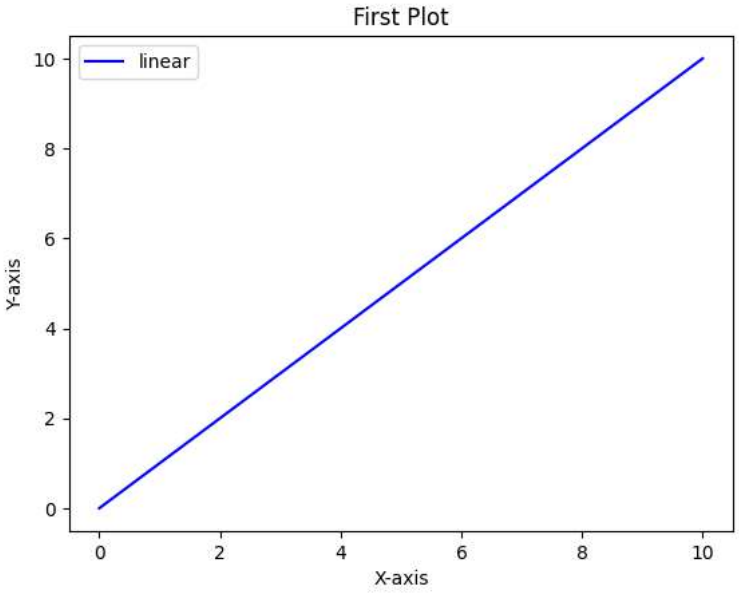
PlottingAndVisualizingData

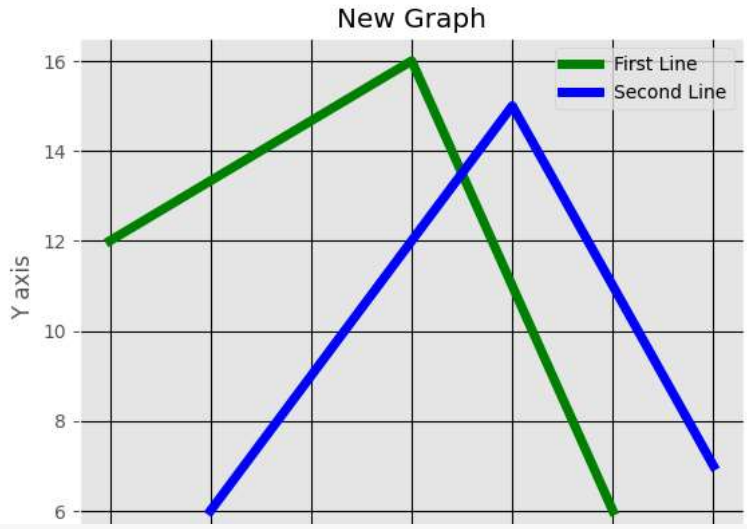
```
#import
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

