D. Bear and Polynomials

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Limak is a little polar bear. He doesn't have many toys and thus he often plays with polynomials.

He considers a polynomial *valid* if its degree is n and its coefficients are integers not exceeding k by the absolute value. More formally:

Let $a_0, a_1, ..., a_n$ denote the coefficients, so . Then, a polynomial $P(x)$ is valid if all the following conditions are satisfied:

- a_i is integer for every i;
- $|a_i| \leq k$ for every i;
- $a_n \neq 0$.

Limak has recently got a valid polynomial P with coefficients $a_0, a_1, a_2, ..., a_n$. He noticed that $P(2) \neq 0$ and he wants to change it. He is going to change one coefficient to get a **valid** polynomial Q of degree n that $Q(2) = 0$. Count the number of ways to do so. You should count two ways as a distinct if coefficients of target polynoms differ.

Input

The first line contains two integers n and k ($1 \leq n \leq 200\,000$, $1 \leq k \leq 10^9$) — the degree of the polynomial and the limit for absolute values of coefficients.

The second line contains $n + 1$ integers $a_0, a_1, ..., a_n$ ($|a_i| \leq k$, $a_n \neq 0$) — describing a **valid** polynomial . It's guaranteed that $P(2) \neq 0$.

Output

Print the number of ways to change one coefficient to get a valid polynomial Q that $Q(2) = 0$.

Examples

input

```
3 1000000000
10 -9 -3 5
```

output

```
3
```

input

```
3 12
10 -9 -3 5
```

output

```
2
```

input

```
2 20
14 -7 19
```

output

```
0
```

Note

In the first sample, we are given a polynomial $P(x) = 10 - 9x - 3x^2 + 5x^3$.

Limak can change one coefficient in three ways:

1. He can set $a_0 = -10$. Then he would get $Q(x) = -10 - 9x - 3x^2 + 5x^3$ and indeed $Q(2) = -10 - 18 - 12 + 40 = 0$.
2. Or he can set $a_2 = -8$. Then $Q(x) = 10 - 9x - 8x^2 + 5x^3$ and indeed $Q(2) = 10 - 18 - 32 + 40 = 0$.
3. Or he can set $a_1 = -19$. Then $Q(x) = 10 - 19x - 3x^2 + 5x^3$ and indeed $Q(2) = 10 - 38 - 12 + 40 = 0$.

In the second sample, we are given the same polynomial. This time though, k is equal to 12 instead of 10^9. Two first of ways listed above are still valid but in the third way we would get $|a_1| > k$ what is not allowed. Thus, the answer is 2 this time.