Doubt Session with Lakshay

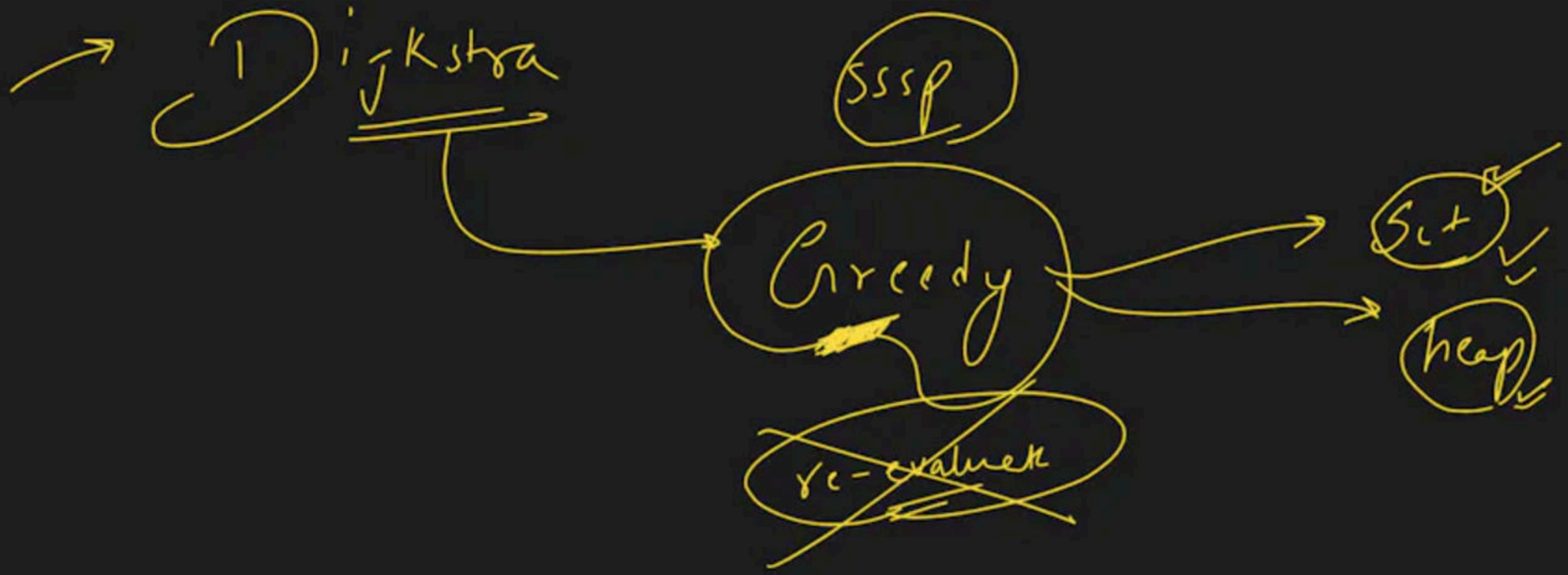
Special class

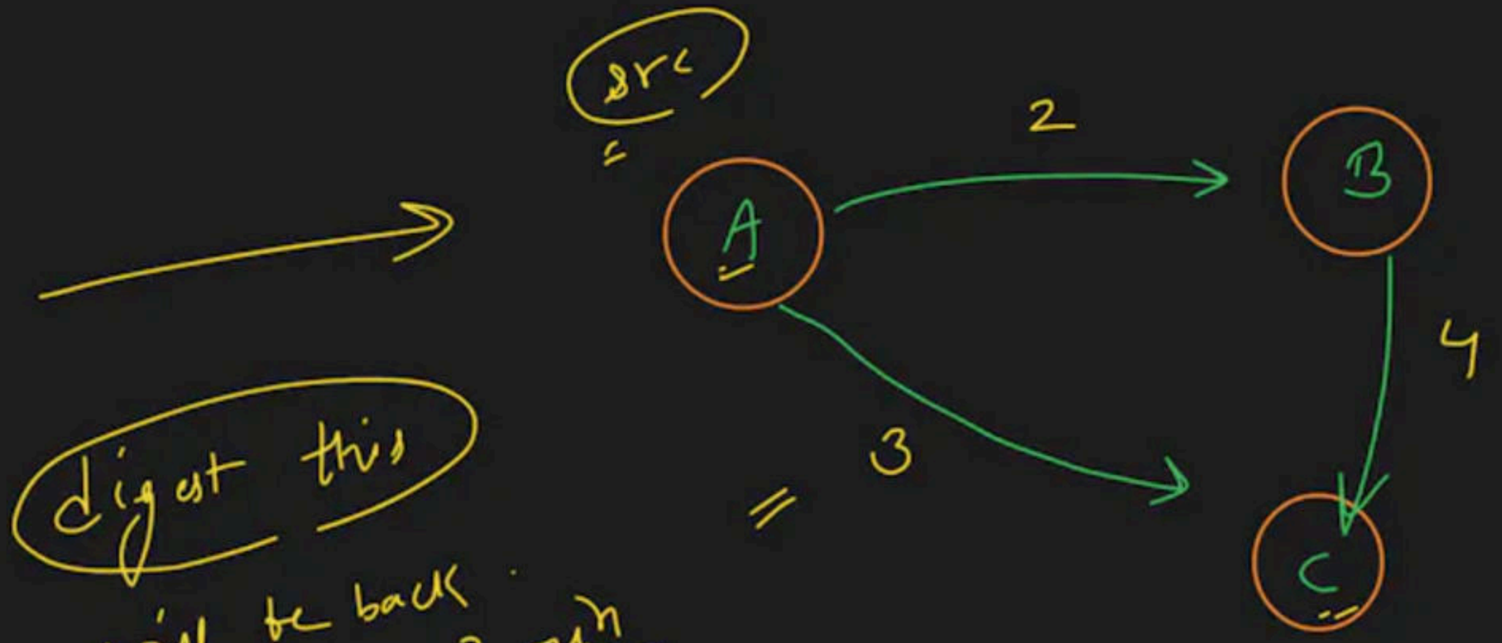
Love Babbar • Mar 10, 2024

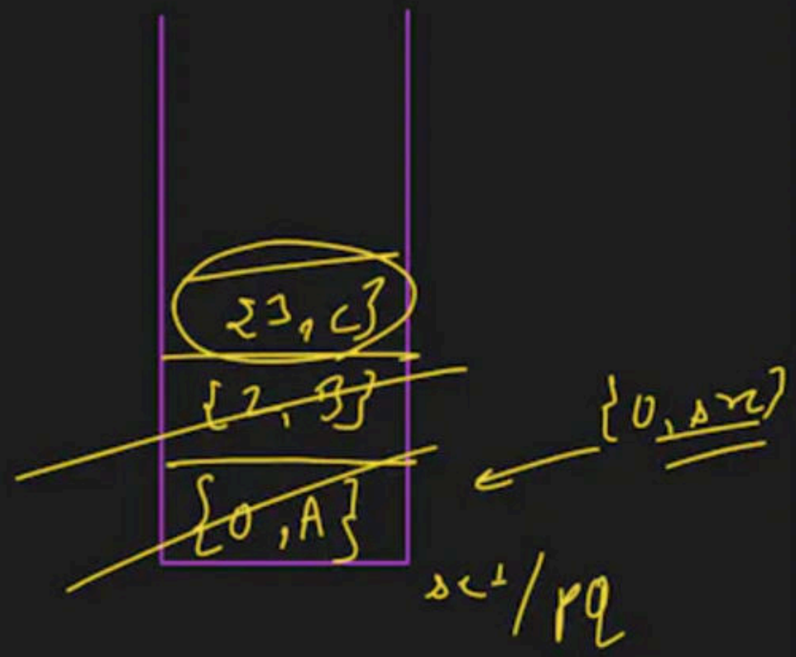
Graph Class - 7 [MEGA]

