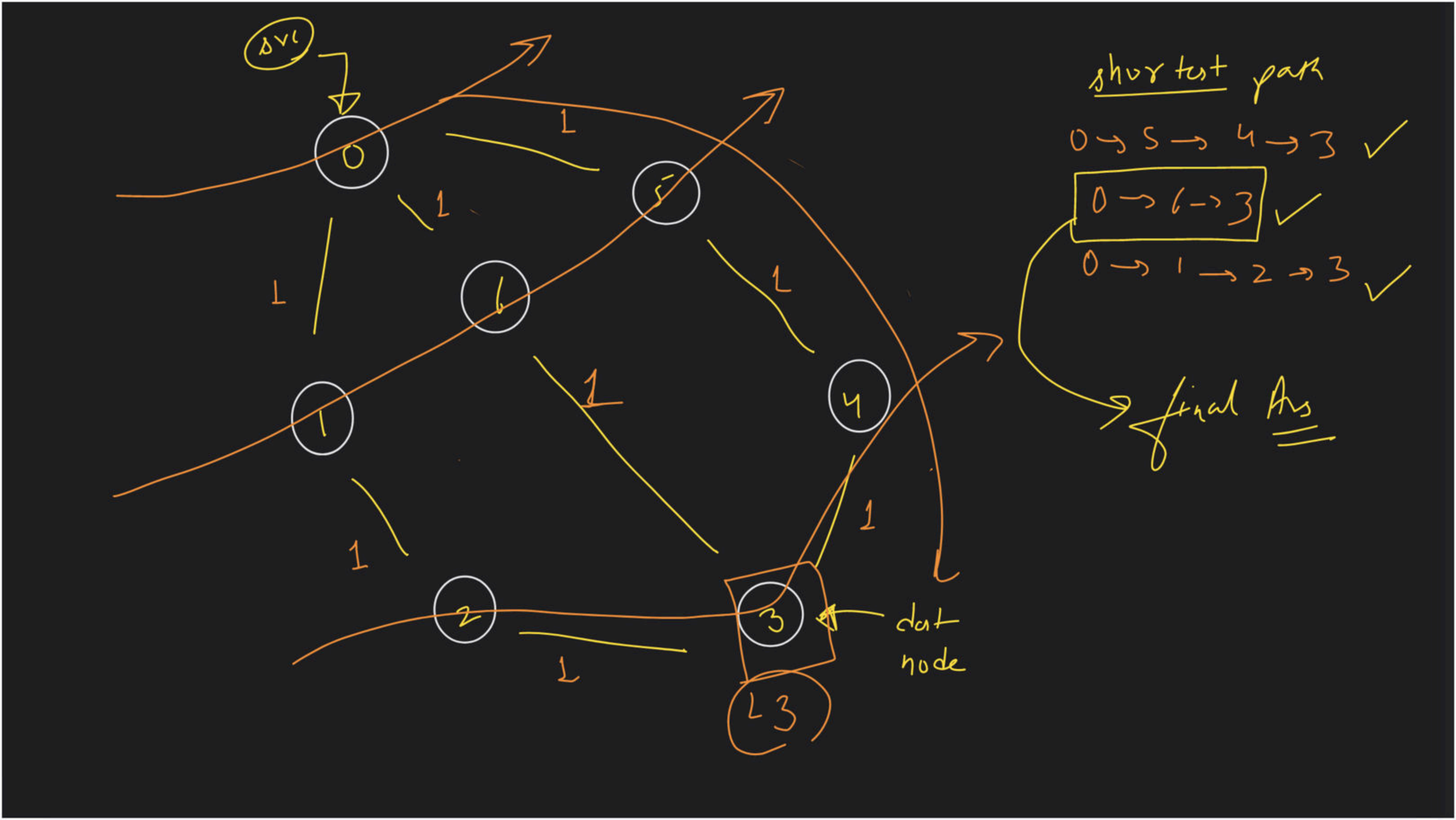
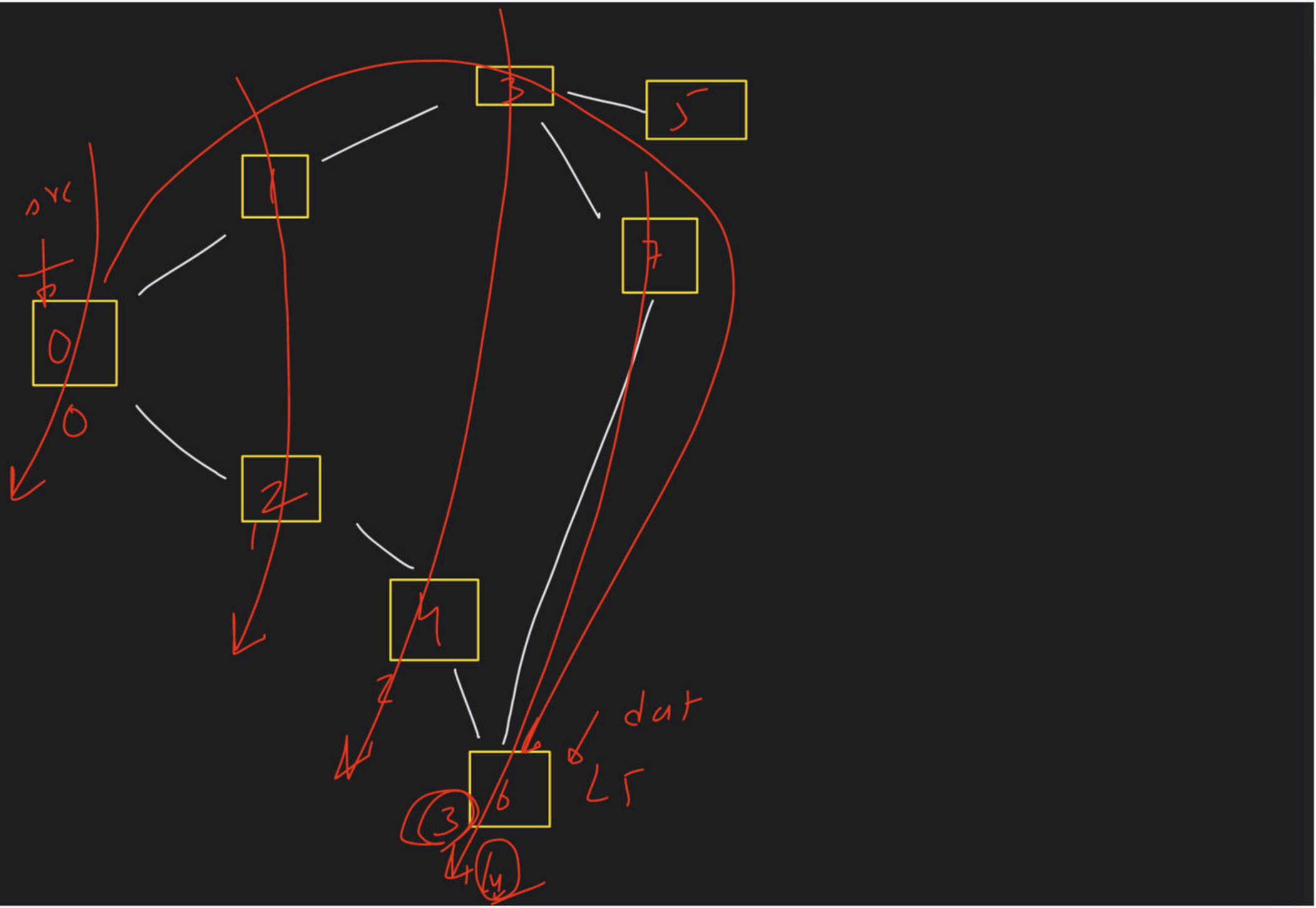
Graphs Class - 4

