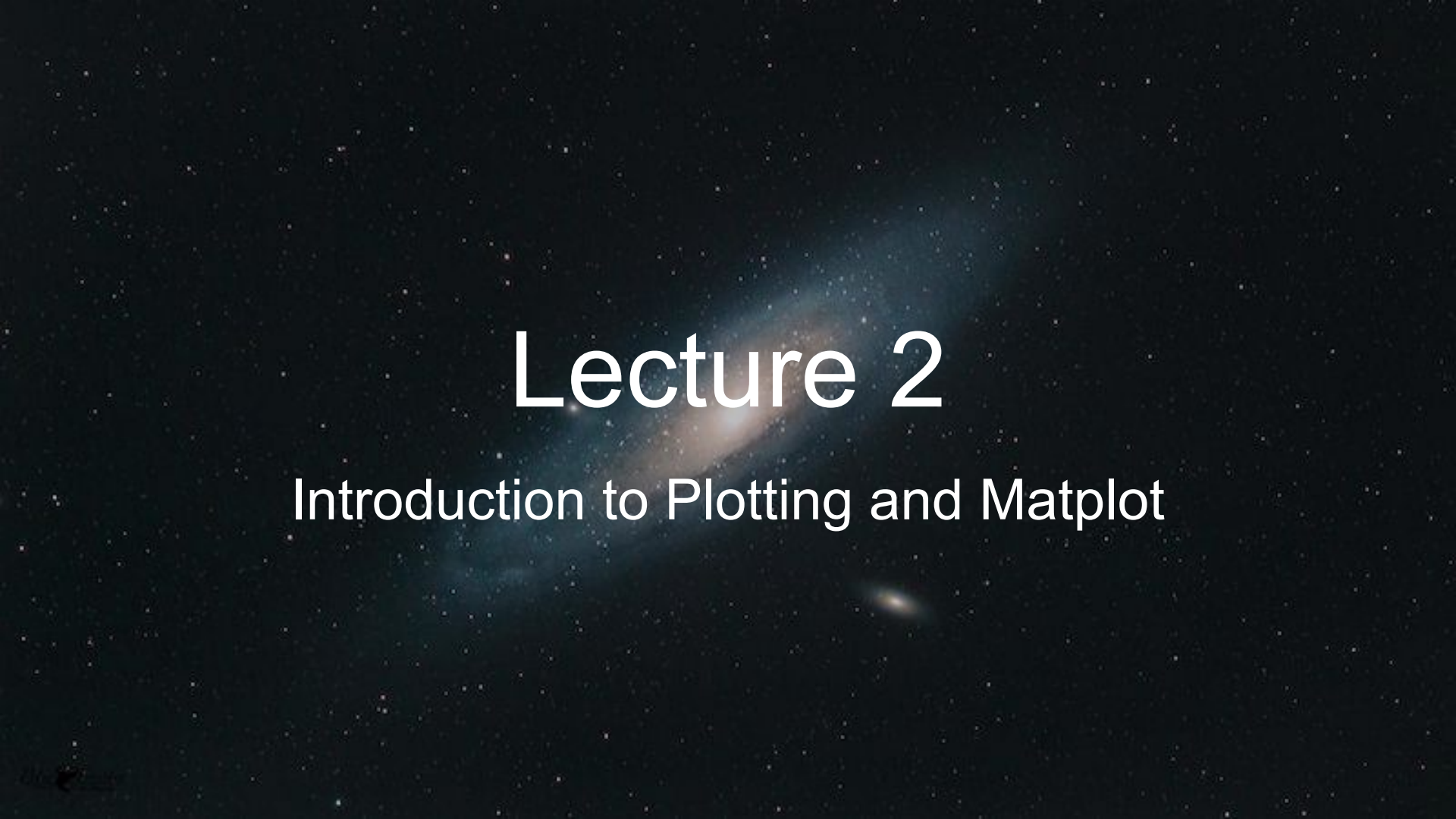
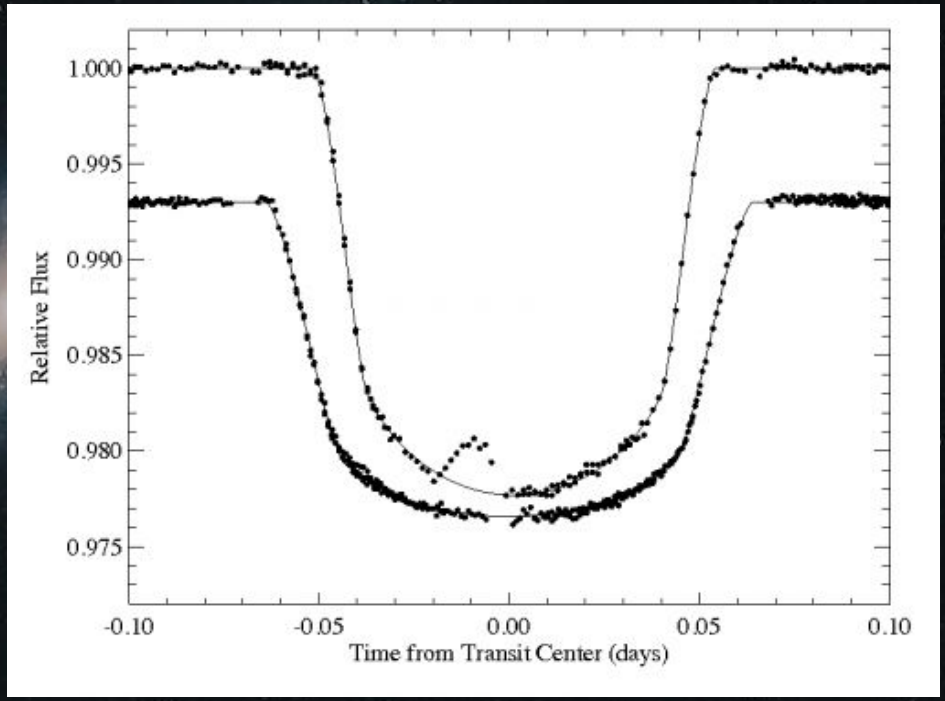

