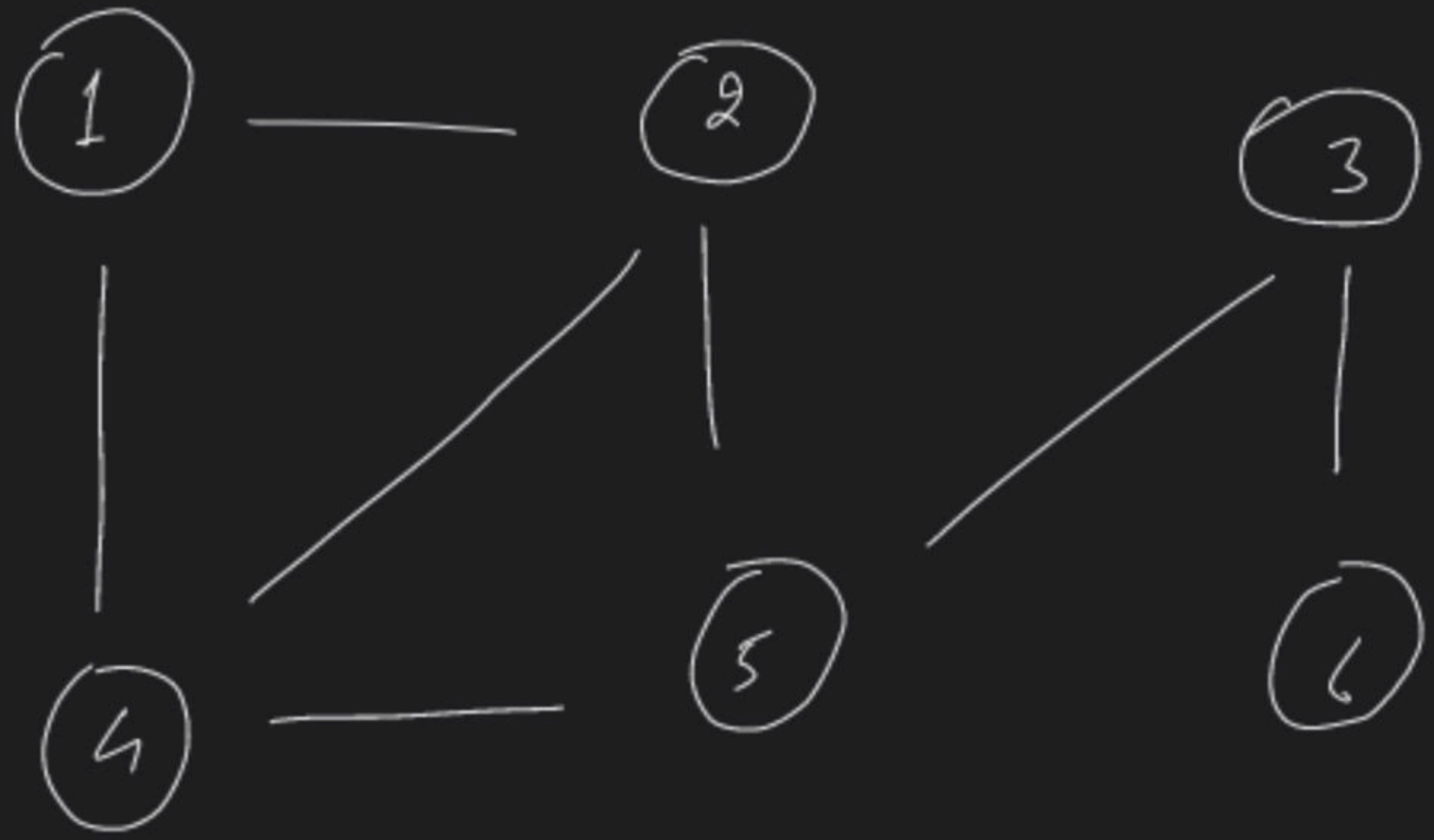
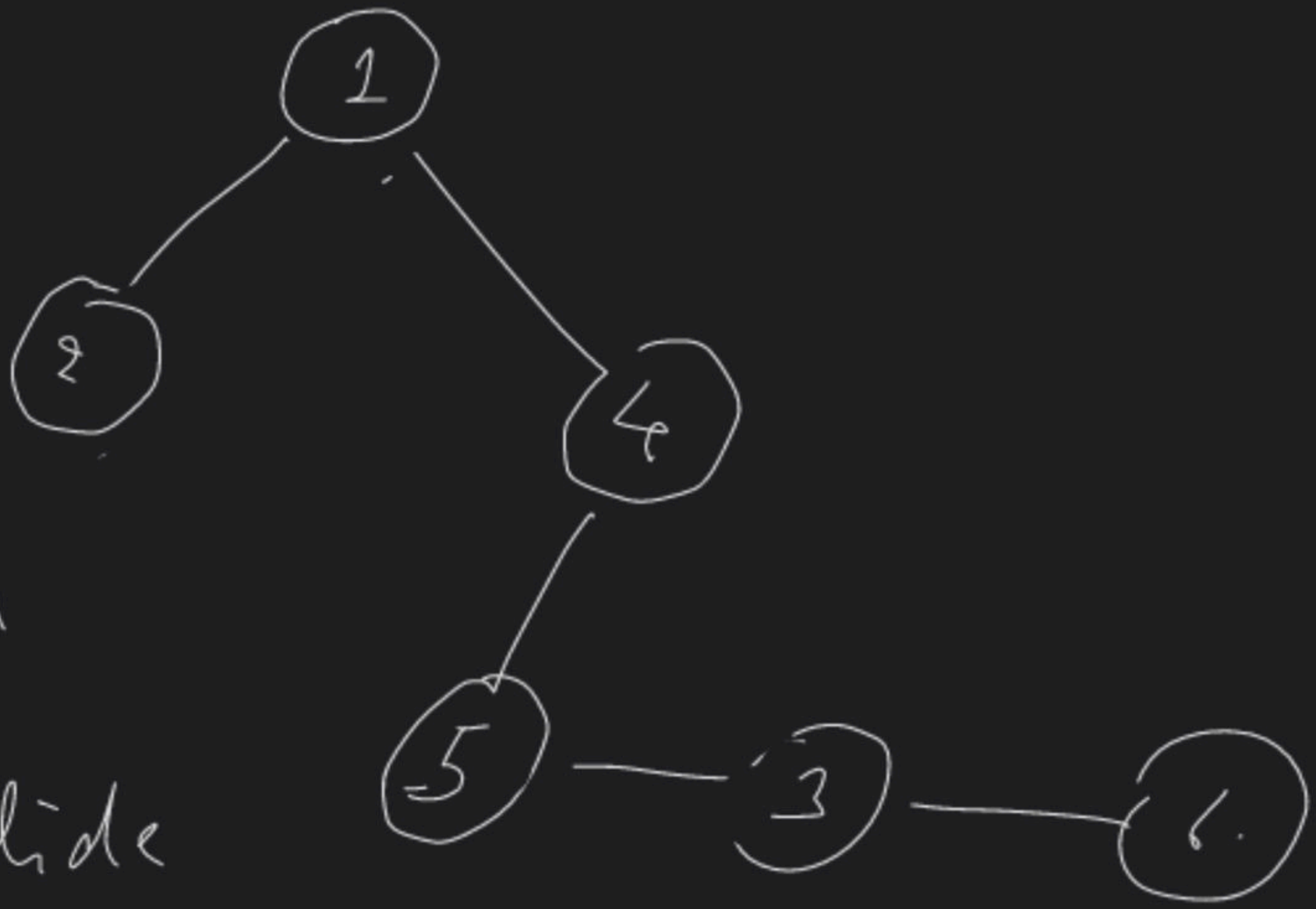
DFS and BFS Spanning Trees
Special class
Pulkit Chhabra • Nov 22, 2020

