DATA SCIENCE LAB MANUAL

1. **Consider the following data of three cricket players in 10 innings T20 Match**

Player	1	2	3	4	5	6	7	8	9	10
Cricketer1	25	10	55	45	55	78	55	0	49	10
Cricketer2	47	62	78	45	100	20	100	0	80	10
Cricketer3	80	17	7	10	45	79	75	75	80	42

   a) **Find Whose average is better.**
   b) **What is the middlemost value of each player?**
   c) **Whose most frequent value is good.**
   d) **Draw a simple plot to show performance of players.**

Solution:

```
#Cricket Player Performance Analysis
import statistics as st
import matplotlib.pyplot as pt
import tabulate
Matches=[1,2,3,4,5,6,7,8,9,10]
Player1=[25,10,55,45,55,78,55,0,49,10]
Player2=[47,62,78,45,100,20,100,0,80,10]
Player3=[80,17,7,10,45,79,75,75,80,42]
#Player1 Summary
print("Player1 Mean = ",st.mean(Player1))
print("Player1 Median = ",st.median(Player1))
print("Player1 Mode = ",st.mode(Player1))
#Player2 Summary
print("Player2 Mean = ",st.mean(Player2))
print("Player2 Median = ",st.median(Player2))
print("Player2 Mode = ",st.mode(Player2))
#Player3 Summary
print("Player3 Mean = ",st.mean(Player3))
print("Player3 Median = ",st.median(Player3))
print("Player3 Mode = ",st.mode(Player3))
#Performance plot
pt.plot(Matches,Player1)
pt.plot(Matches,Player2)
pt.plot(Matches,Player3)
pt.title("Cricket Player Performance")
```

```
pt.xlabel("Matches")
pt.ylabel("Scores")
pt.legend(["Player1","Player2","Player3"])
pt.show()
```

OUTPUT:

Player1 Mean = 38.2

Player1 Median = 47.0

Player1 Mode = 55

Player2 Mean = 54.2

Player2 Median = 54.5

Player2 Mode = 100

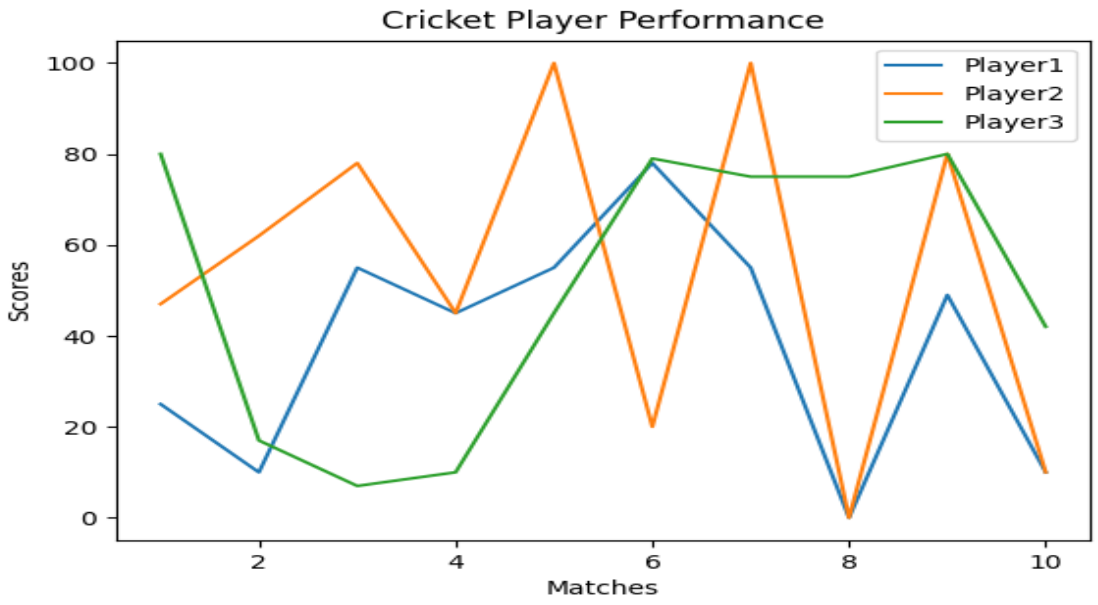
Player3 Mean = 51

Player3 Median = 60.0

Player3 Mode = 80

Analysis

a) Player 2 average is better.
b) Player1 Median = 47.0, Player2 Median = 54.5, Player3 Median = 60.0
c) Player2
d) Draw a simple plot to show performance of players.



