Day 15

Date 24 June 2024

Daily Report

Today's session was based on one of the library for AI - Matplotlib

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Today's Topic

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.

1. 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.

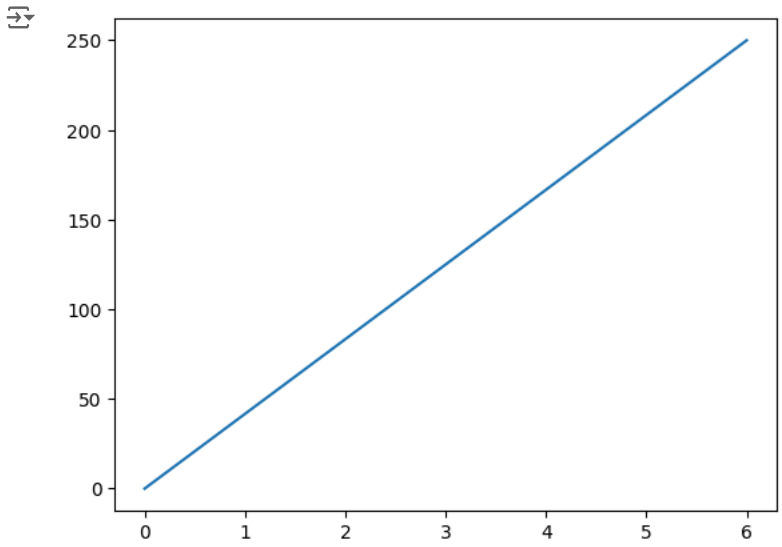
Some practice Questions

1. Import matplotlib and numpy library

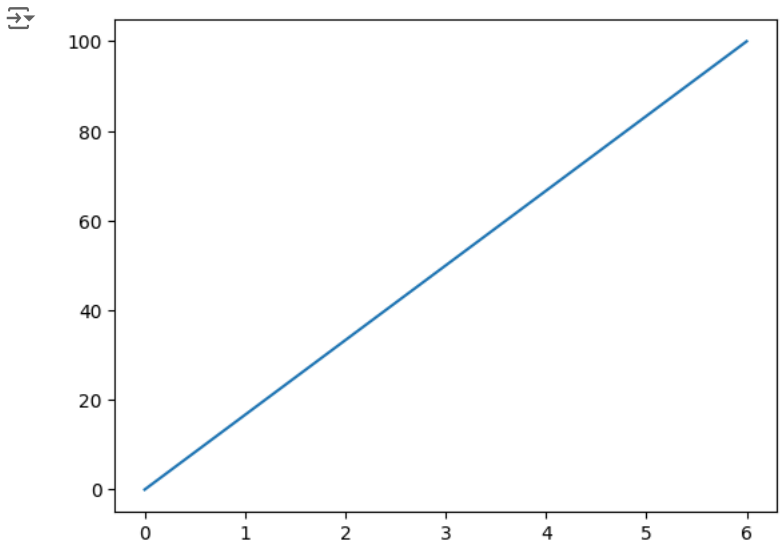
```
import matplotlib.pyplot as plt
import numpy as np
```

2. Draw the graph

```
xpoints=np.array([0,6])
ypoints=np.array([0,250])
plt.plot(xpoints,ypoints)
plt.show()
```

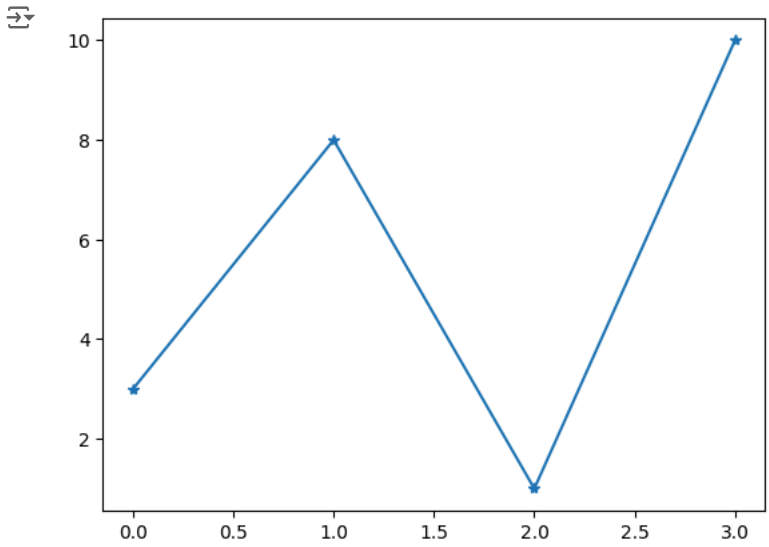



```
x=np.array([0,6])
y=np.array([0,100])
plt.plot(x,y)
plt.show()
```



