

# CoinCapMarket\_Project\_ETL

February 16, 2024

```
[1]: from requests import Request, Session
from requests.exceptions import ConnectionError, Timeout, TooManyRedirects
import json

url = 'https://pro-api.coinmarketcap.com/v1/cryptocurrency/listings/latest'
#Original Sandbox Environment: 'https://sandbox-api.coinmarketcap.com/v1/
↳cryptocurrency/listings/latest'
parameters = {
    'start': '1',
    'limit': '15',
    'convert': 'USD'
}
headers = {
    'Accepts': 'application/json',
    'X-CMC_PRO_API_KEY': '0ad53085-1cb2-4eb8-ad9e-3ffbd7e56509',
}

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)

#NOTE:
# I had to go in and put "jupyter notebook --NotebookApp.
↳iopub_data_rate_limit=1e10"
# Into the Anaconda Prompt to change this to allow to pull data
# If that didn't work try using the local host URL as shown in the video
```

```
[2]: type(data)
```

```
[2]: dict
```

```
[3]: import pandas as pd
```

```
#This allows you to see all the columns, not just like 15  
pd.set_option('display.max_columns', None)  
pd.set_option('display.max_rows', None)
```

```
[4]: #This normalizes the data and makes it all pretty in a dataframe
```

```
df = pd.json_normalize(data['data'])  
df['timestamp'] = pd.to_datetime('now', utc = True)  
df
```

```
[4]:
```

	id	name	symbol	slug	num_market_pairs	\
0	1	Bitcoin	BTC	bitcoin	10818	
1	1027	Ethereum	ETH	ethereum	8411	
2	825	Tether	USDT	tether	74712	
3	1839	BNB	BNB	bnb	2066	
4	5426	Solana	SOL	solana	626	
5	52	XRP	XRP	xrp	1229	
6	3408	USDC	USDC	usd-coin	16724	
7	2010	Cardano	ADA	cardano	1074	
8	5805	Avalanche	AVAX	avalanche	664	
9	74	Dogecoin	DOGE	dogecoin	889	
10	1958	TRON	TRX	tron	930	
11	1975	Chainlink	LINK	chainlink	1642	
12	6636	Polkadot	DOT	polkadot-new	684	
13	3890	Polygon	MATIC	polygon	1274	
14	11419	Toncoin	TON	toncoin	201	

	date_added	\
0	2010-07-13T00:00:00.000Z	
1	2015-08-07T00:00:00.000Z	
2	2015-02-25T00:00:00.000Z	
3	2017-07-25T00:00:00.000Z	
4	2020-04-10T00:00:00.000Z	
5	2013-08-04T00:00:00.000Z	
6	2018-10-08T00:00:00.000Z	
7	2017-10-01T00:00:00.000Z	
8	2020-07-13T00:00:00.000Z	
9	2013-12-15T00:00:00.000Z	
10	2017-09-13T00:00:00.000Z	
11	2017-09-20T00:00:00.000Z	
12	2020-08-19T00:00:00.000Z	
13	2019-04-28T00:00:00.000Z	
14	2021-08-26T13:40:22.000Z	

	tags	max_supply	\
0	[mineable, pow, sha-256, store-of-value, state...	2.100000e+07	
1	[pos, smart-contracts, ethereum-ecosystem, coi...	NaN	
2	[payments, stablecoin, asset-backed-stablecoin...	NaN	
3	[marketplace, centralized-exchange, payments, ...	NaN	
4	[pos, platform, solana-ecosystem, cms-holdings...	NaN	
5	[medium-of-exchange, enterprise-solutions, arr...	1.000000e+11	
6	[medium-of-exchange, stablecoin, asset-backed-...	NaN	
7	[dpos, pos, platform, research, smart-contract...	4.500000e+10	
8	[defi, smart-contracts, three-arrows-capital-p...	7.200000e+08	
9	[mineable, pow, scrypt, medium-of-exchange, me...	NaN	
10	[media, payments, tron-ecosystem, layer-1, dwf...	NaN	
11	[platform, defi, oracles, smart-contracts, sub...	1.000000e+09	
12	[substrate, polkadot, binance-chain, polkadot-...	NaN	
13	[pos, platform, enterprise-solutions, zero-kno...	1.000000e+10	
14	[pos, layer-1, ftx-bankruptcy-estate, dwf-labs...	NaN	

	circulating_supply	total_supply	infinite_supply	platform	cmc_rank	\
0	1.962952e+07	1.962952e+07	False	NaN	1	
1	1.201656e+08	1.201656e+08	True	NaN	2	
2	9.711679e+10	9.960063e+10	True	NaN	3	
3	1.495446e+08	1.495446e+08	False	NaN	4	
4	4.405070e+08	5.697087e+08	True	NaN	5	
5	5.455860e+10	9.998790e+10	False	NaN	6	
6	2.804351e+10	2.804351e+10	False	NaN	7	
7	3.545136e+10	3.662821e+10	False	NaN	8	
8	3.675071e+08	4.355401e+08	False	NaN	9	
9	1.430971e+11	1.430971e+11	True	NaN	10	
10	8.805923e+10	8.805928e+10	True	NaN	11	
11	5.871000e+08	1.000000e+09	False	NaN	12	
12	1.304772e+09	1.411706e+09	True	NaN	13	
13	9.618349e+09	1.000000e+10	False	NaN	14	
14	3.466961e+09	5.102764e+09	True	NaN	15	

	self_reported_circulating_supply	self_reported_market_cap	tlv_ratio	\
0	NaN	NaN	None	
1	NaN	NaN	None	
2	NaN	NaN	None	
3	NaN	NaN	None	
4	NaN	NaN	None	
5	NaN	NaN	None	
6	NaN	NaN	None	
7	NaN	NaN	None	
8	NaN	NaN	None	
9	NaN	NaN	None	
10	7.165966e+10	9.397432e+09	None	
11	NaN	NaN	None	

12		NaN	NaN	None
13		NaN	NaN	None
14		3.414167e+09	7.483543e+09	None

	last_updated	quote.USD.price	quote.USD.volume_24h	\
0	2024-02-16T15:47:00.000Z	51803.517499	3.538087e+10	
1	2024-02-16T15:47:00.000Z	2772.432596	1.912609e+10	
2	2024-02-16T15:46:00.000Z	1.000408	6.236012e+10	
3	2024-02-16T15:46:00.000Z	358.446366	1.595046e+09	
4	2024-02-16T15:47:00.000Z	109.523692	2.297727e+09	
5	2024-02-16T15:47:00.000Z	0.560126	1.845598e+09	
6	2024-02-16T15:47:00.000Z	0.999978	7.079930e+09	
7	2024-02-16T15:46:00.000Z	0.589029	6.880773e+08	
8	2024-02-16T15:46:00.000Z	40.084172	6.693299e+08	
9	2024-02-16T15:47:00.000Z	0.085021	5.015665e+08	
10	2024-02-16T15:46:00.000Z	0.131140	3.036466e+08	
11	2024-02-16T15:46:00.000Z	19.502987	5.195526e+08	
12	2024-02-16T15:46:00.000Z	7.629056	2.768395e+08	
13	2024-02-16T15:46:00.000Z	0.916610	5.578486e+08	
14	2024-02-16T15:47:00.000Z	2.191909	3.912944e+07	

	quote.USD.volume_change_24h	quote.USD.percent_change_1h	\
0	-1.2904	-0.483963	
1	-15.3359	-1.478746	
2	-4.0796	-0.019301	
3	6.3135	-0.582073	
4	4.0062	-1.404814	
5	22.5453	-0.928837	
6	1.1650	0.008836	
7	4.2334	-1.803337	
8	-17.8292	-1.108325	
9	-37.5221	-1.260047	
10	-19.4654	-0.602691	
11	0.1722	-1.590596	
12	-8.6597	-1.712621	
13	44.4507	-0.320905	
14	-0.6772	-0.809555	

	quote.USD.percent_change_24h	quote.USD.percent_change_7d	\
0	-0.098477	9.636418	
1	-1.626754	11.050249	
2	-0.014693	0.033707	
3	-0.446914	10.951614	
4	-3.773335	4.016405	
5	2.504656	7.302442	
6	-0.017140	-0.015565	
7	-2.349349	8.468809	

8	-4.525538	6.402693
9	-0.319572	4.311424
10	0.275406	6.393486
11	-2.312259	6.420423
12	-2.391714	5.407958
13	2.163719	8.584463
14	-1.460662	6.019907

	quote.USD.percent_change_30d	quote.USD.percent_change_60d \
0	21.606935	25.053485
1	8.969304	28.361430
2	0.083988	0.105619
3	14.883391	50.895440
4	9.551569	54.402131
5	-1.576676	-6.193132
6	0.002958	-0.015053
7	11.816009	3.605698
8	11.687260	2.207950
9	5.922900	-4.844016
10	21.468728	31.966567
11	20.518321	38.444766
12	3.883991	15.107381
13	9.261875	17.907028
14	-5.828014	3.755895

	quote.USD.percent_change_90d	quote.USD.market_cap \
0	41.471266	1.016878e+12
1	42.174491	3.331510e+11
2	0.005984	9.715639e+10
3	46.717527	5.360373e+10
4	88.689273	4.824595e+10
5	-7.844618	3.055968e+10
6	-0.013819	2.804288e+10
7	61.019494	2.088190e+10
8	81.055887	1.473122e+10
9	5.373382	1.216622e+10
10	27.647037	1.154807e+10
11	44.597883	1.145020e+10
12	46.167411	9.954182e+09
13	12.288863	8.816273e+09
14	-5.709452	7.599264e+09

	quote.USD.market_cap_dominance	quote.USD.fully_diluted_market_cap \
0	52.5051	1.087874e+12
1	17.1957	3.331510e+11
2	5.0226	9.964124e+10
3	2.7672	5.360373e+10

4	2.4902	6.239660e+10
5	1.5776	5.601258e+10
6	1.4477	2.804288e+10
7	1.0795	2.650632e+10
8	0.7606	2.886060e+10
9	0.6280	1.216622e+10
10	0.5970	1.154807e+10
11	0.5919	1.950299e+10
12	0.5146	1.076999e+10
13	0.4552	9.166098e+09
14	0.3922	1.118479e+10

	quote.USD.tvl	quote.USD.last_updated	platform.id	platform.name	\
0	None	2024-02-16T15:47:00.000Z	NaN	NaN	
1	None	2024-02-16T15:47:00.000Z	NaN	NaN	
2	None	2024-02-16T15:46:00.000Z	1027.0	Ethereum	
3	None	2024-02-16T15:46:00.000Z	NaN	NaN	
4	None	2024-02-16T15:47:00.000Z	NaN	NaN	
5	None	2024-02-16T15:47:00.000Z	NaN	NaN	
6	None	2024-02-16T15:47:00.000Z	1027.0	Ethereum	
7	None	2024-02-16T15:46:00.000Z	NaN	NaN	
8	None	2024-02-16T15:46:00.000Z	NaN	NaN	
9	None	2024-02-16T15:47:00.000Z	NaN	NaN	
10	None	2024-02-16T15:46:00.000Z	NaN	NaN	
11	None	2024-02-16T15:46:00.000Z	1027.0	Ethereum	
12	None	2024-02-16T15:46:00.000Z	NaN	NaN	
13	None	2024-02-16T15:46:00.000Z	NaN	NaN	
14	None	2024-02-16T15:47:00.000Z	NaN	NaN	

	platform.symbol	platform.slug	platform.token_address	\
0	NaN	NaN	NaN	
1	NaN	NaN	NaN	
2	ETH	ethereum	0xdac17f958d2ee523a2206206994597c13d831ec7	
3	NaN	NaN	NaN	
4	NaN	NaN	NaN	
5	NaN	NaN	NaN	
6	ETH	ethereum	0xa0b86991c6218b36c1d19d4a2e9eb0ce3606eb48	
7	NaN	NaN	NaN	
8	NaN	NaN	NaN	
9	NaN	NaN	NaN	
10	NaN	NaN	NaN	
11	ETH	ethereum	0x514910771af9ca656af840dff83e8264ecf986ca	
12	NaN	NaN	NaN	
13	NaN	NaN	NaN	
14	NaN	NaN	NaN	

timestamp

```

0 2024-02-16 15:48:21.896003+00:00
1 2024-02-16 15:48:21.896003+00:00
2 2024-02-16 15:48:21.896003+00:00
3 2024-02-16 15:48:21.896003+00:00
4 2024-02-16 15:48:21.896003+00:00
5 2024-02-16 15:48:21.896003+00:00
6 2024-02-16 15:48:21.896003+00:00
7 2024-02-16 15:48:21.896003+00:00
8 2024-02-16 15:48:21.896003+00:00
9 2024-02-16 15:48:21.896003+00:00
10 2024-02-16 15:48:21.896003+00:00
11 2024-02-16 15:48:21.896003+00:00
12 2024-02-16 15:48:21.896003+00:00
13 2024-02-16 15:48:21.896003+00:00
14 2024-02-16 15:48:21.896003+00:00

```

```

[5]: def api_runner():
    global df
    url = 'https://pro-api.coinmarketcap.com/v1/cryptocurrency/listings/latest'
    #Original Sandbox Environment: 'https://sandbox-api.coinmarketcap.com/v1/
    ↪cryptocurrency/listings/latest'
    parameters = {
        'start': '1',
        'limit': '15',
        'convert': 'USD'
    }
    headers = {
        'Accepts': 'application/json',
        'X-CMC_PRO_API_KEY': '0ad53085-1cb2-4eb8-ad9e-3ffbd7e56509',
    }

    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)

#NOTE:
# I had to go in and put "jupyter notebook --NotebookApp.
    ↪iopub_data_rate_limit=1e10"
# Into the Anaconda Prompt to change this to allow to pull data

# Use this if you just want to keep it in a dataframe

```

```

#df2 = pd.json_normalize(data['data'])
#df2['Timestamp'] = pd.to_datetime('now', utc = True)
#df = pd.concat([df, df2])

if not os.path.isfile(r'/Users/samantarana/Documents/Data analytics/
CoinCapAPI.csv'):
    df.to_csv('/Users/samantarana/Documents/Data analytics/CoinCapAPI.csv',
header = 'column_names')
else:
    df.to_csv('/Users/samantarana/Documents/Data analytics/CoinCapAPI.
csv',mode = 'a', header = False)

df = pd.json_normalize(data['data'])
df['timestamp'] = pd.to_datetime('now',utc = True)
df

```

```

[7]: import os
from time import time
from time import sleep

for i in range(333):
    api_runner()
    print('API Runner completed')
    sleep(60) #sleep for 1 minute
exit()

