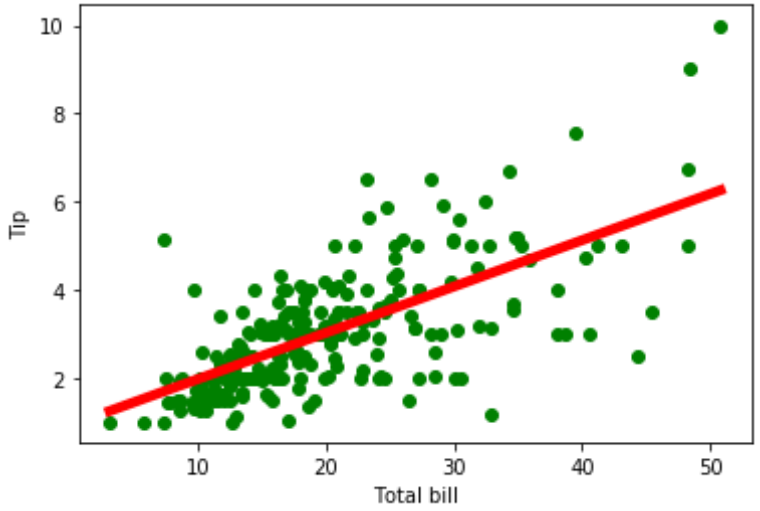
In [2]:

```
import matplotlib.pyplot as plt
import pandas as pd
import numpy as np
def kernel(point,xmat, k):
 m,n = np.shape(xmat)
 weights = np.mat(np.eye((m)))
 for j in range(m):
   diff = point - X[j]
 weights[j,j] = np.exp(diff*diff.T/(-2.0*k**2))
 return weights
def localWeight(point,xmat,ymat,k):
 wei = kernel(point,xmat,k)
 W = (X.T*(wei*X)).I*(X.T*(wei*ymat.T))
 return W
def localWeightRegression(xmat,ymat,k):
 m,n = np.shape(xmat)
 ypred = np.zeros(m)
 for i in range(m):
   ypred[i] = xmat[i]*localWeight(xmat[i],xmat,ymat,k)
 return ypred
def graphPlot(X,ypred):
 sortindex = X[:,1].argsort(0)
 xsort = X[sortindex][:,0]
 fig = plt.figure()
 ax = fig.add_subplot(1,1,1)
 ax.scatter(bill,tip, color='green')
 ax.plot(xsort[:,1],ypred[sortindex], color = 'red', linewidth=5)
 plt.xlabel('Total bill')
 plt.ylabel('Tip')
 plt.show();


data = pd.read_csv('data10_tips.csv')
bill = np.array(data.total_bill)
tip = np.array(data.tip)
mbill = np.mat(bill)
```

```
mtip = np.mat(tip)
m= np.shape(mbill)[1]
one = np.mat(np.ones(m))
X = np.hstack((one.T,mbill.T))
print("Regression with parameter k = 2")
ypred = localWeightRegression(X,mtip,2)
graphPlot(X,ypred)
```

```
Regression with parameter k = 2
```



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