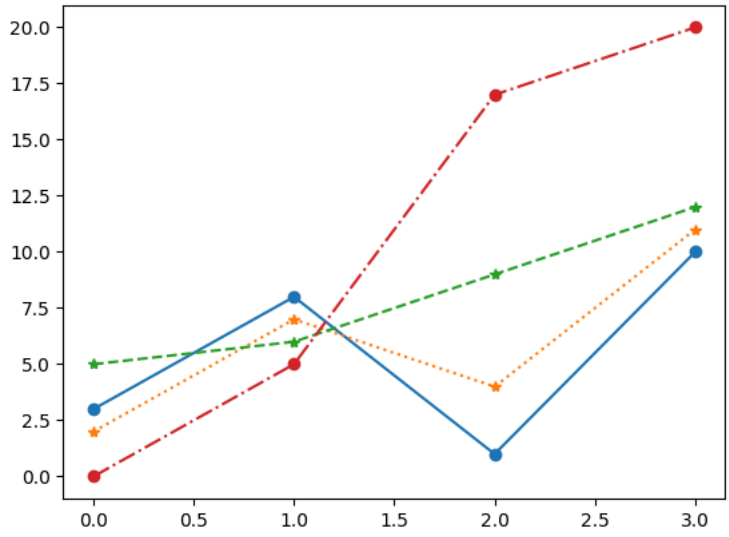
3. Use of Marker

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

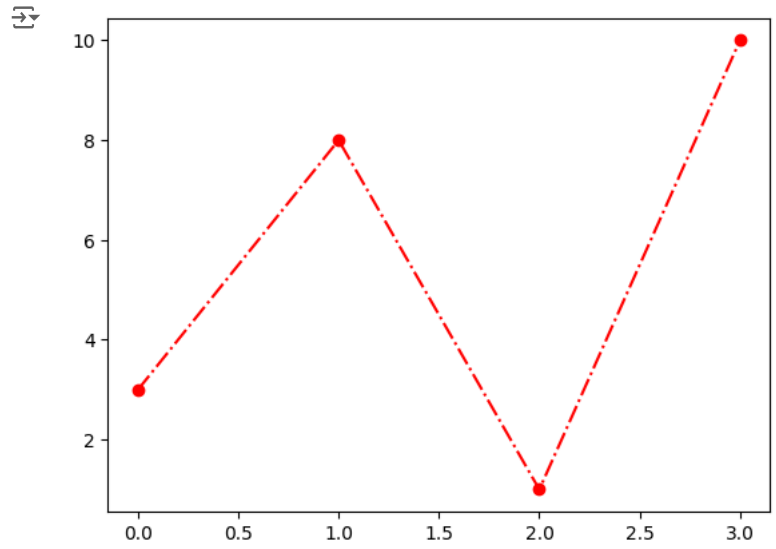



```
ypoints=np.array([3,8,1,10])
plt.plot(ypoints,marker='o')
x  = np.array([2,7,4,11])
plt.plot(x,marker='*',linestyle='dotted')
y = np.array([5,6,9,12])
plt.plot(y,marker='*',linestyle='dashed')

z = np.array([0,5,17,20])
plt.plot(z,marker='o',linestyle='dashdot')
plt.plot()
```

