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What is Blokchain?

Blockchain defined: Blockchain is a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network. An asset can be tangible (a house, car, cash, land) or intangible (intellectual property, patents, copyrights, branding). Virtually anything of value can be tracked and traded on a blockchain network, reducing risk and cutting costs for all involved. (IBM)
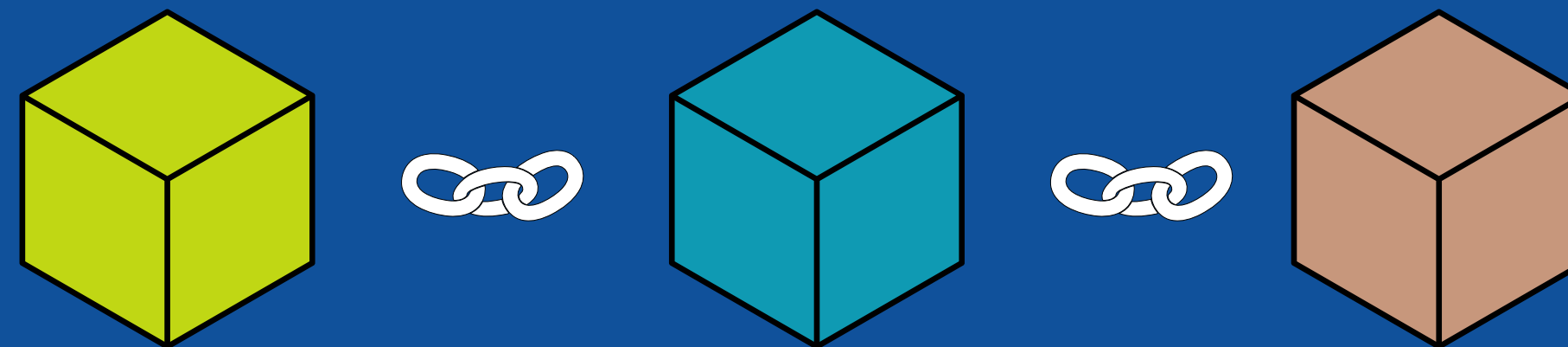
Distributed Ledger

The Blockchain is distributed ledger that is completely open to anyone and it has some interesting properties

Why Blokchains?

Reason why we use blockchain is because it has the following advantages:

Distributed: the data and functionality on the blockchain are scattered in various directions or can be called decentralized.

Replicated: the data is duplicated or backed up in various places, so that all data is the same.

Immutable: data that has been written cannot be changed.

Non-repudiation: whoever wrote the change can be proven involved and cannot be evaded.

Blockchain with data spread over hundreds of millions of servers will ensure that agreements are automatically executed, recorded and stored in a transparent system. So that everyone can check the truth. This blockchain technology is also very secure, because it is applied in many networks. If any hacker wants to change the data they have to change the data of all that many networks simultaneously. This is what makes it difficult to hack.

Blokchain History

Timestamp Tampered

The first work on a cryptographically secured chain of bloks was describe by Stuart Haber

Back to Blockchain

Around 2014, attention shifted from Bitcoin to Blockchain, hundreds of cryptocurrencies were issued

Set of Blockchain Usecases

Different solution based on blockchain technology in Healthcare, Supply Chain and Finance sectors

1991

2008

2014

2015

2018

Bitcoin

Satoshi Nakamoto published a white-paper titled "Bitcoin: A Peer to Peer Electronic Cash System

Hyperledger - Linux

The Hyperledger project was founded in 2015, when the Linux Foundation announced the creation of the Hyperledger project

Cryptocurrency

In the blockchain world, we often hear the terms cryptocurrency, native coin, altcoin and token. Actually what does that mean?

➡ Cryptocurrency comes from the 2 words "crypto" with the actual word "cryptography" which means secret code and the word "currency" which means currency. In simple terms, we can mean that crypto currency or crypto money is a type of digital (virtual) currency that is connected to the internet and blockchain and is guaranteed by strong cryptography and is very difficult to manipulate.

➡ Native coins are digital assets that were created at the same time the blockchain was created. For example Bitcoin assets are created simultaneously with the bitcoin blockchain.

➡ Altcoin is an abbreviation of alternative coin. The majority of altcoins are variants (forks) of Bitcoin, using the open source Bitcoin protocol with coding changes to create new types of coins with different features.

➡ Token is a representation of ownership of a digital asset that runs on a blockchain and is created using a smart contract to run on a particular blockchain

Cryptocurrency

Here is a summary of the differences between native coins, altcoins and tokens:

Type	Characteristic	How it was created	Example
Native Coin	using its own blockchain	created alongside the blockchain	Bitcoin, Ethereum, Binance Coin, Solana, Tron
Altcoin	is a variant (fork) of an existing blockchain	created shortly after the fork and adds certain features to the blockchain	Litecoin, Dogecoin
Token	use another blockchain or do not have their own blockchain	created with smart contracts that exist on the blockchain	Pancakeswap, Uniswap, AXS
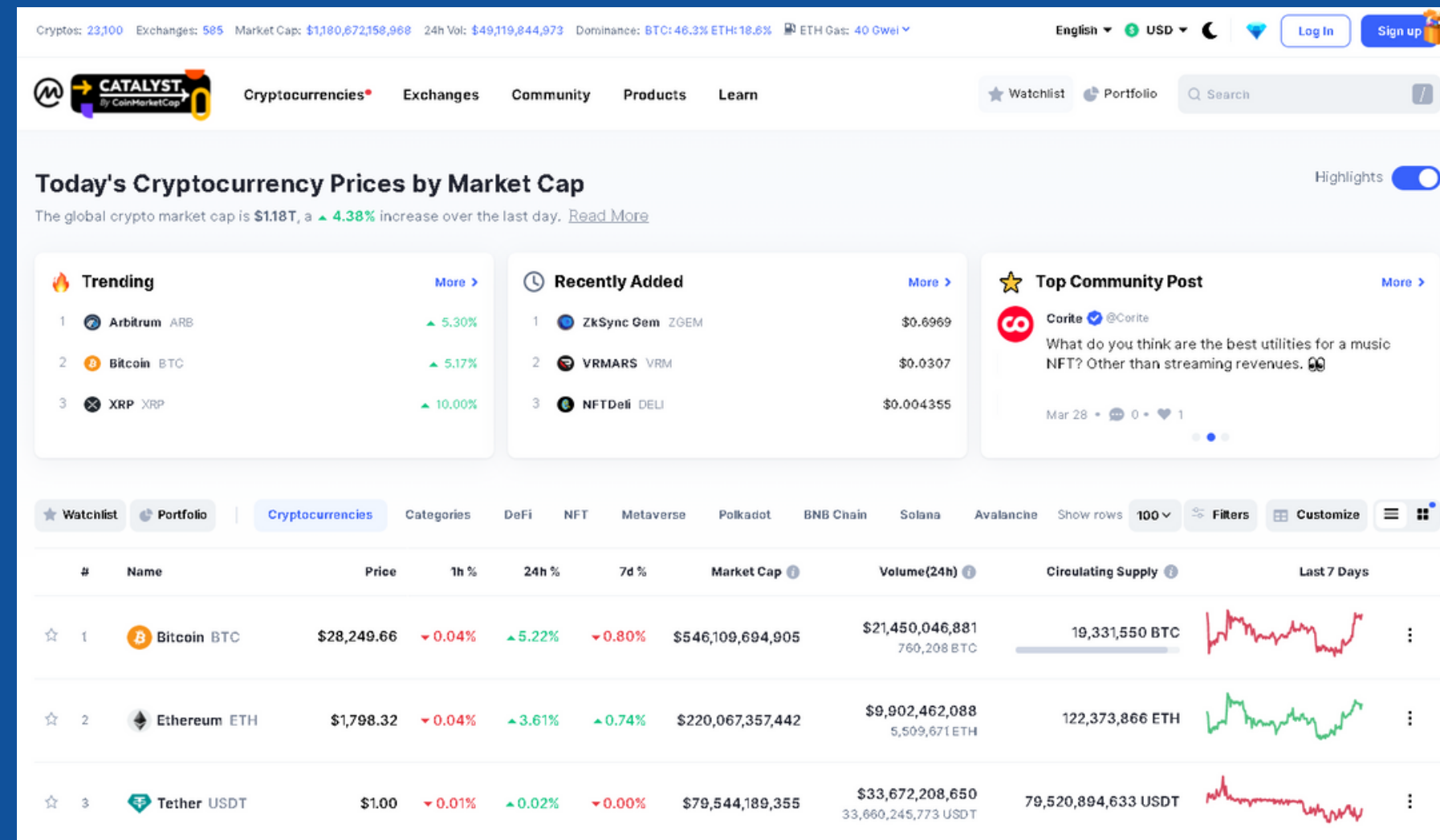
CoinMarketCap

