Problem D. Data Determination

Time limit: 2 seconds
Memory limit: 1024 megabytes

There was once a very serious scientist who decided to answer once and for all the Ultimate Question of Life, the Universe, and Everything. He began with theoretical considerations and ultimately concluded that the answer is a positive integer and equals m. However, these considerations were based on many uncertain assumptions regarding life, the universe, and everything. Theoretical considerations should be supported with experimental evidence!

The scientist designed a special experiment, burdened with various measurement errors. He conducted it n times, and the result of the i-th experiment is the number a_i. In his scientific work, he plans to include data from exactly k experiments, and their median[2] must be exactly m to confirm his theory.

Verify if he can achieve his goal. Write a program that, given the results of all n experiments, determines whether it is possible to select k of them in such a way that the median of their results is exactly m.

Input

The first line of the input contains a single integer t ($1 \le t \le 10\,000$), which represents the number of independent scenarios to consider. Each scenario is described in two lines.

In the first line of each scenario, there are three integers n, k and m ($1 \le k \le n \le 200\,000$, $1 \le m \le 10^9$), representing the number of conducted experiments, the number of experiments required for scientific work, and the desired median, respectively. The second line contains n integers $a_1, \ldots, a_n$ ($1 \le a_i \le 10^9$), representing the results of the experiments.

The sum of values n in all test cases does not exceed 200 000.

Output

The output should consist of t lines, containing answers for each scenario. In the i-th line, there should be one word `TAK` if it is possible to select the appropriate k experiments in the i-th scenario, or one word `NIE` otherwise.

Example

standard input	standard output
3 6 4 42 41 43 41 57 41 42 4 2 4 1 2 5 8 7 5 57 101 2 42 5 57 7 13	TAK NIE NIE

Note

In the first scenario, you can select experiments with results $(41, 43, 41, 57)$; after sorting, you get the sequence $(41, 41, 43, 57)$, where the arithmetic mean of the two middle elements is $\frac{43+41}{2} = 42$.

In the second scenario, it is not possible to select a pair of elements with a median of 4. For example:

- The sequence $(2, 5)$ has a median of $\frac{2+5}{2} = 3.5$, which is too low.
- On the other hand, the sequence $(1, 8)$ has a median of $\frac{1+8}{2} = 4.5$, which is too high.

[2]The *median* of a sequence is the middle element when sorted. If the length of the sequence is even, it is the arithmetic mean of the two middle elements. For example, the median of the sequence $(9, 7, 3, 4, 5)$ is 5, and the median of the sequence $(3, 1, 6, 6)$ is $\frac{3+6}{2} = 4.5$.