CMSC-401 Algorithm Analysis with Advanced Data Structures

Homework #2

Lecturer: Hong-Sheng Zhou *Date: April 1, 2016*

Problem 2-1 (Minimal Integral Distance.) 10%

Define the *distance* for a pair of positive integers x and y, as the absolute value $|x - y|$. For example, the distance for 35 and 44 is $|35 - 44| = 9$, and the distance for 1221 and 100 is $|1221 - 100| = 1121$.

Given n distinct positive integers $x_1, x_2, \ldots, x_n$ where $n > 2$. Please write a program that prints two of these numbers, say x_i and x_j, so that the distance for x_i and x_j is the smallest. For example, for positive integers $11, 55, 34, 8$, the pair of numbers $(11, 8)$ have the smallest distance, and your program should output 11 8 or 8 11.

Please take integers from standard input (`System.in`):

- First line of input contains the number of n positive integers, where $2 < n < 1,000,000$.
- Second line of input contains all n positive integers $x_1, x_2, \ldots, x_n$, where $x_i \in \mathbb{N}$ and $0 < x_i \leq 1,000,000,000$ for all $i \in [n]$.

Please print your result to standard output (`System.out`)

- A single output line with two positive integers

Input: `10`

```
6 2 12 14 91 18 5 333 32 41
```

Correct Output:

```
6 5
```

Please upload through Blackboard by April 1, 2016, with a zip archive `2-FamilyName-FirstName.zip` containing Java source code in a file `cmsc401.java` (all low case letters!). The file should have your name in a comment in the first line. Remember: in Java, class name should match the file name, and is case sensitive. Please also make sure your program compiles.