Visualization in Python

INTRODUCTION TO PYTHON FOR FINANCE

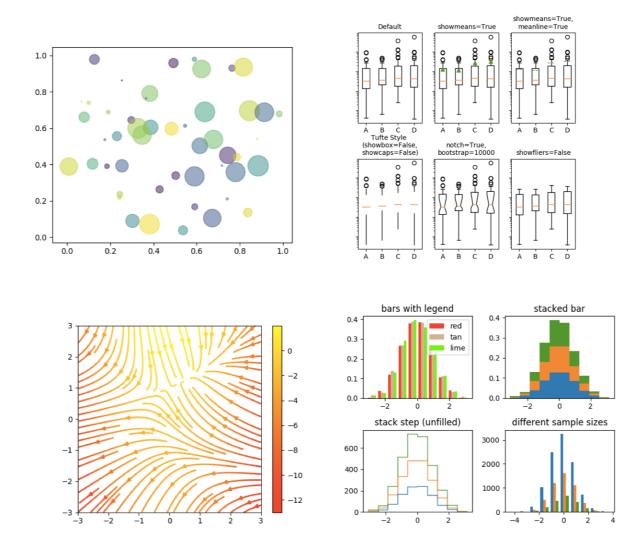


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Matplotlib: A visualization package

See more of the Matplotlib gallery by clicking this link.



matplotlib.pyplot - diverse plotting functions

import matplotlib.pyplot as plt



matplotlib.pyplot - diverse plotting functions

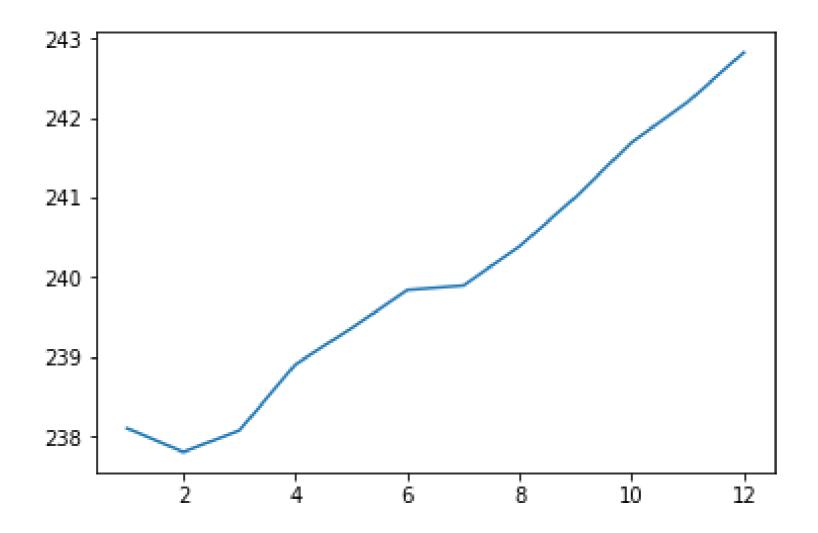
- plt.plot()
 - takes arguments that describe the data to be plotted
- plt.show()
 - displays plot to screen

Plotting with pyplot

```
import matplotlib.pyplot as plt
plt.plot(months, prices)
plt.show()
```



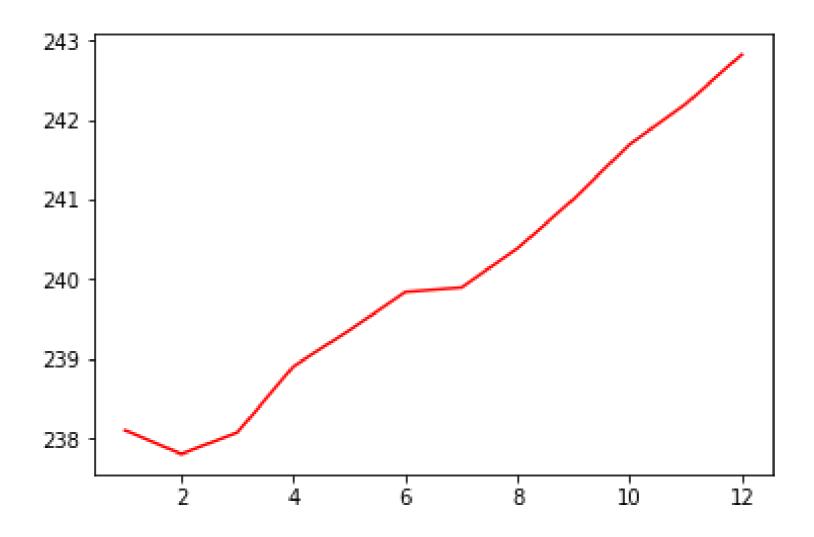
Plot result



Red solid line

```
import matplotlib.pyplot as plt
plt.plot(months, prices, color = 'red')
plt.show()
```

