

Part 3 — Investment Logic Deliverable

Rule (What it does)

I implemented a **moving average crossover** rule on **AAPL** using adjusted close prices:

- Compute **MA20** (20-day moving average) and **MA50** (50-day moving average).
- **Go long (buy/hold AAPL)** when $MA20 > MA50$.
- **Stay in cash** when $MA20 \leq MA50$.

To avoid look-ahead bias, **today's position uses yesterday's signal** (i.e., the signal is shifted by 1 trading day).

Market belief (What it encodes)

This rule is based on a **trend-following / momentum** belief:

When the short-term trend rises above the long-term trend, the upward movement may continue for some time, so staying invested can capture sustained uptrends.

Long / Short definition

- **Long position:** hold AAPL (position = 1), so strategy return follows AAPL's daily return.
- **Short position:** not used in this project. I avoid shorting to keep risk and mechanics simple (shorting has asymmetric risk and requires borrowing/margin).

Pseudocode (implementation)

```
prices = AdjClose(AAPL)

MA_short = rolling_mean(prices, 20)
MA_long = rolling_mean(prices, 50)

signal = 1 if MA_short > MA_long else 0
position[today] = signal[yesterday]    # shift(1) to avoid look-ahead

returns = pct_change(prices)
strategy_returns = position * returns
equity_curve = cumulative_product(1 + strategy_returns)
```

Assumptions

- **No transaction costs/slippage:** real trading would reduce returns.
- **Cash earns 0%:** the “out of market” period assumes no interest on cash.
- **Single-asset focus:** rule is applied only to AAPL; it may not generalize.

Limitations

- **Whipsaw risk:** in sideways markets, frequent crossovers can cause losses.
- **Parameter sensitivity:** results depend on the chosen windows (20/50).