

```
!pip install yfinance
```

```

Requirement already satisfied: yfinance in /usr/local/lib/python3.10/dist-packages (0.2.49)
Requirement already satisfied: pandas≥1.3.0 in /usr/local/lib/python3.10/dist-packages (from yfinance)
Requirement already satisfied: numpy≥1.16.5 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: requests≥2.31 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: multitasking≥0.0.7 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: lxml≥4.9.1 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: platformdirs≥2.0.0 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: pytz≥2022.5 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: frozendict≥2.3.4 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: peewee≥3.16.2 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: beautifulsoup4≥4.11.1 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: html5lib≥1.1 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: soupsieve>1.2 in /usr/local/lib/python3.10/dist-packages (from beautifulsoup4≥4.11.1)
Requirement already satisfied: six≥1.9 in /usr/local/lib/python3.10/dist-packages (from html5lib≥1.1)
Requirement already satisfied: webencodings in /usr/local/lib/python3.10/dist-packages (from html5lib≥1.1)
Requirement already satisfied: python-dateutil≥2.8.2 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: tzdata≥2022.7 in /usr/local/lib/python3.10/dist-packages (from pandas≥1.3.0)
Requirement already satisfied: charset-normalizer<4,≥2 in /usr/local/lib/python3.10/dist-packages (from requests≥2.31)
Requirement already satisfied: idna<4,≥2.5 in /usr/local/lib/python3.10/dist-packages (from requests≥2.31)
Requirement already satisfied: urllib3<3,≥1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests≥2.31)
Requirement already satisfied: certifi≥2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests≥2.31)

```

```
#!pip install yfinance
```

```
import yfinance as yt
```

```
stock_name = 'TSLA'
```

```
stock = yt.Ticker(stock_name_1)
```

Start coding or [generate](#) with AI.

```
stock.history(period='1mo')
```



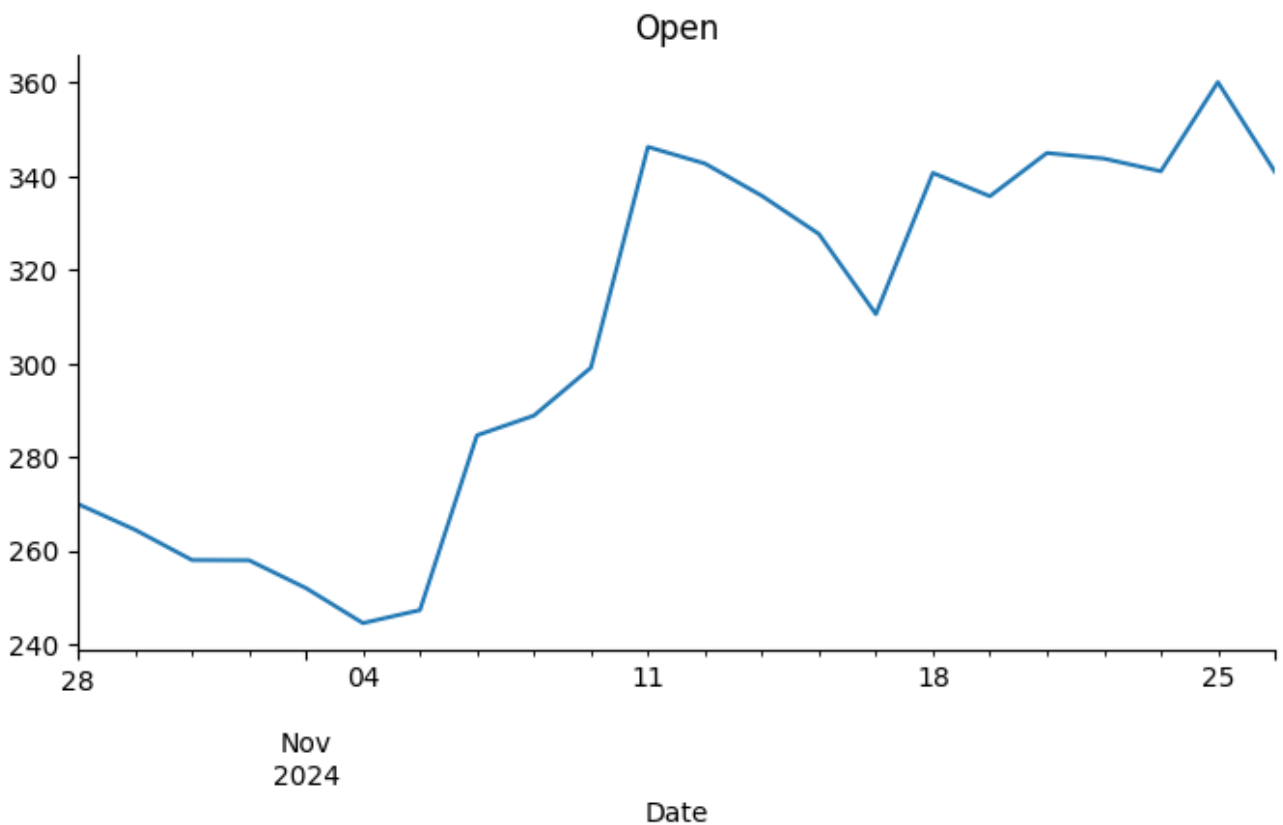
	Open	High	Low	Close	Volume	Divid
<b>Date</b>						
<b>2024-11-04</b> <b>00:00:00-05:00</b>	244.559998	248.899994	238.880005	242.839996	68802400	
<b>2024-11-05</b> <b>00:00:00-05:00</b>	247.339996	255.279999	246.210007	251.440002	69282500	
<b>2024-11-06</b> <b>00:00:00-05:00</b>	284.670013	289.589996	275.619995	288.529999	165228700	
<b>2024-11-07</b> <b>00:00:00-05:00</b>	288.890015	299.750000	285.519989	296.910004	117309200	

