

## src/functions.cpp

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1 // Title:  functions.cpp
2 // Desc:   Implementation of functions
3 // Name:   An Tran
4
5 #include "functions.h"
6
7 #include <array>
8 #include <cstdlib>
9 #include <ctime>
10 #include <cmath>
11 #include <iostream>
12
13 int getInput(std::array<float, MAX_SIZE>& grades){
14     float gradeEntry;
15     int ndx{0};
16
17     while (ndx < MAX_SIZE){
18         std::cout << "Grade to input (-1 when done): ";
19         std::cin >> gradeEntry;
20         if (gradeEntry == -1){
21             break;
22         };
23         grades[ndx++] = gradeEntry;
24     }
25     return ndx;
26 };
27
28 void randInput(std::array<float, MAX_SIZE>& grades, int& amountToGen){
29     if (amountToGen < 1 || amountToGen > MAX_SIZE) {
30         return;
31     };
32
33     std::srand(std::time(0));
34     for (int ndx = 0; ndx < amountToGen; ndx++) {
35         grades[ndx] = std::rand() % 100 + 1;
36     };
37 };
38
39 float average(std::array<float, MAX_SIZE>& grades, int& arrayLength){
40     float sum = 0.0;
41     for (int ndx = 0; ndx < arrayLength; ndx++) {
42         sum += grades[ndx];
43     };
44     return sum / arrayLength;
45 };
46
47 void maxAndMin(std::array<float, MAX_SIZE>& grades, int& arrayLength, float& max,
48 float& min){
49     max = grades[0];
50     min = grades[0];
51     for (int ndx = 1; ndx < arrayLength; ndx++) {
52         if (grades[ndx] > max){
53             max = grades[ndx];
54         }
55         if (grades[ndx] < min){
56             min = grades[ndx];
57         }
58     }
59 }
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53     }
54     if (grades[ndx] < min){
55         min = grades[ndx];
56     }
57 };
58 };
59
60 float standardDev(std::array<float, MAX_SIZE>& grades, int& arrayLength){
61     float mean = average(grades, arrayLength);
62     float sum = 0.0;
63     for (int ndx = 0; ndx < arrayLength; ndx++) {
64         sum += std::pow(grades[ndx] - mean, 2);
65     };
66     return std::sqrt(sum / static_cast<float>(arrayLength - 1));
67 };
68
69 void display(std::array<float, MAX_SIZE>& grades, int& arrayLength){
70     std::cout << arrayLength << " grades were entered\n";
71     std::cout << "The values are : \n";
72     for (int ndx = 0; ndx < arrayLength; ndx++) {
73         std::cout << grades[ndx] << " ";
74         if ((ndx + 1) % 5 == 0 || ndx == arrayLength - 1) std::cout << "\n";
75     };
76
77     if (arrayLength % 5 == 0){
78         std::cout << "\n";
79     }
80
81     float avg = average(grades, arrayLength);
82     float max, min;
83     maxAndMin(grades, arrayLength, max, min);
84     float stddev = standardDev(grades, arrayLength);
85
86     std::cout << "The average of the " << arrayLength << " numbers is : " << avg << "
87 \n";
88     std::cout << "The minimum number is : " << min << "\n";
89     std::cout << "The maximum number is : " << max << "\n";
90     std::cout << "The standard deviation is : " << stddev << "\n";
91 };
```