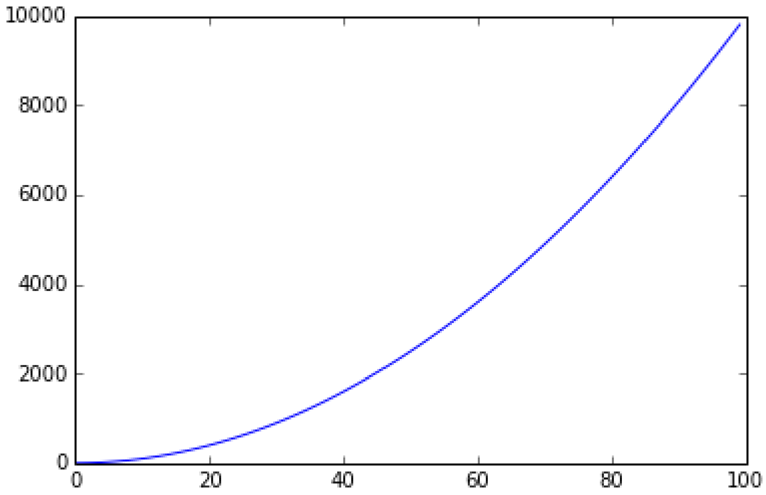
Simple Plotting example

In [113]:

```
%matplotlib inline
import matplotlib.pyplot as plt #importing matplot lib library
import numpy as np
x = range(100)
#print x, print and check what is x
y =[val**2 for val in x]
#print y
plt.plot(x,y) #plotting x and y
```

Out[113]:

```
[<matplotlib.lines.Line2D at 0x7857bb0>]
```



See how [np.linspace] (http://docs.scipy.org/doc/numpy/reference/generated/numpy.linspace.html) works.

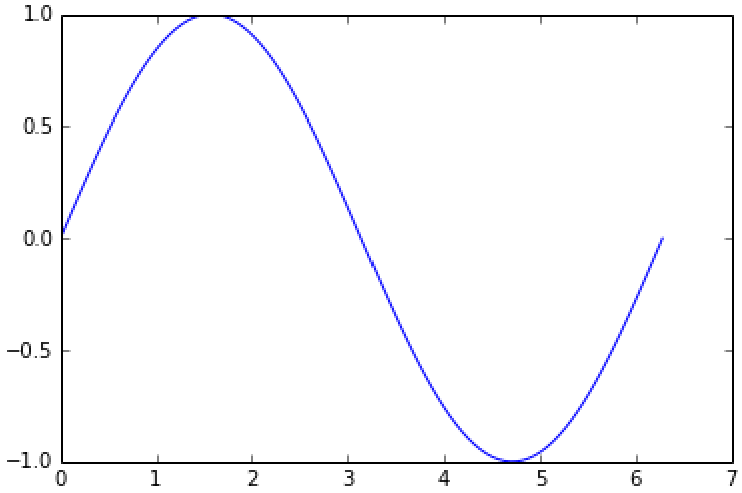
Using Numpy

In [17]:

```
x = np.linspace(0, 2*np.pi, 100)
y =np.sin(x)
plt.plot(x,y)
```

Out[17]:

```
[<matplotlib.lines.Line2D at 0x579aef0>]
```

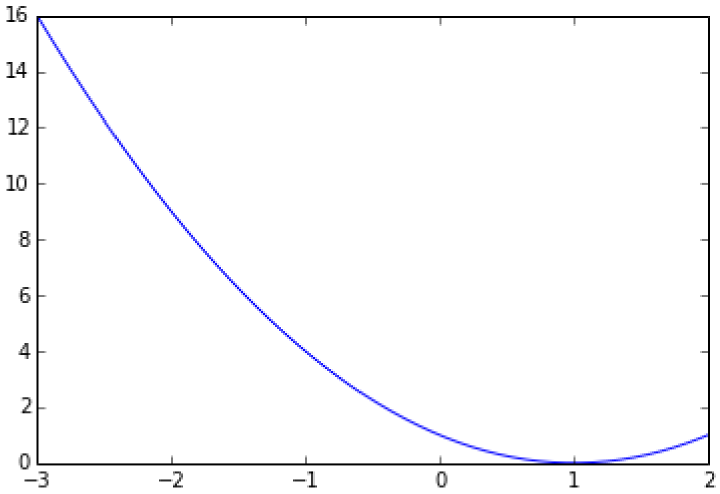


In [24]:

```
x= np.linspace(-3,2, 200)
Y = x ** 2 - 2 * x + 1.
plt.plot(x,Y)
```

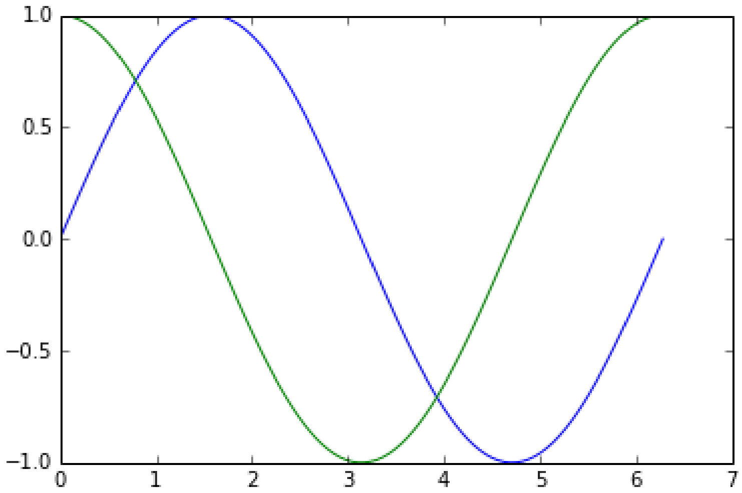
Out[24]:

```
[<matplotlib.lines.Line2D at 0x6ffb310>]
```



```
In [32]: # plotting multiple plots
         x =np.linspace(0, 2 * np.pi, 100)
         y = np.sin(x)
         z = np.cos(x)
         plt.plot(x,y)
         plt.plot(x,z)
         plt.show()

         # Matplot lib picks different colors for different plot.
```

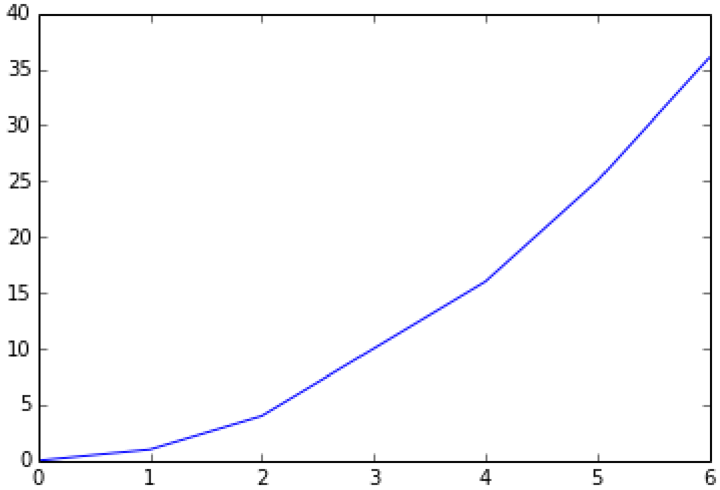


```
In [35]: cd C:\Users\tk\Desktop\Matplot

         C:\Users\tk\Desktop\Matplot
```

```
In [39]:   data = np.loadtxt('numpy.txt')
           plt.plot(data[:,0], data[:,1]) # plotting column 1 vs column 2
           # The text in the numpy.txt should look like this
           # 0  0
           # 1  1
           # 2  4
           # 4  16
           # 5  25
           # 6  36
```

```
Out[39]:   [<matplotlib.lines.Line2D at 0x740f090>]
```