<b>2024-11-08 00:00:00-05:00</b>	299.140015	328.709991	297.660004	321.220001	204782800
<b>2024-11-11 00:00:00-05:00</b>	346.299988	358.640015	336.000000	350.000000	210521600
<b>2024-11-12 00:00:00-05:00</b>	342.739990	345.839996	323.309998	328.489990	155726000
<b>2024-11-13 00:00:00-05:00</b>	335.850006	344.600006	322.500000	330.239990	125405600
<b>2024-11-14 00:00:00-05:00</b>	327.690002	329.980011	310.369995	311.179993	120726100
<b>2024-11-15 00:00:00-05:00</b>	310.570007	324.679993	309.220001	320.720001	114440300
<b>2024-11-18 00:00:00-05:00</b>	340.730011	348.549988	330.010010	338.739990	126547500
<b>2024-11-19 00:00:00-05:00</b>	335.760010	347.380005	332.750000	346.000000	88852500
<b>2024-11-20 00:00:00-05:00</b>	345.000000	346.600006	334.299988	342.029999	66340700
<b>2024-11-21</b>					

```

from matplotlib import pyplot as plt
_df_12['Open'].plot(kind='line', figsize=(8, 4), title='Open')
plt.gca().spines[['top', 'right']].set_visible(False)

```



```
import pandas as pd
pd.set_option('display.max_rows', None)
```

```
stock.history(period='5d')['Close'].iloc[4]
```

```
351.4200134277344
```

Start coding or [generate](#) with AI.

Start coding or [generate](#) with AI.

```
options_chain = stock.option_chain('2027-01-15')
```

```
df1 = options_chain.calls
df2 = options_chain.puts
```

```
import pandas as pd
pd.set_option('display.max_rows', None)
df1
```

	contractSymbol	lastTradeDate	strike	lastPrice	bid	ask	change
0	TSLA270115C00005000	2024-12-03 20:52:43+00:00	5.0	346.10	0.00	0.00	0.0
1	TSLA270115C00010000	2024-12-03 20:38:35+00:00	10.0	340.95	0.00	0.00	0.0
2	TSLA270115C00015000	2024-12-03 19:43:08+00:00	15.0	339.37	0.00	0.00	0.0
3	TSLA270115C00020000	2024-12-03 20:49:32+00:00	20.0	332.95	0.00	0.00	0.0
4	TSLA270115C00030000	2024-12-03 15:11:44+00:00	30.0	328.20	0.00	0.00	0.0
5	TSLA270115C00035000	2024-11-11 16:23:17+00:00	35.0	330.22	0.00	0.00	0.0
6	TSLA270115C00040000	2024-12-03 17:38:43+00:00	40.0	315.73	0.00	0.00	0.0
7	TSLA270115C00045000	2024-10-23 19:03:23+00:00	45.0	175.57	311.00	321.00	0.0
8	TSLA270115C00050000	2024-12-02	50.0	316.02	0.00	0.00	0.0

