In [342]:

```python
# Prathamesh Takalkar
```

In [343]:

```python
# Question 1
Celcius=(int)(input("Enter temperature in Celcius: "))

Fahrenheit=(Celcius*1.8)+32
Fahrenheit

print("Temperature at your location is ",Fahrenheit)
```

```
Enter temperature in Celcius: 40
Temperature at your location is  104.0
```

In [4]:

```python
#Question 2
p=1000  # amount
i=0.10  # Rate of Interest
r=5     # No. of years

# Simple Inetrest
SI=(p*i*r)/100
print("Simple interest is ",SI)

```

```
Simple interest is  5.0
```

In [7]:

```python
#Question 3
m=6
n=3

if m%n==0:
    print(m,"is divisible by",n)
else:
    print("No. is not divisible")
```

```
6 is divisible by 3
```

In [1]:

```python
# Question 4
n=(int)(input("Enter a number: "))

if n%2==0:
        print("Number is even")
else:
        print("No. is even")
```

```
Enter a number: 20
Number is even
```

In [1]:

```python
# question 8
def Febonacci(n):
    if n<0:
        print("Invalid")
    elif n==0:
        return 0
    elif n==1 or n==2:
        return 1
    else:
        return Febonacci(n-1)+Febonacci(n-2)
print(Febonacci(10))
```

```
55
```

In [20]:

```python
# Question 9

A={"a", "b", "c", "d"}
B={"b", "c", "e"}

print("Union is",B|A)
print("Intersection is ",A&B)
```

```
Union is {'e', 'd', 'b', 'a', 'c'}
Intersection is  {'c', 'b'}
```

In [47]:

```
# Question 10
n=10
sum=0
for i in range(1,n+1):     # here range is start=1,end=11(n+1),by difference=1
    sum=sum+i
print("Sum of first",n,"numbers is",sum)
sumsq=0
for j in range(1,n+1,1):
    sumsq=sumsq+(j*j)
print("Sum of square of first",n,"numbers is",sumsq)
```

```
Sum of first 10 numbers is 55
Sum of square of first 10 numbers is 385
```

In [17]:

```
 # Question 11
n=20
sum=0
for i in range(1,n+1):
    if(i%2==1):
        print("{0}".format(i))
        sum=sum+i
 print("Sum of odd numbers is:",sum)


```

```
1
3
5
7
9
11
13
15
17
19
Sum of odd numbers is: 100
```

In [21]:

```
# Question 12 a)
x=(int)(input("Enter the value of x: "))
if x>0:
    y=(x*x)+4
    print("Value of y is: ",y)
elif x==0:
    y=4
    print("Value of y is: ",y)
else:
    y=-((x*x)+4)
    print("Value of y is ",y)
```

```
Enter the value of x: -54
Value of y is  -2920
```

In [28]:

```
# Question 12 b)
x=(int)(input("Enter the value of x: "))
if x>0:
    y=x
    print("y=",y)
elif x==0:
    y=0
    print("y=",y)
else:
    y=-(x)
    print("y=-",y)
```

```
Enter the value of x: -67
y=- 67
```

In [37]:

```python
# Question 13
import math as m
# To find roots we use formula
# (-b+sqrt(b*b-4*a*c))/2a

# The given equation is X^2+2*x-2=0

a=1
b=2
c=-2

Root1=(-b+m.sqrt((b*b)-4*a*c))/2*a
Root1=round(Root1,6)
Root2=(-b-m.sqrt((b*b)-4*a*c))/2*a
Root2=round(Root2,6)

print("Roots of given quadratic equation is",Root1,Root2)
```

```
Roots of given quadratic equation is 0.732051 -2.732051
```

In [43]:

```python
# Question 14
n=20
sum=0
for i in range(1,n+1):
    if i%2==0:
        sum=sum+i
        print("{0}".format(i))
print("The sum of first 10 even numbers is: ",sum)
```

```
2
4
6
8
10
12
14
16
18
20
The sum of first 10 even numbers is:  110
```

In [60]:

```python
# Q15
def sum(numbers):
    sum=0
    for i in numbers:
        sum=sum+i
    return sum
print(sum((20,12,15,1,7,10,5,1,15,5)))
```

```
91
```