```

API Runner completed  
API Runner completed  
API Runner completed  
API Runner completed  
API Runner completed

```

-----
KeyboardInterrupt                                Traceback (most recent call last)
Input In [7], in <cell line: 5>()
      6     api_runner()
      7     print('API Runner completed')
----> 8     sleep(60) #sleep for 1 minute
      9 exit()

KeyboardInterrupt:

```

```

[8]: df

```



```

[8]:      id      name symbol      slug  num_market_pairs  \
0         1    Bitcoin   BTC    bitcoin      10818
1    1027    Ethereum   ETH    ethereum      8411
2     825    Tether USDt  USDT    tether      74712
3    1839       BNB    BNB      bnb      2066
4    5426    Solana    SOL    solana      626
5     52       XRP    XRP      xrp      1229
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7    2010    Cardano   ADA    cardano     1074
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9     74   Dogecoin  DOGE    dogecoin     889
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11   1975  Chainlink  LINK    chainlink     1642
12   6636  Polkadot   DOT  polkadot-new     684
13   3890   Polygon  MATIC    polygon     1274
14  11419   Toncoin   TON    toncoin      201

      date_added  \
0  2010-07-13T00:00:00.000Z
1  2015-08-07T00:00:00.000Z
2  2015-02-25T00:00:00.000Z
3  2017-07-25T00:00:00.000Z
4  2020-04-10T00:00:00.000Z
5  2013-08-04T00:00:00.000Z
6  2018-10-08T00:00:00.000Z
7  2017-10-01T00:00:00.000Z
8  2020-07-13T00:00:00.000Z
9  2013-12-15T00:00:00.000Z
10 2017-09-13T00:00:00.000Z
11 2017-09-20T00:00:00.000Z
12 2020-08-19T00:00:00.000Z
13 2019-04-28T00:00:00.000Z
14 2021-08-26T13:40:22.000Z

      tags      max_supply  \
0  [mineable, pow, sha-256, store-of-value, state...  2.100000e+07
1  [pos, smart-contracts, ethereum-ecosystem, coi...      NaN
2  [payments, stablecoin, asset-backed-stablecoin...      NaN
3  [marketplace, centralized-exchange, payments, ...      NaN
4  [pos, platform, solana-ecosystem, cms-holdings...      NaN
5  [medium-of-exchange, enterprise-solutions, arr...  1.000000e+11
6  [medium-of-exchange, stablecoin, asset-backed-...      NaN
7  [dpos, pos, platform, research, smart-contract...  4.500000e+10
8  [defi, smart-contracts, three-arrows-capital-p...  7.200000e+08
9  [mineable, pow, scrypt, medium-of-exchange, me...      NaN
10 [media, payments, tron-ecosystem, layer-1, dwf...      NaN
11 [platform, defi, oracles, smart-contracts, sub...  1.000000e+09

```

12	[substrate, polkadot, binance-chain, polkadot-...	NaN
13	[pos, platform, enterprise-solutions, zero-kno...	1.000000e+10
14	[pos, layer-1, ftx-bankruptcy-estate, dwf-labs...	NaN

	circulating_supply	total_supply	infinite_supply	platform	cmc_rank	\
0	1.962952e+07	1.962952e+07	False	NaN	1	
1	1.201656e+08	1.201656e+08	True	NaN	2	
2	9.711679e+10	9.960063e+10	True	NaN	3	
3	1.495446e+08	1.495446e+08	False	NaN	4	
4	4.405070e+08	5.697087e+08	True	NaN	5	
5	5.455860e+10	9.998790e+10	False	NaN	6	
6	2.804351e+10	2.804351e+10	False	NaN	7	
7	3.545136e+10	3.662821e+10	False	NaN	8	
8	3.675071e+08	4.355401e+08	False	NaN	9	
9	1.430971e+11	1.430971e+11	True	NaN	10	
10	8.805923e+10	8.805928e+10	True	NaN	11	
11	5.871000e+08	1.000000e+09	False	NaN	12	
12	1.304772e+09	1.411706e+09	True	NaN	13	
13	9.618349e+09	1.000000e+10	False	NaN	14	
14	3.466961e+09	5.102764e+09	True	NaN	15	

	self_reported_circulating_supply	self_reported_market_cap	tlv_ratio	\
0	NaN	NaN	None	
1	NaN	NaN	None	
2	NaN	NaN	None	
3	NaN	NaN	None	
4	NaN	NaN	None	
5	NaN	NaN	None	
6	NaN	NaN	None	
7	NaN	NaN	None	
8	NaN	NaN	None	
9	NaN	NaN	None	
10	7.165966e+10	9.398768e+09	None	
11	NaN	NaN	None	
12	NaN	NaN	None	
13	NaN	NaN	None	
14	3.414167e+09	7.449933e+09	None	

	last_updated	quote.USD.price	quote.USD.volume_24h	\
0	2024-02-16T16:07:00.000Z	51953.377148	3.482934e+10	
1	2024-02-16T16:07:00.000Z	2784.959779	1.880883e+10	
2	2024-02-16T16:06:00.000Z	1.000378	6.118458e+10	
3	2024-02-16T16:06:00.000Z	358.502780	1.541621e+09	
4	2024-02-16T16:07:00.000Z	109.609739	2.218471e+09	
5	2024-02-16T16:07:00.000Z	0.560158	1.835934e+09	
6	2024-02-16T16:07:00.000Z	0.999452	6.963549e+09	
7	2024-02-16T16:06:00.000Z	0.589351	6.708128e+08	

8	2024-02-16T16:06:00.000Z	40.023338	6.499012e+08
9	2024-02-16T16:07:00.000Z	0.085619	4.862640e+08
10	2024-02-16T16:06:00.000Z	0.131158	3.008054e+08
11	2024-02-16T16:06:00.000Z	19.456350	5.095910e+08
12	2024-02-16T16:06:00.000Z	7.632667	2.684228e+08
13	2024-02-16T16:06:00.000Z	0.916699	5.494244e+08
14	2024-02-16T16:07:00.000Z	2.182065	3.876166e+07

	quote.USD.volume_change_24h	quote.USD.percent_change_1h \
0	-3.0210	0.300453
1	-17.5788	0.022700
2	-6.9411	0.024336
3	-0.9091	-0.255568
4	-1.9314	0.560841
5	20.9096	0.464425
6	-1.5792	-0.045070
7	0.4002	-0.162262
8	-20.9029	-0.183254
9	-40.2667	0.755479
10	-20.5531	-0.254134
11	-2.5359	-0.210604
12	-13.3139	-0.181688
13	38.8166	0.614825
14	-2.9647	-0.213785

	quote.USD.percent_change_24h	quote.USD.percent_change_7d \
0	-0.012035	9.902946
1	-1.355775	11.577486
2	0.000012	0.016365
3	-0.119745	11.180896
4	-3.566765	3.457612
5	2.538659	7.286536
6	-0.044372	-0.057921
7	-1.790632	8.866726
8	-4.486172	6.535147
9	0.909344	5.157160
10	0.363234	6.441855
11	-2.139832	5.906043
12	-2.253410	6.185306
13	2.738436	8.559173
14	-1.309020	5.374178

	quote.USD.percent_change_30d	quote.USD.percent_change_60d \
0	22.373895	26.104375
1	9.687630	29.518639
2	0.088083	0.097134
3	14.873983	51.343089

4	10.435258	55.235664
5	-1.482524	-5.914441
6	-0.064384	-0.079842
7	11.938606	3.863039
8	12.074915	2.260675
9	6.928035	-3.688459
10	21.543174	32.236100
11	20.723100	38.815892
12	4.019573	15.627756
13	9.661847	18.346017
14	-6.248161	2.147677

	quote.USD.percent_change_90d	quote.USD.market_cap \
0	41.639112	1.019820e+12
1	42.414933	3.346564e+11
2	0.001571	9.715352e+10
3	46.573601	5.361217e+10
4	86.515750	4.828386e+10
5	-7.901977	3.056142e+10
6	-0.054312	2.802814e+10
7	60.246020	2.089328e+10
8	78.824339	1.470886e+10
9	5.958987	1.225184e+10
10	27.522091	1.154971e+10
11	43.228582	1.142282e+10
12	45.651487	9.958894e+09
13	11.734323	8.817134e+09
14	-6.408142	7.565134e+09

	quote.USD.market_cap_dominance	quote.USD.fully_diluted_market_cap \
0	52.5624	1.091021e+12
1	17.2341	3.346564e+11
2	5.0099	9.963830e+10
3	2.7621	5.361217e+10
4	2.4865	6.244562e+10
5	1.5745	5.601576e+10
6	1.4440	2.802814e+10
7	1.0774	2.652078e+10
8	0.7581	2.881680e+10
9	0.6309	1.225184e+10
10	0.5956	1.154972e+10
11	0.5890	1.945635e+10
12	0.5136	1.077508e+10
13	0.4544	9.166993e+09
14	0.3896	1.113456e+10

quote.USD.tvl	quote.USD.last_updated	platform.id	platform.name \
---------------	------------------------	-------------	-----------------

0	None	2024-02-16T16:07:00.000Z	NaN	NaN
1	None	2024-02-16T16:07:00.000Z	NaN	NaN
2	None	2024-02-16T16:06:00.000Z	1027.0	Ethereum
3	None	2024-02-16T16:06:00.000Z	NaN	NaN
4	None	2024-02-16T16:07:00.000Z	NaN	NaN
5	None	2024-02-16T16:07:00.000Z	NaN	NaN
6	None	2024-02-16T16:07:00.000Z	1027.0	Ethereum
7	None	2024-02-16T16:06:00.000Z	NaN	NaN
8	None	2024-02-16T16:06:00.000Z	NaN	NaN
9	None	2024-02-16T16:07:00.000Z	NaN	NaN
10	None	2024-02-16T16:06:00.000Z	NaN	NaN
11	None	2024-02-16T16:06:00.000Z	1027.0	Ethereum
12	None	2024-02-16T16:06:00.000Z	NaN	NaN
13	None	2024-02-16T16:06:00.000Z	NaN	NaN
14	None	2024-02-16T16:07:00.000Z	NaN	NaN

	platform.symbol	platform.slug	platform.token_address \
0	NaN	NaN	NaN
1	NaN	NaN	NaN
2	ETH	ethereum	0xdac17f958d2ee523a2206206994597c13d831ec7
3	NaN	NaN	NaN
4	NaN	NaN	NaN
5	NaN	NaN	NaN
6	ETH	ethereum	0xa0b86991c6218b36c1d19d4a2e9eb0ce3606eb48
7	NaN	NaN	NaN
8	NaN	NaN	NaN
9	NaN	NaN	NaN
10	NaN	NaN	NaN
11	ETH	ethereum	0x514910771af9ca656af840dff83e8264ecf986ca
12	NaN	NaN	NaN
13	NaN	NaN	NaN
14	NaN	NaN	NaN

	timestamp
0	2024-02-16 16:09:25.810008+00:00
1	2024-02-16 16:09:25.810008+00:00
2	2024-02-16 16:09:25.810008+00:00
3	2024-02-16 16:09:25.810008+00:00
4	2024-02-16 16:09:25.810008+00:00
5	2024-02-16 16:09:25.810008+00:00
6	2024-02-16 16:09:25.810008+00:00
7	2024-02-16 16:09:25.810008+00:00
8	2024-02-16 16:09:25.810008+00:00
9	2024-02-16 16:09:25.810008+00:00
10	2024-02-16 16:09:25.810008+00:00
11	2024-02-16 16:09:25.810008+00:00
12	2024-02-16 16:09:25.810008+00:00

```
13 2024-02-16 16:09:25.810008+00:00
14 2024-02-16 16:09:25.810008+00:00
```

```
[9]: # One thing I noticed was the scientific notation. I like it, but I want to be
      ↪able to see the numbers in this case
```

```
pd.set_option('display.float_format', lambda x: '%.5f' % x)
```

```
[10]: df
```

```
[10]:
```

	id	name	symbol	slug	num_market_pairs	\
0	1	Bitcoin	BTC	bitcoin	10818	
1	1027	Ethereum	ETH	ethereum	8411	
2	825	Tether USDt	USDT	tether	74712	
3	1839	BNB	BNB	bnb	2066	
4	5426	Solana	SOL	solana	626	
5	52	XRP	XRP	xrp	1229	
6	3408	USDC	USDC	usd-coin	16724	
7	2010	Cardano	ADA	cardano	1074	
8	5805	Avalanche	AVAX	avalanche	664	
9	74	Dogecoin	DOGE	dogecoin	889	
10	1958	TRON	TRX	tron	930	
11	1975	Chainlink	LINK	chainlink	1642	
12	6636	Polkadot	DOT	polkadot-new	684	
13	3890	Polygon	MATIC	polygon	1274	
14	11419	Toncoin	TON	toncoin	201	

	date_added	\
0	2010-07-13T00:00:00.000Z	
1	2015-08-07T00:00:00.000Z	
2	2015-02-25T00:00:00.000Z	
3	2017-07-25T00:00:00.000Z	
4	2020-04-10T00:00:00.000Z	
5	2013-08-04T00:00:00.000Z	
6	2018-10-08T00:00:00.000Z	
7	2017-10-01T00:00:00.000Z	
8	2020-07-13T00:00:00.000Z	
9	2013-12-15T00:00:00.000Z	
10	2017-09-13T00:00:00.000Z	
11	2017-09-20T00:00:00.000Z	
12	2020-08-19T00:00:00.000Z	
13	2019-04-28T00:00:00.000Z	
14	2021-08-26T13:40:22.000Z	

	tags	max_supply	\
0	[mineable, pow, sha-256, store-of-value, state...	21000000.00000	
1	[pos, smart-contracts, ethereum-ecosystem, coi...	NaN	

