# 1386 Cellular Automaton

A *cellular automaton* is a collection of cells on a grid of specified shape that evolves through a number of discrete time steps according to a set of rules that describe the new state of a cell based on the states of neighboring cells. The *order of the cellular automaton* is the number of cells it contains. Cells of the automaton of order $n$ are numbered from 1 to $n$.

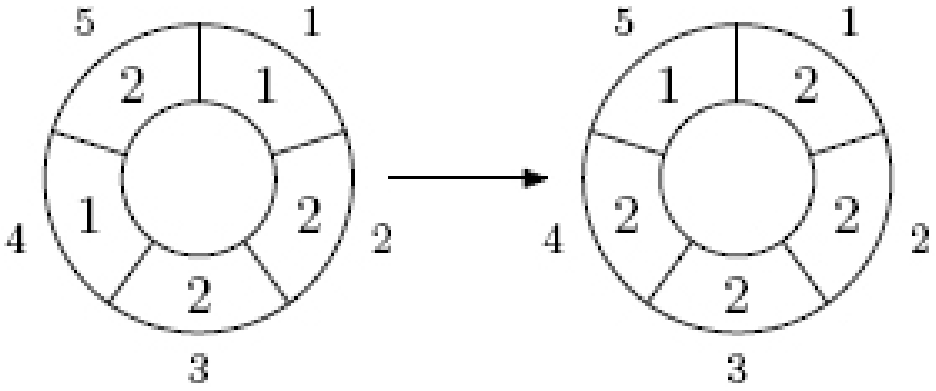
The *order of the cell* is the number of different values it may contain. Usually, values of a cell of order $m$ are considered to be integer numbers from 0 to $m-1$.

One of the most fundamental properties of a cellular automaton is the type of grid on which it is computed. In this problem we examine the special kind of cellular automaton — circular cellular automaton of order $n$ with cells of order $m$. We will denote such kind of cellular automaton as $n, m-$ *automaton*.

A distance between cells $i$ and $j$ in $n, m$-automaton is defined as $\min(|i-j|, n-|i-j|)$. A *d-environment of a cell* is the set of cells at a distance not greater than $d$.

On each *d-step* values of all cells are simultaneously replaced by new values. The new value of cell $i$ after $d$-step is computed as a sum of values of cells belonging to the $d$-enviroment of the cell $i$ modulo $m$.

The following picture shows 1-step of the 5,3-automaton.




The problem is to calculate the state of the $n, m$-automaton after $k$ $d$-steps.

## Input

The input file contains several test cases, each of them consists of two lines, as described below.

The first line of the input contains four integer numbers $n$, $m$, $d$, and $k$ ($1 \le n \le 500$, $1 \le m \le 1000000$, $0 \le d < \frac{n}{2}$ , $1 \le k \le 10000000$). The second line contains $n$ integer numbers from 0 to $m-1$ — initial values of the automaton's cells.

## Output

For each test case, write to the output, on a line by itself, the values of the $n, m$-automaton's cells after $k$ $d$-steps.

## Sample Input

```
5 3 1 1
1 2 2 1 2
5 3 1 10
1 2 2 1 2
```

## Sample Output

```
2 2 2 2 1
2 0 0 2 2
```