**Quantitative Momentum Strategy**

"Momentum investing" means investing in the stocks that have increased in price the most.

For this project, we're going to build an investing strategy that selects the 50 stocks with the highest price momentum. From there, we will calculate recommended trades for an equal-weight portfolio of these 50 stocks.

# Performance of Stock

Just like in our first project, it's now time to execute several batch API calls and add the information we need to our DataFrame. Our stock’s performance on the surface, it looks great to see that a stock has returned 28% since the beginning of the year when viewing the starting price versus the ending price, but the stock was abnormally depressed on the third day let us look at the stock’s total returns that include all dividend or interest payments in addition to the price return and see if we can counter this.

In [7]:

final\_dataframe

**One-Year Price Number of Shares to Ticker Price**

**Return Buy**

1. A 129.10 0.617952 N/A
2. AAL 21.74 0.100404 N/A
3. AAP 164.94 0.217013 N/A
4. AAPL 129.08 0.81578 N/A
5. ABBV 109.93 0.336891 N/A

**...** ... ... ... ...

1. YUM 107.09 0.187428 N/A
2. ZBH 164.80 0.213114 N/A
3. ZBRA 515.84 1.379085 N/A
4. ZION 55.41 0.394375 N/A
5. ZTS 161.49 0.170235 N/A
6. rows × 4 columns

# Removing Low-Momentum Stocks

The investment strategy that we're building seeks to identify the 50 highest-momentum stocks in the S&P 500.

Because of this, the next thing we need to do is remove all the stocks in our DataFrame that fall below this momentum threshold. We'll sort the DataFrame by the stocks' one-year price return, and drop all stocks outside the top 50.

In [8]:

final\_dataframe

Out[8]:

**One-Year Price Number of Shares to Ticker Price**

**Return Buy**

1. FCX 36.10 2.426275 N/A
2. CARR 37.50 2.142797 N/A
3. VIAC 67.45 1.752779 N/A
4. ALGN 576.32 1.63132 N/A
5. LB 57.26 1.598107 N/A
6. SIVB 553.42 1.498511 N/A
7. PYPL 278.51 1.429478 N/A
8. ZBRA 515.84 1.379085 N/A
9. TWTR 79.29 1.332712 N/A
10. DE 363.17 1.314822 N/A
11. URI 314.91 1.275893 N/A
12. PWR 89.80 1.230708 N/A
13. CDNS 150.48 1.188517 N/A
14. ABMD 329.34 1.168701 N/A
15. KLAC 340.48 1.106801 N/A
16. DISCA 59.51 1.081846 N/A
17. NVDA 571.33 1.074003 N/A
18. AMAT 126.24 1.072816 N/A
19. IDXX 552.92 1.060077 N/A
20. LRCX 605.48 0.999353 N/A
21. NWSA 24.89 0.996205 N/A
22. ALB 159.26 0.987544 N/A
23. APTV 155.94 0.955028 N/A
24. NWS 24.75 0.908989 N/A
25. WST 294.42 0.90324 N/A
26. CMG 1497.99 0.89349 N/A
27. AMD 90.29 0.892483 N/A
28. EMN 112.83 0.880255 N/A
29. FDX 262.53 0.868205 N/A
30. TPR 42.00 0.860195 N/A
31. TSCO 166.19 0.856465 N/A
32. AVGO 491.05 0.839696 N/A
33. TGT 193.63 0.835477 N/A
34. UPS 169.07 0.816433 N/A
35. AAPL 129.08 0.81578 N/A
36. QCOM 140.91 0.814155 N/A
37. IPGP 233.54 0.810138 N/A
38. SWKS 188.07 0.803685 N/A
39. DISCK 50.03 0.800106 N/A
40. CAT 229.98 0.796812 N/A
41. SNPS 257.69 0.791972 N/A
42. MOS 31.54 0.77069 N/A
43. MS 81.37 0.766907 N/A
44. MU 98.57 0.765904 N/A
45. GPS 26.66 0.756193 N/A
46. QRVO 187.77 0.746254 N/A
47. MKTX 597.20 0.742575 N/A
48. MXIM 97.88 0.728017 N/A
49. CMI 275.90 0.725944 N/A
50. MCHP 161.80 0.725386 N/A
51. TTWO 193.25 0.724614 N/A

**Calculating the Number of Shares to Buy**

Just like in the last project, we now need to calculate the number of shares we need to buy. And we shall use a portfolio of 1000000

# Building a Better (and More Realistic) Momentum Strategy

Real-world quantitative investment firms differentiate between "high quality" and "low quality" momentum stocks:

High-quality momentum stocks show "slow and steady" outperformance over long periods of time

Low-quality momentum stocks might not show any momentum for a long time, and then surge upwards.

The reason why high-quality momentum stocks are preferred is because low-quality momentum can often be cause by short-term news that is unlikely to be repeated in the future (such as an FDA approval for a biotechnology company).

To identify high-quality momentum, we're going to build a strategy that selects stocks from the highest percentiles of:

1-month price returns

3-month price returns

6-month price returns

1-year price returns

Let's start by building our DataFrame. You'll notice that I use the abbreviation hqm often. It stands for high-quality momentum .

