Matploblib

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Outline

- matploblib

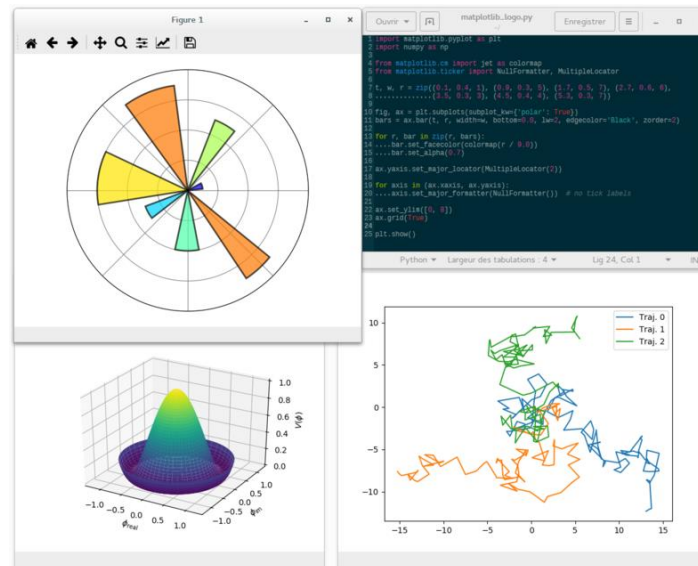# Matplotlib

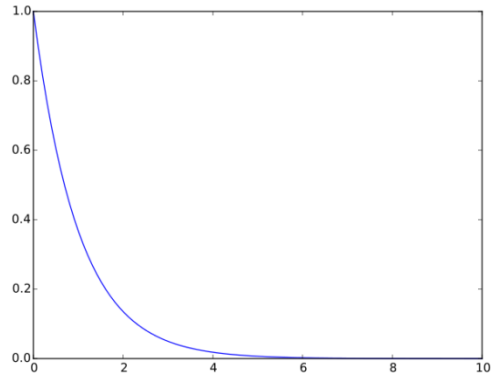# Matplotlib

▸ A plotting library for the Python

  ▸ https://matplotlib.org/

▸ Numerical mathematics extension NumPy

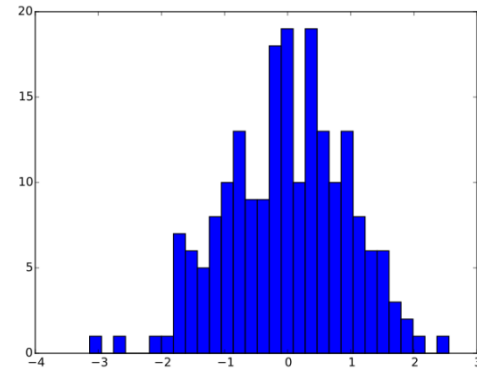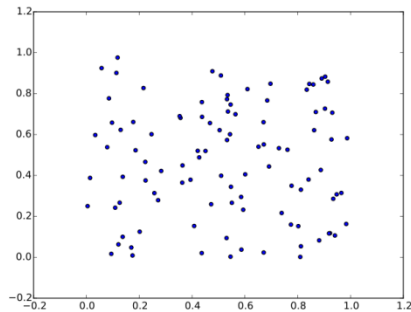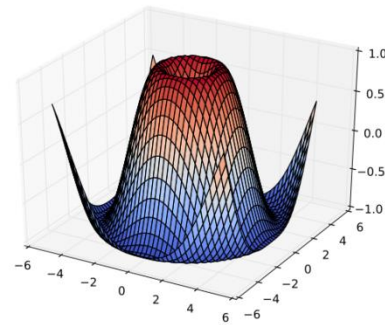▸ Matplotlib 1.2 is the first version of matplotlib to support Python 3.x

Matplotlib

line plot

histogram

scatter plot

3D plot

Matplotlib

▸ more example

 ▸ https://matplotlib.org/gallery.html

# Popular Python Libraries for Data Analysis
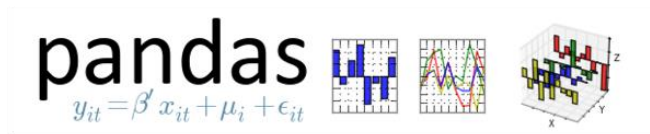
Top 20 python libraries

Figure

▸ A figure is the windows in the GUI that has "Figure #" as title.

