This document is for informational and educational purposes only. The performance data and strategy discussed represent a historical analysis and should not be considered a guide to future performance. Past performance is not a reliable indicator of future results. The content herein does not constitute investment advice or a recommendation to buy or sell any security. All investment strategies involve significant risk, including the potential for loss.

Options Wheel Strategy Performance Report

Alpaca Data Science

May 14 – May 28, 2025

1. Introduction

This report documents the behavior and performance of the automated options wheel strategy run in a paper trading simulation from May 14 to May 28, 2025. The algorithm was initialized with a buying power cap of $80,000 and deployed on ten symbols: AAPL, QQQ, INTC, CAT, DLR, MP, NVDA, PLTR, AAL, and V. Additional trading parameters are specified in the appendix. Trades were selected via a scoring function applied to filtered put and call options. This report describes the strategy's decisions, outcomes, and risks encountered throughout the period.

2. Initial Portfolio Construction

At market open on May 14, the algorithm sold the following six put options, generating an immediate $814 in premium income:

Underlying	Option Type	Expiration	Strike	Premium	DTE	Delta	Score
PLTR	Put	2025-05-23	124.00	2.61	9	-0.299	0.263
NVDA	Put	2025-05-30	127.00	3.32	16	-0.294	0.220
MP	Put	2025-05-23	20.00	0.28	9	-0.250	0.188
AAL	Put	2025-05-30	11.00	0.20	16	-0.233	0.166
INTC	Put	2025-05-30	20.50	0.33	16	-0.256	0.143
CAT	Put	2025-05-16	345.00	1.40	2	-0.280	0.104

Table 1: Initial trades opened by the algorithm on May 14, 2025

3. Score Exploration and Trade Selection

As defined in the code base, the scoring function used to select these contracts was:

$$\text{Score} = (1 - |\Delta|) \cdot \frac{250}{\text{DTE} + 5} \cdot \frac{\text{Premium}}{\text{Strike}} \tag{1}$$

To better understand the algorithm's logic, we examine a few example symbols. The contract for PLTR had the highest initial score of 0.263. Figure 1 plots scores across strikes and expiries for other PLTR put options that were available to sell at the time.

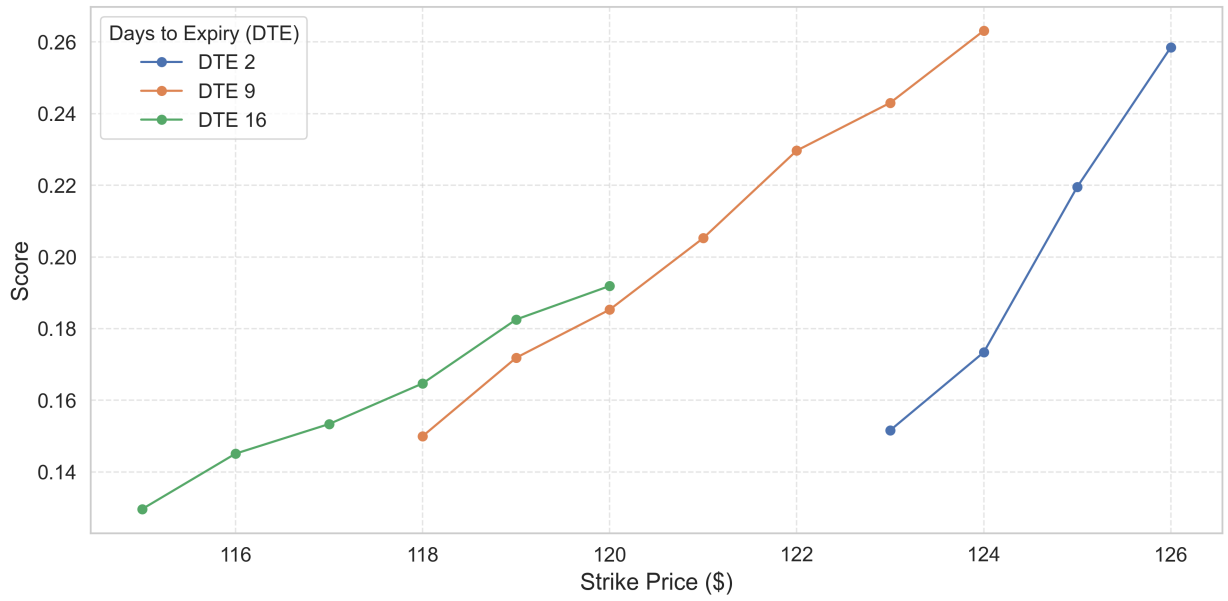

Figure 1: PLTR put option scores by strike and expiry (2025-05-14)

As shown, the score was an increasing function of both strike price and days to expiry, reflecting the effects of moneyness and time decay. This suggests that the drop in premium due to time decay was sufficient to outweigh any benefit from faster turnover. Similarly, the premium was sensitive enough to moneyness that the ratio of premium to strike — despite strike being in the denominator — increased with strike.

