In [1]:

```python
import numpy as np
arr=np.array([[1,2,3,],[34,56,78,],[22,33,44]])
print("orginal aray",arr)
```

```
orginal aray [[ 1  2  3]
 [34 56 78]
 [22 33 44]]
```

In [4]:

```python
import numpy as np
na=np.array([1,2,3])
# na
new_arr=np.r_[arr,[na]]
print("new array",new_arr)
```

```
new array [[ 1  2  3]
 [34 56 78]
 [22 33 44]
 [ 1  2  3]]
```

In [10]:

```python
import pandas as pd
import numpy as np
df=pd.DataFrame(np.random.randn(5,4),
                ['a','b','c','d','e'],['w','x','y','z'])
df
```

Out[10]:

| | w | x | y | z |
|---|---|---|---|---|
| **a** | -1.142032 | -0.807771 | 1.218944 | 0.569139 |
| **b** | -0.152715 | -1.070854 | -1.797606 | 1.499187 |
| **c** | 0.671548 | 0.594451 | -1.756803 | 0.253431 |
| **d** | 1.959344 | 1.593450 | -0.389332 | 0.335396 |
| **e** | 0.599975 | 1.509099 | -0.233384 | -0.344869 |

In [6]:

```python
df["w"]
```

Out[6]:

```
a   -0.536477
b   -0.518584
c    2.012798
d   -0.431437
e    1.542469
Name: w, dtype: float64
```

In [7]:
```
df.loc['a']
```

Out[7]:
```
w   -0.536477
x    0.445307
y   -0.917868
z   -0.061874
Name: a, dtype: float64
```

In [8]:
```
df.loc['b','y']
```

Out[8]:
```
-0.18707395352516518
```

In [9]:
```
df.loc[['a','b'],['w','x']]
```

Out[9]:

| | w | x |
|---|---|---|
| **a** | -0.536477 | 0.445307 |
| **b** | -0.518584 | -0.577105 |

In [10]:
```
df
```

Out[10]:

| | w | x | y | z |
|---|---|---|---|---|
| **a** | -0.536477 | 0.445307 | -0.917868 | -0.061874 |
| **b** | -0.518584 | -0.577105 | -0.187074 | 1.643717 |
| **c** | 2.012798 | -0.316101 | -0.682504 | 0.617219 |
| **d** | -0.431437 | 0.655573 | 0.195862 | 1.539922 |
| **e** | 1.542469 | 0.150712 | -1.342804 | -1.795212 |

In [11]:
```
df>0
```

Out[11]:

| | w | x | y | z |
|---|---|---|---|---|
| **a** | False | True | False | False |
| **b** | False | False | False | True |
| **c** | True | False | False | True |
| **d** | False | True | True | True |
| **e** | True | True | False | False |

In [12]:
```
df['x']>0
```

Out[12]:
```
a     True
b    False
c    False
d     True
e     True
Name: x, dtype: bool
```

In [13]:
```
df[df["w"]>0]
```

Out[13]:

| | w | x | y | z |
|---|---|---|---|---|
| **c** | 2.012798 | -0.316101 | -0.682504 | 0.617219 |
| **e** | 1.542469 | 0.150712 | -1.342804 | -1.795212 |

In [15]:
```
d={"a":[1,2,np.nan],"b":[5,np.nan,np.nan],
   "c":[1,2,3],"d":[np.nan,np.nan,np.nan]}
```

In [18]:
```
df1=pd.DataFrame(d)
df1
```

Out[18]:

| | a | b | c | d |
|---|---|---|---|---|
| **0** | 1.0 | 5.0 | 1 | NaN |
| **1** | 2.0 | NaN | 2 | NaN |
| **2** | NaN | NaN | 3 | NaN |

In [20]:
```
df1.dropna()
```

Out[20]:

| | a | b | c | d |
|---|---|---|---|---|

In [21]:
```
df1.dropna(how='any')
```

Out[21]:

| | a | b | c | d |
|---|---|---|---|---|

In [24]:
```
df1.dropna(how='all',axis=1)
```

Out[24]:

| | a | b | c |
|---|---|---|---|
| **0** | 1.0 | 5.0 | 1 |
| **1** | 2.0 | NaN | 2 |
| **2** | NaN | NaN | 3 |

In [26]:
```
df1.isna()
```

Out[26]:

| | a | b | c | d |
|---|---|---|---|---|
| **0** | False | False | False | True |
| **1** | False | True | False | True |
| **2** | True | True | False | True |

In [27]:
```
df1.isna().sum()
```

Out[27]:
```
a    1
b    2
c    0
d    3
dtype: int64
```

In [28]:
```
df1.dropna(thresh=2)
```

Out[28]:

| | a | b | c | d |
|---|---|---|---|---|
| **0** | 1.0 | 5.0 | 1 | NaN |
| **1** | 2.0 | NaN | 2 | NaN |

In [29]:
```
df1.dropna(thresh=3)
```

Out[29]:

| | a | b | c | d |
|---|---|---|---|---|
| **0** | 1.0 | 5.0 | 1 | NaN |

In [30]:
```
df1.dropna(thresh=1)
```

Out[30]:

| | a | b | c | d |
|---|---|---|---|---|
| **0** | 1.0 | 5.0 | 1 | NaN |
| **1** | 2.0 | NaN | 2 | NaN |
| **2** | NaN | NaN | 3 | NaN |

In [31]:
```
df1.dropna(thresh=3,axis=1)
```

Out[31]:

| | c |
|---|---|
| **0** | 1 |
| **1** | 2 |
| **2** | 3 |

In [32]:
```
df1.dropna(thresh=3,axis=1)
```

Out[32]:

| | c |
|---|---|
| **0** | 1 |
| **1** | 2 |
| **2** | 3 |

In [33]:
```
df1.fillna(value=1)
```

Out[33]:

|   | a | b | c | d |
|---|---|---|---|---|
| **0** | 1.0 | 5.0 | 1 | 1.0 |
| **1** | 2.0 | 1.0 | 2 | 1.0 |
| **2** | 1.0 | 1.0 | 3 | 1.0 |

In [34]:
```
df1['a'].fillna(value=df1['a'].mean())
```

Out[34]:
```
0    1.0
1    2.0
2    1.5
Name: a, dtype: float64
```

In [38]:
```
data ={'COMPANY':['FB','GOOGLE','META','META','GOOGLE','FB'],
       "PERSON":['mam','in','si','srr','maheshbabu','chandu'],
       'SALES':[300,500,100,200,600,20]}
```

In [40]:
```
df2=pd.DataFrame(data)
df2
```

Out[40]:

|   | COMPANY | PERSON | SALES |
|---|---|---|---|
| **0** | FB | mam | 300 |
| **1** | GOOGLE | in | 500 |
| **2** | META | si | 100 |
| **3** | META | srr | 200 |
| **4** | GOOGLE | maheshbabu | 600 |
| **5** | FB | chandu | 20 |

In [44]:
```
bycomp=df2.groupby("COMPANY")
```

In [45]:
```
bycomp
```

Out[45]:
```
<pandas.core.groupby.generic.DataFrameGroupBy object at 0x00000211091E3FD0>
```

In [46]:
```
bycomp.sum()['SALES']
```

Out[46]:
```
COMPANY
FB         320
GOOGLE    1100
META       300
Name: SALES, dtype: int64
```

In [48]:
```
bycomp.max()
```

Out[48]:

| | PERSON | SALES |
|---|---|---|
| COMPANY | | |
| FB | mam | 300 |
| GOOGLE | maheshbabu | 600 |
| META | srr | 200 |

In [49]:
```
bycomp.describe()
```

Out[49]:

| | SALES | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | count | mean | std | min | 25% | 50% | 75% | max |
| COMPANY | | | | | | | | |
| FB | 2.0 | 160.0 | 197.989899 | 20.0 | 90.0 | 160.0 | 230.0 | 300.0 |
| GOOGLE | 2.0 | 550.0 | 70.710678 | 500.0 | 525.0 | 550.0 | 575.0 | 600.0 |
| META | 2.0 | 150.0 | 70.710678 | 100.0 | 125.0 | 150.0 | 175.0 | 200.0 |

In [50]:
```
bycomp['SALES'].max()
```

Out[50]:
```
COMPANY
FB        300
GOOGLE    600
META      200
Name: SALES, dtype: int64
```

In [51]:
```
df2.loc[bycomp['SALES'].idxmax()][['PERSON','SALES']]
```

Out[51]:

| | PERSON | SALES |
|---|---|---|
| 0 | mam | 300 |
| 4 | maheshbabu | 600 |
| 3 | srr | 200 |

In [52]:
```
bycomp[['PERSON','SALES']].max()
```

Out[52]:

| | PERSON | SALES |
|---|---|---|
| COMPANY | | |
| FB | mam | 300 |
| GOOGLE | maheshbabu | 600 |
| META | srr | 200 |

In [53]:
```
df=pd.read_csv(r"C:\Users\vippa\Downloads\samplecsv.csv")
```

In [54]:
```
df
```

Out[54]:

| | Year | Industry_aggregation_NZSIOC | Industry_code_NZSIOC | Industry_name_NZSIOC | |
|---|---|---|---|---|---|
| **0** | 2020 | Level 1 | 99999 | All industries | D<br>(m |
| **1** | 2020 | Level 1 | 99999 | All industries | D<br>(m |
| **2** | 2020 | Level 1 | 99999 | All industries | D<br>(m |
| **3** | 2020 | Level 1 | 99999 | All industries | D<br>(m |
| **4** | 2020 | Level 1 | 99999 | All industries | D<br>(m |
| **...** | ... | ... | ... | ... | |
| **37075** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37076** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37077** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37078** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37079** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |

37080 rows × 10 columns

In [55]:
```
df.head()
```

Out[55]:

| | Year | Industry_aggregation_NZSIOC | Industry_code_NZSIOC | Industry_name_NZSIOC | Units |
|---|---|---|---|---|---|
| **0** | 2020 | Level 1 | 99999 | All industries | Dollars (millions) |
| **1** | 2020 | Level 1 | 99999 | All industries | Dollars (millions) |
| **2** | 2020 | Level 1 | 99999 | All industries | Dollars (millions) |
| **3** | 2020 | Level 1 | 99999 | All industries | Dollars (millions) |
| **4** | 2020 | Level 1 | 99999 | All industries | Dollars (millions) |

In [56]:
```
df.tail()
```

Out[56]:

| | Year | Industry_aggregation_NZSIOC | Industry_code_NZSIOC | Industry_name_NZSIOC | |
|---|---|---|---|---|---|
| **37075** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37076** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37077** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37078** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37079** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |

In [57]:
```
df.head(4)
```

Out[57]:

| | Year | Industry_aggregation_NZSIOC | Industry_code_NZSIOC | Industry_name_NZSIOC | Units |
|---|---|---|---|---|---|
| **0** | 2020 | Level 1 | 99999 | All industries | Dollars (millions) |
| **1** | 2020 | Level 1 | 99999 | All industries | Dollars (millions) |
| **2** | 2020 | Level 1 | 99999 | All industries | Dollars (millions) |
| **3** | 2020 | Level 1 | 99999 | All industries | Dollars (millions) |

In [58]:
```
df.tail(5)
```

Out[58]:

| | Year | Industry_aggregation_NZSIOC | Industry_code_NZSIOC | Industry_name_NZSIOC | |
|---|---|---|---|---|---|
| **37075** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37076** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37077** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37078** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |
| **37079** | 2013 | Level 3 | ZZ11 | Food product manufacturing | Perce |

In [59]:
```
df=pd.read_csv(r"C:\Users\vippa\Downloads\delimatercsv.csv")
```

In [61]:
```
name={"NAME":'Sridhar','Age':'all_age','City':"Place"}
```

In [62]:
```
df=df.rename(columns=name)
```

In [63]:
```
df
```

Out[63]:
```
            Name;Age;City
0           Alice;25;New York
1      Bob;30;San Francisco
2   Charlie;22;Los Angeles
```

In [11]:

```
df_titanic=pd.read_csv(r"C:\Users\vippa\Downloads\titanic_train.csv")
df_titanic
```

Out[11]:

