Aim:

Write a C program to compute the mean, variance, Standard Deviation, and sorting of **n** elements in a single-dimension array using functions.

Source Code:

MeanVariance.c

```
#include <stdio.h>
#include <math.h>
void calculateMean(int [], int);
float calculateVariance(int [], int);
float calculateStandardDeviation(int [], int);
void calculateSort(int [], int);
void main() {
   int arr[20], number;
   float variance = 0, standardDeviation = 0;
   printf("Enter size of the array : ");
   scanf("%d", &number);
   printf("Enter array elements : ");
   for (int i = 0; i < number; i++) {
      scanf("%d", &arr[i]);
   }
   calculateMean(arr, number);
   variance = calculateVariance(arr, number);
   printf("The variance of elements of the array : %f\n", variance);
   standardDeviation = calculateStandardDeviation(arr, number);
   printf("The Standard Deviation of elements of the array : %f\n", standardDeviatio
n);
   calculateSort(arr, number);
   printf("The elements in array after sorting :");
   for (int i = 0; i < number; i++) {
      printf(" %d", arr[i]);
   }
   printf("\n");
}

//Write your code here...
void calculateMean(int arr[],int n){
   int i=0,sum=0;
   for(i=0;i<n;i++){
      sum+=*(arr+i);
   }
   printf("The mean of elements of the array : %.6f\n",(float)sum/n);
      }
//############
float calculateVariance(int arr[],int n){
   int i=0,sum=0;
   float mean,total;
   total=0;
   for(i=0;i<n;i++){
      sum+=*(arr+i);
   }
```

```
    mean=(float)sum/n;
    for(i=0;i<n;i++){
       total+=(*(arr+i)-mean)*(*(arr+i)-mean);
    }
    total= (float)total/n;
    return total;
}
float calculateStandardDeviation(int arr[], int n){
    float var=0;
    float stddeviation;
    var=calculateVariance(arr,n);
    stddeviation=sqrt(var);
    return stddeviation;
}
void calculateSort(int arr[],int n){
    int i,j;
    int c;
    for(i=0;i<n;i++){
       for(j=0;j<n;j++){
          if(arr[i]<arr[j]){
             c=arr[i];
             arr[i]=arr[j];
             arr[j]=c;
          }
       }
    }
}
```

Execution Results - All test cases have succeeded!

Test Case - 1
User Output
Enter size of the array : 5
Enter array elements : 2 4 6 8 0
The mean of elements of the array : 4.000000
The variance of elements of the array : 8.000000
The Standard Deviation of elements of the array : 2.828427
The elements in array after sorting : 0 2 4 6 8

Test Case - 2
User Output
Enter size of the array : 6
Enter array elements : 3 5 7 2 6 8
The mean of elements of the array : 5.166667
The variance of elements of the array : 4.472222
The Standard Deviation of elements of the array : 2.114763
The elements in array after sorting : 2 3 5 6 7 8