The plot also shows that the maximum strike was a decreasing function of days to expiry; that is, longer-dated contracts had maximum strikes further out of the money. This was primarily a consequence of the Delta filter, which required $0.15 < \text{Delta} < 0.3$, effectively excluding long-dated contracts that were close to the money.

As a result of these tradeoffs, the highest scoring contract for PLTR occurred at an intermediate expiry (nine days) and at the maximum strike for that expiry ($124).

We observed similar patterns in NVDA and QQQ (Figure 2). In the case of NVDA, shorter-dated contracts were less sensitive to moneyness (i.e., had a shallower score vs. strike slope), which led to the selection of the longest-dated contract at 16 days to expiry. For QQQ, on the other hand, shorter-dated contracts were more sensitive to moneyness and ultimately outscored their longer-dated counterparts. However, in practice, no QQQ puts were sold, as their relatively low absolute scores caused us to exhaust available buying power before reaching them in the ranking.

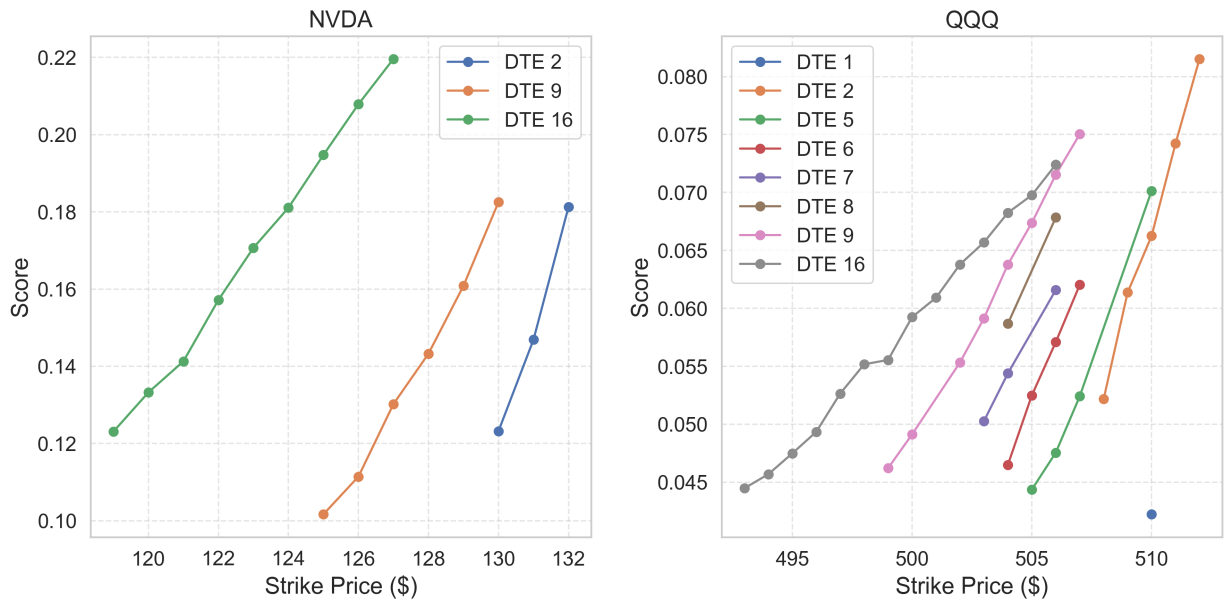

Figure 2: Score behavior for NVDA and QQQ put options (2025-05-14)

4. First Expiry: CAT

Despite being run several times per day, the algorithm did not execute any additional trades until CAT expired on May 16. This released capital for reallocation. Figure 3 shows the market price of our CAT put option through expiration, overlaid on the underlying share price over the same period:

