

Problem F Competition

Time limit: 2 seconds
Memory limit: 2048 megabytes

Problem Description

As the chief judge of a local competition, you oversee n teams. The i -th team has a designated strength a_i .

The competition consists of $n - 1$ games, pitting two remaining teams against each other in each round. The team with the lower strength value loses and is eliminated. However, post each game, the strength of the winning team decreases by a constant k . After all $n - 1$ games, only one team remains—the champion.

It's crucial to note that a team's strength can be positive, negative, or zero after several rounds. Additionally, in cases where two teams possess equal strength at the start of a game, you can decide either team to be the winner.

The objective is to determine if it is possible for each team to be the champion, given the flexibility to decide which two teams to play in each game.

Input Format

The first line of the input contains an integer t denoting the number of testcases.

Each testcase consists of two lines. The first line of each testcase contains two integers n and k . The second line of each testcase contains n space-separated integers a_1, a_2, \dots, a_n , where a_i denotes the strength of the i -th team before the competition.

Output Format

For each testcase, output a binary string of length n , where the i -th character denotes whether the i -th team can be the champion. The i -th character should be 1 if the i -th team has the potential to win, and 0 otherwise.

Technical Specification

- $1 \leq t \leq 10^5$
- $2 \leq n \leq 2 \times 10^5$ for each testcase
- $1 \leq k \leq 10^9$ for each testcase
- $1 \leq a_i \leq 10^9$ for $i = 1, 2, \dots, n$ in each testcase
- It is guaranteed that the sum of n across all test cases does not exceed 2×10^5 .

Scoring

1. (2 points) $2 \leq n \leq 4$ for each testcase.
2. (6 points) $2 \leq n \leq 100$ for each testcase.
3. (2 points) No additional constraints.

Sample Input 1

```
5
5 2
3 10 7 13 14
9 6
40 54 73 15 76 71 70 53 39
9 1000000000
1 1 1 1 1 1 1 1 1
5 10
5 20 20 25 25
3 1
1000000000 1 2
```

Sample Output 1

```
01011
111011110
111111111
11111
100
```