Installing collected packages: vega_datasets
Successfully installed vega_datasets-0.9.0
WARNING: You are using pip version 22.0.4; however, version 22.3.1 is availabl
e.
You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pi
p install --upgrade pip' command.
```

```
In [114... from vega_datasets import data

source = data.cars()
source.rename(columns={"Miles_per_Gallon": "Miles per Gallon"},
              inplace=True)
```

```
In [116... !pip install altair
```

Collecting altair

Using cached altair-4.2.0-py3-none-any.whl (812 kB)
 Requirement already satisfied: jinja2 in /Users/john/miniconda3/lib/python3.8/site-packages (from altair) (3.0.3)
 Requirement already satisfied: numpy in /Users/john/miniconda3/lib/python3.8/site-packages (from altair) (1.22.3)
 Requirement already satisfied: entrypoints in /Users/john/miniconda3/lib/python3.8/site-packages (from altair) (0.4)
 Requirement already satisfied: toolz in /Users/john/miniconda3/lib/python3.8/site-packages (from altair) (0.11.2)
 Requirement already satisfied: pandas>=0.18 in /Users/john/miniconda3/lib/python3.8/site-packages (from altair) (1.2.4)
 Requirement already satisfied: jsonschema>=3.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from altair) (4.4.0)
 Requirement already satisfied: importlib-resources>=1.4.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=3.0->altair) (5.2.0)
 Requirement already satisfied: attrs>=17.4.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=3.0->altair) (21.4.0)
 Requirement already satisfied: pyparsing!=0.17.0,!=0.17.1,!=0.17.2,>=0.14.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=3.0->altair) (0.18.0)
 Requirement already satisfied: python-dateutil>=2.7.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from pandas>=0.18->altair) (2.8.2)
 Requirement already satisfied: pytz>=2017.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from pandas>=0.18->altair) (2021.3)
 Requirement already satisfied: MarkupSafe>=2.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jinja2->altair) (2.0.1)
 Requirement already satisfied: zipp>=3.1.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from importlib-resources>=1.4.0->jsonschema>=3.0->altair) (3.7.0)
 Requirement already satisfied: six>=1.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from python-dateutil>=2.7.3->pandas>=0.18->altair) (1.16.0)
 Installing collected packages: altair
 Successfully installed altair-4.2.0

WARNING: You are using pip version 22.0.4; however, version 22.3.1 is available.

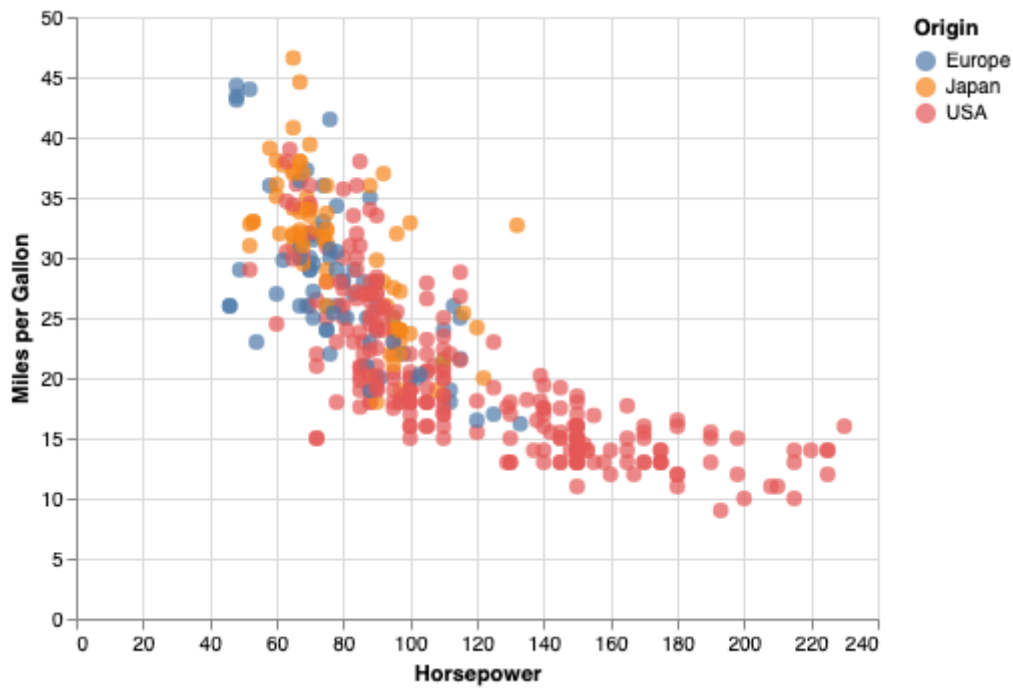
You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pip install --upgrade pip' command.

