Clustering Crypto

Installing External Libraries

In [1]:

```python
# Install the altair plotting library: https://altair-viz.github.io/
!pip install -U altair
```

Requirement already up-to-date: altair in /home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages (3.2.0)
Requirement not upgraded as not directly required: numpy in /home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages (from altair) (1.14.3)
Requirement not upgraded as not directly required: entrypoints in /home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages (from altair) (0.2.3)
Requirement not upgraded as not directly required: jsonschema in /home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages (from altair) (2.6.0)
Requirement not upgraded as not directly required: jinja2 in /home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages (from altair) (2.10)
Requirement not upgraded as not directly required: pandas in /home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages (from altair) (0.24.2)
Requirement not upgraded as not directly required: toolz in /home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages (from altair) (0.9.0)
Requirement not upgraded as not directly required: six in /home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages (from altair) (1.11.0)
Requirement not upgraded as not directly required: MarkupSafe>=0.23 in /home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages (from jinja2->altair) (1.0)
Requirement not upgraded as not directly required: python-dateutil>=2.5.0 in /home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages (from pandas->altair) (2.7.3)
Requirement not upgraded as not directly required: pytz>=2011k in /home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages (from pandas->altair) (2018.4)
You are using pip version 10.0.1, however version 19.2.3 is available.
You should consider upgrading via the 'pip install --upgrade pip' command.

In [2]:

```python
# Initial imports
import requests
import pandas as pd
import altair as alt
from pathlib import Path
from sklearn.preprocessing import StandardScaler, MinMaxScaler
from sklearn.decomposition import PCA
from sklearn.cluster import KMeans
```

Fetching Cryptocurrency Data

```
# Use the following endpoint to fetch json data
url = "https://min-api.cryptocompare.com/data/all/coinlist"
response = requests.get(url).json()
```

In [ ]:

```
# Create a DataFrame
crypto_df = pd.DataFrame(response['Data']).T
crypto_df.head()
```

In [ ]:

```
# Alternatively, use the provided csv file:
# file_path = Path("Resources/crypto_data.csv")

# Create a DataFrame
# crypto_df = pd.read_csv(file_path, index_col=0)
# crypto_df.head(10)
```

Data Preprocessing

In [3]:

```
# Keep only necessary columns:
# 'CoinName','Algorithm','IsTrading','ProofType','TotalCoinsMined','TotalCoinSupply'
crypto_df=crypto_df[['CoinName','Algorithm','IsTrading','ProofType','TotalCoinsMined','TotalCoinSupply']]
crypto_df.head(10)
```

Out[3]:

	CoinName	Algorithm	IsTrading	ProofType	TotalCoinsMined	TotalCoinSupply
42	42 Coin	Scrypt	True	PoW/PoS	4.199995e+01	42
365	365Coin	X11	True	PoW/PoS	NaN	2300000000
404	404Coin	Scrypt	True	PoW/PoS	1.055185e+09	532000000
611	SixEleven	SHA-256	True	PoW	NaN	611000
808	808	SHA-256	True	PoW/PoS	0.000000e+00	0
1337	EliteCoin	X13	True	PoW/PoS	2.927942e+10	314159265359
2015	2015 coin	X11	True	PoW/PoS	NaN	0
BTC	Bitcoin	SHA-256	True	PoW	1.792718e+07	21000000
ETH	Ethereum	Ethash	True	PoW	1.076842e+08	0
LTC	Litecoin	Scrypt	True	PoW	6.303924e+07	84000000

In [4]:

```python
# Keep only cryptocurrencies that are trading
crypto_df = crypto_df[crypto_df["IsTrading"] == True]
print(crypto_df.shape)
crypto_df.head(10)
```

(1144, 6)

Out[4]:

	CoinName	Algorithm	IsTrading	ProofType	TotalCoinsMined	TotalCoinSupply
42	42 Coin	Scrypt	True	PoW/PoS	4.199995e+01	42
365	365Coin	X11	True	PoW/PoS	NaN	2300000000
404	404Coin	Scrypt	True	PoW/PoS	1.055185e+09	532000000
611	SixEleven	SHA-256	True	PoW	NaN	611000
808	808	SHA-256	True	PoW/PoS	0.000000e+00	0
1337	EliteCoin	X13	True	PoW/PoS	2.927942e+10	314159265359
2015	2015 coin	X11	True	PoW/PoS	NaN	0
BTC	Bitcoin	SHA-256	True	PoW	1.792718e+07	21000000
ETH	Ethereum	Ethash	True	PoW	1.076842e+08	0
LTC	Litecoin	Scrypt	True	PoW	6.303924e+07	84000000

In [5]:

```python
# Keep only cryptocurrencies with a working algorithm
crypto_df = crypto_df[crypto_df["Algorithm"] != "N/A"]
print(crypto_df.shape)
crypto_df.head(10)
```

(1144, 6)

Out[5]:

	CoinName	Algorithm	IsTrading	ProofType	TotalCoinsMined	TotalCoinSupply
42	42 Coin	Scrypt	True	PoW/PoS	4.199995e+01	42
365	365Coin	X11	True	PoW/PoS	NaN	2300000000
404	404Coin	Scrypt	True	PoW/PoS	1.055185e+09	532000000
611	SixEleven	SHA-256	True	PoW	NaN	611000
808	808	SHA-256	True	PoW/PoS	0.000000e+00	0
1337	EliteCoin	X13	True	PoW/PoS	2.927942e+10	314159265359
2015	2015 coin	X11	True	PoW/PoS	NaN	0
BTC	Bitcoin	SHA-256	True	PoW	1.792718e+07	21000000
ETH	Ethereum	Ethash	True	PoW	1.076842e+08	0
LTC	Litecoin	Scrypt	True	PoW	6.303924e+07	84000000

In [6]:

```python
# Remove the "IsTrading" column
crypto_df.drop("IsTrading", axis=1, inplace=True)
print(crypto_df.shape)
crypto_df.head(10)
```

(1144, 5)

Out[6]:

	CoinName	Algorithm	ProofType	TotalCoinsMined	TotalCoinSupply
42	42 Coin	Scrypt	PoW/PoS	4.199995e+01	42
365	365Coin	X11	PoW/PoS	NaN	2300000000
404	404Coin	Scrypt	PoW/PoS	1.055185e+09	532000000
611	SixEleven	SHA-256	PoW	NaN	611000
808	808	SHA-256	PoW/PoS	0.000000e+00	0
1337	EliteCoin	X13	PoW/PoS	2.927942e+10	314159265359
2015	2015 coin	X11	PoW/PoS	NaN	0
BTC	Bitcoin	SHA-256	PoW	1.792718e+07	21000000
ETH	Ethereum	Ethash	PoW	1.076842e+08	0
LTC	Litecoin	Scrypt	PoW	6.303924e+07	84000000

```
# Remove rows with at least 1 null value
crypto_df = crypto_df.dropna(axis=0, how="any")
print(crypto_df.shape)
crypto_df.head(10)
```

(685, 5)

Out[7]:

	CoinName	Algorithm	ProofType	TotalCoinsMined	TotalCoinSupply
42	42 Coin	Scrypt	PoW/PoS	4.199995e+01	42
404	404Coin	Scrypt	PoW/PoS	1.055185e+09	532000000
808	808	SHA-256	PoW/PoS	0.000000e+00	0
1337	EliteCoin	X13	PoW/PoS	2.927942e+10	314159265359
BTC	Bitcoin	SHA-256	PoW	1.792718e+07	21000000
ETH	Ethereum	Ethash	PoW	1.076842e+08	0
LTC	Litecoin	Scrypt	PoW	6.303924e+07	84000000
DASH	Dash	X11	PoW/PoS	9.031294e+06	22000000
XMR	Monero	CryptoNight-V7	PoW	1.720114e+07	0
ETC	Ethereum Classic	Ethash	PoW	1.133597e+08	210000000

In [8]:

```python
# Remove rows with cryptocurrencies withouhaving no coins mined
crypto_df = crypto_df[crypto_df["TotalCoinsMined"] > 0]
print(crypto_df.shape)
crypto_df.head(10)
```

(532, 5)

Out[8]:

	CoinName	Algorithm	ProofType	TotalCoinsMined	TotalCoinSupply
42	42 Coin	Scrypt	PoW/PoS	4.199995e+01	42
404	404Coin	Scrypt	PoW/PoS	1.055185e+09	532000000
1337	EliteCoin	X13	PoW/PoS	2.927942e+10	314159265359
BTC	Bitcoin	SHA-256	PoW	1.792718e+07	21000000
ETH	Ethereum	Ethash	PoW	1.076842e+08	0
LTC	Litecoin	Scrypt	PoW	6.303924e+07	84000000
DASH	Dash	X11	PoW/PoS	9.031294e+06	22000000
XMR	Monero	CryptoNight-V7	PoW	1.720114e+07	0
ETC	Ethereum Classic	Ethash	PoW	1.133597e+08	210000000
ZEC	ZCash	Equihash	PoW	7.383056e+06	21000000

In [9]:

```python
# Drop rows where there are 'N/A' text values
crypto_df = crypto_df[crypto_df.iloc[:] != 'N/A'].dropna()
crypto_df.head(10)
```

(532, 1)

Out[9]:

	CoinName
42	42 Coin
404	404Coin
1337	EliteCoin
BTC	Bitcoin
ETH	Ethereum

```
# Store the 'CoinName'column in its own DataFrame prior to dropping it from crypto_df
coins_name = pd.DataFrame(crypto_df["CoinName"], index=crypto_df.index)
print(coins_name.shape)
coins_name.head()
```