```
#Plotting a line chart
x = np.linspace(0, 10, 100) #(start, stop, number)
print(x)
plt.plot(x, x, label='linear',color='b')
plt.legend()
plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.title("First Plot")
plt.show()
```

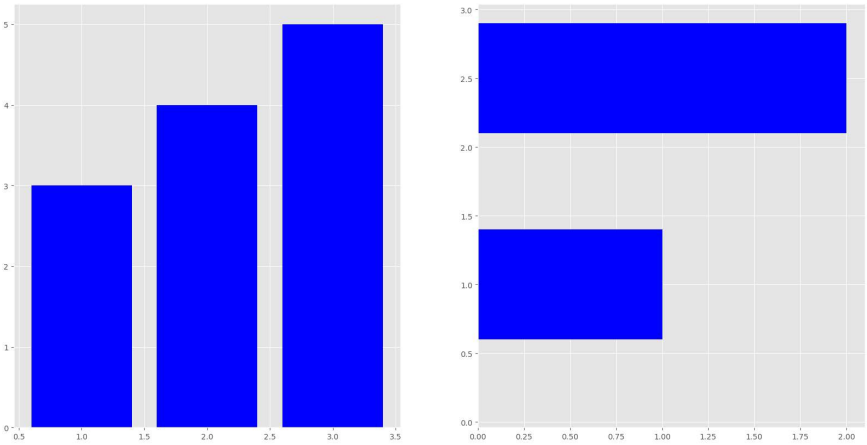
```
[ 0.          0.1010101   0.2020202   0.3030303   0.4040404   0.50505051
  0.60606061  0.70707071  0.80808081  0.90909091  1.01010101  1.11111111
  1.21212121  1.31313131  1.41414141  1.51515152  1.61616162  1.71717172
  1.81818182  1.91919192  2.02020202  2.12121212  2.22222222  2.32323232
  2.42424242  2.52525253  2.62626263  2.72727273  2.82828283  2.92929293
  3.03030303  3.13131313  3.23232323  3.33333333  3.43434343  3.53535354
  3.63636364  3.73737374  3.83838384  3.93939394  4.04040404  4.14141414
  4.24242424  4.34343434  4.44444444  4.54545455  4.64646465  4.74747475
  4.84848485  4.94949495  5.05050505  5.15151515  5.25252525  5.35353535
  5.45454545  5.55555556  5.65656566  5.75757576  5.85858586  5.95959596
  6.06060606  6.16161616  6.26262626  6.36363636  6.46464646  6.56565657
  6.66666667  6.76767677  6.86868687  6.96969697  7.07070707  7.17171717
  7.27272727  7.37373737  7.47474747  7.57575758  7.67676768  7.77777778
  7.87878788  7.97979798  8.08080808  8.18181818  8.28282828  8.38383838
  8.48484848  8.58585859  8.68686869  8.78787879  8.88888889  8.98989899
  9.09090909  9.19191919  9.29292929  9.39393939  9.49494949  9.5959596
  9.6969697   9.7979798   9.8989899  10.        ]
```



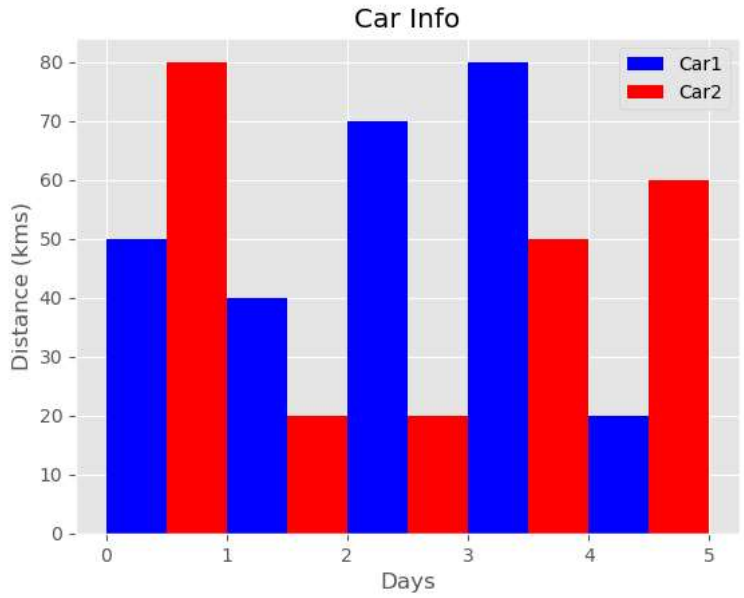