2	[payments, stablecoin, asset-backed-stablecoin...	NaN
3	[marketplace, centralized-exchange, payments, ...	NaN
4	[pos, platform, solana-ecosystem, cms-holdings...	NaN
5	[medium-of-exchange, enterprise-solutions, arr...	100000000000.00000
6	[medium-of-exchange, stablecoin, asset-backed-...	NaN
7	[dpos, pos, platform, research, smart-contract...	45000000000.00000
8	[defi, smart-contracts, three-arrows-capital-p...	720000000.00000
9	[mineable, pow, scrypt, medium-of-exchange, me...	NaN
10	[media, payments, tron-ecosystem, layer-1, dwf...	NaN
11	[platform, defi, oracles, smart-contracts, sub...	1000000000.00000
12	[substrate, polkadot, binance-chain, polkadot-...	NaN
13	[pos, platform, enterprise-solutions, zero-kno...	10000000000.00000
14	[pos, layer-1, ftx-bankruptcy-estate, dwf-labs...	NaN

	circulating_supply	total_supply	infinite_supply	platform \
0	19629518.00000	19629518.00000	False	NaN
1	120165596.08996	120165596.08996	True	NaN
2	97116788125.71764	99600626148.56953	True	NaN
3	149544642.68938	149544642.68938	False	NaN
4	440507009.24939	569708726.07903	True	NaN
5	54558598490.00000	99987895338.00000	False	NaN
6	28043507284.27634	28043507284.27634	False	NaN
7	35451363529.41400	36628205944.37800	False	NaN
8	367507149.48800	435540059.48800	False	NaN
9	143097146383.70520	143097146383.70520	True	NaN
10	88059232792.83615	88059275792.33267	True	NaN
11	587099970.45279	1000000000.00000	False	NaN
12	1304772428.69958	1411706138.96427	True	NaN
13	9618349204.31577	10000000000.00000	False	NaN
14	3466960979.94962	5102763677.30050	True	NaN

	cmc_rank	self_reported_circulating_supply	self_reported_market_cap \
0	1	NaN	NaN
1	2	NaN	NaN
2	3	NaN	NaN
3	4	NaN	NaN
4	5	NaN	NaN
5	6	NaN	NaN
6	7	NaN	NaN
7	8	NaN	NaN
8	9	NaN	NaN
9	10	NaN	NaN
10	11	71659659264.00000	9398768383.96608
11	12	NaN	NaN
12	13	NaN	NaN
13	14	NaN	NaN
14	15	3414166606.00000	7449933065.49324

	tv1_ratio	last_updated	quote.USD.price	quote.USD.volume_24h \
0	None	2024-02-16T16:07:00.000Z	51953.37715	34829335277.00451
1	None	2024-02-16T16:07:00.000Z	2784.95978	18808827706.99440
2	None	2024-02-16T16:06:00.000Z	1.00038	61184579310.90502
3	None	2024-02-16T16:06:00.000Z	358.50278	1541621325.08456
4	None	2024-02-16T16:07:00.000Z	109.60974	2218470856.67413
5	None	2024-02-16T16:07:00.000Z	0.56016	1835933831.01485
6	None	2024-02-16T16:07:00.000Z	0.99945	6963549130.55825
7	None	2024-02-16T16:06:00.000Z	0.58935	670812750.98305
8	None	2024-02-16T16:06:00.000Z	40.02334	649901172.08242
9	None	2024-02-16T16:07:00.000Z	0.08562	486263977.54878
10	None	2024-02-16T16:06:00.000Z	0.13116	300805367.54852
11	None	2024-02-16T16:06:00.000Z	19.45635	509590963.58263
12	None	2024-02-16T16:06:00.000Z	7.63267	268422758.50915
13	None	2024-02-16T16:06:00.000Z	0.91670	549424444.54625
14	None	2024-02-16T16:07:00.000Z	2.18206	38761656.68779

	quote.USD.volume_change_24h	quote.USD.percent_change_1h \
0	-3.02100	0.30045
1	-17.57880	0.02270
2	-6.94110	0.02434
3	-0.90910	-0.25557
4	-1.93140	0.56084
5	20.90960	0.46443
6	-1.57920	-0.04507
7	0.40020	-0.16226
8	-20.90290	-0.18325
9	-40.26670	0.75548
10	-20.55310	-0.25413
11	-2.53590	-0.21060
12	-13.31390	-0.18169
13	38.81660	0.61483
14	-2.96470	-0.21379

	quote.USD.percent_change_24h	quote.USD.percent_change_7d \
0	-0.01203	9.90295
1	-1.35578	11.57749
2	0.00001	0.01637
3	-0.11975	11.18090
4	-3.56676	3.45761
5	2.53866	7.28654
6	-0.04437	-0.05792
7	-1.79063	8.86673
8	-4.48617	6.53515
9	0.90934	5.15716
10	0.36323	6.44186



11	-2.13983	5.90604
12	-2.25341	6.18531
13	2.73844	8.55917
14	-1.30902	5.37418

	quote.USD.percent_change_30d	quote.USD.percent_change_60d \
0	22.37390	26.10437
1	9.68763	29.51864
2	0.08808	0.09713
3	14.87398	51.34309
4	10.43526	55.23566
5	-1.48252	-5.91444
6	-0.06438	-0.07984
7	11.93861	3.86304
8	12.07492	2.26067
9	6.92803	-3.68846
10	21.54317	32.23610
11	20.72310	38.81589
12	4.01957	15.62776
13	9.66185	18.34602
14	-6.24816	2.14768

	quote.USD.percent_change_90d	quote.USD.market_cap \
0	41.63911	1019819751894.75854
1	42.41493	334656351882.32355
2	0.00157	97153518505.05452
3	46.57360	53612170149.45863
4	86.51575	48283858186.21605
5	-7.90198	30561415079.62490
6	-0.05431	28028138196.37597
7	60.24602	20893283383.23812
8	78.82434	14708862953.14979
9	5.95899	12251835222.61201
10	27.52209	11549710696.23000
11	43.22858	11422822574.30190
12	45.65149	9958893802.54889
13	11.73432	8817133922.53341
14	-6.40814	7565133815.06066

	quote.USD.market_cap_dominance	quote.USD.fully_diluted_market_cap \
0	52.56240	1091020920115.81006
1	17.23410	334656351882.32001
2	5.00990	99638295936.16000
3	2.76210	53612170149.46000
4	2.48650	62445624609.52000
5	1.57450	56015762731.20000
6	1.44400	28028138196.38000

7	1.07740	26520778290.11000
8	0.75810	28816803539.80000
9	0.63090	12251835222.61000
10	0.59560	11549716335.98000
11	0.58900	19456350109.32000
12	0.51360	10775083232.23000
13	0.45440	9166992937.39000
14	0.38960	11134561441.18000

	quote.USD.tvl	quote.USD.last_updated	platform.id	platform.name	\
0	None	2024-02-16T16:07:00.000Z	NaN	NaN	
1	None	2024-02-16T16:07:00.000Z	NaN	NaN	
2	None	2024-02-16T16:06:00.000Z	1027.00000	Ethereum	
3	None	2024-02-16T16:06:00.000Z	NaN	NaN	
4	None	2024-02-16T16:07:00.000Z	NaN	NaN	
5	None	2024-02-16T16:07:00.000Z	NaN	NaN	
6	None	2024-02-16T16:07:00.000Z	1027.00000	Ethereum	
7	None	2024-02-16T16:06:00.000Z	NaN	NaN	
8	None	2024-02-16T16:06:00.000Z	NaN	NaN	
9	None	2024-02-16T16:07:00.000Z	NaN	NaN	
10	None	2024-02-16T16:06:00.000Z	NaN	NaN	
11	None	2024-02-16T16:06:00.000Z	1027.00000	Ethereum	
12	None	2024-02-16T16:06:00.000Z	NaN	NaN	
13	None	2024-02-16T16:06:00.000Z	NaN	NaN	
14	None	2024-02-16T16:07:00.000Z	NaN	NaN	

	platform.symbol	platform.slug	platform.token_address	\
0	NaN	NaN	NaN	
1	NaN	NaN	NaN	
2	ETH	ethereum	0xdac17f958d2ee523a2206206994597c13d831ec7	
3	NaN	NaN	NaN	
4	NaN	NaN	NaN	
5	NaN	NaN	NaN	
6	ETH	ethereum	0xa0b86991c6218b36c1d19d4a2e9eb0ce3606eb48	
7	NaN	NaN	NaN	
8	NaN	NaN	NaN	
9	NaN	NaN	NaN	
10	NaN	NaN	NaN	
11	ETH	ethereum	0x514910771af9ca656af840dff83e8264ecf986ca	
12	NaN	NaN	NaN	
13	NaN	NaN	NaN	
14	NaN	NaN	NaN	

	timestamp
0	2024-02-16 16:09:25.810008+00:00
1	2024-02-16 16:09:25.810008+00:00
2	2024-02-16 16:09:25.810008+00:00

```

3 2024-02-16 16:09:25.810008+00:00
4 2024-02-16 16:09:25.810008+00:00
5 2024-02-16 16:09:25.810008+00:00
6 2024-02-16 16:09:25.810008+00:00
7 2024-02-16 16:09:25.810008+00:00
8 2024-02-16 16:09:25.810008+00:00
9 2024-02-16 16:09:25.810008+00:00
10 2024-02-16 16:09:25.810008+00:00
11 2024-02-16 16:09:25.810008+00:00
12 2024-02-16 16:09:25.810008+00:00
13 2024-02-16 16:09:25.810008+00:00
14 2024-02-16 16:09:25.810008+00:00

```

```
[11]: # Now let's look at the coin trends over time
```

```

df3 = df.groupby('name', sort=False)[['quote.USD.percent_change_1h', 'quote.USD.
    ↪percent_change_24h', 'quote.USD.percent_change_7d', 'quote.USD.
    ↪percent_change_30d', 'quote.USD.percent_change_60d', 'quote.USD.
    ↪percent_change_90d']].mean()
df3

```

```

[11]:          quote.USD.percent_change_1h  quote.USD.percent_change_24h  \
name
Bitcoin          0.30045          -0.01203
Ethereum          0.02270          -1.35578
Tether USDt       0.02434           0.00001
BNB             -0.25557          -0.11975
Solana           0.56084          -3.56676
XRP              0.46443           2.53866
USDC            -0.04507          -0.04437
Cardano          -0.16226          -1.79063
Avalanche        -0.18325          -4.48617
Dogecoin         0.75548           0.90934
TRON            -0.25413           0.36323
Chainlink        -0.21060          -2.13983
Polkadot         -0.18169          -2.25341
Polygon          0.61483           2.73844
Toncoin          -0.21379          -1.30902

          quote.USD.percent_change_7d  quote.USD.percent_change_30d  \
name
Bitcoin          9.90295          22.37390
Ethereum         11.57749           9.68763
Tether USDt       0.01637           0.08808
BNB              11.18090          14.87398
Solana            3.45761          10.43526
XRP               7.28654          -1.48252

```

USDC	-0.05792	-0.06438
Cardano	8.86673	11.93861
Avalanche	6.53515	12.07492
Dogecoin	5.15716	6.92803
TRON	6.44186	21.54317
Chainlink	5.90604	20.72310
Polkadot	6.18531	4.01957
Polygon	8.55917	9.66185
Toncoin	5.37418	-6.24816

	quote.USD.percent_change_60d	quote.USD.percent_change_90d
name		
Bitcoin	26.10437	41.63911
Ethereum	29.51864	42.41493
Tether USDt	0.09713	0.00157
BNB	51.34309	46.57360
Solana	55.23566	86.51575
XRP	-5.91444	-7.90198
USDC	-0.07984	-0.05431
Cardano	3.86304	60.24602
Avalanche	2.26067	78.82434
Dogecoin	-3.68846	5.95899
TRON	32.23610	27.52209
Chainlink	38.81589	43.22858
Polkadot	15.62776	45.65149
Polygon	18.34602	11.73432
Toncoin	2.14768	-6.40814

```
[12]: df4 = df3.stack()
df4
```

```
[12]: name
Bitcoin    quote.USD.percent_change_1h    0.30045
          quote.USD.percent_change_24h   -0.01203
          quote.USD.percent_change_7d    9.90295
          quote.USD.percent_change_30d   22.37390
          quote.USD.percent_change_60d   26.10437
          quote.USD.percent_change_90d   41.63911
Ethereum   quote.USD.percent_change_1h    0.02270
          quote.USD.percent_change_24h   -1.35578
          quote.USD.percent_change_7d   11.57749
          quote.USD.percent_change_30d    9.68763
          quote.USD.percent_change_60d   29.51864
          quote.USD.percent_change_90d   42.41493
Tether USDt quote.USD.percent_change_1h    0.02434
          quote.USD.percent_change_24h    0.00001
          quote.USD.percent_change_7d    0.01637
```

BNB	quote.USD.percent_change_30d	0.08808
	quote.USD.percent_change_60d	0.09713
	quote.USD.percent_change_90d	0.00157
	quote.USD.percent_change_1h	-0.25557
	quote.USD.percent_change_24h	-0.11975
	quote.USD.percent_change_7d	11.18090
Solana	quote.USD.percent_change_30d	14.87398
	quote.USD.percent_change_60d	51.34309
	quote.USD.percent_change_90d	46.57360
	quote.USD.percent_change_1h	0.56084
	quote.USD.percent_change_24h	-3.56676
	quote.USD.percent_change_7d	3.45761
XRP	quote.USD.percent_change_30d	10.43526
	quote.USD.percent_change_60d	55.23566
	quote.USD.percent_change_90d	86.51575
	quote.USD.percent_change_1h	0.46443
	quote.USD.percent_change_24h	2.53866
	quote.USD.percent_change_7d	7.28654
USDC	quote.USD.percent_change_30d	-1.48252
	quote.USD.percent_change_60d	-5.91444
	quote.USD.percent_change_90d	-7.90198
	quote.USD.percent_change_1h	-0.04507
	quote.USD.percent_change_24h	-0.04437
	quote.USD.percent_change_7d	-0.05792
Cardano	quote.USD.percent_change_30d	-0.06438
	quote.USD.percent_change_60d	-0.07984
	quote.USD.percent_change_90d	-0.05431
	quote.USD.percent_change_1h	-0.16226
	quote.USD.percent_change_24h	-1.79063
	quote.USD.percent_change_7d	8.86673
Avalanche	quote.USD.percent_change_30d	11.93861
	quote.USD.percent_change_60d	3.86304
	quote.USD.percent_change_90d	60.24602
	quote.USD.percent_change_1h	-0.18325
	quote.USD.percent_change_24h	-4.48617
	quote.USD.percent_change_7d	6.53515
Dogecoin	quote.USD.percent_change_30d	12.07492
	quote.USD.percent_change_60d	2.26067
	quote.USD.percent_change_90d	78.82434
	quote.USD.percent_change_1h	0.75548
	quote.USD.percent_change_24h	0.90934
	quote.USD.percent_change_7d	5.15716
TRON	quote.USD.percent_change_30d	6.92803
	quote.USD.percent_change_60d	-3.68846
	quote.USD.percent_change_90d	5.95899
	quote.USD.percent_change_1h	-0.25413
	quote.USD.percent_change_24h	0.36323

	quote.USD.percent_change_7d	6.44186
	quote.USD.percent_change_30d	21.54317
	quote.USD.percent_change_60d	32.23610
	quote.USD.percent_change_90d	27.52209
Chainlink	quote.USD.percent_change_1h	-0.21060
	quote.USD.percent_change_24h	-2.13983
	quote.USD.percent_change_7d	5.90604
	quote.USD.percent_change_30d	20.72310
	quote.USD.percent_change_60d	38.81589
	quote.USD.percent_change_90d	43.22858
Polkadot	quote.USD.percent_change_1h	-0.18169
	quote.USD.percent_change_24h	-2.25341
	quote.USD.percent_change_7d	6.18531
	quote.USD.percent_change_30d	4.01957
	quote.USD.percent_change_60d	15.62776
	quote.USD.percent_change_90d	45.65149
Polygon	quote.USD.percent_change_1h	0.61483
	quote.USD.percent_change_24h	2.73844
	quote.USD.percent_change_7d	8.55917
	quote.USD.percent_change_30d	9.66185
	quote.USD.percent_change_60d	18.34602
	quote.USD.percent_change_90d	11.73432
Toncoin	quote.USD.percent_change_1h	-0.21379
	quote.USD.percent_change_24h	-1.30902
	quote.USD.percent_change_7d	5.37418
	quote.USD.percent_change_30d	-6.24816
	quote.USD.percent_change_60d	2.14768
	quote.USD.percent_change_90d	-6.40814

dtype: float64

```
[13]: type(df4)
```

```
[13]: pandas.core.series.Series
```

```
[14]: df5 = df4.to_frame(name='values')
df5
```

```
[14]:
```

		values
	name	
Bitcoin	quote.USD.percent_change_1h	0.30045
	quote.USD.percent_change_24h	-0.01203
	quote.USD.percent_change_7d	9.90295
	quote.USD.percent_change_30d	22.37390
	quote.USD.percent_change_60d	26.10437
	quote.USD.percent_change_90d	41.63911
Ethereum	quote.USD.percent_change_1h	0.02270
	quote.USD.percent_change_24h	-1.35578

	quote.USD.percent_change_7d	11.57749
	quote.USD.percent_change_30d	9.68763
	quote.USD.percent_change_60d	29.51864
	quote.USD.percent_change_90d	42.41493
Tether USDT	quote.USD.percent_change_1h	0.02434
	quote.USD.percent_change_24h	0.00001
	quote.USD.percent_change_7d	0.01637
	quote.USD.percent_change_30d	0.08808
	quote.USD.percent_change_60d	0.09713
	quote.USD.percent_change_90d	0.00157
BNB	quote.USD.percent_change_1h	-0.25557
	quote.USD.percent_change_24h	-0.11975
	quote.USD.percent_change_7d	11.18090
	quote.USD.percent_change_30d	14.87398
	quote.USD.percent_change_60d	51.34309
	quote.USD.percent_change_90d	46.57360
Solana	quote.USD.percent_change_1h	0.56084
	quote.USD.percent_change_24h	-3.56676
	quote.USD.percent_change_7d	3.45761
	quote.USD.percent_change_30d	10.43526
	quote.USD.percent_change_60d	55.23566
	quote.USD.percent_change_90d	86.51575
XRP	quote.USD.percent_change_1h	0.46443
	quote.USD.percent_change_24h	2.53866
	quote.USD.percent_change_7d	7.28654
	quote.USD.percent_change_30d	-1.48252
	quote.USD.percent_change_60d	-5.91444
	quote.USD.percent_change_90d	-7.90198
USDC	quote.USD.percent_change_1h	-0.04507
	quote.USD.percent_change_24h	-0.04437
	quote.USD.percent_change_7d	-0.05792
	quote.USD.percent_change_30d	-0.06438
	quote.USD.percent_change_60d	-0.07984
	quote.USD.percent_change_90d	-0.05431
Cardano	quote.USD.percent_change_1h	-0.16226
	quote.USD.percent_change_24h	-1.79063
	quote.USD.percent_change_7d	8.86673
	quote.USD.percent_change_30d	11.93861
	quote.USD.percent_change_60d	3.86304
	quote.USD.percent_change_90d	60.24602
Avalanche	quote.USD.percent_change_1h	-0.18325
	quote.USD.percent_change_24h	-4.48617
	quote.USD.percent_change_7d	6.53515
	quote.USD.percent_change_30d	12.07492
	quote.USD.percent_change_60d	2.26067
	quote.USD.percent_change_90d	78.82434
Dogecoin	quote.USD.percent_change_1h	0.75548

	quote.USD.percent_change_24h	0.90934
	quote.USD.percent_change_7d	5.15716
	quote.USD.percent_change_30d	6.92803
	quote.USD.percent_change_60d	-3.68846
	quote.USD.percent_change_90d	5.95899
TRON	quote.USD.percent_change_1h	-0.25413
	quote.USD.percent_change_24h	0.36323
	quote.USD.percent_change_7d	6.44186
	quote.USD.percent_change_30d	21.54317
	quote.USD.percent_change_60d	32.23610
	quote.USD.percent_change_90d	27.52209
Chainlink	quote.USD.percent_change_1h	-0.21060
	quote.USD.percent_change_24h	-2.13983
	quote.USD.percent_change_7d	5.90604
	quote.USD.percent_change_30d	20.72310
	quote.USD.percent_change_60d	38.81589
	quote.USD.percent_change_90d	43.22858
Polkadot	quote.USD.percent_change_1h	-0.18169
	quote.USD.percent_change_24h	-2.25341
	quote.USD.percent_change_7d	6.18531
	quote.USD.percent_change_30d	4.01957
	quote.USD.percent_change_60d	15.62776
	quote.USD.percent_change_90d	45.65149
Polygon	quote.USD.percent_change_1h	0.61483
	quote.USD.percent_change_24h	2.73844
	quote.USD.percent_change_7d	8.55917
	quote.USD.percent_change_30d	9.66185
	quote.USD.percent_change_60d	18.34602
	quote.USD.percent_change_90d	11.73432
Toncoin	quote.USD.percent_change_1h	-0.21379
	quote.USD.percent_change_24h	-1.30902
	quote.USD.percent_change_7d	5.37418
	quote.USD.percent_change_30d	-6.24816
	quote.USD.percent_change_60d	2.14768
	quote.USD.percent_change_90d	-6.40814

```
[82]: df5.count()
```

```
[82]: values      90
      dtype: int64
```

```
[16]: #Because of how it's structured above we need to set an index. I don't want to
      ↪pass a column as an index for this dataframe
      #So I'm going to create a range and pass that as the dataframe. You can make
      ↪this more dynamic, but I'm just going to hard code it
```



```

index = pd.Index(range(90))

# Set the above DataFrame index object as the index
# using set_index() function
df6 = df5.reset_index()
df6

# If it only has the index and values try doing reset_index like "df5.
↪reset_index()"

```

```

[16]:

```

	name	level_1	values
0	Bitcoin	quote.USD.percent_change_1h	0.30045
1	Bitcoin	quote.USD.percent_change_24h	-0.01203
2	Bitcoin	quote.USD.percent_change_7d	9.90295
3	Bitcoin	quote.USD.percent_change_30d	22.37390
4	Bitcoin	quote.USD.percent_change_60d	26.10437
5	Bitcoin	quote.USD.percent_change_90d	41.63911
6	Ethereum	quote.USD.percent_change_1h	0.02270
7	Ethereum	quote.USD.percent_change_24h	-1.35578
8	Ethereum	quote.USD.percent_change_7d	11.57749
9	Ethereum	quote.USD.percent_change_30d	9.68763
10	Ethereum	quote.USD.percent_change_60d	29.51864
11	Ethereum	quote.USD.percent_change_90d	42.41493
12	Tether USDT	quote.USD.percent_change_1h	0.02434
13	Tether USDT	quote.USD.percent_change_24h	0.00001
14	Tether USDT	quote.USD.percent_change_7d	0.01637
15	Tether USDT	quote.USD.percent_change_30d	0.08808
16	Tether USDT	quote.USD.percent_change_60d	0.09713
17	Tether USDT	quote.USD.percent_change_90d	0.00157
18	BNB	quote.USD.percent_change_1h	-0.25557
19	BNB	quote.USD.percent_change_24h	-0.11975
20	BNB	quote.USD.percent_change_7d	11.18090
21	BNB	quote.USD.percent_change_30d	14.87398
22	BNB	quote.USD.percent_change_60d	51.34309
23	BNB	quote.USD.percent_change_90d	46.57360
24	Solana	quote.USD.percent_change_1h	0.56084
25	Solana	quote.USD.percent_change_24h	-3.56676
26	Solana	quote.USD.percent_change_7d	3.45761
27	Solana	quote.USD.percent_change_30d	10.43526
28	Solana	quote.USD.percent_change_60d	55.23566
29	Solana	quote.USD.percent_change_90d	86.51575
30	XRP	quote.USD.percent_change_1h	0.46443
31	XRP	quote.USD.percent_change_24h	2.53866
32	XRP	quote.USD.percent_change_7d	7.28654
33	XRP	quote.USD.percent_change_30d	-1.48252
34	XRP	quote.USD.percent_change_60d	-5.91444
35	XRP	quote.USD.percent_change_90d	-7.90198

36	USDC	quote.USD.percent_change_1h	-0.04507
37	USDC	quote.USD.percent_change_24h	-0.04437
38	USDC	quote.USD.percent_change_7d	-0.05792
39	USDC	quote.USD.percent_change_30d	-0.06438
40	USDC	quote.USD.percent_change_60d	-0.07984
41	USDC	quote.USD.percent_change_90d	-0.05431
42	Cardano	quote.USD.percent_change_1h	-0.16226
43	Cardano	quote.USD.percent_change_24h	-1.79063
44	Cardano	quote.USD.percent_change_7d	8.86673
45	Cardano	quote.USD.percent_change_30d	11.93861
46	Cardano	quote.USD.percent_change_60d	3.86304
47	Cardano	quote.USD.percent_change_90d	60.24602
48	Avalanche	quote.USD.percent_change_1h	-0.18325
49	Avalanche	quote.USD.percent_change_24h	-4.48617
50	Avalanche	quote.USD.percent_change_7d	6.53515
51	Avalanche	quote.USD.percent_change_30d	12.07492
52	Avalanche	quote.USD.percent_change_60d	2.26067
53	Avalanche	quote.USD.percent_change_90d	78.82434
54	Dogecoin	quote.USD.percent_change_1h	0.75548
55	Dogecoin	quote.USD.percent_change_24h	0.90934
56	Dogecoin	quote.USD.percent_change_7d	5.15716
57	Dogecoin	quote.USD.percent_change_30d	6.92803
58	Dogecoin	quote.USD.percent_change_60d	-3.68846
59	Dogecoin	quote.USD.percent_change_90d	5.95899
60	TRON	quote.USD.percent_change_1h	-0.25413
61	TRON	quote.USD.percent_change_24h	0.36323
62	TRON	quote.USD.percent_change_7d	6.44186
63	TRON	quote.USD.percent_change_30d	21.54317
64	TRON	quote.USD.percent_change_60d	32.23610
65	TRON	quote.USD.percent_change_90d	27.52209
66	Chainlink	quote.USD.percent_change_1h	-0.21060
67	Chainlink	quote.USD.percent_change_24h	-2.13983
68	Chainlink	quote.USD.percent_change_7d	5.90604
69	Chainlink	quote.USD.percent_change_30d	20.72310
70	Chainlink	quote.USD.percent_change_60d	38.81589
71	Chainlink	quote.USD.percent_change_90d	43.22858
72	Polkadot	quote.USD.percent_change_1h	-0.18169
73	Polkadot	quote.USD.percent_change_24h	-2.25341
74	Polkadot	quote.USD.percent_change_7d	6.18531
75	Polkadot	quote.USD.percent_change_30d	4.01957
76	Polkadot	quote.USD.percent_change_60d	15.62776
77	Polkadot	quote.USD.percent_change_90d	45.65149
78	Polygon	quote.USD.percent_change_1h	0.61483
79	Polygon	quote.USD.percent_change_24h	2.73844
80	Polygon	quote.USD.percent_change_7d	8.55917
81	Polygon	quote.USD.percent_change_30d	9.66185
82	Polygon	quote.USD.percent_change_60d	18.34602

```

83      Polygon  quote.USD.percent_change_90d  11.73432
84      Toncoin   quote.USD.percent_change_1h  -0.21379
85      Toncoin   quote.USD.percent_change_24h  -1.30902
86      Toncoin   quote.USD.percent_change_7d   5.37418
87      Toncoin   quote.USD.percent_change_30d  -6.24816
88      Toncoin   quote.USD.percent_change_60d   2.14768
89      Toncoin   quote.USD.percent_change_90d  -6.40814

```

```
[17]: # Change the column name
```

```

df7 = df6.rename(columns={'level_1': 'percent_change'})
df7

```

```

[17]:      name      percent_change  values
0      Bitcoin  quote.USD.percent_change_1h  0.30045
1      Bitcoin  quote.USD.percent_change_24h -0.01203
2      Bitcoin  quote.USD.percent_change_7d   9.90295
3      Bitcoin  quote.USD.percent_change_30d  22.37390
4      Bitcoin  quote.USD.percent_change_60d  26.10437
5      Bitcoin  quote.USD.percent_change_90d  41.63911
6      Ethereum  quote.USD.percent_change_1h   0.02270
7      Ethereum  quote.USD.percent_change_24h -1.35578
8      Ethereum  quote.USD.percent_change_7d  11.57749
9      Ethereum  quote.USD.percent_change_30d   9.68763
10     Ethereum  quote.USD.percent_change_60d  29.51864
11     Ethereum  quote.USD.percent_change_90d  42.41493
12     Tether USDT  quote.USD.percent_change_1h   0.02434
13     Tether USDT  quote.USD.percent_change_24h   0.00001
14     Tether USDT  quote.USD.percent_change_7d   0.01637
15     Tether USDT  quote.USD.percent_change_30d   0.08808
16     Tether USDT  quote.USD.percent_change_60d   0.09713
17     Tether USDT  quote.USD.percent_change_90d   0.00157
18          BNB   quote.USD.percent_change_1h -0.25557
19          BNB   quote.USD.percent_change_24h -0.11975
20          BNB   quote.USD.percent_change_7d  11.18090
21          BNB   quote.USD.percent_change_30d  14.87398
22          BNB   quote.USD.percent_change_60d  51.34309
23          BNB   quote.USD.percent_change_90d  46.57360
24      Solana   quote.USD.percent_change_1h   0.56084
25      Solana   quote.USD.percent_change_24h -3.56676
26      Solana   quote.USD.percent_change_7d   3.45761
27      Solana   quote.USD.percent_change_30d  10.43526
28      Solana   quote.USD.percent_change_60d  55.23566
29      Solana   quote.USD.percent_change_90d  86.51575
30          XRP   quote.USD.percent_change_1h   0.46443
31          XRP   quote.USD.percent_change_24h   2.53866
32          XRP   quote.USD.percent_change_7d   7.28654

