demo of matplotlib

figure (a)

figure (b)
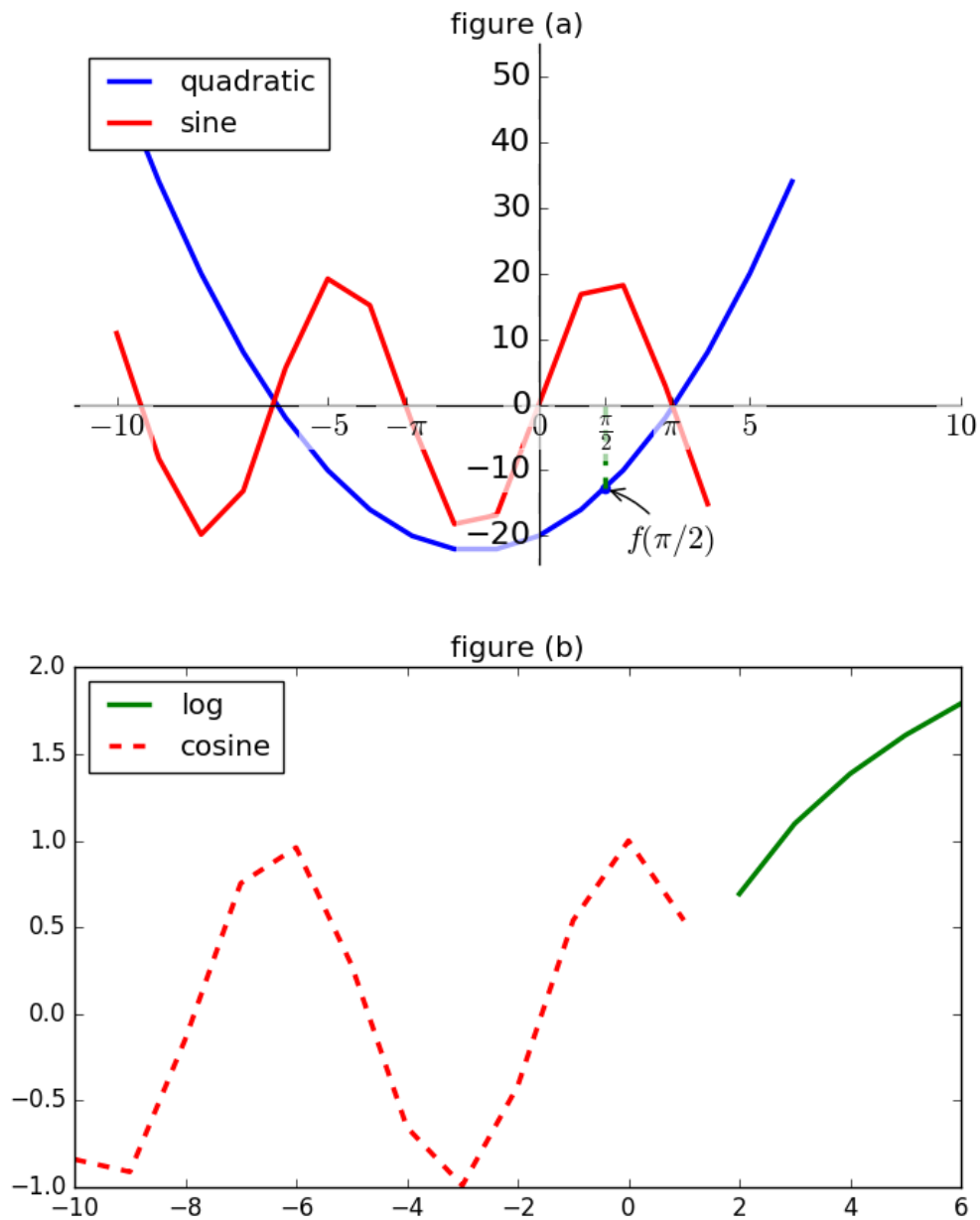


```python
#!/usr/bin/python

import os
import sys

from matplotlib import pyplot as plt
from pylab import *
import math
```

```python
x1 = range(-10,7)
y1 = []
for i in x1:
        v = i*i + 3*i - 20
        y1.append(v)

x2 = range(-10,5)
y2 = []
for i in x2:
        v = 20.0*math.sin(i)
        y2.append(v)

x3 = range(2,7)
y3 = []
for i in x3:
        y3.append(math.log(i))

x4 = range(-10,2)
y4 = []
for i in x4:
        y4.append(math.cos(i))

# set the figure size and title
plt.figure(figsize=(8,10), dpi=80)
plt.suptitle('demo of matplotlib',fontsize=24)

# first plot
subplot(2,1,1)
plt.plot(x1,y1,color='blue',linewidth=2.5,linestyle='-',label='quadratic')
plt.plot(x2,y2,color='red',linewidth=2.5,linestyle='-',label='sine')
plt.legend(loc='upper left')

# change the lim
plt.xlim(min(x1)*1.1,max(x1)*1.1)
plt.ylim(min(y1)*1.1,max(y1)*1.1)

# add ticks
plt.xticks([-10,-5,-math.pi,0,math.pi/2,math.pi,5,10],['$-10$','$-5$','$-\pi$','$0$',r'$\frac{\pi}{2}$','$\pi$','$5$','$10$'])

# move spines
ax = plt.gca()
ax.spines['right'].set_color('none')
ax.spines['top'].set_color('none')
ax.xaxis.set_ticks_position('bottom')
ax.spines['bottom'].set_position(('data',0))
ax.yaxis.set_ticks_position('left')
ax.spines['left'].set_position(('data',0))

# add titile
```

```
ax.set_title('figure (a)')

# add annotation
px = math.pi/2.0
py = px*px + 3*px - 20
plt.plot([px,px],[0,py],color='green',linewidth=2.5,linestyle='--')
plt.scatter([px,],[py,],20,color='blue')
plt.annotate('$f(\pi/2)$',xy=(px,py),xycoords='data',xytext=(+10,-30),textcoords='offset points',
fontsize=16,arrowprops=dict(arrowstyle="->", connectionstyle="arc3,rad=.2"))

for label in ax.get_xticklabels() + ax.get_yticklabels():
        label.set_fontsize(16)
        label.set_bbox(dict(facecolor='white',edgecolor='None',alpha=0.65))

# second plot
subplot(2,1,2)
plt.plot(x3,y3,color='green',linewidth=2.5,linestyle='-',label='log')
ax = plt.gca()
ax.set_title('figure (b)')

plt.plot(x4,y4,color='red',linewidth=2.5,linestyle='--',label='cosine')
plt.legend(loc='upper left')

plt.show()
```
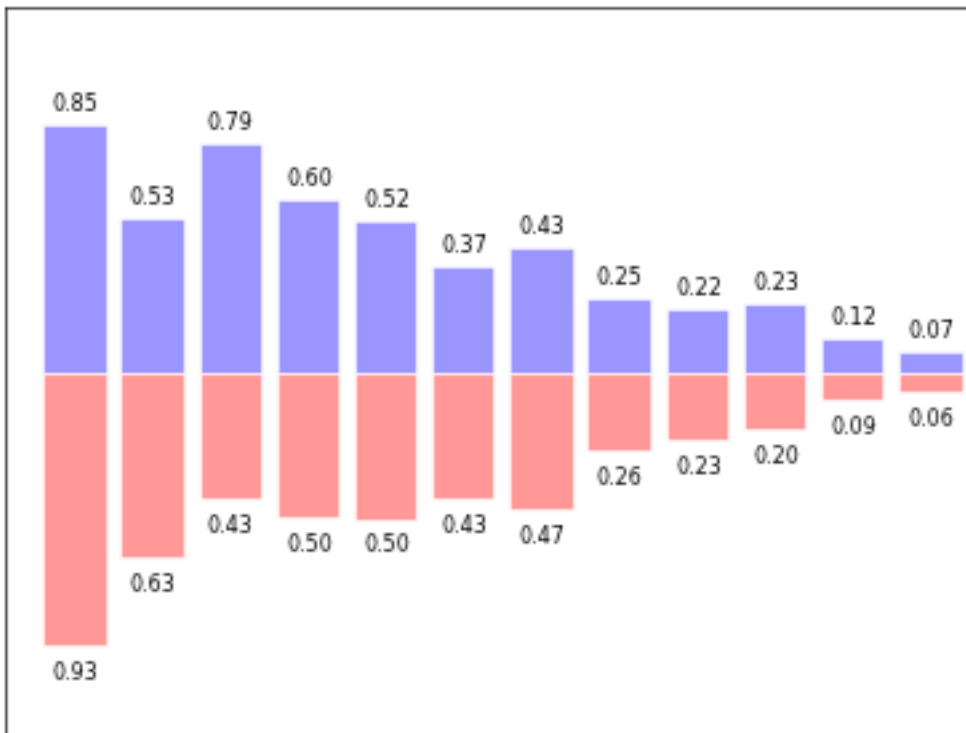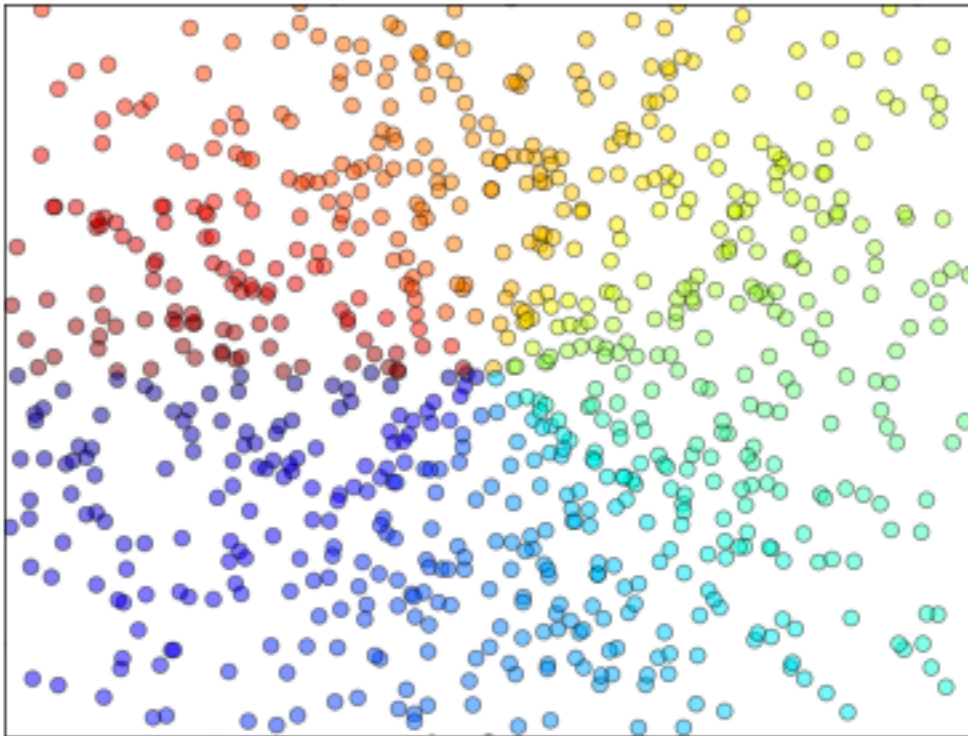
```python
import numpy as np
import maplotlib.pyplot as plt

n = 12
X = np.arange(n)
Y1 = (1-X/float(n)) * np.random.uniform(0.5,1.0,n)
Y2 = (1-X/float(n)) * np.random.uniform(0.5,1.0,n)

plt.bar(X, +Y1, facecolor='#9999ff', edgecolor='white')
plt.bar(X, -Y2, facecolor='#ff9999', edgecolor='white')

for x,y in zip(X,Y1):
    plt.text(x+0.4, y+0.05, '%.2f' % y, ha='center', va= 'bottom')
    plt.ylim(-1.25,+1.25)
    plt.show()
```



```python
import numpy as np
import maplotlib.pyplot as plt

n = 1024
X = np.random.normal(0,1,n)
Y = np.random.normal(0,1,n)

plt.scatter(X,Y)
plt.show()
```