TLE '17 Contest 5 P4 - Cloning

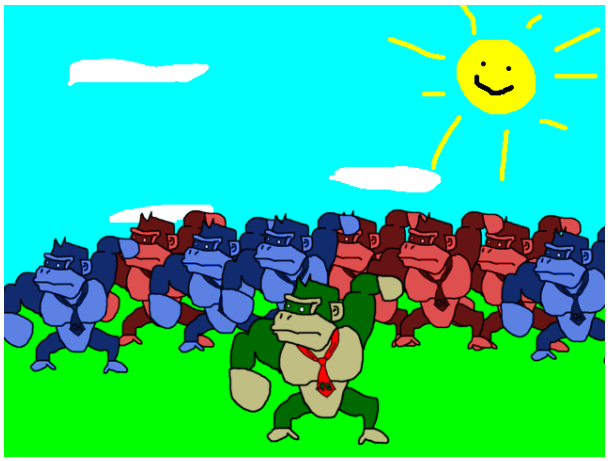
Time limit: 1.0s **Memory limit:** 256M
Java: 1.5s
Python: 3.0s

Dankey Kang, Croneria's most fearsome villain, has decided to increase the size of his gang by creating many clone soldiers. Each clone can be one of two types, type `0` or type `1`.

There are two possible methods of cloning, which can be described as a string of clone types S and T. That is, S and T are strings only containing `0` and `1`.

Initially, there is one clone of type `0` in the line. Then, the following process will continue indefinitely:

- The first clone in the line will leave the front of the line to fight.
- If that clone's type is `0`, a string of clones matching S will be added to the end of the line, in order.
- If that clone's type is `1`, a string of clones matching T will be added to the end of the line, in order.



Dankey Kang and his horde of clones.

Dankey Kang is then interested in Q of the clones. In particular, he wants to know the type of the a_i^{th} clone that leaves the line, indexed starting at 1.

Constraints

For all subtasks:

$2 \leq |S|, |T| \leq 10^5$

$1 \leq Q \leq 10^5$

$1 \leq a_i \leq 10^{12}$

Subtask	Points	Additional Constraints
1	5	$\|S\|, \|T\|, Q, a_i \leq 20$
2	15	$a_i \leq 10^6$
3	20	$\|S\| = \|T\|$
4	25	$\|S\|, \|T\| \leq 10$
5	25	$\|S\|, \|T\| \geq 5\,000$
6	10	No additional constraints.

Input Specification

The first line will contain string S.

The second line will contain string T.

The third line will contain the integer Q.

On the next Q lines, the i^{th} line will contain integer a_i.

Output Specification

Output Q lines. The i^{th} line of output will contain the type of the ${a_i}^{\text{th}}$ clone that leaves the line.

Sample Input

```
100
10
9
1
2
3
4
5
6
7
8
9
```

Sample Output

```
0
1
0
0
1
0
1
0
0
```