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Booklets

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Title: Development of an Artificial Intelligence to Automate the Buying and Selling of bitcoins. Programming, Finance, Mathematics

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Introduction

Cryptocurrencies

Cryptocurrencies are virtual currencies. They can be exchanged and traded like any other traditional currency, but they are outside the control of governments and financial institutions.

Trading

Trading consists of buying and selling listed assets with a lot of market liquidity (stocks, currencies and futures). And that financial market is electronic and regulated. Their objective is to obtain an economic benefit when the operation generates a capital gain.

Bot

It is a program that does repetitive, predefined and automated tasks

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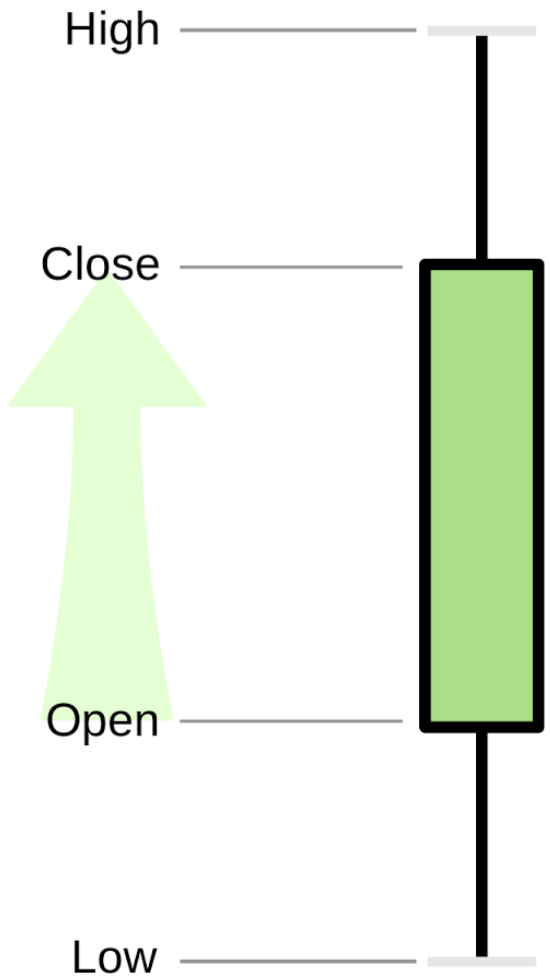
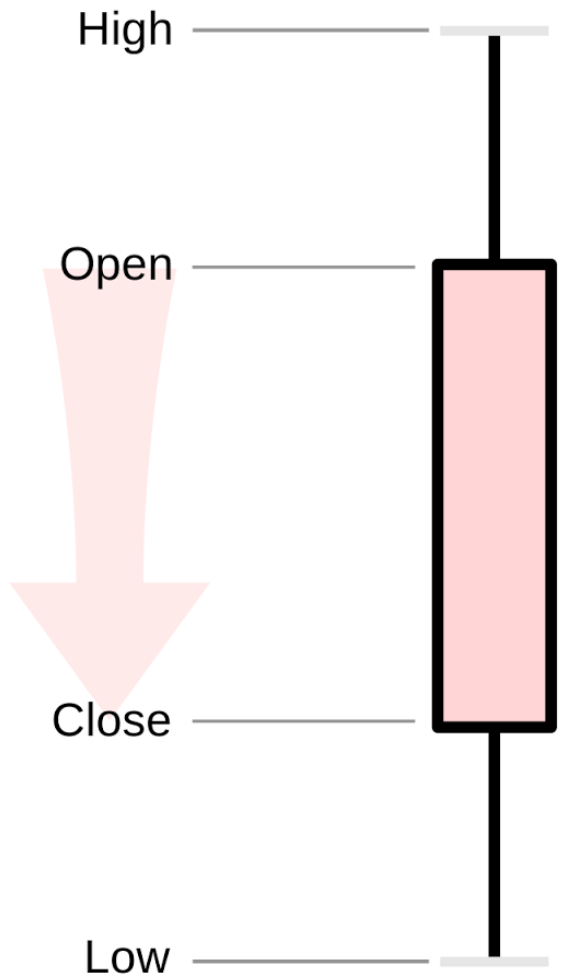
09:02:04

Increasing :
Bullish Candle Stick



Decreasing :
Bearish Candle Stick



Bot

It is a program that does repetitive, predefined and automated tasks

Methodology

Python

Binance

Estructura del bot

Genetic algorithms

A genetic algorithm (or GA for short) is a programming technique inspired by the reproduction of living beings and that mimics biological evolution as a strategy to solve optimization problems

Strategy

- The RSI must be less than the overbought value
- The RSI must be higher than the oversold level
- The low of the previous candle must be less than the band of the bolliger i-1 to be the previous one
- The low of the current candlestick is higher than the bolliger band

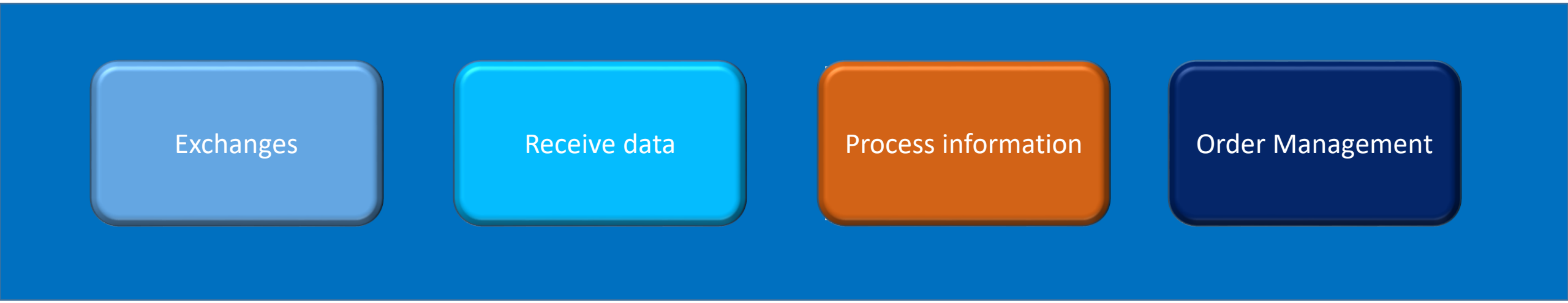
Test

- Tests with historical data
- Real-time tests

Python

Binance

Estructura del bot

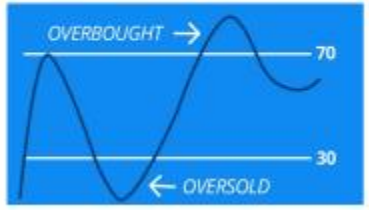


Indicadores

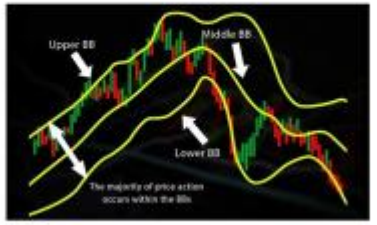
Simple Moving Average (SMA)

Moving Average Convergene Divergence(MACD)