Lecture 2
Introduction to Plotting and Matplot

First Some Housekeeping

- BCourses
- Discussion Board
- Some things I should have said on Tuesday

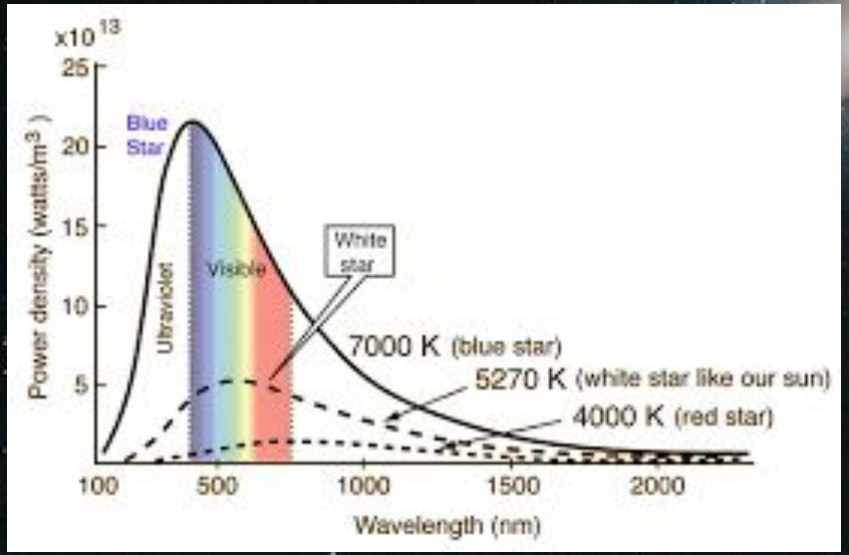
The most critical aspect of research: Analyzing Data

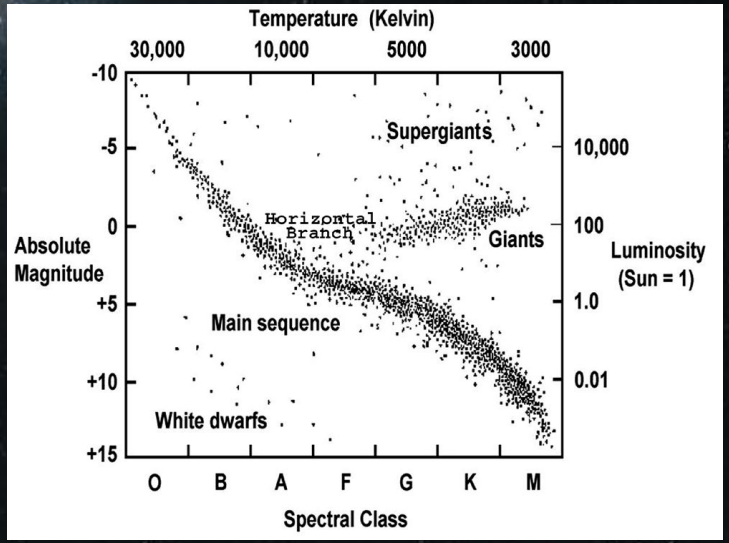
- Once you're done analyzing your data, how are you going to show off your results?
- Not going to get much traction reporting results as a number without a visual
- Plotting is how you convince yourself and others of the strength of your conclusions