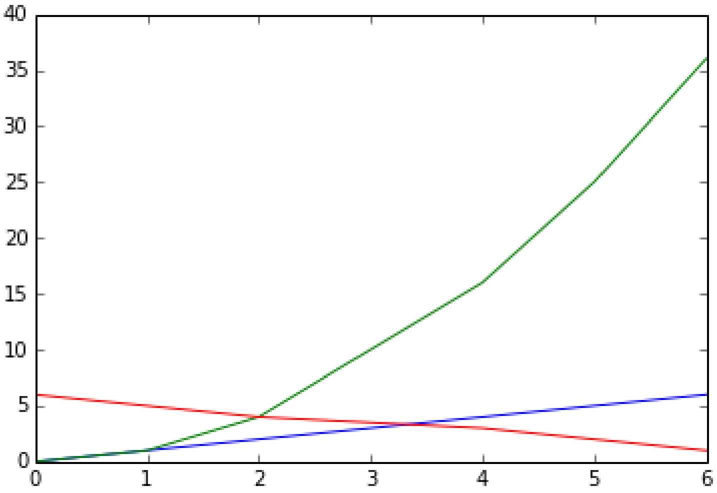


```
In [56]:  data1 = np.loadtxt('scipy.txt') # load the file
          print data1.T

          for val in data1.T: #loop over each and every value in data1.T
              plt.plot(data1[:,0], val) #data1[:,0] is the first row in data1.T

          # data in scipy.txt looks like this:
          # 0 0  6
          # 1 1  5
          # 2 4  4
          # 4 16 3
          # 5 25 2
          # 6 36 1
```

```
[[  0.   1.   2.   4.   5.   6.]
 [  0.   1.   4.  16.  25.  36.]
 [  6.   5.   4.   3.   2.   1.]]
```



Scatter Plots and Bar Graphs

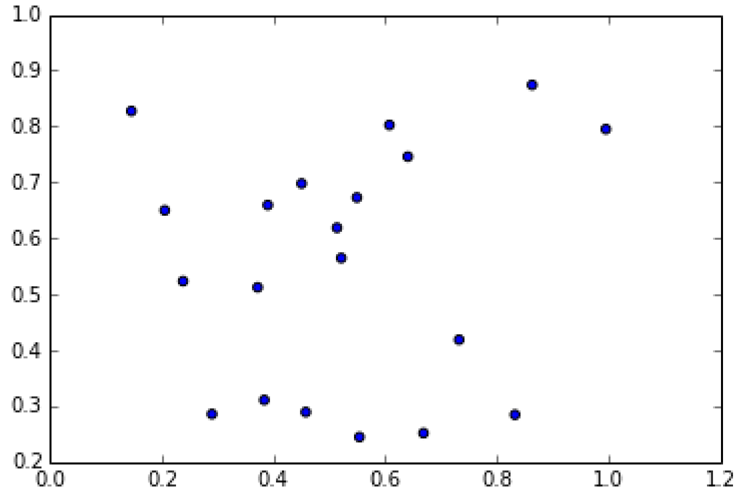
In [64]:

```
sct = np.random.rand(20, 2)
print sct
plt.scatter(sct[:,0], sct[:,1]) # I am plotting a scatter plot.
```

```
[[ 0.51454542  0.61859101]
 [ 0.45115993  0.69774873]
 [ 0.29051205  0.28594808]
 [ 0.73240446  0.41905186]
 [ 0.23869394  0.5238878 ]
 [ 0.38422814  0.31108919]
 [ 0.52218967  0.56526379]
 [ 0.60760426  0.80247073]
 [ 0.37239096  0.51279078]
 [ 0.45864677  0.28952167]
 [ 0.8325996   0.28479446]
 [ 0.14609382  0.8275477 ]
 [ 0.86338279  0.87428696]
 [ 0.55481585  0.24481165]
 [ 0.99553336  0.79511137]
 [ 0.55025277  0.67267026]
 [ 0.39052024  0.65924857]
 [ 0.66868207  0.25186664]
 [ 0.64066313  0.74589812]
 [ 0.20587731  0.64977807]]
```

