PROJECT----WEEK06

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Problem 1

Assume you a call and a put option with the following Current Stock Price: $165
Current Date: 02/25/2022
Options Expiration Date: 03/18/2022
Risk Free Rate: 0.25%
Continuously Compounding Coupon: 0.53%

Calculate the time to maturity using calendar days (not trading days).
For a range of implied volatilities between 10% and 80%, plot the value of the call and the put.
Discuss these graphs. How does the supply and demand affect the implied volatility?

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Time to maturity is:0.058Years
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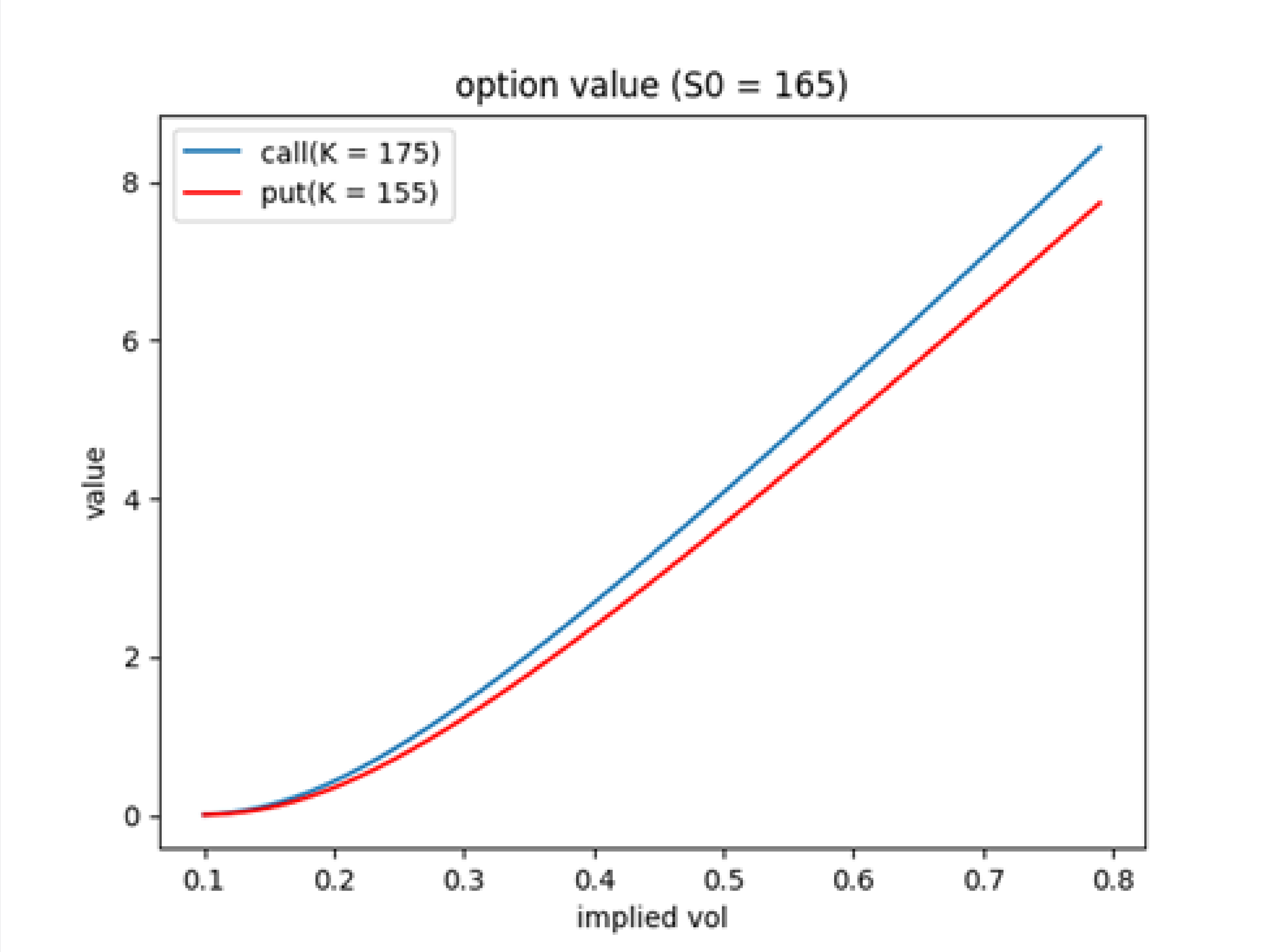
strike price of thce call option: 175

