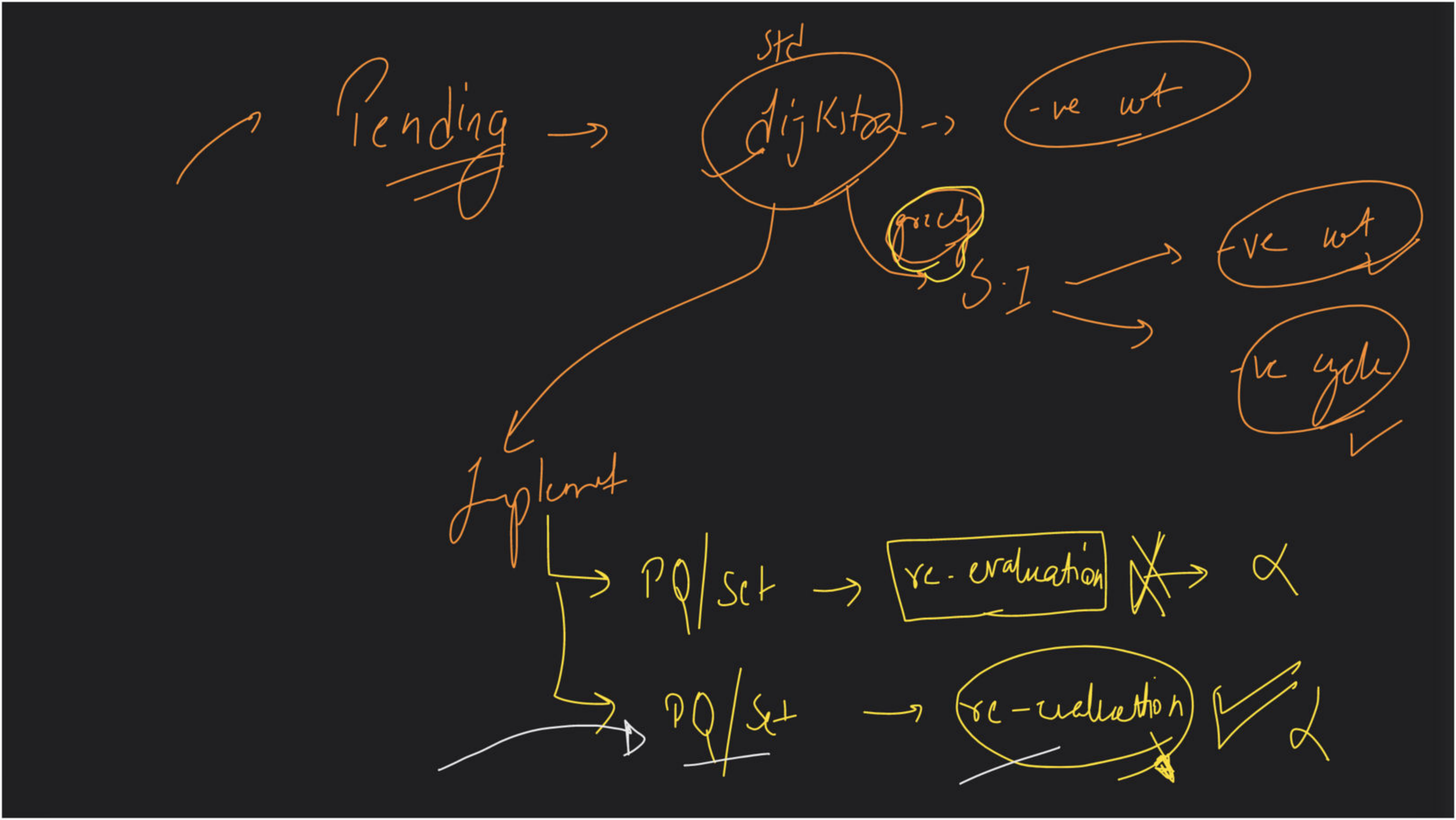
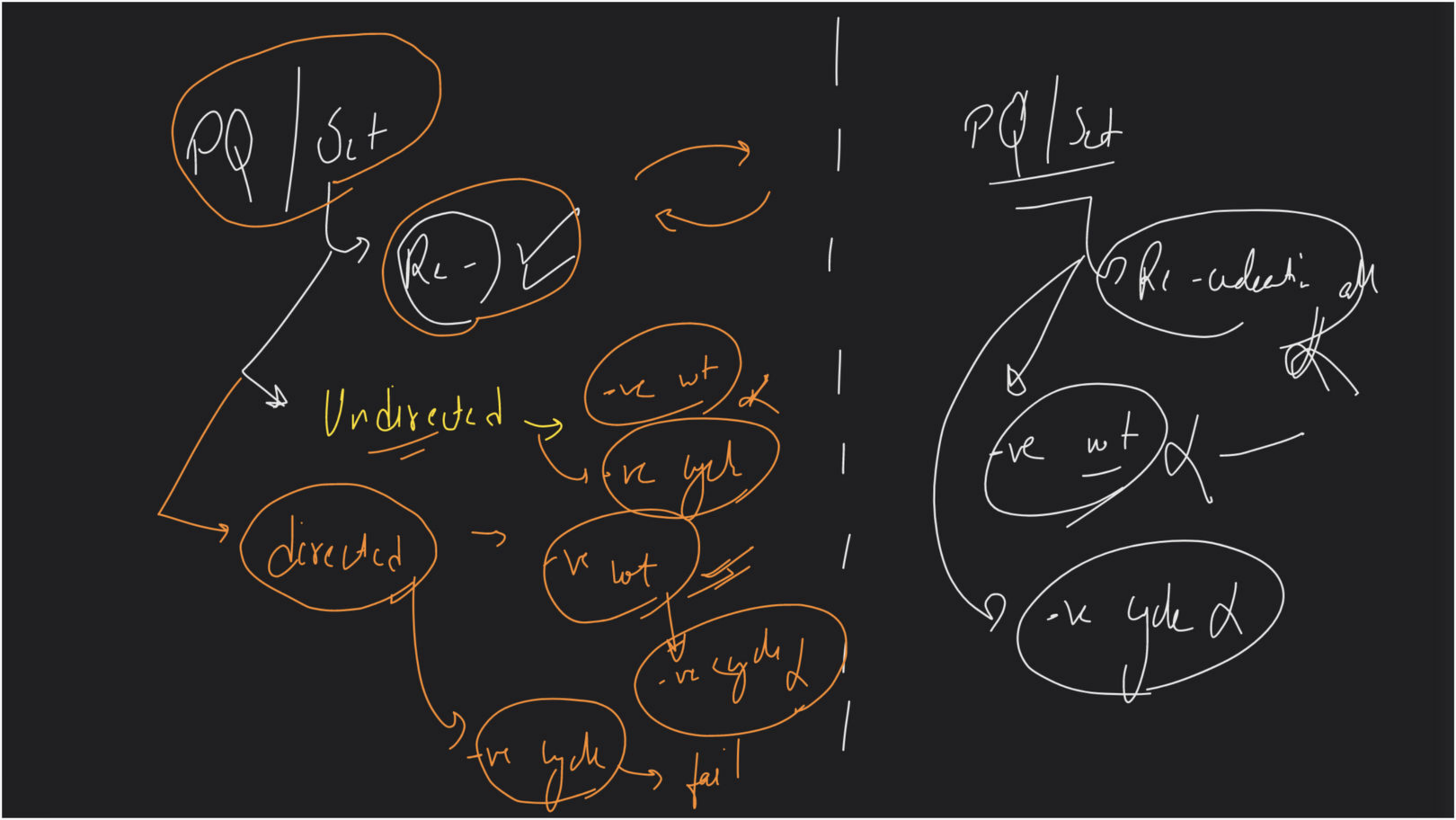
Graph Class - 8

