INTRO TO PYTHON FOR FINANCE

# Visualization in Python

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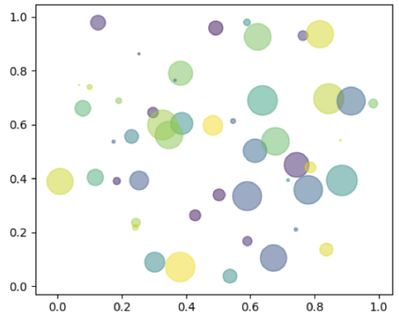
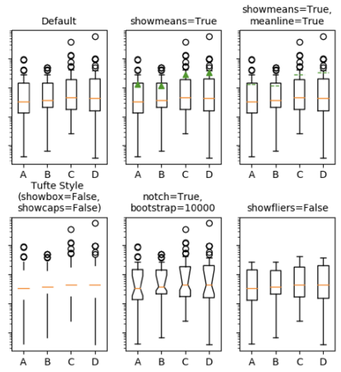
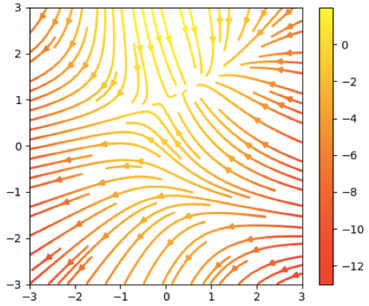
Instructor

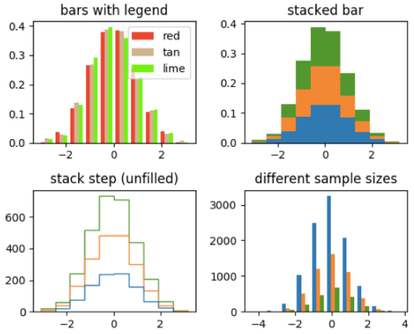
# Matplotlib: A visualization package

See more of the Matplotlib gallery by clicking this link.







# matplotlib.pyplot - diverse plotting functions

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

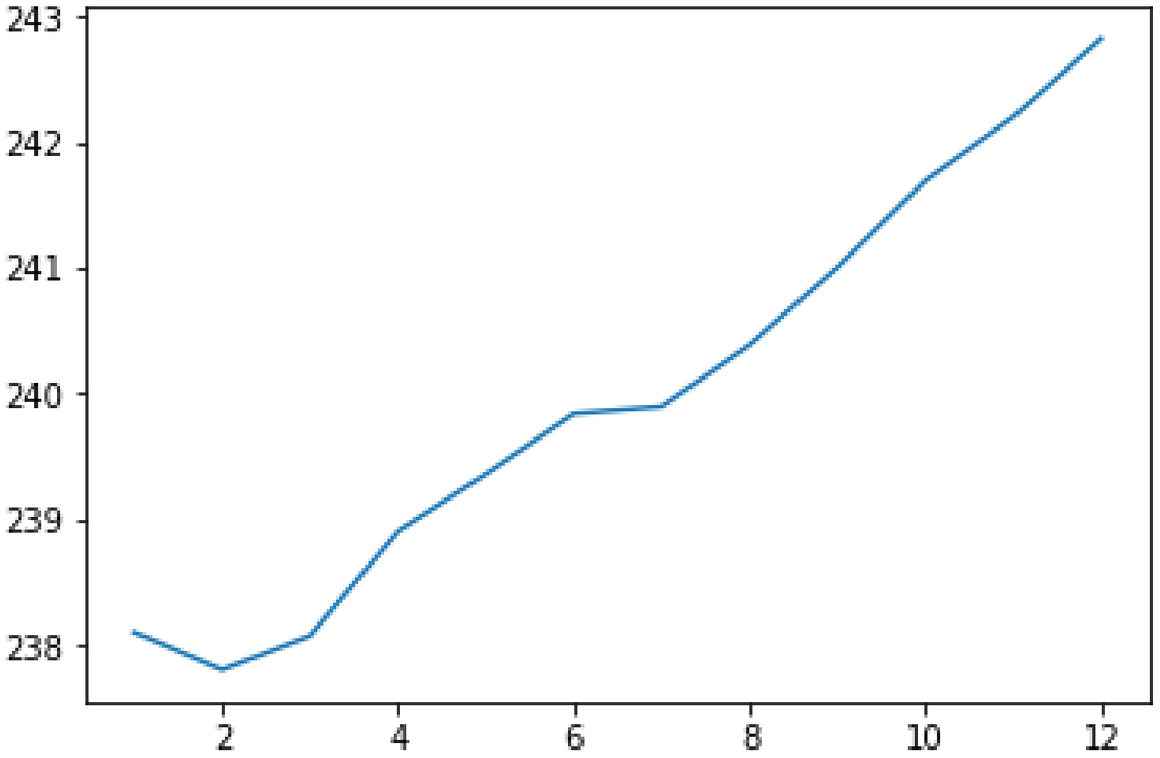
# matplotlib.pyplot - diverse plotting functions