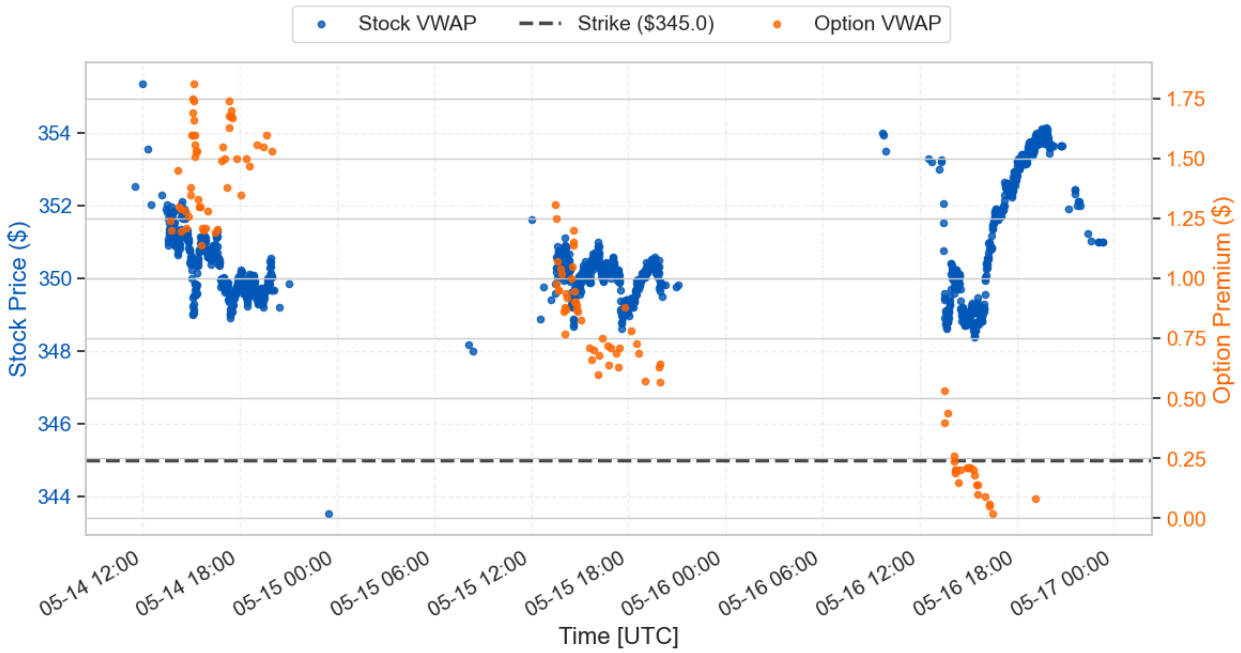

Figure 3: CAT option (CAT250516P00345000) and stock price through expiration

This plot illustrates a successful first leg of the options wheel strategy: selling a put that expires out of the money. The stock remained range-bound between $348 and $354, consistently trading above the strike price. As a result, the option's value steadily declined as expiration approached, allowing us to keep the full $140 premium received at the outset.

5. Subsequent Trades

As stated, the expiration of the CAT contract freed up additional buying power, which the algorithm recognized during its morning run on Monday, May 19th, once the expired contract had been removed from the portfolio. The algorithm proceeded to rank additional put options to sell. This time AAPL topped the list with a score of 0.116 and the following contract was sold:

Underlying	Option Type	Expiration	Strike	Premium	DTE	Delta	Score
AAPL	Put	2025-05-23	200.00	1.10	4	-0.243	0.116

Table 2: New position opened after CAT expiry

This was the only contract sold at the time, as no other symbols met both the buying power and contract filtering requirements.

On the following day (morning of May 20th), one additional contract made it through our filters, and the algorithm selected and sold the following DLR put:

Underlying	Option Type	Expiration	Strike	Premium	DTE	Delta	Score
DLR	Put	2025-05-30	165.00	0.67	10	-0.220	0.053

Table 3: DLR contract selected on May 20

Note that this just barely passed our minimum score threshold of 0.05, which likely explains why it was absent from the previous day's rankings.

6. Assignments on May 23 Expiry

The next round of expirations occurred on May 23rd, including our AAPL, PLTR, and MP contracts. Figure 4 plots each symbol's share price normalized by the strike price of their respective option contracts, against the time until expiration.

