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# Closest Numbers



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Sorting is often useful as the first step in many different tasks. The most common task is to make finding things easier, but there are other uses, as well.

# Challenge

Given a list of unsorted integers,  $A = \{a_1, a_2, \dots, a_N\}$ , can you find the pair of elements that have the smallest absolute difference between them? If there are multiple pairs, find them all.

# **Input Format**

The first line of input contains a single integer, N, representing the length of array A. In the second line, there are N space-separated integers,  $a_1, a_2, \ldots, a_N$ , representing the elements of array A.

# **Output Format**

Output the pairs of elements with the smallest difference. If there are multiple pairs, output all of them in ascending order, all on the same line (consecutively) with just a single space between each pair of numbers. If there's a number which lies in two pair, print it two times (see the sample case #3 for explanation).

#### **Constraints**

- $2 \le N \le 200000$
- $-10^7 \le a_i \le 10^7$
- $a_i \neq a_j$ , where  $1 \leq i < j \leq N$

# Sample Input #1

```
10 -20 -3916237 -357920 -3620601 7374819 -7330761 30 6246457 -6461594 266854
```

## Sample Output #1

-20 30

#### **Explanation**

(30) - (-20) = 50, which is the smallest difference.

# Sample Input #2

```
12
-20 -3916237 -357920 -3620601 7374819 -7330761 30 6246457 -6461594 266854 -520 -470
```

#### Sample Output #2

-520 -470 -20 30

#### **Explanation**

(-470) - (-520) = 30 - (-20) = 50, which is the smallest difference.

#### Sample Input #3

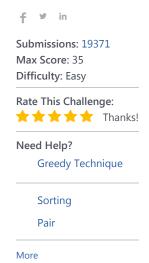
```
4
5 4 3 2
```

## Sample Output #3

```
2 3 3 4 4 5
```

# **Explanation**

Here, the minimum difference will be 1. So valid pairs are (2, 3), (3, 4), and (4, 5). So we have to print 2 once, 3 and 4 twice each, and 5 once.



```
Current Buffer (saved locally, editable) & 🗘
                                                                                          C#
                                                                                                                           Ö
 1 using System;
   using System.Collections.Generic;
 2
 3 using System.IO;
 4 ▼ class Solution {
 5 ₹
        static void Main(String[] args) {
 6
            /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution
 7
 8
 9
             int n = int.Parse(Console.ReadLine());
10
                int[] a = Array.ConvertAll(Console.ReadLine().Split(' '), e => int.Parse(e));
11
12
                Array.Sort(a);
13
14
                int min_dif = int.MaxValue;
15
16
                List<int> pares = new List<int> ();
17
                for (int i = 0; i + 1 < a.Length; i++)
18
                    int dif = Math.Abs(a[i] - a[i + 1]);
19
20
                    if (dif < min_dif)</pre>
21
22 🔻
23
                         min_dif = dif;
24
                         pares = new List<int>();
25
26
                         pares.Add(a[i]);
27
                         pares.Add(a[i+1]);
28
                     else if (dif == min_dif)
29
30 ▼
31
                         pares.Add(a[i]);
```

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