In [63]:

```
# Q16
import numpy as np
A=np.array([[4,-3],[6,5]])
B=np.array([11,7])

C=np.linalg.solve(A,B)
print(C)

```

```
[ 2. -1.]
```

In [64]:

```
# Q17
S="Statistics"
len(S)
```

Out[64]:

```
10
```

In [78]:

```
# Q18
def Palindrome(S):
    return S==S[::-1]
S=(input("Enter the Word: "))
P=Palindrome(S)
if P:
    print("Yes")
else:
    print("No")
```

```
Enter the Word: madam
Yes
```

In [83]:

```
# Q20
ch=input("Enter the key:")
if(ch.isalpha()):
    print("The given key is Alphabet")
else:
    print("The given key is not an alphabet")
```

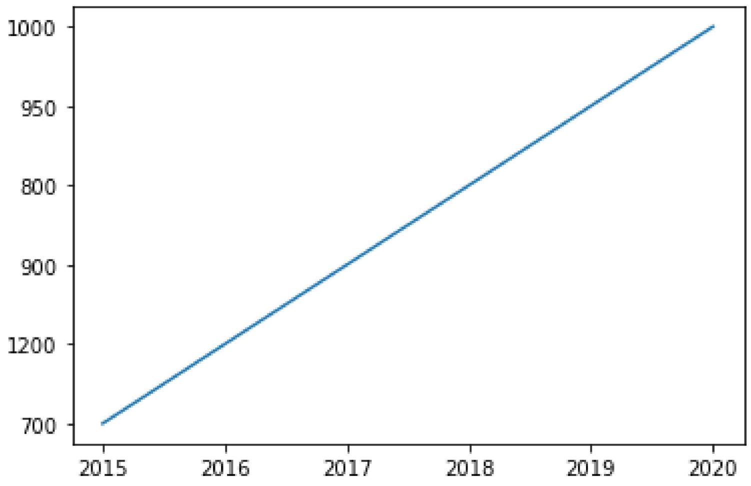
```
Enter the key:*
The given key is not an alphabet
```

In [92]:

```python
# Q23
import matplotlib.pyplot as plt
Year=["2015","2016","2017","2018","2019","2020"]
NS=["700","1200","900","800","950","1000"]      # Number of students
plt.plot(Year,NS)

```

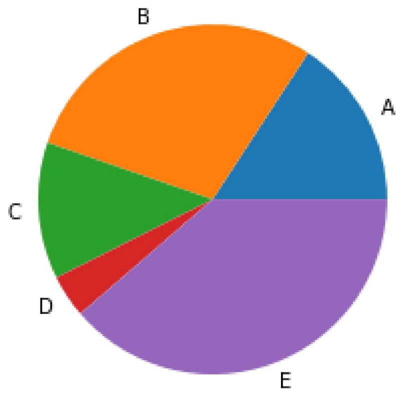
Out[92]:

```
[<matplotlib.lines.Line2D at 0x288d54a1880>]
```



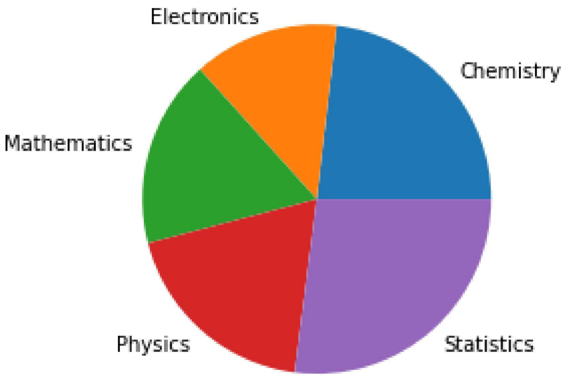
In [101]:

```
# Question 25 a)
import numpy as np
import matplotlib.pyplot as plt

Section=["A","B","C","D","E"]
NW=np.array(["200","367","160","50","490"])  # No. of workers

plt.pie(NW,labels=Section)
plt.show()
```