8	TSLA270115C00050000	20:42:18+00:00	50.0	310.02	0.00	0.00	0.0
9	TSLA270115C00055000	2024-12-03 18:29:38+00:00	55.0	303.32	0.00	0.00	0.0
10	TSLA270115C00060000	2024-10-10 16:31:22+00:00	60.0	190.75	265.55	272.95	0.0
11	TSLA270115C00065000	2024-11-26 18:55:05+00:00	65.0	285.90	0.00	0.00	0.0
12	TSLA270115C00070000	2024-12-03 20:08:17+00:00	70.0	290.35	0.00	0.00	0.0
13	TSLA270115C00075000	2024-11-12 18:19:00+00:00	75.0	263.73	0.00	0.00	0.0
14	TSLA270115C00080000	2024-12-03 20:11:31+00:00	80.0	281.96	0.00	0.00	0.0
15	TSLA270115C00085000	2024-12-03 20:01:49+00:00	85.0	277.85	0.00	0.00	0.0
16	TSLA270115C00090000	2024-12-03 20:03:05+00:00	90.0	273.75	0.00	0.00	0.0
17	TSLA270115C00095000	2024-12-03 14:41:22+00:00	95.0	273.20	0.00	0.00	0.0
18	TSLA270115C00100000	2024-12-03 20:49:59+00:00	100.0	265.00	0.00	0.00	0.0
19	TSLA270115C00105000	2024-11-26 14:31:31+00:00	105.0	254.50	0.00	0.00	0.0
20	TSLA270115C00110000	2024-11-25 20:18:50+00:00	110.0	254.62	0.00	0.00	0.0
21	TSLA270115C00115000	2024-12-03 16:11:33+00:00	115.0	256.00	0.00	0.00	0.0
22	TSLA270115C00120000	2024-12-03 14:42:02+00:00	120.0	253.00	0.00	0.00	0.0
23	TSLA270115C00125000	2024-12-02 16:01:07+00:00	125.0	250.45	0.00	0.00	0.0
24	TSLA270115C00130000	2024-12-03 15:09:26+00:00	130.0	245.95	0.00	0.00	0.0
25	TSLA270115C00135000	2024-11-26 20:36:42+00:00	135.0	225.65	0.00	0.00	0.0
26	TSLA270115C00140000	2024-12-02 17:50:49+00:00	140.0	243.10	0.00	0.00	0.0
27	TSLA270115C00145000	2024-12-03 17:36:55+00:00	145.0	231.10	0.00	0.00	0.0

28	TSLA270115C00150000	2024-12-03 19:16:48+00:00	150.0	226.87	0.00	0.00	0.0
29	TSLA270115C00155000	2024-12-02 17:36:54+00:00	155.0	232.30	0.00	0.00	0.0
30	TSLA270115C00160000	2024-11-27 16:15:01+00:00	160.0	202.95	0.00	0.00	0.0
31	TSLA270115C00165000	2024-11-29 15:42:36+00:00	165.0	207.30	0.00	0.00	0.0
32	TSLA270115C00170000	2024-12-02 20:50:12+00:00	170.0	221.00	0.00	0.00	0.0
33	TSLA270115C00175000	2024-12-03 14:30:00+00:00	175.0	212.75	0.00	0.00	0.0
34	TSLA270115C00180000	2024-12-03 15:46:54+00:00	180.0	207.49	0.00	0.00	0.0
35	TSLA270115C00185000	2024-11-26 20:50:06+00:00	185.0	193.45	0.00	0.00	0.0
36	TSLA270115C00190000	2024-12-03 18:34:27+00:00	190.0	199.80	0.00	0.00	0.0
37	TSLA270115C00195000	2024-11-27 20:14:42+00:00	195.0	182.26	0.00	0.00	0.0
38	TSLA270115C00200000	2024-12-03 18:38:35+00:00	200.0	193.70	0.00	0.00	0.0
39	TSLA270115C00205000	2024-12-02 19:25:55+00:00	205.0	196.80	0.00	0.00	0.0
40	TSLA270115C00210000	2024-12-02 14:50:20+00:00	210.0	194.88	0.00	0.00	0.0
41	TSLA270115C00215000	2024-12-02 18:21:16+00:00	215.0	192.65	0.00	0.00	0.0
42	TSLA270115C00220000	2024-12-03 18:35:28+00:00	220.0	182.85	0.00	0.00	0.0
43	TSLA270115C00225000	2024-12-03 15:10:55+00:00	225.0	182.77	0.00	0.00	0.0
44	TSLA270115C00230000	2024-12-03 16:04:32+00:00	230.0	178.14	0.00	0.00	0.0
45	TSLA270115C00235000	2024-12-02 19:08:55+00:00	235.0	180.53	0.00	0.00	0.0
46	TSLA270115C00240000	2024-12-03 20:18:57+00:00	240.0	171.57	0.00	0.00	0.0
47	TSLA270115C00245000	2024-12-02 19:12:31+00:00	245.0	175.11	0.00	0.00	0.0