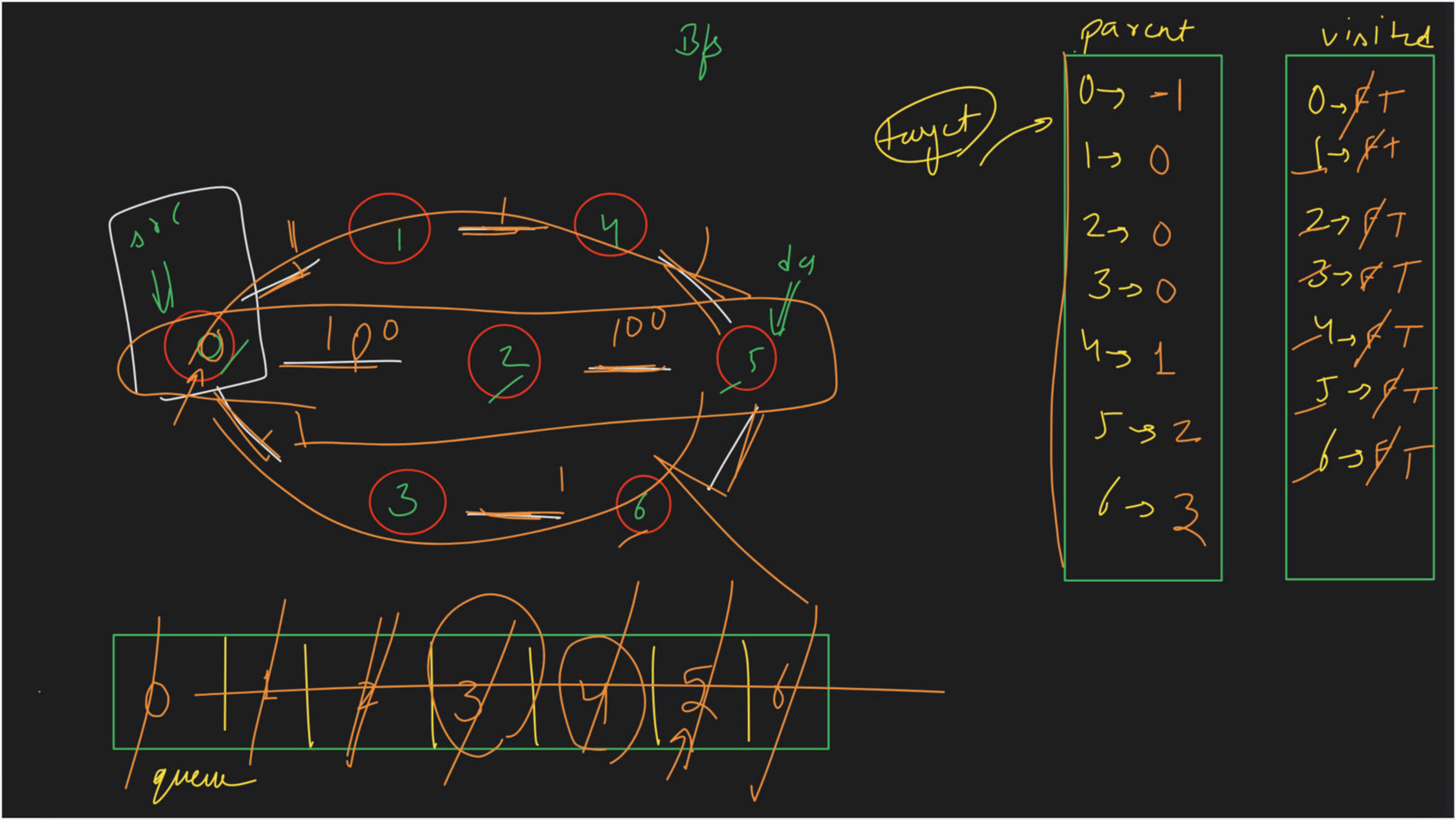
Special class

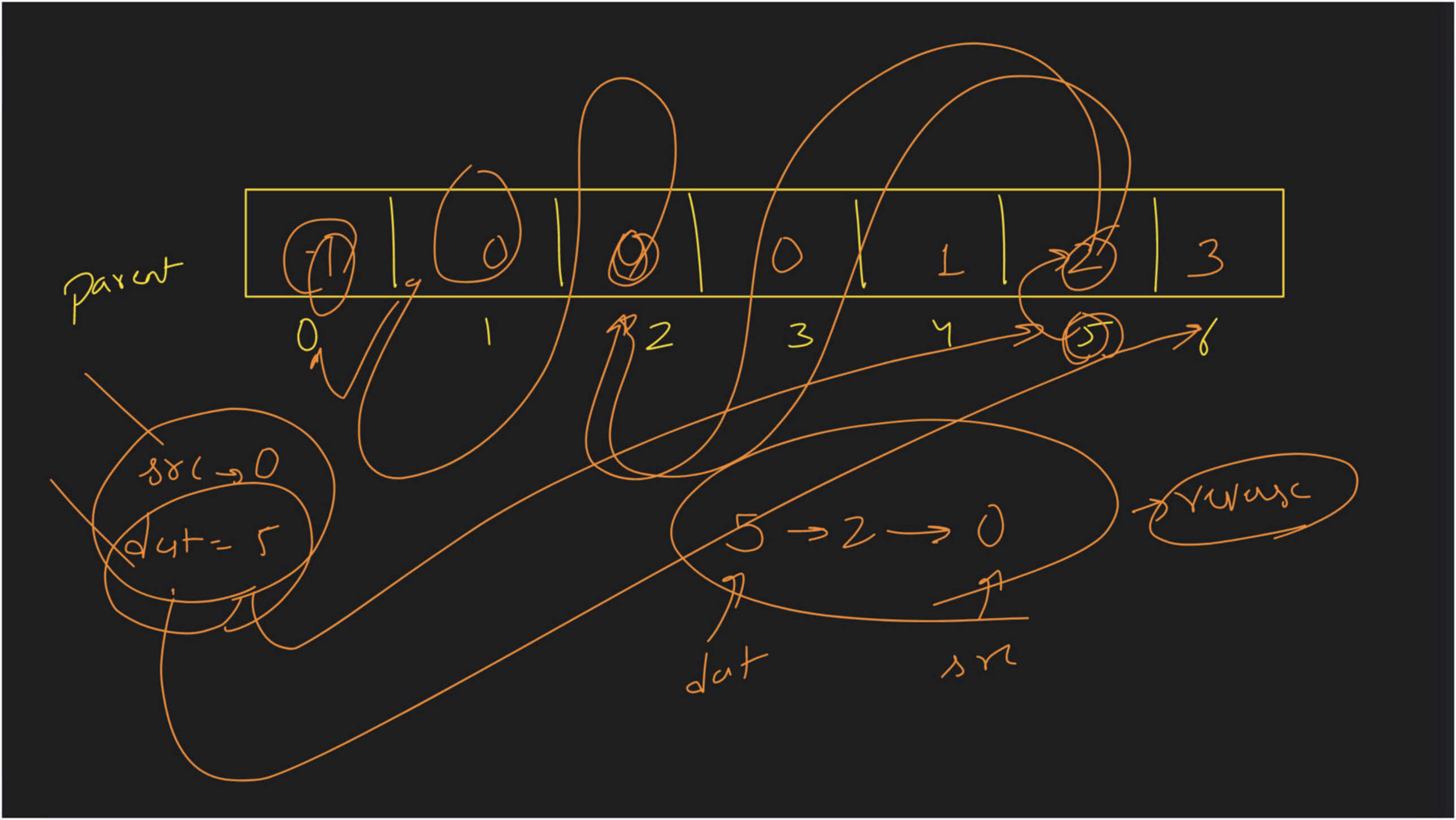
Love Babbar • June 23, 2023

