

Experiment 3:**Study of Python Libraries for ML application such as Pandas and Matplotlib.***# Implementation of Pandas**#Series, dataframes*

```
import pandas as pd
s = pd.Series(["ind", "aus", "NZ", "US"])
print(type(s))
print(len(s)) #length
print(s)
```

Output:

```
<class 'pandas.core.series.Series'>
4
0  ind
1  aus
2  NZ
3  US
dtype: object
```

➔ import pandas as pd

```
s = pd.Series(["ind", "aus", "NZ", "US"],index=['e','f','g','h'])
print(type(s))
print(len(s)) #length
print(s)
```

Output:

```
<class 'pandas.core.series.Series'>
```

```
4
```

```
e ind
```

```
f aus
```

```
g NZ
```

```
h US
```

```
dtype: object
```

➔ import pandas as pd

```
country = ["ind", "aus", "NZ", "US","UAE","kor"]
```

```
cost = [1000, 2000, 3000, 4000,5000,6000]
```

```
sales = pd.Series(cost, index=country)
```

```
print(sales)
```

Output:

```
ind 1000
```

```
aus 2000
```

```
NZ 3000
```

```
US 4000
```

```
UAE 5000
```

```
kor 6000
```

```
dtype: int64
```

#dataframes using dictionary

```
import pandas as pd
```

```
EmployeeData = {
```

```
'ID': [100, 102, 104,106],
```

```
'Name': ['James', 'Sam', 'Rohn', 'Emma'],
```

```
'Age': [30, 28, 35, 25],
'City': ['Agra', 'Chennai', 'Mumbai', 'Goa']
}
EmpDB = pd.DataFrame(EmployeeData)
print(EmpDB)
emp = pd.DataFrame(EmployeeData, index=[1, 2, 3, 4])
print(emp)
```

Output:

```
   ID  Name  Age  City
0  100  James  30   Agra
1  102   Sam  28  Chennai
2  104  Rohn  35  Mumbai
3  106  Emma  25   Goa
   ID  Name  Age  City
1  100  James  30   Agra
2  102   Sam  28  Chennai
3  104  Rohn  35  Mumbai
4  106  Emma  25   Goa
```

```
➔ mydict = {
    "Name": ['James', 'Sam', 'Rohn', 'Emma'],
    "Age": [30, 28, 35, 25],
    "Salary": [53000, 63000, 49000, 72000]
}
Emp= pd.DataFrame(mydict)
print(Emp)
```

Output:

	Name	Age	Salary
0	James	30	53000
1	Sam	28	63000
2	Rohn	35	49000
3	Emma	25	72000

#Create empty dataframes and add data to it

```
import pandas as pd
ColumnData = ['ID', 'Emp', 'Salary', 'Exp']
df = pd.DataFrame(columns=ColumnData)
print(df)
```

Output:

```
Empty DataFrame
Columns: [ID, Emp, Salary, Exp]
Index: []
```

```
➔ import pandas as pd
ColumnData = ['ID', 'Emp', 'Salary', 'Exp']
df = pd.DataFrame(columns=ColumnData)
print(df)
```

Output:

```
Empty DataFrame
Columns: [ID, Emp, Salary, Exp]
Index: []
```

```
df = df.append({"ID": 101, "Emp": "manager", "Salary": 2000, "Exp": 2},
ignore_index==True)
```

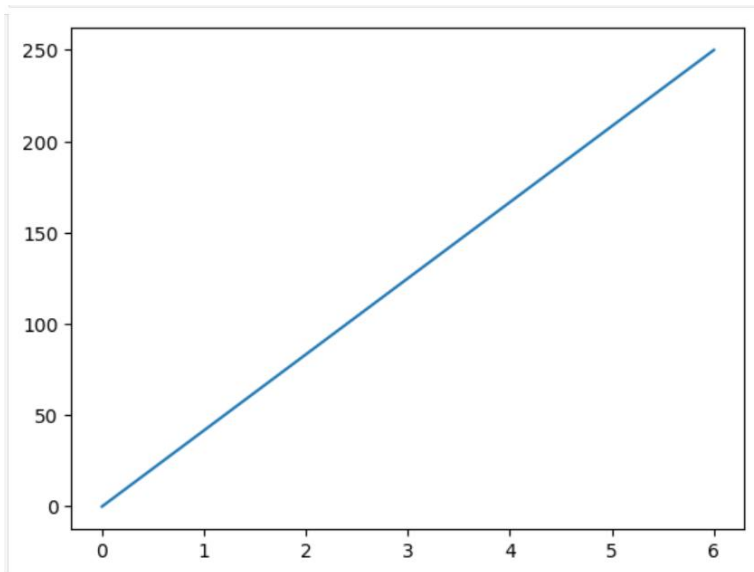
```
print(df)
df = df.append([df, pd.DataFrame([{"ID": 101, "Emp": "daniel", "Salary": 2000, "Exp":
2},ignore_index==True])])
print(df)
df=pd.DataFrame()
print(type(df))
print(df)
ColumnData=['ID','Emp','Salary','Exp']
df=pd.DataFrame(columns=ColumnData)
print(df)
df=df.append({"ID":101,"Emp":"Mark","Salary":20000,"Exp":3},ignore_index=True)
print(df)
```

Output:

#Implementation of matplotlib

```
import matplotlib.pyplot as plt
import numpy as np
xpoints = np.array([0, 6])
ypoints = np.array([0, 250])
plt.plot(xpoints, ypoints)
plt.show()
```

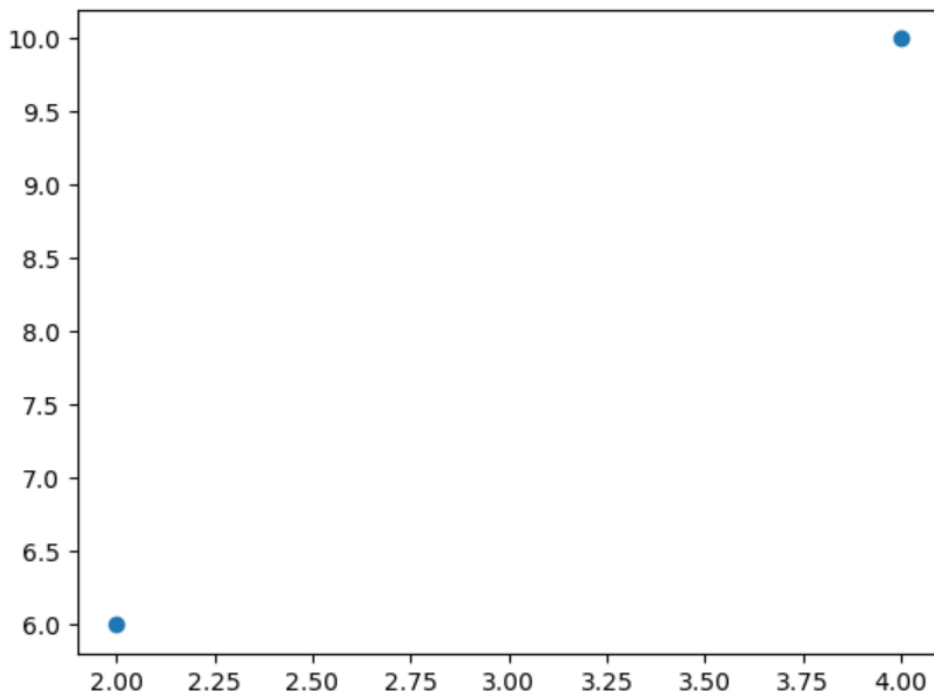
Output:



2.

