

## Problem F. Mămăligă

Input file: *standard input*  
Output file: *standard output*  
Time limit: 5 seconds  
Memory limit: 1024 mebibytes

Mămăligă is a type of side dish made from boiled coarsely ground cornmeal. Typically, it is used as a side dish for Tochitură (meat stew), Sarmale, Pastramă, etc.

Costel and Tanaka are the naughtiest children of the PESI family, and they usually fight over long discussions on the latest papers on CS when they should be solving CP problems. Because they are two naughty boys, the PESI parents have tasked them to stir the Mămăligă mixture in the cauldron as it's cooking. Knowing their past behavior, of course, they couldn't manage not to fight over the recipe of Mămăligă.



The cauldron can be represented as an  $n \times n$  matrix  $a$ , where each cell contains a decimal digit representing the size of a Mămăligă lump at that part of the cauldron. Because the cauldron is big, the boys have to stir using one big spoon, each of them holding it using both of their hands.

At every moment, the spoon is located at some cell  $(i, j)$  where  $i, j \in \{1, 2, \dots, n\}$  in the matrix. We also track the score  $r$  of the Mămăligă. Initially, the spoon is at the cell  $(i_0, j_0)$  and  $r = a_{i_0 j_0}$ .

Mămăligă takes  $k$  seconds to cook. At second  $t$  ( $1 \leq t \leq k$ ):

- The boy controlling the spoon is  $w_t$ : Tanaka if  $w_t = \text{"T"}$  or Costel if  $w_t = \text{"C"}$ .
- That boy moves the spoon from its current cell  $(i, j)$  to some cell  $(i', j')$ .
- For each coordinate, the maximum distance to move the spoon is  $p_t$ . Formally,  $|i - i'| \leq p_t$  and  $|j - j'| \leq p_t$ .
- Note that the spoon may be moved onto the same cell, and it is still considered a movement.
- Once the spoon is moved, the score  $r$  becomes  $10 \cdot r + a_{i' j'}$ .

After  $k$  seconds, the value of  $r$  is the final score. Note that this value has at most  $k + 1$  digits. Tanaka considers that the smaller the final score, the better they did, but Costel thinks otherwise and wants to make the final score as large as possible.

You are given the array  $p_1, \dots, p_k$  and the string  $w_1 \dots w_k$ . For every starting position  $(i_0, j_0)$  with  $i_0, j_0 \in \{1, \dots, n\}$ , find the final value of  $r$  considering that the boys choose their moves optimally according to their goals, and output  $r \bmod 666\,013$ .

### Input

The first line of the input contains two integers  $n$  and  $k$  ( $1 \leq n \leq 240$ ,  $2 \leq k \leq 700$ ).

The second line contains  $k$  integers  $p_1, p_2, \dots, p_k$  separated by spaces ( $1 \leq p_i \leq n$ ).

The third line contains the string  $w$  of length  $k$  without spaces ( $w_i \in \{\text{T}, \text{C}\}$ ).

Next comes the matrix  $a$ . It consists of  $n$  lines. Each of them contains a string of  $n$  decimal digits without spaces.

### Output

Print  $n$  lines, with  $n$  values on each. The  $j$ -th value on the  $i$ -th line should be the value of  $r \bmod 666\,013$  if  $i_0 = i$  and  $j_0 = j$ .

## Examples

<i>standard input</i>	<i>standard output</i>
3 4 1 2 1 1 TCCT 321 112 011	31331 21331 11331 10331 10331 21331 331 10331 11331
5 6 1 2 3 1 2 2 TCTCTT 12345 54310 12314 34622 23411	485487 153461 496448 64422 398409 489409 155422 496448 394487 60500 494487 162461 496448 394487 64422 496448 164422 166383 162461 162461 262461 596448 164422 494487 494487