Getting Started with Matplotlib

We need matplotlib.pyplot for plotting.

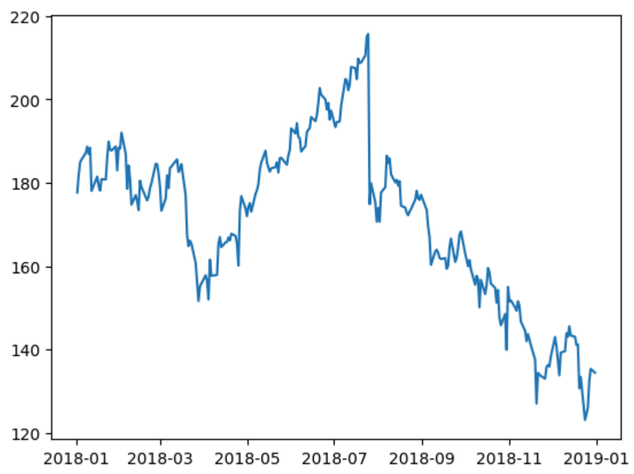
```
import matplotlib.pyplot as plt
import pandas as pd
```

About the Data

Plotting lines

```
fb = pd.read_csv(
    'fb_stock_prices_2018.csv', index_col='date', parse_dates=True
)

plt.plot(fb.index, fb.open)
plt.show()
```




```
%matplotlib inline
import matplotlib.pyplot as plt
import pandas as pd

fb = pd.read_csv(
  'fb_stock_prices_2018.csv', index_col='date', parse_dates=True
)
plt.plot(fb.index, fb.open)
```

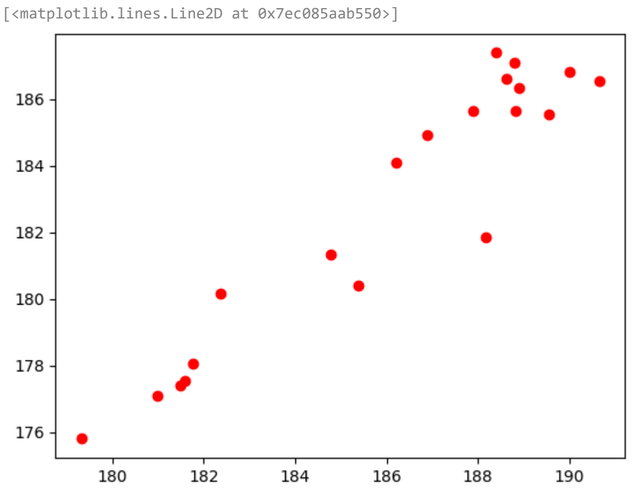
```
[<matplotlib.lines.Line2D at 0x7ec088b798a0>]
```


Scatter plots

We can pass in a string specifying the style of the plot. This is of the form '[color][marker][linestyle]'. For example, we can make a black dashed line with 'k--' or a red scatter plot with 'ro':

```
plt.plot('high', 'low', 'ro', data=fb.head(20))
```

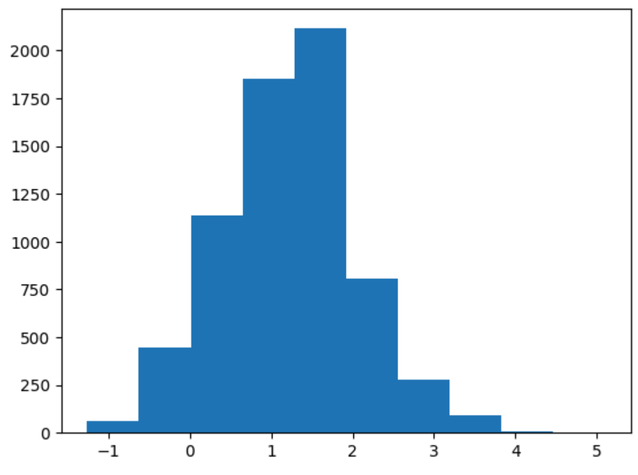
```
[<matplotlib.lines.Line2D at 0x7ec085aab550>]
```



Histograms

```
quakes = pd.read_csv('earthquakes.csv')
plt.hist(quakes.query('magType == "ml"').mag)
```

```
(array([6.400e+01, 4.450e+02, 1.137e+03, 1.853e+03, 2.114e+03, 8.070e+02,
        2.800e+02, 9.200e+01, 9.000e+00, 2.000e+00]),
 array([-1.26 , -0.624,  0.012,  0.648,  1.284,  1.92 ,  2.556,  3.192,
         3.828,  4.464,  5.1  ]),
 <BarContainer object of 10 artists>)
```

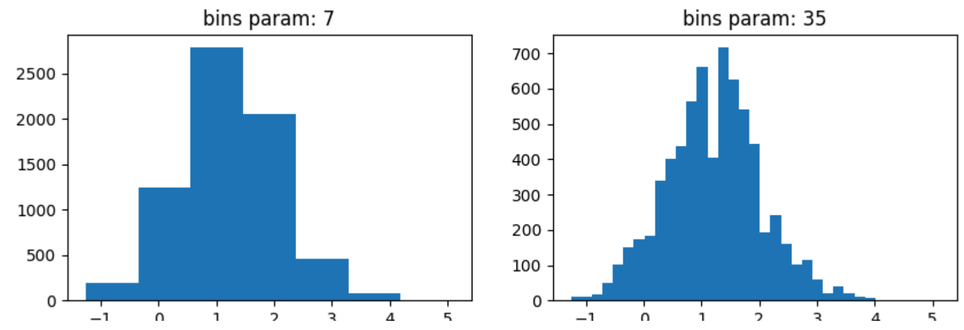


Bin size matters

Notice how our assumptions of the distribution of the data can change based on the number of bins (look at the drop between the two highest peaks on the righthand plot):

```
x = quakes.query('magType == "ml"').mag
fig, axes = plt.subplots(1, 2, figsize=(10, 3))
for ax, bins in zip(axes, [7, 35]):
```

```
    ax.hist(x, bins=bins)
    ax.set_title(f'bins param: {bins}')
```



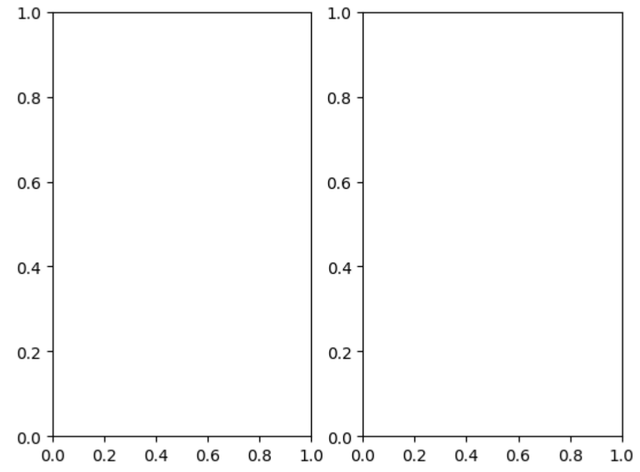
Plot components

```
fig = plt.figure()
```

```
<Figure size 640x480 with 0 Axes>
```

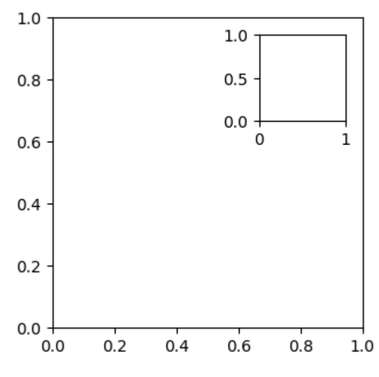
Creating subplots

```
fig, axes = plt.subplots(1, 2)
```



As an alternative to using plt.subplots() we can add the Axes to the Figure on our own. This allows for some more complex layouts, such as picture in picture:

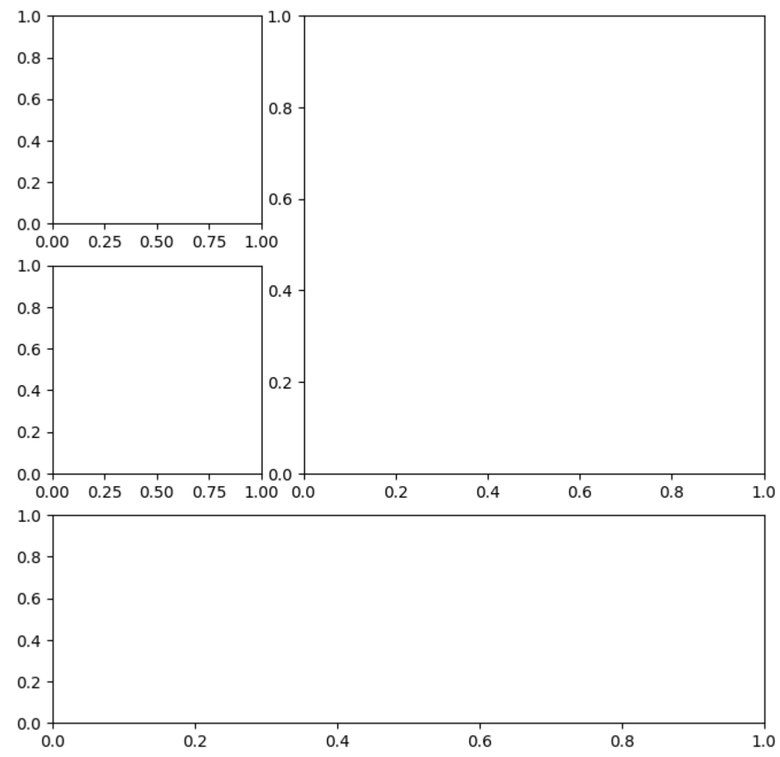
```
fig = plt.figure(figsize=(3, 3))
outside = fig.add_axes([0.1, 0.1, 0.9, 0.9])
inside = fig.add_axes([0.7, 0.7, 0.25, 0.25])
```