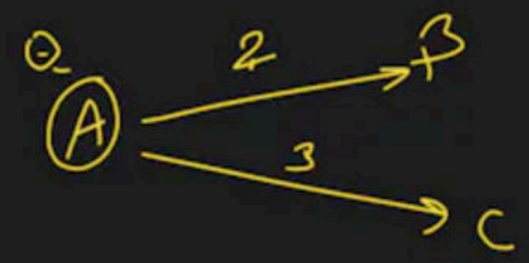
Special class

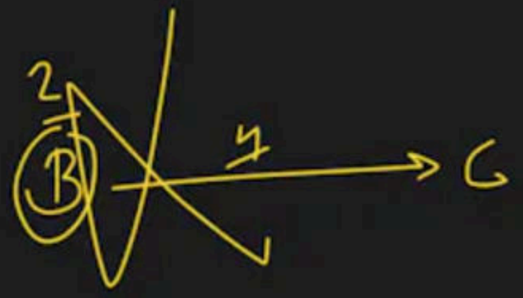
Love Babbar • Mar 8, 2024

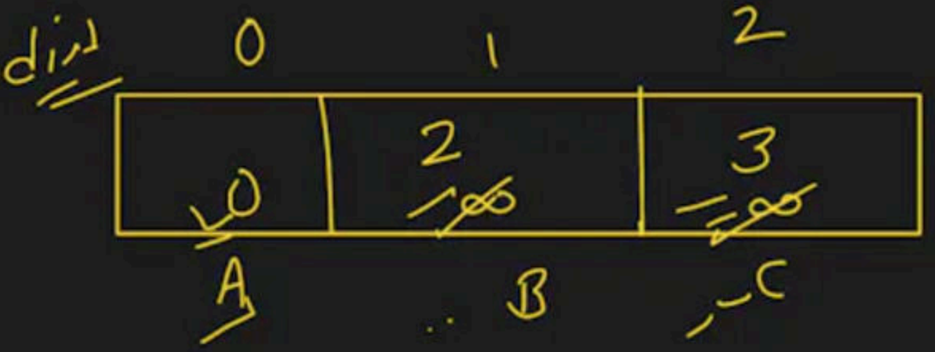

Dijkstra
SSSP
Greedy
Set
Heap
re-evaluate

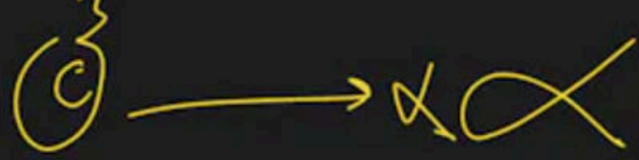

src
A
B
C
2
4
3
digest this
will be back in 2 min


{3, C}
{2, B}
{0, A}
{0, src}
set/pq

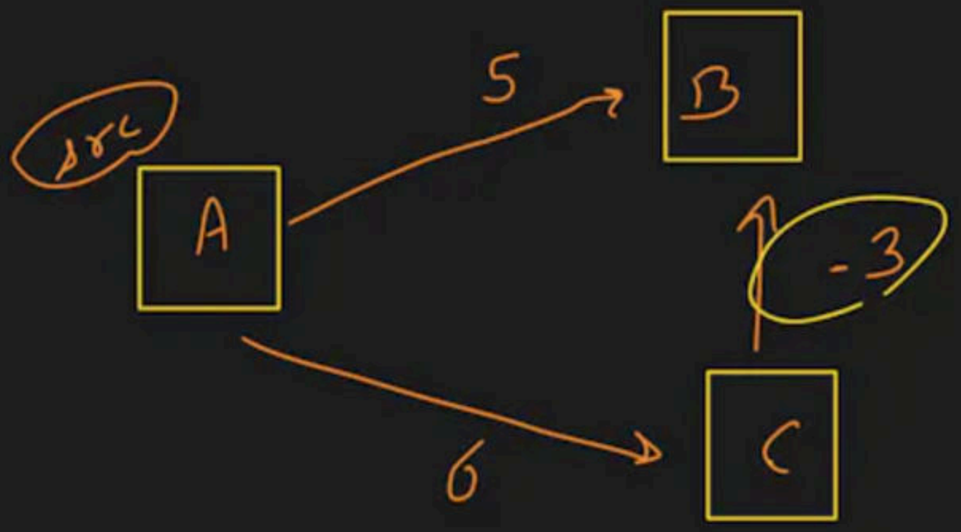

A
2
3
B
C