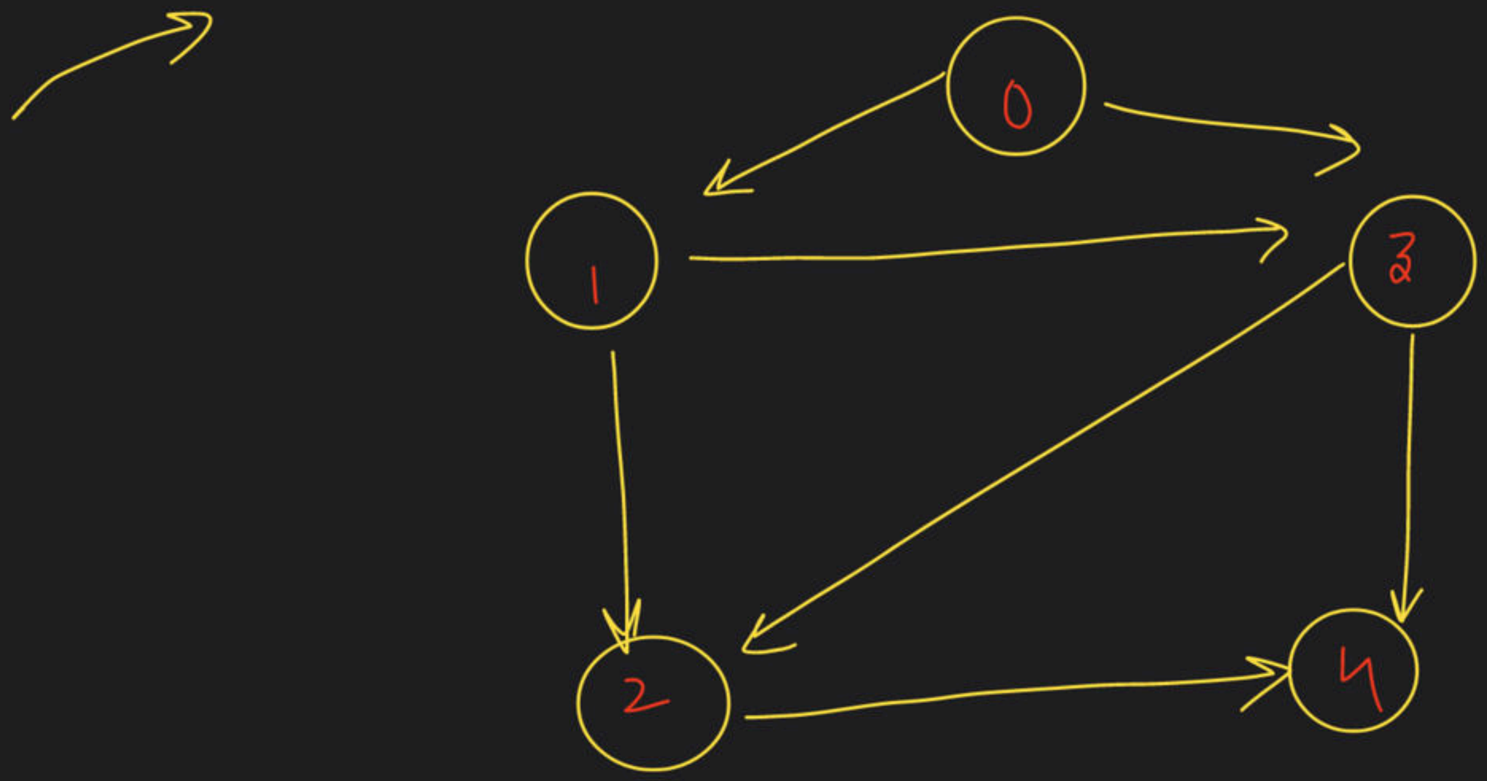
Shortest Path:-

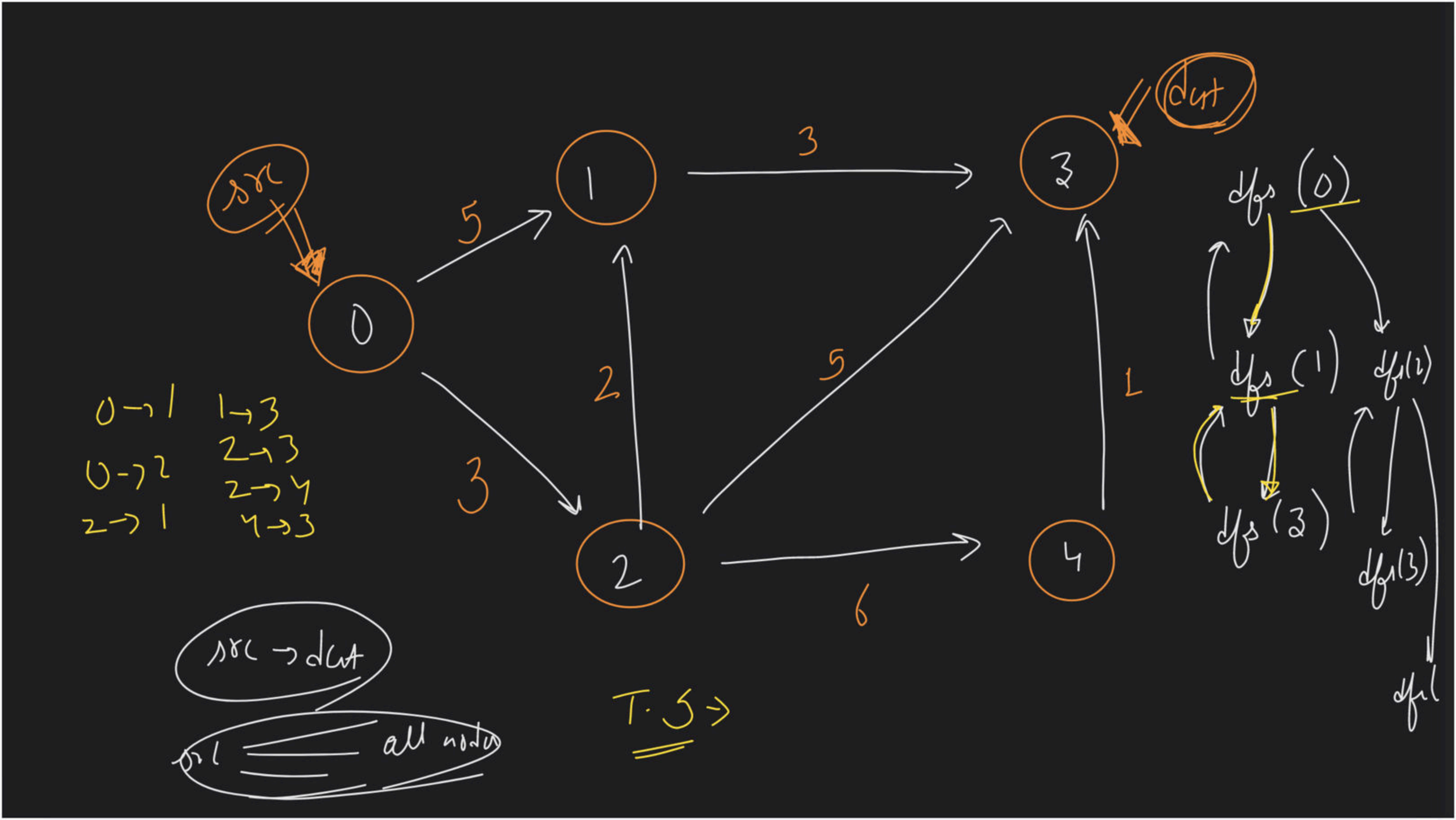

src
0
5
6
1
4
2
3
1
1
1
1
1
1
1
1
dst node
L3
shortest path
0 → 5 → 4 → 3 ✓
0 → 6 → 3 ✓
0 → 1 → 2 → 3 ✓
final Ans

