

Exercises

Level 9: Data Visualization

All the exercises in this level should be done using Anaconda/JupyterLab. Each exercise should be in its own Notebook, with subparts as individual cells. You should submit the actual Notebooks (.ipynb) files from Jupyter.

Pandas Plotting

- 1) Create a DataFrame containing the **sin** of all 1/10 numbers from 0 to 50. Plot this 'sine wave' using Panda's **plot** method.
- 2) Create a DataFrame of 1,000,000 normally distributed random values. Plot a histogram using Pandas **hist** method. Test with several different values for **bins** – how do different numbers of bins affect the shape of the chart?

Matplotlib

- 3) This exercise uses the derived data created in level 7, exercise 12. You should do the following:
 - a. Plot the volume-weighted average daily returns using a line chart.
 - b. Plot the moving average daily return in a separate line chart. Try using different moving windows and a gaussian smoother to see what gives you the best line without losing too much granularity.
 - c. Overlay the plots from **a** and **b**.
 - d. Plot the moving average volume on the same plot.
- 4) This exercise uses the derived data created in level 7, exercise 12. You should do the following:
 - a. Plot the distribution of daily volume using a histogram. Pick the ideal number of bins.
 - b. Plot the distribution of daily volume for each of the two years, using a histogram. You should have two overlaying histograms on the same plot.
- 5) This exercise uses the derived data created in level 7, exercise 13. You should do the following:
 - a. Plot cumulative PnL for each ticker from your portfolio, on the same plot. **Hint:** Use DataFrame pivoting functionality.
 - b. Create a scatter plot of PnL per ticker, year 1 vs year 2. Use different color points for each ticker, and use alpha as appropriate.

Plotly

- 6) Do the same as exercise 3-5, but using Plotly. Try with and without pivoting the table (Hint: use the **color** parameter). What are the evident benefits of using Plotly here over matplotlib?
- 7) Do the same as exercise 6, but using Plotly Express.
- 8) Do the same as exercise 6, but using Plotly FigureWidget. Create a dropdown box that allows for selection of ticker, and update the FigureWidget anytime a new ticker is selected.