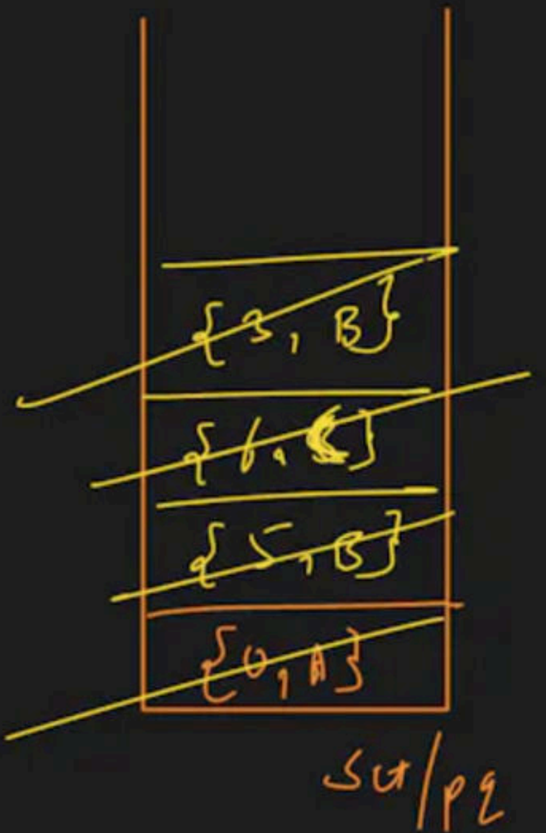

2
B
4
C

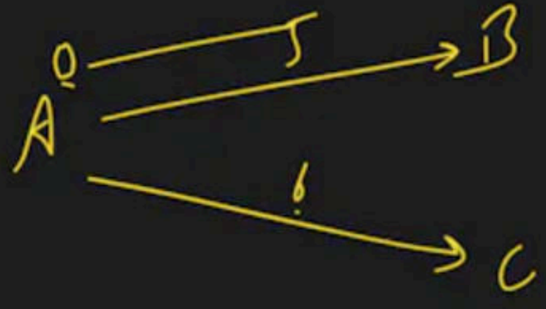

dist
0
1
2
0
2
3
A
B
C

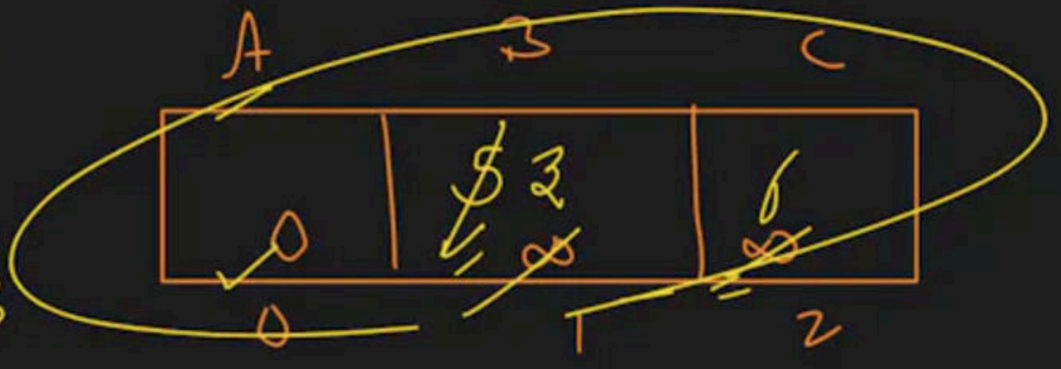


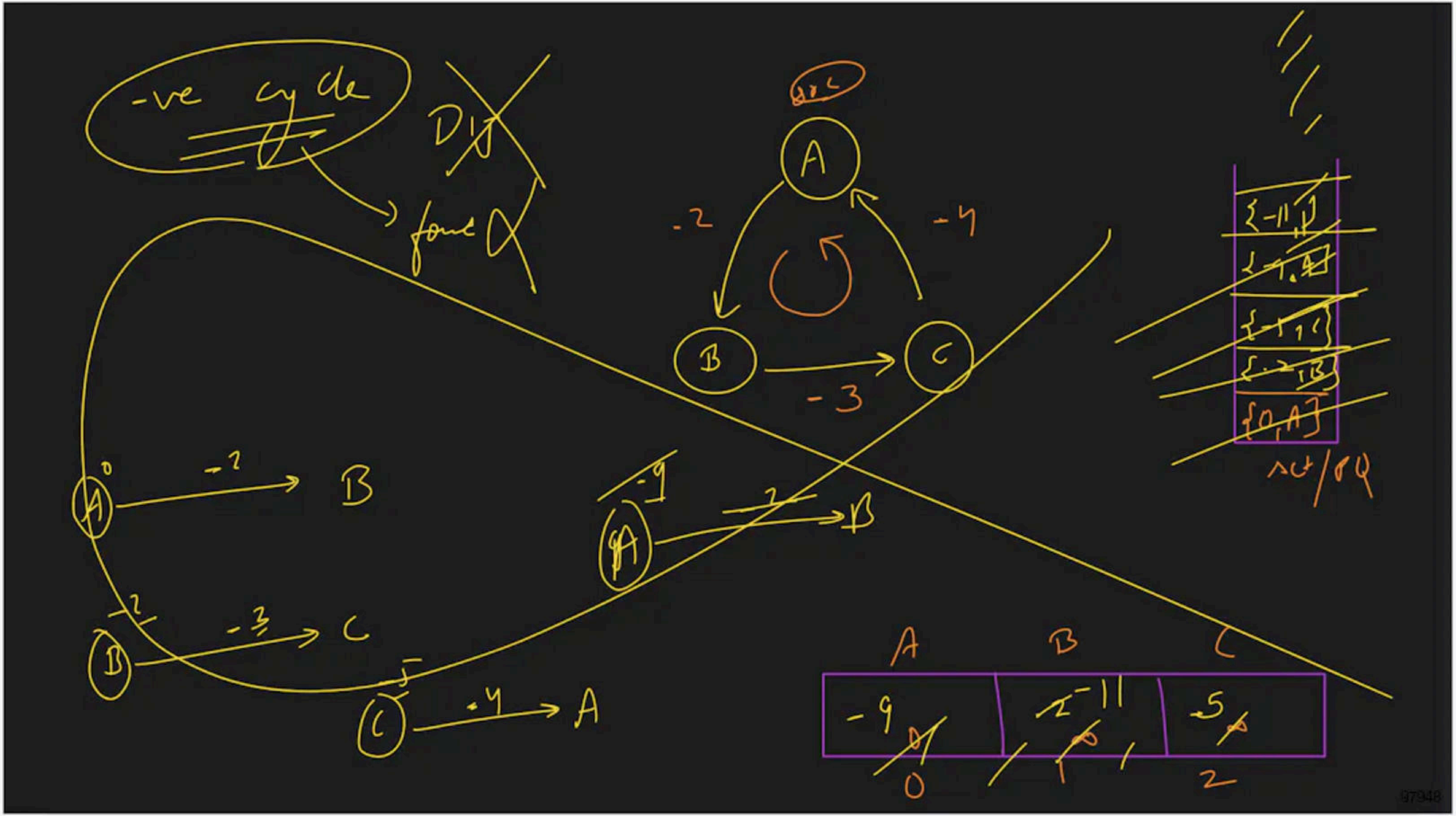
-ve weights :-

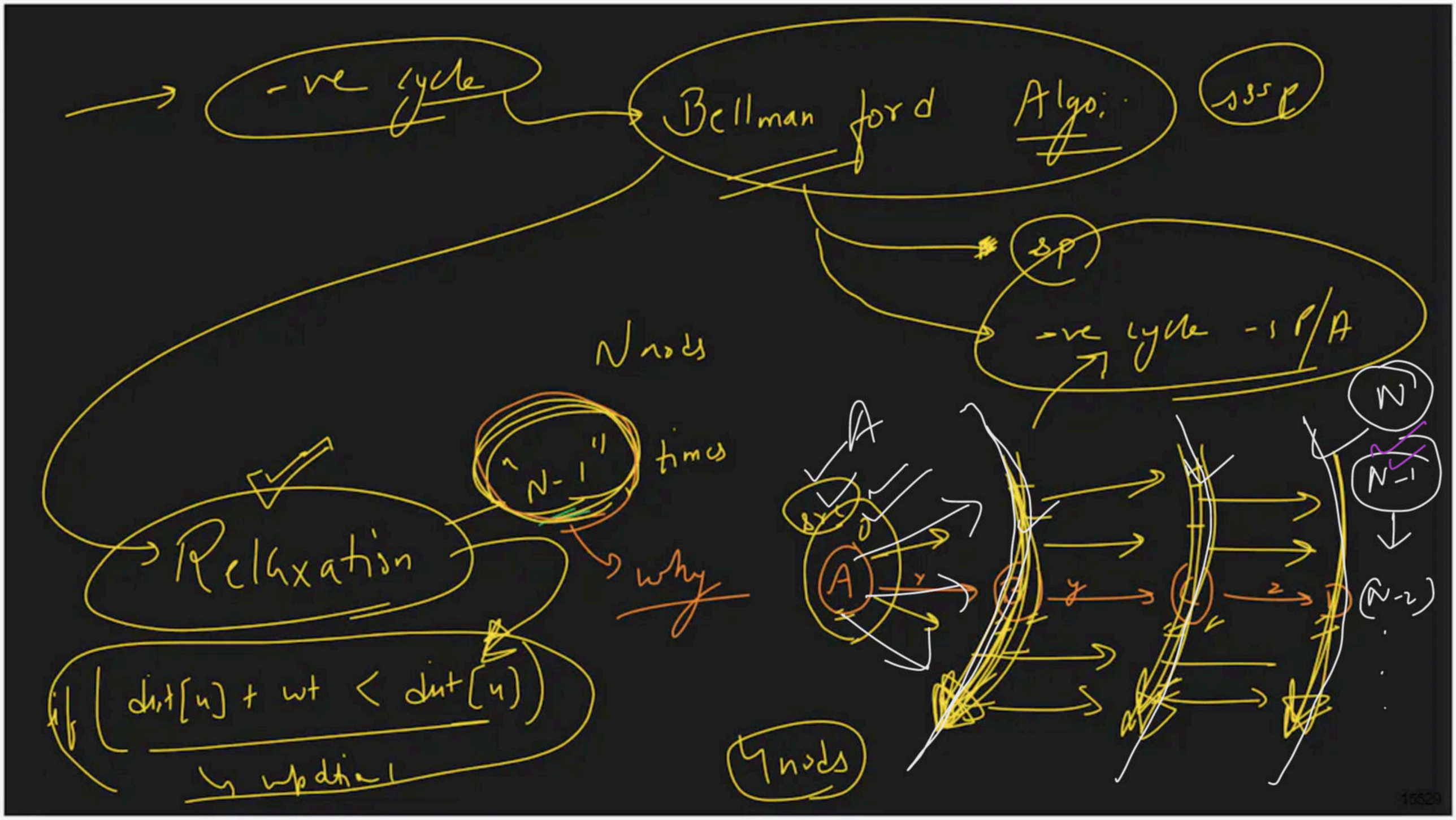


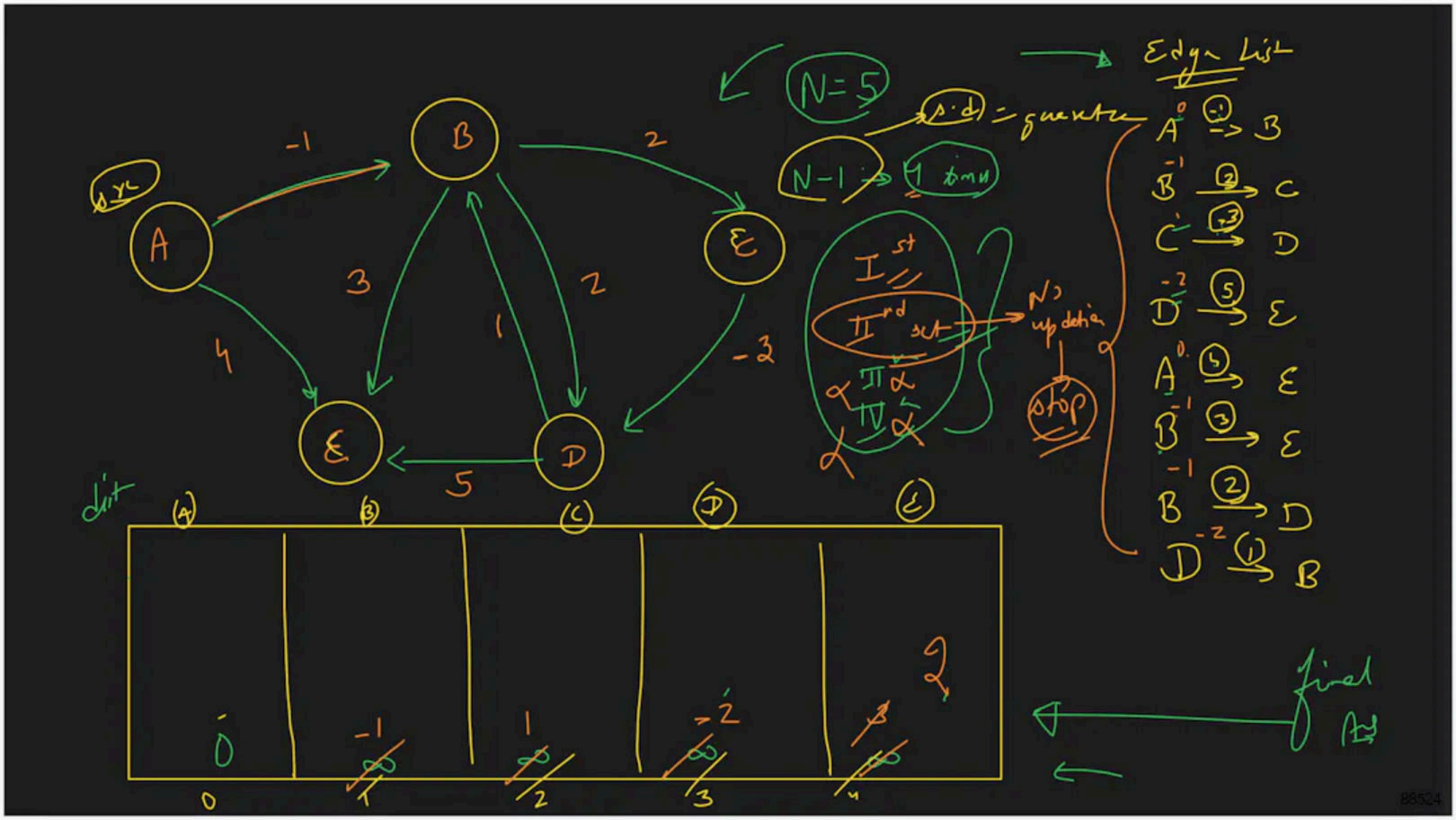


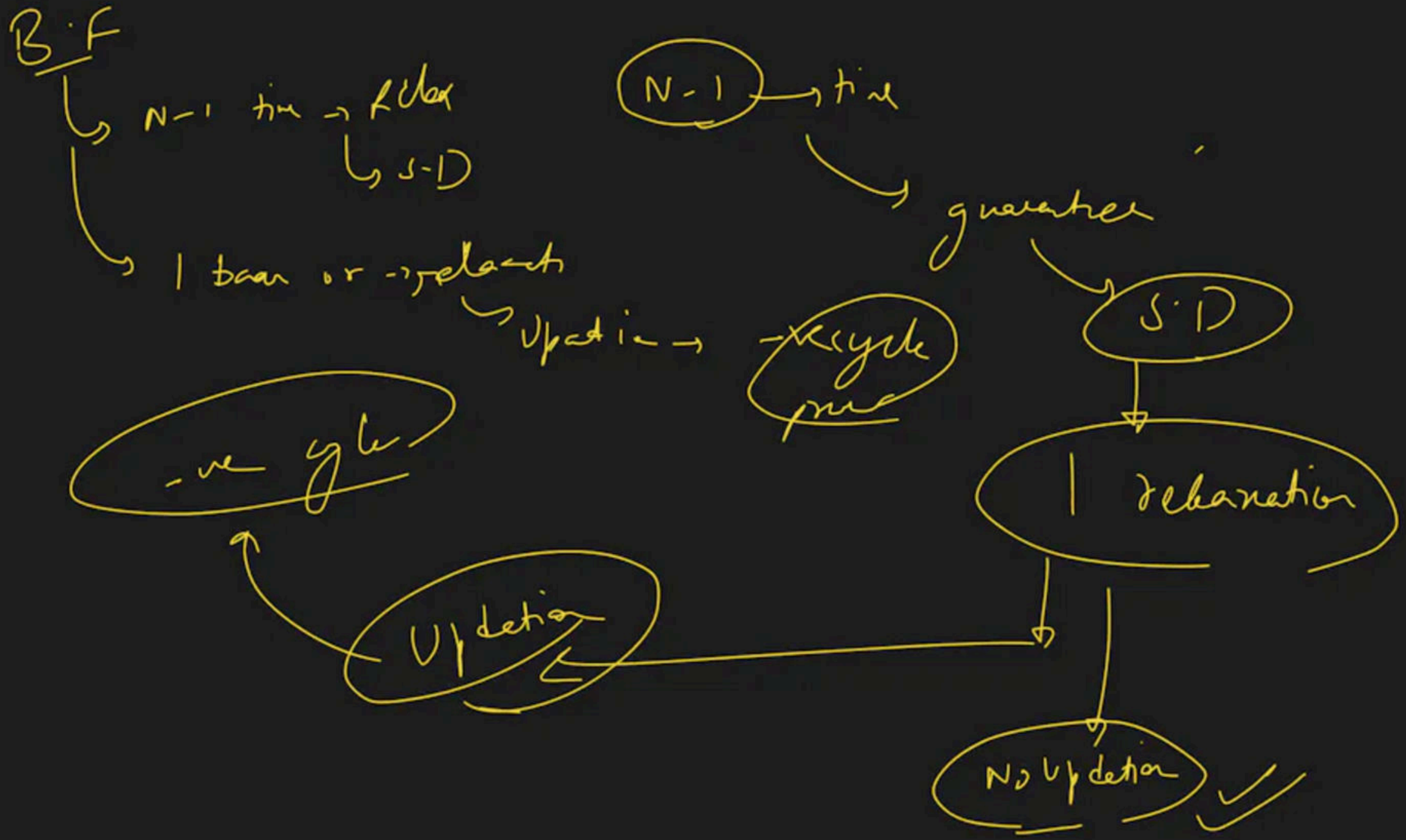




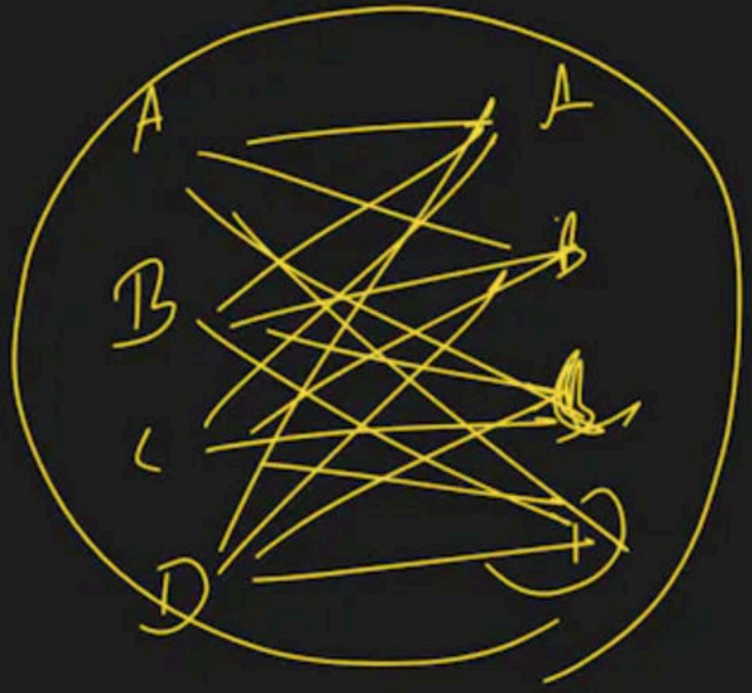

-ve cycle