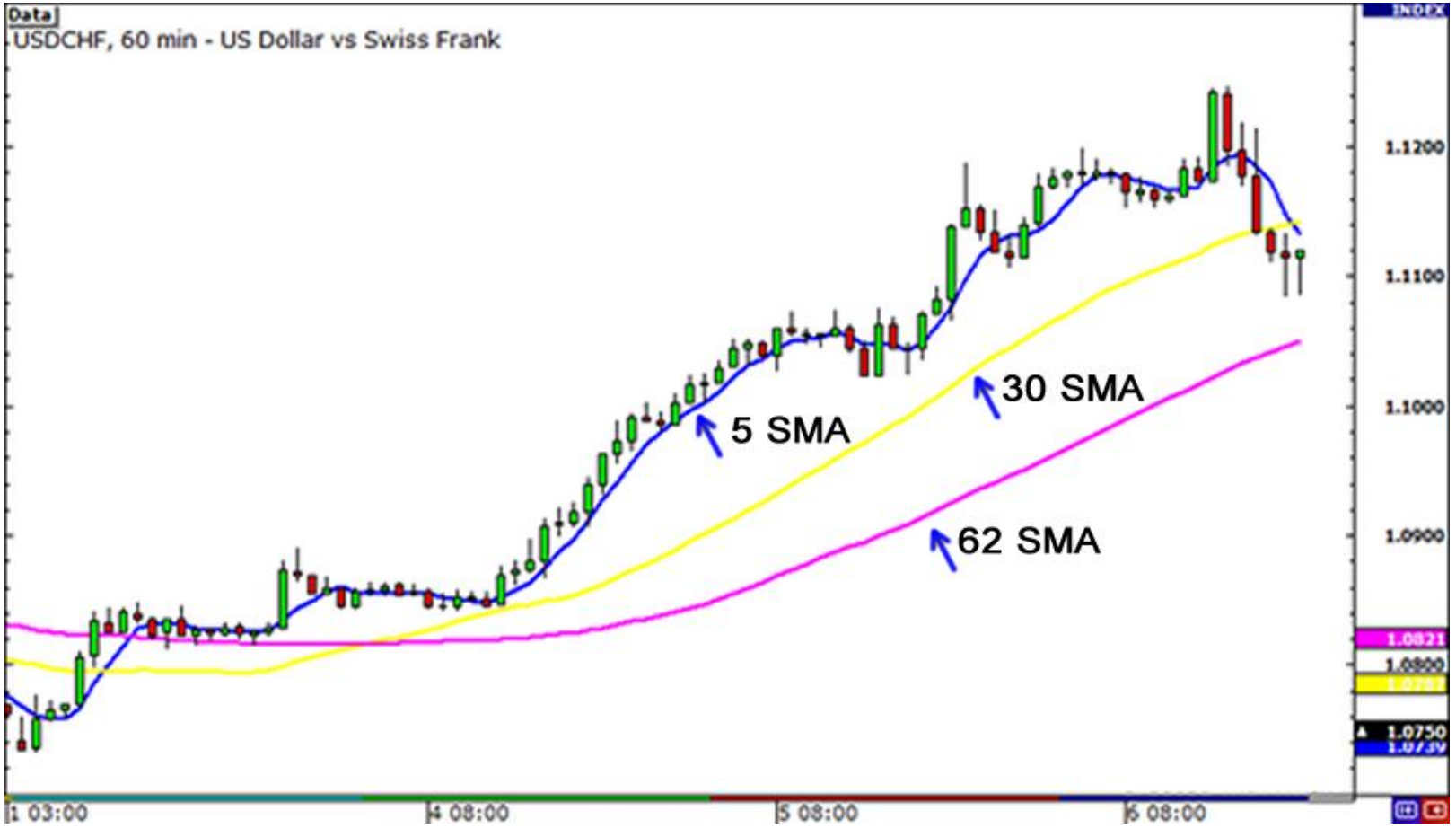
Relative Strength Index (RSI)