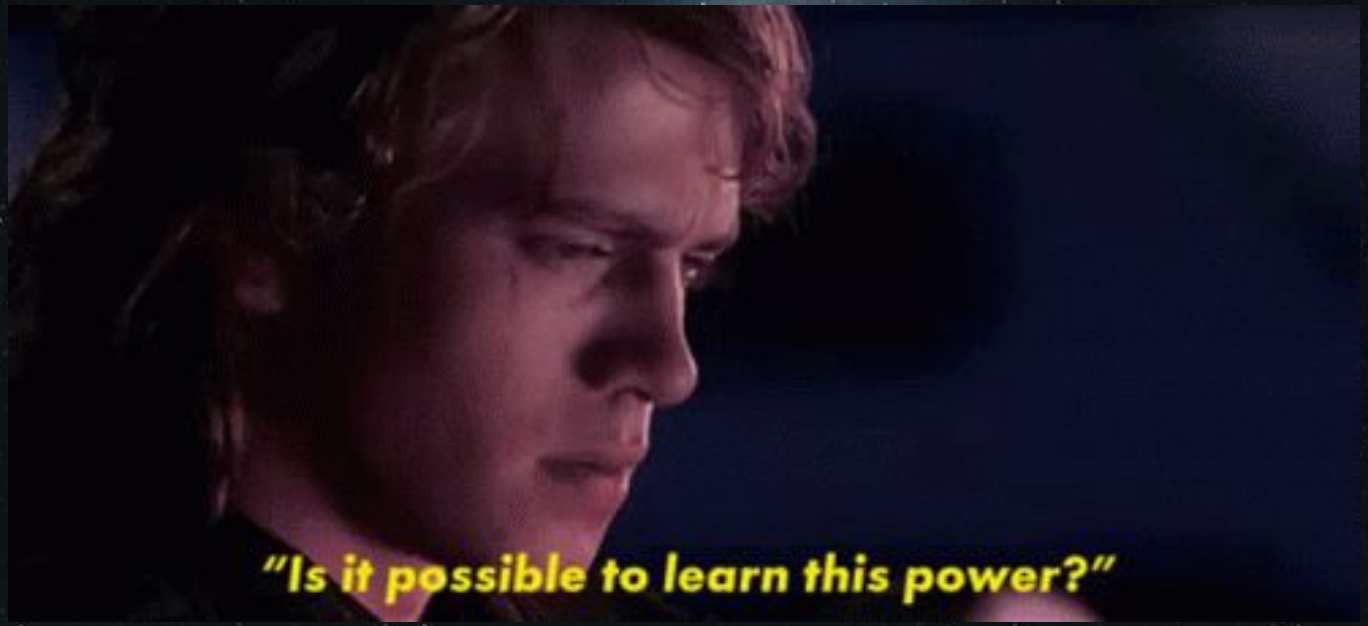
In case you aren't convinced yet…

- Previous slide: Exoplanet transit lightcurve
- Right: HR diagram
- Left: Blackbody Radiation Curve
- Plotting is how scientists convey information clearly and concisely





What do you need to start plotting in python?

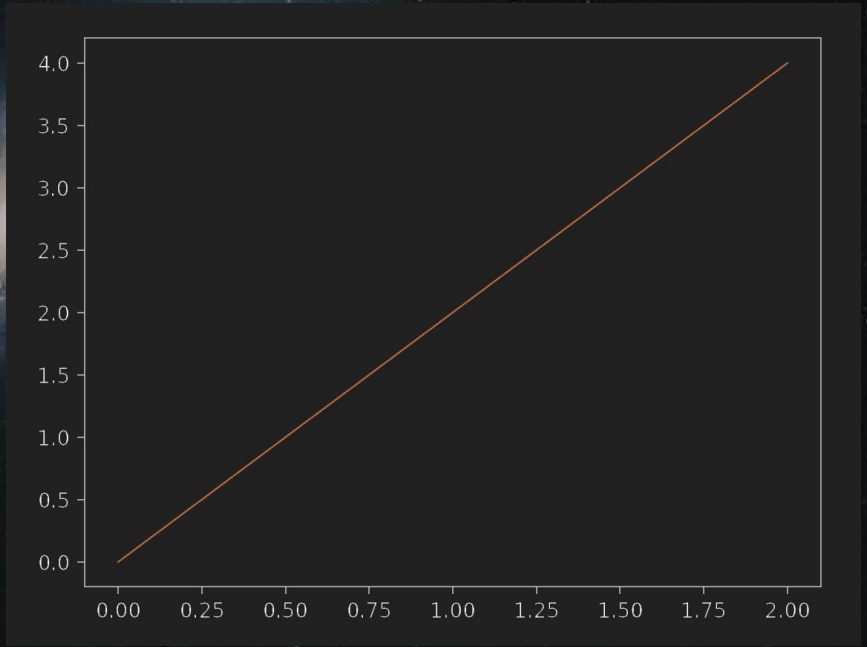


What package to import?

```
import matplotlib.pyplot as plt
```

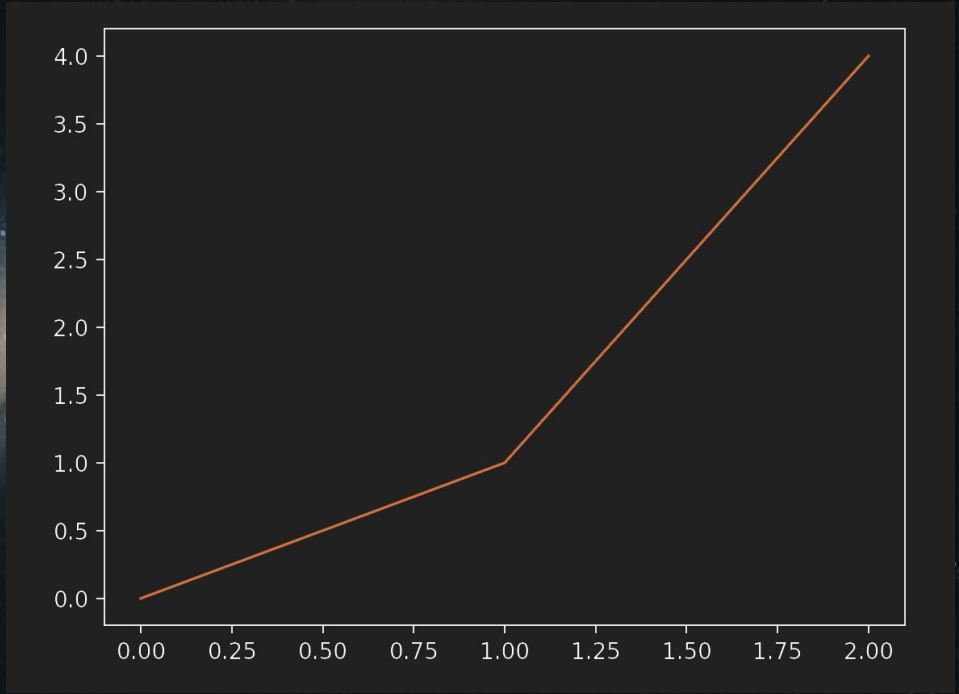
Begin with the simplest…Plotting a line

```
>>> x = np.arange(3)
>>> y = 2*x
>>> plt.plot(x, y)
```



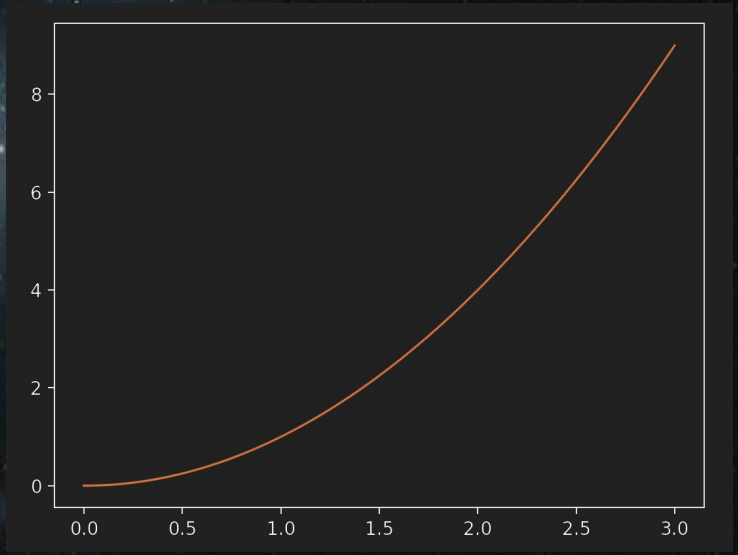
What about a curve?

```
>>> x = np.arange(3)
>>> y = x**2
>>> plt.plot(x, y)
```



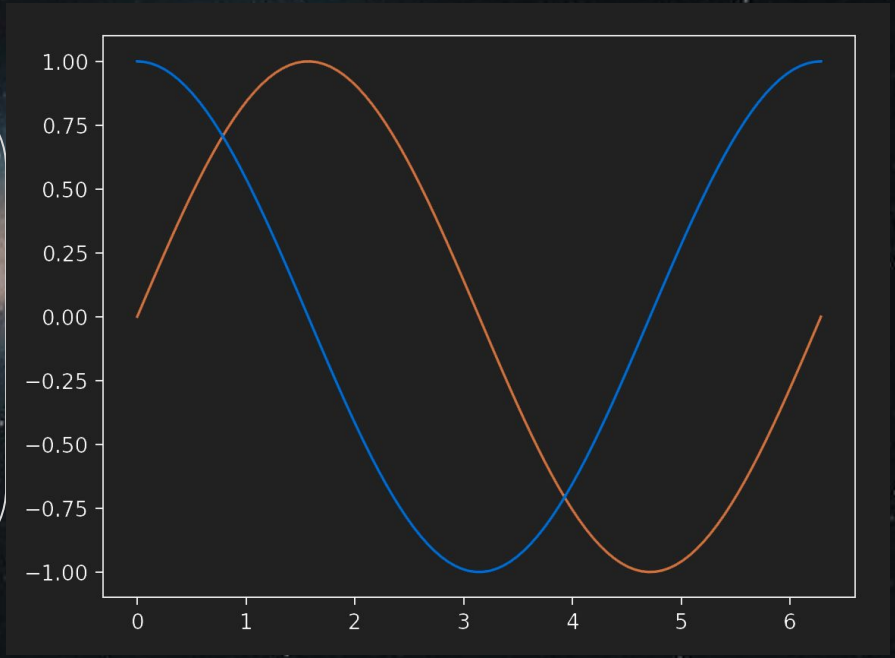
Now, what about a curve?

```
>>> x = np.linspace(0,3,100)
>>> y = x**2
>>> plt.plot(x, y)
```



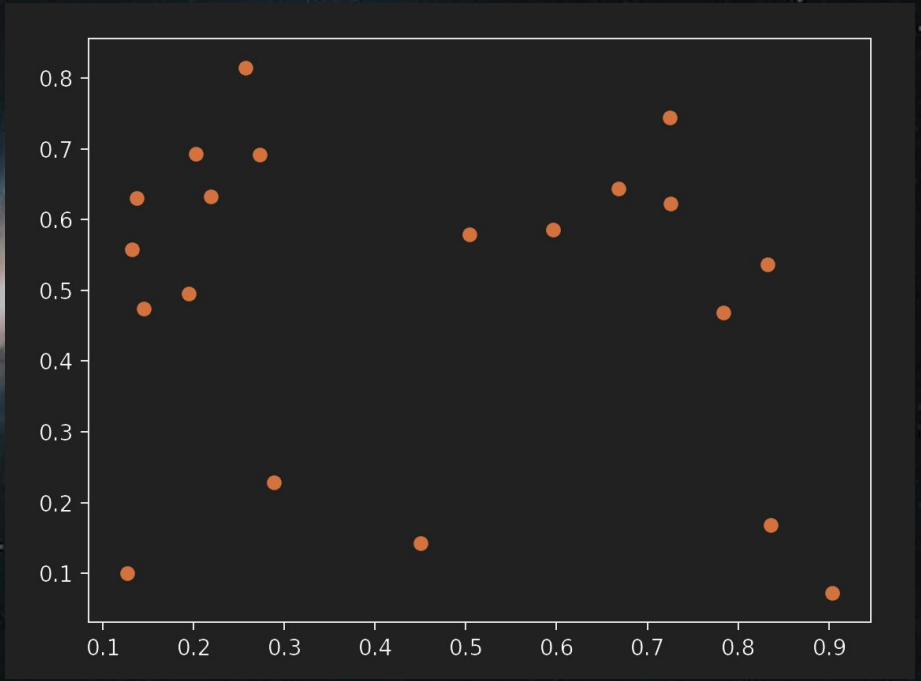
Multiple curves?????

```
x = np.linspace(0,2*np.pi,100)

plt.plot(x, np.sin(x))

plt.plot(x, np.cos(x))

plt.show()
```



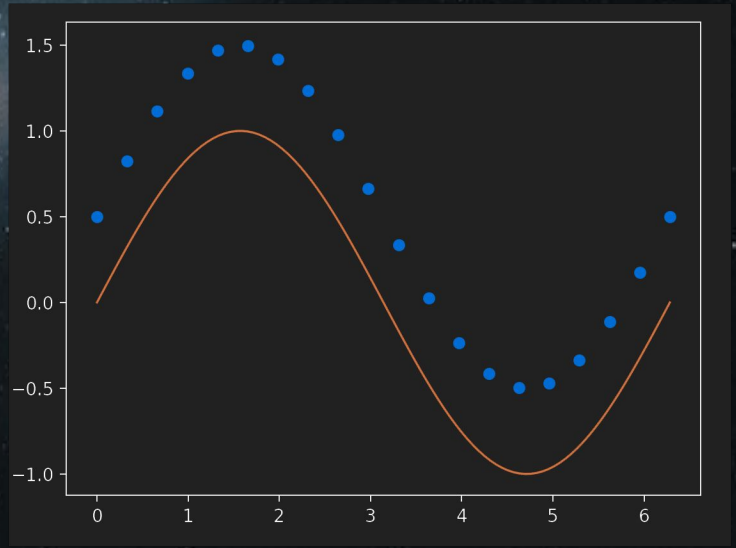
Plotting points? Scatter plots!!!

```
x = np.random.rand(20)

y = np.random.rand(20)

plt.scatter(x,y)

plt.show()
```



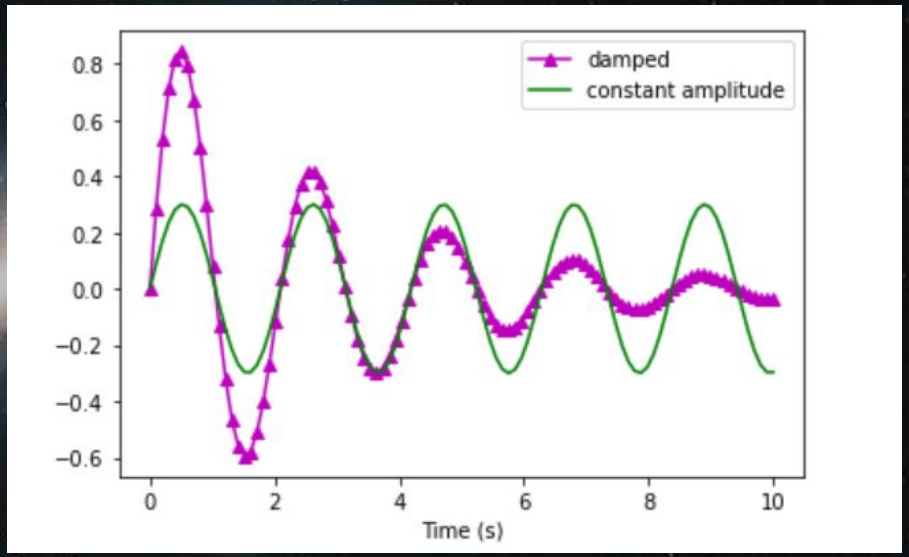
Different types of plot in one?

```
XX = np.linspace(0,2*np.pi,100)

YY = np.sin(XX)

x = np.linspace(0,2*np.pi,20)

y = np.sin(x) + 0.5

plt.plot(XX, YY)

plt.scatter(x,y)

plt.show()
```



Cardinal Rules of Plotting

- Always label your axes
- Always add units to your labels
- Make sure anyone who looks at your plot can tell exactly what everything means
  - Add a legend if necessary
  - Be sure to differentiate between lines on the same plot (by color, or line style, etc.)




Plotting Demo