test_imports_week01

February 24, 2020

1 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!

2 Week01:

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

If the above doesn't work, you can try to install with conda by un-commenting the stuff below:

[2]:
```
#!conda install -c conda-forge matplotlib --yes
#import matplotlib
#import matplotlib.pyplot as plt
```

[3]:
```
import datetime
```

The below is to make inline plots:

[4]:
```
%matplotlib inline
```

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

[5]:
```
import numpy as np
```

If the above doesn't work you can try uncommenting stuff below:

[6]:
```
#!conda install -c anaconda numpy --yes
#import numpy as np
```

Let's make a quick plot:

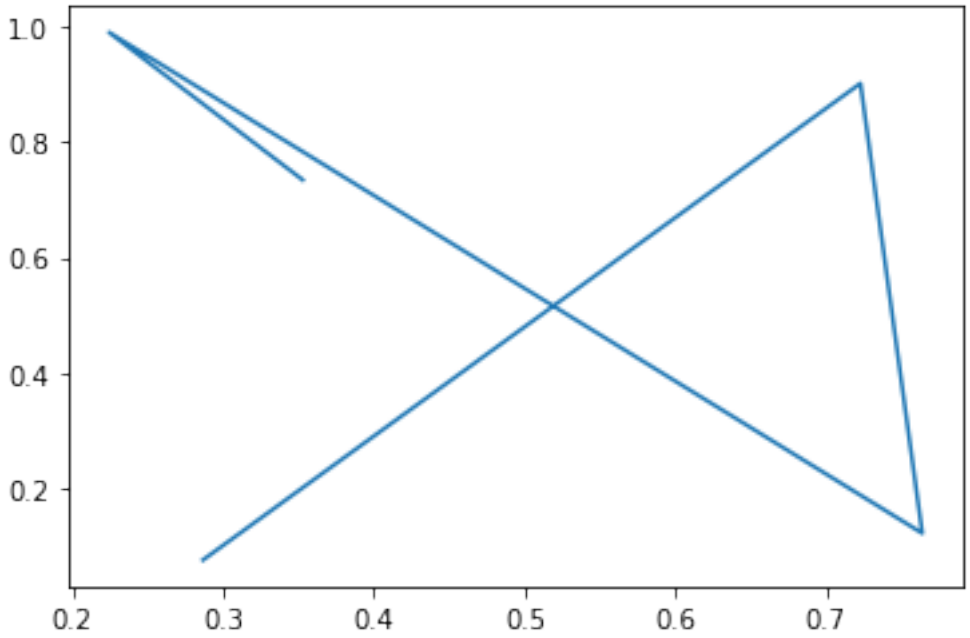
[7]:
```
x = np.random.random(5)
x
```

[7]:
```
array([0.28664748, 0.72278063, 0.76376904, 0.22435403, 0.35284841])
```

[8]:
```
y = np.random.random(5)
y
```

[8]:
```
array([0.07723793, 0.90069545, 0.12349939, 0.98883588, 0.73387683])
```

[9]:
```
plt.plot(x,y)
plt.show()
```



This is a library for importing and manipulating images.

[10]:
```
import PIL.Image as Image
```

If you can't do the above, try uncommenting the below:

[11]:
```
#!conda install -c anaconda pillow --yes
#import PIL.Image as Image
```

3 Week 02

[12]:
```
import csv
import collections
```

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

[13]:
```
import pandas as pd
```

If the above doesn't work try uncommenting the following:

[14]:
```
#!conda install -c anaconda pandas --yes
#import pandas as pd
```

Testing reading with pandas:

[15]:
```
data = pd.read_csv("https://uiuc-ischool-dataviz.github.io/spring2019online/
↪week02/building_inventory.csv")
```

