Problem C. Fast Bubble Sort

Input file:	`standard input`
Output file:	`standard output`
Time limit:	5 seconds
Memory limit:	512 megabytes

Given an array $A = (a_1, a_2, \ldots, a_m)$ of length m, denote by array $B(A)$ the output of a single iteration of bubble sort with input array A, i.e., the output of the following algorithm with input array A.

Algorithm 1: A single iteration of the bubble sort

```
Input: Array A of length m
for i ← 1 to m − 1 do
    if A_i > A_{i+1} then
        swap(A_i, A_{i+1})
    end
end
return A
```

A single iteration of the bubble sort

You may perform the following operation any number (including zero) of times on the array $A = (a_1, a_2, \ldots, a_m)$:

- Select an interval $[i, j]$ where $1 \le i \le j \le m$, and cyclically shift all elements of $a_i, a_{i+1}, \ldots, a_{j-1}, a_j$ in either direction, so that they become $a_j, a_i, a_{i+1}, \ldots, a_{j-1}$ or $a_{i+1}, \ldots, a_{j-1}, a_j, a_i$.

For example, if we cyclically shift the interval $[1, 4]$ of the array $A = [1, 2, 3, 4, 5]$ to the right, the resulting array would be $A' = [4, 1, 2, 3, 5]$.

You are now given a permutation $P = (p_1, p_2, \ldots, p_n)$ of length n and you need to answer q independent queries of the following form:

- In the i-th query, you are given parameters $1 \le l_i \le r_i \le n$ and you are supposed to find the minimum number of above operations needed to transform the subarray $P[l_i, r_i]$ to $B(P[l_i, r_i])$, where $P[l_i, r_i] = (p_{l_i}, p_{l_i+1}, \ldots, p_{r_i})$.

Input

The first line contains an integer $T (1 \le T \le 10)$, denoting the number of test cases.

For each test case, the first line contains two integers n, q $(1 \le n, q \le 10^5)$, denoting the length of permutation P and the number of queries, respectively.

The second line contains n distinct integers $p_1, p_2, \ldots, p_n$ $(1 \le p_i \le n)$.

Each of the following q lines contains two integers l_i, r_i $(1 \le l_i \le r_i \le n)$, denoting the parameters for the i-th query.

Output

For each query of each test case, output an integer in one line, denoting the answer.

Example

standard input	standard output
1 10 5 3 7 9 2 6 4 5 8 10 1 1 10 2 6 7 9 4 9 3 3	2 1 0 1 0

Note

For the second query of the sample test, we can transform $P[2,6]$ to $B(P[2,6])$ by performing a single cyclical shift of the interval $[2,5]$(corresponding to the interval $[3,6]$ in P) to the left:

$$[7,9,2,6,4] \to [7,2,6,4,9].$$