<b>48</b>	TSLA270115C00250000	2024-12-03 20:23:53+00:00	250.0	166.55	0.00	0.00	0.0
<b>49</b>	TSLA270115C00260000	2024-12-03 19:51:40+00:00	260.0	161.00	0.00	0.00	0.0
<b>50</b>	TSLA270115C00270000	2024-12-03 20:36:12+00:00	270.0	156.49	0.00	0.00	0.0
<b>51</b>	TSLA270115C00280000	2024-12-03 18:45:08+00:00	280.0	151.90	0.00	0.00	0.0
<b>52</b>	TSLA270115C00290000	2024-12-03 18:34:29+00:00	290.0	147.00	0.00	0.00	0.0
<b>53</b>	TSLA270115C00300000	2024-12-03 20:51:40+00:00	300.0	143.00	0.00	0.00	0.0
<b>54</b>	TSLA270115C00310000	2024-12-03 20:16:57+00:00	310.0	139.33	0.00	0.00	0.0
<b>55</b>	TSLA270115C00320000	2024-12-03 20:16:57+00:00	320.0	135.53	0.00	0.00	0.0
<b>56</b>	TSLA270115C00330000	2024-12-03 20:36:37+00:00	330.0	131.07	0.00	0.00	0.0
<b>57</b>	TSLA270115C00340000	2024-12-03 20:36:37+00:00	340.0	127.34	0.00	0.00	0.0
<b>58</b>	TSLA270115C00350000	2024-12-03 20:59:37+00:00	350.0	125.48	0.00	0.00	0.0
<b>59</b>	TSLA270115C00360000	2024-12-03 20:43:34+00:00	360.0	120.17	0.00	0.00	0.0
<b>60</b>	TSLA270115C00370000	2024-12-03 20:54:44+00:00	370.0	117.60	0.00	0.00	0.0

2024-12-03

df2

	contractSymbol	lastTradeDate	strike	lastPrice	bid	ask	change	percent
<b>0</b>	TSLA250117P00005000	2024-11-26 17:14:14+00:00	5.0	0.01	0.0	0.0	0.0	
<b>1</b>	TSLA250117P00010000	2024-11-22 15:38:38+00:00	10.0	0.01	0.0	0.0	0.0	
<b>2</b>	TSLA250117P00015000	2024-11-22 15:08:54+00:00	15.0	0.01	0.0	0.0	0.0	
<b>3</b>	TSLA250117P00020000	2024-11-22 15:07:56+00:00	20.0	0.01	0.0	0.0	0.0	

2024-11-21

4	TSLA250117P00025000	2024-11-26 15:51:10+00:00	25.0	0.02	0.0	0.0	0.0
5	TSLA250117P00030000	2024-11-26 16:55:10+00:00	30.0	0.01	0.0	0.0	0.0
6	TSLA250117P00035000	2024-11-21 16:12:27+00:00	35.0	0.03	0.0	0.0	0.0
7	TSLA250117P00040000	2024-11-22 15:28:54+00:00	40.0	0.03	0.0	0.0	0.0
8	TSLA250117P00045000	2024-11-21 16:14:09+00:00	45.0	0.02	0.0	0.0	0.0
9	TSLA250117P00050000	2024-11-26 16:56:22+00:00	50.0	0.02	0.0	0.0	0.0
10	TSLA250117P00055000	2024-11-26 18:57:08+00:00	55.0	0.04	0.0	0.0	0.0
11	TSLA250117P00060000	2024-11-25 19:55:00+00:00	60.0	0.04	0.0	0.0	0.0
12	TSLA250117P00065000	2024-11-25 14:30:05+00:00	65.0	0.02	0.0	0.0	0.0
13	TSLA250117P00070000	2024-11-26 14:30:36+00:00	70.0	0.07	0.0	0.0	0.0
14	TSLA250117P00075000	2024-11-25 15:01:23+00:00	75.0	0.06	0.0	0.0	0.0
15	TSLA250117P00080000	2024-11-26 20:20:08+00:00	80.0	0.06	0.0	0.0	0.0
16	TSLA250117P00085000	2024-11-25 16:51:41+00:00	85.0	0.08	0.0	0.0	0.0
17	TSLA250117P00090000	2024-11-26 15:06:44+00:00	90.0	0.09	0.0	0.0	0.0
18	TSLA250117P00095000	2024-11-26 18:35:09+00:00	95.0	0.09	0.0	0.0	0.0
19	TSLA250117P00100000	2024-11-26 15:06:33+00:00	100.0	0.12	0.0	0.0	0.0
20	TSLA250117P00105000	2024-11-26 17:31:44+00:00	105.0	0.12	0.0	0.0	0.0
21	TSLA250117P00110000	2024-11-25 15:42:39+00:00	110.0	0.16	0.0	0.0	0.0
22	TSLA250117P00115000	2024-11-25 17:39:50+00:00	115.0	0.17	0.0	0.0	0.0
23	TSLA250117P00120000	2024-11-26 20:05:18+00:00	120.0	0.16	0.0	0.0	0.0