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 0 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 |
| **1** | 2 | 1 | 1 | Cumings, Mrs. John Bradley (Florence Briggs Th... | female | 38.0 | 1 | 0 | PC 17599 | 71.2833 |
| **2** | 3 | 1 | 3 | Heikkinen, Miss. Laina | female | 26.0 | 0 | 0 | STON/O2. 3101282 | 7.9250 |
| **3** | 4 | 1 | 1 | Futrelle, Mrs. Jacques Heath (Lily May Peel) | female | 35.0 | 1 | 0 | 113803 | 53.1000 |
| **4** | 5 | 0 | 3 | Allen, Mr. William Henry | male | 35.0 | 0 | 0 | 373450 | 8.0500 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| **886** | 887 | 0 | 2 | Montvila, Rev. Juozas | male | 27.0 | 0 | 0 | 211536 | 13.0000 |
| **887** | 888 | 1 | 1 | Graham, Miss. Margaret Edith | female | 19.0 | 0 | 0 | 112053 | 30.0000 |
| **888** | 889 | 0 | 3 | Johnston, Miss. Catherine Helen "Carrie" | female | NaN | 1 | 2 | W./C. 6607 | 23.4500 |
| **889** | 890 | 1 | 1 | Behr, Mr. Karl Howell | male | 26.0 | 0 | 0 | 111369 | 30.0000 |
| **890** | 891 | 0 | 3 | Dooley, Mr. Patrick | male | 32.0 | 0 | 0 | 370376 | 7.7500 |

891 rows × 12 columns

In [65]:

```
df_titanic.head()
```

Out[65]:

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare | Ca |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 0 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 | N |
| **1** | 2 | 1 | 1 | Cumings, Mrs. John Bradley (Florence Briggs Th... | female | 38.0 | 1 | 0 | PC 17599 | 71.2833 | ( |
| **2** | 3 | 1 | 3 | Heikkinen, Miss. Laina | female | 26.0 | 0 | 0 | STON/O2. 3101282 | 7.9250 | N |
| **3** | 4 | 1 | 1 | Futrelle, Mrs. Jacques Heath (Lily May Peel) | female | 35.0 | 1 | 0 | 113803 | 53.1000 | C |
| **4** | 5 | 0 | 3 | Allen, Mr. William Henry | male | 35.0 | 0 | 0 | 373450 | 8.0500 | N |

In [72]:

```
df_titanic['Pclass'].value_counts()
```

Out[72]:

```
Pclass
3    491
1    216
2    184
Name: count, dtype: int64
```

In [76]:
```
df_titanic
```

Out[76]:

| | PassengerId | Survived | Pclass | Name | Sex | Age | SibSp | Parch | Ticket | Fare |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 1 | 0 | 3 | Braund, Mr. Owen Harris | male | 22.0 | 1 | 0 | A/5 21171 | 7.2500 |
| **1** | 2 | 1 | 1 | Cumings, Mrs. John Bradley (Florence Briggs Th... | female | 38.0 | 1 | 0 | PC 17599 | 71.2833 |
| **2** | 3 | 1 | 3 | Heikkinen, Miss. Laina | female | 26.0 | 0 | 0 | STON/O2. 3101282 | 7.9250 |
| **3** | 4 | 1 | 1 | Futrelle, Mrs. Jacques Heath (Lily May Peel) | female | 35.0 | 1 | 0 | 113803 | 53.1000 |
| **4** | 5 | 0 | 3 | Allen, Mr. William Henry | male | 35.0 | 0 | 0 | 373450 | 8.0500 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| **886** | 887 | 0 | 2 | Montvila, Rev. Juozas | male | 27.0 | 0 | 0 | 211536 | 13.0000 |
| **887** | 888 | 1 | 1 | Graham, Miss. Margaret Edith | female | 19.0 | 0 | 0 | 112053 | 30.0000 |
| **888** | 889 | 0 | 3 | Johnston, Miss. Catherine Helen "Carrie" | female | NaN | 1 | 2 | W./C. 6607 | 23.4500 |
| **889** | 890 | 1 | 1 | Behr, Mr. Karl Howell | male | 26.0 | 0 | 0 | 111369 | 30.0000 |
| **890** | 891 | 0 | 3 | Dooley, Mr. Patrick | male | 32.0 | 0 | 0 | 370376 | 7.7500 |

891 rows × 12 columns

In [73]:
```
df_titanic.describe()
```

Out[73]:

| | PassengerId | Survived | Pclass | Age | SibSp | Parch | Fare |
|---|---|---|---|---|---|---|---|
| **count** | 891.000000 | 891.000000 | 891.000000 | 714.000000 | 891.000000 | 891.000000 | 891.000000 |
| **mean** | 446.000000 | 0.383838 | 2.308642 | 29.699118 | 0.523008 | 0.381594 | 32.204208 |
| **std** | 257.353842 | 0.486592 | 0.836071 | 14.526497 | 1.102743 | 0.806057 | 49.693429 |
| **min** | 1.000000 | 0.000000 | 1.000000 | 0.420000 | 0.000000 | 0.000000 | 0.000000 |
| **25%** | 223.500000 | 0.000000 | 2.000000 | 20.125000 | 0.000000 | 0.000000 | 7.910400 |
| **50%** | 446.000000 | 0.000000 | 3.000000 | 28.000000 | 0.000000 | 0.000000 | 14.454200 |
| **75%** | 668.500000 | 1.000000 | 3.000000 | 38.000000 | 1.000000 | 0.000000 | 31.000000 |
| **max** | 891.000000 | 1.000000 | 3.000000 | 80.000000 | 8.000000 | 6.000000 | 512.329200 |

In [84]:
```
df_titanic.shape[0]
```

Out[84]:
```
891
```

In [85]:
```
df_titanic.isnull().sum()
```

Out[85]:
```
PassengerId      0
Survived         0
Pclass           0
Name             0
Sex              0
Age            177
SibSp            0
Parch            0
Ticket           0
Fare             0
Cabin          687
Embarked         2
dtype: int64
```

In [93]:
```
ans=(df_titanic.isnull().sum()/df_titanic.shape[0])*100
#ans
ans.max()
```

Out[93]:
```
77.10437710437711
```

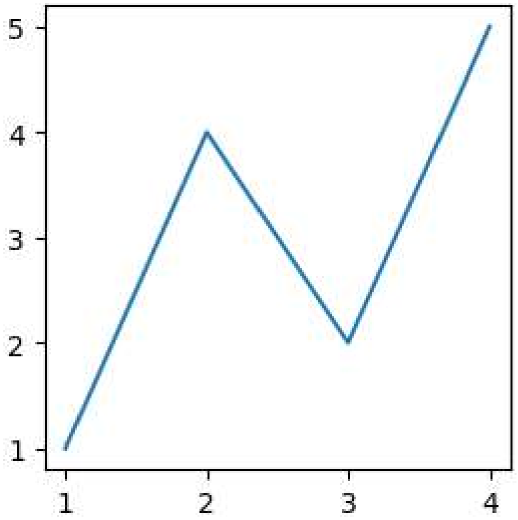
In [111]:
```
import matplotlib.pyplot as plt
```

In [112]:

```
x = [1,2,3,4]
y = [1,4,2,5]

plt.figure(figsize=(3,3))
plt.plot(x,y)
```

Out[112]:

```
[<matplotlib.lines.Line2D at 0x2110eab1290>]
```

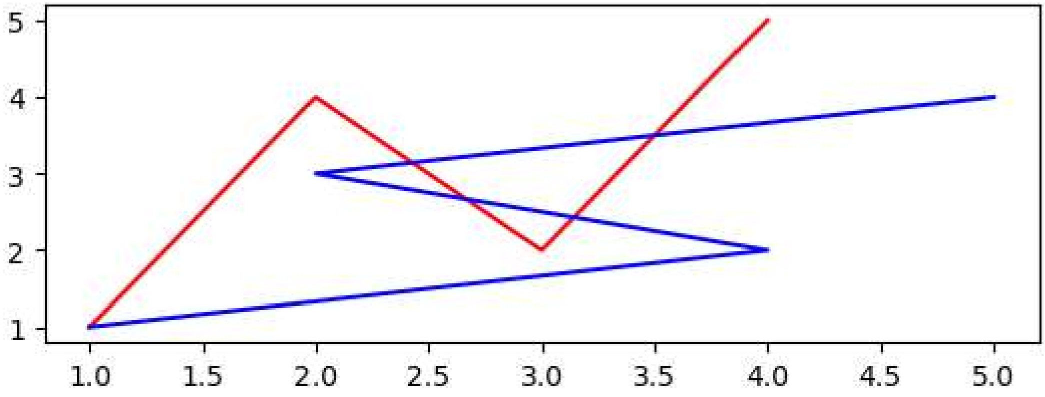


In [136]:

```
#plt.subplot(1, 2, 1)
#plt.plot(x, y,'b')

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

plt.subplot(2,1,2)
plt.plot(x,y,'r')

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

Out[136]:

```
[<matplotlib.lines.Line2D at 0x2111074c350>]
```



```
In [114]: years = np.random.randint(0,100)
```

```
In [115]: years
```

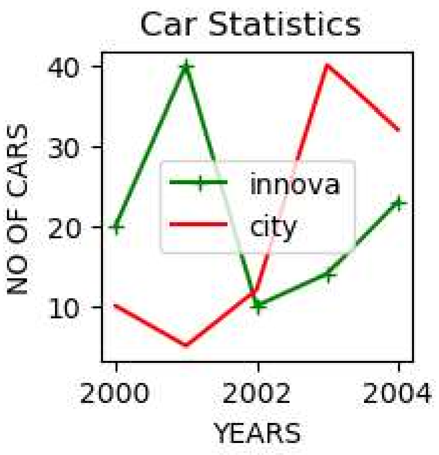
```
Out[115]: 88
```

```
In [4]: import numpy as np
        x_years = np.arange(2000,2005, dtype = int)
        y_innova = np.array([20,40,10,14,23])
        y_honda_city=np.array([10,5,12,40,32])
        x_years,y_innova
```

```
Out[4]: (array([2000, 2001, 2002, 2003, 2004]), array([20, 40, 10, 14, 23]))
```

```
In [5]: import matplotlib.pyplot as plt
        plt.figure(figsize=(2,2))
        plt.plot(x_years,y_innova,'-+g')
        plt.plot(x_years,y_honda_city,'r')
        plt.xlabel("YEARS")
        plt.ylabel("NO OF CARS")
        plt.title("Car Statistics ")
        plt.legend(['innova',"city"])
```

```
Out[5]: <matplotlib.legend.Legend at 0x2102314ed90>
```

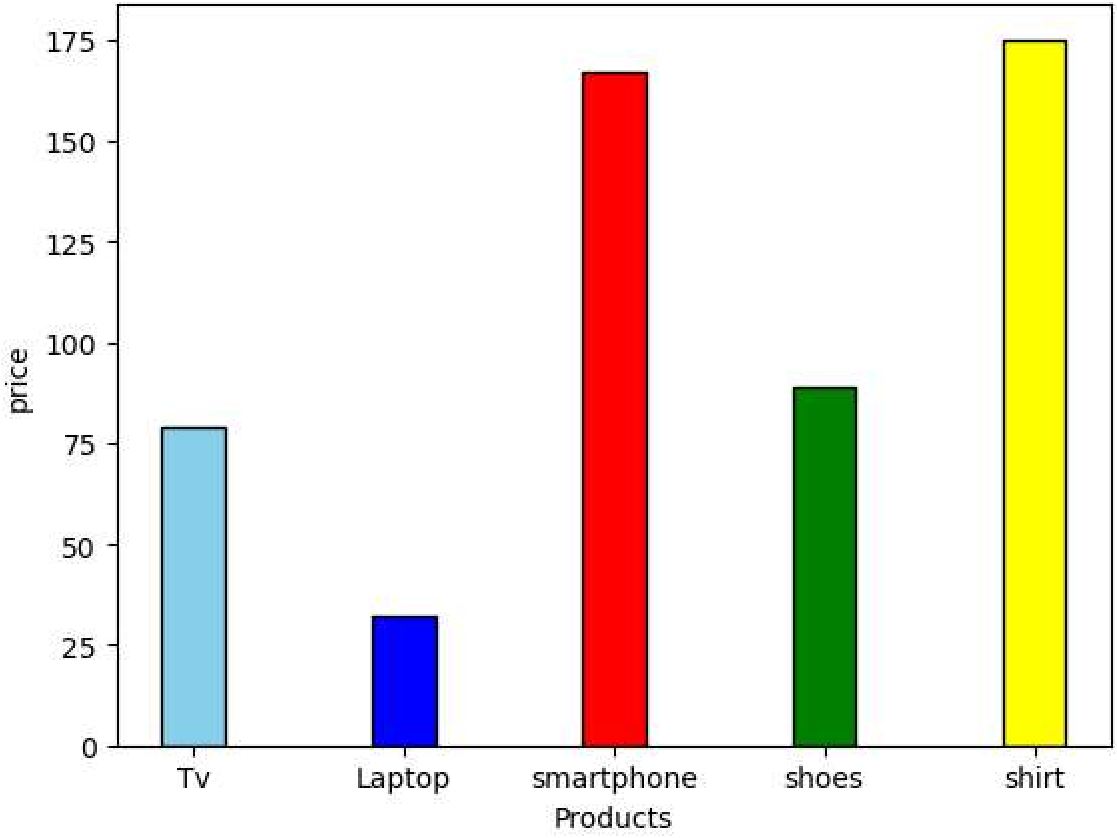


In [6]:

```
# barpolt
products = ['Tv','Laptop','smartphone','shoes','shirt']
sales = np.random.randint(30,200,size=len(products))

plt.bar(products,sales,color=['skyblue','blue','red','green','yellow'], width=
plt.ylabel("price")
plt.xlabel('Products')
```

Out[6]:

```
Text(0.5, 0, 'Products')
```

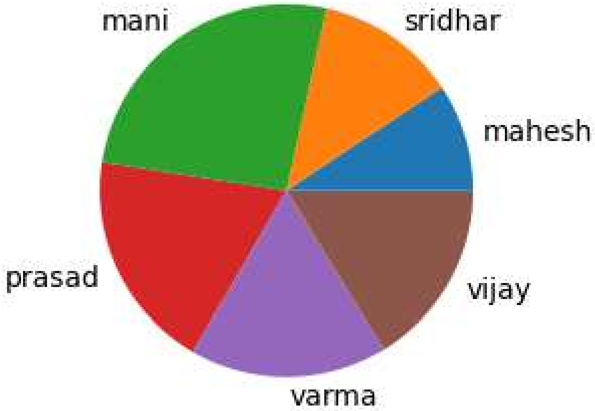


In [7]:

```
student_name=['mahesh','sridhar','mani','prasad','varma','vijay']
scores = [23,30,64,47,42,40]
plt.figure(figsize=(3,4))
plt.pie(scores,labels=student_name)
```

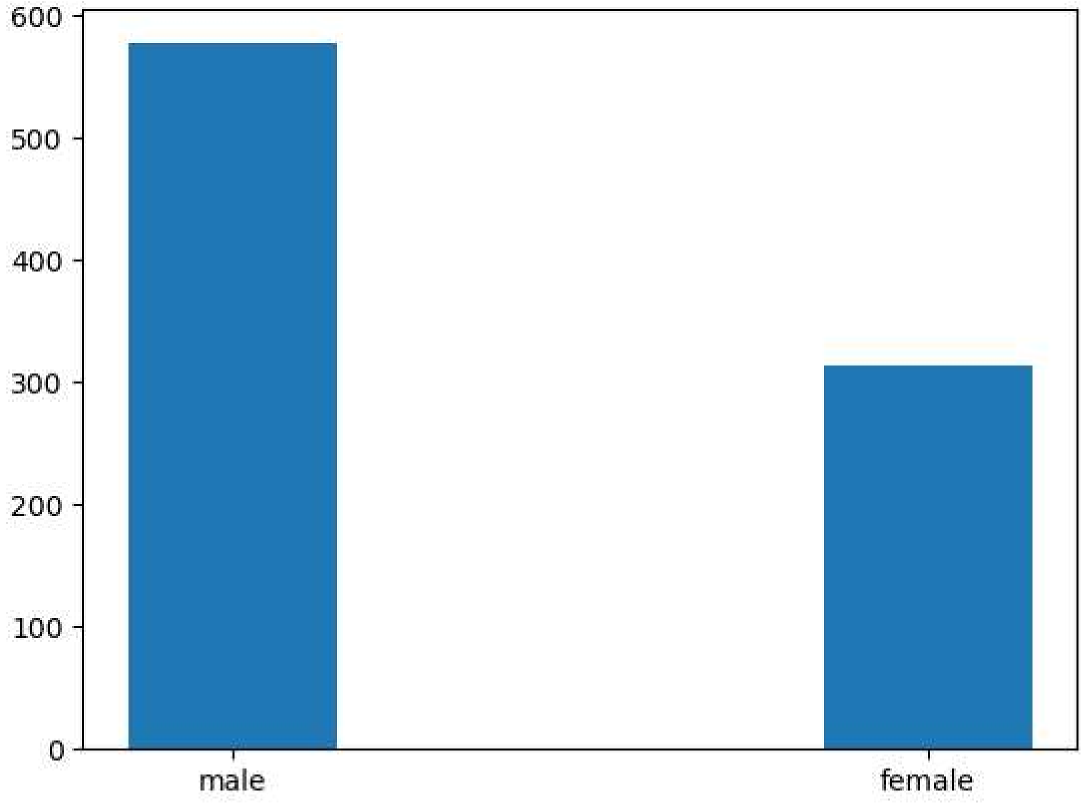
Out[7]:

```
([<matplotlib.patches.Wedge at 0x2102496dd10>,
  <matplotlib.patches.Wedge at 0x2102496e9d0>,
  <matplotlib.patches.Wedge at 0x2102496fe10>,
  <matplotlib.patches.Wedge at 0x21024981510>,
  <matplotlib.patches.Wedge at 0x21024982910>,
  <matplotlib.patches.Wedge at 0x21024983f50>],
 [Text(1.0528888995438015, 0.31847286417753534, 'mahesh'),
  Text(0.6213091383344759, 0.9077306619378191, 'sridhar'),
  Text(-0.6213091383344759, 0.9077306619378191, 'mani'),
  Text(-0.9919348580473716, -0.4754631819505492, 'prasad'),
  Text(0.014047325301146971, -1.0999103020937133, 'varma'),
  Text(0.9595739177560261, -0.5377898254544718, 'vijay')])
```



```
In [13]: male=(df_titanic["Sex"]=="male").sum()
         female=(df_titanic["Sex"]=="female").sum()
         counts=[male,female]
         names = ["male","female"]
         plt.bar(names,counts,width=0.3)
```

```
Out[13]: <BarContainer object of 2 artists>
```

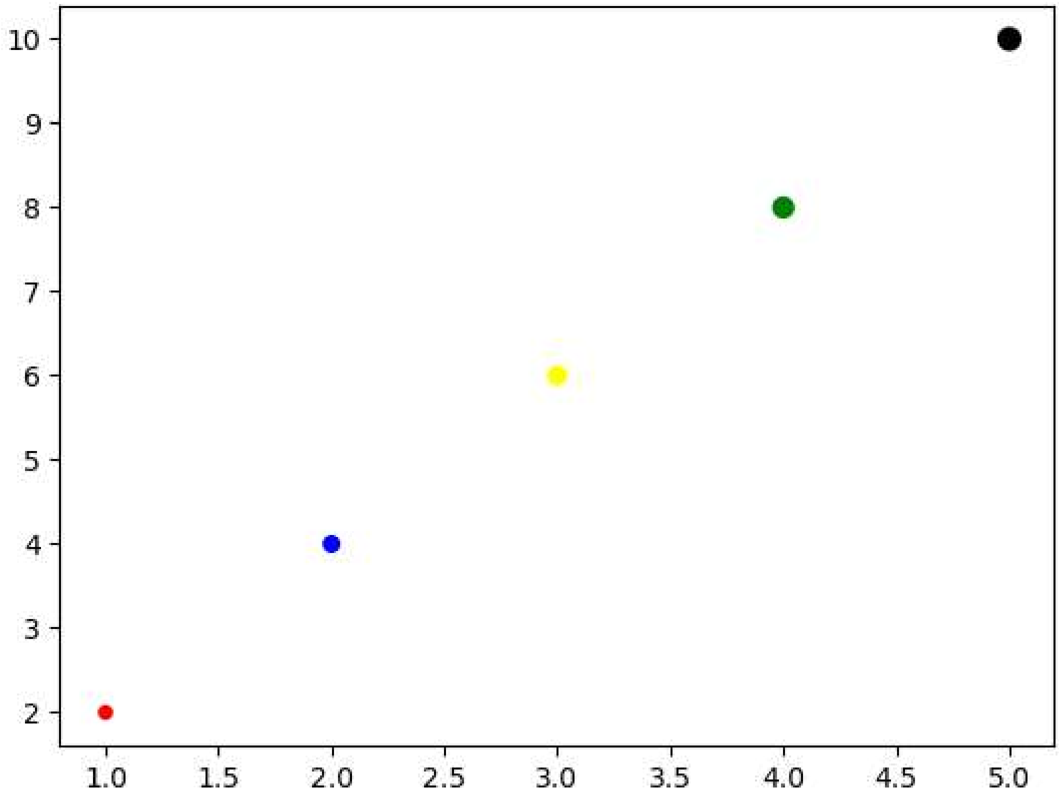


In [17]:

```
x_data = [1,2,3,4,5]
y_data = [2,4,6,8,10]

plt.scatter(x_data,y_data,sizes=[20,30,40,50,60],
            c=["red","blue","yellow","green","black",])
```

Out[17]:

```
<matplotlib.collections.PathCollection at 0x2102969d3d0>
```



In [ ]:

```
```