## APSC 1001 & CS1010

# Introduction to Plotting with Python

import matplotlib.pyplot as plt

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Photo: Kartik Bulusu

### Plotting data; the very basics

**x-values** and **y-values** are vectors containing the x- and y coordinates of points on the graph.

```
>>> import numpy as np
>>> import matplotlib.pyplot as plt
>>>
>>> plt.plot(x-values, y-values, 'style option')
>>> plt.show()
```

Color Style-option	Line Style-option	Marker Style-option
y yellow	- solid	+ plus sign
m magenta	dashed	o circle
c cyan	: dotted	* asterisk
r red	dash-dot	x x-mark
g green	none no line	. point
b blue		up triangle
w white		square square
k black		diamond diamond

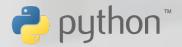


Programming pitfall: The two vector arguments x-values and y-values MUST have the same length.

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### **Plotting Example in Python**



#### I have three functions:

```
y1 = \sin x
y2 = x
y3 = x - \frac{x^3}{3!} + \frac{x^5}{5!}
```

I would like to generate 100 values between 0 and  $2\pi$  radians.

```
>>> import numpy as np
>>> import matplotlib.pyplot as plt
>>> import math as mt
```

```
>>> x = np.linspace(0,2*np.pi,100)
>>> y1 = np.sin(x)
>>> y2 = x;
\Rightarrow y3 = x - (x**3/mt.factorial(3))+(x**5/mt.factorial(5))
```

```
>>> # plt.figure()
>>> plt.plot(p, q1, 'b', label='sin(x)')
>>> plt.plot(p, q2, 'm', label='Linear approximation')
>>> plt.plot(p, q3, 'g--', label='5th order approximation')
```

```
>>> plt.xlabel('Value of x')
>>> plt.ylabel('sin(x)')
>>> plt.title('Fun with sin(x)')
```

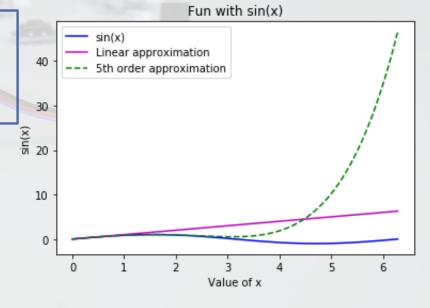
curves in one single plot!!

```
>>> plt.legend()
>>> plt.show()
```

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I would like to plot three



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