Study Guide: Data Visualization with Python

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General structure

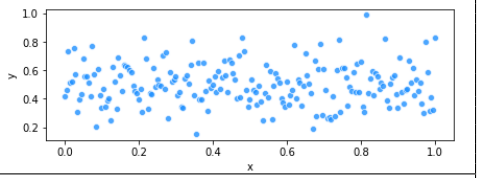
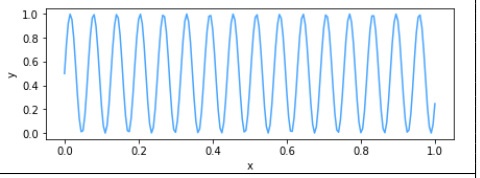
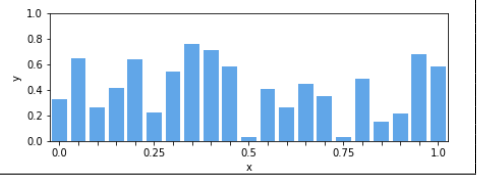
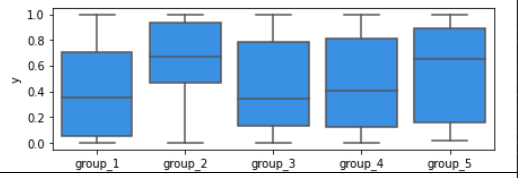
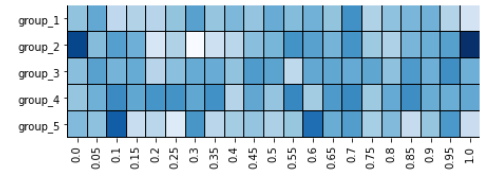
❒ **Overview** – The general structure of the code that is used to plot figures is as follows:

```python
# Plot
f, ax = plt.subplots(...)
ax = sns...

# Legend
plt.title()
plt.xlabel()
plt.ylabel()
```

We note that the `plt.subplots()` command enables to specify the figure size.

❒ **Basic plots** – The main basic plots are summarized in the table below:

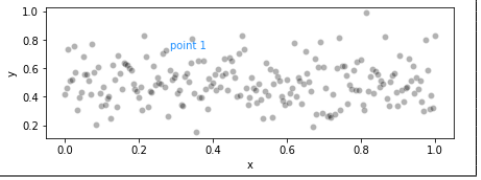
Type	Command	Illustration
Scatter plot	`sns.scatterplot( x, y, params )`	
Line plot	`sns.lineplot( x, y, params )`	
Bar chart	`sns.barplot( x, y, params )`	
Box plot	`sns.boxplot( x, y, params )`	
Heatmap	`sns.heatmap( data, params )`	

where the meaning of parameters are summarized in the table below:

Command	Description	Use case
`hue`	Color of a line / point / border	`'red'`
`fill`	Color of an area	`'red'`
`size`	Size of a line / point	`4`
`linetype`	Shape of a line	`'dashed'`
`alpha`	Transparency, between 0 and 1	`0.3`

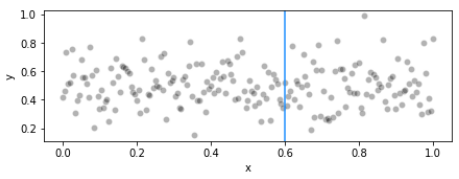
Advanced features

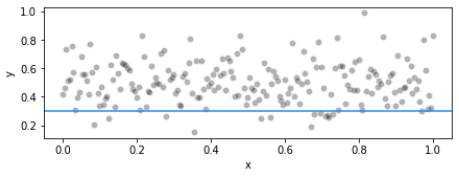
❒ **Text annotation** – Plots can have text annotations with the following commands:

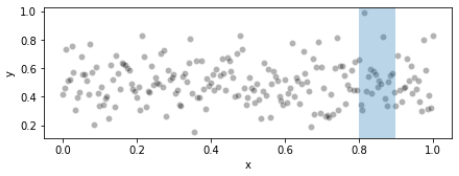
Type	Command	Illustration
Text	`ax.text( x, y, s, color )`	

❒ **Additional elements** – We can add objects on the plot with the following commands:

Type	Command	Illustration

Line	`ax.axvline(`
	`  x, ymin, ymax, color,`
	`  linewidth, linestyle`
	`)`
		

	`ax.axhline(`
	`  y, xmin, xmax, color,`
	`  linewidth, linestyle`
	`)`
		

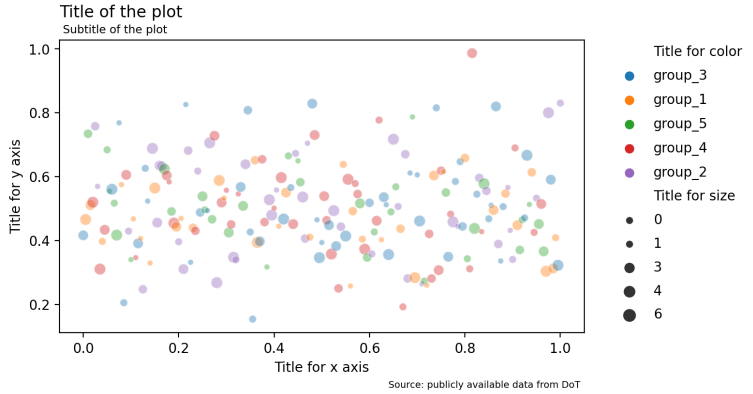
Rectangle	`ax.axvspan(`
	`  xmin, xmax, ymin, ymax,`
	`  color, fill, alpha`
	`)`
		

Last touch

❒ **Legend** – The title of legends can be customized to the plot with the commands summarized below:

Element	Command
Title / subtitle of the plot	`ax.set_title('text', loc, pad)` `plt.suptitle('text', x, y, size, ha)`
Title of the x / y axis	`ax.set_xlabel('text')` / `ax.set_ylabel('text')`
Title of the size / color	`ax.get_legend_handles_labels()`
Caption of the plot	`ax.text('text', x, y, fontsize)`

This results in the following plot:



❒ **Double axes** – A plot can have more than one axis with the `plt.twinx()` command. It is done as follows:

```
Python
ax2 = plt.twinx()
```

❒ **Figure saving** – There are two main steps to save a plot:

- Specifying the width and height of the plot when declaring the figure:

```
Python
f, ax = plt.subplots(1, figsize=(width, height))
```

- Saving the figure itself:

```
Python
f.savefig(fname)
```