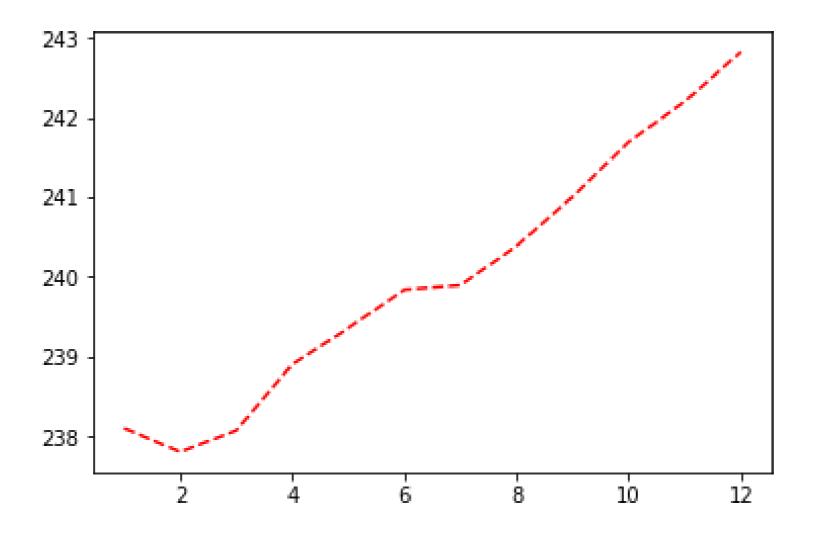
Plot result



Dashed line

```
import matplotlib.pyplot as plt
plt.plot(months, prices, color = 'red', linestyle = '--')
plt.show()
```

Plot result



Colors and linestyles

	color
'green'	green
'red'	red
'cyan'	cyan
'blue'	blue

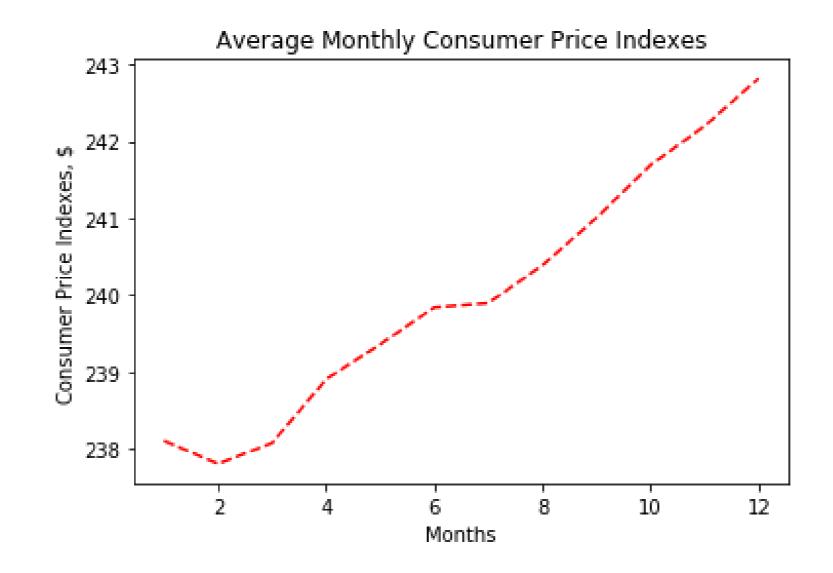
More documentation on colors and lines can be found here.

	linestyle
'_'	solid line
''	dashed line
''	dashed dot line
'.' •	dotted

Adding Labels and Titles

```
import matplotlib.pyplot as plt
plt.plot(months, prices, color = 'red', linestyle = '--')
# Add labels
plt.xlabel('Months')
plt.ylabel('Consumer Price Indexes, $')
plt.title('Average Monthly Consumer Price Indexes')
# Show plot
plt.show()
```