```
#plotting multi line with background
from matplotlib import style
style.use('ggplot')
x1 = [5,8,10]
y1 = [12,16,6]
x2 = [6,9,11]
y2 = [6,15,7]
plt.plot(x1,y1,'g',label='First Line', linewidth=5)
plt.plot(x2,y2,'b',label='Second Line',linewidth=5)
plt.title('New Graph')
plt.ylabel('Y axis')
plt.xlabel('X axis')
plt.legend()
plt.grid(True,color='k')
plt.show()
```



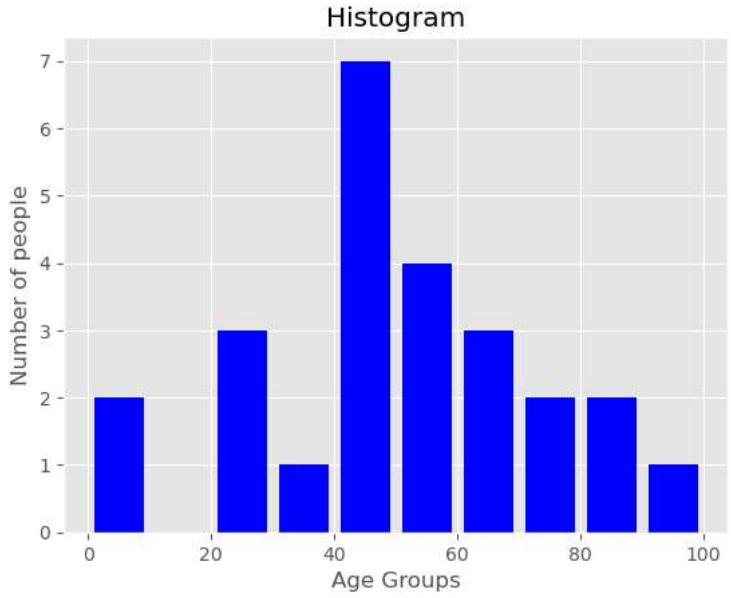

```
# plotting bar graph
fig = plt.figure(figsize=(20,10))
ax1 = fig.add_subplot(121) #1x2 grid 1st subplot
ax2 = fig.add_subplot(122) #1x2 grid 2nd subplot

ax1.bar([1,2,3],[3,4,5],color='b')
ax2.barh([0.5,1,2.5],[0,1,2],color='b')

plt.show()
```



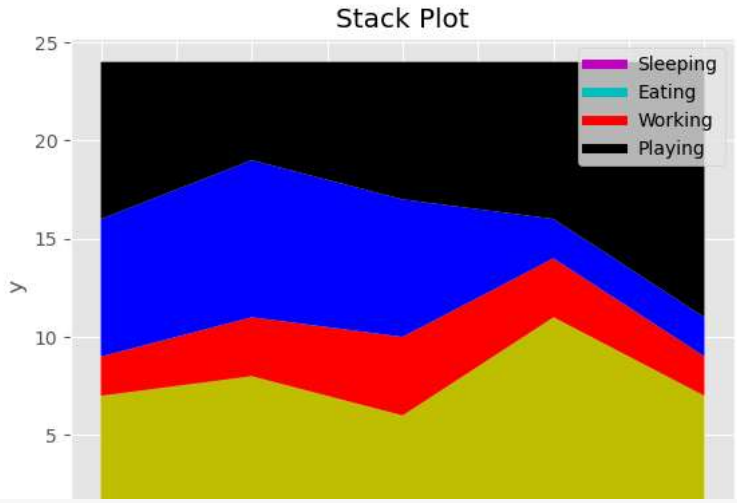
```
#plot multi bar

plt.bar([0.25,1.25,2.25,3.25,4.25],[50,40,70,80,20],label="Car1",color='b', width=.5)
plt.bar([.75,1.75,2.75,3.75,4.75],[80,20,20,50,60], label="Car2", color='r',width=.5)
plt.legend()
plt.xlabel('Days')
plt.ylabel('Distance (kms)')
plt.title('Car Info')
plt.show()
```



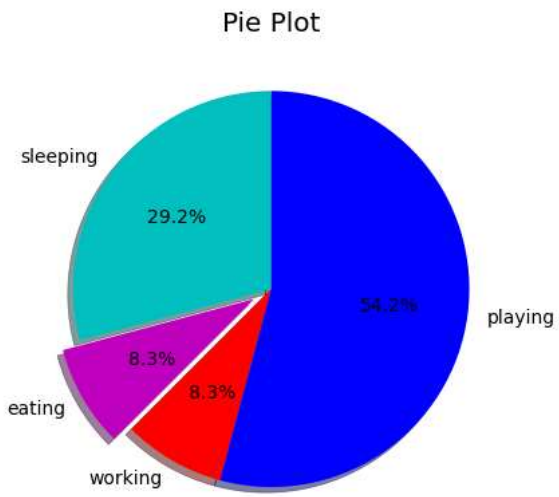