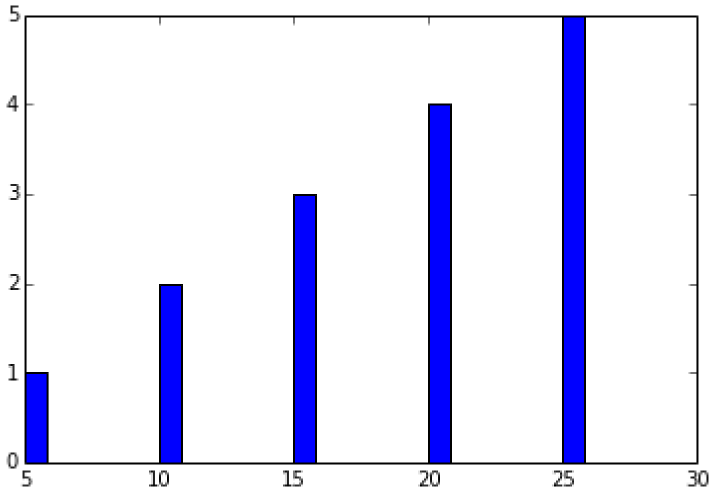
Out[64]:

```
<matplotlib.collections.PathCollection at 0x78a7110>
```



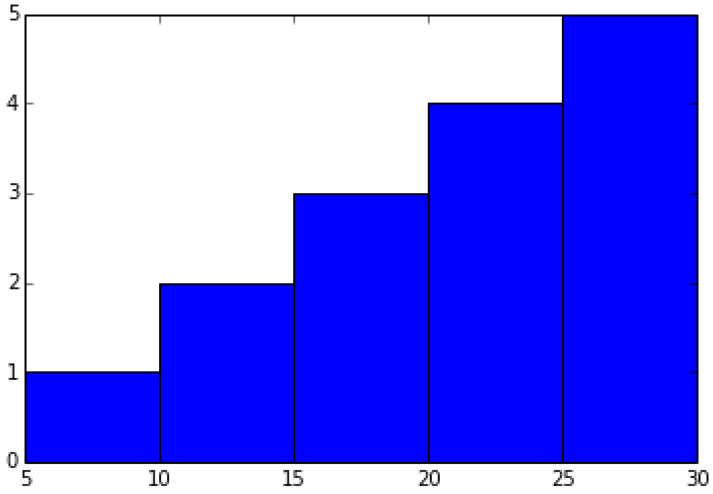
```
In [65]:  ghj =[5, 10 ,15, 20, 25]
          it =[ 1, 2, 3, 4, 5]
          plt.bar(ghj, it) # simple bar graph

Out[65]:  <Container object of 5 artists>
```



```
In [74]:  ghj =[5, 10 ,15, 20, 25]
          it =[ 1, 2, 3, 4, 5]
          plt.bar(ghj, it, width =5)# you can change the thickness of a bar, by

Out[74]:  <Container object of 5 artists>
```

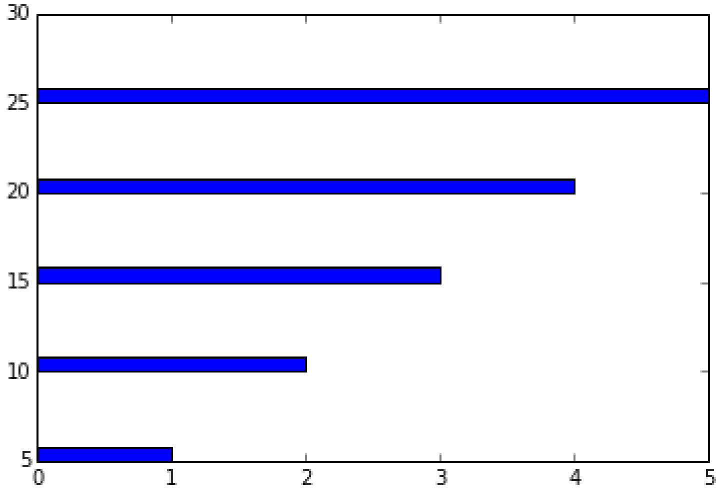


In [75]:

```
ghj =[5, 10 ,15, 20, 25]
it =[ 1, 2, 3, 4, 5]
plt.barh(ghj, it) # barh is a horizontal bar graph
```

