Portfolio Risk Analysis (sample)
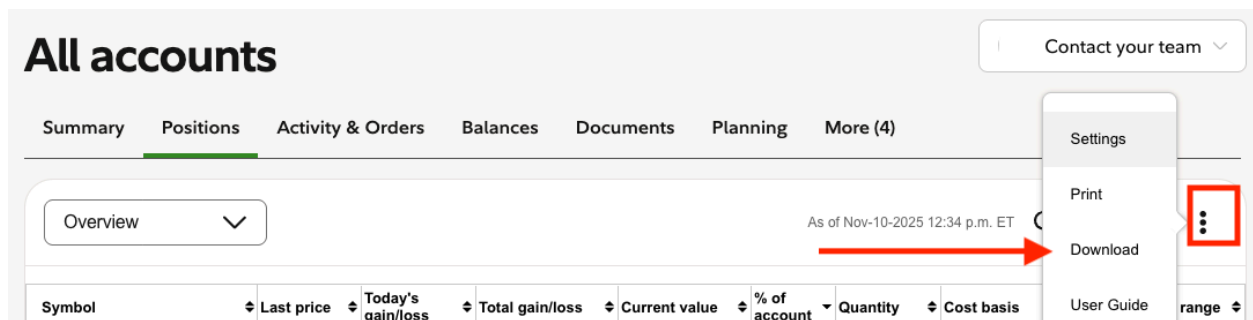
TLDR: Calculate the risk characteristics for a portfolio, e.g.using easily downloaded portfolio information from Fidelity. In this example, I calculate the correlation, beta (relative to SP500, and Value at Risk

Download your Portfolio from Fidelity as a CSV:

The result will be a CSV file called something like:
'`Portfolio_Positions_MM-DD-YYYY.csv`'.

Convert the CSV to a clean data CSV:

You may need to install python and some libraries. Clean up the data to generate a new CSV as that file is not ready to be used for analysis:
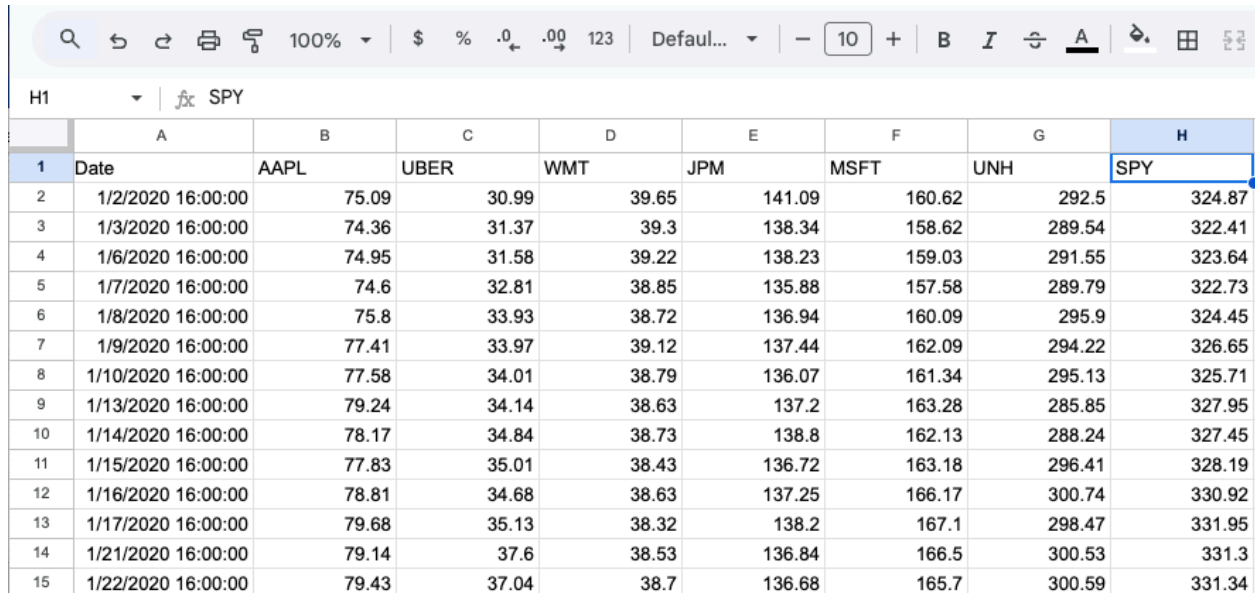
'`python process_portfolio.py`'.