```
In [117... import altair as alt

chart = alt.Chart(source).mark_circle(size=60).encode(
    x='Horsepower',
    y='Miles per Gallon',
    color='Origin',
    tooltip=['Name', 'Origin', 'Horsepower', 'Miles per Gallon']
).interactive()
```

```
In [118... chart
```

Out[118]:



```
In [119... # save chart
chart.properties(width='container').save("cars.json")
```

```
In [120... # print platform
import platform
p = platform.system() # 'Linux', 'Windows'/'Darwin'
print(p)
```

Darwin

```
In [121... # file name with extension
file_name = os.path.basename('./cars.json')

# file name
print(file_name)
```

cars.json

```
In [122... !pip install nbconvert
```

Requirement already satisfied: nbconvert in /Users/john/miniconda3/lib/python3.8/site-packages (6.4.4)

Requirement already satisfied: testpath in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (0.5.0)

Requirement already satisfied: nbclient<0.6.0,>=0.5.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (0.5.13)

Requirement already satisfied: jupyter-core in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (4.9.2)

Requirement already satisfied: defusedxml in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (0.7.1)

Requirement already satisfied: Jinja2>=2.4 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (3.0.3)

Requirement already satisfied: traitlets>=5.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (5.1.1)

Requirement already satisfied: beautifulsoup4 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (4.11.1)

Requirement already satisfied: mistune<2,>=0.8.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (0.8.4)

Requirement already satisfied: nbformat>=4.4 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (5.3.0)

Requirement already satisfied: bleach in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (4.1.0)

Requirement already satisfied: entrypoints>=0.2.2 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (0.4)

Requirement already satisfied: pygments>=2.4.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (2.11.2)

Requirement already satisfied: jupyterlab-pygments in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (0.1.2)

Requirement already satisfied: pandocfilters>=1.4.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbconvert) (1.5.0)

Requirement already satisfied: MarkupSafe>=2.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from Jinja2>=2.4->nbconvert) (2.0.1)

Requirement already satisfied: nest-asyncio in /Users/john/miniconda3/lib/python3.8/site-packages (from nbclient<0.6.0,>=0.5.0->nbconvert) (1.5.5)

Requirement already satisfied: jupyter-client>=6.1.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbclient<0.6.0,>=0.5.0->nbconvert) (7.2.2)

Requirement already satisfied: fastjsonschema in /Users/john/miniconda3/lib/python3.8/site-packages (from nbformat>=4.4->nbconvert) (2.15.1)

Requirement already satisfied: jsonschema>=2.6 in /Users/john/miniconda3/lib/python3.8/site-packages (from nbformat>=4.4->nbconvert) (4.4.0)

Requirement already satisfied: soupsieve>1.2 in /Users/john/miniconda3/lib/python3.8/site-packages (from beautifulsoup4->nbconvert) (2.3.1)

Requirement already satisfied: webencodings in /Users/john/miniconda3/lib/python3.8/site-packages (from bleach->nbconvert) (0.5.1)

Requirement already satisfied: six>=1.9.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from bleach->nbconvert) (1.16.0)

Requirement already satisfied: packaging in /Users/john/miniconda3/lib/python3.8/site-packages (from bleach->nbconvert) (21.3)

Requirement already satisfied: attrs>=17.4.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=2.6->nbformat>=4.4->nbconvert) (21.4.0)

Requirement already satisfied: pyparsing!=0.17.0,!0.17.1,!0.17.2,>=0.14.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=2.6->nbformat>=4.4->nbconvert) (0.18.0)

Requirement already satisfied: importlib-resources>=1.4.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from jsonschema>=2.6->nbformat>=4.4->nbconvert) (5.2.0)

Requirement already satisfied: pyzmq>=22.3 in /Users/john/miniconda3/lib/python3.8/site-packages (from jupyter-client>=6.1.5->nbclient<0.6.0,>=0.5.0->nbconvert) (22.3.0)

Requirement already satisfied: tornado>=6.0 in /Users/john/miniconda3/lib/python