```
#plot histogram
population_age = [22,55,62,45,21,22,34,42,42,4,2,102,95,85,55,110,120,70,65,55,111,115,80,75,65,54,44,43,42,48]
bins = [0,10,20,30,40,50,60,70,80,90,100]
plt.hist(population_age, bins, histtype='bar', color='b',rwidth=0.8)
plt.xlabel('Age Groups')
plt.ylabel('Number of people')
plt.title('Histogram')
plt.show()
```



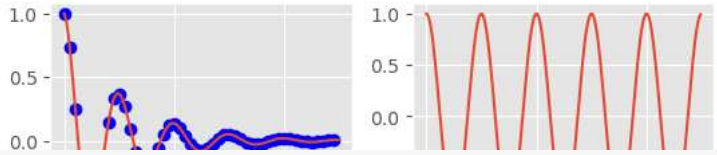

```
#plot area
days = [1,2,3,4,5]
sleeping =[7,8,6,11,7]
eating = [2,3,4,3,2]
working =[7,8,7,2,2]
playing = [8,5,7,8,13]
plt.plot([],[],color='m', label='Sleeping', linewidth=5)
plt.plot([],[],color='c', label='Eating', linewidth=5)
plt.plot([],[],color='r', label='Working', linewidth=5)
plt.plot([],[],color='k', label='Playing', linewidth=5)
plt.stackplot(days, sleeping,eating,working,playing, colors=['y','r','b','k'])
plt.xlabel('x')
plt.ylabel('y')
plt.title('Stack Plot')
plt.legend()
plt.show()
```




```
#drawing pie chart

days = [1,2,3,4,5]

sleeping =[7,8,6,11,7]
eating = [2,3,4,3,2]
working =[7,8,7,2,2]
playing = [8,5,7,8,13]
slices = [7,2,2,13]
activities = ['sleeping','eating','working','playing']
cols = ['c','m','r','b']

plt.pie(slices,
  labels=activities,
  colors=cols,
  startangle=90,
  shadow= True,
  explode=(0,0.1,0,0),
  autopct='%1.1f%%')

plt.title('Pie Plot')
plt.show()
```

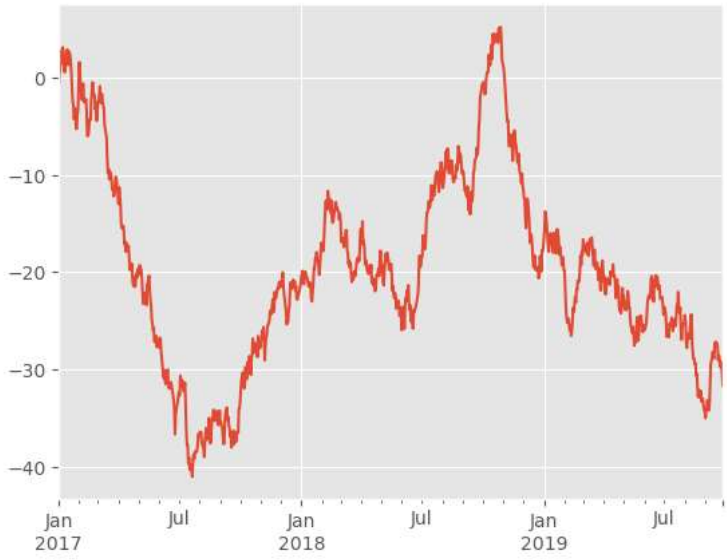



```
def f(t):
    return np.exp(-t) * np.cos(2*np.pi*t)
t1 = np.arange(0.0, 5.0, 0.1)
t2 = np.arange(0.0, 5.0, 0.02)
plt.subplot(221)
plt.plot(t1, f(t1), 'bo', t2, f(t2))
plt.subplot(222)
plt.plot(t2, np.cos(2*np.pi*t2))
plt.show()
```




