Problem G. MAX-MEX Cut

Time limit 1000 ms
Mem limit 262144 kB

A binary string is a string that consists of characters 0 and 1. A bi-table is a table that has exactly two rows of equal length, each being a binary string.

Let MEX of a bi-table be the smallest digit among 0, 1, or 2 that does not occur in the bi-table. For example, MEX for $\begin{bmatrix} 0011 \\ 1010 \end{bmatrix}$ is 2, because 0 and 1 occur in the bi-table at least once. MEX for $\begin{bmatrix} 111 \\ 111 \end{bmatrix}$ is 0, because 0 and 2 do not occur in the bi-table, and $0 < 2$.

You are given a bi-table with n columns. You should cut it into any number of bi-tables (each consisting of consecutive columns) so that each column is in exactly one bi-table. It is possible to cut the bi-table into a single bi-table — the whole bi-table.

What is the **maximal** sum of MEX of all resulting bi-tables can be?

Input

The input consists of multiple test cases. The first line contains a single integer t ($1 \le t \le 10^4$) — the number of test cases. Description of the test cases follows.

The first line of the description of each test case contains a single integer n ($1 \le n \le 10^5$) — the number of columns in the bi-table.

Each of the next two lines contains a binary string of length n — the rows of the bi-table.

It's guaranteed that the sum of n over all test cases does not exceed 10^5.

Output

For each test case print a single integer — the maximal sum of MEX of all bi-tables that it is possible to get by cutting the given bi-table optimally.

Examples

Input	Output
4 7 0101000 1101100 5 01100 10101 2 01 01 6 000000 111111	8 8 2 12

Note

In the first test case you can cut the bi-table as follows:

- $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$, its MEX is 2.
- $\begin{bmatrix} 10 \\ 10 \end{bmatrix}$, its MEX is 2.
- $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$, its MEX is 0.
- $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$, its MEX is 2.
- $\begin{bmatrix} 0 \\ 0 \end{bmatrix}$, its MEX is 1.
- $\begin{bmatrix} 0 \\ 0 \end{bmatrix}$, its MEX is 1.

The sum of MEX is 8.