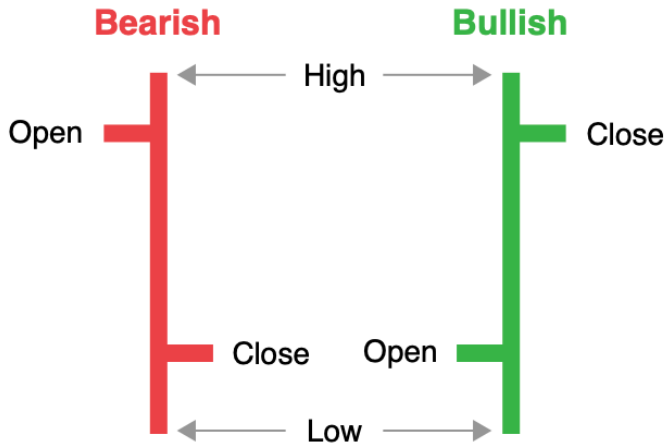
FinOptix - Summer Project'25

INTRODUCTION TO TRADING

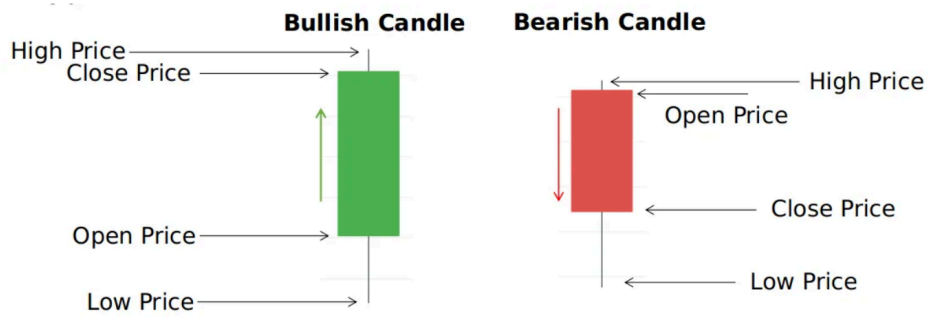
OHLC CANDLES

An OHLC chart is a type of bar chart that shows open, high, low, and closing prices for each period. The following images will explain what the candles show better:



1. O -> OPEN
2. H -> HIGH
3. L -> LOW
4. C -> CLOSE
5. VOLUME -> not shown in candle but refers to amount of trades

The ohlc candles primarily show the 4 prices mentioned above for your respective time frame.



Key Performance Indicators & Backtesting

Back testing is procedure to test how well our strategy works by testing it on previous data.

KPI.
Some of the most famous KPI's are Returns, Sharpe Ratio, Maximum Drawdown, etc.

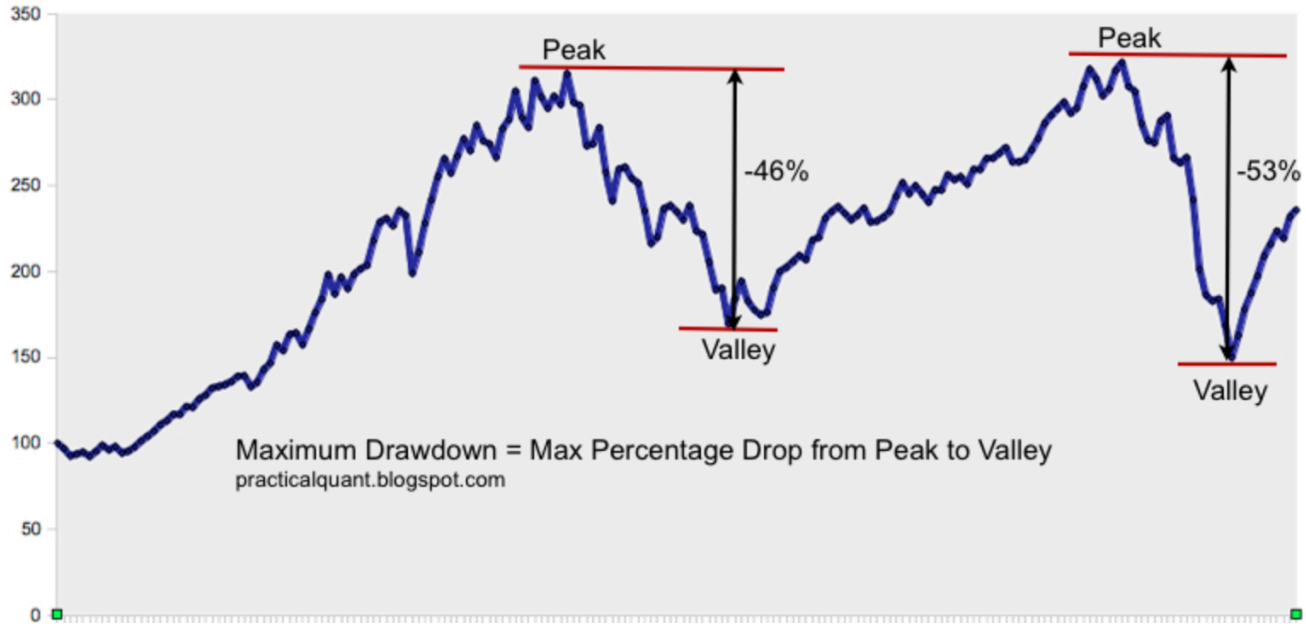
Sharpe Ratio

Widely regarded as the best KPI to judge a strategy upon. Sharpe ratio takes into account the most important features of strategy like returns and standard deviation. The higher the better, It follows the formula:

$$\text{Sharpe Ratio} = \frac{(\text{Expected Return}_{\text{Portfolio}} - \text{Risk-Free Rate})}{\text{Standard Deviation}_{\text{Portfolio}}}$$

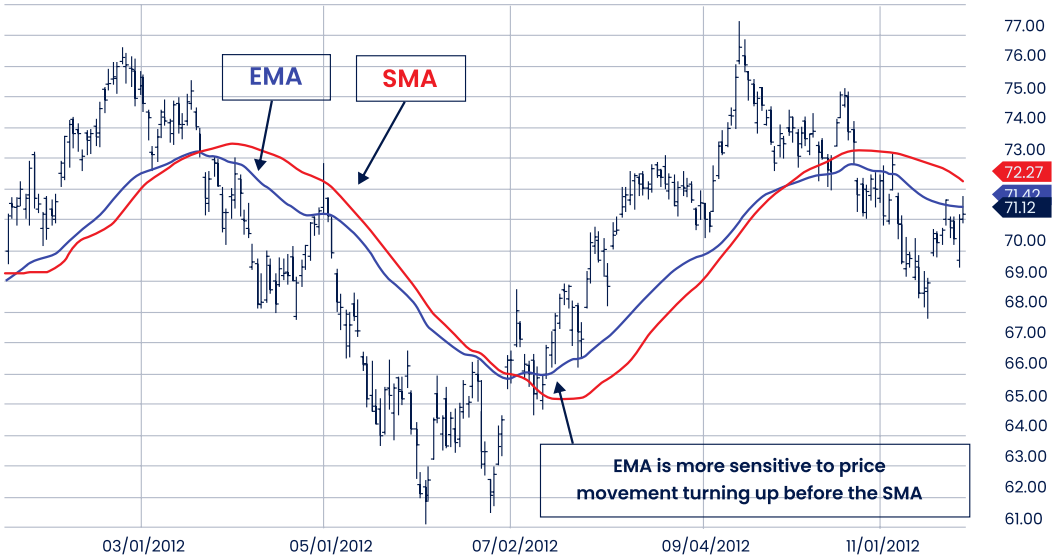
Maximum Drawdown

Maximum drawdown is the largest observed loss from a portfolio's peak value to its lowest point before a new peak is reached.
It helps assess how much an investment can potentially lose in the worst-case scenario before recovering.