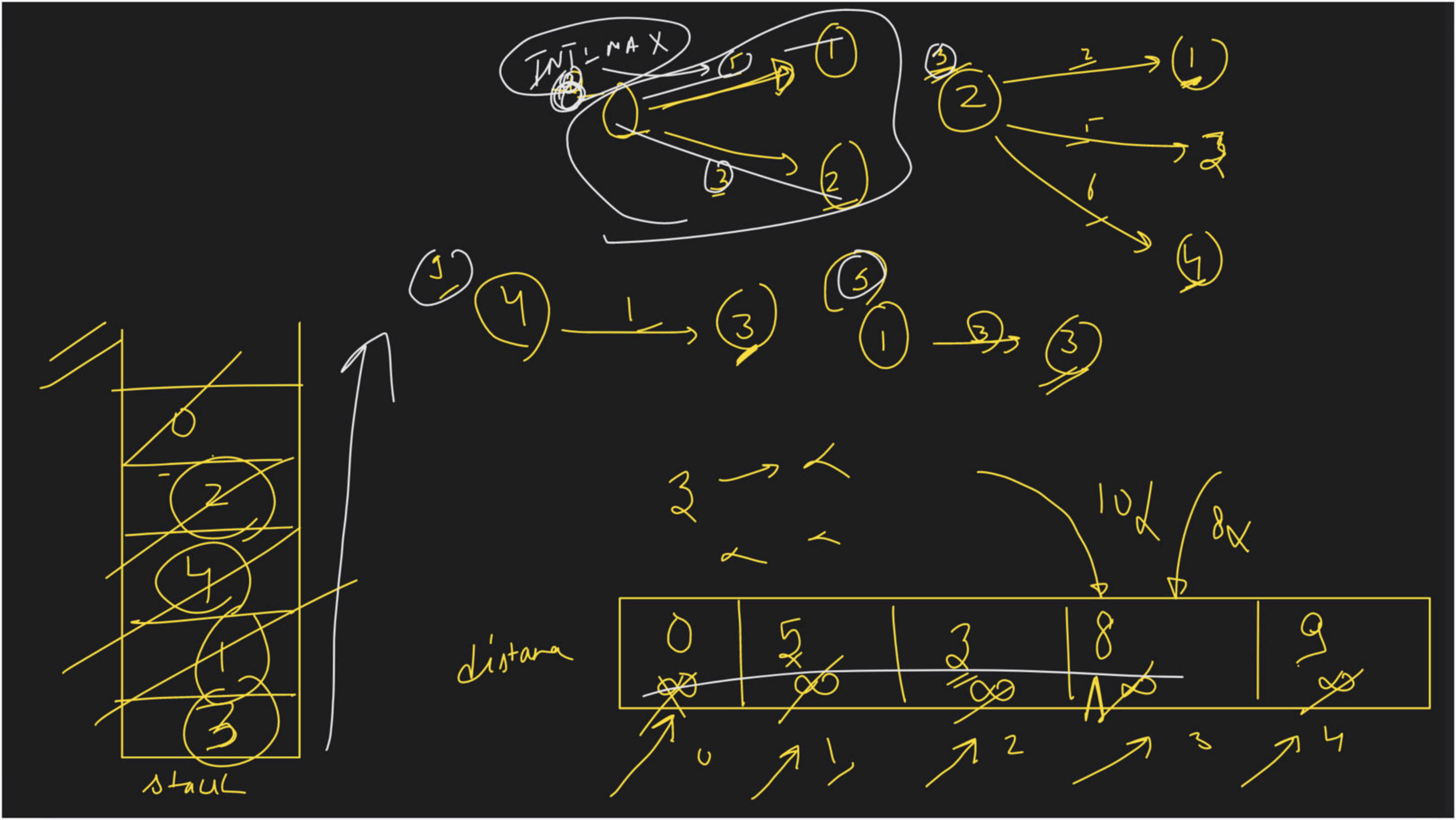

src
0
1
2
3
4
5
6
7
dut
LS

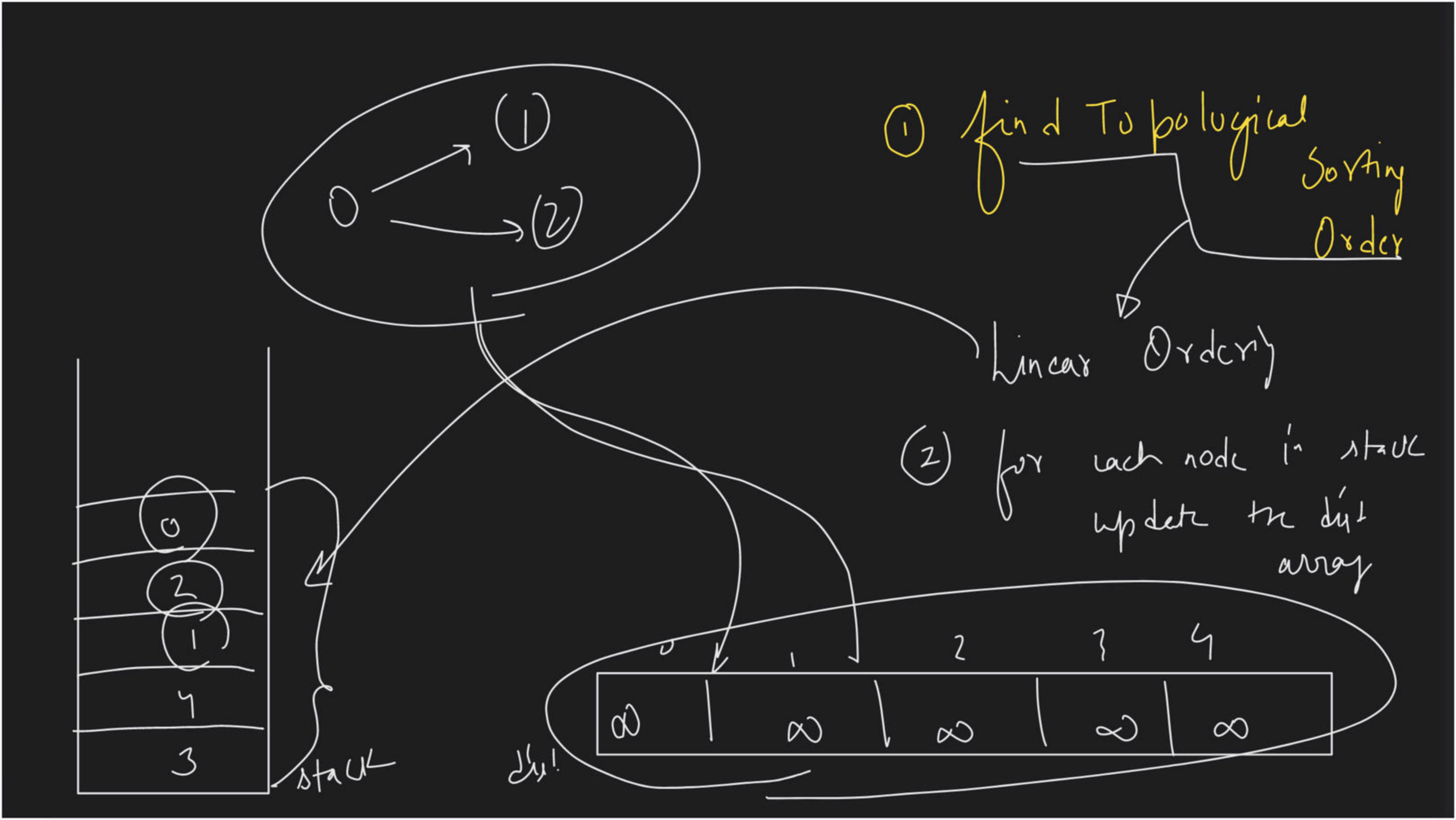

Bfs
parent
visited
fnyct
src
dst
queue
0 -1
1 0
2 0
3 0
4 1
5 2
6 3
0 F T
1 F T
2 F T
3 F T
4 F T
5 F T
6 F T
100
100
1
1
1
1
1
0
1
2
3
4
5
6


