B – Bitwise Beach

Memory limit: 1024 MB
Time limit: 1 s

EUC 2026
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Two friends collected n^2 shells at a beach, and arranged them in a grid of n rows and n columns. They then drew some horizontal and some vertical lines in the sand, which partitioned the beach into zones, with a positive number of shells from their collection in each zone.

Now, the friends play a well-known game of Nim. They make alternating moves; in each move, a player takes a positive number of shells from any single zone. The player who takes the last shells wins.

The friends know that to determine whether the first player has a winning strategy, and which move is optimal, one should count the number of shells in every zone and calculate the bitwise xor of these numbers. That sounds like a lot of work. Help them!

Input

The first line of the input contains one integer n ($1 \leq n \leq 10^6$). We assume that the rows are numbered 1 through n, top to bottom. The columns are also numbered 1 through n, left to right.

The second line contains a string of $n-1$ digits 0 or 1; the i-th digit ($1 \leq i < n$) is 1 if there is a horizontal line between row i and row $i+1$.

The third line contains a string of $n-1$ digits 0 or 1; the i-th digit ($1 \leq i < n$) is 1 if there is a vertical line between column i and column $i+1$.

Output

Output a single integer, the bitwise xor of the numbers of shells in all zones.

Example

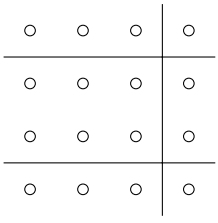
For the input data:

```
4
001
101
```

the correct result is:

```
4
```

Explanation: There are six zones, having 3, 1, 6, 2, 3, 1 shells, respectively. The bitwise xor is equal to $3 \oplus 1 \oplus 6 \oplus 2 \oplus 3 \oplus 1 = 4$.



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