Problem 3: Blowhole Blues
7+4 Points

Problem ID: `blowholes`
Rank: 2+3

Introduction

Switching from computer science to learning marine biology has been the best choice of your life. You've recently been placed in charge of the Bay Area's newest and trendiest traveling whale show, and your first act is next week! However, your most ambitious display—the Blowhole Blast Bonanza—is in desperate need of work. Your whales need to synchronize the heights of their blowhole streams, but ever since you've dissolved their labor union and slashed their healthcare packages, they've been hopelessly disorganized. The first show is fast approaching, so you've begrudgingly decided to accept imperfection for the sake of time. Hopefully the audience won't notice...

Problem Statement

Your task is to output the smallest number of adjustments needed to ensure all $\mathbf{N}$ stream heights $\mathbf{S_1}$, $\mathbf{S_2}$, $\mathbf{...}$, $\mathbf{S_N}$ are within a given range $\mathbf{K}$ of each other.

- An adjustment is defined as setting the height of a whale's blowhole stream to any other height. The size of the adjustment is not relevant.
- Your adjustments need to satisfy the requirement that no two whales have blowhole stream heights more than $\mathbf{K}$ feet apart. In other words, all whales' blowhole stream heights should be within $\mathbf{K}$ feet of each other.

Input Format

The first line of the input contains a positive integer $\mathbf{T}$ denoting the number of test cases that follow. For each test case:

- The first line consists of two space-separated values $\mathbf{N}$ $\mathbf{K}$ where:
  - The positive integer $\mathbf{N}$ denotes the number of whales in your show.
  - The non-negative integer $\mathbf{K}$ denotes the maximum height difference you'll accept between any two whales, in feet.
- The second line contains a space-separated sequence of $\mathbf{N}$ non-negative integers $\mathbf{S_1}$, $\mathbf{S_2}$, **...** , $\mathbf{S_N}$, denoting that whale i has a blowhole stream $\mathbf{S_i}$ feet tall.
- A blank line follows to separate individual test cases.

Output Format

For each test case, your program should output an integer denoting the minimum number of adjustments needed to satisfy the given criteria.

Problem Constraints

$T \le \mathbf{T} \le 100$
$0 \le \mathbf{K}, \mathbf{S_{1..n}} \le 10^9$

Main Test Set

$1 \le \mathbf{N} \le 10^3$
The sum of $\mathbf{N}$ across all test cases in an input does not exceed 10^3.

Bonus Test Set

$1 \le \mathbf{N} \le 10^5$
The sum of $\mathbf{N}$ across all test cases in an input does not exceed 10^5.

Sample Test Case

Sample Input:

```
4
3 1
3 1 4

3 0
3 1 4

6 67
68 69 70 221 253 255

7 67
68 69 70 219 221 253 255
```

Sample Output:

```
1
2
3
3
```

Sample Explanations:

For Test Case #1:
In order to have all blowhole stream heights be within 1 foot of each other, you could adjust whale 2's blowhole stream to be either 3 or 4 feet tall.

For Test Case #4:
In order to have all blowhole stream heights be within 67 feet of each other, you could adjust whales 1, 2, and 3's blowhole streams to be within range of whales 4, 5, 6, and 7's streams. One such adjustment could be assigning whales 1, 2, and 3 all stream heights of 230 feet.