MANUAL STEP - Create a CSV with historical price data for you portfolio (use gSheet GoogleFinance function):

```
=GOOGLEFINANCE(A2,"price",DATE(YEAR(TODAY())-5,1,1),TODAY(),"daily")
```

See Example Output in: '**sample_history.csv**':

	A	B	C	D	E	F	G	H
1	Date	AAPL	UBER	WMT	JPM	MSFT	UNH	SPY
2	1/2/2020 16:00:00	75.09	30.99	39.65	141.09	160.62	292.5	324.87
3	1/3/2020 16:00:00	74.36	31.37	39.3	138.34	158.62	289.54	322.41
4	1/6/2020 16:00:00	74.95	31.58	39.22	138.23	159.03	291.55	323.64
5	1/7/2020 16:00:00	74.6	32.81	38.85	135.88	157.58	289.79	322.73
6	1/8/2020 16:00:00	75.8	33.93	38.72	136.94	160.09	295.9	324.45
7	1/9/2020 16:00:00	77.41	33.97	39.12	137.44	162.09	294.22	326.65
8	1/10/2020 16:00:00	77.58	34.01	38.79	136.07	161.34	295.13	325.71
9	1/13/2020 16:00:00	79.24	34.14	38.63	137.2	163.28	285.85	327.95
10	1/14/2020 16:00:00	78.17	34.84	38.73	138.8	162.13	288.24	327.45
11	1/15/2020 16:00:00	77.83	35.01	38.43	136.72	163.18	296.41	328.19
12	1/16/2020 16:00:00	78.81	34.68	38.63	137.25	166.17	300.74	330.92
13	1/17/2020 16:00:00	79.68	35.13	38.32	138.2	167.1	298.47	331.95
14	1/21/2020 16:00:00	79.14	37.6	38.53	136.84	166.5	300.53	331.3
15	1/22/2020 16:00:00	79.43	37.04	38.7	136.68	165.7	300.59	331.34

The above shows 7 holdings and uses SPY (SP500) as the baseline measurement. It is a daily CLOSE price for the last 5 years.

See this Example Google Sheet

Install Python and ability to run Notebook:

```
First, we import the necessary libraries. If you don't have them installed, you can
install them using pip:

