DATE : 22 june 2024

DAY : Saturday

TOPICS : Matplotlib

Matplotlib

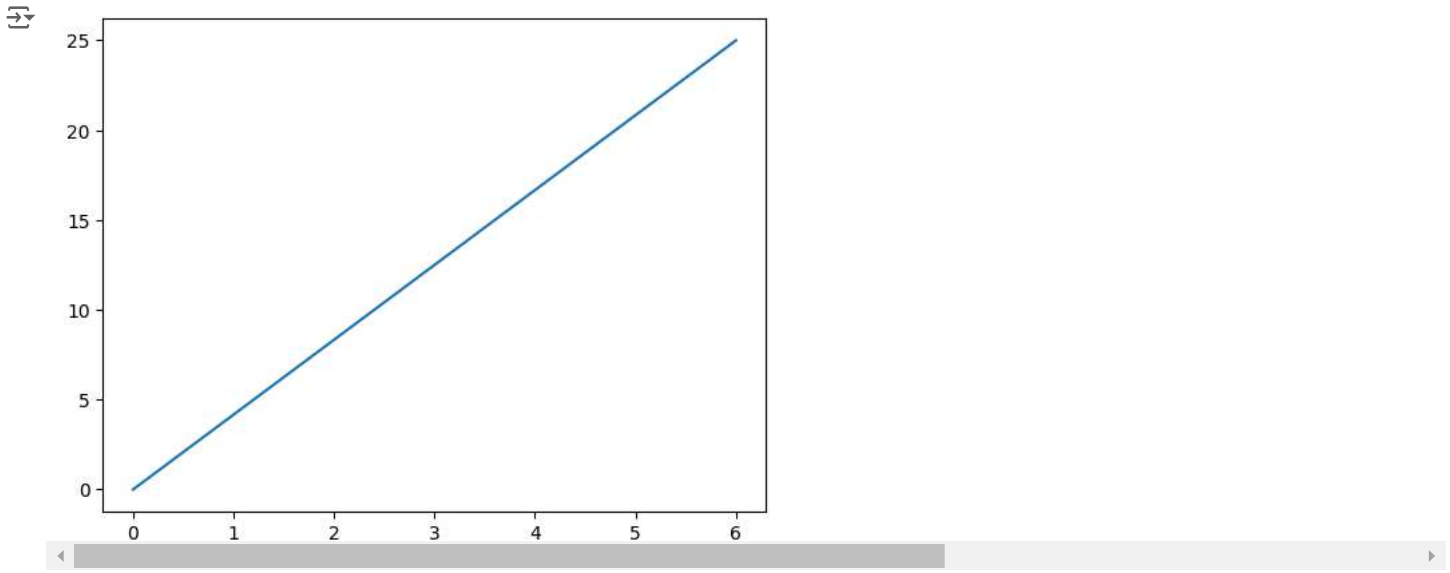
Matplotlib is a comprehensive library for creating static, animated, and interactive visualizations in Python. It is widely used for generating plots, graphs, and other visual representations of data, making it a key tool for data analysis and presentation.

Key Features of Matplotlib

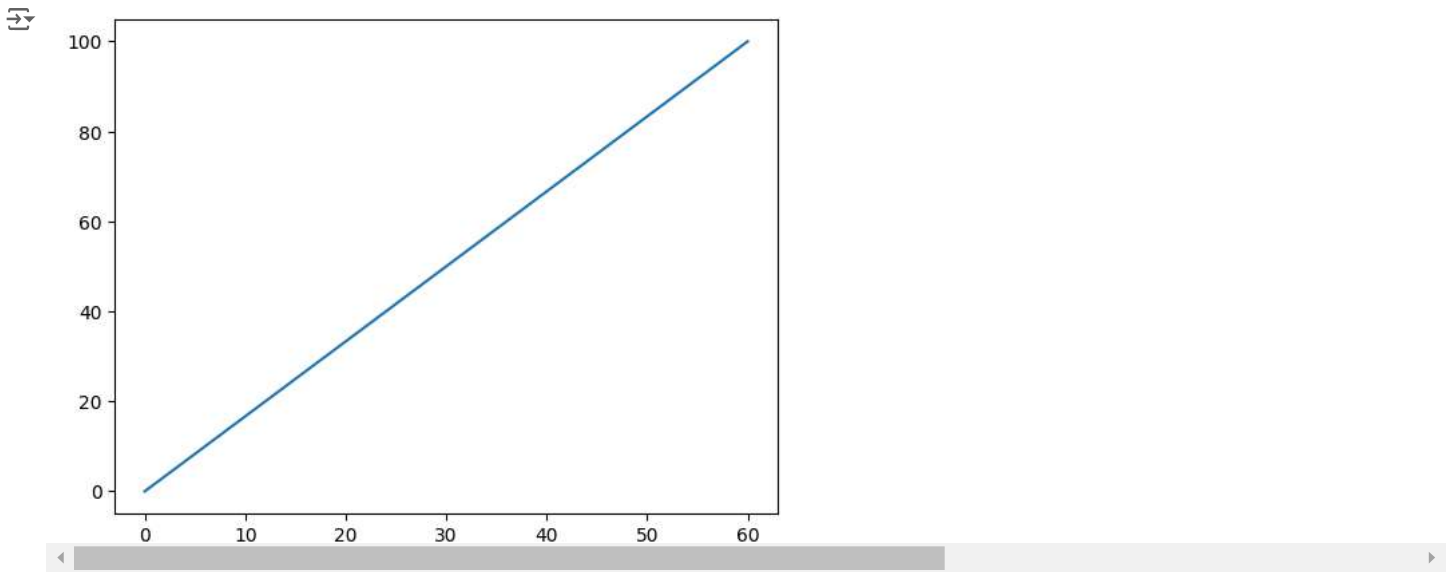
1. **Variety of Plots**: Matplotlib supports a wide range of plots and charts, including:
    - Line plots
    - Scatter plots
    - Bar charts
    - Histograms
    - Pie charts
    - Box plots
    - Error bars
    - Contour plots
    - 3D plots (using the mplot3d toolkit)
2. **Customization**: Extensive customization options for plots, such as:
    - Titles, labels, and legends
    - Colors, markers, and line styles
    - Axis scales, limits, and ticks
    - Grids and subplots
    - Annotations and text
3. **Integration**: Compatible with other popular Python libraries, such as NumPy, Pandas, and SciPy, allowing for seamless integration into data analysis workflows.
4. **Interactive Plots**: Capabilities for creating interactive plots that can be embedded in graphical user interfaces (GUIs) or web applications.
5. **Publication Quality**: Tools for creating high-quality plots suitable for publication, with support for various output formats (PNG, PDF, SVG, etc.).
6. **Gallery and Documentation**: Extensive gallery of examples and thorough documentation to help users create complex and customized visualizations.

```
import matplotlib.pyplot as plt
import numpy as np
```