24	TSLA250117P00125000	2024-11-25 20:59:28+00:00	125.0	0.23	0.0	0.0	0.0
25	TSLA250117P00130000	2024-11-26 20:48:34+00:00	130.0	0.21	0.0	0.0	0.0
26	TSLA250117P00135000	2024-11-26 15:21:59+00:00	135.0	0.23	0.0	0.0	0.0
27	TSLA250117P00140000	2024-11-25 20:55:47+00:00	140.0	0.29	0.0	0.0	0.0
28	TSLA250117P00145000	2024-11-26 15:29:11+00:00	145.0	0.27	0.0	0.0	0.0
29	TSLA250117P00150000	2024-11-26 18:37:19+00:00	150.0	0.29	0.0	0.0	0.0
30	TSLA250117P00155000	2024-11-26 16:51:45+00:00	155.0	0.32	0.0	0.0	0.0
31	TSLA250117P00160000	2024-11-26 20:46:34+00:00	160.0	0.32	0.0	0.0	0.0
32	TSLA250117P00165000	2024-11-26 19:03:44+00:00	165.0	0.38	0.0	0.0	0.0
33	TSLA250117P00170000	2024-11-26 19:03:14+00:00	170.0	0.39	0.0	0.0	0.0
34	TSLA250117P00175000	2024-11-26 20:47:26+00:00	175.0	0.40	0.0	0.0	0.0
35	TSLA250117P00180000	2024-11-26 20:46:18+00:00	180.0	0.45	0.0	0.0	0.0
36	TSLA250117P00185000	2024-11-26 20:38:58+00:00	185.0	0.48	0.0	0.0	0.0
37	TSLA250117P00190000	2024-11-26 20:32:56+00:00	190.0	0.53	0.0	0.0	0.0
38	TSLA250117P00195000	2024-11-26 19:02:43+00:00	195.0	0.57	0.0	0.0	0.0
39	TSLA250117P00200000	2024-11-26 20:53:29+00:00	200.0	0.61	0.0	0.0	0.0
40	TSLA250117P00205000	2024-11-26 19:29:32+00:00	205.0	0.70	0.0	0.0	0.0
41	TSLA250117P00210000	2024-11-26 20:41:59+00:00	210.0	0.77	0.0	0.0	0.0
42	TSLA250117P00215000	2024-11-26 20:59:02+00:00	215.0	0.85	0.0	0.0	0.0
43	TSLA250117P00220000	2024-11-26 20:35:40+00:00	220.0	0.99	0.0	0.0	0.0