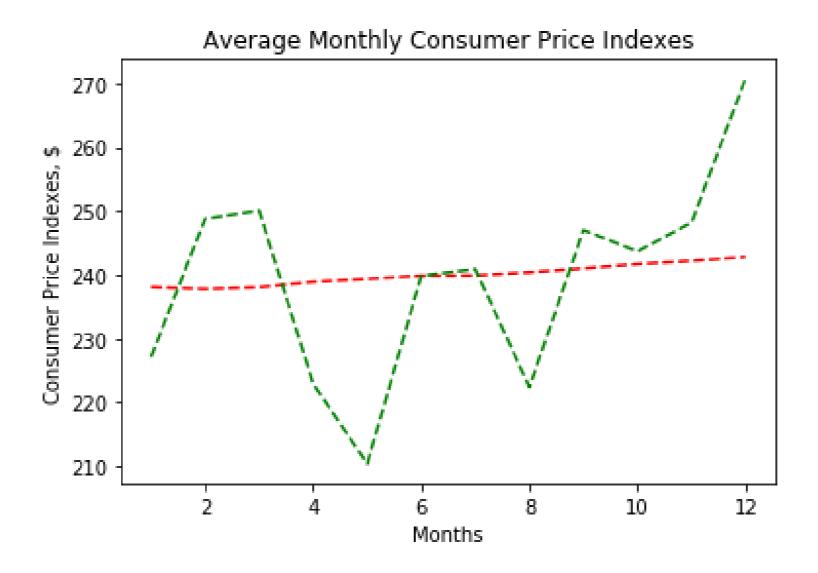
Plot result



Adding additional lines

```
import matplotlib.pyplot as plt
plt.plot(months, prices, color = 'red', linestyle = '--')
# adding an additional line
plt.plot(months, prices_new, color = 'green', linestyle = '--')
plt.xlabel('Months')
plt.ylabel('Consumer Price Indexes, $')
plt.title('Average Monthly Consumer Price Indexes')
plt.show()
```

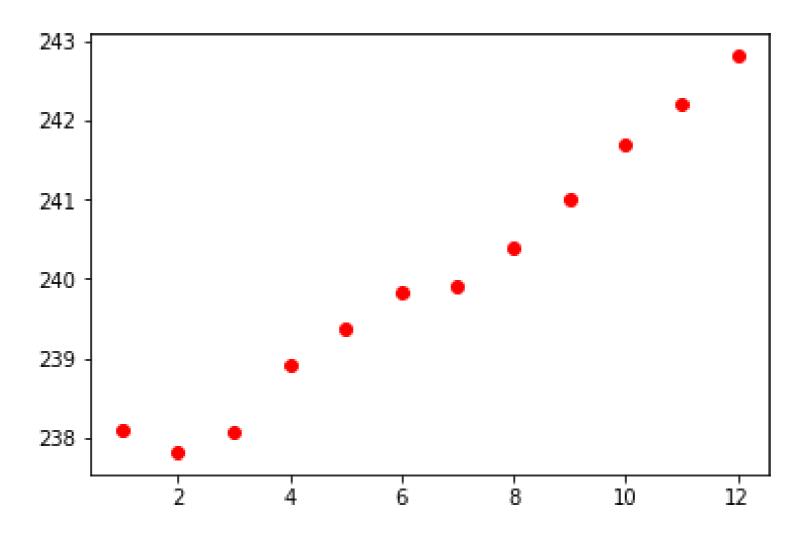
Plot result



Scatterplots

```
import matplotlib.pyplot as plt
plt.scatter(x = months, y = prices, color = 'red')
plt.show()
```

Scatterplot result



Let's practice!

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Histograms

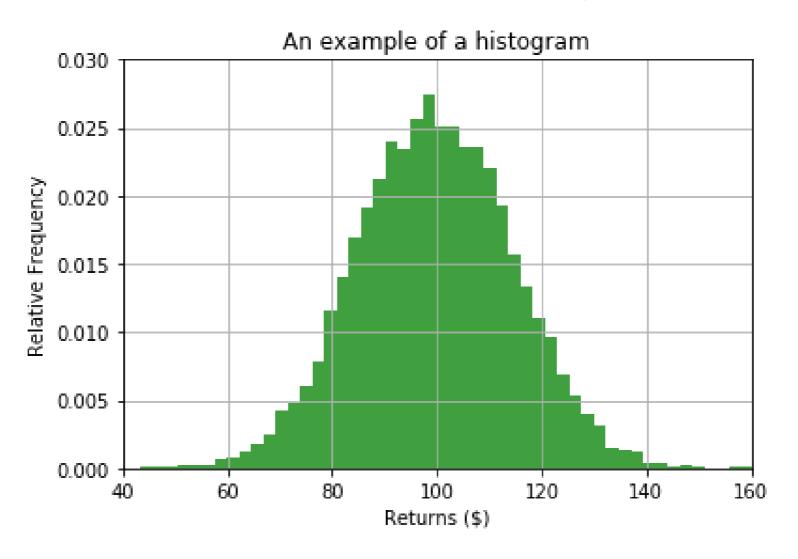
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Why histograms for financial analysis?



