Problem B. Ciorbă

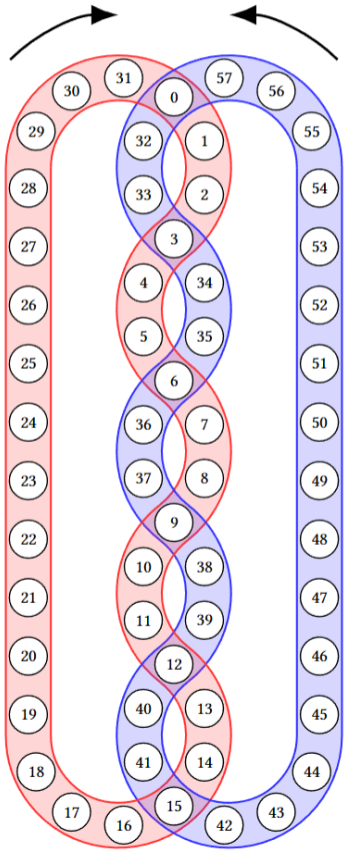
Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	1024 mebibytes

Ciorbă is a type of soup that is sour, made from different vegetables and meats. It's traditionally eaten with spicy peppers, sour cream, and bread. The image on the right shows a delicious bowl of *Ciorbă de perișoare* (meatballs).

You are fed up with the notorious sushi belts, so you decided to go to a new type of restaurant: Ciorbă Belts! The bowls of Ciorbă are placed on two conveyor belts, each belt having n slots. The slots are numbered from 0 to $n-1$ in clockwise order for the red belt (the left one) and in anticlockwise order for the blue belt (the right one). A total of k of these slots (an even number) are shared between the two belts, specifically, the slots numbered $0, d, 2 \cdot d, \ldots, (k-1) \cdot d$. Thus, there are $2n-k$ bowls, numbered from 0 to $2 \cdot n-k-1$. Initially:

- Bowls numbered $0, 1, \ldots, n-1$ are placed in the slots $0, 1, \ldots, n-1$ on the red belt.
- Bowls numbered $n, n+1, \ldots, 2 \cdot n-k-1$ are placed in slots $0, 1, \ldots, n-1$ on the blue belt, skipping shared slots.

On the side of the belts, there are two buttons: "`R`" and "`A`". Pressing the "`R`" button rotates the red belt clockwise by one slot, while pressing the "`A`" button rotates the blue belt anticlockwise by one slot.



The above figure shows the belts for $n = 32$, $k = 6$, and $d = 3$. An "`R`" button press would move bowl 0 to the slot of bowl 1, bowl 1 to the slot of bowl 2, ..., bowl 31 to the slot of bowl 0. An "`A`" button press would move bowl 0 to the slot of bowl 32, bowl 32 to the slot of bowl 33, bowl 33 to the slot of bowl 3, ..., bowl 57 to the slot of bowl 0.

If we denote with $b_0, b_1, \ldots, b_{n-1}$ the values of the bowls in slots $0, 1, \ldots, n-1$ of a belt, then the *encoding* of the belt is the value

$$0 \cdot b_0 + 1 \cdot b_1 + 2 \cdot b_2 + \ldots + (n-1) \cdot b_{n-1}.$$

Given n, k, d, and q, as well as a sequence of q button presses, find the encodings of both of the belts after executing the button presses so you can enjoy a day pass of unlimited Ciorbă!

Input

On the first line, you can find four integers n, k, d, and q ($3 \le n \le 10^6$, $2 \le k < n$, k is even, $1 \le d < n-1$, $1 \le q \le 10^6$). Also, $(k-1) \cdot d+1 < n$.

The next line contains a string of q characters which can be either "`R`" or "`A`", representing the button presses.

Output

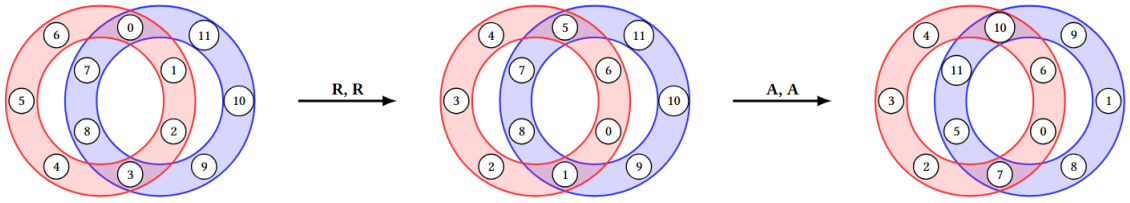
Print two lines. On the first line, print the encoding of the red belt. On the second line, print the encoding of the blue belt.

Examples

standard input	*standard output*
7 2 3 4 RRAA	74 133
32 6 3 2 RA	11195 21666

Note

In the first example, the belts evolve like this:



The final encoding of the red belt is $0 \cdot 10 + 1 \cdot 6 + 2 \cdot 0 + 3 \cdot 7 + 4 \cdot 2 + 5 \cdot 3 + 6 \cdot 4 = 74$.

The final encoding of the blue belt is $0 \cdot 10 + 1 \cdot 11 + 2 \cdot 5 + 3 \cdot 7 + 4 \cdot 8 + 5 \cdot 1 + 6 \cdot 9 = 133$.

The second example describes the belts from the image shown in the statement. After the button presses, the red belt looks like this:

$$57, 0, 1, 33, 3, 4, 35, 6, 7, 37, 9, 10, 39, 12, 13, 41, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30.$$

The blue belt looks like this:

$$57, 31, 32, 33, 2, 34, 35, 5, 36, 37, 8, 38, 39, 11, 40, 41, 14, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56.$$