- `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()
```

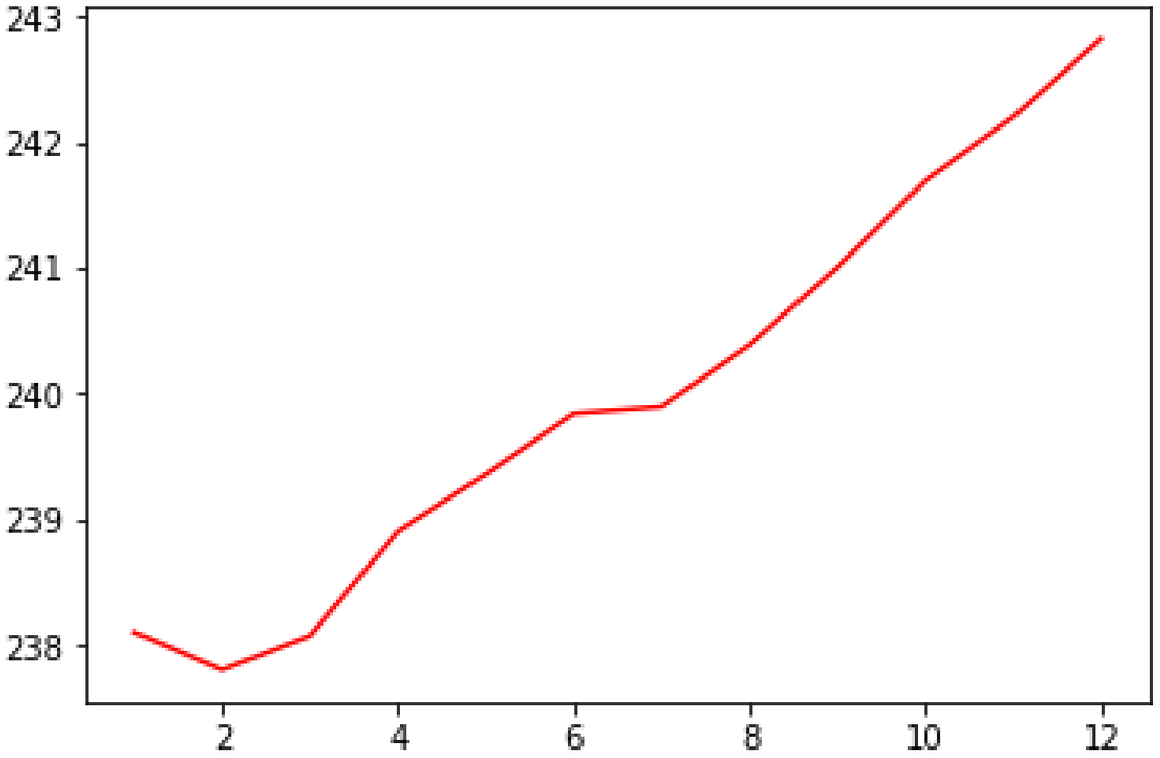
# Plot result



# Red solid line

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

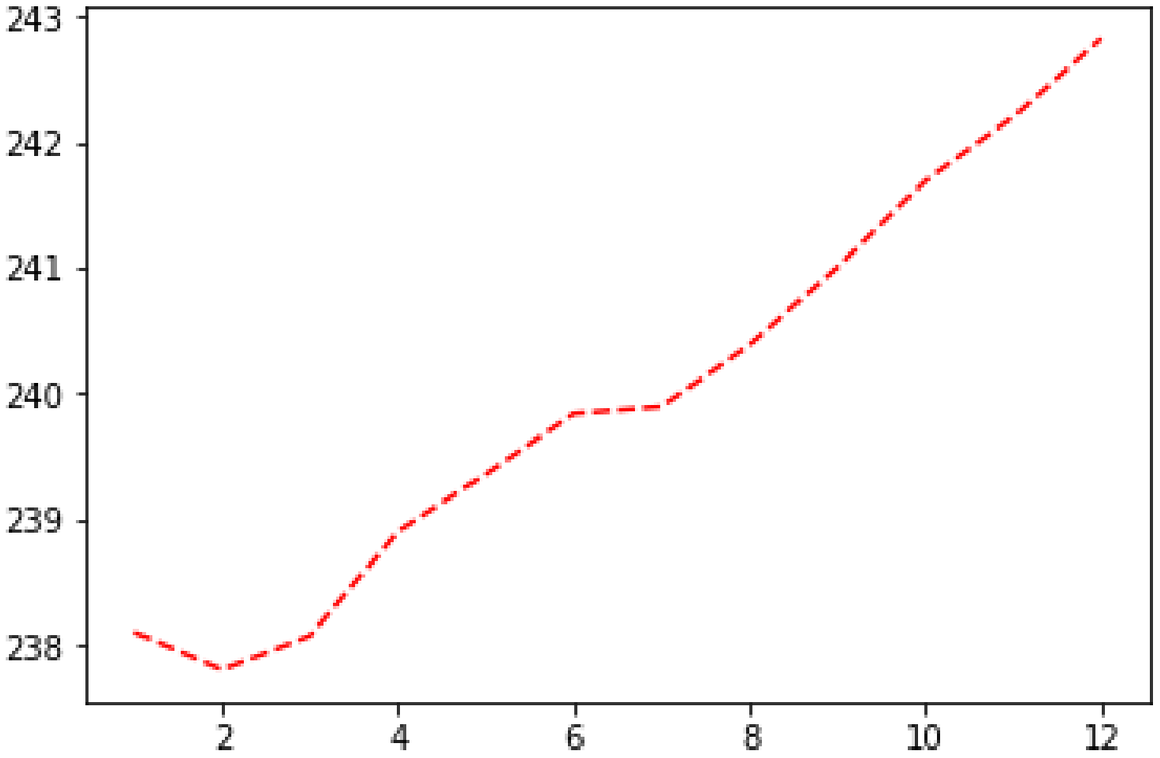