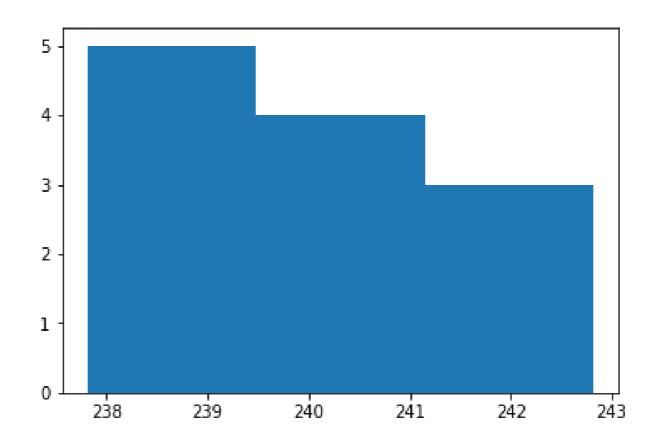
Histograms and Data

- Is your data skewed?
- Is your data centered around the average?
- Do you have any abnormal data points (outliers) in your data?



Histograms and matplotlib.pyplot

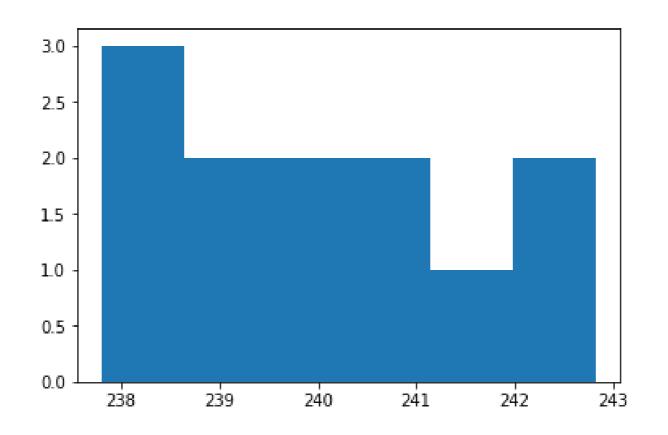
```
import matplotlib.pyplot as plt
plt.hist(x=prices, bins=3)
plt.show()
```





Changing the number of bins

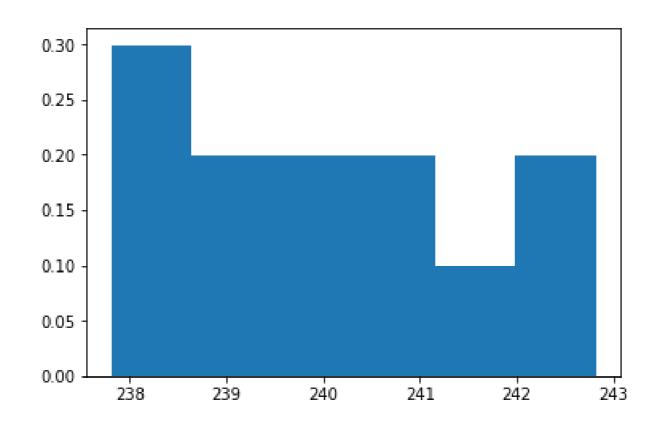
```
import matplotlib.pyplot as plt
plt.hist(prices, bins=6)
plt.show()
```





Normalizing histogram data

```
import matplotlib.pyplot as plt
plt.hist(prices, bins=6, normed=1)
plt.show()
```

