```
In [2]: #Author: Suryoday Basak
    #suryodaybasak.info
    import pandas as pd
    import numpy as np
    import matplotlib.pyplot as plt
    import matplotlib as mpl
    plt.style.use('ggplot')
    mpl.rcParams['figure.figsize'] = (10,8)
```

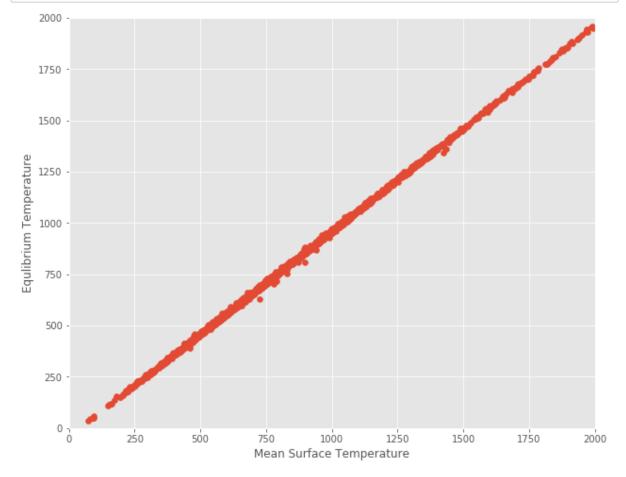
```
In [4]: #Reading the data
df = pd.read_csv('../datsets/physics/exoplanet-temp.csv')
df = df.dropna() #For convenience, we drop any rows with any NaN entri
es
print(df)
```

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3586 181.1 216.1 3587 153.2 181.8							
3587 153.2 181.8							
3658 1949.6 1994.6	3658			1949.6			1994.6
3763 425.6 462.1							

3764	276.4	315.8
3765	117.9	161.4
3779	442.6	474.8
3780	382.0	415.4
3781	331.9	365.9

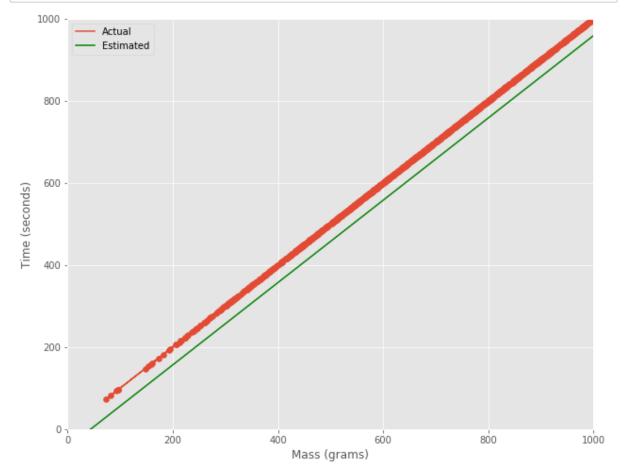
[1724 rows x 2 columns]

```
In [5]: #Plot the data here to visualize the trend
plt.scatter(df['P. Ts Mean (K)'], df['P. Teq Mean (K)'])
#plt.scatter(df['M (g)'], df['T (s)'])
plt.xlabel('Mean Surface Temperature')
plt.ylabel('Equlibrium Temperature')
plt.xlim(0, 2000)
plt.ylim(0, 2000)
plt.show()
#plt.clf()
```



```
In [6]: n = df['P. Ts Mean (K)'].count()
                                                        #Number of samples
        p = np.sum(np.square(df['P. Ts Mean (K)']))
                                                        #The sum of x^2
        q = df['P. Ts Mean (K)'].sum()
                                                        #The sum of x
        r = np.sum(df['P. Ts Mean (K)']*df['P. Teq Mean (K)'])
                                                                 #The sum of
         the product of x and y
        s = df['P. Teq Mean (K)'].sum()
                                                         #The sum of v^2
        #Print all of the above
        print("The number of samples is:\t", n)
        print("The sum of Ts^2 is:\t\t", p)
        print("The sum of Ts is:\t\t", q)
        print("The sum of Ts*Teq is:\t\t", r)
        print("The sum of Teq is:\t\t",s)
        The number of samples is:
                                         1724
        The sum of Ts^2 is:
                                         1675245193.47
        The sum of Ts is:
                                         1526805.7
        The sum of Ts*Teq is:
                                         1613079581.14
        The sum of Teq is:
                                         1455489.0
In [7]: m = (1/((n*p) - (q**2)))*((n*r) - (q*s)) #The slope of the line
        c = (1/((n*p) - (q**2)))*((p*s) - (r*q)) #The y-intercept of the li
        print("The slope of the estimated line is:\t\t", m)
        print("The y-intercept of the estimated line is:\t", c)
        The slope of the estimated line is:
                                                         1.00307588543205
        The y-intercept of the estimated line is:
                                                         -44.09105534234351
```

```
In [12]:
         #To visualize the estimated line, create an x-vs-y set using m and c
         x = [x/10 \text{ for } x \text{ in range } (0, 80000)]
         y = [m*xi + c for xi in x]
         #Plot again to visualize how the estimated line fairs against the orig
          inal data
         orig, = plt.plot(df['P. Ts Mean (K)'], df['P. Ts Mean (K)'], label = "A
          ctual" )
          plt.scatter(df['P. Ts Mean (K)'], df['P. Ts Mean (K)'], label = "Actua
          1")
          est, = plt.plot(x, y, label = "Estimated", color='g')
          plt.xlabel('Mass (grams)')
          plt.ylabel('Time (seconds)')
          plt.legend(handles=[orig, est])
          plt.xlim(0, 1000)
          plt.ylim(0, 1000)
          plt.show()
          #plt.clf()
```



```
In [13]: #Finding the error
error = 0.0
for index, row in df.iterrows():
        error += ((m*row['P. Ts Mean (K)'] + c) - row['P. Teq Mean (K)'])*
        *2 #(Estimated - original)^2
        error/=n

print("The mean squared error is:\t\t", error)
print("The root means squared error is:\t", error**(0.5))
```

The mean squared error is: 42.14731137295646
The root means squared error is: 6.492096069295067