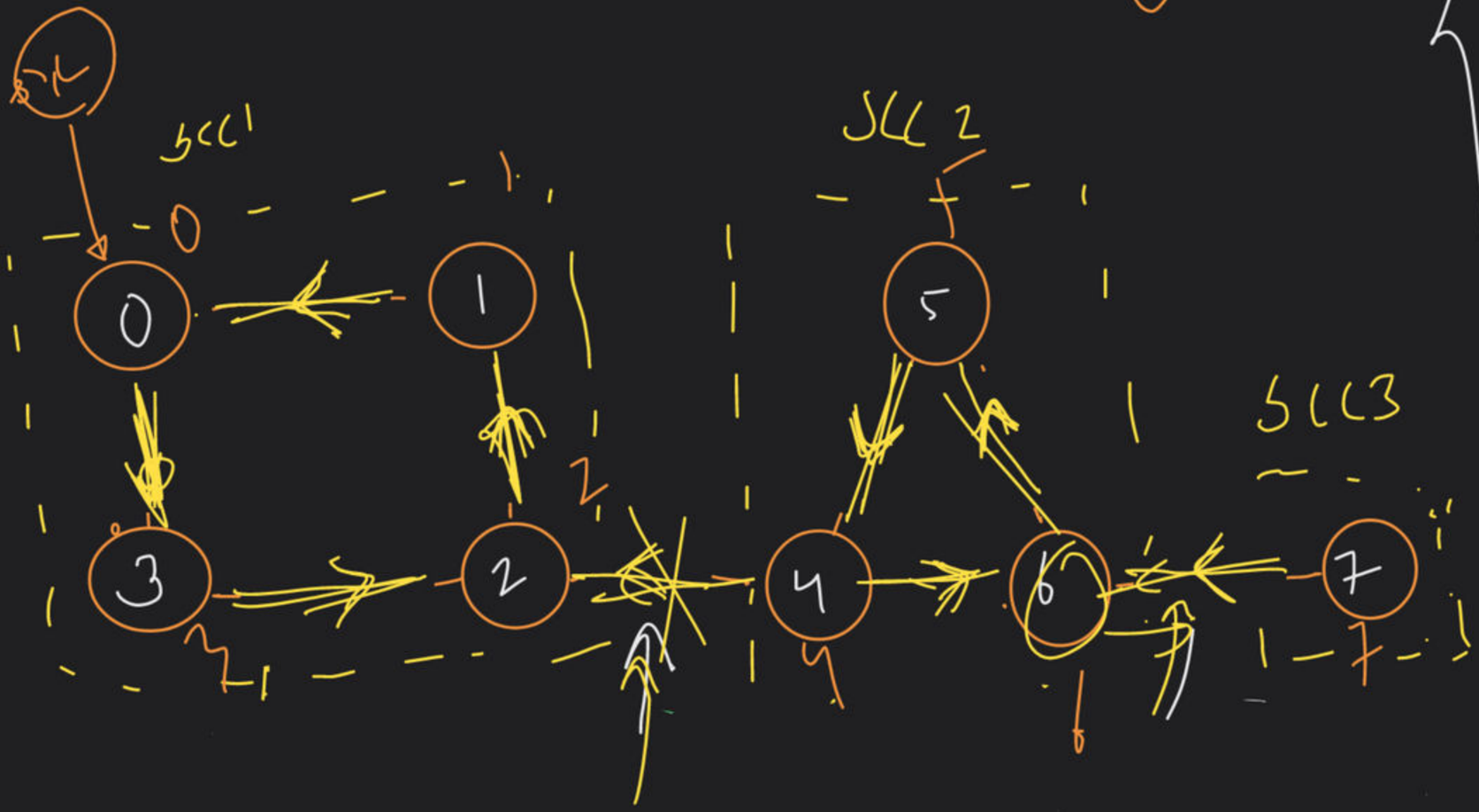
Special class

Love Babbar • July 2, 2023


Pending
Std
dijkstra
-ve wt
-ve wt
-ve cycle
Implement
PQ/Set
re-evaluation
PQ/Set
re-evaluation


PQ / Set
Re-
Undirected
-ve wt
-ve cycle
directed
-ve wt
-ve cycle
-ve cycle
fail
PQ / Set
Re-
-ve wt
-ve cycle