Parent
-1
0
0
0
1
2
3
0
1
2
3
4
5
6
src → 0
dst = 5
5 → 2 → 0
reverse
dst
src


0
1
3
2
4

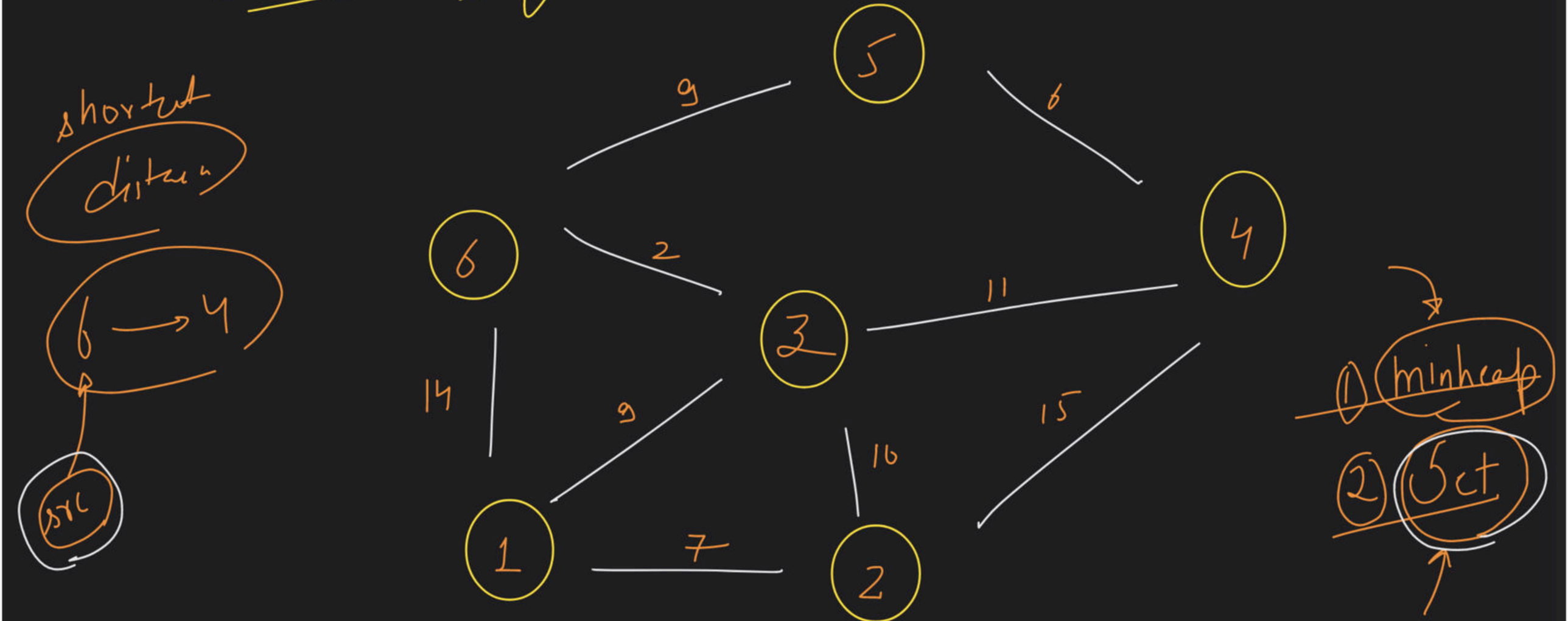

src
dst
0
1
2
3
4
5
3
2
5
3
1
6
0→1
0→2
2→1
1→3
2→3
2→4
4→3
T.S =>
src → dst
src
all nodes
dfs (0)
dfs (1)
dfs (2)
dfs (3)
dfs(2)
dfs(3)