Creating Plot Layouts with gridspec

We can create subplots with varying sizes as well:

```
fig = plt.figure(figsize=(8, 8))
gs = fig.add_gridspec(3, 3)
top_left = fig.add_subplot(gs[0, 0])
mid_left = fig.add_subplot(gs[1, 0])
top_right = fig.add_subplot(gs[:2, 1:])
bottom = fig.add_subplot(gs[2,:])
```



Saving plots

Use plt.savefig() to save the last created plot. To save a specific Figure object, use its savefig() method.

```
fig.savefig('empty.png')
```

Cleaning up

It's important to close resources when we are done with them. We use Figure to close or say 'all' to close all plt.close() to do so. If we pass in nothing, it will close the last plot, but we can pass the specific Figure objects that are open. Let's close all the Figure objects that are open with plt.close() :

```
plt.close('all')
```

Additional plotting options

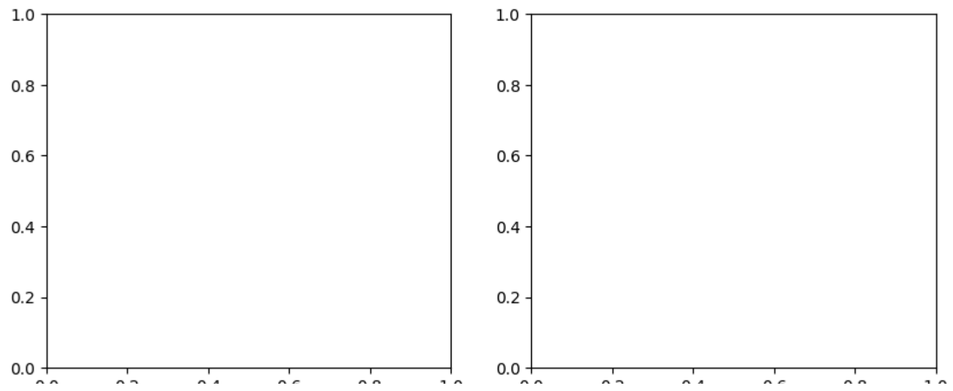
Specifying figure size

Just pass the figsize parameter to plt.figure() . It's a tuple of (width, height):

```
fig = plt.figure(figsize=(10, 4))
```

```
<Figure size 1000x400 with 0 Axes>
```

```
fig, axes = plt.subplots(1, 2, figsize=(10, 4))
```



rcParams

```
import random
import matplotlib as mpl

rcparams_list = list(mpl.rcParams.keys())
random.seed(20) # make this repeatable
random.shuffle(rcparams_list)
sorted(rcparams_list[:20])
```

```
['animation.convert_args',
 'axes.edgecolor',
 'axes.formatter.use_locale',
 'axes.spines.right',
 'boxplot.meanprops.markersize',
 'boxplot.showfliers',
 'keymap.home',
 'lines.markerfacecolor',
 'lines.scale_dashes',
 'mathtext.rm',
 'patch.force_edgecolor',
 'savefig.facecolor',
 'svg.fonttype',
 'text.hinting_factor',
 'xtick.alignment',
 'xtick.minor.top',
 'xtick.minor.width',
 'ytick.left',
 'ytick.major.left',
 'ytick.minor.width']
```

We can check the current default figsize using rcParams :

```
mpl.rcParams['figure.figsize']
```

```
[6.4, 4.8]
```

We can also update this value to change the default (until the kernel is restarted):

```
mpl.rcParams['figure.figsize'] = (300, 10)
mpl.rcParams['figure.figsize']
```

```
[300.0, 10.0]
```

Use rcdefaults() to restore the defaults

```
mpl.rcdefaults()
mpl.rcParams['figure.figsize']
```

```
[6.4, 4.8]
```

This can also be done via pyplot :

```
plt.rc('figure', figsize=(20, 20)) # change figsize default to (20, 20)
plt.rcdefaults() # reset the default
```