In [1]:

```python
import pandas as pd
```

In [2]:

```python
df = pd.read_csv('ETH_1h.csv', index_col='Date', date_format='%Y-%m-%d %I-%p')
df.head()
```

Out[2]:

	Symbol	Open	High	Low	Close	Volume
Date						
2020-03-13 20:00:00	ETHUSD	129.94	131.82	126.87	128.71	1940673.93
2020-03-13 19:00:00	ETHUSD	119.51	132.02	117.10	129.94	7579741.09
2020-03-13 18:00:00	ETHUSD	124.47	124.85	115.50	119.51	4898735.81
2020-03-13 17:00:00	ETHUSD	124.08	127.42	121.63	124.47	2753450.92
2020-03-13 16:00:00	ETHUSD	124.85	129.51	120.17	124.08	4461424.71

In [3]:

```python
df.sort_index(inplace=True)
df
```

Out[3]:

	Symbol	Open	High	Low	Close	Volume
Date						
2017-07-01 11:00:00	ETHUSD	279.98	279.99	272.10	275.01	679358.87
2017-07-01 12:00:00	ETHUSD	275.01	275.01	271.00	274.83	824362.87
2017-07-01 13:00:00	ETHUSD	274.83	274.93	265.00	268.79	3010787.99
2017-07-01 14:00:00	ETHUSD	268.79	269.90	265.00	265.74	1702536.85
2017-07-01 15:00:00	ETHUSD	265.74	272.74	265.00	272.57	1500282.55
...	...	...	...	...	...	...
2020-03-13 16:00:00	ETHUSD	124.85	129.51	120.17	124.08	4461424.71
2020-03-13 17:00:00	ETHUSD	124.08	127.42	121.63	124.47	2753450.92
2020-03-13 18:00:00	ETHUSD	124.47	124.85	115.50	119.51	4898735.81
2020-03-13 19:00:00	ETHUSD	119.51	132.02	117.10	129.94	7579741.09
2020-03-13 20:00:00	ETHUSD	129.94	131.82	126.87	128.71	1940673.93

23674 rows × 6 columns

In [4]:

```python
prediction_df = df.resample('D').agg({'High':'max','Low':'min','Volume':'sum','Close':'last'})
prediction_df
```

Out[4]:

Date	High	Low	Volume	Close
2017-07-01	279.99	253.23	2.858402e+07	263.12
2017-07-02	293.73	255.70	5.226229e+07	285.00
2017-07-03	285.00	273.07	3.501635e+07	276.37
2017-07-04	282.83	265.00	3.010991e+07	269.20
2017-07-05	274.97	252.67	4.315016e+07	266.27
...	...	...	...	...
2020-03-09	208.65	189.85	9.131404e+07	202.77
2020-03-10	206.28	195.17	3.727352e+07	200.50
2020-03-11	202.98	181.00	4.547683e+07	194.61
2020-03-12	195.64	101.22	1.800737e+08	110.30
2020-03-13	148.00	90.00	1.442618e+08	128.71

987 rows × 4 columns

In [5]:

```
# shift is done after resample() else it will break the values of tomorrow
prediction_df['Tomorrow'] = prediction_df['Close'].shift(-1)
prediction_df
```

Out[5]:

Date	High	Low	Volume	Close	Tomorrow
2017-07-01	279.99	253.23	2.858402e+07	263.12	285.00
2017-07-02	293.73	255.70	5.226229e+07	285.00	276.37
2017-07-03	285.00	273.07	3.501635e+07	276.37	269.20
2017-07-04	282.83	265.00	3.010991e+07	269.20	266.27
2017-07-05	274.97	252.67	4.315016e+07	266.27	266.01
...	...	...	...	...	...
2020-03-09	208.65	189.85	9.131404e+07	202.77	200.50
2020-03-10	206.28	195.17	3.727352e+07	200.50	194.61
2020-03-11	202.98	181.00	4.547683e+07	194.61	110.30
2020-03-12	195.64	101.22	1.800737e+08	110.30	128.71
2020-03-13	148.00	90.00	1.442618e+08	128.71	NaN

987 rows × 5 columns

In [6]:

```
prediction_df.dropna(inplace=True)
```

In [7]:

```
def targ(x):
    if(x['Close']<x['Tomorrow']):
        return 1
    elif(x['Close']==x['Tomorrow']):
        return 0
    else:
        return -1
prediction_df['Target'] = prediction_df.apply(targ, axis='columns')
prediction_df
```

Out[7]:

Date	High	Low	Volume	Close	Tomorrow	Target
2017-07-01	279.99	253.23	2.858402e+07	263.12	285.00	1
2017-07-02	293.73	255.70	5.226229e+07	285.00	276.37	-1
2017-07-03	285.00	273.07	3.501635e+07	276.37	269.20	-1
2017-07-04	282.83	265.00	3.010991e+07	269.20	266.27	-1
2017-07-05	274.97	252.67	4.315016e+07	266.27	266.01	-1
...	...	...	...	...	...	...
2020-03-08	237.75	196.00	6.291071e+07	199.46	202.77	1
2020-03-09	208.65	189.85	9.131404e+07	202.77	200.50	-1
2020-03-10	206.28	195.17	3.727352e+07	200.50	194.61	-1
2020-03-11	202.98	181.00	4.547683e+07	194.61	110.30	-1
2020-03-12	195.64	101.22	1.800737e+08	110.30	128.71	1

986 rows × 6 columns

In [8]:

```
prediction_df['MA_10'] = prediction_df['Close'].rolling(10).mean()
prediction_df['Volatility'] = prediction_df['High'] - prediction_df['Low']
prediction_df.head(20)
```

Out[8]:

	High	Low	Volume	Close	Tomorrow	Target	MA_10	Volatility
Date								
2017-07-01	279.99	253.23	2.858402e+07	263.12	285.00	1	NaN	26.76
2017-07-02	293.73	255.70	5.226229e+07	285.00	276.37	-1	NaN	38.03
2017-07-03	285.00	273.07	3.501635e+07	276.37	269.20	-1	NaN	11.93
2017-07-04	282.83	265.00	3.010991e+07	269.20	266.27	-1	NaN	17.83
2017-07-05	274.97	252.67	4.315016e+07	266.27	266.01	-1	NaN	22.30
2017-07-06	275.00	261.59	2.310482e+07	266.01	241.28	-1	NaN	13.41
2017-07-07	266.97	235.01	4.323564e+07	241.28	246.64	1	NaN	31.96
2017-07-08	249.50	231.25	3.255106e+07	246.64	238.81	-1	NaN	18.25
2017-07-09	253.31	236.00	1.750668e+07	238.81	202.86	-1	NaN	17.31
2017-07-10	240.33	185.39	8.359540e+07	202.86	190.57	-1	255.556	54.94
2017-07-11	216.50	175.56	1.037703e+08	190.57	224.04	1	248.301	40.94
2017-07-12	228.88	181.00	8.623487e+07	224.04	205.00	-1	242.205	47.88
2017-07-13	227.00	193.07	4.705455e+07	205.00	197.23	-1	235.068	33.93
2017-07-14	206.99	183.12	4.134945e+07	197.23	167.72	-1	227.871	23.87
2017-07-15	198.97	167.00	4.718611e+07	167.72	155.68	-1	218.016	31.97
2017-07-16	172.30	130.26	9.258433e+07	155.68	190.87	1	206.983	42.04
2017-07-17	191.50	153.25	1.098202e+08	190.87	227.01	1	201.942	38.25
2017-07-18	249.40	176.51	1.823123e+08	227.01	194.73	-1	199.979	72.89
2017-07-19	243.90	186.01	1.643936e+08	194.73	226.06	1	195.571	57.89
2017-07-20	237.00	194.73	1.349053e+08	226.06	216.60	-1	197.891	42.27

In [9]:

```
prediction_df.dropna(inplace=True)
prediction_df
```

Out[9]:

	High	Low	Volume	Close	Tomorrow	Target	MA_10	Volatility
Date								
2017-07-10	240.33	185.39	8.359540e+07	202.86	190.57	-1	255.556	54.94
2017-07-11	216.50	175.56	1.037703e+08	190.57	224.04	1	248.301	40.94
2017-07-12	228.88	181.00	8.623487e+07	224.04	205.00	-1	242.205	47.88
2017-07-13	227.00	193.07	4.705455e+07	205.00	197.23	-1	235.068	33.93
2017-07-14	206.99	183.12	4.134945e+07	197.23	167.72	-1	227.871	23.87
...	...	...	...	...	...	...	...	...
2020-03-08	237.75	196.00	6.291071e+07	199.46	202.77	1	225.378	41.75
2020-03-09	208.65	189.85	9.131404e+07	202.77	200.50	-1	222.918	18.80
2020-03-10	206.28	195.17	3.727352e+07	200.50	194.61	-1	221.237	11.11
2020-03-11	202.98	181.00	4.547683e+07	194.61	110.30	-1	218.972	21.98
2020-03-12	195.64	101.22	1.800737e+08	110.30	128.71	1	206.790	94.42

977 rows × 8 columns

In [10]:

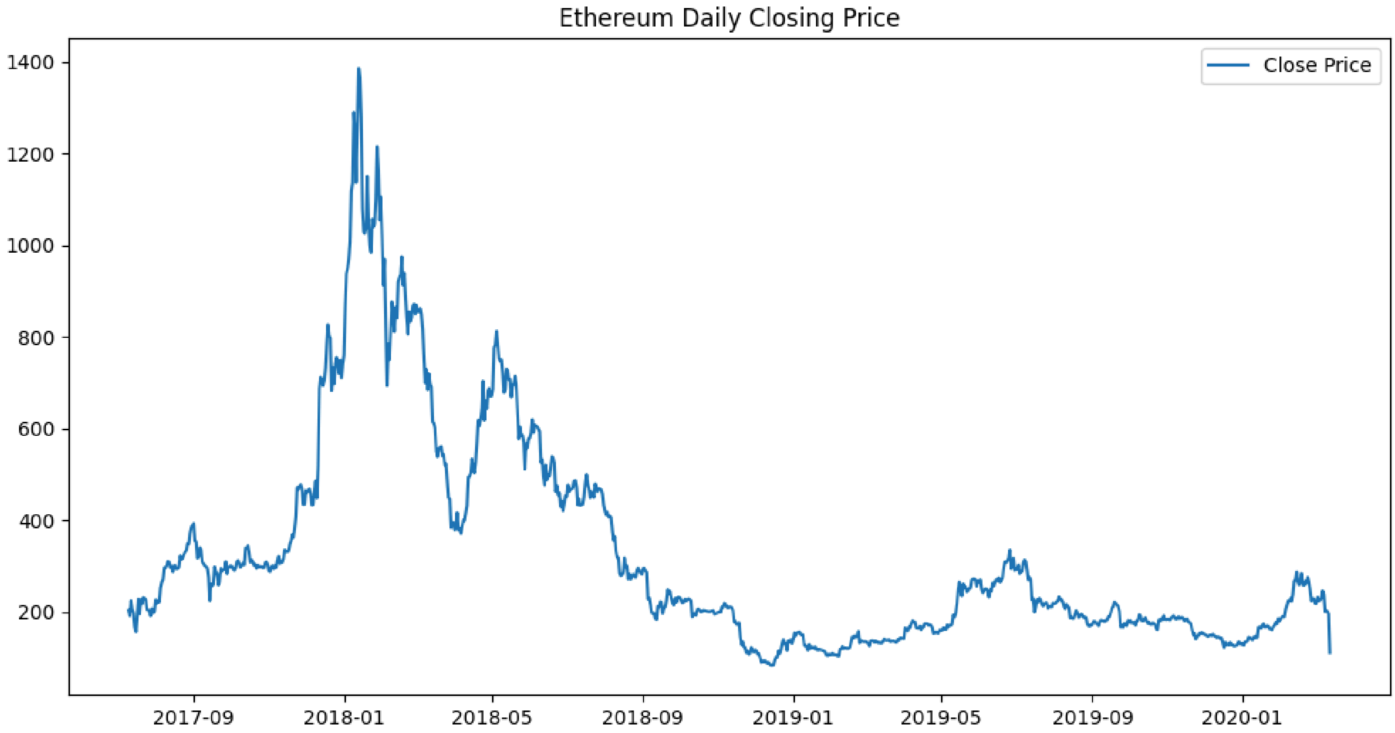
```
prediction_df['Close'].agg(['min','max'])
```

Out[10]:

```
min       83.00
max     1386.02
Name: Close, dtype: float64
```

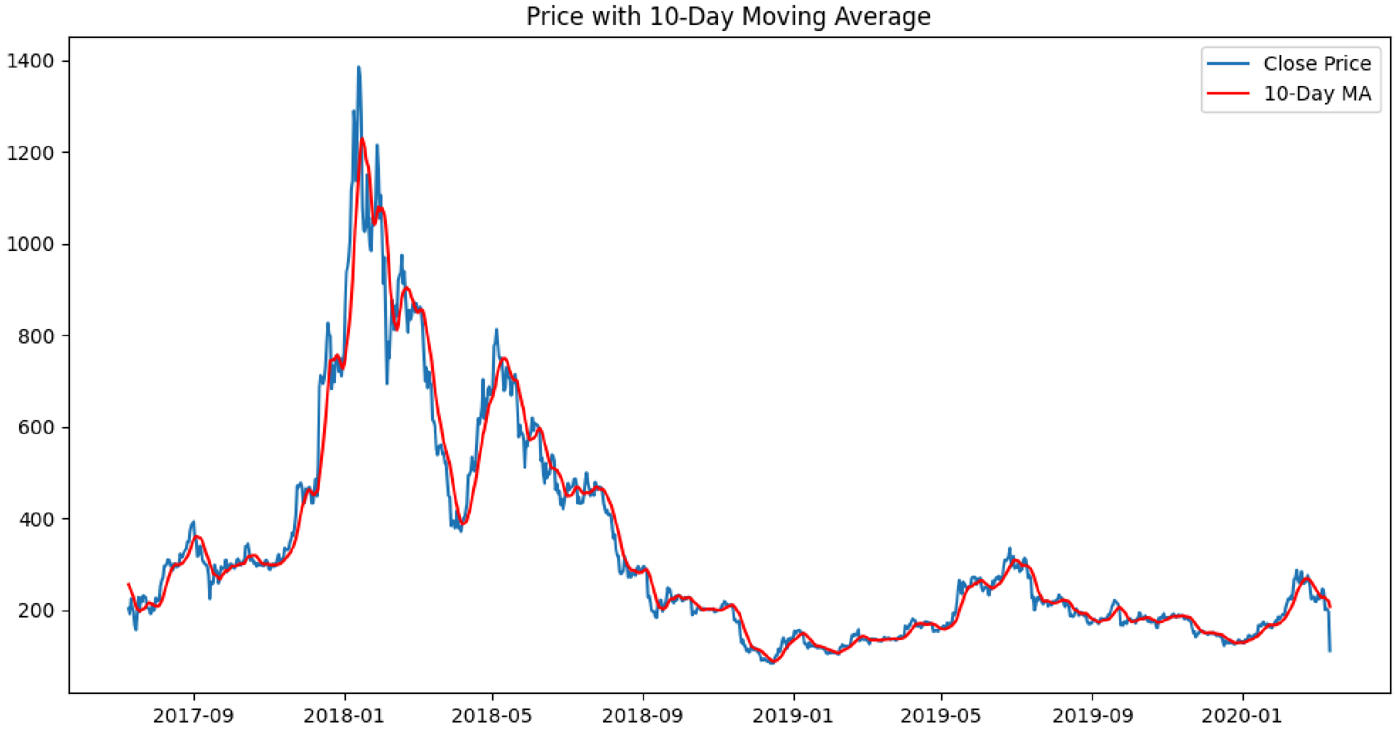
In [11]:

```
# Price Trend
import matplotlib.pyplot as plt
plt.figure(figsize=(12,6))
plt.plot(prediction_df['Close'], label='Close Price')
plt.title('Ethereum Daily Closing Price')
plt.legend()
plt.show()
```


Ethereum Daily Closing Price

In [12]:

```
plt.figure(figsize=(12,6))
plt.plot(prediction_df['Close'], label='Close Price')
plt.plot(prediction_df['MA_10'], label='10-Day MA', color='red')
plt.legend()
plt.title('Price with 10-Day Moving Average')
plt.show()
```


Price with 10-Day Moving Average

In [13]:

```
prediction_df['Target'].value_counts()
```

Out[13]:

```
Target
 1    489
-1    488
Name: count, dtype: int64
```

In [ ]: