

Magical colorful cats (hard)

There is a circle of n cats, includes white cats, red cats and green cats. When two cats of different colors talk with each other, they both change to third color. If they have same color, nothing will happen.

At each step, the 1st cat talks with 2nd cat, the 2nd cat talks with the 3rd cat,... and the n^{th} cat talks with 1st cat.

Given the original color of n cats, your task is find the color of n cats after k steps.

Input

- First line : n and k ($1 \leq n \leq 50000$, $1 \leq k \leq 10^9$)
- Second line : n characters, the i -th character denotes color of the i -th cat at first state

Output

- n characters denotes the color of n cats after k steps.

Example

Input :

3 1

GRR

Output :

RGR

Input :

5 4

WRWRW

Output :

GGGWG

Note : Before solving this problem, you may want to try [COLORCAT](#)