CoinMarketCap (CMC) is a website to see the capitalization of crypto assets or cryptocurrencies. CMC also shows the change in amount and volume traded over the last 24 hours in percentage terms and market cap which is the total value of a specific coin in circulation.

Fetching Data from CoinMarketCap API

To get started to fetch data with the API, we need to know what the definition and function of the API are. API stands for application programming interface. This API is an interface that can connect one application to another application.

In simple terms, this API is an intermediary between different applications, whether it's the same platform or cross-platform. So, with this API, we can more easily build functional applications. Because it can fetch data and connect data across platforms. This API can also facilitate application development to make it more efficient, as well as lighten the server load.
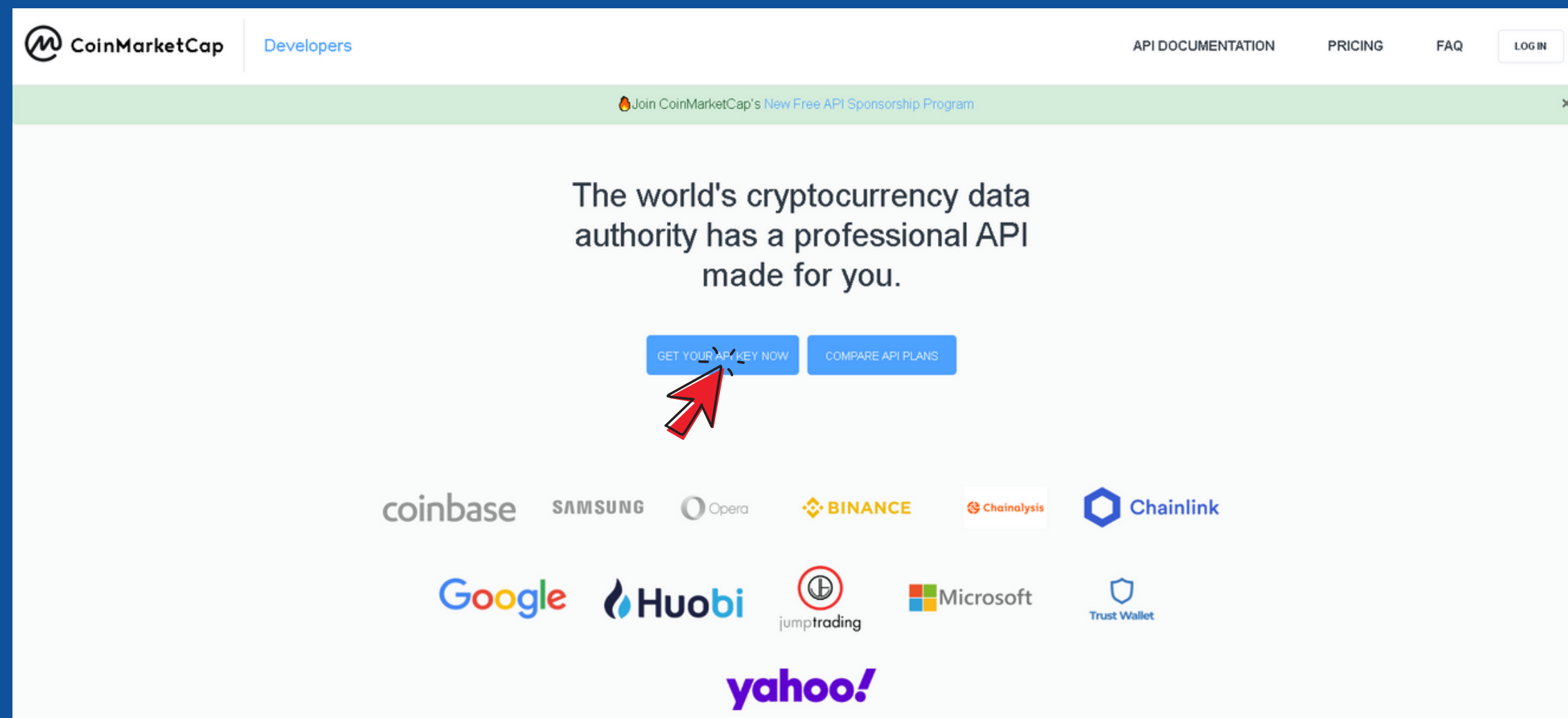
Request API key from CoinMarketCap

Please note there are two types of API in CMC, the first is free API and the second is paid API. The following steps need to be taken if we want to request an API key and retrieve data from CMC:

