

CS1020E: DATA STRUCTURES AND ALGORITHMS I

Lab 7 – Math

(Week 11, starting 24 October 2016)

Problem 1 – Math1

70%

Given an **odd integer** n ($1 \leq n \leq 999\,999$) followed by an integer array $A = \{A_1, A_2, \dots, A_n\}$ where each integer in array A is between $[1 \dots 65\,536]$, output **the only possible integer** B such that the formula:

$$(|A_1 - B| + |A_2 - B| + \dots + |A_n - B|)$$

yields minimum value.

Input1	Output1
3 1 2 3	2

Input2	Output2
9 9 8 6 7 1 5 2 4 3	5

Submission

Your source file should be named math1.cpp

Problem 2 – Math2

30%

Given an integer n ($1 \leq n \leq 1\,000\,000$, now n is not necessarily odd) followed by an integer array $A = \{A_1, A_2, \dots, A_n\}$ where each integer in array A is between $[1 \dots 65\,536]$, output three integers: B C D separated by single space in one line where:

- B is the **minimum integer** such that the formula:

$$(|A_1 - B| + |A_2 - B| + \dots + |A_n - B|)$$

yields minimum value.

- C is the number of integers in the given array A that satisfy the property of minimum integer B above.
- D is the number of integers (not necessarily in the given array A) that satisfy the property of minimum integer B above.

Input1	Output1
3 1 2 3	2 1 1

Input2	Output2
9 9 8 6 7 1 5 2 4 3	5 1 1

Input3	Output3
10 9 8 10 6 7 1 5 2 4 3	5 2 2

Input4	Output4
10 9 8 10 7 7 1 5 2 5 3	5 4 3

Submission

Your source file should be named math2.cpp

- End of Lab 7 -