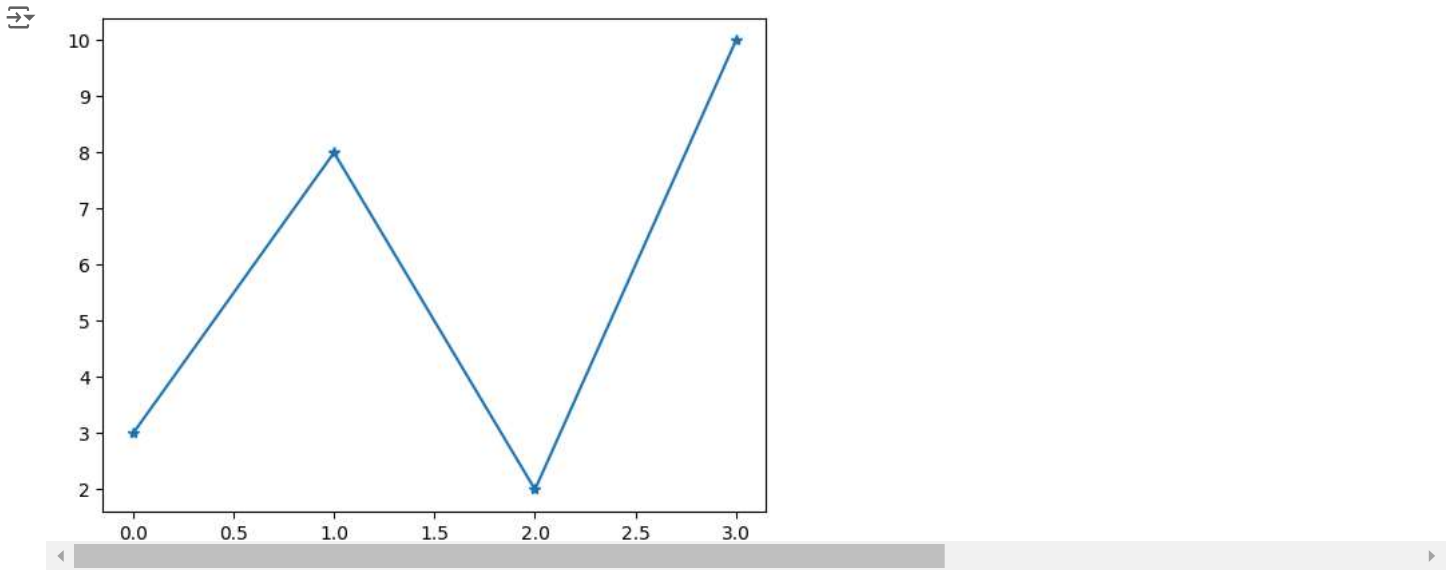
```
xpoints=np.array([0,6])
ypoints=np.array([0,25])
plt.plot(xpoints,ypoints)
plt.show()
```



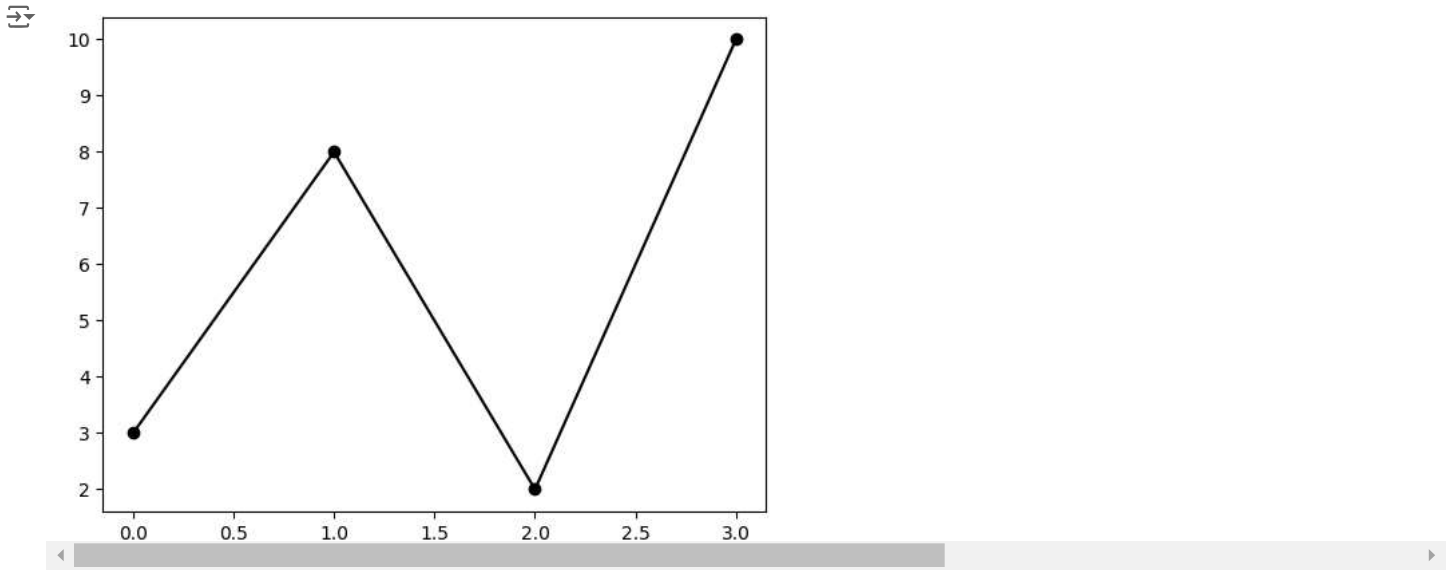

```
x=np.array([0,60])
y=np.array([0,100])
plt.plot(x,y)
plt.show()
```



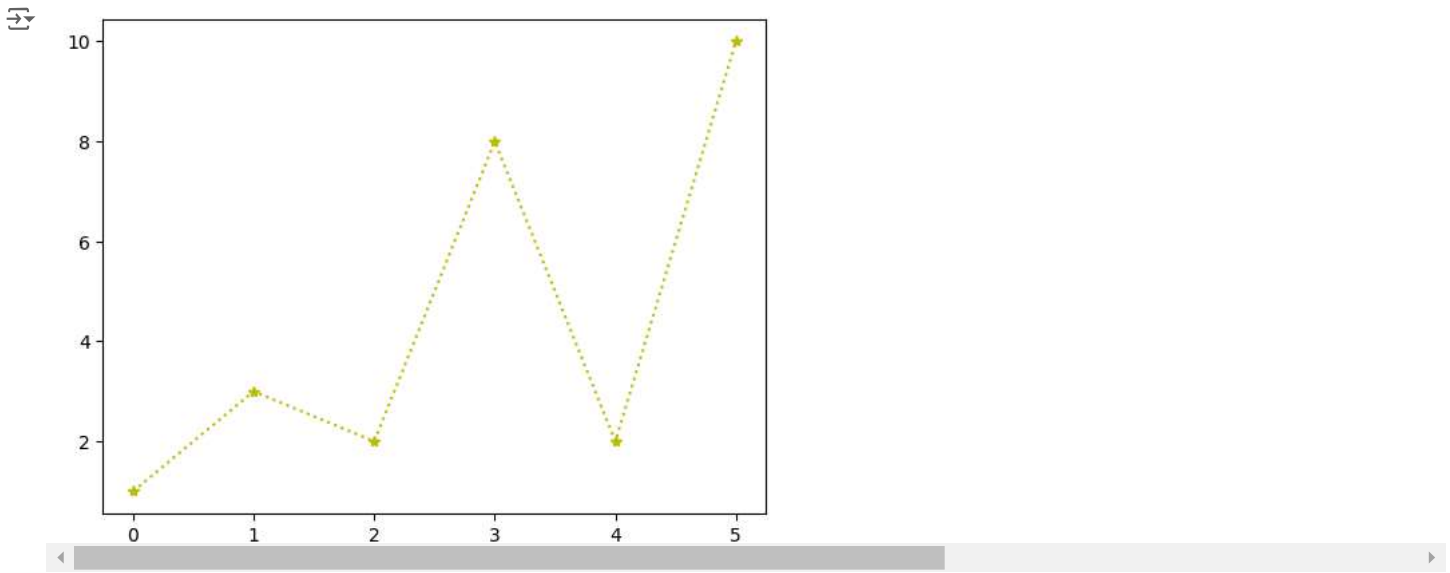

```
ypoints=np.array([3,8,2,10])
plt.plot(ypoints,marker='*')
plt.show()
```



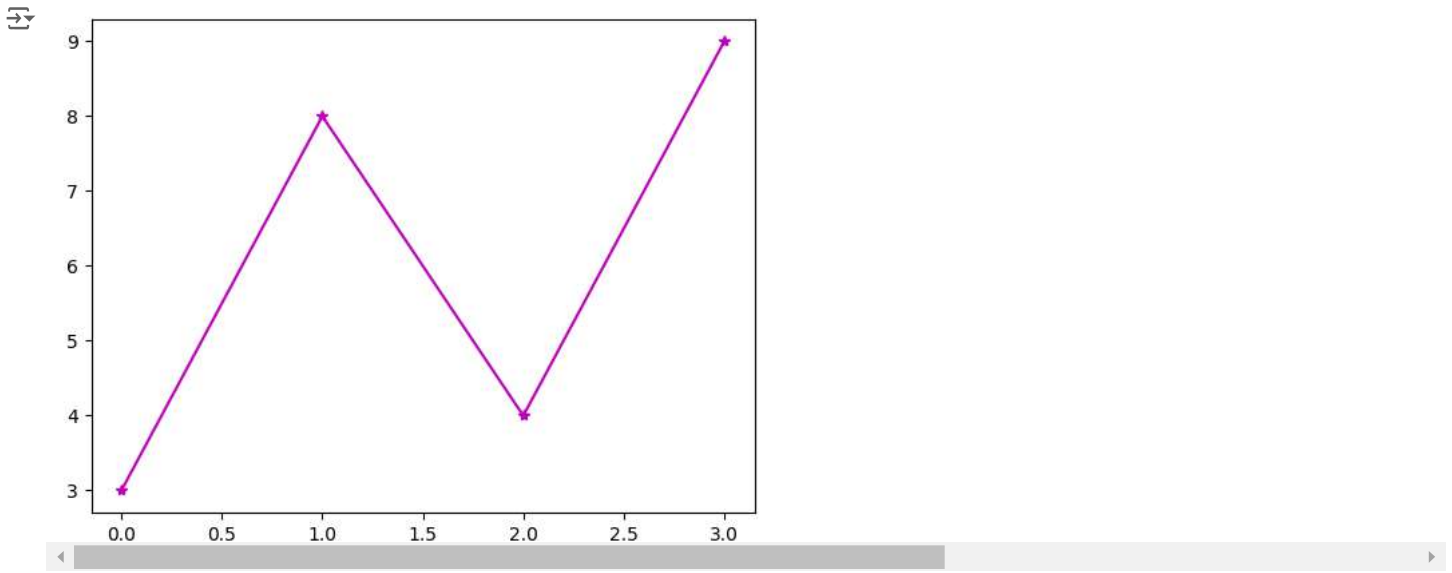

```
ypoints = np.array([3,8,2,10])
plt.plot(ypoints,marker='o',color='k')
plt.show()
```



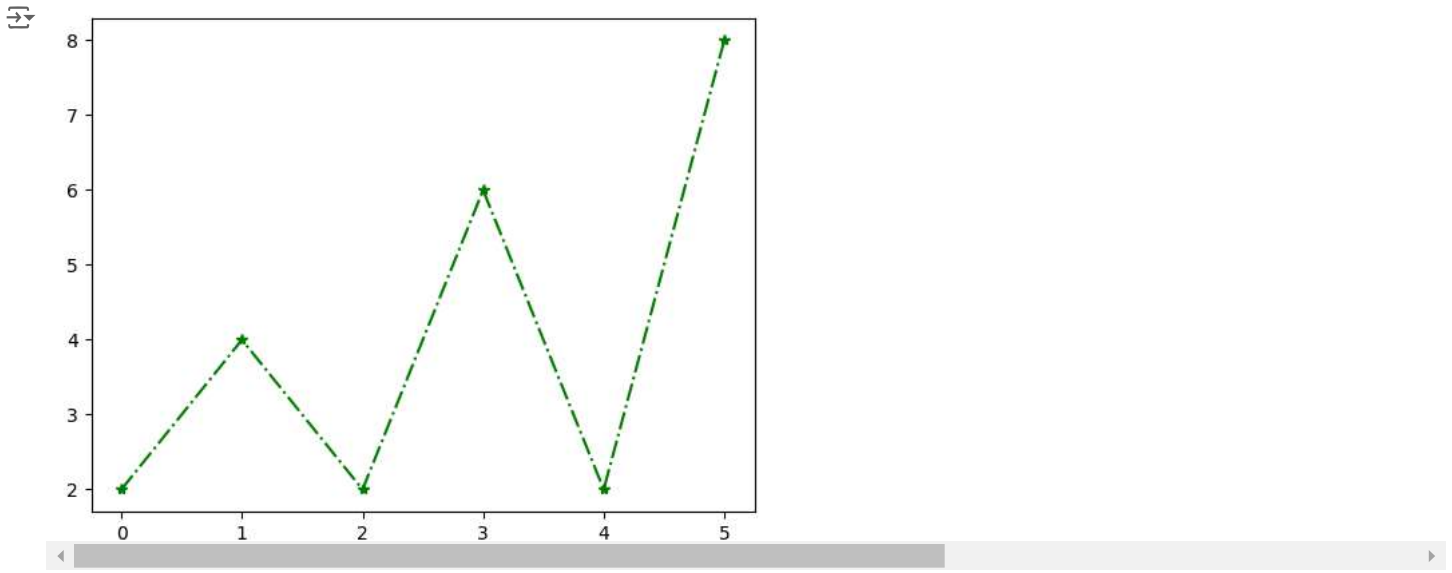

```
ypoints = np.array([1,3,2,8,2,10])
plt.plot(ypoints,marker='*',linestyle = 'dotted',color='y')
plt.show()
```



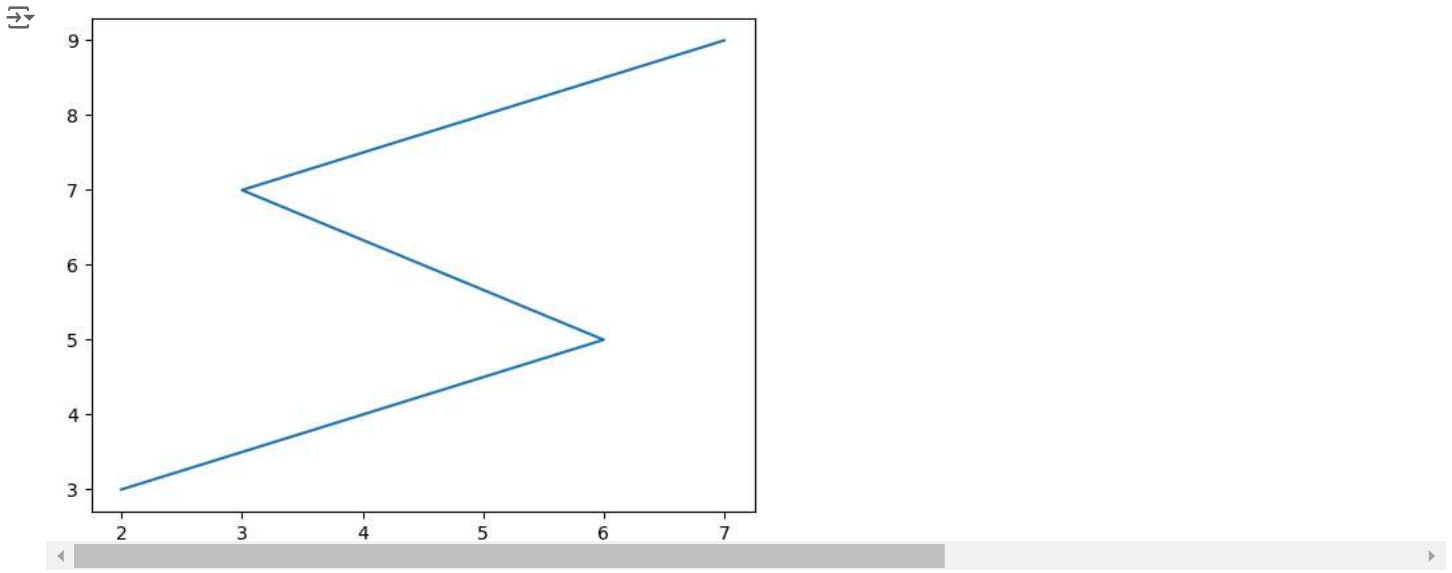
```
ypoints = np.array([3,8,4,9])
plt.plot(ypoints,marker='*',linestyle='solid',color='m')
plt.show()
```



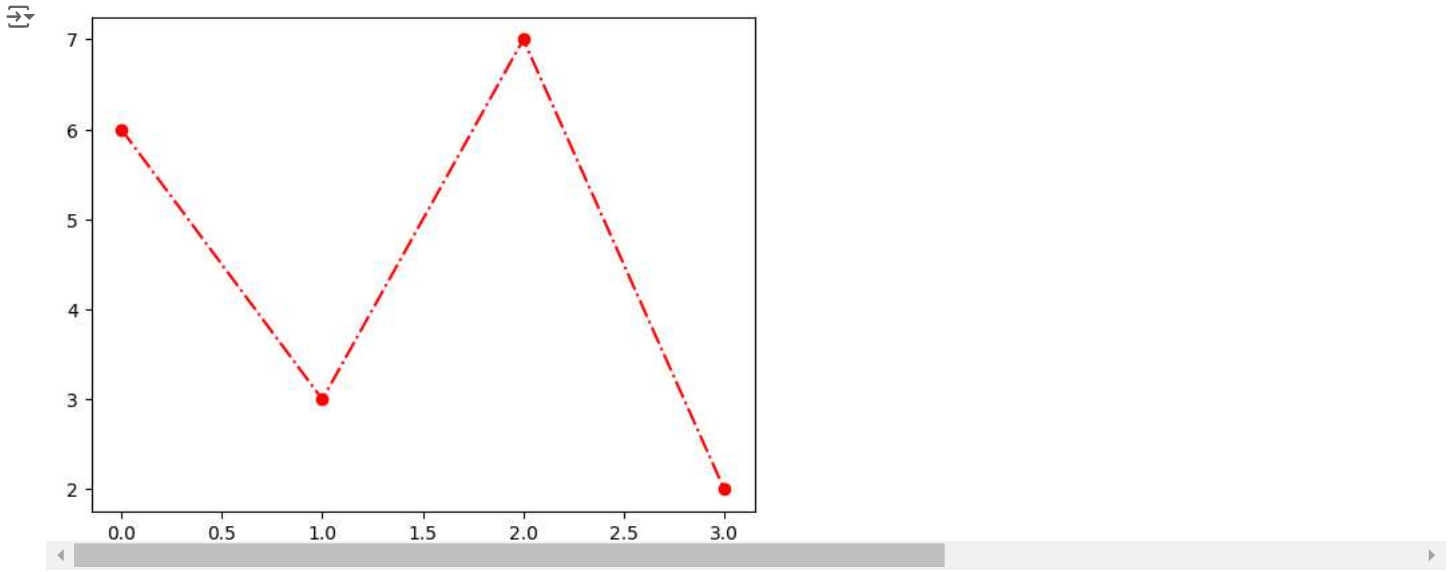

```
ypoints = np.array([2,4,2,6,2,8])
plt.plot(ypoints,marker='*',linestyle='dashdot',color='g')
plt.show()
```




```
xpoints = np.array([3,5,7,9])
ypoints = np.array([2,6,3,7])
plt.plot(ypoints,xpoints)
plt.show()
```

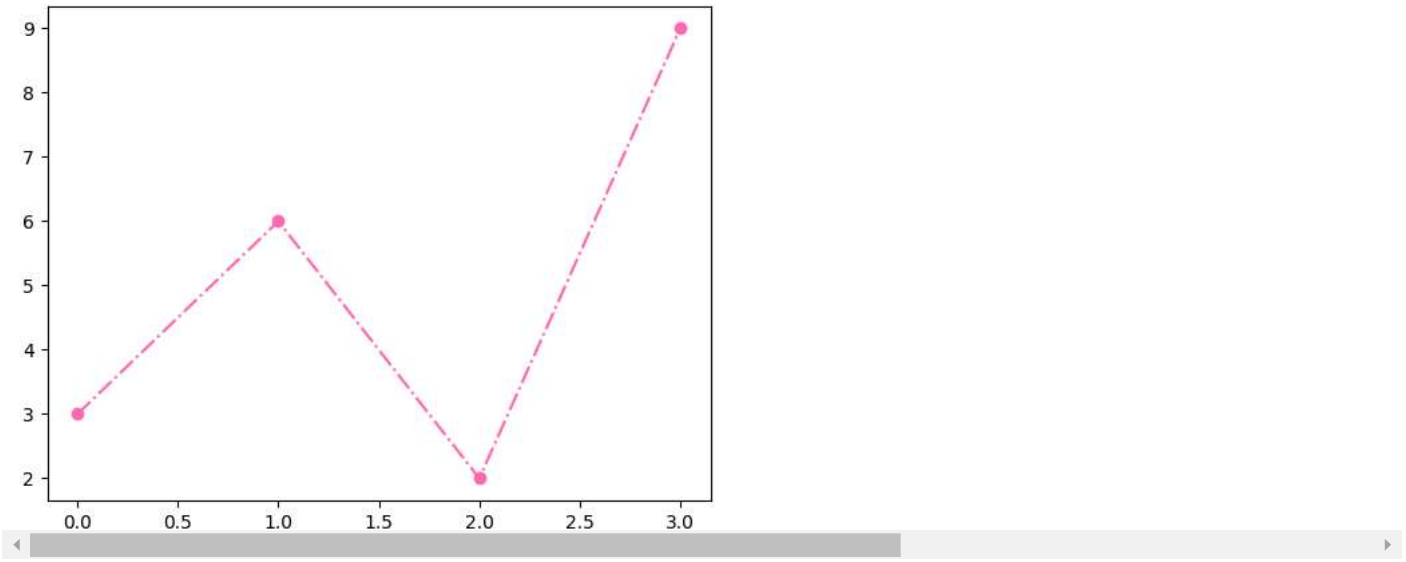



```
ypoints = np.array([6,3,7,2])
plt.plot(ypoints,marker='o',linestyle='dashdot',color='r')
plt.show()
```