# Plot result



# 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 |

| | linestyle |
|---|---|
| '-' | solid line |
| '--' | dashed line |
| '-.' | dashed dot line |
| ':' | dotted |

More documentation on colors and lines can be found here.

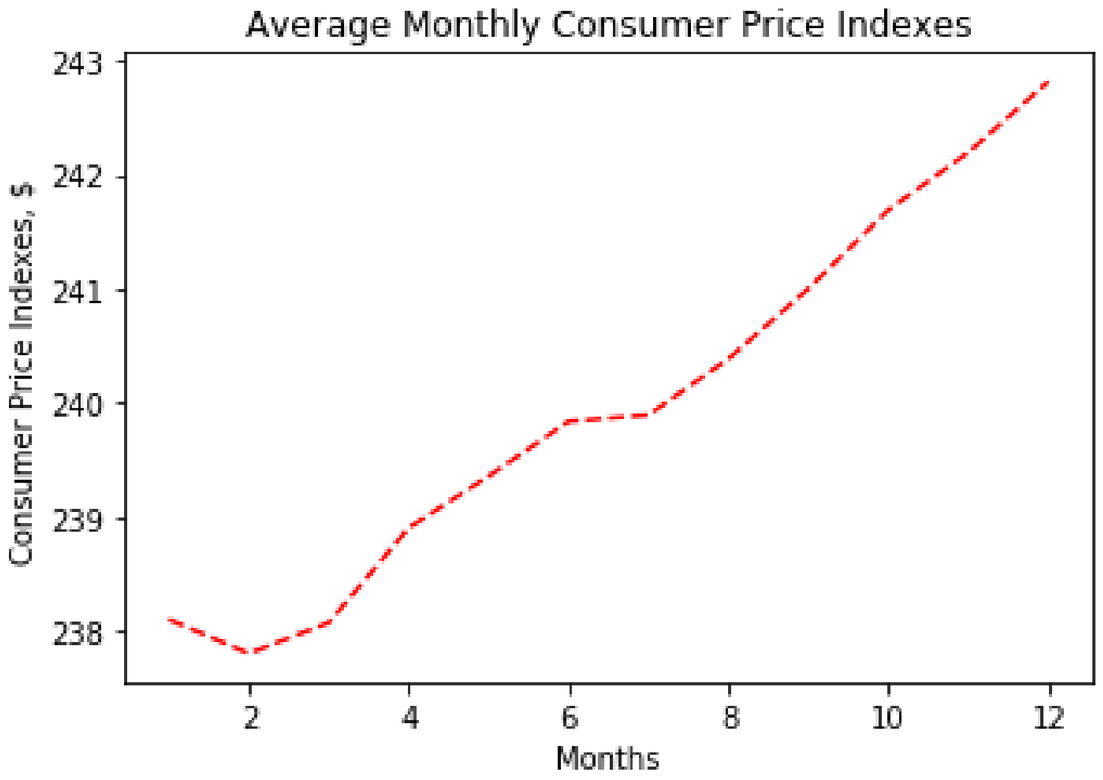
# Adding Labels and Titles