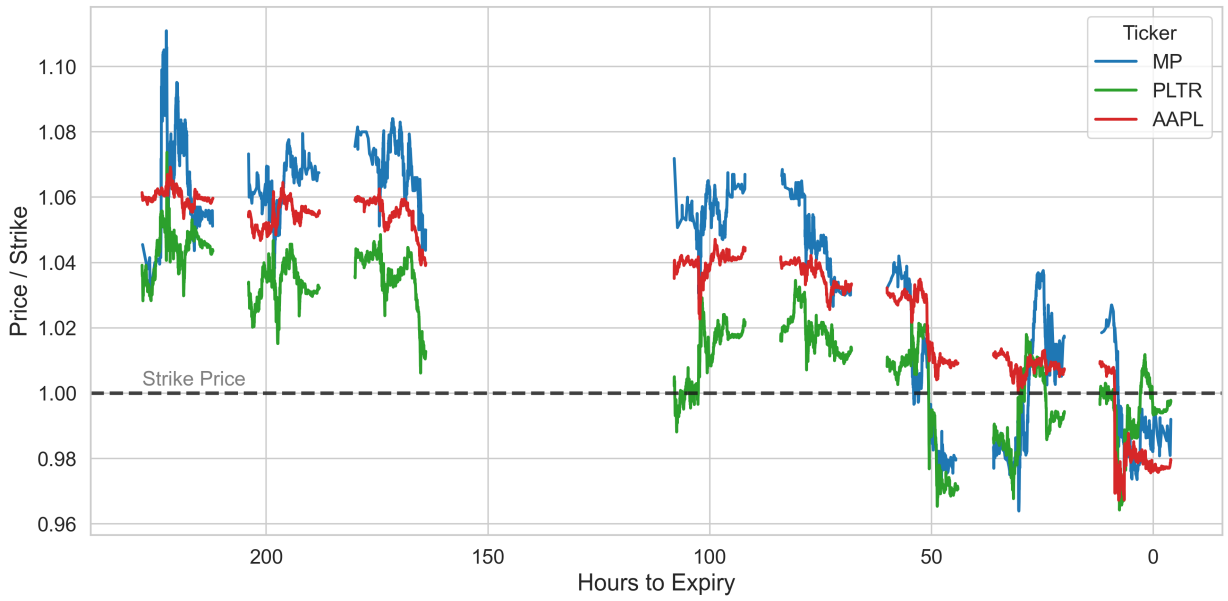

Figure 4: Price-to-strike ratios for assigned puts (May 14 - 23)

All three stocks declined during the final 2–3 days before expiry (May 20–23). This followed a broader market pullback amid renewed concerns over tariffs and the U.S. fiscal deficit. As a result, all three contracts expired in the money, with price-to-strike ratios falling below 1, and were therefore assigned.

The algorithm detected this assignment on the next trading day, Tuesday, May 27th (following the Memorial Day weekend), when 100 shares of each symbol appeared in the portfolio. In response, the strategy proceeded to search for and sell the following call options on the three underlyings, continuing the options wheel cycle:

Underlying	Option Type	Expiration	Strike	Premium	DTE	Delta	Score
AAPL	Call	2025-05-30	202.50	1.10	3	0.273	0.123
MP	Call	2025-05-30	20.50	0.12	3	0.212	0.144
PLTR	Call	2025-05-30	132.00	1.27	3	0.274	0.218

Table 4: Covered calls sold after put assignment

7. Conclusion and Current Status

At this stage of the wheel strategy, we are now long 100 shares each of AAPL at $198.79, MP at $19.70, and PLTR at $121.35. The algorithm will continue collecting premium by selling covered calls on these positions while simultaneously monitoring opportunities to sell new puts. However, this also introduces a significant shift in risk profile: we are now exposed to equity downside on three individual stocks.

The strategy will suffer if these holdings underperform in the coming weeks, as capital remains tied up in depreciating assets with limited downside protection. This illustrates a key vulnerability

of the wheel — being assigned shares during broader market weakness or poor individual stock performance. As suggested in the README, enhancing the algorithm to actively manage this equity risk (e.g. through protective puts or stop losses), rather than passively waiting for calls to be assigned, is a crucial area for improvement.

As of the final test run on May 28th, the state of the strategy was as follows:

Current Snapshot

- **Timestamp:** 2025-05-28T13:33:18.394869-04:00
- **Time elapsed:** 10 trading days
- **Current portfolio:**

Asset Class	Symbol	Side	Quantity	Purchase Price	Current Price	PnL
us_option	AAL250530P00011000	short	-1	0.18	0.04	14
us_equity	AAPL	long	100	198.79	200.95	216
us_option	AAPL250530C00202500	short	-1	1.10	1.42	-32
us_option	DLR250530P00165000	short	-1	0.65	0.40	25
us_option	INTC250530P00020500	short	-1	0.31	0.27	4
us_equity	MP	long	100	19.70	19.6948	-0.52
us_option	MP250530C00020500	short	-1	0.10	0.35	-25
us_option	NVDA250530P00127000	short	-1	3.35	1.23	212
us_equity	PLTR	long	100	121.35	124.4826	313.26
us_option	PLTR250530C00132000	short	-1	1.18	0.40	78

Table 5: Current portfolio state as of May 28, 2025

- **Total premiums collected:** +$1240.00
- **Total PnL (change in liquidating value):** +$951.89

Appendix: Strategy Parameters

Table 6: Parameter Settings Used in Strategy

Parameter	Value	Description
MAX_RISK	80,000	Maximum dollar risk allowed by the strategy.
DELTA_MIN	0.15	Minimum absolute Delta allowed.
DELTA_MAX	0.30	Maximum absolute Delta allowed.
YIELD_MIN	0	Minimum option yield considered.
YIELD_MAX	1.00	Maximum option yield considered.
EXPIRATION_MIN	0	Minimum days to expiration.
EXPIRATION_MAX	21	Maximum days to expiration.
OPEN_INTEREST_MIN	100	Minimum required open interest.
SCORE_MIN	0.05	Minimum score for contract selection.