In [3]:
```
# This script utilizes CoinmarketCap's API to extract data from their website and store
# Subsequently, the data is transformed into various graphs for visualization purposes."

import pandas as pd
import matplotlib.pyplot as plt
from matplotlib.dates import DateFormatter
from matplotlib.ticker import MultipleLocator
from dateutil.parser import parse
import plotly.express as pX

!pip install pyppeteer
!pyppeteer-install

import plotly.io as pio
pio.renderers.default = 'notebook'
```

```
Requirement already satisfied: pyppeteer in ./anaconda3/lib/python3.10/site-packages (1.
0.2)
Requirement already satisfied: certifi>=2021 in ./anaconda3/lib/python3.10/site-packages
(from pyppeteer) (2023.5.7)
Requirement already satisfied: appdirs<2.0.0,>=1.4.3 in ./anaconda3/lib/python3.10/site-
packages (from pyppeteer) (1.4.4)
Requirement already satisfied: importlib-metadata>=1.4 in ./anaconda3/lib/python3.10/sit
e-packages (from pyppeteer) (4.11.3)
Requirement already satisfied: tqdm<5.0.0,>=4.42.1 in ./anaconda3/lib/python3.10/site-pa
ckages (from pyppeteer) (4.64.1)
Requirement already satisfied: websockets<11.0,>=10.0 in ./anaconda3/lib/python3.10/site
-packages (from pyppeteer) (10.4)
Requirement already satisfied: urllib3<2.0.0,>=1.25.8 in ./anaconda3/lib/python3.10/site
-packages (from pyppeteer) (1.26.14)
Requirement already satisfied: pyee<9.0.0,>=8.1.0 in ./anaconda3/lib/python3.10/site-pac
kages (from pyppeteer) (8.2.2)
Requirement already satisfied: zipp>=0.5 in ./anaconda3/lib/python3.10/site-packages (fr
om importlib-metadata>=1.4->pyppeteer) (3.11.0)
chromium is already installed.
```

In [308…
```
from requests import Session
from requests.exceptions import ConnectionError, Timeout, TooManyRedirects
import json
from time import time, sleep

df = pd.DataFrame()

def api_runner():
    global df
    url = 'https://pro-api.coinmarketcap.com/v1/cryptocurrency/listings/latest'
    # Original Sandbox Environment: 'https://sandbox-api.coinmarketcap.com/v1/cryptocurr
    parameters = {
        'start': '1',
        'limit': '31',
        'convert': 'USD'
    }
    headers = {
        'Accepts': 'application/json',
        'X-CMC_PRO_API_KEY': 'aad4bb09-b00b-4da5-9ebc-ec926199e14f',
    }

    session = Session()
    session.headers.update(headers)

    try:
        response = session.get(url, params=parameters)
        data = json.loads(response.text)
        # print(data)
```

```
    except (ConnectionError, Timeout, TooManyRedirects) as e:
        print(e)

    # Use this if you just want to keep it in a dataframe
    df = pd.json_normalize(data['data'])
    df['Timestamp'] = pd.to_datetime('now', utc=True).strftime("%d-%m-%Y %H:%M:%S")
    df

    if not os.path.isfile('/Users/coding/Documents/Python tests/APIDATA.csv'):
        df.to_csv('/Users/coding/Documents/Python tests/APIDATA0.csv', header = 'column_
    else:
        df.to_csv('/Users/coding/Documents/Python tests/APIDATA0.csv', mode = 'a', heade

for i in range(300):
    api_runner()
    print('API has been successfully run!')
    sleep(60)  # sleep for 1 minute
```

```
API has been successfully run!
```

```
---------------------------------------------------------------------------
KeyboardInterrupt                         Traceback (most recent call last)
Cell In[308], line 45
     43 api_runner()
     44 print('API has been successfully run!')
---> 45 sleep(60)

KeyboardInterrupt:
```

In [316…

```
df = pd.read_csv('/Users/coding/Documents/Python tests/APIDATA0.csv')
df
```

Out[316]:

	Unnamed: 0	id	name	symbol	slug	num_market_pairs	date_added	tags
0	0	1	Bitcoin	BTC	bitcoin	10247	2010-07-13T00:00:00.000Z	['mineable' 'pow', 'sha-256', 'store-of-value..
1	1	1027	Ethereum	ETH	ethereum	7000	2015-08-07T00:00:00.000Z	['pos', 'smart-contracts' 'ethereum-ecosystem..
2	2	825	Tether	USDT	tether	55468	2015-02-25T00:00:00.000Z	['payments' 'stablecoin' 'asset-backed-stabl..
3	3	1839	BNB	BNB	bnb	1458	2017-07-25T00:00:00.000Z	['marketplace' 'centralized-exchange' 'payme..
4	4	3408	USD Coin	USDC	usd-coin	12966	2018-10-08T00:00:00.000Z	['medium-of-exchange' 'stablecoin' 'asset-ba..
5	5	52	XRP	XRP	xrp	965	2013-08-04T00:00:00.000Z	['medium-of-exchange' 'enterprise-solutions',..
6	6	2010	Cardano	ADA	cardano	837	2017-10-01T00:00:00.000Z	['dpos', 'pos' 'platform' 'research' 'smart..

7	7	74	Dogecoin	DOGE	dogecoin	728	2013-12-15T00:00:00.000Z	['mineable' 'pow', 'scrypt' 'medium-of-excha..
8	8	1958	TRON	TRX	tron	772	2017-09-13T00:00:00.000Z	['media' 'payments' 'tron-ecosystem']
9	9	5426	Solana	SOL	solana	472	2020-04-10T00:00:00.000Z	['pos' 'platform' 'solana-ecosystem' 'cms-h..
10	10	3890	Polygon	MATIC	polygon	741	2019-04-28T00:00:00.000Z	['pos' 'platform' 'enterprise-solutions', 'z..
11	11	2	Litecoin	LTC	litecoin	924	2013-04-28T00:00:00.000Z	['mineable' 'pow', 'scrypt' 'medium-of-excha..
12	12	6636	Polkadot	DOT	polkadot-new	514	2020-08-19T00:00:00.000Z	['substrate' 'polkadot' 'binance-chain' 'po..
13	13	4943	Dai	DAI	multi-collateral-dai	2350	2019-11-22T00:00:00.000Z	['defi' 'stablecoin' 'asset-backed-stablecoi..
14	14	4687	Binance USD	BUSD	binance-usd	6915	2019-09-20T00:00:00.000Z	['stablecoin' 'asset-backed-stablecoin' 'bin..
15	15	5805	Avalanche	AVAX	avalanche	449	2020-07-13T00:00:00.000Z	['defi', 'smart-contracts' 'three-arrows-capi..
16	16	3717	Wrapped Bitcoin	WBTC	wrapped-bitcoin	1236	2019-01-30T00:00:00.000Z	['medium-of-exchange' 'defi' 'wrapped-tokens..
17	17	5994	Shiba Inu	SHIB	shiba-inu	543	2020-08-01T00:00:00.000Z	['memes' 'ethereum-ecosystem' 'doggone-dogge..
18	18	3957	UNUS SED LEO	LEO	unus-sed-leo	27	2019-05-21T00:00:00.000Z	['marketplace' 'centralized-exchange' 'disco..
19	19	3794	Cosmos	ATOM	cosmos	452	2019-03-14T00:00:00.000Z	['platform' 'cosmos-ecosystem' 'content-crea..
20	20	1975	Chainlink	LINK	chainlink	1189	2017-09-20T00:00:00.000Z	['platform' 'defi', 'oracles' 'smart-contrac..

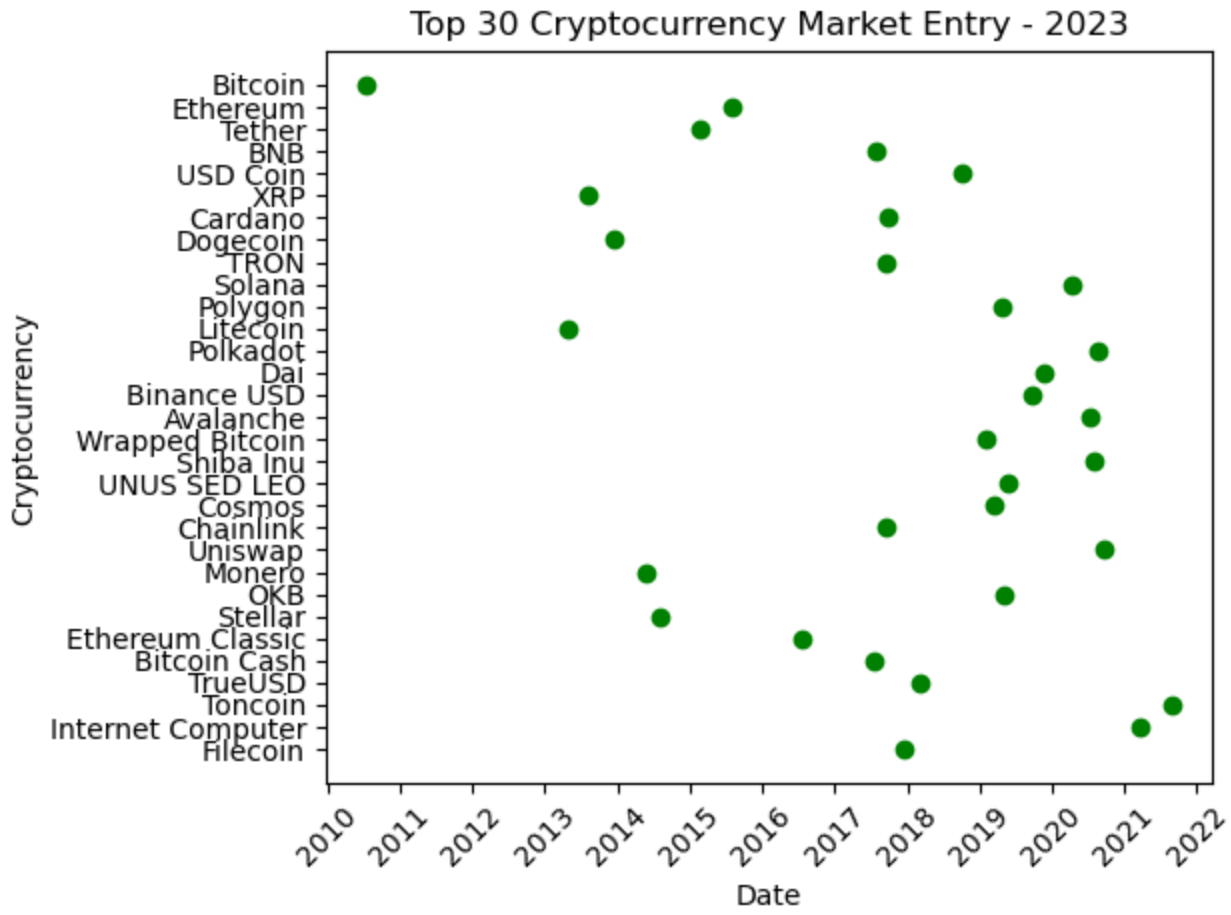
21	21	7083	Uniswap	UNI	uniswap	698	2020-09-17T00:00:00.000Z	['decentralized-exchange-dex-token', 'defi', '..
22	22	328	Monero	XMR	monero	217	2014-05-21T00:00:00.000Z	['mineable' 'pow', 'medium-of-exchange' 'pri..
23	23	3897	OKB	OKB	okb	97	2019-04-30T00:00:00.000Z	['marketplace' 'centralized-exchange' 'disco..
24	24	512	Stellar	XLM	stellar	492	2014-08-05T00:00:00.000Z	['medium-of-exchange' 'enterprise-solutions',..
25	25	1321	Ethereum Classic	ETC	ethereum-classic	407	2016-07-24T00:00:00.000Z	['mineable' 'pow', 'ethash' 'platform' 'sma..
26	26	1831	Bitcoin Cash	BCH	bitcoin-cash	703	2017-07-23T00:00:00.000Z	['mineable' 'pow', 'sha-256' 'marketplace' ..
27	27	2563	TrueUSD	TUSD	trueusd	383	2018-03-06T00:00:00.000Z	['store-of-value' 'stablecoin' 'asset-backed..
28	28	11419	Toncoin	TON	toncoin	115	2021-08-26T13:40:22.000Z	['pos']
29	29	8916	Internet Computer	ICP	internet-computer	150	2021-03-23T00:00:00.000Z	['platform' 'distributed-computing' 'collect..
30	30	2280	Filecoin	FIL	filecoin	320	2017-12-13T00:00:00.000Z	['mineable' 'distributed-computing' 'filesha..