```

on3.8/site-packages (from jupyter-client>=6.1.5->nbclient<0.6.0,>=0.5.0->nbconvert) (6.1)
Requirement already satisfied: python-dateutil>=2.8.2 in /Users/john/miniconda3/lib/python3.8/site-packages (from jupyter-client>=6.1.5->nbclient<0.6.0,>=0.5.0->nbconvert) (2.8.2)
Requirement already satisfied: pyparsing!=3.0.5,>=2.0.2 in /Users/john/miniconda3/lib/python3.8/site-packages (from packaging->bleach->nbconvert) (3.0.4)
Requirement already satisfied: zipp>=3.1.0 in /Users/john/miniconda3/lib/python3.8/site-packages (from importlib-resources>=1.4.0->jsonschema>=2.6->nbformat>=4.4->nbconvert) (3.7.0)
WARNING: You are using pip version 22.0.4; however, version 22.3.1 is available.
You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pip install --upgrade pip' command.

```

In [123... `!pip install pypeteer`

```

Collecting pypeteer
  Downloading pypeteer-1.0.2-py3-none-any.whl (83 kB)
      83.4/83.4 KB 3.1 MB/s eta 0:00:00
0
Collecting appdirs<2.0.0,>=1.4.3
  Downloading appdirs-1.4.4-py2.py3-none-any.whl (9.6 kB)
Requirement already satisfied: urllib3<2.0.0,>=1.25.8 in /Users/john/miniconda3/lib/python3.8/site-packages (from pypeteer) (1.26.9)
Collecting importlib-metadata>=1.4
  Downloading importlib_metadata-6.0.0-py3-none-any.whl (21 kB)
Collecting websockets<11.0,>=10.0
  Downloading websockets-10.4-cp38-cp38-macosx_10_9_x86_64.whl (97 kB)
      97.9/97.9 KB 3.8 MB/s eta 0:00:00
0
Collecting pyee<9.0.0,>=8.1.0
  Downloading pyee-8.2.2-py2.py3-none-any.whl (12 kB)
Requirement already satisfied: tqdm<5.0.0,>=4.42.1 in /Users/john/miniconda3/lib/python3.8/site-packages (from pypeteer) (4.64.0)
Requirement already satisfied: certifi>=2021 in /Users/john/miniconda3/lib/python3.8/site-packages (from pypeteer) (2022.9.14)
Requirement already satisfied: zipp>=0.5 in /Users/john/miniconda3/lib/python3.8/site-packages (from importlib-metadata>=1.4->pypeteer) (3.7.0)
Installing collected packages: pyee, appdirs, websockets, importlib-metadata, pypeteer
Successfully installed appdirs-1.4.4 importlib-metadata-6.0.0 pyee-8.2.2 pypeteer-1.0.2 websockets-10.4
WARNING: You are using pip version 22.0.4; however, version 22.3.1 is available.
You should consider upgrading via the '/Users/john/miniconda3/bin/python -m pip install --upgrade pip' command.

```

In []: `!conda install pandoc`