💾   ➕   ✂   🗐   📋   ↑   ↓   ▶ Run   ■   C   ▶▶   Code ⌄   ⌨

```
In [21]:    1  !pip install matplotlib
            2  from matplotlib import pyplot |
            3  from matplotlib import style
            4  from matplotlib import figure
            5  import numpy as np
            6  import pandas as pd
```

Requirement already satisfied: matplotlib in c:\users\hp\anaconda3\lib\site-packages (3.3.4)
Requirement already satisfied: numpy>=1.15 in c:\users\hp\anaconda3\lib\site-packages (from matplotlib) (1.20.1)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.3 in c:\users\hp\anaconda3\lib\site-packages (from matplo
tlib) (2.4.7)
Requirement already satisfied: pillow>=6.2.0 in c:\users\hp\anaconda3\lib\site-packages (from matplotlib) (8.2.0)
Requirement already satisfied: python-dateutil>=2.1 in c:\users\hp\anaconda3\lib\site-packages (from matplotlib) (2.8.1)
Requirement already satisfied: cycler>=0.10 in c:\users\hp\anaconda3\lib\site-packages (from matplotlib) (0.10.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\hp\anaconda3\lib\site-packages (from matplotlib) (1.3.1)
Requirement already satisfied: six in c:\users\hp\anaconda3\lib\site-packages (from cycler>=0.10->matplotlib) (1.15.0)

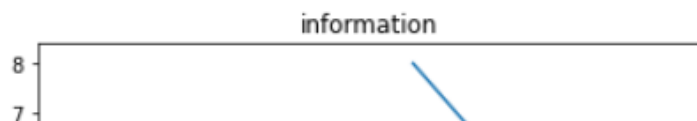```
In [109]:   1   # data visualization for matplotlib
```

```
In [110]:    1      # types of plot    bar ,  scatter ,  histogram  ,  pie  ,  violin,
```

