Cartesian Trees

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

You are given a permutation $A = (A_1, A_2, \ldots, A_N)$ of $(1, 2, \ldots, N)$.

For a pair of integers l, r $(1 \leq l \leq r \leq N)$, we define the **Cartesian Tree** $\mathrm{C}(l, r)$ as follows:

- $\mathrm{C}(l, r)$ is a rooted binary tree with $r - l + 1$ nodes. We denote the root of this tree as rt.
- Let m be the unique integer such that $A_m = \min\{A_l, A_{l+1}, \ldots, A_r\}$.
- If $l < m$, then the left subtree of rt is $\mathrm{C}(l, m-1)$. If $l = m$, then rt has no left child.
- If $m < r$, then the right subtree of rt is $\mathrm{C}(m+1, r)$. If $m = r$, then rt has no right child.

You are given Q pairs of integers $(l_1, r_1), (l_2, r_2), \ldots, (l_Q, r_Q)$. Determine how many different Cartesian Trees are there among $\mathrm{C}(l_1, r_1), \mathrm{C}(l_2, r_2), \ldots, \mathrm{C}(l_Q, r_Q)$.

Two Cartesian Trees X and Y are considered the same if and only if all of the following conditions are satisfied:

- Let the root of X be rt_X, and the root of Y be rt_Y.
- If rt_X has a left child, then rt_Y also has a left child, and the left subtrees of rt_X and rt_Y are the same Cartesian Tree.
- If rt_X has no left child, then rt_Y also has no left child.
- If rt_X has a right child, then rt_Y also has a right child, and the right subtrees of rt_X and rt_Y are the same Cartesian Tree.
- If rt_X has no right child, then rt_Y also has no right child.

Input

The input is given in the following format:

N
$A_1\ A_2\ \ldots\ A_N$
Q
$l_1\ r_1$
$l_2\ r_2$
$\vdots$
$l_Q\ r_Q$

- All input values are integers.
- $1 \leq N \leq 4 \times 10^5$.
- A is a permutation of $(1, 2, \ldots, N)$.
- $1 \leq Q \leq 4 \times 10^5$.
- $1 \leq l_i \leq r_i \leq N$ $(1 \leq i \leq Q)$.
- $(l_i, r_i) \neq (l_j, r_j)$ $(1 \leq i < j \leq Q)$.

Output

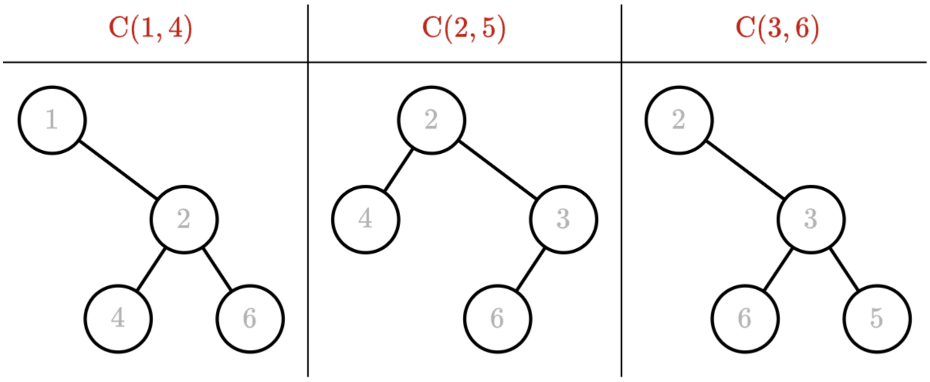
Print the number of different Cartesian Trees among the given pairs $(l_1, r_1), (l_2, r_2), \ldots, (l_Q, r_Q)$.

Examples

standard input	standard output
6 1 4 2 6 3 5 3 1 4 2 5 3 6	2
4 1 2 3 4 10 1 1 2 2 3 3 4 4 1 2 2 3 3 4 1 3 2 4 1 4	4
10 3 8 4 7 2 5 9 10 1 6 13 5 8 2 6 7 9 3 8 3 5 2 4 4 6 1 9 3 7 6 9 2 10 4 9 3 9	11

Note

In the first example, $\mathrm{C}(1,4), \mathrm{C}(2,5), \mathrm{C}(3,6)$ are the following Cartesian Trees:



C(1, 4) and C(3, 6) are the same Cartesian Tree, while C(2, 5) is a different Cartesian Tree from these. Therefore, there are 2 different Cartesian Trees.