44	TSLA250117P00225000	2024-11-26 20:55:18+00:00	225.0	1.08	0.0	0.0	0.0
45	TSLA250117P00230000	2024-11-26 20:52:17+00:00	230.0	1.25	0.0	0.0	0.0
46	TSLA250117P00235000	2024-11-26 19:21:49+00:00	235.0	1.50	0.0	0.0	0.0
47	TSLA250117P00240000	2024-11-26 20:56:24+00:00	240.0	1.61	0.0	0.0	0.0
48	TSLA250117P00245000	2024-11-26 20:59:20+00:00	245.0	1.85	0.0	0.0	0.0
49	TSLA250117P00250000	2024-11-26 20:50:56+00:00	250.0	2.19	0.0	0.0	0.0
50	TSLA250117P00255000	2024-11-26 20:54:21+00:00	255.0	2.53	0.0	0.0	0.0
51	TSLA250117P00260000	2024-11-26 20:59:51+00:00	260.0	2.95	0.0	0.0	0.0
52	TSLA250117P00265000	2024-11-26 20:59:51+00:00	265.0	3.45	0.0	0.0	0.0
53	TSLA250117P00270000	2024-11-26 20:49:01+00:00	270.0	4.11	0.0	0.0	0.0
54	TSLA250117P00275000	2024-11-26 20:58:04+00:00	275.0	4.75	0.0	0.0	0.0
55	TSLA250117P00280000	2024-11-26 20:45:13+00:00	280.0	5.55	0.0	0.0	0.0
56	TSLA250117P00285000	2024-11-26 20:52:19+00:00	285.0	6.57	0.0	0.0	0.0
57	TSLA250117P00290000	2024-11-26 20:59:08+00:00	290.0	7.55	0.0	0.0	0.0
58	TSLA250117P00295000	2024-11-26 20:50:14+00:00	295.0	8.90	0.0	0.0	0.0
59	TSLA250117P00300000	2024-11-26 20:59:33+00:00	300.0	10.10	0.0	0.0	0.0
60	TSLA250117P00305000	2024-11-26 20:53:29+00:00	305.0	11.70	0.0	0.0	0.0
61	TSLA250117P00310000	2024-11-26 20:58:32+00:00	310.0	13.30	0.0	0.0	0.0
62	TSLA250117P00315000	2024-11-26 20:59:02+00:00	315.0	15.20	0.0	0.0	0.0
63	TSLA250117P00320000	2024-11-26	320.0	17.10	0.0	0.0	0.0

63	TSLA250117P00320000	20:59:39+00:00	320.0	17.10	0.0	0.0	0.0
64	TSLA250117P00325000	2024-11-26 20:54:41+00:00	325.0	19.42	0.0	0.0	0.0
65	TSLA250117P00330000	2024-11-26 20:53:15+00:00	330.0	22.00	0.0	0.0	0.0
66	TSLA250117P00335000	2024-11-26 20:57:16+00:00	335.0	24.35	0.0	0.0	0.0
67	TSLA250117P00340000	2024-11-26 20:59:51+00:00	340.0	27.00	0.0	0.0	0.0
68	TSLA250117P00345000	2024-11-26 20:58:02+00:00	345.0	29.80	0.0	0.0	0.0
69	TSLA250117P00350000	2024-11-26 20:55:31+00:00	350.0	32.73	0.0	0.0	0.0
70	TSLA250117P00355000	2024-11-26 20:54:35+00:00	355.0	36.20	0.0	0.0	0.0
71	TSLA250117P00360000	2024-11-26 20:28:25+00:00	360.0	39.50	0.0	0.0	0.0
72	TSLA250117P00365000	2024-11-26 20:54:53+00:00	365.0	42.75	0.0	0.0	0.0
73	TSLA250117P00370000	2024-11-26 20:07:26+00:00	370.0	45.90	0.0	0.0	0.0
74	TSLA250117P00375000	2024-11-26 20:34:46+00:00	375.0	51.30	0.0	0.0	0.0
75	TSLA250117P00380000	2024-11-26 19:39:22+00:00	380.0	53.85	0.0	0.0	0.0
76	TSLA250117P00385000	2024-11-26 14:37:58+00:00	385.0	56.71	0.0	0.0	0.0
77	TSLA250117P00390000	2024-11-26 15:59:49+00:00	390.0	58.66	0.0	0.0	0.0
78	TSLA250117P00395000	2024-11-26 16:05:31+00:00	395.0	62.58	0.0	0.0	0.0
79	TSLA250117P00400000	2024-11-26 20:46:24+00:00	400.0	70.00	0.0	0.0	0.0
80	TSLA250117P00405000	2024-11-22 18:30:48+00:00	405.0	67.95	0.0	0.0	0.0
81	TSLA250117P00410000	2024-11-26 15:31:14+00:00	410.0	72.63	0.0	0.0	0.0
82	TSLA250117P00415000	2024-11-22 19:38:30+00:00	415.0	73.69	0.0	0.0	0.0