Dij
A
B
C
-2
-4
-3
A B C
-9 -11 -5
0 1 2


-ve cycle
Bellman ford Algo:
SSSP
SP
-ve cycle - SP/A
N nods
N-1 times
why
Relaxation
if (dist[u] + wt < dist(u))
↳ update
A
A
x
y
z
N
N-1
(N-2)
4 nods

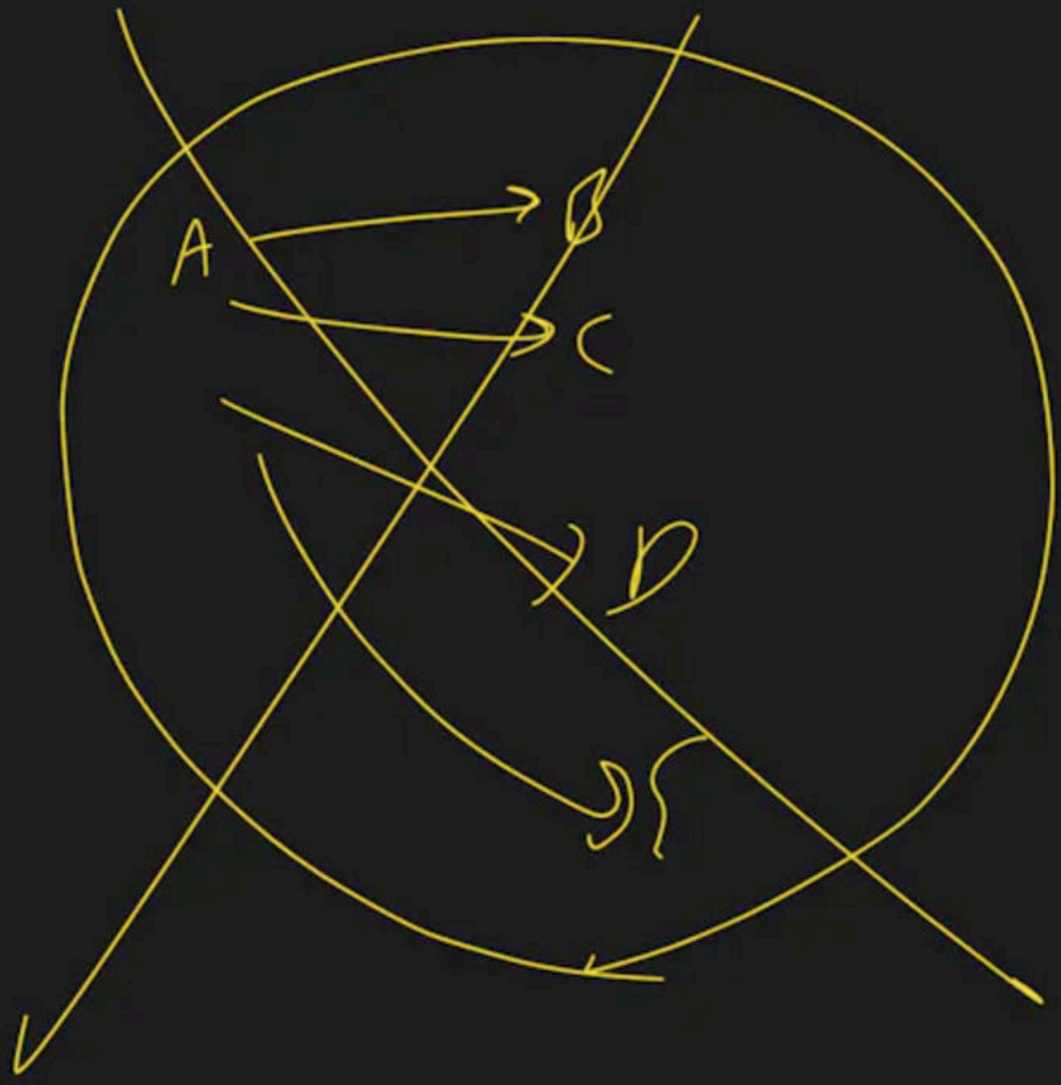

N=5
N-1 → 1 time
Edge List
A 1 → B
B -1 2 → C
C 3 → D
D -2 5 → E
A 4 → E
B -1 3 → E
B 2 → D
D -2 1 → B
A
B
C
D
E
-1
2
3
4
1
2
-3
5
dist
0
-1
1
-2
2
final
stop