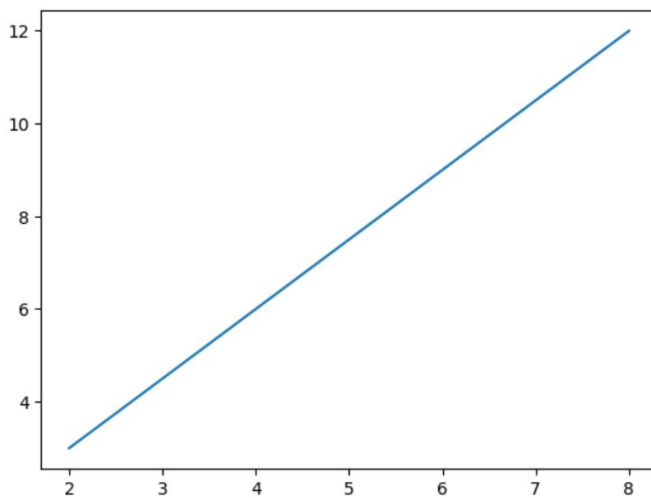
```
import matplotlib.pyplot as plt
import numpy as np
xpoints=np.array([2,4])
ypoints=np.array([6,10])
plt.plot(xpoints,ypoints,'o')
plt.show()
```

Output:



3.

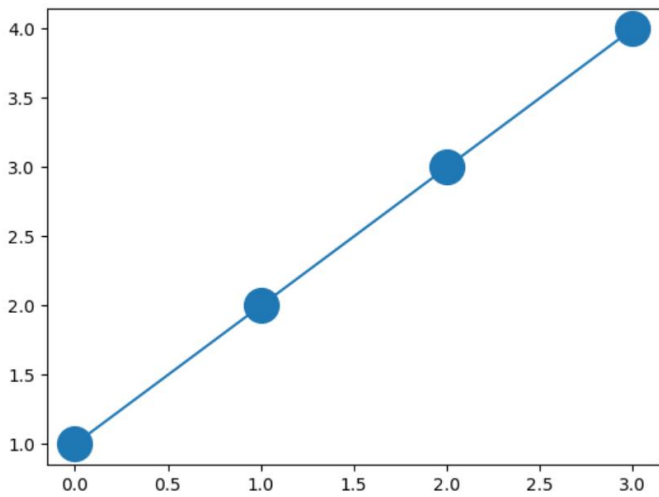
```
import matplotlib.pyplot as plt
import numpy as np
x=np.array([2,4,6,8])
y=np.array([3,6,9,12])
plt.plot(x,y)
plt.show()
```

Output:

4.

```
import matplotlib.pyplot as plt
import numpy as np
x=np.array([2,4,6,8])
y=np.array([1,2,3,4])
plt.plot(y,marker='o',ms=20)
plt.show()
```

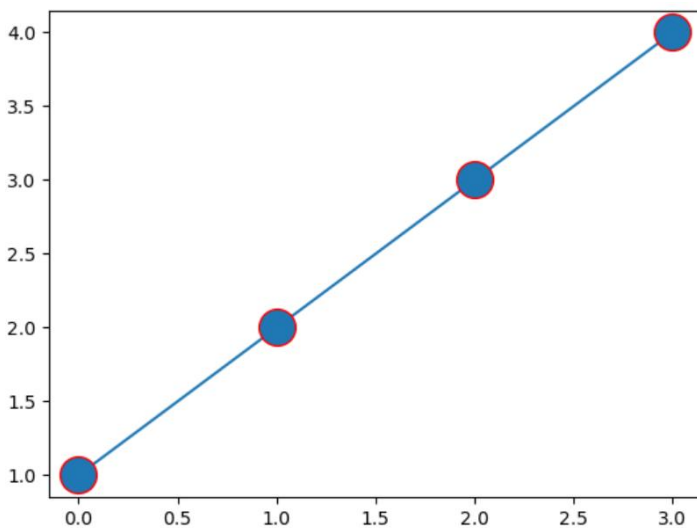
Output:



5.

```
import matplotlib.pyplot as plt
import numpy as np
x=np.array([2,4,6,8])
y=np.array([1,2,3,4])
plt.plot(y,marker='o',ms=20,mec='r')
plt.show()
```

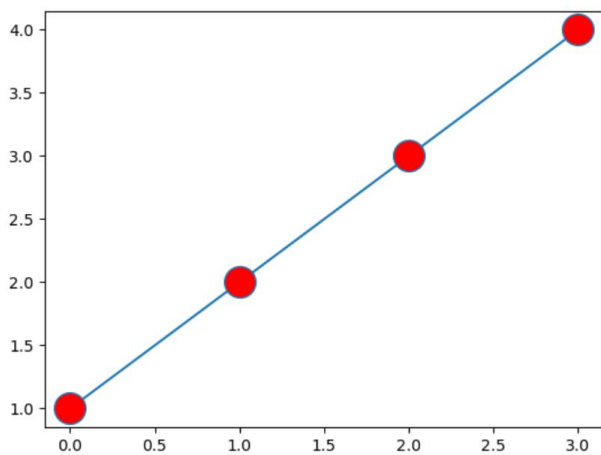
Output:



6.

```
import matplotlib.pyplot as plt
import numpy as np
x=np.array([2,4,6,8])
y=np.array([1,2,3,4])
plt.plot(y,marker='o',ms=20,mfc='r')
plt.show()
```

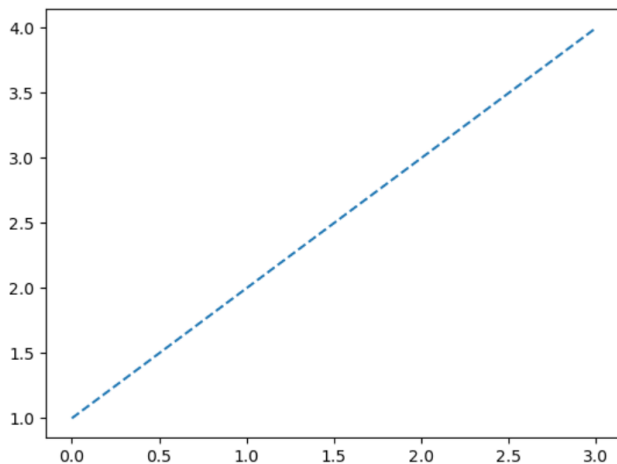

Output:



7.

```
import matplotlib.pyplot as plt
import numpy as np
x=np.array([2,4,6,8])
y=np.array([1,2,3,4])
plt.plot(y,linestyle='dashed')
plt.show()
```

Output:

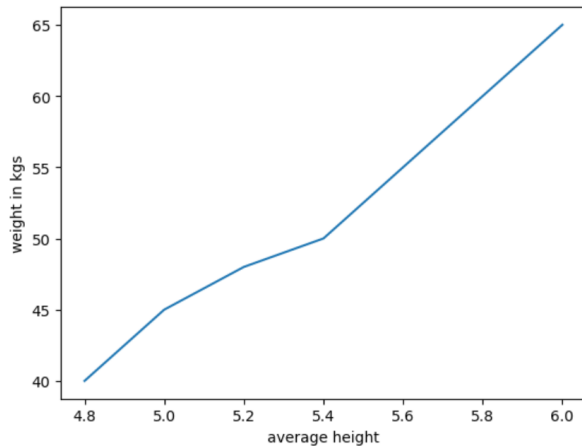


8.

```
import matplotlib.pyplot as plt
import numpy as np
x=np.array([4.8,5.0,5.2,5.4,5.6,5.8,6.0])
y=np.array([40,45,48,50,55,60,65])
plt.plot(x,y)
plt.xlabel("average height")
plt.ylabel("weight in kgs")
plt.show()
```

23261A6629

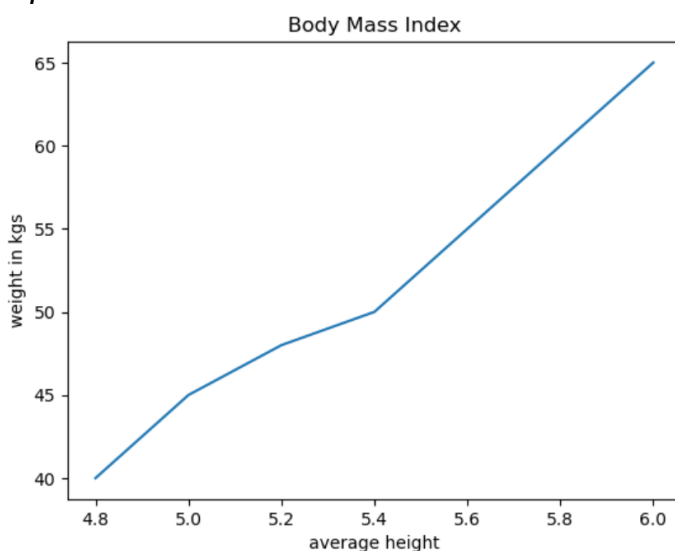
Output:



9.

```
import matplotlib.pyplot as plt
import numpy as np
x=np.array([4.8,5.0,5.2,5.4,5.6,5.8,6.0])
y=np.array([40,45,48,50,55,60,65])
plt.plot(x,y)
plt.xlabel("average height")
plt.ylabel("weight in kgs")
plt.title("Body Mass Index")
plt.show()
```

Output:



10. *Grid*

```
import matplotlib.pyplot as plt
import numpy as np
x=np.array([1,3,5,7,9])
```

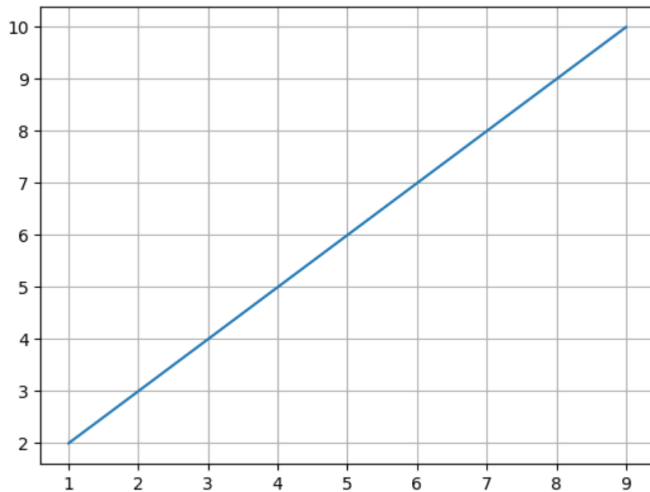
23261A6629

```

y=np.array([2,4,6,8,10])
plt.plot(x,y)
plt.grid()
plt.show()

```

Output:



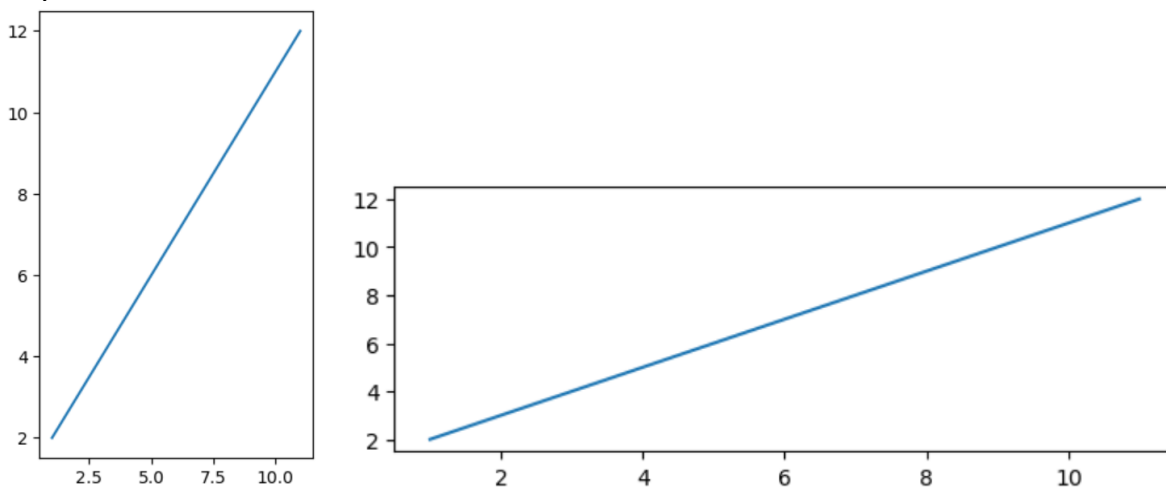
11.Subplots

```

import matplotlib.pyplot as plt
import numpy as np
x=np.array([1,3,5,7,9,11])
y=np.array([2,4,6,8,10,12])
plt.subplot(1,2,1)
plt.plot(x,y)
plt.show()
plt.subplot(2,1,2)
plt.plot(x,y)
plt.show()

```

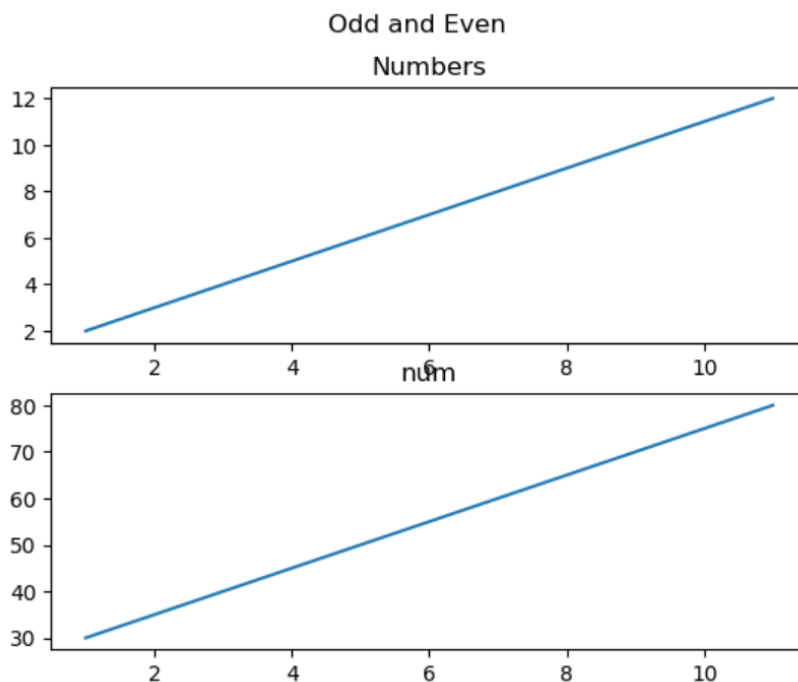
Output:



12. Subplot with titles

```
import matplotlib.pyplot as plt
import numpy as np
x=np.array([1,3,5,7,9,11])
y=np.array([2,4,6,8,10,12])
plt.subplot(2,1,1)
plt.plot(x,y)
plt.title("Numbers")
x1=np.array([1,3,5,7,9,11])
y1=np.array([30,40,50,60,70,80])
plt.subplot(2,1,2)
plt.plot(x1,y1)
plt.title("num")
plt.suptitle("Odd and Even")
plt.show()
```

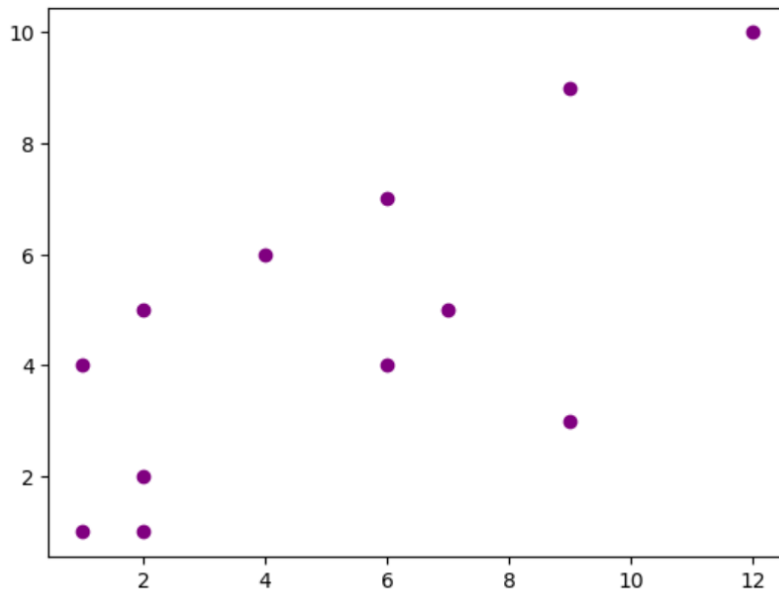
Output:



