Collapse (Solution)

Subtask 1

Simulate the plan using Union Find.

Subtask 2

Since the place of collapse is fixed, we can consider the left side and the right side of it independently. Using Segment Tree, we keep the information of cities which are connected for consecutive period. Using reversible Union Find and applying Euler Tour to Segment Tree, we can calculate the number of connected components for each time.

Subtask 3

Apply the Square Root Decomposition to the number of cities in the upstream side and the downstream side. For the operations for each block, using one Union Find, we handle the cables in the block for which collapse does not happen. For the cables for which collapse happens, using the information of the previous Union Find, we can calculate the number of connected components using another Union Find.

Subtask 4 (Full Score)

Apply the Square Root Decomposition to the queries. For the operations for each block, sort the queries according to the positions where the collapses happen. We handle the cables in the block where constructions will not occur using one Union Find. For the cables in the block where constructions will occur, using the information of the previous Union Find, we can calculate the number of connected components using another Union Find.