<b>83</b>	TSLA250117P00420000	2024-11-26 18:37:19+00:00	420.0	83.90	0.0	0.0	0.0
<b>84</b>	TSLA250117P00425000	2024-11-22 15:28:45+00:00	425.0	89.80	0.0	0.0	0.0
<b>85</b>	TSLA250117P00430000	2024-11-25 17:17:51+00:00	430.0	90.10	0.0	0.0	0.0
<b>86</b>	TSLA250117P00435000	2024-11-25 15:48:24+00:00	435.0	92.00	0.0	0.0	0.0
<b>87</b>	TSLA250117P00440000	2024-11-25 14:50:46+00:00	440.0	93.60	0.0	0.0	0.0
<b>88</b>	TSLA250117P00445000	2024-11-19 15:00:21+00:00	445.0	113.20	0.0	0.0	0.0
<b>89</b>	TSLA250117P00450000	2024-11-26 20:02:03+00:00	450.0	113.60	0.0	0.0	0.0
<b>90</b>	TSLA250117P00455000	2024-11-22 18:24:31+00:00	455.0	109.35	0.0	0.0	0.0
<b>91</b>	TSLA250117P00460000	2024-11-26 16:21:36+00:00	460.0	120.30	0.0	0.0	0.0
<b>92</b>	TSLA250117P00465000	2024-11-25 15:57:26+00:00	465.0	117.65	0.0	0.0	0.0
<b>93</b>	TSLA250117P00470000	2024-11-25 14:46:40+00:00	470.0	119.00	0.0	0.0	0.0
<b>94</b>	TSLA250117P00475000	2024-11-21 16:07:10+00:00	475.0	137.25	0.0	0.0	0.0
<b>95</b>	TSLA250117P00480000	2024-11-19 16:23:02+00:00	480.0	139.90	0.0	0.0	0.0
<b>96</b>	TSLA250117P00485000	2024-11-26 19:10:10+00:00	485.0	146.30	0.0	0.0	0.0
<b>97</b>	TSLA250117P00490000	2024-11-21 14:55:38+00:00	490.0	148.15	0.0	0.0	0.0
<b>98</b>	TSLA250117P00495000	2024-11-22 16:40:26+00:00	495.0	144.70	0.0	0.0	0.0
<b>99</b>	TSLA250117P00500000	2024-11-26 19:12:46+00:00	500.0	161.55	0.0	0.0	0.0
<b>100</b>	TSLA250117P00510000	2024-11-21	510.0	171.55	0.0	0.0	0.0

```
def options_np(stock_name, exp_date):
    import yfinance as yt
    stock = yt.Ticker(stock_name)
    stock_value = stock.history(period='1d')['Close'].iloc[-1]
    options_chain = stock.option_chain(exp_date)
```

```

df1 = options_chain.calls
df2 = options_chain.puts
common_strikes = set(df1['strike']).intersection(df2['strike'])
df1_filtered = df1[df1['strike'].isin(common_strikes)].copy()
df2_filtered = df2[df2['strike'].isin(common_strikes)].copy()
call_strikes = df1_filtered['strike'].to_numpy()
call_prices = df1_filtered['lastPrice'].to_numpy()
call_contracts = df1_filtered['contractSymbol'].to_numpy()
put_strikes = df2_filtered['strike'].to_numpy()
put_prices = df2_filtered['lastPrice'].to_numpy()
put_contracts = df2_filtered['contractSymbol'].to_numpy()
return call_contracts, call_prices, put_contracts, put_prices, call_strikes, stock_value

```

```
call_contracts, call_prices, put_contracts, put_prices, strikes, stock_value = options_np('TSLA',
```

```
stock_value
```

```
352.55999755859375
```

```

def payoff(stock_value, strike_prices, portfolio):
    individual_payoffs = np.maximum(stock_value - strike_prices, 0)
    print(individual_payoffs)
    total_payoff = np.sum(individual_payoffs * portfolio)
    return total_payoff

```

```
payoff(1009, strikes, prices)
```

```

[959. 954. 949. 944. 939. 934. 929. 924. 919. 914. 909. 904. 899. 894.
 889. 884. 879. 874. 869. 864. 859. 854. 849. 844. 839. 834. 829. 824.
 819. 814. 809. 804. 799. 794. 789. 784. 779. 774. 769. 764. 759. 754.
 749. 744. 739. 734. 729. 724. 719. 714. 709. 704. 699. 694. 689. 684.
 679. 674. 669. 664. 659. 654. 649. 644. 639. 634. 629. 624. 619. 614.
 609. 604. 599. 594. 589. 584. 579. 574. 569. 559. 549. 539. 529. 519.
 509. 499. 489. 479. 469. 459. 449. 439. 429. 419. 409. 399. 389. 379.
 369. 359. 349. 339. 329. 319. 309. 299.]
8591548.770000001

```

```

def optimal_portfolio(strikes, call_prices, put_prices, stock_value):
    import numpy as np
    extended_strikes = np.concatenate(([0] * (strikes.shape[0] + 1), strikes, [1]))
    individual_payoffs_call = np.maximum(strikes.reshape(-1,1) - strikes.reshape(1,-1), 0)
    individual_payoffs_put = individual_payoffs_call.T
    payoff_merged = np.concatenate((strikes.reshape(-1,1), individual_payoffs_call, individual_payoff
    payoff_merged = np.concatenate((extended_strikes.reshape(1,-1), payoff_merged), axis=0)
    payoff_merged[0,-1] = 1.

```

```
print(payoff_merged)
```

```
optimal_portfolio(strikes,call_prices, put_prices, 10000)
```

```
[[ 0.  0.  0. ... 700. 710.  1.]
 [ 5.  0.  0. ... 695. 705.  1.]
 [10.  5.  0. ... 690. 700.  1.]
 ...
 [680. 675. 670. ... 20. 30.  1.]
 [700. 695. 690. ...  0. 10.  1.]
 [710. 705. 700. ...  0.  0.  1.]]
```

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```
individual_payoff_call == individual_payoff_put.T
```

```
array([[ True,  True,  True, ...,  True,  True,  True],
       [ True,  True,  True, ...,  True,  True,  True],
       [ True,  True,  True, ...,  True,  True,  True],
       ...,
       [ True,  True,  True, ...,  True,  True,  True],
       [ True,  True,  True, ...,  True,  True,  True],
       [ True,  True,  True, ...,  True,  True,  True]])
```

```
individual_payoff_put
```

```
array([[ 0.,  5., 10., ..., 675., 695., 705.],
       [ 0.,  0.,  5., ..., 670., 690., 700.],
       [ 0.,  0.,  0., ..., 665., 685., 695.],
       ...,
       [ 0.,  0.,  0., ...,  0., 20., 30.],
       [ 0.,  0.,  0., ...,  0.,  0., 10.],
       [ 0.,  0.,  0., ...,  0.,  0.,  0.]])
```

```
strikes
```

```
array([ 50.,  55.,  60.,  65.,  70.,  75.,  80.,  85.,  90.,  95., 100.,
        105., 110., 115., 120., 125., 130., 135., 140., 145., 150., 155.,
        160., 165., 170., 175., 180., 185., 190., 195., 200., 205., 210.,
        215., 220., 225., 230., 235., 240., 245., 250., 255., 260., 265.,
        270., 275., 280., 285., 290., 295., 300., 305., 310., 315., 320.,
        325., 330., 335., 340., 345., 350., 355., 360., 365., 370., 375.,
        380., 385., 390., 395., 400., 405., 410., 415., 420., 425., 430.,
        435., 440., 450., 460., 470., 480., 490., 500., 510., 520., 530.,
        540., 550., 560., 570., 580., 590., 600., 610., 620., 630., 640.,
        650., 660., 670., 680., 690., 700., 710.]])
```

```
import numpy as np
```

```
portfolio = np.array([1.]*len(strikes))
```

```
total_payoff = payoff(stock_value, strikes, portfolio)
print(total_payoff)
```

```
9306.159851074219
```

```
prices.sum()
```

```
10478.18
```

```
def minimize_loss(strike_prices, stock_prices, budget=10000):
```

```
    import numpy as np
```

```
    from scipy.optimize import linprog
```

```
    num_options = len(strike_prices)
```

```
    bounds = [(0, float('inf')) for _ in range(num_options)]
```

```
minimize_loss(strikes, prices)
```

```
[(0, inf), (0, inf), (0, inf), (0, inf), (0, inf), (0, inf), (0, inf), (0, inf), (0, inf), (0
```

```
strikes
```

```
array([ 50.,  55.,  60.,  65.,  70.,  75.,  80.,  85.,  90.,  95., 100.,
        105., 110., 115., 120., 125., 130., 135., 140., 145., 150., 155.,
        160., 165., 170., 175., 180., 185., 190., 195., 200., 205., 210.,
        215., 220., 225., 230., 235., 240., 245., 250., 255., 260., 265.,
        270., 275., 280., 285., 290., 295., 300., 305., 310., 315., 320.,
        325., 330., 335., 340., 345., 350., 355., 360., 365., 370., 375.,
        380., 385., 390., 395., 400., 405., 410., 415., 420., 425., 430.,
        435., 440., 450., 460., 470., 480., 490., 500., 510., 520., 530.,
        540., 550., 560., 570., 580., 590., 600., 610., 620., 630., 640.,
        650., 660., 670., 680., 690., 700., 710.]])
```

```
stock_value
```

```
352.55999755859375
```

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