```
#drawing with pandas
ts = pd.Series(np.random.randn(1000),index=pd.date_range('1/1/2017', periods=1000))

ts = ts.cumsum()

ts.plot()
```

```
<Axes: >
```

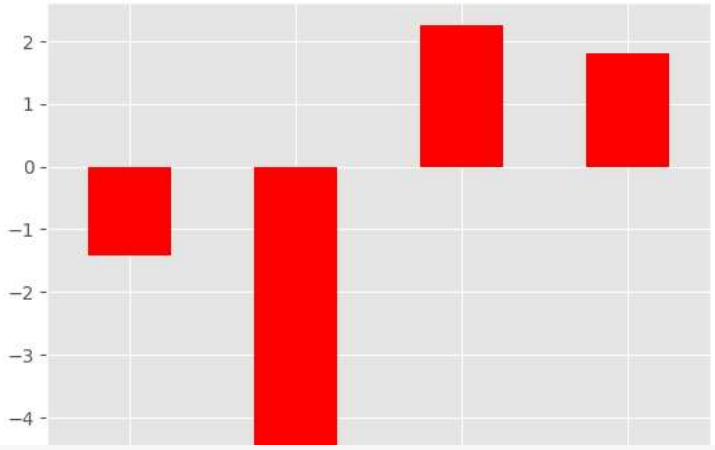



```
#drawing multiple time series
df = pd.DataFrame(np.random.randn(1000, 4),index=ts.index, columns=list('ABCD'))

df = df.cumsum()

plt.figure()

df.plot()
```

```
<Axes: >
<Figure size 640x480 with 0 Axes>
```

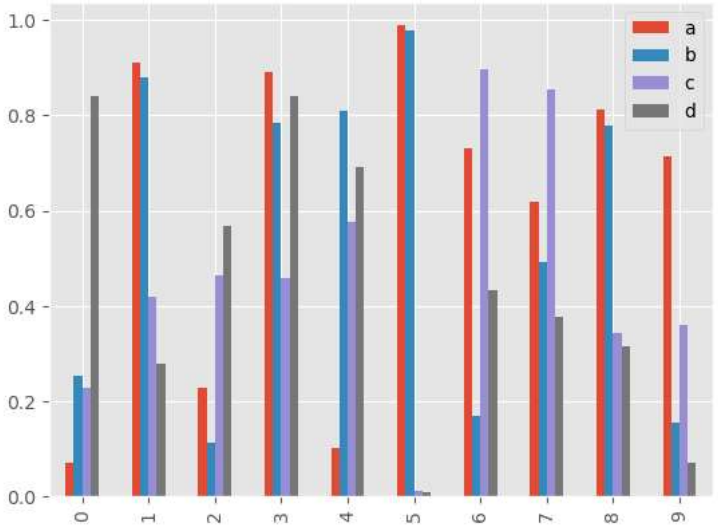

```
#plotting bar graph
plt.figure()
df.iloc[5].plot(kind='bar',color='r')
```

```
<Axes: >
```



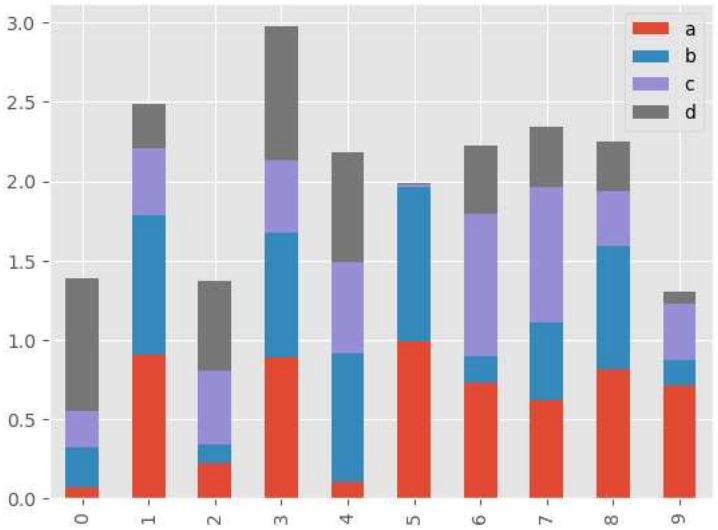
```
#plotting multiple bar graph
df2 = pd.DataFrame(np.random.rand(10, 4), columns=['a', 'b', 'c', 'd'])