31 rows × 38 columns

In [318…

```
# In this visualization, I plot the top 30 largest cryptocurrencies of 2023 on a scatter
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from matplotlib.dates import DateFormatter, YearLocator


f = pd.read_csv('/Users/coding/Documents/Python tests/APIDATA0.csv')
pd.set_option('display.float_format', lambda x: '%.2f' % x)  # Set display format

df = f.drop(columns=['id', 'platform.id', 'platform.symbol', 'platform.slug', 'platform.

x = df['date_added'].apply(parse)  # Use dateutil.parser.parse for correct date parsing
y = df['name']

plt.scatter(x, y, color='green')  # Change the color to green
plt.xlabel('Date')
```

```
plt.ylabel('Cryptocurrency')
plt.title('Top 30 Cryptocurrency Market Entry - 2023')

# Reverse the order of Y-axis
plt.gca().invert_yaxis()

# Set the x-axis major locator and formatter
plt.gca().xaxis.set_major_locator(YearLocator(base=1))  # 1-year intervals
plt.gca().xaxis.set_major_formatter(DateFormatter('%Y'))

plt.xticks(rotation=45)  # Rotate x-axis tick labels for better visibility
plt.tight_layout()  # Adjust layout to prevent overlapping labels
plt.show()
```



In [233…

```
df
```

Out[233]:

	name	symbol	slug	num_market_pairs	date_added	tags	max_supply
0	Bitcoin	BTC	bitcoin	10247	2010-07-13T00:00:00.000Z	['mineable', 'pow', 'sha-256', 'store-of-value...	21000000.0(
1	Ethereum	ETH	ethereum	7000	2015-08-07T00:00:00.000Z	['pos', 'smart-contracts', 'ethereum-ecosystem...	NaN
2	Tether	USDT	tether	55466	2015-02-25T00:00:00.000Z	['payments', 'stablecoin', 'asset-backed-stabl...	NaN
3	BNB	BNB	bnb	1458	2017-07-25T00:00:00.000Z	['marketplace', 'centralized-exchange', 'payme...	NaN

4	XRP	XRP	xrp	965	2013-08-04T00:00:00.000Z	['medium-of-exchange', 'enterprise-solutions',...	100000000000.0(
5	USD Coin	USDC	usd-coin	12962	2018-10-08T00:00:00.000Z	['medium-of-exchange', 'stablecoin', 'asset-ba...	NaN
6	Cardano	ADA	cardano	837	2017-10-01T00:00:00.000Z	['dpos', 'pos', 'platform', 'research', 'smart...	45000000000.0(
7	Dogecoin	DOGE	dogecoin	728	2013-12-15T00:00:00.000Z	['mineable', 'pow', 'scrypt', 'medium-of-excha...	NaN
8	TRON	TRX	tron	772	2017-09-13T00:00:00.000Z	['media', 'payments', 'tron-ecosystem']	NaN
9	Solana	SOL	solana	472	2020-04-10T00:00:00.000Z	['pos', 'platform', 'solana-ecosystem', 'cms-h...	NaN
10	Polygon	MATIC	polygon	741	2019-04-28T00:00:00.000Z	['pos', 'platform', 'enterprise-solutions', 'z...	10000000000.0(
11	Litecoin	LTC	litecoin	924	2013-04-28T00:00:00.000Z	['mineable', 'pow', 'scrypt', 'medium-of-excha...	84000000.0(
12	Polkadot	DOT	polkadot-new	514	2020-08-19T00:00:00.000Z	['substrate', 'polkadot', 'binance-chain', 'po...	NaN
13	Dai	DAI	multi-collateral-dai	2349	2019-11-22T00:00:00.000Z	['defi', 'stablecoin', 'asset-backed-stablecoi...	NaN
14	Binance USD	BUSD	binance-usd	6915	2019-09-20T00:00:00.000Z	['stablecoin', 'asset-backed-stablecoin', 'bin...	NaN
15	Wrapped Bitcoin	WBTC	wrapped-bitcoin	1236	2019-01-30T00:00:00.000Z	['medium-of-exchange', 'defi', 'wrapped-tokens...	NaN
16	Avalanche	AVAX	avalanche	449	2020-07-13T00:00:00.000Z	['defi', 'smart-contracts', 'three-arrows-capi...	720000000.0(
17	Shiba Inu	SHIB	shiba-inu	543	2020-08-01T00:00:00.000Z	['memes', 'ethereum-ecosystem', 'doggone-dogge...	NaN