13. Scatter graph

```
import matplotlib.pyplot as plt
import numpy as np
x=np.array([1,2,4,6,9,12,6,7,9,2,2,1])
y=np.array([4,5,6,7,9,10,4,5,3,1,2,1])
plt.scatter(x,y,color='purple')
plt.show()
```

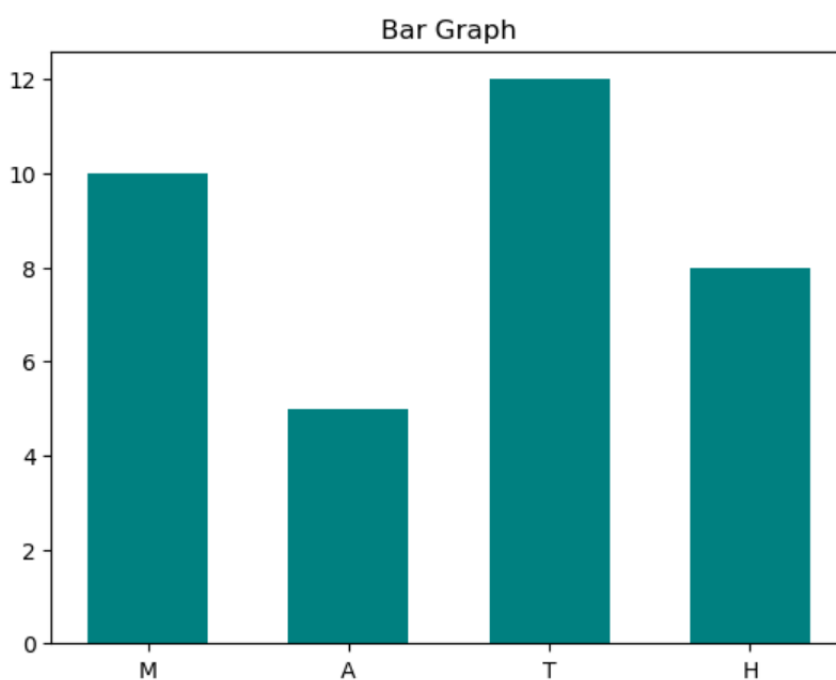
Output:



14. Bargraph

```
import matplotlib.pyplot as plt
import numpy as np
x = np.array(["M", "A", "T", "H"])
y = np.array([10, 5, 12, 8])
plt.bar(x, y, color='teal', width=0.6)
plt.title("Bar Graph")
plt.show()
```

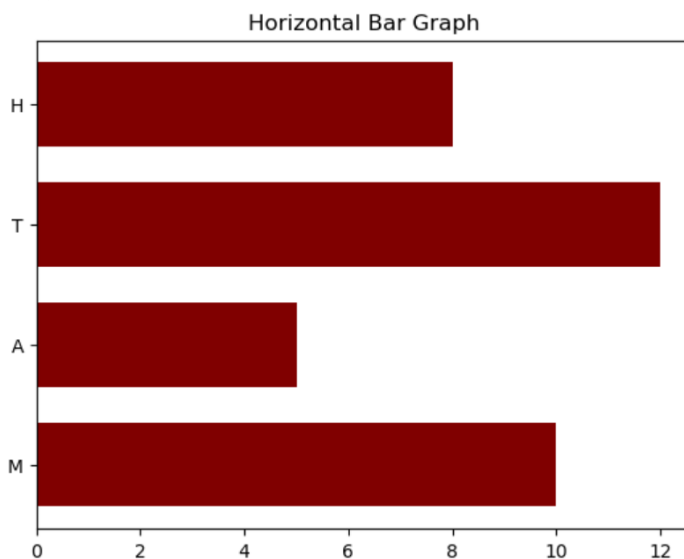
Output:



15. Horizontal bargraph

```
import matplotlib.pyplot as plt
import numpy as np
x = np.array(["M", "A", "T", "H"])
y = np.array([10, 5, 12, 8])
plt.barh(x, y, color='maroon', height=0.7)
plt.title("Horizontal Bar Graph")
plt.show()
```

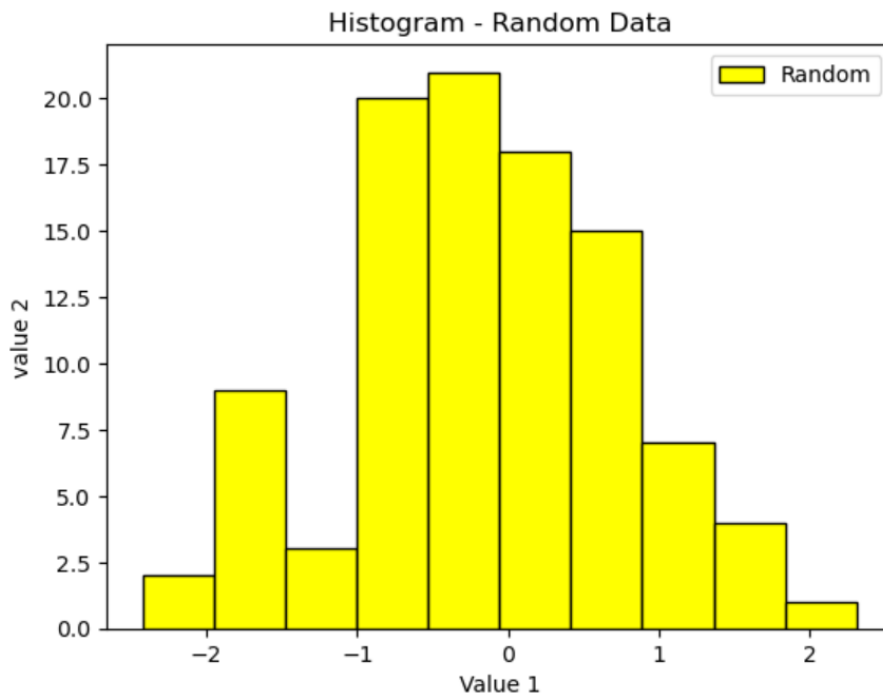
Output:



16. Histogram

```
import matplotlib.pyplot as plt
import numpy as np
data = np.random.randn(100)
plt.hist(data, bins=10, color='yellow', edgecolor='black', label="Random")
plt.title("Histogram - Random Data")
plt.xlabel("Value 1")
plt.ylabel("value 2")
plt.legend()
plt.show()
```

Output:



17.PieChart

```
import matplotlib.pyplot as plt
values = [472, 448, 716, 464, 367, 394, 1819, 300, 926, 4663]
labels = ["Odisha (472)", "Delhi (448)", "West Bengal (716)", "Uttar Pradesh (464)",
"Andhra Pradesh (367)", "Tamil Nadu (394)", "Karnataka (1819)", "Rajasthan (300)",
"Maharashtra (926)", "Kerala (4663)"]
colors = ["lightgreen", "peachpuff", "gold", "darkorange",
"lightseagreen", "mediumpurple", "olive", "plum", "royalblue", "firebrick"]
plt.figure(figsize=(12, 8))
wedges, texts, autotexts = plt.pie(values, labels=labels, colors=colors, autopct="",
startangle=90)
plt.title("COVID-19 Cases Distribution in Indian States", fontsize=16, pad=20)
plt.axis('equal')
plt.legend(wedges, labels, title="States", loc="center left", bbox_to_anchor=(1, 0, 0.5,
1))
plt.tight_layout()
plt.show()
```

Output:

COVID-19 Cases Distribution in Indian States