```

33	XRP	quote.USD.percent_change_30d	-1.48252
34	XRP	quote.USD.percent_change_60d	-5.91444
35	XRP	quote.USD.percent_change_90d	-7.90198
36	USDC	quote.USD.percent_change_1h	-0.04507
37	USDC	quote.USD.percent_change_24h	-0.04437
38	USDC	quote.USD.percent_change_7d	-0.05792
39	USDC	quote.USD.percent_change_30d	-0.06438
40	USDC	quote.USD.percent_change_60d	-0.07984
41	USDC	quote.USD.percent_change_90d	-0.05431
42	Cardano	quote.USD.percent_change_1h	-0.16226
43	Cardano	quote.USD.percent_change_24h	-1.79063
44	Cardano	quote.USD.percent_change_7d	8.86673
45	Cardano	quote.USD.percent_change_30d	11.93861
46	Cardano	quote.USD.percent_change_60d	3.86304
47	Cardano	quote.USD.percent_change_90d	60.24602
48	Avalanche	quote.USD.percent_change_1h	-0.18325
49	Avalanche	quote.USD.percent_change_24h	-4.48617
50	Avalanche	quote.USD.percent_change_7d	6.53515
51	Avalanche	quote.USD.percent_change_30d	12.07492
52	Avalanche	quote.USD.percent_change_60d	2.26067
53	Avalanche	quote.USD.percent_change_90d	78.82434
54	Dogecoin	quote.USD.percent_change_1h	0.75548
55	Dogecoin	quote.USD.percent_change_24h	0.90934
56	Dogecoin	quote.USD.percent_change_7d	5.15716
57	Dogecoin	quote.USD.percent_change_30d	6.92803
58	Dogecoin	quote.USD.percent_change_60d	-3.68846
59	Dogecoin	quote.USD.percent_change_90d	5.95899
60	TRON	quote.USD.percent_change_1h	-0.25413
61	TRON	quote.USD.percent_change_24h	0.36323
62	TRON	quote.USD.percent_change_7d	6.44186
63	TRON	quote.USD.percent_change_30d	21.54317
64	TRON	quote.USD.percent_change_60d	32.23610
65	TRON	quote.USD.percent_change_90d	27.52209
66	Chainlink	quote.USD.percent_change_1h	-0.21060
67	Chainlink	quote.USD.percent_change_24h	-2.13983
68	Chainlink	quote.USD.percent_change_7d	5.90604
69	Chainlink	quote.USD.percent_change_30d	20.72310
70	Chainlink	quote.USD.percent_change_60d	38.81589
71	Chainlink	quote.USD.percent_change_90d	43.22858
72	Polkadot	quote.USD.percent_change_1h	-0.18169
73	Polkadot	quote.USD.percent_change_24h	-2.25341
74	Polkadot	quote.USD.percent_change_7d	6.18531
75	Polkadot	quote.USD.percent_change_30d	4.01957
76	Polkadot	quote.USD.percent_change_60d	15.62776
77	Polkadot	quote.USD.percent_change_90d	45.65149
78	Polygon	quote.USD.percent_change_1h	0.61483
79	Polygon	quote.USD.percent_change_24h	2.73844

```

80     Polygon    quote.USD.percent_change_7d    8.55917
81     Polygon    quote.USD.percent_change_30d    9.66185
82     Polygon    quote.USD.percent_change_60d    18.34602
83     Polygon    quote.USD.percent_change_90d    11.73432
84     Toncoin     quote.USD.percent_change_1h    -0.21379
85     Toncoin     quote.USD.percent_change_24h    -1.30902
86     Toncoin     quote.USD.percent_change_7d     5.37418
87     Toncoin     quote.USD.percent_change_30d    -6.24816
88     Toncoin     quote.USD.percent_change_60d     2.14768
89     Toncoin     quote.USD.percent_change_90d    -6.40814

```

```

[18]: df7['percent_change'] = df7['percent_change'].replace(['quote.USD.
↳percent_change_1h', 'quote.USD.percent_change_24h', 'quote.USD.
↳percent_change_7d', 'quote.USD.percent_change_30d', 'quote.USD.
↳percent_change_60d', 'quote.USD.
↳percent_change_90d'], ['1h', '24h', '7d', '30d', '60d', '90d'])
df7

```

```

[18]:
      name percent_change  values
0    Bitcoin           1h  0.30045
1    Bitcoin          24h -0.01203
2    Bitcoin           7d  9.90295
3    Bitcoin          30d 22.37390
4    Bitcoin          60d 26.10437
5    Bitcoin          90d 41.63911
6    Ethereum           1h  0.02270
7    Ethereum          24h -1.35578
8    Ethereum           7d 11.57749
9    Ethereum          30d  9.68763
10   Ethereum          60d 29.51864
11   Ethereum          90d 42.41493
12  Tether USDt           1h  0.02434
13  Tether USDt          24h  0.00001
14  Tether USDt           7d  0.01637
15  Tether USDt          30d  0.08808
16  Tether USDt          60d  0.09713
17  Tether USDt          90d  0.00157
18      BNB           1h -0.25557
19      BNB          24h -0.11975
20      BNB           7d 11.18090
21      BNB          30d 14.87398
22      BNB          60d 51.34309
23      BNB          90d 46.57360
24   Solana           1h  0.56084
25   Solana          24h -3.56676
26   Solana           7d  3.45761
27   Solana          30d 10.43526

```

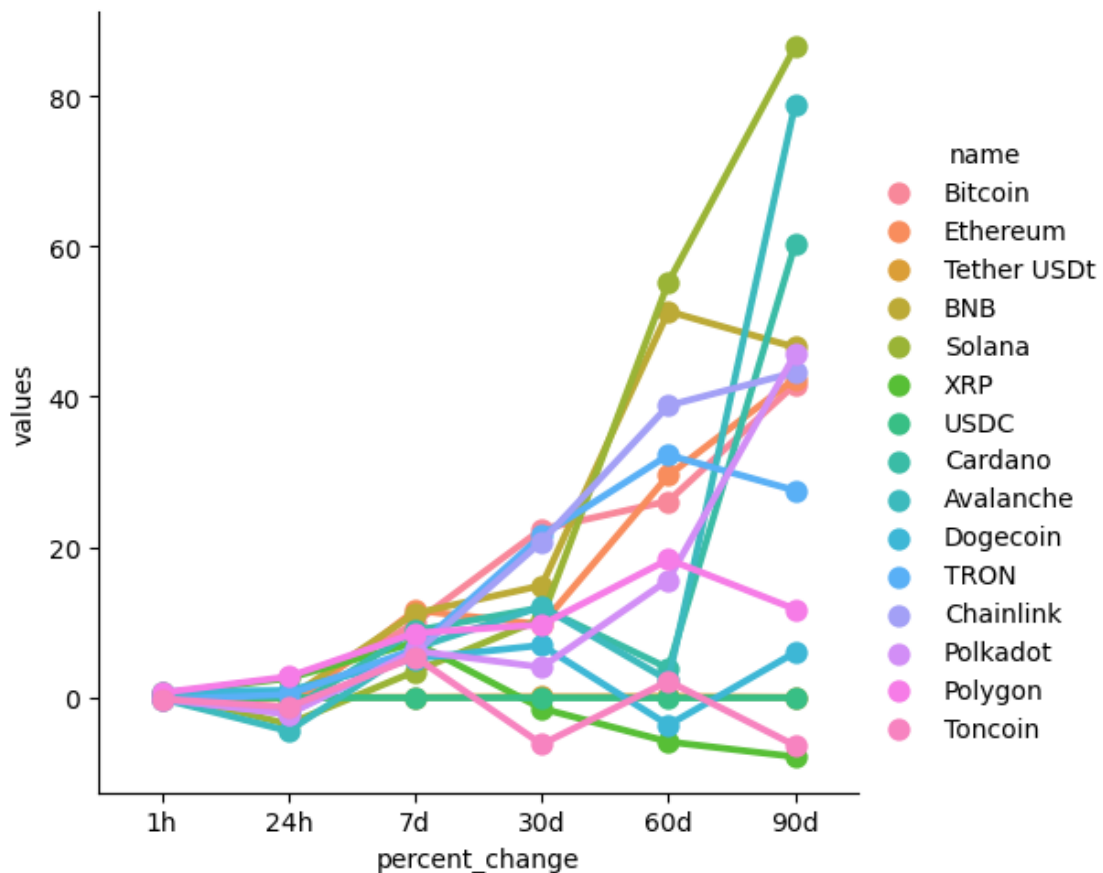
28	Solana	60d	55.23566
29	Solana	90d	86.51575
30	XRP	1h	0.46443
31	XRP	24h	2.53866
32	XRP	7d	7.28654
33	XRP	30d	-1.48252
34	XRP	60d	-5.91444
35	XRP	90d	-7.90198
36	USDC	1h	-0.04507
37	USDC	24h	-0.04437
38	USDC	7d	-0.05792
39	USDC	30d	-0.06438
40	USDC	60d	-0.07984
41	USDC	90d	-0.05431
42	Cardano	1h	-0.16226
43	Cardano	24h	-1.79063
44	Cardano	7d	8.86673
45	Cardano	30d	11.93861
46	Cardano	60d	3.86304
47	Cardano	90d	60.24602
48	Avalanche	1h	-0.18325
49	Avalanche	24h	-4.48617
50	Avalanche	7d	6.53515
51	Avalanche	30d	12.07492
52	Avalanche	60d	2.26067
53	Avalanche	90d	78.82434
54	Dogecoin	1h	0.75548
55	Dogecoin	24h	0.90934
56	Dogecoin	7d	5.15716
57	Dogecoin	30d	6.92803
58	Dogecoin	60d	-3.68846
59	Dogecoin	90d	5.95899
60	TRON	1h	-0.25413
61	TRON	24h	0.36323
62	TRON	7d	6.44186
63	TRON	30d	21.54317
64	TRON	60d	32.23610
65	TRON	90d	27.52209
66	Chainlink	1h	-0.21060
67	Chainlink	24h	-2.13983
68	Chainlink	7d	5.90604
69	Chainlink	30d	20.72310
70	Chainlink	60d	38.81589
71	Chainlink	90d	43.22858
72	Polkadot	1h	-0.18169
73	Polkadot	24h	-2.25341
74	Polkadot	7d	6.18531

75	Polkadot	30d	4.01957
76	Polkadot	60d	15.62776
77	Polkadot	90d	45.65149
78	Polygon	1h	0.61483
79	Polygon	24h	2.73844
80	Polygon	7d	8.55917
81	Polygon	30d	9.66185
82	Polygon	60d	18.34602
83	Polygon	90d	11.73432
84	Toncoin	1h	-0.21379
85	Toncoin	24h	-1.30902
86	Toncoin	7d	5.37418
87	Toncoin	30d	-6.24816
88	Toncoin	60d	2.14768
89	Toncoin	90d	-6.40814

```
[19]: import seaborn as sns
import matplotlib.pyplot as plt
```

```
[20]: sns.catplot(x='percent_change', y='values', hue='name', data=df7, kind='point')
```

```
[20]: <seaborn.axisgrid.FacetGrid at 0x11e4a5d60>
```



## 0.0.1 Exploratory Data Analysis

```
[22]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
```

```
RangeIndex: 15 entries, 0 to 14
```

```
Data columns (total 37 columns):
```

#	Column	Non-Null Count	Dtype
0	id	15 non-null	int64
1	name	15 non-null	object
2	symbol	15 non-null	object
3	slug	15 non-null	object
4	num_market_pairs	15 non-null	int64
5	date_added	15 non-null	object
6	tags	15 non-null	object
7	max_supply	6 non-null	float64
8	circulating_supply	15 non-null	float64
9	total_supply	15 non-null	float64
10	infinite_supply	15 non-null	bool
11	platform	0 non-null	float64
12	cmc_rank	15 non-null	int64
13	self_reported_circulating_supply	2 non-null	float64
14	self_reported_market_cap	2 non-null	float64
15	tv_l_ratio	0 non-null	object
16	last_updated	15 non-null	object
17	quote.USD.price	15 non-null	float64
18	quote.USD.volume_24h	15 non-null	float64
19	quote.USD.volume_change_24h	15 non-null	float64
20	quote.USD.percent_change_1h	15 non-null	float64
21	quote.USD.percent_change_24h	15 non-null	float64
22	quote.USD.percent_change_7d	15 non-null	float64
23	quote.USD.percent_change_30d	15 non-null	float64
24	quote.USD.percent_change_60d	15 non-null	float64
25	quote.USD.percent_change_90d	15 non-null	float64
26	quote.USD.market_cap	15 non-null	float64
27	quote.USD.market_cap_dominance	15 non-null	float64
28	quote.USD.fully_diluted_market_cap	15 non-null	float64
29	quote.USD.tvl	0 non-null	object
30	quote.USD.last_updated	15 non-null	object
31	platform.id	3 non-null	float64
32	platform.name	3 non-null	object
33	platform.symbol	3 non-null	object
34	platform.slug	3 non-null	object
35	platform.token_address	3 non-null	object



```

36 timestamp                                15 non-null    datetime64[ns, UTC]
dtypes: bool(1), datetime64[ns, UTC](1), float64(19), int64(3), object(13)
memory usage: 4.4+ KB

```

```
[25]: df.head()
```

```

[25]:      id      name symbol      slug  num_market_pairs  \
0      1      Bitcoin   BTC   bitcoin           10818
1    1027    Ethereum   ETH  ethereum           8411
2     825    Tether USDt  USDT   tether          74712
3    1839         BNB   BNB     bnb           2066
4    5426     Solana   SOL   solana           626

      date_added  \
0  2010-07-13T00:00:00.000Z
1  2015-08-07T00:00:00.000Z
2  2015-02-25T00:00:00.000Z
3  2017-07-25T00:00:00.000Z
4  2020-04-10T00:00:00.000Z

      tags      max_supply  \
0  [mineable, pow, sha-256, store-of-value, state...  21000000.00000
1  [pos, smart-contracts, ethereum-ecosystem, coi...      NaN
2  [payments, stablecoin, asset-backed-stablecoin...      NaN
3  [marketplace, centralized-exchange, payments, ...      NaN
4  [pos, platform, solana-ecosystem, cms-holdings...      NaN

      circulating_supply      total_supply  infinite_supply  platform  cmc_rank  \
0      19629518.00000      19629518.00000          False      NaN         1
1      120165596.08996      120165596.08996           True      NaN         2
2      97116788125.71764  99600626148.56953           True      NaN         3
3      149544642.68938      149544642.68938          False      NaN         4
4      440507009.24939      569708726.07903           True      NaN         5

      self_reported_circulating_supply  self_reported_market_cap  tvl_ratio  \
0                                NaN                                NaN      None
1                                NaN                                NaN      None
2                                NaN                                NaN      None
3                                NaN                                NaN      None
4                                NaN                                NaN      None

      last_updated  quote.USD.price  quote.USD.volume_24h  \
0  2024-02-16T16:07:00.000Z      51953.37715      34829335277.00451
1  2024-02-16T16:07:00.000Z      2784.95978      18808827706.99440
2  2024-02-16T16:06:00.000Z         1.00038      61184579310.90502
3  2024-02-16T16:06:00.000Z       358.50278      1541621325.08456
4  2024-02-16T16:07:00.000Z       109.60974      2218470856.67413

```

	quote.USD.volume_change_24h	quote.USD.percent_change_1h \
0	-3.02100	0.30045
1	-17.57880	0.02270
2	-6.94110	0.02434
3	-0.90910	-0.25557
4	-1.93140	0.56084

	quote.USD.percent_change_24h	quote.USD.percent_change_7d \
0	-0.01203	9.90295
1	-1.35578	11.57749
2	0.00001	0.01637
3	-0.11975	11.18090
4	-3.56676	3.45761

	quote.USD.percent_change_30d	quote.USD.percent_change_60d \
0	22.37390	26.10437
1	9.68763	29.51864
2	0.08808	0.09713
3	14.87398	51.34309
4	10.43526	55.23566

	quote.USD.percent_change_90d	quote.USD.market_cap \
0	41.63911	1019819751894.75854
1	42.41493	334656351882.32355
2	0.00157	97153518505.05452
3	46.57360	53612170149.45863
4	86.51575	48283858186.21605

	quote.USD.market_cap_dominance	quote.USD.fully_diluted_market_cap \
0	52.56240	1091020920115.81006
1	17.23410	334656351882.32001
2	5.00990	99638295936.16000
3	2.76210	53612170149.46000
4	2.48650	62445624609.52000

	quote.USD.tvl	quote.USD.last_updated	platform.id	platform.name \
0	None	2024-02-16T16:07:00.000Z	NaN	NaN
1	None	2024-02-16T16:07:00.000Z	NaN	NaN
2	None	2024-02-16T16:06:00.000Z	1027.00000	Ethereum
3	None	2024-02-16T16:06:00.000Z	NaN	NaN
4	None	2024-02-16T16:07:00.000Z	NaN	NaN

	platform.symbol	platform.slug	platform.token_address \
0	NaN	NaN	NaN
1	NaN	NaN	NaN
2	ETH	ethereum	0xdac17f958d2ee523a2206206994597c13d831ec7

3	NaN	NaN	NaN
4	NaN	NaN	NaN

```

            timestamp
0 2024-02-16 16:09:25.810008+00:00
1 2024-02-16 16:09:25.810008+00:00
2 2024-02-16 16:09:25.810008+00:00
3 2024-02-16 16:09:25.810008+00:00
4 2024-02-16 16:09:25.810008+00:00

```

```
[116]: # Assuming 'timestamp' is the column name in the DataFrame df
df['timestamp'] = df['timestamp'].dt.strftime('%Y-%m-%d %H:%M:%S')
```

```

-----
AttributeError                                Traceback (most recent call last)
Input In [116], in <cell line: 2>()
      1 # Assuming 'timestamp' is the column name in the DataFrame df
----> 2 df['timestamp'] = df['timestamp'].dt.strftime('%Y-%m-%d %H:%M:%S')

File /Applications/anaconda3/lib/python3.9/site-packages/pandas/core/generic.py
   5575, in NDFrame.__getattr__(self, name)
   5568 if (
   5569     name not in self._internal_names_set
   5570     and name not in self._metadata
   5571     and name not in self._accessors
   5572     and self._info_axis._can_hold_identifiers_and_holds_name(name)
   5573 ):
   5574     return self[name]
-> 5575 return object.__getattr__(self, name)

File /Applications/anaconda3/lib/python3.9/site-packages/pandas/core/accessor.py :
   182, in CachedAccessor.__get__(self, obj, cls)
   179 if obj is None:
   180     # we're accessing the attribute of the class, i.e., Dataset.geo
   181     return self._accessor
--> 182 accessor_obj = self._accessor(obj)
   183 # Replace the property with the accessor object. Inspired by:
   184 # https://www.pydanny.com/cached-property.html
   185 # We need to use object.__setattr__ because we overwrite __setattr__ on
   186 # NDFrame
   187 object.__setattr__(obj, self._name, accessor_obj)

File /Applications/anaconda3/lib/python3.9/site-packages/pandas/core/indexes/
   509, in CombinedDatetimelikeProperties.__new__(cls, data)
   506 elif is_period_dtype(data.dtype):
   507     return PeriodProperties(data, orig)

```

```
--> 509 raise AttributeError("Can only use .dt accessor with datetimelike_
↪values")
```

```
AttributeError: Can only use .dt accessor with datetimelike values
```

```
[117]: df
```

```
[117]:
```

	id	name	symbol	slug	num_market_pairs	\
0	1	Bitcoin	BTC	bitcoin	10818	
1	1027	Ethereum	ETH	ethereum	8411	
2	825	Tether	USDT	tether	74712	
3	1839	BNB	BNB	bnb	2066	
4	5426	Solana	SOL	solana	626	
5	52	XRP	XRP	xrp	1229	
6	3408	USDC	USDC	usd-coin	16724	
7	2010	Cardano	ADA	cardano	1074	
8	5805	Avalanche	AVAX	avalanche	664	
9	74	Dogecoin	DOGE	dogecoin	889	
10	1958	TRON	TRX	tron	930	
11	1975	Chainlink	LINK	chainlink	1642	
12	6636	Polkadot	DOT	polkadot-new	684	
13	3890	Polygon	MATIC	polygon	1274	
14	11419	Toncoin	TON	toncoin	201	

	date_added	\
0	2010-07-13T00:00:00.000Z	
1	2015-08-07T00:00:00.000Z	
2	2015-02-25T00:00:00.000Z	
3	2017-07-25T00:00:00.000Z	
4	2020-04-10T00:00:00.000Z	
5	2013-08-04T00:00:00.000Z	
6	2018-10-08T00:00:00.000Z	
7	2017-10-01T00:00:00.000Z	
8	2020-07-13T00:00:00.000Z	
9	2013-12-15T00:00:00.000Z	
10	2017-09-13T00:00:00.000Z	
11	2017-09-20T00:00:00.000Z	
12	2020-08-19T00:00:00.000Z	
13	2019-04-28T00:00:00.000Z	
14	2021-08-26T13:40:22.000Z	

	tags	max_supply	\
0	[mineable, pow, sha-256, store-of-value, state...	21000000.00000	
1	[pos, smart-contracts, ethereum-ecosystem, coi...	NaN	
2	[payments, stablecoin, asset-backed-stablecoin...	NaN	
3	[marketplace, centralized-exchange, payments, ...	NaN	
4	[pos, platform, solana-ecosystem, cms-holdings...	NaN	

5	[medium-of-exchange, enterprise-solutions, arr...	100000000000.00000
6	[medium-of-exchange, stablecoin, asset-backed-...	NaN
7	[dpos, pos, platform, research, smart-contract...	45000000000.00000
8	[defi, smart-contracts, three-arrows-capital-p...	720000000.00000
9	[mineable, pow, script, medium-of-exchange, me...	NaN
10	[media, payments, tron-ecosystem, layer-1, dwf...	NaN
11	[platform, defi, oracles, smart-contracts, sub...	1000000000.00000
12	[substrate, polkadot, binance-chain, polkadot-...	NaN
13	[pos, platform, enterprise-solutions, zero-kno...	10000000000.00000
14	[pos, layer-1, ftx-bankruptcy-estate, dwf-labs...	NaN

	circulating_supply	total_supply	infinite_supply	platform \
0	19629518.00000	19629518.00000	False	NaN
1	120165596.08996	120165596.08996	True	NaN
2	97116788125.71764	99600626148.56953	True	NaN
3	149544642.68938	149544642.68938	False	NaN
4	440507009.24939	569708726.07903	True	NaN
5	54558598490.00000	99987895338.00000	False	NaN
6	28043507284.27634	28043507284.27634	False	NaN
7	35451363529.41400	36628205944.37800	False	NaN
8	367507149.48800	435540059.48800	False	NaN
9	143097146383.70520	143097146383.70520	True	NaN
10	88059232792.83615	88059275792.33267	True	NaN
11	587099970.45279	1000000000.00000	False	NaN
12	1304772428.69958	1411706138.96427	True	NaN
13	9618349204.31577	10000000000.00000	False	NaN
14	3466960979.94962	5102763677.30050	True	NaN

	cmc_rank	self_reported_circulating_supply	self_reported_market_cap \
0	1	NaN	NaN
1	2	NaN	NaN
2	3	NaN	NaN
3	4	NaN	NaN
4	5	NaN	NaN
5	6	NaN	NaN
6	7	NaN	NaN
7	8	NaN	NaN
8	9	NaN	NaN
9	10	NaN	NaN
10	11	71659659264.00000	9398768383.96608
11	12	NaN	NaN
12	13	NaN	NaN
13	14	NaN	NaN
14	15	3414166606.00000	7449933065.49324

	tv1_ratio	last_updated	quote.USD.price	quote.USD.volume_24h \
0	None	2024-02-16T16:07:00.000Z	51953.37715	34829335277.00451

1	None	2024-02-16T16:07:00.000Z	2784.95978	18808827706.99440
2	None	2024-02-16T16:06:00.000Z	1.00038	61184579310.90502
3	None	2024-02-16T16:06:00.000Z	358.50278	1541621325.08456
4	None	2024-02-16T16:07:00.000Z	109.60974	2218470856.67413
5	None	2024-02-16T16:07:00.000Z	0.56016	1835933831.01485
6	None	2024-02-16T16:07:00.000Z	0.99945	6963549130.55825
7	None	2024-02-16T16:06:00.000Z	0.58935	670812750.98305
8	None	2024-02-16T16:06:00.000Z	40.02334	649901172.08242
9	None	2024-02-16T16:07:00.000Z	0.08562	486263977.54878
10	None	2024-02-16T16:06:00.000Z	0.13116	300805367.54852
11	None	2024-02-16T16:06:00.000Z	19.45635	509590963.58263
12	None	2024-02-16T16:06:00.000Z	7.63267	268422758.50915
13	None	2024-02-16T16:06:00.000Z	0.91670	549424444.54625
14	None	2024-02-16T16:07:00.000Z	2.18206	38761656.68779

	quote.USD.volume_change_24h	quote.USD.percent_change_1h \
0	-3.02100	0.30045
1	-17.57880	0.02270
2	-6.94110	0.02434
3	-0.90910	-0.25557
4	-1.93140	0.56084
5	20.90960	0.46443
6	-1.57920	-0.04507
7	0.40020	-0.16226
8	-20.90290	-0.18325
9	-40.26670	0.75548
10	-20.55310	-0.25413
11	-2.53590	-0.21060
12	-13.31390	-0.18169
13	38.81660	0.61483
14	-2.96470	-0.21379

	quote.USD.percent_change_24h	quote.USD.percent_change_7d \
0	-0.01203	9.90295
1	-1.35578	11.57749
2	0.00001	0.01637
3	-0.11975	11.18090
4	-3.56676	3.45761
5	2.53866	7.28654
6	-0.04437	-0.05792
7	-1.79063	8.86673
8	-4.48617	6.53515
9	0.90934	5.15716
10	0.36323	6.44186
11	-2.13983	5.90604
12	-2.25341	6.18531
13	2.73844	8.55917

14	-1.30902	5.37418
----	----------	---------

	quote.USD.percent_change_30d	quote.USD.percent_change_60d \
0	22.37390	26.10437
1	9.68763	29.51864
2	0.08808	0.09713
3	14.87398	51.34309
4	10.43526	55.23566
5	-1.48252	-5.91444
6	-0.06438	-0.07984
7	11.93861	3.86304
8	12.07492	2.26067
9	6.92803	-3.68846
10	21.54317	32.23610
11	20.72310	38.81589
12	4.01957	15.62776
13	9.66185	18.34602
14	-6.24816	2.14768

	quote.USD.percent_change_90d	quote.USD.market_cap \
0	41.63911	1019819751894.75854
1	42.41493	334656351882.32355
2	0.00157	97153518505.05452
3	46.57360	53612170149.45863
4	86.51575	48283858186.21605
5	-7.90198	30561415079.62490
6	-0.05431	28028138196.37597
7	60.24602	20893283383.23812
8	78.82434	14708862953.14979
9	5.95899	12251835222.61201
10	27.52209	11549710696.23000
11	43.22858	11422822574.30190
12	45.65149	9958893802.54889
13	11.73432	8817133922.53341
14	-6.40814	7565133815.06066

	quote.USD.market_cap_dominance	quote.USD.fully_diluted_market_cap \
0	52.56240	1091020920115.81006
1	17.23410	334656351882.32001
2	5.00990	99638295936.16000
3	2.76210	53612170149.46000
4	2.48650	62445624609.52000
5	1.57450	56015762731.20000
6	1.44400	28028138196.38000
7	1.07740	26520778290.11000
8	0.75810	28816803539.80000
9	0.63090	12251835222.61000

10	0.59560	11549716335.98000
11	0.58900	19456350109.32000
12	0.51360	10775083232.23000
13	0.45440	9166992937.39000
14	0.38960	11134561441.18000

	quote.USD.tvl	quote.USD.last_updated	platform.id	platform.name	\
0	None	2024-02-16T16:07:00.000Z	NaN	NaN	
1	None	2024-02-16T16:07:00.000Z	NaN	NaN	
2	None	2024-02-16T16:06:00.000Z	1027.00000	Ethereum	
3	None	2024-02-16T16:06:00.000Z	NaN	NaN	
4	None	2024-02-16T16:07:00.000Z	NaN	NaN	
5	None	2024-02-16T16:07:00.000Z	NaN	NaN	
6	None	2024-02-16T16:07:00.000Z	1027.00000	Ethereum	
7	None	2024-02-16T16:06:00.000Z	NaN	NaN	
8	None	2024-02-16T16:06:00.000Z	NaN	NaN	
9	None	2024-02-16T16:07:00.000Z	NaN	NaN	
10	None	2024-02-16T16:06:00.000Z	NaN	NaN	
11	None	2024-02-16T16:06:00.000Z	1027.00000	Ethereum	
12	None	2024-02-16T16:06:00.000Z	NaN	NaN	
13	None	2024-02-16T16:06:00.000Z	NaN	NaN	
14	None	2024-02-16T16:07:00.000Z	NaN	NaN	

	platform.symbol	platform.slug	platform.token_address	\
0	NaN	NaN	NaN	
1	NaN	NaN	NaN	
2	ETH	ethereum	0xdac17f958d2ee523a2206206994597c13d831ec7	
3	NaN	NaN	NaN	
4	NaN	NaN	NaN	
5	NaN	NaN	NaN	
6	ETH	ethereum	0xa0b86991c6218b36c1d19d4a2e9eb0ce3606eb48	
7	NaN	NaN	NaN	
8	NaN	NaN	NaN	
9	NaN	NaN	NaN	
10	NaN	NaN	NaN	
11	ETH	ethereum	0x514910771af9ca656af840dff83e8264ecf986ca	
12	NaN	NaN	NaN	
13	NaN	NaN	NaN	
14	NaN	NaN	NaN	

	timestamp
0	2024-02-16 16:09:25
1	2024-02-16 16:09:25
2	2024-02-16 16:09:25
3	2024-02-16 16:09:25
4	2024-02-16 16:09:25
5	2024-02-16 16:09:25



```

6    2024-02-16 16:09:25
7    2024-02-16 16:09:25
8    2024-02-16 16:09:25
9    2024-02-16 16:09:25
10   2024-02-16 16:09:25
11   2024-02-16 16:09:25
12   2024-02-16 16:09:25
13   2024-02-16 16:09:25
14   2024-02-16 16:09:25

