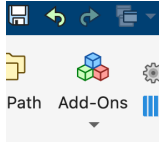


# Find the NASDAQ 100 Winner and Loser

We will read the stock prices of the NASDAQ 100 to find 2024 Q1's winner, loser, most volatile and least volatile stocks.

## Getting the right add-on

First, we have to add the `hist_stock_data` add on to MATLAB. We do this using the "Add-Ons" button.



## Next we use `hist_stock_data`

Use `hist_stock_data` to get the stock prices for the NASDAQ 100 for the first quarter of 2024. The first quarter runs from January 1, 2024 to March 31, 2024.

The stock tickers for the NASDAQ 100 are stored in the file `NASDAQ100.txt` provided with the assignment. To save time on multiple runs, we only load the data if we haven't already read it in this session.

```
stocks = 1x101 struct
```

Field s	Ticker	Date	Open	High	Low	Close	AdjClose	Volume
1	'AAPL'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
2	'ABNB'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
3	'ADBE'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
4	'ADI'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
5	'ADP'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
6	'ADSK'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
7	'AEP'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
8	'AMAT'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
9	'AMD'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
10	'AMGN'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
11	'AMZN'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
12	'ANSS'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
13	'ASML'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
14	'AVGO'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
15	'AZN'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
16	'BIIB'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
17	'BKNG'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
18	'BKR'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double

Field s	Ticker	Date	Open	High	Low	Close	AdjClose	Volume
19	'CCEP'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
20	'CDNS'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
21	'CDW'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
22	'CEG'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
23	'CHTR'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
24	'CMCSA'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
25	'COST'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
26	'CPRT'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
27	'CRWD'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
28	'CSCO'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
29	'CSGP'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
30	'CSX'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
31	'CTAS'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
32	'CTSH'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
33	'DASH'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
34	'DDOG'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
35	'DLTR'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
36	'DXCM'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
37	'EA'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
38	'EXC'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
39	'FANG'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
40	'FAST'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
41	'FTNT'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
42	'GEHC'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
43	'GFS'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
44	'GILD'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
45	'GOOG'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
46	'GOOGL'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
47	'HON'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
48	'IDXX'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
49	'ILMN'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
50	'INTC'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
51	'INTU'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double

Field s	Ticker	Date	Open	High	Low	Close	AdjClose	Volume
52	'ISRG'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
53	'KDP'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
54	'KHC'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
55	'KLAC'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
56	'LIN'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
57	'LRCX'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
58	'LULU'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
59	'MAR'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
60	'MCHP'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
61	'MDB'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
62	'MDLZ'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
63	'MELI'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
64	'META'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
65	'MNST'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
66	'MRNA'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
67	'MRVL'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
68	'MSFT'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
69	'MU'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
70	'NFLX'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
71	'NVDA'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
72	'NXPI'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
73	'ODFL'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
74	'ON'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
75	'ORLY'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
76	'PANW'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
77	'PAYX'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
78	'PCAR'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
79	'PDD'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
80	'PEP'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
81	'PYPL'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
82	'QCOM'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
83	'REGN'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
84	'ROP'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double

Field s	Ticker	Date	Open	High	Low	Close	AdjClose	Volume
85	'ROST'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
86	'SBUX'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
87	'SIRI'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
88	'SNPS'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
89	'TEAM'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
90	'TMUS'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
91	'TSLA'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
92	'TTD'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
93	'TTWO'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
94	'TXN'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
95	'VRSK'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
96	'VRTX'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
97	'WBA'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
98	'WBD'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
99	'WDAY'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double
100	'XEL'	61x1 datetime	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double	61x1 double

⋮

hist\_stock\_data returns 101 structs (one company has two classes of stock). Now we can analyze the data in these structs.

### Percentages

We will use the percent difference between beginning and end to find the winning and losing stock. The equation looks like this:

$$\text{percentChange} = \frac{(\text{mar30Price} - \text{Jan1Price})}{\text{Jan1Price}} \times 100$$

### Finding the winner and loser

We find the winner by finding the percent differences in the stock prices at the beginning and end of the quarter. That is, index 1 and index end of AdjClose.

Now that we've calculated the precentChange we can print the winner and loser names

```
"Winner: "      "NVDA"      "Percent Growth"      "87.59"
"Loser: "       "TSLA"       "Percent Growth"       "-29.24"
```

### Measuring Volatility with Standard Deviation

Now we will find the most volatile and least volatile stocks by finding the standard deviation of their closing prices

"Craziest Stock"	"NVDA"	"STDDEV"	"143.93"
"Quietest Stock"	"SIRI"	"STDDEV"	"0.55"