

Python For Data Science Cheat Sheet

NumPy Basics

Learn Python for Data Science Interactively at [www.DataCamp.com](https://www.datacamp.com)



NumPy

The NumPy library is the core library for scientific computing in Python. It provides a high-performance multidimensional array object, and tools for working with these arrays.

Use the following import convention:



```
>>> import numpy as np
```

NumPy Arrays

1D array

```
1 2 3
```

2D array

axis 1
axis 0

```
1.5 2 3  
4 5 6
```

3D array

axis 2
axis 1
axis 0

Creating Arrays

```
>>> a = np.array([1,2,3])  
>>> b = np.array([(1.5,2,3), (4,5,6)], dtype = float)  
>>> c = np.array([(1.5,2,3), (4,5,6)], [(3,2,1), (4,5,6)]],  
                dtype = float)
```

Initial Placeholders

```
>>> np.zeros((3,4))  
>>> np.ones((2,3,4),dtype=np.int16)  
>>> d = np.arange(10,25,5)  
  
>>> np.linspace(0,2,9)  
  
>>> e = np.full((2,2),7)  
>>> f = np.eye(2)  
>>> np.random.random((2,2))  
>>> np.empty((3,2))
```

Create an array of zeros
Create an array of ones
Create an array of evenly spaced values (step value)
Create an array of evenly spaced values (number of samples)
Create a constant array
Create a 2X2 identity matrix
Create an array with random values
Create an empty array

I/O

Saving & Loading On Disk

```
>>> np.save('my_array', a)  
>>> np.savez('array.npz', a, b)  
>>> np.load('my_array.npy')
```

Saving & Loading Text Files

```
>>> np.loadtxt("myfile.txt")  
>>> np.genfromtxt("my_file.csv", delimiter=',')  
>>> np.savetxt("myarray.txt", a, delimiter=" ")
```

Data Types

```
>>> np.int64  
>>> np.float32  
>>> np.complex  
>>> np.bool  
>>> np.object  
>>> np.string_  
>>> np.unicode_
```

Signed 64-bit integer types
Standard double-precision floating point
Complex numbers represented by 128 floats
Boolean type storing TRUE and FALSE values
Python object type
Fixed-length string type
Fixed-length unicode type

Inspecting Your Array

```
>>> a.shape  
>>> len(a)  
>>> b.ndim  
>>> e.size  
>>> b.dtype  
>>> b.dtype.name  
>>> b.astype(int)
```

Array dimensions
Length of array
Number of array dimensions
Number of array elements
Data type of array elements
Name of data type
Convert an array to a different type

Asking For Help

```
>>> np.info(np.ndarray.dtype)
```

Array Mathematics

Arithmetic Operations

```
>>> g = a - b  
array([[ -0.5,  0. ,  0. ],  
       [ -3. , -3. , -3. ]])  
>>> np.subtract(a,b)  
>>> b + a  
array([[ 2.5,  4. ,  6. ],  
       [ 5. ,  7. ,  9. ]])  
>>> np.add(b,a)  
>>> a / b  
array([[ 0.66666667,  1. ,  1. ],  
       [ 0.25 ,  0.4 ,  0.5 ]])  
>>> np.divide(a,b)  
>>> a * b  
array([[ 1.5,  4. ,  9. ],  
       [ 4. , 10. , 18. ]])  
>>> np.multiply(a,b)  
>>> np.exp(b)  
>>> np.sqrt(b)  
>>> np.sin(a)  
>>> np.cos(b)  
>>> np.log(a)  
>>> e.dot(f)  
array([[ 7. ,  7. ],  
       [ 7. ,  7.]])
```

Subtraction
Subtraction
Addition
Addition
Division
Division
Multiplication
Multiplication
Exponentiation
Square root
Print sines of an array
Element-wise cosine
Element-wise natural logarithm
Dot product

Comparison

```
>>> a == b  
array([[False,  True,  True],  
       [False, False, False]], dtype=bool)  
>>> a < 2  
array([[True, False, False], dtype=bool)  
>>> np.array_equal(a, b)
```

Element-wise comparison
Element-wise comparison
Array-wise comparison

Aggregate Functions

```
>>> a.sum()  
>>> a.min()  
>>> b.max(axis=0)  
>>> b.cumsum(axis=1)  
>>> a.mean()  
>>> b.median()  
>>> a.corrcoef()  
>>> np.std(b)
```