df2.plot.bar()
```

```
<Axes: >
```



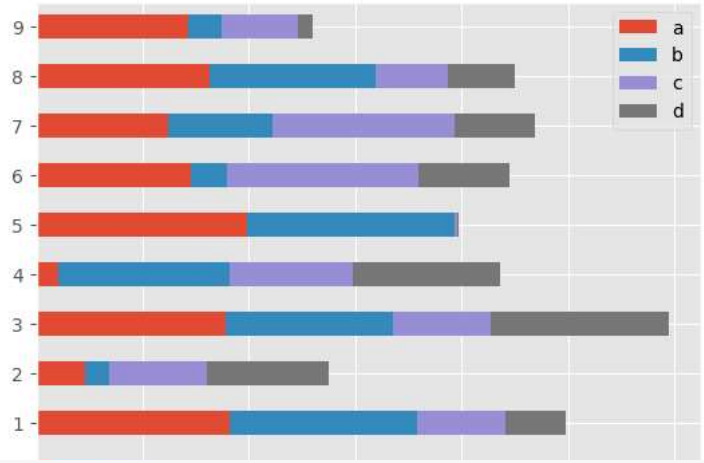

```
#plotting stacked vertical bar graph
df2.plot.bar(stacked=True)
```

```
<Axes: >
```



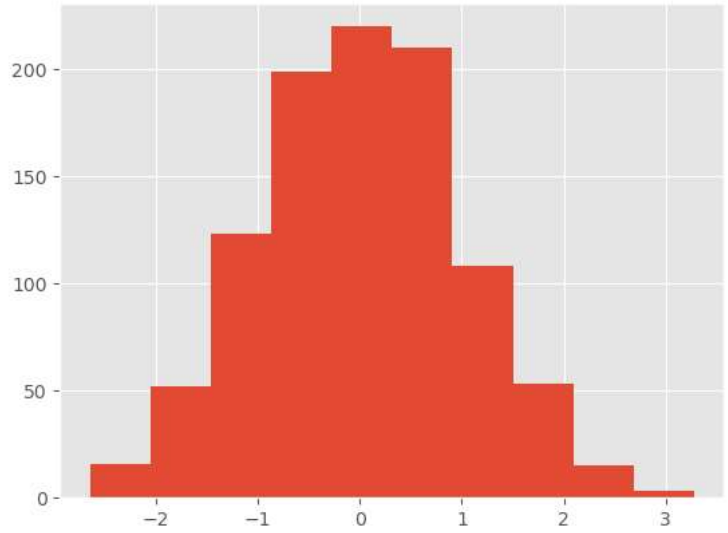

```
#plotting stacked horizontal bar graph
df2.plot.barh(stacked=True)
```

```
<Axes: >
```



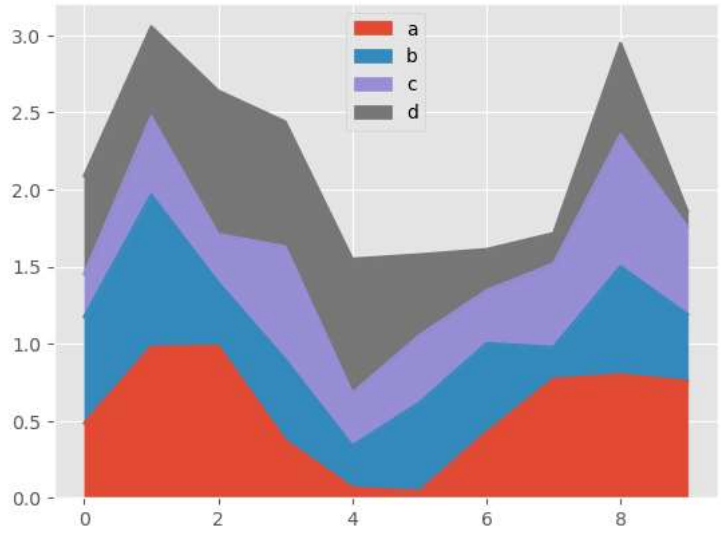

```
#plotting histogram
df['A'].diff().hist()
```

```
<Axes: >
```



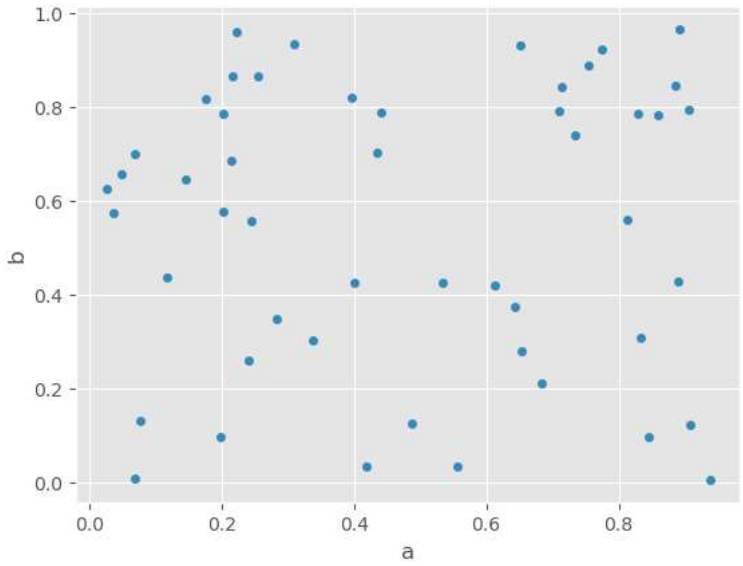

```
#plotting area
df = pd.DataFrame(np.random.rand(10, 4), columns=['a', 'b', 'c', 'd'])

df.plot.area()
```

```
<Axes: >
```



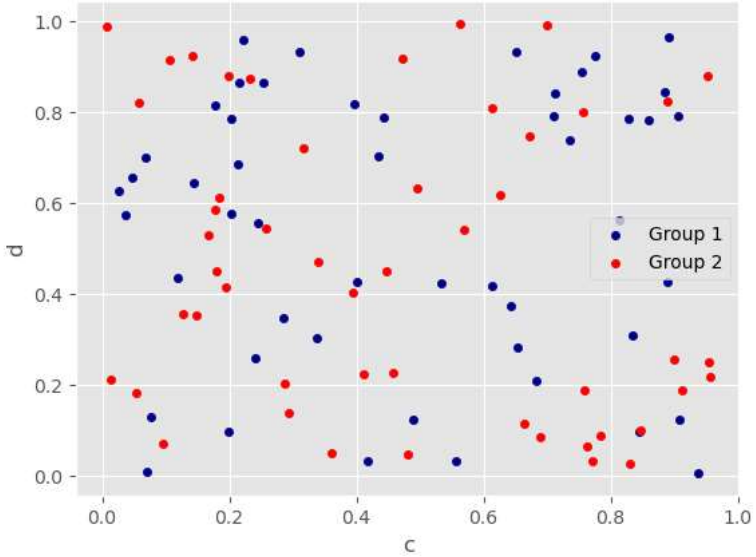

```
#plotting scatter graph
df = pd.DataFrame(np.random.rand(50, 4), columns=['a', 'b', 'c', 'd'])

df.plot.scatter(x='a', y='b')
```

```
<Axes: xlabel='a', ylabel='b'>
```




```
#plotting
ax = df.plot.scatter(x='a', y='b', color='DarkBlue', label='Group 1')
df.plot.scatter(x='c', y='d', color='Red', label='Group 2', ax=ax)
```

```
<Axes: xlabel='c', ylabel='d'>
```




```
#plotting grayscale scatter plot
df.plot.scatter(x='a', y='b', c='c', s=50)
```

```
<Axes: xlabel='a', ylabel='b'>
```