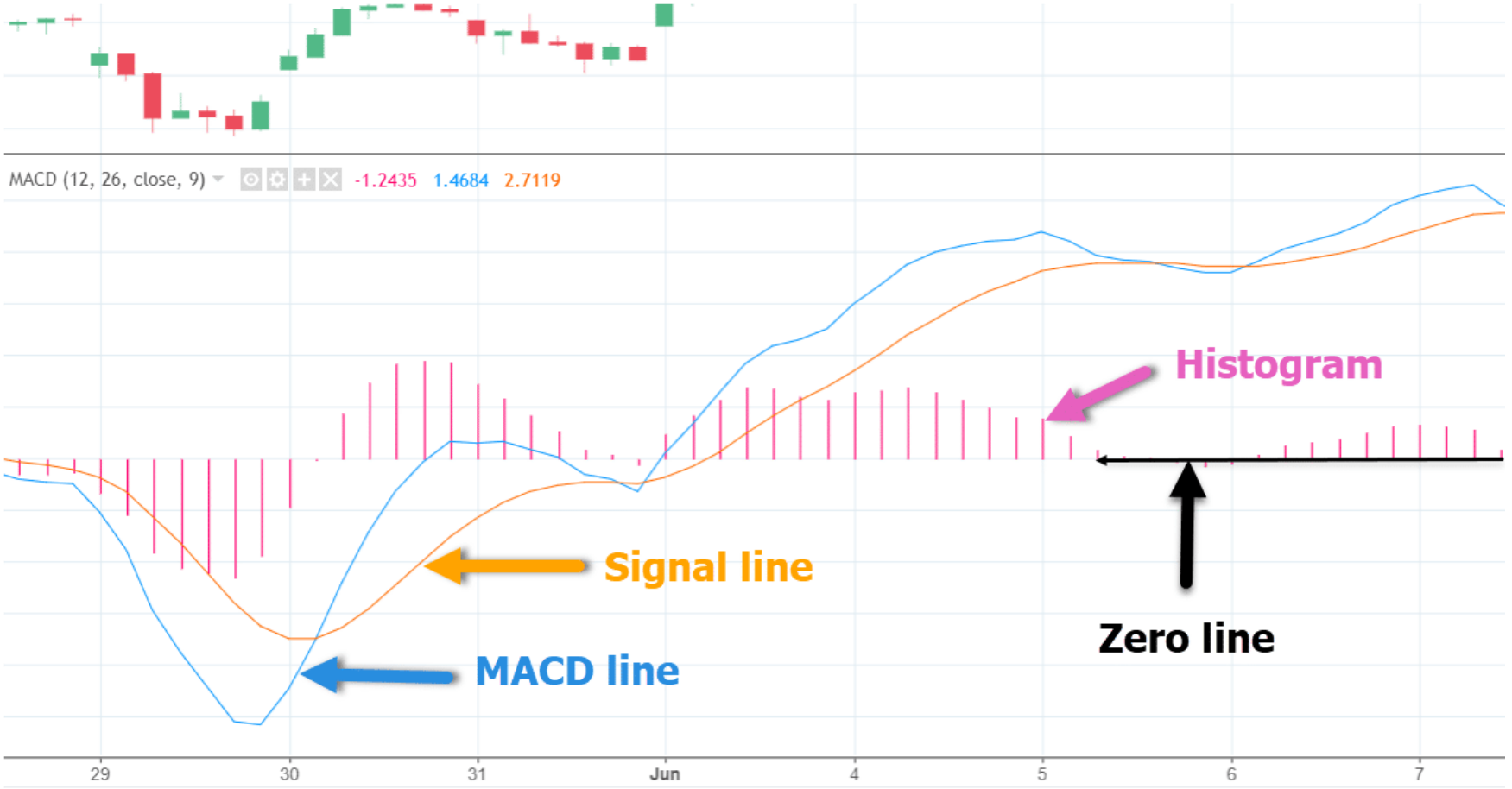
Bollinger Bands



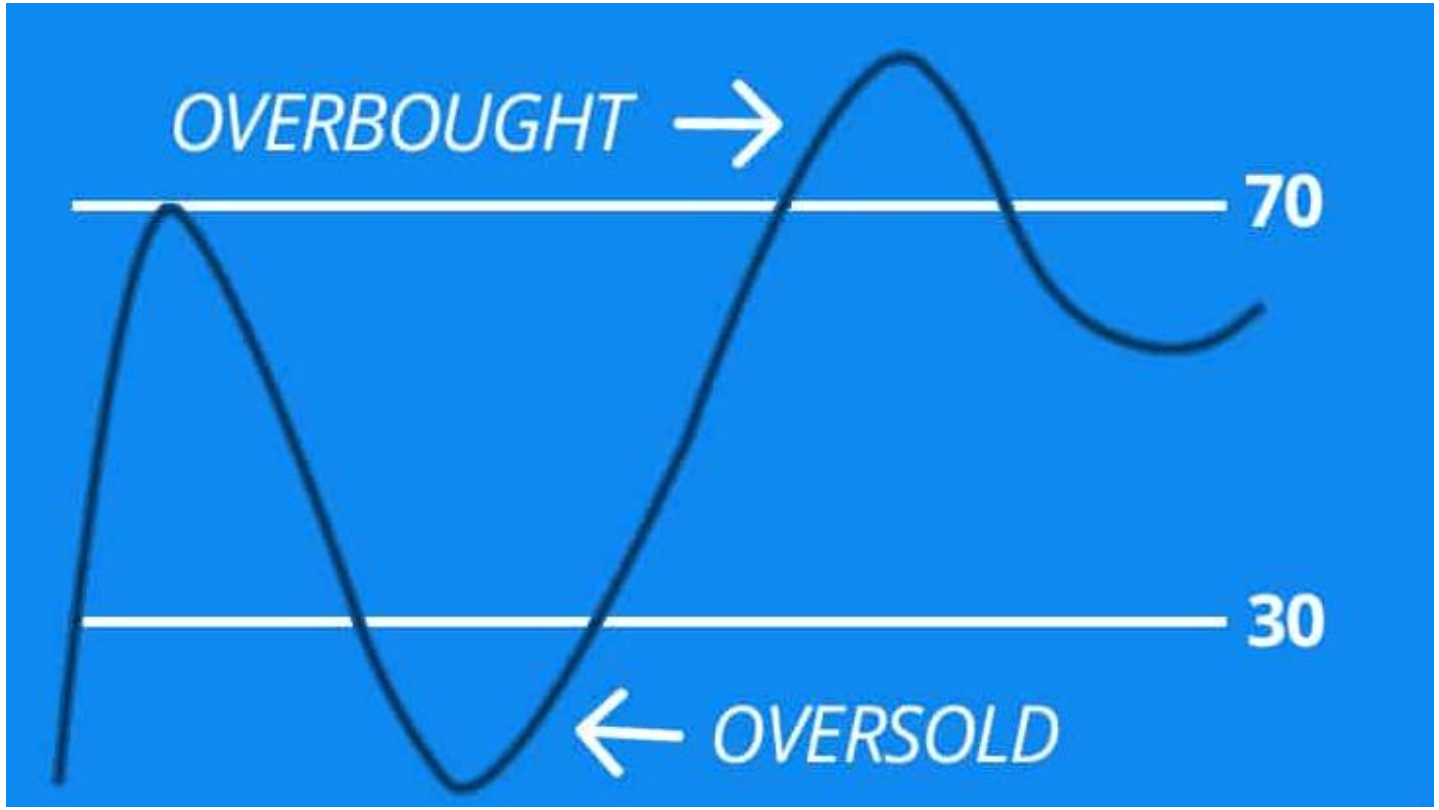
Simple Moving Average (SMA)



