Problem D.
Dictionary Problem

Time limit: 2 seconds

Imagine a world equipped with character set $\mathbf{U} = \{c_1, c_2, \ldots, c_k\}$ with an unknown total order $\prec_{\mathbf{U}}$. You are given an important string $S = \langle s_1, s_2, \ldots, s_n \rangle$ consists of characters from set $\mathbf{U}$. Also, the lexicographical order of **suffices** of S is given. Please write a program to compute a possible total order $\prec'_{\mathbf{U}}$ (maybe not identical to the unknown $\prec_{\mathbf{U}}$) of $\mathbf{U}$.

Let $S[i, j]$ with $1 \leq i \leq j \leq |S|$ be the string $\langle s_i, s_{i+1}, \ldots, s_j \rangle$, where $|S|$ is the length of S. The **suffices** of S is a particular set of strings $\mathbf{suf}(S) := \{S[i, |S|] \mid 1 \leq i \leq |S|\}$. For example, the suffices of string `"abb"` are `"abb"`, `"bb"` and `"b"`.

We call that a string X is lexicographically smaller than a string Y (written as $X \prec^*_{\mathbf{U}} Y$) if either X is exactly $Y[1, |X|]$ or $X_i \prec_{\mathbf{U}} Y_i$, where i is the first position having different characters in X and Y. For example, consider the character set of lowercase letters with the common character order from `a` to `z`, then `"aa"` is lexicographically smaller than `"aab"`; `"acc"` is lexicographically smaller than `"baa"`.

For this problem, you will be given the rank of each suffix of S. The smaller the rank is, the smaller the lexicographical order is. Suppose that we are given the order that `b` is smaller than `a`. String `"abba"` has its smallest suffix being `"bba"` and the biggest one being `"abba"`. To construct the rank one may have multiple choices for order of $\mathbf{U}$. Both `b < c < a` or `c < b < a` act as a valid choice.

Table 2: Rank of the suffices of `"abba"`.

Suffix	Rank
`"abba"`	4
`"bba"`	1
`"ba"`	2
`"a"`	3

Input

The first line of input contains an integer T indicating the number of test cases, described by the following lines.

For each test case, there are three lines of input. The first line of the test case contains two space-separated integers n and k. The second line of the test case has n space-separated integers $a_1, a_2, \ldots, a_n$ representing the important string $S = \langle c_{a_1} c_{a_2} \ldots c_{a_n} \rangle$. The third line of the test case has n space-separated distinct integers $r_1, r_2, \ldots, r_n$ representing the rank of each suffix of S, where r_i is the rank of $S[i, n]$ among $\mathbf{suf}(S)$.

- $1 \leq T \leq 100$
- $2 \leq n, k \leq 200000$
- $1 \leq a_i \leq k$ for every $i = 1, 2, \ldots, n$
- $1 \leq r_i \leq n$

Output

For each test case, please output one line containing k integers $b_1, b_2, \ldots, b_k$, separated by single spaces, to indicate c_{b_1} being the smallest character of **U**, c_{b_2} the second smallest and so on.

If there are multiple solutions, output any of them. We guarantee that there must be a valid solution for every test case.

Sample Input	Sample Output
2 4 2 1 2 2 1 4 1 2 3 3 3 1 1 1 3 2 1	2 1 3 2 1

Sample Input	Sample Output
2 3 3 1 2 3 1 2 3 3 3 2 1 3 1 2 3	1 2 3 2 1 3

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