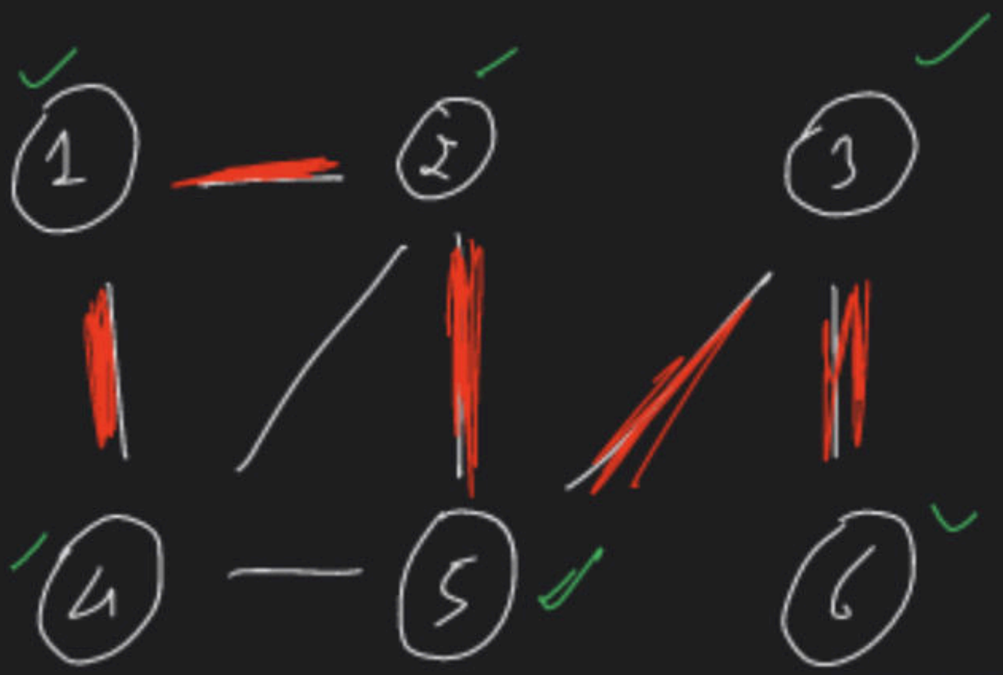
Spanning Tree



1 of the possible S. Trees for the graph in previous slide

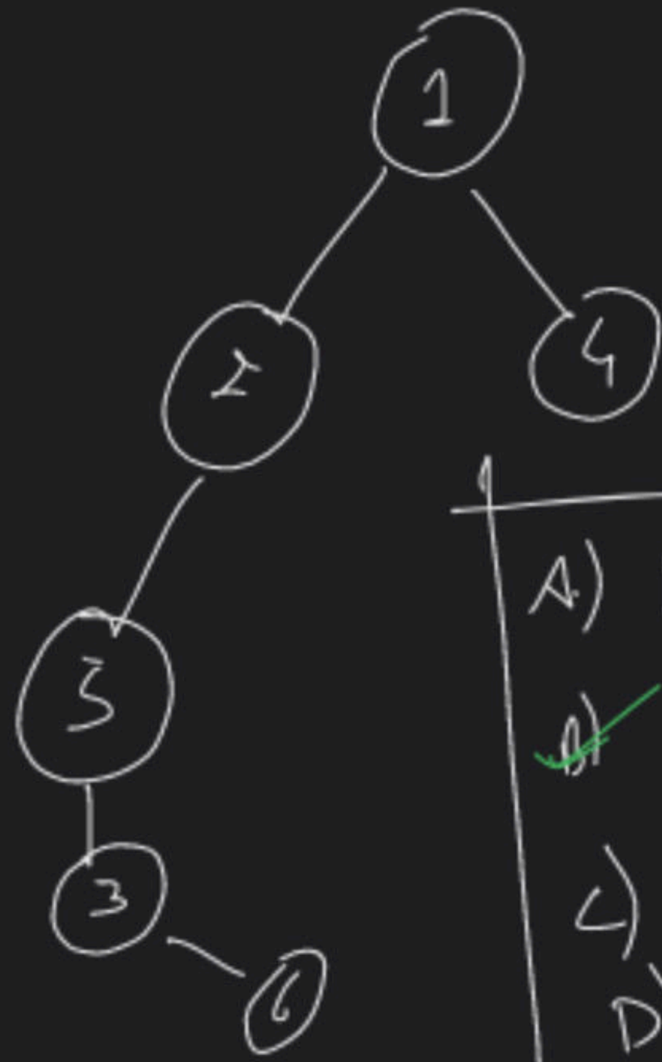


B.F.S. & B.F.S. Spanning Tree



1, 2, 4, 5, 3, 6

Queue



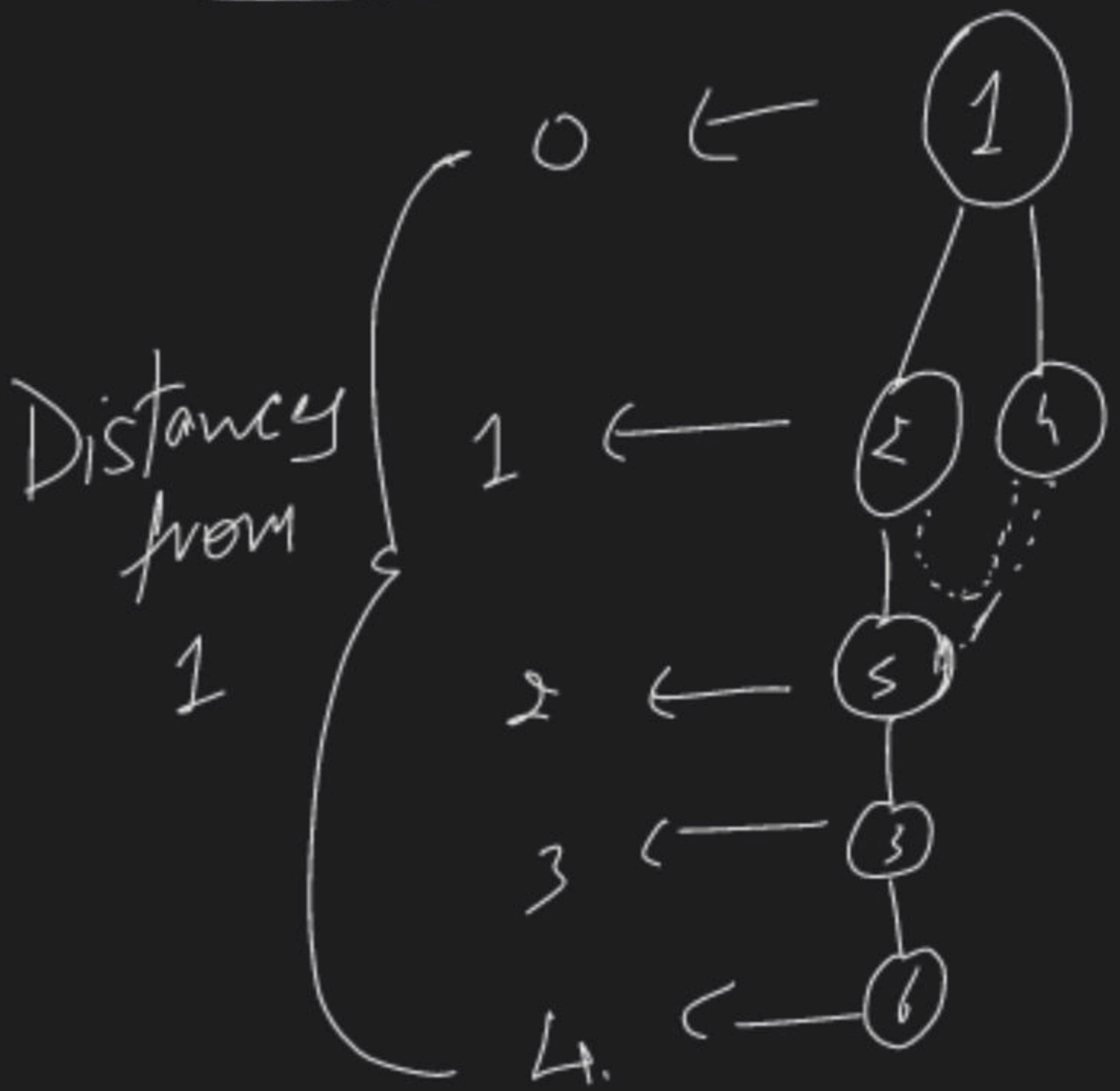
A) $N * M$

B) $N + M$

C) $N^2 + M$

D) $N + M^2$

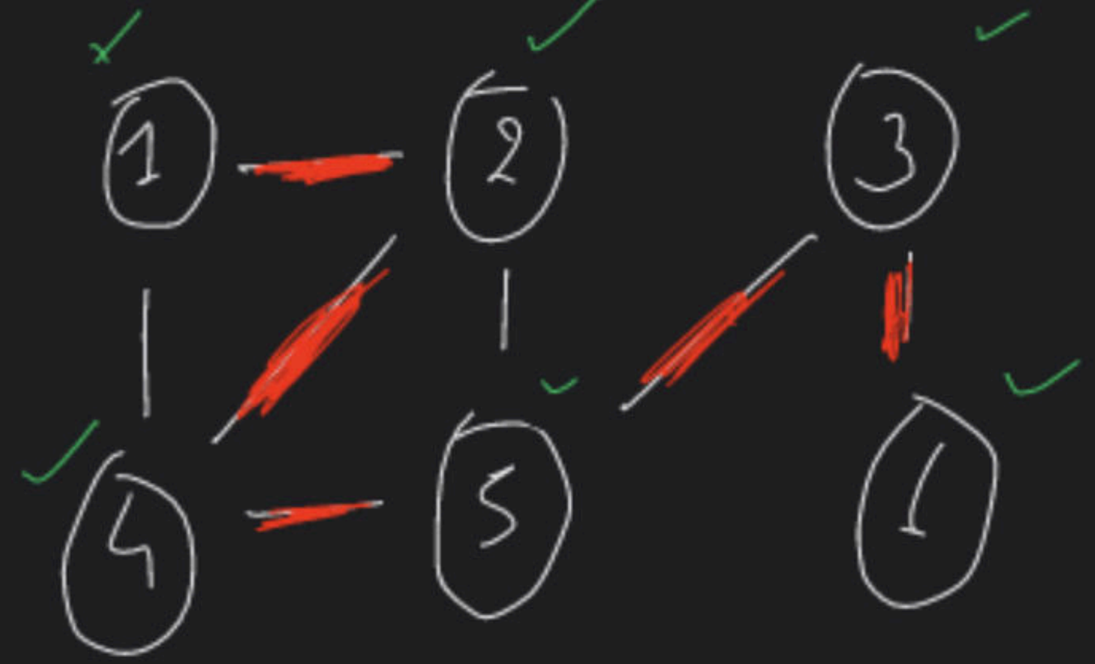
