B. Binary Path

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

output: standard output

You are given a $2 \times n$ grid filled with zeros and ones. Let the number at the intersection of the i-th row and the j-th column be a_{ij} .

There is a grasshopper at the top-left cell (1,1) that can only jump one cell right or downwards. It wants to reach the bottom-right cell (2,n). Consider the binary string of length n+1 consisting of numbers written in cells of the path without changing their order.

Your goal is to:

- 1. Find the lexicographically smallest[†] string you can attain by choosing any available path;
- 2. Find the number of paths that yield this lexicographically smallest string.
- † If two strings s and t have the same length, then s is lexicographically smaller than t if and only if in the first position where s and t differ, the string s has a smaller element than the corresponding element in t.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \le t \le 10^4$). The description of the test cases follows.

The first line of each test case contains a single integer n ($2 \le n \le 2 \cdot 10^5$).

The second line of each test case contains a binary string $a_{11}a_{12}\dots a_{1n}$ (a_{1i} is either 0 or 1).

The third line of each test case contains a binary string $a_{21}a_{22}\dots a_{2n}$ (a_{2i} is either 0 or 1).

It is guaranteed that the sum of n over all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output two lines:

- 1. The lexicographically smallest string you can attain by choosing any available path;
- 2. The number of paths that yield this string.

Example

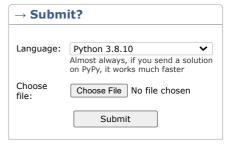
input	Сору
3	
2	
00	
00	
4	
1101	
1100	
8	
00100111	
11101101	
output	Сору
000	
2	
11000	
1	
001001101	
4	

Note

In the first test case, the lexicographically smallest string is 000. There are two paths that yield this string:







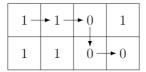






The first path The second pat

6/15/24), ক্টাৰেওকাৰোন est case, the lexicographically smallest string is 11000. Photie is elly Ordefathces that yields this string:



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