Annual_Returns

September 29, 2021

1 Annual Returns & Monthly Returns

[1]:

```
import numpy as np
import matplotlib.pyplot as plt; plt.rcdefaults()
import pandas as pd

import warnings
warnings.filterwarnings("ignore")

# fix_yahoo_finance is used to fetch data
import fix_yahoo_finance as yf
yf.pdr_override()
```

[2]:

```
# input
symbol = 'AMD'
start = '2007-01-01'
end = '2019-01-01'

# Read data
dataset = yf.download(symbol,start,end)

# View Data
dataset.head()
```

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

[2]:

```
                 Open       High        Low      Close  Adj Close    Volume
Date
2007-01-03  20.080000  20.400000  19.350000  19.520000  19.520000  28350300
2007-01-04  19.660000  19.860001  19.320000  19.790001  19.790001  23652500
2007-01-05  19.540001  19.910000  19.540001  19.709999  19.709999  15902400
2007-01-08  19.709999  19.860001  19.370001  19.469999  19.469999  15814800
2007-01-09  19.450001  19.709999  19.370001  19.650000  19.650000  14494200
```

[3]:

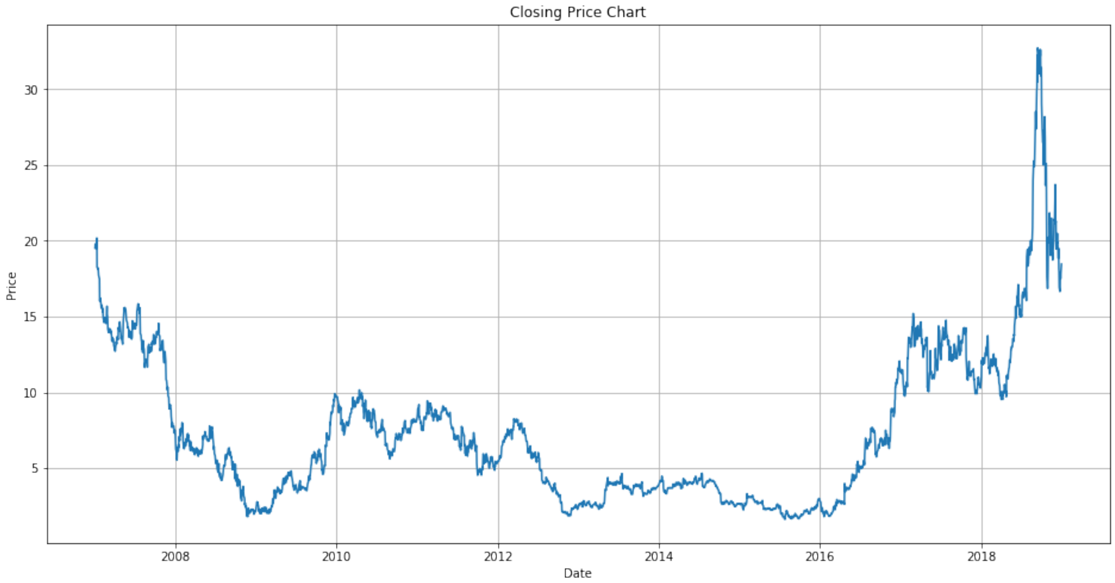
```
dataset.tail()
```

[3]:

```
                 Open       High        Low      Close  Adj Close     Volume
Date
2018-12-24  16.520000  17.219999  16.370001  16.650000  16.650000   62933100
2018-12-26  16.879999  17.910000  16.030001  17.900000  17.900000  108811800
2018-12-27  17.430000  17.740000  16.440001  17.490000  17.490000  111373000
2018-12-28  17.530001  18.309999  17.139999  17.820000  17.820000  109214400
2018-12-31  18.150000  18.510000  17.850000  18.459999  18.459999   84732200
```

[4]:

```
plt.figure(figsize=(16,8))
plt.plot(dataset['Adj Close'])
plt.title('Closing Price Chart')
plt.xlabel('Date')
plt.ylabel('Price')
plt.grid(True)
plt.show()
```



[5]:

```
monthly = dataset.asfreq('BM')
monthly['Returns'] = dataset['Adj Close'].pct_change().dropna()
monthly.head()
```