Sign up for a free developer portal account and request an API

In this section, we need to register as a developer first on the CMC developer platform at https://pro.coinmarketcap.com/. When we visit the platform, we will be redirected to a page like the one below:
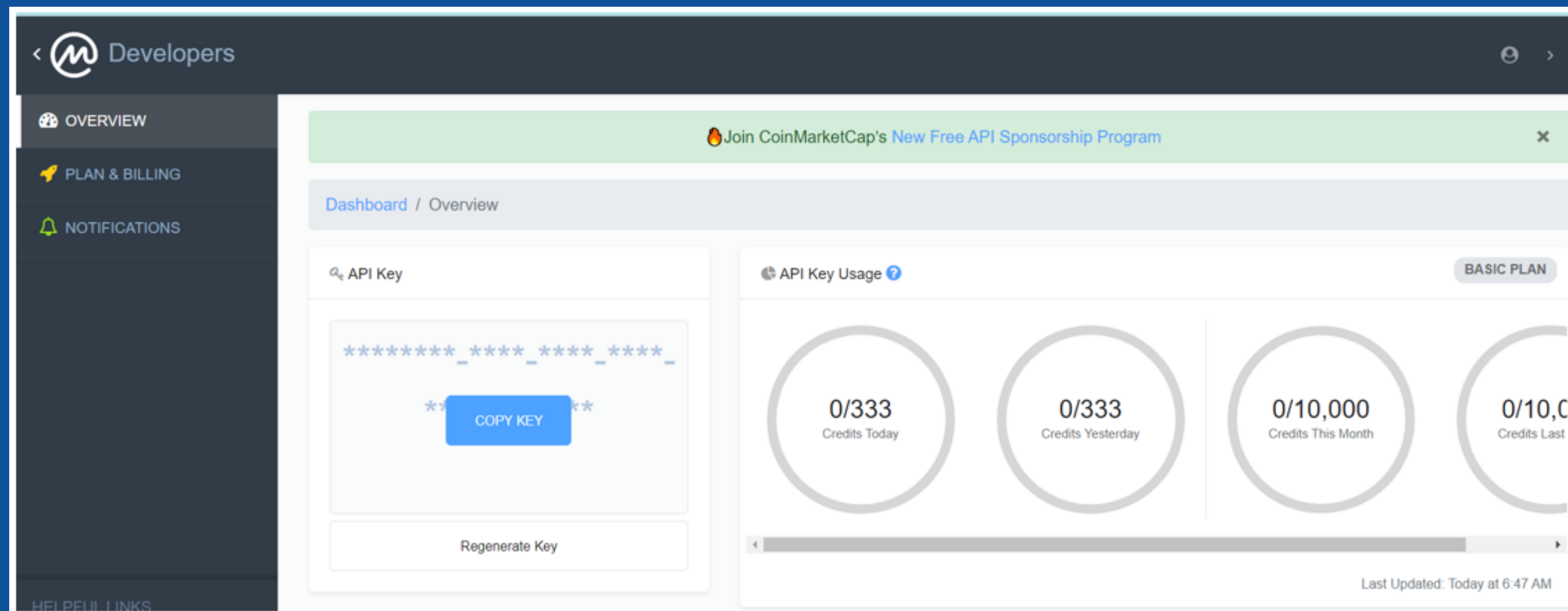
We immediately select and click "GET YOUR API KEY NOW".

Request API key from CoinMarketCap

after clicking GET YOUR API KEY NOW a page will appear for login or sign up, fill in with the email you have

If it is successful, then you will enter the developers dashboard page as below

After the page appears in the image above, we click "COPY KEY". If we want a new "API KEY", then we can select it and click "Regenerate Key". So, we can create the codes or "API KEY" to retrieve data on CoinMarketCap.

Withdraw Data from CoinMarketCap based on API-key #1

Once we have obtained the API key we can use the following python with some of the necessary libraries as shown by the following code snippet here

Withdraw Data from CoinMarketCap based on API-key #2

If we want to retrieve data in a dataframe or table format with the columns displayed only name_crypto, symbol_crypto, rank, last_updated, max_supply, price. Then we need some code to process it.

If you want to try, you can write code like this

Data Preparation

What is data preparation?
Data preparation or data preparation is the process of collecting, combining, structuring, and organizing data so that it can be used in business intelligence (BI) applications, analytics, and data visualization.

Why do we need data preparation?
Because in data preparation, the aim is for us to be able to load data, retrieve data, also tidy up data, clean up data if there is dirty data or it is possible for us to visualize data.

In this lesson, step by step do the data preparation as mentioned below:

- load data from json file
- selecting data for closing prices
- data manipulation for date or time
- save the manipulated data to csv

Data Visualization

After we do data preparation, we are ready to do visualization. The visualization that will be carried out includes:

- Heatmap
- Scatter Plot
- Line Charts
- histogram
- Candle stick chart

In this visualization we use 3 python libraries, namely:

- matplotlib. The most popular python library for making data visualization more interesting and easy to understand so that matplotlib will feel more natural to learn.
- seaborn. Seaborn is a Python visual library based on matplotlib. Seaborn provides a high-level interface to handle problems related to statistical data visualization to make it look more attractive.
- mpfinance. It is an extension of matplotlib which is intended to make it easier to visualize financial data in Python. We can easily create various kinds of charts needed for financial or investment data analysis, such as candlesticks, moving averages, renko charts, volume, and so on, without the need to do a lot of coding.

Import Data

```
[8]  # import library pandas sebagai alias
     import pandas as pd

     # load data csv yang di-assign ke dalam data_gabungan
     data_gabungan = pd.read_csv('https://storage.googleapis.com/dqlab-dataset/data_penutupan_harga.csv')

     # tampilkan informasi dataset data_gabungan
     data_gabungan.info()
     print()

     # tampilkan 5 baris teratas dataset data_gabungan
     print(data_gabungan.head())
     print()

     # tampilkan 5 baris terbawah dataset data_gabungan
     print(data_gabungan.tail())
     print()

     # tampilkan ukuran dataset data_gabungan
     print(data_gabungan.shape)
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 737 entries, 0 to 736
Data columns (total 6 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   Date    737 non-null    object
 1   BTC     737 non-null    float64
 2   ETH     737 non-null    float64
 3   BNB     737 non-null    float64
 4   SOL     737 non-null    float64
 5   TRX     737 non-null    float64
dtypes: float64(5), object(1)
memory usage: 34.7+ KB

         Date           BTC         ETH        BNB       SOL       TRX
0  2020-08-01  11759.592773  385.199707  21.530432  1.526610  0.020396
1  2020-08-02  11053.614258  370.671722  20.944887  1.742810  0.019039
2  2020-08-03  11246.348633  386.295166  22.055012  1.802611  0.019887
3  2020-08-04  11205.892578  389.875488  22.282585  1.871639  0.020352
4  2020-08-05  11747.022461  401.590576  23.336218  1.754550  0.020451

           Date           BTC         ETH         BNB        SOL       TRX
732  2022-08-03  22846.507812  1618.874512  298.356781  38.544418  0.067825
733  2022-08-04  22630.957031  1608.205811  310.706055  38.830673  0.068944
734  2022-08-05  23289.314453  1732.254639  315.185547  40.561031  0.069828
735  2022-08-06  22961.279297  1691.658081  315.068909  40.057007  0.069472
736  2022-08-07  23016.318359  1677.911011  311.616028  39.890846  0.069568

(737, 6)
```