2. Consider Insurance Dataset and analyze following
   a) Count Number of Male and Female
   b) What is average age of peoples.
   c) Display simple bar plot Gender wise

   Solution:

```
import pandas as pd
import openpyxl
import statistics as st
import matplotlib.pyplot as pt
data = pd.read_csv("E:\Data Science with
Python\DataSet\insurance.csv")
print(data)
#Analysis genderwise
ls=data['sex'].tolist()
y1=ls.count('female')
y2=ls.count('male')
print("female Count = ",y1)
print("male Count = ",y2)

#Aveage age of customers
avgage=data['age'].tolist()
print("Average Age=  %.2f " % st.mean(avgage))

#Display Histogram genderwise
x=["FEMALE","MALE"]
y=[y1,y2]
pt.bar(x,y)
pt.title("Genderwise Insurance Data")
pt.xlabel("Gender")
pt.ylabel("Count")
pt.show()
```

   Analysis:

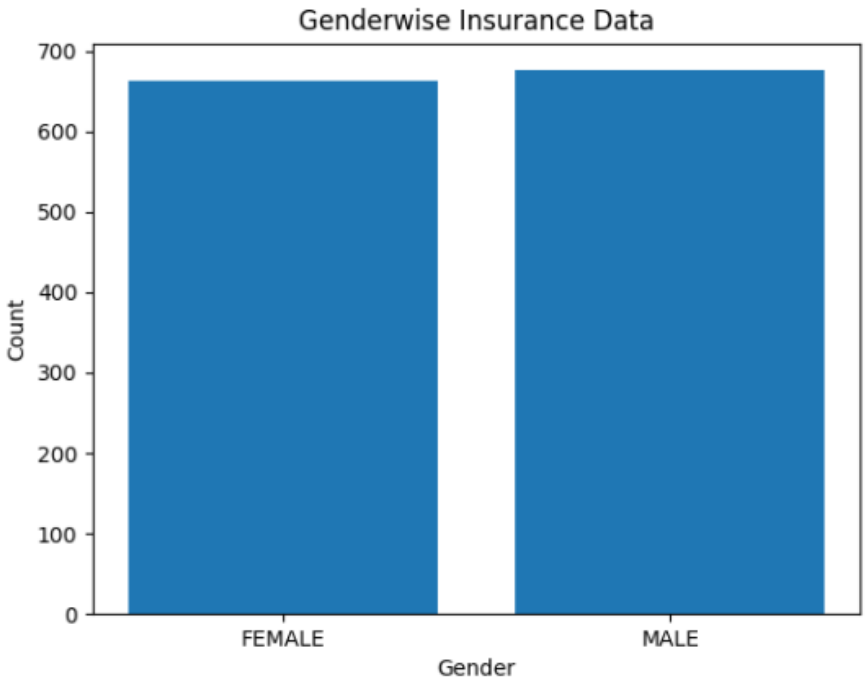
   a)

   female Count = 662

   male Count = 676

   b) Average Age= 39.21

c)


Genderwise Insurance Data
700
600
500
400
300
200
100
0
Count
FEMALE
MALE
Gender

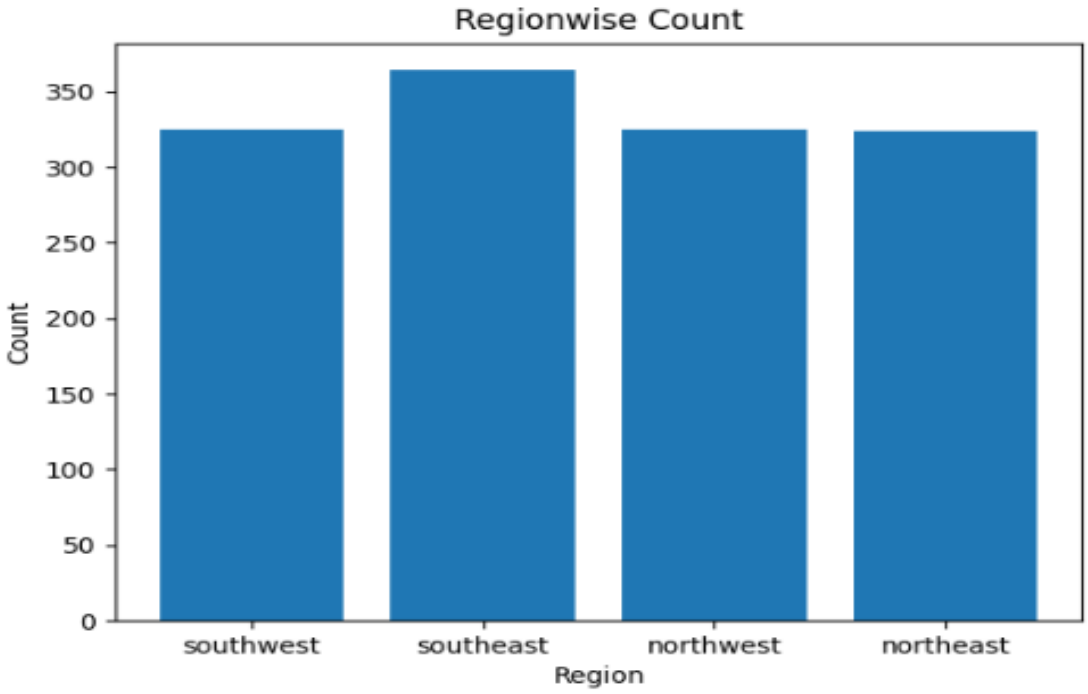
3. **Consider Insurance Dataset and analyze data region wise. Also display simple bar chart region wise.**

Solution:

```
import pandas as pd
import openpyxl
import matplotlib.pyplot as pt
data = pd.read_csv("E:\Data Science with
Python\DataSet\insurance.csv")
print(data)

#Regionwise count
region=data['region'].tolist()
output=[]
for x in region:
    if x not in output:
        output.append(x)
print(output)
y1=region.count('southwest')
y2=region.count('southeast')
y3=region.count('northwest')
y4=region.count('northeast')
print("Southwest count= ",y1)
print("southeast count= ",y2)
print("northwest count= ",y3)
print("northeast count= ",y4)
pt.title("Regionwise Count")
pt.xlabel("Region")
pt.ylabel("Count")
y=[y1,y2,y3,y4]
pt.bar(output,y)
pt.show()
```

Analysis:

Southwest count= 325
southeast count= 364
northwest count= 325
northeast count= 324


Regionwise Count
Count
350
300
250
200
150
100
50
0
southwest
southeast
northwest
northeast
Region

4. Consider temperature dataset and analyze average of minimum and maximum temperature, minimum temperature, maximum temperature month wise.
   Solution:

```
import pandas as pd
import openpyxl
import numpy as np
data=pd.read_excel("E:\\Data Science with
Python\\DataSet\\belgavitemp2022.xlsx")
print(data)
df1 = (data.groupby(["Year",
"Month"],sort=False).agg(Avg_of_Max_Temp=("Max", 'mean'),
    Max_temp=("Max",'max'),Avg_of_Min_Temp=("Min",
'mean'),Min_temp=("Min",'min')))
print(df1)
```

   Analysis:

		Avg_of_Max_Temp	Max_temp	Avg_of_Min_Temp	Min_temp
Year	Month				
2022	January	29.290323	33	14.838710	11
	February	32.535714	35	16.928571	14
	March	35.451613	39	20.322581	17
	April	36.666667	39	22.300000	19
	May	33.838710	38	21.612903	19
	June	31.533333	36	21.033333	20
	July	28.225806	33	20.451613	19
	August	28.419355	32	20.258065	19
	September	29.533333	32	19.833333	18
	October	29.741935	32	18.677419	14
	November	30.433333	32	16.433333	11
	December	29.870968	33	17.967742	14

5.Consider following data and calculate Descriptive statistics using formules.

22,26,14,30,18,1135,41,12,32

Solution:

```
import numpy as np
import pandas as pd
data=[22,26,14,30,18,11,35,41,12,32]
print("Mean = %.2f"% np.mean(data))
print("Median = ",np.median(data))
print("Max = ",np.max(data))
print("Min = ",np.min(data))
print("First Quartile =",np.quantile(data,0.25))
print("Second Quartile = ",np.quantile(data,0.50))
print("Third Quartile = ",np.quantile(data,0.75))
print("20 th Percentilee = ",np.percentile(data,20))
print("99 th Percentilee = ",np.percentile(data,99))
print("Standard deviation = %.2f" % np.std(data))
print("Variance  = ",np.var(data))
```

OUTPUT:

Mean = 24.10
Median = 24.0
Max = 41
Min = 11
First Quartile = 15.0
Second Quartile = 24.0
Third Quartile = 31.5
20 th Percentilee = 13.6
99 th Percentilee = 40.46
Standard deviation = 9.83
Variance = 96.69

6. Find the Quartiles for the following Students Score data and visualize graphically.
   50,50,47,97,49,3,53,42,26,74,82,62,37,15,70,27,36,35,48,52,63,64.

Solution:

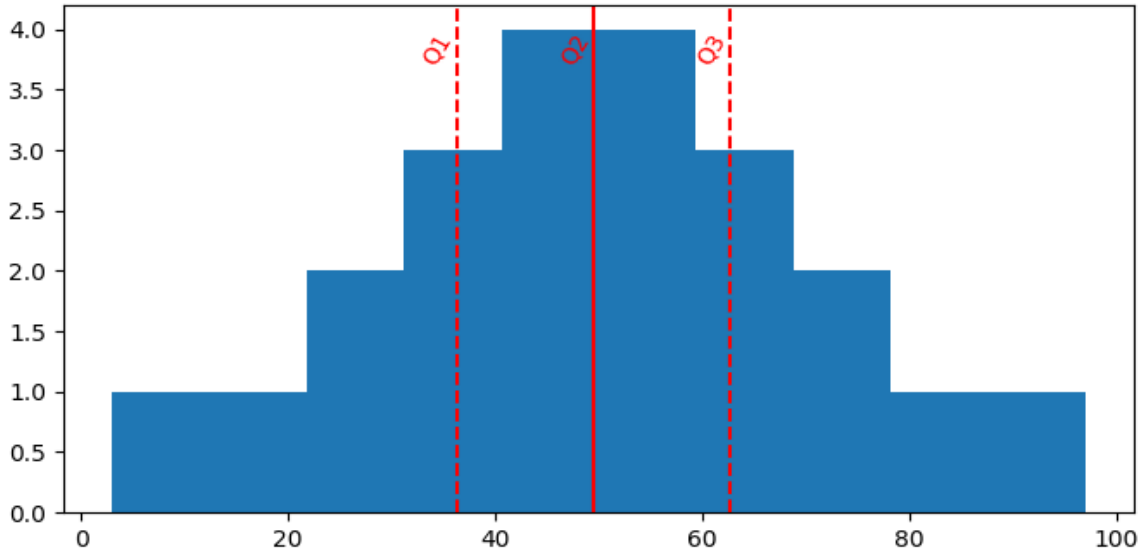
```
import numpy as np
import matplotlib.pyplot as pt
import numpy as np
import pandas as pd
data=[50,50,47,97,49,3,53,42,26,74,82,62,37,15,70,27,36,35,48,52,63,64]
print(data)
print("Quartile 1 = %.2f"%np.quantile(data,0.25))
print("Quartile 2 = %.2f"%np.quantile(data,0.50))
print("Quartile 3 = %.2f"%np.quantile(data,0.75))
pt.figure(figsize=(8,4))
pt.hist(data)
# Vertical lines for each percentile of interest
pt.axvline(np.quantile(data, 0.25), linestyle='--', color='red')
pt.text(np.quantile(data, 0.25), 4, 'Q1', color='r', ha='right', va='top',
rotation=60)
pt.axvline(np.quantile(data, 0.50), linestyle='-',  color='red')
pt.text(np.quantile(data, 0.50), 4, 'Q2', color='r', ha='right', va='top',
rotation=60)
pt.axvline(np.quantile(data, 0.75), linestyle='--', color='red')
pt.text(np.quantile(data, 0.75), 4, 'Q3', color='r', ha='right', va='top',
rotation=60)
pt.show()
```

OUTPUT:

Quartile 1 = 36.25

Quartile 2 = 49.50

Quartile 3 = 62.75

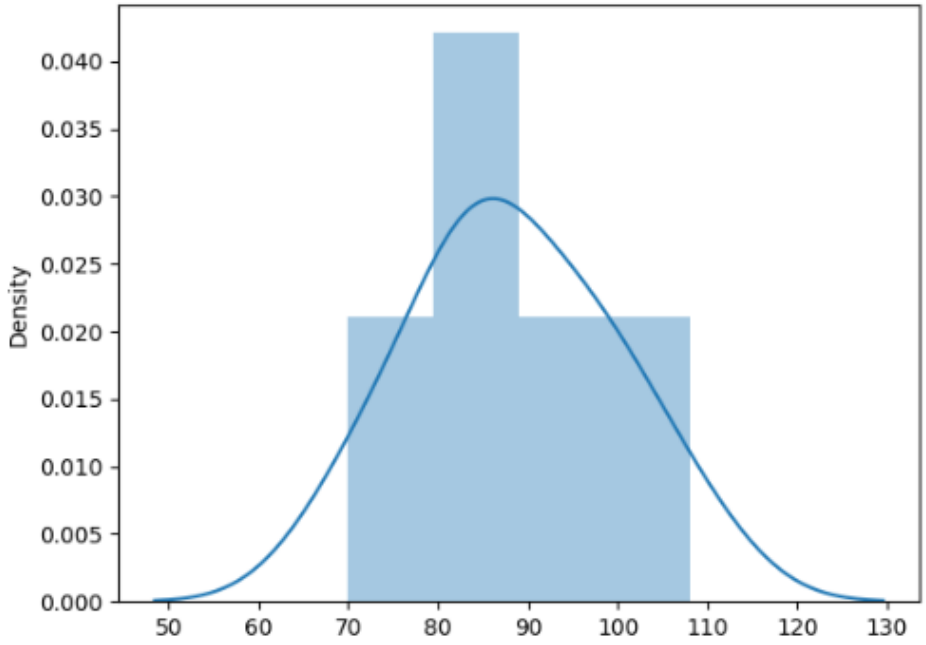


7. Calculate the skewness for the following data also conclude skewness
85,96,76,108,84,100,86,70,95,84

Solution

```
# Importing library
import matplotlib.pyplot as pt
import statistics as st
import seaborn as sns
# Creating a dataset
dataset =[85,96,76,108,84,100,86,70,95,84]
meandata=st.mean(dataset)
print("Mean =  %.2f"%meandata)
modedata=st.mode(dataset)
print("Mode =  %.2f"%modedata)
meddata=st.median(dataset)
print("Median =  %.2f"%meddata)
# Calculate the skewness
stddata=st.stdev(dataset)
print("Standard Deviation =%.2f" % stddata)
sk=(meandata-modedata)/stddata
print("Skewness= %.2f" % sk)
sns.distplot(dataset)
pt.show()
```

OUTPUT:
Mean = 88.40
Mode = 84.00
Median = 85.50

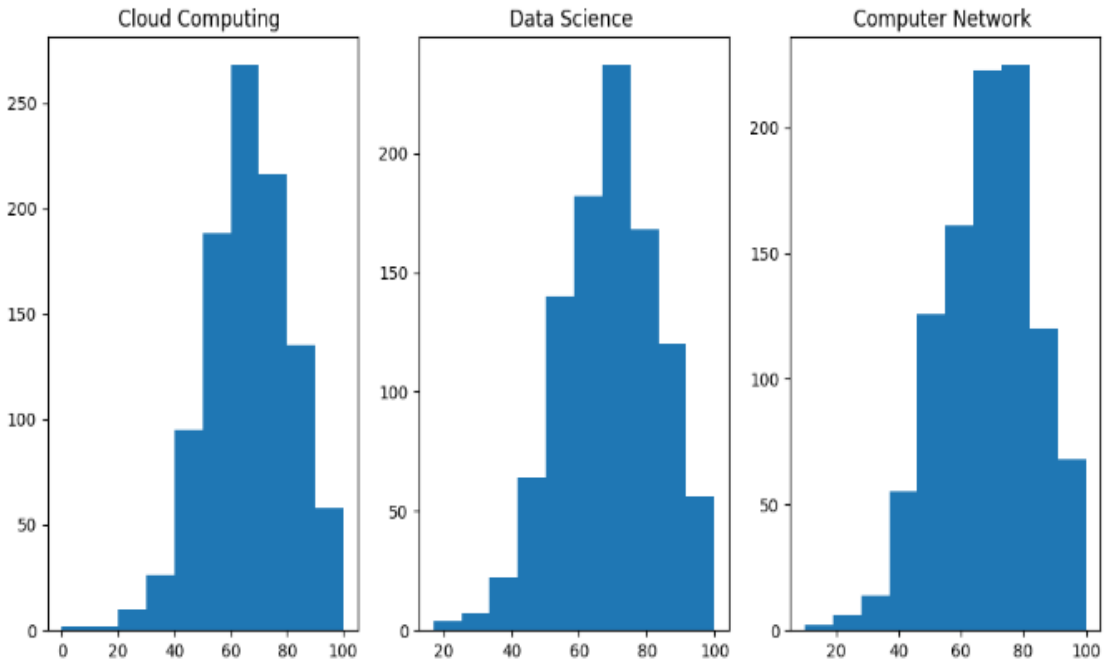


Analysis: Distribution is Positively Skewed.

8. Consider Student Performance dataset and find skewness for all subjects.

```
import pandas as pd
import matplotlib.pyplot as plt
import openpyxl
data =pd.read_csv("E:\Data Science with
Python\DataSet\StudentsPerformance.csv")
print(data)
print("Skew of Cloud Computing score:
%.2f"%data['Cloud Computing'].skew())
print("Skew of Data Science: %.2f"%data['Data
Science'].skew())
print("Skew of Computer Networks:
%.2f"%data['Computer Network'].skew())

plt.figure(figsize = (12,6))
plt.subplot(1, 3, 1)
plt.hist(data['Cloud Computing'])
plt.title('Cloud Computing ')

plt.subplot(1, 3, 2)
plt.hist(data['Data Science'])
plt.title('Data Science ')

plt.subplot(1,3,3)
plt.hist(data['Computer Network'])
plt.title('Computer Network ')

plt.show()
```

OUTPUT:
Skew of Cloud Computing score: -0.28
Skew of Data Science: -0.26
Skew of Computer Networks: -0.29



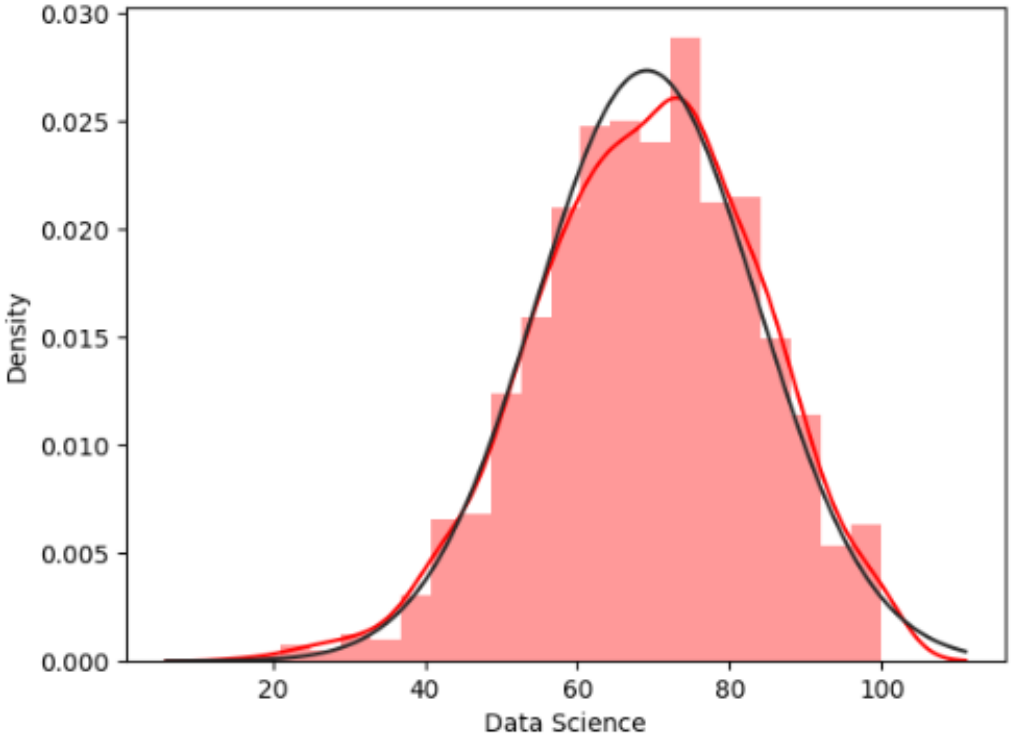
Analysis:
All subjects Distribution is negatively skewed.
Maximum students score between 60-100.

9. Consider Student Performance dataset find basic statistics of data science subject using pandas describe function, calculate skewness also visualize distribution.
   Solution:

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
from scipy.stats import skew, skewtest, norm
import openpyxl
data =pd.read_csv("E:\Data Science with
Python\DataSet\StudentsPerformance.csv")
print(data)
print(data['Data Science'].describe())
print("Skewness= %.2f"%data['Data Science'].skew())
sns.distplot(data['Data Science'], fit=norm, color="r")
plt.show()
```

   OUTPUT:

```
count    1000.000000
mean       69.169000
std        14.600192
min        17.000000
25%        59.000000
50%        70.000000
75%        79.000000
max       100.000000
Name: Data Science, dtype: float64
Skewness= -0.26
```


0.030
0.025
0.020
0.015
0.010
0.005
0.000
Density
20
40
60
80
100
Data Science