```
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


Average Monthly Consumer Price Indexes
Consumer Price Indexes, $
243
242
241
240
239
238
2
4
6
8
10
12
Months

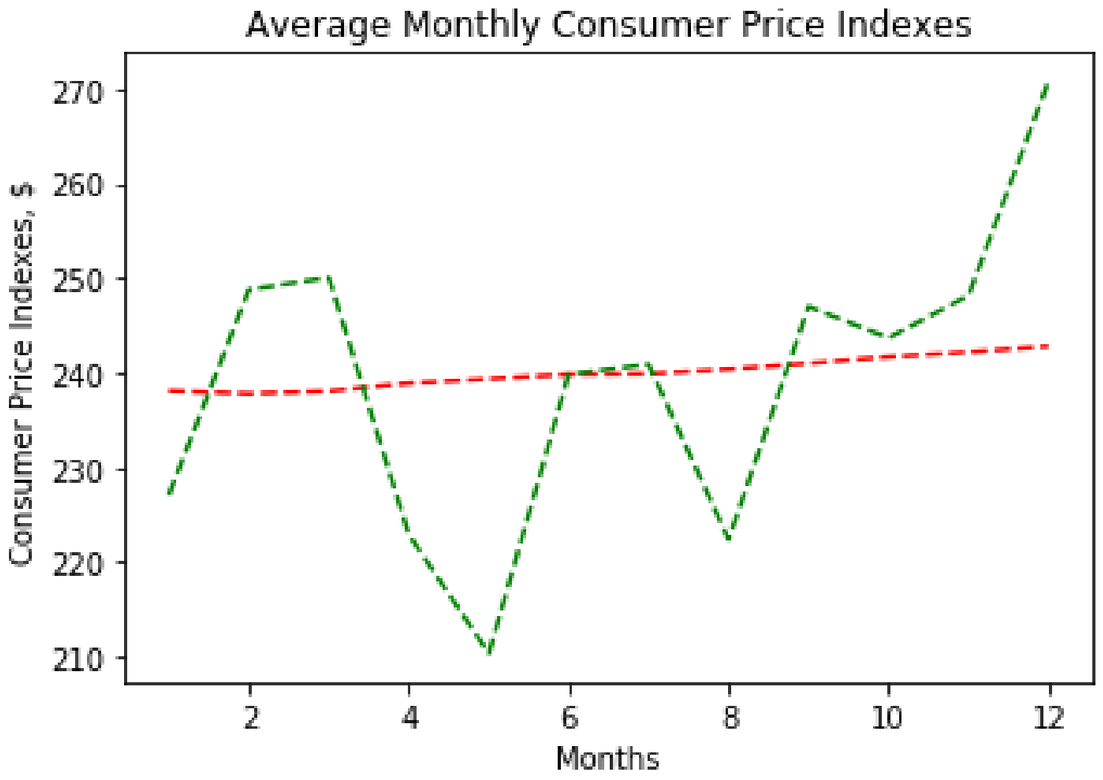
# Adding additional lines

```
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()
```

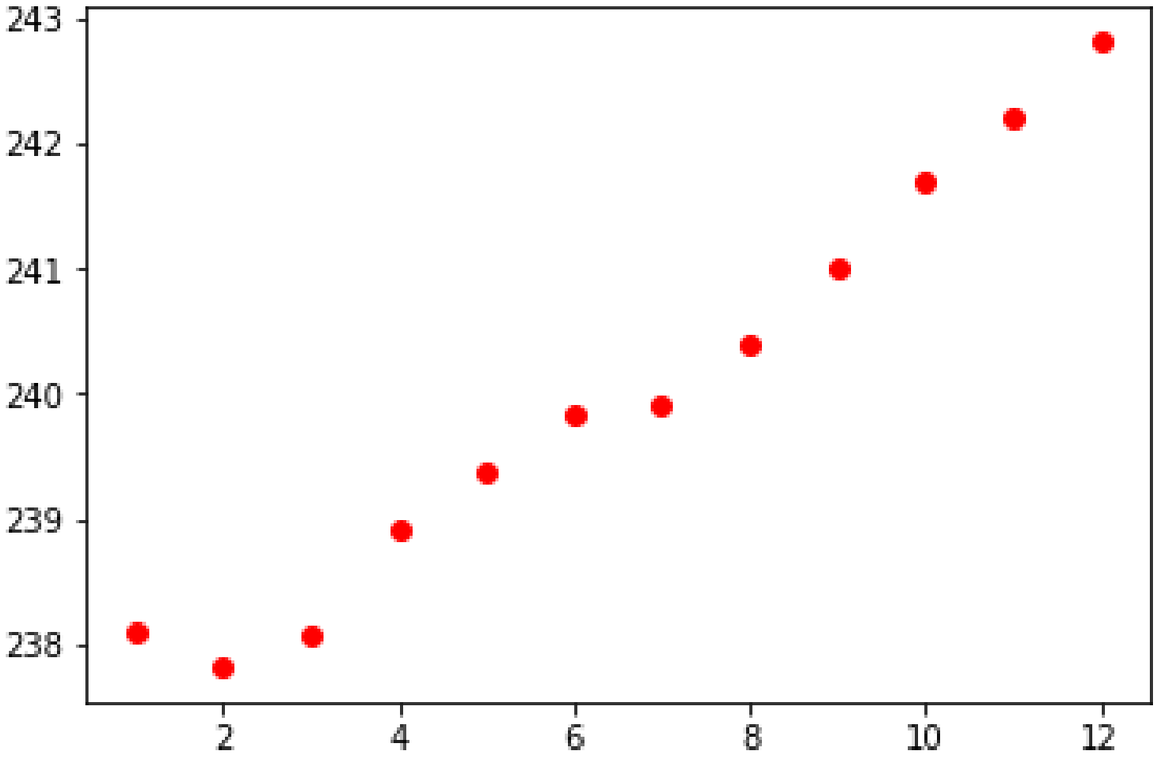
# Plot result


Average Monthly Consumer Price Indexes
Consumer Price Indexes, $
270
260
250
240
230
220
210
2
4
6
8
10
12
Months

# Scatterplots

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

# Scatterplot result



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# Let's practice!

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# Histograms

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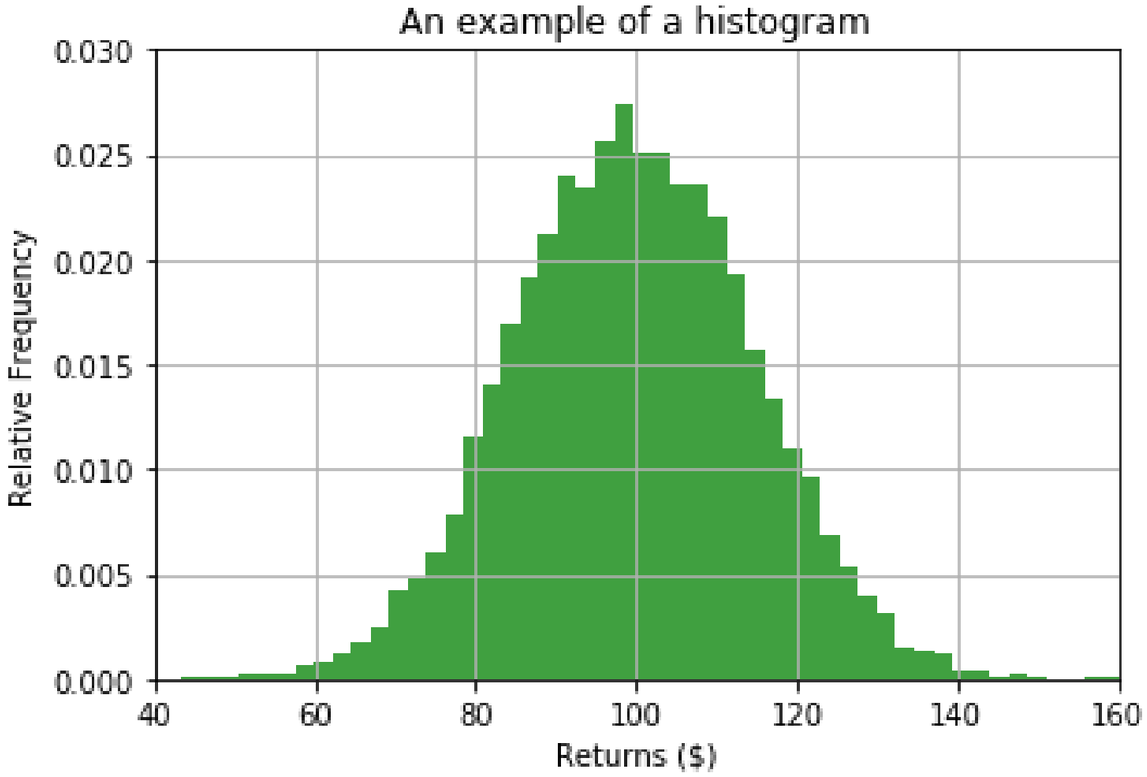
Instructor

# Why histograms for financial analysis?

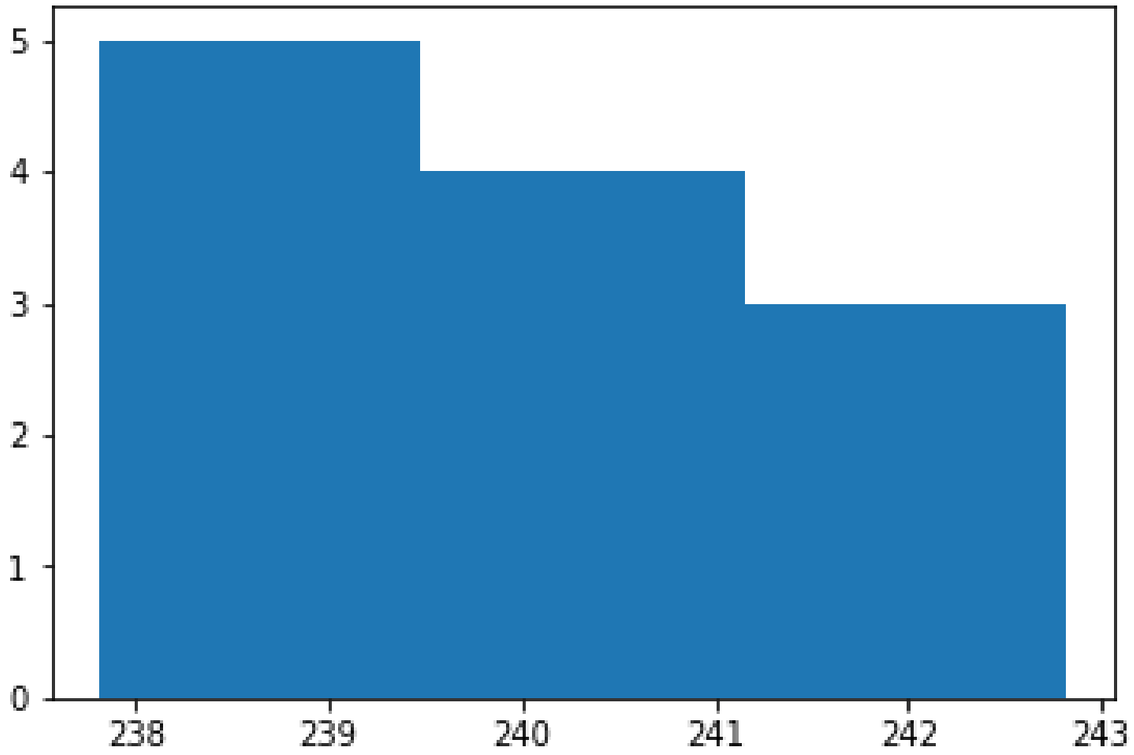


# Histograms and Data

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

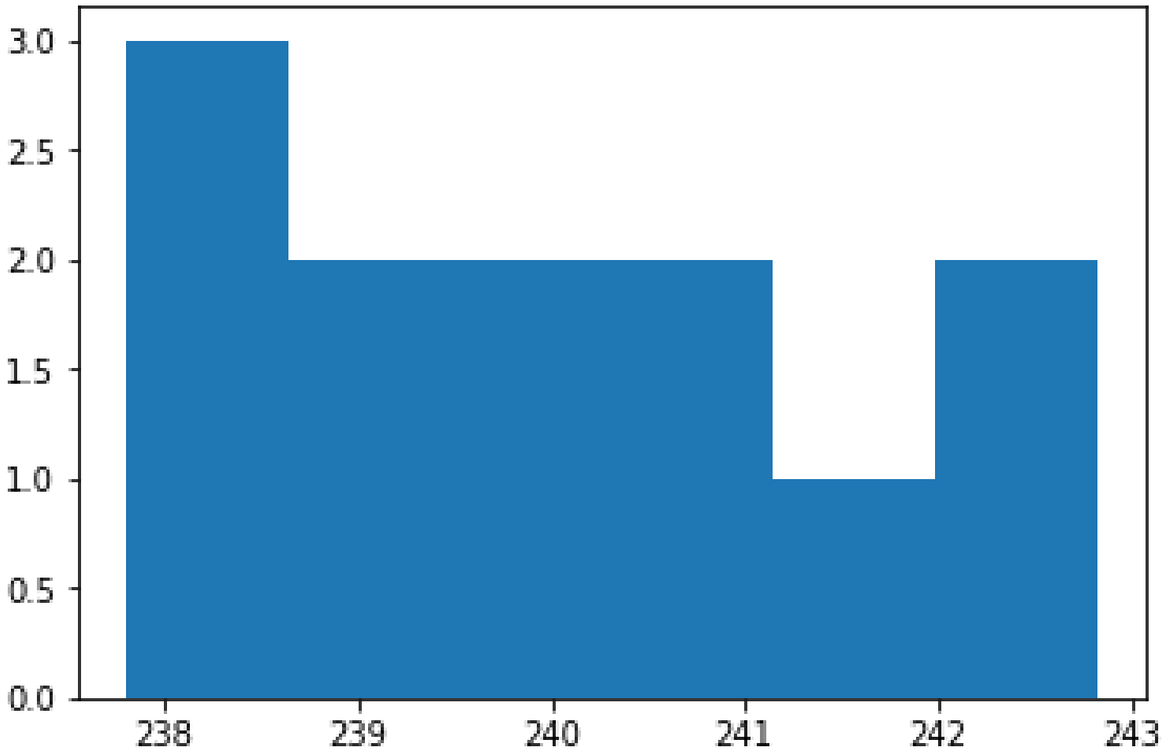
# Histograms and matplotlib.pyplot

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



# Changing the number of bins

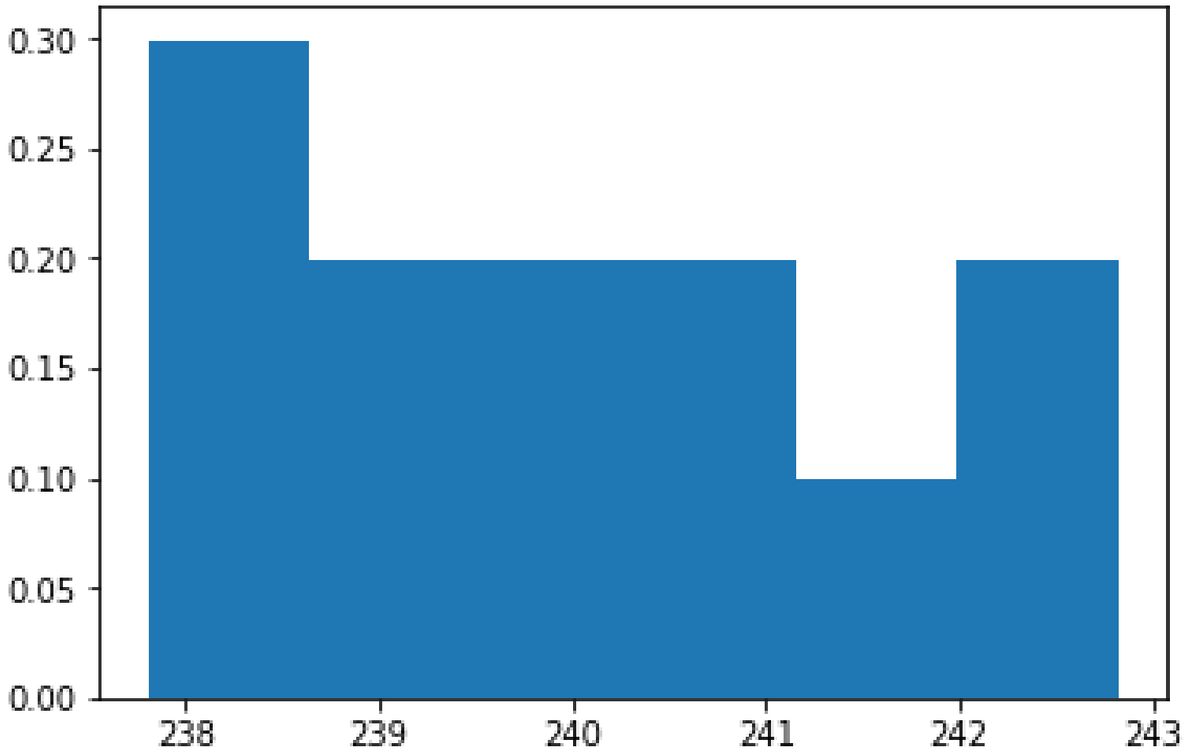
```
import matplotlib.pyplot as plt
plt.hist(prices, bins=6)
plt.show()
```



# Normalizing histogram data

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

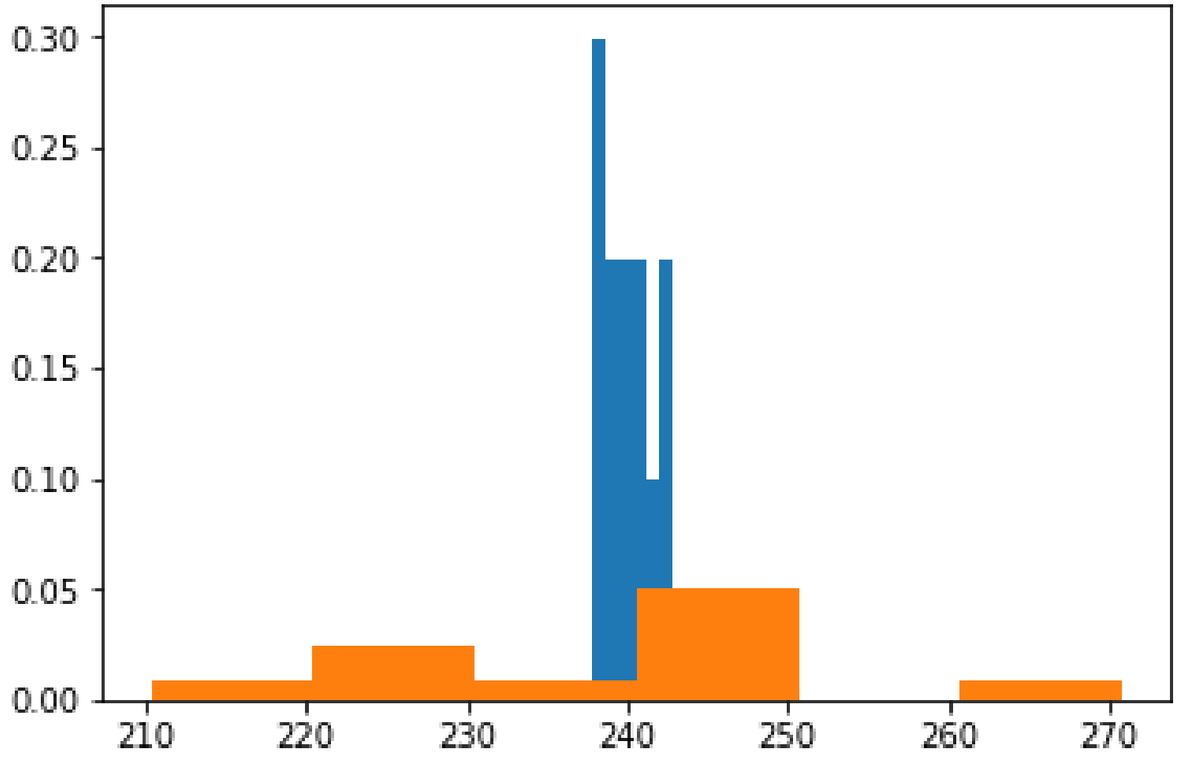
To normalize the frequency to one, you add the argument normed = 1.



# 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

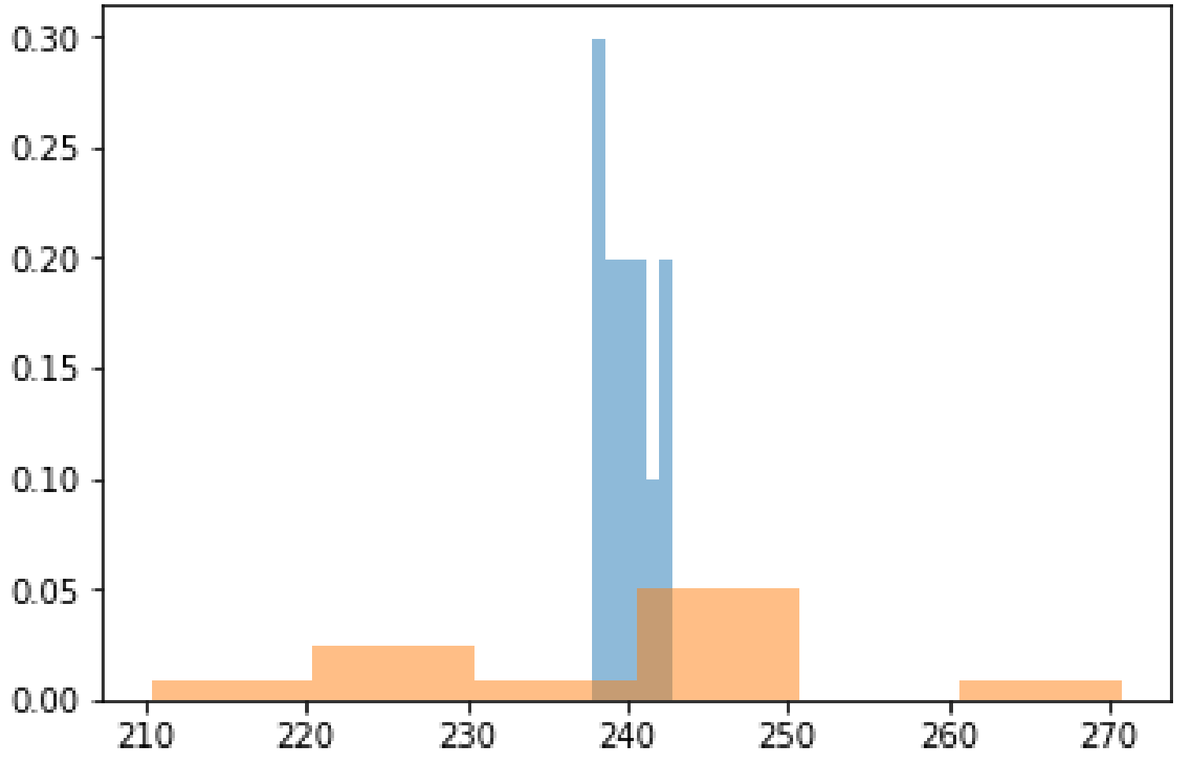


# Alpha: Changing transparency of histograms

```
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()
```

change the transparency of histograms

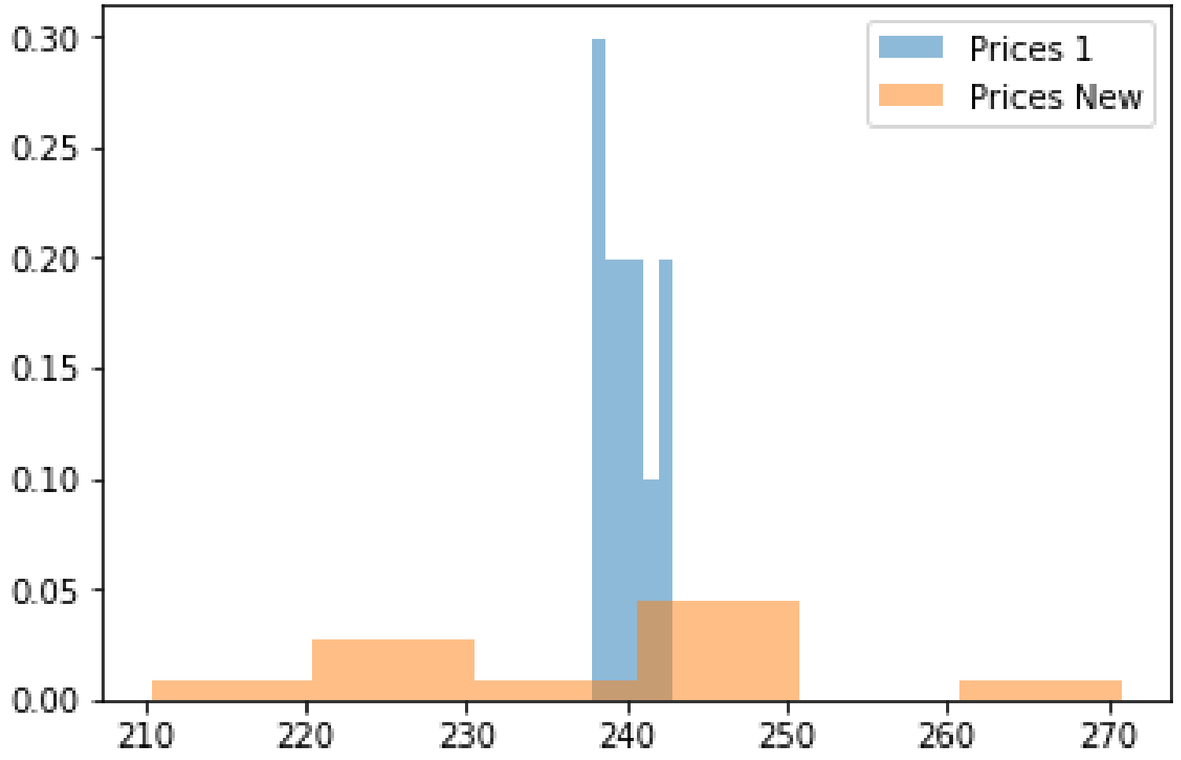
# Histogram result



# 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



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# Let's practice!