**import** matplotlib.pyplot **as** plt  
**import** numpy **as** np  
**import** copy  
  
**def** sort\_vector(alist):  
 exchange\_flag = **True** passnum = len(alist) - 1  
 **while** passnum > 0 **and** exchange\_flag:  
 exchange\_flag = **False  
 for** i **in** range(passnum):  
 **if** alist[i] > alist[i + 1]:  
 exchange\_flag = **True** temp = alist[i]  
 alist[i] = alist[i + 1]  
 alist[i + 1] = temp  
 passnum = passnum - 1  
  
**def** show\_vector(a, b):  
 x = len(a)  
 y = max(a)  
 plt.axis([0, x + 1, 0, y + 1])  
 locs = np.arange(x)  
  
 plt.subplot(2, 1, 1)  
 plt.bar(locs, a, color=**'cyan'**)  
 plt.xticks(locs, **''**)  
 plt.title(**'random list of elements'**)  
  
 plt.subplot(2, 1, 2)  
 plt.bar(locs, b, color=**'green'**)  
 plt.xticks(locs, **' '**)  
 plt.title(**'sorted list of elements'**)  
  
 plt.show()  
  
**def** main():  
 a = np.random.randint(100, size=100)  
 print(**"Current list:\n"**)  
 print(a,**"\n"**)  
 b = copy.deepcopy(a)  
 sort\_vector(b)  
 print(**"Sorted list:\n"**)  
 print(b)  
 show\_vector(a, b)  
  
**if** \_\_name\_\_ == **'\_\_main\_\_'**:  
 main()





