



CS103-Computer Programming 2

Programming Exercise 1

2nd Semester 2023-2024

Write a program that reads data into an array from a file “**input.dat**”. The first value to be read from the file is an integer that represents the number of floating-point values that will be stored in the float array (assume that the array has a maximum of 100 elements). Compute the mean and standard deviation of the array of data, then display on the screen and write into the output file “**output.dat**” the difference between each data value and the mean.

The formula for the standard deviation is $s = \sqrt{\frac{\sum (X - \bar{X})^2}{n - 1}}$ where

- s : sample standard deviation
- Σ : sum of...
- X : data value
- \bar{X} : mean
- n : number of data in sample/array

Sample content of input file “input.dat”:

```
10
20.3 16 12.89 6 8.2 2.5 12.0 14.0 -54.5 37.6
```

The integer value 10 corresponds to the number of elements and the succeeding floating-point values are the actual values that will be stored in the array.

Sample output on the screen and on output file “output.dat”

```
The mean is 7.4990.
The standard deviation is 23.8173.

Table of differences between the data values and mean deviation
Index      Data      Data-Mean
0          20.30      12.80
1          16.00       8.50
2          12.89       5.39
3           6.00      -1.50
4           8.20       0.70
5           2.50      -5.00
6          12.00       4.50
7          14.00       6.50
8         -54.50     -62.00
9          37.60      30.10
```