Array-wise sum
Array-wise minimum value
Maximum value of an array row
Cumulative sum of the elements
Mean
Median
Correlation coefficient
Standard deviation

Copying Arrays

```
>>> h = a.view()  
>>> np.copy(a)  
>>> h = a.copy()
```

Create a view of the array with the same data
Create a copy of the array
Create a deep copy of the array

Sorting Arrays

```
>>> a.sort()  
>>> c.sort(axis=0)
```

Sort an array
Sort the elements of an array's axis

Subsetting, Slicing, Indexing

Also see Lists

Subsetting

```
>>> a[2]  
3  
>>> b[1,2]  
6.0
```

Select the element at the 2nd index
Select the element at row 1 column 2 (equivalent to b[1][2])

Slicing

```
>>> a[0:2]  
array([1, 2])  
>>> b[0:2,1]  
array([ 2.,  5.])  
>>> b[:1]  
array([[1.5, 2., 3.]])  
>>> c[1,...]  
array([[ 3.,  2.,  1.],  
       [ 4.,  5.,  6.]])
```

Select items at index 0 and 1
Select items at rows 0 and 1 in column 1
Select all items at row 0 (equivalent to b[0:1, :])
Same as [1, :, :]

Boolean Indexing

```
>>> a[a<2]  
array([1])
```

Reversed array a
Select elements from a less than 2

Fancy Indexing

```
>>> b[[1, 0, 1, 0], [0, 1, 2, 0]]  
array([ 4. ,  2. ,  6. , 1.5])  
>>> b[[1, 0, 1, 0]][:, [0,1,2,0]]  
array([[ 4. ,  5. ,  6. ,  4. ],  
       [ 1.5,  2. ,  3. , 1.5]])
```

Select elements (1,0), (0,1), (1,2) and (0,0)
Select a subset of the matrix's rows and columns

Array Manipulation

Transposing Array

```
>>> i = np.transpose(b)  
>>> i.T
```

Permute array dimensions
Permute array dimensions

Changing Array Shape

```
>>> b.ravel()  
>>> g.reshape(3,-2)
```

Flatten the array
Reshape, but don't change data

Adding/Removing Elements

```
>>> h.resize((2,6))  
>>> np.append(h,g)  
>>> np.insert(a, 1, 5)  
>>> np.delete(a, [1])
```

Return a new array with shape (2,6)
Append items to an array
Insert items in an array
Delete items from an array

Combining Arrays

```
>>> np.concatenate((a,d),axis=0)  
array([ 1,  2,  3, 10, 15, 20])  
>>> np.vstack((a,b))  
array([[ 1. ,  2. ,  3. ],  
       [ 1.5,  2. ,  3. ],  
       [ 4. ,  5. ,  6. ]])  
>>> np.r_[e,f]  
>>> np.hstack((e,f))  
array([[ 7.,  7.,  1.,  0.],  
       [ 7.,  7.,  0.,  1.]])  
>>> np.column_stack((a,d))  
array([[ 1, 10],  
       [ 2, 15],  
       [ 3, 20]])  
>>> np.c_[a,d]
```

Concatenate arrays
Stack arrays vertically (row-wise)
Stack arrays vertically (row-wise)
Stack arrays horizontally (column-wise)
Create stacked column-wise arrays
Create stacked column-wise arrays

Splitting Arrays

```
>>> np.hsplit(a,3)  
[array([1]),array([2]),array([3])]  
>>> np.vsplit(c,2)  
[array([[ 1.5,  2. ,  1. ],  
       [ 4. ,  5. ,  6. ]]),  
 array([[ 3.,  2.,  3.],  
       [ 4. ,  5. ,  6.]])]
```

Split the array horizontally at the 3rd index
Split the array vertically at the 2nd index

DataCamp

Learn Python for Data Science Interactively





Data Science Cheat Sheet

Pandas

KEY

*We'll use shorthand in this cheat sheet***df** - A pandas DataFrame object**s** - A pandas Series object

IMPORTS

*Import these to start***import pandas as pd****import numpy as np**

IMPORTING DATA

pd.read_csv(filename) - From a CSV file**pd.read_table(filename)** - From a delimited text file (like TSV)**pd.read_excel(filename)** - From an Excel file**pd.read_sql(query, connection_object)** - Reads from a SQL table/database**pd.read_json(json_string)** - Reads from a JSON formatted string, URL or file.**pd.read_html(url)** - Parses an html URL, string or file and extracts tables to a list of dataframes**pd.read_clipboard()** - Takes the contents of your clipboard and passes it to **read_table()****pd.DataFrame(dict)** - From a dict, keys for columns names, values for data as lists

EXPORTING DATA

df.to_csv(filename) - Writes to a CSV file**df.to_excel(filename)** - Writes to an Excel file**df.to_sql(table_name, connection_object)** - Writes to a SQL table**df.to_json(filename)** - Writes to a file in JSON format**df.to_html(filename)** - Saves as an HTML table**df.to_clipboard()** - Writes to the clipboard

CREATE TEST OBJECTS

*Useful for testing***pd.DataFrame(np.random.rand(20,5))** - 5 columns and 20 rows of random floats**pd.Series(my_list)** - Creates a series from an iterable **my_list****df.index = pd.date_range('1900/1/30', periods=df.shape[0])** - Adds a date index

VIEWING/INSPECTING DATA

df.head(n) - First **n** rows of the DataFrame**df.tail(n)** - Last **n** rows of the DataFrame**df.shape()** - Number of rows and columns**df.info()** - Index, Datatype and Memory information**df.describe()** - Summary statistics for numerical columns**s.value_counts(dropna=False)** - Views unique values and counts**df.apply(pd.Series.value_counts)** - Unique values and counts for all columns

SELECTION

df[col] - Returns column with label **col** as Series**df[[col1, col2]]** - Returns Columns as a new DataFrame**s.iloc[0]** - Selection by position**s.loc[0]** - Selection by index**df.iloc[0, :]** - First row**df.iloc[0,0]** - First element of first column

DATA CLEANING

df.columns = ['a', 'b', 'c'] - Renames columns**pd.isnull()** - Checks for null Values, Returns Boolean Array**pd.notnull()** - Opposite of **s.isnull()****df.dropna()** - Drops all rows that contain null values**df.dropna(axis=1)** - Drops all columns that contain null values**df.dropna(axis=1, thresh=n)** - Drops all rows have have less than **n** non null values**df.fillna(x)** - Replaces all null values with **x****s.fillna(s.mean())** - Replaces all null values with the mean (mean can be replaced with almost any function from the statistics section)**s.astype(float)** - Converts the datatype of the series to float**s.replace(1, 'one')** - Replaces all values equal to 1 with 'one'**s.replace([1,3], ['one', 'three'])** - Replaces all 1 with 'one' and 3 with 'three'**df.rename(columns=lambda x: x + 1)** - Mass renaming of columns**df.rename(columns={'old_name': 'new_name'})** - Selective renaming**df.set_index('column_one')** - Changes the index**df.rename(index=lambda x: x + 1)** - Mass renaming of index

FILTER, SORT, & GROUPBY

df[df[col] > 0.5] - Rows where the **col** column is greater than 0.5**df[(df[col] > 0.5) & (df[col] < 0.7)]** - Rows where 0.7 > col > 0.5**df.sort_values(col1)** - Sorts values by **col1** in ascending order**df.sort_values(col2, ascending=False)** - Sorts values by **col2** in descending order**df.sort_values([col1, col2], ascending=[True, False])** - Sorts values by**col1** in ascending order then **col2** in descending order**df.groupby(col)** - Returns a groupby object for values from one column**df.groupby([col1, col2])** - Returns a groupby object values from multiple columns**df.groupby(col1)[col2].mean()** - Returns the mean of the values in **col2**, grouped by the values in **col1** (mean can be replaced with almost any function from the statistics section)**df.pivot_table(index=col1, values=[col2, col3], aggfunc=mean)** - Creates a pivot table that groups by **col1** and calculates the mean of **col2** and **col3****df.groupby(col1).agg(np.mean)** - Finds the average across all columns for every unique column 1 group**df.apply(np.mean)** - Applies a function across each column**df.apply(np.max, axis=1)** - Applies a function across each row

JOIN/COMBINE

df1.append(df2) - Adds the rows in **df1** to the end of **df2** (columns should be identical)**pd.concat([df1, df2], axis=1)** - Adds the columns in **df1** to the end of **df2** (rows should be identical)**df1.join(df2, on=col1, how='inner')** - SQL-style joins the columns in **df1** with the columns on **df2** where the rows for **col1** have identical values. **how** can be one of 'left', 'right', 'outer', 'inner'

STATISTICS

*These can all be applied to a series as well.***df.describe()** - Summary statistics for numerical columns**df.mean()** - Returns the mean of all columns
df.corr() - Returns the correlation between columns in a DataFrame**df.count()** - Returns the number of non-null values in each DataFrame column**df.max()** - Returns the highest value in each column**df.min()** - Returns the lowest value in each column**df.median()** - Returns the median of each column**df.std()** - Returns the standard deviation of each column

Python For Data Science Cheat Sheet

Matplotlib

Learn Python Interactively at [www.DataCamp.com](https://www.datacamp.com)



Matplotlib

Matplotlib is a Python 2D plotting library which produces publication-quality figures in a variety of hardcopy formats and interactive environments across platforms.