Descriptive statistics

```
[9]  # import library pandas sebagai alias
     import pandas as pd

     # load data csv yang di-assign ke dalam data_gabungan
     data_gabungan = pd.read_csv('https://storage.googleapis.com/dqlab-dataset/data_penutupan_harga.csv')

     # melihat summary descriptive statistics pada variabel data_gabungan
     print(data_gabungan.describe())
```

```
                  BTC            ETH           BNB           SOL           TRX
count      737.000000     737.000000    737.000000    737.000000    737.000000
mean     36700.067461    2175.400061    297.462407     63.684270      0.065440
std      15351.847901    1227.738124    187.765657     65.810824      0.029265
min      10131.516602     321.116302     19.478767      1.205692      0.019039
25%      22961.279297    1191.526245     51.056404      4.782046      0.035001
50%      38483.125000    2146.692383    320.485107     38.518307      0.064830
75%      47706.117188    3122.608643    423.130157    100.707802      0.083259
max      67566.828125    4812.087402    675.684082    258.934326      0.164650
```

Missing Value Checking

```python
[10]  # import library pandas sebagai alias
      import pandas as pd

      # load data csv yang di-assign ke dalam data_gabungan
      data_gabungan = pd.read_csv('https://storage.googleapis.com/dqlab-dataset/data_penutupan_harga.csv')

      # tampilkan jumlah missing values dengan isna().sum()
      print(data_gabungan.isna().sum())

