B. Treasure Hunt

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

After the big birthday party, Katie still wanted Shiro to have some more fun. Later, she came up with a game called *treas ure hunt*. Of course, she invited her best friends Kuro and Shiro to play with her.

The three friends are very smart so they passed all the challenges very quickly and finally reached the destination. But the treasure can only belong to one cat so they started to think of something which can determine who is worthy of the treasure. Instantly, Kuro came up with some ribbons.

A random colorful ribbon is given to each of the cats. Each color of the ribbon can be represented as an uppercase or lowercase Latin letter. Let's call a consecutive subsequence of colors that appears in the ribbon a *subribbon*. The *beaut y* of a ribbon is defined as the maximum number of times one of its subribbon appears in the ribbon. The more the subribbon appears, the more beautiful is the ribbon. For example, the ribbon `aaaaaaa` has the beauty of 7 because its subribbon `a` appears 7 times, and the ribbon `abcdabc` has the beauty of 2 because its subribbon `abc` appears twice.

The rules are simple. The game will have n turns. Every turn, each of the cats must change strictly **one** color (at one position) in his/her ribbon to an arbitrary color which is **different** from the unchanged one. For example, a ribbon `aaab` can be changed into `acab` in one turn. The one having the most beautiful ribbon after n turns wins the treasure.

Could you find out who is going to be the winner if they all play optimally?

Input

The first line contains an integer n ($0 \le n \le 10^9$) — the number of turns.

Next 3 lines contain 3 ribbons of Kuro, Shiro and Katie one per line, respectively. Each ribbon is a string which contains no more than 10^5 uppercase and lowercase Latin letters and is not empty. It is guaranteed that the length of all ribbons are equal for the purpose of fairness. Note that uppercase and lowercase letters are considered different colors.

Output

Print the name of the winner ("`Kuro`", "`Shiro`" or "`Katie`"). If there are at least two cats that share the maximum beauty, print "`Draw`".

Examples

input
3 Kuroo Shiro Katie
output
Kuro

input
7 treasurehunt threefriends hiCodeforces
output
Shiro

input

```
1
abcabc
cbabac
ababca
```

output

```
Katie
```

input

```
15
foPaErcvJ
mZaxowpbt
mkuOlaHRE
```

output

```
Draw
```

Note

In the first example, after 3 turns, Kuro can change his ribbon into `ooooo`, which has the beauty of 5, while reaching such beauty for Shiro and Katie is impossible (both Shiro and Katie can reach the beauty of at most 4, for example by changing Shiro's ribbon into `SSiSS` and changing Katie's ribbon into `Kaaaa`). Therefore, the winner is Kuro.

In the fourth example, since the length of each of the string is 9 and the number of turn is 15, everyone can change their ribbons in some way to reach the maximal beauty of 9 by changing their strings into `zzzzzzzzz` after 9 turns, and repeatedly change their strings into `azzzzzzzz` and then into `zzzzzzzzz` thrice. Therefore, the game ends in a draw.