EMA - Exponential Moving Average

- An exponential moving average (EMA) is a type of moving average that places a greater weight and significance on the most recent data points.
- EMA is similar to a simple moving average (SMA) but gives more weight to recent data.
- EMA is more responsive to price changes and can help identify trends earlier than an SMA.
- EMA can be used to generate buy/sell signals.
- EMA can also indicate support and resistance areas.



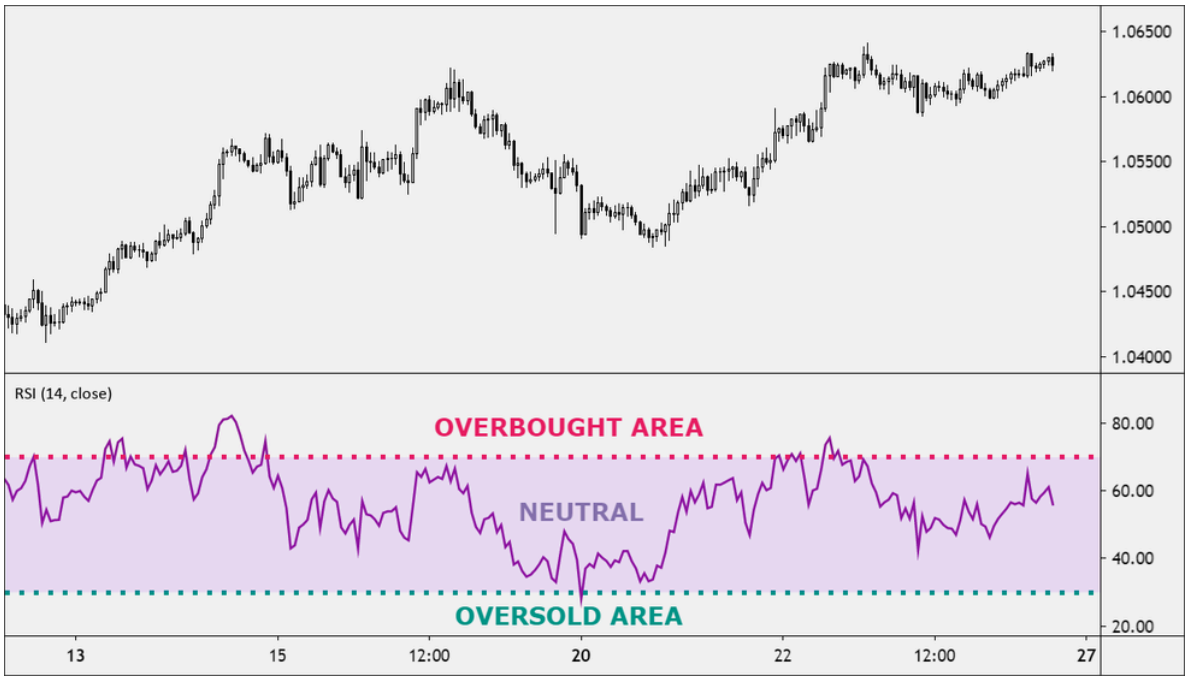
MACD - Moving Average Convergence/Divergence

- Moving average convergence/divergence (MACD) is a technical indicator to help investors identify entry points for buying or selling.
- The MACD line is calculated by subtracting the 26-period exponential moving average (EMA) from the 12-period EMA.
- The signal line is a nine-period EMA of the MACD line.
- Traders may buy the security when the MACD line crosses above the signal line and sell—or short—the security when the MACD line crosses below the signal line.

RSI - Relative Strength Index

- The relative strength index (RSI) is a momentum indicator used in technical analysis. RSI measures the speed and magnitude of a security's recent price changes to detect overbought or oversold conditions in the price of that security.
- An asset is usually considered overbought when the RSI is above 70 and oversold when it is below 30.

$$\text{RSI} = 100 - \frac{100}{1 + \frac{(\text{Previous Average Loss} \times 13) + \text{Current Loss}}{(\text{Previous Average Gain} \times 13) + \text{Current Gain}}}$$



Bollinger Bands

- Bollinger Bands is a technical analysis tool used to determine where prices are high and low relative to each other.
- These bands are composed of three lines: a simple moving average (the middle band) and an upper and lower band.
- The upper and lower bands are typically two standard deviations above or below a 20-period simple moving average (SMA).
- The bands widen and narrow as the volatility of the underlying asset changes.

