ASSIGNMENT 6. DATA VISUALIZATION (MATPLOTLIB)

AIM : Write Python code to demonstrate the use of Data Visualization (Matplotlib).

CODE :

```
#Draw a line in a diagram from position (0,0) to position (9,300):
import matplotlib.pyplot as pit
import numpy as np

xpoints = np.array([0, 9])
ypoints = np.array([0, 300])

pit.plot(xpoints, ypoints)
pit.show()


#Draw two points in the diagram.
import matplotlib.pyplot as pit
import numpy as np

xpoints = np.array([1,5])
ypoints = np.array([13,1])

pit.plot(xpoints, ypoints, 'o')
pit.show()

#Multiple point
xpoints = np.array([1,2,5,7])
ypoints = np.array([3,7,1,15])

pit.plot(xpoints, ypoints)
pit.show()

#Default x points
ypoints = np.array([3,7,5,12,15,21])

pit.plot(ypoints)
pit.show()
```

```
#Mark each point with a circle:
import matplotlib.pyplot as plt
import numpy as np
ypoints = np.array([13, 7, 11, 1])
plt.plot(ypoints, marker = '*')
plt.show()

#Dashed Line
import matplotlib.pyplot as plt
import numpy as np
ypoints = np.array([13, 4, 11, 3])
plt.plot(ypoints, 'o-.r')
plt.show()


##Encircled Points
import matplotlib.pyplot as plt
import numpy as np
ypoints = np.array([13, 2, 11, 7])
plt.plot(ypoints, marker = 'o', ms = 20, mec = 'r')
plt.show()

import matplotlib.pyplot as plt
import numpy as np
ypoints = np.array([2, 5, 11, 10])
plt.plot(ypoints, color = 'b')
plt.show()

#Intersecting Lines
import matplotlib.pyplot as plt
import numpy as np
y1 = np.array([13, 18, 1, 10])
y2 = np.array([6, 12, 17, 11])
plt.plot(y1)
plt.plot(y2)
plt.show()

#Names Axis and Title
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.title("Runner Data")
```

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plt.xlabel("Heart Rate")
plt.ylabel("Meters(m)")
plt.show()

#Use of Grids
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.title("Runner Data")
plt.xlabel("Heart Rate")
plt.ylabel("Meters(m)")
plt.grid()
plt.plot(x, y)
plt.show()

#Subplot() Function
import matplotlib.pyplot as plt
import numpy as np
#plot 1:
x = np.array([0, 1, 2, 3])
y = np.array([3, 8, 1, 10])
plt.subplot(2, 1, 1)
plt.plot(x,y)
#plot 2:
x = np.array([10, 11,3, 3])
y = np.array([10, 20, 30, 40])
plt.subplot(2, 1, 2)
plt.plot(x,y)
plt.show()

import matplotlib.pyplot as plt
import numpy as np
#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)
plt.title("SALES")
#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.title("INCOME")
plt.suptitle("MY SHOP")
plt.show()

#Plot of two graphs
import matplotlib.pyplot as plt
import numpy as np
#day one, the age and speed of 13 cars:
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)
#day two, the age and speed of 15 cars:
x = np.array([2,2,8,1,15,8,12,9,7,3,11,4,7,14,12])
y = np.array([100,105,84,105,90,99,90,95,94,100,79,112,91,80,85])
plt.scatter(x, y)
plt.show()


#Graphs
import sys
import matplotlib
matplotlib.use('Agg')
import matplotlib.pyplot as plt
import numpy as np
x = ["APPLES", "BANANAS"]
y = [250, 350]
plt.bar(x, y)
plt.show()

import matplotlib.pyplot as plt
import numpy as np
x = np.array(["A", "B", "C", "D"])
y = np.array([8, 18, 9, 19])
plt.barh(x, y, height = 0.2)
plt.show()

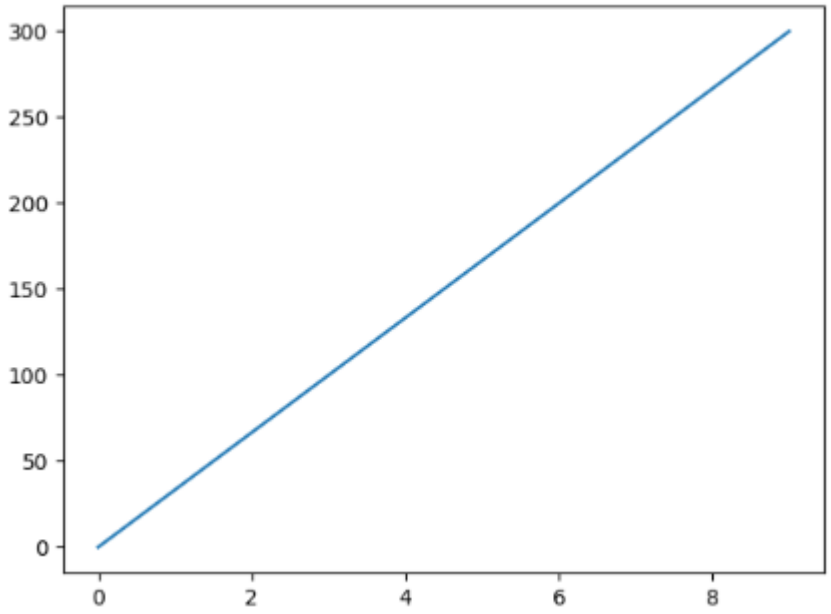
#Joint Graphs
import matplotlib.pyplot as plt
import numpy as np
x = np.random.normal(190, 90, 250)
plt.hist(x)
plt.show()
```

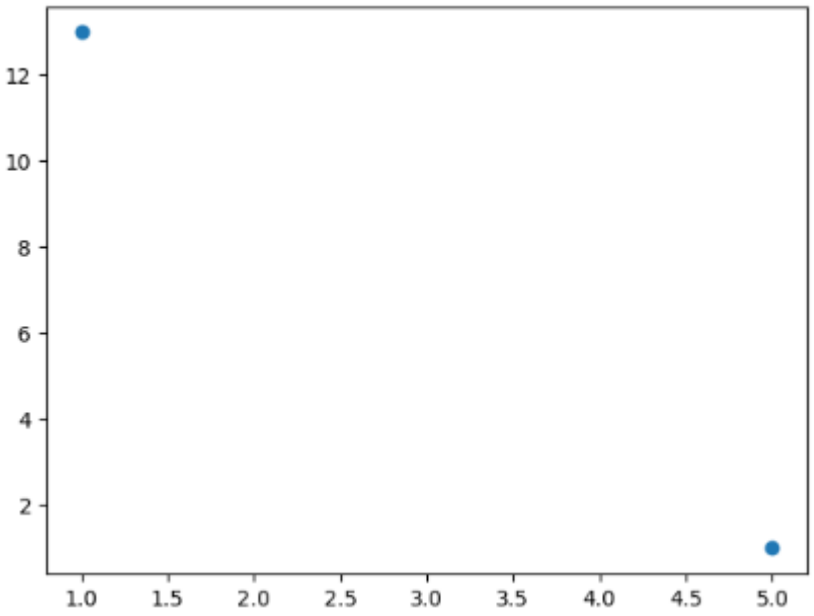
```
#Pie Chart
import matplotlib.pyplot as plt
import numpy as np
y = np.array([35, 25, 25, 15])
mylabels = ["Apples", "Bananas", "Cherries", "Dates"]
plt.pie(y, labels = mylabels, startangle = 90)
plt.show()

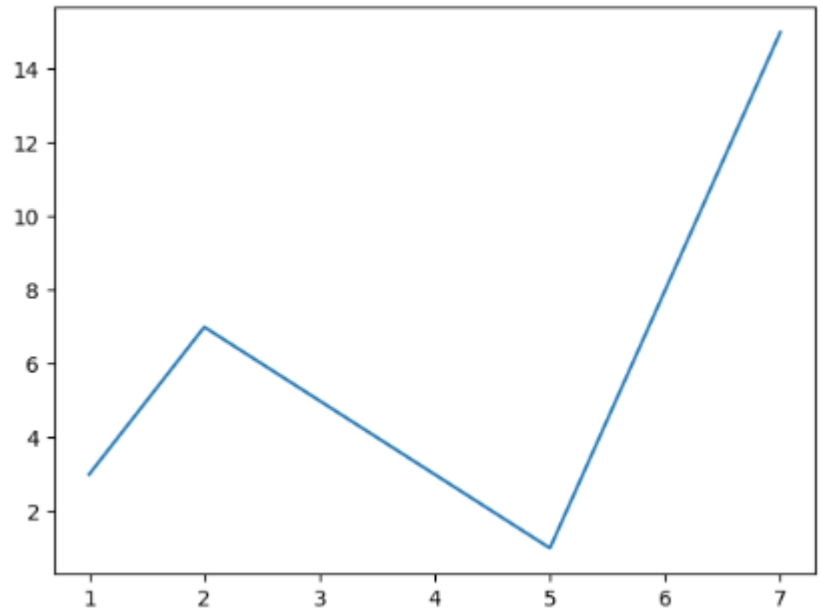
#Exploding pie
import matplotlib.pyplot as plt
import numpy as np
y = np.array([35, 25, 25, 15])
mylabels = ["Apples", "Bananas", "Cherries", "Dates"]
myexplode = [0.2, 0, 0, 0]
plt.pie(y, labels = mylabels, explode = myexplode, shadow = True)
plt.show()

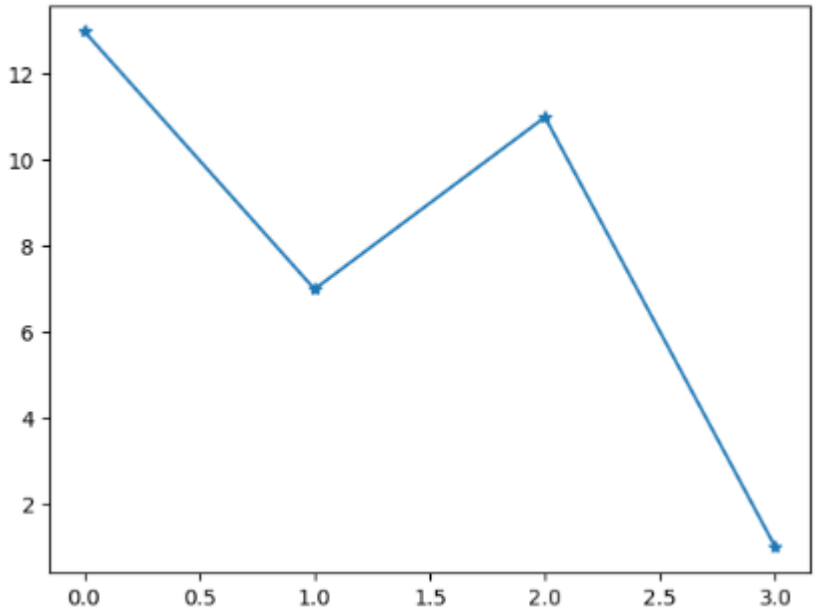
#Pie Chart with Tables
import matplotlib.pyplot as plt
import numpy as np
y = np.array([35, 25, 25, 15])
mylabels = ["Apples", "Bananas", "Cherries", "Dates"]
plt.pie(y, labels = mylabels)
plt.legend(title = "Four Fruits:")
plt.show()
```

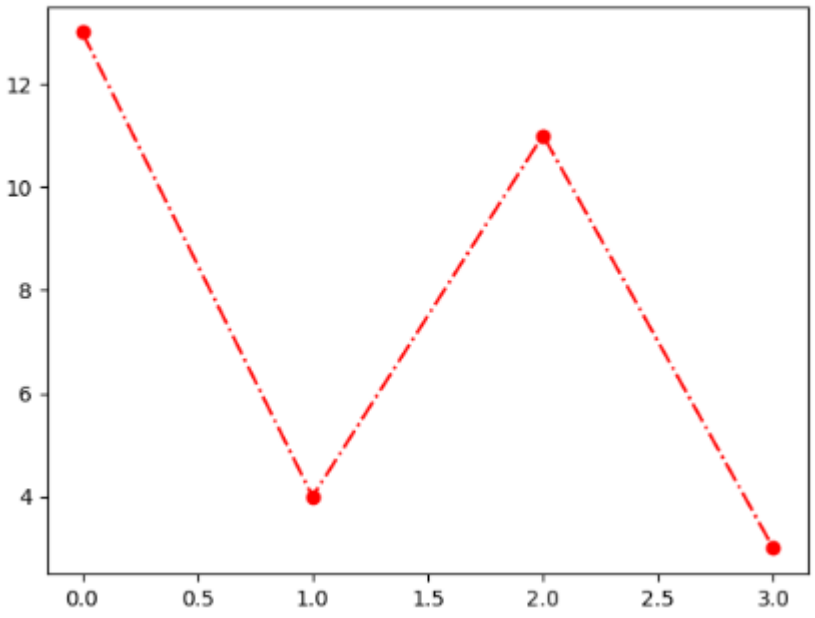
OUTPUT :

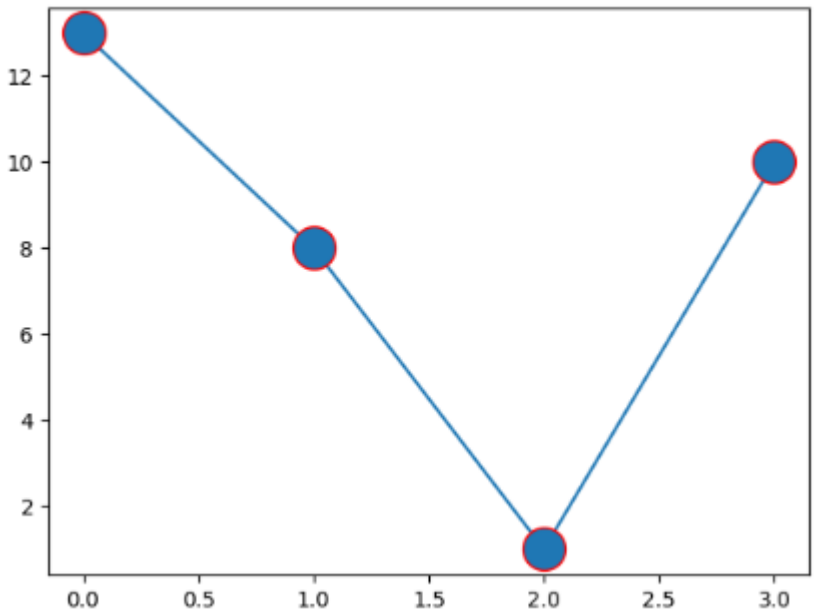


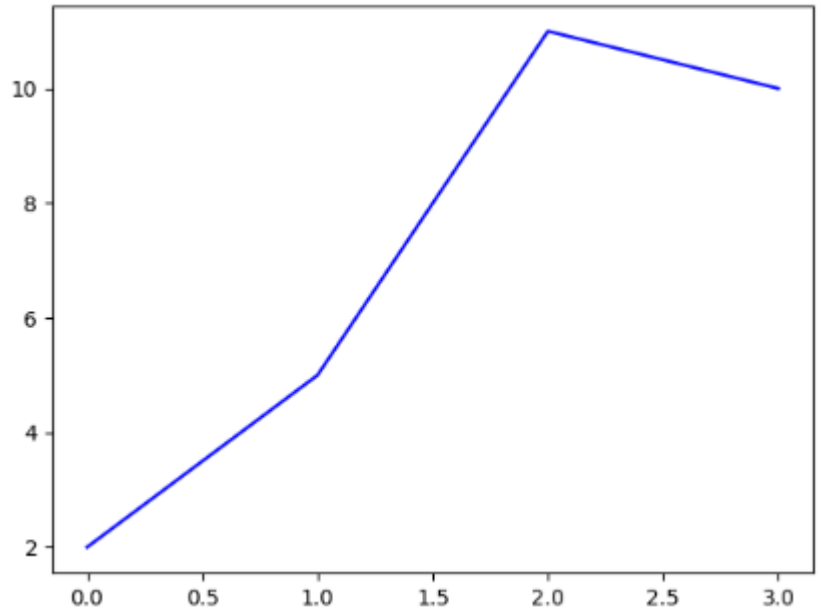

12
10
8
6
4
2
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0

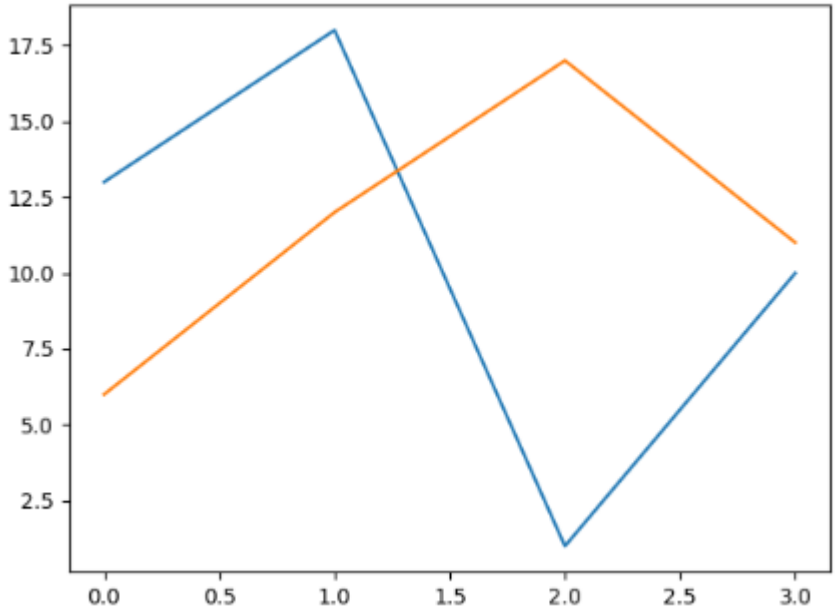

14
12
10
8
6
4
2
1
2
3
4
5
6
7

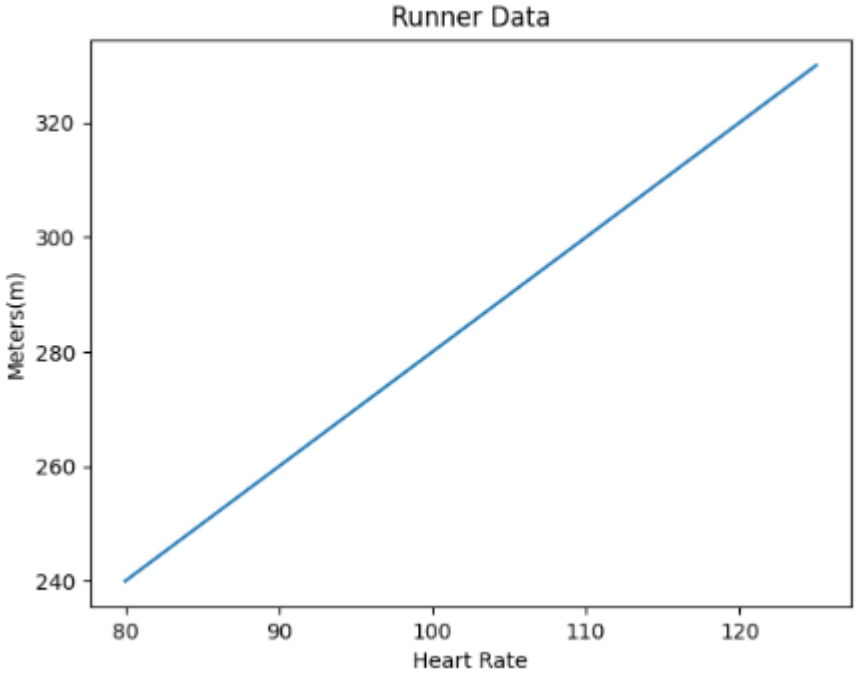

12
10
8
6
4
2
0.0
0.5
1.0
1.5
2.0
2.5
3.0

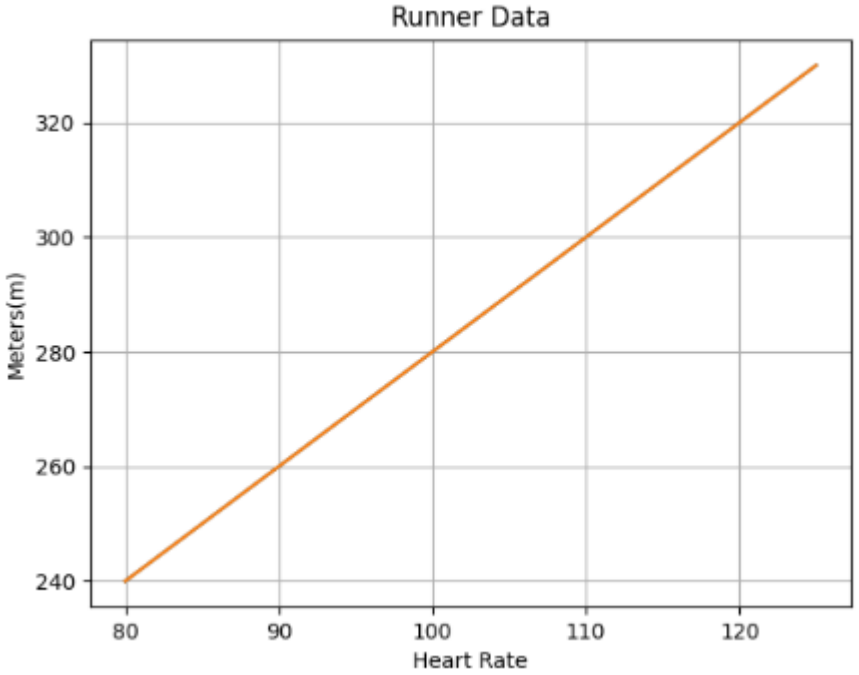

12
10
8
6
4
0.0
0.5
1.0
1.5
2.0
2.5
3.0

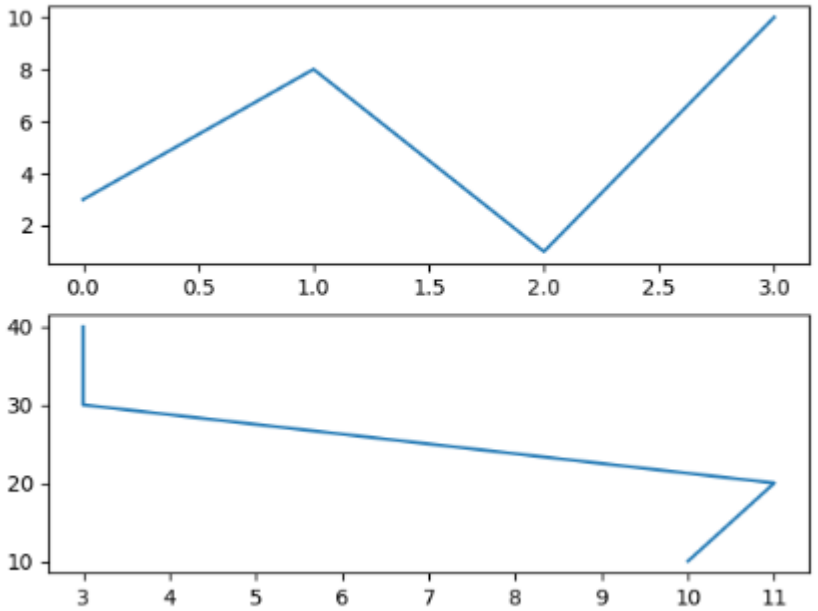

12
10
8
6
4
2
0.0
0.5
1.0
1.5
2.0
2.5
3.0


10
8
6
4
2
0.0
0.5
1.0
1.5
2.0
2.5
3.0

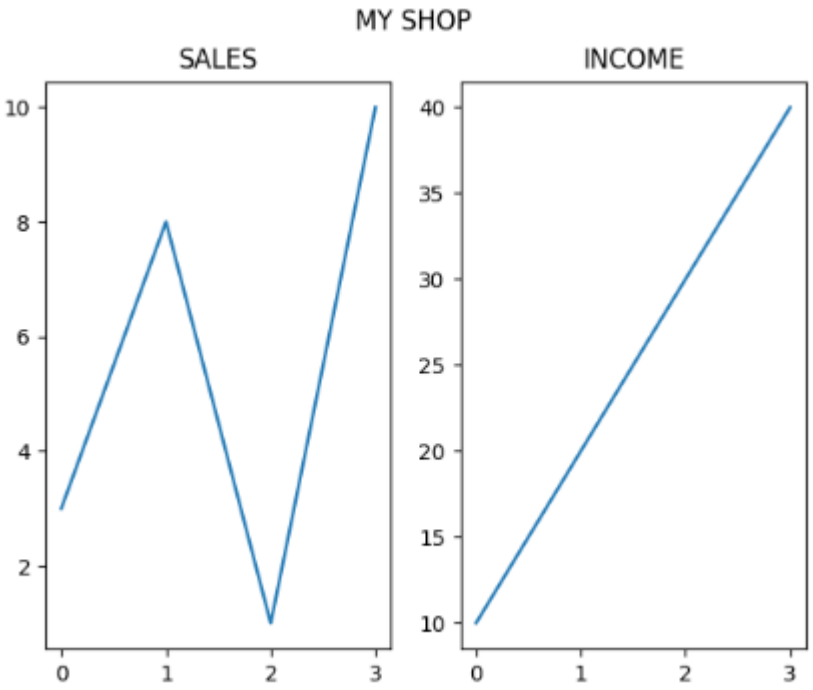

17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0

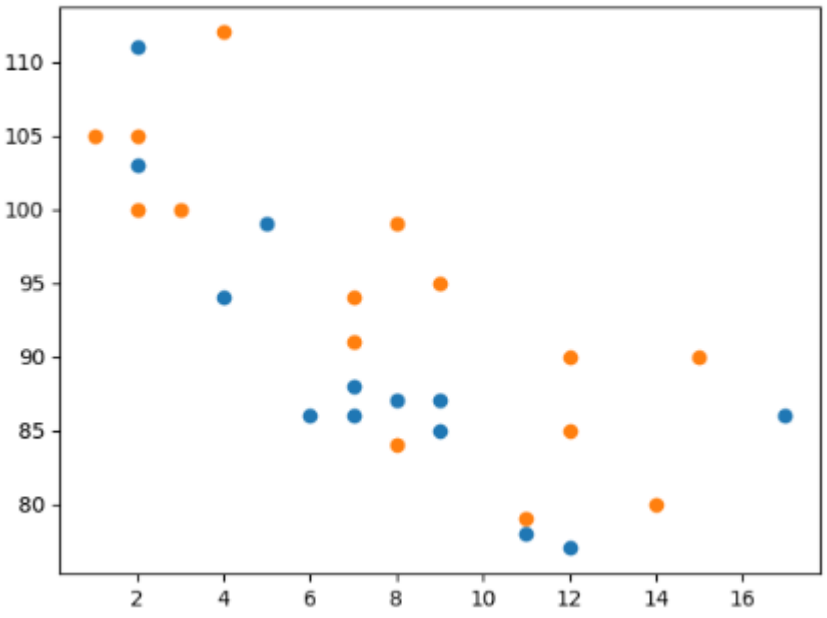

Runner Data
320
300
280
260
240
Meters(m)
80
90
100
110
120
Heart Rate

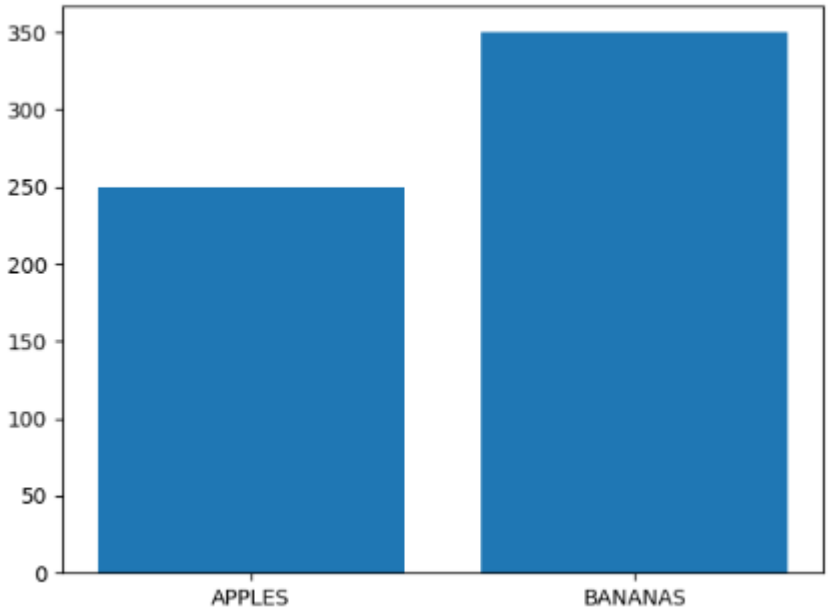

Runner Data
320
300
280
260
240
Meters(m)
80
90
100
110
120
Heart Rate

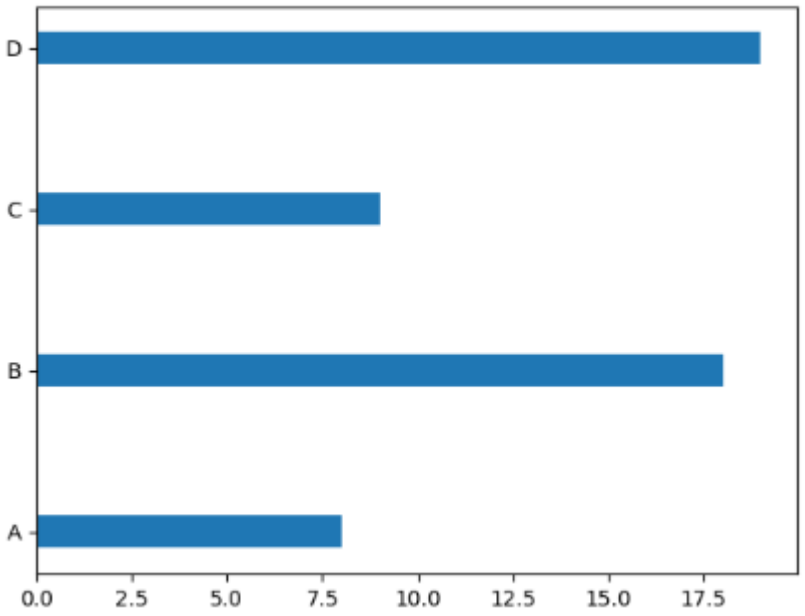

10
8
6
4
2
0.0
0.5
1.0
1.5
2.0
2.5
3.0

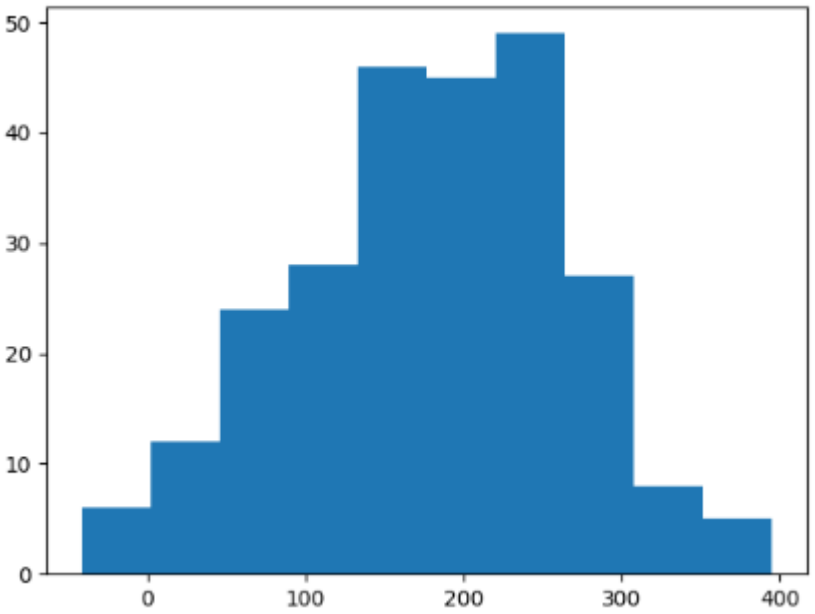
40
30
20
10
3
4
5
6
7
8
9
10
11

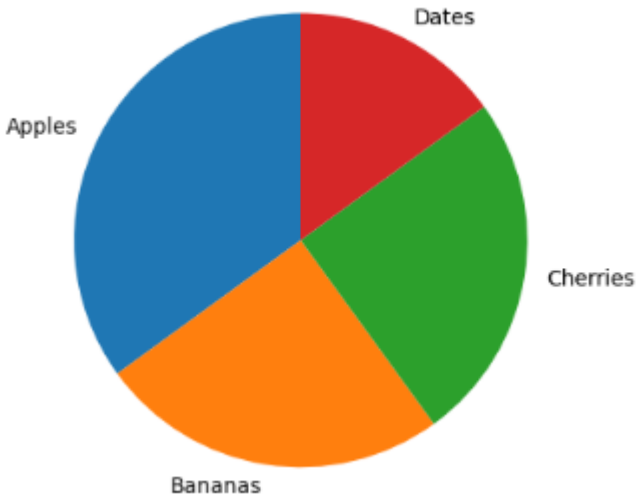

MY SHOP
SALES
INCOME
10
8
6
4
2
0
1
2
3
40
35
30
25
20
15
10
0
1
2
3

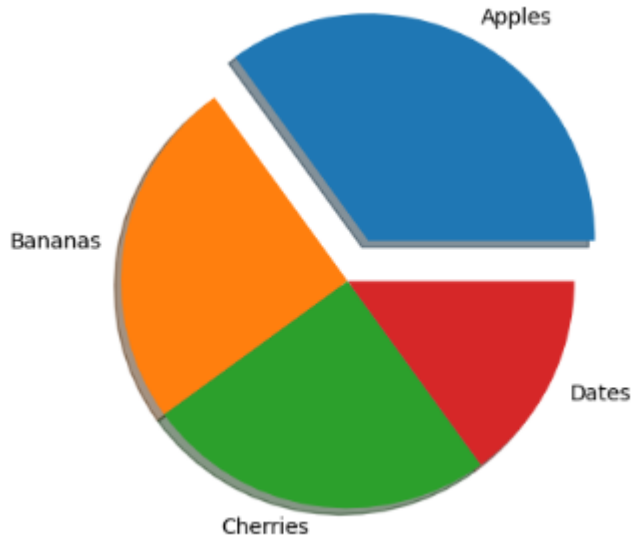

110
105
100
95
90
85
80
2
4
6
8
10
12
14
16

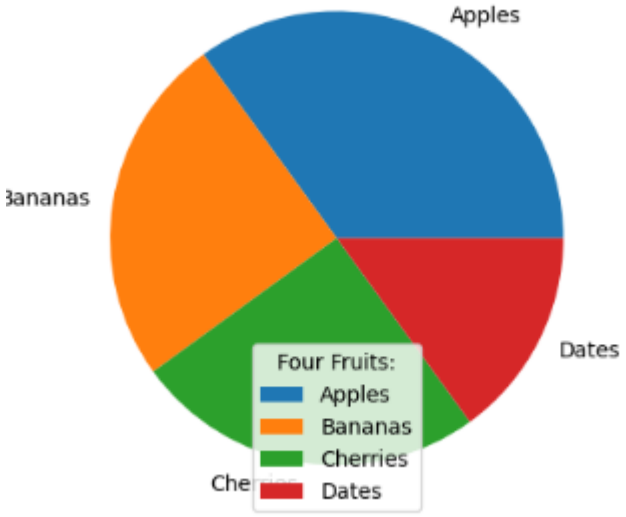

350
300
250
200
150
100
50
0
APPLES
BANANAS


D
C
B
A
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5


50
40
30
20
10
0
0
100
200
300
400


Dates
Apples
Cherries
Bananas


Apples
Bananas
Dates
Cherries


Apples
Bananas
Dates
Four Fruits:
Apples
Bananas
Cherries
Dates