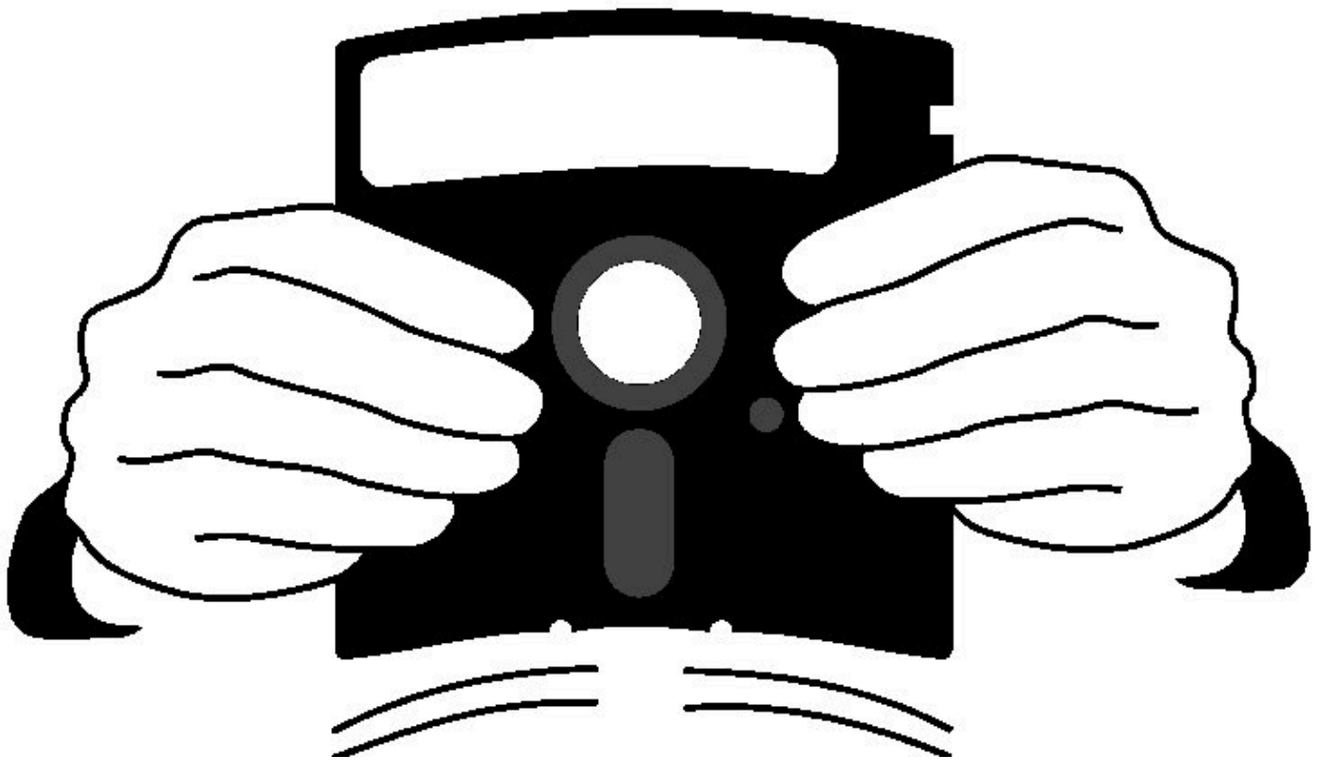
MATPLOTLIB

9.25.2020

PROBLEM SET 2



* due in exactly
  1 week

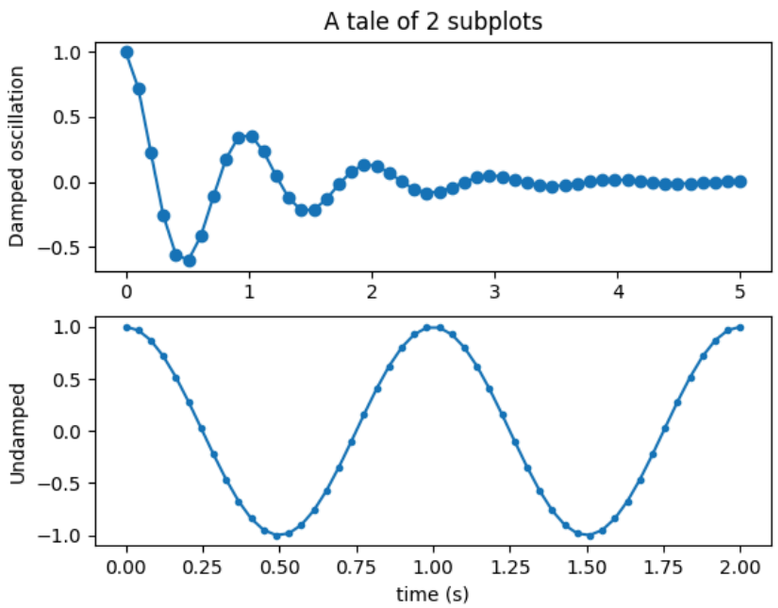
WHAT IF YOU WANTED TO PLOT THINGS

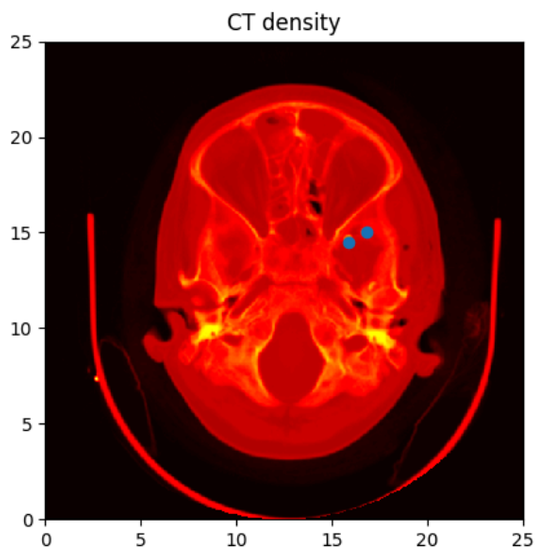
* how would you even do that?

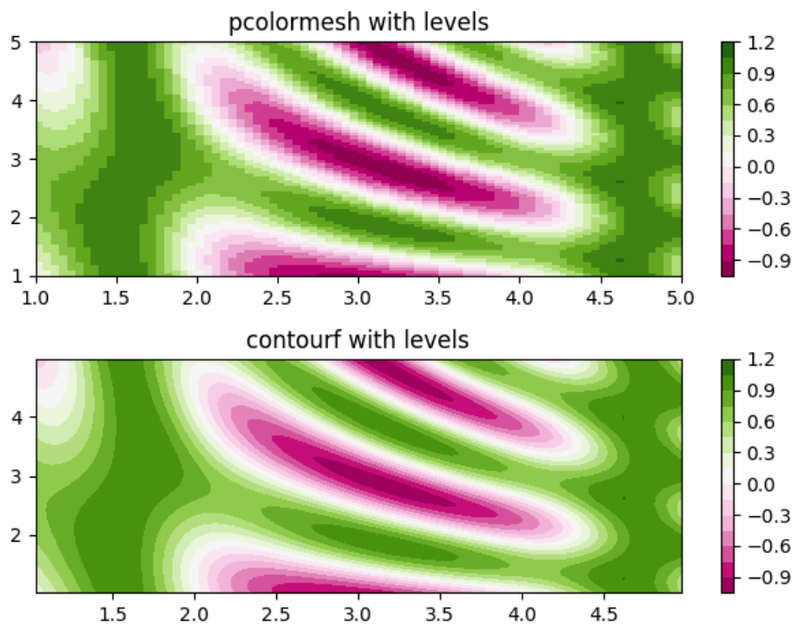
MATPLOTLIB

John Hunter

* Plotting library for python!
* Initially led by John Hunter (1968-2012), with first release in 2003







MATPLOTLIB READING

* PDSH Chapter 4: https://jakevdp.github.io/PythonDataScienceHandbook/04.00-introduction-to-matplotlib.html

MATPLOTLIB GALLERY

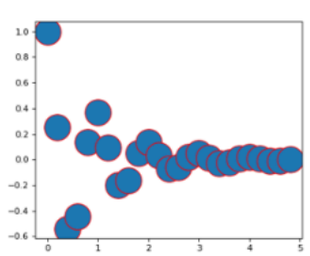
* https://matplotlib.org/gallery/index.html

Gallery

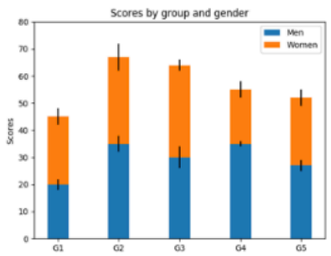
This gallery contains examples of the many things you can do with Matplotlib. Click on any image to see the full image and source code.

For longer tutorials, see our tutorials page. You can also find external resources and a FAQ in our user guide.

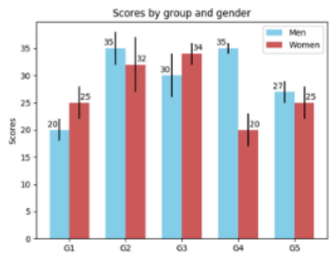
Lines, bars and markers



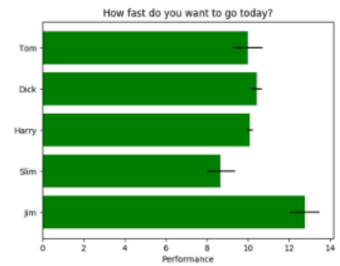
Arctest



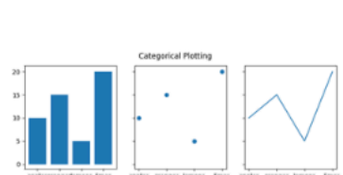
Stacked Bar Graph

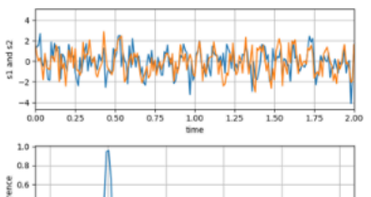


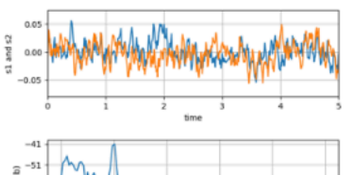
Barchart



Horizontal bar chart







MATPLOTLIB

* we will use this evocation:

```
* %matplotlib inline # only for notebooks!
  from matplotlib import pyplot as plt

*  %config InlineBackend.figure_format = ‘retina' # makes pretty
```

MATPLOTLIB

* The basic commands:
    * plt.plot
    * plt.hist
    * plt.imshow / plt.matshow

PLT.PLOT

* plots a line: plt.plot(x, y)
* you can change the *line* and *marker* styles by putting a "format string" after x and y: plt.plot(x, y, fmt)

PLT.PLOT

* format strings usually have two parts, a marker style and a line style, e.g.:

- # just a line (default)
.- # dots connected by line
o # just big dots
s: # squares w/ dotted line

PLT.HIST

* creates a histogram: plt.hist(data)

* by default it has 10 bins (you can change this)

XLIM / YLIM

* you can zoom in (or out) on some portion of your plot using **plt.xlim** and **plt.ylim**

* xlim(xmin, xmax) scales the x-axis so that the left edge is at xmin and right is at xmax

* similar for ylim

IMSHOW / MATSHOW

* turns a 2D array (matrix) into an image

* matshow is a wrapper around imshow (i.e. matshow calls imshow internally) with some default values set (and, by default, it creates a new figure)

* imshow(arr)
  matshow(arr)

IMSHOW / MATSHOW

* imshow & matshow turn each value in the array into a color using a **colormap**
* by default, the smallest value in the array gets mapped to the “lowest” color, and the largest value gets mapped to the “highest” color

lowest everything in between highest

IMSHOW / MATSHOW

* you can control the color mapping using the **vmin** and **vmax** parameters to imshow/matshow

* vmin is the value that gets set to the “lowest” color (by default the smallest value in your array)

* similar for vmax

vmin vmax

IMSHOW / MATSHOW

* there are many colormaps to choose from!

* they are listed in the plt.cm module

* you can change the colormap using the **cmap** argument to imshow/matshow

* to see all the matplotlib colormaps: https://matplotlib.org/examples/color/colormaps_reference.html

REMINDER: DOCSTRINGS

* docstrings ARE YOUR FRIEND

* to see the documentation for the function “function” in jupyter notebook, run:

  function?

* e.g.

  plt.hist?

END