strike price of the put option: 155

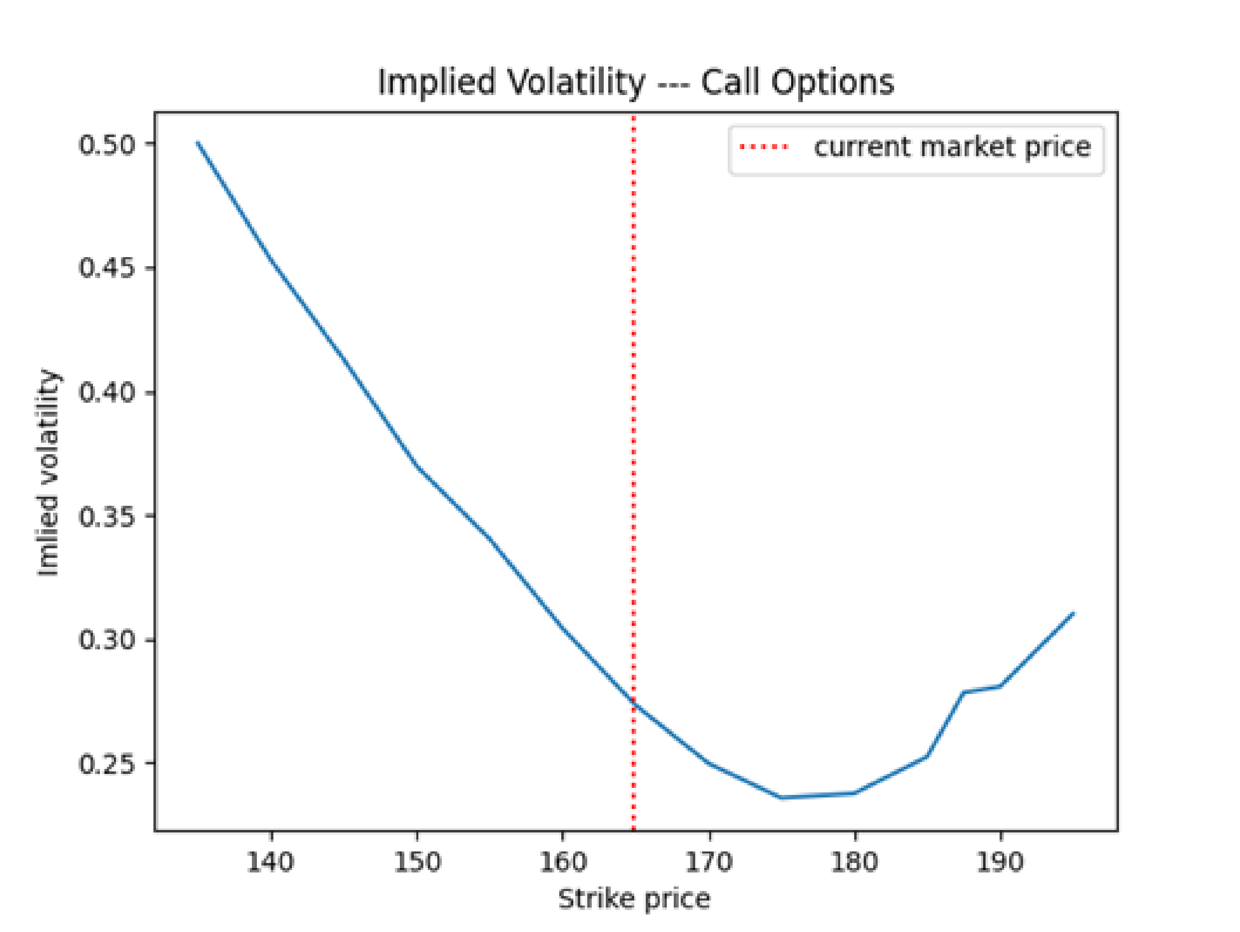


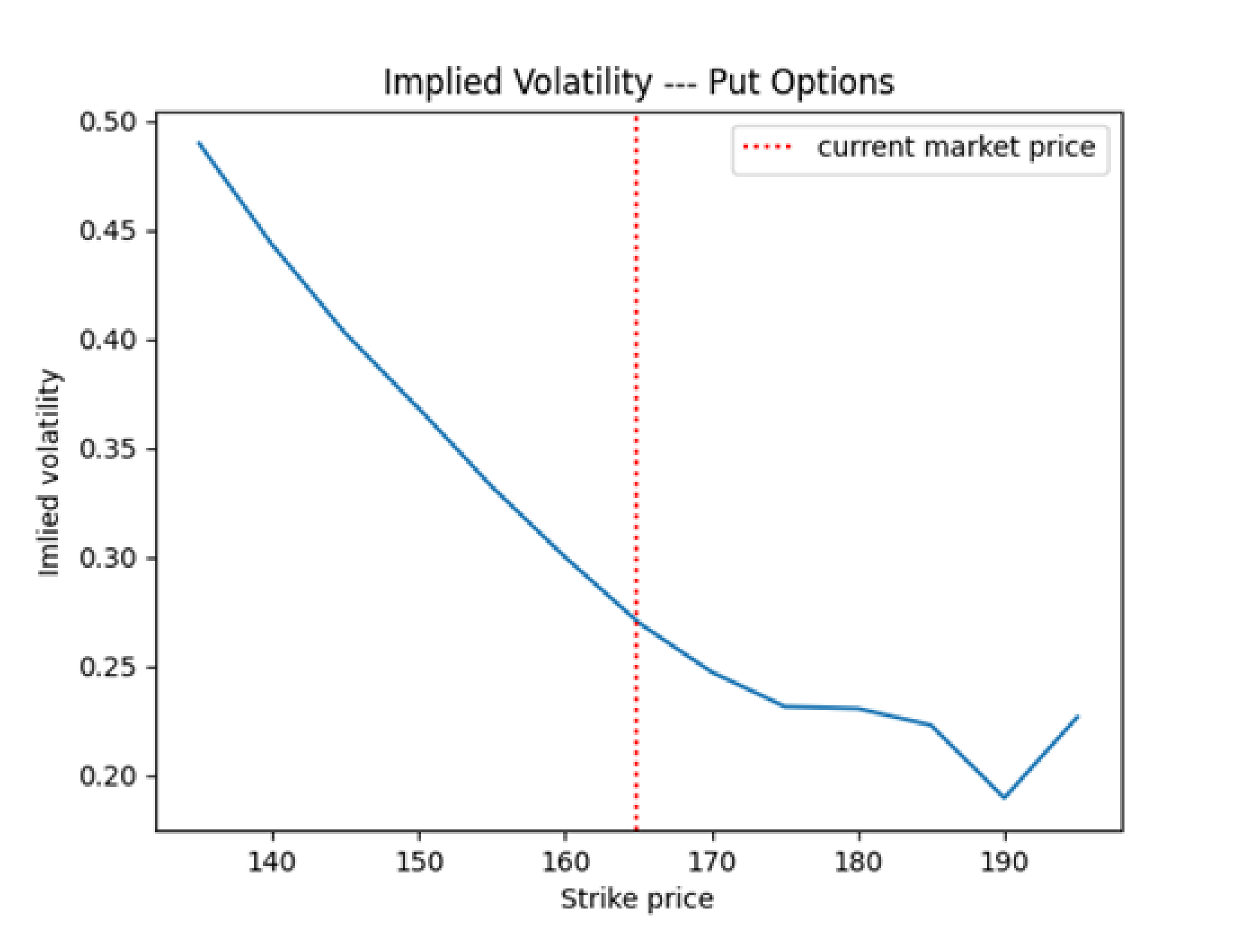
Demand ↑ price ↑

Problem 2

Use the options found in AAPL_Options.csv
Current AAPL price is 164.85
Current Date, Risk Free Rate and Dividend Rate are the same as problem #1.

Calculate the implied volatility for each option. Plot the implied volatility vs the strike price for Puts and Calls. Discuss the shape of these graphs. What market dynamics could make these graphs?



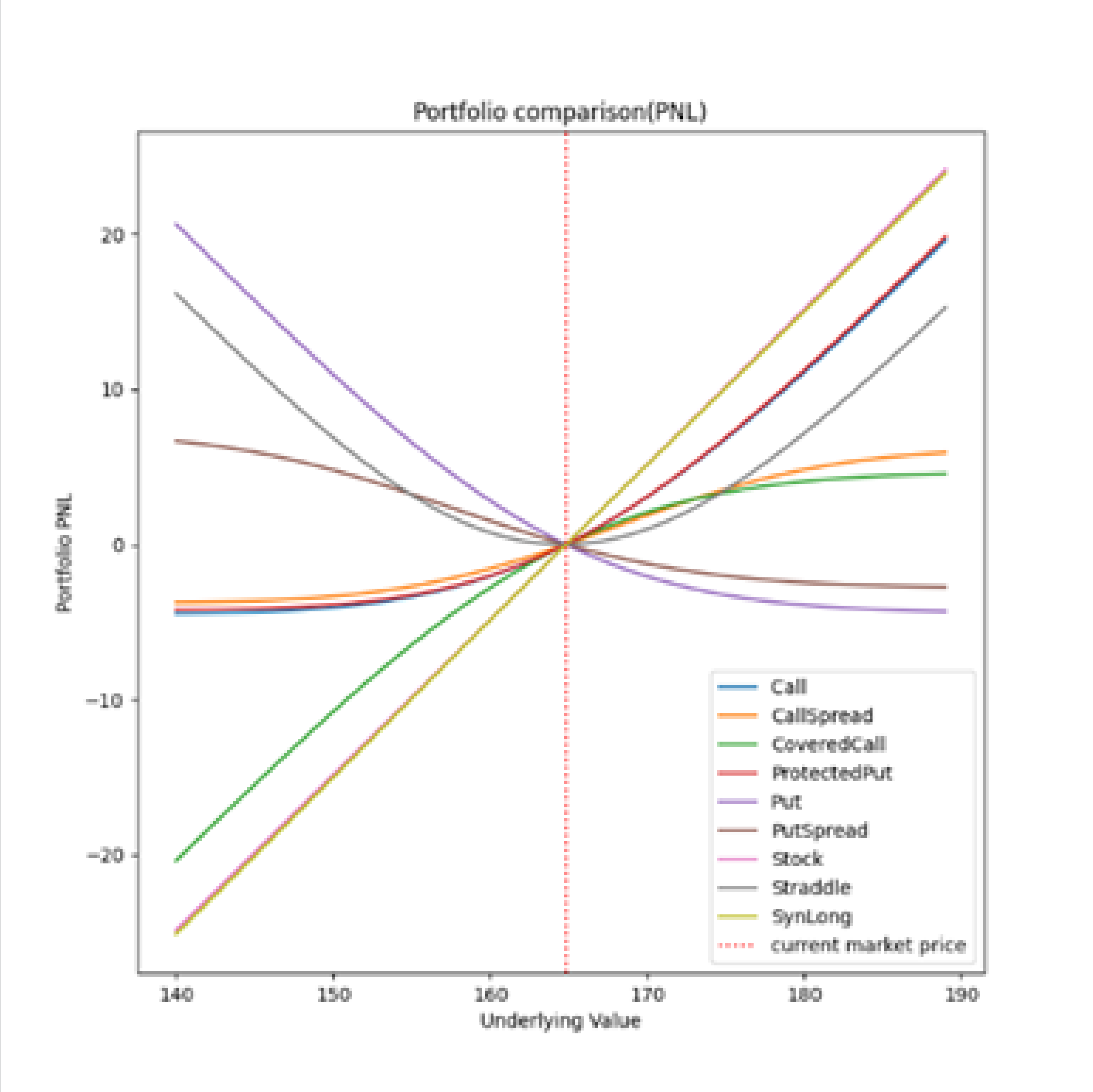


Problem 3

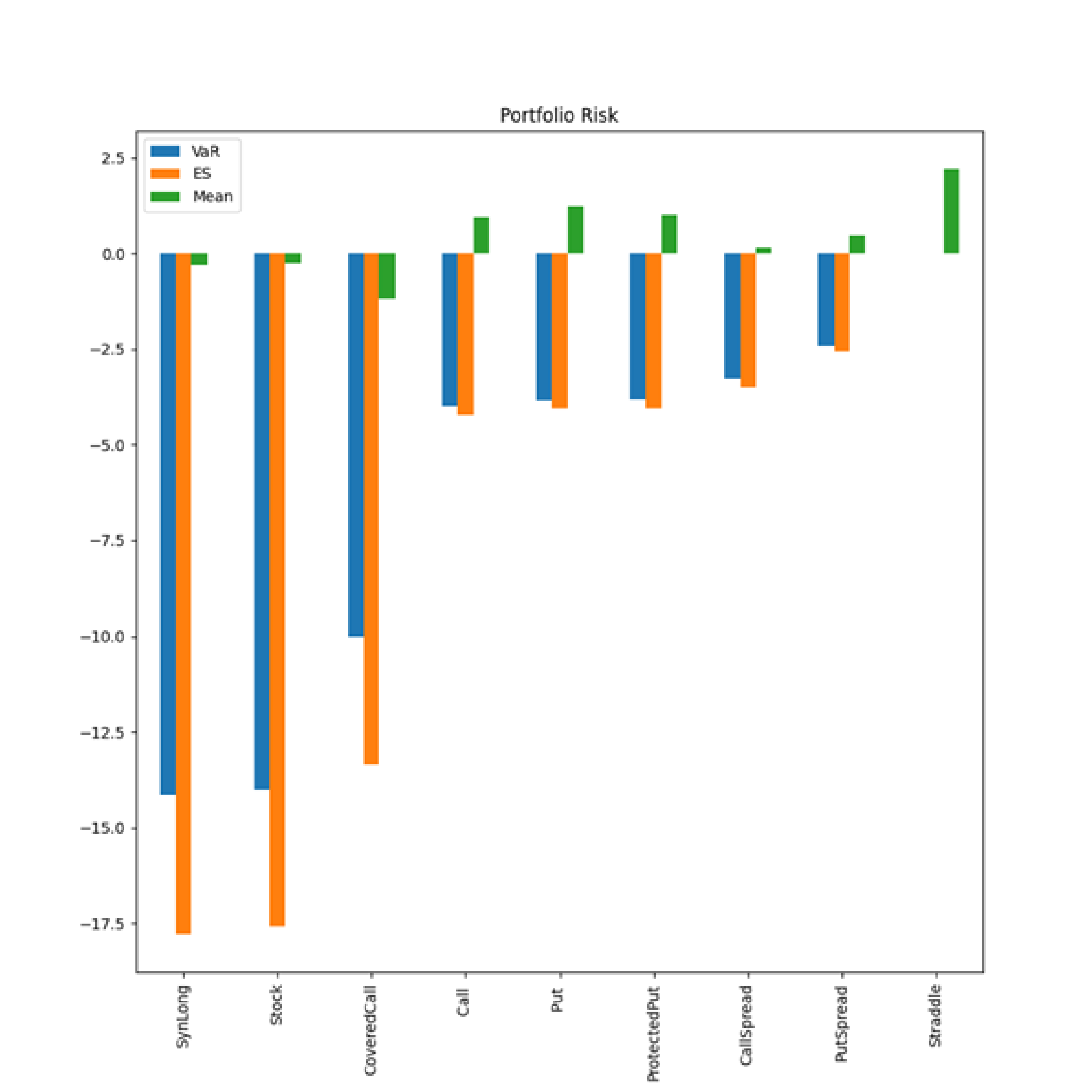
Use the portfolios found in problem3.csv
Current AAPL price is 164.85
Current Date, Risk Free Rate and Dividend Rate are the same as problem #1.

For each of the portfolios, graph the portfolio value over a range of underlying values. Plot the portfolio values and discuss the shapes. Bonus points available for tying these graphs to other topics discussed in the lecture. Using DailyReturn.csv.

Fit a Normal distribution to AAPL returns – assume 0 mean return. Simulate AAPL returns 10 days ahead and apply those returns to the current AAPL price (above). Calculate Mean, VaR and ES. Discuss.



Portfolio	Type	Underlying	Holding	OptionType	ExpirationDate	Strike	CurrentPrice
Straddle	Option	AAPL	1	Call	3/18/2022	165.0	4.50
