ChatGPT

Decision Tree of the "Nuclear" Trading Strategy

The "Nuclear" strategy uses a nested series of technical conditions (mainly **Relative Strength Index (RSI)** triggers, moving average signals, and **cumulative return** thresholds) to determine a **single daily portfolio allocation**. Below is a comprehensive breakdown of every possible final signal or portfolio configuration the strategy can produce, along with the precise market conditions (indicator values and comparisons) that lead to each outcome. We first walk through each logical path in narrative form, then summarize the outcomes in a structured table. All conditions (RSI levels, moving averages, etc.) are exactly as specified in the strategy's code.

Narrative Walkthrough of Strategy Logic

100% UVXY Allocation (Volatility Hedge Activation)

Outcome: The strategy allocates **100% to UVXY**, the ProShares Ultra VIX Short-Term Futures ETF (a leveraged volatility fund), when an "extreme overbought" condition is detected in any of several key market indices. This is a defensive hedge signal triggered by very high RSI values:

- **SPY RSI > 81:** If the S&P 500 ETF (SPY) has a 10-day RSI above 81, the strategy immediately shifts to 100% UVXY [1]. This is the first and highest-priority trigger in the decision tree.
- **IOO RSI > 81 (with SPY <= 79):** If SPY's RSI is not above 79 (so the SPY overbought trigger failed) but the iShares Global 100 ETF (IOO) has a 10-day RSI above 81, that condition triggers a full UVXY allocation [2].
- **TQQQ RSI > 81 (with SPY, IOO <= 79):** If neither SPY nor IOO triggered, the next check is the 3x Nasdaq 100 ETF (TQQQ). A 10-day RSI above 81 on TQQQ (while SPY and IOO did not exceed 79) results in 100% UVXY [3].
- **VTV RSI > 81 (with SPY, IOO, TQQQ <= 79):** If the broad indices haven't triggered, the strategy checks the Vanguard Value ETF (VTV). A 10-day RSI above 81 on VTV (with no prior triggers) also yields 100% UVXY [4].
- **XLF RSI > 81 (with SPY, IOO, TQQQ, VTV <= 79):** Next, it checks the Financials sector (XLF). XLF's 10-day RSI above 81 (with no earlier triggers) will trigger 100% UVXY [5].

In summary, **any one of these indices** reaching an extreme overbought RSI (>81) – in the priority order SPY → IOO → TQQQ → VTV → XLF – causes the strategy to take a full long volatility position (UVXY) [6] [7]. This is a protective move anticipating a market reversal due to overbought conditions.

75% UVXY / 25% BTAL Allocation (Volatility Hedge with Anti-Beta)

Outcome: The strategy allocates to a hedged **portfolio of 75% UVXY and 25% BTAL** when a high but not extreme overbought condition exists. BTAL is the AGF U.S. Market Neutral Anti-Beta Fund, which shorts high-beta stocks and longs low-beta stocks (market neutral) [8] [9]. This mixed hedge is chosen under slightly less extreme conditions:

- **RSI 79–81 Overbought Range:** If an index's RSI is above 79 but **no RSI in the chain exceeds 81**, the strategy uses the UVXY/BTAL combination instead of pure UVXY. For example:
- SPY's 10-day RSI is > 79 but ≤ 81, and none of IOO, TQQQ, VTV, XLF hit >81 [10] [11].
- Or if SPY didn't trigger, IOO's RSI is >79 but ≤81 and TQQQ, VTV, XLF remain ≤81 [12] [13].

- Similarly, for TQQQ (>79 ≤81 with VTV, XLF ≤81) [14] [15]; VTV (>79 ≤81 with XLF ≤81) [16] [17]; or XLF (>79 ≤81) [18] [7].
- **VOX RSI > 79:** If none of SPY/IOO/TQQQ/VTV/XLF had RSI >79 (no prior overbought triggers fired) *but* the Communications Services sector ETF (VOX) has a 10-day RSI above 79, the strategy also allocates 75% UVXY and 25% BTAL [19] [9]. In the VOX-triggered case, the code still checks if XLF's RSI > 81 inside this branch, but since reaching the VOX condition implies XLF's RSI was ≤ 79 earlier, that sub-condition will fail [20]. Therefore any **VOX RSI > 79** (with no higher-priority triggers) yields the UVXY/BTAL split.

Conditions Summary: Broadly, a UVXY (75%) + BTAL (25%) allocation occurs under **overbought conditions that are notable but slightly less extreme** – RSI above 79 on one of the monitored indices, but no RSI reading crosses the >81 "full panic" threshold in that decision path [8] [21]. BTAL provides a market-neutral hedge alongside UVXY's volatility spike exposure in these scenarios.

100% TQQQ Allocation (Oversold Tech Rebound)

Outcome: The strategy allocates **100% to TQQQ**, the 3x leveraged Nasdaq-100 ETF, in a **contrarian long** signal when tech markets are deeply oversold. This happens under the following condition:

- **TQQQ RSI < 30:** If none of the above overbought conditions triggered (i.e. no RSI >79 on SPY, IOO, TQQQ, VTV, XLF, VOX) and **TQQQ's 10-day RSI drops below 30**, the strategy takes a full long position in TQQQ [22]. An RSI <30 indicates an oversold condition; here specifically on the Nasdaq, prompting an aggressive rebound play in the tech sector. This check is the first in the "oversold" branch once all overbought signals are bypassed. No additional sub-condition is needed – **if TQQQ's RSI ≤ 30**, the outcome is a 100% allocation to TQQQ [23].

(All earlier conditions must have failed to reach this branch, meaning the market was not extremely overbought, and we are now detecting a potential oversold bottom in tech.)

100% UPRO Allocation (Oversold Broad Market Rebound)

Outcome: The strategy allocates **100% to UPRO**, the 3x leveraged S&P 500 ETF, as a contrarian long signal when the broad market is deeply oversold (and the tech-specific trigger didn't fire). The specific condition is:

- **SPY RSI < 30:** If no overbought triggers fired and TQQQ's RSI was not <30, but now the S&P 500's **10-day RSI falls below 30**, the strategy allocates fully to UPRO [24]. This indicates a general market oversold condition (on the S&P 500), prompting a leveraged long position in the broader market.

In practice, this is evaluated as the next step if **TQQQ's RSI is ≥ 30** (so the tech oversold signal did not trigger) and **SPY's RSI < 30** [24]. Under those circumstances, the portfolio goes 100% into UPRO to capture an anticipated rebound in the S&P 500.

"Bull" Portfolio – Top 3 Nuclear Energy Stocks (Momentum-Weighted)

Outcome: The strategy constructs a **"Bull" portfolio focused on nuclear energy equities**, dynamically selecting top momentum names, when the market is in an ongoing uptrend regime. This occurs if no extreme overbought or oversold signals have triggered and the market's trend is bullish:

- **SPY above 200-day SMA:** If all prior conditions are bypassed (no RSI extremes) and the **current price of SPY is above its 200-day moving average**, the model classifies the regime as bullish

[25] . In this scenario, it allocates to the **Bull portfolio**, defined as a selection of nuclear-related stocks weighted by inverse volatility.

- **Composition:** The Bull portfolio is labeled `"Nuclear Energy Portfolio"` in the code [26] . It is constructed by **picking the top 3 securities (out of a defined universe of six nuclear energy stocks/ETFs)** based on their 90-day moving-average return, and weighting those three selections according to the inverse of their 90-day volatility [27] [28] . This yields a basket of three names with larger weights for the less volatile picks (for risk balancing). The universe of candidates includes:
- SMR – NuScale Power (Small Modular Reactor company) [29]
- BWXT – BWX Technologies [30]
- LEU – Centrus Energy (uranium enrichment) [30]
- EXC – Exelon Corp (nuclear utility) [30]
- NLR – Global X Uranium/Nuclear ETF [30]
- OKLO – Oklo Inc. Class A (advanced fission tech) [31]

The strategy uses a filter to select the **top 3 by 90-day return** and then applies a 90-day inverse volatility weighting to those picks [27] . These three positions are equally risk-weighted within this Bull portfolio (the code uses `weight-inverse-volatility 90` to achieve this) [32] . The Bull portfolio as a whole is one component that would receive 100% allocation in this regime.

