**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

1. 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 |

1. Defect.log

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

1. Lab1.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()

{

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);

}

1. Output