```
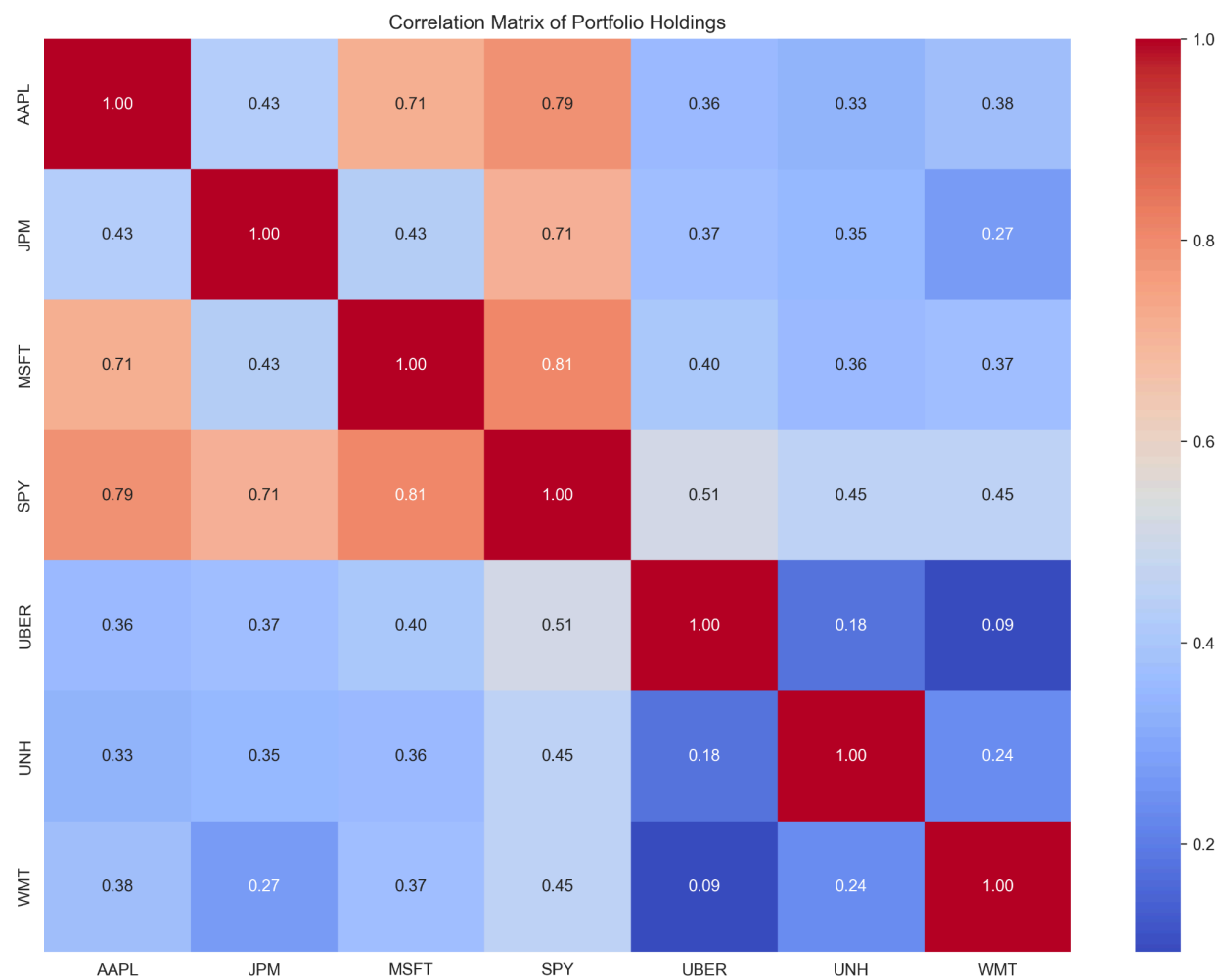pip install pandas yfinance numpy matplotlib seaborn
```

BUT yFinance no longer allows you to download stock history?

Correlation Results:

As expected MSFT is somewhat correlated to APPL and Uber is not very correlated to WMT.

Correlation Matrix of Portfolio Holdings

	AAPL	JPM	MSFT	SPY	UBER	UNH	WMT
AAPL	1.00	0.43	0.71	0.79	0.36	0.33	0.38
JPM	0.43	1.00	0.43	0.71	0.37	0.35	0.27
MSFT	0.71	0.43	1.00	0.81	0.40	0.36	0.37
SPY	0.79	0.71	0.81	1.00	0.51	0.45	0.45
UBER	0.36	0.37	0.40	0.51	1.00	0.18	0.09
UNH	0.33	0.35	0.36	0.45	0.18	1.00	0.24
WMT	0.38	0.27	0.37	0.45	0.09	0.24	1.00

Annualized Volatility Calculations:

```
Annualized Volatility of Individual Stocks:
UBER     0.525295
UNH      0.335993
AAPL     0.321269
JPM      0.316129
MSFT     0.297795
WMT      0.229896
SPY      0.209902
dtype: float64
```

Beta Calculations:

```
Stock Betas relative to S&P 500 (SPY):
          Beta
UBER   1.277602
AAPL   1.202929
MSFT   1.143252
JPM    1.070472
UNH    0.724999
WMT    0.491409
```

Value a Risk (VaR) Calculations:

```
Daily Value at Risk (VaR) at 95% confidence level: -1.91%
This means that on any given day, there is a 5% chance of losing -3,297.30 or more.
```