Out[75]:

```
<Container object of 5 artists>
```

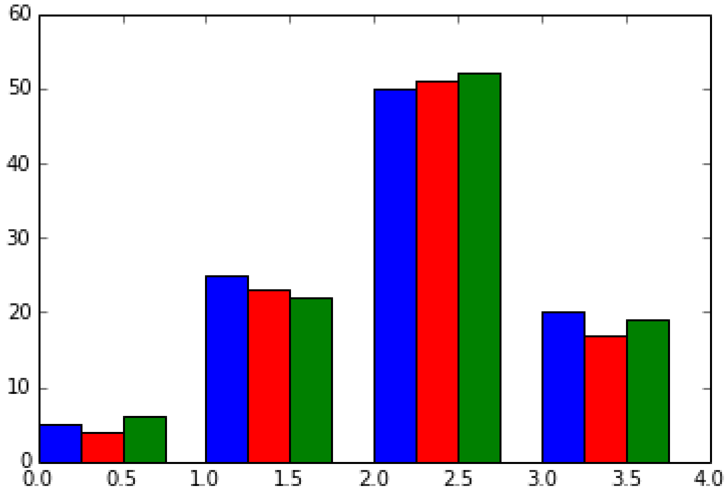


Multiple bar charts

In [95]:

```
new_list = [[5., 25., 50., 20.], [4., 23., 51., 17.], [6., 22., 52., 1
x = np.arange(4)
plt.bar(x + 0.00, new_list[0], color ='b', width =0.25)
plt.bar(x + 0.25, new_list[1], color ='r', width =0.25)
plt.bar(x + 0.50, new_list[2], color ='g', width =0.25)

#plt.show()
```

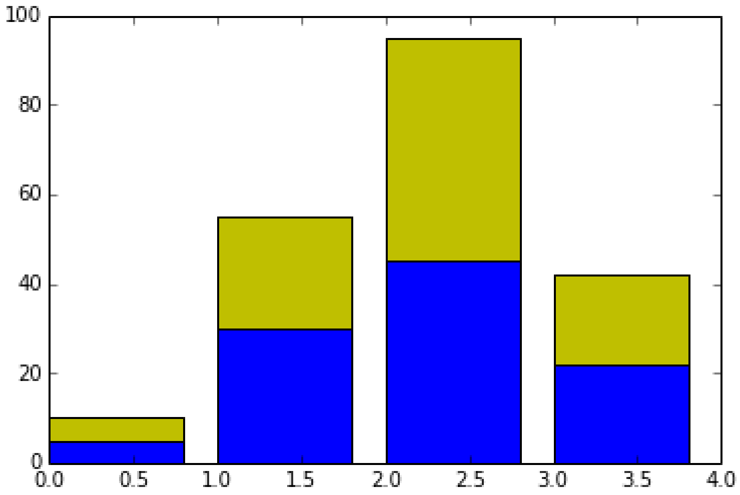


In [100]:

```
#Stacked Bar charts
p = [5., 30., 45., 22.]
q = [5., 25., 50., 20.]
x =range(4)
plt.bar(x, p, color ='b')
plt.bar(x, q, color ='y', bottom =p)
```

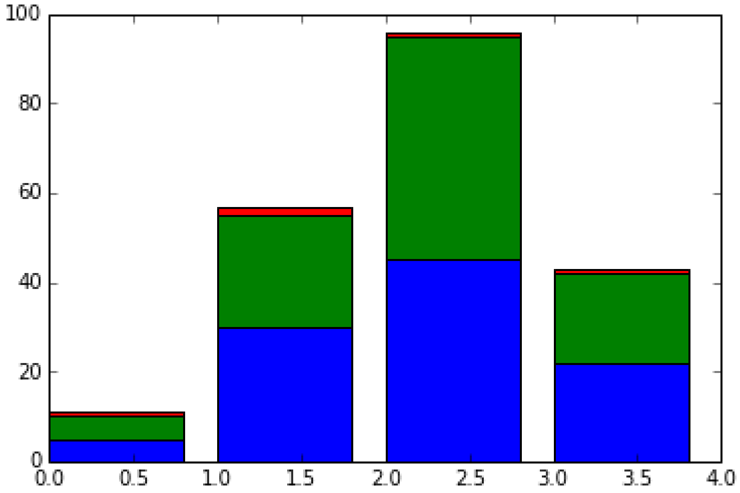
Out[100]:

```
<Container object of 4 artists>
```