1 Prepare The Data

Also see Lists & NumPy

1D Data

```
>>> import numpy as np
>>> x = np.linspace(0, 10, 100)
>>> y = np.cos(x)
>>> z = np.sin(x)
```

2D Data or Images

```
>>> data = 2 * np.random.random((10, 10))
>>> data2 = 3 * np.random.random((10, 10))
>>> Y, X = np.mgrid[-3:3:100j, -3:3:100j]
>>> U = -1 - X**2 + Y
>>> V = 1 + X - Y**2
>>> from matplotlib.cbook import get_sample_data
>>> img = np.load(get_sample_data('axes_grid/bivariate_normal.npy'))
```

2 Create Plot

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

Figure

```
>>> fig = plt.figure()
>>> fig2 = plt.figure(figsize=plt.figaspect(2.0))
```

Axes

All plotting is done with respect to an Axes. In most cases, a subplot will fit your needs. A subplot is an axes on a grid system.

```
>>> fig.add_axes()
>>> ax1 = fig.add_subplot(221) # row-col-num
>>> ax3 = fig.add_subplot(212)
>>> fig3, axes = plt.subplots(nrows=2,ncols=2)
>>> fig4, axes2 = plt.subplots(ncols=3)
```

3 Plotting Routines

1D Data

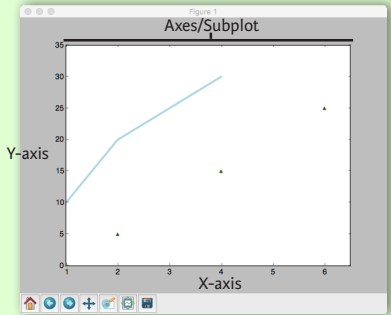
<pre>>>> lines = ax.plot(x,y) >>> ax.scatter(x,y) >>> axes[0,0].bar([1,2,3],[3,4,5]) >>> axes[1,0].barh([0.5,1,2.5],[0,1,2]) >>> axes[1,1].axhline(0.45) >>> axes[0,1].axvline(0.65) >>> ax.fill(x,y,color='blue') >>> ax.fill_between(x,y,color='yellow')</pre>	<p>Draw points with lines or markers connecting them</p> <p>Draw unconnected points, scaled or colored</p> <p>Plot vertical rectangles (constant width)</p> <p>Plot horizontal rectangles (constant height)</p> <p>Draw a horizontal line across axes</p> <p>Draw a vertical line across axes</p> <p>Draw filled polygons</p> <p>Fill between y-values and 0</p>
--	--

2D Data or Images

<pre>>>> fig, ax = plt.subplots() >>> im = ax.imshow(img, cmap='gist_earth', interpolation='nearest', vmin=-2, vmax=2)</pre>	Colormapped or RGB arrays
--	---------------------------

Plot Anatomy & Workflow

Plot Anatomy



Workflow

The basic steps to creating plots with matplotlib are:

- 1 Prepare data
- 2 Create plot
- 3 Plot
- 4 Customize plot
- 5 Save plot
- 6 Show plot

```
>>> import matplotlib.pyplot as plt
>>> x = [1,2,3,4]
>>> y = [10,20,25,30]
>>> fig = plt.figure()
>>> ax = fig.add_subplot(111)
>>> ax.plot(x, y, color='lightblue', linewidth=3)
>>> ax.scatter([2,4,6],
    [5,15,25],
    color='darkgreen',
    marker='^')
>>> ax.set_xlim(1, 6.5)
>>> plt.savefig('foo.png')
>>> plt.show()
```

4 Customize Plot

Colors, Color Bars & Color Maps

```
>>> plt.plot(x, x, x, x**2, x, x**3)
>>> ax.plot(x, y, alpha = 0.4)
>>> ax.plot(x, y, c='k')
>>> fig.colorbar(im, orientation='horizontal')
>>> im = ax.imshow(img,
    cmap='seismic')
```

