# Python For Data Science *Cheat Sheet*
## Seaborn

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## 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:

```python
>>> 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

```python
>>> import matplotlib.pyplot as plt
>>> import seaborn as sns
>>> tips = sns.load_dataset("tips")           Step 1
>>> sns.set_style("whitegrid")                Step 2
>>> g = sns.lmplot(x="tip",                   Step 3
                   y="total_bill",
                   data=tips,
                   aspect=2)
>>> g = (g.set_axis_labels("Tip","Total bill(USD)").
set(xlim=(0,10),ylim=(0,100)))                Step 4
>>> plt.title("title")
>>> plt.show(g)                               Step 5
```

### 1  Data                    *Also see Lists, NumPy & Pandas*

```python
>>> 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:

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

### 2  Figure Aesthetics                    *Also see Matplotlib*

```python
>>> f, ax = plt.subplots(figsize=(5,6))
```
Create a figure and one subplot

**Seaborn styles**

```python
>>> 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

**Context Functions**

```python
>>> sns.set_context("talk")
>>> sns.set_context("notebook",
                    font_scale=1.5,
                    rc={"lines.linewidth":2.5})
```
Set context to `talk`
Set context to `notebook`, scale font elements and override param mapping

**Color Palette**

```python
>>> sns.set_palette("husl",3)
>>> sns.color_palette("husl")
>>> flatui = ["#9b59b6","#3498db","#95a5a6","#e74c3c","#34495e","#2ecc71"]
>>> sns.set_palette(flatui)
```
Define the color palette
Use with `with` to temporarily set palette
Set your own color palette

### 3  Plotting With Seaborn

#### Axis Grids

```python
>>> 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

```python
>>> 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**

```python
>>> 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**

```python
>>> sns.barplot(x="sex",
                y="survived",
                hue="class",
                data=titanic)
```
Show point estimates and confidence intervals with scatterplot glyphs

**Count Plot**

```python
>>> sns.countplot(x="deck",
                  data=titanic,
                  palette="Greens_d")
```
Show count of observations

**Point Plot**

```python
>>> sns.pointplot(x="class",
                  y="survived",
                  hue="sex",
                  data=titanic,
                  palette={"male":"g",
                           "female":"m"},
                  markers=["^","o"],
                  linestyles=["-","--"])
```
Show point estimates and confidence intervals as rectangular bars

**Boxplot**

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

Boxplot with wide-form data

**Violinplot**

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

#### Regression Plots

```python
>>> sns.regplot(x="sepal_width",
                y="sepal_length",
                data=iris,
                ax=ax)
```
Plot data and a linear regression model fit

#### Distribution Plots

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

#### Matrix Plots

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

### 4  Further Customizations                    *Also see Matplotlib*

#### Axisgrid Objects

```python
>>> 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

```python
>>> 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*

```python
>>> 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*

```python
>>> plt.cla()
>>> plt.clf()
>>> plt.close()
```
Clear an axis
Clear an entire figure
Close a window