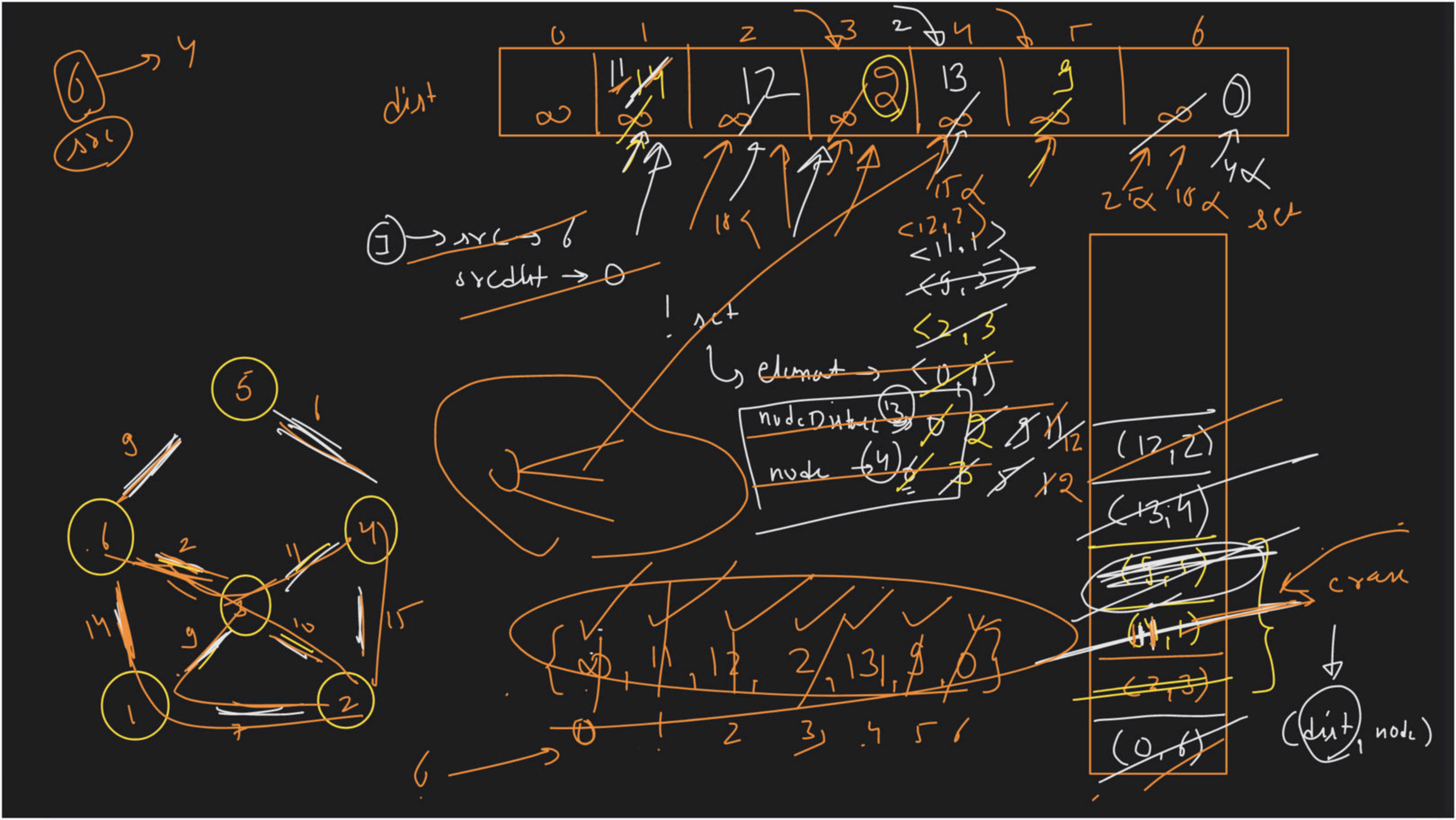

INT_MAX
stack
distanta
0
5
3
8
9
10
8
0
1
2
3
4

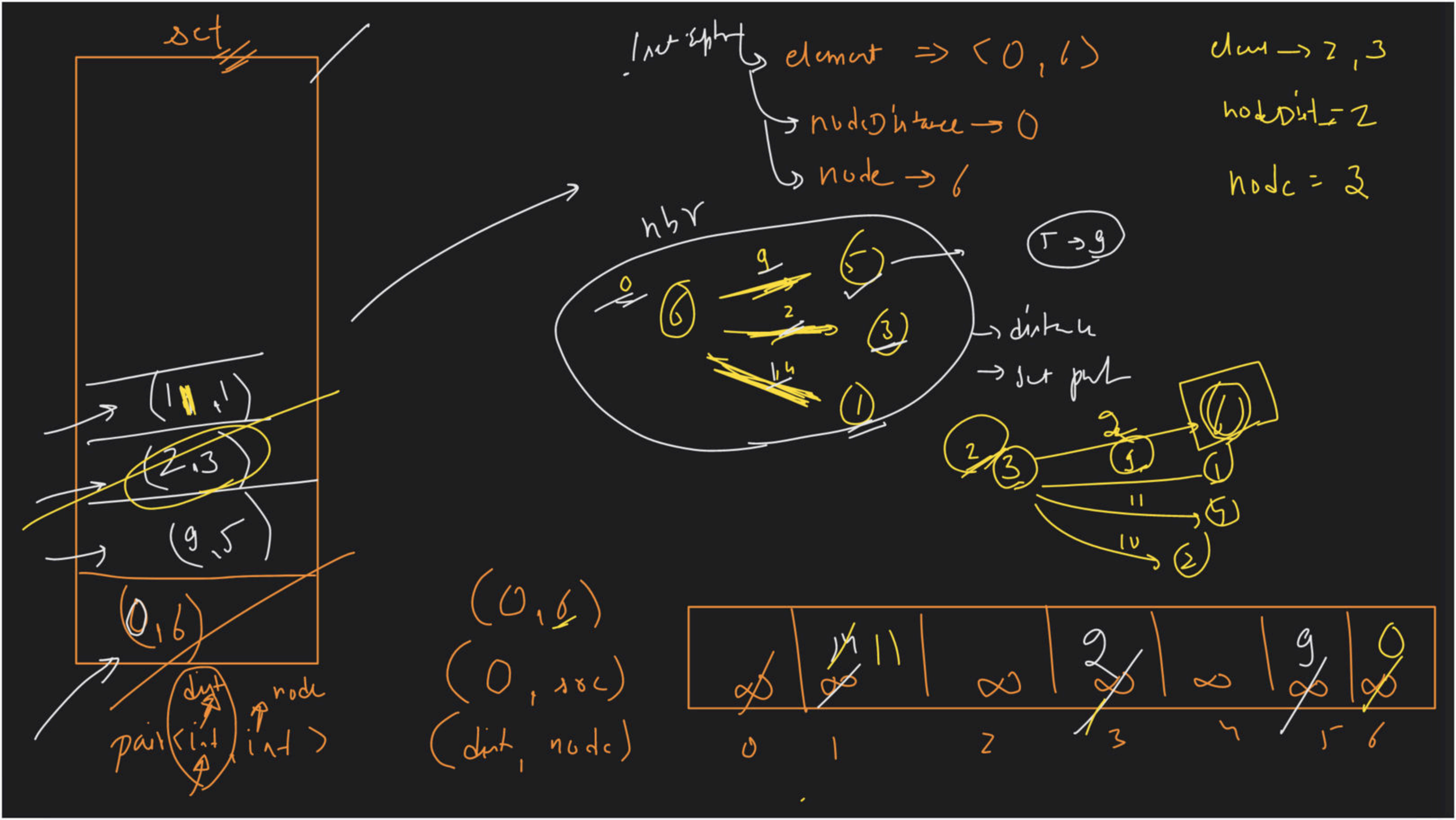

① find Topological Sorting Order
Linear Order
② for each node in stack update the dist array
0
1
2
3
4
∞
∞
∞
∞
∞
stack
dist

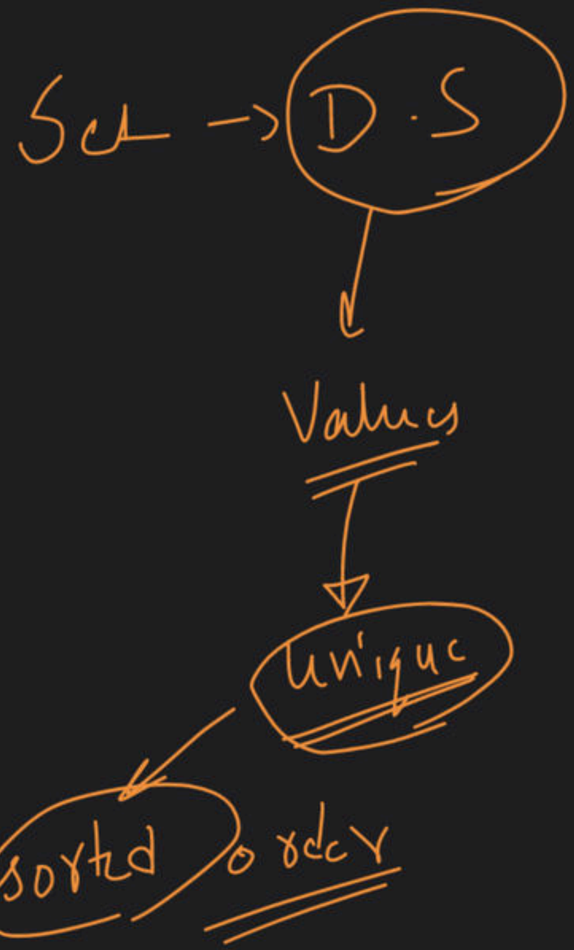
→ Dijkstra algo:-

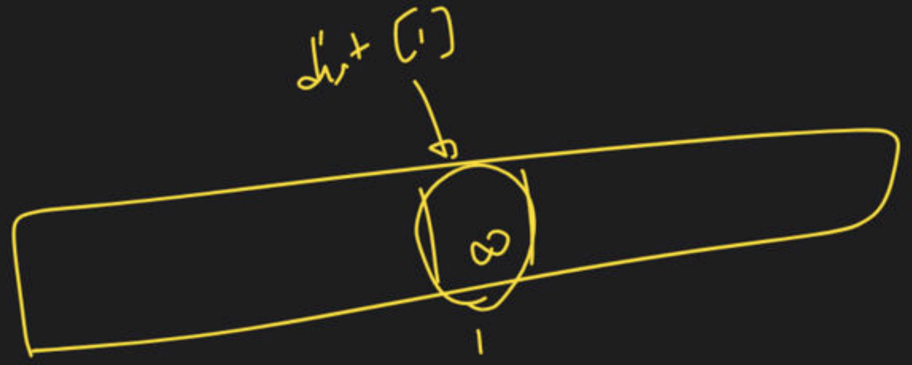
30 sec

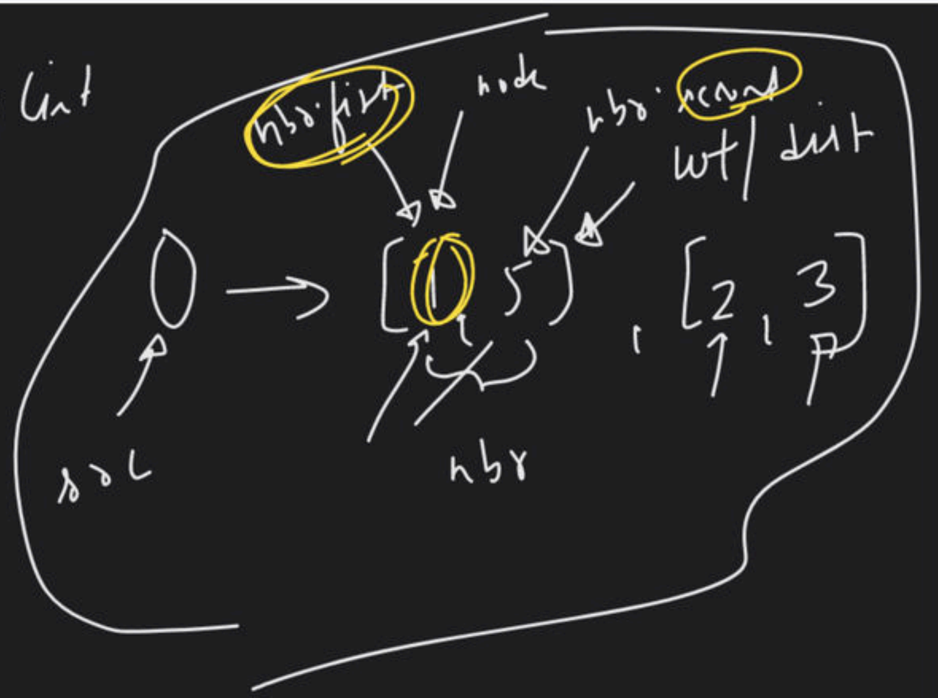


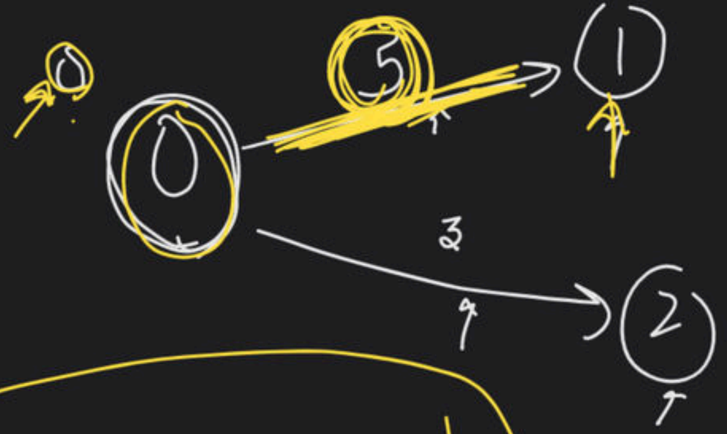

dist
src
srcdist → 0
! set
elimset →
nodeDist
node
crash
(dist, node)


set
(1,1)
(2,3)
(9,5)
(0,6)
pair<int, int>
dist
node
(0,6)
(0, src)
(dist, node)
0 1 2 3 4 5 6
∞ ∞ 11 ∞ 3 ∞ 9 ∞
nbr
0
6
9
5
2
3
11
1
r → 9
→ distance
→ set path
2
3
2
9
1
11
5
10
2
dist = 2, 3
nodeDist = 2
node = 3


Set
D.S
Values
Unique
sorted
order







dist[elmcord] + nbr.second < dist[nbr.first]

dist[nbr.first] = ∞ + 5

0 + 5 ≤ dist [1]

dist [1] = ∞ + 5