D. Om Nom and Necklace

One day Om Nom found a thread with n beads of different colors. He decided to cut the first several beads from this thread to make a bead necklace and present it to his girlfriend Om Nelly.

Om Nom knows that his girlfriend loves beautiful patterns. That's why he wants the beads on the necklace to form a *regular* pattern. A sequence of beads S is *regular* if it can be represented as $S = A + B + A + B + A + ... + A + B + A$, where A and B are some bead sequences, " $+$ " is the concatenation of sequences, there are exactly $2k + 1$ summands in this sum, among which there are $k + 1$ "A" summands and k "B" summands that follow in alternating order. Om Nelly knows that her friend is an eager mathematician, so she doesn't mind if A or B is an empty sequence.

Help Om Nom determine in which ways he can cut off the first several beads from the found thread (at least one; probably, all) so that they form a *regular pattern*. When Om Nom cuts off the beads, he doesn't change their order.

Input

The first line contains two integers n, k ($1 \le n, k \le 1\,000\,000$) — the number of beads on the thread that Om Nom found and number k from the definition of the regular sequence above.

The second line contains the sequence of n lowercase Latin letters that represent the colors of the beads. Each color corresponds to a single letter.

Output

Print a string consisting of n zeroes and ones. Position i ($1 \le i \le n$) must contain either number one if the first i beads on the thread form a regular sequence, or a zero otherwise.

Examples

input
7 2 bcabcab

output
0000011

input
21 2 ababaababaabababaababaa

output
000110000111111000011

Note

In the first sample test a regular sequence is both a sequence of the first 6 beads (we can take $A = $ "", $B = $ "bca"), and a sequence of the first 7 beads (we can take $A = $ "b", $B = $ "ca").

In the second sample test, for example, a sequence of the first 13 beads is regular, if we take $A = $ "aba", $B = $ "ba".