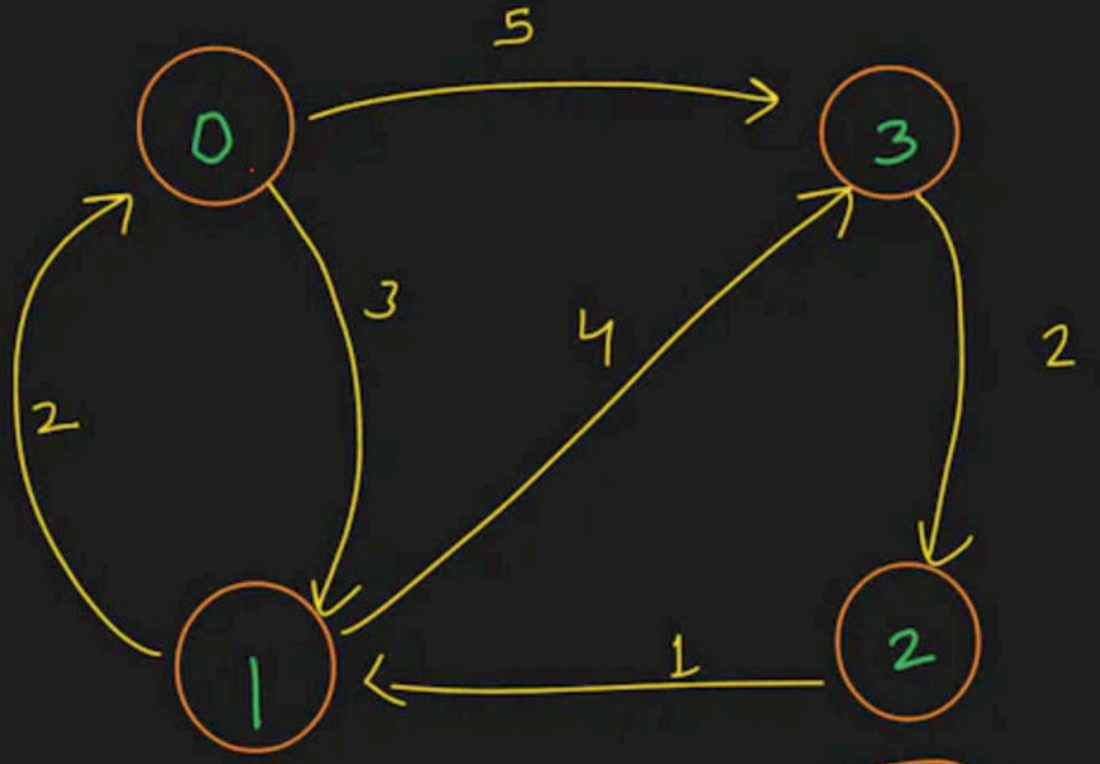

B.F
N-1
S-D
N-1
guarantee
S.D
Updation
Updation
No Updation

Floyd warshall :>



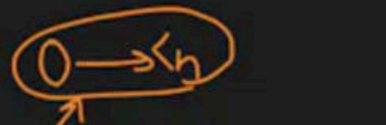
mssp





dist

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



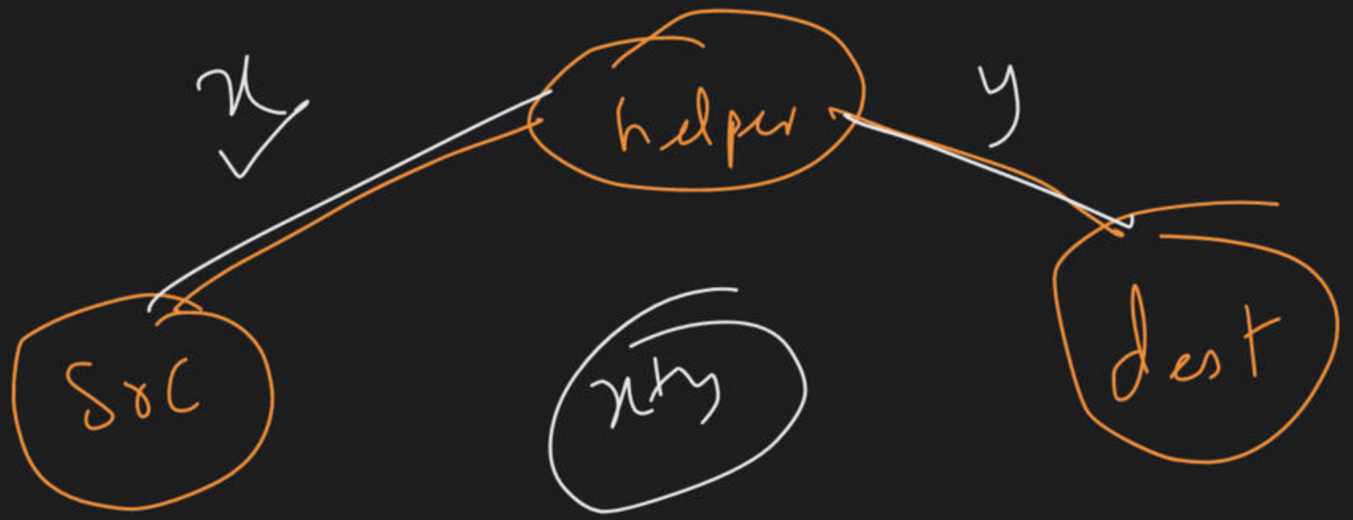
helper → src, dest

initial stuff → src → src → 0

dist[src][dst] = min(dist[src][dst], (dist[src][0] + dist[0][dst]), (dist[src][1] + dist[1][dst]), dist[src][2] + dist[2][dst], dist[src][3] + dist[3][dst])

① initial state $-\infty$, diagonal $= 0$

② helper logic.



dist[src][dest]

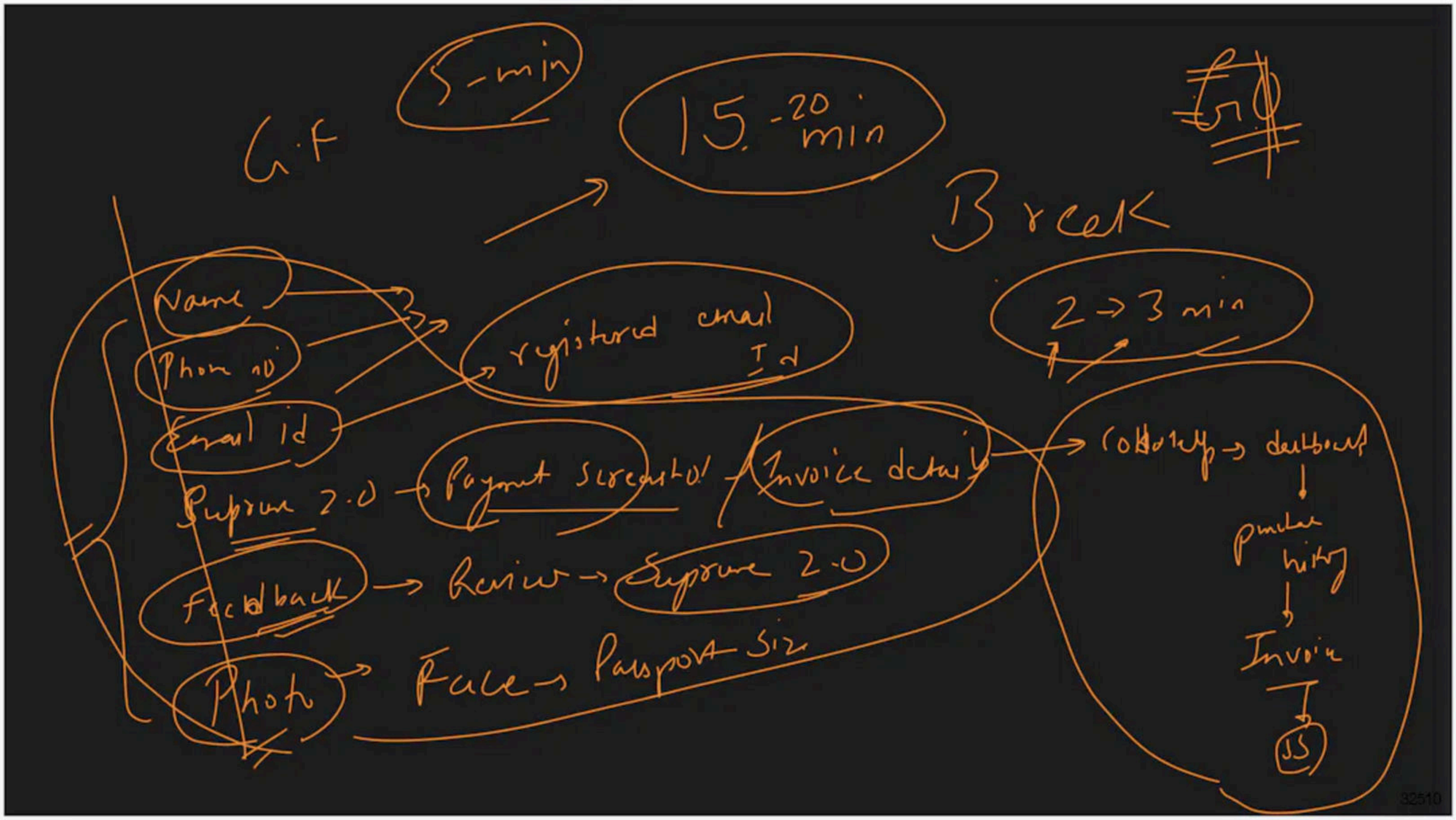
$\Downarrow$

dist[src][dest

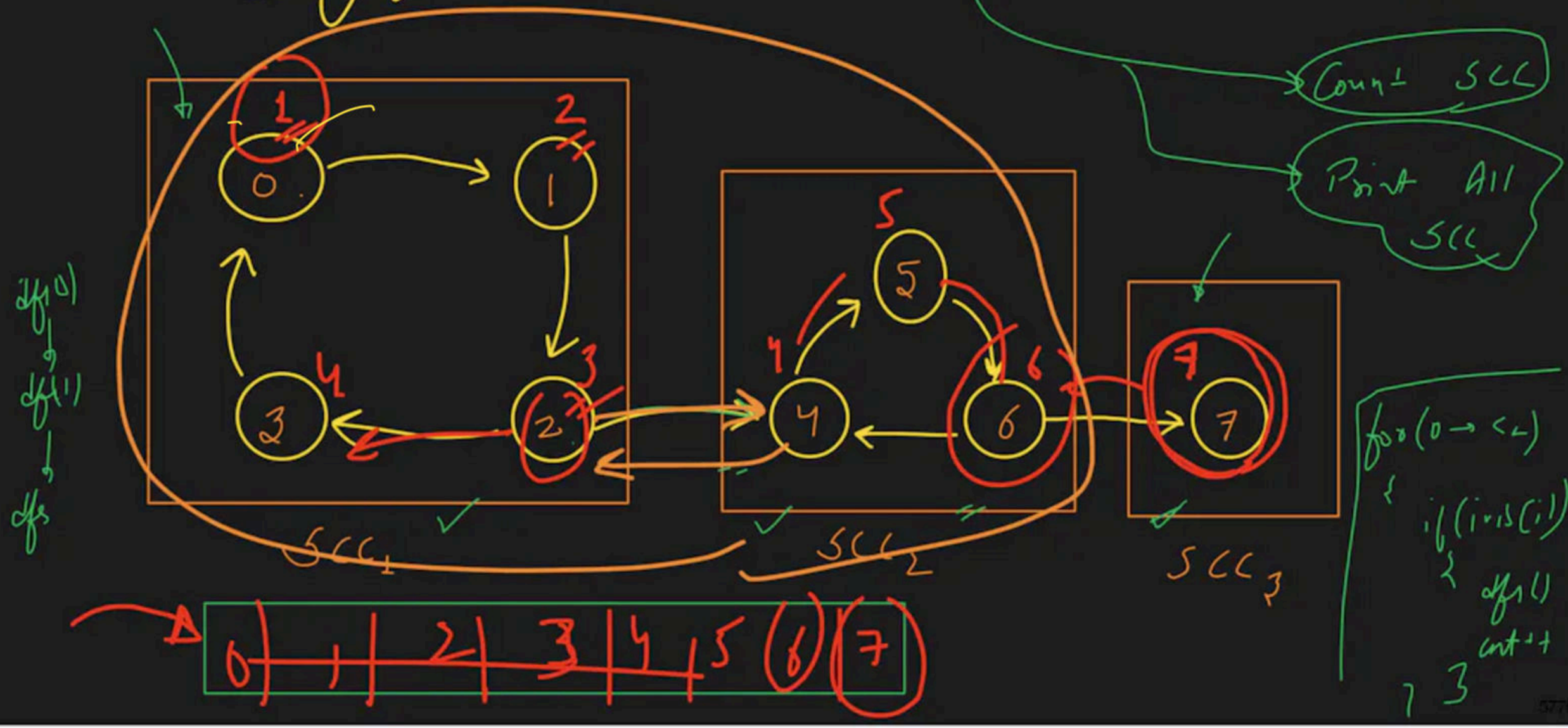
$\leq$

$\leq$ dist[src][0] (helper) + dist[0][dest

dist[src][1] (helper) + dist[1][dest]

