Data from 2019, 1 ,10 ~ 2022, 2, 14

SPY (S & P 500)

QQQ (Nasdaq 100)

DIA (dow jone)

Use different strategy

Try back-test

Test the significance of different strategies

[https://www.quantifiedstrategies.com/trading-strategies/](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.quantifiedstrategies.com%2Ftrading-strategies%2F&data=05%7C01%7Cnhoang7%40groute.uic.edu%7C1da10a924d054e993cc408db5652abe7%7Ce202cd477a564baa99e3e3b71a7c77dd%7C0%7C0%7C638198685303422235%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=gVKnetMDxOptawOklOL7pKQb0%2FmFVCL53%2F2ZsUb32Hk%3D&reserved=0)

[https://www.tradingwithrayner.com/trend-following-trading-strategy-guide/](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.tradingwithrayner.com%2Ftrend-following-trading-strategy-guide%2F&data=05%7C01%7Cnhoang7%40groute.uic.edu%7C1da10a924d054e993cc408db5652abe7%7Ce202cd477a564baa99e3e3b71a7c77dd%7C0%7C0%7C638198685303422235%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=gpOO4gN5PUEBceXau2VeDFxYAOgqFBlTXhgNiiucI5Y%3D&reserved=0)

[https://medium.com/swlh/a-step-by-step-guide-towards-a-trend-following-trading-strategy-814b198b815](https://nam04.safelinks.protection.outlook.com/?url=https%3A%2F%2Fmedium.com%2Fswlh%2Fa-step-by-step-guide-towards-a-trend-following-trading-strategy-814b198b815&data=05%7C01%7Cnhoang7%40groute.uic.edu%7C1da10a924d054e993cc408db5652abe7%7Ce202cd477a564baa99e3e3b71a7c77dd%7C0%7C0%7C638198685303422235%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=FNffyLqVs0ilWderIA6jSohFXVBTUJene95on%2FK3Tdk%3D&reserved=0)

Indicators

**Moving Average Convergence Divergence (MACD):** MACD combines two moving averages and oscillates around a zero line. Traders look for bullish crossovers (MACD line crosses above the signal line) as buy signals and bearish crossovers as sell signals.

**Relative Strength Index (RSI)**: RSI measures the magnitude of recent price changes to determine overbought or oversold conditions. Readings above 70 indicate overbought conditions, while readings below 30 indicate oversold conditions.

**Moving Average Crossover:**

Use two or more moving averages of different lengths not limited to 50-day (short-term) or 200-day (long-term). Also, try 10 vs. 21 days. And 21 vs. 50 days.

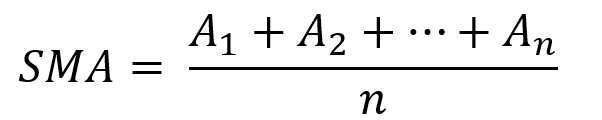
* Bullish Signal (Buy): When the shorter-term moving average crosses above the longer-term moving average, it generates a bullish signal. This crossover suggests a potential upward trend and serves as a buying opportunity.
* Bearish Signal (Sell): When the shorter-term moving average crosses below the longer-term moving average, it generates a bearish signal. This crossover indicates a potential downward trend and serves as a selling opportunity.

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# **The Concept of Moving Averages**

We can use them to find support and resistance levels, stops and targets, and to understand the underlying trend.

It is simply the total values of the observations divided by the number of observations. Mathematically speaking, it can be written down as:



Workflow (create a trend following trading strategy)

1. Define the time period and data (opening, closing, or other relevant price data for each time period)
2. Choose the moving average periods for the short-term and long-term moving averages. Common choices include 50-day and 200-day moving averages
3. Calculate the moving averages: Calculate the short-term and long-term moving averages for each data point in the time period. To calculate the moving average for a specific day, sum the closing prices for the specified number of periods and divide the sum by the number of periods.
4. Determine the trading signals: Generate trading signals based on the moving averages.

a buy signal when the short-term moving average crosses above the long-term moving average (a "golden cross")

a sell signal when the short-term moving average crosses below the long-term moving average (a "death cross").

1. Implement the strategy: iterates through each data point, checks the trading signal conditions, and executes the appropriate action (e.g., buying or selling) based on the signals generated.
2. Backtest and evaluate: Apply the strategy to historical data and assess its performance. Evaluate metrics such as profitability, risk-adjusted returns, and drawdowns to determine the effectiveness of the strategy. Consider using a library like pandas or numpy in Python to help with data manipulation and analysis.