Strongly Connected Components

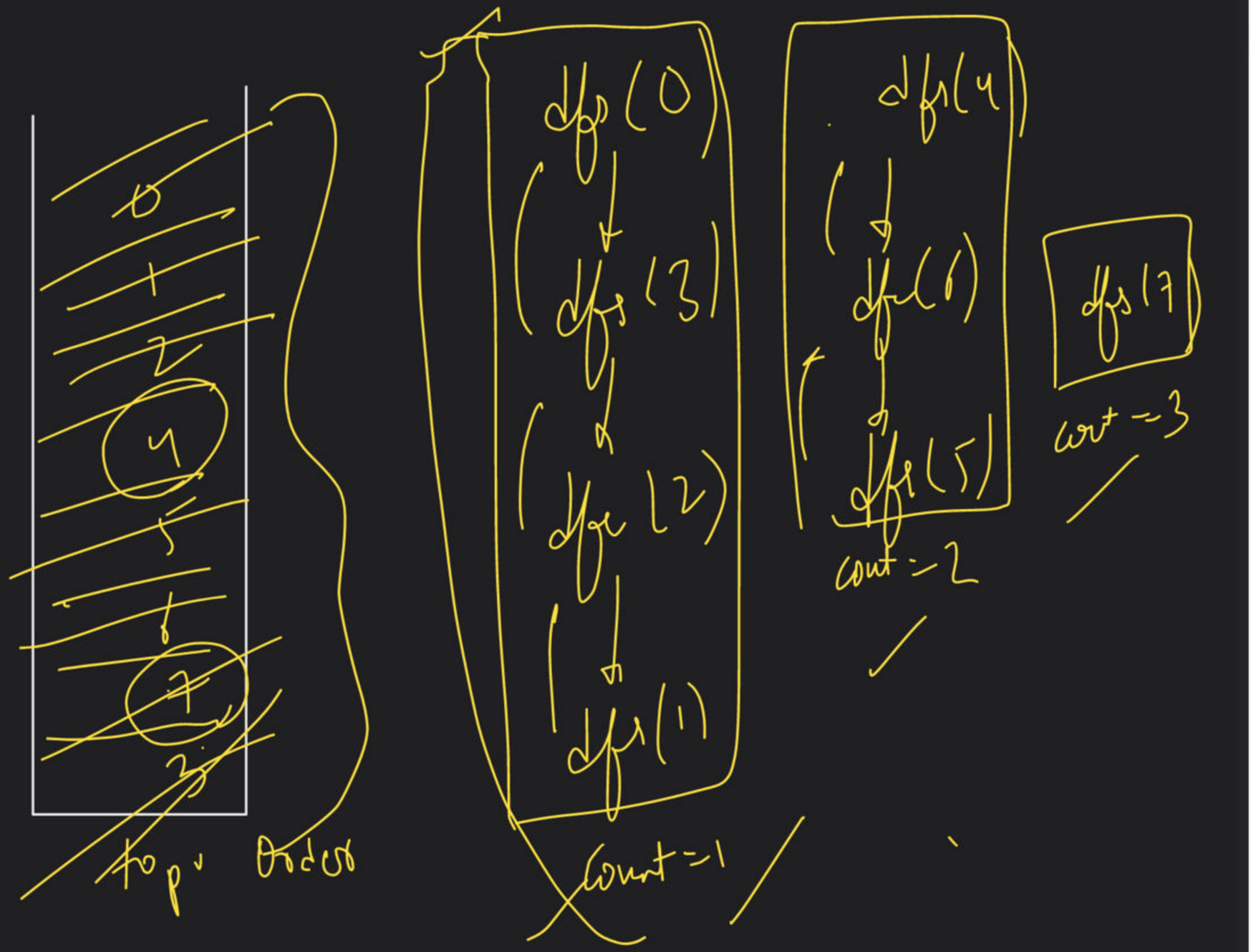


① find Ordering in which we should traverse the graph

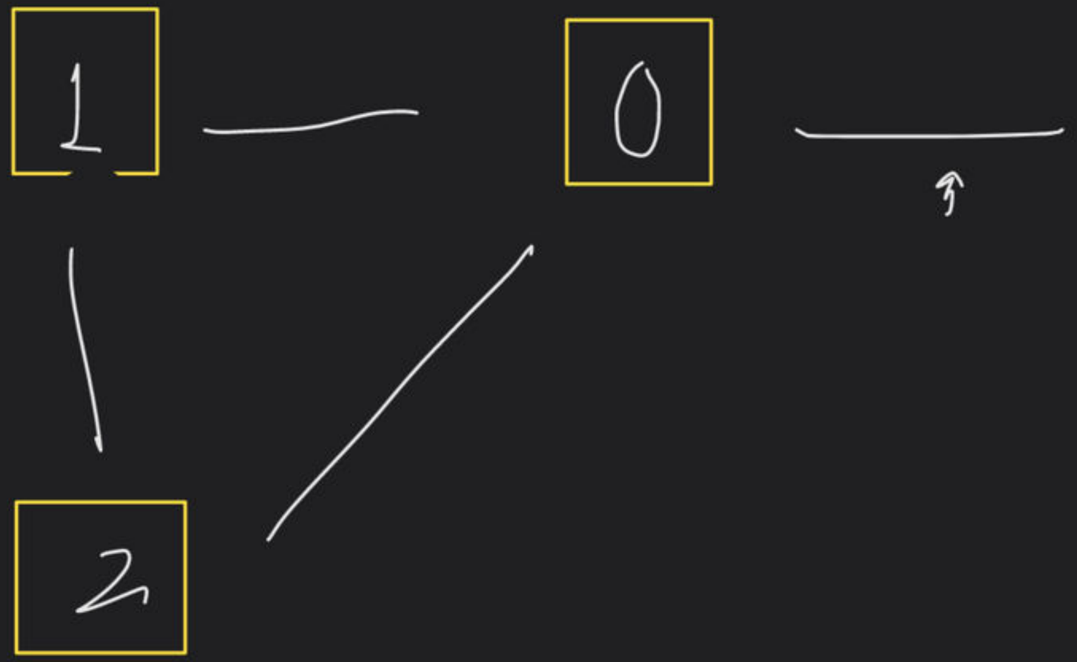
② reverse the edges

all

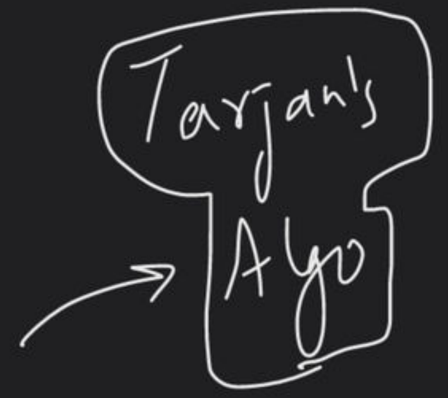
③ count components

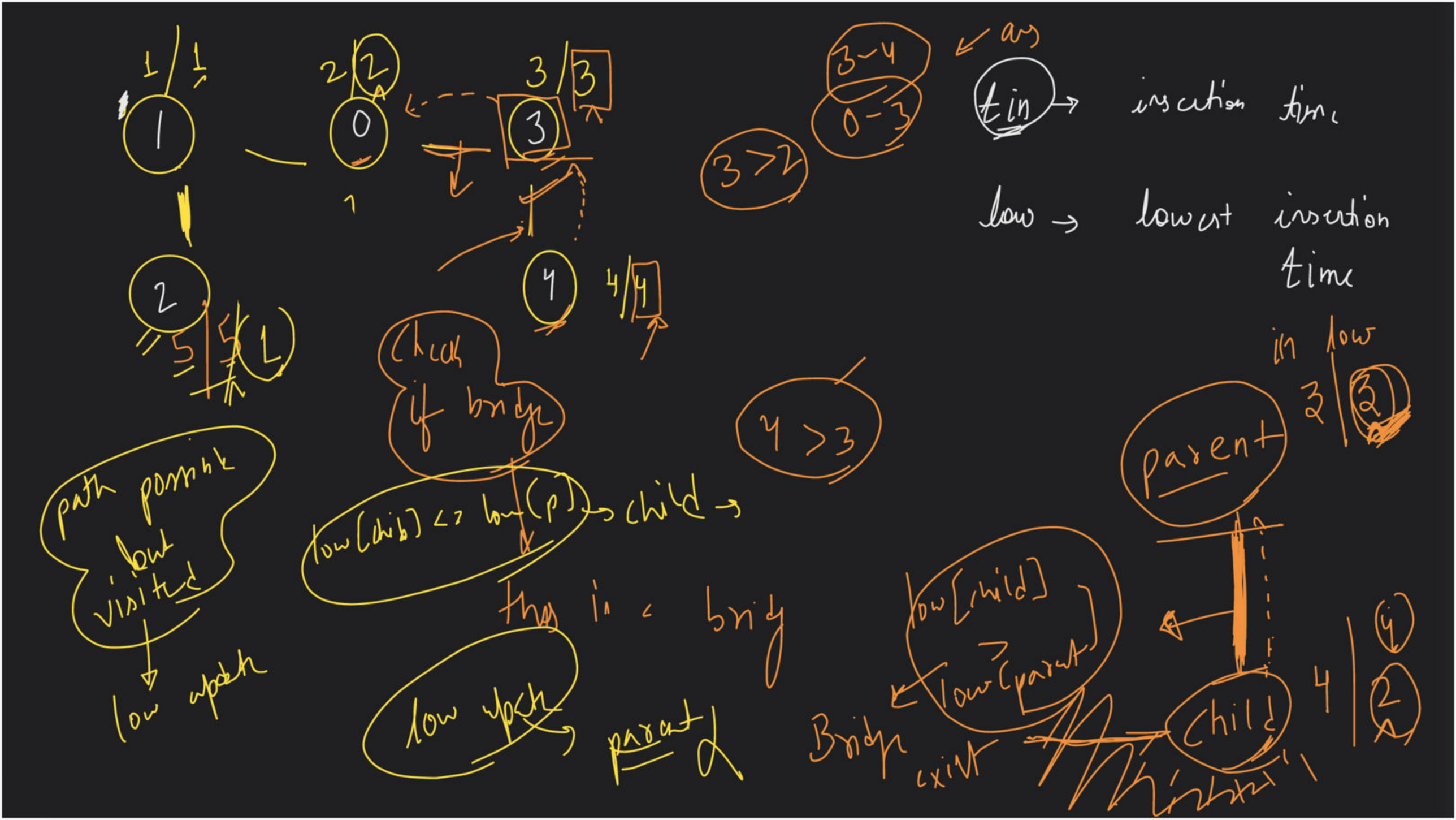

0
1
2
4
5
7
3
top
Order
dfs(0)
dfs(3)
dfs(2)
dfs(1)
count=1
dfs(4)
dfs(1)
dfs(5)
count=2
dfs(7
count=3