Markers

```
>>> fig, ax = plt.subplots()
>>> ax.scatter(x,y,marker=".")
>>> ax.plot(x,y,marker="o")
```

Linestyles

```
>>> plt.plot(x,y,linewidth=4.0)
>>> plt.plot(x,y,ls='solid')
>>> plt.plot(x,y,ls='--')
>>> plt.plot(x,y,'--',x**2,y**2,'-.')
>>> plt.setp(lines,color='r',linewidth=4.0)
```

Text & Annotations

```
>>> ax.text(1,
    -2.1,
    'Example Graph',
    style='italic')
>>> ax.annotate("Sine",
    xy=(8, 0),
    xycoords='data',
    xytext=(10.5, 0),
    textcoords='data',
    arrowprops=dict(arrowstyle="->",
        connectionstyle="arc3"),)
```

Mathtext

```
>>> plt.title(r'$\sigma_i=15$', fontsize=20)
```

Limits, Legends & Layouts

Limits & Autoscaling

```
>>> ax.margins(x=0.0,y=0.1)
>>> ax.axis('equal')
>>> ax.set(xlim=[0,10.5],ylim=[-1.5,1.5])
>>> ax.set_xlim(0,10.5)
```

Legends

```
>>> ax.set(title='An Example Axes',
    ylabel='Y-Axis',
    xlabel='X-Axis')
>>> ax.legend(loc='best')
```

Ticks

```
>>> ax.xaxis.set(ticks=range(1,5),
    ticklabels=[3,100,-12,"foo"])
>>> ax.tick_params(axis='y',
    direction='inout',
    length=10)
```

Subplot Spacing

```
>>> fig3.subplots_adjust(wspace=0.5,
    hspace=0.3,
    left=0.125,
    right=0.9,
    top=0.9,
    bottom=0.1)
```

```
>>> fig.tight_layout()
```

Axis Spines

```
>>> ax1.spines['top'].set_visible(False)
>>> ax1.spines['bottom'].set_position(('outward',10))
```

Add padding to a plot

Set the aspect ratio of the plot to 1

Set limits for x-and y-axis

Set limits for x-axis

Set a title and x-and y-axis labels

No overlapping plot elements

Manually set x-ticks

Make y-ticks longer and go in and out

Adjust the spacing between subplots

Fit subplot(s) in to the figure area

Make the top axis line for a plot invisible

Move the bottom axis line outward

5 Save Plot

Save figures

```
>>> plt.savefig('foo.png')
```

Save transparent figures

```
>>> plt.savefig('foo.png', transparent=True)
```

6 Show Plot

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

Close & Clear

```
>>> plt.cla()
>>> plt.clf()
>>> plt.close()
```

Clear an axis

Clear the entire figure

Close a window

DataCamp

Learn Python for Data Science Interactively



Seaborn

Learn Data Science Interactively at [www.DataCamp.com](https://www.datacamp.com)



Statistical Data Visualization With Seaborn

The Python visualization library **Seaborn** is based on **matplotlib** and provides a high-level interface for drawing attractive statistical graphics.

Make use of the following aliases to import the libraries:

```
>>> import matplotlib.pyplot as plt
>>> import seaborn as sns
```

The basic steps to creating plots with Seaborn are:

- 1. Prepare some data
- 2. Control figure aesthetics
- 3. Plot with Seaborn
- 4. Further customize your plot

```
>>> import matplotlib.pyplot as plt
>>> import seaborn as sns
>>> tips = sns.load_dataset("tips")
>>> sns.set_style("whitegrid")
>>> g = sns.lmplot(x="tip", y="total_bill", data=tips, aspect=2)
>>> g = (g.set_axis_labels("Tip", "Total bill (USD)")).set(xlim=(0,10),ylim=(0,100))
>>> plt.title("title")
>>> plt.show(g)
```

1 Data

Also see Lists, NumPy & Pandas

```
>>> import pandas as pd
>>> import numpy as np
>>> uniform_data = np.random.rand(10, 12)
>>> data = pd.DataFrame({'x':np.arange(1,101), 'y':np.random.normal(0,4,100)})
```

Seaborn also offers built-in data sets:

```
>>> titanic = sns.load_dataset("titanic")
>>> iris = sns.load_dataset("iris")
```

