Problem A. General Symmetry

Time limit: 2 seconds
Memory limit: 256 megabytes

Let $S = [s_1, s_2, \ldots, s_m]$ be a sequence consisting of m integers. Such a sequence S is called k-symmetric if and only if $|s_i - s_{m-i+1}| \le k$ for all integers i ($1 \le i \le m$).

You will be given a sequence $A = [a_1, a_2, \ldots, a_n]$ of length n. Your task is to find the length of the longest k-symmetric consecutive subsequence of A centered on each place. Assume that the index range of the corresponding consecutive subsequence is $[l, r]$, it is centered on $\frac{l+r}{2}$.

Input

The first line of the input contains two integers n and k ($2 \le n \le 2 \times 10^5$, $0 \le k \le 10^3$), denoting the length of sequence A and the parameter k.

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^3$), denoting the sequence A.

Output

Print n integers in the first line, the i-th integer ($1 \le i \le n$) denoting the length of the longest k-symmetric consecutive subsequence of A centered on i.

Print $n - 1$ integers in the second line, the i-th integer ($1 \le i < n$) denoting the length of the longest k-symmetric consecutive subsequence of A centered on $(i + 0.5)$.

Note that when there is no finding for a fixed center, please print "0" instead.

Examples

standard input	standard output
5 0 1 2 1 2 1	1 3 5 3 1 0 0 0 0
5 1 1 2 1 3 1	1 3 5 3 1 2 2 0 0