 ▸ figures are numbered starting from 1

 ▸ several parameters that determine what the figure looks like:

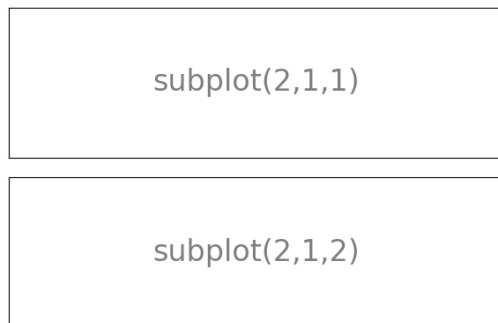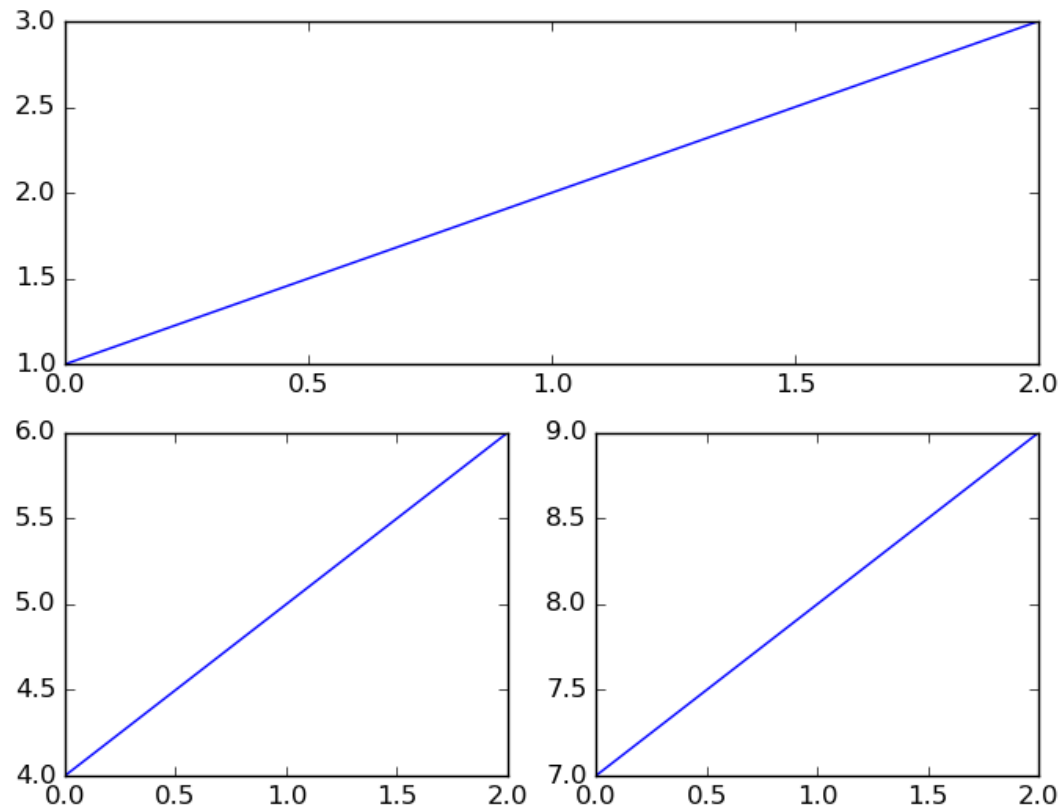| Argument	Default	Description
num	1	number of figure
figsize	figure.figsize	figure size in in inches (width, height)
dpi	figure.dpi	resolution in dots per inch
facecolor	figure.facecolor	color of the drawing background
edgecolor	figure.edgecolor	color of edge around the drawing background
frameon	True	draw figure frame or not