      # buat dataframe dengan men-chain method .reset_index()
      df_null = data_gabungan.isna().sum().reset_index()

      # ganti kolom 'index' menjadi 'nama kolom' dan '0' menjadi 'sum_nan'
      df_null.columns = ['nama kolom','sum_nan']

      # tampilkan data df_null
      print('\n', df_null)
```
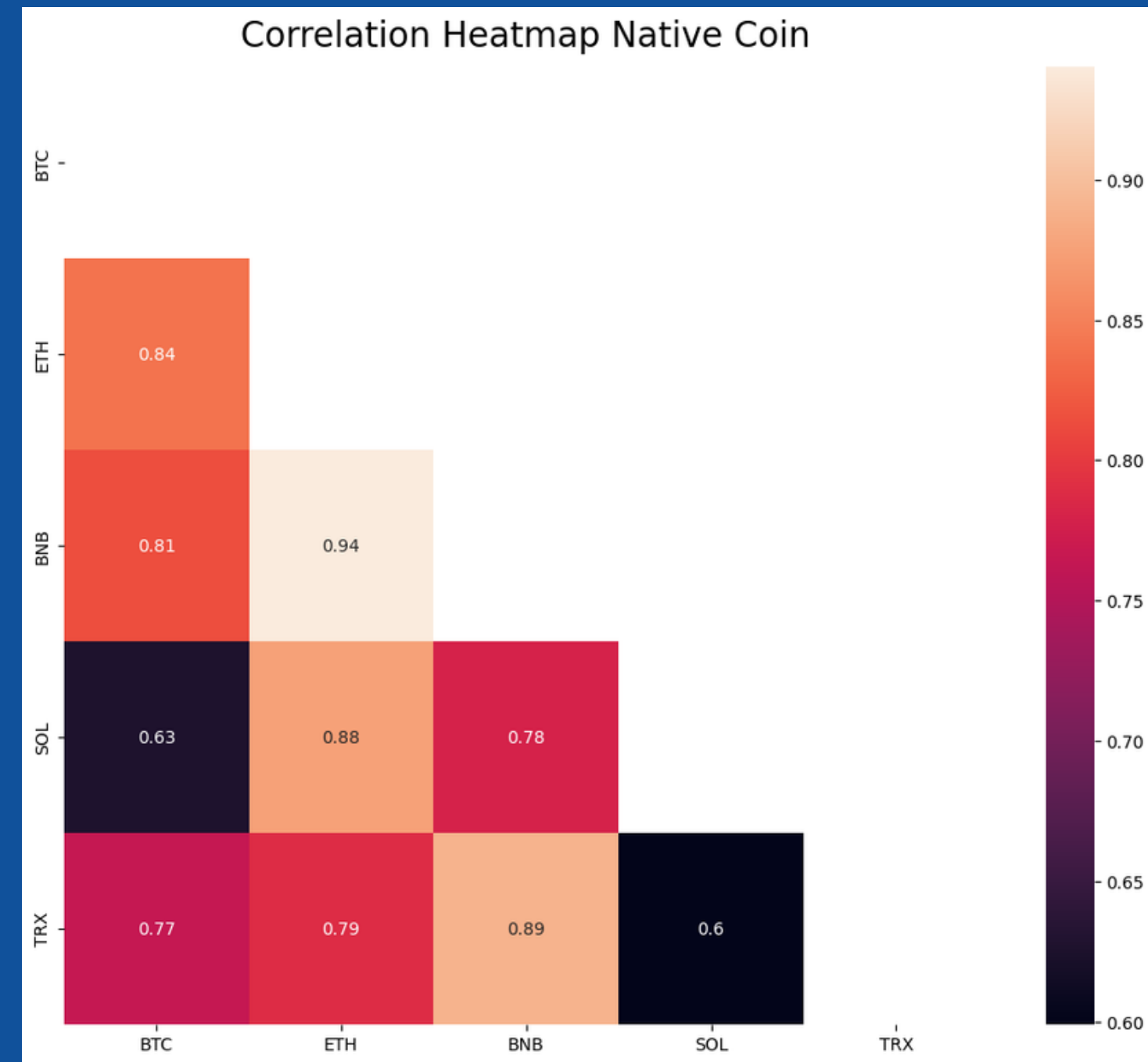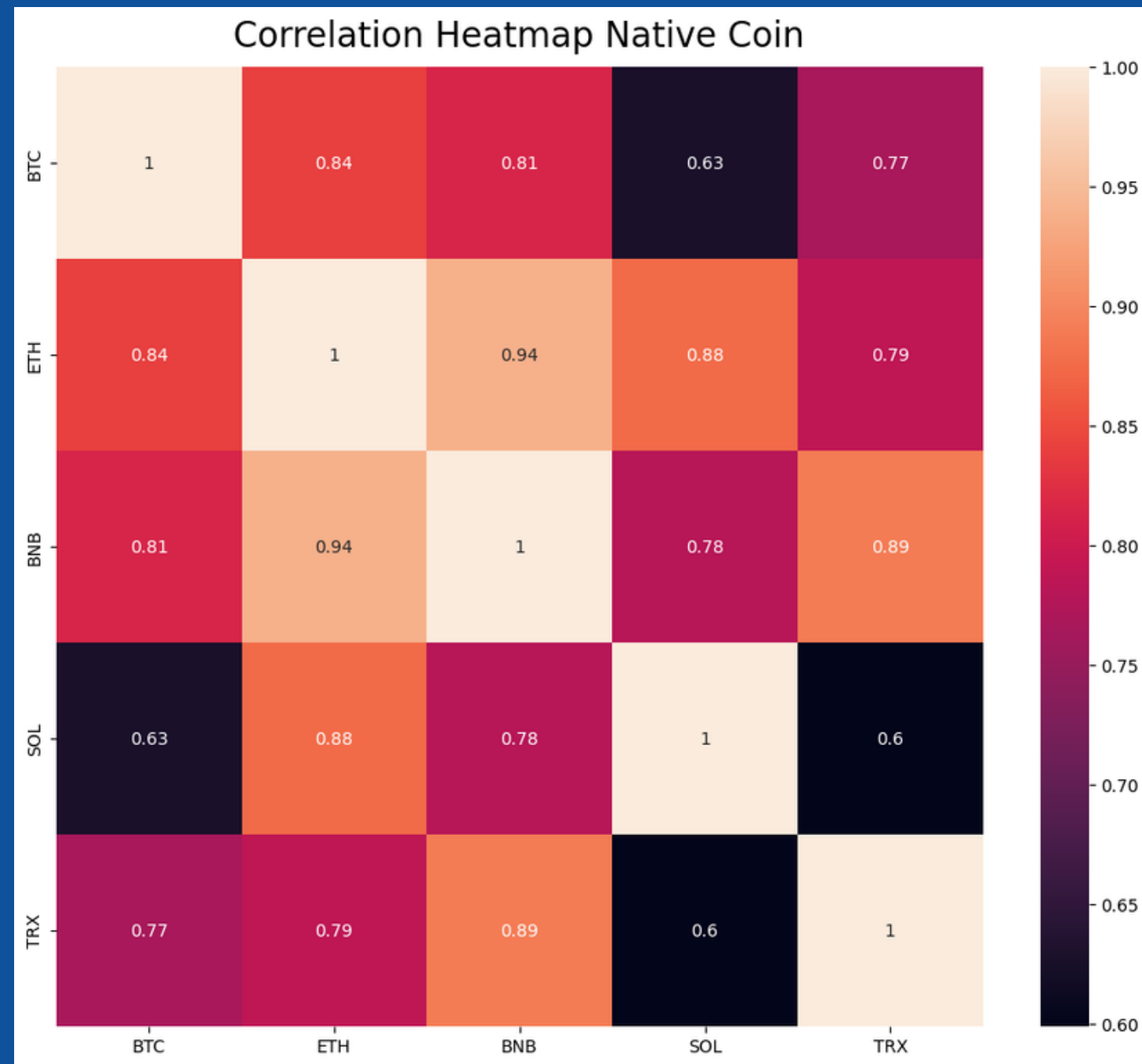
```
Date    0
BTC     0
ETH     0
BNB     0
SOL     0
TRX     0
dtype: int64

   nama kolom  sum_nan
0        Date        0
1         BTC        0
2         ETH        0
3         BNB        0
4         SOL        0
5         TRX        0
```
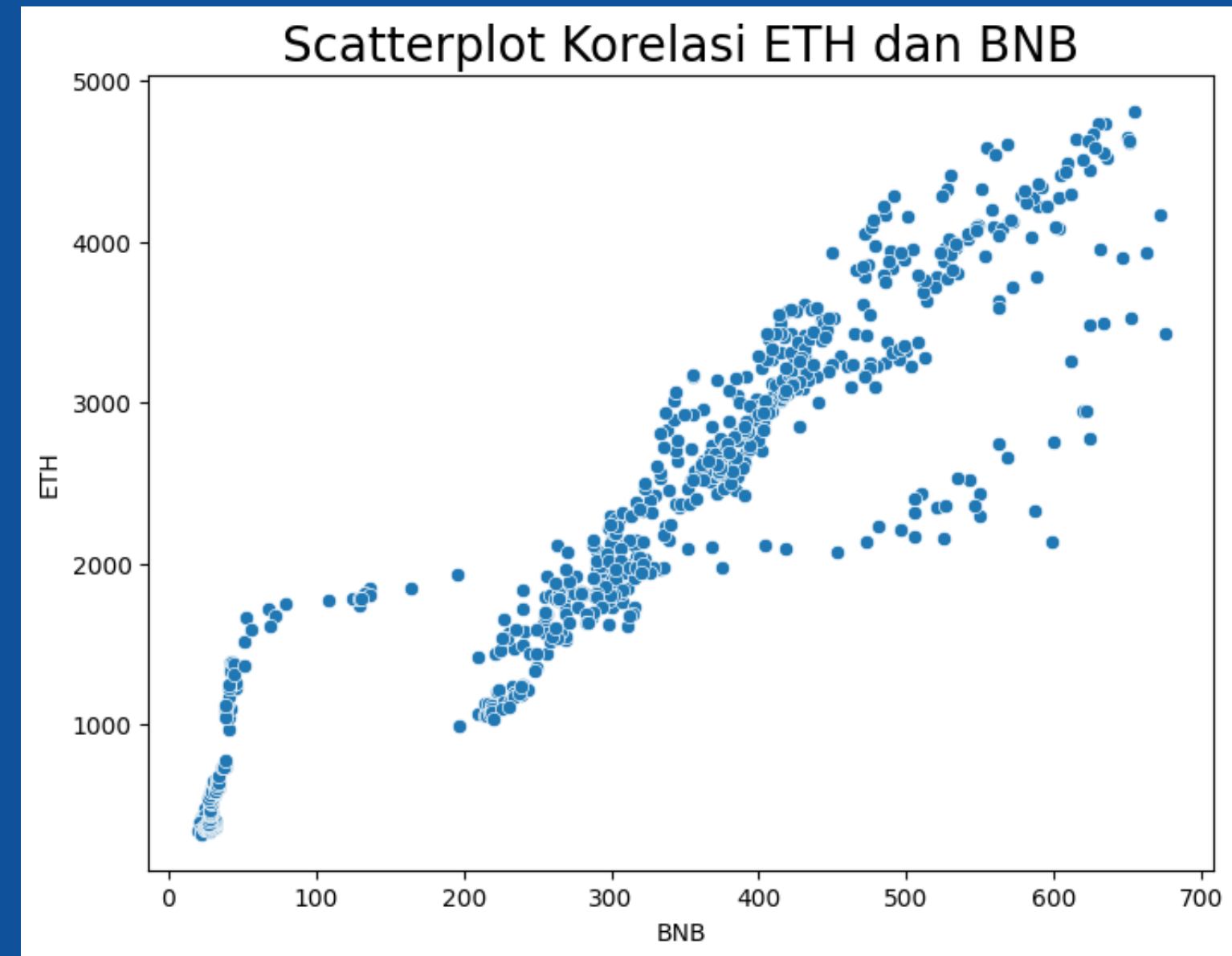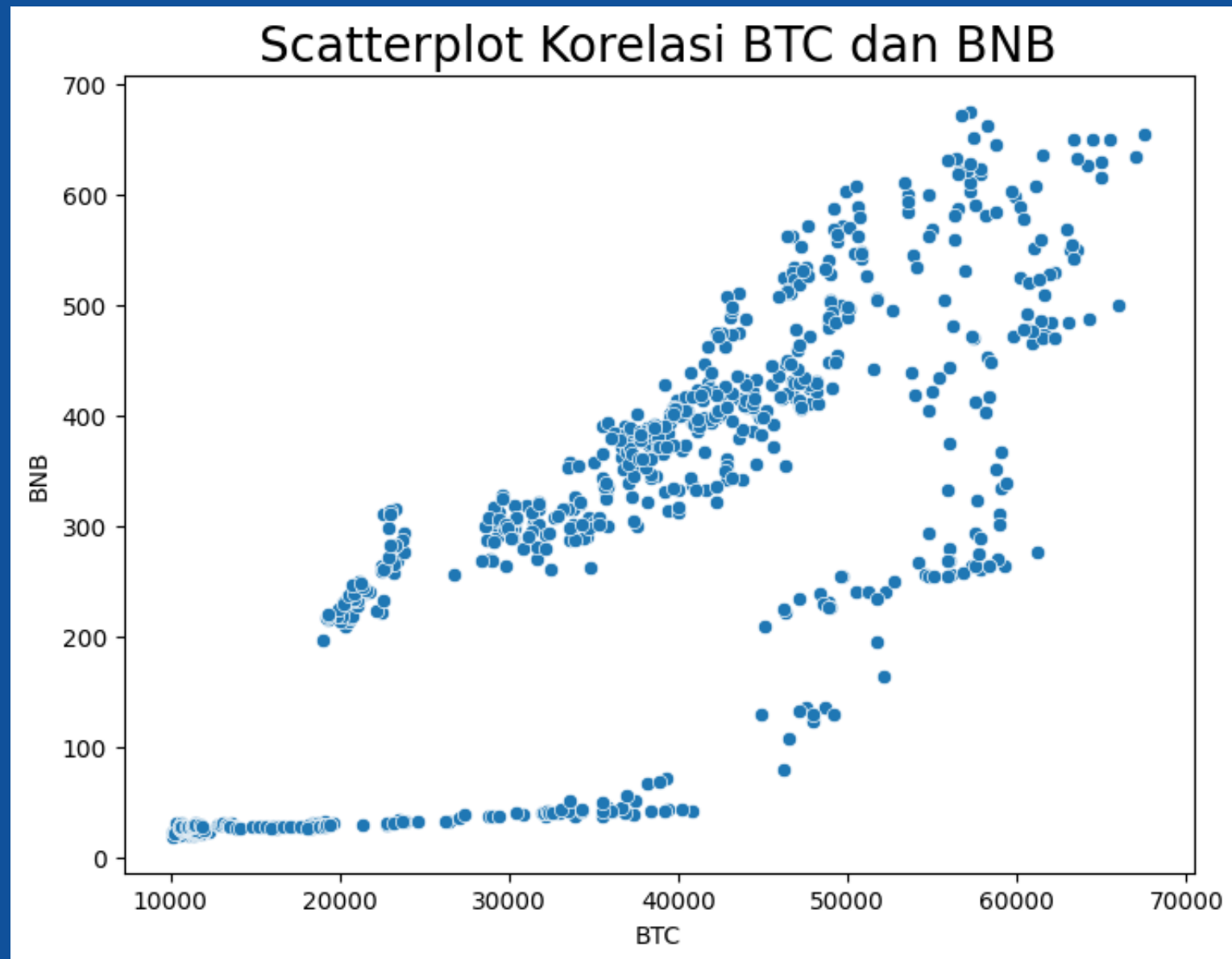
Heatmap

The heatmaps above are the correlation of native coins, it can be seen that BNB and ETH have a fairly high correlation of 0.94

Scatterplot

Scatterplot Korelasi BTC dan BNB

Scatterplot Korelasi ETH dan BNB

as shown in the heatmap that the correlation between BTC and BNB is quite positive, however, the correlation between BNB and ETH looks more very positive as shown by the scatterplot above.

ATH (All Time High) and ATL (All Time Low)

```python
[15]  # import library
      import pandas as pd
      import requests

      # load data BTC dari json dengan link
      url = 'https://raw.githubusercontent.com/ronnyfahrudin/Blockchain_n_Crypto_Analysis/main/crypto_datasets_final.json'
      f = requests.get(url)
      df_btc = pd.DataFrame(f.json().get('BTC'))

      # print harga BTC paling tinggi dari tahun 2014
      print(f'Harga tertinggi BTC dari tahun 2014 sampai 2022 mencapai ${df_btc.High.max()}')

      # print harga BTC paling rendah dari tahun 2014 s/d 2022
      print(f'Harga terendah BTC dari tahun 2014 sampai 2022 mencapai ${df_btc.Low.min()}')

      Harga tertinggi BTC dari tahun 2014 sampai 2022 mencapai $68789.625
      Harga terendah BTC dari tahun 2014 sampai 2022 mencapai $171.50999450683594
```
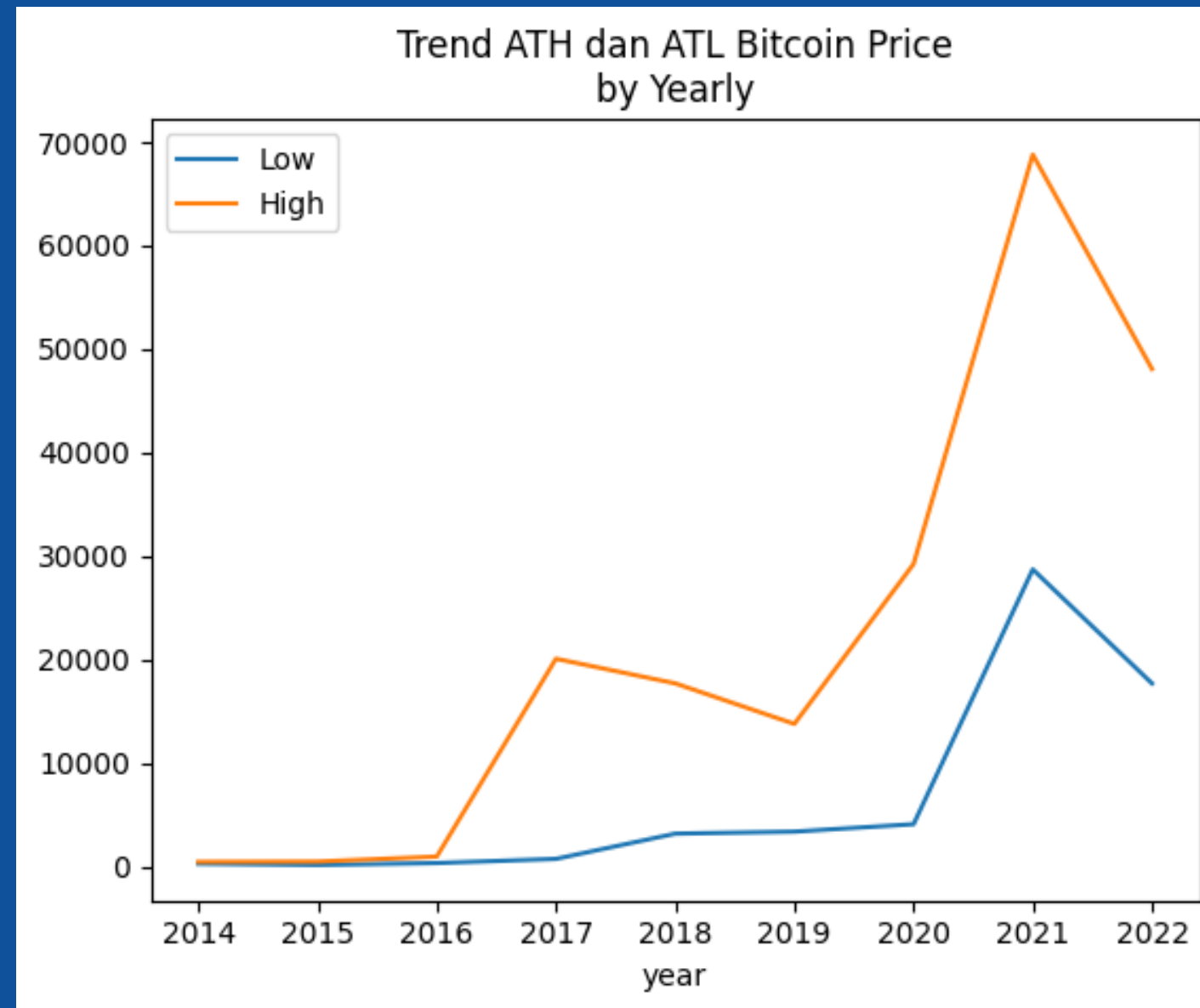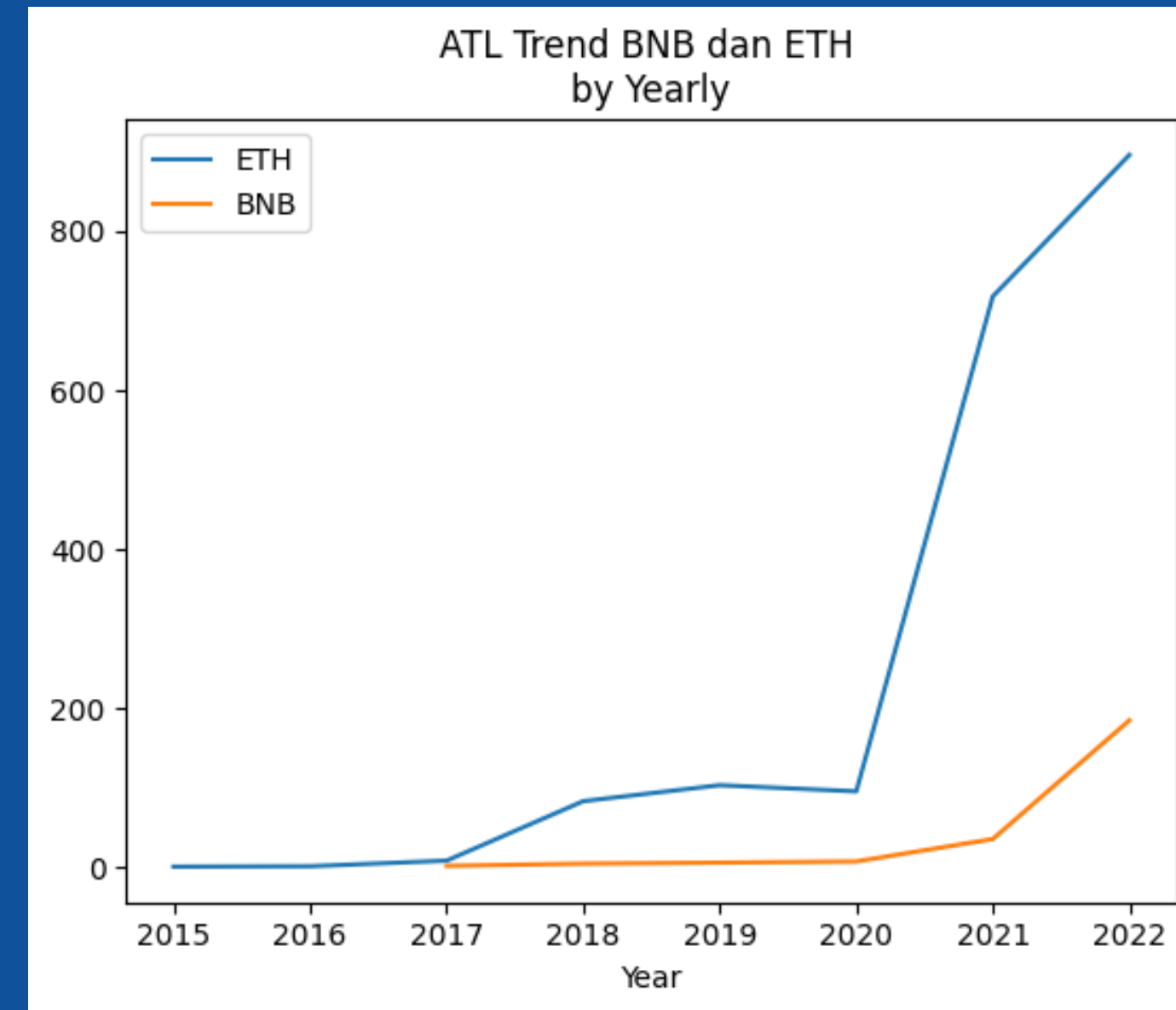
The highest price of BTC from 2014 to 2022 was $68789.625

