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Practical:- 6

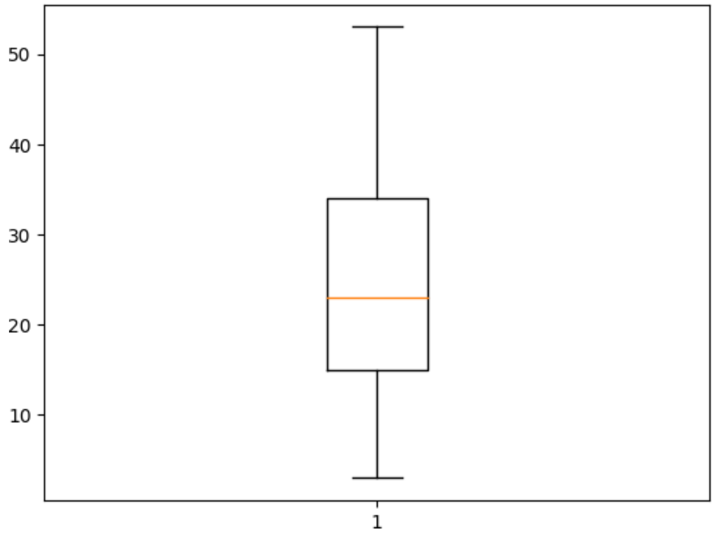
Roll no:-26   Sub:-DV

Program/Notebook to draw Box plot, Pie Chart & Scatter plot, Heat Maps & Histogram

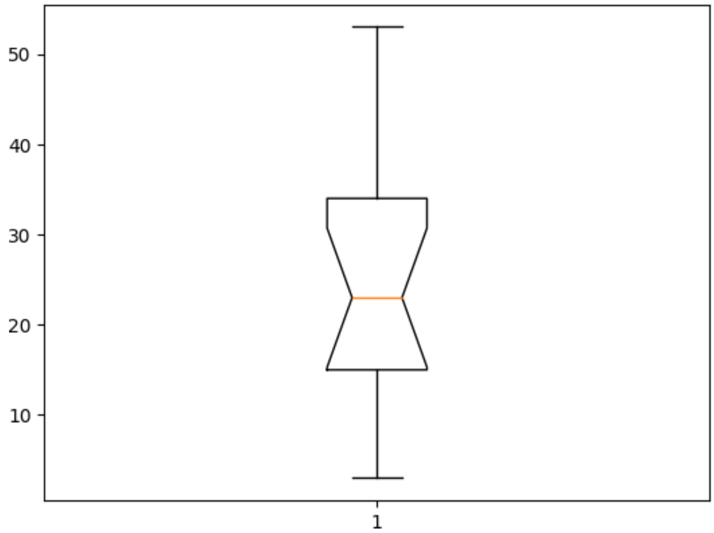
```
#Import Requied Libraries
import matplotlib.pyplot as plt
import numpy as np
import pandas as pd
```

1)Box Plot

```
data = np.array([12,32,53,12,32,18,3,5,34,23,43,23,45,23,34])
plt.boxplot(data)
#fig = plt.figure(figsize = (10, 8))     #figsize :- atribute allows us to specify the width and height if figure in unit inches
plt.show()
```



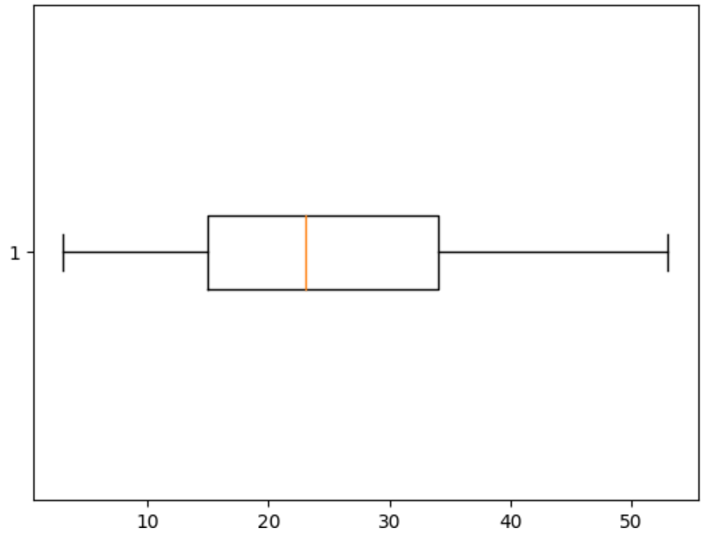
```
data = np.array([12,32,53,12,32,18,3,5,34,23,43,23,45,23,34])
plt.boxplot(data, notch = "true")  #Notch is opetional parameter that accepts boolen values (Ture, Falase). If ture, it creates notched boxplot
fig = plt.figure(figsize = (5, 2))     #figsize :- atribute allows us to specify the width and height if figure in unit inches
plt.show()
```



```
<Figure size 500x200 with 0 Axes>
```

```
plt.boxplot(data, vert= 0)   #vert  accept a boolen value eihter false(0) or True (1) . it specifies whether the boxplot is horizontal or vertical
```

```
{'whiskers': [<matplotlib.lines.Line2D at 0x26721cba230>,
  <matplotlib.lines.Line2D at 0x26721cba4d0>],
 'caps': [<matplotlib.lines.Line2D at 0x26721cba770>,
  <matplotlib.lines.Line2D at 0x26721cbaa10>],
 'boxes': [<matplotlib.lines.Line2D at 0x26721cb9f90>],
 'medians': [<matplotlib.lines.Line2D at 0x26721cbacb0>],
 'fliers': [<matplotlib.lines.Line2D at 0x26721cbaf50>],
 'means': []}
```

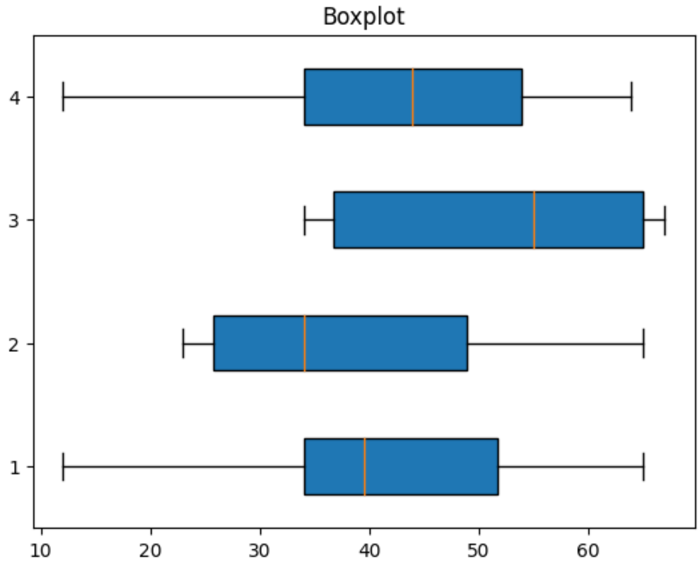


```
df = pd.read_csv("bxplt.csv")
df
```

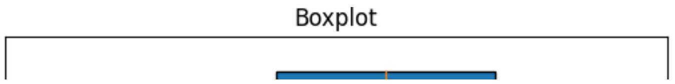
	1	0
0	3	2
1	4	1
2	4	7
3	2	9
4	4	10
5	4	8
6	1	6
7	8	4
8	4	4
9	9	3
10	7	4

```
plt.boxplot(df)
plt.show()
```

```
value1 = [12,34,45,34,54,65]
value2 = [34,34,23,23,54,65]
value3 = [45,34,65,67,34,65]
value4 = [64,34,54,34,54,12]

plt.title("Boxplot")
bxdata = [value1, value2, value3,value4]
box = plt.boxplot(bxdata, vert= 0, patch_artist=True)
plt.show()
```

