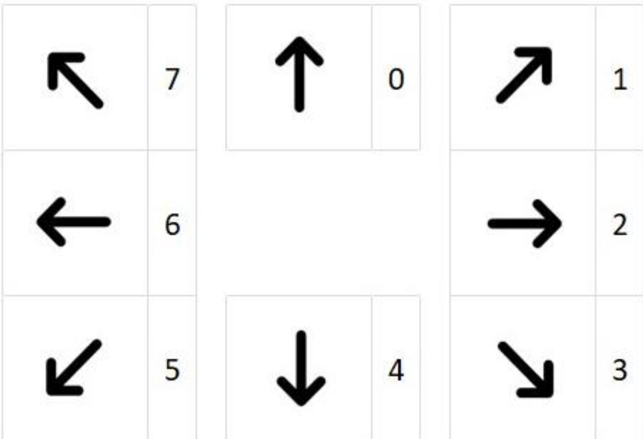
FlowField

SEASON 9 – SECOND ROUND

The physics faculty needs a simulation with the following parameters:

There is a discrete two dimensional space (grid with cells) with C columns and R rows. Initially, in every cell a single particle is placed, as well as a one of eight possible vectors (described later). The time is discrete too, separated in simulation steps. Every step, every particle on the grid goes to one of the eight **neighbour** cells (or falls out of the grid and disappears), depending on the vector in that cell. For example, if a particle is in cell (3;3) and there is a vector of type 1 (1;-1), in the next simulation step the particle will be in cell (4;2). Write a program that will compute how many particles there are in every cell of the grid after *S* simulation steps.



Each of the eight possible vectors has a digit (type) associated with it. The direction of the arrow shows in which **neighbour** cell a particle following that vector will go.

For exmaple, a vector of type 3 would make a particle go from (c;r) to (c+1;r+1).

Input

From the first line of the file `flowfield.in` three integers are entered - *C*, *R* and *S*

On each of the next *R* lines there are *C* digits (0 to 7) - the vectors in every cell of the grid.

Output

In the file `flowfield.out` output the number of particles in every cell of the grid after *S* simulations. **There are spaces between the digits.**

Constraints

$2 \leq R, C \leq 100$

$1 \leq S \leq 10^{17}$

Time limit: 0.3 seconds
Memory limit: 256 MB

Example

Input (flowfield.in)	Output (flowfield.out)
3 3 2 2 4 6 0 4 0 0 6 4	1 2 0 1 2 0 1 1 0

On the following illustration you can see the state of the grid after zero (initially), one and two simulation steps. Particles are named for clarity only.