```
In [2]:    1  import pandas as pd
           2  import numpy as np
           3  import matplotlib.pyplot as plt
           4  %matplotlib inline
```

```
In [4]:    1  df = pd.read_csv('tips.csv')
           2  features = np.array(df.total_bill)
           3  labels = np.array(df.tip)
```

```
In [5]:    1  def kernel(data, point, xmat, k):
           2      m,n = np.shape(xmat)
           3      ws = np.mat(np.eye((m)))
           4      for j in range(m):
           5          diff = point - data[j]
           6          ws[j,j] = np.exp(diff*diff.T/(-2.0*k**2))
           7      return ws
```
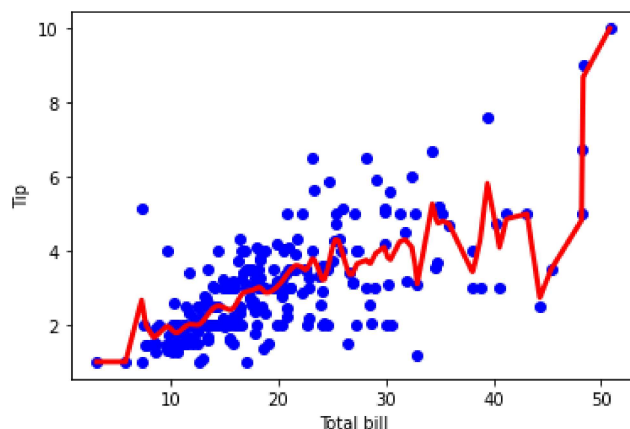
```
In [6]:    1  def local_weight(data, point, xmat, ymat, k):
           2      wei = kernel(data, point, xmat, k)
           3      return (data.T*(wei*data)).I*(data.T*(wei*ymat.T))
```

```
In [7]:    1  def local_weight_regression(xmat, ymat, k):
           2      m,n = np.shape(xmat)
           3      ypred = np.zeros(m)
           4      for i in range(m):
           5          ypred[i] = xmat[i]*local_weight(xmat, xmat[i],xmat,ymat,k)
           6      return ypred
```

```
In [8]:    1  m = features.shape[0]
           2  mtip = np.mat(labels)
           3  data = np.hstack((np.ones((m, 1)), np.mat(features).T))
           4
```

```
In [9]:    1  ypred = local_weight_regression(data, mtip, 0.5)
           2  indices = data[:,1].argsort(0)
           3  xsort = data[indices][:,0]
```

```
In [10]:   1  fig = plt.figure()
           2  ax = fig.add_subplot(1,1,1)
           3  ax.scatter(features, labels, color='blue')
           4  ax.plot(xsort[:,1],ypred[indices], color = 'red', linewidth=3)
           5  plt.xlabel('Total bill')
           6  plt.ylabel('Tip')
           7  plt.show()
```

In [ ]: 1