LIS

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	256 megabytes

DreamGrid is learning the LIS (Longest Increasing Subsequence) problem and he needs to find the longest increasing subsequence of a given sequence $a_1, a_2, \ldots, a_n$ of length n.

Recall that

- A subsequence $b_1, b_2, \ldots, b_m$ of length m is a sequence satisfying $b_1 = a_{k_1}, b_2 = a_{k_2}, \ldots, b_m = a_{k_m}$ and $1 \le k_1 < k_2 < \cdots < k_m \le n$.
- An increasing subsequence $b_1, b_2, \ldots, b_m$ is a subsequence satisfying $b_1 < b_2 < \cdots < b_m$.

DreamGrid defines the helper sequence $f_1, f_2, \ldots, f_n$ where f_i indicates the maximum length of the increasing subsequence which ends with a_i. In case you don't know how to derive the helper sequence, he provides you with the following pseudo-code which calculates the helper sequence.

```
procedure lis_helper(a: original sequence)
{Let n be the length of the original sequence,
f(i) be the i-th element in sequence f, and a(i)
be the i-th element in sequence a}
for i := 1 to n
  f(i) := 1
  for j := 1 to (i - 1)
    if a(j) < a(i) and f(j) + 1 > f(i)
      f(i) := f(j) + 1
return f {f is the helper sequence}
```

DreamGrid has derived the helper sequence using the program, but the original sequence $a_1, a_2, \ldots, a_n$ is stolen by BaoBao and is lost! All DreamGrid has in hand now is the helper sequence and two range sequences $l_1, l_2, \ldots, l_n$ and $r_1, r_2, \ldots, r_n$ indicating that $l_i \le a_i \le r_i$ for all $1 \le i \le n$.

Please help DreamGrid restore the original sequence which is compatible with the helper sequence and the two range sequences.

Input

There are multiple test cases. The first line of the input contains an integer T, indicating the number of test cases. For each test case:

The first line contains an integer n ($1 \le n \le 10^5$), indicating the length of the original sequence.

The second line contains n integers $f_1, f_2, \ldots, f_n$ ($1 \le f_i \le n$) seperated by a space, indicating the helper sequence.

For the following n lines, the i-th line contains two integers l_i and r_i ($0 \le l_i \le r_i \le 2 \times 10^9$), indicating the range sequences.

It's guaranteed that the original sequence exists, and the sum of n of all test cases will not exceed 5×10^5.

Output

For each test case output one line containing n integers separated by a space, indicating the original sequence. If there are multiple valid answers, print any of them.

Please, DO NOT print extra spaces at the end of each line, or your solution may be considered incorrect!

Example

standard input	standard output
4 6 1 2 3 2 4 3 0 5 2 4 3 3 1 2 3 5 1 5 5 1 2 1 3 1 100 200 200 300 200 400 400 500 100 500 7 1 2 3 1 1 4 2 0 3 0 3 0 3 0 3 0 3 0 3 0 3 2 1 1 1 2 2 3	1 2 3 2 5 3 200 300 200 500 200 0 1 2 0 0 3 1 2 2