```

```

[26]: # Summary statistics
df.describe()

```

```

[26]:          id  num_market_pairs      max_supply  circulating_supply \
count      15.00000      15.00000          6.00000          15.00000
mean    3089.66667      8129.60000  26123500000.00000    30826744873.65892
std     3139.89838     19034.25668  40079658999.29789    45146897810.30799
min         1.00000       201.00000    21000000.00000     19629518.00000
25%       926.00000       786.50000    790000000.00000     404007079.36870
50%      1975.00000      1229.00000   5500000000.00000     3466960979.94962
75%      4658.00000      5238.50000  36250000000.00000     45004981009.70700
max     11419.00000     74712.00000 100000000000.00000    143097146383.70520

```

```

          total_supply  platform  cmc_rank \
count          15.00000      0.00000    15.00000
mean    34281714349.99153         NaN      8.00000
std     48386982128.21310         NaN      4.47214
min         19629518.00000         NaN      1.00000
25%       502624392.78352         NaN      4.50000
50%       5102763677.30050         NaN      8.00000
75%       62343740868.35533         NaN     11.50000
max     143097146383.70520         NaN     15.00000

```

```

          self_reported_circulating_supply  self_reported_market_cap \
count                2.00000                2.00000
mean              37536912935.00000          8424350724.72966
std              48256850643.88854          1378034669.10799
min              3414166606.00000          7449933065.49324
25%              20475539770.50000          7937141895.11145
50%              37536912935.00000          8424350724.72966
75%              54598286099.50000          8911559554.34787
max              71659659264.00000          9398768383.96608

```

```

          quote.USD.price  quote.USD.volume_24h  quote.USD.volume_change_24h \
count          15.00000          15.00000          15.00000
mean          3685.33511      8723753368.64829          -4.82476
std          13371.94975     17381935467.69445          18.20821

```

min	0.08562	38761656.68779	-40.26670
25%	0.75302	497927470.56570	-15.44635
50%	2.18206	670812750.98305	-2.96470
75%	74.81654	4591009993.61619	-1.24415
max	51953.37715	61184579310.90502	38.81660

	quote.USD.percent_change_1h	quote.USD.percent_change_24h	\
count	15.00000	15.00000	
mean	0.08245	-0.70187	
std	0.35690	2.01409	
min	-0.25557	-4.48617	
25%	-0.19693	-1.96523	
50%	-0.04507	-0.11975	
75%	0.38244	0.18162	
max	0.75548	2.73844	

	quote.USD.percent_change_7d	quote.USD.percent_change_30d	\
count	15.00000	15.00000	
mean	6.42597	9.10354	
std	3.45870	8.71001	
min	-0.05792	-6.24816	
25%	5.26567	2.05383	
50%	6.44186	9.68763	
75%	8.71295	13.47445	
max	11.57749	22.37390	

	quote.USD.percent_change_60d	quote.USD.percent_change_90d	\
count	15.00000	15.00000	
mean	17.72755	31.72976	
std	20.22336	30.37276	
min	-5.91444	-7.90198	
25%	1.12241	2.98028	
50%	15.62776	41.63911	
75%	30.87737	46.11254	
max	55.23566	86.51575	

	quote.USD.market_cap	quote.USD.market_cap_dominance	\
count	15.00000	15.00000	
mean	113952192017.56581	5.87214	
std	263887917836.41574	13.60022	
min	7565133815.06066	0.38960	
25%	11486266635.26595	0.59230	
50%	20893283383.23812	1.07740	
75%	50948014167.83734	2.62430	
max	1019819751894.75854	52.56240	

quote.USD.fully\_diluted\_market\_cap platform.id

count	15.00000	3.00000
mean	123672625648.63133	1027.00000
std	279801272266.03491	0.00000
min	9166992937.39000	1027.00000
25%	11900775779.29500	1027.00000
50%	28028138196.38000	1027.00000
75%	59230693670.36000	1027.00000
max	1091020920115.81006	1027.00000

```
[106]: df.isnull().sum()
```

```
[106]: id                                0
      name                              0
      symbol                            0
      slug                              0
      num_market_pairs                  0
      date_added                        0
      tags                              0
      max_supply                        9
      circulating_supply                 0
      total_supply                      0
      infinite_supply                   0
      platform                          15
      cmc_rank                          0
      self_reported_circulating_supply  13
      self_reported_market_cap         13
      tvl_ratio                         15
      last_updated                      0
      quote.USD.price                   0
      quote.USD.volume_24h              0
      quote.USD.volume_change_24h       0
      quote.USD.percent_change_1h        0
      quote.USD.percent_change_24h       0
      quote.USD.percent_change_7d        0
      quote.USD.percent_change_30d       0
      quote.USD.percent_change_60d       0
      quote.USD.percent_change_90d       0
      quote.USD.market_cap               0
      quote.USD.market_cap_dominance     0
      quote.USD.fully_diluted_market_cap  0
      quote.USD.tvl                      15
      quote.USD.last_updated             0
      platform.id                        12
      platform.name                      12
      platform.symbol                    12
      platform.slug                      12
      platform.token_address             12
```

```
timestamp                                0
dtype: int64
```

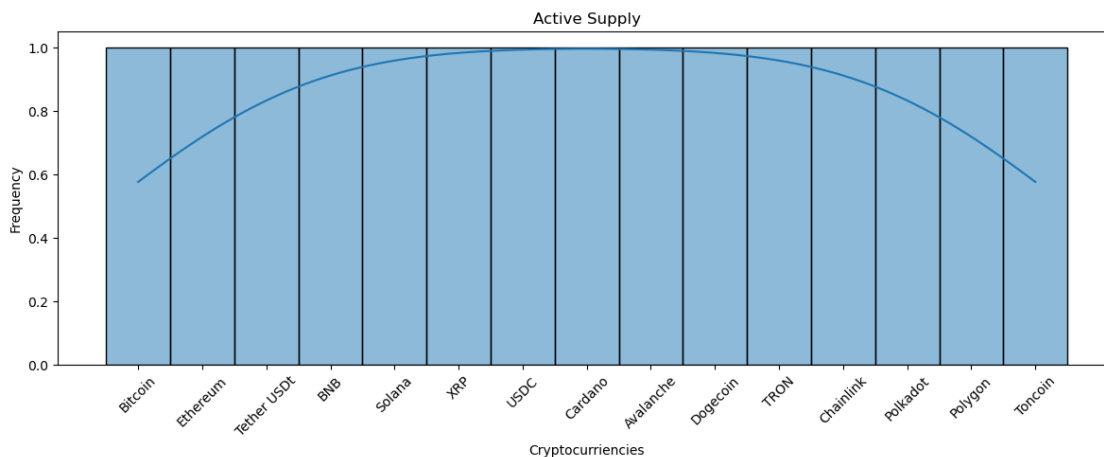
```
[31]: df.columns
```

```
[31]: Index(['id', 'name', 'symbol', 'slug', 'num_market_pairs', 'date_added',
        'tags', 'max_supply', 'circulating_supply', 'total_supply',
        'infinite_supply', 'platform', 'cmc_rank',
        'self_reported_circulating_supply', 'self_reported_market_cap',
        'tvl_ratio', 'last_updated', 'quote.USD.price', 'quote.USD.volume_24h',
        'quote.USD.volume_change_24h', 'quote.USD.percent_change_1h',
        'quote.USD.percent_change_24h', 'quote.USD.percent_change_7d',
        'quote.USD.percent_change_30d', 'quote.USD.percent_change_60d',
        'quote.USD.percent_change_90d', 'quote.USD.market_cap',
        'quote.USD.market_cap_dominance', 'quote.USD.fully_diluted_market_cap',
        'quote.USD.tvl', 'quote.USD.last_updated', 'platform.id',
        'platform.name', 'platform.symbol', 'platform.slug',
        'platform.token_address', 'timestamp'],
        dtype='object')
```

```
[45]: # Distribution of numerical features
```

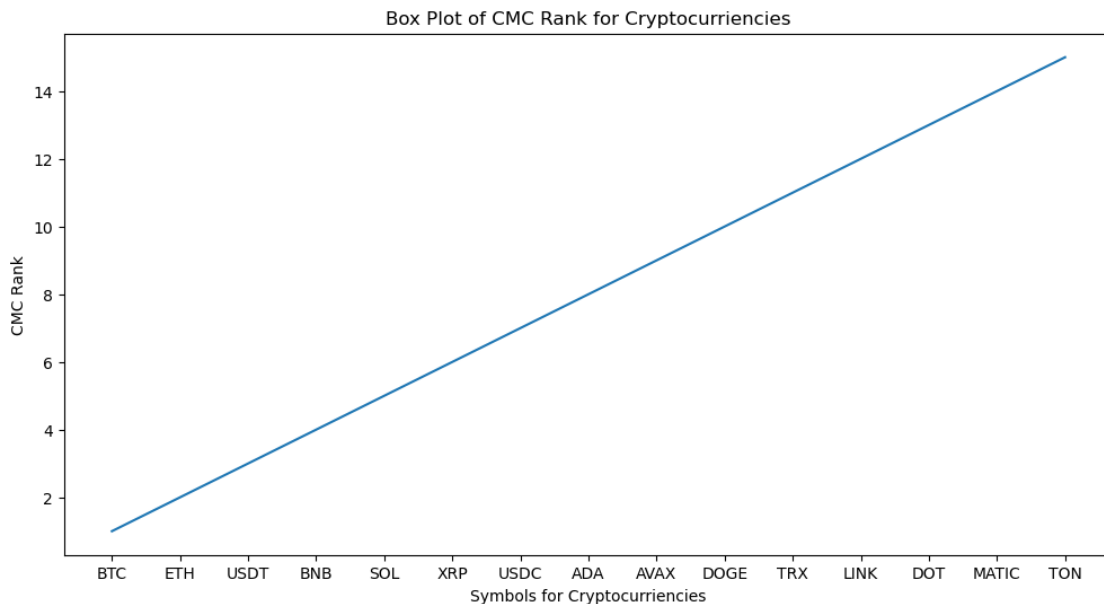
```
#cmc rank
```

```
plt.figure(figsize=(12, 5))
sns.histplot(df['name'], kde=True)
plt.title('Active Supply')
plt.xlabel('Cryptocurrencies')
plt.ylabel('Frequency')
plt.xticks(rotation=45) # Rotate x-axis labels by 45 degrees
plt.tight_layout() # Adjust layout to prevent overlapping
plt.show()
```



```
[50]: # Box plot for numeric feature

plt.figure(figsize=(12, 6))
sns.lineplot(x=df['symbol'], y=df['cmc_rank'])
plt.title('Box Plot of CMC Rank for Cryptocurrencies')
plt.xlabel('Symbols for Cryptocurrencies')
plt.ylabel('CMC Rank')
plt.show()
```



```
[91]: #Refining the graph for Ranking of Cryptocurrencies

# Sort the DataFrame by CMC rank
df_sorted = df.sort_values(by='cmc_rank')

# Get the top three ranked cryptocurrencies
top_three = df_sorted.head(3)
top_three_flip = df.sort_values(by='cmc_rank', ascending = False)

# Create a horizontal bar plot
plt.figure(figsize=(10, 7))
plt.barh(top_three_flip['symbol'], top_three_flip['cmc_rank'], color=['gold', 'silver', 'peru'])

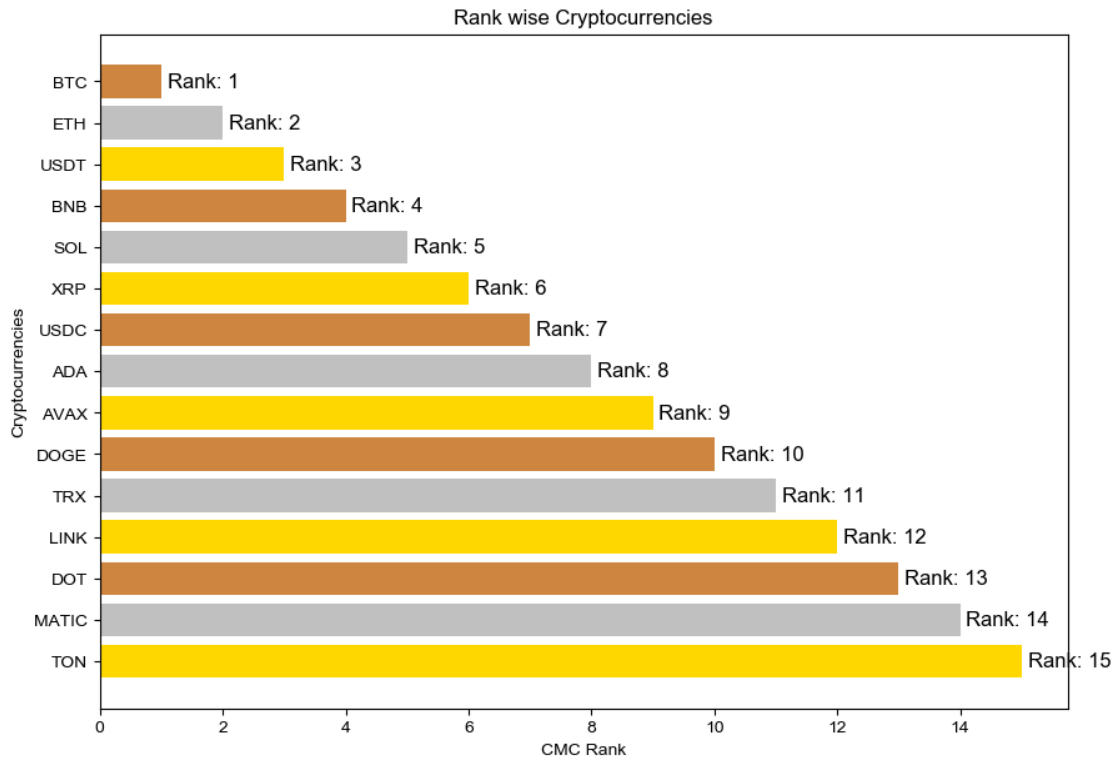
# Add text labels with the cryptocurrency ranks
```

```

for i, (symbol, rank) in enumerate(zip(top_three_flip['symbol'],
↳top_three_flip['cmc_rank'])):
    plt.text(rank+ 0.1, i, f'Rank: {rank}', va='center', fontsize=12)

# Customize plot appearance
plt.title('Rank wise Cryptocurrencies')
plt.xlabel('CMC Rank')
plt.ylabel('Cryptocurrencies')
plt.show()

