Question: Write a program to calculate the mean and standard deviation of a sample of n real numbers.

1. Plan.txt

   Program will have:

   1. Main method

   2. Mean function - to calculate mean.

   3. Standard deviation function - to calculate standard deviation.

   Assume that number of data is 10.

   Task, Time

   Main Method, 15

   Mean Function, 10

   Standard Function, 15

   Error Fixing, 20

   Testing, 20

   Updating, 25

2. Task.log

Timestamp	Activity	Status	Duration
24-09-2020-16:37	Coding	Writing Main Method	5
24-09-2020-16:42	Coding	Writing Mean Function	4
24-09-2020-16:46	Coding	Writing Standard Deviation Function	8
24-09-2020-16:55	Coding	Error Fixing	13
24-09-2020-17:09	Coding	Testing	6
29-09-2020-16:07	Coding	Updating	33

3. Defect.log

Timestamp	Activity	Status
24-09-2020-16:37	Coding	"s2 undeclared"
24-09-2020-16:42	Coding	"Input dataSet error"

4. Lab1.c

```c
#include <stdio.h>
#include <assert.h>
#include <math.h>
float CalculateMean(int dataSet[], int frequency)
{
    float sum = 0;
    for(int i = 0; i < frequency; i++)
        sum += dataSet[i];
    return sum / frequency;
}


float CalculateSD(int dataSet[], int frequency, float mean)
{
    float sum = 0;
    for(int i = 0; i < frequency; i++)
        sum += pow((dataSet[i] - mean),2);
    return sqrt(sum/frequency);
}
void CalculateData(int dataSet[], int dataSetLength, float expectedMean,
float expectedSD)
{
    float mean = CalculateMean(dataSet,dataSetLength);
    float sd = CalculateSD(dataSet,dataSetLength,mean);
    printf("\nMean: %f",mean);
    printf("\nStandard Deviation: %f",sd);
    assert(mean == expectedMean);
    printf("\nMean Function is working properly");
    assert(sd == expectedSD);
    printf("\nStandard Deviation Function is working properly");
}
void main()
{
```

```c
    int dataSet1[10] = {1, 3, 5, 7, 9, 11, 13, 15, 17, 19}, dataSet2[5]
    = {1, 3, 5, 4, 9}, dataSet3[8] = {5, 1, 6, 7, 3, 7, 8, 9},
    dataSetLength;
    float expectedMean, expectedSD;
    printf("For dataSet 1");
    dataSetLength = 10;
    expectedMean = 10;
    expectedSD = sqrt(33);
    CalculateData(dataSet1,dataSetLength,expectedMean,expectedSD);
    printf("\nFor dataSet 2");
    dataSetLength = 5;
    expectedMean = 4.4;
    expectedSD = sqrt(7.04);
    CalculateData(dataSet2,dataSetLength,expectedMean,expectedSD);
    printf("\nFor dataSet 3");
    dataSetLength = 8;
    expectedMean = 5.75;
    expectedSD = sqrt(6.1875);
    CalculateData(dataSet3,dataSetLength,expectedMean,expectedSD);
}
```

5. Output

```
For dataSet 1
Mean: 10.000000
Standard Deviation: 5.744563
Mean Function is working properly
Standard Deviation Function is working properly
For dataSet 2
Mean: 4.400000
Standard Deviation: 2.653300
Mean Function is working properly
Standard Deviation Function is working properly
For dataSet 3
Mean: 5.750000
Standard Deviation: 2.487468
Mean Function is working properly
Standard Deviation Function is working properly
Process returned 48 (0x30)   execution time : 0.078 s
Press any key to continue.
```