```
In [2]: 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)
```

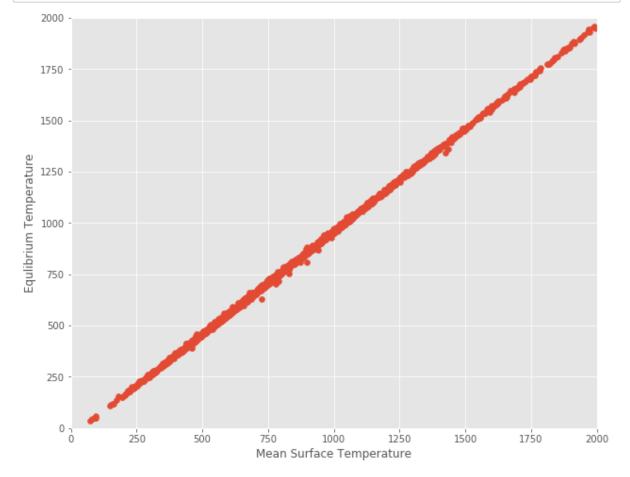
```
In [3]: #Reading the data
df = pd.read_csv('datsets/physics/exoplanet-temp.csv')
df = df.dropna() #For convenience, we drop any rows with any NaN entri
es
print(df)
```

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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

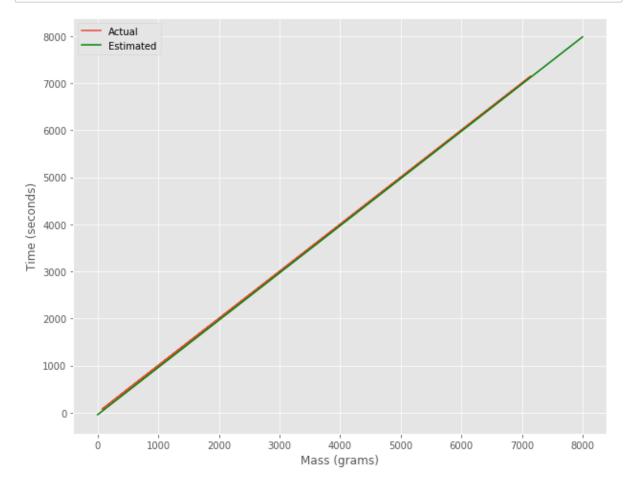
[1724 rows x 2 columns]

```
In [4]: #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 [5]: 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 [6]: 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 [7]:
        #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" )
         #orig, = plt.scatter(df['P. Ts Mean (K)'], df['P. Ts Mean (K)'], label
         = "Actual")
         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, 2000)
         #plt.ylim(0, 2000)
         plt.show()
         #plt.clf()
```



```
In [8]: #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