C. Robin Hood in Town

time limit per test: 2 seconds
memory limit per test: 256 megabytes

In Sherwood, we judge a man not by his wealth, but by his merit.

Look around, the rich are getting richer, and the poor are getting poorer. We need to take from the rich and give to the poor. We need Robin Hood!

There are n people living in the town. Just now, the wealth of the i-th person was a_i gold. But guess what? The richest person has found an extra pot of gold!

More formally, find an $a_j = max(a_1, a_2, \ldots, a_n)$, change a_j to $a_j + x$, where x is a non-negative integer number of gold found in the pot. If there are multiple maxima, it can be any one of them.

A person is unhappy if their wealth is **strictly less than half** of the average wealth*.

If **strictly more than half** of the total population n are unhappy, Robin Hood will appear by popular demand.

Determine the minimum value of x for Robin Hood to appear, or output -1 if it is impossible.

*The average wealth is defined as the total wealth divided by the total population n, that is, $\frac{\sum a_i}{n}$, the result is a real number.

Input

The first line of input contains one integer t ($1 \le t \le 10^4$) — the number of test cases.

The first line of each test case contains an integer n ($1 \le n \le 2 \cdot 10^5$) — the total population.

The second line of each test case contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^6$) — the wealth of each person.

It is guaranteed that the sum of n across all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output one integer — the minimum number of gold that the richest person must find for Robin Hood to appear. If it is impossible, output -1 instead.

Example

input Copy

```
6
1
2
2
2 19
3
1 3 20
4
1 2 3 4
5
1 2 3 4 5
6
1 2 1 1 1 25
```

output Copy

```
-1
-1
0
15
16
0
```

Note

In the first test case, it is impossible for a single person to be unhappy.

In the second test case, there is always 1 happy person (the richest).

In the third test case, no additional gold are required, so the answer is 0.

In the fourth test case, after adding 15 gold, the average wealth becomes $\frac{25}{4}$, and half of this average is $\frac{25}{8}$, resulting in 3 people being unhappy.

In the fifth test case, after adding 16 gold, the average wealth becomes $\frac{31}{5}$, resulting in 3 people being unhappy.