In [3]:

```
import pandas as pd
# Create team data
data_england = {'Name': ['Kane', 'Sterling', 'Saka', 'Maguire'], 'Age': [27, 26, 19, 28]}
data_italy = {'Name': ['Immobile', 'Insigne', 'Chiellini', 'Chiesa'], 'Age': [31, 30, 36, 2
# Create Dataframe
df_england = pd.DataFrame(data_england)
df_italy = pd.DataFrame(data_italy)
print("England:")
print()
print(df_england)
print()
print("Italy:")
print()
print(df_italy)
```

```
England:

       Name  Age
0      Kane   27
1  Sterling   26
2      Saka   19
3   Maguire   28

Italy:

        Name  Age
0   Immobile   31
1    Insigne   30
2  Chiellini   36
3     Chiesa   23
```

In [ ]:

In [12]:

```
print("concating:")
print()
frames = [df_england,df_italy]
both_teams = pd.concat(frames)
print("Concat():")
print()
print(both_teams)
print()
print("append():")
print()
print(df_england.append(df_italy))
print()
print("labeling:")
print()
print(pd.concat(frames, keys=["England", "Italy"]))
print()
```

```
concating:

Concat():

        Name  Age
0       Kane   27
1   Sterling   26
2       Saka   19
3    Maguire   28
0   Immobile   31
1    Insigne   30
2  Chiellini   36
3     Chiesa   23

append():

        Name  Age
0       Kane   27
1   Sterling   26
2       Saka   19
3    Maguire   28
0   Immobile   31
1    Insigne   30
2  Chiellini   36
3     Chiesa   23

labeling:

                Name  Age
England 0       Kane   27
        1   Sterling   26
        2       Saka   19
        3    Maguire   28
Italy   0   Immobile   31
        1    Insigne   30
        2  Chiellini   36
        3     Chiesa   23
```

In [18]:

```
print("setting conditions:")
print()
both_teams[both_teams["Age"] >= 30]
both_teams
```

```
setting conditions:
```

Out[18]:

	Age	Associated Clubs	Name
0	27	Tottenham	Kane
1	26	Man City	Sterling
2	19	Arsenal	Saka
3	28	Man Utd	Maguire
0	31	NaN	Immobile
1	30	NaN	Insigne
2	36	NaN	Chiellini
3	23	NaN	Chiesa

In [17]:

```
print("Adding A New Column 'Associated Clubs':")
print()
club = ['Tottenham', 'Man City', 'Arsenal', 'Man Utd']
# 'Associated Club' is our new column name
df_england['Associated Clubs'] = club
df_england
```

```
Adding A New Column 'Associated Clubs':
```

Out[17]:

	Name	Age	Associated Clubs
0	Kane	27	Tottenham
1	Sterling	26	Man City
2	Saka	19	Arsenal
3	Maguire	28	Man Utd

In [20]:

```
!pip install matplotlib
```

```
Requirement already satisfied: matplotlib in c:\programdata\anaconda3\lib\si
te-packages (2.2.2)
Requirement already satisfied: numpy>=1.7.1 in c:\programdata\anaconda3\lib
\site-packages (from matplotlib) (1.14.3)
Requirement already satisfied: cycler>=0.10 in c:\programdata\anaconda3\lib
\site-packages (from matplotlib) (0.10.0)
Requirement already satisfied: pyparsing!=2.0.4,!=2.1.2,!=2.1.6,>=2.0.1 in
c:\programdata\anaconda3\lib\site-packages (from matplotlib) (2.2.0)
Requirement already satisfied: python-dateutil>=2.1 in c:\programdata\anacon
da3\lib\site-packages (from matplotlib) (2.7.3)
Requirement already satisfied: pytz in c:\programdata\anaconda3\lib\site-pac
kages (from matplotlib) (2018.4)
Requirement already satisfied: six>=1.10 in c:\programdata\anaconda3\lib\sit
e-packages (from matplotlib) (1.11.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\programdata\anaconda3
\lib\site-packages (from matplotlib) (1.0.1)
Requirement already satisfied: setuptools in c:\programdata\anaconda3\lib\si
te-packages (from kiwisolver>=1.0.1->matplotlib) (39.1.0)


distributed 1.21.8 requires msgpack, which is not installed.
You are using pip version 10.0.1, however version 21.3.1 is available.
You should consider upgrading via the 'python -m pip install --upgrade pip'
command.
```

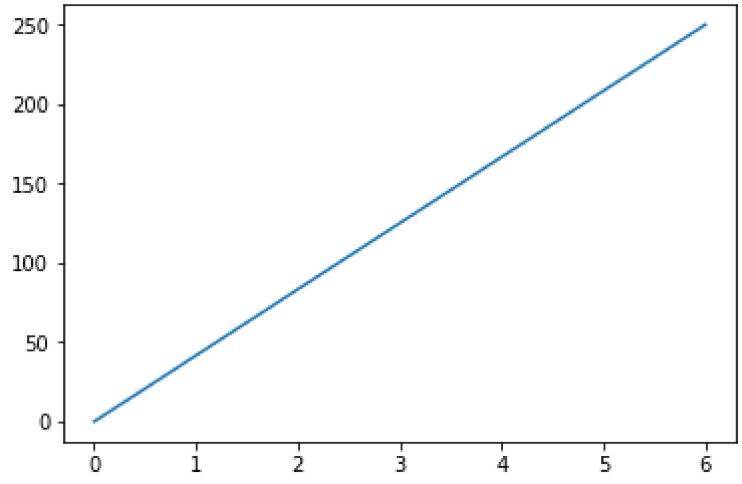
In [21]:

```
import matplotlib
```

In [25]:

```
import matplotlib.pyplot as plt
import numpy as np
xpoints = np.array([0, 6])
ypoints = np.array([0, 250])
print("Drawing a line in a diagram from position (0,0) to position (6,250):")
plt.plot(xpoints,ypoints)
plt.show()
```

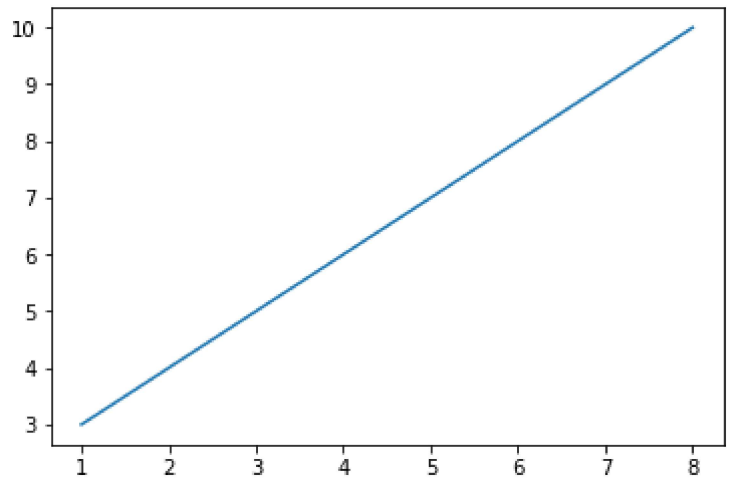
```
Drawing a line in a diagram from position (0,0) to position (6,250):
```



In [26]:

```
import matplotlib.pyplot as plt
import numpy as np
xpoints = np.array([1, 8])
ypoints = np.array([3, 10])
print("Drawing a line in a diagram from position (1, 3) to position (8, 10):")
plt.plot(xpoints, ypoints)
plt.show()
```

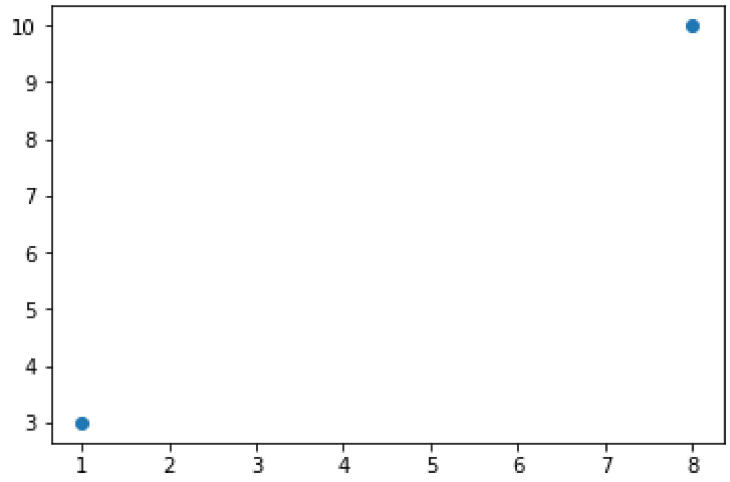
```
Drawing a line in a diagram from position (1, 3) to position (8, 10):
```



In [27]:

```
print("Drawing two points in the diagram, one at position (1, 3) and one in position (8, 10
xpoints = np.array([1, 8])
ypoints = np.array([3, 10])
plt.plot(xpoints, ypoints, 'o')
plt.show()
```

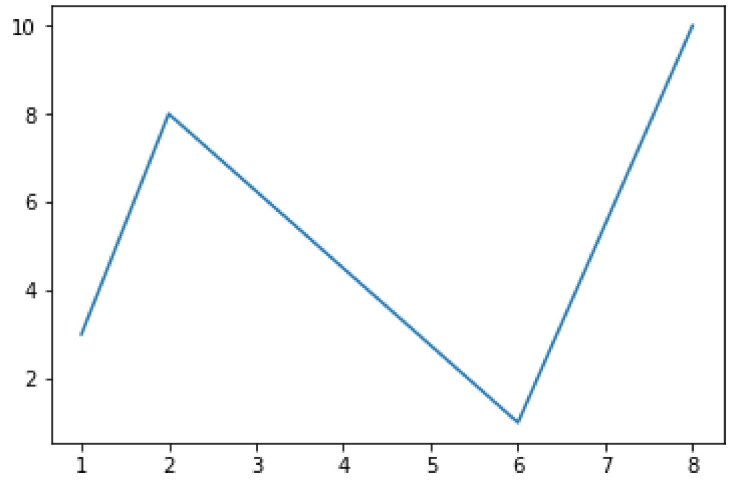
```
Drawing two points in the diagram, one at position (1, 3) and one in positio
n (8, 10):
```



In [28]:

```
print("Drawing a line in a diagram from position (1, 3) to (2, 8) then to (6, 1) and finall
import matplotlib.pyplot as plt
import numpy as np
xpoints = np.array([1, 2, 6, 8])
ypoints = np.array([3, 8, 1, 10])
plt.plot(xpoints, ypoints)
plt.show()
```

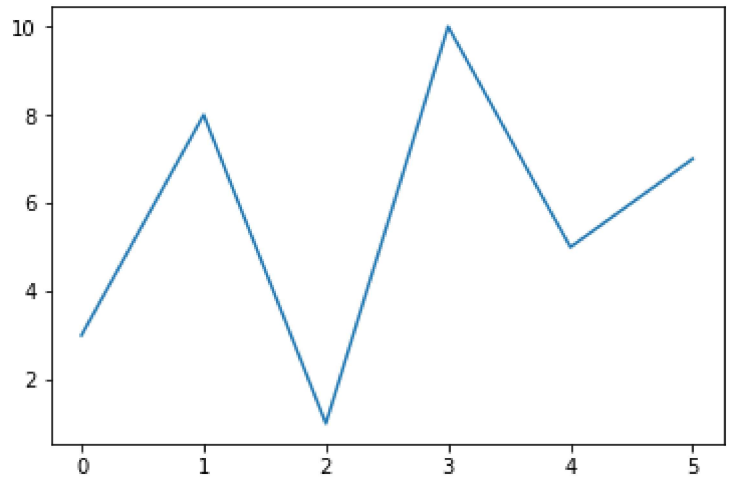
```
Drawing a line in a diagram from position (1, 3) to (2, 8) then to (6, 1) an
d finally to position (8, 10):
```



In [30]:

```
print("Plotting without x-points:")
ypoints = np.array([3, 8, 1, 10, 5, 7])
plt.plot(ypoints)
plt.show()
```

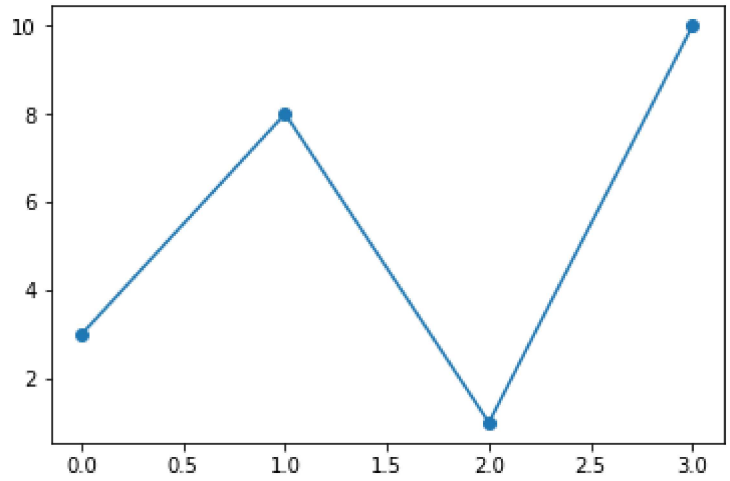
```
Plotting without x-points:
```



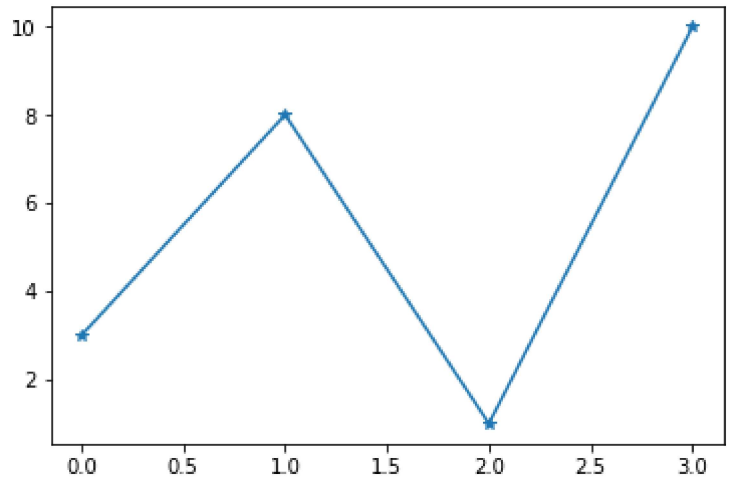
In [33]:

```
print("Mark each point with a circle:")
ypoints = np.array([3, 8, 1, 10])
plt.plot(ypoints, marker = 'o')
plt.show()
print("Mark each point with a star:")
plt.plot(ypoints, marker = '*')
plt.show()
```

```
Mark each point with a circle:
```



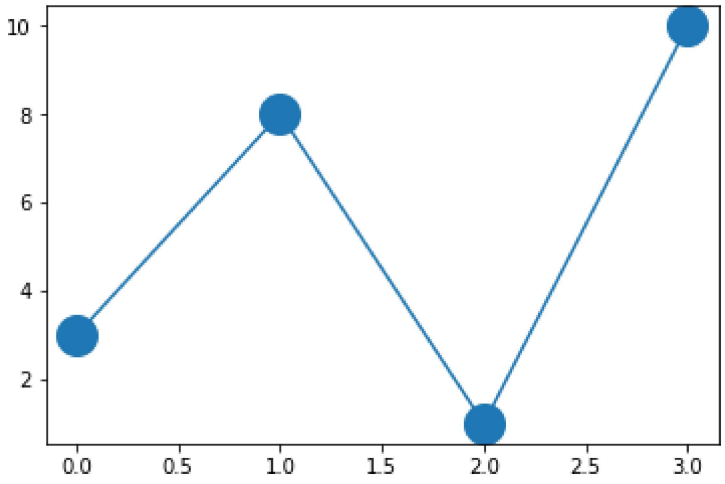

```
Mark each point with a star:
```



In [34]:

```
print("Set the size of the markers to 20:")
ypoints = np.array([3, 8, 1, 10])
plt.plot(ypoints, marker = 'o', ms = 20)
plt.show()
```

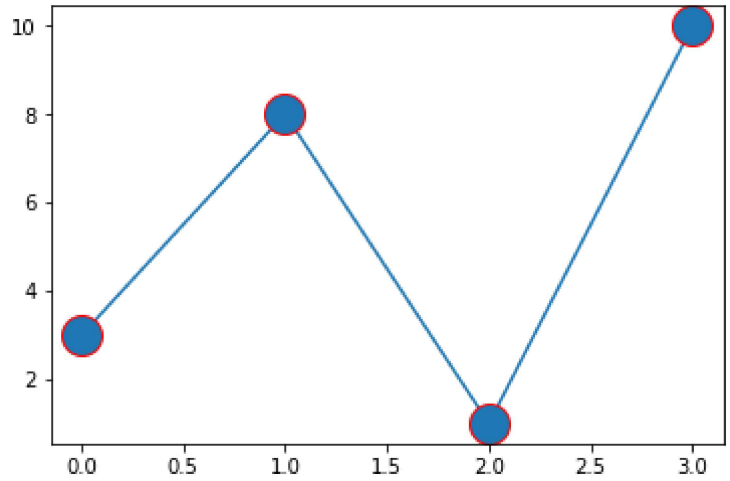
```
Set the size of the markers to 20:
```



In [35]:

```
print("Set the EDGE color to red:")
ypoints = np.array([3, 8, 1, 10])
plt.plot(ypoints, marker = 'o', ms = 20, mec = 'r')
plt.show()
```

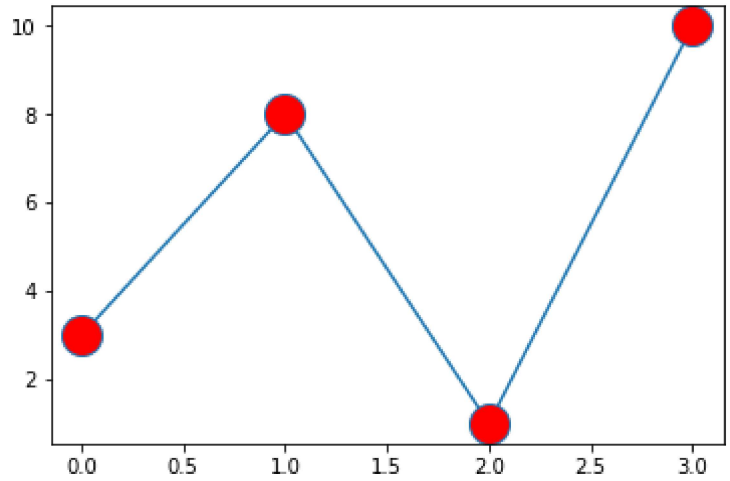
```
Set the EDGE color to red:
```



In [36]:

```
print("Set the FACE color to red:")
import matplotlib.pyplot as plt
import numpy as np
ypoints = np.array([3, 8, 1, 10])
plt.plot(ypoints, marker = 'o', ms = 20, mfc = 'r')
plt.show()
```

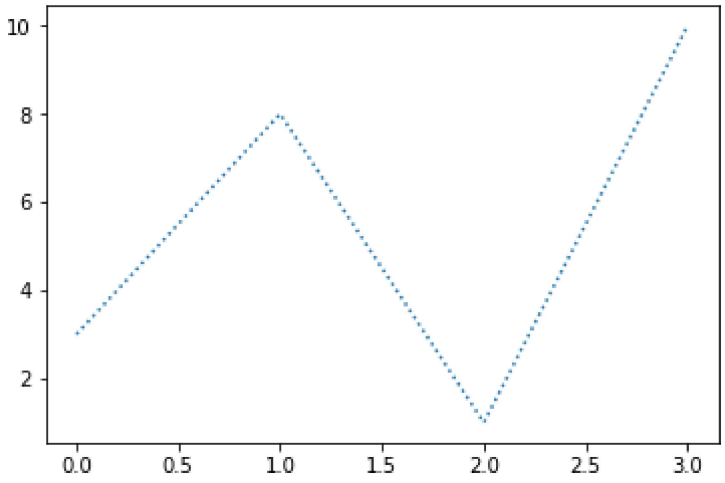
```
Set the FACE color to red:
```



In [38]:

```
print("Use a dotted line:")
import matplotlib.pyplot as plt
import numpy as np
ypoints = np.array([3, 8, 1, 10])
plt.plot(ypoints, linestyle = 'dotted')
plt.show()
```

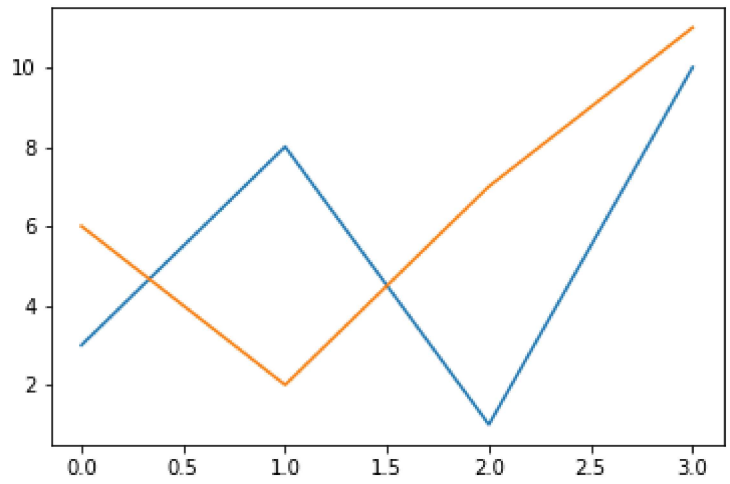
```
Use a dotted line:
```



In [39]:

```
print("Draw two lines by specifying a plt.plot() function for each line:")

y1 = np.array([3, 8, 1, 10])
y2 = np.array([6, 2, 7, 11])
plt.plot(y1)
plt.plot(y2)
plt.show()
```

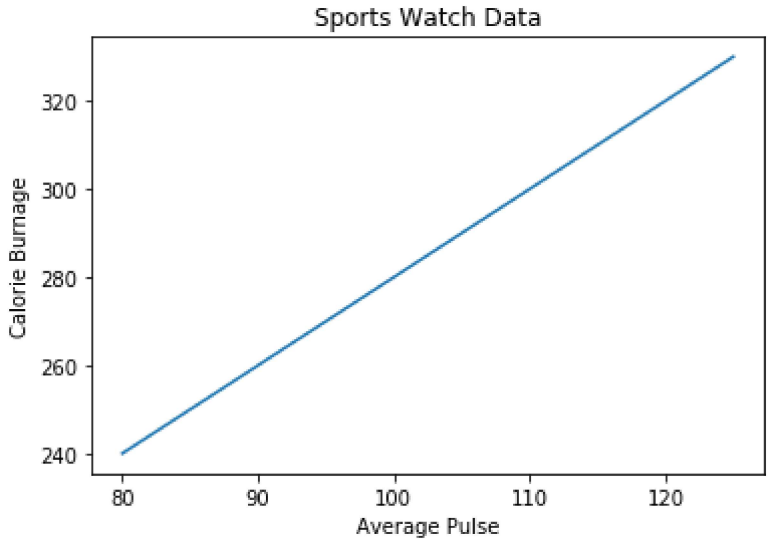
```
Draw two lines by specifying a plt.plot() function for each line:
```



In [41]:

```
print("Add labels to the x- and y-axis:")
import numpy as np
import matplotlib.pyplot as plt
x = np.array([80, 85, 90, 95, 100, 105, 110, 115, 120, 125])
y = np.array([240, 250, 260, 270, 280, 290, 300, 310, 320, 330])
plt.plot(x, y)
plt.xlabel("Average Pulse")
plt.ylabel("Calorie Burnage")
plt.title("Sports Watch Data")
plt.show()
```

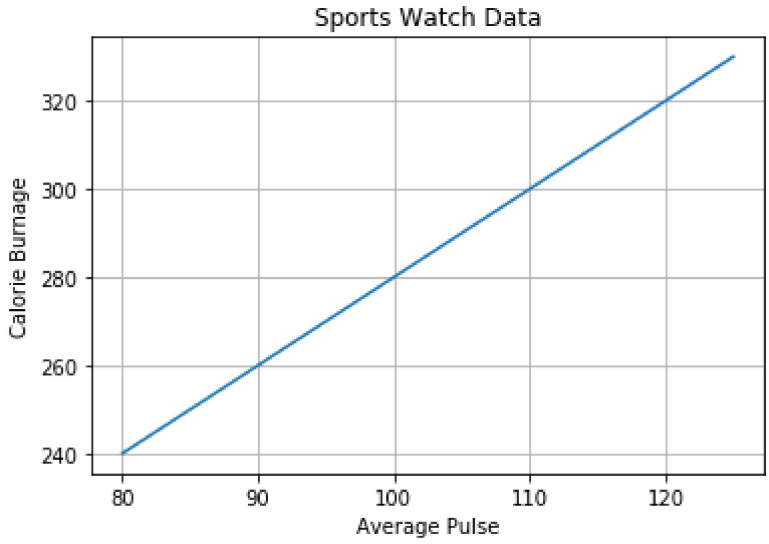
```
Add labels to the x- and y-axis:
```



In [42]:

```
print("Add grid lines to the plot:")
x = np.array([80, 85, 90, 95, 100, 105, 110, 115, 120, 125])
y = np.array([240, 250, 260, 270, 280, 290, 300, 310, 320, 330])
plt.title("Sports Watch Data")
plt.xlabel("Average Pulse")
plt.ylabel("Calorie Burnage")
plt.plot(x, y)
plt.grid()
```

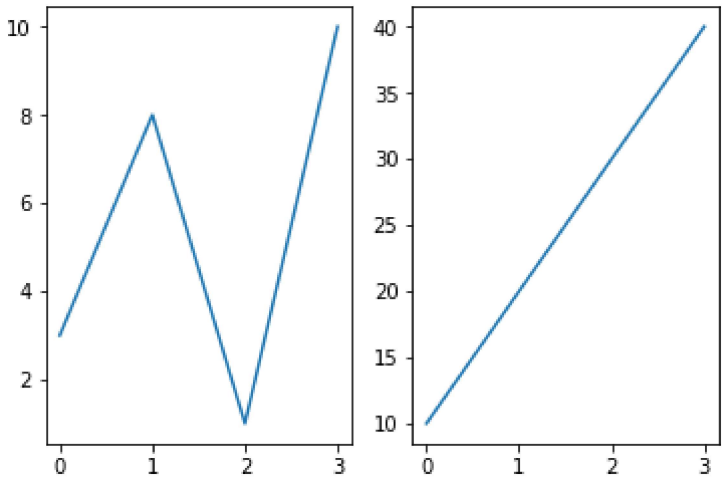
```
Add grid lines to the plot:
```



In [43]:

```
print("Draw 2 plots:")

#plot 1:
x = np.array([0, 1, 2, 3])
y = np.array([3, 8, 1, 10])
plt.subplot(1, 2, 1)
plt.plot(x,y)
#plot 2:
x = np.array([0, 1, 2, 3])
y = np.array([10, 20, 30, 40])
plt.subplot(1, 2, 2)
plt.plot(x,y)
plt.show()
```

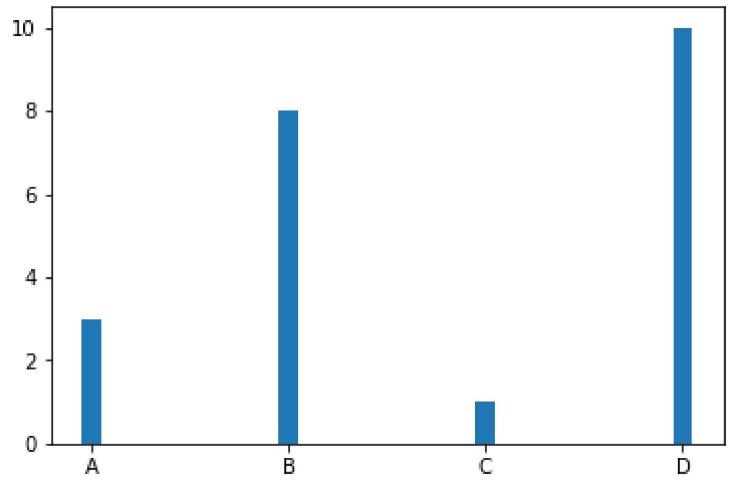
```
Draw 2 plots:
```



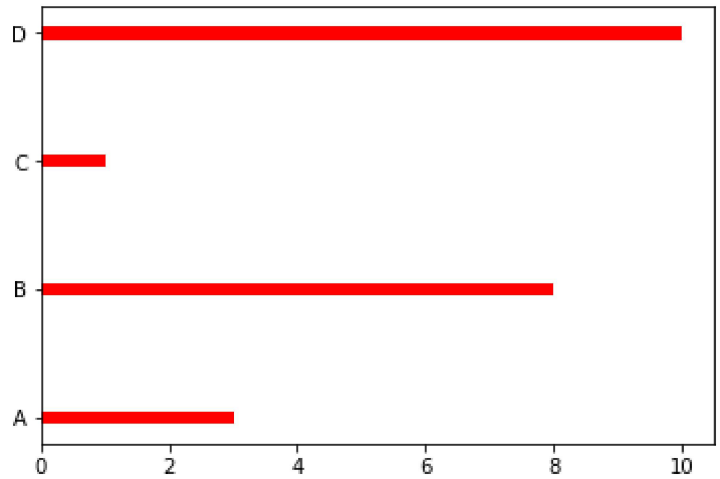
In [45]:

```
print("Creating Bars")
x = np.array(["A", "B", "C", "D"])
y = np.array([3, 8, 1, 10])
plt.bar(x,y, width = 0.1)
plt.show()
print("Horizontal Bars")
x = np.array(["A", "B", "C", "D"])
y = np.array([3, 8, 1, 10])
plt.barh(x, y, color = "red", height = 0.1)
plt.show()
```

```
Creating Bars
```



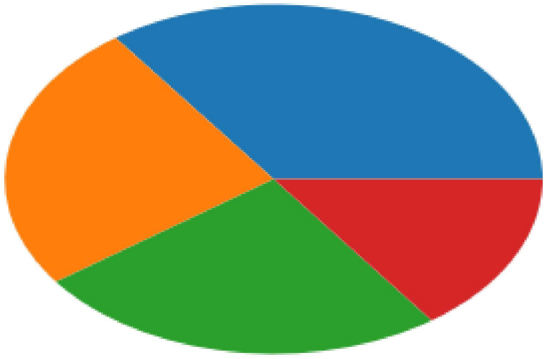

```
Horizontal Bars
```



In [46]:

```
print("Creating Pie Charts")
import matplotlib.pyplot as plt
import numpy as np
y = np.array([35, 25, 25, 15])
plt.pie(y)
plt.show()
```

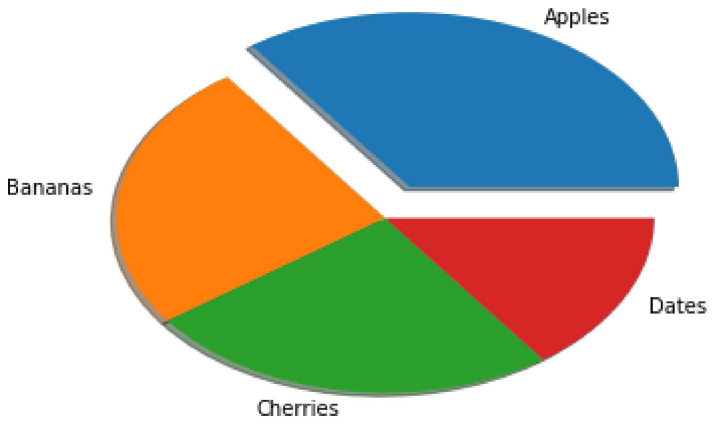
```
Creating Pie Charts
```



In [47]:

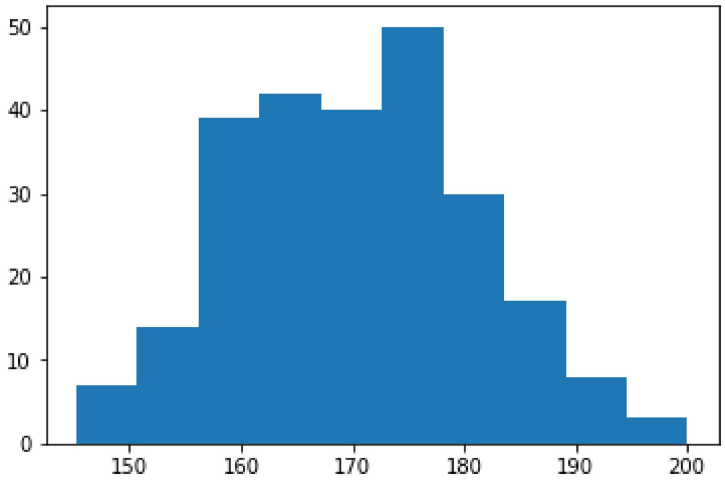
```
print("explode&Shadow")

y = np.array([35, 25, 25, 15])
mylabels = ["Apples", "Bananas", "Cherries", "Dates"]
myexplode = [0.2, 0, 0, 0]
plt.pie(y, labels = mylabels, explode = myexplode, shadow = True)
plt.show()
```

explode&Shadow



In [48]:

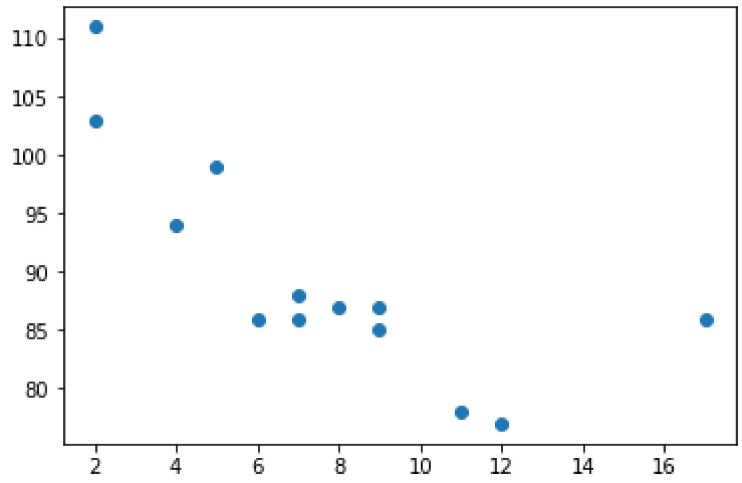
```
import matplotlib.pyplot as plt
import numpy as np
x = np.random.normal(170, 10, 250)
plt.hist(x)
plt.show()
```



In [50]:

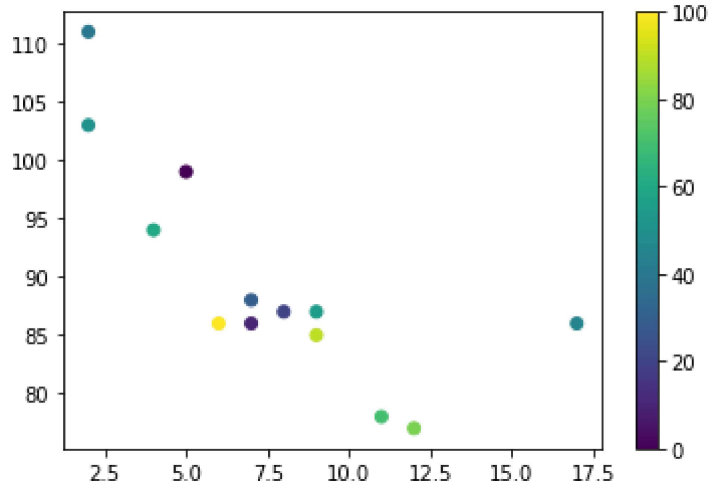
```
print("Scatter")
x = np.array([5,7,8,7,2,17,2,9,4,11,12,9,6])
y = np.array([99,86,87,88,111,86,103,87,94,78,77,85,86])
plt.scatter(x, y)
plt.show()
```

```
Scatter
```



In [51]:

```
x = np.array([5,7,8,7,2,17,2,9,4,11,12,9,6])
y = np.array([99,86,87,88,111,86,103,87,94,78,77,85,86])
colors = np.array([0, 10, 20, 30, 40, 45, 50, 55, 60, 70, 80, 90, 100])
plt.scatter(x, y, c=colors, cmap='viridis')
plt.colorbar()
plt.show()
```



In [ ]:

```

```