2 Figure Aesthetics

Also see Matplotlib

```
>>> f, ax = plt.subplots(figsize=(5,6))
```

Create a figure and one subplot

Seaborn styles

```
>>> sns.set()
>>> sns.set_style("whitegrid")
>>> sns.set_style("ticks", {'xtick.major.size':8, 'ytick.major.size':8})
>>> sns.axes_style("whitegrid")
```

(Re)set the seaborn default
Set the matplotlib parameters
Set the matplotlib parameters

Return a dict of params or use with
with to temporarily set the style

Axis Grids

```
>>> g = sns.FacetGrid(titanic, col="survived", row="sex")
>>> g = g.map(plt.hist, "age")
>>> sns.factorplot(x="pclass", y="survived", hue="sex", data=titanic)
>>> sns.lmplot(x="sepal_width", y="sepal_length", hue="species", data=iris)
```

Subplot grid for plotting conditional relationships

Draw a categorical plot onto a Facetgrid

Plot data and regression model fits across a FacetGrid

```
>>> h = sns.PairGrid(iris)
>>> h = h.map(plt.scatter)
>>> sns.pairplot(iris)
>>> i = sns.JointGrid(x="x", y="y", data=data)
>>> i = i.plot(sns.regplot, sns.distplot)
>>> sns.jointplot("sepal_length", "sepal_width", data=iris, kind='kde')
```

Subplot grid for plotting pairwise relationships
Plot pairwise bivariate distributions
Grid for bivariate plot with marginal univariate plots

Plot bivariate distribution

Categorical Plots

Scatterplot

```
>>> sns.stripplot(x="species", y="petal_length", data=iris)
>>> sns.swarmplot(x="species", y="petal_length", data=iris)
```

Scatterplot with one categorical variable

Categorical scatterplot with non-overlapping points

Bar Chart

```
>>> sns.barplot(x="sex", y="survived", hue="class", data=titanic)
```

Show point estimates and confidence intervals with scatterplot glyphs

Count Plot

```
>>> sns.countplot(x="deck", data=titanic, palette="Greens_d")
```

Show count of observations

Point Plot

```
>>> sns.pointplot(x="class", y="survived", hue="sex", data=titanic, palette={"male": "g", "female": "m"}, markers=["^", "o"], linestyle=["-", "--"])
```

Show point estimates and confidence intervals as rectangular bars

Boxplot

```
>>> sns.boxplot(x="alive", y="age", hue="adult_male", data=titanic)
>>> sns.boxplot(data=iris, orient="h")
```

Boxplot

Boxplot with wide-form data

Violinplot

```
>>> sns.violinplot(x="age", y="sex", hue="survived", data=titanic)
```

Violin plot

Regression Plots

```
>>> sns.regplot(x="sepal_width", y="sepal_length", data=iris, ax=ax)
```

Plot data and a linear regression model fit

Distribution Plots

```
>>> plot = sns.distplot(data.y, kde=False, color="b")
```

Plot univariate distribution

Matrix Plots

```
>>> sns.heatmap(uniform_data, vmin=0, vmax=1)
```

Heatmap

4 Further Customizations

Also see Matplotlib

Axisgrid Objects

```
>>> g.despine(left=True)
>>> g.set_ylabels("Survived")
>>> g.set_xticklabels(rotation=45)
>>> g.set_axis_labels("Survived", "Sex")
>>> h.set(xlim=(0,5), ylim=(0,5), xticks=[0,2.5,5], yticks=[0,2.5,5])
```

Remove left spine
Set the labels of the y-axis
Set the tick labels for x
Set the axis labels

Set the limit and ticks of the x-and y-axis

Plot

```
>>> plt.title("A Title")
>>> plt.ylabel("Survived")
>>> plt.xlabel("Sex")
>>> plt.ylim(0,100)
>>> plt.xlim(0,10)
>>> plt.setp(ax, yticks=[0,5])
>>> plt.tight_layout()
```

Add plot title
Adjust the label of the y-axis
Adjust the label of the x-axis
Adjust the limits of the y-axis
Adjust the limits of the x-axis
Adjust a plot property
Adjust subplot params

5 Show or Save Plot

Also see Matplotlib

```
>>> plt.show()
>>> plt.savefig("foo.png")
>>> plt.savefig("foo.png", transparent=True)
```

Show the plot
Save the plot as a figure
Save transparent figure

Close & Clear

Also see Matplotlib

```
>>> plt.cla()
>>> plt.clf()
>>> plt.close()
```

Clear an axis
Clear an entire figure
Close a window

