Railgun

null_awe

1 Problem Statement

Toaru Kagaku no Railgun: Misaka sisters drink tea.

There are n Misaka sisters standing by a large field partitioned into an $n \times n$ grid, each one standing on their own row. The sister at row i fires a railgun with power p_i starting from the left side and at row i, initially directed diagonally towards the top right.

On the right side of the grid, there are n targets, one in each row, with the value q_i.

Railguns travel as rays, bouncing off the top and bottom sides of the grid. Additionally, any amount of 2-way reflectors can be placed on horizontal edges of the grid to help direct rays. The Misaka sisters are confused by their railgun movement and need help placing reflectors! Please find a valid formation of reflectors such that every railgun originating from row i ends up hitting the target in row j such that $p_i = q_j$.

It can be shown that this is always possible.

2 Input

The first line contains a single integer t ($1 \le t \le 10^3$) — the number of test cases.

The first line of every test case contains a single integer n ($2 \le n \le 2 \times 10^3$) — the number of Misaka sisters.

The second line contains a permutation of the first n positive integers p — the powers of each Misaka railgun.

The third and final line in every test case contains another permutation of the first n positive integers q — the values of the targets.

It is guaranteed that the sum of all n will not exceed 5×10^3.

3 Output

For each test case, output $n - 1$ binary strings of length n, representing the state of each horizontal edge within the grid. 1 represents putting a reflector on that edge, and 0 represents no reflector.
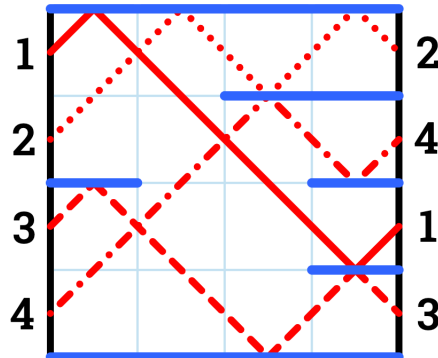
Any valid configuration of reflectors will be counted as correct.

4 Samples

Sample Input 1	Sample Output 1
3 4 1 2 3 4 2 4 1 3 3 3 1 2 3 1 2 6 3 2 4 6 1 5 5 1 6 4 2 3	0011 1001 0001 111 111 000000 000000 000000 000000 000000

5 Explanation

In the first test case, the reflectors and railguns are displayed in the diagram below:

In the second test case, we can place reflectors at every horizontal edge to guarantee that the railguns do not move out of their own rows.

In the third test case, no extra reflectors are necessary.