```
In [ ]:    1
```

```
In [111]:    1  ## pyplot
```

```
In [4]:    1  x=[2,5,14,8]
           2  y=[3,5,2,8]
           3  plt.plot(x,y,0)
           4  plt.xlabel('x-axis')
           5  plt.ylabel('y-axis')
           6  plt.title('information')
           7  plt.show()
           8
```
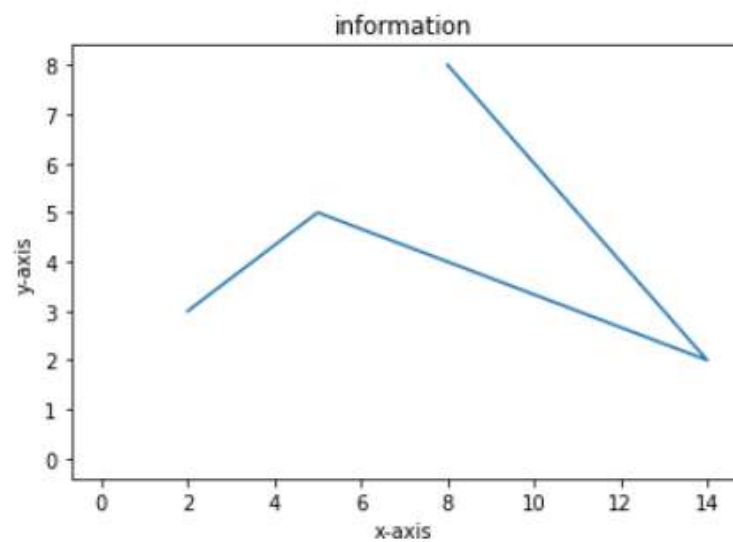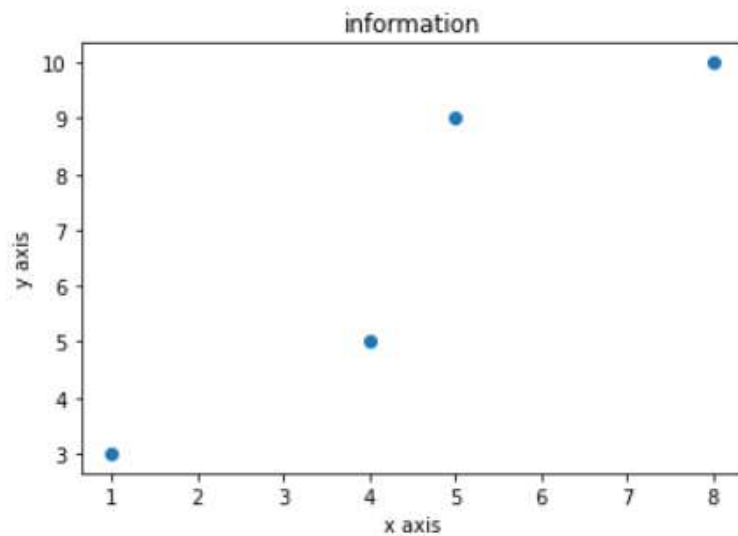
information

8 -

7 -

▶ Run ■ C ▶▶ Code

In [111]:
```
## pyplot
```

In [4]:
```
x=[2,5,14,8]
y=[3,5,2,8]
plt.plot(x,y,0)
plt.xlabel('x-axis')
plt.ylabel('y-axis')
plt.title('information')
plt.show()
```

Code

In [113]:
```python
x=[1,8,4,5]
y=[3,10,5,9]
plt.plot(x,y,'o')              # this is o not zero 0 (plot without a line)
plt.xlabel('x axis')
plt.ylabel('y axis')
plt.title('information')
plt.show()
```


In [ ]:

In [114]:
```python
y=[2,8,1,9]                    # default points