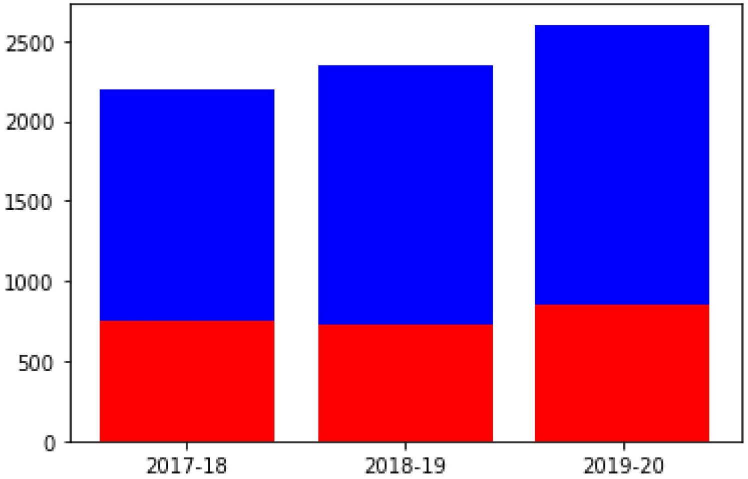
In [106]:

```
# Question 25 b)
import numpy as np
import matplotlib.pyplot as plt


Subject=["Chemistry","Electronics","Mathematics","Physics","Statistics"]
Students=np.array(["23.17","13.51","17.37","18.92","27.03"])

plt.pie(Students,labels=Subject)
plt.show()
```



In [120]:

```python
# Q26
Year=["2017-18","2018-19","2019-20"]
Arts=(750,725,850)
Commerce=(1450,1625,1750)

plt.bar(Year,Arts,color='r')
plt.bar(Year,Commerce,bottom=Arts,color='b')
plt.show()
```

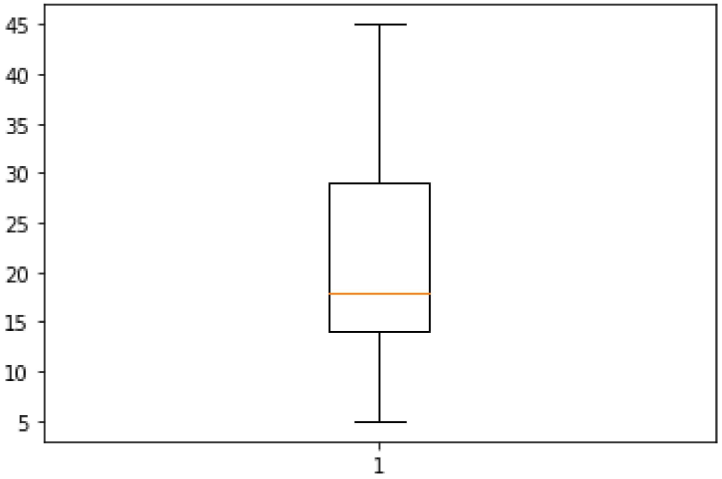


In [127]:

```
# Q29 a)
X=[15,17,29,37,5,12,45,16,29,32,18,22,24,7,13]

plt.boxplot(X)
```

Out[127]:

```
{'whiskers': [<matplotlib.lines.Line2D at 0x288d554f6a0>,
  <matplotlib.lines.Line2D at 0x288d5698be0>],
 'caps': [<matplotlib.lines.Line2D at 0x288d577bb50>,
  <matplotlib.lines.Line2D at 0x288d577b430>],
 'boxes': [<matplotlib.lines.Line2D at 0x288d554f520>],
 'medians': [<matplotlib.lines.Line2D at 0x288d577b070>],
 'fliers': [<matplotlib.lines.Line2D at 0x288d579a4f0>],
 'means': []}
```

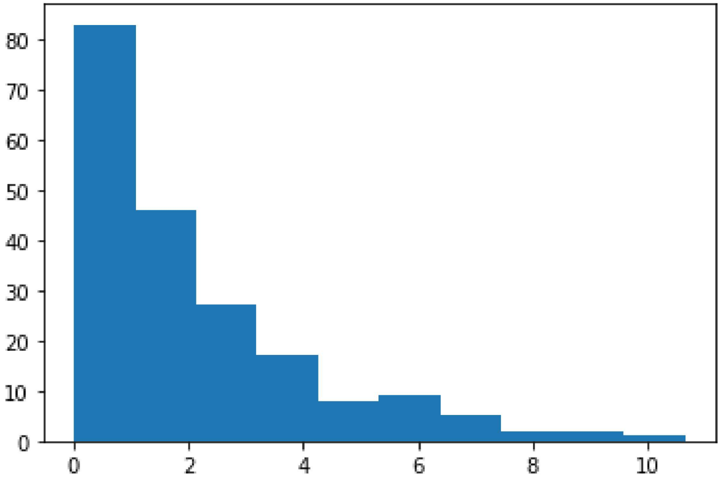


In [138]:

```
#Q29 b)
from numpy import random
Exp=random.exponential(2,size=200)
plt.hist(Exp)
```

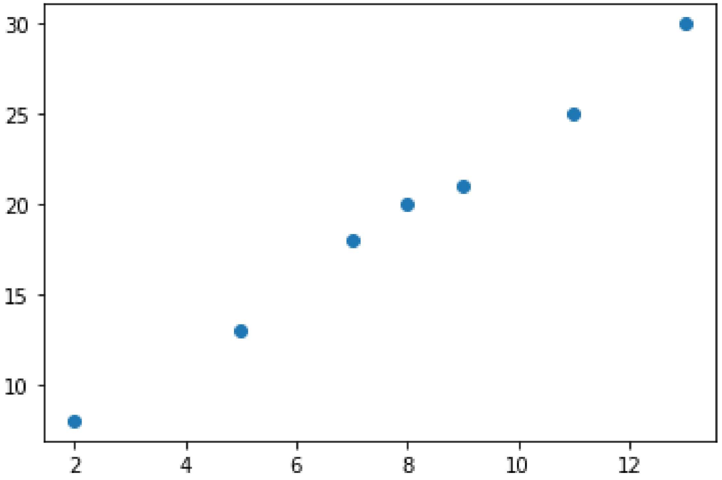
Out[138]:

```
(array([83., 46., 27., 17.,  8.,  9.,  5.,  2.,  2.,  1.]),
 array([6.82129943e-03, 1.07139370e+00, 2.13596611e+00, 3.20053852e+00,
        4.26511092e+00, 5.32968333e+00, 6.39425573e+00, 7.45882814e+00,
        8.52340054e+00, 9.58797295e+00, 1.06525454e+01]),
 <BarContainer object of 10 artists>)
```



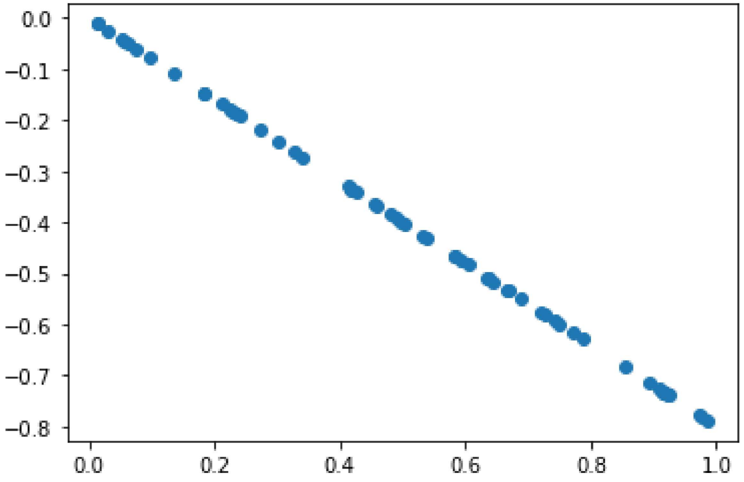
In [140]:

```
# Q30
X=[2,5,7,8,9,11,13]
Y=[8,13,18,20,21,25,30]

plt.scatter(X,Y)
plt.show()
```



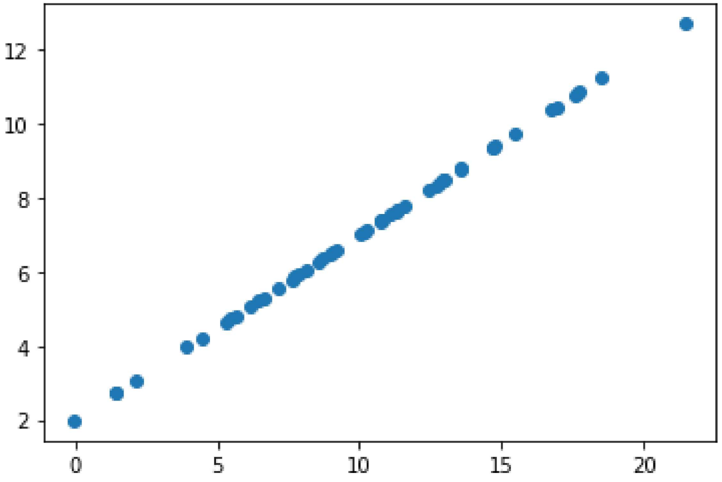
In [143]:

```
# Q31
X=random.uniform(0,1,size=60)
Y=-0.8*X

plt.scatter(X,Y)
plt.show()
```



In [146]:

```
# Q32)
X=random.normal(10,5,size=50)
Y=2+0.5*X

plt.scatter(X,Y)
plt.show()
```



In [160]:

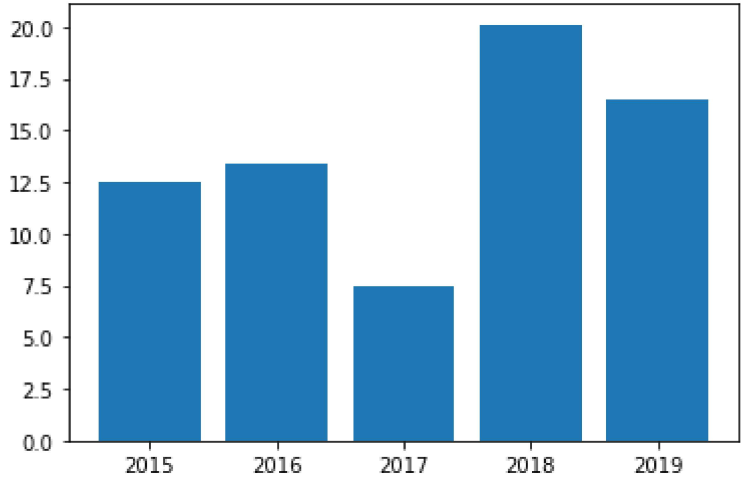
```
# Q33)
Years=(2015,2016,2017,2018,2019)

```

In [161]:

```
AS=(12.5,13.4,7.5,20.1,16.5)

plt.bar(Years,AS,label="Year")
```

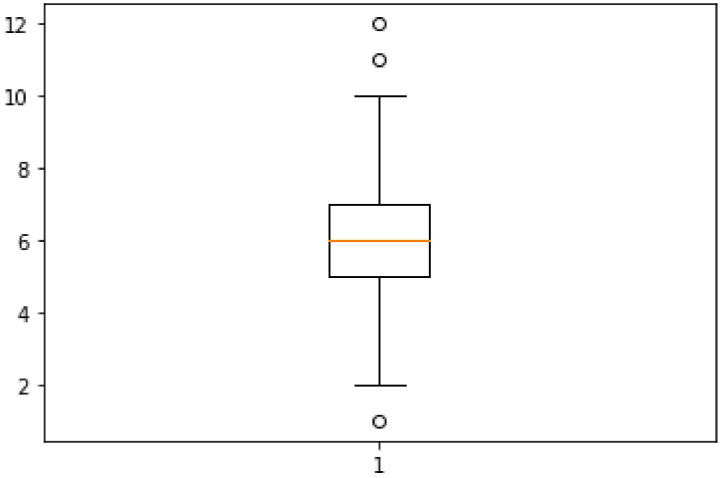
Out[161]:

```
<BarContainer object of 5 artists>
```



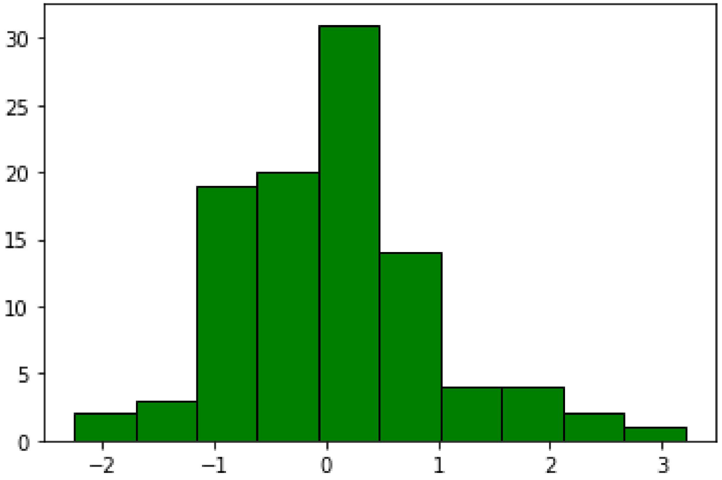
In [165]:

```
# Q35)
Binom=random.binomial(20,0.3,size=100)
plt.boxplot(Binom)
plt.show()
```



In [175]:

```
# Q36)
Normal=random.normal(0,1,size=100)
plt.hist(Normal,color="g",edgecolor="black")
plt.show()
```



In [177]:

```
# Q37
x=0.2
n=100
sum=1
for i in range(2,n+1):
    sum=sum+x**i
print("sum of given arithmatic series is: ",sum)
```

```
sum of given arithmatic series is:  1.05
```

In [179]:

```python
# Q 38)
a=5
b=7
c=10

Area=(a+b+c)/2
print("Area of Triangle is ",Area)
```

```
Area of Triangle is  11.0
```

In [185]:

```python
# Q39)
n=5
X=2
mult=1
for i in range(2,n):
    mult=X**i
print("Value of X^n is:",mult)
```

```
Value of X^n is: 16
```

In [189]:

```python
# Q40)
import math as m
r=0.5
Area=m.pi*r*r
Area=round(Area,3)
Circum=2*m.pi*r
Circum=round(Circum,3)
print("Area of circle is",Area,"& Circumference of the circle is",Circum)
```

```
Area of circle is 0.785 & Circumference of the circle is 3.142
```

In [196]:

```python
# Q41)
A={"a","b","c","d"}
B={"b","c","e"}
C1=A&B
print("Value of A-B is:",C1)
C2=B&A
print("Value of B-A is:",C2)
```

```
Value of A-B is: {'c', 'b'}
Value of B-A is: {'c', 'b'}
```

In [199]:

```python
# Q42)
Rad=(int)(input("Enter the value of Radius:"))

Area=m.pi*Rad*Rad
Area=round(Area,3)
Circum=2*m.pi*Rad
Circum=round(Circum,3)
print("Area of circle is:",Area)
print("Circumference of Circle is:",Circum)
```

```
Enter the value of Radius:50
Area of circle is: 7853.982
Circumference of Circle is: 314.159
```

In [202]:

```python
#Q43)
Temp=[15,20,48,10,40,42,35,30,37,25]
Min=min(Temp)
Max=max(Temp)

print("Maximum Temperature is:",Max)
print("Minimum Temperature is:",Min)
```

```
Maximum Temperature is: 48
Minimum Temperature is: 10
```

In [204]:

```python
# Q44)
B=10
H=5
Area=(H*B)/2
print("Area of Triangle is",Area)
```

```
Area of Triangle is 25.0
```

In [218]:

```python
# Q46)
import numpy as np
import statistics as S
Data=[3.1,2.5,7.9,3.4,5.8,1.9,2.4,3.2,9.1,2.1]
Mean=np.mean(Data)
Mean=round(Mean,3)
Mode=S.mode(Data)
Mode=round(Mode,3)
SD=S.stdev(Data)
SD=round(SD,3)
CV=SD/Mean
CV=round(CV,3)
print("Summary of given data:","Mean:",Mean,", Mode:",Mode,", Standard Deviation:",SD,"& Coefficient Of Variation:",
```

```
Summary of given data: Mean: 4.14 , Mode: 3.1 , Standard Deviation: 2.558 & Coefficient Of Variation: 0.618
```

In [223]:

```python
# Q47)
A=[[1,2,3],[1,6,7],[5,6,7]]
B=[[1,4,9],[4,9,6],[8,9,4]]
C=[[0,0,0],[0,0,0],[0,0,0]]
# For iteration in X
for i in range(len(A)):
    for j in range(len(B[0])): # For iteration in B's rows
        for k in range(len(B)):
            C[i][j]+=A[i][k]*B[k][j]
for r in C:
    print(r)
```

```
[33, 49, 33]
[81, 121, 73]
[85, 137, 109]
```