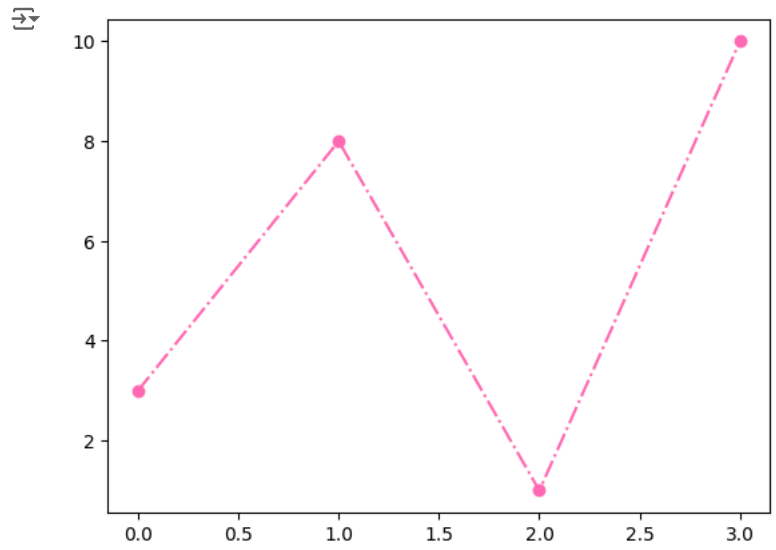
```
[]
```



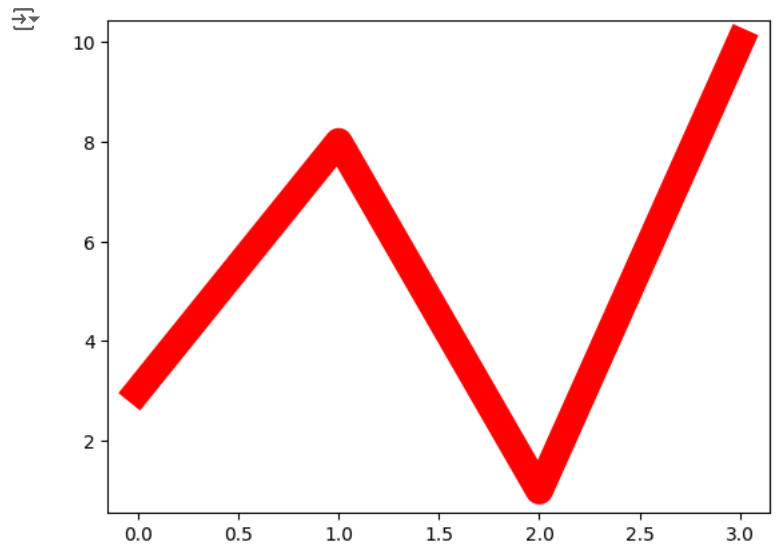

```
ypoints=np.array([3,8,1,10])
plt.plot(ypoints,marker='o',linestyle='dashdot',color="r")
plt.show()
```



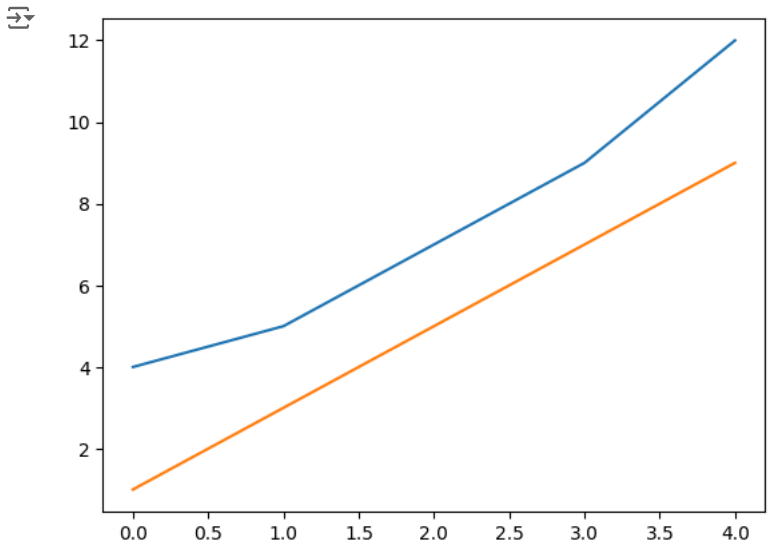

```
ypoints=np.array([3,8,1,10])
plt.plot(ypoints,marker='o',linestyle='dashdot',color="hotpink")
plt.show()
```




```
ypoints=np.array([3,8,1,10])
plt.plot(ypoints,marker='o',color="r",linewidth="15.0")
plt.show()
```



```
x=np.array([4,5,7,9,12])
y=np.array([1,3,5,7,9])
plt.plot(x)
plt.plot(y)
plt.show()
```




