Problem 6: Social Distancing

(Medium)

(Adapted from the Australian Informatics Olympiad 2021, Problem 4)

The hippopotami of North Yorkshire are hosting their annual Grand Banquet tonight!

The banquet is an ancient tradition and is hosted by the hippo mayor on the main street of North Yorkshire. In a normal year, the mayor invites all N hippos to the event, and each of them is provided with a meal consisting of a mouth-watering main course followed by an enormous dessert. The head chef prepares the N meals, the ith of which is placed D_i metres along the street for a hippo to eat.

However, due to social distancing requirements, each hippo is required to stay at least K metres away from every other hippo at all times. This means that the ith and jth meals cannot both be eaten if they are strictly less than K metres away from each other. If they are exactly K or more metres away from each other, then they can both be eaten.

The mayor wishes to invite as many hippos as possible, while still obeying the social distancing requirements. As the head informatician for the hippos, the mayor has turned to you for help. What is the maximum number of hippos that can be invited?

Input Format

- The first line of input contains the two integers N and K.
- The next N lines each contain one integer. The ith of these is D_i, the location of the ith meal.

Constraints

- $2 \leq N \leq 10^5$
- $1 \leq K \leq 10^9$
- $1 \leq D_i \leq 10^9$ for all $i = 1, 2, \ldots, N$

The time limit for this problem is 2 seconds.

Output Format

Your program should output a single integer, the maximum number of hippos that can be invited.

Sample Input 1

```
3 1
3
2
3
```

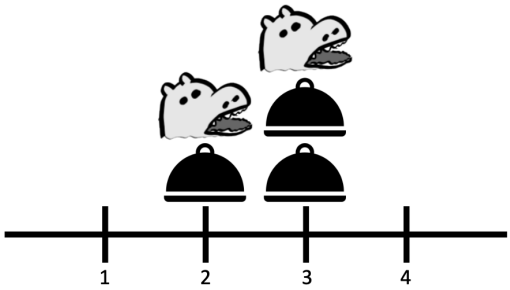
Sample Output 1

```
2
```

Explanation 1

Each of the samples shown contains one possible solution. The dishes represent the meals, and hippos are shown above the meals which can be eaten.

In the first sample input, there are 2 meals with $D_i = 3$, but only one hippo can be invited to eat them due to social distancing requirements. Another hippo can be invited to eat the meal at $D_i = 2$ because they are $K = 1$ metres away from the other hippo.



Sample Input 2

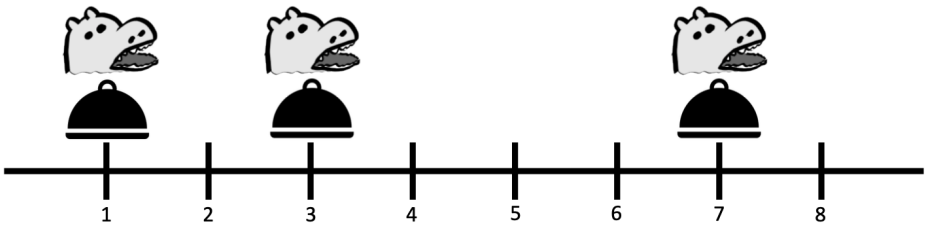
```
3 2
1
3
7
```

Sample Output 2

```
3
```

Explanation 2

In the second sample input, the hippos are all far away enough that they can all be invited to eat all the 3 meals.



Sample Input 3

```
5 4
3
5
1
12
10
```

Sample Output 3

```
3
```

Explanation 3

The following is one possible solution for the third sample input. There is at least one more solution that also achieves the maximum number of hippos that can be invited.