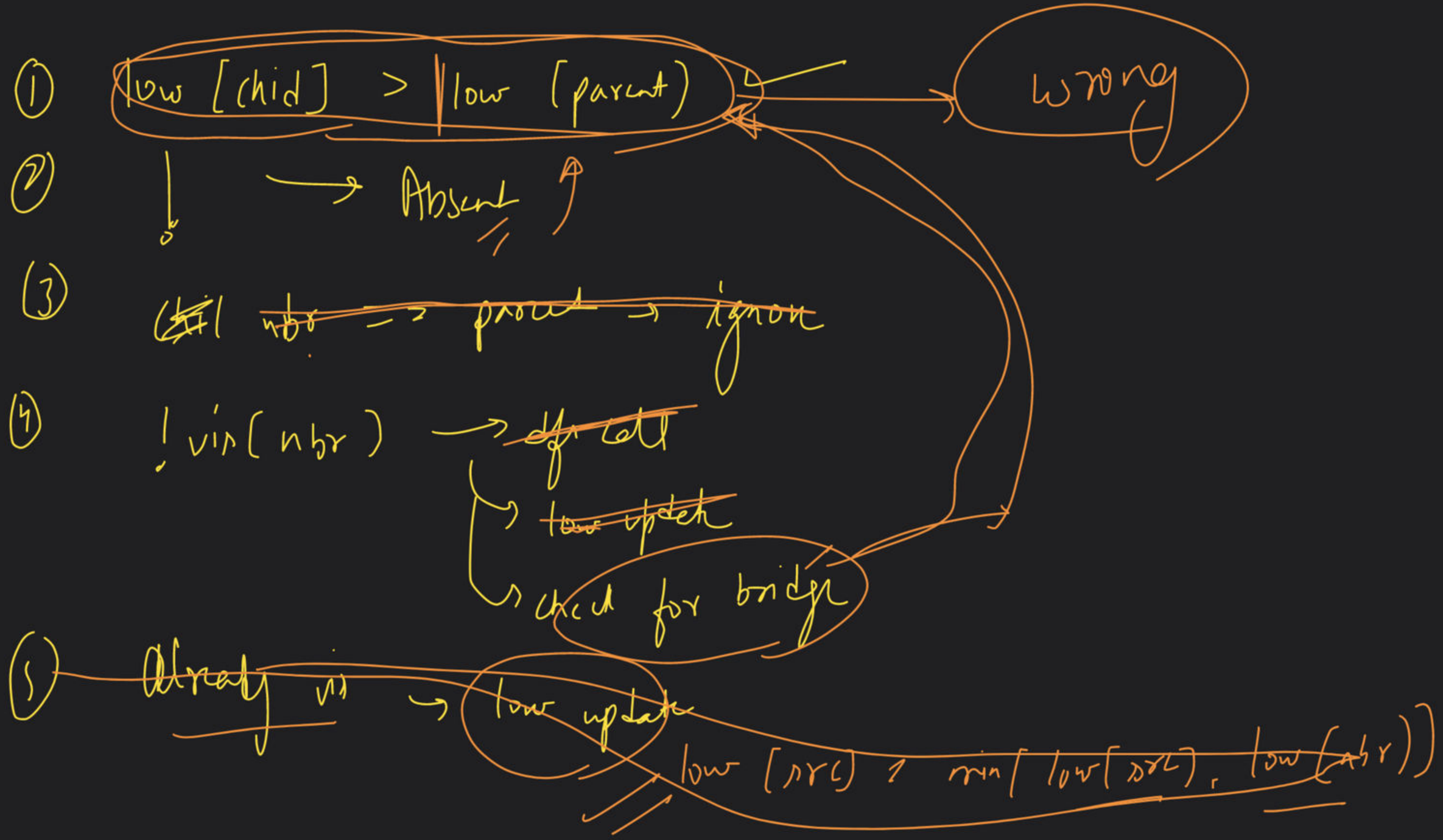
Bridge in a Graph:-

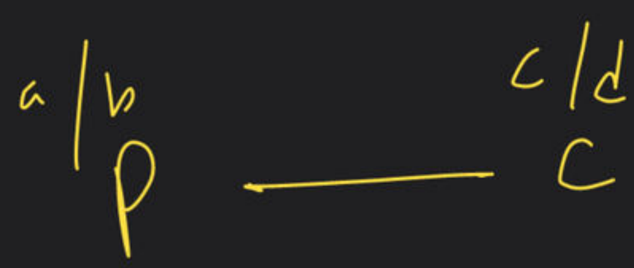


Back edge




1 1/1
2 2/2
3 3/3
1
0
3
2
4
4/4
3~4
0~3
3>2
4>3
ans
tin → insertion time
low → lowest insertion time
check if bridge
low[child] <> low(p) → child →
this is a bridge
path possible low visited
low update
low update → parent
parent
child
low[child] → low[parent]
Bridge exist
in low
3/3
4/4


low [child] > low (parent)
wrong
Absent
check for bridge
low update
low [src] = min [low [src], low [nbr]]

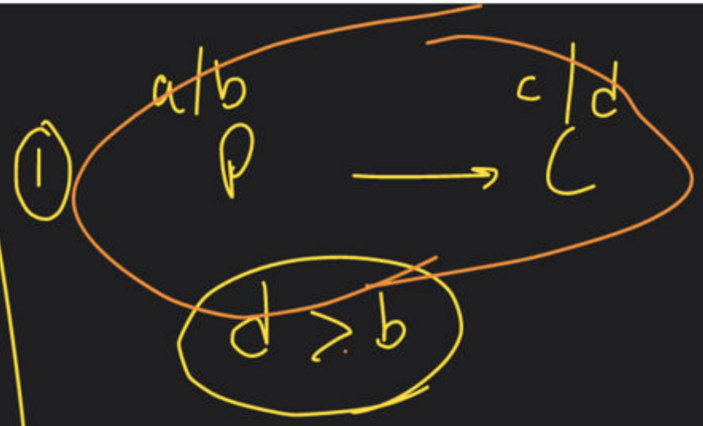


d > b ✗

↳ 1. (low [child] > low (parent))

↳ c tak kabhi bhi pahuch sakta ✗

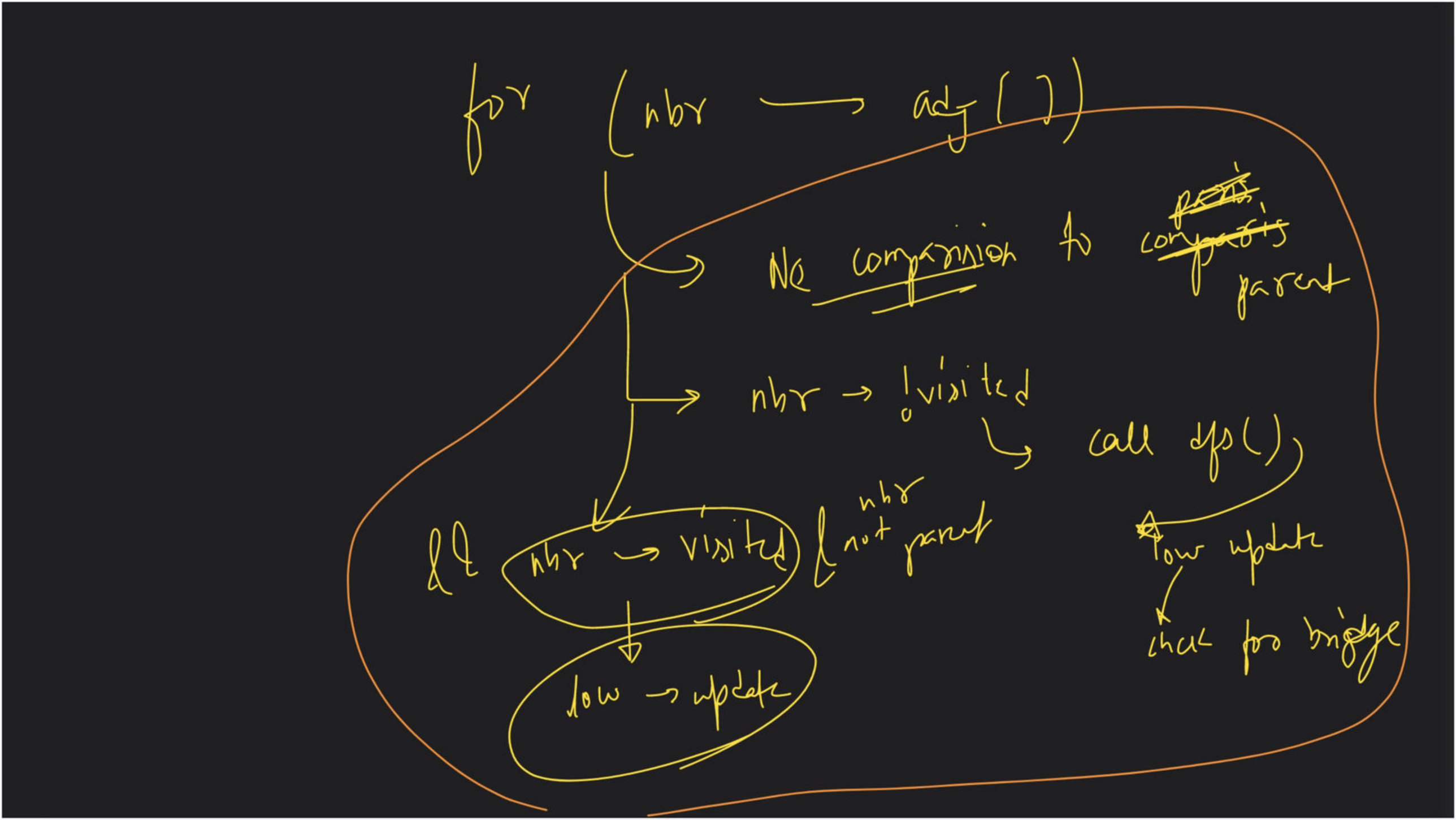
↳ ✗ c − p → Not a bridge

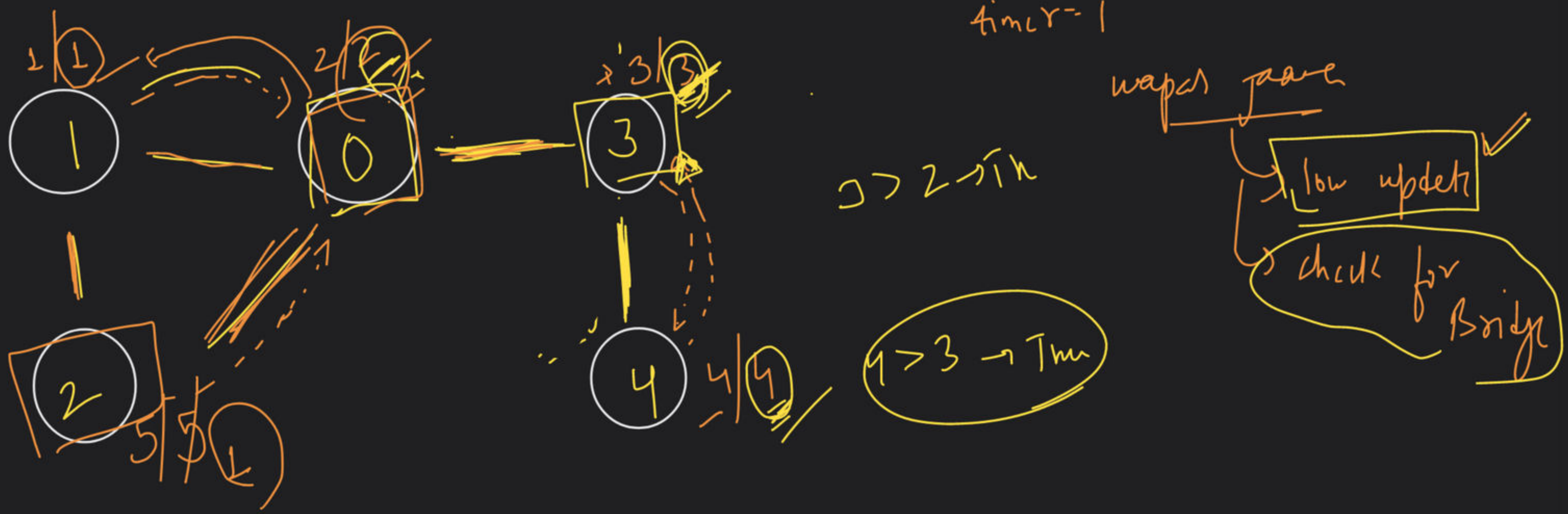


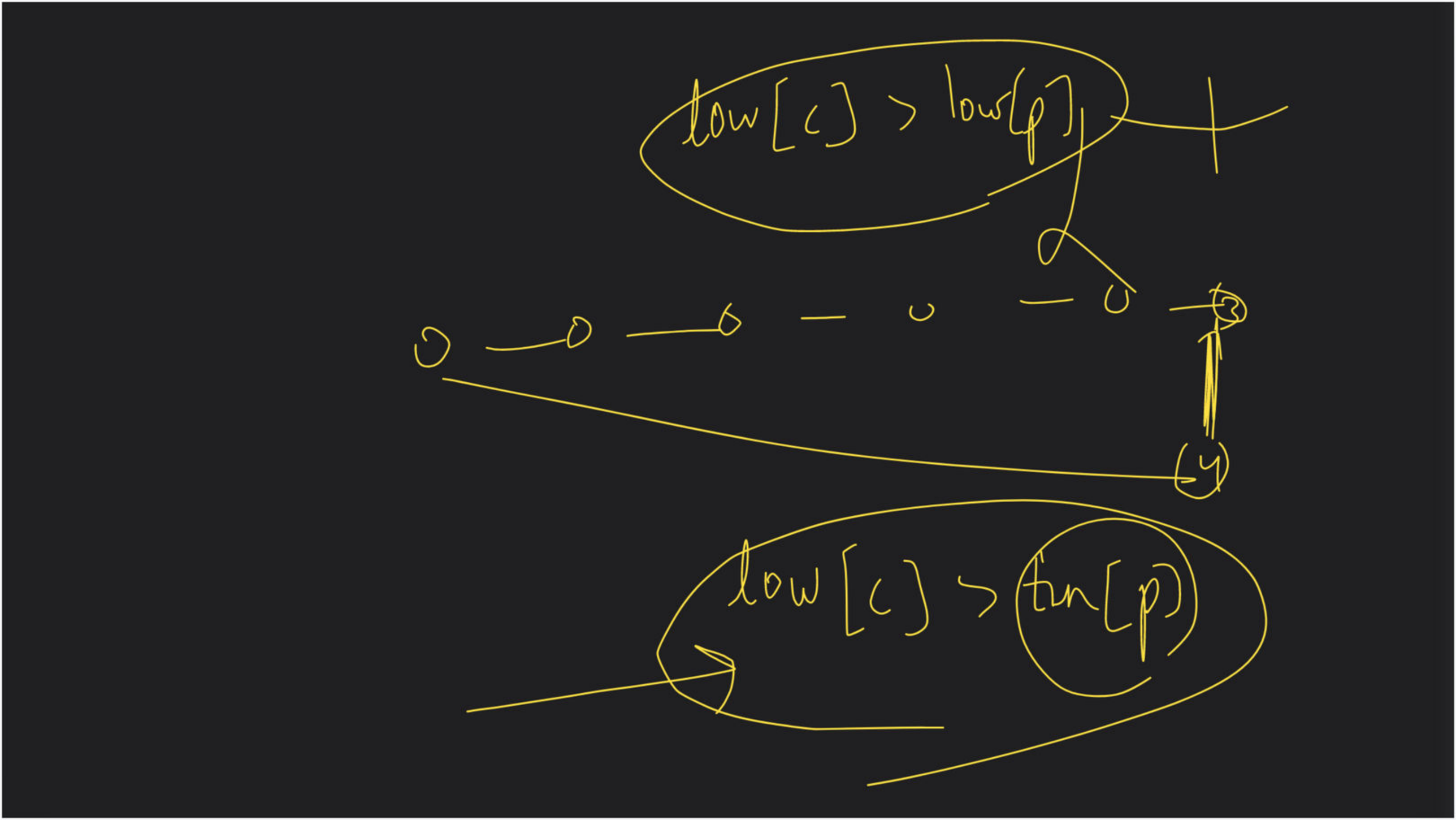
low [child] > low (parent)

↳ c tak sirf p se pahuch sakta ✓

↳ c − p is a bridge


for (nbr → adj( ))
No comparision to parent
nbr → !visited
call dfs( )
if nbr → visited & nbr not parent
low update
low → update
check for bridge


timer = 1
wapas jaate
low update
check for Bridge
4 > 3 → True
1
0
2
3
4

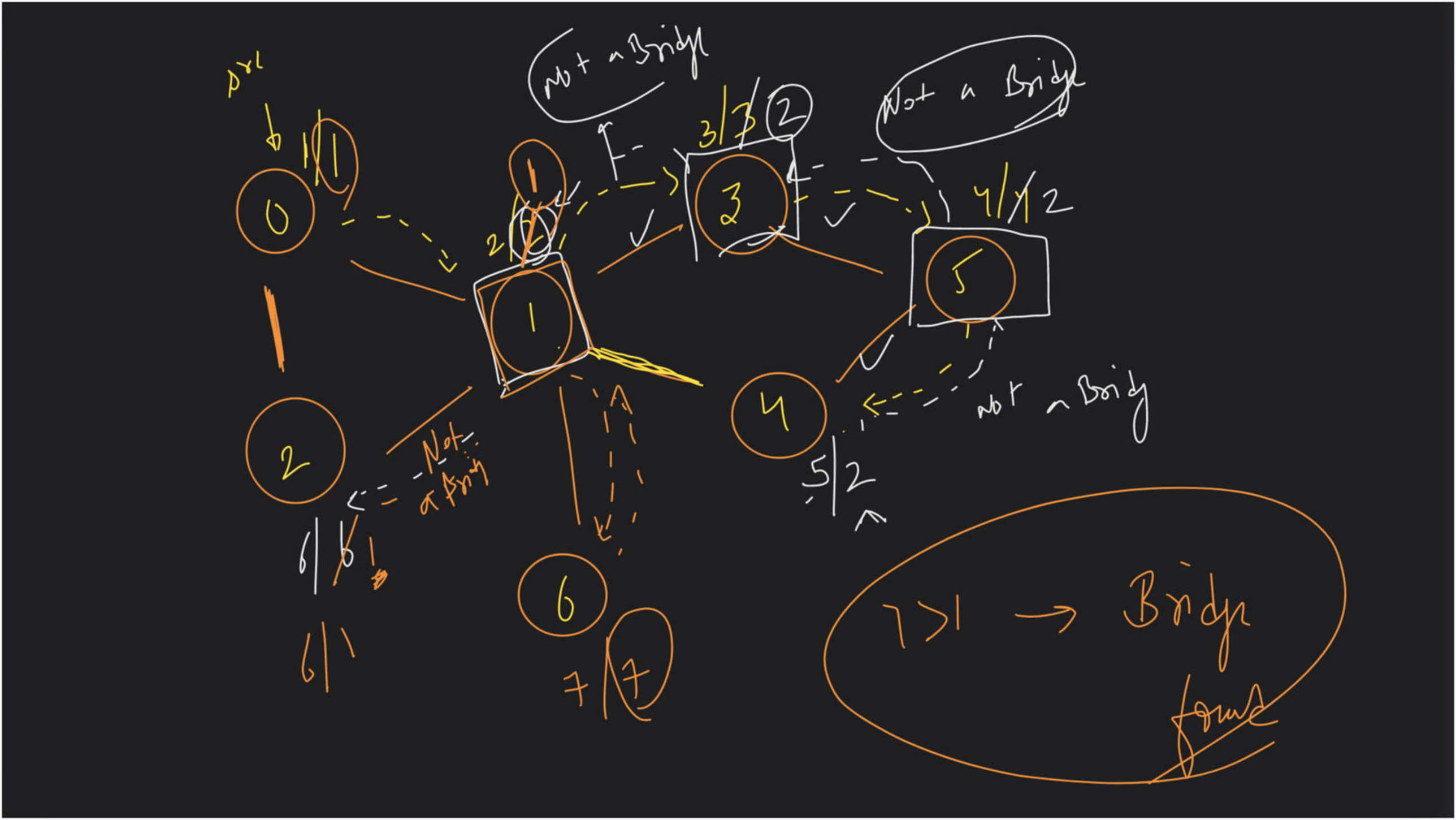

low[c] > low[p]
low[c] > tin[p]

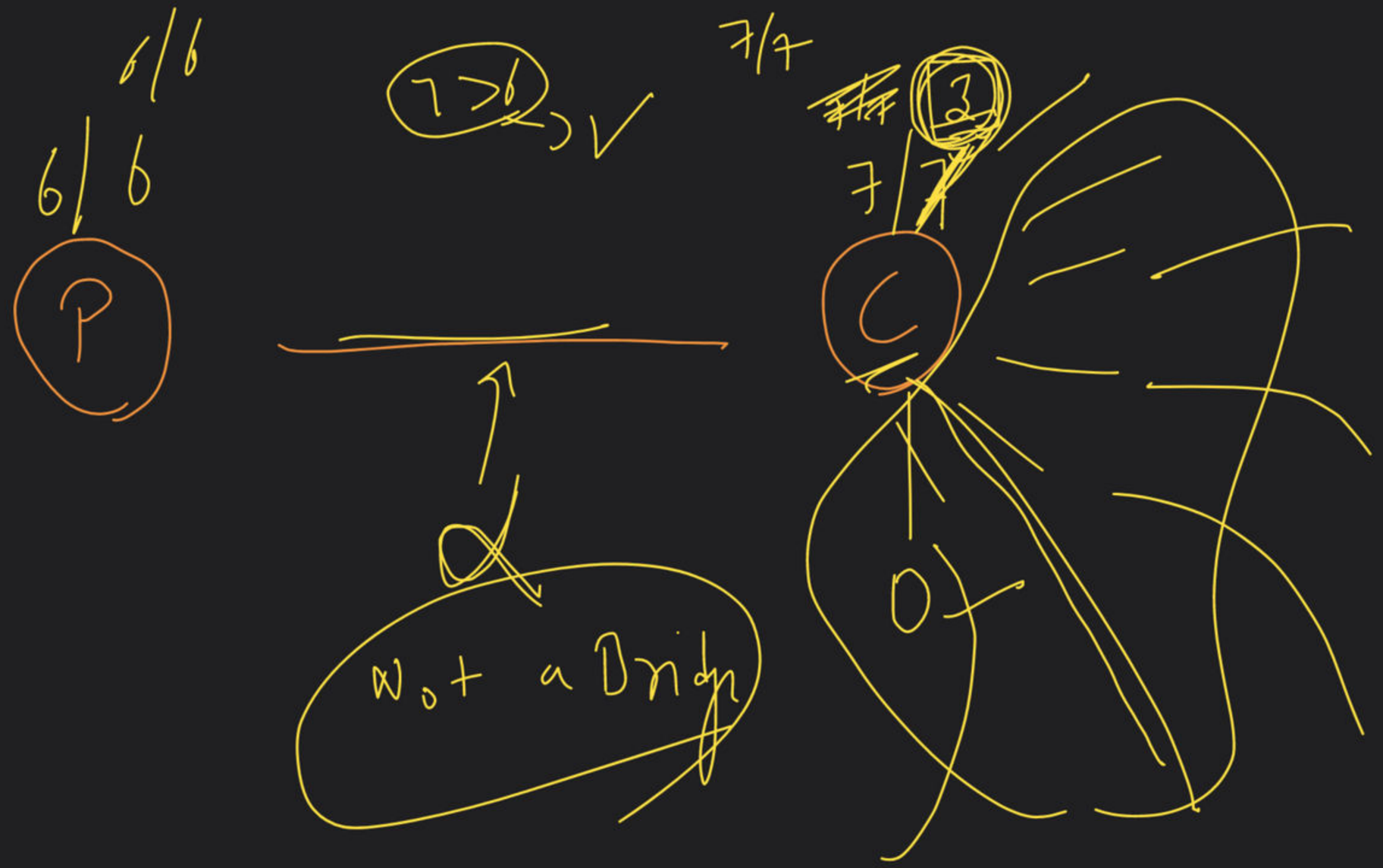
$2 \geq 1 \rightarrow$ 1-2

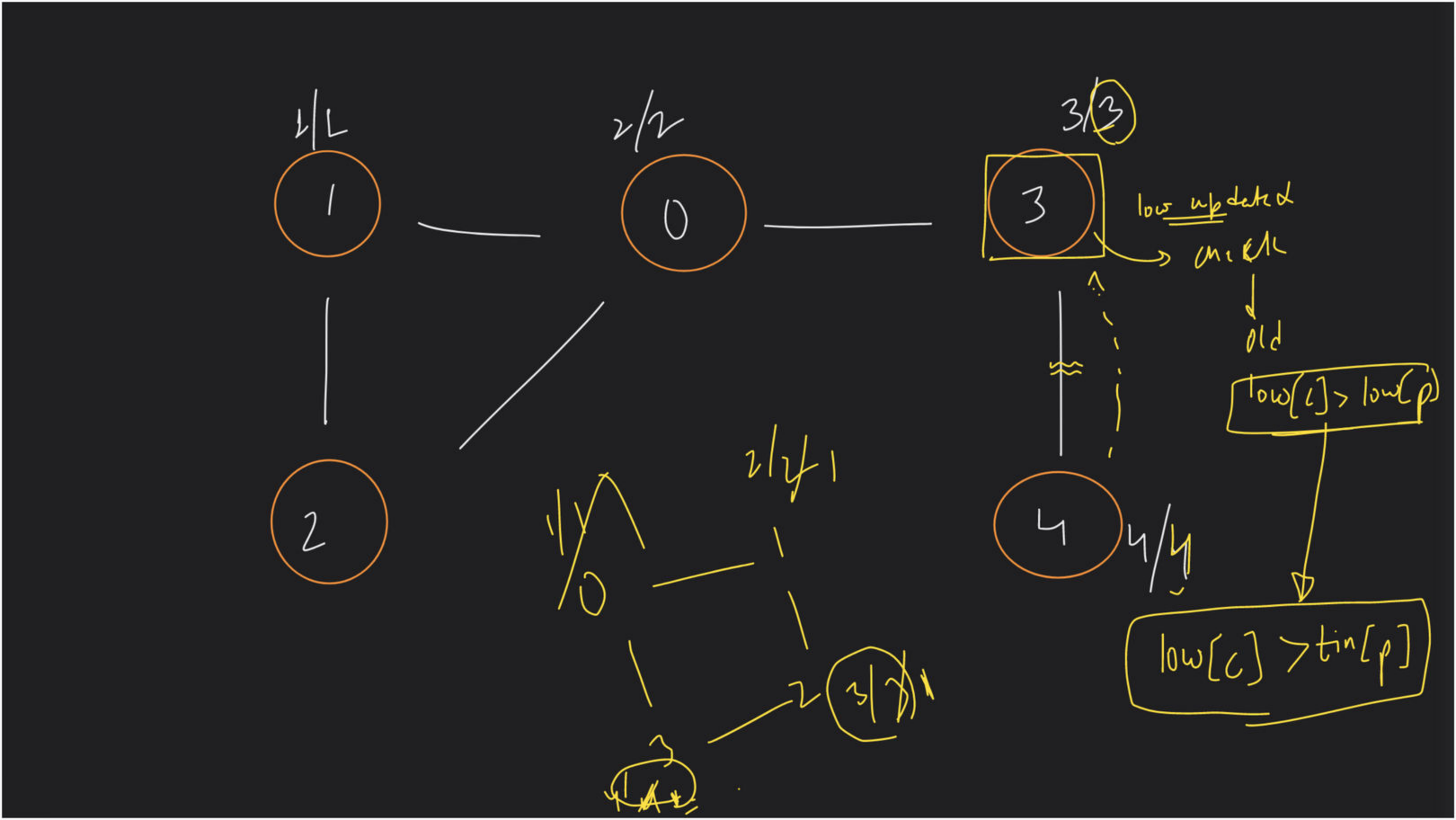
$3 > 2 \rightarrow$ 2-7

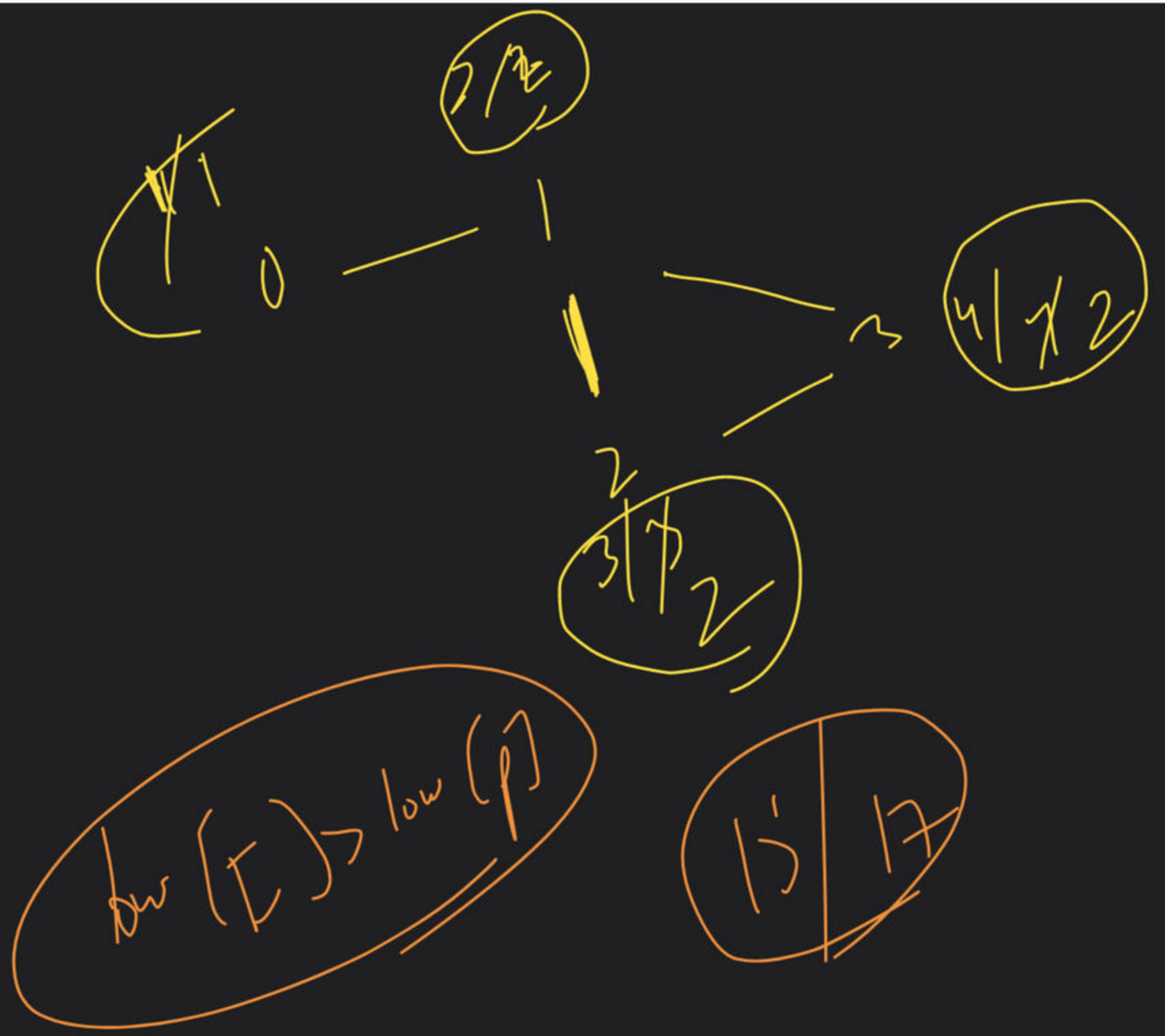
3 Bridge

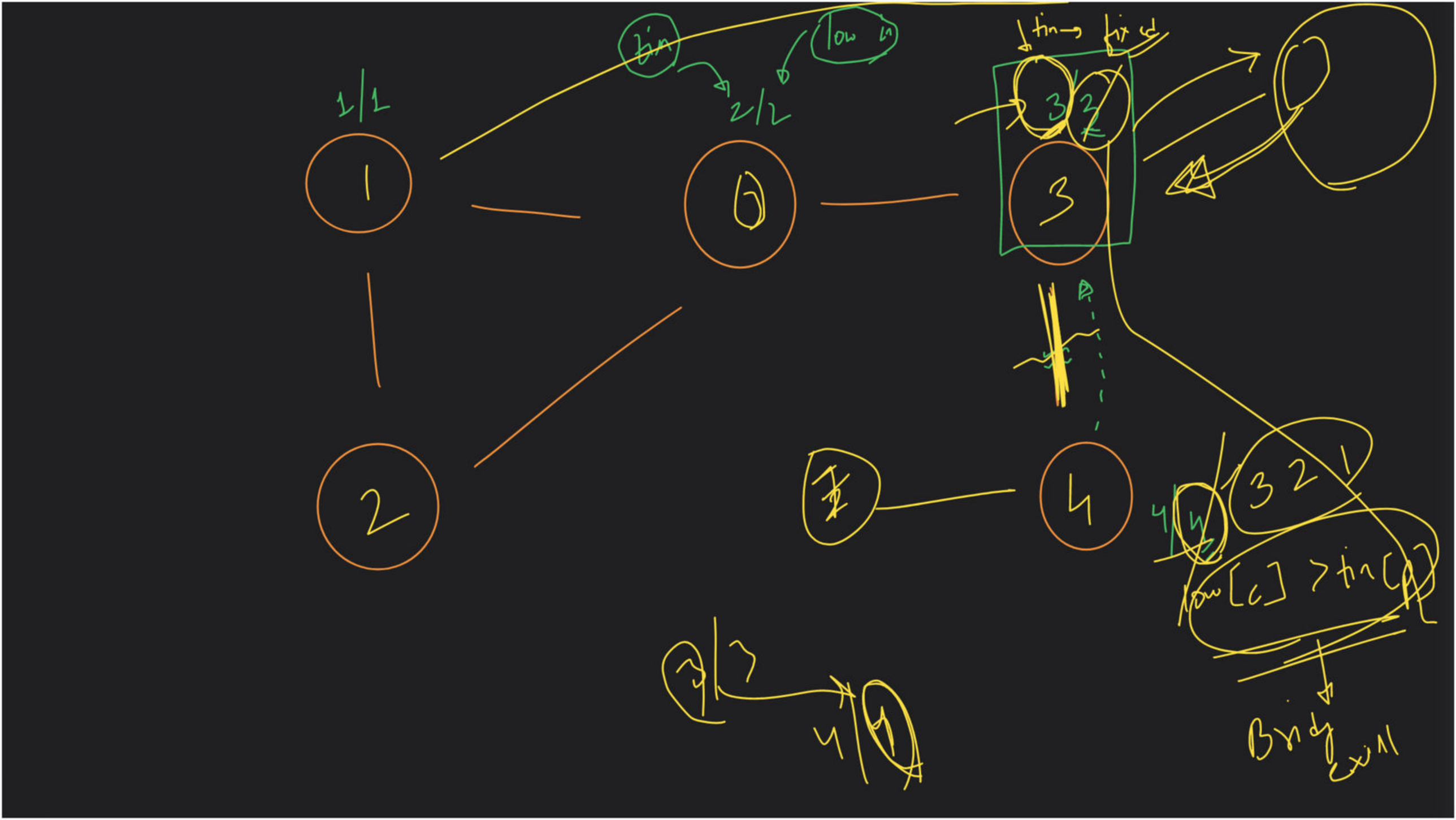
$4 > 3 \rightarrow$ 2-3


Not a Bridge
Not a Bridge
Not a Bridge
Not a Bridge
Not a Bridge
7>1 → Bridge found


6/6
6/6
P
7>6
7/7
3
7
7
C
0
Not a Bridge


1/1
2/2
3/3
1
0
3
low updated
old
2
4
4/4
low[c] > low[p]
low[c] > tin[p]


2/2
1/1
0
1
3
4/12
2
3/7
2
low(T) > low(P)
15
17


tin
low
1/1
2/2
1
0
2
3
2
3
tin
fixed
4/4
3 2 1
low[c] > tin[p]
Bridge
4/7
4/1


Bridge No
bridge