18	UNUS SED LEO	LEO	unus-sed-leo	27	2019-05-21T00:00:00.000Z	['marketplace', 'centralized-exchange', 'disco...	NaN
19	Cosmos	ATOM	cosmos	452	2019-03-14T00:00:00.000Z	['platform', 'cosmos-ecosystem', 'content-crea...	NaN
20	Chainlink	LINK	chainlink	1189	2017-09-20T00:00:00.000Z	['platform', 'defi', 'oracles', 'smart-contrac...	1000000000.00
21	Monero	XMR	monero	217	2014-05-21T00:00:00.000Z	['mineable', 'pow', 'medium-of-exchange', 'pri...	NaN
22	Uniswap	UNI	uniswap	698	2020-09-17T00:00:00.000Z	['decentralized-exchange-dex-token', 'defi', '...	1000000000.00
23	OKB	OKB	okb	97	2019-04-30T00:00:00.000Z	['marketplace', 'centralized-exchange', 'disco...	NaN
24	Stellar	XLM	stellar	492	2014-08-05T00:00:00.000Z	['medium-of-exchange', 'enterprise-solutions',...	50001806812.00
25	Ethereum Classic	ETC	ethereum-classic	407	2016-07-24T00:00:00.000Z	['mineable', 'pow', 'ethash', 'platform', 'sma...	210700000.00
26	Bitcoin Cash	BCH	bitcoin-cash	703	2017-07-23T00:00:00.000Z	['mineable', 'pow', 'sha-256', 'marketplace', ...	21000000.00
27	TrueUSD	TUSD	trueusd	383	2018-03-06T00:00:00.000Z	['store-of-value', 'stablecoin', 'asset-backed...	NaN
28	Toncoin	TON	toncoin	115	2021-08-26T13:40:22.000Z	['pos']	5000000000.00
29	Internet Computer	ICP	internet-computer	150	2021-03-23T00:00:00.000Z	['platform', 'distributed-computing', 'collect...	NaN
30	Lido DAO	LDO	lido-dao	198	2020-12-15T00:00:00.000Z	['defi', 'dao', 'three-arrows-capital-portfoli...	1000000000.00

31 rows × 29 columns

In [236…

```
df50 = df.rename(columns={'quote.USD.market_cap_dominance': 'Market_Cap'})
df51 = selected_columns = df50[['name', 'Market_Cap']]
```

```
df51
```

Out[236]:

	name	Market_Cap
0	Bitcoin	47.67
1	Ethereum	19.77
2	Tether	7.84
3	BNB	3.47
4	XRP	2.74
5	USD Coin	2.66
6	Cardano	0.93
7	Dogecoin	0.81
8	TRON	0.61
9	Solana	0.58
10	Polygon	0.57
11	Litecoin	0.54
12	Polkadot	0.52
13	Dai	0.44
14	Binance USD	0.43
15	Wrapped Bitcoin	0.39
16	Avalanche	0.38
17	Shiba Inu	0.38
18	UNUS SED LEO	0.31
19	Cosmos	0.29
20	Chainlink	0.26
21	Monero	0.24
22	Uniswap	0.24
23	OKB	0.23
24	Stellar	0.21
25	Ethereum Classic	0.20
26	Bitcoin Cash	0.19
27	TrueUSD	0.19
28	Toncoin	0.17
29	Internet Computer	0.16
30	Lido DAO	0.15

In [237…

```
# In order to ensure accurate graph results, I implemented a mechanism to calculate and
column_data = df11['Market_Cap']
column_sum = sum(column_data)
remainder = 100 - column_sum
remainder = 6.374600000000001
formatted_remainder = "{:.3g}".format(remainder)
formatted_remainder
```

Out[237]: '6.37'

In [225…
```
df12

df12.drop_duplicates(subset=['name', 'Market_Cap'], keep='first', inplace=True)

# Print the updated DataFrame
print(df12)
```

```
                  name  Market_Cap
0              Bitcoin       47.76
1             Ethereum       19.80
2               Tether        7.85
3                  BNB        3.47
4             USD Coin        2.66
5                  XRP        2.59
6              Cardano        0.92
7             Dogecoin        0.81
8                 TRON        0.61
9               Solana        0.58
10             Polygon        0.57
11            Litecoin        0.54
12            Polkadot        0.52
13                 Dai        0.44
14        Binance USD         0.43
15    Wrapped Bitcoin         0.39
16           Avalanche        0.38
17           Shiba Inu        0.38
18       UNUS SED LEO         0.30
19             Cosmos         0.29
20           Chainlink        0.26
21              Monero        0.24
22             Uniswap        0.24
23                 OKB        0.23
24             Stellar        0.21
25   Ethereum Classic         0.20
26       Bitcoin Cash         0.19
27            TrueUSD         0.19
28            Toncoin         0.17
29   Internet Computer        0.16
30            Lido DAO         0.15
31  Rest of the Market        6.37
```

In [238…
```
# In order to incorporate the calculated remainder information, I introduced a new row c
new_row = {'name': 'Rest of the Market', 'Market_Cap': 6.37}

df51.loc[df.index.max() + 1] = new_row
```

```
/var/folders/w2/x6wdr2694dbgvlhy8s27v_900000gp/T/ipykernel_5862/709269262.py:6: SettingW
ithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_
guide/indexing.html#returning-a-view-versus-a-copy
  df51.loc[df.index.max() + 1] = new_row
```

In [240…
```
df51
```

Out[240]:

	name	Market_Cap
0	Bitcoin	47.67
1	Ethereum	19.77
2	Tether	7.84

3	BNB	3.47
4	XRP	2.74
5	USD Coin	2.66
6	Cardano	0.93
7	Dogecoin	0.81
8	TRON	0.61
9	Solana	0.58
10	Polygon	0.57
11	Litecoin	0.54
12	Polkadot	0.52
13	Dai	0.44
14	Binance USD	0.43
15	Wrapped Bitcoin	0.39
16	Avalanche	0.38
17	Shiba Inu	0.38
18	UNUS SED LEO	0.31
19	Cosmos	0.29
20	Chainlink	0.26
21	Monero	0.24
22	Uniswap	0.24
23	OKB	0.23
24	Stellar	0.21
25	Ethereum Classic	0.20
26	Bitcoin Cash	0.19
27	TrueUSD	0.19
28	Toncoin	0.17
29	Internet Computer	0.16
30	Lido DAO	0.15
31	Rest of the Market	6.37

In [241…

```
# Reset the order of the 'quote.USD.market_cap_dominance' column in descending order
df51_sorted = df12.sort_values('Market_Cap', ascending=False)

df51 = pd.DataFrame(df10_sorted)
print(df51_sorted)
```

```
                 name  Market_Cap
0             Bitcoin       47.76
1            Ethereum       19.80
2              Tether        7.85
31  Rest of the Market        6.37
32  Rest of the Market        6.37
3                  BNB        3.47
4            USD Coin        2.66
5                 XRP        2.59
```

```
6               Cardano        0.92
7              Dogecoin        0.81
8                  TRON        0.61
9                Solana        0.58
10              Polygon        0.57
11             Litecoin        0.54
12             Polkadot        0.52
13                  Dai        0.44
14          Binance USD        0.43
15     Wrapped Bitcoin         0.39
16           Avalanche         0.38
17            Shiba Inu        0.38
18         UNUS SED LEO        0.30
19               Cosmos        0.29
20            Chainlink        0.26
21               Monero        0.24
22              Uniswap        0.24
23                  OKB        0.23
24              Stellar        0.21
25    Ethereum Classic         0.20
26         Bitcoin Cash        0.19
27              TrueUSD        0.19
28              Toncoin        0.17
29   Internet Computer         0.16
30              Lido DAO        0.15
```

In [242…

```
df51
```

Out[242]:

	name	Market_Cap
0	Bitcoin	47.76
1	Ethereum	19.80
2	Tether	7.85
31	Rest of the Market	6.37
32	Rest of the Market	6.37
3	BNB	3.47
4	USD Coin	2.66
5	XRP	2.59
6	Cardano	0.92
7	Dogecoin	0.81
8	TRON	0.61
9	Solana	0.58
10	Polygon	0.57
11	Litecoin	0.54
12	Polkadot	0.52
13	Dai	0.44
14	Binance USD	0.43
15	Wrapped Bitcoin	0.39
16	Avalanche	0.38
17	Shiba Inu	0.38
18	UNUS SED LEO	0.30

19	Cosmos	0.29
20	Chainlink	0.26
21	Monero	0.24
22	Uniswap	0.24
23	OKB	0.23
24	Stellar	0.21
25	Ethereum Classic	0.20
26	Bitcoin Cash	0.19
27	TrueUSD	0.19
28	Toncoin	0.17
29	Internet Computer	0.16
30	Lido DAO	0.15

In [244…

```
df51.drop_duplicates(subset=['name', 'Market_Cap'], keep='first', inplace=True)

# Print the updated DataFrame
print(df51)
```

```
                 name  Market_Cap
0             Bitcoin       47.76
1            Ethereum       19.80
2              Tether        7.85
31  Rest of the Market        6.37
3                 BNB        3.47
4            USD Coin        2.66
5                 XRP        2.59
6             Cardano        0.92
7            Dogecoin        0.81
8                TRON        0.61
9              Solana        0.58
10             Polygon        0.57
11            Litecoin        0.54
12            Polkadot        0.52
13                 Dai        0.44
14         Binance USD        0.43
15     Wrapped Bitcoin        0.39
16           Avalanche        0.38
17           Shiba Inu        0.38
18        UNUS SED LEO        0.30
19              Cosmos        0.29
20           Chainlink        0.26
21              Monero        0.24
22             Uniswap        0.24
23                 OKB        0.23
24             Stellar        0.21
25    Ethereum Classic        0.20
26        Bitcoin Cash        0.19
27             TrueUSD        0.19
28             Toncoin        0.17
29   Internet Computer        0.16
30            Lido DAO        0.15
```

In [245…

```
df51
```

Out[245]:

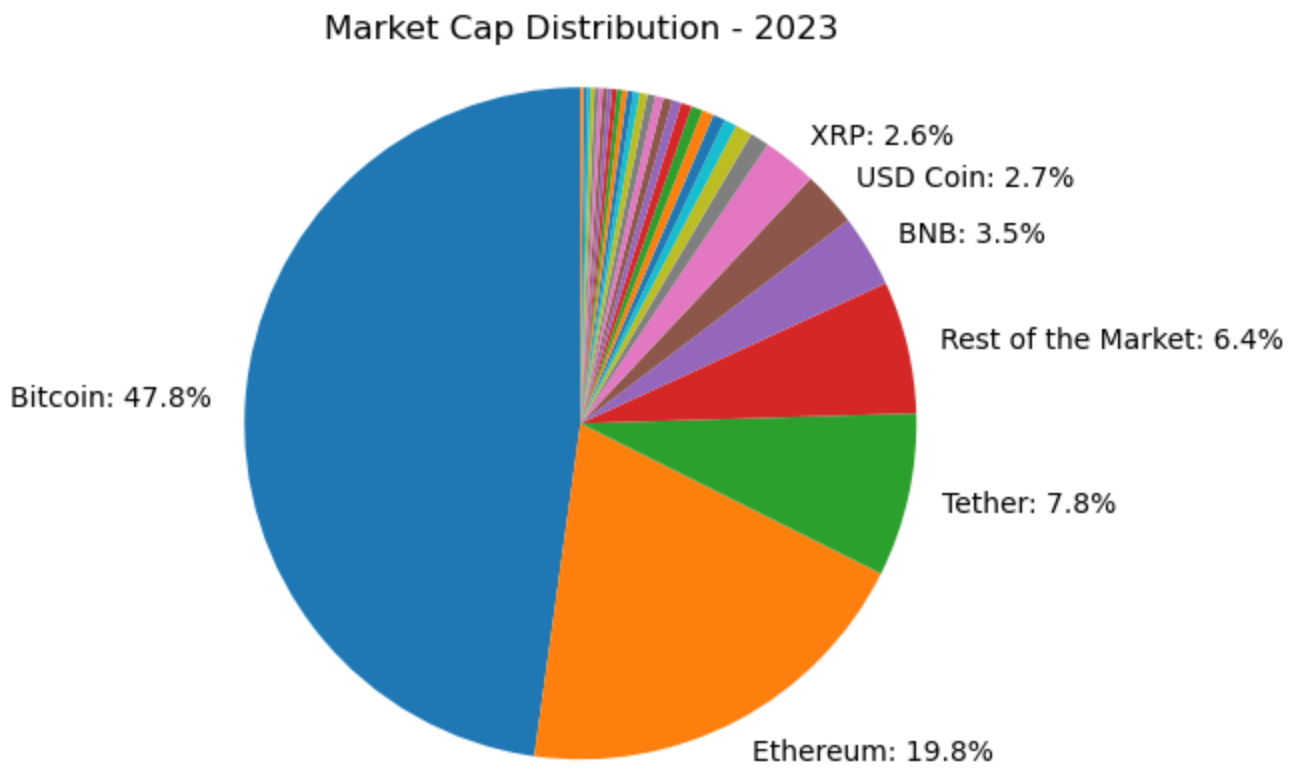
	name	Market_Cap
0	Bitcoin	47.76

1	Ethereum	19.80
2	Tether	7.85
31	Rest of the Market	6.37
3	BNB	3.47
4	USD Coin	2.66
5	XRP	2.59
6	Cardano	0.92
7	Dogecoin	0.81
8	TRON	0.61
9	Solana	0.58
10	Polygon	0.57
11	Litecoin	0.54
12	Polkadot	0.52
13	Dai	0.44
14	Binance USD	0.43
15	Wrapped Bitcoin	0.39
16	Avalanche	0.38
17	Shiba Inu	0.38
18	UNUS SED LEO	0.30
19	Cosmos	0.29
20	Chainlink	0.26
21	Monero	0.24
22	Uniswap	0.24
23	OKB	0.23
24	Stellar	0.21
25	Ethereum Classic	0.20
26	Bitcoin Cash	0.19
27	TrueUSD	0.19
28	Toncoin	0.17
29	Internet Computer	0.16
30	Lido DAO	0.15

In [311…

```
# In this visualization, I represent the data mentioned above through a pie chart, illus
# Assuming you have a DataFrame named 'df51' with columns 'name' and 'Market_Cap'
market_cap_data = df51['Market_Cap']
label_threshold = 1

# Create labels for pie chart
labels = ['' if pct <= label_threshold else f"{label}: {pct:.1f}%" for label, pct in zip

# Plotting the pie chart
_, _, autotexts = plt.pie(market_cap_data, labels=labels, autopct='', startangle=90)

# Adjusting label properties
```

```
for i, autotext in enumerate(autotexts):
    if market_cap_data[i] <= label_threshold:
        autotext.set_visible(False)  # Hide labels for smaller areas
    else:
        angle = np.degrees(np.arctan2(*autotext.get_position()))  # Get angle of text po
        x = autotext.get_position()[0] + 0.1 * (1 if angle < -90 else -1)  # Adjust x-po
        y = autotext.get_position()[1] + 0.05  # Adjust y-position
        plt.annotate(autotext.get_text(), (x, y), color='white')  # Add label to the pie

plt.axis('equal')  # Ensure pie is drawn as a circle
plt.title('Market Cap Distribution - 2023')  # Add title to the pie chart
plt.show()
```



In [269…

```
df50
```

Out[269]:

	name	symbol	slug	num_market_pairs	date_added	tags	max_supply
0	Bitcoin	BTC	bitcoin	10247	2010-07-13T00:00:00.000Z	['mineable', 'pow', 'sha-256', 'store-of-value...	21000000.0(
1	Ethereum	ETH	ethereum	7000	2015-08-07T00:00:00.000Z	['pos', 'smart-contracts', 'ethereum-ecosystem...	NaN
2	Tether	USDT	tether	55466	2015-02-25T00:00:00.000Z	['payments', 'stablecoin', 'asset-backed-stabl...	NaN
3	BNB	BNB	bnb	1458	2017-07-25T00:00:00.000Z	['marketplace', 'centralized-exchange', 'payme...	NaN
4	XRP	XRP	xrp	965	2013-08-04T00:00:00.000Z	['medium-of-exchange', 'enterprise-solutions',...	100000000000.0(

5	USD Coin	USDC	usd-coin	12962	2018-10-08T00:00:00.000Z	['medium-of-exchange', 'stablecoin', 'asset-ba...	NaN
6	Cardano	ADA	cardano	837	2017-10-01T00:00:00.000Z	['dpos', 'pos', 'platform', 'research', 'smart...	45000000000.00
7	Dogecoin	DOGE	dogecoin	728	2013-12-15T00:00:00.000Z	['mineable', 'pow', 'scrypt', 'medium-of-excha...	NaN
8	TRON	TRX	tron	772	2017-09-13T00:00:00.000Z	['media', 'payments', 'tron-ecosystem']	NaN
9	Solana	SOL	solana	472	2020-04-10T00:00:00.000Z	['pos', 'platform', 'solana-ecosystem', 'cms-h...	NaN
10	Polygon	MATIC	polygon	741	2019-04-28T00:00:00.000Z	['pos', 'platform', 'enterprise-solutions', 'z...	10000000000.00
11	Litecoin	LTC	litecoin	924	2013-04-28T00:00:00.000Z	['mineable', 'pow', 'scrypt', 'medium-of-excha...	84000000.00
12	Polkadot	DOT	polkadot-new	514	2020-08-19T00:00:00.000Z	['substrate', 'polkadot', 'binance-chain', 'po...	NaN
13	Dai	DAI	multi-collateral-dai	2349	2019-11-22T00:00:00.000Z	['defi', 'stablecoin', 'asset-backed-stablecoi...	NaN
14	Binance USD	BUSD	binance-usd	6915	2019-09-20T00:00:00.000Z	['stablecoin', 'asset-backed-stablecoin', 'bin...	NaN
15	Wrapped Bitcoin	WBTC	wrapped-bitcoin	1236	2019-01-30T00:00:00.000Z	['medium-of-exchange', 'defi', 'wrapped-tokens...	NaN
16	Avalanche	AVAX	avalanche	449	2020-07-13T00:00:00.000Z	['defi', 'smart-contracts', 'three-arrows-capi...	720000000.00
17	Shiba Inu	SHIB	shiba-inu	543	2020-08-01T00:00:00.000Z	['memes', 'ethereum-ecosystem', 'doggone-dogge...	NaN
18	UNUS SED LEO	LEO	unus-sed-leo	27	2019-05-21T00:00:00.000Z	['marketplace', 'centralized-exchange', 'disco...	NaN

19	Cosmos	ATOM	cosmos	452	2019-03-14T00:00:00.000Z	['platform', 'cosmos-ecosystem', 'content-crea...	NaN
20	Chainlink	LINK	chainlink	1189	2017-09-20T00:00:00.000Z	['platform', 'defi', 'oracles', 'smart-contrac...	1000000000.00
21	Monero	XMR	monero	217	2014-05-21T00:00:00.000Z	['mineable', 'pow', 'medium-of-exchange', 'pri...	NaN
22	Uniswap	UNI	uniswap	698	2020-09-17T00:00:00.000Z	['decentralized-exchange-dex-token', 'defi', '...	1000000000.00
23	OKB	OKB	okb	97	2019-04-30T00:00:00.000Z	['marketplace', 'centralized-exchange', 'disco...	NaN
24	Stellar	XLM	stellar	492	2014-08-05T00:00:00.000Z	['medium-of-exchange', 'enterprise-solutions',...	50001806812.00
25	Ethereum Classic	ETC	ethereum-classic	407	2016-07-24T00:00:00.000Z	['mineable', 'pow', 'ethash', 'platform', 'sma...	210700000.00
26	Bitcoin Cash	BCH	bitcoin-cash	703	2017-07-23T00:00:00.000Z	['mineable', 'pow', 'sha-256', 'marketplace', ...	21000000.00
27	TrueUSD	TUSD	trueusd	383	2018-03-06T00:00:00.000Z	['store-of-value', 'stablecoin', 'asset-backed...	NaN
28	Toncoin	TON	toncoin	115	2021-08-26T13:40:22.000Z	['pos']	5000000000.00
29	Internet Computer	ICP	internet-computer	150	2021-03-23T00:00:00.000Z	['platform', 'distributed-computing', 'collect...	NaN
30	Lido DAO	LDO	lido-dao	198	2020-12-15T00:00:00.000Z	['defi', 'dao', 'three-arrows-capital-portfoli...	1000000000.00

31 rows × 29 columns

In [275…

```
df52 = df50.rename(columns={'quote.USD.percent_change_1h': '1 HOUR', 'quote.USD.percent_
df53 = df52[['name', '1 HOUR', '24 HOUR', '7 DAYS', '30 DAYS', '60 DAYS', '90 DAYS']]

df53
```

Out[275]:

	name	1 HOUR	24 HOUR	7 DAYS	30 DAYS	60 DAYS	90 DAYS
0	Bitcoin	-0.14	0.48	1.66	-2.61	-15.22	6.14

1	Ethereum	-0.15	0.15	-3.54	-2.97	-17.33	4.48
2	Tether	-0.01	-0.01	-0.04	-0.06	-0.09	-0.41
3	BNB	0.03	1.35	-14.91	-24.20	-29.08	-22.94
4	XRP	5.58	7.95	10.18	31.20	5.14	51.94
5	USD Coin	-0.00	0.01	-0.01	-0.00	0.02	0.10
6	Cardano	0.75	0.46	-19.78	-23.01	-35.97	-15.95
7	Dogecoin	0.07	0.94	-7.35	-14.13	-31.39	-15.44
8	TRON	0.22	2.76	-8.37	3.72	7.73	8.75
9	Solana	0.32	0.95	-21.89	-26.05	-37.97	-24.22
10	Polygon	0.77	1.85	-20.59	-23.55	-44.60	-44.39
11	Litecoin	-0.23	1.23	-10.58	-3.18	-19.13	-3.91
12	Polkadot	0.23	2.77	-8.38	-13.53	-31.45	-24.76
13	Dai	-0.04	0.02	0.00	-0.04	-0.04	0.18
14	Binance USD	-0.00	0.04	0.01	-0.05	-0.08	0.06
15	Wrapped Bitcoin	-0.07	0.62	1.52	-2.66	-15.38	6.34
16	Avalanche	0.26	2.66	-16.11	-21.23	-38.35	-29.68
17	Shiba Inu	0.10	2.63	-15.52	-23.06	-40.24	-38.12
18	UNUS SED LEO	0.05	-0.16	-0.48	-2.58	2.50	3.90
19	Cosmos	0.29	1.38	-12.25	-20.12	-28.93	-30.83
20	Chainlink	0.72	2.86	-13.46	-19.22	-32.48	-22.24
21	Monero	0.43	0.52	-1.80	-8.86	-14.46	-6.04
22	Uniswap	0.36	5.17	-8.02	-15.14	-31.24	-29.56
23	OKB	0.06	1.85	-9.48	-9.65	-15.19	-16.33
24	Stellar	2.11	2.55	-2.90	-3.72	-21.91	-1.39
25	Ethereum Classic	0.29	1.67	-10.33	-15.57	-32.65	-22.58
26	Bitcoin Cash	0.28	2.67	-3.46	-7.87	-21.10	-18.97
27	TrueUSD	-0.02	-0.01	-0.14	-0.15	-0.22	-0.04
28	Toncoin	0.06	1.42	-8.70	-20.77	-33.22	-37.42
29	Internet Computer	0.58	3.83	-12.17	-26.26	-31.61	-29.72
30	Lido DAO	0.39	-0.62	-19.21	-5.57	-30.48	-32.75

In [288…
```
df55 = df53.set_index('name')
df55
```

Out[288]:

name	1 HOUR	24 HOUR	7 DAYS	30 DAYS	60 DAYS	90 DAYS
Bitcoin	-0.14	0.48	1.66	-2.61	-15.22	6.14
Ethereum	-0.15	0.15	-3.54	-2.97	-17.33	4.48
Tether	-0.01	-0.01	-0.04	-0.06	-0.09	-0.41
BNB	0.03	1.35	-14.91	-24.20	-29.08	-22.94

