Actividad Final

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Actividad Evaluable: Obtención de estadisticas descriptivas

In [4]:
```
import pandas as pd
from matplotlib import pyplot as plt

data = pd.read_csv('Bitcoin.csv')
```

In [5]:
```
data
```

Out[5]:

	Date	Price	Open	High	Low
0	Apr 25, 2021	49561.9	50088.2	50438.8	49226.5
1	Apr 24, 2021	50088.9	51140.8	51183.0	48775.2
2	Apr 23, 2021	51143.6	51707.1	52099.9	47659.4
3	Apr 22, 2021	51729.5	53821.3	55408.4	50590.9
4	Apr 21, 2021	53820.2	56479.5	56764.4	53657.6
...	...	...	...	...	...
416	Mar 05, 2020	9060.3	8757.9	9147.3	8751.5
417	Mar 04, 2020	8757.9	8761.3	8840.3	8679.7
418	Mar 03, 2020	8761.4	8906.1	8911.7	8669.3
419	Mar 02, 2020	8904.8	8537.5	8961.8	8503.1
420	Mar 01, 2020	8540.0	8543.8	8737.2	8437.2

421 rows × 5 columns

In [6]:
```
filas=len(data)
filas
```

Out[6]:
```
421
```

En esta parte de la documentación, mostramos los datos cargados mediante el uso de la librería de Pandas, por lo que al revisar esta tabla se muestra que es lo que contiene nuestra base de datos que cuenta con 421 filas y 5 columnas.

In [7]:
```
data.columns
```

Out[7]:
```
Index(['Date', 'Price', 'Open', 'High', 'Low'], dtype='object')
```

In [9]:
```
type(data)
```

Out[9]:
```
pandas.core.frame.DataFrame
```

In [10]:
```
type(data.Date)
```

Out[10]:
```
pandas.core.series.Series
```

In [11]:
```
type(data.Price)
```

Out[11]:
```
pandas.core.series.Series
```

In [12]:
```
type(data.Open)
```

Out[12]:
```
pandas.core.series.Series
```

In [13]:
```
type(data.High)
```

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

In [14]:
```
type(data.Low)
```

Out[14]:
```
pandas.core.series.Series
```

Por medio de estos comandos, encontramos las 5 columnas con sus respectivos tipos de datos como lo es DataFrame y series.

In [16]:
```
pd.unique(data['Price']) #como se comporta el dato
```

Out[16]:
```
array([49561.9, 50088.9, 51143.6, 51729.5, 53820.2, 56483.2, 55646.1,
       56207.1, 60041.9, 61379.7, 63216. , 62980.4, 63540.9, 59863.8,
       59978.7, 59748.4, 58118.7, 58077.4, 55948.7, 57996.3, 58993.4,
       58199.9, 57059.9, 58977.3, 58718.3, 58763.7, 58771.3, 57616.2,
       55765.2, 55862.9, 55036.1, 51322.3, 52325.4, 54452.5, 54158.3,
       57383.8, 58093.4, 58088. , 57656. , 58913.5, 56889.7, 55791.3,
       59113.7, 61195.3, 57265.1, 57799.5, 55851.9, 54879. , 52311. ,
       50982.3, 48855.6, 48792.5, 48428. , 50395.1, 48424.2, 49595.5,
       45164. , 46136.7, 46345.6, 46928.5, 49697.5, 48911.2, 54111.8,
       57433.8, 55923.7, 55906.6, 51582.2, 52079.2, 49169.7, 47936.3,
       48643.4, 47168.7, 47371.7, 47990.7, 44836. , 46508.6, 46395.7,
       38852.9, 39256.6, 38297.6, 36982.1, 37646.8, 35485.2, 33515.7,
       33108.1, 34283.1, 34301.8, 33374.8, 30404. , 32502.1, 32252.3,
       32241.3, 32088.9, 33000.5, 30842.1, 35476.3, 36002.9, 36613.2,
       35839.6, 36019.5, 36845.8, 39175.7, 37382.2, 34076.1, 35544.3,
       38192.2, 40151.9, 40599.3, 39460.2, 36793.2, 33991.5, 32022.6,
       32958.9, 32193.3, 29359.9, 28949.4, 28868.7, 27376. , 27057.8,
       26261.3, 26454.4, 24689.6, 23736.5, 23257.9, 23823.2, 22728.5,
       23474.9, 23844. , 23127.9, 22825.4, 21352.2, 19434.9, 19273.8,
       19176.8, 18808.9, 18023.6, 18247.2, 18546. , 18326.6, 19170.7,
       19379.9, 19146.5, 18658.1, 19433.3, 19218.8, 18770.7, 19698.1,
       18185.5, 17730.7, 17127.1, 17162. , 18723. , 19152.6, 18379.6,
       18412.9, 18687.2, 18675.2, 17803.5, 17774.6, 17662.3, 16715.8,
       15953. , 16071. , 16324.2, 16294.7, 15695.8, 15303.6, 15327.2,
       15483.7, 14828.4, 15577.9, 15587.1, 14145.6, 14019.9, 13561.4,
       13759.4, 13797.3, 13559.9, 13457.2, 13278.9, 13657.8, 13061.6,
       13032.2, 13117.2, 12934.1, 12974.6, 12808.7, 11913.5, 11753.4,
       11506.9, 11362.1, 11322. , 11503. , 11420.4, 11423.8, 11533.9,
       11371. , 11298.4, 11054.2, 10924.1, 10670.9, 10602.6, 10789.5,
       10672.9, 10544.2, 10572.3, 10620.5, 10776.1, 10840.9, 10693.2,
```

```
       10776.2, 10727.9, 10688.8, 10739.4, 10237.3, 10531.5, 10416.8,
       10921.5, 11081.8, 10933. , 10941.3, 10949.5, 10785.3, 10675.3,
       10326. , 10441.9, 10390.2, 10339.7, 10224.6, 10126.6, 10376.9,
       10296.4, 10092.2, 10472.5, 10168.8, 11413.3, 11908.5, 11644.2,
       11702. , 11468.1, 11527.4, 11327.4, 11462.3, 11324.8, 11753.5,
       11641.6, 11661.3, 11529.2, 11856.9, 11750.2, 11947.6, 12282.6,
       11899. , 11845.3, 11750.8, 11770.9, 11557.2, 11390.4, 11889.2,
       11681.2, 11764.3, 11592. , 11757.1, 11735.1, 11184.7, 11224.4,
       11066.8, 11803.1, 11333.4, 11096.2, 11105.9, 10908.5, 11022.8,
        9932.5,  9704.1,  9546.4,  9599.6,  9513.7,  9387.3,  9162.4,
        9208. ,  9170.2,  9155.8,  9135.3,  9198.7,  9253.4,  9243.6,
        9300.8,  9233.3,  9285.1,  9235.7,  9429.9,  9256. ,  9339. ,
        9081. ,  9134.4,  9067.1,  9085.1,  9229.9,  9135.4,  9185.4,
        9124. ,  9008.3,  9160. ,  9247.5,  9302. ,  9624.6,  9683.7,
        9296.4,  9358.8,  9314. ,  9388.1,  9464.6,  9523.5,  9425.4,
        9345.3,  9471.3,  9466.6,  9283.2,  9878.8,  9768.8,  9777.9,
        9742.6,  9669.6,  9631.2,  9794.4,  9667.2,  9527.6, 10189.3,
        9454.8,  9692.5,  9424.8,  9572.2,  9199.1,  8842.5,  8898.2,
        8728.2,  9177. ,  9169.7,  9059. ,  9512.3,  9773.3,  9730.7,
        9677.7,  9379.5,  9318. ,  9778.4,  9298.7,  8813.8,  8579.8,
        8738.8,  9554.6,  9806.2,  9979.8,  9151.4,  9001. ,  8874.7,
        8885.5,  8966.3,  8821.6,  8629. ,  8770.9,  7746.9,  7766. ,
        7678.9,  7540.4,  7503.8,  7488.5,  7112.9,  6842.5,  6833.5,
        7122.9,  7230.8,  7035.8,  7085.6,  6629.1,  6850.9,  6841.3,
        6917.6,  6867.8,  6863.1,  7289. ,  7361.2,  7185.2,  7332.3,
        6772.7,  6857.4,  6735.9,  6800.5,  6638.5,  6412.5,  6391. ,
        5890.4,  6233.7,  6373.4,  6725.1,  6678.9,  6744.6,  6468.9,
        5822.1,  6186.2,  6205.3,  6172. ,  5361.4,  5261.1,  5030. ,
        5366.3,  5182.7,  5584.3,  4826. ,  7935.1,  7891.2,  7933. ,
        8034.1,  8887.8,  9134.8,  9060.3,  8757.9,  8761.4,  8904.8,
        8540. ])
```

In [17]:
```
data['Price'].describe()
```

Out[17]:
```
count      421.000000
mean     21471.073872
std      17492.702670
min       4826.000000
25%       9314.000000
50%      11557.200000
75%      32958.900000
max      63540.900000
Name: Price, dtype: float64
```

In [18]:
```
data['Price'].std()
```

Out[18]:
```
17492.702669813672
```

In [19]:
```
data['Price'].median()
```

Out[19]:
```
11557.2
```

In [20]:
```
data['Price'].mean()
```

Out[20]:
```
21471.07387173399
```

Al analizar estos datos tenemos una desviación estándar muy alta por lo que me lleva a deducir que su precio es muy cambiante respecto a esta criptomoneda, como media se tiene que el valor medio es de 11557.2. Por último, se tiene un promedio de sus 421 datos que se tiene de registro desde marzo de 2020 dando un valor de 21471.07387173399.

Actividad Evaluable: Mapas de calor y boxplots

In [21]:
```
import pandas as pd
import seaborn as sb
import numpy as np; np.random.seed(0)
import matplotlib.pyplot as plt
data = pd.read_csv('Bitcoin.csv')
from matplotlib import cm
plt.rcParams['figure.figsize'] = (16, 9)
plt.style.use('ggplot')
# Voy a revisar dimensiones
data.shape
```

Out[21]:
```
(421, 5)
```

Son 421 registros con 5 columnas que no se me olvide que puedo intercalar texto y fórmulas.

In [22]:
```
data.head()
```

Out[22]:

	Date	Price	Open	High	Low
0	Apr 25, 2021	49561.9	50088.2	50438.8	49226.5
1	Apr 24, 2021	50088.9	51140.8	51183.0	48775.2
2	Apr 23, 2021	51143.6	51707.1	52099.9	47659.4
3	Apr 22, 2021	51729.5	53821.3	55408.4	50590.9
4	Apr 21, 2021	53820.2	56479.5	56764.4	53657.6

In [23]:
```
data.describe()
```

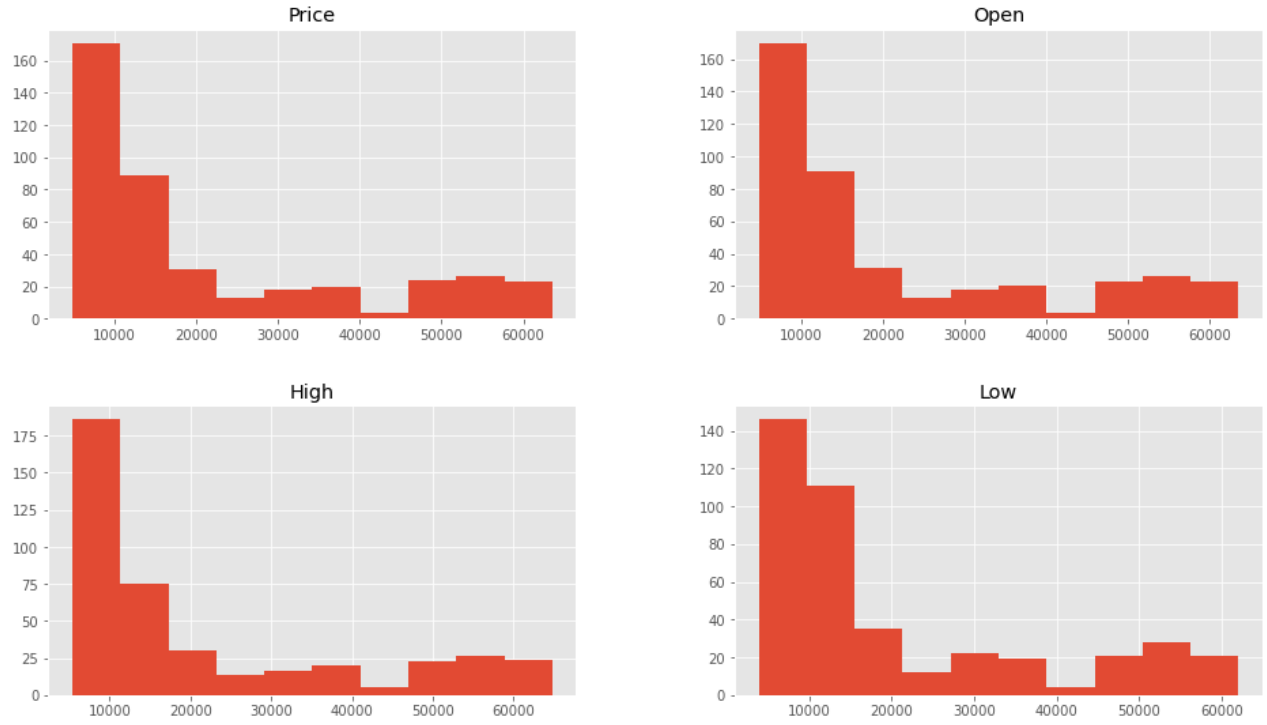
Out[23]:

	Price	Open	High	Low
count	421.000000	421.000000	421.000000	421.000000
mean	21471.073872	21372.344181	22028.754869	20687.659857
std	17492.702670	17448.718099	18024.928136	16785.882734
min	4826.000000	4815.200000	5369.300000	3869.500000
25%	9314.000000	9300.800000	9458.300000	9184.200000
50%	11557.200000	11533.500000	11766.900000	11315.900000
75%	32958.900000	32499.600000	34348.300000	30850.000000
max	63540.900000	63544.200000	64778.000000	62067.500000

Visualización general

Eliminar etiquetas de filas o columnas

In [25]:
```
data.drop ([0, 1]).hist()
plt.show ()
```



Filtros

In [26]:
```
mas_de_40 = data[data['Price'] > 4000]
mas_de_40
```

Out[26]:

	Date	Price	Open	High	Low
0	Apr 25, 2021	49561.9	50088.2	50438.8	49226.5
1	Apr 24, 2021	50088.9	51140.8	51183.0	48775.2
2	Apr 23, 2021	51143.6	51707.1	52099.9	47659.4
3	Apr 22, 2021	51729.5	53821.3	55408.4	50590.9
4	Apr 21, 2021	53820.2	56479.5	56764.4	53657.6
...	...	...	...	...	...
416	Mar 05, 2020	9060.3	8757.9	9147.3	8751.5
417	Mar 04, 2020	8757.9	8761.3	8840.3	8679.7
418	Mar 03, 2020	8761.4	8906.1	8911.7	8669.3
419	Mar 02, 2020	8904.8	8537.5	8961.8	8503.1
420	Mar 01, 2020	8540.0	8543.8	8737.2	8437.2

421 rows × 5 columns

Doble filtro

In [27]:
```
doble_filtro = data[(data['Price'] > 4000) & (data['High'] > 35000)]
doble_filtro
```

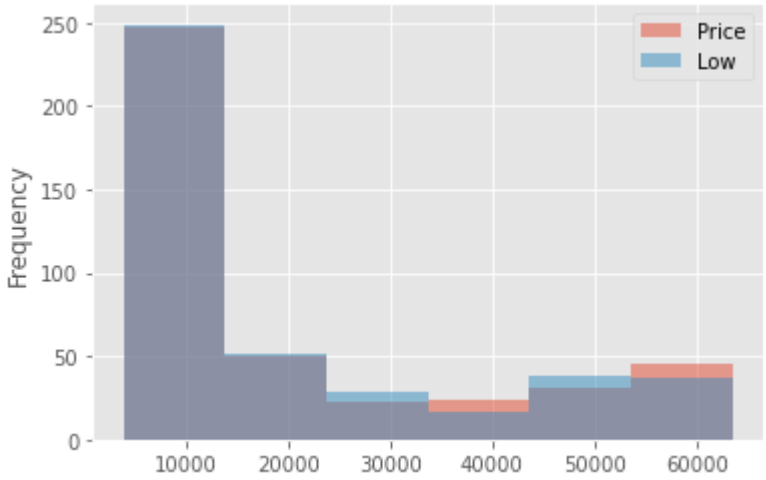
Out[27]:

	Date	Price	Open	High	Low
0	Apr 25, 2021	49561.9	50088.2	50438.8	49226.5
1	Apr 24, 2021	50088.9	51140.8	51183.0	48775.2
2	Apr 23, 2021	51143.6	51707.1	52099.9	47659.4
3	Apr 22, 2021	51729.5	53821.3	55408.4	50590.9
4	Apr 21, 2021	53820.2	56479.5	56764.4	53657.6
...	...	...	...	...	...
105	Jan 10, 2021	38192.2	40149.7	41362.4	35141.6
106	Jan 09, 2021	40151.9	40607.2	41363.5	38775.1
107	Jan 08, 2021	40599.3	39466.4	41921.7	36613.4
108	Jan 07, 2021	39460.2	36798.5	40340.9	36361.2
109	Jan 06, 2021	36793.2	33999.3	36934.8	33408.3

100 rows × 5 columns

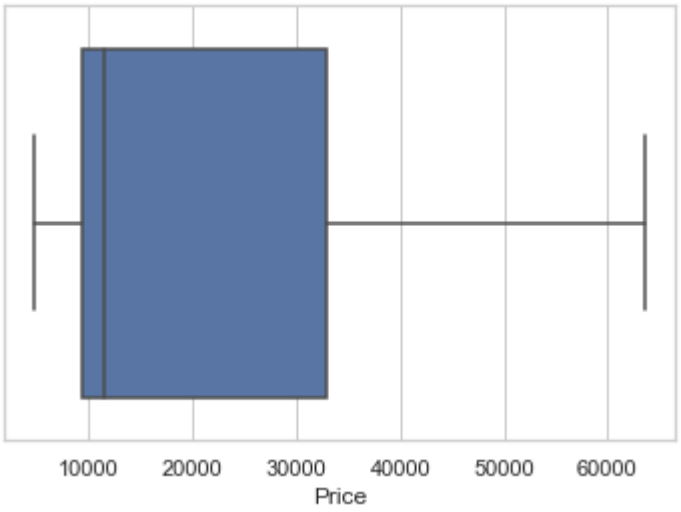
Visualización

In [28]:
```
%matplotlib inline
data[['Price', 'Low']].plot.hist(bins=6, alpha=0.5)
plt.show()
```

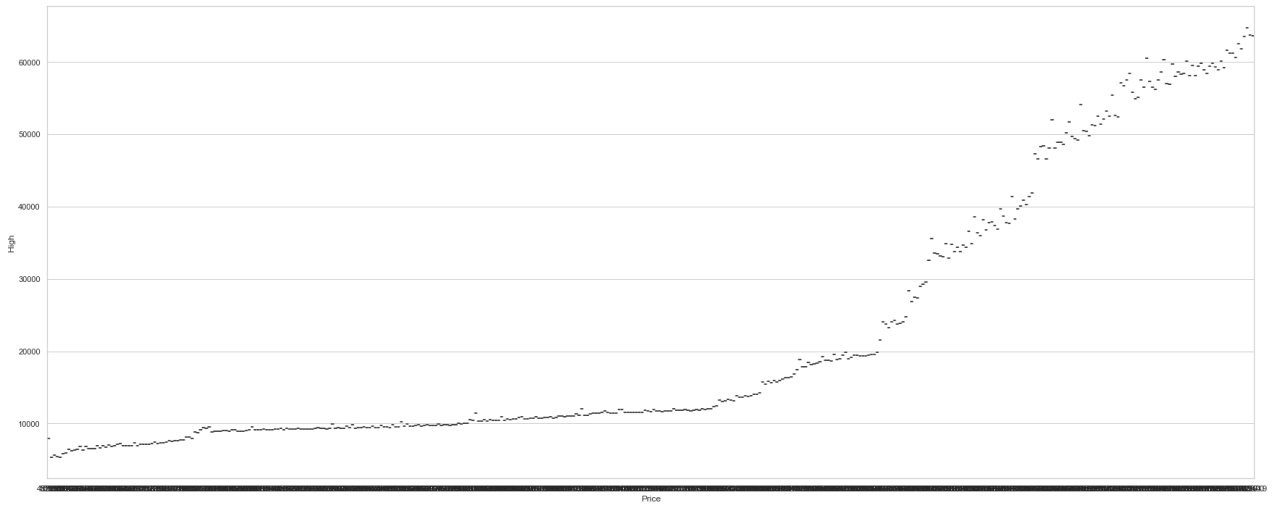


Boxplot para obtener un diagrama de cajas y bigotes

In [41]:
```
sb.set_theme(style = "whitegrid")
Bitcoin = pd.read_csv('Data Bitcoin.csv')
ax = sb.boxplot(x = Bitcoin["Price"])
```

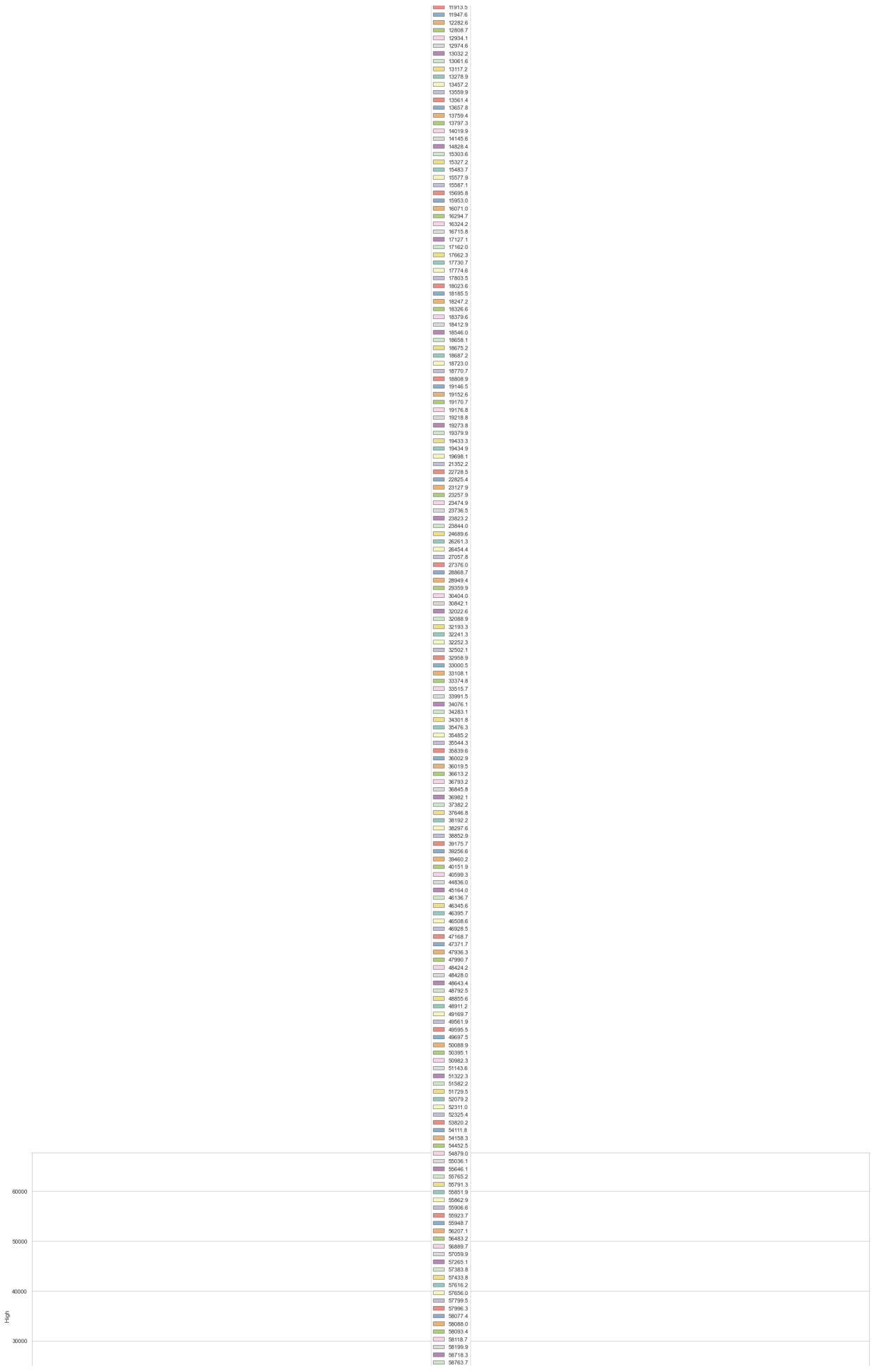


In [30]:
```
plt.figure(figsize=(30,12))
ax = sb.boxplot(x = "Price", y = "High", data = Bitcoin)
```

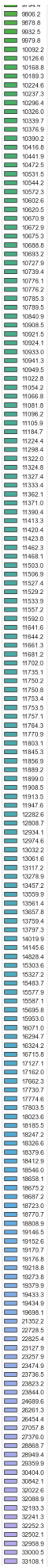


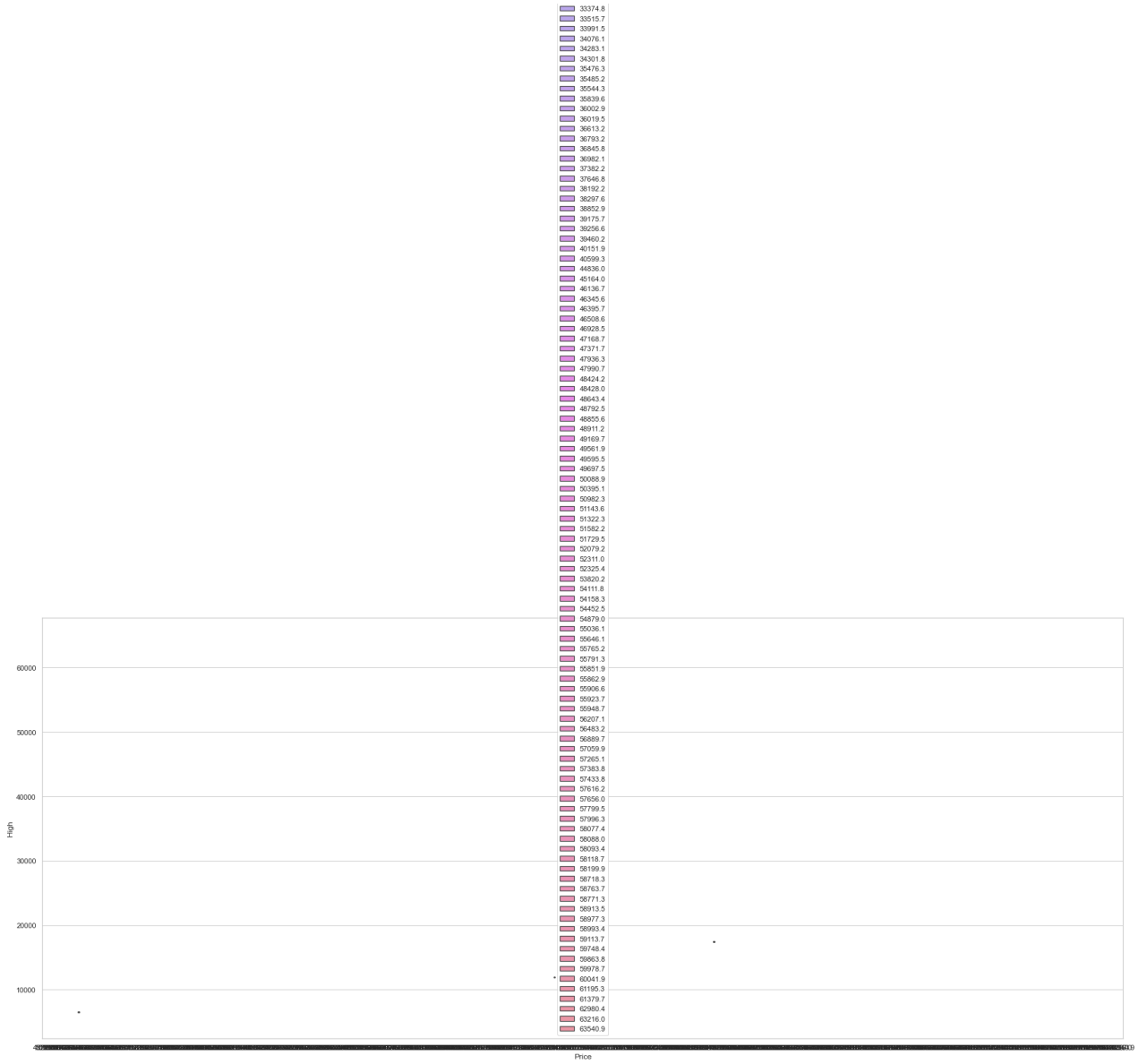
In [31]:
```
plt.figure(figsize=(30,12))
ax = sb.boxplot(x = "Price", y = "High", hue = "Price",
                data = Bitcoin, palette = "Set3")
```


8738.8
8757.9
8761.4
8770.9
8813.8
8821.6
8842.5
8874.7
8885.5
8887.8
8898.2
8904.6
8966.3
9001.0
9008.3
9059.0
9060.3
9067.1
9081.0
9085.1
9124.0
9134.4
9134.8
9135.3
9135.4
9151.4
9155.8
9160.0
9162.4
9169.7
9170.2
9177.0
9185.4
9198.7
9199.1
9208.0
9229.9
9233.3
9235.7
9243.6
9247.5
9253.4
9256.0
9283.2
9285.1
9296.4
9298.7
9300.8
9302.0
9314.0
9318.0
9339.0
9345.3
9358.8
9379.5
9387.3
9388.1
9424.8
9425.4
9429.9
9454.8
9464.6
9466.6
9471.3
9512.3
9513.7
9523.5
9527.6
9546.4
9554.6
9572.2
9599.6
9624.6
9631.2
9667.2
9669.6
9677.7
9683.7
9692.5
9704.1
9730.7
9742.6
9768.8
9773.3
9777.9
9778.4
9794.4
9806.2
9878.8
9932.5
9979.8
10092.2
10126.6
10168.8
10189.3
10224.6
10237.3
10296.4
10326.0
10339.7
10376.9
10390.2
10416.8
10441.9
10472.5
10531.5
10544.2
10572.3
10602.6
10620.5
10670.9
10672.9
10675.3
10688.8
10693.2
10727.9
10739.4
10776.1
10776.2
10785.3
10789.5
10840.9
10908.5
10921.5
10924.1
10933.0
10941.3
10949.5
11022.8
11054.2
11066.8
11081.8
11096.2
11105.9
11184.7
11224.4
11298.4
11322.0
11324.8
11327.4
11333.4
11362.1
11371.0
11390.4
11413.3
11420.4
11423.8
11462.3
11468.1
11503.0
11506.9
11527.4
11529.2
11533.9
11557.2
11592.0
11641.6
11644.2
11661.3
11681.2
11702.0
11735.1
11750.2
11750.8
11753.4
11753.5
11757.1
11764.3
11770.9
11803.1
11845.3
11856.9
11889.2
11899.0
11908.5


11913.5
11947.6
12282.6
12808.7
12934.1
12974.6
13032.2
13061.6
13117.2
13278.9
13457.2
13559.9
13561.4
13657.8
13759.4
13797.3
14019.9
14145.6
14828.4
15303.6
15327.2
15483.7
15577.9
15587.1
15695.8
15953.0
16071.0
16294.7
16324.2
16715.8
17127.1
17162.0
17662.3
17730.7
17774.6
17803.5
18023.6
18185.5
18247.2
18326.6
18379.6
18412.9
18546.0
18658.1
18675.2
18687.2
18723.0
18770.7
18808.9
19146.5
19152.6
19170.7
19176.8
19218.8
19273.8
19379.9
19433.3
19434.9
19698.1
21352.2
22728.5
22825.4
23127.9
23257.9
23474.9
23736.5
23823.2
23844.0
24689.6
26261.3
26454.4
27057.8
27376.0
28868.7
28949.4
29359.9
30404.0
30842.1
32022.6
32088.9
32193.3
32241.3
32252.3
32502.1
32958.9
33000.5
33108.1
33374.8
33515.7
33991.5
34076.1
34283.1
34301.8
35476.3
35485.2
35544.3
35839.6
36002.9
36019.5
36613.2
36793.2
36845.8
36982.1
37382.2
37646.8
38192.2
38297.6
38852.9
39175.7
39256.6
39460.2
40151.9
40599.3
44836.0
45164.0
46136.7
46345.6
46395.7
46508.6
46928.5
47168.7
47371.7
47936.3
47990.7
48424.2
48428.0
48643.4
48792.5
48855.6
48911.2
49169.7
49561.9
49595.5
49697.5
50088.9
50395.1
50982.3
51143.6
51322.3
51582.2
51729.5
52079.2
52311.0
52325.4
53820.2
54111.8
54158.3
54452.5
54879.0
55036.1
55646.1
55765.2
55791.3
55851.9
55862.9
55906.6
55923.7
55948.7
56207.1
56483.2
56889.7
57059.9
57265.1
57383.8
57433.8
57616.2
57656.0
57799.5
57996.3
58077.4
58088.0
58093.4
58118.7
58199.9
58718.3
58763.7
60000
50000
40000
30000
High

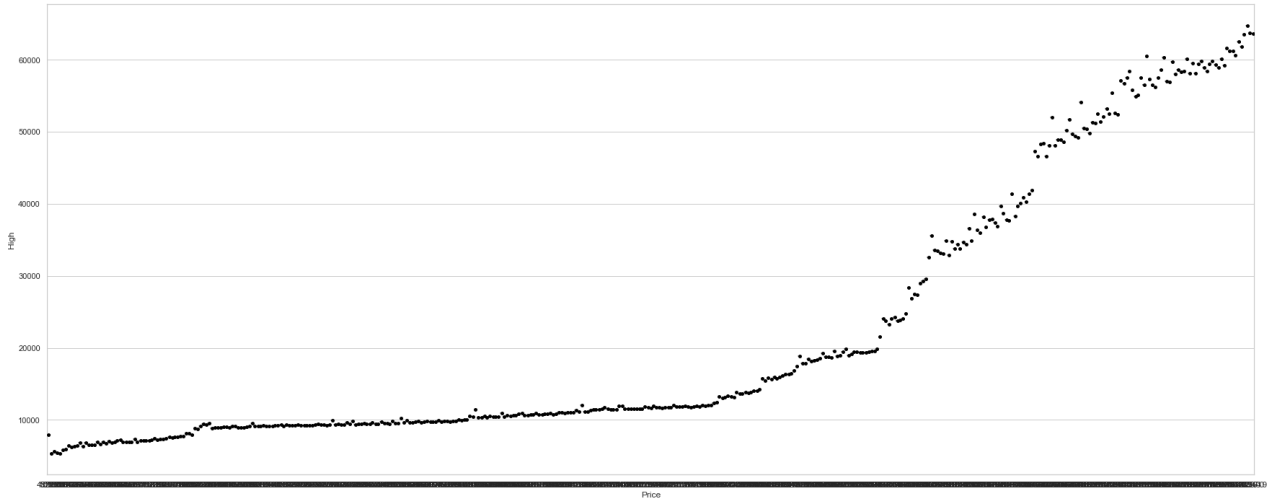
In [42]:
```
plt.figure(figsize=(30,12))
ax = sb.boxplot(x = "Price", y = "High", hue = "Price",
                data = Bitcoin, linewidth = 2.5)
```


9806.2
9678.8
9932.5
9979.8
10092.2
10126.6
10168.8
10189.3
10224.6
10237.3
10296.4
10326.0
10339.7
10376.9
10390.2
10416.8
10441.9
10472.5
10531.5
10544.2
10572.3
10602.6
10620.5
10670.9
10672.9
10675.3
10688.8
10693.2
10727.9
10739.4
10776.1
10776.2
10785.3
10789.5
10840.9
10908.5
10921.5
10924.1
10933.0
10941.3
10949.5
11022.8
11054.2
11066.8
11081.8
11096.2
11105.9
11184.7
11224.4
11298.4
11322.0
11324.8
11327.4
11333.4
11362.1
11371.0
11390.4
11413.3
11420.4
11423.8
11462.3
11468.1
11503.0
11506.9
11527.4
11529.2
11533.9
11557.2
11592.0
11641.6
11644.2
11681.3
11681.2
11702.0
11735.1
11750.2
11750.8
11753.4
11753.5
11757.1
11764.3
11770.9
11803.1
11845.3
11856.9
11889.2
11899.0
11908.5
11913.5
11947.6
12282.6
12808.7
12934.1
12974.6
13032.2
13061.6
13117.2
13278.9
13457.2
13559.9
13561.4
13657.8
13759.4
13797.3
14019.9
14145.6
14828.4
15303.6
15327.2
15483.7
15577.9
15587.1
15695.8
15953.0
16071.0
16294.7
16324.2
16715.8
17127.1
17162.0
17662.3
17730.7
17774.6
17803.5
18023.6
18185.5
18247.2
18326.6
18379.6
18412.9
18546.0
18658.1
18675.2
18687.2
18723.0
18770.7
18808.9
19146.5
19152.6
19170.7
19176.8
19218.8
19273.8
19379.9
19433.3
19434.9
19698.1
21352.2
22728.5
22825.4
23127.9
23257.9
23474.9
23736.5
23823.2
23844.0
24689.6
26261.3
26454.4
27057.8
27376.0
28868.7
28949.4
29359.9
30404.0
30842.1
32022.6
32088.9
32193.3
32241.3
32252.3
32502.1
32958.9
33000.5
33108.1



Cajas

In [43]:
```
plt.figure(figsize=(30,12))
ax = sb.boxplot(x = "Price", y = "High", data = Bitcoin)
ax = sb.stripplot(x = "Price", y = "High", data = Bitcoin, color = "0.0000005")
```



Correlación

In [32]:
```
data.corr(method = 'pearson')
```

Out[32]:

	Price	Open	High	Low
Price	1.000000	0.997997	0.999207	0.998767
Open	0.997997	1.000000	0.999032	0.998379
High	0.999207	0.999032	1.000000	0.998287
Low	0.998767	0.998379	0.998287	1.000000

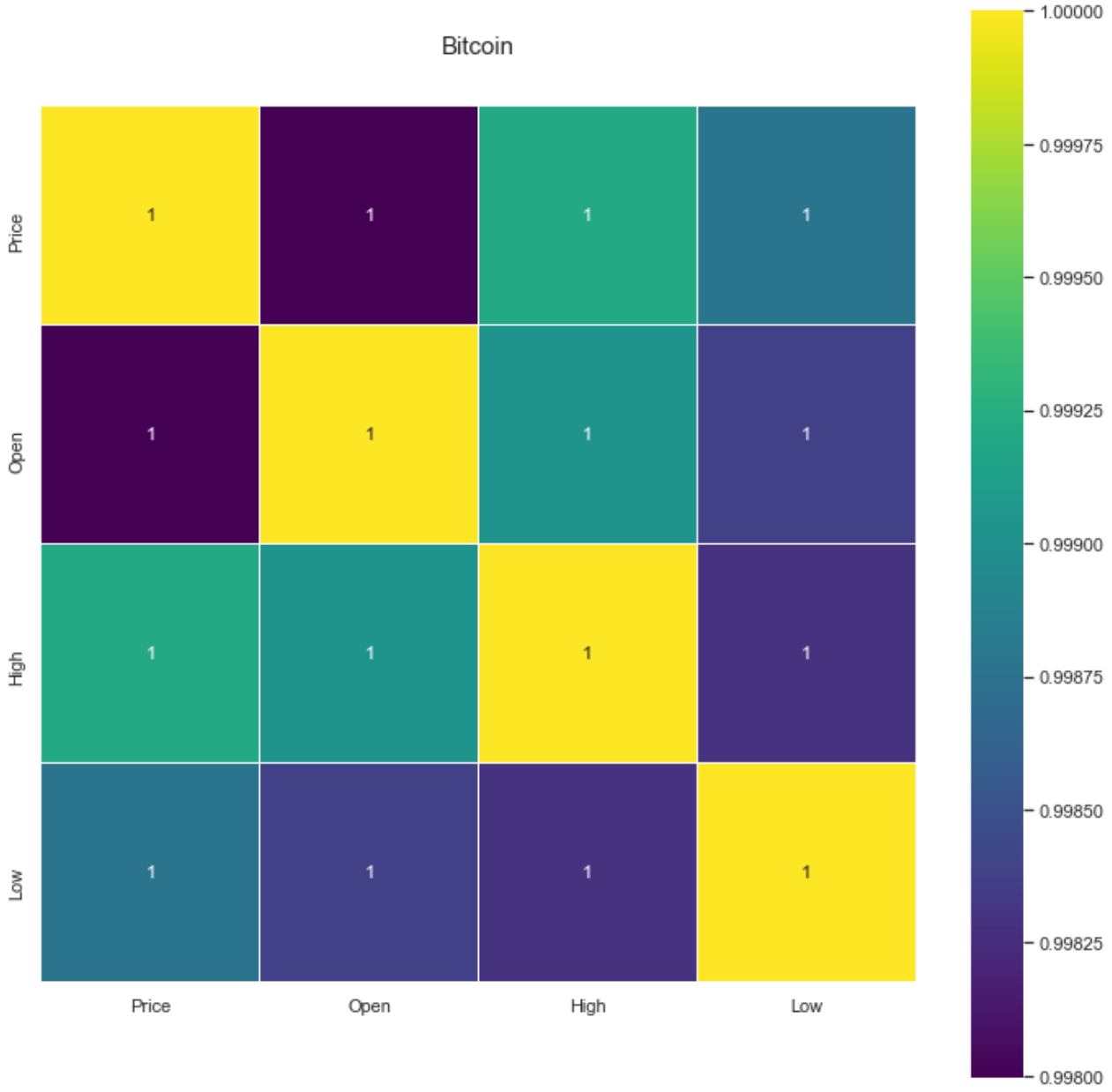
In [33]:
```
data.corr(method = 'kendall')
```

Out[33]:

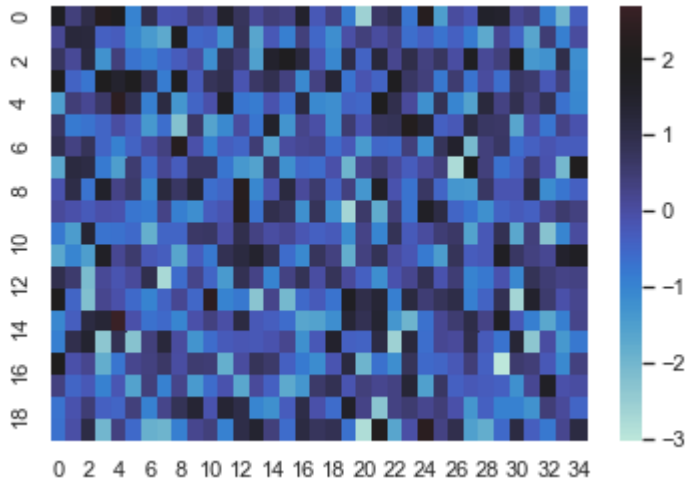
	Price	Open	High	Low
Price	1.000000	0.945413	0.966768	0.969574
Open	0.945413	1.000000	0.965298	0.962402
High	0.966768	0.965298	1.000000	0.957154
Low	0.969574	0.962402	0.957154	1.000000

Visualizar mapa de calor

In [34]:
```
colormap = plt.cm.viridis
plt.figure(figsize = (12, 12))
plt.title('Bitcoin', y = 1.05, size = 15)
sb.heatmap(data.corr(), linewidths = 0.1, vmax = 1.0, square = True, cmap = colormap, l
```

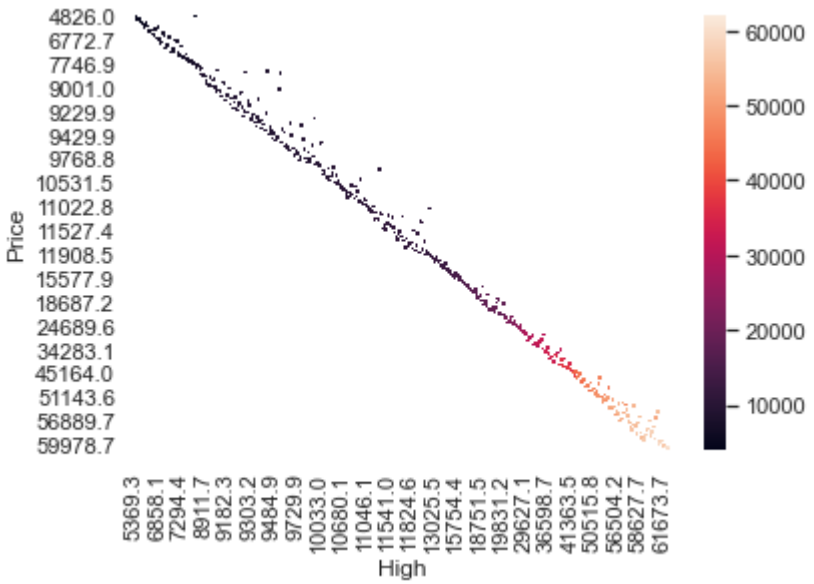


In [35]:
```
normal_data = np.random.randn(20, 35)
ax = sb.heatmap(normal_data, center = 2)
```



In [37]:
```
Bitcoin = pd.read_csv('Bitcoin.csv')
```

```
Bitcoin = Bitcoin.pivot("Price", "High", "Low")
ax = sb.heatmap(Bitcoin)
```



Actividad Evaluable: Patrones con K-means

In [44]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sb
import sklearn
from sklearn.cluster import KMeans
from sklearn.metrics import pairwise_distances_argmin_min
from sklearn.metrics import confusion_matrix, classification_report
from sklearn.preprocessing import scale
import sklearn.metrics as sm
from sklearn import datasets


%matplotlib inline
from mpl_toolkits.mplot3d import Axes3D
plt.rcParams['figure.figsize'] = (16, 9)
plt.style.use('ggplot')
```

In [45]:
```
dataframe = pd.read_csv(r"Bitcoin.csv") # Base de datos
dataframe.head()
```

Out[45]:

	Date	Price	Open	High	Low
0	Apr 25, 2021	49561.9	50088.2	50438.8	49226.5
1	Apr 24, 2021	50088.9	51140.8	51183.0	48775.2
2	Apr 23, 2021	51143.6	51707.1	52099.9	47659.4
3	Apr 22, 2021	51729.5	53821.3	55408.4	50590.9
4	Apr 21, 2021	53820.2	56479.5	56764.4	53657.6

Para este punto en nuestra base de datos quitamos dos variables la de Volume y la de Change, ya

que no hacías un gran cambio en nuestros datos, ya que al momento de graficar no los tomábamos en cuenta al no ser unos valores numéricos.

In [46]:
```
dataframe.describe()
```

Out[46]:

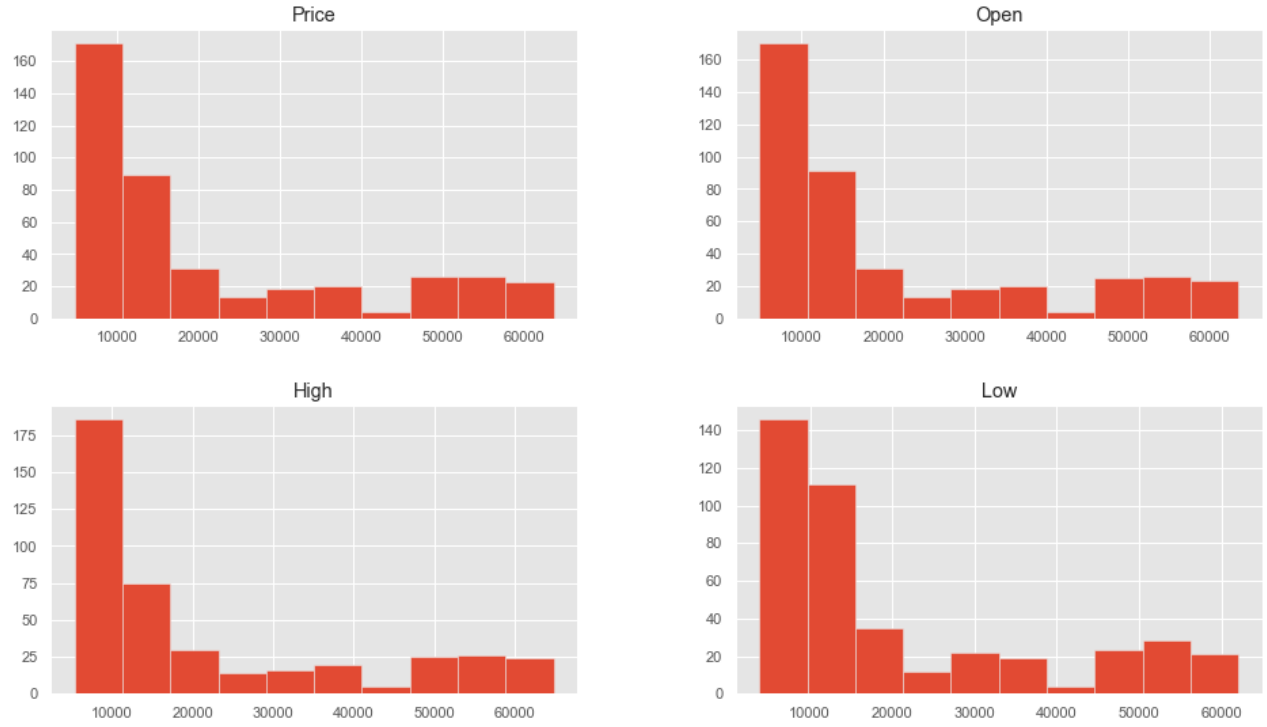
	Price	Open	High	Low
count	421.000000	421.000000	421.000000	421.000000
mean	21471.073872	21372.344181	22028.754869	20687.659857
std	17492.702670	17448.718099	18024.928136	16785.882734
min	4826.000000	4815.200000	5369.300000	3869.500000
25%	9314.000000	9300.800000	9458.300000	9184.200000
50%	11557.200000	11533.500000	11766.900000	11315.900000
75%	32958.900000	32499.600000	34348.300000	30850.000000
max	63540.900000	63544.200000	64778.000000	62067.500000

In [47]:
```
# Vemos en cuanto esta el Precio de la Bitcoin
print(dataframe.groupby('Date').size())
```

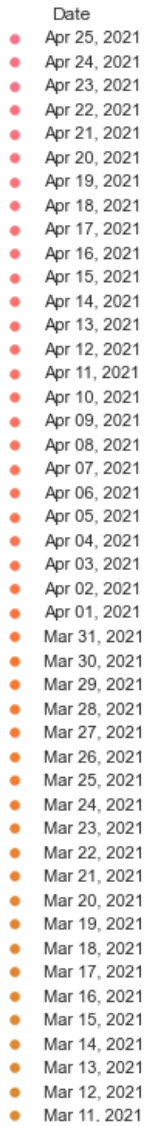
```
Date
Apr 01, 2020    1
Apr 01, 2021    1
Apr 02, 2020    1
Apr 02, 2021    1
Apr 03, 2020    1
               ..
Sep 26, 2020    1
Sep 27, 2020    1
Sep 28, 2020    1
Sep 29, 2020    1
Sep 30, 2020    1
Length: 421, dtype: int64
```

Visualizamos los datos

In [48]:
```
dataframe.drop(['Date'], 1).hist()
plt.show()
```



In [49]:
```
sb.pairplot(dataframe, hue = "Date", diag_kind = "hist");
```



Mar 10, 2021
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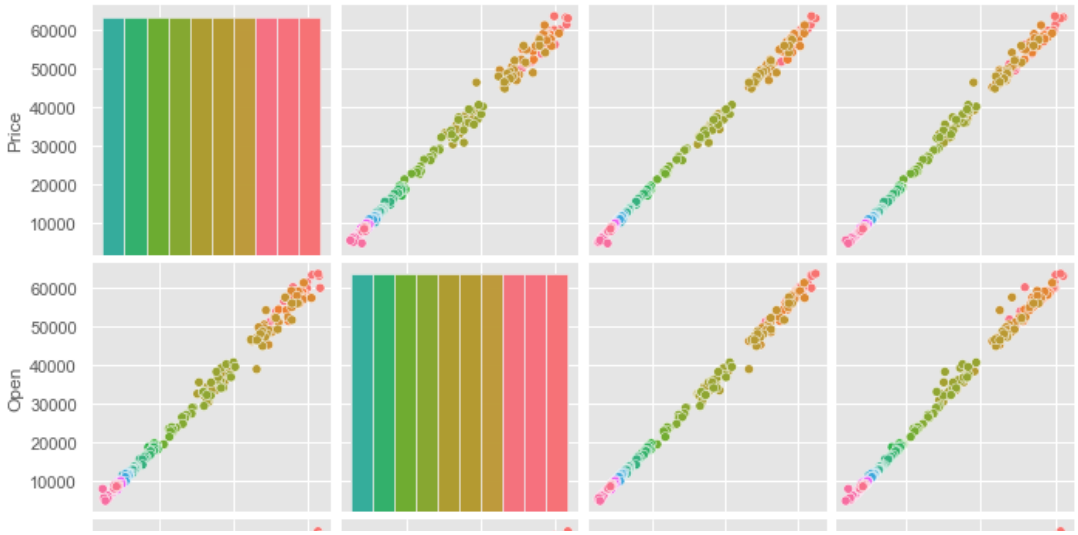

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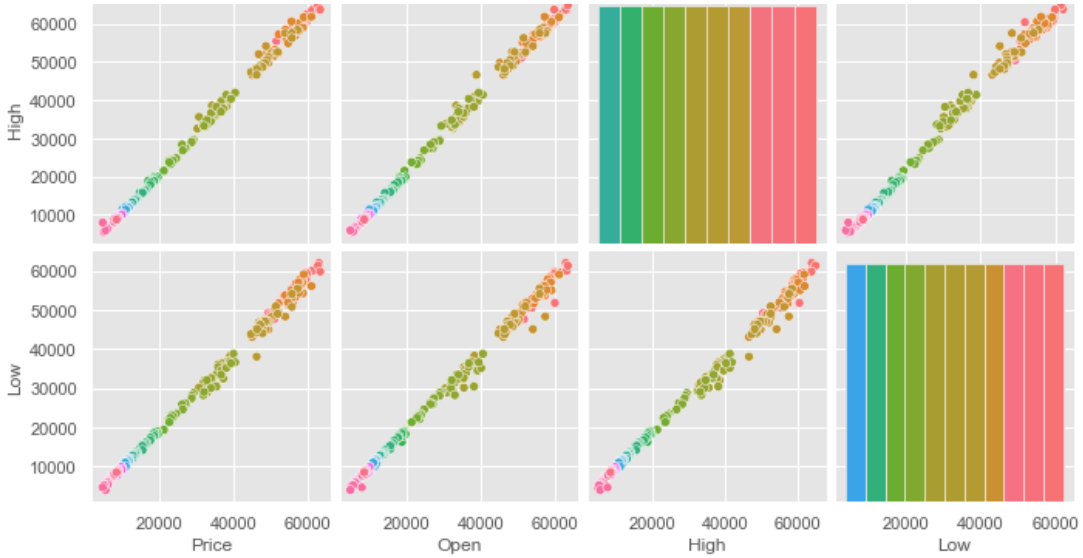

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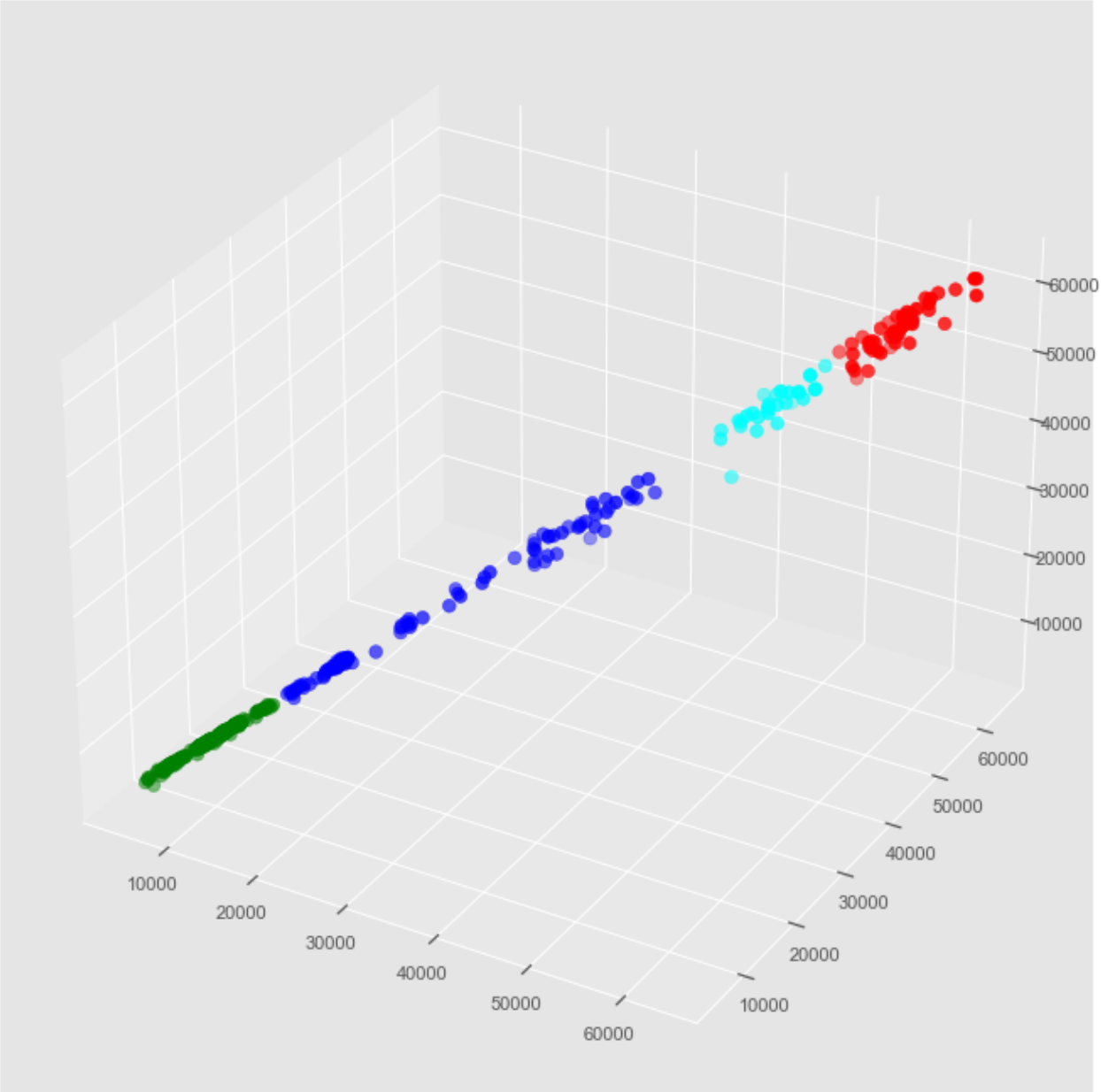
Creamos el modelo

In [74]:
```
# Para el ejercicio, sólo seleccionamos 3 dimensiones, para poder graficarlo
X = np.array(dataframe[["Price", "High", "Low"]])
y = np.array(dataframe['Date'])
X.shape
```

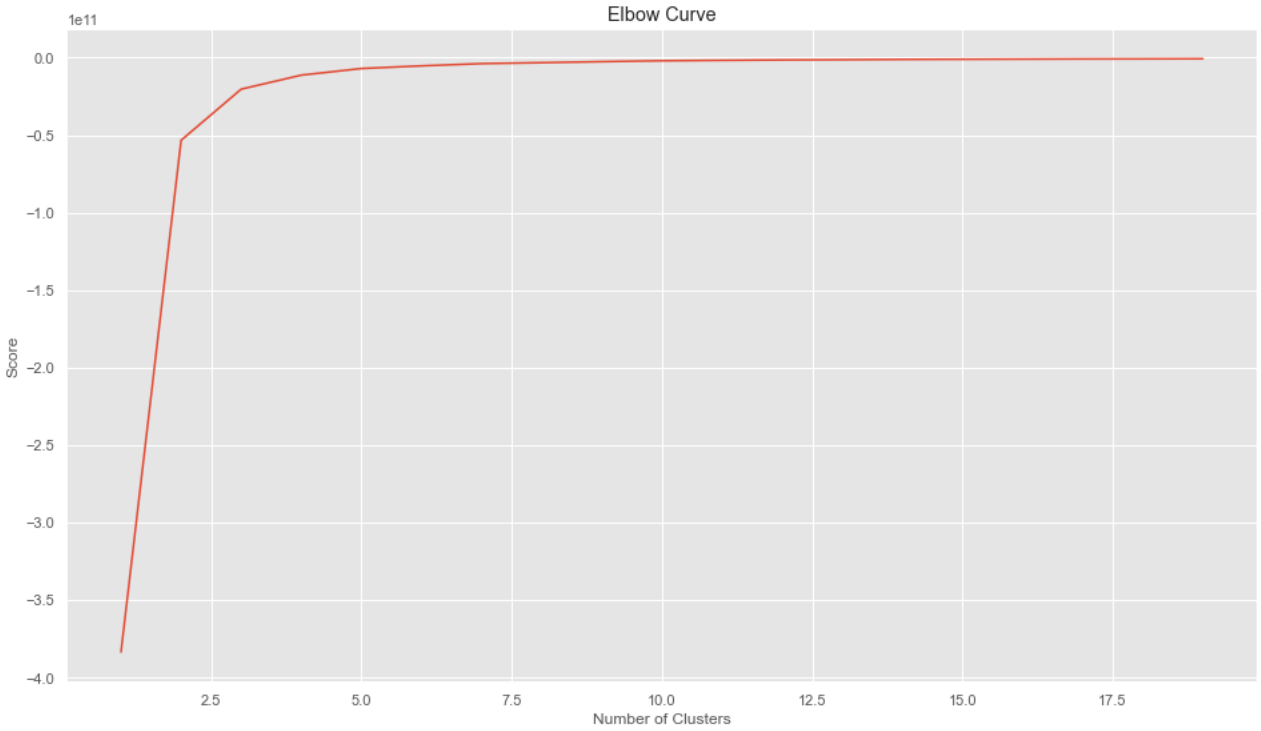
Out[74]: (421, 3)

In [88]:
```
fig = plt.figure()
ax = Axes3D(fig)
colores = ['blue', 'red', 'green','blue', 'cyan', 'yellow', 'orange', 'black', 'pink',
asignar = []
for row in labels:
    asignar.append(colores[row])
ax.scatter(X[:, 0], X[:, 1], X[:, 2], c = asignar, s = 60);
```



Buscamos el valor K

In [75]:
```
Nc = range(1, 20)
kmeans = [KMeans(n_clusters = i) for i in Nc]
kmeans
score = [kmeans[i].fit(X).score(X) for i in range(len(kmeans))]
score
plt.plot(Nc, score)
plt.xlabel('Number of Clusters')
plt.ylabel('Score')
plt.title('Elbow Curve')
plt.show()
```

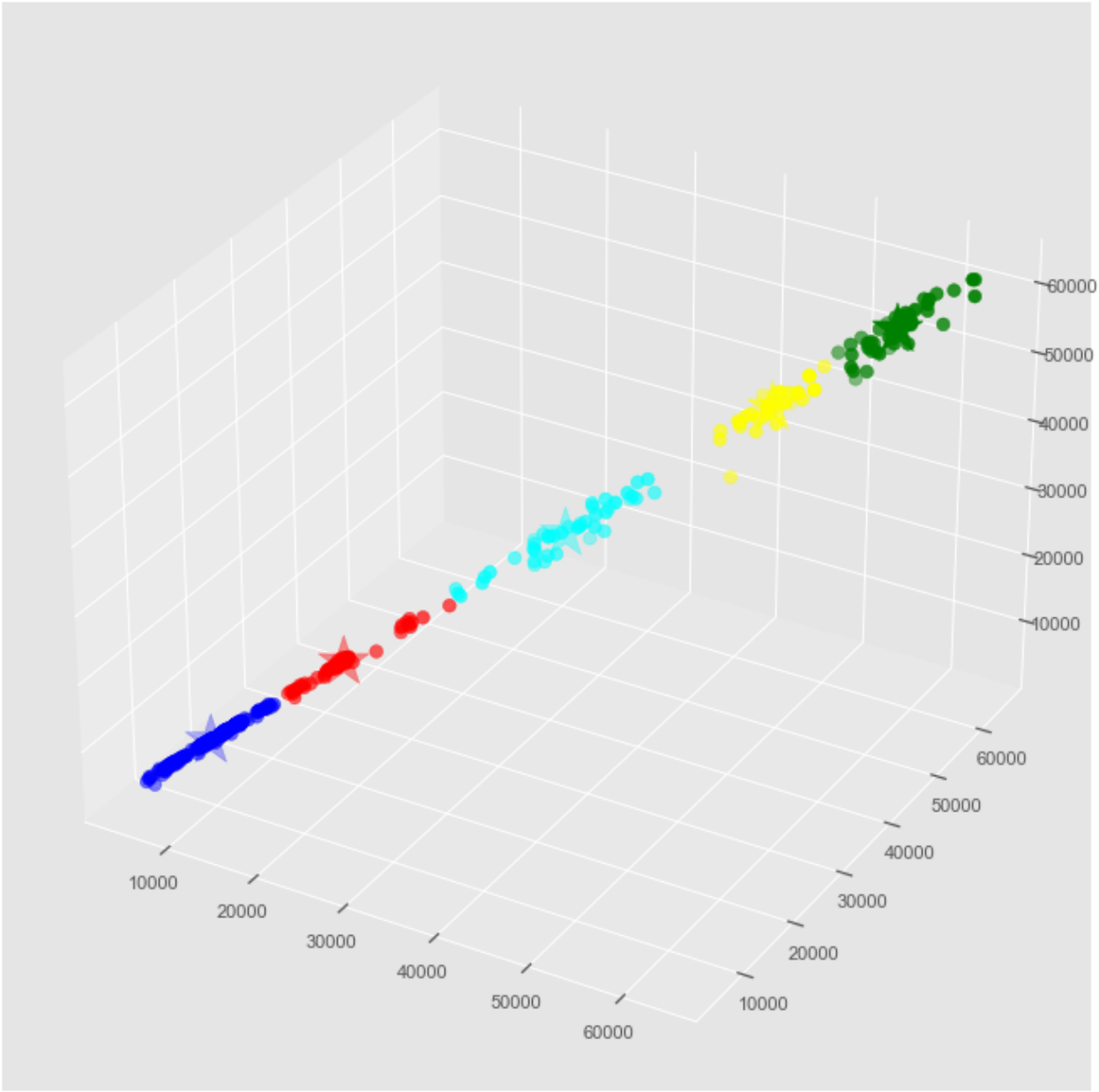


In [83]:
```
# Para el ejercicio, elijo 5 como un buen valor de K, pero podría ser otro.
kmeans = KMeans(n_clusters = 5).fit(X)
centroids = kmeans.cluster_centers_
print(centroids)
```

```
[[18985.90384615 19351.15192308 18280.81538462]
 [57660.5106383  59107.12978723 55776.62553191]
 [ 9646.05341365  9825.5686747   9415.36787149]
 [34317.38837209 35616.37906977 32374.81860465]
 [48816.53666667 50391.33       46695.24      ]]
```

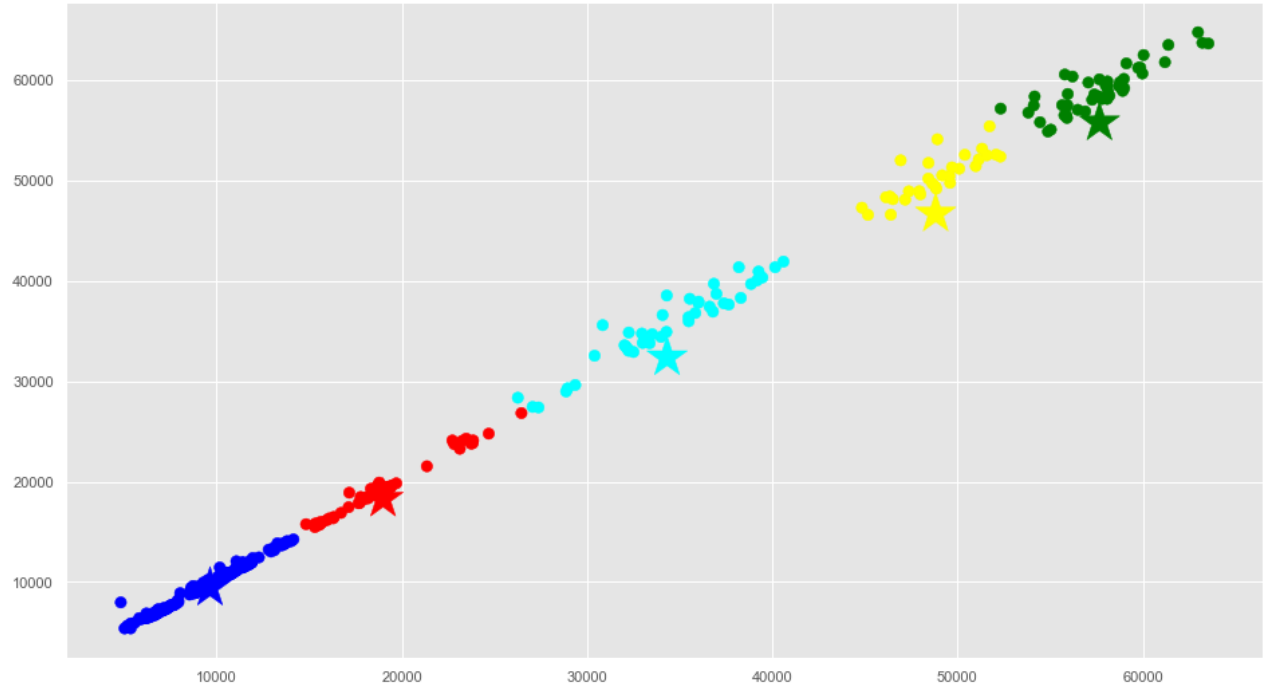
In [84]:
```
# Obtener las etiquetas de cada punto de nuestros datos
labels = kmeans.predict(X)
# Obtenemos los centroids
C = kmeans.cluster_centers_
colores = ['red', 'green', 'blue', 'cyan', 'yellow']
asignar = []
for row in labels:
    asignar.append(colores[row])

fig = plt.figure()
ax = Axes3D(fig)
ax.scatter(X[:, 0], X[:, 1], X[:, 2], c = asignar, s = 60)
ax.scatter(C[:, 0], C[:, 1], C[:, 2], marker = '*', c = colores, s = 1000);
```



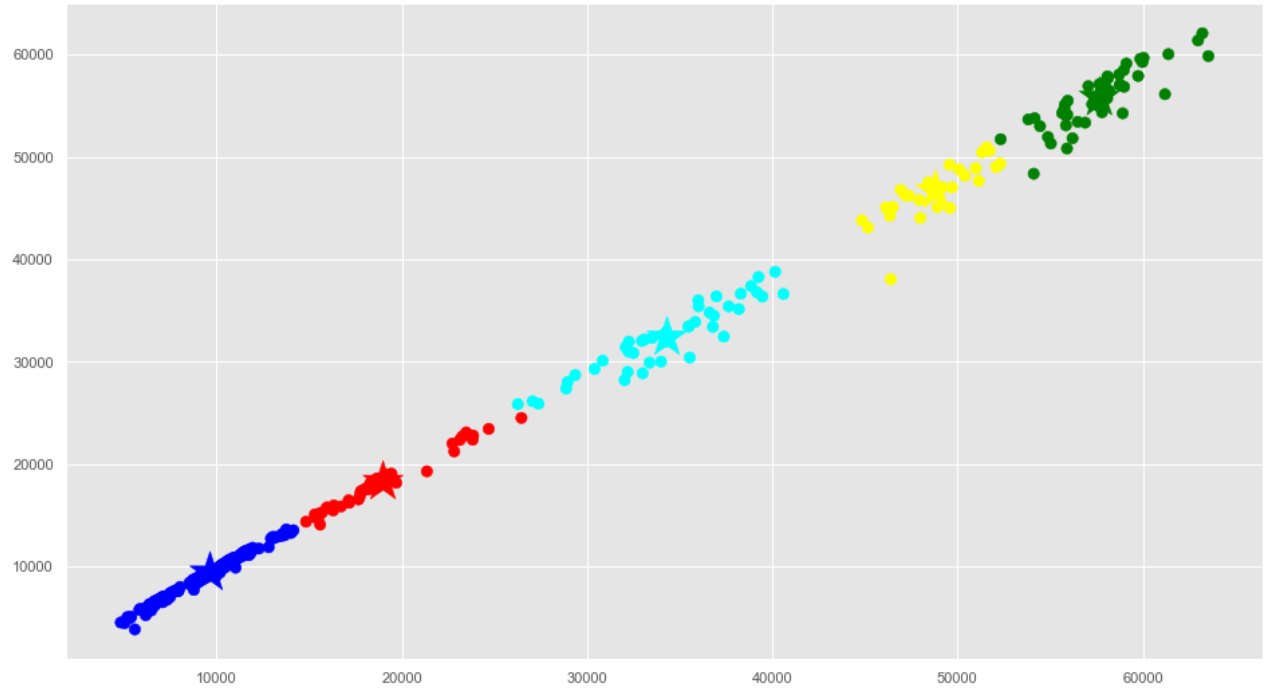
In [85]:
```
# Hacemos una proyección a 2D con los diversos ejes
f1 = dataframe['Price'].values
f2 = dataframe['High'].values

plt.scatter(f1, f2, c = asignar, s = 70)
plt.scatter(C[:, 0], C[:, 2], marker = '*', c = colores, s = 1000);
plt.show()
```



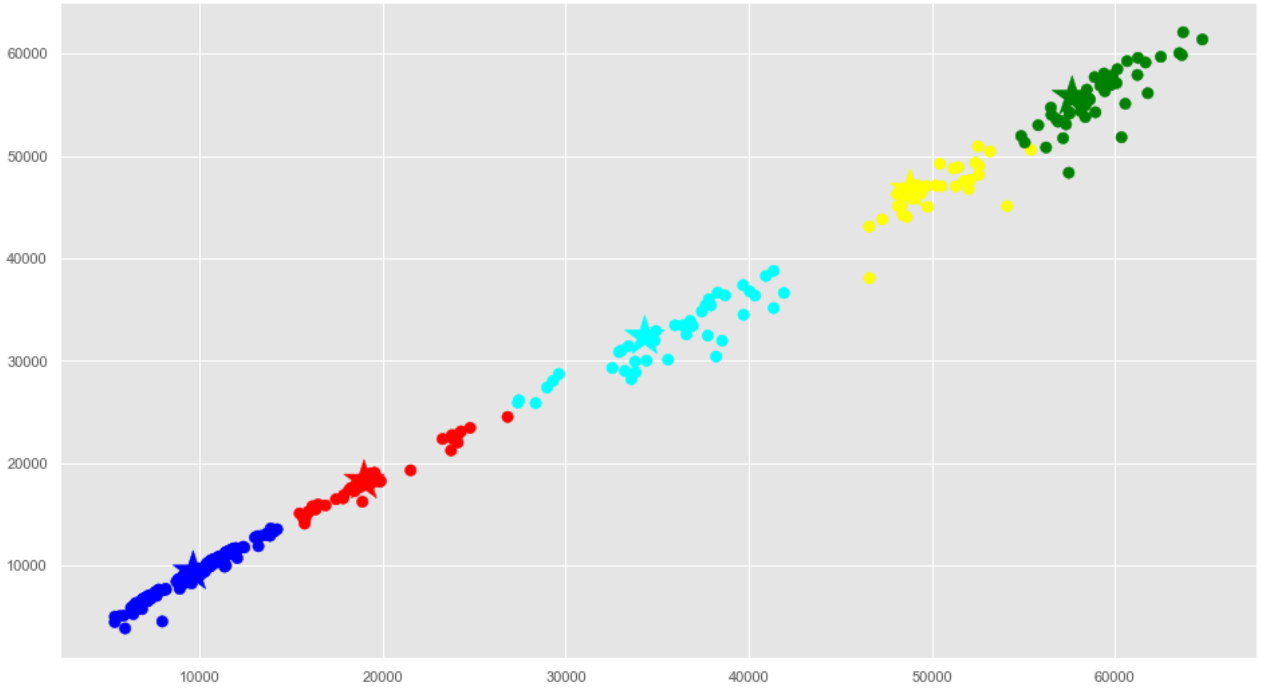
In [86]:
```
f1 = dataframe['Price'].values
f2 = dataframe['Low'].values

plt.scatter(f1, f2, c = asignar, s = 70)
plt.scatter(C[:, 0], C[:, 2], marker = '*', c = colores, s = 1000);
plt.show()
```



In [87]:
```
f1 = dataframe['High'].values
f2 = dataframe['Low'].values

plt.scatter(f1, f2, c = asignar, s = 70)
plt.scatter(C[:, 0], C[:, 2], marker = '*', c = colores, s = 1000);
plt.show()
```



Evaluando los resultados

In [89]:
```
print (classification_report(labels, labels));
```

```
              precision    recall  f1-score   support

           0       1.00      1.00      1.00        52
           1       1.00      1.00      1.00        47
           2       1.00      1.00      1.00       249
           3       1.00      1.00      1.00        43
           4       1.00      1.00      1.00        30

    accuracy                           1.00       421
   macro avg       1.00      1.00      1.00       421
weighted avg       1.00      1.00      1.00       421
```