Moving Average Convergene Divergence(MACD)



Relative Strength Index (RSI)



Bollinger Bands

Genetic algorithms

A genetic algorithm (or GA for short) is a programming technique inspired by the reproduction of living beings and that mimics biological evolution as a strategy to solve optimization problems

Genetic algorithms

Initialization	Evaluation	Evolution	Finished
An initial population composed of possible solutions to the problem, also called individuals, is randomly generated.	Application of the evaluation function to each of the individuals.	Application of genetic operators (such as selection, reproduction and mutation).	The GA should stop when the optimal solution is reached, but this is generally unknown, so various stopping criteria are used.

Strategy

- The RSI must be less than the overbought value
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Test

- Tests with historical data

- Real-time tests

Results

Library

Indicators

Genetic algorithms

Strategy with historical data

Real time strategy

Library


PS C:\Backtesting\ema> python 01get_data.py
['aax', 'acx', 'aofex', 'ascendex', 'bequant', 'bibox', 'bigone', 'binance', 'binanceus', 'b
it2c', 'bitbank', 'bitbay', 'bitcoincom', 'bitfinex', 'bitfinex2', 'bitflyer', 'bitforex', '
bitget', 'bithumb', 'bitkk', 'bitmart', 'bitmax', 'bitmex', 'bitpanda', 'bitso', 'bitstamp',
'bitstamp1', 'bittrex', 'bitvavo', 'bitz', 'bl3p', 'bleutrade', 'braziliex', 'btcalpha', 'b
tcbox', 'btcmarkets', 'btctradeua', 'btcturk', 'buda', 'bw', 'bybit', 'bytetrade', 'cdax', '
cex', 'chilebit', 'coinbase', 'coinbaseprime', 'coinbasepro', 'coincheck', 'coinegg', 'coine
x', 'coinfalcon', 'coinfloor', 'coingi', 'coinmarketcap', 'coinmate', 'coinone', 'coinspot',
'crex24', 'currencycom', 'delta', 'deribit', 'digifinex', 'equos', 'eterbase', 'exmo', 'exx
', 'fcoin', 'fcoinjp', 'flowbtc', 'foxbit', 'ftx', 'gateio', 'gemini', 'gopax', 'hbtc', 'hit
btc', 'hollaex', 'huobijp', 'huobipro', 'idex', 'independentreserve', 'indodax', 'itbit', 'k
raken', 'kucoin', 'kuna', 'lakebtc', 'latoken', 'lbank', 'liquid', 'luno', 'lykke', 'mercado
', 'mixcoins', 'ndax', 'novadax', 'oceanex', 'okcoin', 'okex', 'paymium', 'phemex', 'polonie
x', 'probit', 'qtrade', 'rightbtc', 'ripio', 'southxchange', 'stex', 'surbitcoin', 'therock'
, 'tidebit', 'tidex', 'timex', 'upbit', 'vbtc', 'vcc', 'wavesexchange', 'whitebit', 'xbtce',

