Burrows-Wheeler Transform

Programming Challenge

Eddie Li (grc4rz), Luke Del Giudice (wcc5ub), Siddharth Premjith (rqf8pe)
University of Virginia

Problem Statement

Alice and Bob have been sending messages to each other for a while. The messages they send are arrays of positive integers, with the last value always being -1 to indicate the end of the message. But recently, Alice suspected that her parents might have been reading her messages with Bob, and because they are very secretive of what they are sending to each other, they have decided to use the Burrow Wheeler Transform (BWT) algorithm to alter their messages! Specifically, Alice took her original message of the array of numbers, applied BWT on it, and sent the transformed string to Bob. And because Bob also knows BWT, he can easily find the original message from Alice without her nosey parents being able to understand!

However, one day, when Bob went to check Alice's message, his phone glitched, and replaced one of the numbers with a 0 (it is guaranteed to not be the -1). Bob doesn't want to lose any aura by asking Alice to resend her message, so he wants to see what are possible numbers that the 0 could have been. Specifically, if Bob were to replace the 0 with a positive number, is there an input array of numbers that can go through the BWT algorithm and get that output array? Help Bob solve this problem and not lose any aura!

Input

The first line of the input contains two integers n ($2 \leq n \leq 1000$) and k ($1 \leq k \leq 10^9$).

The next line contains n integers $a_1, a_2, ..., a_n$. $-1 \leq a_i \leq k$ - the transformed BWT array. It is guaranteed that -1 and 0 both appear exactly once in the array.

Output

Print a single integer - the number of possible numbers that can replace the 0 in the BWT-transformed message such that there is a valid message that maps to it.

Sample

Sample Input

4 4

1 0 -1 3

Sample Output

1

Sample Explanation

In this case, we can only replace the 0 with 4. The array that would have been sent to Bob is $[3, 4, 1, -1]$. It can be shown that no other number can replace the 0 and have an array transform to it using the BWT algorithm.