



# THE 2024 ICPC ASIA PACIFIC CHAMPIONSHIP

VNU UNIVERSITY OF ENGINEERING AND TECHNOLOGY

2ND MARCH 2024



## Problem F

### Forming Groups

Time limit: 5 seconds

There are  $n$  students, numbered from 1 to  $n$ , who need to form groups for the upcoming hackathon. You are student 1, the captain of the students. Student  $i$  has *skill level*  $a_i$ .

Students 2 to  $n$  are standing in a line from left to right in order. You can choose to stand in between any two students, to the left of student 2, or to the right of student  $n$ . You cannot change the order of the  $n - 1$  students.

You can also choose the number of groups  $k$  ( $k > 1$  and  $k$  must be a divisor of  $n$ ) to participate in the hackathon. The groups will be numbered from 1 to  $k$ . After you have chosen your position and the value of  $k$ , the students will be grouped as follows:

- The first student from the left will be assigned to group 1.
- The second student from the left will be assigned to group 2.
- ...
- The  $k$ -th student from the left will be assigned to group  $k$ .
- The  $(k + 1)$ -th student from the left will be assigned to group 1.
- The  $(k + 2)$ -th student from the left will be assigned to group 2.
- ...
- The  $n$ -th student from the left will be assigned to group  $k$ .

Formally, for each  $j$  ( $1 \leq j \leq k$ ) and for each  $i$  ( $0 \leq i < n/k$ ), the  $(i \times k + j)$ -th student from the left will be assigned to group  $j$ . It can be shown that each student will be assigned to exactly one group and all the groups have the same number of students.

The *skill level of a group* is the sum of the skill levels of the students inside the group. By choosing where you stand as well as the number of groups  $k$  optimally, you want to minimize the ratio  $x_{\max}/x_{\min}$  where

- $x_{\max}$  is the skill level of the group with the largest skill level, and
- $x_{\min}$  is the skill level of the group with the smallest skill level.

### Input

The first line of input contains one integer  $t$  ( $1 \leq t \leq 100\,000$ ) representing the number of test cases. After that,  $t$  test cases follow. Each of them is presented as follows.

The first line of a test case contains two integers  $n$  and  $a_1$  ( $2 \leq n \leq 10^6$ ;  $1 \leq a_1 \leq 1000$ ). The next line contains  $n - 1$  integers  $a_2, a_3, \dots, a_n$  ( $1 \leq a_i \leq 1000$  for all  $i$ ).

The sum of  $n$  across all test cases in one input file does not exceed  $10^6$ .



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## Output

For each test case, output one line containing two positive integers  $p$  and  $q$  such that the minimum ratio is  $p/q$ . The fraction  $p/q$  should be irreducible. In other words,  $p$  and  $q$  should be coprime.

### Sample Input #1

```
2
4 1
2 1 2
3 10
4 3
```

### Sample Output #1

```
1 1
10 3
```

### *Explanation for the sample input/output #1*

In the first test case, by standing between students 2 and 3 (or between students 3 and 4) and choosing  $k = 2$ , group 1 will have the skill level  $2 + 1$  and group 2 will have the skill level  $1 + 2$ , thus the ratio is  $1/1$ .

In the second test case, the only choice for the value of  $k$  is 3.