Indicators

SMA

```
100 rows x 7 columns]
<class 'numpy.float64'>
sma
      close     volume                 date  sma_target
0   45787.85  1058.12591 2022-03-31 22:00:00         NaN
1   45510.34  2889.28168 2022-03-31 23:00:00         NaN
2   45541.50  1838.20071 2022-04-01 00:00:00         NaN
3   44923.77  4127.99675 2022-04-01 01:00:00         NaN
4   44392.71  5752.16535 2022-04-01 02:00:00         NaN
..       ...         ...                 ...         ...
95  46449.06  2177.02783 2022-04-04 21:00:00   45897.105
96  46666.67  1841.99003 2022-04-04 22:00:00   45963.114
97  46580.51  1894.37376 2022-04-04 23:00:00   46004.308
98  46512.01  1516.16322 2022-04-05 00:00:00   46065.811
99  46474.19   219.10360 2022-04-05 01:00:00   46149.842

[100 rows x 4 columns]
PS C:\Backtesting\ema>
```

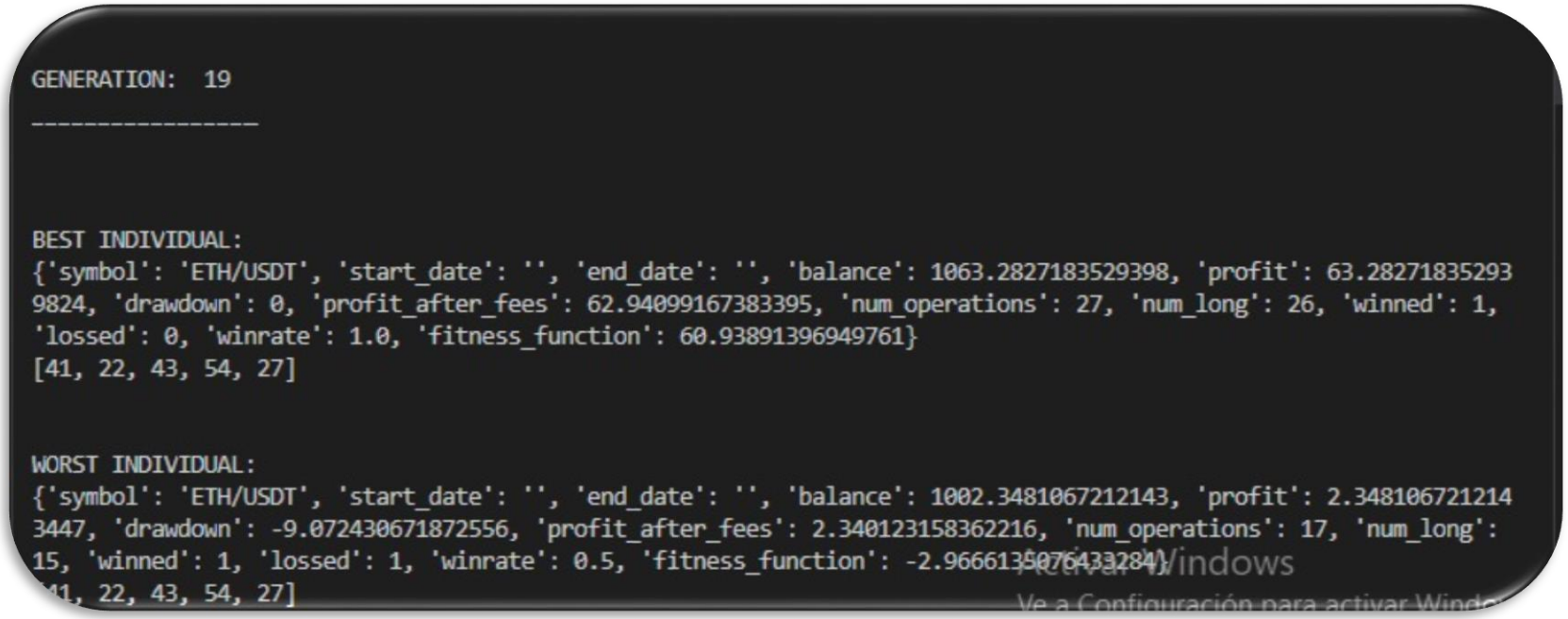
RSI

```
PS C:\Backtesting\ema> python 03_rsi.py
      close     volume                 date   rsi_ours  rsi_target
0   38761.04  1110.31613 2022-03-15 06:00:00        NaN         NaN
1   38439.50  3473.18543 2022-03-15 07:00:00   0.000000         NaN
2   38362.15  1614.88804 2022-03-15 08:00:00   0.000000         NaN
3   38581.61  1667.94993 2022-03-15 09:00:00  38.601222         NaN
4   38663.58  1256.76846 2022-03-15 10:00:00  46.853272         NaN
..       ...         ...                 ...        ...         ...
495 46449.06  2177.02783 2022-04-04 21:00:00  57.702107   57.702107
496 46666.67  1841.99003 2022-04-04 22:00:00  61.019175   61.019175
497 46580.51  1894.37376 2022-04-04 23:00:00  59.044804   59.044804
498 46512.01  1516.16322 2022-04-05 00:00:00  57.453159   57.453159
499 46489.50   243.61923 2022-04-05 01:00:00  56.910254   56.910254
```