In [35]:

```
# plotting more than 2 values
A = np.array([5., 30., 45., 22.])
B = np.array([5., 25., 50., 20.])
C = np.array([1., 2., 1., 1.])
X = np.arange(4)
plt.bar(X, A, color = 'b')
plt.bar(X, B, color = 'g', bottom = A)
plt.bar(X, C, color = 'r', bottom = A + B) # for the third argument, I
plt.show()
```

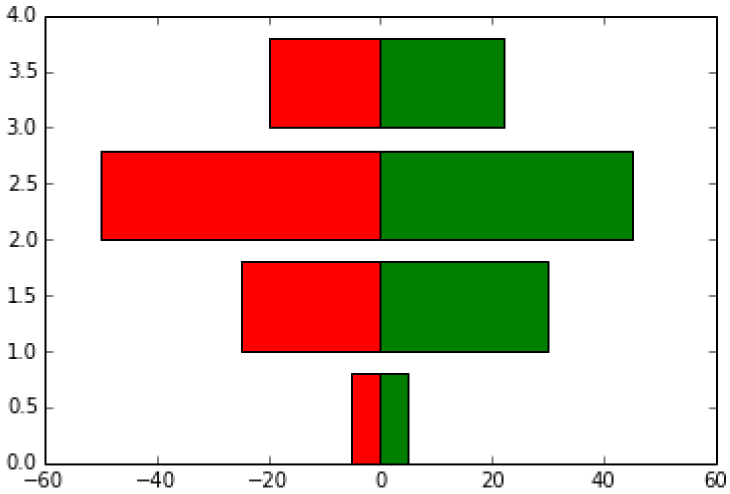


In [94]:

```
black_money = np.array([5., 30., 45., 22.])
white_money = np.array([5., 25., 50., 20.])
z = np.arange(4)
plt.barh(z, black_money, color ='g')
plt.barh(z, -white_money, color ='r')# - notation is needed for generat
```