Figure
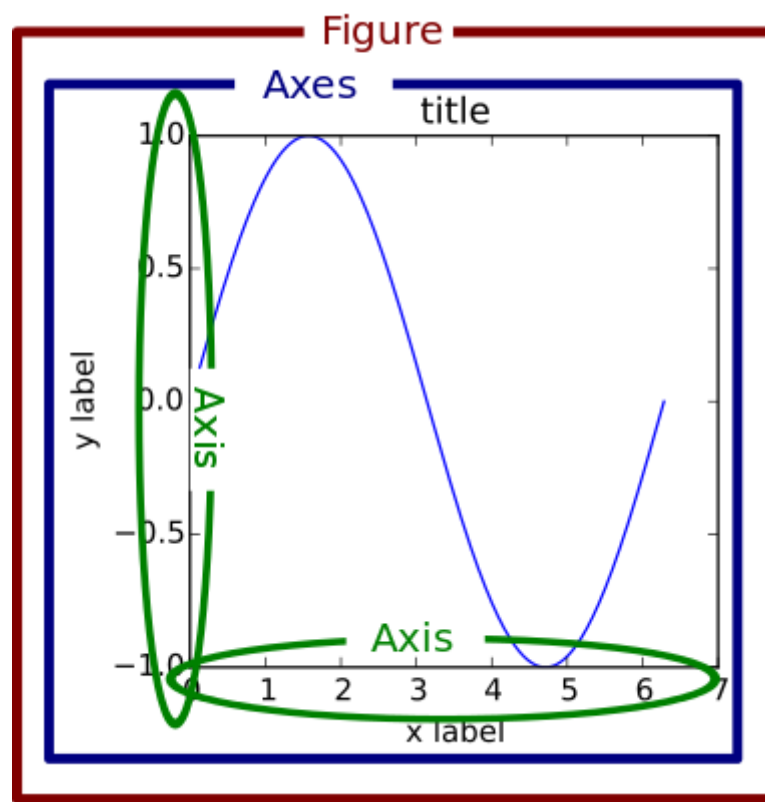
Subplot

- Subplot allow user to arrange plots in a regular grid
  - need to specify # of rows/columns and # of the plot

subplot(1,2,1)   subplot(1,2,2)

subplot(2,1,1)

subplot(2,1,2)
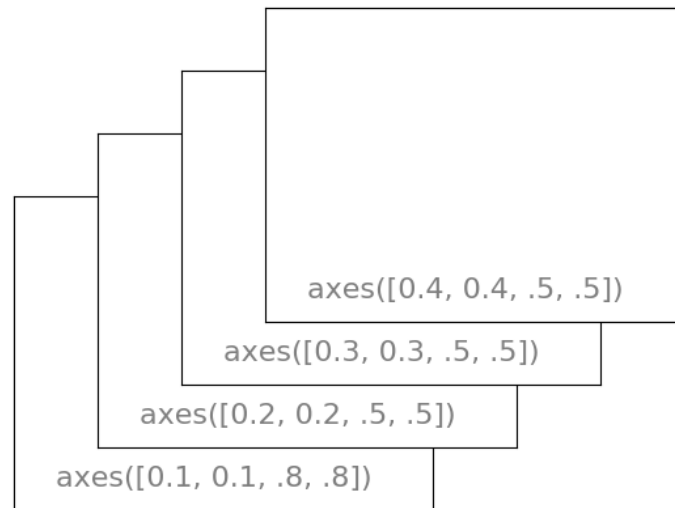
subplot(2,2,1)   subplot(2,2,2)

subplot(2,2,3)   subplot(2,2,4)

Subplot

Axes

▸ Axes allow placement of plots at any location in the figure.

  ▸ Can put a smaller plot inside a bigger one

axes([0.4, 0.4, .5, .5])

axes([0.3, 0.3, .5, .5])

axes([0.2, 0.2, .5, .5])

axes([0.1, 0.1, .8, .8])

Ticks
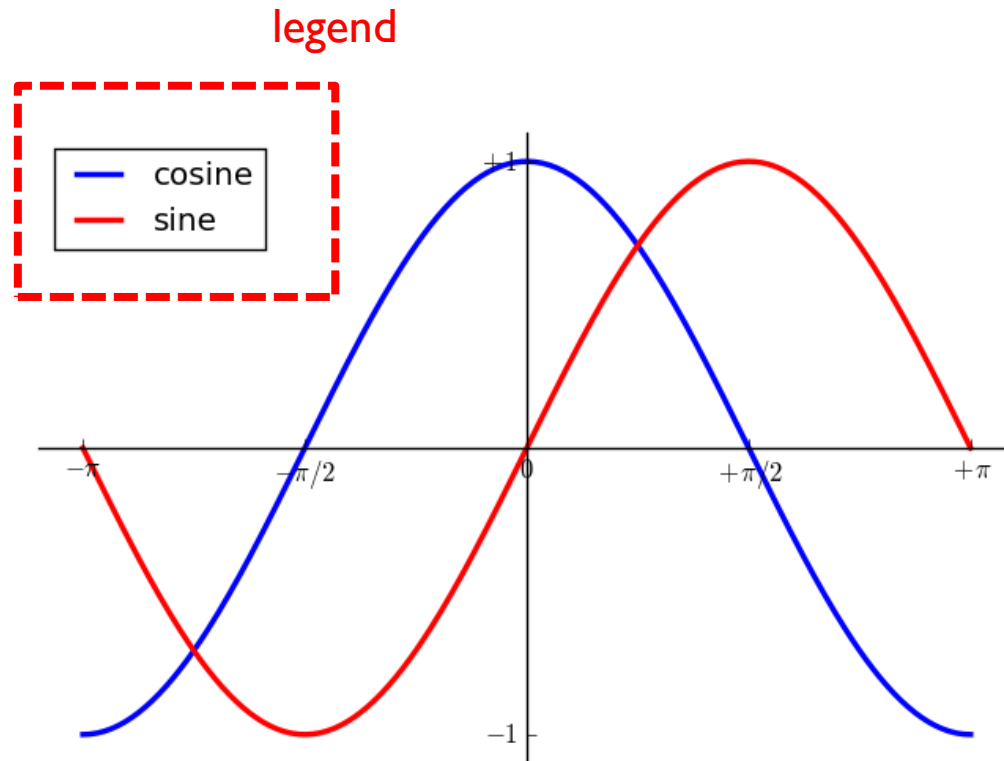
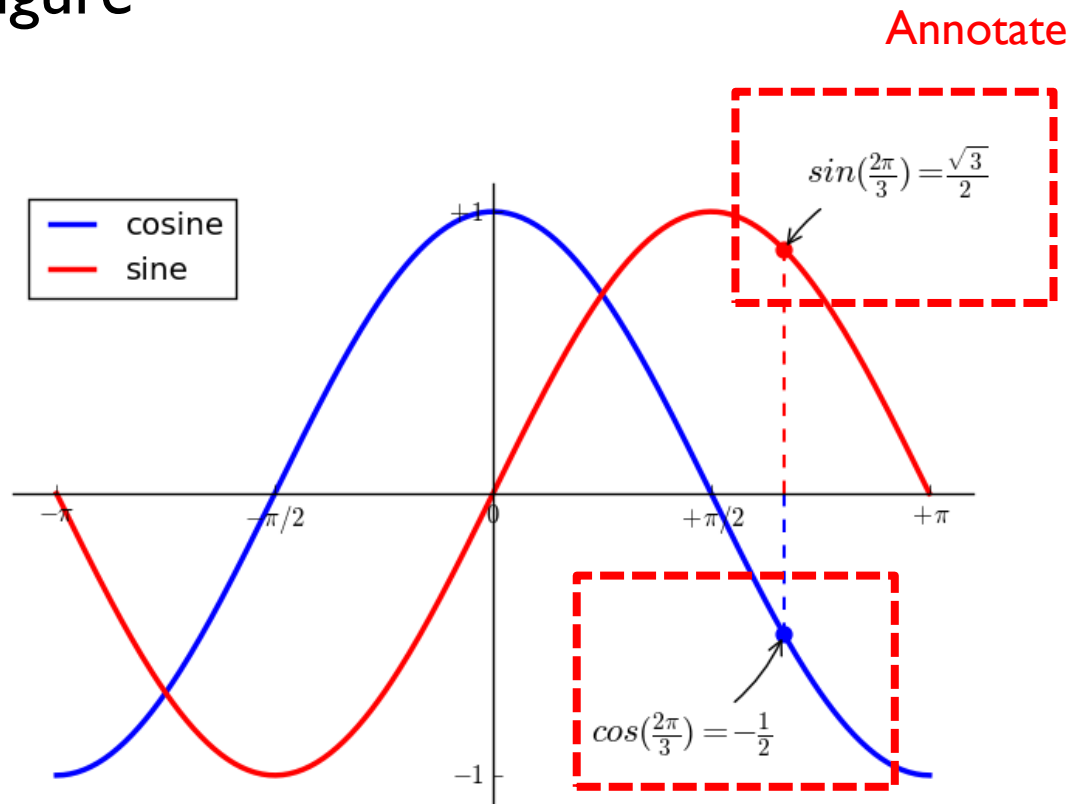▸ Ticks help specify where ticks should appear and tick formatters to give ticks the appearance you want
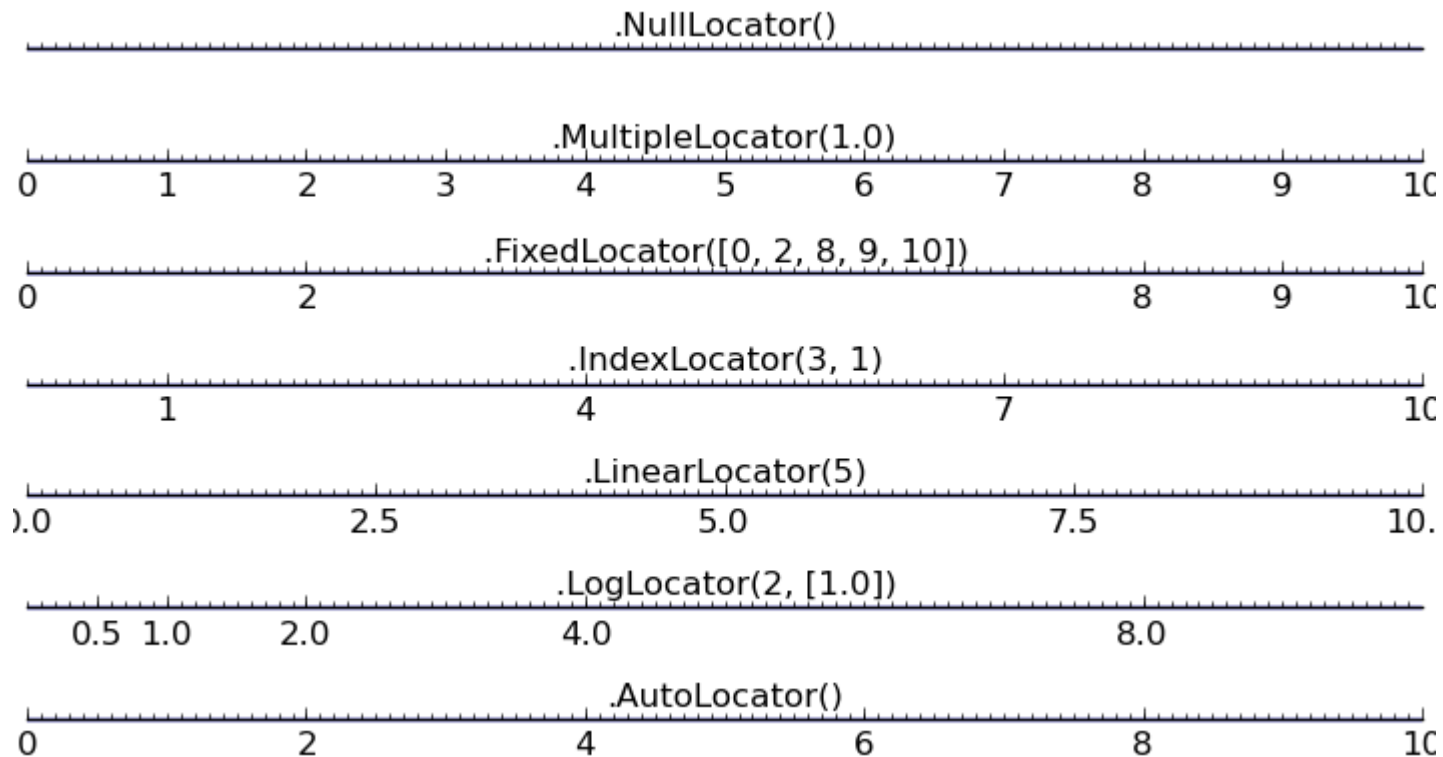
Legend

▸ Lengend help user to describe figure easily

legend

Annotate

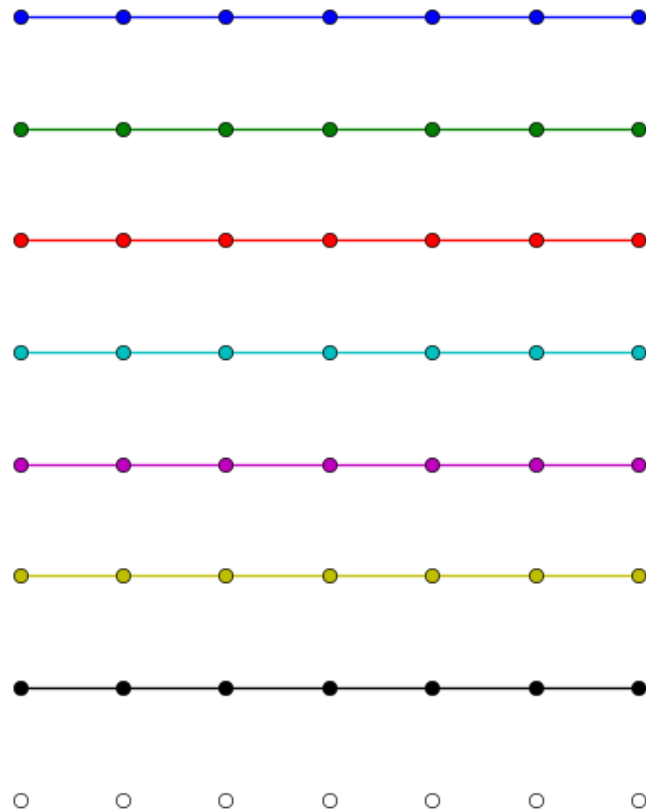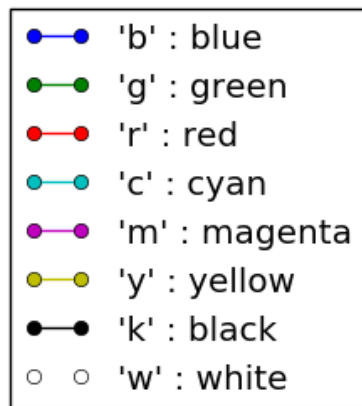- Annotation some points help user to focus on specific part of figure

