Group Meeting

Description

In Hoogle, the biggest software company on earth, every employee (except the boss of Hoogle) has exactly one manager, which is another employee in Hoogle.

When any employee encounters some issue, he/she can send a ticket to his/her manager for help. If his/her manager can not handle that, then the ticket will be referred to his/her manager's manager, and so on. Such process halts when someone has the ability to solve the issue or the ticket is referred to the boss, who is the only person with no manager in Hoogle. It is guaranteed that no one will receive the same ticket twice in the process. That is, there's no cycle in every "manager chain". The term "manager chain" indicates all the people that is possible to get the ticket start from a certain employee.

Sometimes there will be a group meeting in Hoogle, and each group meeting has a host employee. The people attending the meeting are those whose manager chain contains the host employee. You can say that a group meeting contains every employee that "managed" by the host employee.

When it comes to the group meeting, the snack for the meeting is a crucial and difficult problem. Every group meeting has to have snacks and every employee in Hoogle has a favorite food for meeting, such as sparking water or ice cream. Because the food team will only prepare exactly one kind of food for a certain meeting, so each meeting will provide the food favored by the most people.

Given each employee's manager and favorite food, can you answer that for every employee in Hoogle (including the boss), what food should be prepared is he/she is the host employee of the group meeting?

Input

The first line of the input contains a integer T indicating the number of test cases.

For each test case, the first line contains a integers N indicating the number of the employees in Hoogle.

The second line contains N numbers, the i-th number m_i indicates the manager of employee i. $m_i = 0$ means employee i is the boss.

The third line contains N numbers, the i-th number f_i indicates the favorite food of employee i.

- $1 \leq T \leq 100$
- $1 \leq N \leq 10^5$
- $0 \leq m_i \leq N$
- $1 \leq f_i \leq 10^9$
- For at least 85% of the test cases, $N \leq 100$

Output

For each test case, please print a line with N integer(s). The i-th number denotes the meeting food when the host employee is i. If there are several most popular foods, then output the one with the lowest number.

Sample Input

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1
5
0 1 1 2 2
7 1 1 2 2
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Sample Output

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1 2 1 2 2
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