Codeforces Round 907 Problem F Growing Tree

August 18, 2024

Given

Given q query Each query Can be of two types

1 x = query add a node of $sz + 1$ where sz is the size of tree

2 x w = add w to the numerical values of all vertices in the subtree of vertex x

Constraint

Number of queries $q \leq 5 * e^5$

Compute

Values of all the vertices after performing the operation

We will do a simple dfs on the tree starting from node 1 and will and calculate for each node the number of operations of type 2 performed on it or on it's ancestor after additon of the node.

Implementation

We will store the time of insertion of each vertices

We will also store the operation performed on the node u time t and the numerical value added to the node

Do a simple dfs on the tree and update numerical values of the segment tree at the times operation performed and then calculate the sum of the range $time[n] \rightarrow q$ which can be calculated in $o(log(q))$ using segment tree

On returning from dfs undo the changes done by the vertices as the change on the vertices do not impact the ancestor of the vertices.