[16]:
```
data
```

[16]:
```
                          Agency Name  \
0      Department of Natural Resources
1      Department of Natural Resources
2      Department of Natural Resources
3      Department of Natural Resources
4      Department of Natural Resources
…                                  …
8857      Department of Transportation
8858      Department of Transportation
8859      Department of Transportation
8860  Illinois Community College Board
8861    Department of Military Affairs

                                        Location Name  \
0       Anderson Lake Conservation Area - Fulton County
1       Anderson Lake Conservation Area - Fulton County
2       Anderson Lake Conservation Area - Fulton County
3       Anderson Lake Conservation Area - Fulton County
4       Anderson Lake Conservation Area - Fulton County
…                                                     …
8857  Belvidere Maintenance Storage Facility - Boone…
8858  Belvidere Maintenance Storage Facility - Boone…
8859                Quincy Maintenance Storage Facility
8860        Illinois Valley Community College - Oglesby
8861              Peoria Army Aviation Support Facility

                           Address       City  Zip code   County  \
```

```
0                Anderson Lake C.a.    Astoria     61501   Fulton
1                Anderson Lake C.a.    Astoria     61501   Fulton
2                Anderson Lake C.a.    Astoria     61501   Fulton
3                Anderson Lake C.a.    Astoria     61501   Fulton
4                Anderson Lake C.a.    Astoria     61501   Fulton
…                                …        …       …      …
8857          9797 Illinois Rte. 76  Belvidere     61008    Boone
8858           9797 Illinois Rte 76  Belvidere     61008    Boone
8859                800 Koch's Lane     Quincy     62305    Adams
8860  815 North Orlando Smith Avenue    Oglesby     61348  LaSalle
8861             2323 S. Airport Rd     Peoria     61607   Peoria

      Congress Dist Congressional Full Name  Rep Dist       Rep Full Name  \
0                17            Cheri Bustos        93   Hammond Norine K.
1                17            Cheri Bustos        93   Hammond Norine K.
2                17            Cheri Bustos        93   Hammond Norine K.
3                17            Cheri Bustos        93   Hammond Norine K.
4                17            Cheri Bustos        93   Hammond Norine K.
…             …                       …       …               …
8857             16          Adam Kinzinger        69       Sosnowski Joe
8858             16          Adam Kinzinger        69       Sosnowski Joe
8859             18         Darin M. LaHood        94      Frese Randy E.
8860             16          Adam Kinzinger        76      Long Jerry Lee
8861             17            Cheri Bustos        92  Gordon-Booth Jehan

      …  Bldg Status Year Acquired Year Constructed  Square Footage  \
0     …       In Use          1975             1975             144
1     …       In Use          2004             2004             144
2     …       In Use          2004             2004             144
3     …       In Use          2004             2004             144
4     …       In Use          2004             2004             144
…   …          …           …               …             …
8857  …       In Use             0                0             432
8858  …       In Use             0                0             330
8859  …       In Use             0             1987             130
8860  …       In Use          1971             1971           49552
8861  …  In Progress             0             2017             288

      Total Floors  Floors Above Grade  Floors Below Grade  \
0                1                   1                   0
1                1                   1                   0
2                1                   1                   0
3                1                   1                   0
4                1                   1                   0
…             …                  …                  …
8857             1                   0                   0
8858             1                   0                   0
```

```
8859             1                   0                   0
8860             1                   1                   0
8861             1                   0                   0

         Usage Description   Usage Description 2 Usage Description 3
0                  Unusual               Unusual        Not provided
1                  Unusual               Unusual        Not provided
2                  Unusual               Unusual        Not provided
3                  Unusual               Unusual        Not provided
4                  Unusual               Unusual        Not provided
…                        …                     …                   …
8857               Storage                   NaN                 NaN
8858               Storage                   NaN                 NaN
8859               Storage           High Hazard                 NaN
8860             Education             Education        Not provided
8861  Utiility & Miscellan  Utiility & Miscellan                 NaN

[8862 rows x 22 columns]
```

[17]:
```
import scipy
import scipy.misc
import scipy.cluster
```

If the above doesn't work, try uncommenting:

[18]:
```
#!conda install -c anaconda scipy
#import scipy
#import scipy.misc
#import scipy.cluster
```

4 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 installations (e.g. bqplot, cartopy, pyodide, etc).

[19]:
```
import ipywidgets
```

If the above doesn't work try uncommenting the following:

[20]:
```
#!conda install -c conda-forge ipywidgets --yes
#!jupyter nbextension enable --py widgetsnbextension

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

#import ipywidgets
```

Test a widget:

[21]:
```
ipywidgets.IntSlider()
```

```
IntSlider(value=0)
```

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

[22]:
```
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:

[23]:
```
#!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.

