In [1]:
```python
#importing modules for scrapping, analyzing and vizualisation of data

import pandas as pd
from pandas import Series, DataFrame
import numpy as np

import matplotlib.pyplot as plt

from datetime import datetime
from __future__ import division

from pandas_datareader import data as pdr
import yfinance as yf

yf.pdr_override()
```

In [2]:
```python
#analyzing the security price movements of two companies, Corning, Inc. (GLW US) and

tech_list = ['GLW','GRUB']

start = datetime(2015,1,1)
end = datetime(2015,6,30)
```

In [3]:
```python
for stock in tech_list:
    globals()[stock] = pdr.get_data_yahoo(stock,start,end)
```

```
[*********************100%***********************]  1 of 1 completed
[*********************100%***********************]  1 of 1 completed

1 Failed download:
- GRUB: Data doesn't exist for startDate = 1420066800, endDate = 1435615200
```

After scrapping data, there is no stock information before 2020 for GrubHub, Inc. (GRUB US)!

In [4]:
```python
GLW.head()
```

Out[4]:

Date	Open	High	Low	Close	Adj Close	Volume
2014-12-31	23.299999	23.440001	22.910000	22.930000	19.212643	6251600
2015-01-02	23.030001	23.110001	22.750000	23.010000	19.279667	5009300
2015-01-05	22.840000	22.950001	22.570000	22.690001	19.011549	7039700
2015-01-06	21.889999	22.770000	21.889999	22.299999	18.684769	7835600
2015-01-07	22.480000	22.770000	22.350000	22.620001	18.952898	5839900

1. Calculate and report the min, max, and average closing price for each security over the period.

In [5]:
```python
#simple comand describe to generate descriptive statistics.

GLW.describe()
```

Out[5]:

	Open	High	Low	Close	Adj Close	Volume
count	124.000000	124.000000	124.000000	124.000000	124.000000	1.240000e+02
mean	22.623952	22.824032	22.373952	22.595726	19.014889	8.924693e+06

	Open	High	Low	Close	Adj Close	Volume
std	1.361690	1.404034	1.354200	1.391862	1.119721	2.854714e+06
min	20.219999	20.240000	19.660000	19.700001	16.680981	4.808100e+06
25%	21.237500	21.422500	20.995000	21.217499	17.916947	6.917375e+06
50%	22.595000	22.835000	22.380000	22.630000	19.024127	8.294200e+06
75%	23.682500	23.900000	23.362501	23.760000	19.940628	9.957125e+06
max	24.959999	25.160000	24.760000	25.000000	20.947058	2.263510e+07

In [6]:
```python
#Python use 'mean' to show average value. I did change of name in order to show on t

MMM = GLW.describe()
MMM = MMM.rename(index = {'mean':'average'})
MMM.loc[['min', 'max', 'average']]
```

Out[6]:

	Open	High	Low	Close	Adj Close	Volume
min	20.219999	20.240000	19.660000	19.700001	16.680981	4.808100e+06
max	24.959999	25.160000	24.760000	25.000000	20.947058	2.263510e+07
average	22.623952	22.824032	22.373952	22.595726	19.014889	8.924693e+06

1. Identify and report the most significant positive spike in the price. Please provide a possible explanation for the spike.

In [7]:
```python
#plotting data using Volume of Trades
GLW['Volume'].plot(label= 'GLW', figsize = (16,8), title = 'Volume Traded')
plt.legend()
```

Out[7]: <matplotlib.legend.Legend at 0x18dea73dbb0>
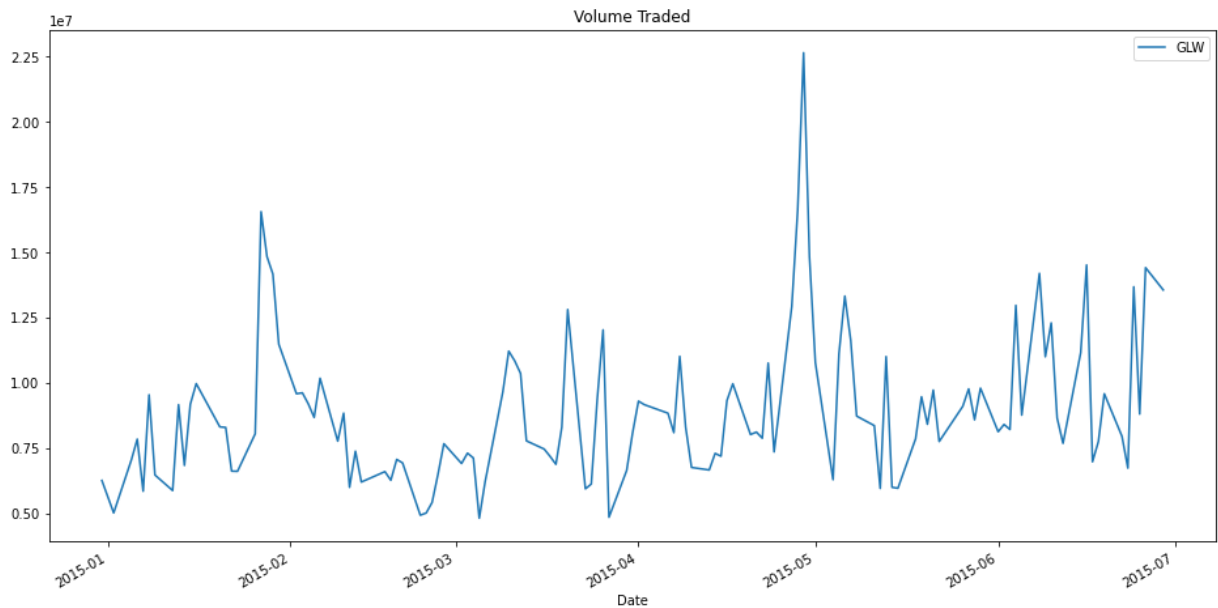
In [8]:
```python
GLW.iloc[[GLW['Volume'].argmax()]]
```

Out[8]:

	Open	High	Low	Close	Adj Close	Volume
Date						

	Open	High	Low	Close	Adj Close	Volume
Date						
2015-04-29	21.77	21.780001	20.870001	21.360001	17.984257	22635100

Possible explaination of spike: Corning Declares Quarterly Dividend CORNING, N.Y., April 29, 2015 - The Board of Directors of Corning Incorporated (NYSE: GLW) today declared a quarterly dividend on the company's common stock of $0.12 per share, payable on June 30, 2015, to holders of record on May 29, 2015.

[source] https://www.marketscreener.com/quote/stock/CORNING-INCORPORATED-12788/news/Corning-2015-04-29-Corning-Declares-Quarterly-Dividend-20282496/

1. Calculate the return on investment for 1,000 shares from 1/1/2015 to the date of any one significant price spike. You may choose either security for this exercise.

Formula for calculation:

ROI= ((FVI−IVI)/Cost of Investment)*100%

Where:

ROI=Return on Investment FVI=Final value of investment IVI=Initial value of investment

I decided to calculate data until fist spike visible on Volume plot shown earlier happend at 28th January 2015 with Open Security price of 24.87$

```
In [9]:   #finding exact day of pick (highest price on Open Security) in February.

          GLW[15:22]
```

Out[9]:

	Open	High	Low	Close	Adj Close	Volume
Date						
2015-01-23	23.690001	23.930000	23.629999	23.850000	19.983488	6603100
2015-01-26	23.750000	24.120001	23.540001	23.910000	20.033760	8039600
2015-01-27	23.709999	24.980000	23.700001	24.730000	20.720825	16548000
2015-01-28	24.870001	25.160000	24.170000	24.219999	20.293505	14824600
2015-01-29	24.360001	24.360001	23.270000	23.790001	19.933216	14157400
2015-01-30	23.650000	24.150000	23.610001	23.770000	19.916456	11472400
2015-02-02	23.870001	24.190001	23.230000	24.150000	20.234852	9573700

```
In [10]:   #showing start and end price.

           Investment = GLW.loc[['2015-01-02','2015-01-28']]
           InvestmentData = pd.DataFrame (Investment, columns=['Open'])
           InvestmentData
```

Out[10]:

	Open
Date	

	Open
Date	
2015-01-02	23.030001
2015-01-28	24.870001

In [11]:
```
Percentage_Return_of_Investment=((InvestmentData.loc['2015-01-28']-InvestmentData.lo
Percentage_Return_of_Investment
```

Out[11]:
```
Open     7.989579
dtype: float64
```

ROI = 7.99%

In [12]:
```
Return_of_Investment=((InvestmentData.loc['2015-01-28']-InvestmentData.loc['2015-01-
Return_of_Investment
```

Out[12]:
```
Open     1840.000153
dtype: float64
```

Return on investment for 1000 shares in this period fo time is 1840

$which means profit for this transaction is$ 840

1. Please create a data visualization using a medium of your choice to show the price moves and highlight any abnormal price moves.

Below is shown graphic showing Open Price Moving Average for 5, 10 & 20 Days in order to follow trands of the data.

In [13]:
```
GLW['Open'].plot(label = 'Open Price',figsize=(14,8))
MA=GLW['Open'].rolling(5).mean()
MA.plot(label = 'Moving Average 5')
MA10=GLW['Open'].rolling(10).mean()
MA10.plot(label = 'Moving Average 10')
MA20=GLW['Open'].rolling(20).mean()
MA20.plot(label = 'Moving Average 20')
plt.legend()
plt.title('Open Price Moving Average for 5, 10 & 20 Days')
plt.ylabel('Price')
plt.show()
```

Open Price Moving Average for 5, 10 & 20 Days
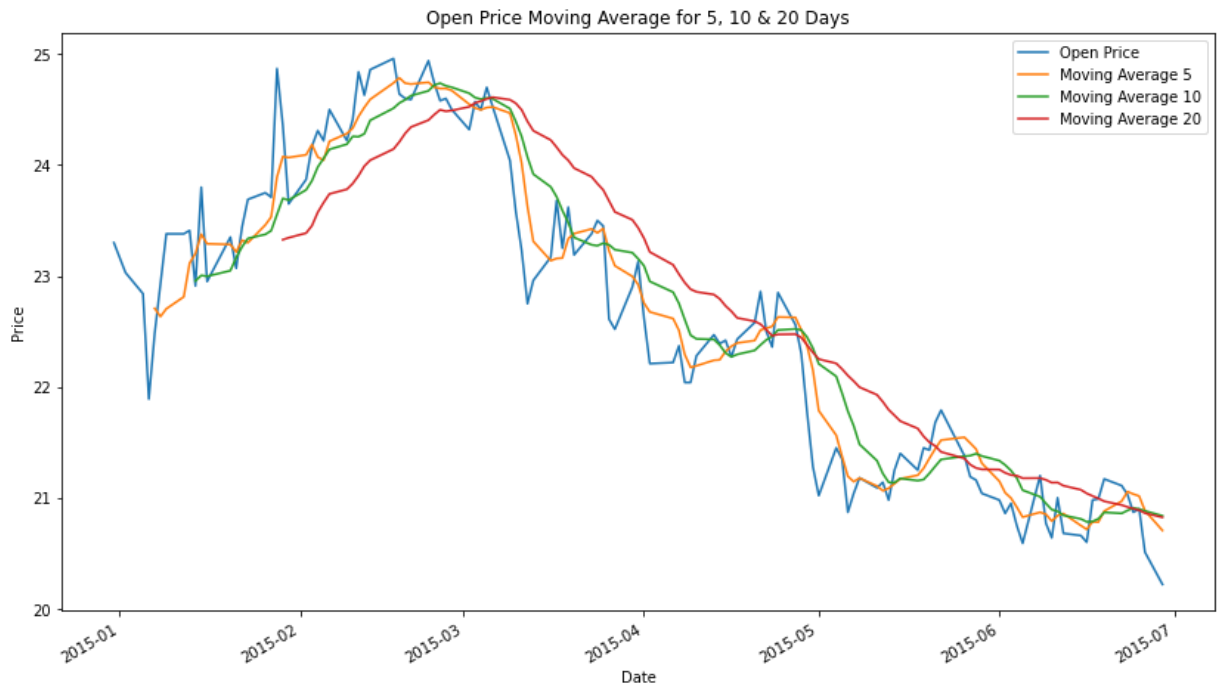
We notice abnormal price move at the end of January. Possible explanation for this is announcmend that Corning Incorporated Acquires Assets of NovaSol. [source: https://sensorsandsystems.com/corning-incorporated-acquires-assets-of-novasol/]