Problem 3123: Find Edges in Shortest Paths

Problem Information

Difficulty: Hard
Acceptance Rate: 46.25%
Paid Only: No
Tags: Depth-First Search, Breadth-First Search, Graph, Heap (Priority Queue), Shortest Path

Problem Description

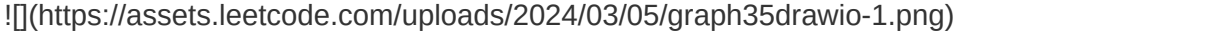
You are given an undirected weighted graph of `n` nodes numbered from 0 to `n - 1`. The graph consists of `m` edges represented by a 2D array `edges`, where `edges[i] = [ai, bi, wi]` indicates that there is an edge between nodes `ai` and `bi` with weight `wi`.

Consider all the shortest paths from node 0 to node `n - 1` in the graph. You need to find a **boolean** array `answer` where `answer[i]` is `true` if the edge `edges[i]` is part of **at least** one shortest path. Otherwise, `answer[i]` is `false`.

Return the array `answer`.

Note that the graph may not be connected.

Example 1:



Input: n = 6, edges = [[0,1,4],[0,2,1],[1,3,2],[1,4,3],[1,5,1],[2,3,1],[3,5,3],[4,5,2]]

Output: [true,true,true,false,true,true,true,false]

Explanation:

The following are **all** the shortest paths between nodes 0 and 5:

* The path `0 -> 1 -> 5`: The sum of weights is `4 + 1 = 5`. * The path `0 -> 2 -> 3 -> 5`: The sum of weights is `1 + 1 + 3 = 5`. * The path `0 -> 2 -> 3 -> 1 -> 5`: The sum of weights is `1 +

1 + 2 + 1 = 5`.

Example 2:

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

Output: [true,false,false,true]

Explanation:

There is one shortest path between nodes 0 and 3, which is the path `0 -> 2 -> 3` with the sum of weights `1 + 2 = 3`.

Constraints:

* `2 <= n <= 5 * 104` * `m == edges.length` * `1 <= m <= min(5 * 104, n * (n - 1) / 2)` * `0 <= ai, bi < n` * `ai != bi` * `1 <= wi <= 105` * There are no repeated edges.

Code Snippets

C++:

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

}
};
```

Java:

```
class Solution {
public boolean[] findAnswer(int n, int[][] edges) {

}
}
```

Python3:

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