Conditions Recap: The Bull regime is activated when **market trend is positive** (SPY > 200-day SMA) and none of the high-volatility or oversold triggers are active [25] . The final allocation is a diversified long portfolio of nuclear energy equities (3 names, inverse-vol weighted).

"Bear" Portfolio – Combined Short/Long QQQ Positions (Risk-Off Composite)

Outcome: The strategy enters a **“Bear” portfolio** when no other conditions have triggered and the market is in a **downtrend regime**. This Bear portfolio is more complex – it is composed of two sub-strategies (Bear 1 and Bear 2), each making conditional allocations to Nasdaq-100 related positions (long or short), and then combined with risk-weighting. The top-level trigger and structure:

- **SPY below 200-day SMA:** If all prior conditions fail and **SPY’s price is at or below its 200-day moving average**, the strategy deems the environment bearish and allocates to the Bear portfolio [33] . The code creates a `"Bear"` group containing two sub-groups, Bear 1 and Bear 2, which are then **combined with 14-day inverse-volatility weighting** [34] [35] . This means Bear 1 and Bear 2 each output a position, and those two positions are sized inversely proportional to their recent volatility (14-day window) in the final portfolio. We detail each Bear sub-strategy below.

Bear Sub-Strategy 1 (Bear 1)

Bear 1 focuses on aggressive **short vs long Nasdaq-100 decisions** using RSI and momentum signals. It outputs a single position based on the following hierarchy of conditions [36] [37] :

- **PSQ RSI < 35:** PSQ is the ProShares Short QQQ ETF (inverse 1x Nasdaq). If PSQ’s 10-day RSI is below 35 (meaning the inverse Nasdaq is oversold – equivalently the Nasdaq 100 index has been strongly rising), Bear 1 takes a contrarian short position via **SQQQ** (3x short Nasdaq) [36] . In other words, if the short ETF is oversold, it implies extreme optimism in the market, so Bear 1 responds by allocating to SQQQ expecting a downturn. This is the first check in Bear 1.
- **Nasdaq Drawdown Check:** If PSQ RSI is ≥ 35, Bear 1 next looks at the **60-day cumulative return of QQQ** (Nasdaq-100 ETF).

- **QQQ 60-day return < –10%:** If the Nasdaq has fallen more than 10% in the past 60 trading days (significant drawdown), Bear 1 attempts a **rebound trade**. It compares momentum of bonds vs short equity: if the 20-day RSI of long Treasuries (TLT) is higher than the 20-day RSI of PSQ [38], that indicates relative strength in safe-haven bonds, so Bear 1 goes **long TQQQ** (3x long Nasdaq) expecting a tech rebound [39]. Otherwise (if TLT's RSI is not greater than PSQ's), it favors continued caution and goes **long PSQ** (1x short Nasdaq) [39]. (This branch thus yields either TQQQ or PSQ.) [38] [39]
- **QQQ 60-day return ≥ –10%:** If the Nasdaq's decline is not steep enough (less than 10% drawdown), Bear 1 assumes a more prolonged or uncertain downtrend and uses shorter-term signals:
  - **TQQQ Price > 20-day SMA:** If the 3x Nasdaq (TQQQ) is trading above its 20-day moving average (i.e. a short-term uptick amid the downtrend) [40], Bear 1 will **fade that uptick** by comparing bond vs short-equity momentum similar to above. If TLT's 20-day RSI is higher than PSQ's 20-day RSI, Bear 1 takes a **long TQQQ** position (anticipating a rally); otherwise it takes **long SQQQ** (expecting a renewed drop) [41] [42]. (This yields either TQQQ or SQQQ in this branch.)
  - **TQQQ Price ≤ 20-day SMA:** If TQQQ is at or below its 20-day average (indicating no short-term rebound), Bear 1 uses an additional confirmation: **IEF vs PSQ RSI:** IEF (7–10 Year Treasury ETF) 10-day RSI is compared to PSQ's 20-day RSI [43]. If IEF's RSI is higher (bonds outperforming shorts, suggesting risk-off sentiment easing), Bear 1 opts for **SQQQ** (staying short Nasdaq) [44]. If IEF's RSI is not higher, then as a last step Bear 1 again compares TLT vs PSQ RSIs: if TLT's 20-day RSI > PSQ's 20-day, it chooses **long QQQ** (closing shorts, perhaps expecting a bottom) [45] [46]; otherwise it remains **long SQQQ** [46]. This final else branch yields either QQQ or SQQQ.

Bear 1 Summary: Depending on market conditions, Bear 1 can output **SQQQ, TQQQ, PSQ, or QQQ**. It tends to short the market (SQQQ or PSQ) in most risk-off conditions, but in cases of very deep drawdowns or improving bond momentum it can go long the Nasdaq (via TQQQ or QQQ) to catch rebounds. The logic sequence is: check for an oversold inverse ETF (PSQ RSI) -> check for large recent drawdown (QQQ -10%) -> check short-term trend (TQQQ vs 20DMA) -> check bond relative strength (RSIs of TLT/IEF vs PSQ) to decide between long or short positions [36] [47].

Bear Sub-Strategy 2 (Bear 2)

Bear 2 is a slightly simpler, parallel risk-off strategy. It also outputs one position, focusing on short-term trend and bond momentum without the cumulative return filter:

- **PSQ RSI < 35:** Similarly to Bear 1, if the inverse Nasdaq (PSQ) has a 10-day RSI below 35 (extremely low, indicating market euphoria), Bear 2 takes a **100% SQQQ** position (short Nasdaq) as a contrarian play [48].
- **PSQ RSI ≥ 35:** If this condition fails, Bear 2 checks the Nasdaq 3x ETF's price trend:
- **TQQQ Price > 20-day SMA:** If TQQQ is trading above its 20-day moving average (short-term upswing) [49], Bear 2 again uses the bond vs short RSI test. If TLT's 20-day RSI > PSQ's 20-day RSI, it takes a **long TQQQ** position; otherwise it takes **long SQQQ** [50] [51].
- **TQQQ Price ≤ 20-day SMA:** If TQQQ is at or below its 20-day average, Bear 2 skips directly to the TLT vs PSQ momentum comparison (since no bounce is in play). If TLT's 20-day RSI is higher than PSQ's, Bear 2 chooses **long QQQ** (closing shorts, anticipating stabilization) [52] [53]. If not, it stays **long SQQQ** [53].

Bear 2 Summary: Bear 2 can output **SQQQ, TQQQ, or QQQ**. It mirrors parts of Bear 1's logic but omits the 60-day drawdown check and the intermediate IEF check, making it react to *current* trends more

directly. It short-circuits to SQQQ if the market is extremely euphoric (PSQ RSI very low), otherwise it fades rallies or covers shorts based on the **20-day trend and bond-relative RSI signals** [48] [49].

Final Bear Portfolio Composition

The final Bear portfolio takes **Bear 1 and Bear 2's chosen positions** (each one of {SQQQ, TQQQ, PSQ, QQQ} depending on conditions above) and combines them. The two positions are **sized via 14-day inverse volatility weighting** [34], meaning the more volatile position gets a smaller allocation and vice versa, to balance risk. For example, if Bear 1 and Bear 2 both select SQQQ, the combined result is effectively 100% SQQQ (since both sub-parts hold the same asset). If they select different assets (say SQQQ and TQQQ), the portfolio will hold both long and short positions in Nasdaq with weights adjusted by their recent volatilities. All possible pairings of Bear 1 and Bear 2 outcomes are thus handled in a risk-weighted manner. The **trigger for entering the Bear portfolio** is simply the **market being below its 200-day MA with no overriding extreme RSI signals** [33], upon which this two-pronged Bear strategy dictates the exact short vs long Nasdaq exposure.

Final Signals and Conditions Summary (Tabular)

The table below summarizes each distinct final signal or portfolio allocation the strategy can produce, along with the conditions leading to it and the weighting configuration of the assets:

Final Signal / Portfolio	Triggering Market Conditions	Allocation / Weighting
100% UVXY *Ultra VIX Short-Term Futures ETF*	- **Extreme overbought** RSI on a major index: RSI₁₀ > 81 on SPY, or (if not SPY) on IOO, or (next) TQQQ, or VTV, or XLF (checked in this order) [1] [4] . – *Condition evaluated sequentially; first index to exceed 81 triggers UVXY.*	100% UVXY (single holding) [6] [7]
75% UVXY / 25% BTAL *Volatility + Anti-Beta*	- **High but not extreme RSI** ($79 < RSI \leq 81$) on one of the monitored indices, with no earlier index in the sequence exceeding 81 [10] [18] . - Or **VOX sector RSI > 79** (with all of SPY, IOO, TQQQ, VTV, XLF not triggering above 79) [19] [9] .	75% UVXY **/** 25% BTAL (UVXY volatility hedge combined with anti-beta hedge) [9]
100% TQQQ *3× Long Nasdaq 100*	- **Tech oversold contrarian signal:** No prior overbought signal triggered, and TQQQ's 10-day RSI drops below 30 (RSI₁₀ < 30) [22] .	100% TQQQ (single holding) [23]
100% UPRO *3× Long S&P 500*	- **Broad market oversold signal:** No prior triggers and SPY's 10-day RSI < 30 (while TQQQ's RSI $\geq$ 30, i.e. tech not oversold first) [24] .	100% UPRO (single holding) [54]

Final Signal / Portfolio	Triggering Market Conditions	Allocation / Weighting
"Bull" Portfolio *Top 3 Nuclear Energy Stocks*	- **Bullish regime:** No extreme RSI triggers and SPY's price > 200-day moving average (200-day SMA) [25] . - *Selects top 3 of 6 nuclear energy equities by 90-day return momentum* [30] .	Equally risk-weighted **basket of 3 stocks/ETFs** from {SMR, BWXT, LEU, EXC, NLR, OKLO}, chosen by highest 90-day returns. Weights by inverse 90-day volatility [27] [55] .
"Bear" Portfolio *Combined Nasdaq Short/ Long*	- **Bearish regime:** No prior triggers and SPY's price ≤ 200-day SMA [33] . - *Bear 1:* if PSQ RSI<35 then SQQQ; else if QQQ 60d return < –10% then (TLT RSI > PSQ RSI ? TQQQ : PSQ); else if TQQQ > 20d SMA then (TLT RSI > PSQ RSI ? TQQQ : SQQQ); else if IEF RSI > PSQ RSI then SQQQ; else (TLT RSI > PSQ RSI ? QQQ : SQQQ) [36] [47] . - *Bear 2:* if PSQ RSI<35 then SQQQ; else if TQQQ > 20d SMA then (TLT RSI > PSQ RSI ? TQQQ : SQQQ); else (TLT RSI > PSQ RSI ? QQQ : SQQQ) [48] [56] .	**Composite of 2 positions** (Bear 1 and Bear 2 outputs) weighted by inverse 14-day volatility [34] . Possible holdings include SQQQ, TQQQ, QQQ, and PSQ (various combinations per Bear 1/2 logic). Each sub-strategy's pick gets scaled by 1/volatility, balancing the risk [34] .

Every branch and threshold in the strategy's logic is as specified above, with no discretionary overrides. This exhaustive mapping of conditions to outcomes can be used to **replicate the strategy's signals** or to trace how any given market scenario would flow through the decision tree to a final portfolio allocation. All technical indicators (RSI windows, moving average periods, return lookbacks) and weightings are explicitly defined in the code [57] [26] , ensuring a transparent and deterministic strategy behavior.

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