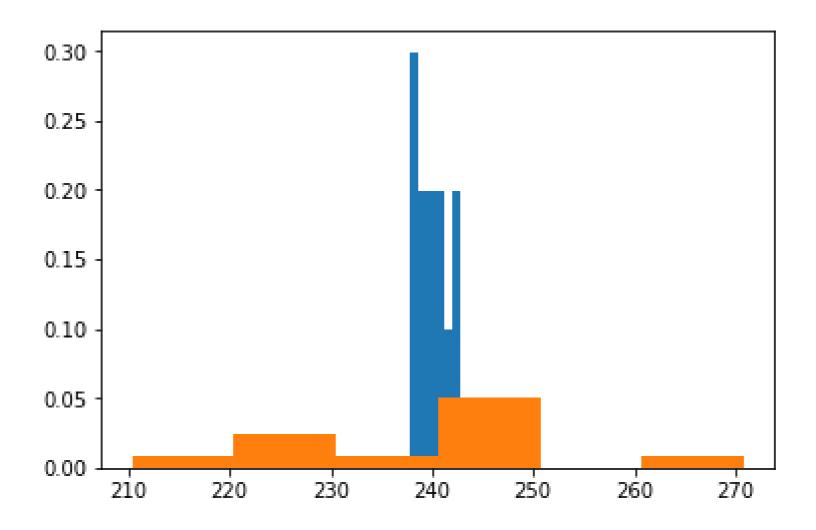




Layering histograms on a plot

```
import matplotlib.pyplot as plt
plt.hist(x=prices, bins=6, normed=1)
plt.hist(x=prices_new, bins=6, normed=1)
plt.show()
```

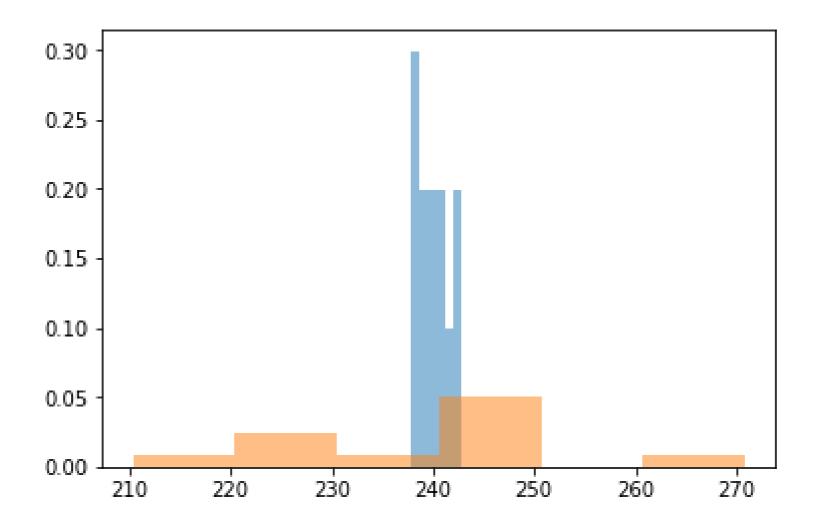
Histogram result



Alpha: Changing transparency of histograms

```
import matplotlib.pyplot as plt
plt.hist(x=prices, bins=6, normed=1, alpha=0.5)
plt.hist(x=prices_new, bins=6, normed=1, alpha=0.5)
plt.show()
```

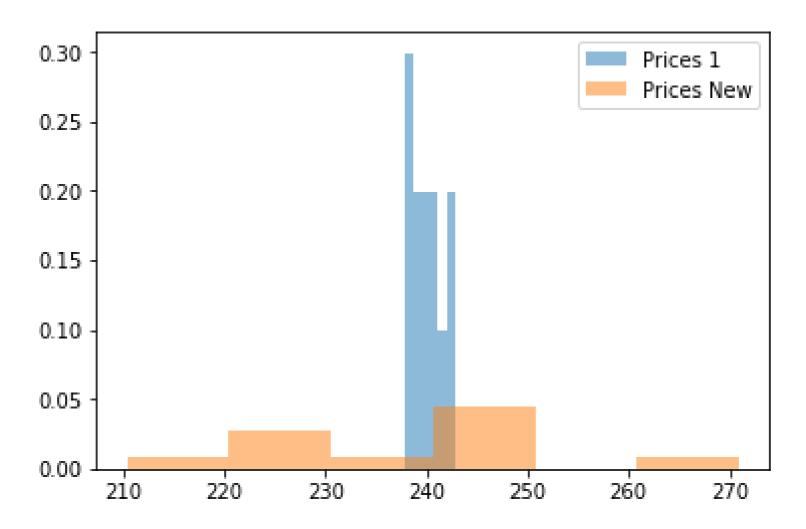
Histogram result



Adding a legend

```
import matplotlib.pyplot as plt
plt.hist(x=prices, bins=6, normed=1, alpha=0.5, label="Prices 1")
plt.hist(x=prices_new, bins=6, normed=1, alpha=0.5, label="Prices New")
plt.legend()
plt.show()
```

Histogram result



Let's practice!

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