Problem D. DNA

Input file:	`standard input`
Output file:	`standard output`
Time limit:	0.1 seconds
Memory limit:	256 megabytes

Note the unusual time limit in this task.

Dwarf the Biologist has recently made a groundbreaking discovery in the field of folklore genetics at the University of Wrocław. After years of research, he has successfully sequenced the DNA of three distinct species that inhabit the city: dwarves (his own kind), gnomes (the magical forest dwellers), and bronzelings (the legendary bronze statue-folk of Wrocław's streets).

Each DNA sequence is represented as a binary string, where `0` denotes a recessive genetic marker and `1` denotes a dominant one. His goal is to find the longest common subsequence (LCS) of genetic markers shared among all three species — this would reveal their common evolutionary ancestry and explain why they all ended up in Wrocław! However, computing the exact LCS of three sequences is computationally expensive, and the dwarf's research grant is running out. He doesn't need perfect precision; he just needs to find an integer x such that the true length of the *3-LCS* lies in the interval $[x, 2x]$. In other words, a 2-approximation will do.

This approximation will be good enough for his research paper and still provide valuable insights into the shared genetic heritage of Wrocław's magical inhabitants. Can you help the dwarf to find such an approximation?

Input

The first line of input contains the number T, representing the number of test cases.

Each test case consists of four lines. The first line contains an integer N, the length of the DNA sequences. The next three lines contain binary strings of length N representing the DNA sequences of dwarves, gnomes, and bronzelings.

Output

For each test case, output a single integer x such that the length of the longest common subsequence of the three DNA sequences lies in the interval $[x, 2x]$.

Limits $1 \le T \le 10$, $1 \le N \le 3\,000$, each string consists only of digits `0` and `1`.

Example

standard input	standard output
2 4 0010 0110 0101 2 10 00 01	2 1

Note

In the first example, optimal LCS is `010`, so its length is 3. Therefore answer `2` is also correct.