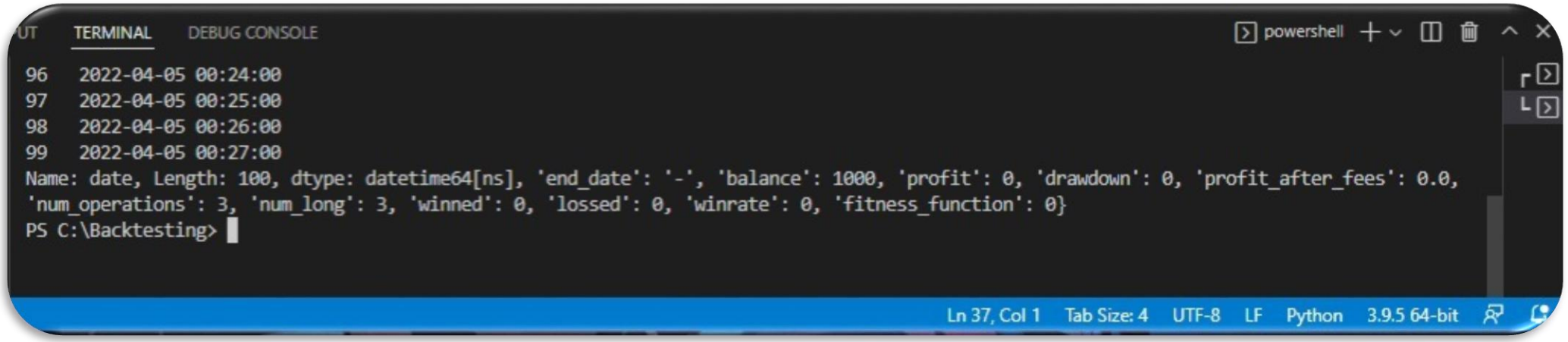
Bollinger Bands

```
Target
     BBL_20_20.0  BBM_20_20.0  BBU_20_20.0  BBB_20_20.0  BBP_20_20.0
0            NaN          NaN          NaN          NaN          NaN
1            NaN          NaN          NaN          NaN          NaN
2            NaN          NaN          NaN          NaN          NaN
3            NaN          NaN          NaN          NaN          NaN
4            NaN          NaN          NaN          NaN          NaN
..           ...          ...          ...          ...          ...
495  40726.507817   45995.7235  51264.939183    22.911763     0.543017
496  39999.151561   46027.2085  52055.265439    26.193450     0.553040
497  39565.959026   46055.9620  52545.964974    28.183118     0.540412
498  39289.427936   46077.7700  52866.112064    29.464716     0.531984
499  39091.722146   46090.8355  53089.948854    30.370955     0.528728

[500 rows x 5 columns]
Ours
           BBL         MID         BBU
0          NaN         NaN         NaN
1          NaN         NaN         NaN
2          NaN         NaN         NaN
3          NaN         NaN         NaN
4          NaN         NaN         NaN
..         ...         ...         ...
495  40589.622277  45995.7235  51401.824723
496  39842.552575  46027.2085  52211.864425
497  39397.359444  46055.9620  52714.564556
498  39113.077996  46077.7700  53042.462004
499  38909.896715  46090.8355  53271.774285

[500 rows x 3 columns]
PS C:\Backtesting\ema>
```

