



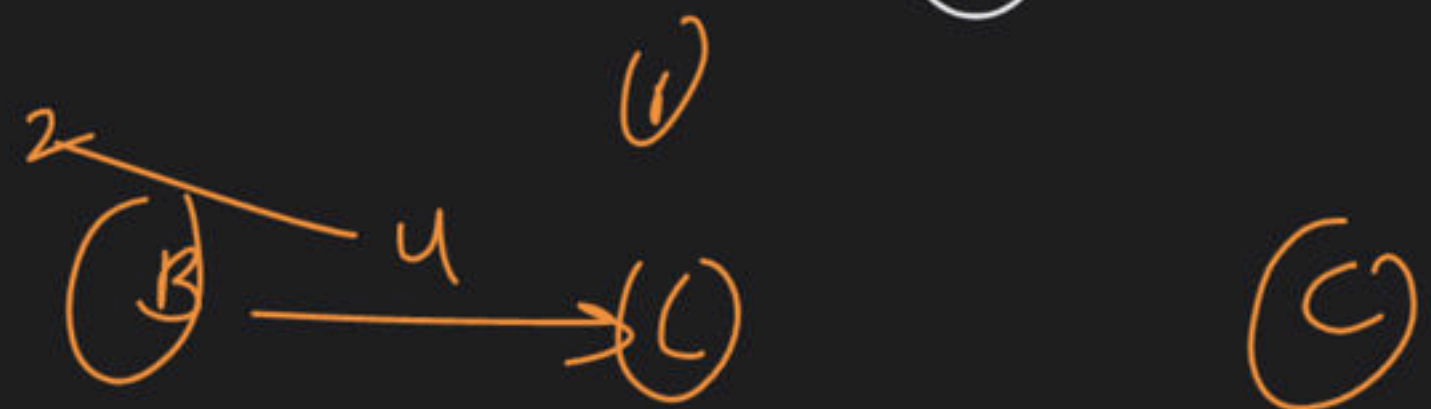
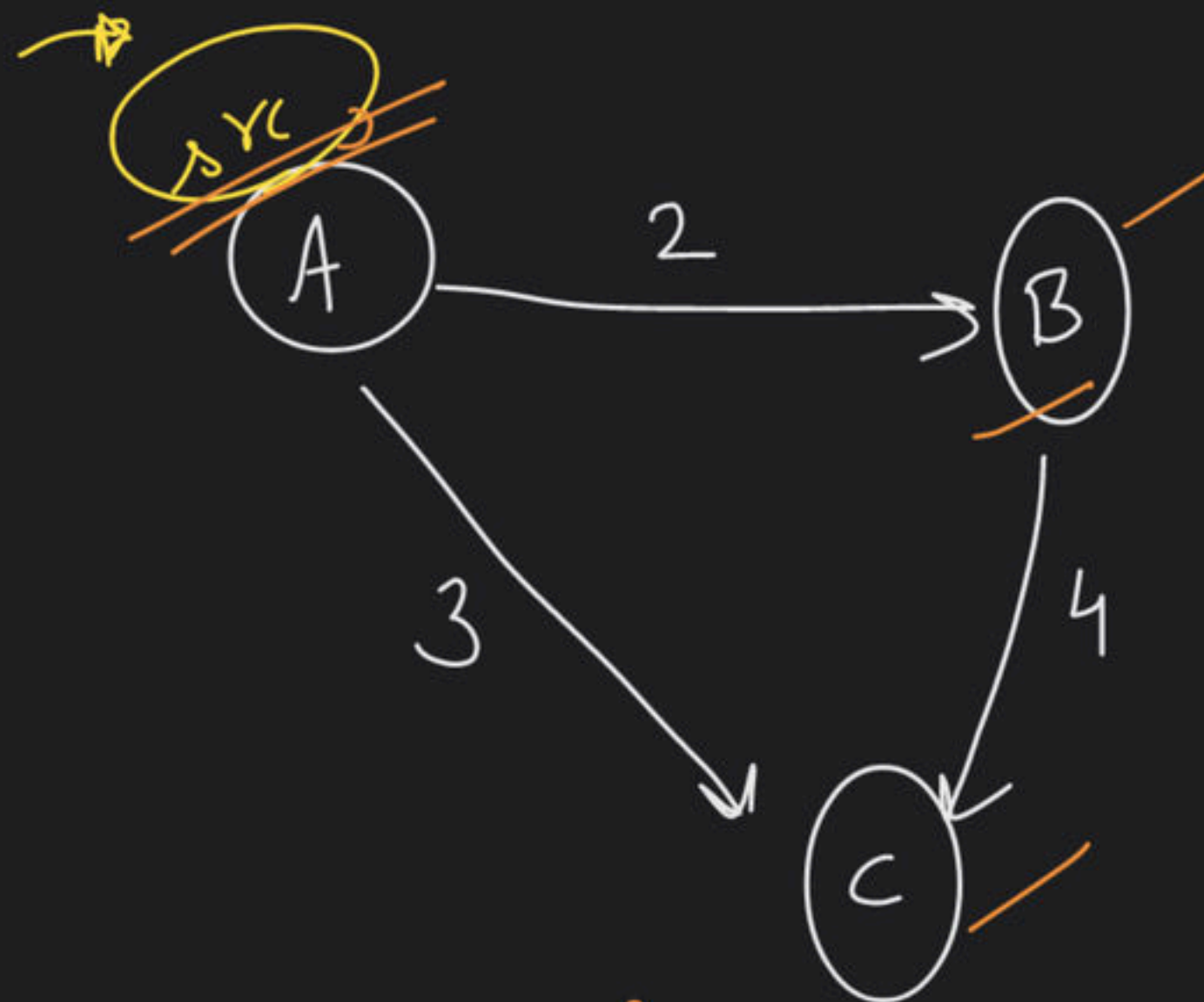
Graph Class - 7

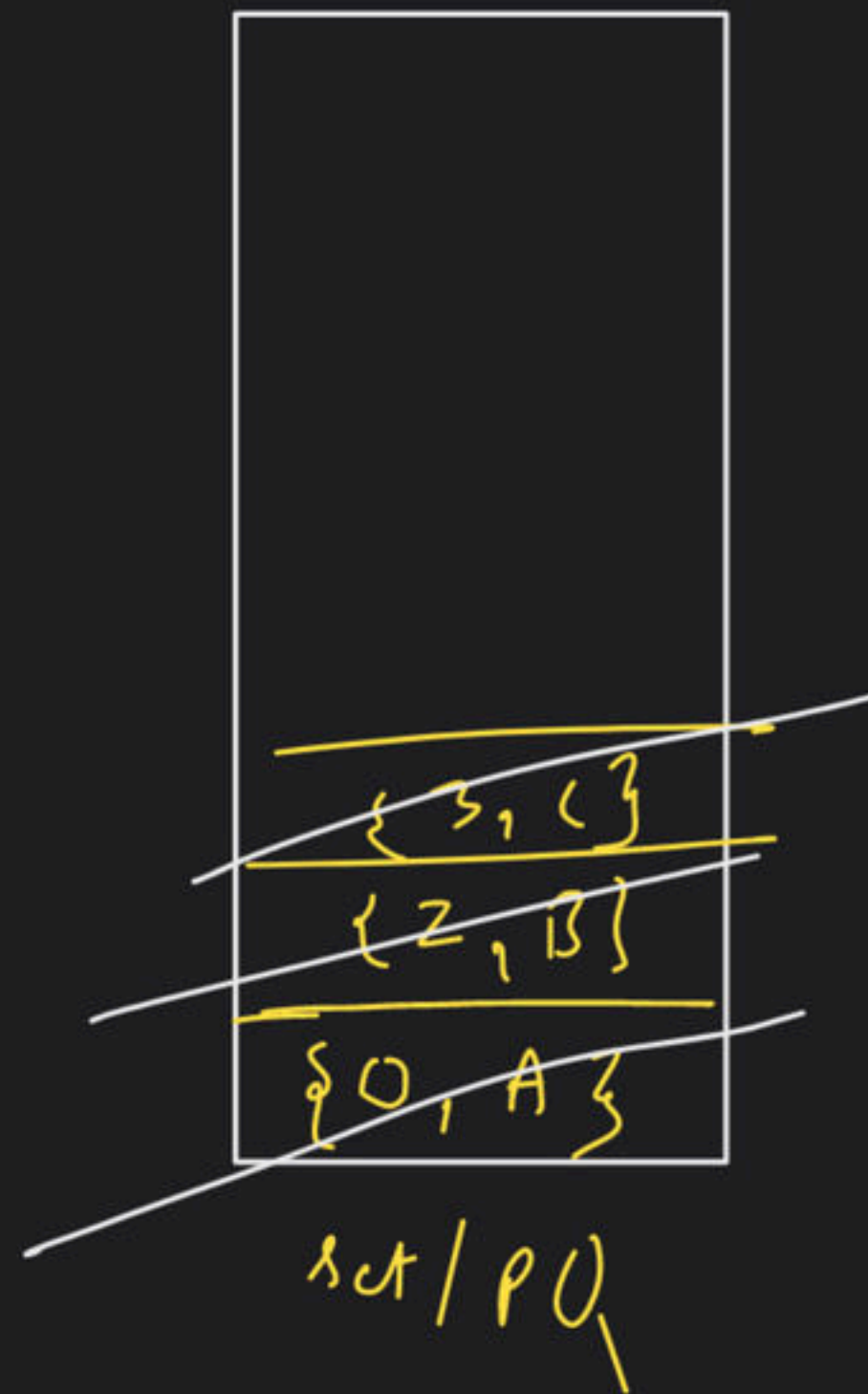
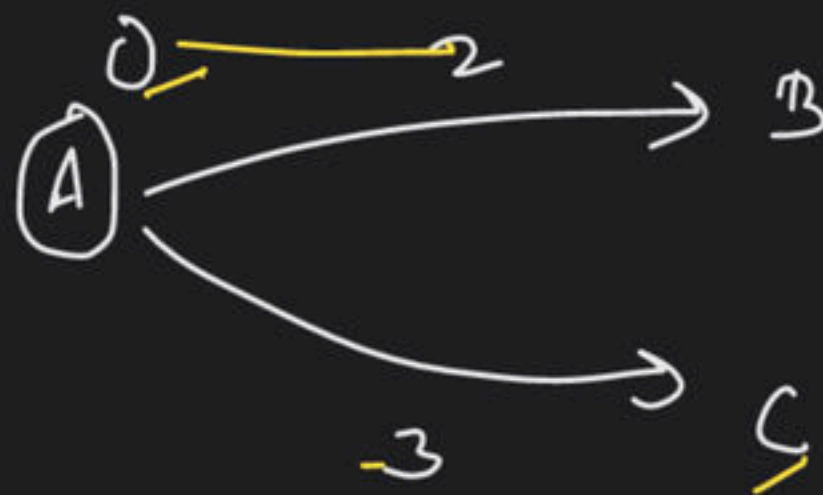
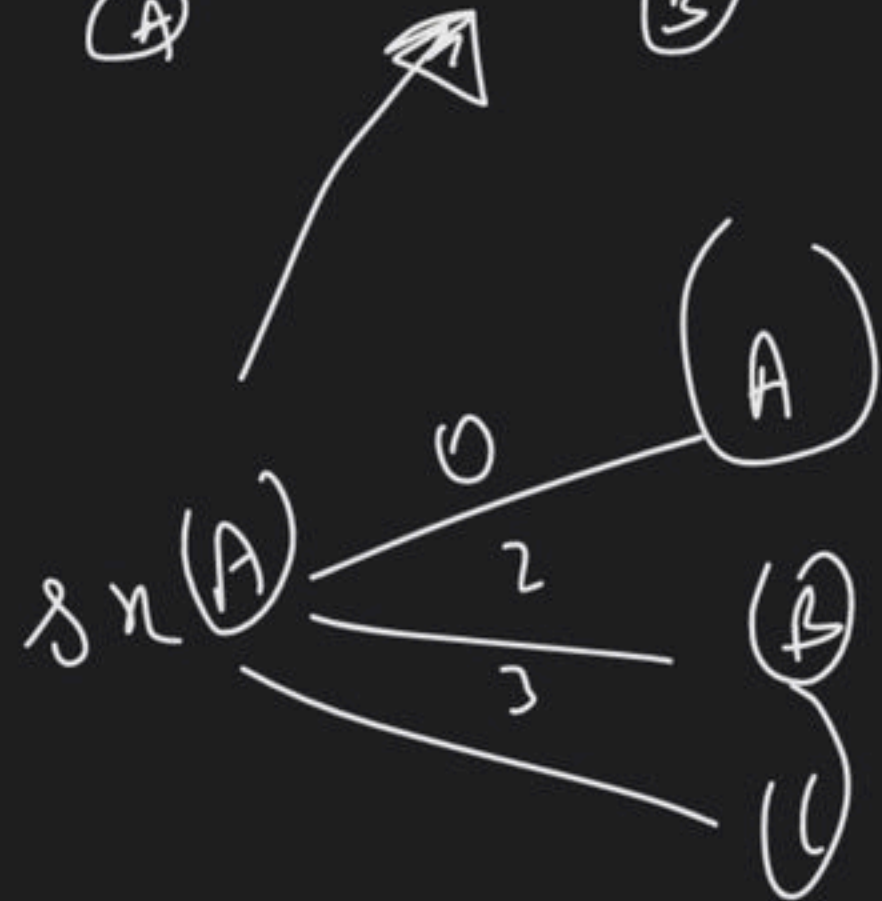
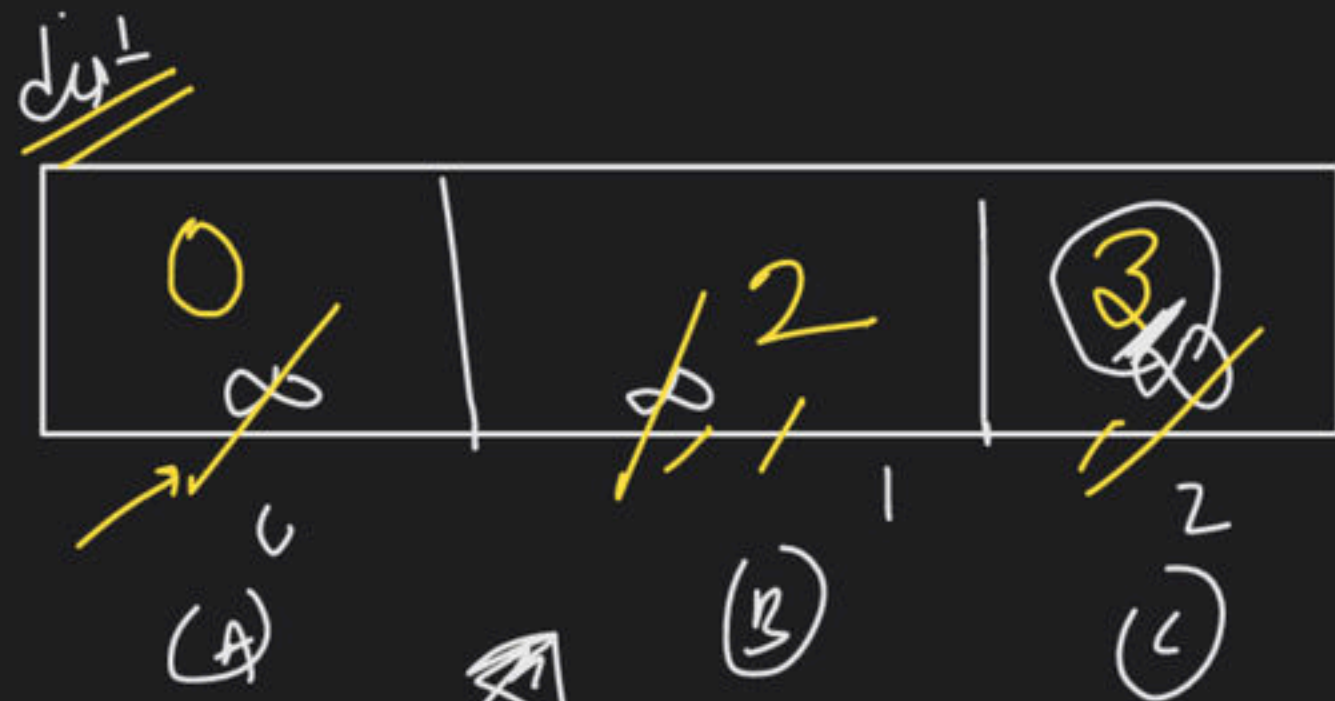
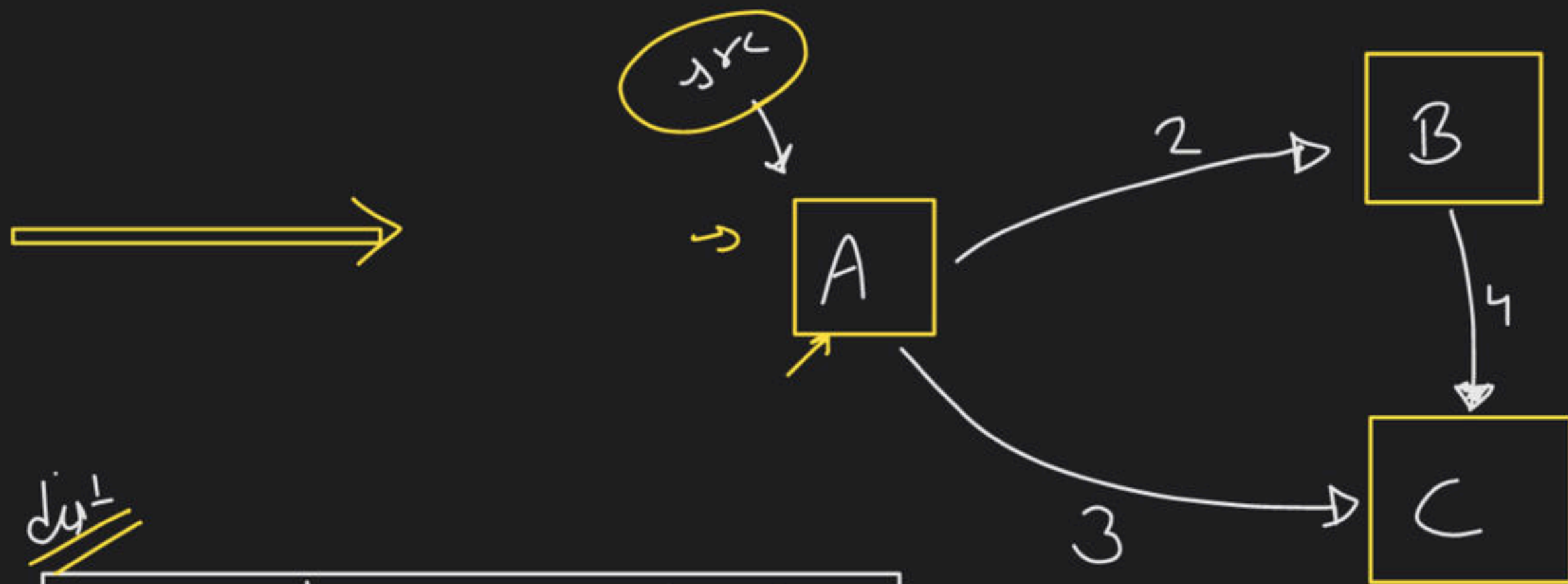
Special class

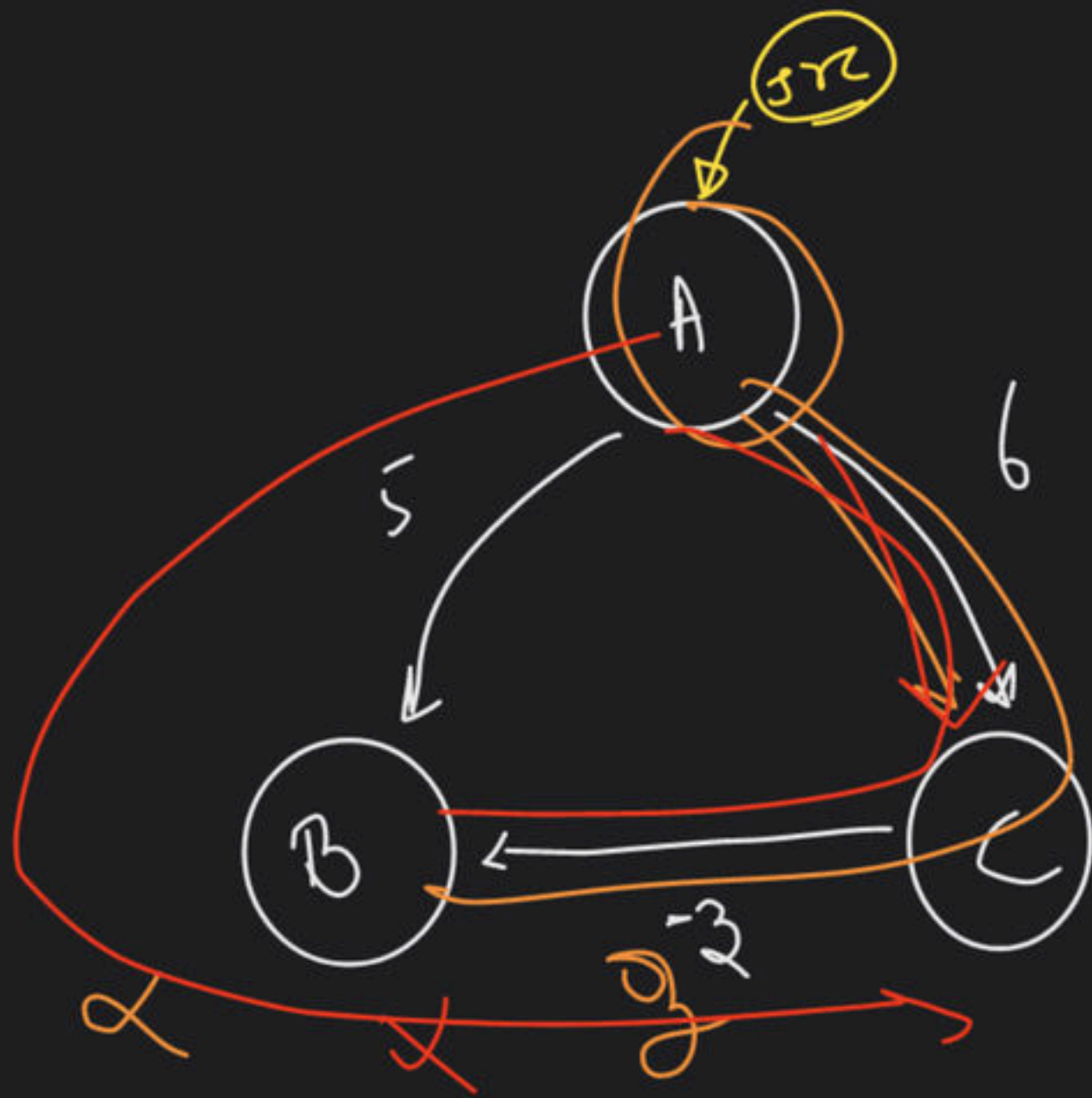
→ Dijkstra's Algo

dist

A	B	C
0	∞	∞
	<u>2</u>	<u>3</u> ←







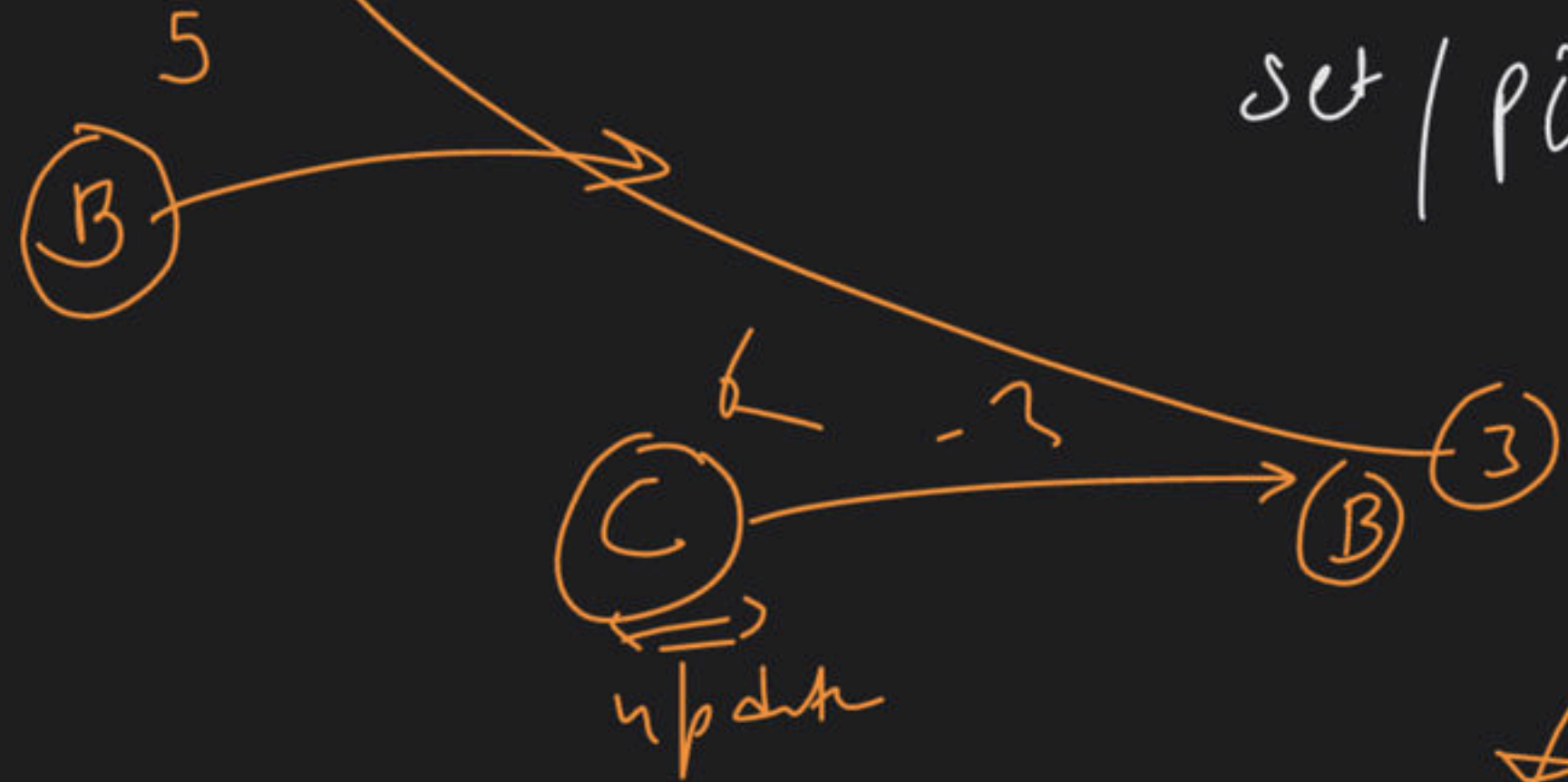
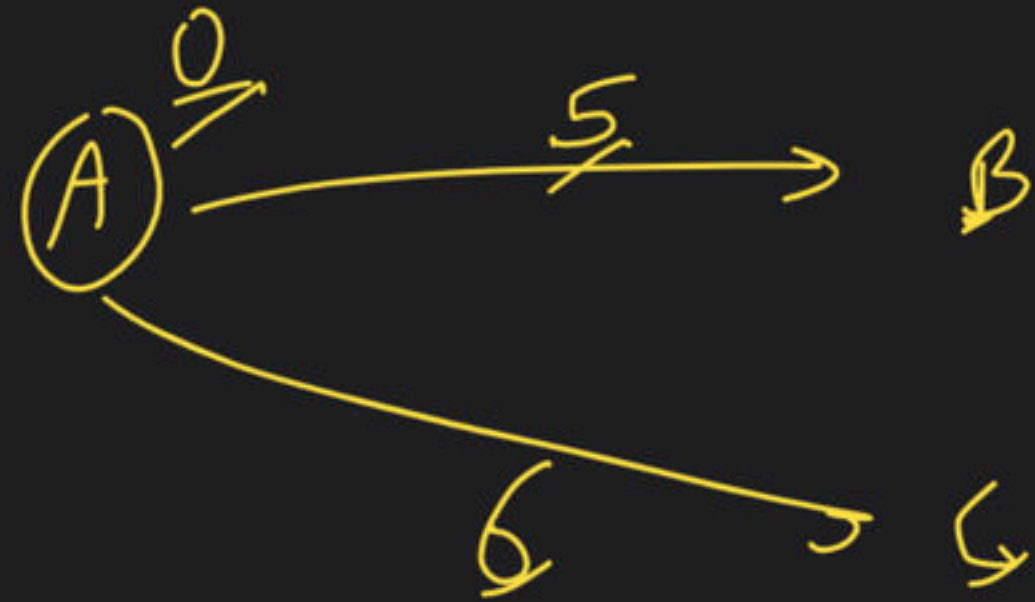
(Dist.)

0	1	2
0	5	6
(A)	(B)	(C)



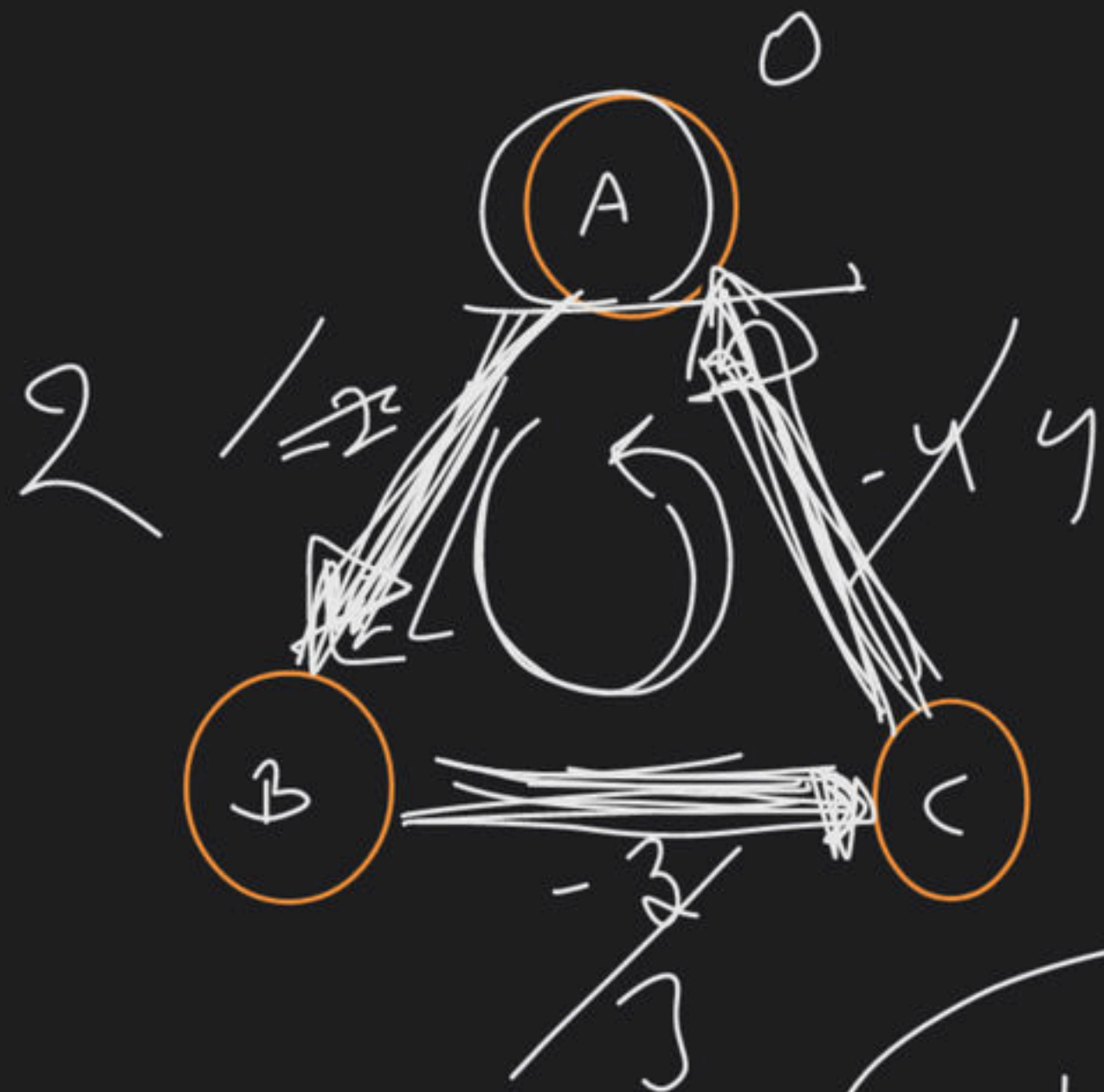
{6, C}
{5, B}
{0, A}

set / PQ



~~greedy~~

update



$$-2 - 3 - 4 = -9$$

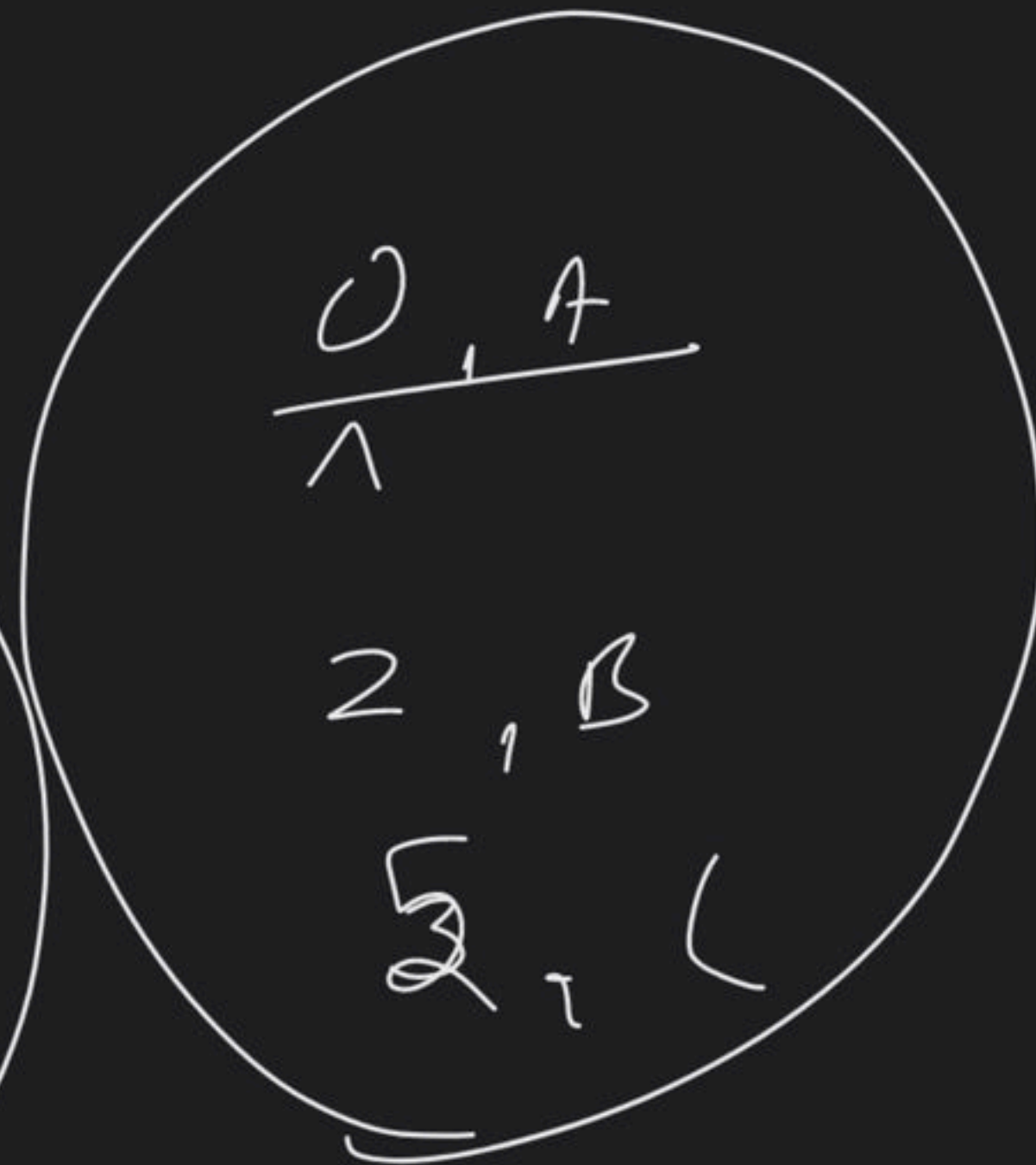
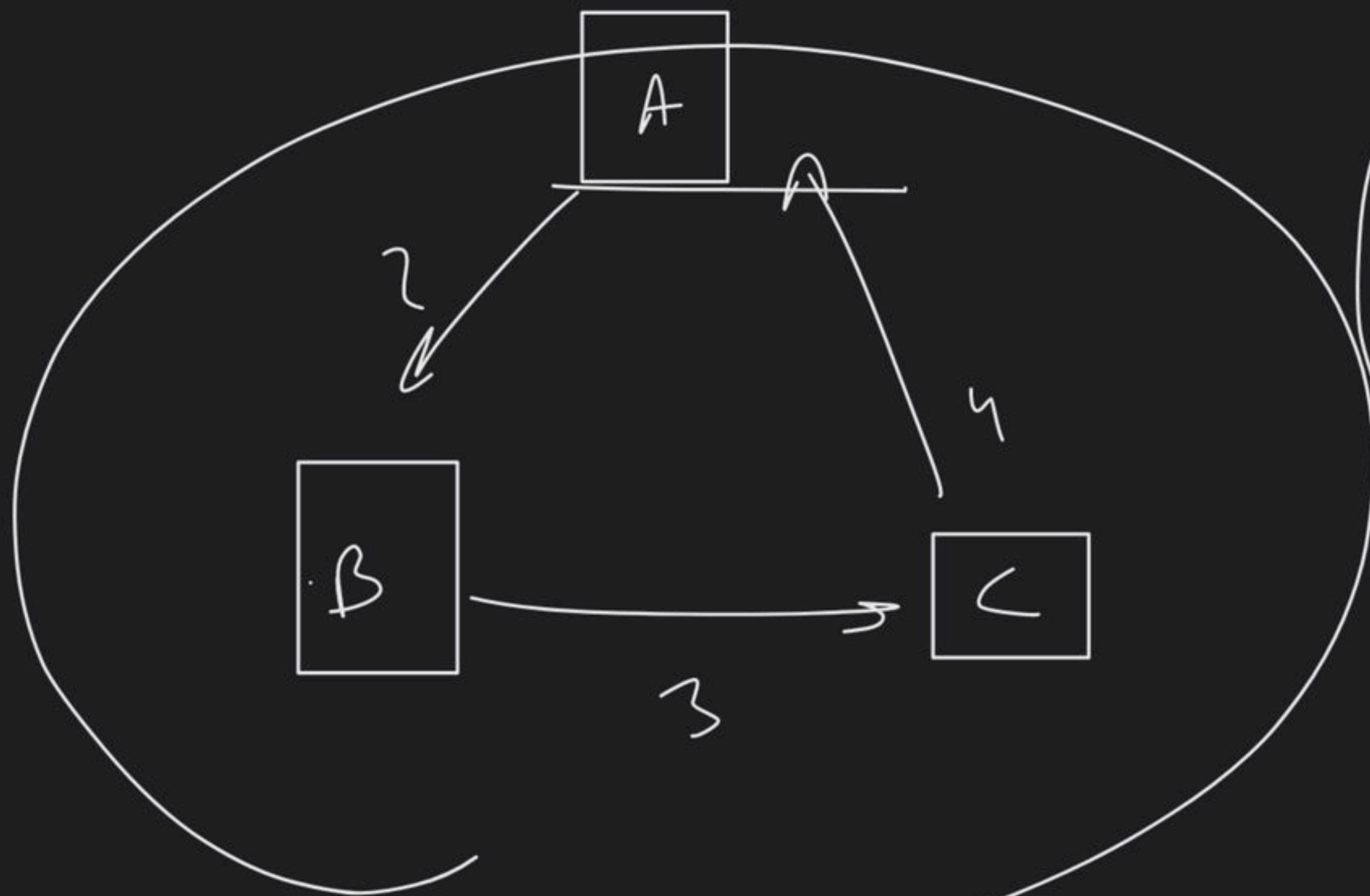
cycle \rightarrow path
wt

ve
cycle

dijkstra's

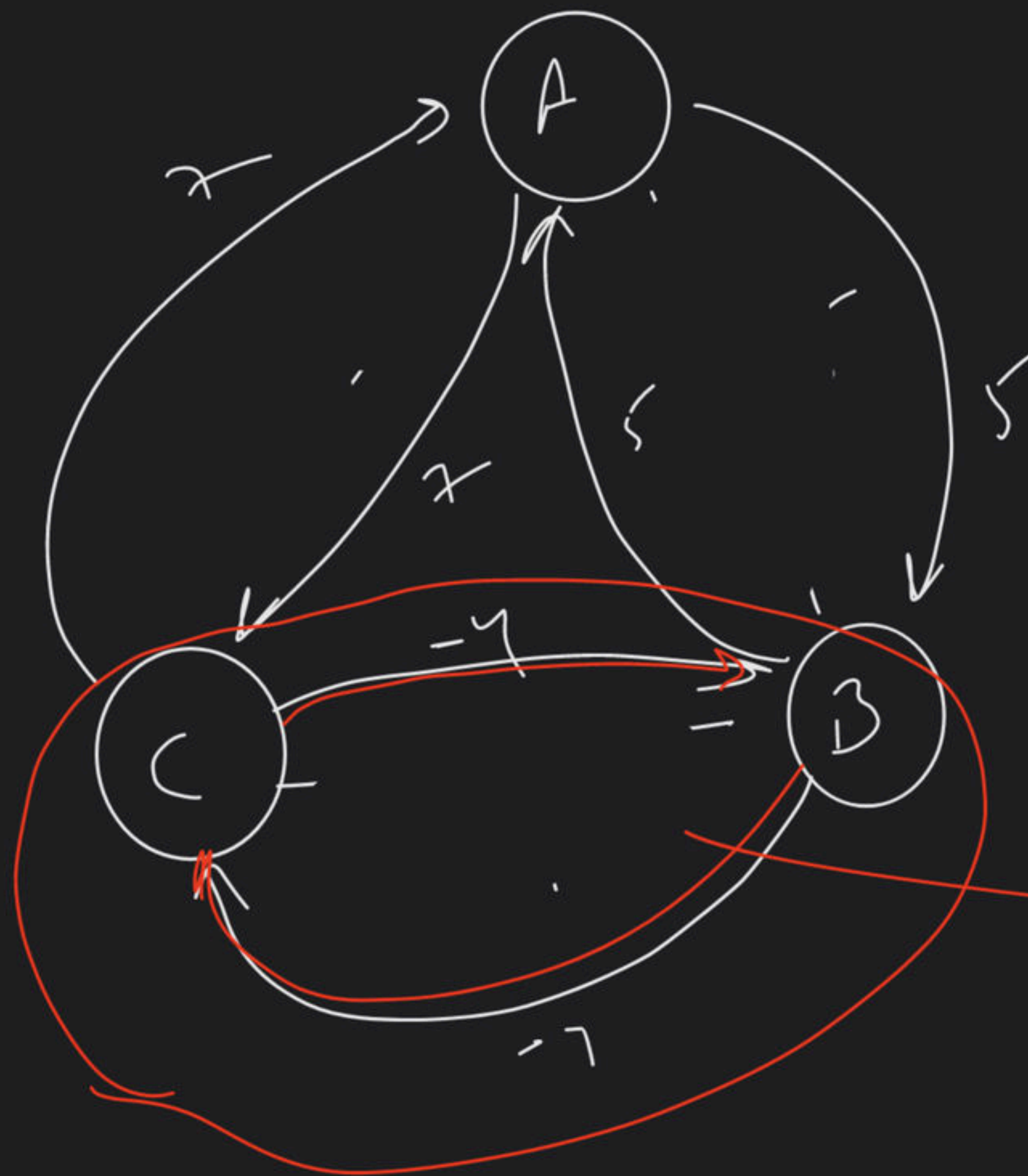
ve cycles

α



infinite?

∞ A



disconnected

2 farjaye

Dijkstra Algo :-

Σ

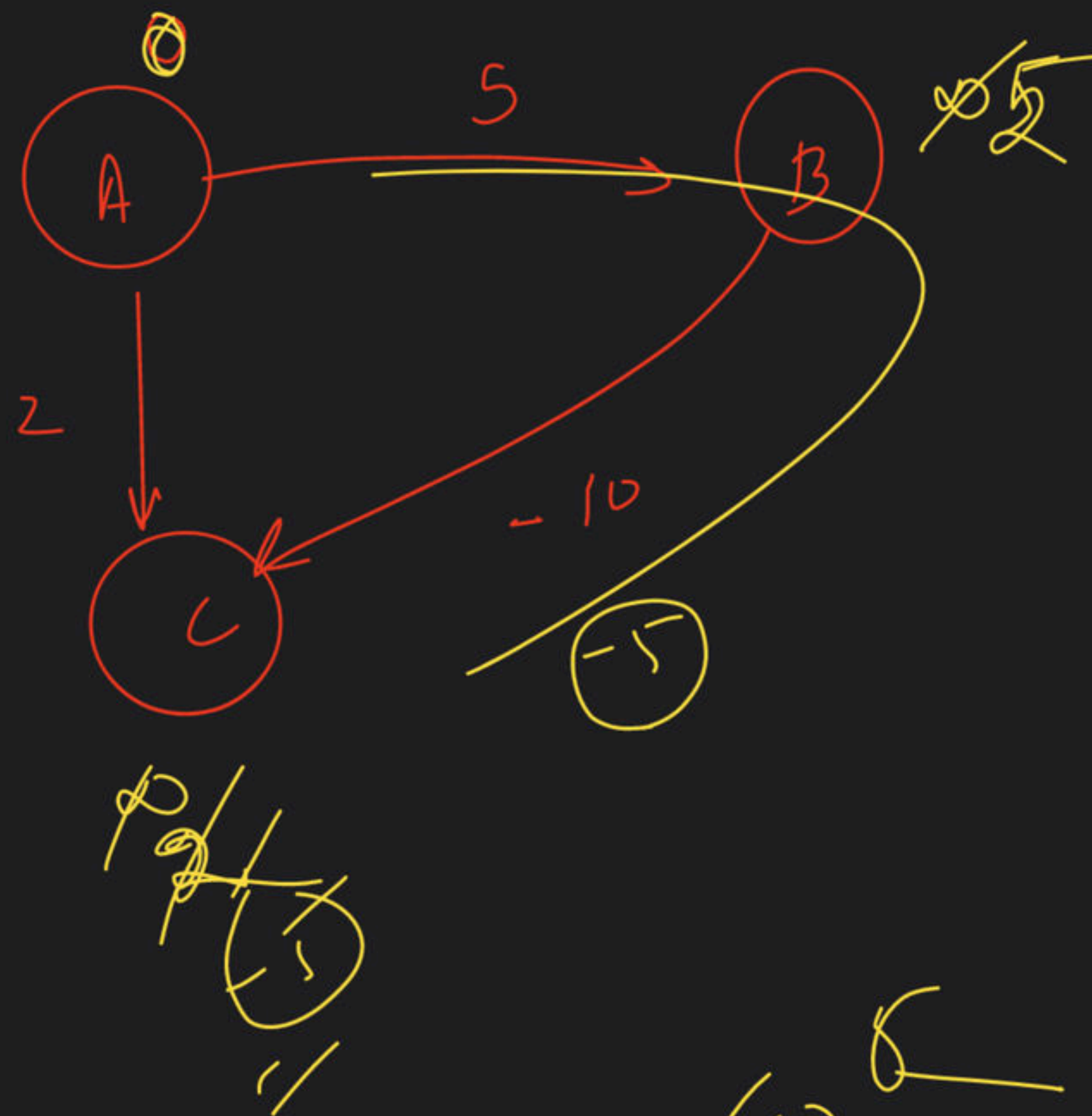
\mathcal{D}

\mathcal{L}

\mathcal{B}

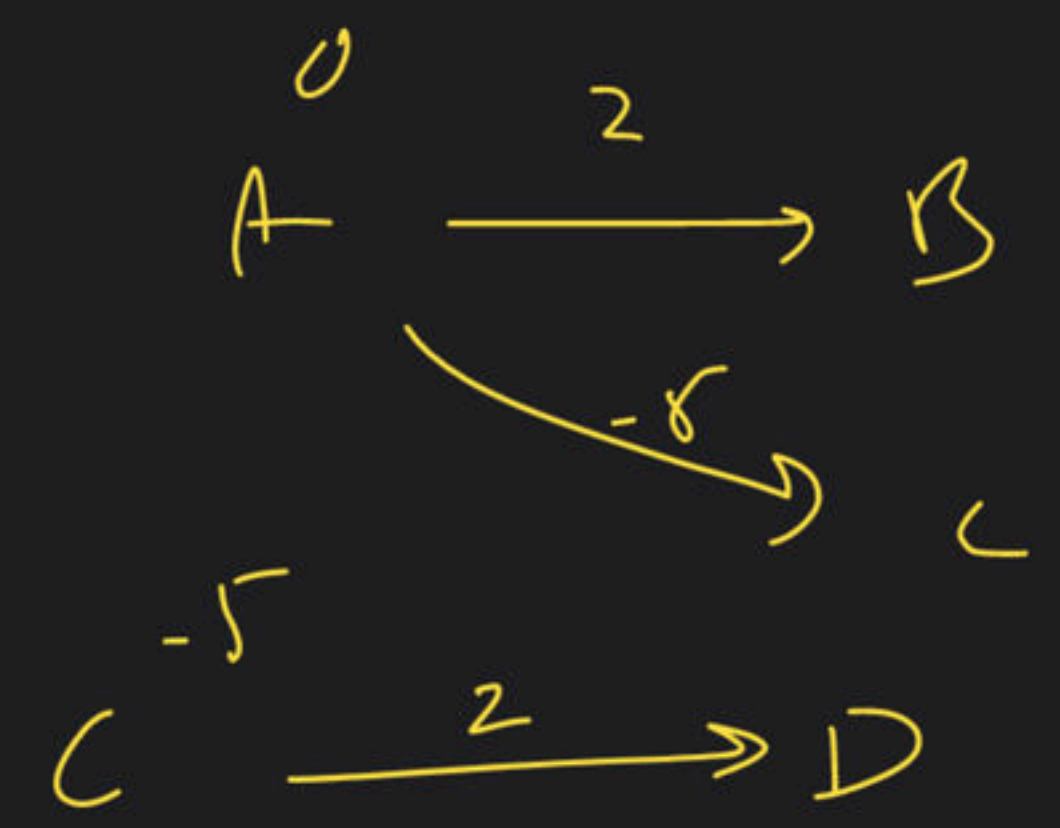
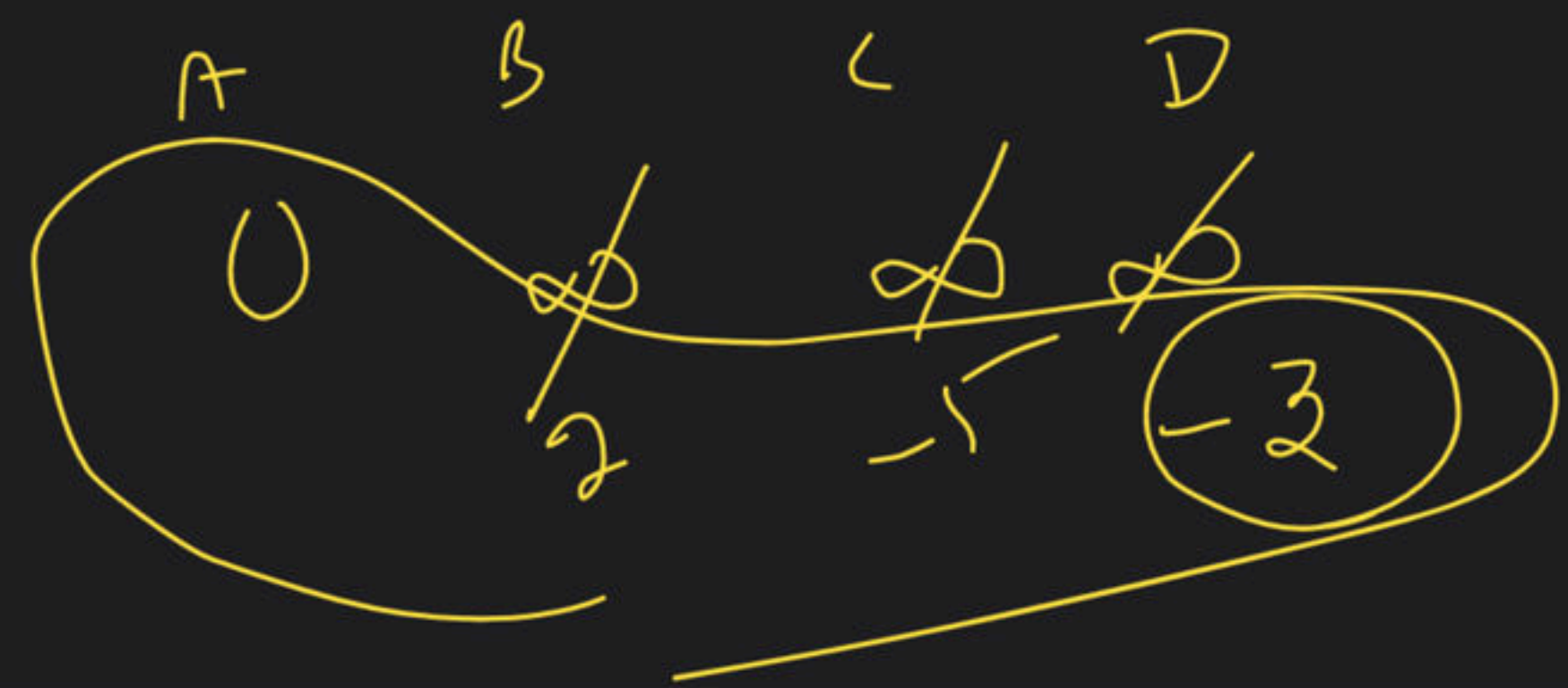
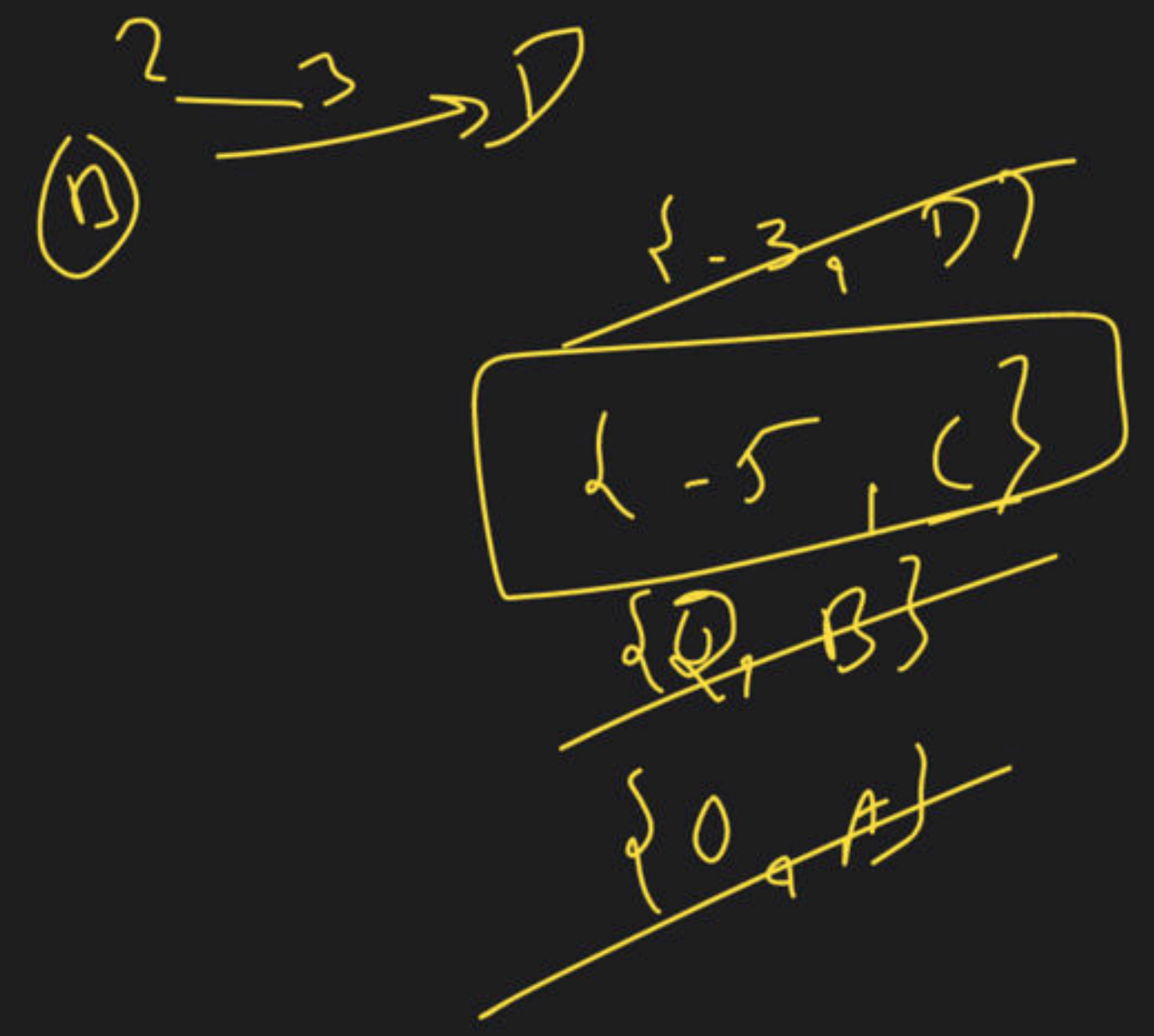
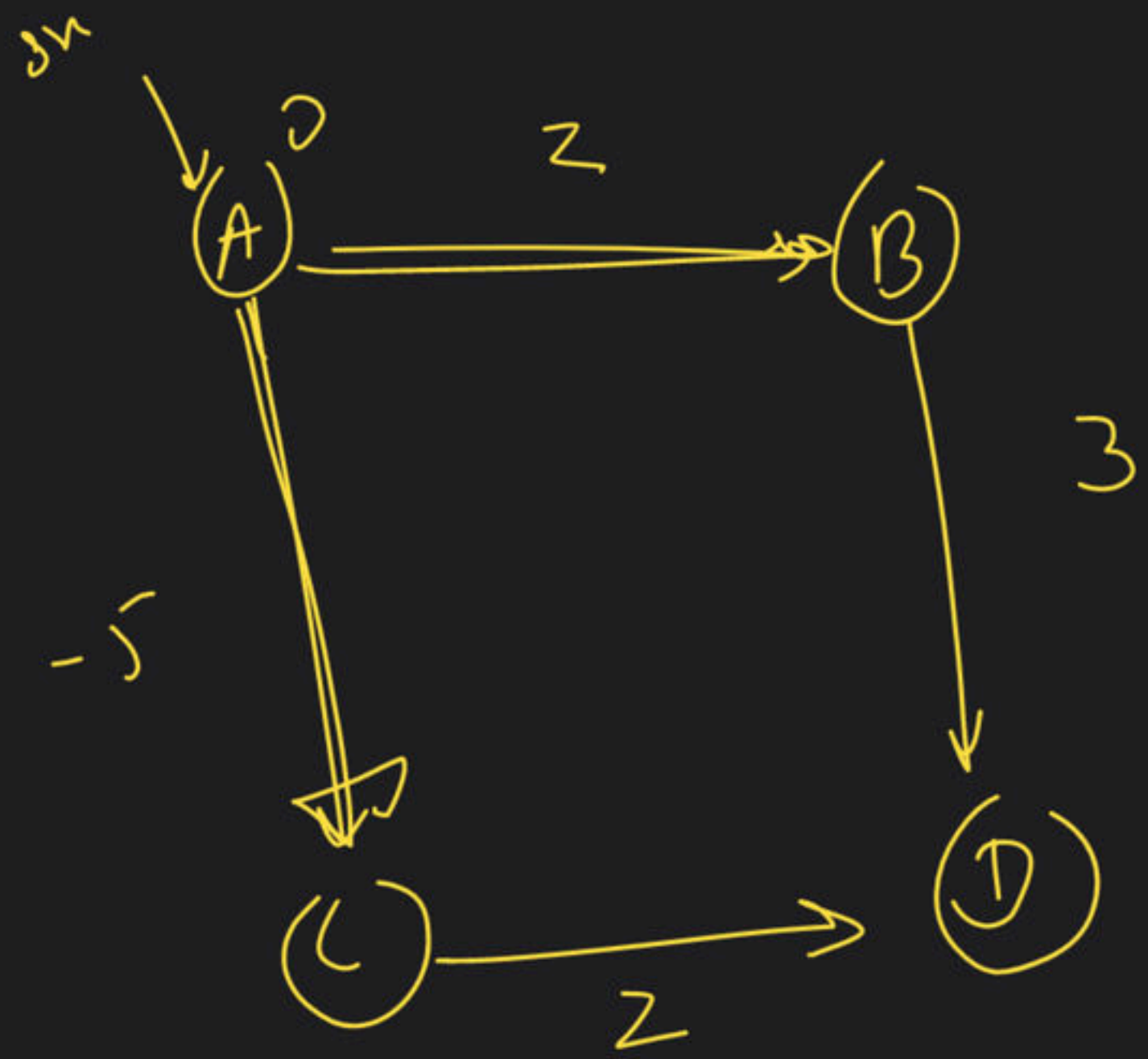
A

0 5 - 5



~~$\{1, 2\}$~~
 ~~$\{2, 1\}$~~
 ~~$\{0, 1\}$~~

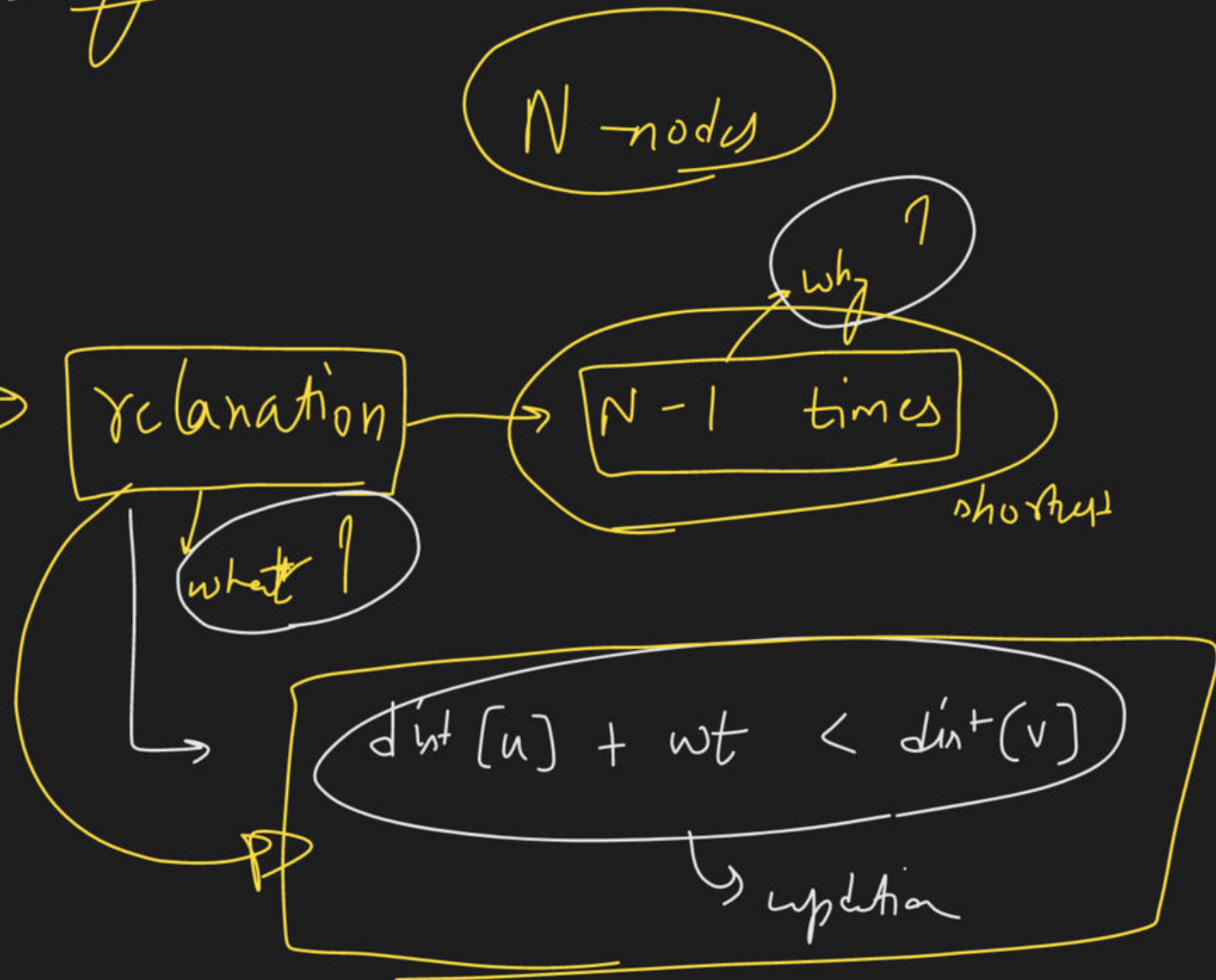




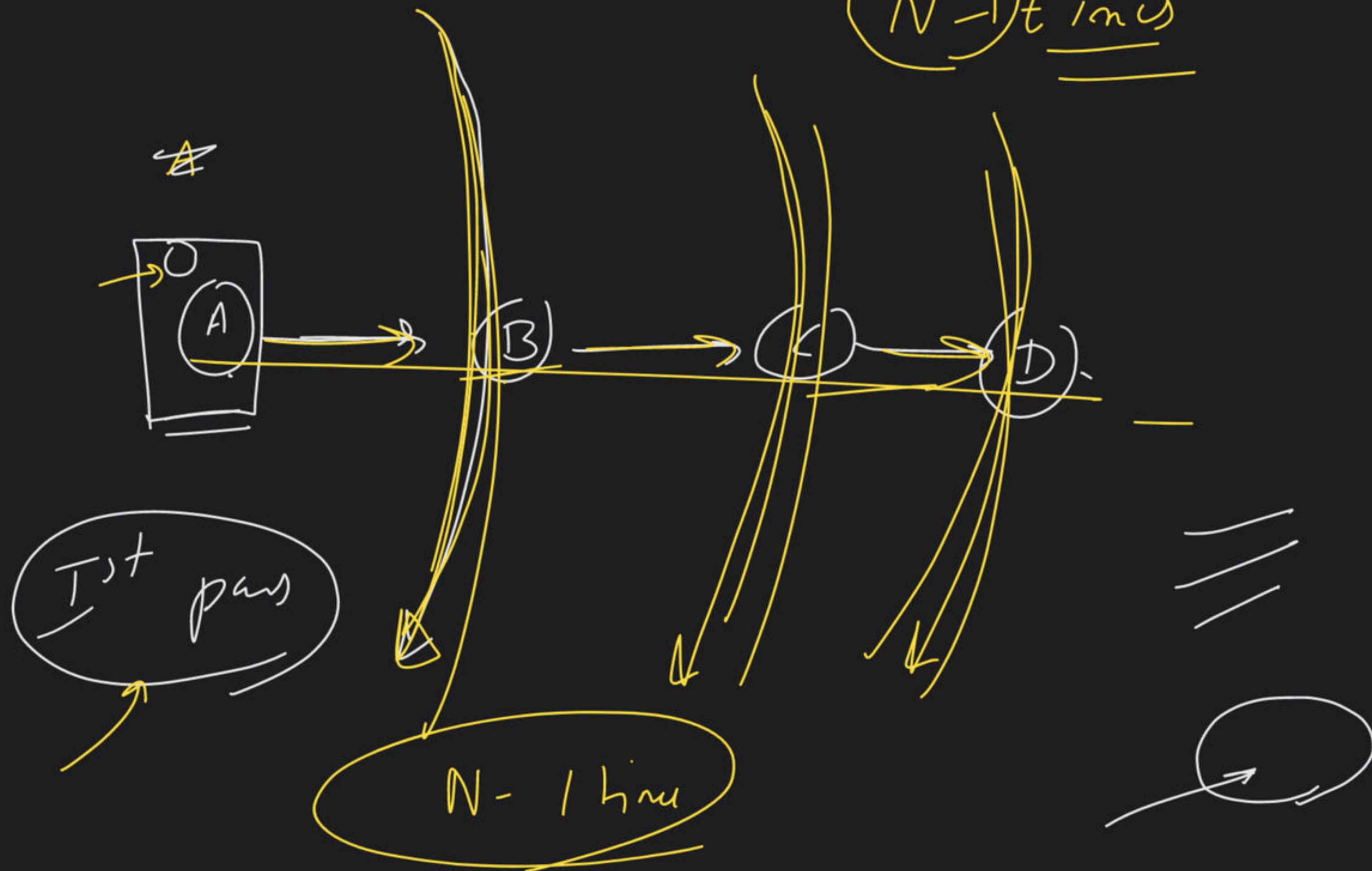
Dijkstra



→ Bellman - Ford Algo: -



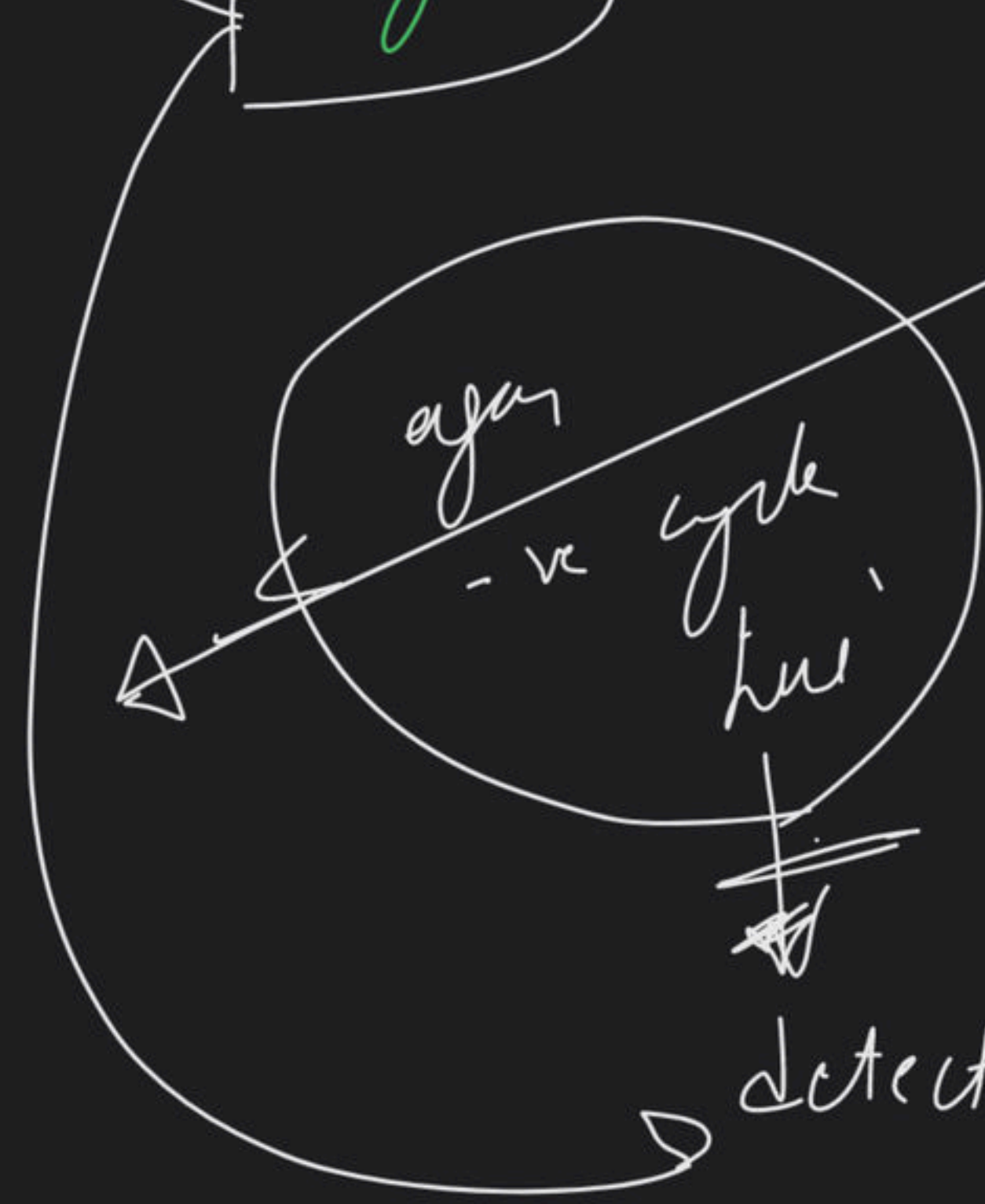
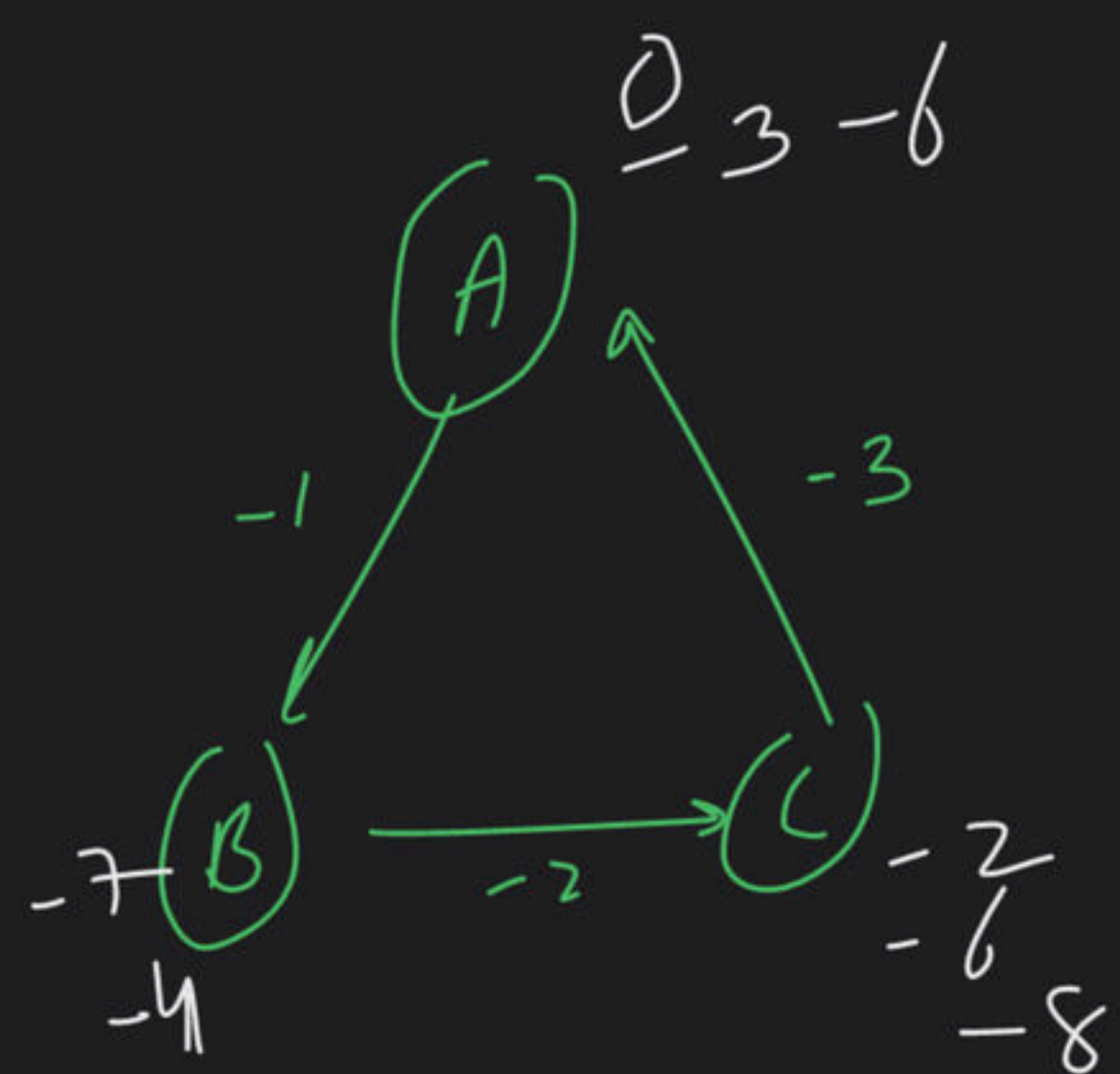
N-1 times



infinite pass → updation
hotz
sahay

happy can

B.F. Myr



why
N-1 times

Relaxation
↓
update

1 bar or value

update here
→ -ve cycle hai
update nah hai
→ -ve cycle Not hai

detection

B.F Algo

① $(N-1)$ times relaxation on all edges

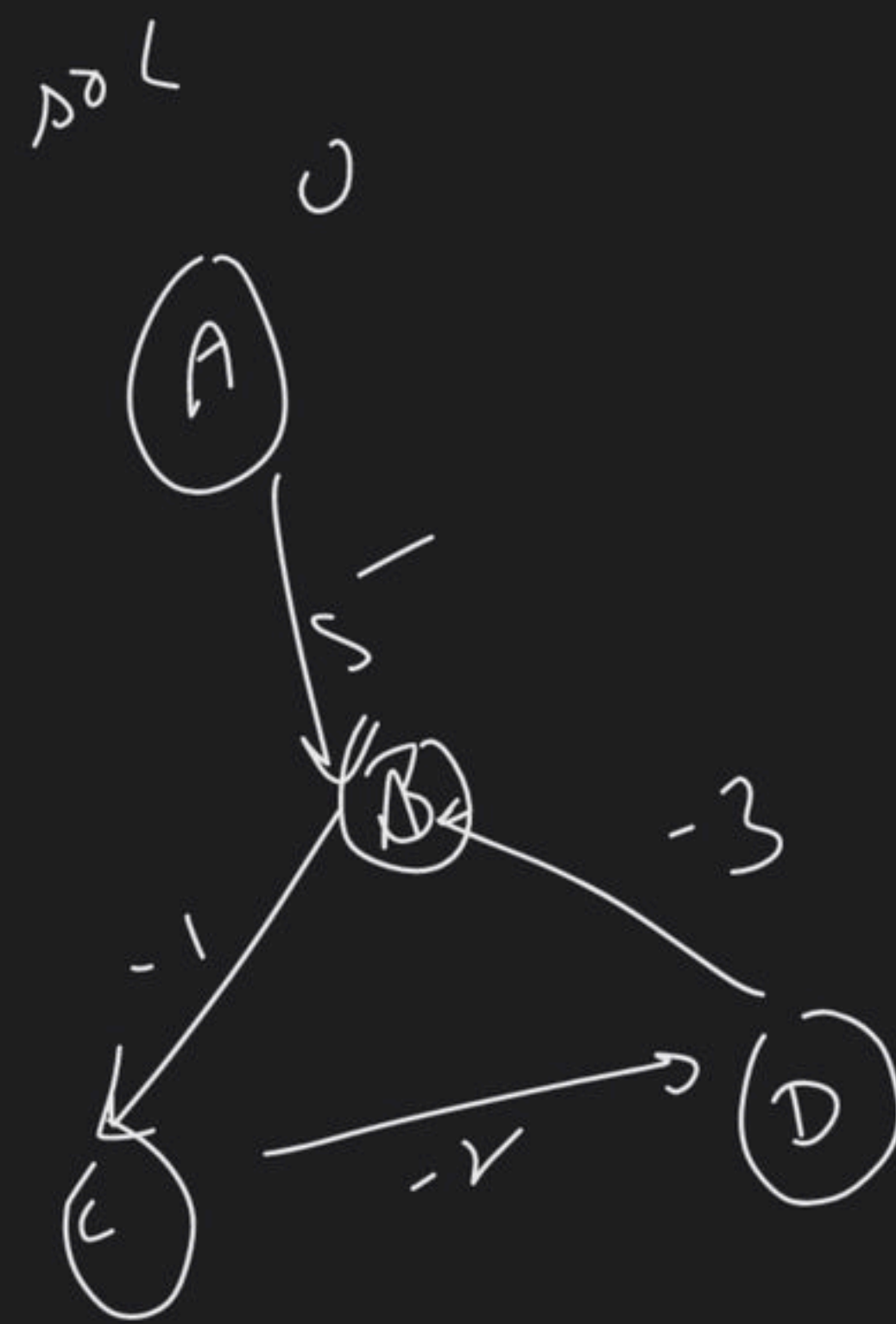
② to find/detect -ve cycle

run relaxation step 1 more
time

↳ if dist gets updated

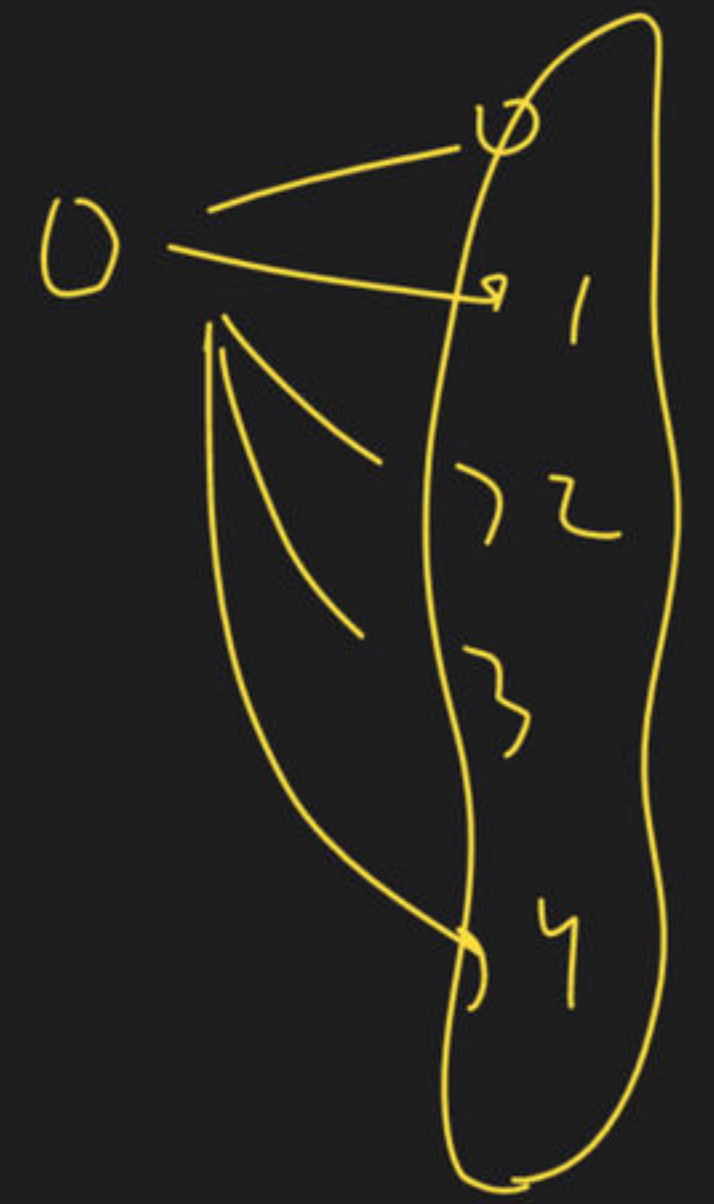
then, there is a -ve

cycle.

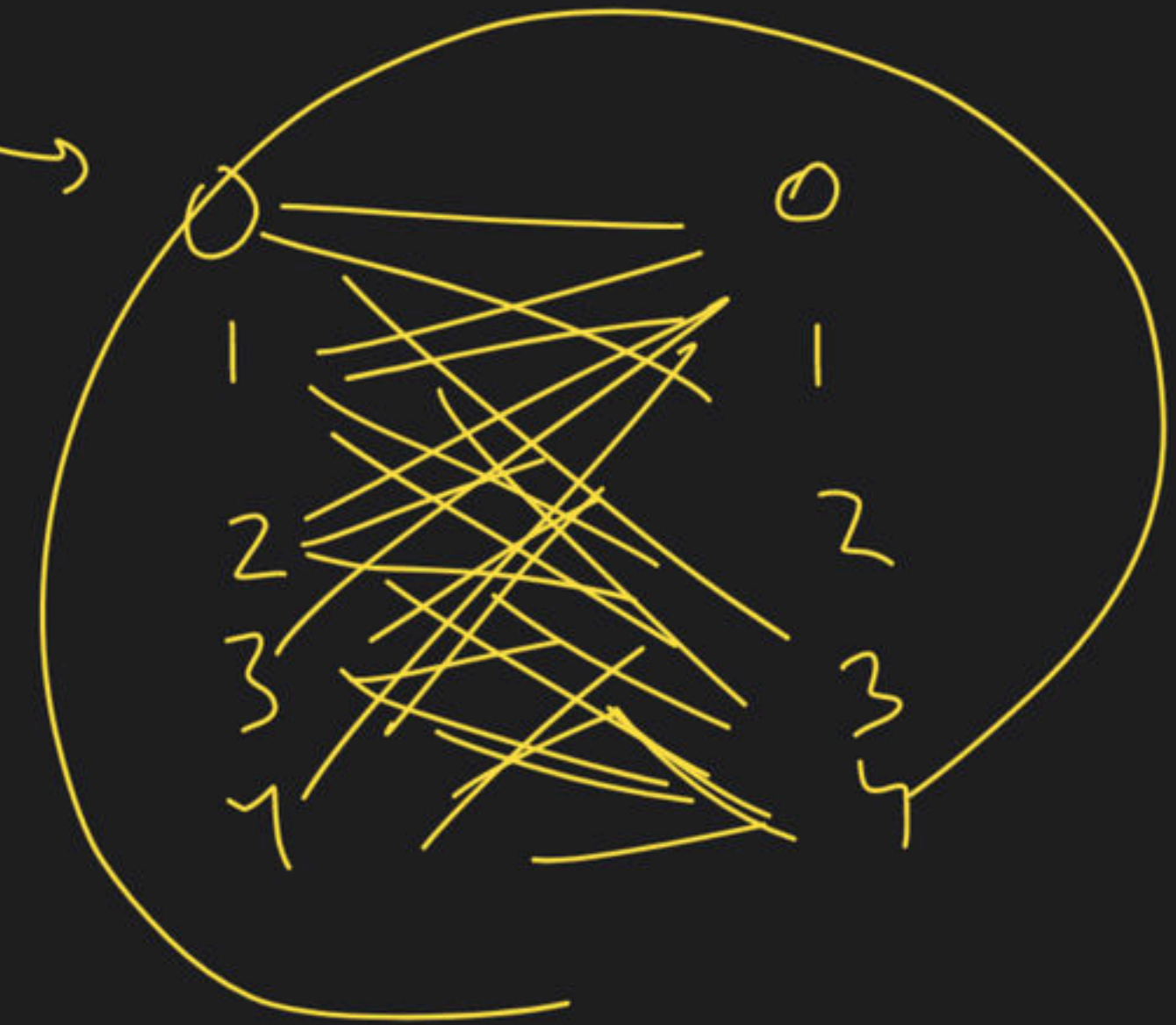




sssp

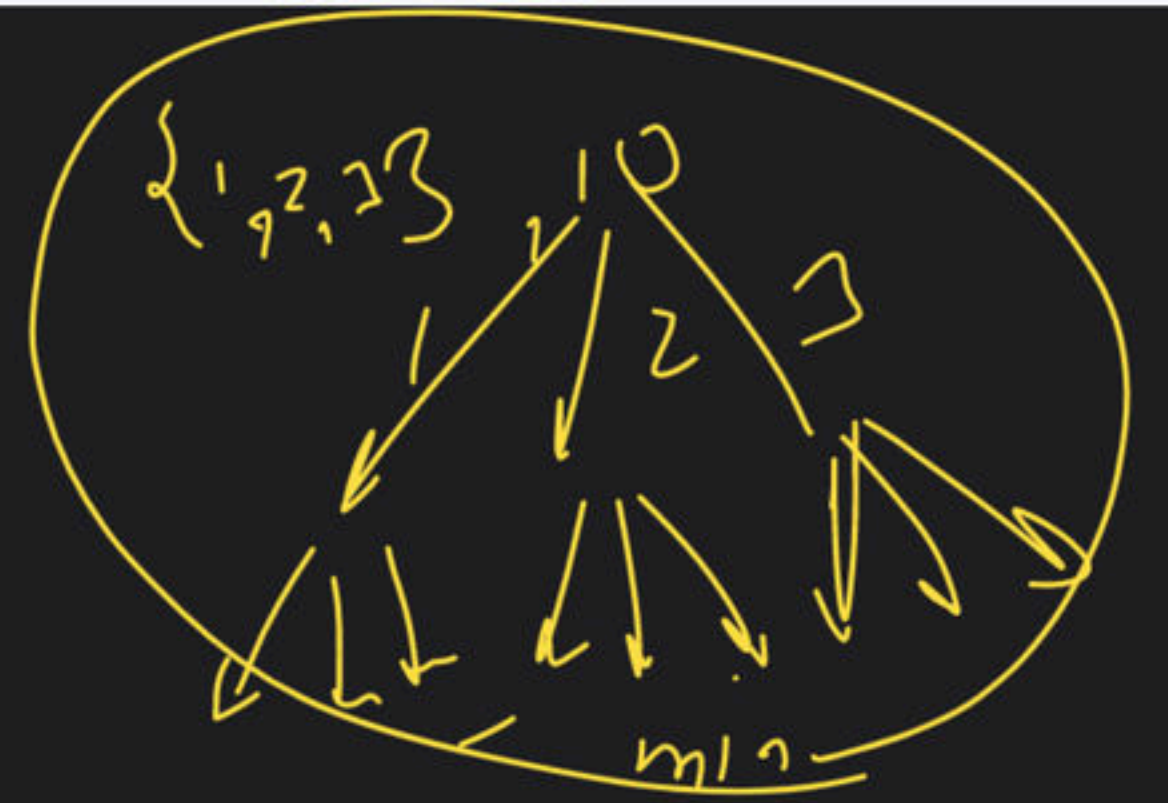


floyd warshall



Floyd Warshall

mssp

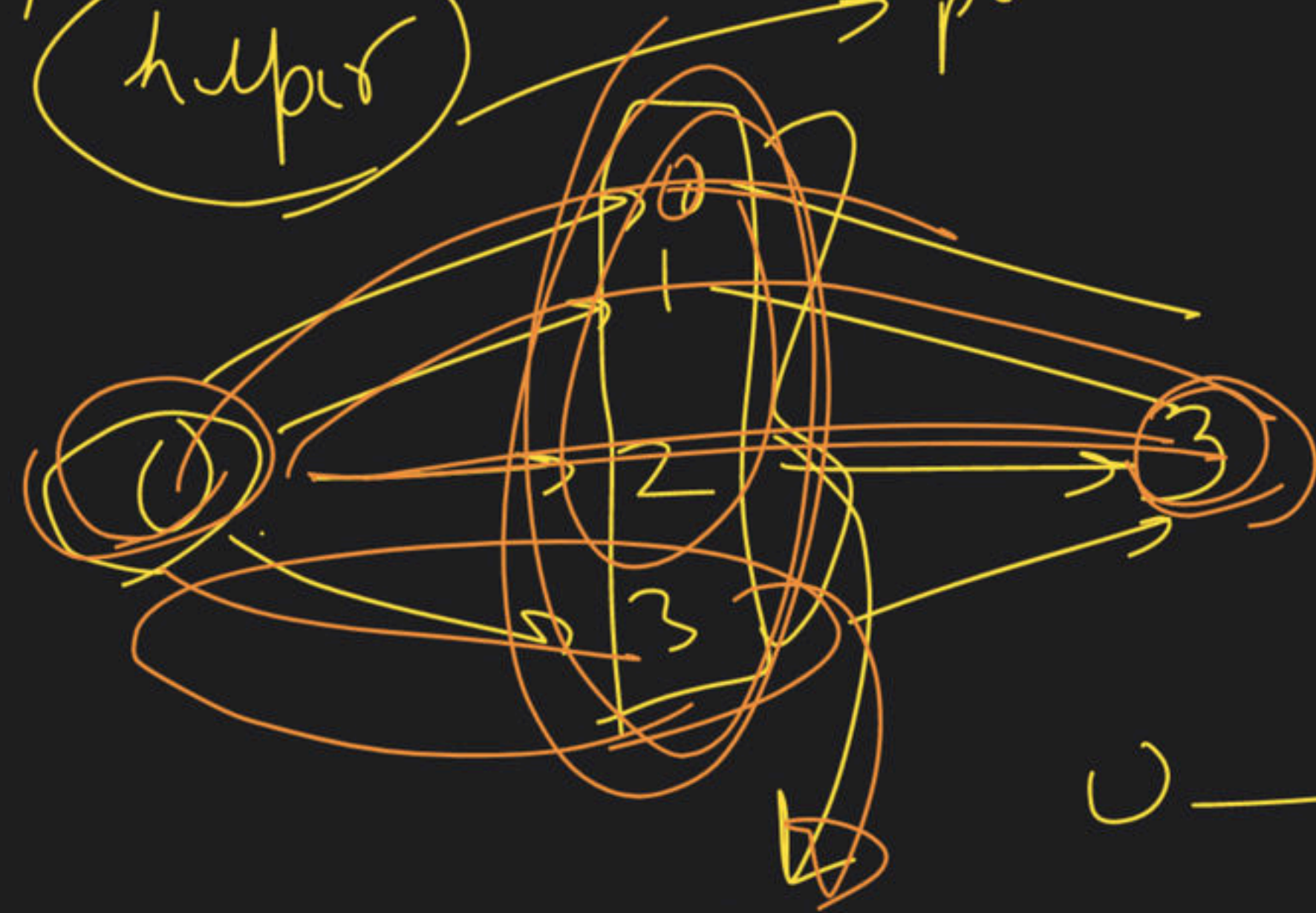


helper

permutation → explore

shortest

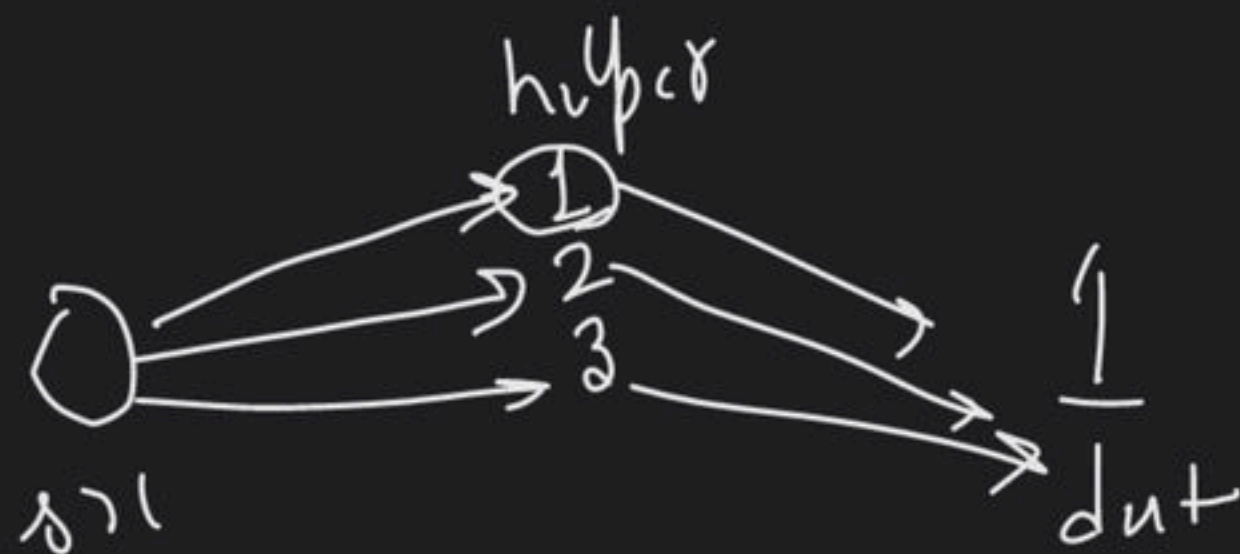
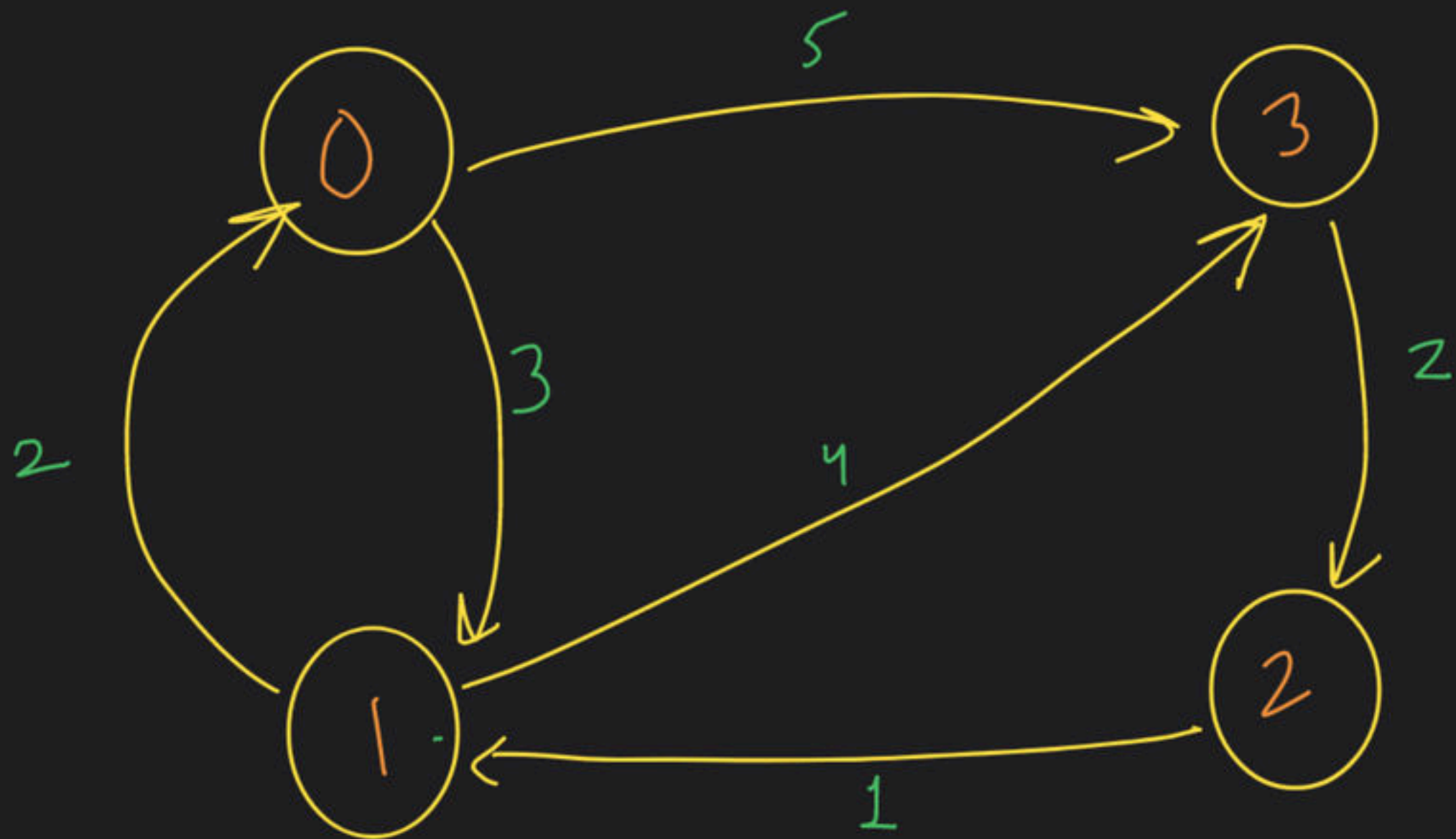
min



min

0 → 3

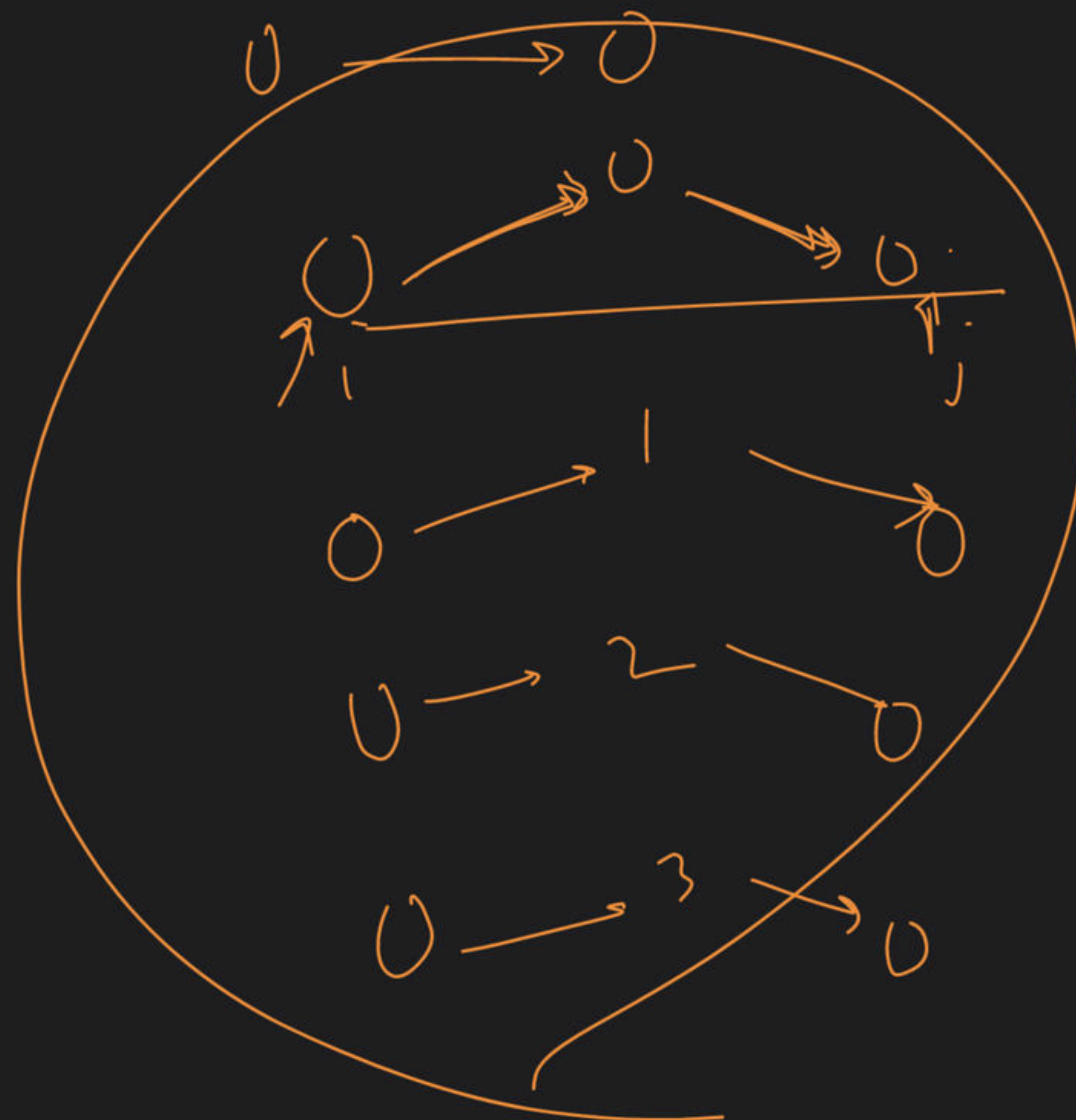
0 \xrightarrow{x} 3

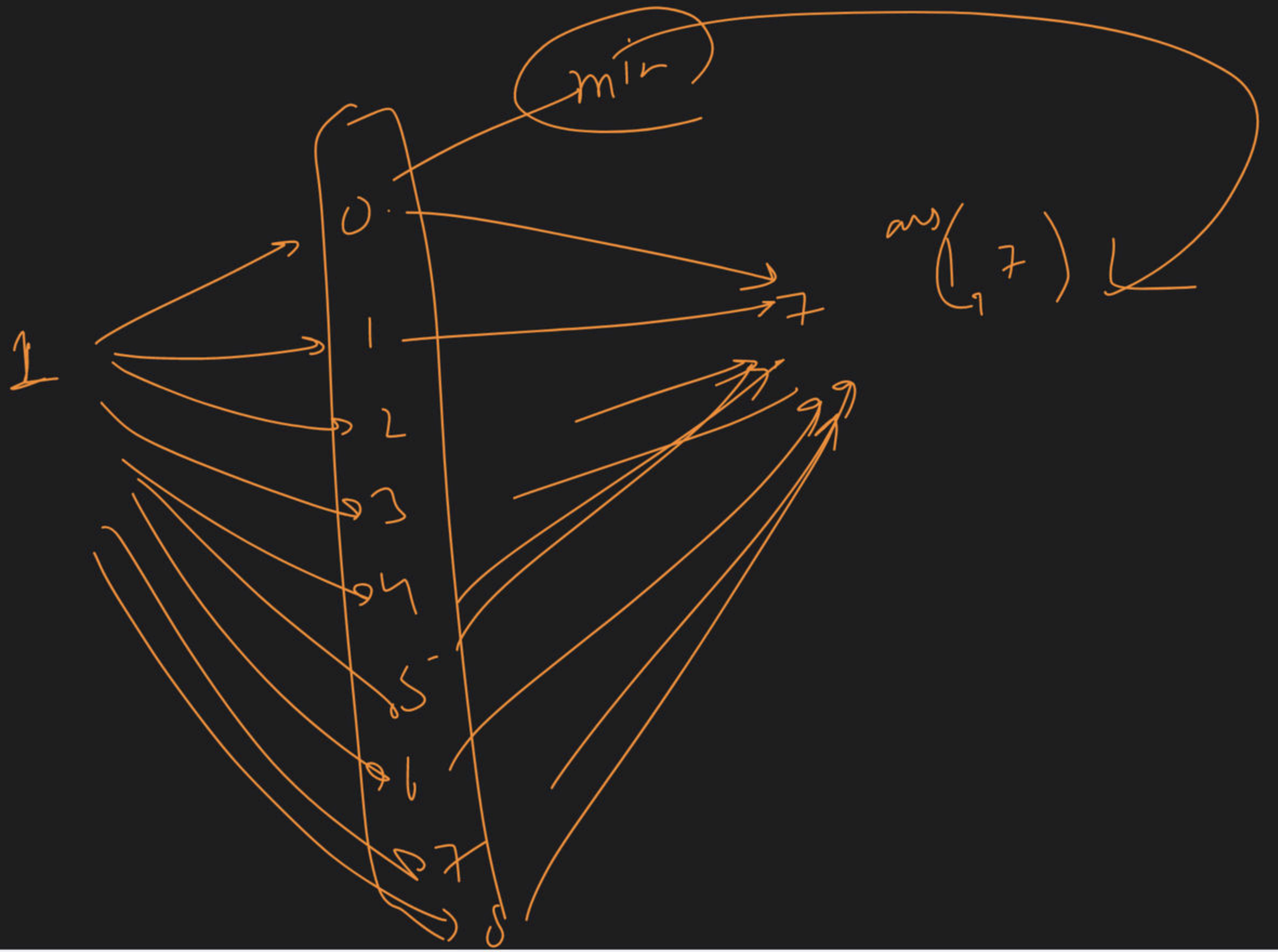


Step 1 \rightarrow diagonal $\rightarrow 0$
 \rightarrow remaining $\rightarrow \infty$

	0	1	2	3
0	0	∞	∞	∞
1	∞	0	∞	∞
2	∞	∞	0	∞
3	∞	∞	∞	0







for (helper

{

for (i

{

for (j

{

$dist[i][j] = \min(dist[i][j],$

)

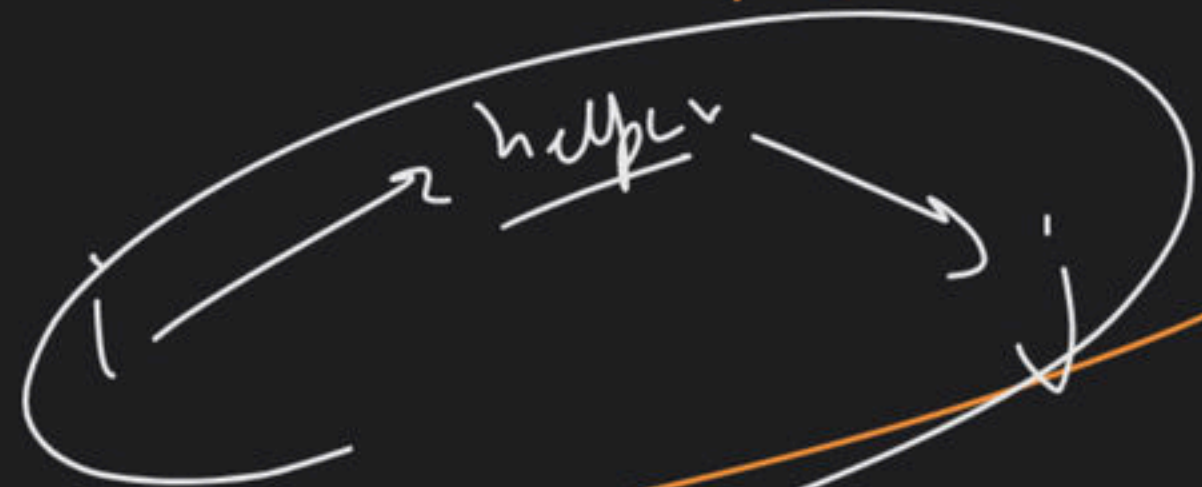
$dist[i][helper] + dist[helper][j])$

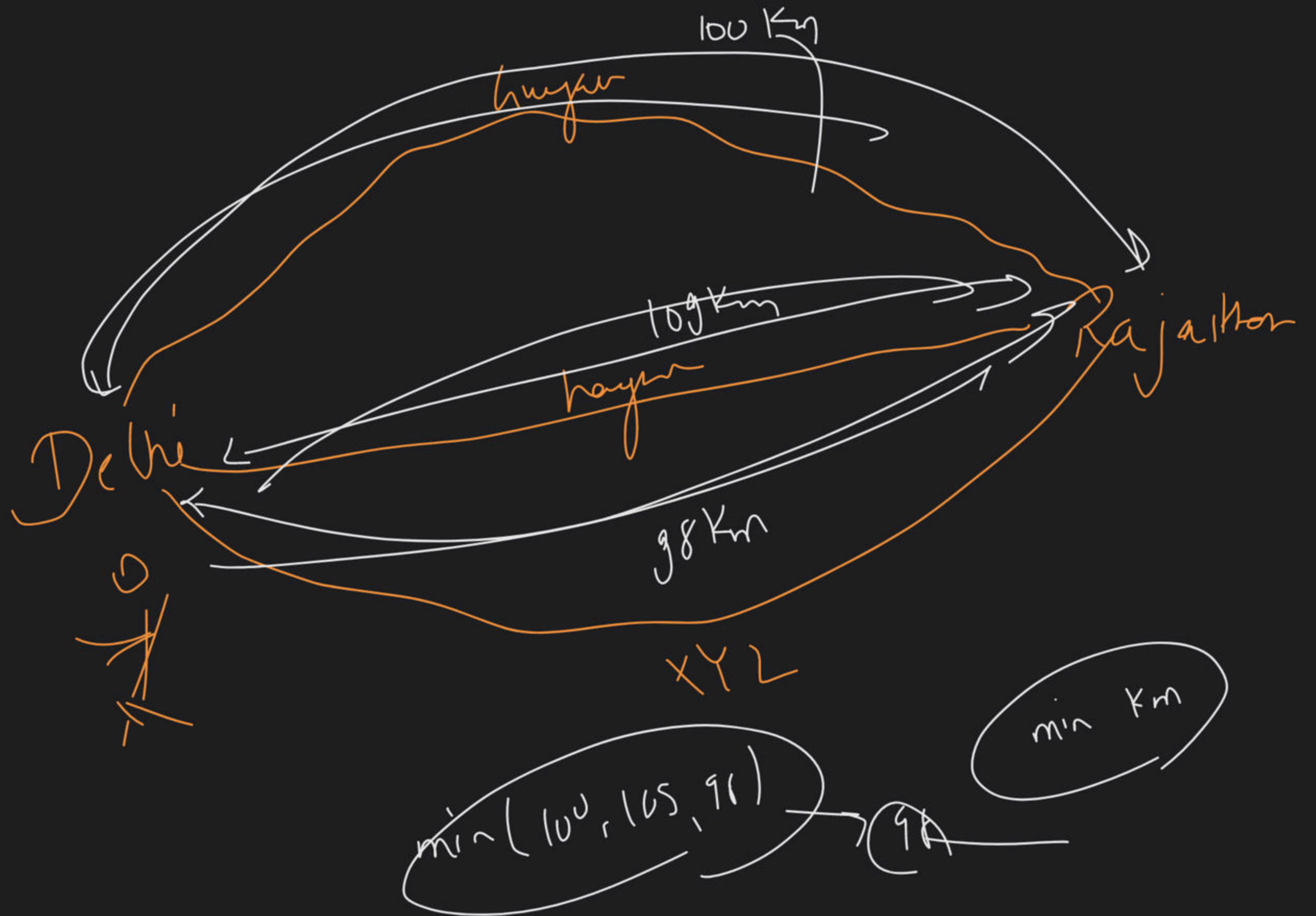
}

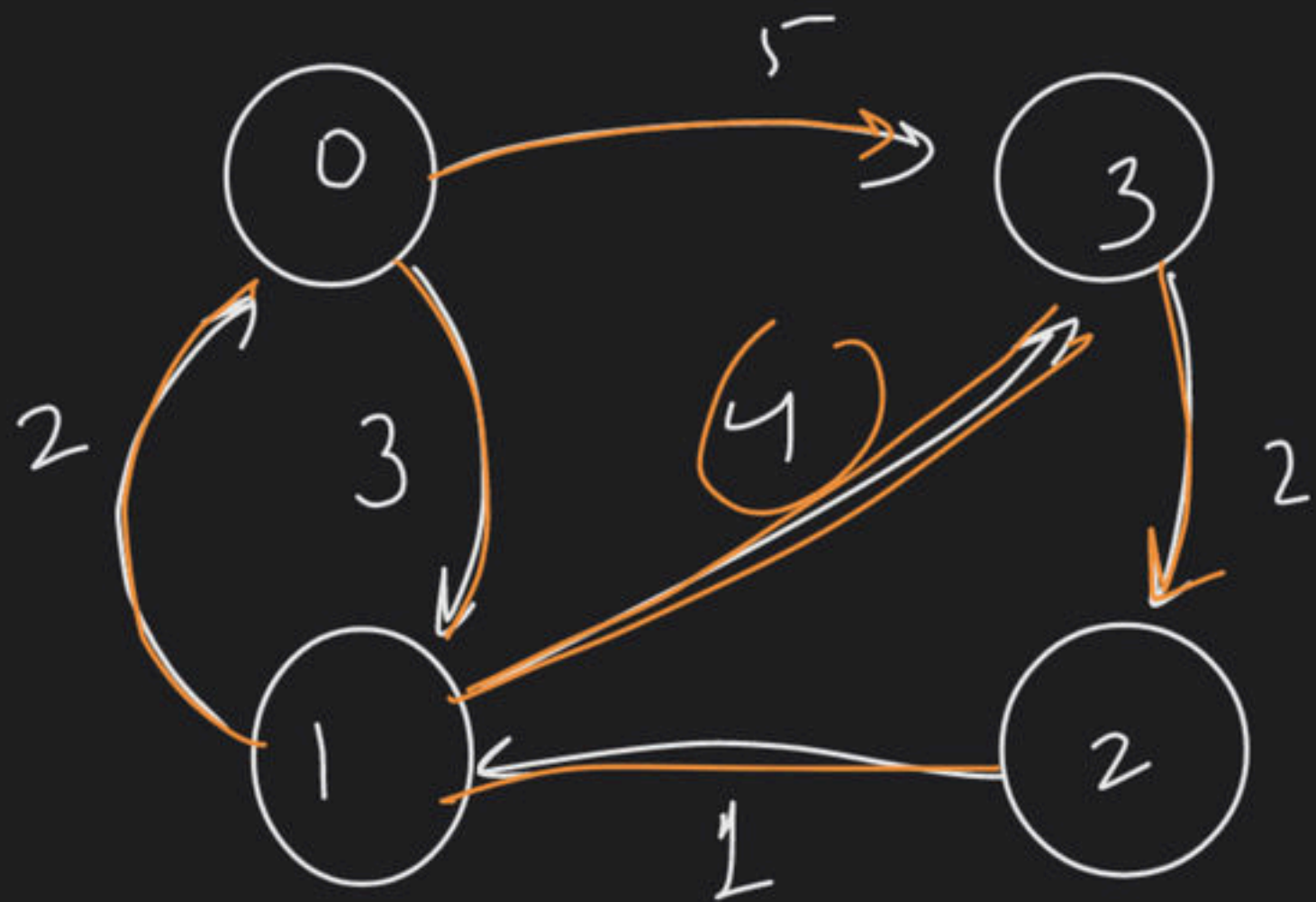
}

dist
i

dist-
j







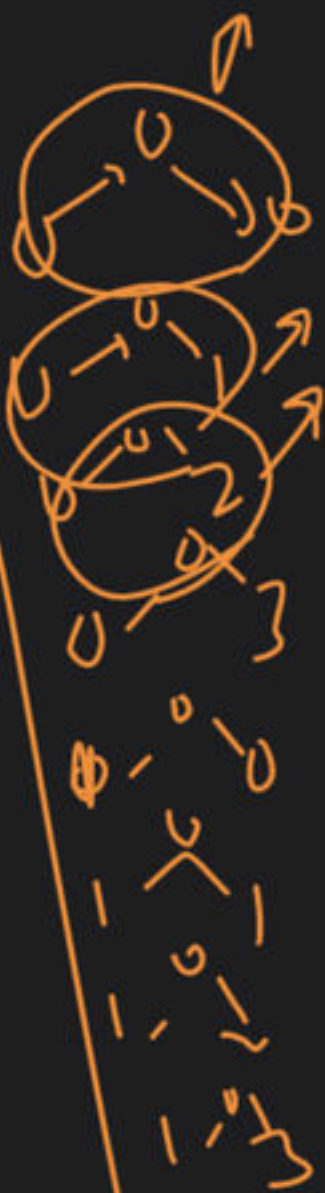
	0	1	2	3
0	0	2	3	5
1	2	0	1	4
2	8	8	0	8
3	8	8	0	0

helper
via "0"



2	1
2	0
2	1
2	3
2	0
2	1
2	3
2	0
2	1
2	3

00	01	02	03	10	11	12	13	20	21	22	23	30	31	32	33
----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----



bfs

dfs

dig^{kstr} → 1 pending

B.F → ✓

F.W //