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

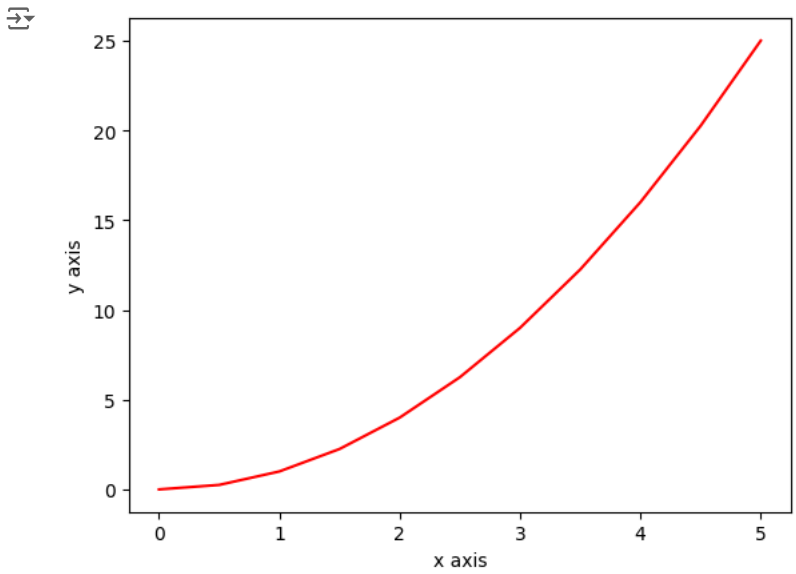
```
x
```

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

```
y
```

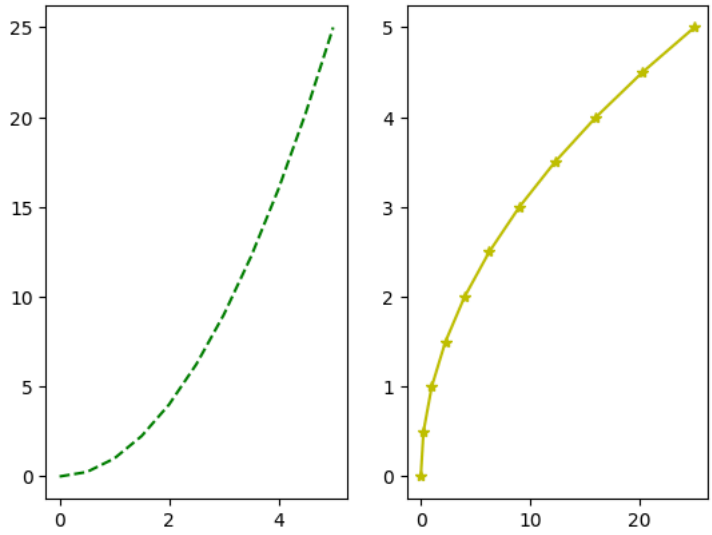
```
array([ 0.  ,  0.25,  1.  ,  2.25,  4.  ,  6.25,  9.  , 12.25, 16.  ,
       20.25, 25.  ])
```