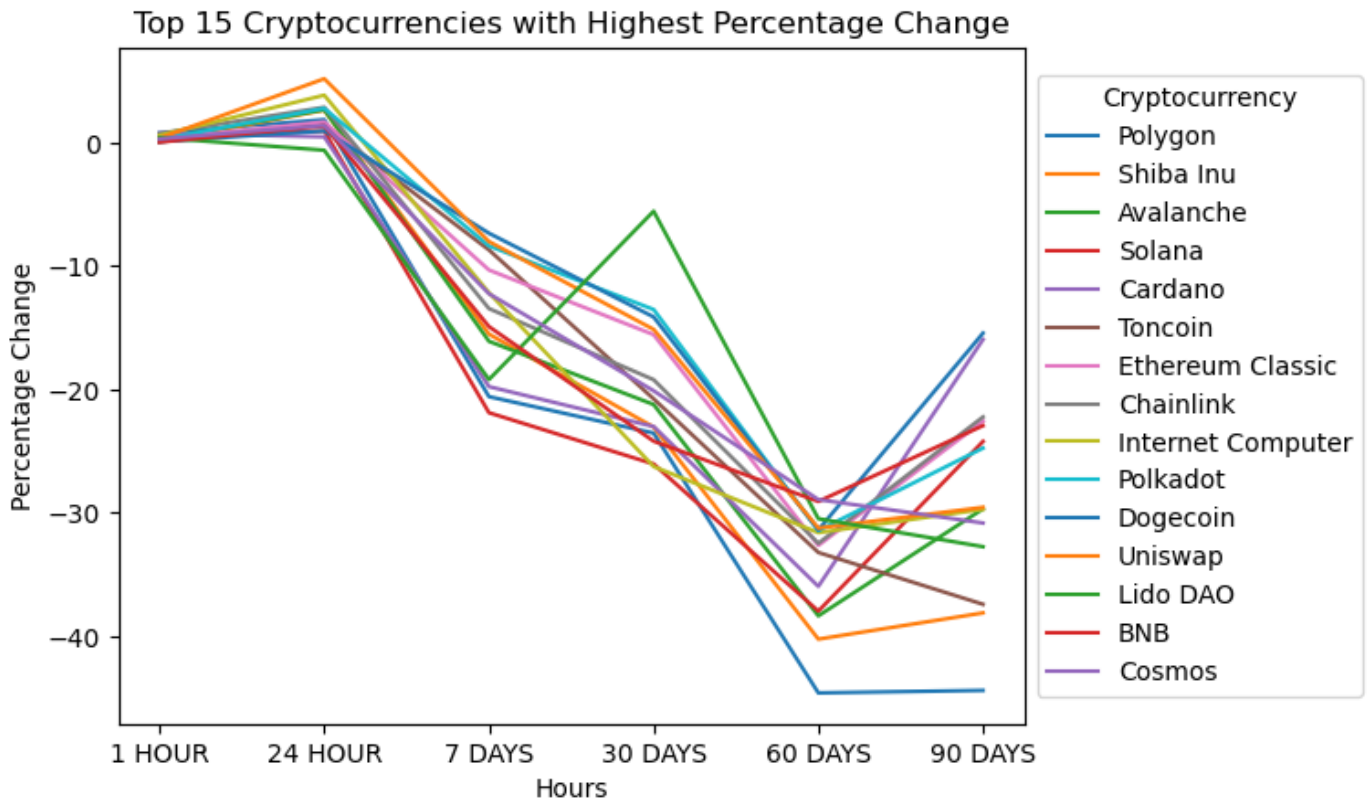
XRP	5.58	7.95	10.18	31.20	5.14	51.94
USD Coin	-0.00	0.01	-0.01	-0.00	0.02	0.10
Cardano	0.75	0.46	-19.78	-23.01	-35.97	-15.95
Dogecoin	0.07	0.94	-7.35	-14.13	-31.39	-15.44
TRON	0.22	2.76	-8.37	3.72	7.73	8.75
Solana	0.32	0.95	-21.89	-26.05	-37.97	-24.22
Polygon	0.77	1.85	-20.59	-23.55	-44.60	-44.39
Litecoin	-0.23	1.23	-10.58	-3.18	-19.13	-3.91
Polkadot	0.23	2.77	-8.38	-13.53	-31.45	-24.76
Dai	-0.04	0.02	0.00	-0.04	-0.04	0.18
Binance USD	-0.00	0.04	0.01	-0.05	-0.08	0.06
Wrapped Bitcoin	-0.07	0.62	1.52	-2.66	-15.38	6.34
Avalanche	0.26	2.66	-16.11	-21.23	-38.35	-29.68
Shiba Inu	0.10	2.63	-15.52	-23.06	-40.24	-38.12
UNUS SED LEO	0.05	-0.16	-0.48	-2.58	2.50	3.90
Cosmos	0.29	1.38	-12.25	-20.12	-28.93	-30.83
Chainlink	0.72	2.86	-13.46	-19.22	-32.48	-22.24
Monero	0.43	0.52	-1.80	-8.86	-14.46	-6.04
Uniswap	0.36	5.17	-8.02	-15.14	-31.24	-29.56
OKB	0.06	1.85	-9.48	-9.65	-15.19	-16.33
Stellar	2.11	2.55	-2.90	-3.72	-21.91	-1.39
Ethereum Classic	0.29	1.67	-10.33	-15.57	-32.65	-22.58
Bitcoin Cash	0.28	2.67	-3.46	-7.87	-21.10	-18.97
TrueUSD	-0.02	-0.01	-0.14	-0.15	-0.22	-0.04
Toncoin	0.06	1.42	-8.70	-20.77	-33.22	-37.42
Internet Computer	0.58	3.83	-12.17	-26.26	-31.61	-29.72
Lido DAO	0.39	-0.62	-19.21	-5.57	-30.48	-32.75

In [292…
```
type(df55)
```

Out[292]:
```
pandas.core.series.Series
```

In [324…
```
# This line graph displays the top 15 cryptocurrencies with the highest percentage chang
import pandas as pd
import matplotlib.pyplot as plt


# Sort the DataFrame by the desired column ('1 HOUR' in this example) in descending orde
df_sorted = df53.sort_values('60 DAYS', ascending=True)

# Select the top N values (e.g., top 10)
top_n = 15
df_top = df_sorted.head(top_n)

# Transpose the DataFrame
df_transposed = df_top.set_index('name').T
```

```
# Plot the transposed DataFrame
ax = df_transposed.plot(kind='line')

plt.xlabel('Hours')
plt.ylabel('Percentage Change')
plt.title(f'Top {top_n} Cryptocurrencies with Highest Percentage Change')

# Move the legend keys to the right
ax.legend(title='Cryptocurrency', bbox_to_anchor=(1, 0.5), loc='center left')

plt.show()
```



In [ ]: