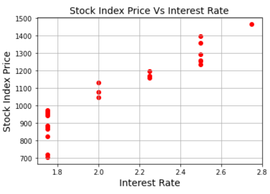
In [2]:
```
import pandas as pd
Stock_Market = pd.read_csv('Stock market data.csv')
df = pd.DataFrame(Stock_Market,columns=['Year','Month','Interest_Rate','Unemployment_Rate','Stock_Index_Price'])
print (df)
```

```
    Year  Month  Interest_Rate  Unemployment_Rate  Stock_Index_Price
0   2017     12           2.75                5.3               1464
1   2017     11           2.50                5.3               1394
2   2017     10           2.50                5.3               1357
3   2017      9           2.50                5.3               1293
4   2017      8           2.50                5.4               1256
5   2017      7           2.50                5.6               1254
6   2017      6           2.50                5.5               1234
7   2017      5           2.25                5.5               1195
8   2017      4           2.25                5.5               1159
9   2017      3           2.25                5.6               1167
10  2017      2           2.00                5.7               1130
11  2017      1           2.00                5.9               1075
12  2016     12           2.00                6.0               1047
13  2016     11           1.75                5.9                965
14  2016     10           1.75                5.8                943
15  2016      9           1.75                6.1                958
16  2016      8           1.75                6.2                971
17  2016      7           1.75                6.1                949
18  2016      6           1.75                6.1                884
19  2016      5           1.75                6.1                866
20  2016      4           1.75                5.9                876
21  2016      3           1.75                6.2                822
22  2016      2           1.75                6.2                704
23  2016      1           1.75                6.1                719
```

In [3]:
```
from pandas import DataFrame
import matplotlib.pyplot as plt
plt.scatter(df['Interest_Rate'], df['Stock_Index_Price'], color='red')
plt.title('Stock Index Price Vs Interest Rate', fontsize=14)
plt.xlabel('Interest Rate', fontsize=14)
plt.ylabel('Stock Index Price', fontsize=14)
plt.grid(True)
plt.show()
```



In [4]:
```
plt.scatter(df['Unemployment_Rate'], df['Stock_Index_Price'], color='green')
plt.title('Stock Index Price Vs Unemployment Rate', fontsize=14)
plt.xlabel('Unemployment Rate', fontsize=14)
plt.ylabel('Stock Index Price', fontsize=14)
plt.grid(True)
plt.show()
```

In [5]:
```
from sklearn import linear_model
import statsmodels.api as sm
X = df[['Interest_Rate','Unemployment_Rate']] # here we have 2 variables for multiple regression. If you just want to use one variable for simple linear regression, then use X = df
Y = df['Stock_Index_Price']

# with sklearn
regr = linear_model.LinearRegression()
regr.fit(X, Y)

print('Intercept: \n', regr.intercept_)
print('Coefficients: \n', regr.coef_)
```

```
Intercept:
 1798.403977625855
Coefficients:
 [ 345.54008701 -250.14657137]
```

In [6]:
```
# prediction with sklearn
New_Interest_Rate = 2.75
New_Unemployment_Rate = 5.3
print ('Predicted Stock Index Price: \n', regr.predict([[New_Interest_Rate ,New_Unemployment_Rate]]))

# with statsmodels
X = sm.add_constant(X) # adding a constant

model = sm.OLS(Y, X).fit()
predictions = model.predict(X)

print_model = model.summary()
print(print_model)
```

```
Predicted Stock Index Price:
 [1422.86238865]
                            OLS Regression Results
==============================================================================
Dep. Variable:      Stock_Index_Price   R-squared:                       0.898
Model:                            OLS   Adj. R-squared:                  0.888
Method:                 Least Squares   F-statistic:                     92.07
Date:                Sun, 30 Apr 2023   Prob (F-statistic):           4.04e-11
Time:                        12:18:42   Log-Likelihood:                -134.61
No. Observations:                  24   AIC:                             275.2
Df Residuals:                      21   BIC:                             278.8
Df Model:                           2
Covariance Type:            nonrobust
==============================================================================
                 coef    std err          t      P>|t|      [0.025      0.975]
------------------------------------------------------------------------------
const          1798.4040    899.248      2.000      0.059     -71.685    3668.493
Interest_Rate   345.5401    111.367      3.103      0.005     113.940     577.140
Unemployment_Rate  -250.1466    117.950     -2.121      0.046    -495.437      -4.856
==============================================================================
Omnibus:                        2.691   Durbin-Watson:                   0.530
Prob(Omnibus):                  0.260   Jarque-Bera (JB):                1.551
Skew:                          -0.612   Prob(JB):                        0.461
Kurtosis:                       3.226   Cond. No.                         394.
==============================================================================

Notes:
[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.
C:\Users\dnhac\anaconda3\lib\site-packages\statsmodels\tsa\tsatools.py:142: FutureWarning: In a future version of pandas all arguments of concat except for the argument 'objs' will be keyword-only
  x = pd.concat(x[::order], 1)
```

In [7]:
```
import tkinter as tk
import statsmodels.api as sm
X = df[['Interest_Rate','Unemployment_Rate']] # here we have 2 input variables for multiple regression. If you just want to use one variable for simple linear regression, then use
Y = df['Stock_Index_Price'] # output variable (what we are trying to predict)

# with sklearn
regr = linear_model.LinearRegression()
regr.fit(X, Y)

print('Intercept: \n', regr.intercept_)
print('Coefficients: \n', regr.coef_)


# with statsmodels
X = sm.add_constant(X) # adding a constant

model = sm.OLS(Y, X).fit()
predictions = model.predict(X)
```

```
Intercept:
 1798.403977625855
Coefficients:
 [ 345.54008701 -250.14657137]
C:\Users\dnhac\anaconda3\lib\site-packages\statsmodels\tsa\tsatools.py:142: FutureWarning: In a future version of pandas all arguments of concat except for the argument 'objs' will be keyword-only
  x = pd.concat(x[::order], 1)
```

In [ ]:
```
# tkinter GUI
root= tk.Tk()

canvas1 = tk.Canvas(root, width = 1200, height = 450)
canvas1.pack()

# with sklearn
Intercept_result = ('Intercept: ', regr.intercept_)
label_Intercept = tk.Label(root, text=Intercept_result, justify = 'center')
canvas1.create_window(260, 220, window=label_Intercept)

# with sklearn
Coefficients_result  = ('Coefficients: ', regr.coef_)
label_Coefficients = tk.Label(root, text=Coefficients_result, justify = 'center')
canvas1.create_window(260, 240, window=label_Coefficients)

# with statsmodels
print_model = model.summary()
label_model = tk.Label(root, text=print_model, justify = 'center', relief = 'solid', bg='LightSkyBlue1')
canvas1.create_window(800, 220, window=label_model)
# New_Interest_Rate label and input box
label1 = tk.Label(root, text='Type Interest Rate: ')
canvas1.create_window(100, 100, window=label1)

entry1 = tk.Entry (root) # create 1st entry box
canvas1.create_window(270, 100, window=entry1)

# New_Unemployment_Rate label and input box
label2 = tk.Label(root, text=' Type Unemployment Rate: ')
canvas1.create_window(120, 120, window=label2)

entry2 = tk.Entry (root) # create 2nd entry box
canvas1.create_window(270, 120, window=entry2)
def values():
    global New_Interest_Rate #our 1st input variable
    New_Interest_Rate = float(entry1.get())

    global New_Unemployment_Rate #our 2nd input variable
    New_Unemployment_Rate = float(entry2.get())

    Prediction_result  = ('Predicted Stock Index Price: ', regr.predict([[New_Interest_Rate ,New_Unemployment_Rate]]))
    label_Prediction = tk.Label(root, text= Prediction_result, bg='orange')
    canvas1.create_window(260, 280, window=label_Prediction)

button1 = tk.Button (root, text='Predict Stock Index Price',command=values, bg='orange') # button to call the 'values' command above
canvas1.create_window(270, 150, window=button1)


root.mainloop()
```

In [ ]: