FBI Tree

Problem Description

We can classify strings consisting of "0" and "1" into three categories: all "0" are called B strings, all "1" are called I strings, and strings containing both "0" and "1" are called F strings.

FBI tree is a binary tree[1], and its node types also include F node, B node and I node. An FBI tree T can be constructed from a string S of "01" with a length of 2^N, and the recursive construction method is as follows:

1) The root node of T is R, and its type is the same as that of string S;
2) If the length of string S is greater than 1, separate the string S from the middle and divide it into equal length left and right substrings S_1 and S_2; the left subtree T_1 of R is constructed from the left substring S_1, and the right subtree T_2 of R is constructed from the right substring S_2.

Now given a "01" string of length 2^N, construct an FBI tree using the above construction method and output its post-order traversal[2] sequence.

Input

The first line of the input file is an integer N($0 \le N \le 10$), and the second line is a "01" string of length 2^N.

Output

The output file contains a line that contains only one string, which is the post-traversal sequence of the FBI tree.

Sample Input

3
10001011

Sample Output

IBFBBBFIBFIIIFF

Data Size

For 40% of data, $N \le 2$;
For all of the data, $N \le 10$.