The lowest BTC price from 2014 to 2022 was $171.50999450683594
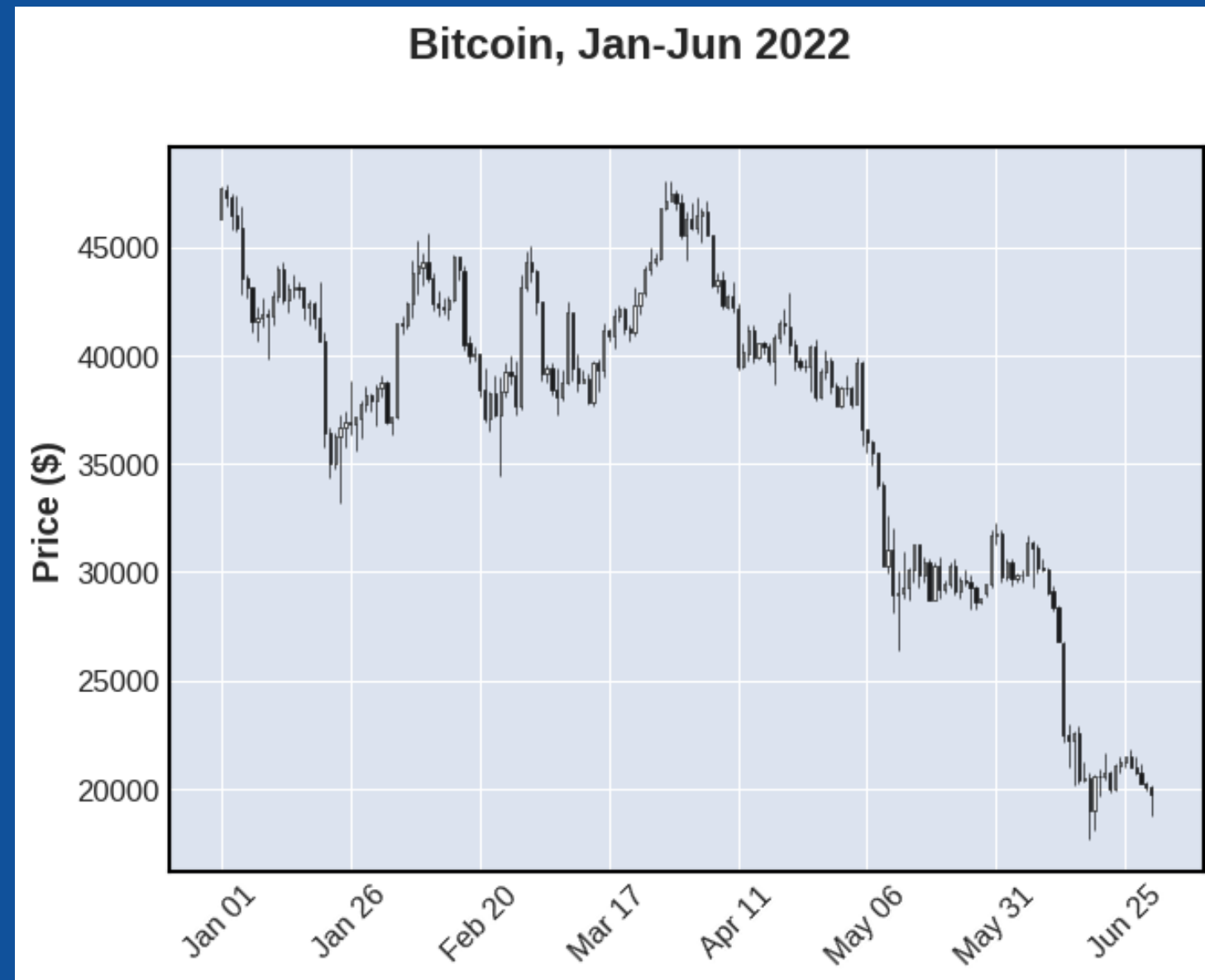
ATH (All Time High) and ATL (All Time Low)

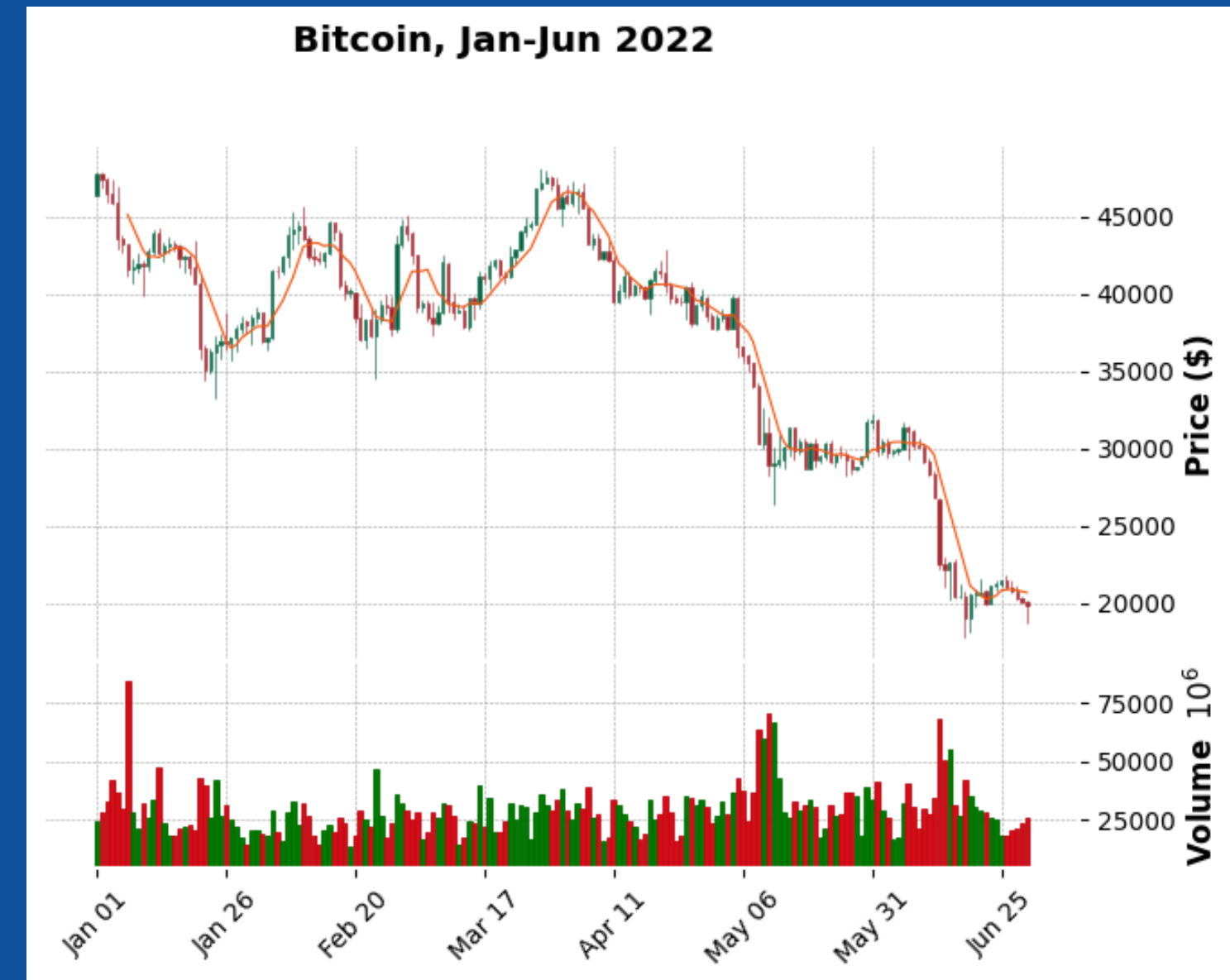The results of BTC data analysis show an upward trend from 2024 to 2021, and decreased from 2021 to 2022.

the results of ETH and BNB analysis from 2014 to 2022 tend to go up

Candlestick Chart Visualization

Bitcoin, Jan-Jun 2022

Bitcoin, Jan-Jun 2022

The following is an example of a basic candlestick chart using data from BTC for the period from January to June 2022

This is a candlestick chart with volume indicators and a 7-day moving average

Practice Task

Bitcoin, Jun 2022

The following image is an example of a candlestick chart from BTC in June 2022 with additional volume indicators and a 3-day moving average

Certificate of completion

DQLab

XERATIC   UMN

#DQLABCRPPYTGSHNJ

CERTIFICATE
OF COMPLETION

This Certificate is Proudly Presented to

Hafidz Alawy

Has Completed in

Crypto Analysis

Mar 29, 2023

Thank You