Problem 3419: Minimize the Maximum Edge Weight of Graph

Problem Information

Difficulty: Medium
Acceptance Rate: 43.43%
Paid Only: No
Tags: Binary Search, Depth-First Search, Breadth-First Search, Graph, Shortest Path

Problem Description

You are given two integers, `n` and `threshold`, as well as a **directed** weighted graph of `n` nodes numbered from 0 to `n - 1`. The graph is represented by a **2D** integer array `edges`, where `edges[i] = [Ai, Bi, Wi]` indicates that there is an edge going from node `Ai` to node `Bi` with weight `Wi`.

You have to remove some edges from this graph (possibly **none**), so that it satisfies the following conditions:

* Node 0 must be reachable from all other nodes. * The **maximum** edge weight in the resulting graph is **minimized**. * Each node has **at most** `threshold` outgoing edges.

Return the **minimum** possible value of the **maximum** edge weight after removing the necessary edges. If it is impossible for all conditions to be satisfied, return -1.

Example 1:

Input: n = 5, edges = [[1,0,1],[2,0,2],[3,0,1],[4,3,1],[2,1,1]], threshold = 2

Output: 1

Explanation:

Remove the edge `2 -> 0`. The maximum weight among the remaining edges is 1.

Example 2:

Input: n = 5, edges = [[0,1,1],[0,2,2],[0,3,1],[0,4,1],[1,2,1],[1,4,1]], threshold = 1

Output: -1

Explanation:

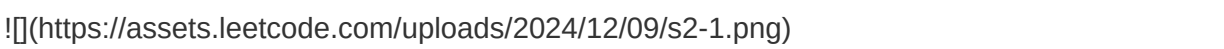
It is impossible to reach node 0 from node 2.

Example 3:

Input: n = 5, edges = [[1,2,1],[1,3,3],[1,4,5],[2,3,2],[3,4,2],[4,0,1]], threshold = 1

Output: 2

Explanation:



Remove the edges `1 -> 3` and `1 -> 4`. The maximum weight among the remaining edges is 2.

Example 4:

Input: n = 5, edges = [[1,2,1],[1,3,3],[1,4,5],[2,3,2],[4,0,1]], threshold = 1

Output: -1

Constraints:

* `2 <= n <= 105` * `1 <= threshold <= n - 1` * `1 <= edges.length <= min(105, n * (n - 1) / 2).` * `edges[i].length == 3` * `0 <= Ai, Bi < n` * `Ai != Bi` * `1 <= Wi <= 106` * There **may be** multiple edges between a pair of nodes, but they must have unique weights.

Code Snippets

C++:

```
class Solution {
public:
int minMaxWeight(int n, vector<vector<int>>& edges, int threshold) {

}
};
```

Java:

```
class Solution {
public int minMaxWeight(int n, int[][] edges, int threshold) {

}
}
```

Python3:

```
class Solution:
def minMaxWeight(self, n: int, edges: List[List[int]], threshold: int) ->
int:
```