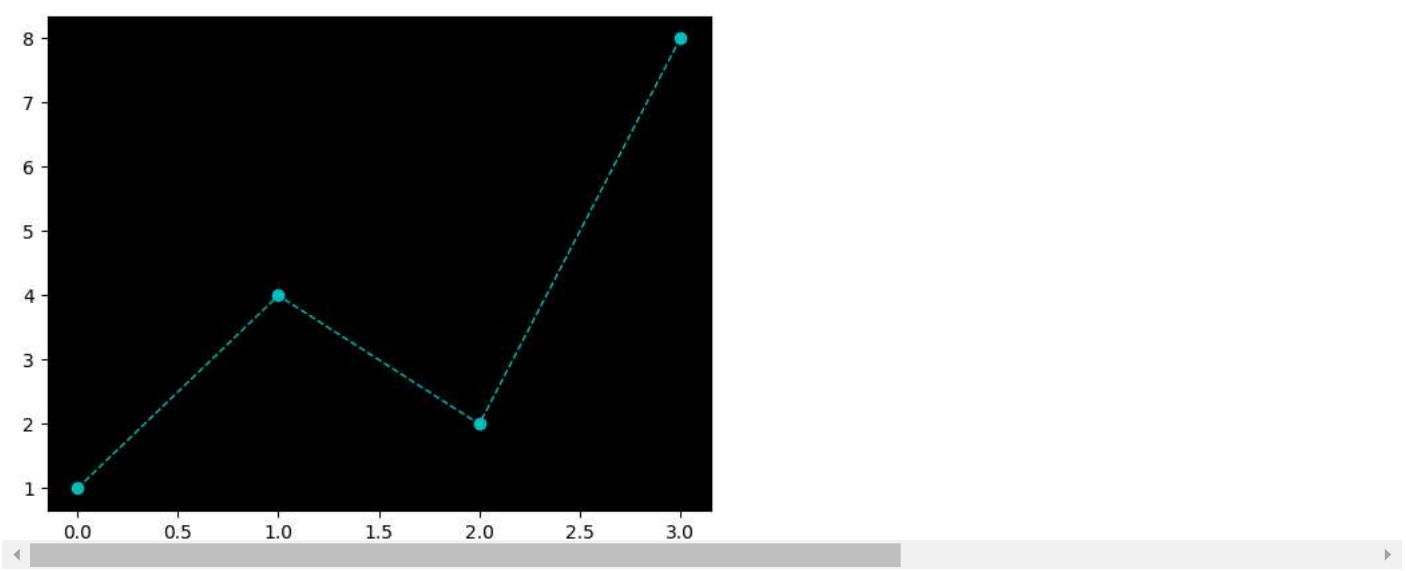



```
ypoints = np.array([3,6,2,9])
plt.plot(ypoints,marker='o',linestyle='dashdot',color='hotpink')
plt.plot()
```

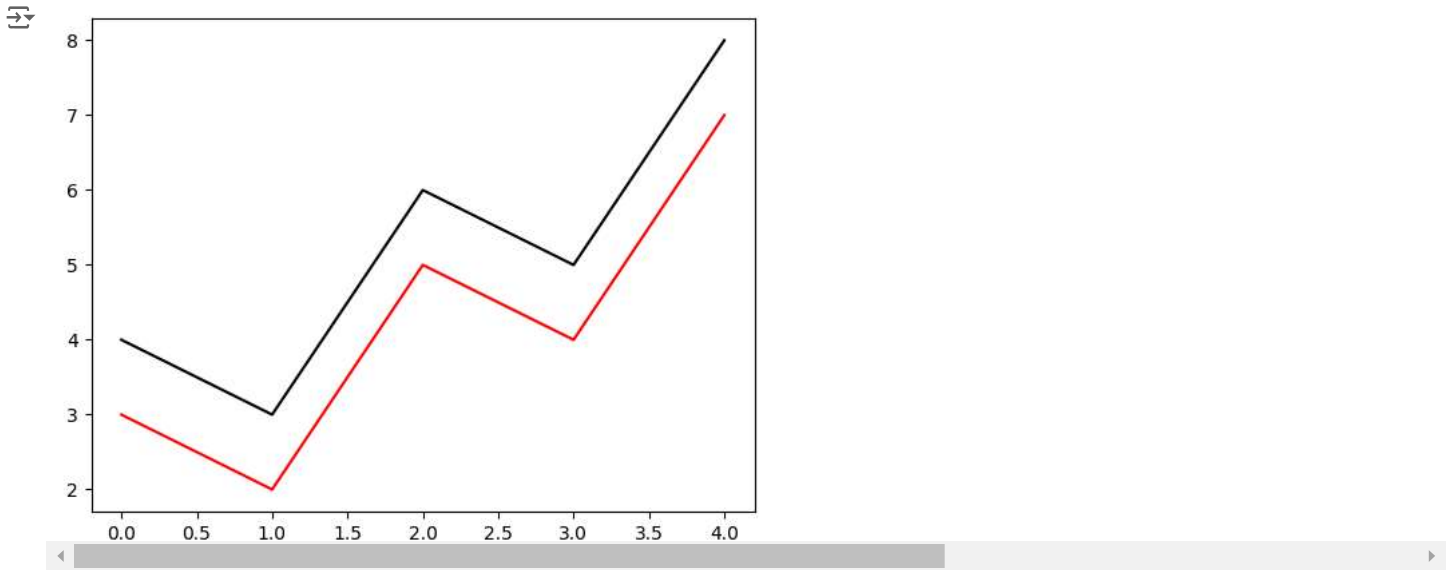
[]




```
ypoints = np.array([1,4,2,8])
ax = plt.axes()
ax.set_facecolor('black')
plt.plot(ypoints,marker='o',linestyle='dashed',color='c',linewidth=1.0)
plt.show()
```




```
x = np.array([3,2,5,4,7])
y = np.array([4,3,6,5,8])
plt.plot(x,color='r')
plt.plot(y,color='k')
plt.show()
```




```
x = np.linspace(0,5,11)
y = x**2
```

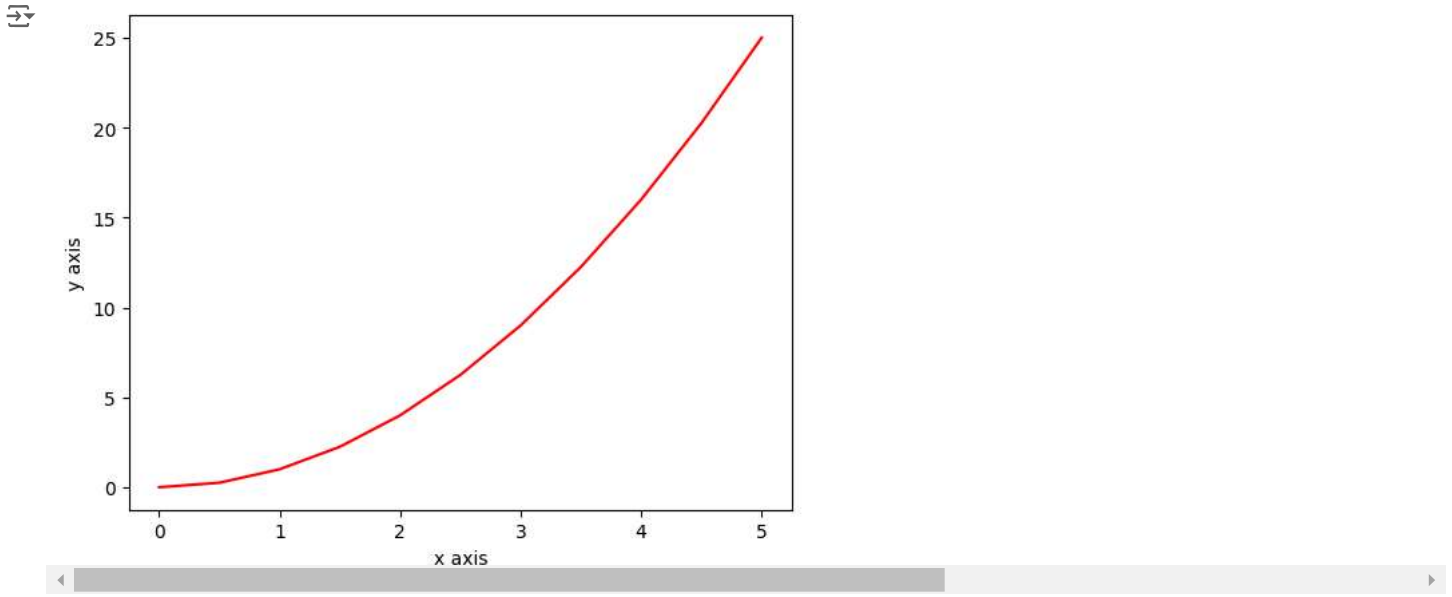
```
x
```

```
array([0. , 0.5, 1. , 1.5, 2. , 2.5, 3. , 3.5, 4. , 4.5, 5. ])
```

```
y
```

```
array([ 0.  ,  0.25,  1.  ,  2.25,  4.  ,  6.25,  9.  , 12.25, 16.  ,
       20.25, 25.  ])
```

```
plt.plot(x,y,color="r")
plt.xlabel("x axis")
plt.ylabel("y axis")
plt.show()
```




```
plt.subplot(1,2,1)
plt.plot(x,y,'g--')

plt.subplot(1,2,2)
plt.plot(y,x,'y*-')
```

```
[<matplotlib.lines.Line2D at 0x7f89ed839be0>]
```

```
plt.subplot(1,4,1)
plt.plot(x,y,'g--')

plt.subplot(1,4,2)
plt.plot(x,y,'y*-')

plt.subplot(1,4,3)
plt.plot(x,y,'g--')

plt.subplot(1,4,4)
plt.plot(x,y,'y*-')
```

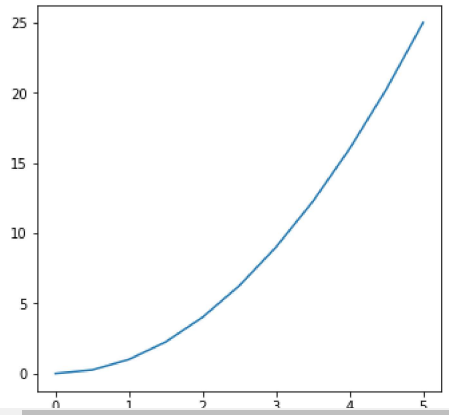
```
[<matplotlib.lines.Line2D at 0x28b1d7b3e50>]
```

```
plt.subplot(2,2,1)
plt.plot(x,y,'g--')

plt.subplot(2,2,2)
plt.plot(x,y,'y*-')

plt.subplot(2,2,3)
plt.plot(x,y,'g--')

plt.subplot(2,2,4)
plt.plot(x,y,'y*-')
```

```
[<matplotlib.lines.Line2D at 0x28b1e10e280>]
```