(532, 4)

Out[10]:

|	Algorithm	ProofType	TotalCoinsMined	TotalCoinSupply
42	Scrypt	PoW/PoS	4.199995e+01	42
404	Scrypt	PoW/PoS	1.055185e+09	532000000
1337	X13	PoW/PoS	2.927942e+10	314159265359
BTC	SHA-256	PoW	1.792718e+07	21000000
ETH	Ethash	PoW	1.076842e+08	0
LTC	Scrypt	PoW	6.303924e+07	84000000
DASH	X11	PoW/PoS	9.031294e+06	22000000
XMR	CryptoNight-V7	PoW	1.720114e+07	0
ETC	Ethash	PoW	1.133597e+08	210000000
ZEC	Equihash	PoW	7.383056e+06	21000000

```
# Drop the 'CoinName' column since it's not going to be used on the clustering algorithm
crypto_df = crypto_df.drop("CoinName", axis=1)
print(crypto_df.shape)
crypto_df.head(10)
```

(532, 98)

Out[11]:

	TotalCoinsMined	TotalCoinSupply	Algorithm_1GB AES Pattern Search	Algorithm_536	Algorithm_Argon2d	Alg
42	4.199995e+01	42	0	0	0	
404	1.055185e+09	532000000	0	0	0	
1337	2.927942e+10	314159265359	0	0	0	
BTC	1.792718e+07	21000000	0	0	0	
ETH	1.076842e+08	0	0	0	0	
LTC	6.303924e+07	84000000	0	0	0	
DASH	9.031294e+06	22000000	0	0	0	
XMR	1.720114e+07	0	0	0	0	
ETC	1.133597e+08	210000000	0	0	0	
ZEC	7.383056e+06	21000000	0	0	0	

10 rows × 98 columns
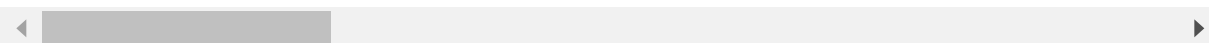
```
# Create dummy variables for text features
X = pd.get_dummies(data=crypto_df, columns=["Algorithm", "ProofType"])
print(X.shape)
X.head(10)
```

```
/home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages/sklearn/pre
processing/data.py:645: DataConversionWarning: Data with input dtype uint8, f
loat64, object were all converted to float64 by StandardScaler.
  return self.partial_fit(X, y)
/home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages/sklearn/bas
e.py:464: DataConversionWarning: Data with input dtype uint8, float64, object
were all converted to float64 by StandardScaler.
  return self.fit(X, **fit_params).transform(X)
```

Out[12]:

```
array([[-0.11710817, -0.1528703 , -0.0433963 , -0.0433963 , -0.0433963 ,
        -0.06142951, -0.07530656, -0.0433963 , -0.06142951, -0.06142951,
        -0.0433963 , -0.0433963 , -0.19245009, -0.06142951, -0.09740465,
        -0.0433963 , -0.11547005, -0.07530656, -0.0433963 , -0.0433963 ,
        -0.15191091, -0.0433963 , -0.13118084, -0.0433963 , -0.0433963 ,
        -0.08703883, -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
        -0.06142951, -0.0433963 , -0.08703883, -0.08703883, -0.08703883,
        -0.0433963 , -0.13118084, -0.13840913, -0.13840913, -0.0433963 ,
        -0.06142951, -0.0433963 , -0.07530656, -0.18168574, -0.0433963 ,
        -0.0433963 , -0.0433963 , -0.07530656, -0.15826614, -0.31491833,
        -0.0433963 , -0.08703883, -0.07530656, -0.06142951,  1.38675049,
        -0.0433963 , -0.0433963 , -0.06142951, -0.0433963 , -0.0433963 ,
        -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
        -0.0433963 , -0.39879994, -0.0433963 , -0.18168574, -0.0433963 ,
        -0.08703883, -0.08703883, -0.10680283, -0.0433963 , -0.13118084,
        -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.07530656,
        -0.43911856, -0.0433963 , -0.06142951, -0.0433963 , -0.0433963 ,
        -0.89632016, -0.0433963 , -0.0433963 ,  1.42222617, -0.0433963 ,
        -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
        -0.0433963 , -0.0433963 , -0.0433963 ],
       [-0.09396955, -0.145009  , -0.0433963 , -0.0433963 , -0.0433963 ,
        -0.06142951, -0.07530656, -0.0433963 , -0.06142951, -0.06142951,
        -0.0433963 , -0.0433963 , -0.19245009, -0.06142951, -0.09740465,
        -0.0433963 , -0.11547005, -0.07530656, -0.0433963 , -0.0433963 ,
        -0.15191091, -0.0433963 , -0.13118084, -0.0433963 , -0.0433963 ,
        -0.08703883, -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
        -0.06142951, -0.0433963 , -0.08703883, -0.08703883, -0.08703883,
        -0.0433963 , -0.13118084, -0.13840913, -0.13840913, -0.0433963 ,
        -0.06142951, -0.0433963 , -0.07530656, -0.18168574, -0.0433963 ,
        -0.0433963 , -0.0433963 , -0.07530656, -0.15826614, -0.31491833,
        -0.0433963 , -0.08703883, -0.07530656, -0.06142951,  1.38675049,
        -0.0433963 , -0.0433963 , -0.06142951, -0.0433963 , -0.0433963 ,
        -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
        -0.0433963 , -0.39879994, -0.0433963 , -0.18168574, -0.0433963 ,
        -0.08703883, -0.08703883, -0.10680283, -0.0433963 , -0.13118084,
        -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.07530656,
        -0.43911856, -0.0433963 , -0.06142951, -0.0433963 , -0.0433963 ,
        -0.89632016, -0.0433963 , -0.0433963 ,  1.42222617, -0.0433963 ,
        -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
        -0.0433963 , -0.0433963 , -0.0433963 ],
       [ 0.52494561,  4.48942416, -0.0433963 , -0.0433963 , -0.0433963 ,
        -0.06142951, -0.07530656, -0.0433963 , -0.06142951, -0.06142951,
        -0.0433963 , -0.0433963 , -0.19245009, -0.06142951, -0.09740465,
        -0.0433963 , -0.11547005, -0.07530656, -0.0433963 , -0.0433963 ,
        -0.15191091, -0.0433963 , -0.13118084, -0.0433963 , -0.0433963 ,
        -0.08703883, -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
        -0.06142951, -0.0433963 , -0.08703883, -0.08703883, -0.08703883,
        -0.0433963 , -0.13118084, -0.13840913, -0.13840913, -0.0433963 ,
        -0.06142951, -0.0433963 , -0.07530656, -0.18168574, -0.0433963 ,
        -0.0433963 , -0.0433963 , -0.07530656, -0.15826614, -0.31491833,
        -0.0433963 , -0.08703883, -0.07530656, -0.06142951, -0.72111026,
        -0.0433963 , -0.0433963 , -0.06142951, -0.0433963 , -0.0433963 ,
        -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
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        -0.08703883, -0.08703883, -0.10680283, -0.0433963 , -0.13118084,
```

```
          -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.07530656,
          -0.43911856, -0.0433963 , -0.06142951, -0.0433963 , -0.0433963 ,
          -0.89632016, -0.0433963 , -0.0433963 ,  1.42222617, -0.0433963 ,
          -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
          -0.0433963 , -0.0433963 , -0.0433963 ],
         [-0.11671506, -0.15255998, -0.0433963 , -0.0433963 , -0.0433963 ,
          -0.06142951, -0.07530656, -0.0433963 , -0.06142951, -0.06142951,
          -0.0433963 , -0.0433963 , -0.19245009, -0.06142951, -0.09740465,
          -0.0433963 , -0.11547005, -0.07530656, -0.0433963 , -0.0433963 ,
          -0.15191091, -0.0433963 , -0.13118084, -0.0433963 , -0.0433963 ,
          -0.08703883, -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
          -0.06142951, -0.0433963 , -0.08703883, -0.08703883, -0.08703883,
          -0.0433963 , -0.13118084, -0.13840913, -0.13840913, -0.0433963 ,
          -0.06142951, -0.0433963 , -0.07530656, -0.18168574, -0.0433963 ,
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          -0.0433963 , -0.08703883, -0.07530656, -0.06142951, -0.72111026,
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          -0.0433963 , -0.39879994, -0.0433963 , -0.18168574, -0.0433963 ,
          -0.08703883, -0.08703883, -0.10680283, -0.0433963 , -0.13118084,
          -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.07530656,
          -0.43911856, -0.0433963 , -0.06142951, -0.0433963 , -0.0433963 ,
           1.11567277, -0.0433963 , -0.0433963 , -0.70312305, -0.0433963 ,
          -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
          -0.0433963 , -0.0433963 , -0.0433963 ],
         [-0.11474682, -0.1528703 , -0.0433963 , -0.0433963 , -0.0433963 ,
          -0.06142951, -0.07530656, -0.0433963 , -0.06142951, -0.06142951,
          -0.0433963 , -0.0433963 , -0.19245009, -0.06142951, -0.09740465,
          -0.0433963 , -0.11547005, -0.07530656, -0.0433963 , -0.0433963 ,
          -0.15191091, -0.0433963 ,  7.62306442, -0.0433963 , -0.0433963 ,
          -0.08703883, -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
          -0.06142951, -0.0433963 , -0.08703883, -0.08703883, -0.08703883,
          -0.0433963 , -0.13118084, -0.13840913, -0.13840913, -0.0433963 ,
          -0.06142951, -0.0433963 , -0.07530656, -0.18168574, -0.0433963 ,
          -0.0433963 , -0.0433963 , -0.07530656, -0.15826614, -0.31491833,
          -0.0433963 , -0.08703883, -0.07530656, -0.06142951, -0.72111026,
          -0.0433963 , -0.0433963 , -0.06142951, -0.0433963 , -0.0433963 ,
          -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
          -0.0433963 , -0.39879994, -0.0433963 , -0.18168574, -0.0433963 ,
          -0.08703883, -0.08703883, -0.10680283, -0.0433963 , -0.13118084,
          -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.07530656,
          -0.43911856, -0.0433963 , -0.06142951, -0.0433963 , -0.0433963 ,
           1.11567277, -0.0433963 , -0.0433963 , -0.70312305, -0.0433963 ,
          -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 , -0.0433963 ,
          -0.0433963 , -0.0433963 , -0.0433963 ]])
```