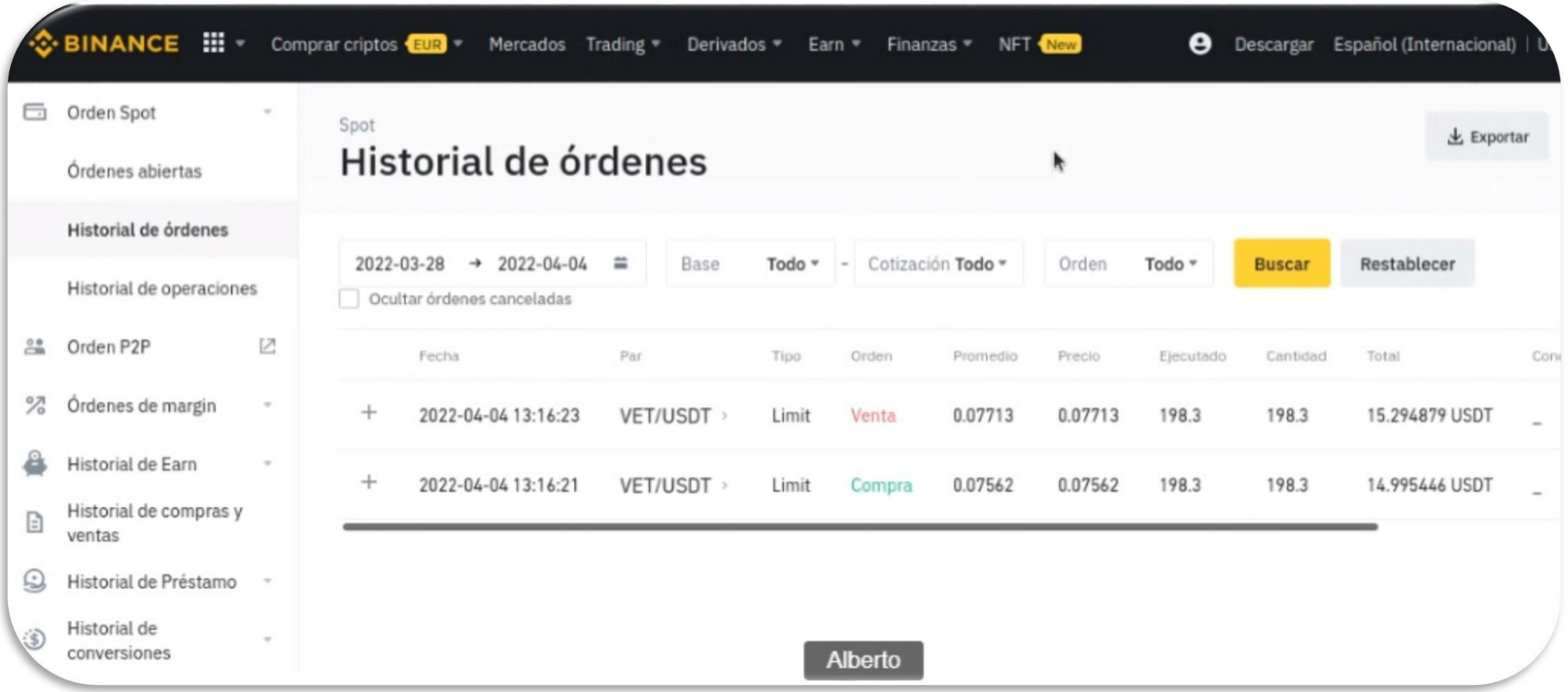
Genetic algorithms



Strategy with historical data



Real time strategy



Conclusions

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