[5]:

```
             Open   High    Low  Close  Adj Close      Volume   Returns
Date
2007-01-31  15.83  15.89  15.52  15.55      15.55  30280100.0 -0.015199
2007-02-28  15.30  15.30  14.96  15.07      15.07  32605500.0 -0.000663
2007-03-30  13.09  13.18  12.97  13.06      13.06  18148200.0 -0.001529
2007-04-30  14.27  14.28  13.81  13.82      13.82  20980200.0 -0.034916
2007-05-31  14.43  14.43  14.24  14.27      14.27  14011200.0 -0.006959
```

[6]:
```
monthly['Month_Name'] = monthly.index.strftime("%b")
monthly['Month_Name_Year'] = monthly.index.strftime("%b-%Y")
```

[7]:
```
import calendar
import datetime

monthly = monthly.reset_index()
monthly['Month'] = monthly["Date"].dt.month
```

[8]:
```
monthly.head()
```

[8]:
```
        Date   Open   High    Low  Close  Adj Close      Volume   Returns  \
0 2007-01-31  15.83  15.89  15.52  15.55      15.55  30280100.0 -0.015199
1 2007-02-28  15.30  15.30  14.96  15.07      15.07  32605500.0 -0.000663
2 2007-03-30  13.09  13.18  12.97  13.06      13.06  18148200.0 -0.001529
3 2007-04-30  14.27  14.28  13.81  13.82      13.82  20980200.0 -0.034916
4 2007-05-31  14.43  14.43  14.24  14.27      14.27  14011200.0 -0.006959

  Month_Name Month_Name_Year  Month
0        Jan        Jan-2007      1
1        Feb        Feb-2007      2
2        Mar        Mar-2007      3
3        Apr        Apr-2007      4
4        May        May-2007      5
```

[9]:
```
monthly.head()
```

[9]:
```
        Date   Open   High    Low  Close  Adj Close      Volume   Returns  \
0 2007-01-31  15.83  15.89  15.52  15.55      15.55  30280100.0 -0.015199
1 2007-02-28  15.30  15.30  14.96  15.07      15.07  32605500.0 -0.000663
2 2007-03-30  13.09  13.18  12.97  13.06      13.06  18148200.0 -0.001529
3 2007-04-30  14.27  14.28  13.81  13.82      13.82  20980200.0 -0.034916
4 2007-05-31  14.43  14.43  14.24  14.27      14.27  14011200.0 -0.006959

  Month_Name Month_Name_Year  Month
0        Jan        Jan-2007      1
1        Feb        Feb-2007      2
2        Mar        Mar-2007      3
3        Apr        Apr-2007      4
4        May        May-2007      5
```

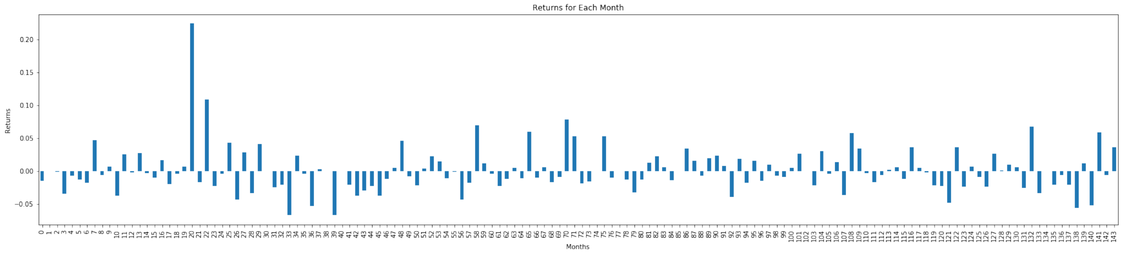
[10]:
```
monthly.tail()
```

[10]:
```
          Date       Open       High        Low      Close  Adj Close  \
139 2018-08-31  24.889999  25.240000  24.719999  25.170000  25.170000
140 2018-09-28  32.240002  32.779999  29.980000  30.889999  30.889999
141 2018-10-31  17.870001  18.340000  17.120001  18.209999  18.209999
```