In [ ]:

```python
# Standardize data
X = StandardScaler().fit_transform(X)
X[:5]
```

Reducing Dimensions Using PCA

In [13]:

```python
# Use PCA to reduce dimension to 3 principal components
n_comp = 3
pca = PCA(n_components=n_comp)
principal_components = pca.fit_transform(X)
principal_components
```

Out[13]:

```
array([[-0.33730955,  1.08194557, -0.37668659],
       [-0.32063105,  1.0821204 , -0.37716892],
       [ 2.30347915,  1.65841599, -0.5079926 ],
       ...,
       [ 0.31911641, -2.29451519,  0.31235355],
       [-0.16544195, -2.0718468 ,  0.15685175],
       [-0.29072706,  0.84564675, -0.15234827]])
```

In [14]:

```python
# Create a DataFrame with the principal components data
col_names = [f"PC {i}" for i in range(1, n_comp + 1)]
pcs_df = pd.DataFrame(principal_components, columns=col_names, index=crypto_df.index)
print(pcs_df.shape)
pcs_df.head(10)
```

(532, 3)

Out[14]:

	PC 1	PC 2	PC 3
42	-0.337310	1.081946	-0.376687
404	-0.320631	1.082120	-0.377169
1337	2.303479	1.658416	-0.507993
BTC	-0.139675	-1.311413	0.135082
ETH	-0.149715	-2.036022	0.237966
LTC	-0.167853	-1.070010	0.018563
DASH	-0.390818	1.155356	-0.456691
XMR	-0.132352	-2.139376	0.255300
ETC	-0.148157	-2.036119	0.237942
ZEC	-0.165441	-2.071847	0.156852

Clustering Crytocurrencies Using K-Means

Finde the Best Value for k Using the Elbow Curve

```
inertia = []
k = list(range(1, 11))

# Calculate the inertia for the range of k values
for i in k:
    km = KMeans(n_clusters=i, random_state=0)
    km.fit(pcs_df)
    inertia.append(km.inertia_)

# Create the Elbow Curve using hvPlot
elbow_data = {"k": k, "inertia": inertia}
df_elbow = pd.DataFrame(elbow_data)
alt.Chart(df_elbow).mark_line().encode(x="k", y="inertia")
```

Out[15]:
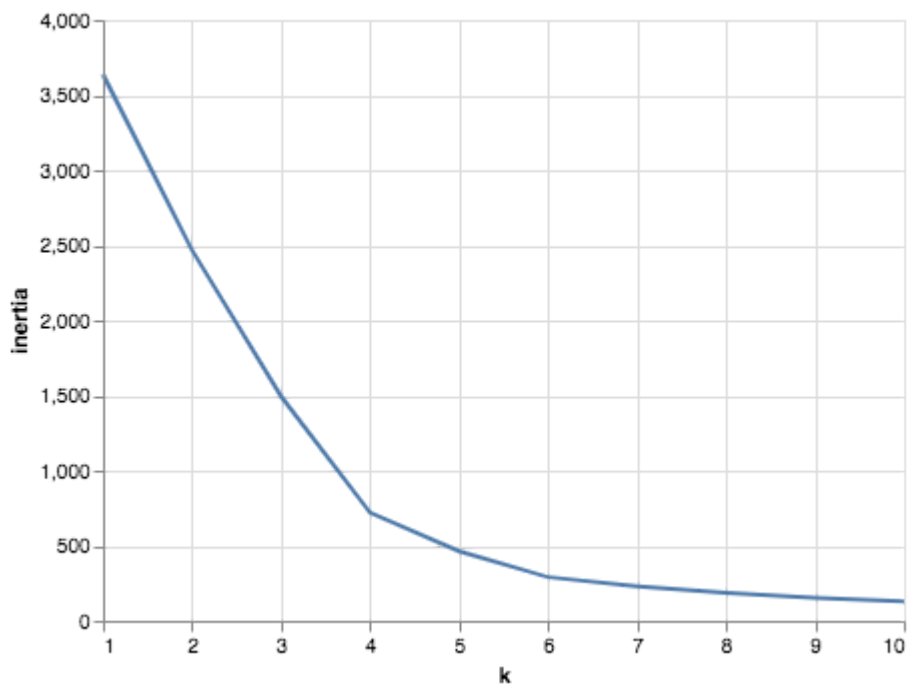
Running K-Means with k=4

In [16]:

```python
# Initialize the K-Means model
model = KMeans(n_clusters=4, random_state=0)

# Fit the model
model.fit(pcs_df)

# Predict clusters
predictions = model.predict(pcs_df)

# Create a new DataFrame including predicted clusters and cryptocurrencies features
clustered_df = pd.concat([crypto_df, pcs_df], axis=1, sort=False)
clustered_df["CoinName"] = coins_name["CoinName"]
clustered_df["Class"] = model.labels_
print(clustered_df.shape)
clustered_df.head(10)
```

(532, 9)

Out[16]:

|	Algorithm	ProofType	TotalCoinsMined	TotalCoinSupply	PC 1	PC 2	PC 3
42	Scrypt	PoW/PoS	4.199995e+01	42	-0.337310	1.081946	-0.376687
404	Scrypt	PoW/PoS	1.055185e+09	532000000	-0.320631	1.082120	-0.377169
1337	X13	PoW/PoS	2.927942e+10	314159265359	2.303479	1.658416	-0.507993
BTC	SHA-256	PoW	1.792718e+07	21000000	-0.139675	-1.311413	0.135082
ETH	Ethash	PoW	1.076842e+08	0	-0.149715	-2.036022	0.237966
LTC	Scrypt	PoW	6.303924e+07	84000000	-0.167853	-1.070010	0.018563
DASH	X11	PoW/PoS	9.031294e+06	22000000	-0.390818	1.155356	-0.456691
XMR	CryptoNight-V7	PoW	1.720114e+07	0	-0.132352	-2.139376	0.255300
ETC	Ethash	PoW	1.133597e+08	210000000	-0.148157	-2.036119	0.237942
ZEC	Equihash	PoW	7.383056e+06	21000000	-0.165441	-2.071847	0.156852

Visualizing Results

Scatter Plot for Clusters

```python
# Scatter plot to visualize clusters using two principal components
alt.Chart(clustered_df).mark_circle(size=60).encode(
    x="PC 1",
    y="PC 2",
    color=alt.Color(
        "Class",
        scale=alt.Scale(domain=[0, 1, 2, 3], range=["red", "green", "blue", "orange"]),
    ),
    tooltip=["CoinName", "Algorithm", "TotalCoinsMined", "TotalCoinSupply"],
).interactive()
```

Out[17]:
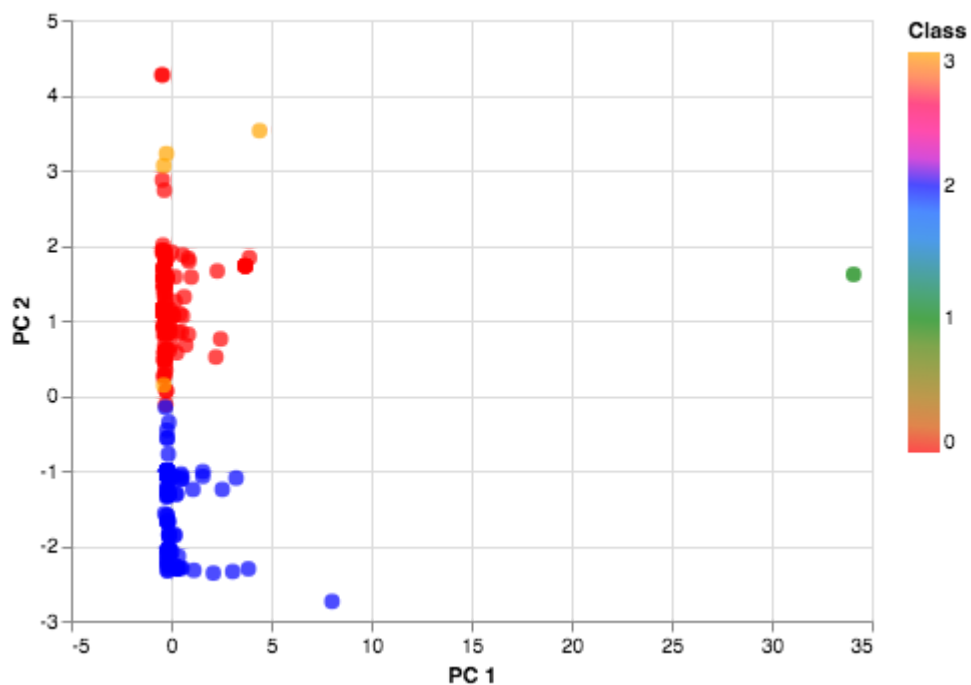
Scatter Plot with Tradable Cryptocurrencies

```
# Scale data to create the scatter plot
mm_scaler = MinMaxScaler()
plot_data = mm_scaler.fit_transform(
    clustered_df[["TotalCoinSupply", "TotalCoinsMined"]]
)
plot_df = pd.DataFrame(
    plot_data, columns=["TotalCoinSupply", "TotalCoinsMined"], index=clustered_df.index
)
plot_df["CoinName"] = clustered_df["CoinName"]
plot_df["Class"] = clustered_df["Class"]
plot_df.head()
```

/home/ec2-user/anaconda3/envs/python3/lib/python3.6/site-packages/sklearn/pre
processing/data.py:334: DataConversionWarning: Data with input dtype float64,
object were all converted to float64 by MinMaxScaler.
  return self.partial_fit(X, y)

Out[18]:

	TotalCoinSupply	TotalCoinsMined	CoinName	Class
42	4.200000e-11	0.000000	42 Coin	0
404	5.320000e-04	0.001066	404Coin	0
1337	3.141593e-01	0.029576	EliteCoin	0
BTC	2.100000e-05	0.000018	Bitcoin	2
ETH	0.000000e+00	0.000109	Ethereum	2

In [19]:

```python
# Plot the scatter with x="TotalCoinsMined" and y="TotalCoinSupply"
alt.Chart(plot_df).mark_circle(size=60).encode(
    x="TotalCoinsMined",
    y="TotalCoinSupply",
    color=alt.Color(
        "Class",
        scale=alt.Scale(domain=[0, 1, 2, 3], range=["red", "green", "blue", "orange"]),
    ),
    tooltip=["CoinName", "TotalCoinsMined", "TotalCoinSupply"],
).interactive()
```
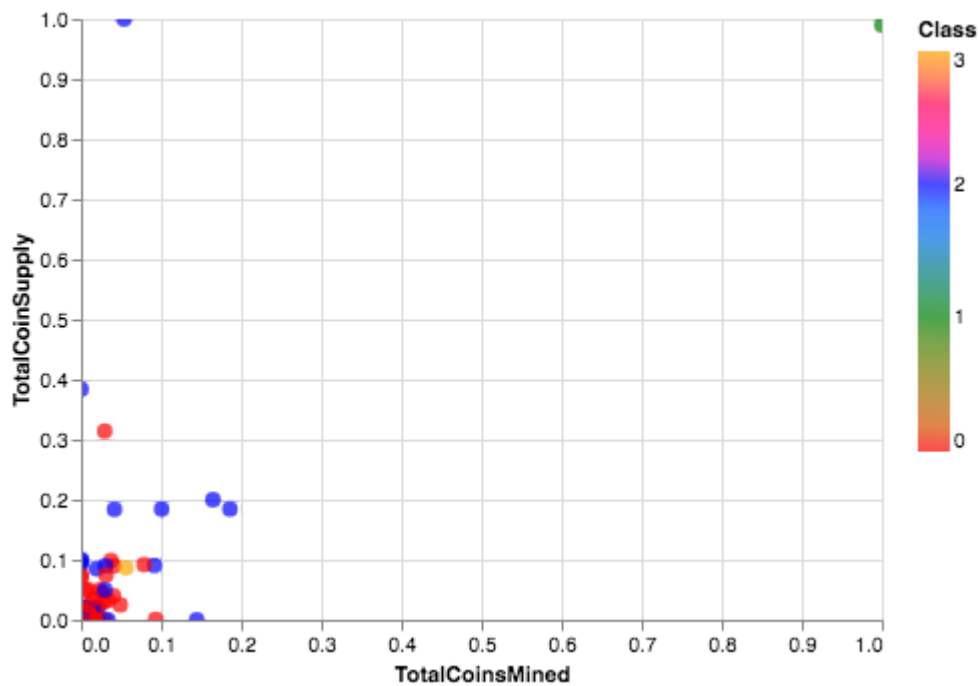
Out[19]:

Table of Tradable Cryptocurrencies

```python
# Table with tradable cryptos
with pd.option_context("display.max_rows", None, "display.max_columns", None):
    display(
        clustered_df[
            [
                "CoinName",
                "Algorithm",
                "ProofType",
                "TotalCoinSupply",
                "TotalCoinsMined",
                "Class",
            ]
        ]
    )
```

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
42	42 Coin	Scrypt	PoW/PoS	42	4.199995e+
404	404Coin	Scrypt	PoW/PoS	532000000	1.055185e+
1337	EliteCoin	X13	PoW/PoS	314159265359	2.927942e+
BTC	Bitcoin	SHA-256	PoW	21000000	1.792718e+
ETH	Ethereum	Ethash	PoW	0	1.076842e+
LTC	Litecoin	Scrypt	PoW	84000000	6.303924e+
DASH	Dash	X11	PoW/PoS	22000000	9.031294e+
XMR	Monero	CryptoNight-V7	PoW	0	1.720114e+
ETC	Ethereum Classic	Ethash	PoW	210000000	1.133597e+
ZEC	ZCash	Equihash	PoW	21000000	7.383056e+
BTS	Bitshares	SHA-512	PoS	3600570502	2.741570e+
DGB	DigiByte	Multiple	PoW	21000000000	1.140622e+
BTCD	BitcoinDark	SHA-256	PoW/PoS	22000000	1.288862e+
XPY	PayCoin	SHA-256	PoS	12500000	1.199533e+
PRC	ProsperCoin	Scrypt	PoW	21000000	5.768310e+
KOBO	KoboCoin	X15	PoW/PoS	350000000	2.554254e+
SPR	Spreadcoin	X11	PoW	20000000	1.114973e+
ARG	Argentum	Scrypt	PoW	64000000	1.220580e+
AUR	Aurora Coin	Scrypt	PoW/PoS	16768584	1.813510e+
BLU	BlueCoin	Scrypt	PoW/PoS	0	6.354239e+
XMY	MyriadCoin	Multiple	PoW	2000000000	1.688254e+
MOON	MoonCoin	Scrypt	PoW	384000000000	8.800000e+
ZET	ZetaCoin	SHA-256	PoW	169795588	1.702044e+
SXC	SexCoin	Scrypt	PoW	250000000	1.289410e+
QTL	Quatloo	Scrypt	PoW	100000000	7.357795e+
ENRG	EnergyCoin	Scrypt	PoW/PoS	0	1.230628e+
QRK	QuarkCoin	Quark	PoW	247000000	2.595572e+
RIC	Riecoin	Groestl	PoW	84000000	4.954859e+
DGC	Digitalcoin	Scrypt	PoW	48166000	3.344299e+
BTB	BitBar	Scrypt	PoW/PoS	500000	4.257948e+
CAT	Catcoin	Scrypt	PoW	21000000	7.219957e+
CBX	CryptoBullion	Scrypt	PoW/PoS	1000000	1.039117e+
CCN	CannaCoin	Scrypt	PoW	13140000	4.703880e+
CRYPT	CryptCoin	X11	PoW	18000000	4.996986e+
CSC	CasinoCoin	Scrypt	PoC	40000000000	4.000000e+

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
DMD	Diamond	Groestl	PoW/PoS	4380000	3.304488e+
XVG	Verge	Multiple	PoW	16555000000	1.592953e+
DVC	DevCoin	SHA-256	PoW	21000000000	1.877386e+
EAC	EarthCoin	Scrypt	PoW	13500000000	1.253902e+
EFL	E-Gulden	Scrypt	PoW	21000000	2.091048e+
EMC2	Einsteinium	Scrypt	PoW	299792458	2.188719e+
EMD	Emerald	Scrypt	PoW	32000000	1.949679e+
EXCL	Exclusive Coin	PoS	PoS	0	5.679705e+
FLT	FlutterCoin	Scrypt	PoS/PoW/PoT	0	4.618299e+
FRK	Franko	Scrypt	PoW	11235813	1.142732e+
FTC	FeatherCoin	NeoScrypt	PoW	336000000	2.086691e+
GDC	GrandCoin	Scrypt	PoW	1420609614	8.841258e+
GLC	GlobalCoin	Scrypt	PoW	70000000	6.567272e+
GLD	GoldCoin	Scrypt	PoW	72245700	4.165865e+
HBN	HoboNickels	Scrypt	PoW/PoS	120000000	8.926693e+
HYP	HyperStake	X11	PoS	0	1.678520e+
IFC	Infinite Coin	Scrypt	PoW	90600000000	9.059575e+
IOC	IOCoin	X11	PoW/PoS	22000000	1.765091e+
IXC	IXcoin	SHA-256	PoW	21000000	2.108935e+
KGC	KrugerCoin	Scrypt	PoW	265420800	1.514476e+
LKY	LuckyCoin	Scrypt	PoW	20000000	1.932632e+
LTB	Litebar	Scrypt	PoW	1350000	1.104344e+
MAX	MaxCoin	SHA3	PoW/PoS	100000000	6.144580e+
MEC	MegaCoin	Scrypt	PoW	42000000	3.815200e+
MED	MediterraneanCoin	HybridScryptHash256	PoW	200000000	4.043186e+
MINT	MintCoin	Scrypt	PoS	0	2.129393e+
MINC	MinCoin	Scrypt	PoW	10000000	5.804205e+
MZC	MazaCoin	SHA-256	PoW/PoS	2419200000	1.613836e+
NAUT	Nautilus Coin	Scrypt	PoS	16180000	1.618000e+
NAV	NavCoin	X13	PoW/PoS	0	6.608710e+
NOBL	NobleCoin	Scrypt	PoW	15000000000	2.366066e+
NMC	Namecoin	SHA-256	PoW	21000000	1.473640e+
NYAN	NyanCoin	Scrypt	PoW	337000000	3.347092e+
OPAL	OpalCoin	X13	PoW/PoS	0	1.515636e+
ORB	Orbitcoin	NeoScrypt	PoW/PoS	3770000	3.220616e+
POT	PotCoin	Scrypt	PoW/PoS	420000000	2.226772e+

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
PXC	PhoenixCoin	Scrypt	PoW/PoS	98000000	7.395927e+
RDD	Reddcoin	Scrypt	PoW/PoS	0	2.931557e+
RPC	RonPaulCoin	Scrypt	PoW	21000000	1.104157e+
SBC	StableCoin	Scrypt	PoW	250000000	2.421518e+
SMC	SmartCoin	Scrypt	PoW	51200000	2.559374e+
SUPER	SuperCoin	X11	PoS	0	5.070766e+
SYNC	SyncCoin	X11	PoW/PoS	1000	1.177000e+
SYS	SysCoin	SHA-256	PoW	888000000	5.633365e+
TES	TeslaCoin	Multiple	PoS	100000000	8.026046e+
TGC	TigerCoin	SHA-256	PoW	47011968	4.353680e+
TIT	TittieCoin	PHI1612	PoS	2300000000	1.622326e+
TOR	TorCoin	X11	PoW/PoS	10000000	1.431851e+
TRC	TerraCoin	SHA-256	PoW	42000000	2.293540e+
UNB	UnbreakableCoin	SHA-256	PoW	80000000	2.278150e+
UNO	Unobtanium	SHA-256	PoW	250000	2.009118e+
URO	UroCoin	X11	PoW	0	1.207310e+
USDE	UnitaryStatus Dollar	Scrypt	PoW/PoS	1600000000	1.098953e+
UTC	UltraCoin	Scrypt	PoW/PoS	100000000	5.023521e+
VIA	ViaCoin	Scrypt	PoW	23000000	2.315089e+
VRC	VeriCoin	Scrypt	PoST	0	3.202111e+
VTC	Vertcoin	Lyra2REv2	PoW	84000000	5.117372e+
WDC	WorldCoin	Scrypt	PoW	265420800	1.196069e+
XC	X11 Coin	X11	PoW/PoS	5500000	6.950831e+
XCR	Crypti	Multiple	PoS	0	1.000000e+
XJO	JouleCoin	SHA-256	PoW	45000000	3.919574e+
XST	StealthCoin	X13	PoW/PoS	0	3.309373e+
ZCC	ZCC Coin	Scrypt	PoW/PoS	1000000000	1.479902e+
BCN	ByteCoin	CryptoNight	PoW	184467440735	1.840668e+
XDN	DigitalNote	CryptoNight	PoW	10000000000	6.906588e+
BURST	BurstCoin	Shabal256	PoC	2158812800	1.813034e+
SJCX	StorjCoin	Counterparty	PoS	500000000	5.117314e+
MONA	MonaCoin	Scrypt	PoW	105120000	6.819467e+
NTRN	Neutron	SHA-256	PoW/PoS	68000000	3.912169e+
FAIR	FairCoin	Groestl	PoW/PoS	0	5.319383e+
NLG	Gulden	Scrypt	PoW	1680000000	4.150324e+
RBY	RubyCoin	Scrypt	PoS	0	2.718449e+

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
PTC	PesetaCoin	Scrypt	PoW	166386000	1.375177e-
KORE	Kore	X13	PoW/PoS	12000000	2.022465e-
WBB	Wild Beast Coin	Scrypt	PoW	2628000	1.819192e-
NOTE	Dnotes	Scrypt	PoS	500000000	1.746461e-
FLO	Flo	Scrypt	PoW	160000000	1.522707e-
8BIT	8BIT Coin	Scrypt	PoW/PoS	0	1.467841e-
STV	Sativa Coin	X13	PoW/PoS	10000000	7.096834e-
ABY	ArtByte	Scrypt	PoW	1000000000	7.925372e-
FLDC	Folding Coin	Stanford Folding	PoW	1000000000	7.194170e-
U	Ucoin	X11	PoS	20000000	2.689812e-
UIS	Unitus	Multiple	PoW	0	6.511330e-
CYP	CypherPunkCoin	QuBit	PoW	0	6.365285e-
OMC	OmniCron	Scrypt	PoW	3371337	1.014004e-
VTR	Vtorrent	Scrypt	PoW/PoS	20000000	1.160472e-
GRE	GreenCoin	Scrypt	PoW	10000000000	4.610341e-
XCN	Cryptonite	M7 POW	PoW	1840000000	7.085065e-
MSC	MasterCoin	Scrypt	PoW	619478	6.194780e-
SOON	SoonCoin	SHA-256	PoW	21000000	1.246262e-
1CR	1Credit	Scrypt	PoW	92000000000	8.821300e-
ISL	IslaCoin	X11	PoW/PoS	0	1.513704e-
NXS	Nexus	SHA3	PoW/nPoS	78000000	6.365722e-
MARS	MarsCoin	X11	PoW	33000000	3.222157e-
CTO	Crypto	Lyra2RE	PoW	65789100	1.374274e-
ACP	Anarchists Prime	SHA-256	PoW	53760000	1.474720e-
DRZ	Droidz	QUAIT	PoW/PoS	5060000	8.568038e-
BSC	BowsCoin	X11	PoW	21000000	1.586384e-
SQL	Squall Coin	X11	PoS/PoW	0	3.292000e-
SONG	Song Coin	Scrypt	PoW	210240000	3.256530e-
ZNY	BitZeny	Scrypt	PoW	250000000	7.561450e-
DIGS	Diggits	Scrypt	PoS	100000000	1.000000e-
EXP	Expanse	Ethash	PoW	16906397	1.049528e-
CON	Paycon	X13	PoW/PoS	50000000	2.304260e-
SC	Siacoin	Blake2b	PoW	0	3.309830e-
EMC	Emercoin	SHA-256	PoW/PoS	1000000000	4.305979e-
EGC	EverGreenCoin	X15	PoW/PoS	26298000	1.353056e-
MND	MindCoin	X11	PoW	16000000	1.586770e-

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
I0C	I0coin	SHA-256	PoW	21000000	2.099748e+
DCR	Decred	BLAKE256	PoW/PoS	21000000	1.036505e+
RVR	Revolution VR	Scrypt	PoW	210000000	2.100000e+
HODL	HOdlcoin	1GB AES Pattern Search	PoW	81962100	1.144895e+
EDRC	EDRCoin	SHA-256	PoW/PoS	22000000	3.669692e+
HTC	Hitcoin	X11	PoW/PoS	26550000000	1.099632e+
GAME	Gamecredits	Scrypt	PoW	84000000	6.983610e+
DBIC	DubaiCoin	SHA-256	PoW/PoS	10500000	5.129014e+
DIEM	CarpeDiemCoin	SHA-256	PoW	21626280000	2.173997e+
PWR	PWR Coin	NIST5	PoW/PoS	0	1.006945e+
BLRY	BillaryCoin	Scrypt	PoW/PoS	42000000	8.998743e+
GPU	GPU Coin	Scrypt	PoS	221052632	4.047704e+
ADZ	Adzcoin	X11	PoW	84000000	4.511032e+
SOIL	SoilCoin	Dagger	PoW	30000000	5.702048e+
YOC	YoCoin	Scrypt	PoW	168351300	6.364626e+
SIB	SibCoin	X11GOST	PoW	24000000	1.726336e+
ERC	EuropeCoin	X11	PoW/PoS	384000000	1.040727e+
ZEIT	ZeitCoin	Scrypt	PoS	99000000000	3.697124e+
SWING	SwingCoin	SHA-256	PoW/PoS	40000000	4.377082e+
SAFEX	SafeExchangeCoin	Scrypt	PoC	2147483647	2.147484e+
NEBU	Nebuchadnezzar	PoS	PoS	20000000	2.000000e+
FRN	Francs	Scrypt	PoW	20000000	6.570808e+
BOLI	BolivarCoin	X11	PoW	25000000	1.365408e+
XRA	Ratecoin	X11	PoW/PoS	75000000	1.345549e+
REV	Revenu	SHA-256	PoW/PoS	222725000	1.195525e+
CKC	Clockcoin	SHA-256	PoW/PoS	525000000	1.666282e+
VIP	VIP Tokens	NIST5	PoW/PoS	90000000	8.345040e+
BSD	BitSend	X11	PoW/PoS	139000000	2.438772e+
OMNI	Omni	Scrypt	PoW	616448	6.164480e+
LIR	Let it Ride	POS 3.0	PoS	33500000	3.858981e+
PUT	PutinCoin	Scrypt	PoW/PoS	2000000000	8.130923e+
IBANK	iBankCoin	Scrypt	PoW/PoS	44333333	4.526324e+
FRWC	Frankywillcoin	Scrypt	PoW/PoS	100000000	1.000000e+
MUDRA	MudraCoin	X13	PoS	200000000	5.000000e+
PIZZA	PizzaCoin	X11	PoW	25000000	1.377917e+
LC	Lutetium Coin	X11	PoS	657000000	6.570000e+

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMin
KMD	Komodo	Equihash	dPoW/PoW	200000000	1.158981e+
GB	GoldBlocks	X11	PoW/PoS	50000000	1.556387e+
CTC	CarterCoin	Scrypt	PoW/PoS	90000000	4.316550e+
KRB	Karbo	CryptoNight	PoW	10000000	7.822433e+
BXT	BitTokens	SHA-256	PoW/PoS	21000000	5.954290e+
ZYD	ZayedCoin	SHA-256	PoW	9736000	6.243840e+
MST	MustangCoin	X11	PoW/PoS	3000000	6.576363e+
ZNE	ZoneCoin	Scrypt	PoW/PoS	21000000	2.581970e+
COVAL	Circuits of Value	Multiple	PoW	1200000000	1.000000e+
ROOT	RootCoin	Scrypt	PoW/PoS	0	1.939889e+
DOPE	DopeCoin	Scrypt	PoW	200000000	1.168452e+
BTCR	BitCurrency	Scrypt	PoS	0	1.695986e+
DLC	DollarCoin	SHA-256	PoW	10638298	9.106714e+
SCN	Swiscoin	Scrypt	PoW/PoW	3100000000	6.652001e+
SH	Shilling	Scrypt	PoW	30000000	1.111920e+
BUZZ	BuzzCoin	SHA-256D	PoW/PoS	20000000000	1.957779e+
XPO	Opair	PoS	PoS	74000000	7.403381e+
PSB	PesoBit	Scrypt	PoW/PoS	0	3.352296e+
HALLO	Halloween Coin	X11	PoW/PoS	1500000000	2.646785e+
XZC	ZCoin	Lyra2Z	PoW	21400000	7.568281e+
CFC	CoffeeCoin	PoS	PoS	39999898	1.487168e+
ROYAL	RoyalCoin	X13	PoS	2500124	2.500124e+
GNJ	GanjaCoin V2	X14	PoW/PoS	100000000	1.000000e+
TEAM	TeamUP	PoS	PoS	301000000	1.781868e+
LANA	LanaCoin	SHA-256D	PoW/PoS	7506000000	1.082163e+
ELE	Elementrem	Ethash	PoW	26205539	2.620554e+
ZCL	ZClassic	Equihash	PoW	21000000	5.613550e+
ARK	ARK	DPoS	DPoS	125000000	1.082021e+
INSANE	InsaneCoin	X11	PoW/PoS	30000000	1.834281e+
KLC	KiloCoin	Scrypt	PoW	10000000000	1.962980e+
ATX	ArtexCoin	X11	PoW	500000000	8.240000e+
EMB	EmberCoin	X13	PoW/PoS	850000000	9.219282e+
XEN	XenixCoin	X11	PoW/PoS	3853326.77707314	3.853327e+
FRE	FreeCoin	PoS	PoS	50000000	5.000000e+
PLNC	PLNCoin	Scrypt	PoW/PoS	38540000	1.708960e+
ARCO	AquariusCoin	Scrypt	PoW/PoS	42000000	2.449577e+

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
KURT	Kurrent	X11	PoW	228000000	6.136481e
XCRE	Creatio	PoS	PoS	20000000	2.000000e
ENT	Eternity	X11	PoW/PoS	60000000	6.069482e
EUC	Eurocoin	SHA-256	PoW/PoS	20000000	1.241655e
BCF	BitcoinFast	Scrypt	PoW/PoS	33000000	2.024402e
XSN	Stakenet	X11	TPoS	76500000	7.559037e
BCCOIN	BitConnect Coin	Scrypt	PoW/PoS	28000000	1.108072e
MONEY	MoneyCoin	Scrypt	PoW/PoS	650659833	1.091442e
XNG	Enigma	X11	PoW/PoS	5000000	8.146710e
XCI	Cannabis Industry Coin	CryptoNight	PoW	21000000	9.781450e
RC	Russiacoin	Scrypt	PoW/PoS	144000000	8.377873e
PND	PandaCoin	Scrypt	PoS	32514916898	3.381314e
UNITS	GameUnits	Scrypt	PoW/PoS	13000000	3.472983e
GAKH	GAKHcoin	Scrypt	PoW/PoS	3315789	3.315789e
ASAFE2	Allsafe	Quark	PoS	15000000	1.051777e
LTCR	LiteCreed	QuBit	PoW/PoS	78835200	3.022775e
OS76	OsmiumCoin	Scrypt	PoW	2714286	8.940260e
BIC	Bikercoins	CryptoNight	PoW	25000000	9.357088e
HXX	HexxCoin	Lyra2RE	PoW	9999999	1.876146e
KED	Klingon Empire Darsek	Scrypt	PoW/PoS	500000000	2.396537e
IOP	Internet of People	SHA-256	PoW/PoS	21000000	2.526078e
KUSH	KushCoin	X11	PoW/PoS	9354000	5.659097e
PRX	Printerium	Scrypt	PoW/PoS	20000000	1.182173e
PAC	PacCoin	X11	PoW	100000000000	5.369821e
IMPCH	Impeach	Scrypt	PoW/PoS	21933333	3.081790e
CTL	Citadel	CryptoNight-V7	PoW	185000000	1.096932e
ZBC	Zilbercoin	Scrypt	PoS	55000000	2.922614e
FRST	FirstCoin	Scrypt	PoW/PoS	110000000	1.100000e
BVC	BeaverCoin	Scrypt	PoW	3360000	3.115258e
FIND	FindCoin	X13	PoS	14524851.4827	1.452485e
VLTC	VaultCoin	X11	PoW	1000000000	3.038554e
ZER	Zero	Equihash	PoW	17000000	6.921654e
CHAT	OpenChat	Scrypt	PoW/PoS	1000000000	1.000000e
CDN	Canada eCoin	Scrypt	PoW	100000000	9.984341e
ZOI	Zoin	Lyra2RE	PoW	21000000	1.854576e

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMin
RNS	RenosCoin	Scrypt	PoS	34426423	3.605036e+
DBIX	DubaiCoin	Dagger-Hashimoto	PoW	2232901	2.232901e+
XVP	VirtacoinPlus	X11	PoW/PoS	100000000	1.316275e+
TAJ	TajCoin	Blake2S	PoW/PoS	36900000	1.218420e+
IMX	Impact	X11	PoW/PoS	110000000	1.106304e+
EB3	EB3coin	Scrypt	PoW	4000000000	6.409605e+
ATMOS	Atmos	PoS	PoS	110290030	1.111358e+
HPC	HappyCoin	X11	PoW/PoS	100000000	2.152132e+
CXT	Coinonat	NIST5	PoW	48252000	1.012320e+
MCRN	MacronCoin	PoS	PoS	400000000	4.014214e+
RAIN	Condensate	X11	PoW/PoS	500000000	1.216655e+
IMS	Independent Money System	Scrypt	PoW/PoS	21212121	5.368934e+
ARGUS	ArgusCoin	Scrypt	PoW/PoS	28600000	1.148324e+
LMC	LomoCoin	Scrypt	PoW/PoS	1000000000	5.000000e+
PROC	ProCurrency	SHA-256	PoS	75000000000	1.005457e+
XGR	GoldReserve	X11	PoW/PoS	40000000	1.717138e+
BENJI	BenjiRolls	Scrypt	PoW	35520400	2.027610e+
GRW	GrowthCoin	Scrypt	PoS	2000000000	2.951355e+
ILC	ILCoin	SHA-256	PoW	2500000000	1.317748e+
PHR	Phreak	PoS	PoS	30000000	1.139023e+
DEA	Degas Coin	Scrypt	PoW/PoS	105000000	2.135876e+
HTML5	HTML5 Coin	X15	PoW/PoS	90000000000	4.065902e+
USC	Ultimate Secure Cash	SHA-256	PoS	200084200	1.034311e+
EQT	EquiTrader	Scrypt	PoW	72000000	1.367341e+
QTUM	QTUM	POS 3.0	PoS	100000000	1.000000e+
QRL	Quantum Resistant Ledger	CryptoNight-V7	PoW	105000000	6.903602e+
ESP	Espers	536	PoW/PoS	50000000000	2.280188e+
DYN	Dynamic	Argon2d	PoW	0	1.978422e+
NANO	Nano	Blake2b	PoW	340282367	1.332483e+
CHAN	ChanCoin	Cloverhash	PoW	30000000	1.840726e+
DCY	Dinastycoin	CryptoNight	PoW	2000000000	1.809467e+
DNR	Denarius	NIST5	PoW/PoS	10000000	4.171382e+
DP	DigitalPrice	X11	PoW	100000000	3.513898e+
VUC	Virta Unique Coin	NIST5	PoW/PoS	120000000	6.294208e+
BTPL	Bitcoin Planet	Skein	PoW/PoS	100000000	6.804362e+