Line property

Property	Description	Appearance		
alpha (or a)	alpha transparency on 0-1 scale			
antialiased	True or False - use antialised rendering	Aliased Anti-aliased		
color (or c)	matplotlib color arg			
linestyle (or ls)	see Line properties			
linewidth (or lw)	float, the line width in points			
solid_capstyle	Cap style for solid lines			
solid_joinstyle	Join style for solid lines			
dash_capstyle	Cap style for dashes			
dash_joinstyle	Join style for dashes			
marker	see Markers			
markeredgewidth (mew)	line width around the marker symbol			
markeredgecolor (mec)	edge color if a marker is used			
markerfacecolor (mfc)	face color if a marker is used			
markersize (ms)	size of the marker in points			

Color

Marker

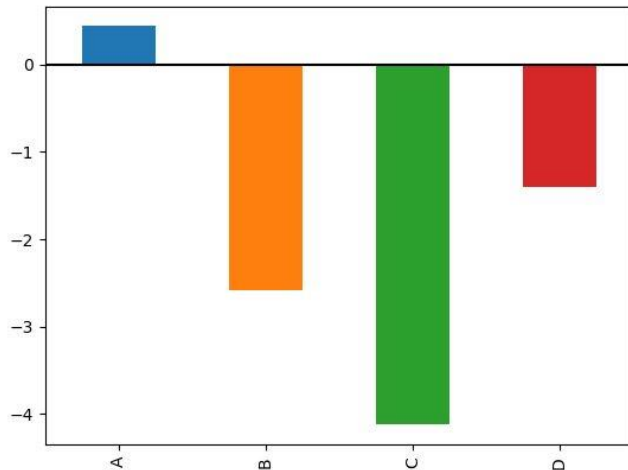Filled markers in Matplotlib
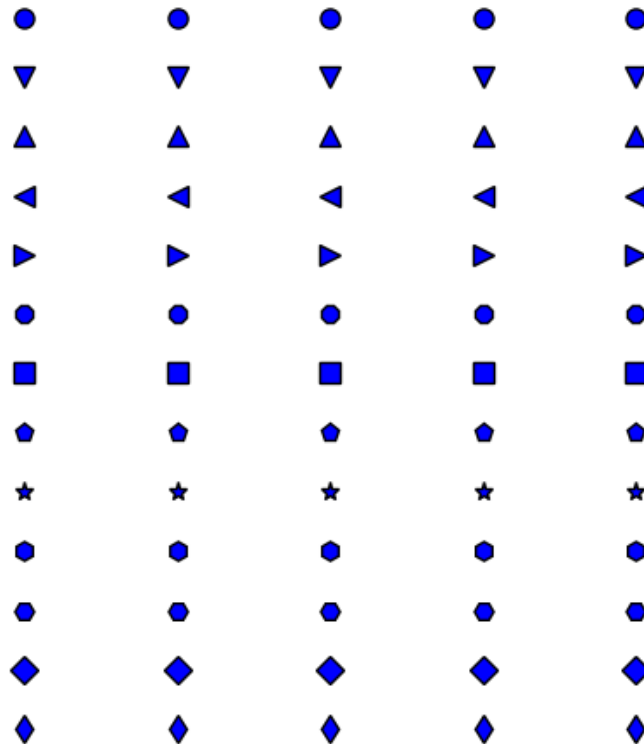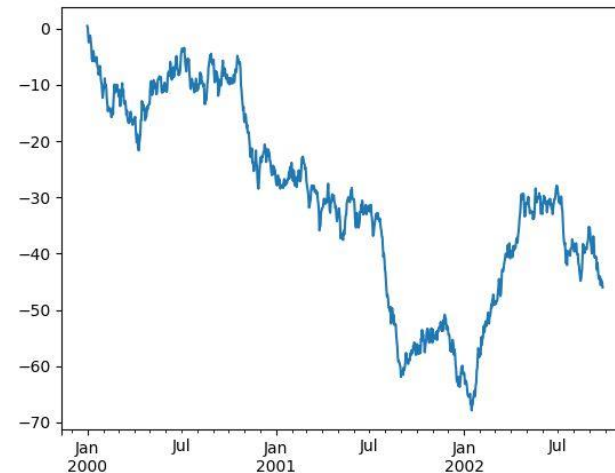
Line style Example

Line style

Line styles
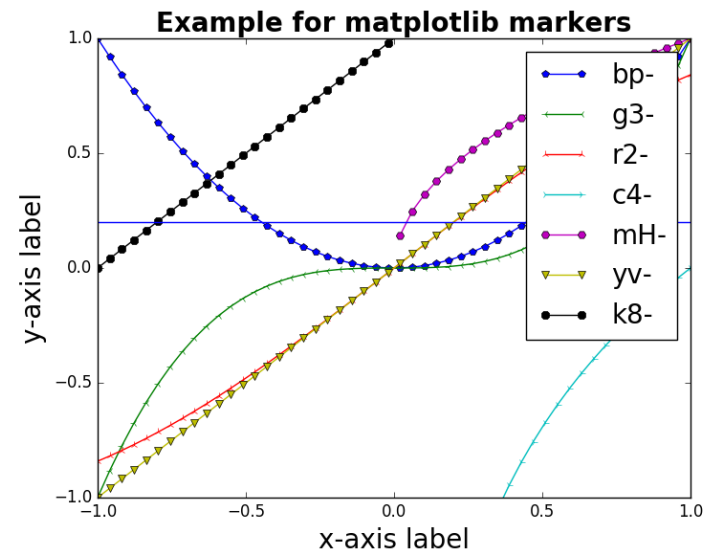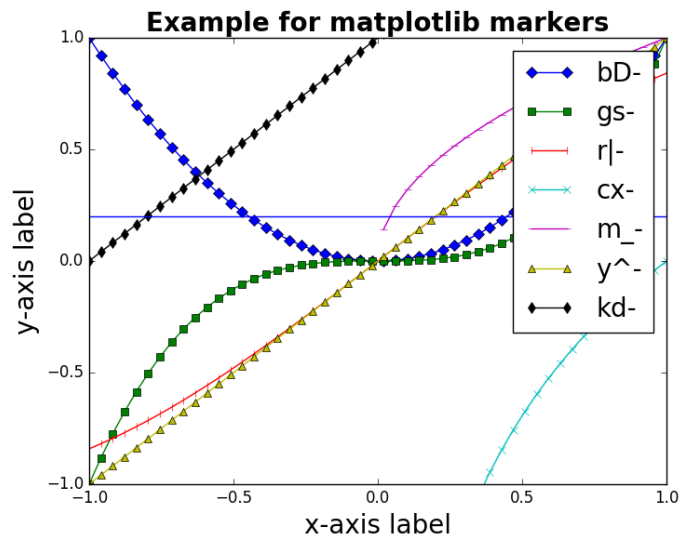
Pandas plot

▸ Pandas can also use plot function
  ▸ It is based on matplotlib


```
In [11]: plt.figure();

In [12]: df.iloc[5].plot(kind='bar');
```



```
In [2]: ts = pd.Series(np.random.randn(1000), index=pd.date_range('1/1/2000', periods=1000))

In [3]: ts = ts.cumsum()

In [4]: ts.plot()
Out[4]: <matplotlib.axes._subplots.AxesSubplot at 0x1c36bc0780>
```

Pandas plot

- ## Pandas can plot include
  - 'bar' or 'barh' for bar plots
  - 'hist' for histogram
  - 'box' for boxplot
  - 'kde' or 'density' for density plots
  - 'area' for area plots
  - 'scatter' for scatter plots
  - 'hexbin' for hexagonal bin plots
  - 'pie' for pie plots