The Bollinger Bands are calculated using the following steps:

1. *Calculate the Typical Price (TP):*

$$TP = \frac{(\text{High} + \text{Close} + \text{Open})}{3}$$

2. *Calculate the Upper Bollinger Band(BOLU):*

$$BOLU = \text{SMA(TP,n)} + \text{multiplier}^* \, \sigma(\text{TP,n})$$

3. *Calculate the Lower Bollinger Band(BOLD):*

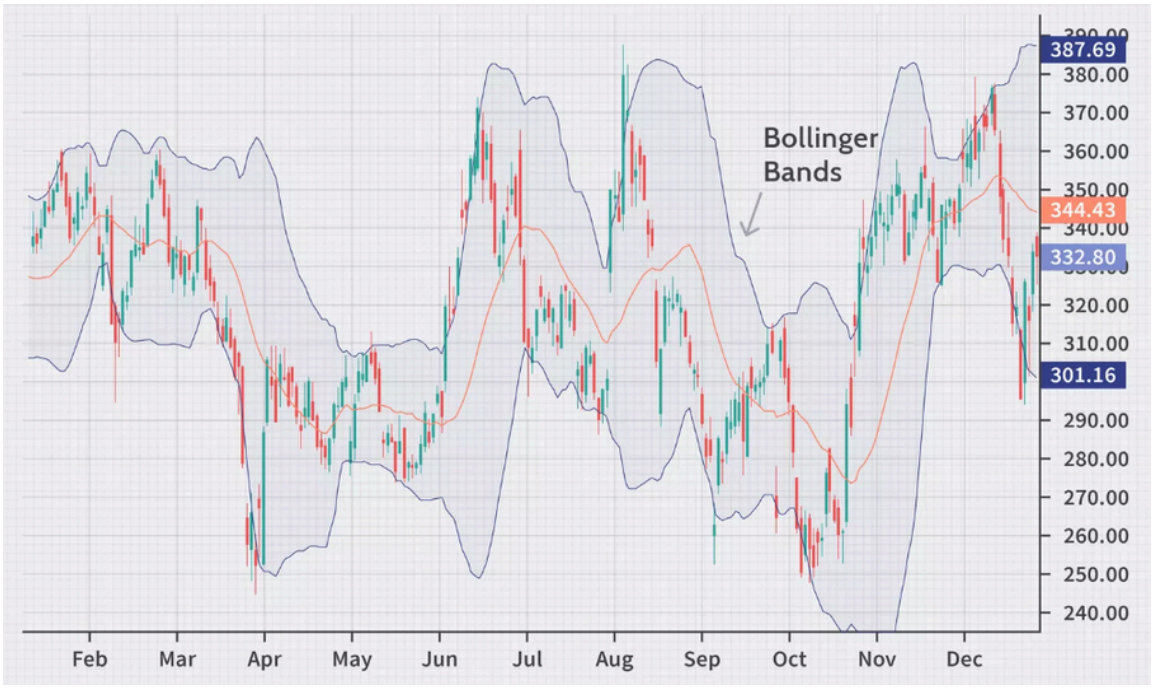
$$BOLD = \text{SMA(TP,n)} - \text{multiplier}^* \, \sigma(\text{TP,n})$$

where

SMA(TP,n)= Simple Moving Average over last n days

multiplier= It is for enhancing the effect of standard deviation typically 2

σ(TP,n) = Standard Deviation over last n days of typical price


Bollinger
Bands
387.69
380.00
370.00
360.00
350.00
344.43
340.00
332.80
320.00
310.00
301.16
290.00
280.00
270.00
260.00
250.00
240.00
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec