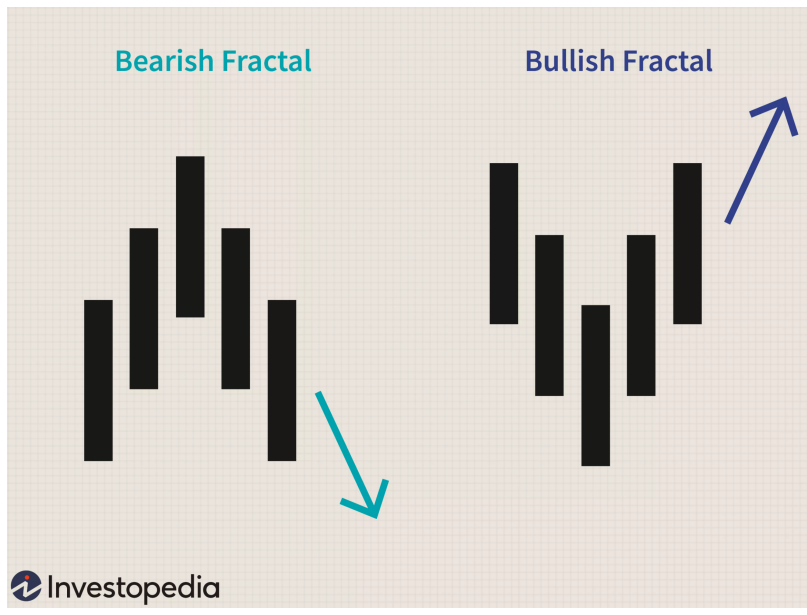
In [1]:
```
# We recognize a support or a resistance by fractal
from IPython.display import Image
Image('fractal.png',width=400,height=300)
```

Out[1]:



In [2]:
```
# To test a support, it must have 2 higher lows before and 2 higher lows after

def isSupport(df, i):

    support = df.iloc[i]['Low'] < df.iloc[i-1]['Low'] and \
    df.iloc[i]['Low'] < df.iloc[i+1]['Low'] and \
    df.iloc[i+1]['Low'] < df.iloc[i+2]['Low'] and \
    df.iloc[i-1]['Low'] < df.iloc[i-2]['Low']

    return support  # a boolean return
```

In [3]:
```
# To test a resistance, it must have 2 lower highs before and 2 lower highs after

def isResistance(df,i):

    resistance = df.iloc[i]['High'] > df.iloc[i-1]['High'] and \
    df.iloc[i]['High'] > df.iloc[i+1]['High'] and \
    df.iloc[i+1]['High'] > df.iloc[i+2]['High'] and \
    df.iloc[i-1]['High'] > df.iloc[i-2]['High']

    return resistance  # a boolean return
```

In [4]:
```
import pandas as pd
df = pd.read_csv('concordia_toyproblem.csv')
df = df[['Date','Close', 'Open', 'Low', 'High', 'Support', 'Resistance']]
```

In [5]:
```
df.head()
```

Out[5]:

	Date	Close	Open	Low	High	Support	Resistance
0	2020-04-09	16.82	17.94	16.50	18.69	NaN	NaN
1	2020-04-08	17.32	16.50	16.40	17.53	NaN	NaN
2	2020-04-07	16.40	16.61	16.34	17.07	NaN	NaN
3	2020-04-06	15.77	16.05	15.18	16.10	NaN	NaN
4	2020-04-03	15.34	16.30	14.93	16.36	NaN	NaN

In [6]:
```
df.tail()
```

Out[6]:

	Date	Close	Open	Low	High	Support	Resistance
1038	2016-01-29	4.84	4.70	4.52	4.86	NaN	NaN
1039	2016-01-28	4.60	4.67	4.35	5.13	NaN	NaN
1040	2016-01-27	4.57	4.22	4.16	4.64	NaN	NaN
1041	2016-01-26	4.20	4.23	4.12	4.31	NaN	NaN
1042	N	13.04	13.05	12.84	13.26	NaN	NaN

In [7]:
```
# Notice that the date is in reversed order

supports = []  # Make an emptylist to store supports
resistances = []  # Make an emplist to store resistances

for i in reversed(range(len(df) - 2)):  # We have to compare low or high 2 days before

    if i < 2:  # We have to compare low or high 2 days after
        break

    if isSupport(df, i):
        supports.append((i, df.iloc[i]['Low']))
        df.loc[df.index[i], 'Support' ] = 'S'
    elif isResistance(df, i):
        resistances.append((i, df.iloc[i]['High']))
        df.loc[df.index[i], 'Resistance'] = 'R'
```

In [8]:
```
df.head(10)
```

Out[8]:

	Date	Close	Open	Low	High	Support	Resistance
0	2020-04-09	16.82	17.94	16.50	18.69	NaN	NaN
1	2020-04-08	17.32	16.50	16.40	17.53	NaN	NaN
2	2020-04-07	16.40	16.61	16.34	17.07	NaN	NaN
3	2020-04-06	15.77	16.05	15.18	16.10	NaN	NaN
4	2020-04-03	15.34	16.30	14.93	16.36	NaN	NaN
5	2020-04-02	15.51	15.40	15.01	16.55	NaN	R
6	2020-04-01	14.30	13.45	13.32	14.55	NaN	NaN
7	2020-03-31	13.99	13.60	13.60	14.54	NaN	NaN
8	2020-03-30	13.38	13.15	12.83	13.74	NaN	NaN
9	2020-03-27	13.30	13.30	13.25	13.69	NaN	NaN

In [9]:
```
df.tail(10)
```

Out[9]:

	Date	Close	Open	Low	High	Support	Resistance
1033	2016-02-05	4.54	4.73	4.53	4.78	NaN	NaN
1034	2016-02-04	4.73	4.56	4.36	4.94	NaN	NaN
1035	2016-02-03	4.49	4.42	4.22	4.52	S	NaN
1036	2016-02-02	4.30	4.56	4.30	4.65	NaN	NaN
1037	2016-02-01	4.72	4.74	4.66	4.86	NaN	NaN
1038	2016-01-29	4.84	4.70	4.52	4.86	NaN	NaN
1039	2016-01-28	4.60	4.67	4.35	5.13	NaN	NaN
1040	2016-01-27	4.57	4.22	4.16	4.64	NaN	NaN
1041	2016-01-26	4.20	4.23	4.12	4.31	NaN	NaN
1042	N	13.04	13.05	12.84	13.26	NaN	NaN

In [10]:
```
df.to_excel('output.xlsx')
```