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



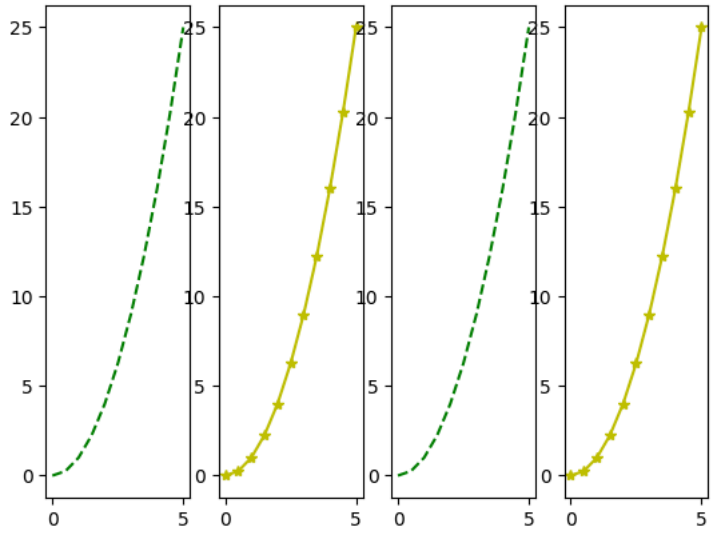
```
plt.subplot(1,2,1)
plt.plot(x,y,'g--')

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

```
[<matplotlib.lines.Line2D at 0x79cd600448b0>]
```



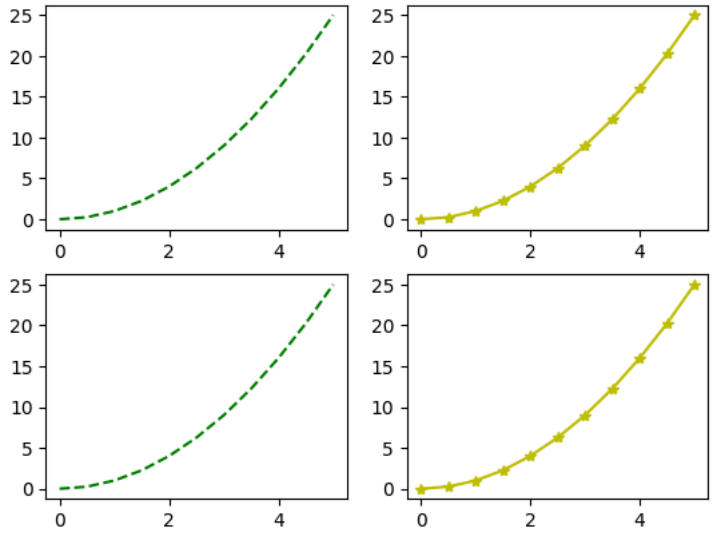
```
plt.subplot(1,4,1)
plt.plot(x,y,'g--')

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 0x79cd45eeb520>]
```



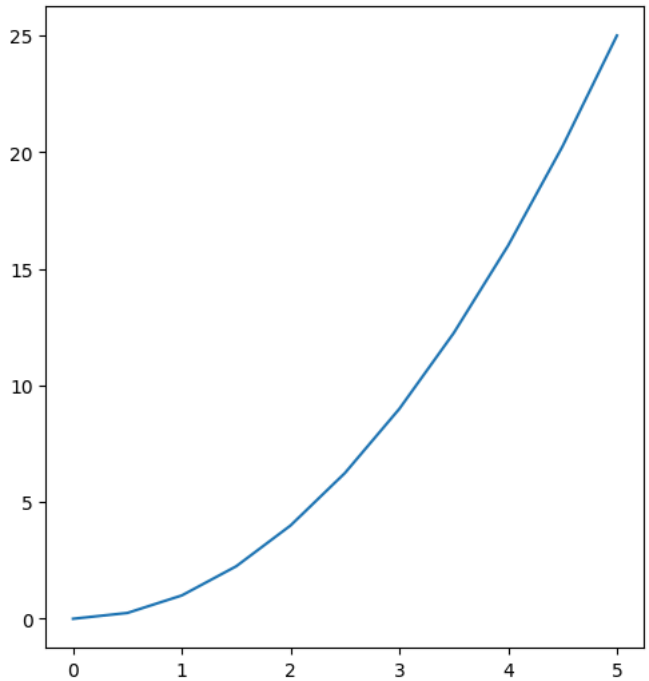
```
plt.subplot(2,2,1)
plt.plot(x,y,'g--')

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 0x79cd45c72560>]
```



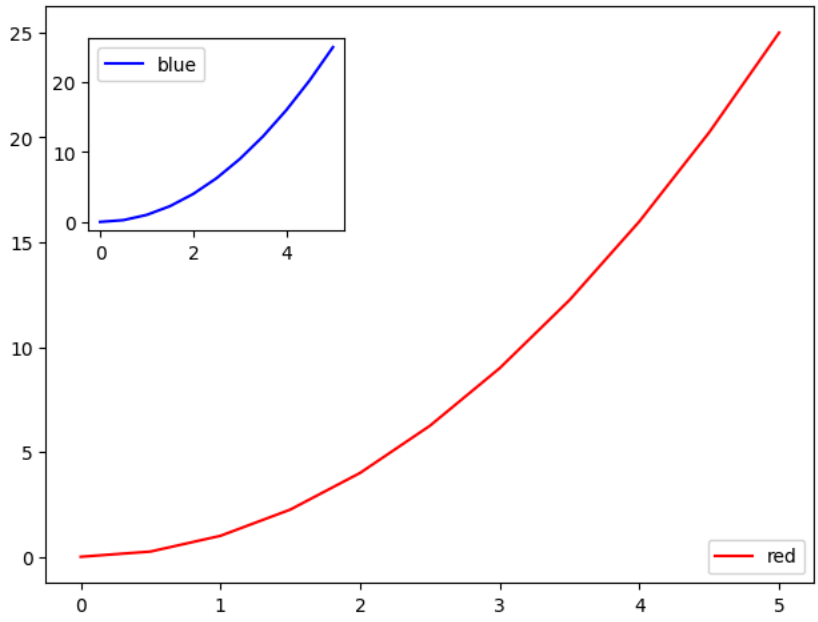
```
fig=plt.figure()
axes=fig.add_axes([0.1,0.5,0.7,1])
#add_axes(left,bottom,width,height)
axes.plot(x,y)
```

```
[<matplotlib.lines.Line2D at 0x79cd45b430d0>]
```

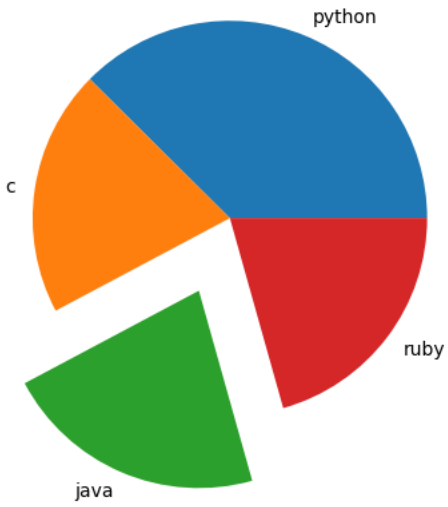


```
fig=plt.figure()
axes1=fig.add_axes([0.1,0.2,0.9,0.9])
#add_axes(left,bottom,width,height)
axes1.plot(x,y,'r',label="red")

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()
```

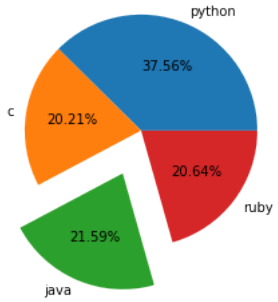
```
<matplotlib.legend.Legend at 0x79cd45b95960>
```



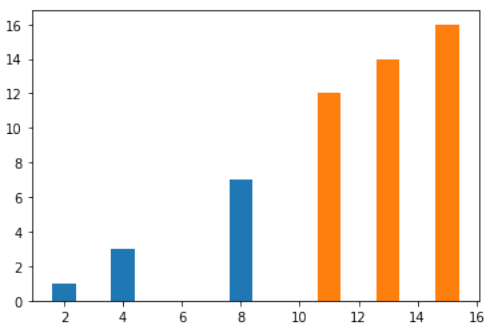

```
sizes=[435,234,250,239]
labels=['python','c','java','ruby']
explode=[0,0,0.4,0]
plt.pie(sizes,labels=labels,explode=explode)
plt.show()
```



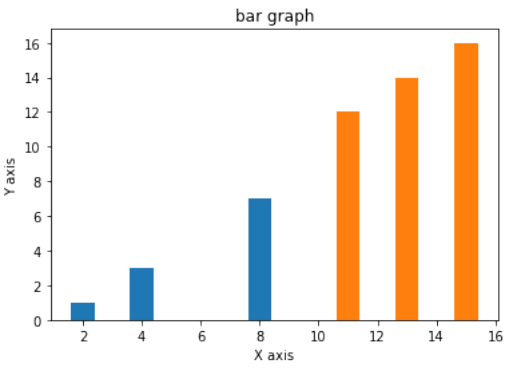

```
sizes=[435,234,250,239]
labels=['python','c','java','ruby']
explode=[0,0,0.4,0]
plt.pie(sizes,labels=labels,explode=explode,autopct='%1.2f%%')
plt.show()
```



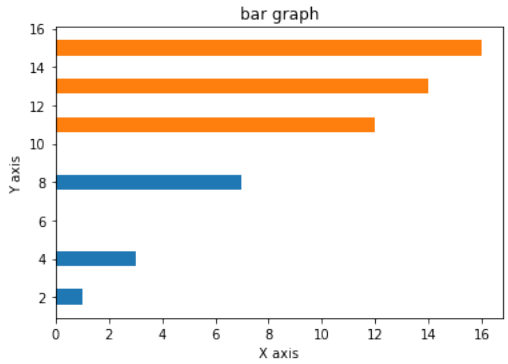

```
x=[2,4,8]
y=[1,3,7]
x2=[11,13,15]
y2=[12,14,16]
plt.bar(x,y)
plt.bar(x2,y2)
plt.show()
```



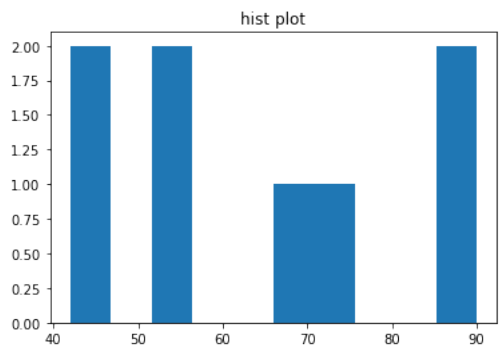

```
x=[2,4,8]
y=[1,3,7]
x2=[11,13,15]
y2=[12,14,16]
plt.bar(x,y)
plt.bar(x2,y2)
plt.title("bar graph")
plt.xlabel('X axis')
plt.ylabel('Y axis')
plt.show()
```



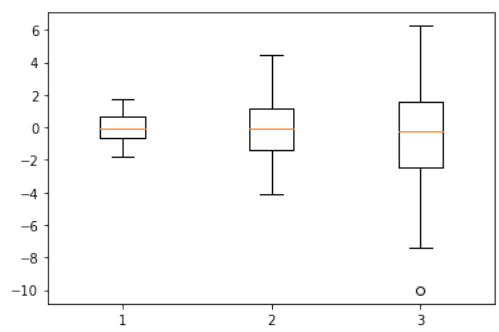

```
x=[2,4,8]
y=[1,3,7]
x2=[11,13,15]
y2=[12,14,16]
plt.barh(x,y)
plt.barh(x2,y2)
plt.title("bar graph")
plt.xlabel('X axis')
plt.ylabel('Y axis')
plt.show()
```




```
#hist plot


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




```
plt.boxplot(data)
plt.show()
```



```
y = np.array([3,8,1,10,2])
x = np.array([2,4,5,8])
z = np.array([2,3,8,6])
plt.xlabel("x axis")
plt.ylabel("y axis")
plt.plot(y,marker = "o",color ="b",linestyle = "solid")
plt.plot(x,marker = "o",color = "r",linestyle = "solid")
plt.plot(z,marker = "o",color = "y",linestyle = "solid")
```

```
[<matplotlib.lines.Line2D at 0x7e2b69bb1390>]
```