1724. Checking Existence of Edge Length Limited Paths II Premium

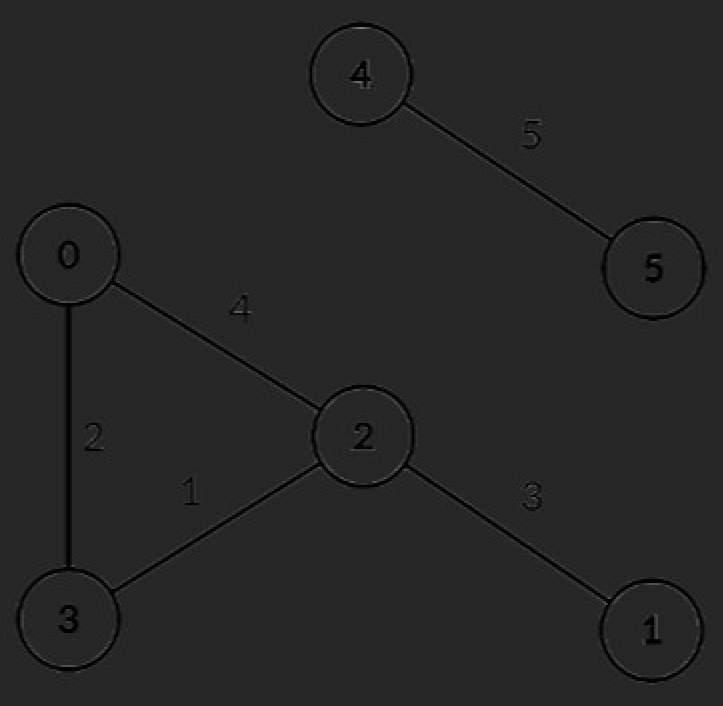
Hard Topics Companies Hint

An undirected graph of `n` nodes is defined by `edgeList`, where `edgeList[i] =` $[u_i, v_i, dis_i]$ denotes an edge between nodes u_i and v_i with distance dis_i. Note that there may be **multiple** edges between two nodes, and the graph may not be connected.

Implement the `DistanceLimitedPathsExist` class:

- `DistanceLimitedPathsExist(int n, int[][] edgeList)` Initializes the class with an undirected graph.
- `boolean query(int p, int q, int limit)` Returns `true` if there exists a path from `p` to `q` such that each edge on the path has a distance **strictly less than** `limit`, and otherwise `false`.

Example 1:



```
Input
["DistanceLimitedPathsExist", "query", "query", "query", "query"]
[[6, [[0, 2, 4], [0, 3, 2], [1, 2, 3], [2, 3, 1], [4, 5, 5]]], [2, 3, 2], [1, 3, 3], [2, 0, 3], [0, 5, 6]]
Output
[null, true, false, true, false]

Explanation
DistanceLimitedPathsExist distanceLimitedPathsExist = new DistanceLimitedPathsExist(6, [[0, 2, 4], [0, 3, 2], [1, 2, 3], [2, 3, 1], [4, 5, 5]]);
distanceLimitedPathsExist.query(2, 3, 2); // return true. There is an edge from 2 to 3 of distance 1, which is less than 2.
distanceLimitedPathsExist.query(1, 3, 3); // return false. There is no way to go from 1 to 3 with distances strictly less than 3.
distanceLimitedPathsExist.query(2, 0, 3); // return true. There is a way to go from 2 to 3 to 0 with distance < 3: travel from 2 to 3 to 0.
distanceLimitedPathsExist.query(0, 5, 6); // return false. There are no paths from 0 to 5.
```

Constraints:

- $2 <= n <= 10^4$
- $0 <=$ `edgeList.length` $<= 10^4$
- `edgeList[i].length == 3`
- $0 <= u_i, v_i, p, q <= n-1$
- $u_i != v_i$
- `p != q`
- $1 <= dis_i, limit <= 10^9$
- At most 10^4 calls will be made to `query`.

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

Yes No

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Hint 1

Find the minimum spanning tree of the given graph.

Hint 2

Root the tree in an arbitrary node and calculate the maximum weight of the edge from each node to the chosen root.

Hint 3

To answer a query, find the lca between the two nodes, and find the maximum weight from each of the query nodes to their lca and compare it to the given limit.

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