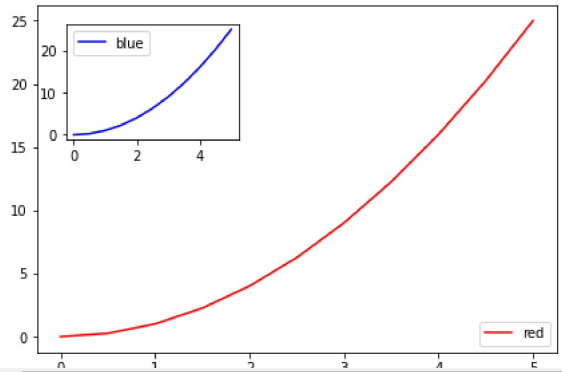
```
fig=plt.figure()
axes=fig.add_axes([0.1,0.5,0.7,1])
#add_axes(left,bottom,width,height)
axes.plot(x,y)
```

```
[<matplotlib.lines.Line2D at 0x28b1e13a280>]
```

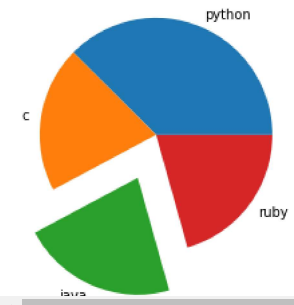


```
fig=plt.figure()
axes1=fig.add_axes([0.1,0.2,0.9,0.9])
#add_axes(left,bottom,width,height)
axes1.plot(x,y,'r',label="red")

axes2=fig.add_axes([0.15,0.75,0.3,0.3])
#add_axes(left,bottom,width,height)
axes2.plot(x,y,"b",label="blue")

axes1.legend(loc=4)
axes2.legend()
```

```
<matplotlib.legend.Legend at 0x28b1e044790>
```



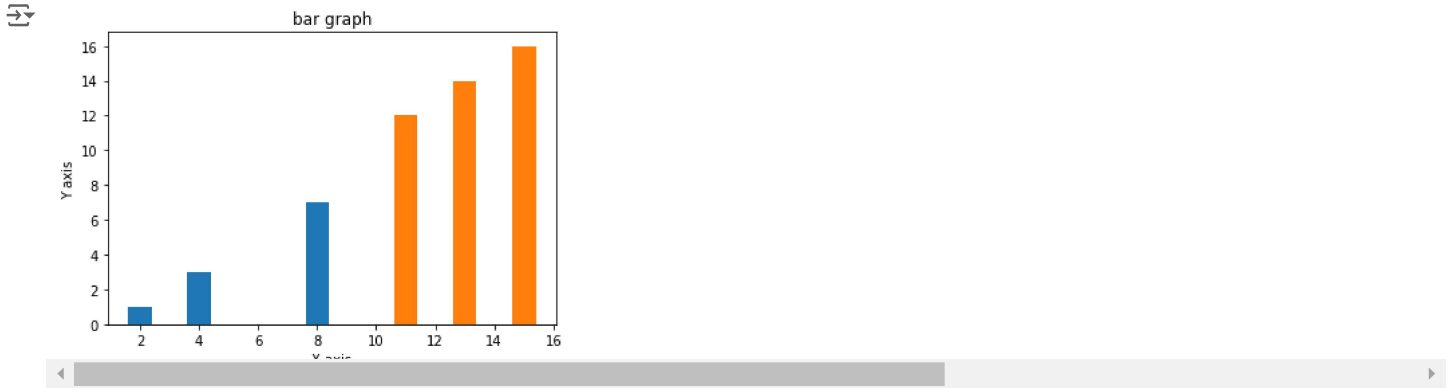

```
sizes=[435,234,250,239]
labels=['python','c','java','ruby']
explode=[0,0,0.4,0]
plt.pie(sizes,labels=labels,explode=explode)
plt.show()
```



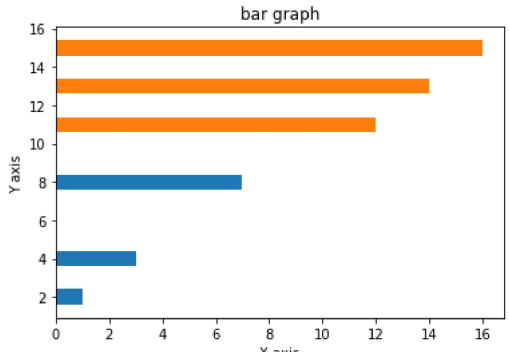

```
sizes=[435,234,250,239]
labels=['python','c','java','ruby']
explode=[0,0,0.4,0]
plt.pie(sizes,labels=labels,explode=explode,autopct='%1.2f%%')
plt.show()
```


```
x=[2,4,8]
y=[1,3,7]
x2=[11,13,15]
y2=[12,14,16]
plt.bar(x,y)
plt.bar(x2,y2)
plt.show()
```


```
x=[2,4,8]
y=[1,3,7]
x2=[11,13,15]
y2=[12,14,16]
plt.bar(x,y)
plt.bar(x2,y2)
plt.title("bar graph")
plt.xlabel('X axis')
plt.ylabel('Y axis')
plt.show()
```




```
x=[2,4,8]
y=[1,3,7]
x2=[11,13,15]
y2=[12,14,16]
plt.barh(x,y)
plt.barh(x2,y2)
plt.title("bar graph")
plt.xlabel('X axis')
plt.ylabel('Y axis')
plt.show()
```




```
#hist plot


a=np.array([45,67,86,75,55,42,56,90])
plt.hist(a)
plt.title("hist plot")
plt.show()
```