Straddle	Option	AAPL	1	Put	3/18/2022	165.0	4.40
SynLong	Option	AAPL	1	Call	3/18/2022	165.0	4.50
SynLong	Option	AAPL	-1	Put	3/18/2022	165.0	4.40
CallSpread	Option	AAPL	1	Call	3/18/2022	165.0	4.50
CallSpread	Option	AAPL	-1	Call	3/18/2022	175.0	0.72
PutSpread	Option	AAPL	1	Put	3/18/2022	165.0	4.40
PutSpread	Option	AAPL	-1	Put	3/18/2022	155.0	1.60
Stock	Stock	AAPL	1	NaN	NaN	NaN	164.85
Call	Option	AAPL	1	Call	3/18/2022	165.0	4.50
Put	Option	AAPL	1	Put	3/18/2022	165.0	4.40
CoveredCall	Stock	AAPL	1	NaN	NaN	NaN	164.85
CoveredCall	Option	AAPL	-1	Call	3/18/2022	165.0	4.50
ProtectedPut	Stock	AAPL	1	NaN	NaN	NaN	164.85
ProtectedPut	Option	AAPL	1	Put	3/18/2022	165.0	4.40


Portfolio Risk
VaR
ES
Mean
2.5
0.0
−2.5
−5.0
−7.5
−10.0
−12.5
−15.0
−17.5
SynLong
Stock
CoveredCall
Call
Put
ProtectedPut
CallSpread
PutSpread
Straddle

THANKS FOR LISTENING