

## 517 Word

Dr. R. E. Wright's class was studying modified L-Systems. Let us explain necessary details. As a model let us have words of length  $n$  over a two letter alphabet  $\{a, b\}$ . The words are cyclic, this means we can write one word in any of  $n$  forms we receive by cyclic shift, whereby the first and the last letters in the word are considered to be neighbours.

Rewriting rules rewrite a letter at a position  $i$ , depending on letters at the positions  $i - 2, i, i + 1$ . We rewrite all letters of the word in one step. When we have a given starting word and a set of rewriting rules a natural question is: how does the word look after  $s$  rewriting steps?

Help Dr. R. E. Wright and write a program which solves this task.

### Input

There are several blocks in the input file, each describing one system. There is an integer number  $n$ ,  $2 < n < 16$  the length of the input word in the first line. There is a word in the next line. The word contains only lowercase letters **a** and **b**. There are four characters  $c_1c_2c_3c_4$  in the next eight lines. Each quadruple represents one rewriting rule with the following meaning: when the letter at the position  $i - 2$  is  $c_1$  and the letter at the position  $i$  is  $c_2$  and the letter at the position  $i + 1$  is  $c_3$  then the letter at the position  $i$  after rewriting will be  $c_4$ . Rewriting rules are correct and complete. There is an integer number  $s$ ,  $0 \leq s \leq 2000000000$ , in the last line of the block.

### Output

There is one line corresponding to each block of the input file. The line contains a word which we receive after  $s$  rewriting steps from the corresponding starting word using given rewriting rules. As we mentioned above, the word can be written in any of  $n$  cyclic shifted forms. The output file contains the lexicographically smallest word, assuming that **a** < **b**.

### Sample Input

```
5
aaaaa
aaab
aabb
abab
abbb
baab
babb
bbab
bbbb
1
```

### Sample Output

```
bbbbbb
```