[24]:
```
@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=('seaborn-dark', 'seaborn-darkgrid
```

[25]:
```
import json # should be already installed
```

[26]:
```
import palettable
```

If the above doesn't work you can try uncommenting the below and re-importing:

[27]:
```
#!conda install -c conda-forge palettable --yes
#import palettable
```

[28]:
```
from PIL import Image
import IPython.display
import io
from mpl_toolkits.mplot3d import Axes3D
import matplotlib.cm
import matplotlib.transforms as mpt
```

5 Week 04

[29]:
```
import matplotlib.dates as mdates
```

[30]:
```
import PIL.ImageFilter as ImageFilter
```

[31]:
```
import bqplot
```

If the above doesn't work, try uncommenting below:

[32]:
```
#!conda install -c conda-forge bqplot --yes
import bqplot
```

You may have to do:

[33]:
```
#!jupyter nbextension enable --py bqplot

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

#import bqplot
```

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.

[34]:
```
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]} )
bqplot.Figure(marks = [lines], axes = [ax_x, ax_y], interaction = pz)
```

```
Figure(axes=[Axis(label='x value', scale=LinearScale()), Axis(label='y value', orientation='ver
```

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))
```

6 Week 05

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

[35]:
```
%matplotlib inline
%matplotlib notebook
%pylab
```

```
Using matplotlib backend: nbAgg
Populating the interactive namespace from numpy and matplotlib
```

[36]:
```
import PIL.ImageFilter as ImageFilter
```

[37]:
```
import h5py
```

If the above doesn't work try uncommenting:

[38]:
```
#!conda install -c anaconda h5py --yes
#import h5py
```

[39]:
```
import matplotlib.colors as colors
```

7 Week 06

[40]:
```
import bqplot.market_map
```

[41]:
```
import traitlets
```

8 Week 07

[42]:
```
import cartopy
```

If the above doesn't work try uncommenting:

[43]:
```
#!conda install -c conda-forge cartopy --yes
#import cartopy
```

There are a few options here if the above doesn't work: https://scitools.org.uk/cartopy/docs/v0.15/installing.html

Try this little test below:

[44]:
```
states = cartopy.io.shapereader.natural_earth(resolution='110m',␣
↪category='cultural',
                                    name='admin_1_states_provinces_lakes_shp')
```

9 Week 08

[45]:
```
import cartopy.io.img_tiles
```

Try it out:

[46]:
```
imagery = cartopy.io.img_tiles.OSM()
```

10 Week 09

[47]:
```
import bqplot.market_map
```

[48]:
```
from webcolors import rgb_to_hex
```

If the above doesn't work you can try uncommenting the following:

[49]:
```
#!conda install -c conda-forge webcolors --yes
#from webcolors import rgb_to_hex
```

[50]:
```
import ipyleaflet
```

If the above doesn't work, try uncommenting the following:

[51]:
```
#!conda install -c conda-forge ipyleaflet --yes
#import ipyleaflet
```

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

[52]:
```
import pandas as pd
#!pip install xlrd # JPN
df = pd.read_excel('https://query.data.world/s/ivl45pdpubos6jpsii3djsjwm2pcjv',␣
↪skiprows=5)
```

If it doesn't work, you can try uncommenting:

[53]:
```
#!conda install -c anaconda xlrd --yes
#df = pd.read_excel('https://query.data.world/s/
↪ivl45pdpubos6jpsii3djsjwm2pcjv', skiprows=5)
```

[54]:
```
df
```

[54]:

	DRG Definition	Provider Id
0	001 - HEART TRANSPLANT OR IMPLANT OF HEART ASS…	10033
1	001 - HEART TRANSPLANT OR IMPLANT OF HEART ASS…	30103
2	001 - HEART TRANSPLANT OR IMPLANT OF HEART ASS…	50108
3	001 - HEART TRANSPLANT OR IMPLANT OF HEART ASS…	50262
4	001 - HEART TRANSPLANT OR IMPLANT OF HEART ASS…	50441
…	…	…

```
202651  988 - NON-EXTENSIVE O.R. PROC UNRELATED TO PRI…       520098
202652  988 - NON-EXTENSIVE O.R. PROC UNRELATED TO PRI…       520138
202653  989 - NON-EXTENSIVE O.R. PROC UNRELATED TO PRI…       170104
202654  989 - NON-EXTENSIVE O.R. PROC UNRELATED TO PRI…       180088
202655  989 - NON-EXTENSIVE O.R. PROC UNRELATED TO PRI…       330101

                                        Provider Name  \
0                         UNIVERSITY OF ALABAMA HOSPITAL
1                                  MAYO CLINIC HOSPITAL
2                               SUTTER GENERAL HOSPITAL
3                    RONALD REAGAN U C L A MEDICAL CENTER
4                                    STANFORD HOSPITAL
…                                                    …
202651    UNIVERSITY OF WI  HOSPITALS & CLINICS AUTHORITY
202652                      AURORA ST LUKES MEDICAL CENTER
202653                      SHAWNEE MISSION MEDICAL CENTER
202654  NORTON HOSPITAL/NORTON MEDICAL PAVILIONS/KOSAI…
202655                      NEW YORK-PRESBYTERIAN HOSPITAL

         Provider Street Address    Provider City Provider State  \
0          619 SOUTH 19TH STREET       BIRMINGHAM             AL
1       5777 EAST MAYO BOULEVARD          PHOENIX             AZ
2                2801 L STREET       SACRAMENTO             CA
3            757 WESTWOOD PLAZA      LOS ANGELES             CA
4             300 PASTEUR DRIVE         STANFORD             CA
…                           …             …            …
202651       600 HIGHLAND AVENUE          MADISON             WI
202652       2900 W OKLAHOMA AVE        MILWAUKEE             WI
202653        9100 W 74TH STREET  SHAWNEE MISSION             KS
202654  200 EAST CHESTNUT STREET       LOUISVILLE             KY
202655      525 EAST 68TH STREET         NEW YORK             NY

        Provider Zip Code Hospital Referral Region (HRR) Description  \
0                   35233                            AL - Birmingham
1                   85054                               AZ - Phoenix
2                   95816                            CA - Sacramento
3                   90095                          CA - Los Angeles
4                   94305                  CA - San Mateo County
…                       …                                       …
202651              53792                               WI - Madison
202652              53215                             WI - Milwaukee
202653              66204                           MO - Kansas City
202654              40202                            KY - Louisville
202655              10021                             NY - Manhattan

        Total Discharges  Average Covered Charges  Average Total Payments  \
0                     13            1.172866e+06           251876.307692
```

```
1                    20             4.375313e+05          240422.800000
2                    25             8.156741e+05          233197.480000
3                    14             1.499044e+06          415968.785714
4                    23             2.238699e+06          420865.478261
…                   …                       …                     …
202651               15             3.058027e+04           16574.533333
202652               13             6.320408e+04           13649.846154
202653               13             2.636138e+04            6237.461538
202654               13             2.433500e+04            7850.307692
202655               13             3.483262e+04           12361.615385

        Average Medicare Payments
0                   244457.923077
1                   133509.550000
2                   221681.800000
3                   366608.928571
4                   403453.652174
…                             …
202651               12450.466667
202652               11114.615385
202653                5023.846154
202654                6594.846154
202655               10554.923077

[202656 rows x 12 columns]
```

11 Week 10

[55]:
```
import yt
```

If the above doesn't work try uncommenting:

[56]:
```
#!conda install -c conda-forge yt --yes
#import yt
```

12 Week 11

13 Week 12

More info here: http://www2.compute.dtu.dk/projects/GEL/PyGEL/

[57]:
```
from PyGEL3D import gel
from PyGEL3D import js
```

You will probably have to pip install:

[58]:
```
#!pip install PyGEL3D
#from PyGEL3D import gel
#from PyGEL3D import js
```

14 Week 13

[59]:
```
import ipyvolume
```

You will probably have to install this:

[60]:
```
#!conda install -c conda-forge ipyvolume --yes
#import ipyvolume
```

[ ]:
```

```

[ ]:
```

```