Name: Avisha Singh ID: 2088371 Homework 4

Section B

In [4]:
```
#Importing Libraries
import numpy as np
import pandas as pd
from matplotlib import pyplot as plt
```

In [5]:
```
df = pd.read_excel("ExampleOilMeasurementDaily.xlsx")
df.head()
```

Out[5]:

	Oil	2018-10-01 00:00:00	1329.6
0	Oil	2018-10-02	1435.2
1	Oil	2018-10-03	1372.1
2	Oil	2018-10-04	1371.7
3	Oil	2018-10-05	1200.0
4	Oil	2018-10-06	978.7

In [6]:
```
# As we can see the column header row too has data. So first, making that row as the fi
#then giving column names
df.iloc[0] = df.columns
df.columns = ['Type','Date','Amount']
df = df.drop(labels=0,axis=0)

#Dropping the Type column since we will not use that for forecasting

df1 = df.drop(columns=['Type'])
```

In [7]:
```
df1.set_index('Date',inplace=True) #Making the Date as the index
```

In [8]:
```
df1
```

Out[8]:

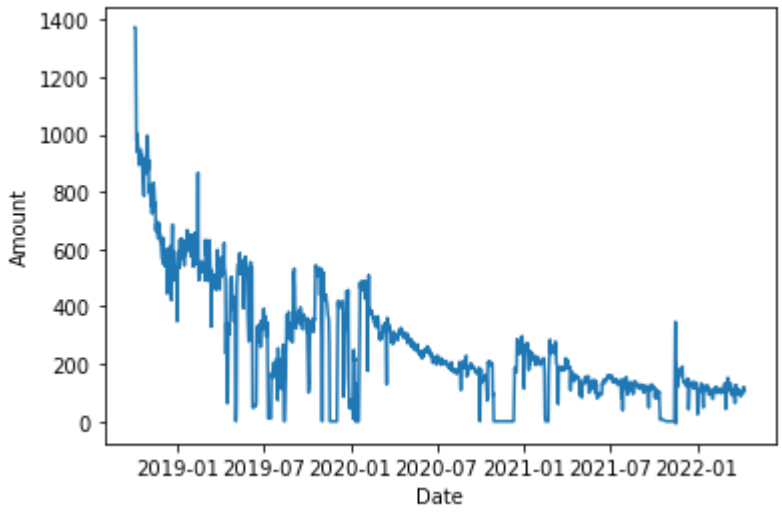
	Amount
Date	
2018-10-03	1372.1
2018-10-04	1371.7
2018-10-05	1200.0
2018-10-06	978.7
2018-10-07	1003.8
...	...

Date	Amount
2022-04-07	110.8
2022-04-08	97.2
2022-04-09	119.9
2022-04-10	114.1
2022-04-11	109.9

1265 rows × 1 columns

In [9]:
```
# Plot of Date vs the Amount of Oil Extracted
plt.ylabel('Amount')
plt.xlabel('Date')
plt.plot(df1)
```

Out[9]:
```
[<matplotlib.lines.Line2D at 0x214fe865c10>]
```



In [10]:
```
df1.info()
```

```
<class 'pandas.core.frame.DataFrame'>
DatetimeIndex: 1265 entries, 2018-10-03 to 2022-04-11
Data columns (total 1 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   Amount  1265 non-null   float64
dtypes: float64(1)
memory usage: 19.8 KB
```

In [11]:
```
df1.describe()
```

Out[11]:

	Amount
count	1265.000000
mean	270.418893

	Amount
std	208.986701
min	-8.100000
25%	125.900000
50%	206.400000
75%	364.800000
max	1372.100000

In [12]:
```
data = df1.Amount.values
```

Using ARIMA

In [13]:
```
from statsmodels.tsa.arima.model import ARIMA #Importing ARIMA
# fit model

model = ARIMA(data, order=(1, 1, 1))
model_fit = model.fit()
# make prediction
yhat = model_fit.predict(len(data), len(data), typ='levels')
print(yhat)
```

```
[109.37715268]
```

In [14]:
```
# next day predicted change is
forecast_percent_change = ((yhat/data[-1])-1)*100.0
forecast_percent_change
```

Out[14]:
```
array([-0.47574824])
```

Using Simple Exponential Smoothing (SES)

In [15]:
```
from statsmodels.tsa.holtwinters import SimpleExpSmoothing #Importing SES
# fit model
model = SimpleExpSmoothing(data)
model_fit = model.fit()
# make prediction
yhat = model_fit.predict(len(data), len(data))
print(yhat)
```

```
[110.60519698]
C:\Users\avish\anaconda3\lib\site-packages\statsmodels\tsa\holtwinters\model.py:427: Fut
ureWarning: After 0.13 initialization must be handled at model creation
  warnings.warn(
```

In [16]:
```
# next day predicted change is
forecast_percent_change = ((yhat/data[-1])-1)*100.0
forecast_percent_change
```

Out[16]:
```
array([0.6416715])
```

In [ ]: