Permutation Graph

https://vjudge.csgrandeur.cn/problem/CodeForces-1696D

A permutation is an array consisting of n distinct integers from 1 to n in arbitrary order. For example, $[2, 3, 1, 5, 4]$ is a permutation, but $[1, 2, 2]$ is not a permutation (2 appears twice in the array) and $[1, 3, 4]$ is also not a permutation ($n = 3$ but there is 4 in the array).

You are given a permutation of $1, 2, \ldots, n$, $[a_1, a_2, \ldots, a_n]$. For integers i, j such that $1 \leq i < j \leq n$, define $\mathrm{mn}(i, j)$ as $\min\limits_{k=i}^{j} a_k$, and define $\mathrm{mx}(i, j)$ as $\max\limits_{k=i}^{j} a_k$.

Let us build an undirected graph of n vertices, numbered 1 to n. For every pair of integers $1 \leq i < j \leq n$, if $\mathrm{mn}(i, j) = a_i$ and $\mathrm{mx}(i, j) = a_j$ both holds, or $\mathrm{mn}(i, j) = a_j$ and $\mathrm{mx}(i, j) = a_i$ both holds, add an undirected edge of length 1 between vertices i and j.

In this graph, find the length of the shortest path from vertex 1 to vertex n. We can prove that 1 and n will always be connected via some path, so a shortest path always exists.

Input

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 5 \cdot 10^4$). Description of the test cases follows.

The first line of each test case contains one integer n ($1 \leq n \leq 2.5 \cdot 10^5$).

The second line of each test case contains n integers $a_1, a_2, \ldots, a_n$ ($1 \leq a_i \leq n$). It's guaranteed that a is a permutation of $1, 2, \ldots, n$.

It is guaranteed that the sum of n over all test cases does not exceed $5 \cdot 10^5$.

Output

For each test case, print a single line containing one integer — the length of the shortest path from 1 to n.

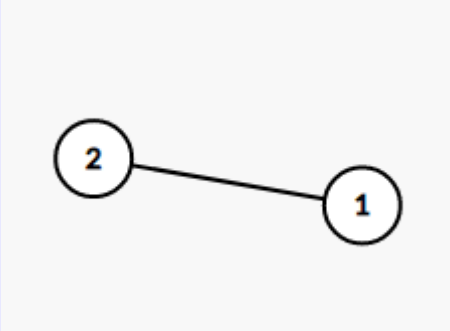
Sample 1

Input	Output
5 1 1 2 1 2 5 1 4 2 3 5 5 2 1 5 3 4 10 7 4 8 1 6 10 3 5 2 9	0 1 1 4 6

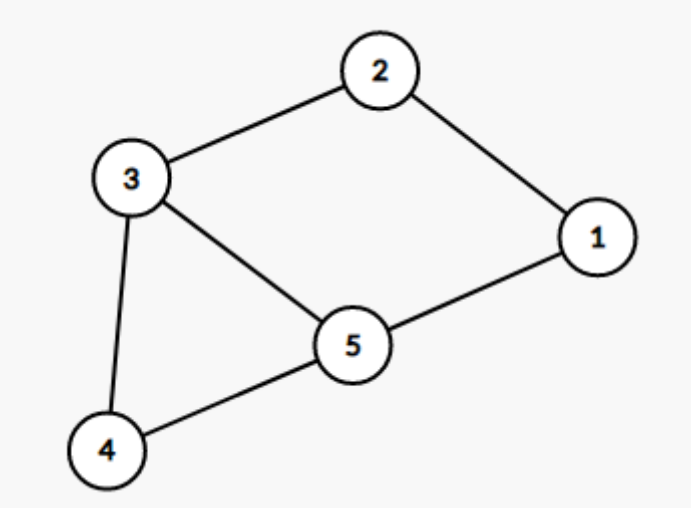
Note

The following are illustrations of constructed graphs in example test cases.

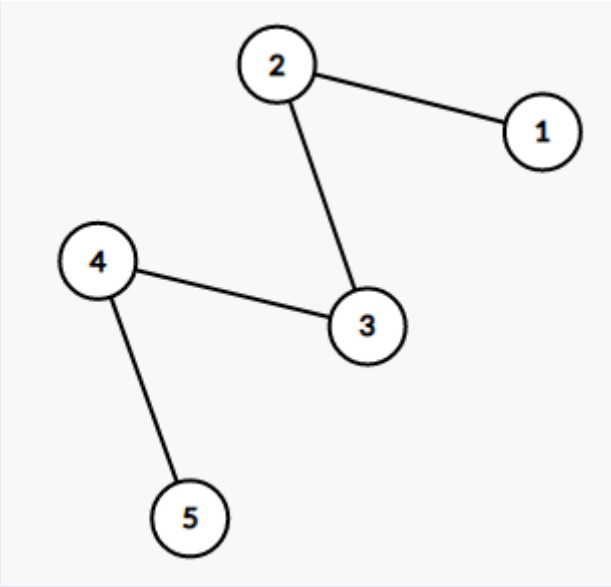
the constructed graph in test case 1



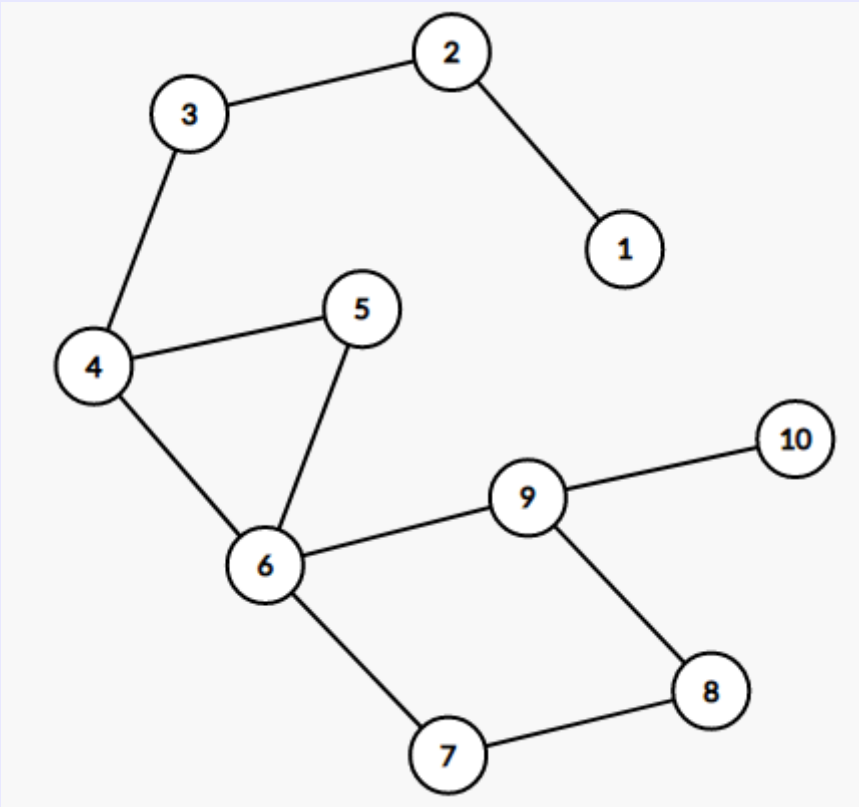
the constructed graph in test case 2



the constructed graph in test case 3



the constructed graph in test case 4



the constructed graph in test case 5