Out[94]:

```
<Container object of 4 artists>
```



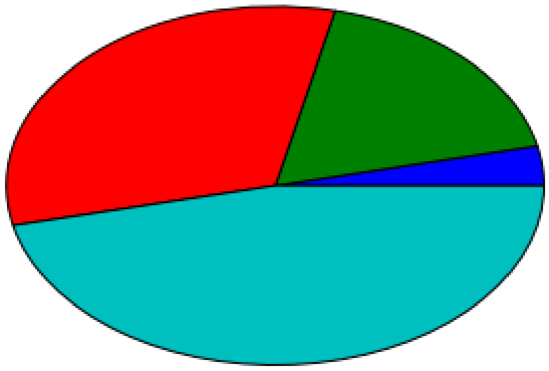
Other Plots

In [114]:

```
#Pie charts
y = [5, 25, 45, 65]
plt.pie(y)
```

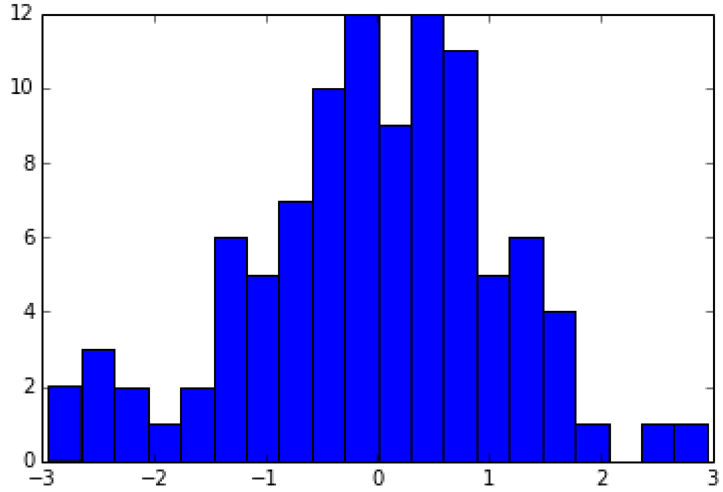
Out[114]:

```
([<matplotlib.patches.Wedge at 0x7a19d50>,
  <matplotlib.patches.Wedge at 0x7a252b0>,
  <matplotlib.patches.Wedge at 0x7a257b0>,
  <matplotlib.patches.Wedge at 0x7a25cb0>],
 [<matplotlib.text.Text at 0x7a25070>,
  <matplotlib.text.Text at 0x7a25550>,
  <matplotlib.text.Text at 0x7a25a50>,
  <matplotlib.text.Text at 0x7a25f50>])
```



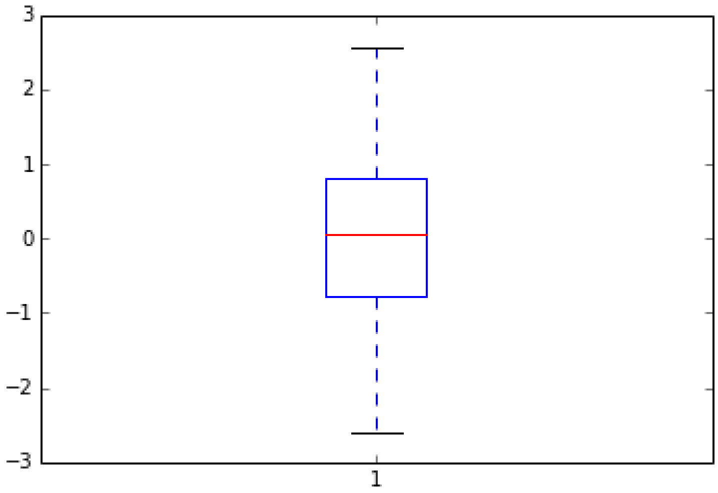
```
In [115]: #Histograms
          d = np.random.randn(100)
          plt.hist(d, bins = 20)
```

```
Out[115]: (array([  2.,   3.,   2.,   1.,   2.,   6.,   5.,   7.,  10.,  12.,   9
                   12.,  11.,   5.,   6.,   4.,   1.,   0.,   1.,   1.]),
           array([-2.9389701 , -2.64475645, -2.35054281, -2.05632916, -1.7621155
                  -1.46790186, -1.17368821, -0.87947456, -0.58526092, -0.2910472
                   0.00316638,  0.29738003,  0.59159368,  0.88580733,  1.1800209
                   1.47423462,  1.76844827,  2.06266192,  2.35687557,  2.6510892
                   2.94530286]),
           <a list of 20 Patch objects>)
```



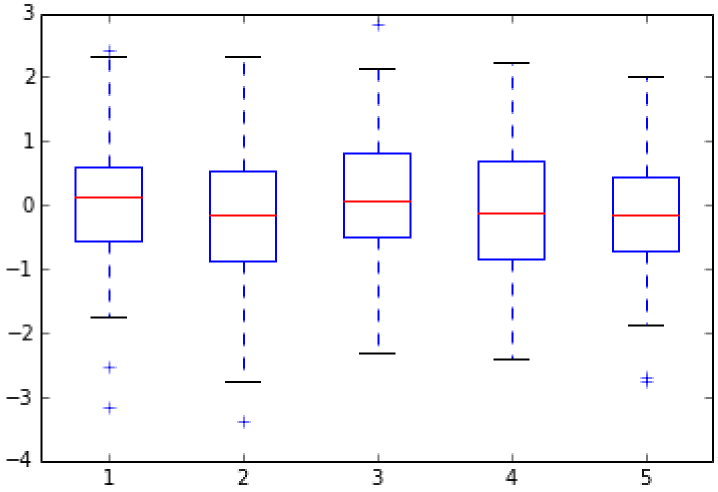
```
In [116]:  d = np.random.randn(100)
           plt.boxplot(d)
           #1) The red bar is the median of the distribution
           #2) The blue box includes 50 percent of the data from the lower quarti
           #   Thus, the box is centered on the median of the data.
```

```
Out[116]:  {'boxes': [<matplotlib.lines.Line2D at 0x7cca090>],
            'caps': [<matplotlib.lines.Line2D at 0x7c02d70>,
             <matplotlib.lines.Line2D at 0x7cc2c90>],
            'fliers': [<matplotlib.lines.Line2D at 0x7cca850>,
             <matplotlib.lines.Line2D at 0x7ccae10>],
            'medians': [<matplotlib.lines.Line2D at 0x7cca470>],
            'whiskers': [<matplotlib.lines.Line2D at 0x7c02730>,
             <matplotlib.lines.Line2D at 0x7cc24b0>]}
```



```
In [118]: d = np.random.randn(100, 5) # generating multiple box plots
          plt.boxplot(d)
```

```
Out[118]: {'boxes': [<matplotlib.lines.Line2D at 0x7f49d70>,
            <matplotlib.lines.Line2D at 0x7ea1c90>,
            <matplotlib.lines.Line2D at 0x7eafb90>,
            <matplotlib.lines.Line2D at 0x7ebea90>,
            <matplotlib.lines.Line2D at 0x7ece990>],
           'caps': [<matplotlib.lines.Line2D at 0x7f2b3b0>,
            <matplotlib.lines.Line2D at 0x7f49990>,
            <matplotlib.lines.Line2D at 0x7ea14d0>,
            <matplotlib.lines.Line2D at 0x7ea18b0>,
            <matplotlib.lines.Line2D at 0x7eaf3d0>,
            <matplotlib.lines.Line2D at 0x7eaf7b0>,
            <matplotlib.lines.Line2D at 0x7ebe2d0>,
            <matplotlib.lines.Line2D at 0x7ebe6b0>,
            <matplotlib.lines.Line2D at 0x7ece1d0>,
            <matplotlib.lines.Line2D at 0x7ece5b0>],
           'fliers': [<matplotlib.lines.Line2D at 0x7e98550>,
            <matplotlib.lines.Line2D at 0x7e98930>,
            <matplotlib.lines.Line2D at 0x7ea8470>,
            <matplotlib.lines.Line2D at 0x7ea8a10>,
            <matplotlib.lines.Line2D at 0x7eb6370>,
            <matplotlib.lines.Line2D at 0x7eb6730>,
            <matplotlib.lines.Line2D at 0x7ec6270>,
            <matplotlib.lines.Line2D at 0x7ec6810>,
            <matplotlib.lines.Line2D at 0x8030170>,
            <matplotlib.lines.Line2D at 0x8030710>],
           'medians': [<matplotlib.lines.Line2D at 0x7e98170>,
            <matplotlib.lines.Line2D at 0x7ea8090>,
            <matplotlib.lines.Line2D at 0x7eaff70>,
            <matplotlib.lines.Line2D at 0x7ebee70>,
            <matplotlib.lines.Line2D at 0x7eced70>],
           'whiskers': [<matplotlib.lines.Line2D at 0x7f2bb50>,
            <matplotlib.lines.Line2D at 0x7f491b0>,
            <matplotlib.lines.Line2D at 0x7e98cf0>,
            <matplotlib.lines.Line2D at 0x7ea10f0>,
            <matplotlib.lines.Line2D at 0x7ea8bf0>,
            <matplotlib.lines.Line2D at 0x7ea8fd0>,
            <matplotlib.lines.Line2D at 0x7eb6cd0>,
            <matplotlib.lines.Line2D at 0x7eb6ed0>,
            <matplotlib.lines.Line2D at 0x7ec6bd0>,
            <matplotlib.lines.Line2D at 0x7ec6dd0>]}
```


3
2
1
0
−1
−2
−3
−4
1
2
3
4
5