Problem

Chef gives an array A with N elements to Babla. Babla's task is to find the **maximum non-negative** integer X such that:

- No element in the array belongs to the range $[-X, X]$. In other words, for all $(1 \leq i \leq N)$, either $A_i < -X$ or $A_i > X$.

Help Babla to find the **maximum non-negative** integer X for which the given condition is satisfied or determine if no such X exists.

Input Format

- The first line of input will contain a single integer T, denoting the number of test cases.
- Each test case consists of multiple lines of input.
  - The first line of each test case contains an integer N — the number of elements in the array.
  - The second line of each test case contains N space-separated integers $A_1, A_2, \ldots, A_N$ representing the array A.

Output Format

For each test case, output on a new line, the **maximum non-negative** integer X, satisfying the above condition.
If no such X exists, output -1 instead.

Constraints

- $1 \leq T \leq 10^5$
- $1 \leq N \leq 10^5$
- $-10^9 \leq A_i \leq 10^9$
- Sum of N over all test cases does not exceed $2 \cdot 10^5$.

Sample 1:

Input	Output
3 5 8 4 2 5 2 6 7 9 -10 8 12 17 4 0 -3 -1 -10	1 6 -1

Explanation:

Test case 1: The maximum value of X such that no element of the array belongs to the range $[-X, X]$ is 1. All elements of the array are strictly greater than 1.

Test case 2: The maximum value of X such that no element of the array belongs to the range $[-X, X]$ is 6. All positive elements of the array are strictly greater than 6 and negative elements are strictly less than -6.

Test case 3: It is not possible to choose an element X that satisfies the given condition.

More Info

Contributors