Min or Max 2

Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	1024 megabytes

The story continues. Now Little Cyan Fish has mastered the concept of Min or Max. He would like to practice his understanding by playing with some tuples of integers.

Here, Little Cyan Fish is presented with two sequences, each a permutation of the numbers from 1 to n, which we will call $a_1, a_2, \cdots, a_n$ and $b_1, b_2, \cdots, b_n$. Initially, he has a tuple (x, y), where $x = a_1$ and $y = b_1$. For each subsequent index i, ranging from 2 to n, he must choose and execute exactly one of the following operations in ascending order of i:

- Update $x \leftarrow \min(x, a_i)$ and $y \leftarrow \min(y, b_i)$.
- Update $x \leftarrow \max(x, a_i)$ and $y \leftarrow \max(y, b_i)$.

After performing all $(n-1)$ operations, Little Cyan Fish ends up with a final tuple (x, y). The challenge is to determine, for each value of k from 0 to $(n-1)$, the count of all distinct final tuples (x, y) such that $|x - y| = k$.

Input

There are multiple test cases in a single test file. The first line of the input contains a single integer T ($1 \le T \le 10^5$), indicating the number of test cases.

For each test case, the first line of the input contains a single integer n ($2 \le n \le 5 \times 10^5$).

The next line of the input contains n integers $a_1, a_2, \cdots, a_n$ ($1 \le a_i \le n$, $a_i \ne a_j$ for all $1 \le i < j \le n$).

The next line of the input contains n integers $b_1, b_2, \cdots, b_n$ ($1 \le b_i \le n$, $b_i \ne b_j$ for all $1 \le i < j \le n$).

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

Output

For each test case, output a single line contains n integers. The i-th integer represents the answer for $k = i - 1$.

Example

standard input	standard output

4
2
1 2
2 1
5
2 4 1 5 3
2 4 1 5 3
5
1 2 3 4 5
5 4 3 2 1
8
5 8 3 4 2 7 1 6
4 6 3 8 5 1 2 7
	2 0
	5 0 0 0 0
	2 2 2 2 0
	5 5 2 2 1 0 0 0