3620. Network Recovery Pathways

Solved

Hard Topics Hint

You are given a directed acyclic graph of `n` nodes numbered from 0 to `n - 1`. This is represented by a 2D array `edges` of length `m`, where `edges[i] = [ui, vi, costi]` indicates a one-way communication from node u_i to node v_i with a recovery cost of $cost_i$.

Some nodes may be offline. You are given a boolean array `online` where `online[i] = true` means node `i` is online. Nodes 0 and `n - 1` are always online.

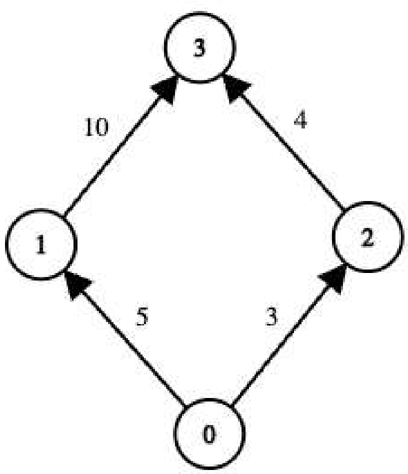
A path from 0 to `n - 1` is **valid** if:

- All intermediate nodes on the path are online.
- The total recovery cost of all edges on the path does not exceed `k`.

For each valid path, define its **score** as the minimum edge-cost along that path.

Return the **maximum** path score (i.e., the largest **minimum**-edge cost) among all valid paths. If no valid path exists, return -1.

Example 1:

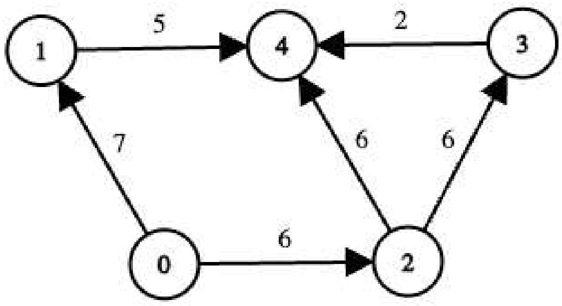
> **Input:** edges = [[0,1,5],[1,3,10],[0,2,3],[2,3,4]], online = [true,true,true,true], k = 10
>
> **Output:** 3
>
> **Explanation:**
>
> 
>
>
> - The graph has two possible routes from node 0 to node 3:
>   1. Path `0 → 1 → 3`
>   - Total cost = `5 + 10 = 15`, which exceeds k (`15 > 10`), so this path is invalid.
>   2. Path `0 → 2 → 3`
>   - Total cost = `3 + 4 = 7 <= k`, so this path is valid.
>   - The minimum edge-cost along this path is `min(3, 4) = 3`.
> - There are no other valid paths. Hence, the maximum among all valid path-scores is 3.

Example 2:

Input: edges = [[0,1,7],[1,4,5],[0,2,6],[2,3,6],[3,4,2],[2,4,6]], online = [true,true,true,false,true], k = 12

Output: 6

Explanation:



- Node 3 is offline, so any path passing through 3 is invalid.
- Consider the remaining routes from 0 to 4:
  1. Path `0 → 1 → 4`
     - Total cost = `7 + 5 = 12 <= k`, so this path is valid.
     - The minimum edge-cost along this path is `min(7, 5) = 5`.
  2. Path `0 → 2 → 3 → 4`
     - Node 3 is offline, so this path is invalid regardless of cost.
  3. Path `0 → 2 → 4`
     - Total cost = `6 + 6 = 12 <= k`, so this path is valid.
     - The minimum edge-cost along this path is `min(6, 6) = 6`.
- Among the two valid paths, their scores are 5 and 6. Therefore, the answer is 6.

Constraints:

- `n == online.length`
- $2 <= n <= 5 * 10^4$
- $0 <= m ==$ edges.length $<= \min(10^5, n * (n - 1) / 2)$
- edges[i] = $[u_i, v_i, cost_i]$
- $0 <= u_i, v_i < n$
- $u_i != v_i$
- $0 <= cost_i <= 10^9$
- $0 <= k <= 5 * 10^{13}$
- `online[i]` is either `true` or `false`, and both `online[0]` and `online[n − 1]` are `true`.
- The given graph is a directed acyclic graph.

Seen this question in a real interview before? 1/5

Yes No

Accepted 12.347/40.7K | **Acceptance Rate** 30.3%

Topics

Hint 1

Hint 2

Hint 3

Discussion (45)