```



## 0.1 Predictive Modelling

```

[168]: from sklearn.preprocessing import MinMaxScaler

# Select the columns you want to normalize
columns_to_normalize = ['quote.USD.price', 'quote.USD.volume_24h', 'quote.USD.
↳market_cap_dominance', 'quote.USD.fully_diluted_market_cap'] # Add the
↳column names you want to normalize

# Initialize the MinMaxScaler
scaler = MinMaxScaler()

```

```
# Fit and transform the selected columns
df[columns_to_normalize] = scaler.fit_transform(df[columns_to_normalize])
```

```
[169]: df
```

```
[169]:
```

	id	name	symbol	slug	num_market_pairs	\
0	1	Bitcoin	BTC	bitcoin	10818	
1	1027	Ethereum	ETH	ethereum	8411	
2	825	Tether	USDT	tether	74712	
3	1839	BNB	BNB	bnb	2066	
4	5426	Solana	SOL	solana	626	
5	52	XRP	XRP	xrp	1229	
6	3408	USDC	USDC	usd-coin	16724	
7	2010	Cardano	ADA	cardano	1074	
8	5805	Avalanche	AVAX	avalanche	664	
9	74	Dogecoin	DOGE	dogecoin	889	
10	1958	TRON	TRX	tron	930	
11	1975	Chainlink	LINK	chainlink	1642	
12	6636	Polkadot	DOT	polkadot-new	684	
13	3890	Polygon	MATIC	polygon	1274	
14	11419	Toncoin	TON	toncoin	201	

	date_added	\
0	2010-07-13T00:00:00.000Z	
1	2015-08-07T00:00:00.000Z	
2	2015-02-25T00:00:00.000Z	
3	2017-07-25T00:00:00.000Z	
4	2020-04-10T00:00:00.000Z	
5	2013-08-04T00:00:00.000Z	
6	2018-10-08T00:00:00.000Z	
7	2017-10-01T00:00:00.000Z	
8	2020-07-13T00:00:00.000Z	
9	2013-12-15T00:00:00.000Z	
10	2017-09-13T00:00:00.000Z	
11	2017-09-20T00:00:00.000Z	
12	2020-08-19T00:00:00.000Z	
13	2019-04-28T00:00:00.000Z	
14	2021-08-26T13:40:22.000Z	

	tags	max_supply	\
0	[mineable, pow, sha-256, store-of-value, state...	21000000.00000	
1	[pos, smart-contracts, ethereum-ecosystem, coi...	NaN	
2	[payments, stablecoin, asset-backed-stablecoin...	NaN	
3	[marketplace, centralized-exchange, payments, ...	NaN	
4	[pos, platform, solana-ecosystem, cms-holdings...	NaN	
5	[medium-of-exchange, enterprise-solutions, arr...	100000000000.00000	
6	[medium-of-exchange, stablecoin, asset-backed-...	NaN	

7	[dpos, pos, platform, research, smart-contract...	45000000000.00000
8	[defi, smart-contracts, three-arrows-capital-p...	7200000000.00000
9	[mineable, pow, scrypt, medium-of-exchange, me...	NaN
10	[media, payments, tron-ecosystem, layer-1, dwf...	NaN
11	[platform, defi, oracles, smart-contracts, sub...	10000000000.00000
12	[substrate, polkadot, binance-chain, polkadot-...	NaN
13	[pos, platform, enterprise-solutions, zero-kno...	100000000000.00000
14	[pos, layer-1, ftx-bankruptcy-estate, dwf-labs...	NaN

	circulating_supply	total_supply	infinite_supply	platform	\
0	19629518.00000	19629518.00000	False	NaN	
1	120165596.08996	120165596.08996	True	NaN	
2	97116788125.71764	99600626148.56953	True	NaN	
3	149544642.68938	149544642.68938	False	NaN	
4	440507009.24939	569708726.07903	True	NaN	
5	54558598490.00000	99987895338.00000	False	NaN	
6	28043507284.27634	28043507284.27634	False	NaN	
7	35451363529.41400	36628205944.37800	False	NaN	
8	367507149.48800	435540059.48800	False	NaN	
9	143097146383.70520	143097146383.70520	True	NaN	
10	88059232792.83615	88059275792.33267	True	NaN	
11	587099970.45279	1000000000.00000	False	NaN	
12	1304772428.69958	1411706138.96427	True	NaN	
13	9618349204.31577	10000000000.00000	False	NaN	
14	3466960979.94962	5102763677.30050	True	NaN	

	cmc_rank	self_reported_circulating_supply	self_reported_market_cap	\
0	1	NaN	NaN	
1	2	NaN	NaN	
2	3	NaN	NaN	
3	4	NaN	NaN	
4	5	NaN	NaN	
5	6	NaN	NaN	
6	7	NaN	NaN	
7	8	NaN	NaN	
8	9	NaN	NaN	
9	10	NaN	NaN	
10	11	71659659264.00000	9398768383.96608	
11	12	NaN	NaN	
12	13	NaN	NaN	
13	14	NaN	NaN	
14	15	3414166606.00000	7449933065.49324	

	tv1_ratio	last_updated	quote.USD.price	quote.USD.volume_24h	\
0	None	2024-02-16T16:07:00.000Z	1.00000	0.56898	
1	None	2024-02-16T16:07:00.000Z	0.05360	0.30697	
2	None	2024-02-16T16:06:00.000Z	0.00002	1.00000	



3	None	2024-02-16T16:06:00.000Z	0.00690	0.02458
4	None	2024-02-16T16:07:00.000Z	0.00211	0.03565
5	None	2024-02-16T16:07:00.000Z	0.00001	0.02939
6	None	2024-02-16T16:07:00.000Z	0.00002	0.11325
7	None	2024-02-16T16:06:00.000Z	0.00001	0.01034
8	None	2024-02-16T16:06:00.000Z	0.00077	0.00999
9	None	2024-02-16T16:07:00.000Z	0.00000	0.00732
10	None	2024-02-16T16:06:00.000Z	0.00000	0.00429
11	None	2024-02-16T16:06:00.000Z	0.00037	0.00770
12	None	2024-02-16T16:06:00.000Z	0.00015	0.00376
13	None	2024-02-16T16:06:00.000Z	0.00002	0.00835
14	None	2024-02-16T16:07:00.000Z	0.00004	0.00000

	quote.USD.volume_change_24h	quote.USD.percent_change_1h \
0	-3.02100	0.30045
1	-17.57880	0.02270
2	-6.94110	0.02434
3	-0.90910	-0.25557
4	-1.93140	0.56084
5	20.90960	0.46443
6	-1.57920	-0.04507
7	0.40020	-0.16226
8	-20.90290	-0.18325
9	-40.26670	0.75548
10	-20.55310	-0.25413
11	-2.53590	-0.21060
12	-13.31390	-0.18169
13	38.81660	0.61483
14	-2.96470	-0.21379

	quote.USD.percent_change_24h	quote.USD.percent_change_7d \
0	0.61929	9.90295
1	0.43330	11.57749
2	0.62096	0.01637
3	0.60438	11.18090
4	0.12726	3.45761
5	0.97235	7.28654
6	0.61482	-0.05792
7	0.37311	8.86673
8	0.00000	6.53515
9	0.74682	5.15716
10	0.67123	6.44186
11	0.32477	5.90604
12	0.30905	6.18531
13	1.00000	8.55917
14	0.43977	5.37418

	quote.USD.percent_change_30d	quote.USD.percent_change_60d \
0	22.37390	26.10437
1	9.68763	29.51864
2	0.08808	0.09713
3	14.87398	51.34309
4	10.43526	55.23566
5	-1.48252	-5.91444
6	-0.06438	-0.07984
7	11.93861	3.86304
8	12.07492	2.26067
9	6.92803	-3.68846
10	21.54317	32.23610
11	20.72310	38.81589
12	4.01957	15.62776
13	9.66185	18.34602
14	-6.24816	2.14768

	quote.USD.percent_change_90d	quote.USD.market_cap \
0	41.63911	1019819751894.75854
1	42.41493	334656351882.32355
2	0.00157	97153518505.05452
3	46.57360	53612170149.45863
4	86.51575	48283858186.21605
5	-7.90198	30561415079.62490
6	-0.05431	28028138196.37597
7	60.24602	20893283383.23812
8	78.82434	14708862953.14979
9	5.95899	12251835222.61201
10	27.52209	11549710696.23000
11	43.22858	11422822574.30190
12	45.65149	9958893802.54889
13	11.73432	8817133922.53341
14	-6.40814	7565133815.06066

	quote.USD.market_cap_dominance	quote.USD.fully_diluted_market_cap \
0	1.00000	1.00000
1	0.32286	0.30086
2	0.08856	0.08363
3	0.04547	0.04108
4	0.04019	0.04925
5	0.02271	0.04330
6	0.02021	0.01743
7	0.01318	0.01604
8	0.00706	0.01816
9	0.00463	0.00285
10	0.00395	0.00220
11	0.00382	0.00951

12	0.00238	0.00149
13	0.00124	0.00000
14	0.00000	0.00182

	quote.USD.tvl	quote.USD.last_updated	platform.id	platform.name	\
0	None	2024-02-16T16:07:00.000Z	NaN	NaN	
1	None	2024-02-16T16:07:00.000Z	NaN	NaN	
2	None	2024-02-16T16:06:00.000Z	1027.00000	Ethereum	
3	None	2024-02-16T16:06:00.000Z	NaN	NaN	
4	None	2024-02-16T16:07:00.000Z	NaN	NaN	
5	None	2024-02-16T16:07:00.000Z	NaN	NaN	
6	None	2024-02-16T16:07:00.000Z	1027.00000	Ethereum	
7	None	2024-02-16T16:06:00.000Z	NaN	NaN	
8	None	2024-02-16T16:06:00.000Z	NaN	NaN	
9	None	2024-02-16T16:07:00.000Z	NaN	NaN	
10	None	2024-02-16T16:06:00.000Z	NaN	NaN	
11	None	2024-02-16T16:06:00.000Z	1027.00000	Ethereum	
12	None	2024-02-16T16:06:00.000Z	NaN	NaN	
13	None	2024-02-16T16:06:00.000Z	NaN	NaN	
14	None	2024-02-16T16:07:00.000Z	NaN	NaN	

	platform.symbol	platform.slug	platform.token_address	\
0	NaN	NaN	NaN	
1	NaN	NaN	NaN	
2	ETH	ethereum	0xdac17f958d2ee523a2206206994597c13d831ec7	
3	NaN	NaN	NaN	
4	NaN	NaN	NaN	
5	NaN	NaN	NaN	
6	ETH	ethereum	0xa0b86991c6218b36c1d19d4a2e9eb0ce3606eb48	
7	NaN	NaN	NaN	
8	NaN	NaN	NaN	
9	NaN	NaN	NaN	
10	NaN	NaN	NaN	
11	ETH	ethereum	0x514910771af9ca656af840dff83e8264ecf986ca	
12	NaN	NaN	NaN	
13	NaN	NaN	NaN	
14	NaN	NaN	NaN	

	timestamp	day_of_week	month	year	hour	minute	second
0	2024-02-16 16:09:25	4	2	2024	16	9	25
1	2024-02-16 16:09:25	4	2	2024	16	9	25
2	2024-02-16 16:09:25	4	2	2024	16	9	25
3	2024-02-16 16:09:25	4	2	2024	16	9	25
4	2024-02-16 16:09:25	4	2	2024	16	9	25
5	2024-02-16 16:09:25	4	2	2024	16	9	25
6	2024-02-16 16:09:25	4	2	2024	16	9	25
7	2024-02-16 16:09:25	4	2	2024	16	9	25

8	2024-02-16 16:09:25	4	2	2024	16	9	25
9	2024-02-16 16:09:25	4	2	2024	16	9	25
10	2024-02-16 16:09:25	4	2	2024	16	9	25
11	2024-02-16 16:09:25	4	2	2024	16	9	25
12	2024-02-16 16:09:25	4	2	2024	16	9	25
13	2024-02-16 16:09:25	4	2	2024	16	9	25
14	2024-02-16 16:09:25	4	2	2024	16	9	25

```
[170]: from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error
```

```
[171]: features = ['quote.USD.volume_24h', 'quote.USD.market_cap_dominance', 'quote.USD.
↳fully_diluted_market_cap']
target = ['quote.USD.price']
X = df[features]
y = df[target]
```

```
[172]: # Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
↳random_state=42)
```

```
[173]: # Train a linear regression model
model = LinearRegression()
model.fit(X_train, y_train)
```

```
[173]: LinearRegression()
```

```
[174]: # Make predictions on the test set
y_pred = model.predict(X_test)
```

```
[175]: # Evaluate the model
mse = round(mean_squared_error(y_test, y_pred), 2)
print(f'Mean Squared Error: {mse}')
```

Mean Squared Error: 0.23

```
[176]: from sklearn.tree import DecisionTreeRegressor
from sklearn.ensemble import RandomForestRegressor
```

```
[177]: # Decision Tree Regressor
decision_tree_model = DecisionTreeRegressor(random_state=42)
decision_tree_model.fit(X_train, y_train)
y_pred_dt = decision_tree_model.predict(X_test)
mse_dt = round(mean_squared_error(y_test, y_pred_dt), 2)
print(f'Mean Squared Error (Decision Tree): {mse_dt}')
```

Mean Squared Error (Decision Tree): 0.3

```
[178]: # Random Forest Regressor
random_forest_model = RandomForestRegressor(random_state=42)
random_forest_model.fit(X_train, y_train.values.ravel()) # .ravel() to avoid
↳DataConversionWarning
y_pred_rf = random_forest_model.predict(X_test)
mse_rf = round(mean_squared_error(y_test, y_pred_rf), 2)
print(f'Mean Squared Error (Random Forest): {mse_rf}')
```

Mean Squared Error (Random Forest): 0.31

```
[ ]:
```