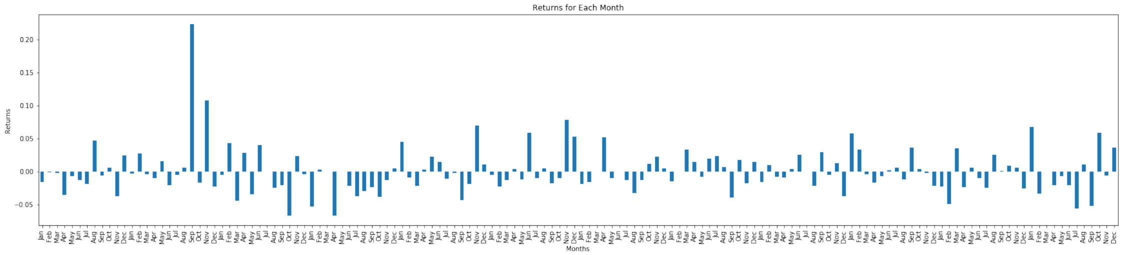
```
142 2018-11-30  21.299999  21.360001  20.520000  21.299999  21.299999
143 2018-12-31  18.150000  18.510000  17.850000  18.459999  18.459999

          Volume   Returns Month_Name Month_Name_Year  Month
139   65206400.0  0.011250        Aug        Aug-2018      8
140  165453500.0 -0.052163        Sep        Sep-2018      9
141  110463700.0  0.058721        Oct        Oct-2018     10
142   82370700.0 -0.006066        Nov        Nov-2018     11
143   84732200.0  0.035915        Dec        Dec-2018     12
```

[11]:
```python
monthly['Returns'].plot(kind='bar', figsize=(30,6))
plt.xlabel("Months")
plt.ylabel("Returns")
plt.title("Returns for Each Month")
plt.show()
```



[12]:
```python
monthly['Returns'].plot(kind='bar', figsize=(30,6))
plt.xlabel("Months")
plt.ylabel("Returns")
plt.title("Returns for Each Month")
plt.xticks(monthly.index, monthly['Month_Name'])
plt.show()
```

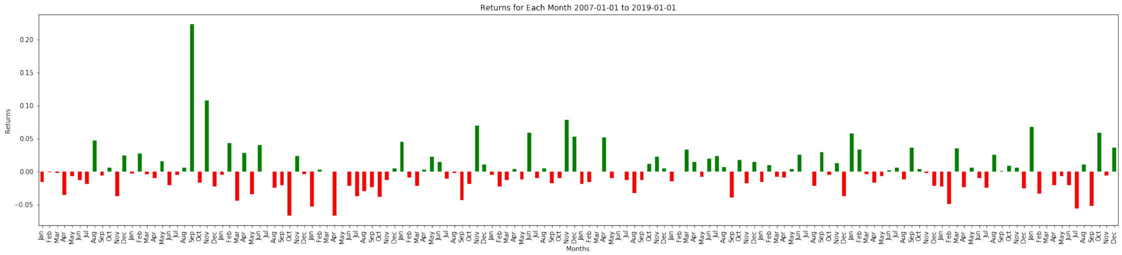


[13]:
```python
from matplotlib import dates as mdates
import datetime as dt

monthly['ReturnsPositive'] = 0 < monthly['Returns']
```

```
monthly['Date'] = pd.to_datetime(monthly['Date'])
monthly['Date'] = monthly['Date'].apply(mdates.date2num)
```

```
[14]: colors = monthly.ReturnsPositive.map({True: 'g', False: 'r'})
      monthly['Returns'].plot(kind='bar', color = colors, figsize=(30,6))
      plt.xlabel("Months")
      plt.ylabel("Returns")
      plt.title("Returns for Each Month " + start + ' to ' + end)
      plt.xticks(monthly.index, monthly['Month_Name'])
      plt.show()
```



```
[15]: yearly = dataset.asfreq('BY')
      yearly['Returns'] = dataset['Adj Close'].pct_change().dropna()
```

```
[16]: yearly
```

```
[16]:             Open   High    Low      Close  Adj Close    Volume   Returns
      Date
      2007-12-31   7.26   7.60   7.26   7.500000   7.500000  19668800  0.024590
      2008-12-31   2.20   2.20   2.11   2.160000   2.160000  10226500 -0.022624
      2009-12-31   9.75   9.77   9.63   9.680000   9.680000   9396500 -0.004115
      2010-12-31   8.14   8.19   8.05   8.180000   8.180000   7971200  0.004914
      2011-12-30   5.34   5.45   5.28   5.400000   5.400000   6906000  0.011236
      2012-12-31   2.29   2.42   2.28   2.400000   2.400000  20698200  0.052632
      2013-12-31   3.87   3.88   3.83   3.870000   3.870000  12347800  0.005195
      2014-12-31   2.64   2.70   2.64   2.670000   2.670000  11177900  0.015209
      2015-12-31   2.97   3.01   2.87   2.870000   2.870000  11086100 -0.036913
      2016-12-30  11.70  11.78  11.25  11.340000  11.340000  44095400 -0.021570
      2017-12-29  10.57  10.58  10.27  10.280000  10.280000  26678900 -0.025592
      2018-12-31  18.15  18.51  17.85  18.459999  18.459999  84732200  0.035915
```

```
[17]: yearly = yearly.reset_index()
```

```
[18]: yearly
```

```
[18]:         Date   Open   High    Low      Close  Adj Close    Volume   Returns
      0 2007-12-31   7.26   7.60   7.26   7.500000   7.500000  19668800  0.024590
```

```
1  2008-12-31   2.20   2.20   2.11   2.160000   2.160000  10226500 -0.022624
2  2009-12-31   9.75   9.77   9.63   9.680000   9.680000   9396500 -0.004115
3  2010-12-31   8.14   8.19   8.05   8.180000   8.180000   7971200  0.004914
4  2011-12-30   5.34   5.45   5.28   5.400000   5.400000   6906000  0.011236
5  2012-12-31   2.29   2.42   2.28   2.400000   2.400000  20698200  0.052632
6  2013-12-31   3.87   3.88   3.83   3.870000   3.870000  12347800  0.005195
7  2014-12-31   2.64   2.70   2.64   2.670000   2.670000  11177900  0.015209
8  2015-12-31   2.97   3.01   2.87   2.870000   2.870000  11086100 -0.036913
9  2016-12-30  11.70  11.78  11.25  11.340000  11.340000  44095400 -0.021570
10 2017-12-29  10.57  10.58  10.27  10.280000  10.280000  26678900 -0.025592
11 2018-12-31  18.15  18.51  17.85  18.459999  18.459999  84732200  0.035915
```

[19]:

```
yearly['Years'] = yearly['Date'].dt.year
```

[20]:

```
yearly
```

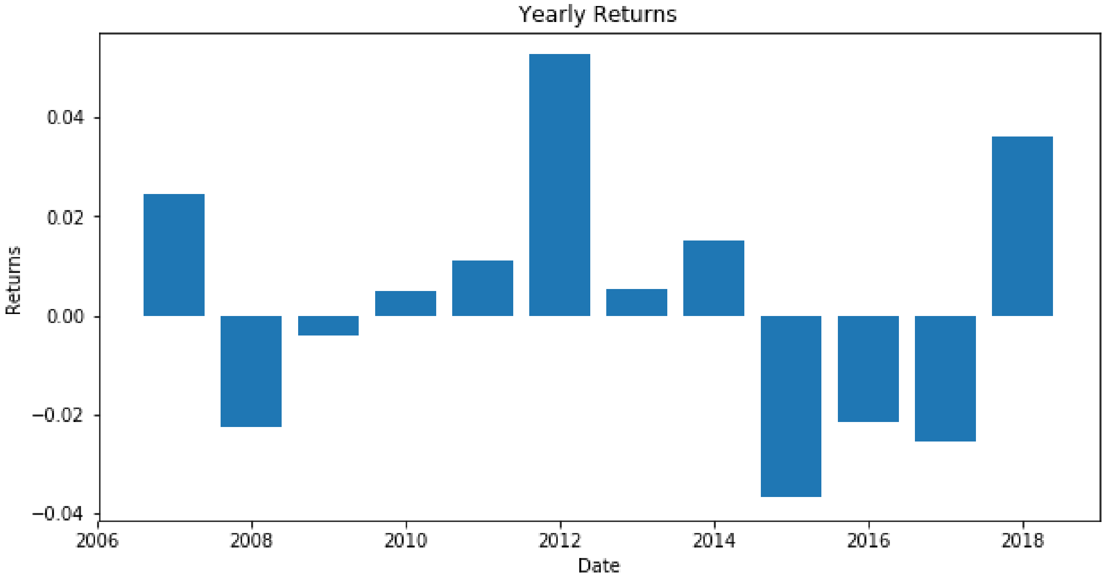
[20]:

```
         Date   Open   High    Low      Close  Adj Close    Volume   Returns  \
0  2007-12-31   7.26   7.60   7.26   7.500000   7.500000  19668800  0.024590
1  2008-12-31   2.20   2.20   2.11   2.160000   2.160000  10226500 -0.022624
2  2009-12-31   9.75   9.77   9.63   9.680000   9.680000   9396500 -0.004115
3  2010-12-31   8.14   8.19   8.05   8.180000   8.180000   7971200  0.004914
4  2011-12-30   5.34   5.45   5.28   5.400000   5.400000   6906000  0.011236
5  2012-12-31   2.29   2.42   2.28   2.400000   2.400000  20698200  0.052632
6  2013-12-31   3.87   3.88   3.83   3.870000   3.870000  12347800  0.005195
7  2014-12-31   2.64   2.70   2.64   2.670000   2.670000  11177900  0.015209
8  2015-12-31   2.97   3.01   2.87   2.870000   2.870000  11086100 -0.036913
9  2016-12-30  11.70  11.78  11.25  11.340000  11.340000  44095400 -0.021570
10 2017-12-29  10.57  10.58  10.27  10.280000  10.280000  26678900 -0.025592
11 2018-12-31  18.15  18.51  17.85  18.459999  18.459999  84732200  0.035915

    Years
0    2007
1    2008
2    2009
3    2010
4    2011
5    2012
6    2013
7    2014
8    2015
9    2016
10   2017
11   2018
```

[21]:

```
plt.figure(figsize=(10,5))
plt.bar(yearly['Years'], yearly['Returns'], align='center')
plt.title('Yearly Returns')
plt.xlabel('Date')
plt.ylabel('Returns')
plt.show()
```



[22]:
```
from matplotlib import dates as mdates
import datetime as dt

yearly['ReturnsPositive'] = 0 < yearly['Returns']
yearly['Date'] = pd.to_datetime(yearly['Date'])
yearly['Date'] = yearly['Date'].apply(mdates.date2num)
```

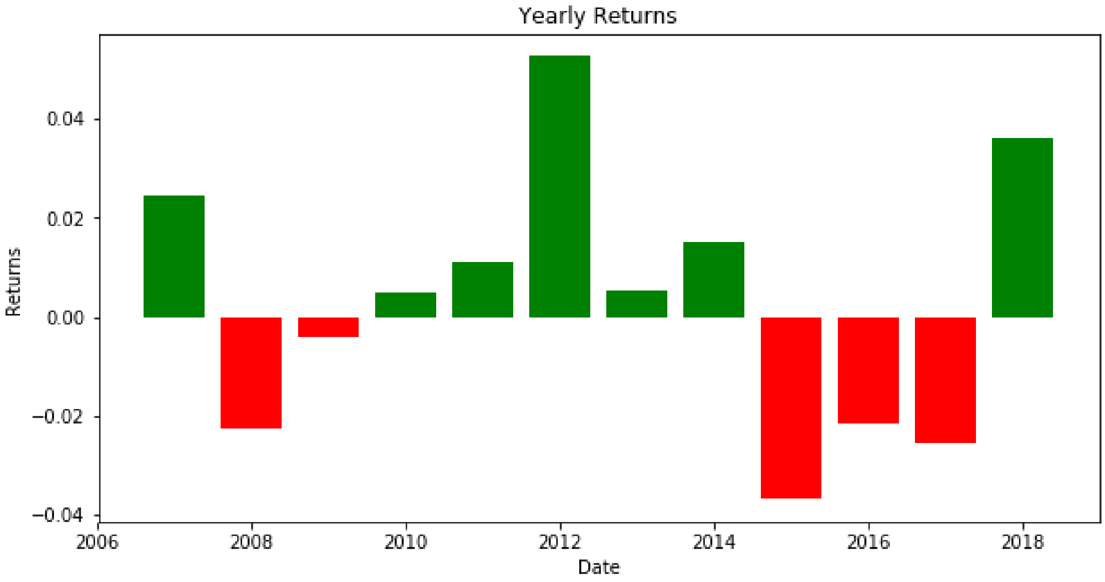
[23]:
```
yearly
```

[23]:
```
        Date   Open   High    Low      Close  Adj Close    Volume   Returns  \
0   733041.0   7.26   7.60   7.26   7.500000   7.500000  19668800  0.024590
1   733407.0   2.20   2.20   2.11   2.160000   2.160000  10226500 -0.022624
2   733772.0   9.75   9.77   9.63   9.680000   9.680000   9396500 -0.004115
3   734137.0   8.14   8.19   8.05   8.180000   8.180000   7971200  0.004914
4   734501.0   5.34   5.45   5.28   5.400000   5.400000   6906000  0.011236
5   734868.0   2.29   2.42   2.28   2.400000   2.400000  20698200  0.052632
6   735233.0   3.87   3.88   3.83   3.870000   3.870000  12347800  0.005195
7   735598.0   2.64   2.70   2.64   2.670000   2.670000  11177900  0.015209
8   735963.0   2.97   3.01   2.87   2.870000   2.870000  11086100 -0.036913
9   736328.0  11.70  11.78  11.25  11.340000  11.340000  44095400 -0.021570
10  736692.0  10.57  10.58  10.27  10.280000  10.280000  26678900 -0.025592
11  737059.0  18.15  18.51  17.85  18.459999  18.459999  84732200  0.035915
```

```
    Years  ReturnsPositive
0    2007             True
1    2008            False
2    2009            False
3    2010             True
4    2011             True
5    2012             True
6    2013             True
7    2014             True
8    2015            False
9    2016            False
10   2017            False
11   2018             True
```

[24]:

```
colors = yearly.ReturnsPositive.map({True: 'g', False: 'r'})
plt.figure(figsize=(10,5))
plt.bar(yearly['Years'], yearly['Returns'], color=colors, align='center')
plt.title('Yearly Returns')
plt.xlabel('Date')
plt.ylabel('Returns')
plt.show()
```



[25]:

```
dataset['Returns'] = dataset['Adj Close'].pct_change().dropna()
```

[26]:

```
yearly_returns_avg = dataset['Returns'].groupby([dataset.index.year]).mean()
```

[27]:

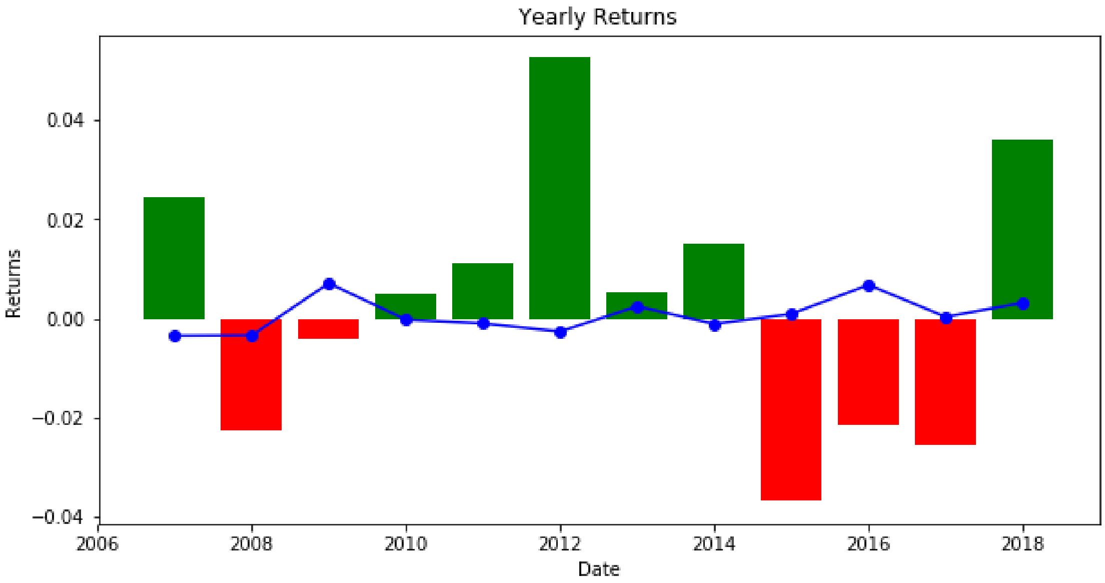
```
yearly_returns_avg
```

[27]:

```
Date
2007   -0.003543
2008   -0.003470
2009    0.007087
2010   -0.000265
2011   -0.001038
2012   -0.002664
2013    0.002413
2014   -0.001137
2015    0.000893
2016    0.006752
2017    0.000297
2018    0.003122
Name: Returns, dtype: float64
```

[28]:

```
colors = yearly.ReturnsPositive.map({True: 'g', False: 'r'})
plt.figure(figsize=(10,5))
plt.bar(yearly['Years'], yearly['Returns'], color=colors, align='center')
plt.plot(yearly_returns_avg, marker='o', color='b')
plt.title('Yearly Returns')
plt.xlabel('Date')
plt.ylabel('Returns')
plt.show()
```


Yearly Returns
Returns
Date