Problem M. Puzzle: Summon

Little Cyan Fish is a fan of logic puzzles. Today, he is playing a special version of the classic puzzle "Summon".

Consider a grid with 2 rows and $2n$ columns. Let (x, y) denote the cell on the x-th row and y-th column. The grid was divided into n regions, where each region is a 2×2 square. Specifically, for each $1 \leq i \leq n$, the i-th region R_i contains exactly 4 cells: $(1, 2i-1)$, $(1, 2i)$, $(2, 2i-1)$, and $(2, 2i)$.

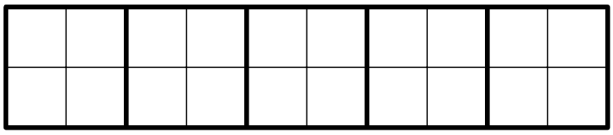

Figure 4: A sample grid for $n = 5$. The borders of each region was marked in bold lines.

The task of the puzzle is to fill digits from 1 to 2 in some of the cells according to the following rules:

- For each region R_i $(1 \leq i \leq n)$, it must contain each digit from 1 to 2 exactly once.
- Cells with the same digit don't touch, not even diagonally.

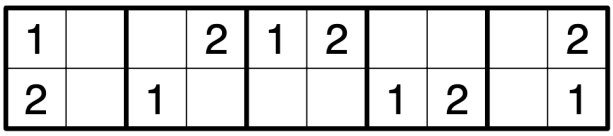

Figure 5: A valid plan to fill the integers

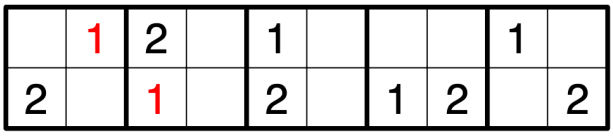

Figure 6: An invalid plan: the digits marked red touch each other

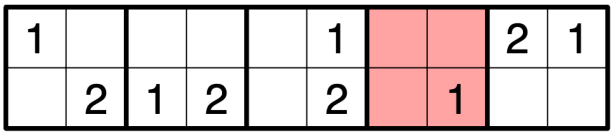

Figure 7: An invalid plan: the region R_4 doesn't contain the digit 2.

The value of a plan will be defined as the sum of the formed numbers in the first row. Specifically, the connected blocks of digits in the first row form numbers by reading left to right. And the sum of all such numbers will be the the value of the plan.

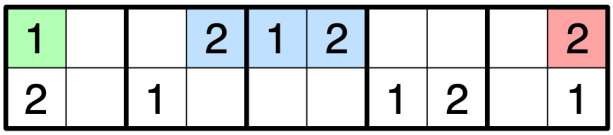

Figure 8: In this plan, the value will be $1 + 212 + 2 = 215$

Now, Little Cyan Fish gives you an unfinished puzzle: a grid of $2 \times 2n$ with some pre-filled digits. Your task is to fill some digits in some empty cells to get a valid solution of the puzzle with the maximum value.

Input

There are multiple test cases in a single test file.

The first line of the input contains a single integer T ($1 \le T \le 100\,000$), indicating the number of the test cases.

For each test case, the first line of the input contains one single integer n ($1 \le n \le 100\,000$).

Each of the next two lines contains $2n$ characters, representing the initial state of the puzzle. Each character is either a digit from 1 to 2 (indicating a pre-filled digit), or a character `?` (indicating an empty cell).

It is guaranteed that the sum of n in all testcases does not exceed $1\,000\,000$.

Output

For each test case, if there is no possible plan, output a single line containing the string "impossible" (without quotes).

Otherwise, the first line of the output contains a single integer, indicating the maximum value of the plan.

The next two lines of the output describes the plan you found. Each line should contain $2n$ characters, indicating your solution. Each character is either a digit from 1 to 2 (indicating a cell with a digit filled) or 0 (indicating an empty cell). If there are multiple possible solutions with the maximum value, you may output any of them.

Example

standard input	standard output
5 2 ?1?? ??1? 4 1??????? ???2???2 5 ?????????? ?????????? 6 1212???????? ????????1212 7 ??1?????1??2?? ?????1???????2	impossible 242 12101210 00020002 2121212121 2121212121 0000000000 12121212 121212120000 000000001212 21 12010202010201 00020101020102