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
UNIFY	Unify	Scrypt	PoW	19276800	1.813320e-
BRIT	BritCoin	X13	PoW/PoS	30000000	2.126809e-
SOCC	SocialCoin	Scrypt	PoW	75000000	5.167775e-
ARC	ArcticCoin	X11	PoW	60000000	2.604236e-
DAS	DAS	X11	PoW	18900000	2.622886e-
LINDA	Linda	Scrypt	PoW/PoS	50000000000	9.044931e-
XLC	LeviarCoin	CryptoNight	PoW	54000000	1.416180e-
ONION	DeepOnion	X13	PoW/PoS	18898187.6216583	2.191702e-
BTX	Bitcore	Time Travel	PoW	21000000	1.780187e-
GCN	gCn Coin	Scrypt	PoW	200000000000	1.630551e-
SMART	SmartCash	Keccak	PoW	5000000000	2.241009e-
SIGT	Signatum	SkunkHash v2 Raptor	PoS	137500000	1.079728e-
ONX	Onix	X11	PoW	1100000000	1.224756e-
CRM	Cream	Skein	PoW/PoS	100000000	4.733180e-
BCH	Bitcoin Cash	SHA-256	PoW	21000000	1.799559e-
XMCC	Monoeci	X11	PoW/PoS	9507271	1.256926e-
DFT	Draftcoin	Scrypt	PoS	17405891.19707116	1.866330e-
VET	Vechain	VeChainThor Authority	Proof of Authority	86712634466	5.545473e-
SOJ	Sojourn Coin	Scrypt	PoW	10500000000	4.852140e-
STCN	Stakecoin	PoS	PoS	61599965	4.000000e-
NYC	NewYorkCoin	Scrypt	PoW	0	1.430067e-
FRAZ	FrazCoin	Scrypt	PoW	20000000	9.704042e-
KRONE	Kronecoin	Scrypt	PoW	84000000	1.745375e-
ACC	AdCoin	Scrypt	PoW	100000000	3.264673e-
LINX	Linx	Scrypt	PoW	100000000	3.371653e-
XCXT	CoinonatX	Scrypt	PoW/PoS	48252000	1.953959e-
ETHD	Ethereum Dark	Scrypt	PoW/PoS	4200000	4.200000e-
SUMO	Sumokoin	CryptoNight	PoW	88888888	8.946653e-
ODN	Obsidian	SHA-512	PoS	91388946	2.500000e-
ADA	Cardano	Ouroboros	PoS	45000000000	2.592707e-
REC	Regalcoin	X11	PoW/PoS	27000000	7.262402e-
BTCZ	BitcoinZ	Equihash	PoW	21000000000	5.211553e-
TZC	TrezarCoin	NeoScrypt	PoW/PoS	400000000	1.826384e-
ELM	Elements	X11	PoW	1800000000	2.702856e-
TER	TerraNovaCoin	Scrypt	PoW/PoS	15733333	1.140735e-
VIVO	VIVO Coin	NeoScrypt	PoW	27000000	4.165968e-

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
RUP	Rupee	Lyra2REv2	PoS	24000000	2.400000e
BTG	Bitcoin Gold	Equihash	PoW	21000000	1.720236e
WOMEN	WomenCoin	Scrypt	PoW/PoS	25000000000	4.845947e
MAY	Theresa May Coin	SHA-256	PoW/PoS	100000000	9.205080e
NAMO	NamoCoin	NIST5	PoW/PoS	1200000000	5.605632e
LUX	LUXCoin	PHI1612	PoW/PoS	60000000	8.305775e
PIRL	Pirl	Dagger	PoW	156306732.71	3.398698e
XIOS	Xios	Scrypt	PoW/PoS	21000000	2.149688e
BTDX	Bitcloud 2.0	Quark	PoW/PoS	200000000	3.071155e
EBST	eBoost	Scrypt	PoW	100000000	9.999000e
KEK	KekCoin	POS 2.0	PoS	21000000	1.233081e
BLHC	BlackholeCoin	Scrypt	PoW/PoS	14788275.991	1.636254e
XIN	Infinity Economics	SHA-256	PoS	9000000000	9.000000e
PURA	Pura	X11	PoW	350000000	1.752159e
INN	Innova	NeoScrypt	PoW	45000000	6.375259e
ELLA	Ellaism	Ethash	PoW	280000000	1.275637e
GBX	GoByte	NeoScrypt	PoW	31800000	5.832307e
MAG	Magnet	X11	PoW/PoS	144000000	3.819859e
TAU	Lamden Tau	DPoS	DPoS	500000000	2.880906e
ECA	Electra	NIST5	PoW/PoS	30000000000	2.839915e
BCD	Bitcoin Diamond	X13	PoW/PoS	210000000	1.835340e
XSH	SHIELD	Multiple	PoW	660000000	4.817306e
CNBC	Cash & Back Coin	Scrypt	PoW/PoS	210000000	1.109770e
XUN	UltraNote	CryptoNight	PoW	85000000000	1.928182e
COAL	BitCoal	CryptoNight	PoW	12500000	4.500000e
DAXX	DaxxCoin	Ethash	PoW	10000000000	5.208918e
BWK	Bulwark	NIST5	PoS	27716121	1.324718e
KLKS	Kalkulus	Quark	PoS	20000000	1.695576e
AC3	AC3	X11	PoW	550000000	8.031621e
LTHN	Lethean	CryptoNight-V7	PoW	999481516	4.412502e
GER	GermanCoin	Scrypt	PoW/PoS	50000000000	4.911500e
LTCU	LiteCoin Ultra	Scrypt	PoW/PoS	150000000	8.419402e
POP	PopularCoin	Scrypt	PoW	4999999999	3.964201e
PNX	PhantomX	X11	PoW/PoS	50000000	4.517421e
PHO	Photon	BLAKE256	PoW	90000000000	3.008967e
SUCR	Sucre	X11	PoW	19800000	4.229041e

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMin
SPK	SparksPay	NeoScrypt	PoW	21000000	7.847417e+
WAGE	Digiwage	Quark	PoS	120000000	2.729968e+
GUN	GunCoin	NeoScrypt	PoW	500000000	2.997980e+
IRL	IrishCoin	Scrypt	PoW	64000000	4.548305e+
TROLL	Trollcoin	Scrypt	PoW/PoS	900000000	5.910227e+
LCP	Litecoin Plus	Scrypt	PoW/PoS	4000000	2.504486e+
MONK	Monkey Project	X11	PoS	21000000	4.407252e+
PCOIN	Pioneer Coin	X11	PoW	23000000	8.478104e+
UBTC	UnitedBitcoin	SHA-256	PoW	20166000	2.016600e+
ITZ	Interzone	C11	PoW	23000000	1.191659e+
TPAY	TokenPay	POS 3.0	PoS	25000000	2.044586e+
MCT	1717 Masonic Commemorative Token	Ethash	PoS	1618033	1.618033e+
MBC	My Big Coin	Scrypt	PoW and PoS	30000000	9.399343e+
TRTL	TurtleCoin	CryptoNight	PoW	1000000000000	5.313984e+
MUN	MUNcoin	SkunkHash	PoW	16600000	4.818339e+
USX	Unified Society USDEX	Scrypt	PoW/PoS	232000000	2.348463e+
NBR	Niobio Cash	CryptoNight	PoW	336000000	1.339325e+
SSS	ShareChain	Scrypt	PoW	10000000000	1.000000e+
TRF	Travelflex	Dagger	PoW	100000000	1.073253e+
KREDS	KREDS	Lyra2REv2	PoW	1100000000	6.437959e+
TOKC	Tokyo Coin	X13	PoS	800000000	2.302989e+
BBP	BiblePay	Proof-of-BibleHash	POBh	5200000000	1.772092e+
LCC	LitecoinCash	SHA-256 + Hive	PoW + Hive	840000000	6.383823e+
FLIP	BitFlip	Scrypt	PoW	40000000	1.244610e+
LOT	LottoCoin	Scrypt	PoW	18406979840	1.449101e+
CIF	Crypto Improvement Fund	X11	PoW	500000000	2.112976e+
SPD	Stipend	C11	PoW/PoS	19340594	1.125134e+
POA	Poa Network	Proof-of-Authority	PoA	252460800	2.044790e+
PUSHI	Pushi	X11	PoW/PoS	25000000	2.167827e+
ELP	Ellerium	XEVAN	PoW/PoS	60000000	4.192754e+
VLX	Velox	Scrypt	PoS	124000000	2.557001e+
ONT	Ontology	VBFT	PoS	1000000000	6.508486e+
CLO	Callisto Network	Ethash	PoW	6500000000	2.476125e+
TUBE	BitTube	CryptoNight	PoW	1000000000	8.004908e+

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
PSD	Poseidon	Scrypt	PoW	21000000	4.070212e-
ADK	Aidos Kuneen	IMesh	PoW	25000000	2.500000e-
BSX	Bitspace	NIST5	PoW/PoS	50000000	1.378785e-
BRIA	Briacoin	Scrypt	PoW/PoS	3000000	8.456378e-
IC	Ignition	Scrypt	PoW/PoS	5000000	1.182154e-
BTL	Bitrolium	Equihash	PoW	70000000	7.135548e-
MEDIC	MedicCoin	Scrypt	PoS	500000000	2.672977e-
ALPS	Alpenschillling	Lyra2Z	PoW	300000000	2.734050e-
BITG	Bitcoin Green	Green Protocol	PoS	21000000	9.803691e-
DEV	Deviant Coin	PoS	PoS	88000000	2.187659e-
ABJ	Abjcoin	Scrypt	PoW/PoS	30000000	9.880502e-
SEM	Semux	Semux BFT consensus	DPoS	100000000	1.231147e-
FTO	FuturoCoin	X11	PoW	100000000	3.180146e-
CARE	Carebit	Quark	PoW/PoS	200000000	1.397396e-
NZL	Zealium	PoS	PoS	80000000	1.107525e-
XMC	Monero Classic	CryptoNight	PoW	18400000	1.601686e-
PROTON	Proton	X16R	PoS	45000000	4.403800e-
DEAL	iDealCash	Scrypt	PoW/PoS	5121951220	1.404158e-
JUMP	Jumpcoin	NIST5	PoW	21000000	2.106935e-
INFX	Infinex	Lyra2RE	PoW	26280000	5.097690e-
XBI	Bitcoin Incognito	XEVAN	PoS/PoW	21000000	1.090496e-
KEC	KEYCO	Tribus	PoW	18000000	7.954470e-
HWC	HollyWoodCoin	Scrypt	PoS	26000000	3.870681e-
GIN	GINcoin	Lyra2Z	PoW	10500000	6.986400e-
PLTC	PlatinCoin	CryptoNight	PoW	600000518	8.430000e-
LOKI	Loki	CryptoNight Heavy	PoW	150000000	1.915363e-
NCP	Newton Coin	CryptoNight	PoW	184000000000	4.129452e-
SIC	Swisscoin	Scrypt	PoW/PoS	10200000000	1.020000e-
XT3	Xt3ch	Scrypt	PoS	44000000	7.630000e-
MGD	MassGrid	Jump Consistent Hash	PoW	168000000	1.358624e-
VIG	TheVig	SHA-256D	PoW/PoS	100000000	3.323818e-
PLURA	PluraCoin	CryptoNight	PoW	1000000000	5.600860e-
EMAR	EmaratCoin	Scrypt	PoW/PoS	84000000	2.159934e-
DKD	Dekado	X15	PoS	90000000	3.028420e-
LYNX	Lynx	Scrypt	HPoW	92000000000	7.787206e-