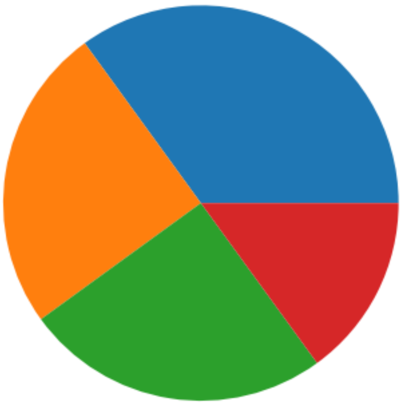


```
value1 = [12,34,45,34,54,65]
value2 = [34,34,23,23,54,65]
value3 = [45,34,65,67,34,65]
value4 = [64,34,54,34,54,12]

plt.title("Boxplot")
bxdata = [value1, value2, value3,value4]
box = plt.boxplot(bxdata, vert= 0, patch_artist=True)
plt.xlabel("X-Axis")
plt.ylabel('Y-Axis')
plt.show()
```

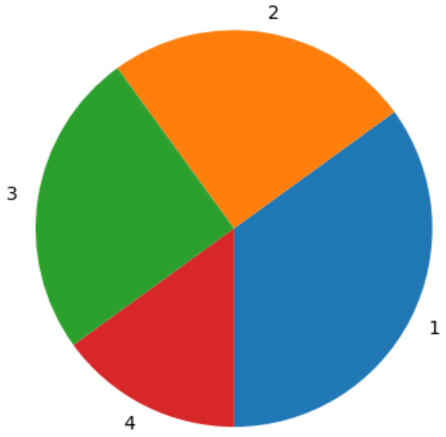


2) Pie Chart

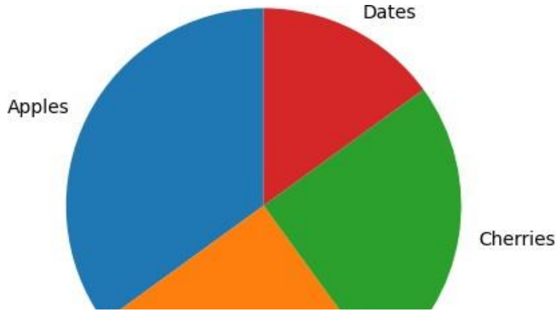
```
y = np.array([35, 25, 25, 15]) #As We can see the pie chart draws one piece (called a wedge) for each value in the array (in this case [35, 25, 25, 15]).
plt.pie(y)
plt.show()
```



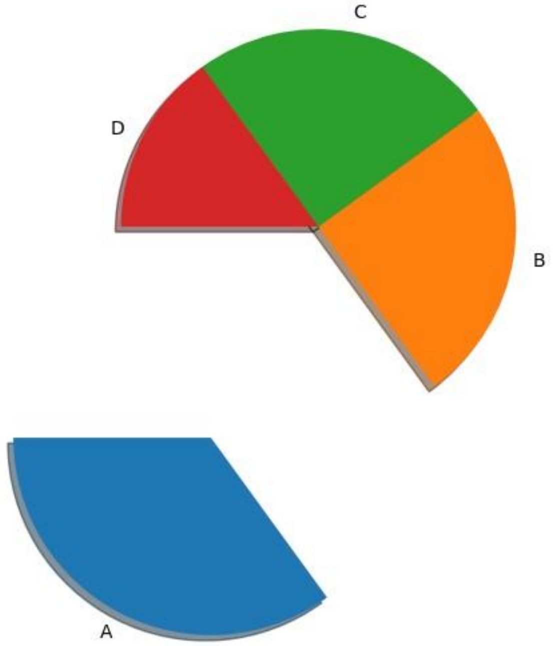
```
y = np.array([35, 25, 25, 15])          #Lets suppose Total is 100% which is divided into 4 values, which are 35, 25, 25, 15
mylabels = ['1', '2', '3', '4']

plt.pie(y, labels = mylabels, startangle = 270)          #specifying start angle for chart
plt.show()
```



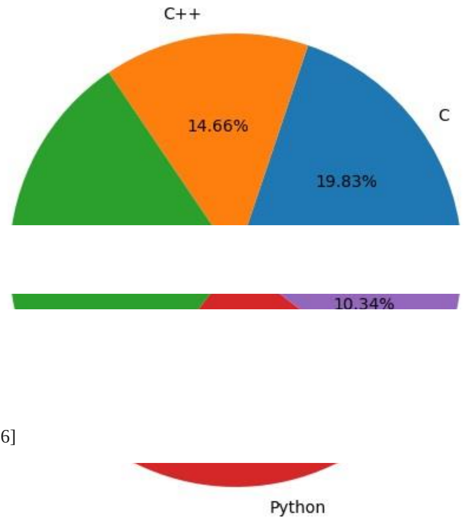
```
y = np.array([35, 25, 25, 15])
mylabels = ["Apples", "Bananas", "Cherries", "Dates"]

plt.pie(y, labels = mylabels, startangle = 90)
plt.show()
```



```
y = np.array([35, 25, 25, 15])          #Lets suppose Total is 100% which is divided into 4 values, which are 35, 25, 25, 15
mylabels = ['A', 'B', 'C', 'D']
myexplode = [1.2, 0, 0,0]
plt.pie(y, labels = mylabels, startangle = 180, explode = myexplode, shadow=True)          #we can explode piece of chart and add shadow
plt.show()
```

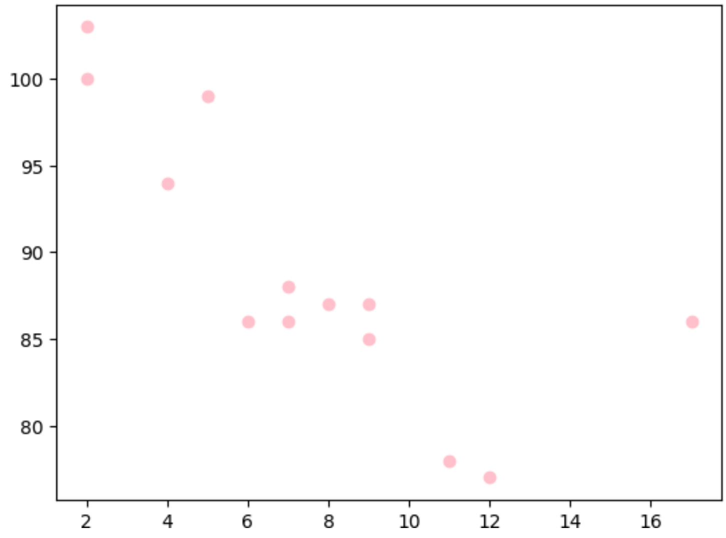


```
fig = plt.figure()
ax = fig.add_axes([0,0,1,1])
ax.axis('equal')
langs = ['C', 'C++', 'Java', 'Python', 'PHP']
students = [23,17,35,29,12]
ax.pie(students, labels = langs,autopct='%1.2f%%') #The proportionate percentage is displayed inside the respective wedge with the help of autopct parameter which is s
plt.show()
```

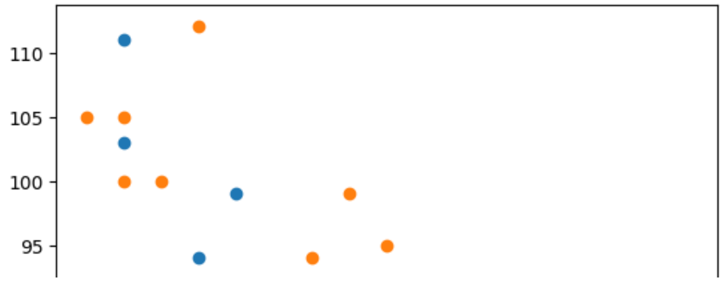


3) Scatter plot

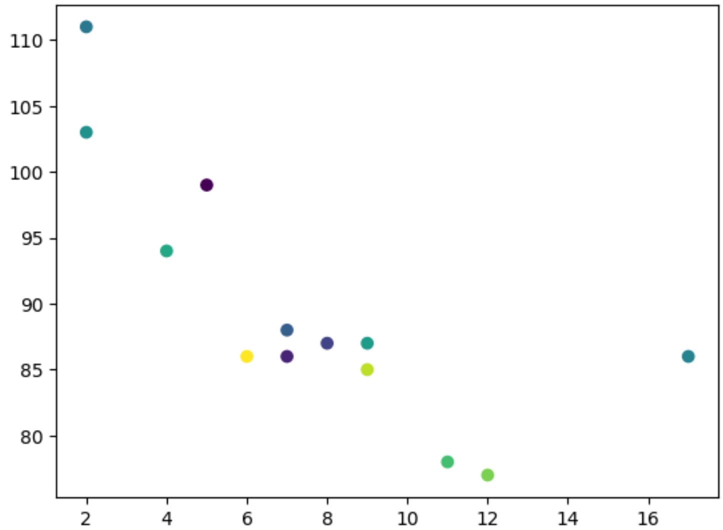
```
x =[5, 7, 8, 7, 2, 17, 2, 9,
    4, 11, 12, 9, 6]

y =[99, 86, 87, 88, 100, 86,
    103, 87, 94, 78, 77, 85, 86]

plt.scatter(x, y, c ="pink")

# To show the plot
plt.show()
```



```
#Draw two plots on the same figure:

#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()
```

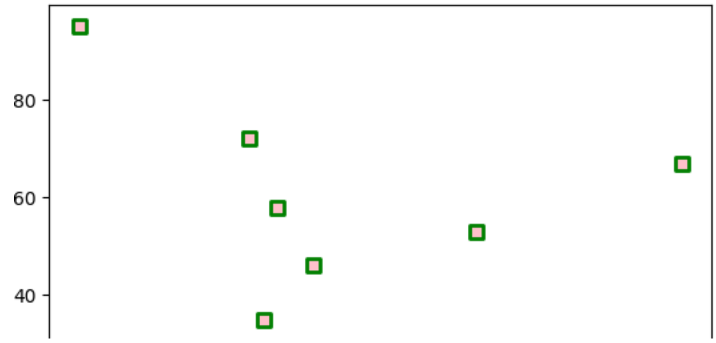


```
x = np.array([5,7,8,7,2,17,2,9,4,11,12,9,6])
y = np.array([99,86,87,88,111,86,103,87,94,78,77,85,86])
colors = np.array([0, 10, 20, 30, 40, 45, 50, 55, 60, 70, 80, 90, 100])

plt.scatter(x, y, c=colors, cmap='viridis')

plt.show()
```



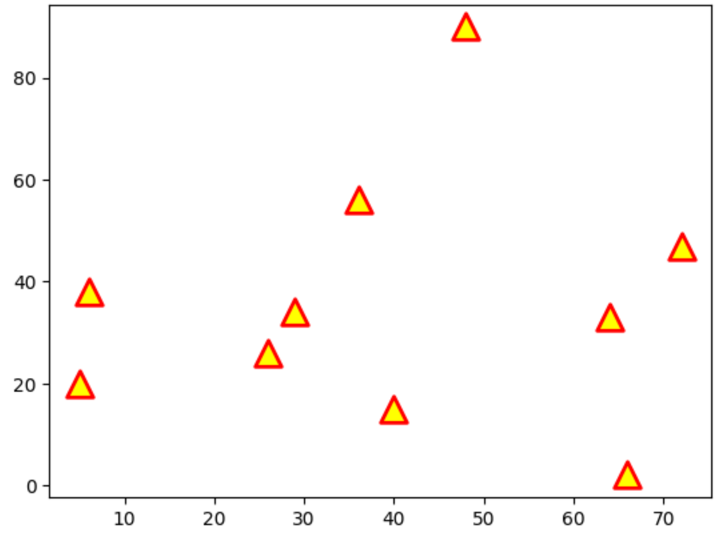
```
#Scatter plot with different shape and colour for two datasets.
# dataset-1
x1 = [89, 43, 36, 36, 95, 10,
   66, 34, 38, 20]

y1 = [21, 46, 3, 35, 67, 95,
   53, 72, 58, 10]


# dataset2
x2 = [26, 29, 48, 64, 6, 5,
   36, 66, 72, 40]

y2 = [26, 34, 90, 33, 38,
   20, 56, 2, 47, 15]


plt.scatter(x1, y1, c ="pink",
         linewidths = 2,
         marker ="s",
         edgecolor ="green",
         s = 50)
```

```
<matplotlib.collections.PathCollection at 0x26734fc7dc0>
```

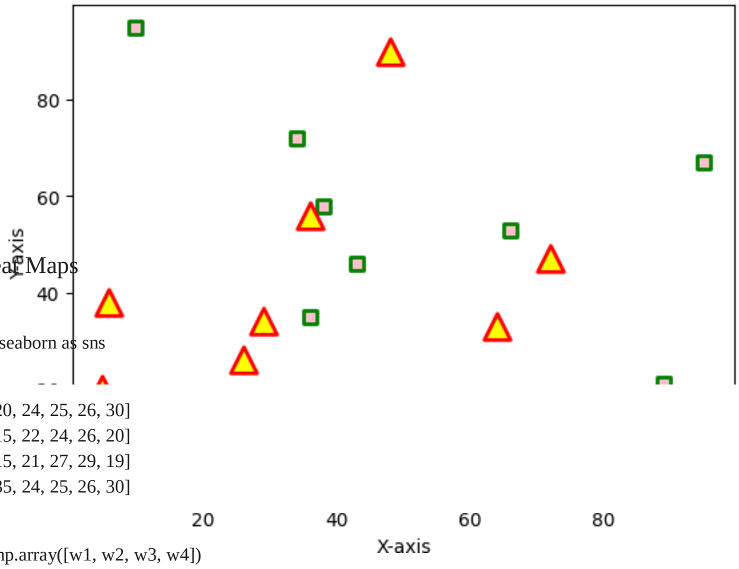


```
plt.scatter(x2, y2, c ="yellow",
            linewidths = 2,
            marker ="^",
            edgecolor ="red",
            s = 200)
```

```
<matplotlib.collections.PathCollection at 0x26735153550>
```

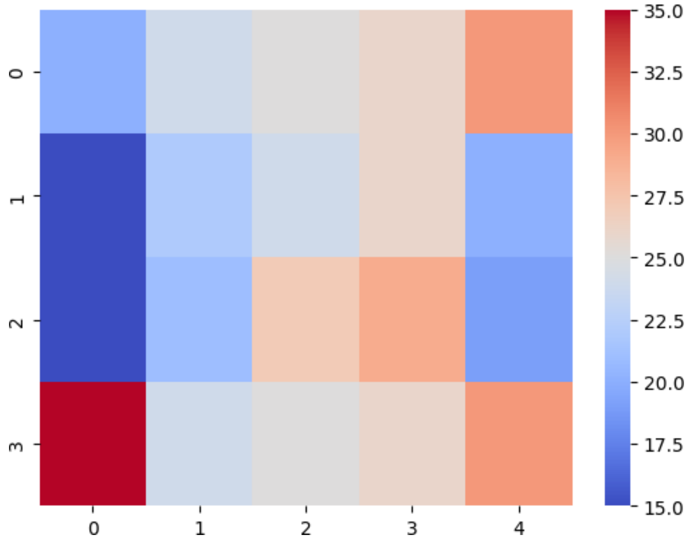


```
plt.scatter(x1, y1, c ="pink",
            linewidths = 2,
            marker ="s",
            edgecolor ="green",
            s = 50)

plt.scatter(x2, y2, c ="yellow",
            linewidths = 2,
            marker ="^",
            edgecolor ="red",
            s = 200)

plt.xlabel("X-axis")
plt.ylabel("Y-axis")
plt.show()
```



4) Heat Maps

```
import seaborn as sns

w1 = [20, 24, 25, 26, 30]
w2 = [15, 22, 24, 26, 20]
w3 = [15, 21, 27, 29, 19]
w4 = [35, 24, 25, 26, 30]

data = np.array([w1, w2, w3, w4])

#sns.heatmap(data)
sns.heatmap(data, cmap='coolwarm')
plt.show()
```

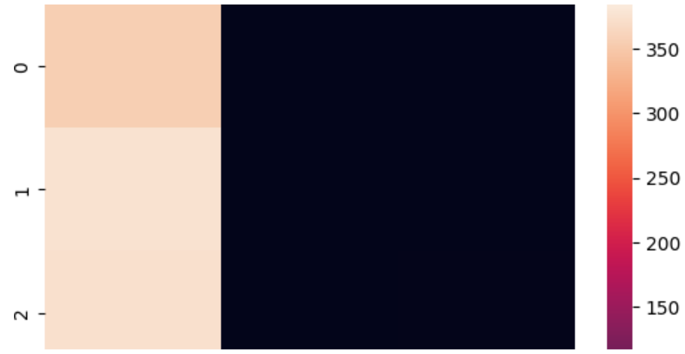


```
df = pd.read_excel('heat.xlsx')
df
```

	Rank	Month	Day
0	355	1	1
1	375	1	2
2	374	1	3
3	385	1	4

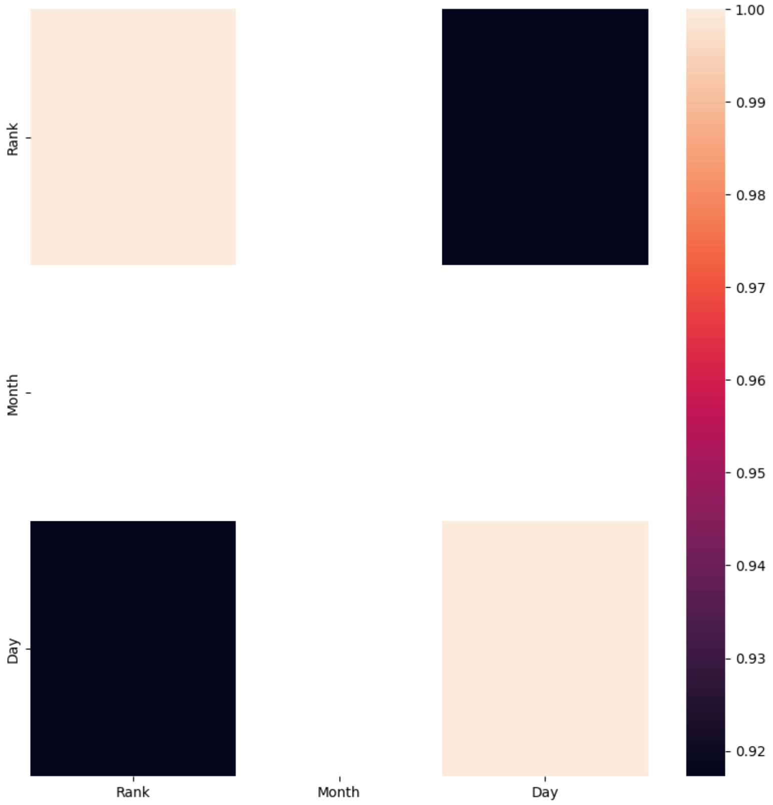
```
sns.heatmap(df)
```

```
<Axes: >
```



```
df_corr = df.corr()
```

```
figure =plt.figure(figsize=(10, 10))
sns.heatmap(df_corr)
#sns.heatmap(df_corr, annot = True, fmt='.1g')
plt.show()
```



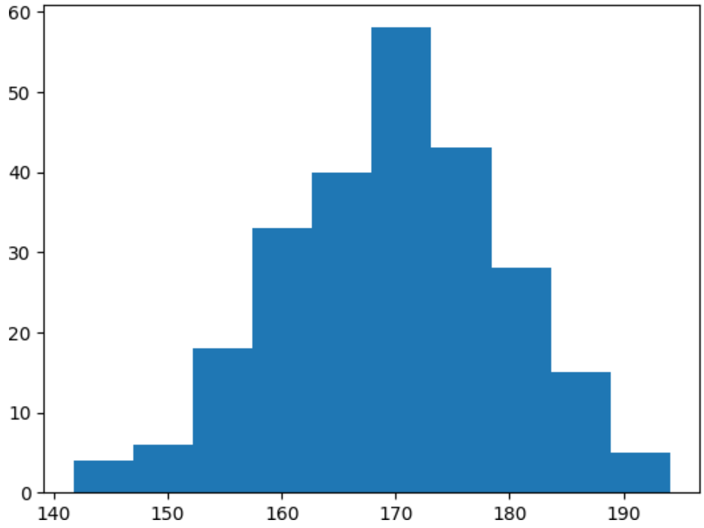
5)Histogram

A histogram is a graph showing frequency distributions.

It is a graph showing the number of observations within each given interval.

In Matplotlib, we use the hist() function to create histograms.

```
x = np.random.normal(170, 10, 250)

plt.hist(x)
plt.show()
```


60
50
40
30
20
10
0
140
150
160
170
180
190