plt.plot(y)
plt.show()
```
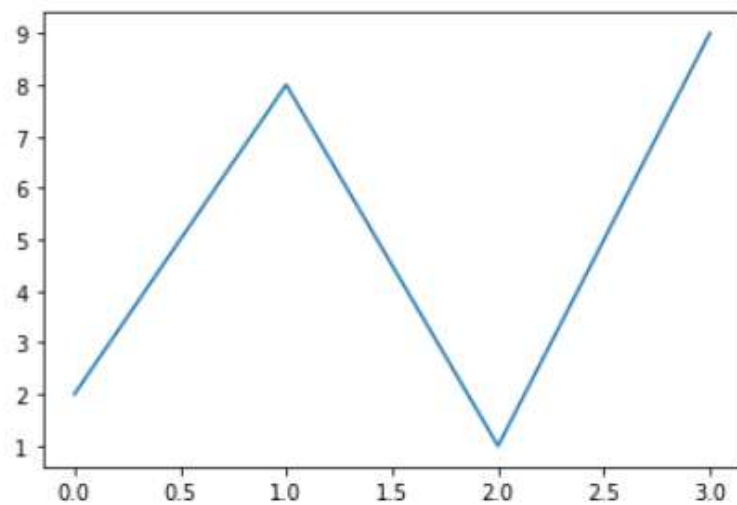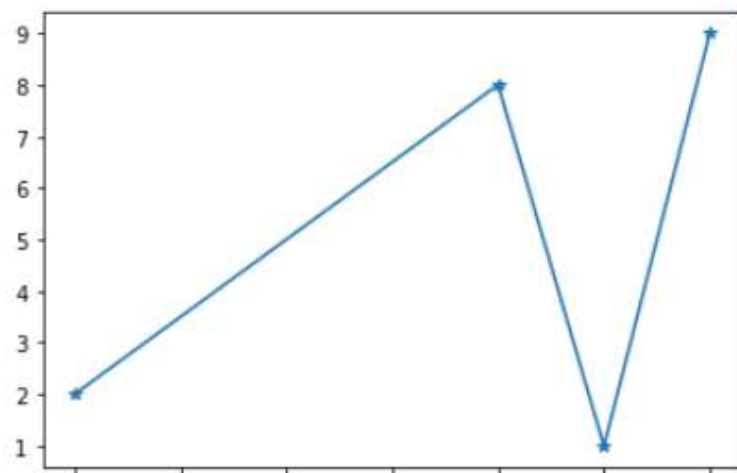
In [114]:
```python
1  y=[2,8,1,9]                    # default points
2  plt.plot(y)
3  plt.show()
```
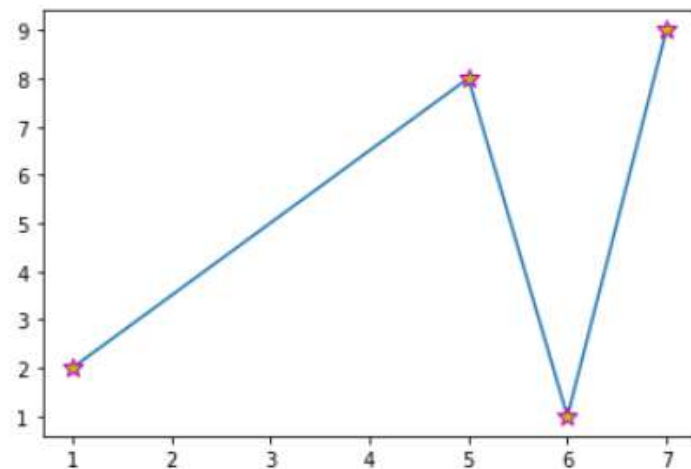

In [115]:
```python
1  x=[1,5,6,7]
2  y=[2,8,1,9]                    # markers points
3  plt.plot(x,y,marker='*')
4  plt.show()
```
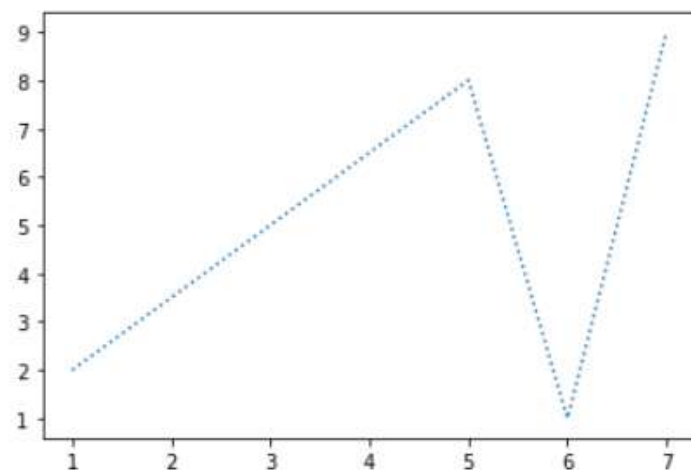
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In [116]:
```python
plt.plot(x,y,marker='*',ms=10,mec='m',mfc='y')
plt.show()
```
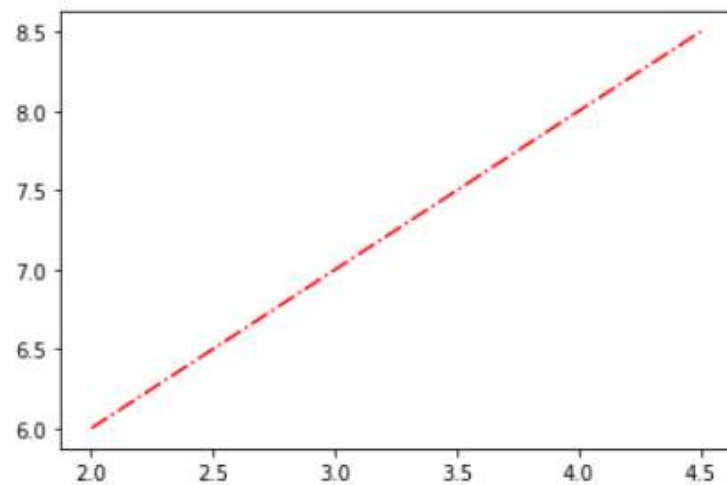

In [117]:
```python
plt.plot(x,y,linestyle='dotted')
plt.show()
```
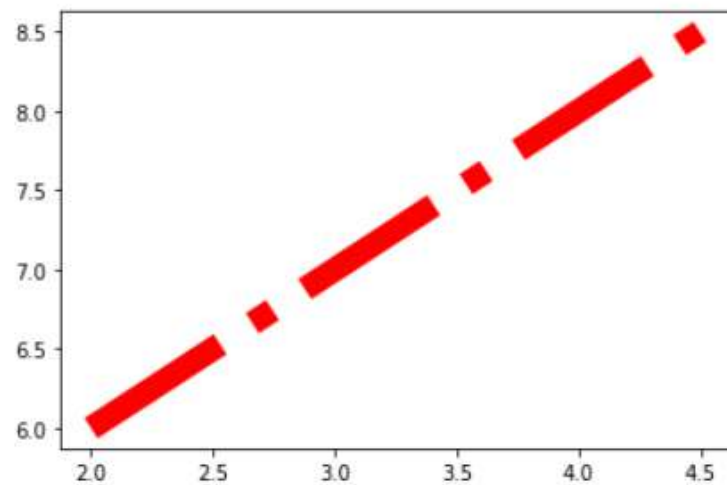
```
In [15]:   1  plt.plot(x,y,linestyle='dashdot',color='r')
           2  plt.show()
```
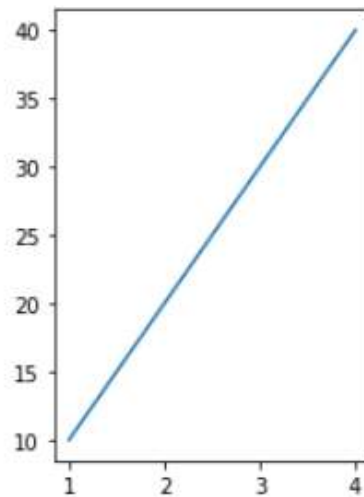


```
In [16]:   1  plt.plot(x,y,linestyle='dashdot',color='r',linewidth='12')
           2  plt.show()
```

2.0   2.5   3.0   3.5   4.0   4.5

In [119]:
```python
# sub plot
```

In [120]:
```python
x=[1,2,3,4]
y=[10,20,30,40]
plt.subplot(1,2,2)
plt.plot(x,y)
plt.show()
```


In [17]:
```python
x=np.array([1,3,5,6])
y=np.array([0,4,3,12])
plt.subplot(2,3,1)
plt.plot(x,y)

x=np.array([1,3,5,6])
y=np.array([10,20,30,40])
plt.subplot(2,3,2)
plt.plot(x,y)

x=np.array([1,3,5,6])
y=np.array([0,12,36,55])
plt.subplot(2,3,3)
plt.plot(x,y)
```
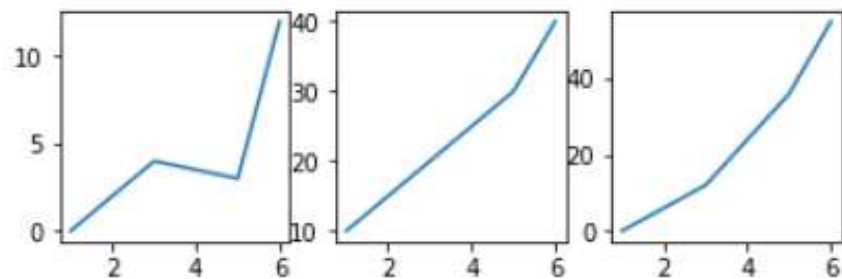
```python
1  x=np.array([1,3,5,6])
2  y=np.array([0,4,3,12])
3  plt.subplot(2,3,1)
4  plt.plot(x,y)
5
6  x=np.array([1,3,5,6])
7  y=np.array([10,20,30,40])
8  plt.subplot(2,3,2)
9  plt.plot(x,y)
10
11 x=np.array([1,3,5,6])
12 y=np.array([0,12,36,55])
13 plt.subplot(2,3,3)
14 plt.plot(x,y)
15
16 plt.show()
```

```python
1
```

```python
1    # bar plot
```
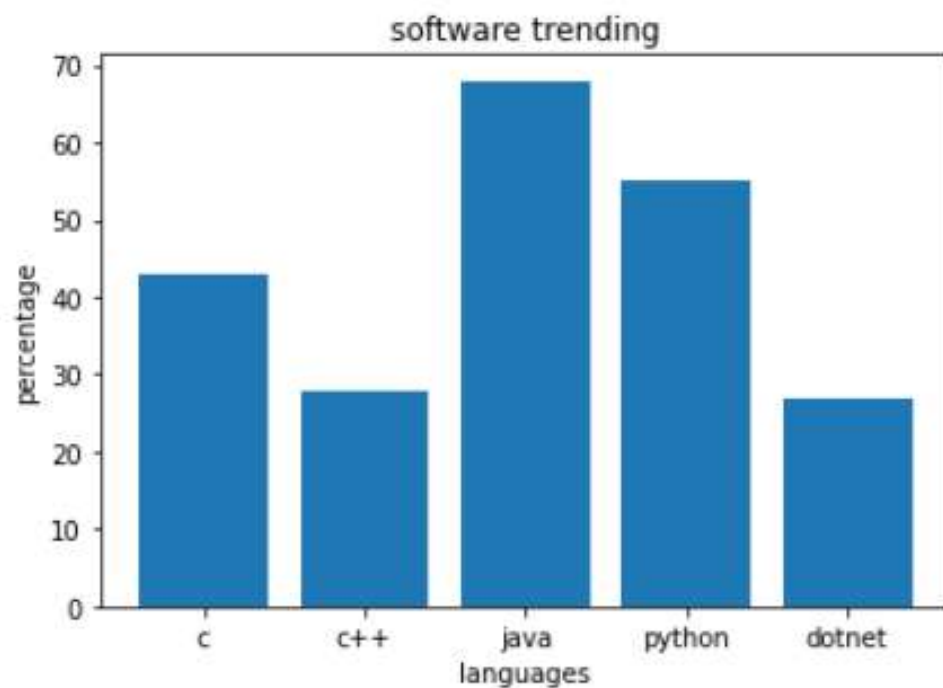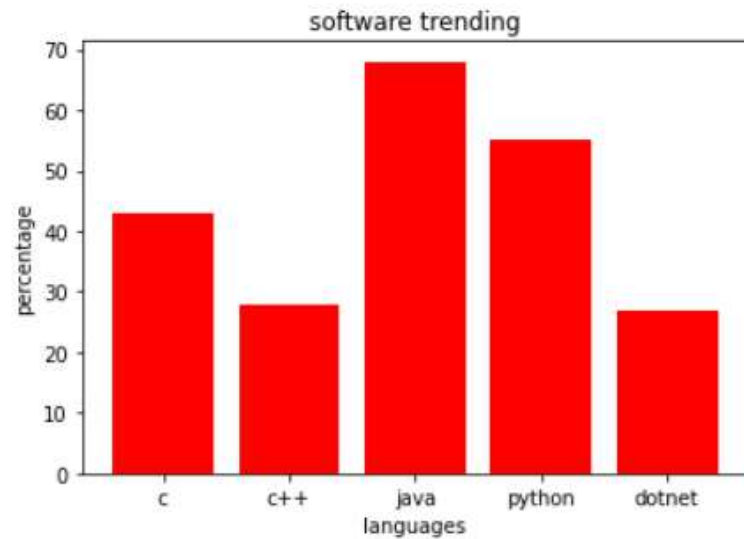
Run ■ C ▶▶ Code

In [ ]: 1

In [121]: 1   # bar plot

In [122]:
```python
1  lang=['c','c++','java','python','dotnet']
2  percent=[43,28,68,55,27]
3  plt.bar(lang,percent)
4  plt.xlabel('languages')
5  plt.ylabel('percentage')
6  plt.title('software trending')
7  plt.show()
```
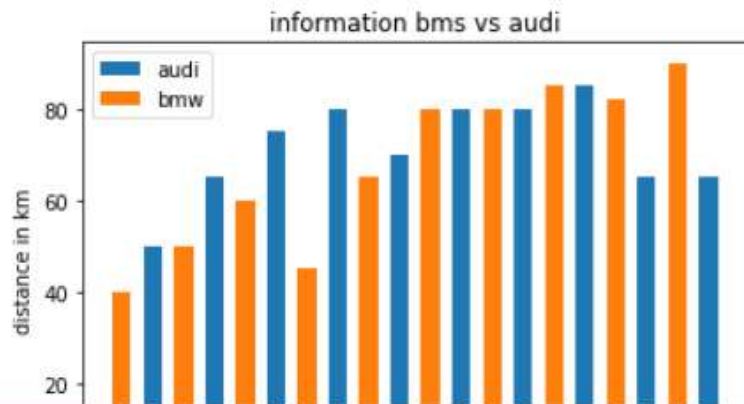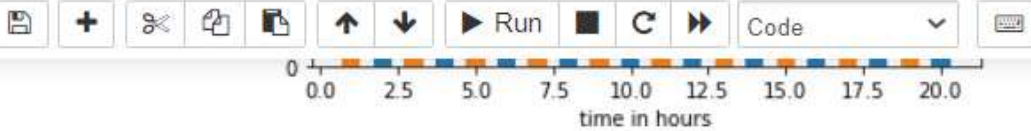
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```
7 plt.show()
```
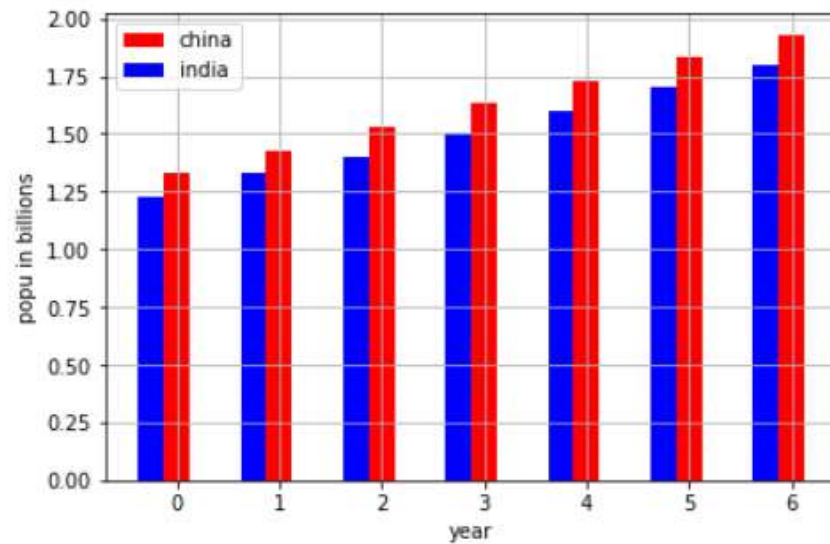
software trending


```
In [7]:  1 plt.bar([2,4,6,8,10,12,14,16,18,20],[50,65,75,80,70,80,80,85,65,65],label='audi',width=0.6)
         2 plt.bar([1,3,5,7,9,11,13,15,17,19],[40,50,60,45,65,80,80,85,82,90],label='bmw',width=0.6)
         3 plt.xlabel('time in hours')
         4 plt.ylabel('distance in km')
         5 plt.legend()
         6 plt.title('information bms vs audi')
         7 plt.show()
         8
```

information bms vs audi

```
year=[2015,2016,2017,2018,2019,2020,2021]
width=0.25
indices=np.arange(len(year))
pop_china=[1.33,1.43,1.53,1.63,1.73,1.83,1.93]
pop_india=[1.23,1.33,1.40,1.50,1.60,1.70,1.80]
plt.bar(indices,pop_china,width=0.25,label='china',color='red')
plt.bar(indices-width,pop_india,width=0.25,label='india',color='blue')
plt.legend()
plt.xlabel('year')
plt.ylabel('popu in billions')
plt.tight_layout()
plt.grid(True)

plt.show()
```
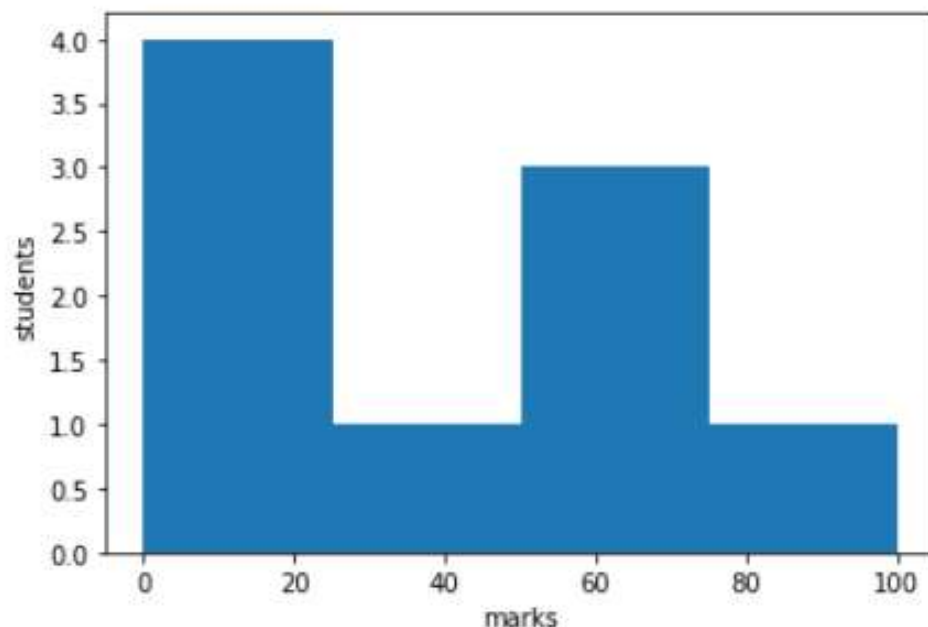
In [10]:

In [ ]:

```
# histogram
```

File   Edit   View   Insert   Cell   Kernel   Widgets   Help
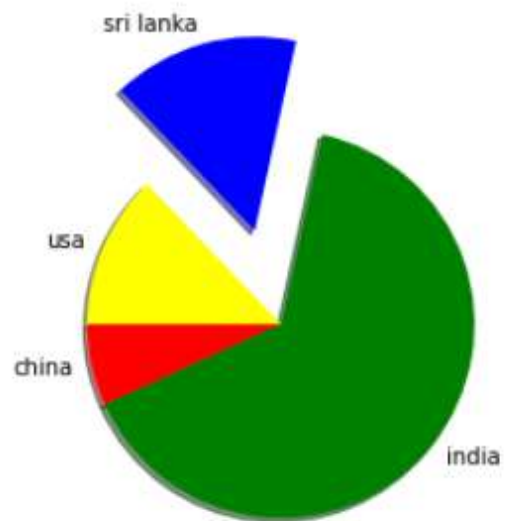
Code

In [ ]:
```python
# histogram
```

In [ ]:
```python
!pip install matplotlib
import pandas as pd
import numpy as np
from matplotlib import pyplot as plt
```

In [5]:
```python
a = ([22,87,5,43,56,73,55,11,20])
plt.hist(a,bins=[0,25,50,75,100])
plt.xticks=(0,20,50,75,100)
plt.xlabel('marks')
plt.ylabel('students')
plt.show()
```

Run   Code

```
In [ ]:    1  # pie plots
```

```
In [12]:   1  slices=[14338,136641,32906,27062]
           2  labels=['china','india','sri lanka','usa']
           3  explode=[0,0,0.5,0]
           4  colors=['red','green','blue','yellow']
           5  plt.pie(slices,labels=labels,explode=explode,shadow=True,startangle=180,colors=colors)
           6  plt.grid(True)
           7  plt.show()
```
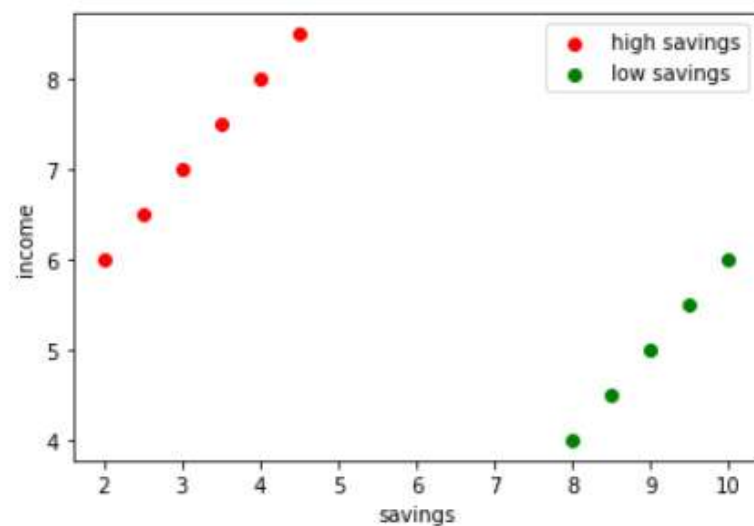


```
In [ ]:    1
```
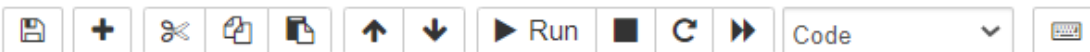
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In [ ]:　　1　# scatter plots

In [13]:
```
1  x=[2,2.5,3,3.5,4,4.5]
2  y=[6,6.5,7,7.5,8,8.5]
3  x1=[8,8.5,9,9.5,10]
4  y1=[4,4.5,5,5.5,6]
5  plt.scatter(x,y,label='high savings',color='red')
6  plt.scatter(x1,y1,label='low savings',color='green')
7  plt.legend()
8  plt.xlabel('savings')
9  plt.ylabel('income')
10 plt.show()
```
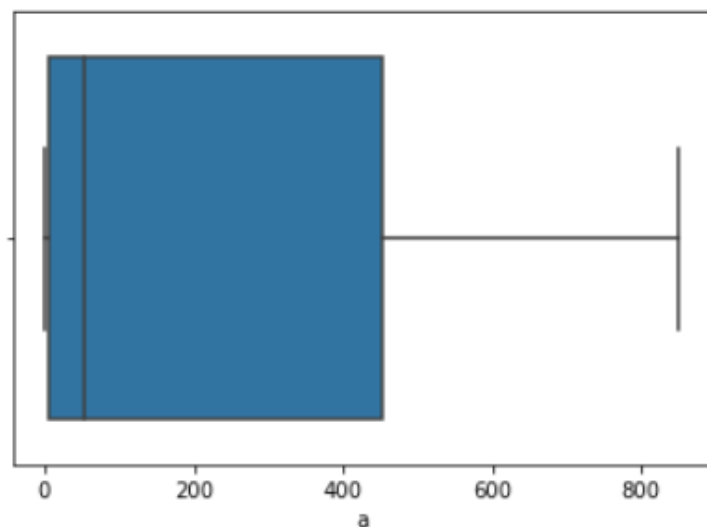
Code

In [18]:
```python
import seaborn as sb

l=[0,2,52,6,452,9,685,850,452]
df=pd.DataFrame(l,columns=['a'])
df
sb.boxplot(df['a'])
```

```
C:\Users\hp\anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning: Pass the following variable as a keyword
x. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit k
d will result in an error or misinterpretation.
  warnings.warn(
```

Out[18]:   <AxesSubplot:xlabel='a'>

In [19]:
```python
sb.violinplot(df['a'])
```

```
C:\Users\hp\anaconda3\lib\site-packages\seaborn\_decorators.py:36: FutureWarning: Pass the following variable as a keyword
x. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit k
d will result in an error or misinterpretation.
  warnings.warn(
```
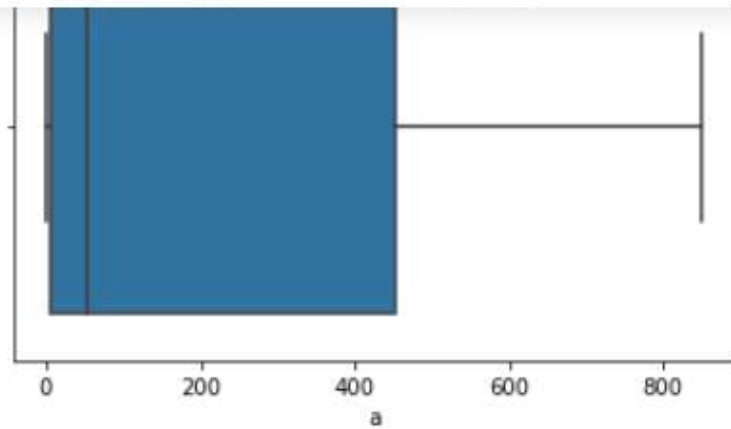
Out[19]:   <AxesSubplot:xlabel='a'>

```
In [19]:   1  sb.violinplot(df['a'])
```

C:\Users\hp\anaconda3\lib\site-packages\seaborn_decorators.py:36: FutureWarning: Pass the following variable as a keyw
x. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explici
d will result in an error or misinterpretation.
  warnings.warn(

Out[19]: <AxesSubplot:xlabel='a'>