Kitchen Knives

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

Little MS has a collection of n knives, and the i-th knife has a cutting power of a_i. She needs to cut a giant cake into pieces, but she can't decide which knives to choose from her collection for this very important job.

After some time, Little MS decided that she will choose a non-empty subset of knives uniformly at random (so every subset has a chance of $\frac{1}{2^n-1}$ to be chosen). Then she will use all the chosen knives in any order; a knife with cutting power of x will cut every current slice into x smaller ones. In the end, Little MS will end up with $a_{i_1} \cdot \ldots \cdot a_{i_k}$ slices, where $i_1, \ldots, i_k$ are the indices of the chosen knives.

Help Little MS determine if there is a number s such that the probability of Little MS ending up with exactly s slices of cake is **strictly greater** than 50%.

Input

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

The first line of each test case contains a single integer n ($2 \le n \le 2 \cdot 10^5$) — the number of knives.

The second line of each test case contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^9$), where a_i is the cutting power of the i-th knife.

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

Output

For each test case, output -1 if there is no suitable number s.

Otherwise, output a number s such that the probability that Little MS ends up with exactly s cake slices is strictly greater than 50%.

Example

standard input	standard output
4 2 2 3 2 100 100 3 2 2 2 4 1 1 1 1	-1 100 -1 1

Note

In the first test case, the possible products over all non-empty subsets of knives are 2, 3, and 6. Each of them appears once, so none of them is obtained with a probability strictly greater than 50%. Therefore, the answer is -1.

In the second test case, the possible products over all non-empty subsets of knives are 100, 100, and 10000. The product 100 appears in 2 out of 3 cases, so its probability is strictly greater than 50%. Therefore, the answer is 100.

In the third test case, the possible products over all non-empty subsets of knives are 2, 2, 2, 4, 4, 4, and 8. No product appears more than half of the time, so the answer is -1.