

Problem D: Flipper

Little Bobby Roberts (son of Big Bob, of Problem G) plays this solitaire memory game called Flipper. He starts with n cards, numbered 1 through n , and lays them out in a row with the cards in order left-to-right. (Card 1 is on the far left; card n is on the far right.) Some cards are face up and some are face down. Bobby then performs $n - 1$ flips — either right flips or left flips. In a right flip he takes the pile to the far right and flips it over onto the card to its immediate left. For example, if the rightmost pile has cards A, B, C (from top to bottom) and card D is to the immediate left, then flipping the pile over onto card D would result in a pile of 4 cards: C, B, A, D (from top to bottom). A left flip is analogous.

The very last flip performed will result in one pile of cards — some face up, some face down. For example, suppose Bobby deals out 5 cards (numbered 1 through 5) with cards 1 through 3 initially face up and cards 4 and 5 initially face down. If Bobby performs 2 right flips, then 2 left flips, the pile will be (from top to bottom) a face down 2, a face up 1, a face up 4, a face down 5, and a face up 3.

Now Bobby is very sharp and you can ask him what card is in any position and he can tell you!!! You will write a program that matches Bobby's amazing feat.

Input

Each test case will consist of 4 lines. The first line will be a positive integer n ($2 \leq n \leq 100$) which is the number of cards laid out. The second line will be a string of n characters. A character U indicates the corresponding card is dealt face up and a character D indicates the card is face down. The third line is a string of $n - 1$ characters indicating the order of the flips Bobby performs. Each character is either R, indicating a right flip, or L, indicating a left flip. The fourth line is of the form $m q_1 q_2 \dots q_m$, where m is a positive integer and $1 \leq q_i \leq n$. Each q_i is a query on a position of a card in the pile (1 being the top card, n being the bottom card). A line containing 0 indicates end of input.

Output

Each test case should generate $m + 1$ lines of output. The first line is of the form

Pile t

where t is the number of the test case (starting at 1). Each of the next m lines should be of the form

Card q_i is a face up k .

or

Card q_i is a face down k .

accordingly, for $i = 1, \dots, m$, where k is the number of the card.

For instance, in the above example with 5 cards, if $q_i = 3$, then the answer would be

Card 3 is a face up 4.

Sample Input

```
5
UUUDD
RRLL
5 1 2 3 4 5
10
UUDDUUDDUU
LLRRRLRL
4 3 7 6 1
0
```

Sample Output

```
Pile 1
Card 1 is a face down 2.
Card 2 is a face up 1.
Card 3 is a face up 4.
Card 4 is a face down 5.
Card 5 is a face up 3.
Pile 2
Card 3 is a face down 1.
Card 7 is a face down 9.
Card 6 is a face up 7.
Card 1 is a face down 5.
```