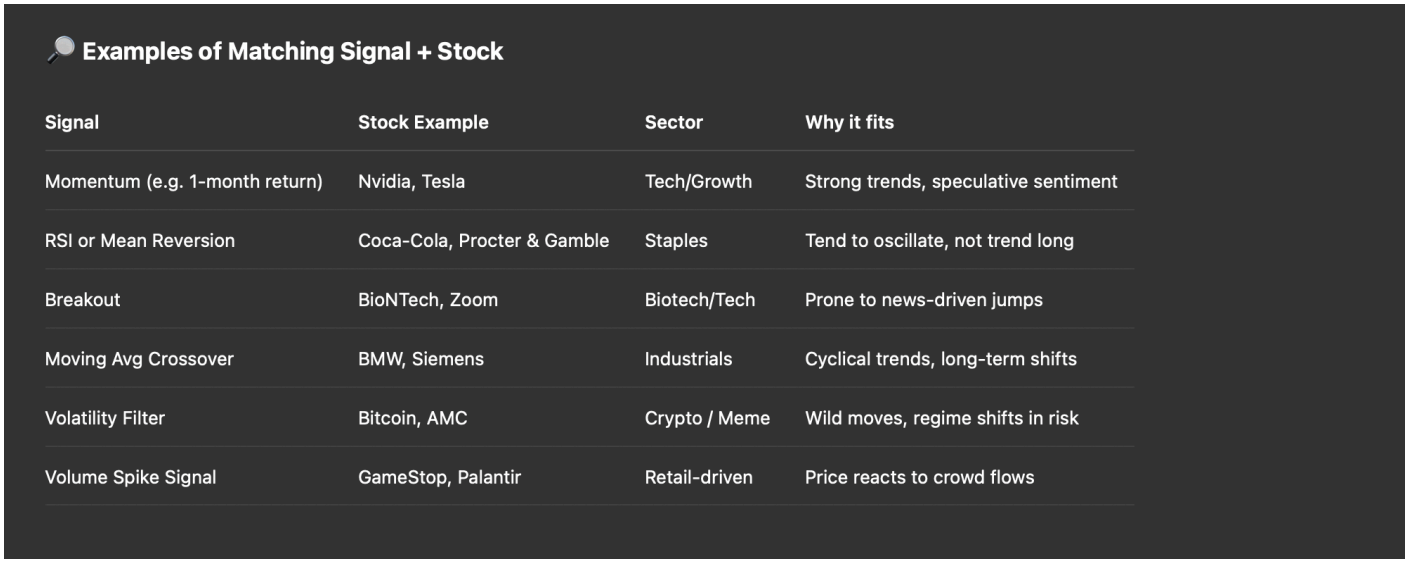
02. Hints on Justification of choosing Signals

1. **Goal**
   - Design and justify three trading strategies using different signals and stocks, with strong economic reasoning and clear logic. Each signal should be tested, interpreted, and ultimately combined into a portfolio.
2. Approach to strategy design

   1. Option A: Strategic diversity (complementary signals)
   - Choose signals with **different logics** (e.g., momentum, mean-reversion, volatility breakout)
   - Use them on **different stocks or industries**
   - Goal: diversify risk and style exposure
   - At the end, you combine them in a **portfolio optimization** step
     - This is common approach in hedge funds and quant asset management.

       1. Option B: Thematic or sector-aligned signals
   - Choose signals that all apply to, say, tech stocks or cyclical sectors
   - Show that **some signals work better in specific environments**
   - This can make your strategy more coherent thematically
     - Good if your group wants a more cohesive economic story.
3. **Example Signal+Stock Combinations**



🔎 **Examples of Matching Signal + Stock**

Signal	Stock Example	Sector	Why it fits
Momentum (e.g. 1-month return)	Nvidia, Tesla	Tech/Growth	Strong trends, speculative sentiment
RSI or Mean Reversion	Coca-Cola, Procter & Gamble	Staples	Tend to oscillate, not trend long
Breakout	BioNTech, Zoom	Biotech/Tech	Prone to news-driven jumps
Moving Avg Crossover	BMW, Siemens	Industrials	Cyclical trends, long-term shifts
Volatility Filter	Bitcoin, AMC	Crypto / Meme	Wild moves, regime shifts in risk
Volume Spike Signal	GameStop, Palantir	Retail-driven	Price reacts to crowd flows

   - **Momentum signal** on a **trend-heavy stock** (like Tesla or Nvidia)
   - **RSI or z-score strategy** on a **mean-reverting stock** (like Unilever or Bayer)
   - **Volatility-adjusted signal** on a **high-risk asset** (e.g. Bitcoin, biotech)
4. How to justify the choices

Justification	Example
Volatility profile	“We use a mean-reversion strategy on Unilever, a low-volatility stock known to oscillate around fair value.”
Trend strength	“Tesla displays strong momentum characteristics driven by speculative and growth expectations, which aligns well with our momentum signal.”
Market structure	“Biotech stocks often show low-volatility periods followed by jumps, making them ideal for breakout strategies.”
Investor type	“Our chosen stock suits moderately risk-tolerant investors seeking smoother returns and lower drawdowns.”

Then show that:

- Signal performance depends on market structure
- Portfolio benefits from diversification of logic and asset behavior

Hints on choosing the stocks:

- Start with the stock universe
- Justify the combinations that work best on the stock's behaviour
- then test different signals over it
  - flexibility to experiment
  - strong economic narrative - we chose this signal because it matches the nature of the stock

5. Project Flow
   1. **Select 3 Stocks or Industries**
      - Based on volatility, sector logic, and risk level
      - Bonus: pick stocks you find interesting (makes writing easier)
   2. **Test Several Signals Per Stock**
      - Have coder run signals like SMA crossover, RSI, momentum, breakout
      - Compare performance visually and statistically
   3. **Choose Best Signal for Each Stock**
      - Use criteria: visual fit, performance metrics, theoretical logic
   4. **Justify Signal–Stock Pairing**
      - In your research notebook, explain:
        - Why this signal fits this stock
        - What behavior or pattern it exploits
        - What kind of investor would choose this strategy
6. Optimization

Step	What is being optimized
Grid Search	The parameters of each signal
Portfolio Ottimization	The weights of each signal's strategy in our final portfolio

- Optimizing over parameters based on performance metrics like:

Metric	Meaning
Cumulative return	Total growth of portfolio during the backtest
Sharpe ratio	Return relative to risk — higher is better
Max drawdown	Biggest drop from a peak — lower is better
(others optional)	e.g., win ratio, volatility, Sortino ratio, etc.