CMPUT 274 - Tangible Computing
Morning Problem: Bakery

Description

Alice and Bob have opened a bakery! They have n different recipes, with each one baking at a slightly different temperature. The oven they are using is quite special and can fit m items and be set to any temperature instantly! To top it off it takes only 1 unit of time to bake any amount of goods in the oven.

Alice and Bob want to make all n recipes in as little time as possible, thankfully baked goods can be cooked at slightly different temperatures than recommended and still come out perfect. This means each item can be baked at most k degrees hotter/colder than their base baking temperature (for further elaboration look at the samples).

Can you develop an algorithm that will minimize the amount of time it takes to bake n goods given an allowed temperature difference of k and an oven that can fit m items?

Input

The first line of input contains three space seperated integers, $1 \leq n \leq 100,000$, $1 \leq m \leq 100$ and $0 \leq k \leq 1,000$, the amount of recipes, the amount of items the oven can fit and the temperature tolerance respectively.

The next line of input contains n space seperated integers, $1 \leq t_i \leq 200,000$ indicating the temperature that the i-th item should be idealy baked at.

Output

Output a single integer, that is the minimal amount of time it should take to bake all n items.

Sample Input 1

```
3 3 5
150 160 154
```

Sample Output 1

```
1
```

Explanation

We can fit 3 items in the oven at a time, if we set the oven to 155 we can bake any items that require a temperature in the range [155-k, 155+k] that is [155-5, 155+5], so we can bake any goods that can be cooked at a temperature in the range [150, 160]. Since all three items are in the aformentioned range we can bake them all at the same time, taking 1 unit of time to do.

Sample Input 2

```
4 3 7
154 150 161 160
```

Sample Output 2

```
2
```

Explanation

We can fit 3 items in the oven at a time, if we set the oven to 156 we can bake any items that require a temperature in the range [156-k, 156+k] that is [156-7, 156+7], so we can bake any goods that can be cooked at a temperature in the range [149, 163]. Since all four items are in the aformentioned range we can bake 3 of them in the first unit of time and the remaining 1 in the second unit of time.

Note, another valid way to bake these goods optimally is by first setting the oven to 147 and baking two goods of temperature 150 and 154 followed by setting the oven to 167 and baking the remaining 2 goods still resulting in 2 units of time.