2642. Design Graph With Shortest Path Calculator

Hint

Hard 125 14

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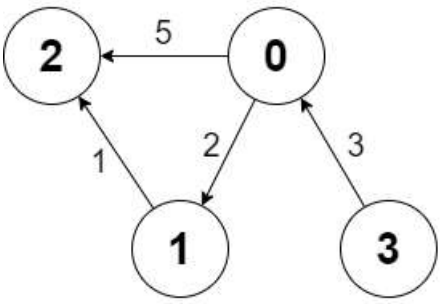
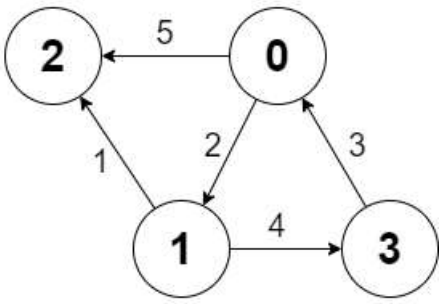
There is a **directed weighted** graph that consists of `n` nodes numbered from `0` to `n - 1`. The edges of the graph are initially represented by the given array `edges` where `edges[i] = [from_i, to_i, edgeCost_i]` meaning that there is an edge from `from_i` to `to_i` with the cost `edgeCost_i`.

Implement the `Graph` class:

- `Graph(int n, int[][] edges)` initializes the object with `n` nodes and the given edges.
- `addEdge(int[] edge)` adds an edge to the list of edges where `edge = [from, to, edgeCost]`. It is guaranteed that there is no edge between the two nodes before adding this one.
- `int shortestPath(int node1, int node2)` returns the **minimum** cost of a path from `node1` to `node2`. If no path exists, return `-1`. The cost of a path is the sum of the costs of the edges in the path.

Example 1:





Input
["Graph", "shortestPath", "shortestPath", "addEdge", "shortestPath"]
[[4, [[0, 2, 5], [0, 1, 2], [1, 2, 1], [3, 0, 3]]], [3, 2], [0, 3], [[1, 3, 4]], [0, 3]]
Output
[null, 6, -1, null, 6]

Explanation
Graph g = new Graph(4, [[0, 2, 5], [0, 1, 2], [1, 2, 1], [3, 0, 3]]);
g.shortestPath(3, 2); // return 6. The shortest path from 3 to 2 in the first diagram above is 3 -> 0 -> 1 -> 2 with a total cost of 3 + 2 + 1 = 6.
g.shortestPath(0, 3); // return -1. There is no path from 0 to 3.
g.addEdge([1, 3, 4]); // We add an edge from node 1 to node 3, and we get the second diagram above.
g.shortestPath(0, 3); // return 6. The shortest path from 0 to 3 now is 0 -> 1 -> 3 with a total cost of 2 + 4 = 6.

Constraints:

- `1 <= n <= 100`
- `0 <= edges.length <= n * (n - 1)`
- `edges[i].length == edge.length == 3`
- `0 <= from_i, to_i, from, to, node1, node2 <= n - 1`
- `1 <= edgeCost_i, edgeCost <= 10^6`
- There are no repeated edges and no self-loops in the graph at any point.
- At most `100` calls will be made for `addEdge`.
- At most `100` calls will be made for `shortestPath`.

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Yes No

Discussion (2)

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