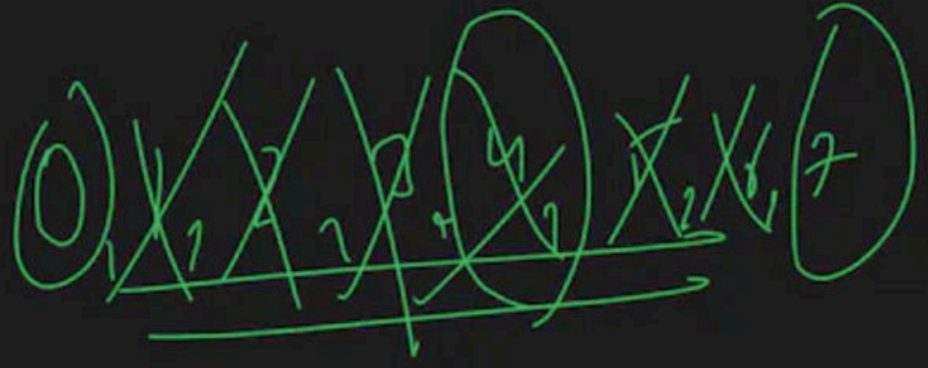

5-min
15-20 min
Break
2 → 3 min
Name
Phone no
Email id
registered email Id
Payment screenshot
Invoice details
Feedback
Review
Payment 2.0
Photo
Face → Passport Size
Invoice
JS

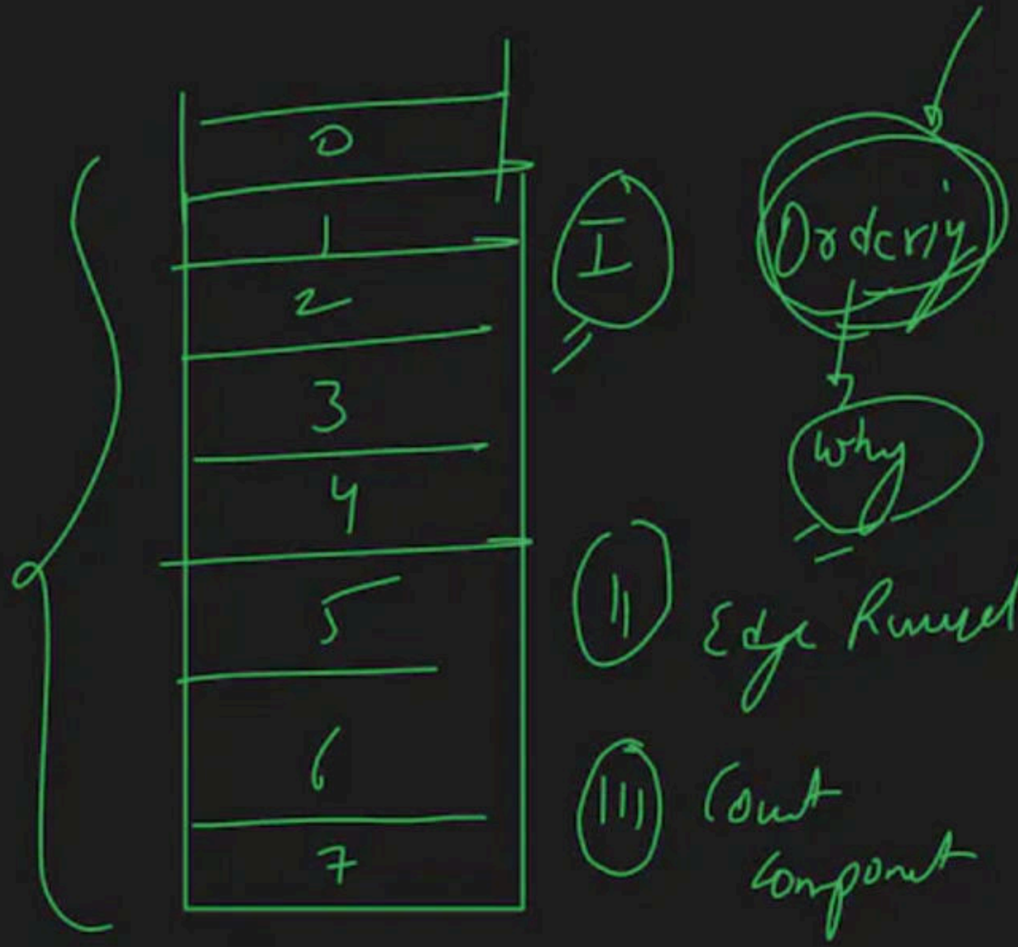
Strongly Connected Component :- Kosaraju

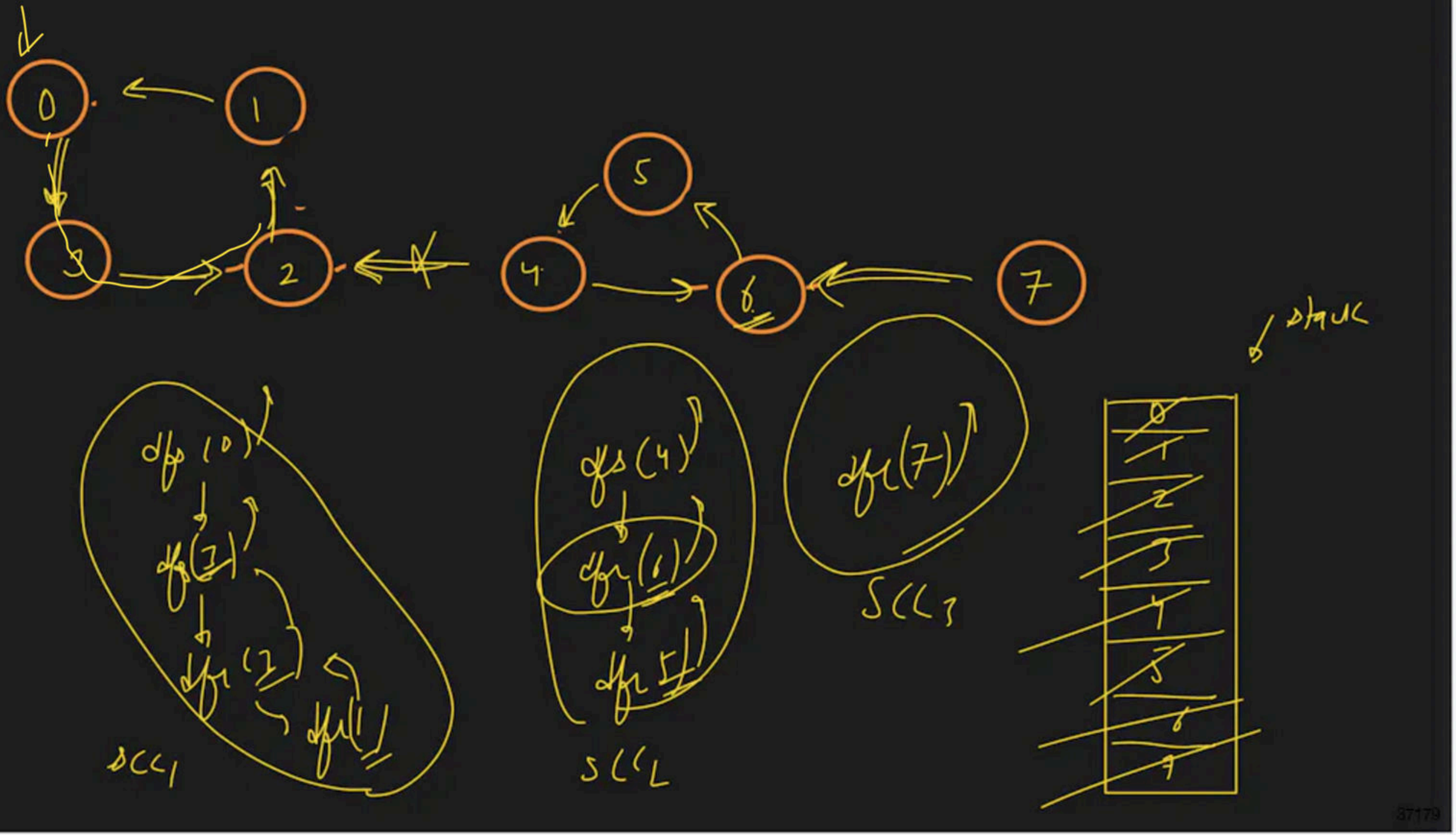


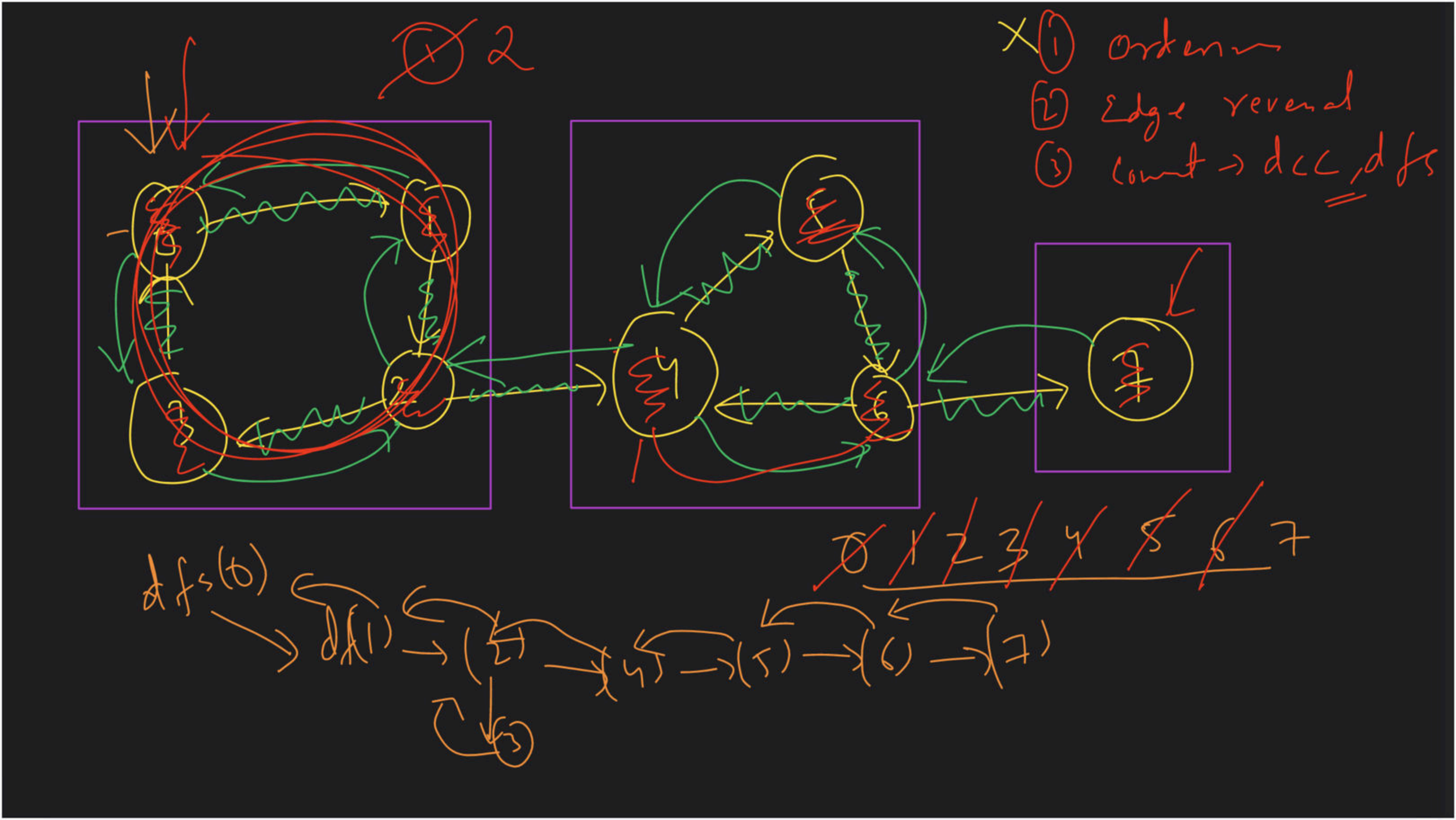
Kosaraju → 2 tools → Edge Reversal

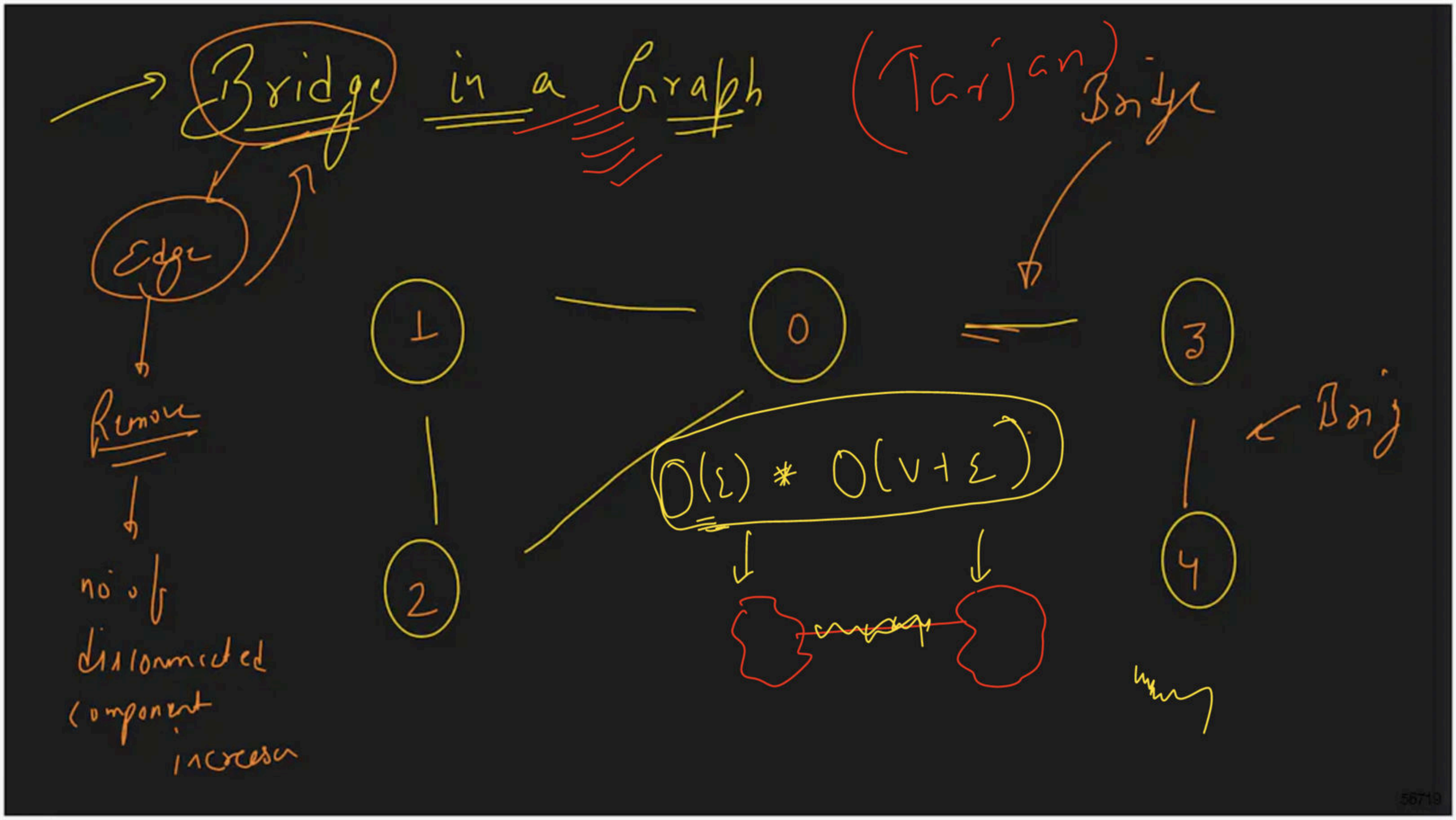
Dfs → count

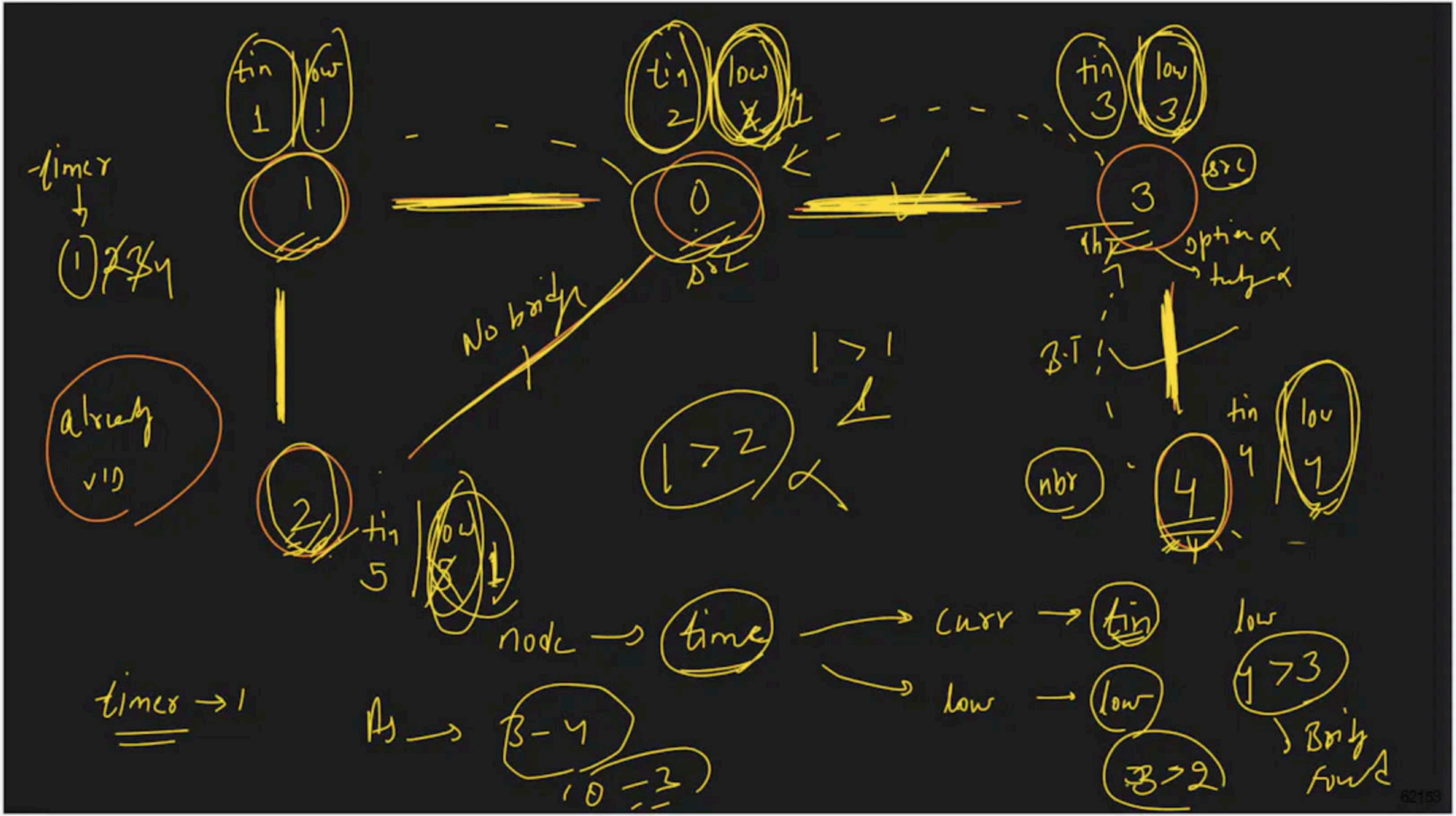


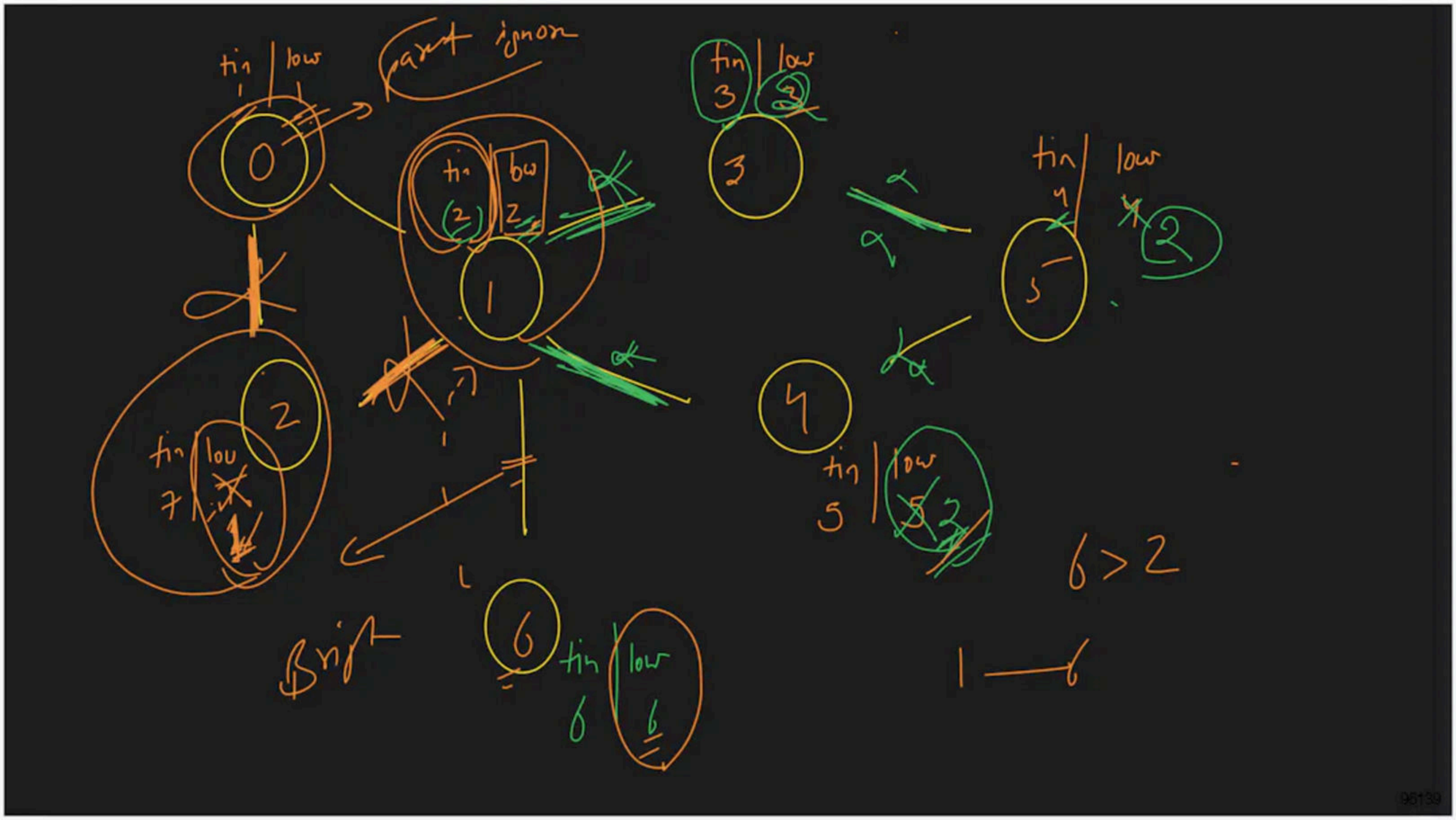



0
1
2
3
4
5
6
7
dfs(0)
dfs(3)
dfs(2)
dfs(1)
SCC1
dfs(4)
dfs(5)
dfs(6)
SCC2
dfs(7)
SCC3
stack
0
1
2
3
4
5
6
7


1
2
1 order
2 Edge reversal
3 count → dcc, dfs
dfs(0)
0 1 2 3 4 5 6 7


Bridge in a Graph
(Tarjan Bridge)
Edge
Remove
no of disconnected component increases
1
0
3
2
4
O(E) * O(V+E)
Bridge


tin
low
timer
already vid
No bridge
1 > 1
1 > 2
src
B.T
nbr
node → time → curr → tin
low → low
timer → 1
3 - 4
0 - 3
4 > 3
3 > 2


tin | low
parent ignore
0
tin | low
2 | 2
1
2
tin | low
7 | 1
L
Bridge
6
tin | low
6 | 6
tin | low
3 | 3
3
tin | low
4 | 2
5
4
tin | low
5 | 5 3
6 > 2
1 — 6

⇒ din/dlow → min. possible Time

↓

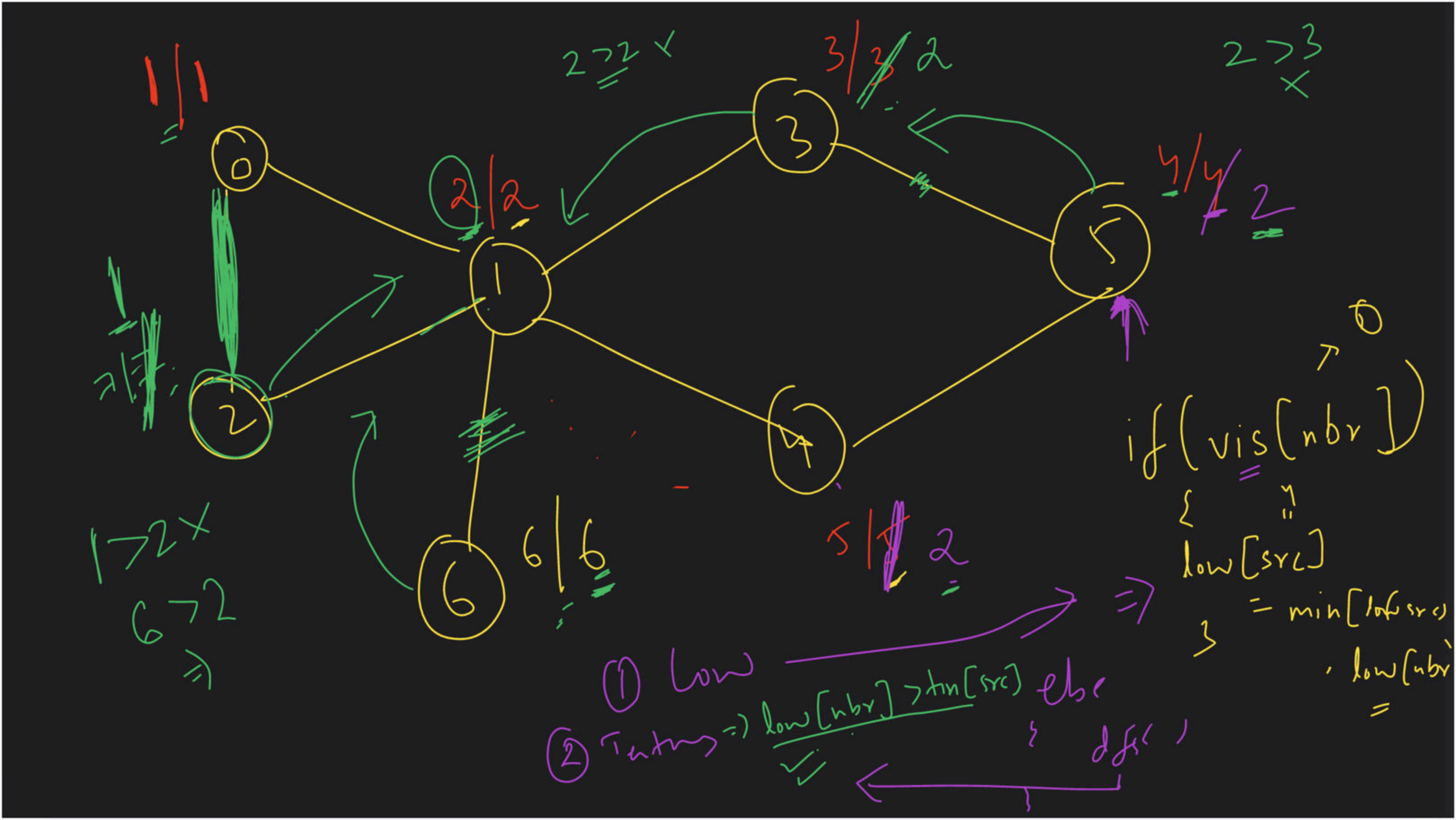
node par first time reach ka Time

① Low update

② Testing Bridge

↓

hai ke nai


0
1
2
3
4
5
6
1/1
2>=2 X
2/2
3/3
2
2>=3 X
4/4
2
1>=2 X
6>=2
6/6
5/5
2
if(vis[nbr])
{
low[src]
= min[low[src]
, low[nbr
}
① Low
② Tarjan => low[nbr] > tin[src]
else
{
dfs( )
}