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
POSQ	Poseidon Quark	Quark	PoS	650000000	2.716265e-
BWS	BitcoinWSpectrum	SHA-256	PoS	100262205	5.781100e-
MUSE	Muse	DPoS	PoS	18081806	1.819494e-
XMN	Motion	X16R	PoW	22075700	8.125865e-
PLUS1	PlusOneCoin	HMQ1725	PoW	21000000	8.645406e-
AXE	Axe	X11	PoW	21000000	4.993031e-
TRVC	Trivechain	X16R	PoW/PoS	82546564	3.692312e-
DTEM	Dystem	Quark	PoS	21000000	7.082392e-
GIC	Giant	Quark	PoW/PoS	5151000	5.919490e-
PNY	Peony Coin	Scrypt	PoS	16880000000	1.042012e-
ABS	Absolute Coin	Lyra2REv2	PoW/PoS	52500000	1.333262e-
VITAE	Vitae	Quark	PoS	100000000	6.605388e-
HEX	HexCoin	Scrypt	PoW	22105263	1.416663e-
TPC	TPCash	Scrypt	PoW/PoS	1000000000	5.403802e-
WEBC	Webchain	CryptoNight-V7	PoW	1750000000	1.558020e-
RYO	Ryo	Cryptonight-GPU	PoW	88188888	4.890897e-
URALS	Urals Coin	XEVAN	PoW	210000000	1.474615e-
QWC	Qwertycoin	CryptoNight Heavy	PoW	184470000000	9.955311e-
ARE	ARENON	X11	PoS	55000000	1.926951e-
EUNO	EUNO	X11	PoW/PoS	50000000	3.077113e-
MMO	MMOCoin	Scrypt	PoS	260000000	1.077639e-
KETAN	Ketan	PoS	PoS	210000000	9.327132e-
PPAI	Project Pai	SHA-256	PoW	2100000000	2.100000e-
XDNA	XDNA	Keccak	PoW/PoS	366000000	4.672514e-
PAXEX	PAXEX	X11	PoS	100000000	4.504639e-
AZART	Azart	X11	PoW	25000000	5.015881e-
TSC	ThunderStake	Scrypt	PoW/PoS	18000000000	1.059954e-
KCASH	Kcash	SHA-512	Zero-Knowledge Proof	1000000000	1.000000e-
XCG	Xchange	X16R	PoW	100000000	9.753754e-
AAC	Acute Angle Cloud	ECC 256K1	DPOS	1000000000	1.000000e-
CRYP	CrypticCoin	Equihash	PoW	7600000000	4.235112e-
BTXC	Bettex coin	XEVAN	PoS	50000000	6.787405e-
ACM	Actinium	Lyra2Z	PoW	84000000	1.363485e-
BSV	Bitcoin SV	SHA-256	PoW	21000000	1.799251e-
BITM	BitMoney	XEVAN	Pos	70000000000	2.085159e-

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
JMC	Junson Ming Chan Coin	X11	PoS	0	1.720992e-
FRED	FREDEnergy	CryptoNight	PoW	8080000000	1.867055e-
HERB	HerbCoin	Quark	PoW/PoS	54000000	3.531219e-
UMO	Universal Molecule	Blake	PoW	105120001.44	1.578281e-
LIT	Lithium	Blake	PoW	25228800	1.584672e-
PIRATE	PirateCash	Equihash	PoS	105000000	1.347592e-
EXO	Exosis	Exosis	PoW	21000000	4.060919e-
BLTG	Block-Logic	Scrypt	PoW	120000000	3.528472e-
OWC	Oduwa	Scrypt	PoW/PoS	21000000	1.477755e-
BEAM	Beam	Equihash	PoW	262800000	3.568752e-
GALI	Galilel	Quark	PoW/PoS	19035999	1.826501e-
BTH	Bithereum	Equihash	PoW	30886000	2.515079e-
CSPN	Crypto Sports	Quark	PoS	13370000	1.934702e-
CREDIT	Credit	Scrypt	PoW/PoS	74800000000	3.082571e-
SLC	SLICE	QuBit	PoW	100000000	1.292579e-
DASHP	Dash Platinum	X11	PoS	19700000	7.156594e-
NSD	Nasdacoin	Scrypt	PoW/PoS	84000000	2.054653e-
BEET	Beetle Coin	XEVAN	PoW/PoS	500000000	1.989381e-
TTN	Titan Coin	SHA-256D	PoW/PoS	5000000000	8.963612e-
AWR	Award	X11	PoW/PoS	420000000	1.542023e-
BLAST	BLAST	SHA-256	PoW	64000000	5.229384e-
XRC	Bitcoin Rhodium	X13	PoW	2100000	1.170292e-
GLT	GlobalToken	SHA-256	PoW	168000000	8.461310e-
INSN	Insane Coin	X11	PoW/PoS	30000000	2.377596e-
ALX	ALAX	DPoS	DPoS	1000000000	1.000000e-
LDOGE	LiteDoge	Scrypt	PoW/PoS	35000000000	1.531889e-
SLR	SolarCoin	Scrypt	PoW	98100000000	5.556508e-
TRK	TruckCoin	X11	PoW/PoS	0	2.425741e-
UFO	UFO Coin	NeoScrypt	PoW	4000000000	3.824685e-
OC	OrangeCoin	Scrypt	PoW/PoS	200000000	3.537150e-
BLC	BlakeCoin	Blake	PoW	7000000000	2.335679e-
BITS	BitstarCoin	Scrypt	PoW/PoS	54256119	2.057653e-
NEOS	NeosCoin	SHA-256	PoS	21000000	4.392258e-
HYPER	HyperCoin	Scrypt	PoW/PoS	0	9.631200e-
PINK	PinkCoin	X11	PoW/PoS	500000000	4.363536e-
CESC	Crypto Escudo	Scrypt	PoW	1000000000	7.802107e-

	CoinName	Algorithm	ProofType	TotalCoinSupply	TotalCoinsMir
ADC	AudioCoin	Scrypt	PoW/PoS	10500000000	9.807325e-
NKA	IncaKoin	SHA-256	PoW/PoS	190000000	1.793973e-
PIGGY	Piggy Coin	X11	PoW/PoS	1000000000	4.942407e-
CRW	Crown Coin	SHA-256	PoW	42000000	2.298693e-
GEN	Genstake	Scrypt	PoW/PoS	15000000	6.000000e-
SMLY	SmileyCoin	Scrypt	PoW	50000000000	2.958399e-
MI	XiaoMiCoin	Scrypt	PoW/PoS	400000000	4.043165e-
GRS	Groestlcoin	Groestl	PoW	105000000	7.329820e-
CPC	CapriCoin	X11	PoW/PoS	208000000	2.013643e-
CLUB	ClubCoin	Scrypt	PoW/PoS	160000000	1.036219e-
RADS	Radium	PoS	PoS	9000000	3.821246e-
BTA	Bata	Scrypt	PoW	5000000	5.052556e-
PAK	Pakcoin	Scrypt	PoW	182000000	6.968446e-
CRB	Creditbit	X11	Proof of Trust	16504333	1.690102e-
OK	OKCash	SHA-256	PoW/PoS	105000000	7.467606e-
LSK	Lisk	DPoS	DPoS	159918400	1.200121e-
XHI	HiCoin	Scrypt	PoS	10008835635	1.000024e-
XWC	WhiteCoin	Scrypt	PoW/PoS	300000000	2.520056e-
FSC	FriendshipCoin	NeoScrypt	PoW/PoS	60168145	1.120385e-
J	JoinCoin	Multiple	PoW	2800000	3.332922e-
TRI	Triangles Coin	X13	PoW/PoS	120000	1.407778e-
VOLLAR	Vollar	Equihash+Scrypt	PoW	2100000000	1.000000e-
EOS	EOS	DPoS	DPoS	0	1.020545e-
RCC	Reality Clash	Ethash	PoW	24487944	2.448794e-
OXY	Oxycoin	DPoS	DPoS	0	1.122382e-
TCH	TigerCash	SHA-256	PoS	1000000000	1.000000e-
WAVES	Waves	Leased POS	LPoS	100000000	1.000000e-
PART	Particl	PoS	PoS	8634140	9.283138e-
BTT	BitTorrent	TRC10	DPoS	990000000000	9.899887e-
NXT	Nxt	PoS	PoS/LPoS	1000000000	1.000000e-
ZEPH	ZEPHYR	SHA-256	DPoS	2000000000	2.000000e-
GAP	Gapcoin	Scrypt	PoW/PoS	250000000	1.493105e-
BDX	Beldex	CryptoNight	PoW	1400222610	9.802226e-
ZEN	Horizen	Equihash	PoW	21000000	7.296538e-
XBC	BitcoinPlus	Scrypt	PoS	1000000	1.283270e-