**15**

AEP

76.80

255

-0.137417

0.057426

-0.035518

0.164356

-0.114617

0.053465

-0.067551

0.09505

0.092574

# Calculating the HQM Score

We'll now calculate our HQM Score , which is the high-quality momentum score that we'll use to filter for stocks in this investing strategy.

The HQM Score will be the arithmetic mean of the 4 momentum percentile scores that we calculated in the last section.

To calculate arithmetic mean, we will use the mean function from Python's built-in statistics module.

# Selecting the 50 Best Momentum Stocks

As before, we can identify the 50 best momentum stocks in our universe by sorting the DataFrame on the HQM Score column and dropping all but the top 50 entries.

# Calculating the Number of Shares to Buy

We'll use the portfolio\_input function that we created earlier to accept our portfolio size. Then we will use similar logic in a for loop to calculate the number of shares to buy for each stock in our investment universe. we shall start with a portfolio of 10000000

In [63]:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | | | | | | | | | | Out[63]: | | |
|  | | | | | |  | |  | |  | |  | |  | |  | |  | | |  |
|  | **Ticker** | **Price** | **Number of**  **Shares to**  **Buy** | **One-Year**  **Price**  **Return** | **One-Year**  **Return**  **Percentile** | | **Six-Month**  **Price**  **Return** | | **Six-Month**  **Return**  **Percentile** | | **Three-**  **Month Price**  **Return** | | **Three-Month**  **Return**  **Percentile** | | **One-Month**  **Price**  **Return** | | **One-Month**  **Return**  **Percentile** | | | **HQM**  **Score** | |
| **0** | A | 129.22 | 151 | 0.626366 | 0.857426 | | 0.223391 | | 0.582178 | | 0.046257 | | 0.459406 | | 0.016172 | | 0.39802 | | | 0.574257 | |
| **1** | AAL | 21.58 | 908 | 0.103552 | 0.293069 | | 0.605047 | | 0.879208 | | 0.486700 | | 0.972277 | | 0.225589 | | 0.906931 | | | 0.762871 | |
| **2** | AAP | 166.62 | 117 | 0.219691 | 0.455446 | | 0.029416 | | 0.283168 | | 0.088266 | | 0.538614 | | 0.076656 | | 0.60396 | | | 0.470297 | |
| **3** | AAPL | 131.93 | 148 | 0.793077 | 0.928713 | | -0.058119 | | 0.136634 | | 0.020822 | | 0.384158 | | -0.081234 | | 0.059406 | | | 0.377228 | |
| **4** | ABBV | 109.21 | 179 | 0.337721 | 0.609901 | | 0.159697 | | 0.493069 | | 0.043832 | | 0.447525 | | 0.053105 | | 0.526733 | | | 0.519307 | |
| **5** | ABC | 106.14 | 184 | 0.222375 | 0.463366 | | 0.052800 | | 0.318812 | | -0.014312 | | 0.281188 | | -0.025759 | | 0.229703 | | | 0.323267 | |
| **6** | ABMD | 336.26 | 58 | 1.178738 | 0.976238 | | 0.057337 | | 0.324752 | | 0.186186 | | 0.736634 | | -0.069574 | | 0.089109 | | | 0.531683 | |
| **7** | ABT | 124.56 | 157 | 0.598829 | 0.843564 | | 0.103749 | | 0.407921 | | 0.115385 | | 0.592079 | | -0.032092 | | 0.205941 | | | 0.512376 | |
| **8** | ACN | 262.35 | 74 | 0.415081 | 0.70297 | | 0.054189 | | 0.322772 | | 0.010921 | | 0.348515 | | 0.037421 | | 0.471287 | | | 0.461386 | |
| **9** | ADBE | 487.71 | 40 | 0.336628 | 0.605941 | | -0.108597 | | 0.067327 | | -0.040345 | | 0.223762 | | 0.001974 | | 0.340594 | | | 0.309406 | |
| **10** | ADI | 159.47 | 122 | 0.479387 | 0.766337 | | 0.345684 | | 0.706931 | | 0.132423 | | 0.635644 | | 0.064604 | | 0.576238 | | | 0.671287 | |
| **11** | ADM | 57.40 | 341 | 0.555144 | 0.815842 | | 0.283957 | | 0.659406 | | 0.147119 | | 0.659406 | | 0.140958 | | 0.762376 | | | 0.724257 | |
| **12** | ADP | 177.50 | 110 | 0.154690 | 0.360396 | | 0.277642 | | 0.649505 | | 0.006398 | | 0.336634 | | 0.056172 | | 0.534653 | | | 0.470297 | |
| **13** | ADSK | 297.02 | 66 | 0.456424 | 0.744554 | | 0.125347 | | 0.445545 | | -0.015344 | | 0.279208 | | -0.005406 | | 0.285149 | | | 0.438614 | |
| **14** | AEE | 73.88 | 265 | -0.094979 | 0.079208 | | -0.108514 | | 0.069307 | | -0.091597 | | 0.093069 | | -0.035317 | | 0.19604 | | | 0.109406 | |