In [230]:

```
# Q48
Data=[7,5,5,9,1,9,4,8,6,5]
Mean=S.mean(Data)
Mode=S.mode(Data)
Max=max(Data)
Min=min(Data)
Range=Max-Min
print("Mean of the data is:",Mean)
print("Mode of the data is:",Mode)
print("Range of the data is:",Range)
```

```
Mean of the data is: 5.9
Mode of the data is: 5
Range of the data is: 8
```

In [236]:

```
# Q50
n=(int)(input("Enter a number: "))
rev=0
while(n>0):
    r=n%10
    rev=rev*10+r
    n=n//10
print(rev)
```

```
Enter a number: 1234
4321
```

In [263]:

```python
# Q51
import numpy as np
P1=np.array((1,3,4,6,7))
P2=np.array((6,8,1,4,3))

Sq=np.square(P1-P2)
Sum=np.sum(Sq)
Distance=np.sqrt(Sum)
print("The Euclidean Distance is:",Distance)

Sum2=np.sum(P1-P2)
print("The Manhattan Distance is:",Sum2)
```

```
The Euclidean Distance is: 8.888194417315589
The Manhattan Distance is: -1
```

In [270]:

```python
# Q53
Data1=np.array((1,9,2,14,6,8,9,7,5,10))
Mean=np.mean(Data1)
print("Mean of gien Data is:",Mean)

GM=S.geometric_mean(Data1)
print("Gometric Mean of given data is:",GM)

HM=S.harmonic_mean(Data1)
print("Harmonic Mean of given data is:",HM)
```

```
Mean of gien Data is: 7.1
Gometric Mean of given data is: 5.729216489236118
Harmonic Mean of given data is: 3.9554230105164025
```

In [272]:

```
# Q55)
L=(int)(input("Enter Length:"))
W=(int)(input("Enter Width:"))

Area_rec=L*W
print("Area of Rectangle",Area_rec)

r=(int)(input("Enter Radius:"))
Area_cir=m.pi*r*r
print("Area of Circle:",Area_cir)
```

```
Enter Length:5
Enter Width:7
Area of Rectangle 35
Enter Radius:2
Area of Circle: 12.566370614359172
```

In [289]:

```
# Q56
X=(int)(input("Enter value of X:"))
Lambda=2

PMF=((m.exp(-Lambda))*Lambda**X)/m.factorial(X)
PMF=round(PMF,6)
print("PMF of Poisson Distribution is:",PMF)

X1=range(0,X)
for i in range(len(X1)):
    CDF=(m.exp(-Lambda)*(np.sum(Lambda**i/m.factorial(i))))
CDF=round(CDF,6)
print("CDF of Poisson Distribution is:",CDF)
```

```
Enter value of X:5
PMF of Poisson Distribution is: 0.036089
CDF of Poisson Distribution is: 0.090224
```

In [295]:

```
# Q57
n=10
p=0.5
X=(int)(input("Enter value of X:"))
X1=range(0,X)
if X<=10:
    PMF=m.comb(n,X)*(p**X)*((1-p)**(n-X))
    print("PMF of Biomial is:",PMF)
    for i in range(len(X1)):
        CDF=np.sum(m.comb(n,i)*(p**i)*((1-p)**(n-i)))

else:
    print("Invalid X, PMF cannot be computed")

print("CDF of Binomial is:",CDF)
```

```
Enter value of X:5
PMF of Biomial is: 0.24609375
CDF of Binomial is: 0.205078125
```

In [298]:

```
# Q58
p=0.5
X=(int)(input("Enter the value of X:"))

if X>=0:
    PMF=((1-p)**(X-1))*p
    CDF=1-((1-p)**X)
else:
    PMF=((1-p)**X)*p
    CDF=1-((1-p)**X+1)
print("PMF of Geometric Distribution is:",PMF)
print("CDF of Geometric Distribution is:",CDF)
```

```
Enter the value of X:5
PMF of Geometric Distribution is: 0.03125
CDF of Geometric Distribution is: 0.96875
```

In [314]:

```
# Q59
f=[10,20,40,21,9]
X=[1,2,3,4,5]
Sum=np.sum(f)
Mean=0
for i in range(len(f)):
    for j in range(len(X)):
        Mean=np.sum(f[i]*X[j])/Sum
print("Mean of the given data is:",Mean)

l=3   # Lower limit of median Class
h=1   # Width of Median Class
f=40  # Respective Frequency
CF=60 # Cumulative Frequency
N=Sum   # N

Median=l+(h*((N/2)-CF)/f)
print("Median of the data is:",Median)

h=1
Xk=2 #lower limit of class
fk=40 # Frequency of modal class
fl=20 # Lower frequency of resp. class
fu=21 # Upper frequency of resp. class

Mode=Xk+h*((fk-fl)/(2*fk -fl-fu))
Mode=round(Mode,6)
print("Mode of given data is: ",Mode)


```

```
Mean of the given data is: 0.45
Median of the data is: 2.75
Mode of given data is:  2.512821
```

In [322]:

```
f=[10,20,40,21,9]
X=[1,2,3,4,5]
Var=0
for k in range(len(f)):
    for l in range(len(X)):
        Var=np.sum(f[k]*((X[l]-Mean)**2))/5
Var=round(Var,6)
print("Variance of given data is: ",Var)

SD=np.sqrt(Var)

Coef=SD/Mean
Coef=round(Coef,6)
print("Coefficient of Variance is:",Coef)
```

```
Variance of given data is:  37.2645
Coefficient of Variance is: 13.565479
```

In [326]:

```
# Q60
Data1=[30.1,23.5,27.9,13.4,15.8,14.9,32.4,35.2,29.1,20.1]

Mean=S.mean(Data1)
Mean=round(Mean,6)
Var=S.variance(Data1)
Var=round(Var,6)
SD=np.sqrt(Var)
Coeff=SD/Mean
Coeff=round(Coeff,6)
print("Summary of given data is: Mean:",Mean,", Variance:",Var,", Coefficient of Variance:",Coeff)
```

```
Summary of given data is: Mean: 24.24 , Variance: 61.302667 , Coefficient of Variance: 0.323003
```

In [332]:

```python
# Q61
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
X=[3,5,6,7,10,11,4,12,13,14]
Y=[8,12,11,14,16,17,10,18,20,21]

Xmean=np.mean(X)
Ymean=np.mean(Y)
for i in range(len(X)):
    for j in range(len(Y)):
        B1_1=np.sum((X[i]-Xmean)*(Y[j]-Ymean))
        B1_2=np.sum(X[i]-Xmean)**2
B1=B1_1/B1_2

B0=Ymean-(B1*Xmean)
B0=round(B0,6)
print("Linear Regression is:",B0)
```

```
Linear Regression is: 4.963636
```

In [339]:

```python
# Q63
Data2=[26.86,33.33,55.82,10.61,51.93,75.94,61.67,15.01,49.17,76.78]
temp=0
for i in range(0,len(Data2)):
    for j in range(i+1,len(Data2)):
        if(Data2[i]>Data2[j]):
            temp=Data2[i]
            Data2[i]=Data2[j]
            Data2[j]=temp
Me=np.median(Data2)
print("Ascending order of Data is:",Data2)
print("Median of data is:",Me)
```

```
Ascending order of Data is: [10.61, 15.01, 26.86, 33.33, 49.17, 51.93, 55.82, 61.67, 75.94, 76.78]
Median of data is: 50.55
```

In [340]:

```python
# Q64 (Descending)

Data3=[18.11,95.34,81.31,36.66,10.15,71.81,3.16,66.73,49.03,79.94]
temp=0

for i in range(0,len(Data3)):
    for j in range(i+1,len(Data3)):
        if(Data3[i]<Data3[j]):
            temp=Data3[j]
            Data3[j]=Data3[i]
            Data3[i]=temp
Me=np.median(Data3)
print("Descending order of Data is:",Data3)
print("Median of the data is",Me)
```

```
Descending order of Data is: [95.34, 81.31, 79.94, 71.81, 66.73, 49.03, 36.66, 18.11, 10.15, 3.16]
Median of the data is 57.88
```