video-46

GRAPHS...

"let's make it easy too"

Hard

Leetcode - 3123

If you have tried my "Graph Concepts & Qns" playlist, these Qns, will seem very easy. Do try it once :)

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~~HARD~~ → Don't worry...

(Focus on concepts)

3123. Find Edges in Shortest Paths

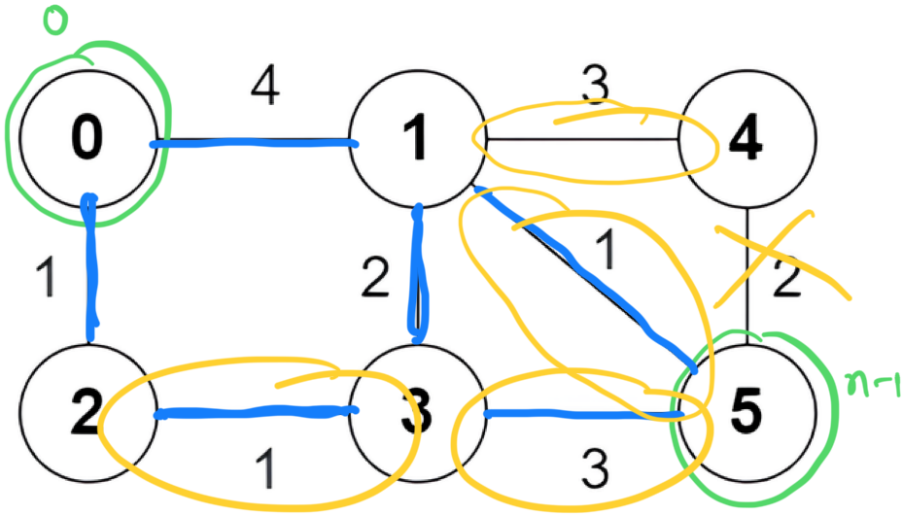
Hard 10 1 Add to List Share

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] = [a_i, b_i, w_i]` indicates that there is an edge between nodes `a_i` and `b_i` with weight `w_i`.

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.



n = 6

5

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}

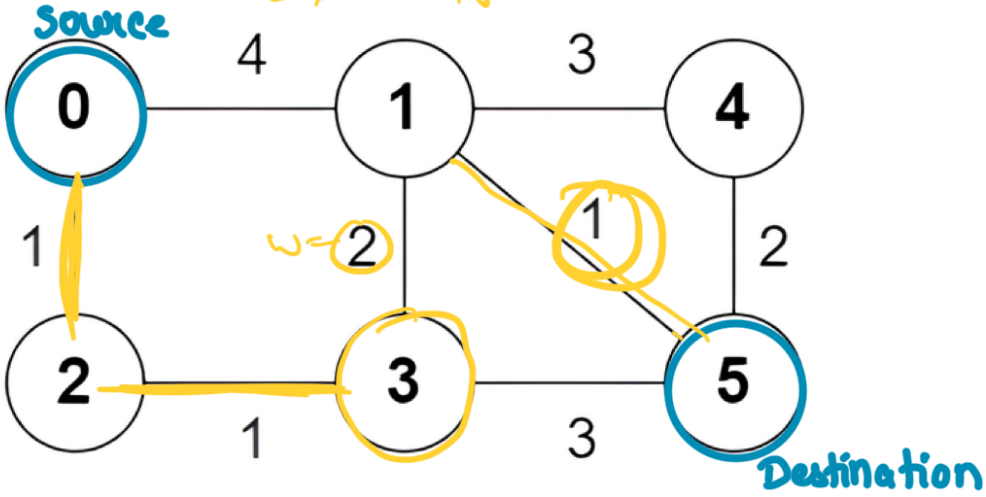
Thought Process

(Intuition)

(1) Shortest Path → Dijkstra.

src = 0 to n-1

x=2, w=2, y=1 ==S== ==S



Result = (from 0) src = 0

0	1	2	3	4	5
0	4	1	2	7	5

⇐ src = 0

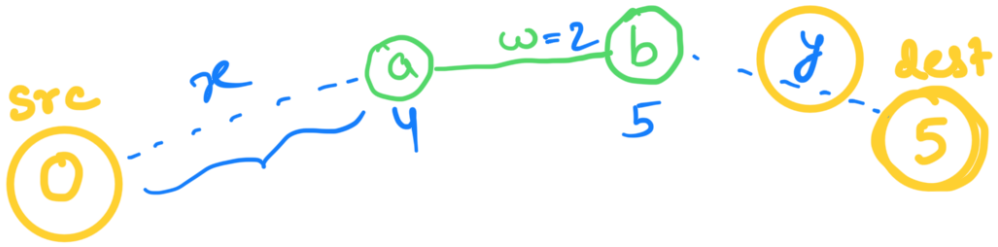
0	1	2	3	4	5
5	1	4	3	2	0

⇐ dest = 5

{(0,1,4), (0,2,1), (1,3,2), (1,4,3), (1,5,1),

(2,3,1), (3,5,3), (4,5,2) }

false



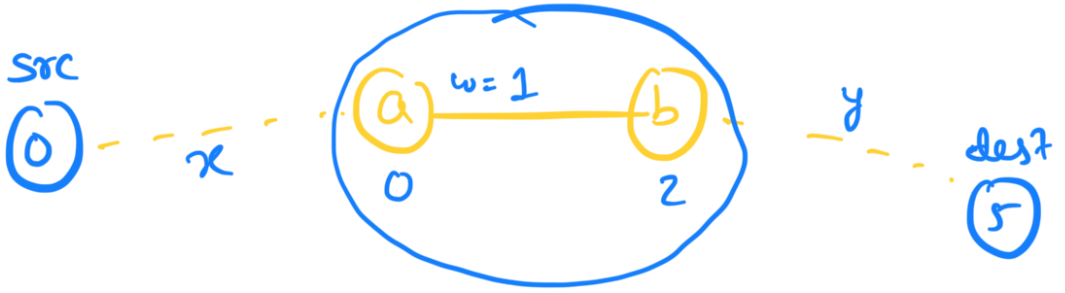
$x + y + w == 5$

$7 + 0 + 2 == 5$

False

$0 \rightarrow 5$

= result[5] = 5



$x + w + y == result[5];$

$0 + 1 + 4 == 5$

x + w + y == result[n-1]

4 + 2 + 3

(1, 3, 2)

9 ✗ result[5]

Double (Both) ended Dijkstra.

src → dest = ↓ □

dest → src = ↓ □

steps:-

1. Dijkstra's copy + paste.

2. src → fromSrc

2. dest → fromEnd

4. edges[i]

u = edge[i][0]
v = edge[i][1]
w = edge[i][2]

(1) src→u + w + dest→v == fromSrc[n-1];
x y s

(2) src→v + w + dest→u == fromSrc[n-1];
x y s

T.C = O(V + E).

S.C = Pq.