Problem D. Station

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4.5 seconds
Memory limit:	1024 mebibytes

There are n bus stations and n bus lines along the main street of City A. The bus stations are labeled from 1 to n from left to right, and the importance of station i is a_i. The bus lines are also numbered from 1 to n. A bus of line k stops at stations whose importance is greater than or equal to k. Each bus line operates in both directions.

A tourist standing at station x can take any bus that stops at station x, pick a direction, and go to the **next** station y visited by that bus in that direction (of course, it is only possible if such station exists). The cost of such trip is l_x yuan if $y < x$, or r_x yuan if $y > x$. Tourists can take multiple bus trips to reach their destination.

Now there are q tourists, and the j-th tourist wants to travel from station s_j to station t_j. Your task is to find the minimum cost of the route for each tourist.

It is guaranteed that, for each i from 1 to $n-1$, the following are true: $l_i \le l_{i+1}$ and $r_i \ge r_{i+1}$.

Input

The first line of input contains a single integer T, the number of test cases ($1 \le T \le 3 \cdot 10^4$). The descriptions of test cases follow.

The first line of each test case contains two integers n and q: the number of stations and the number of tourists ($1 \le n, q \le 3 \cdot 10^5$).

The second line contains n integers $a_1, \ldots, a_n$, where a_i is the importance of station i ($1 \le a_i \le n$).

Then follow n lines, the i-th of which contains two integers l_i and r_i: the costs at station i ($1 \le l_i, r_i \le 10^9$, $l_i \le l_{i+1}$, $r_i \ge r_{i+1}$).

Then follow q lines, the j-th of which contains two integers s_j and t_j: the endpoints of a route for j-th tourist ($1 \le s_j, t_j \le n$).

The sum of n and the sum of q over all test cases do not exceed $3 \cdot 10^5$.

Output

For each tourist, output a line with the answer.

Example

standard input	*standard output*
1 9 6 1 7 3 4 9 9 1 2 2 1 11 1 11 5 11 7 10 8 6 8 4 8 3 9 1 10 1 1 9 5 1 3 1 7 6 2 6 1 1	33 9 6 8 17 0