Bead Analogy

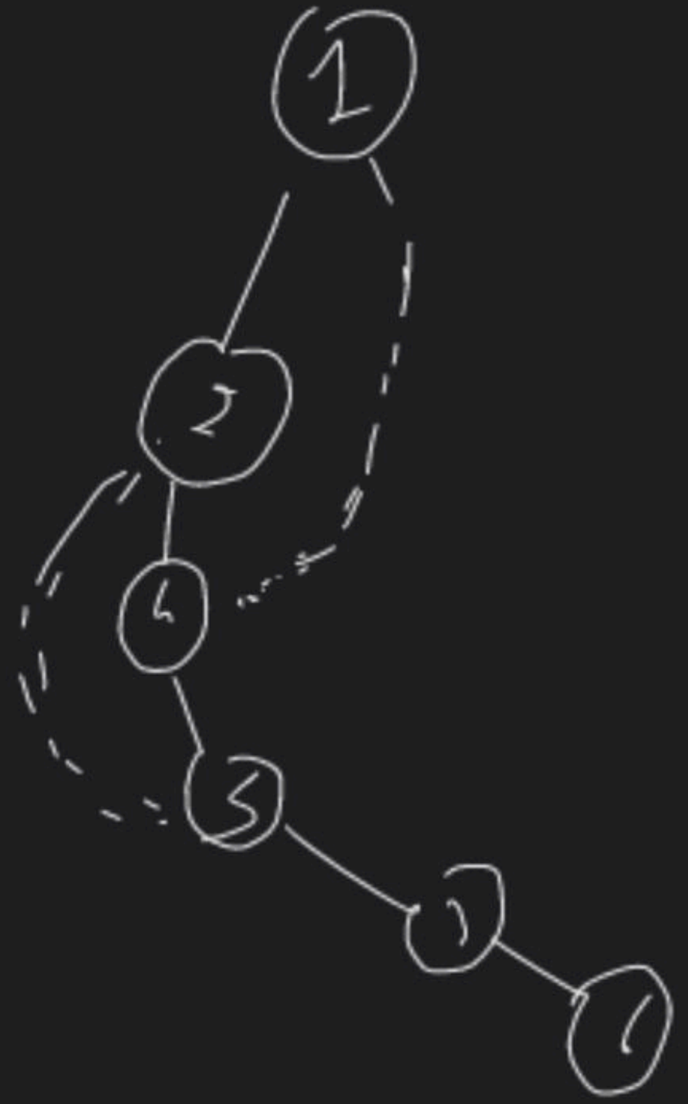


$$d[1] = 0$$

$$d[u] = d[par[u]] + 1$$

D.F.S. & D.F.S. Spanning Tree.





Time Comp of DFS ?

A) $N M$

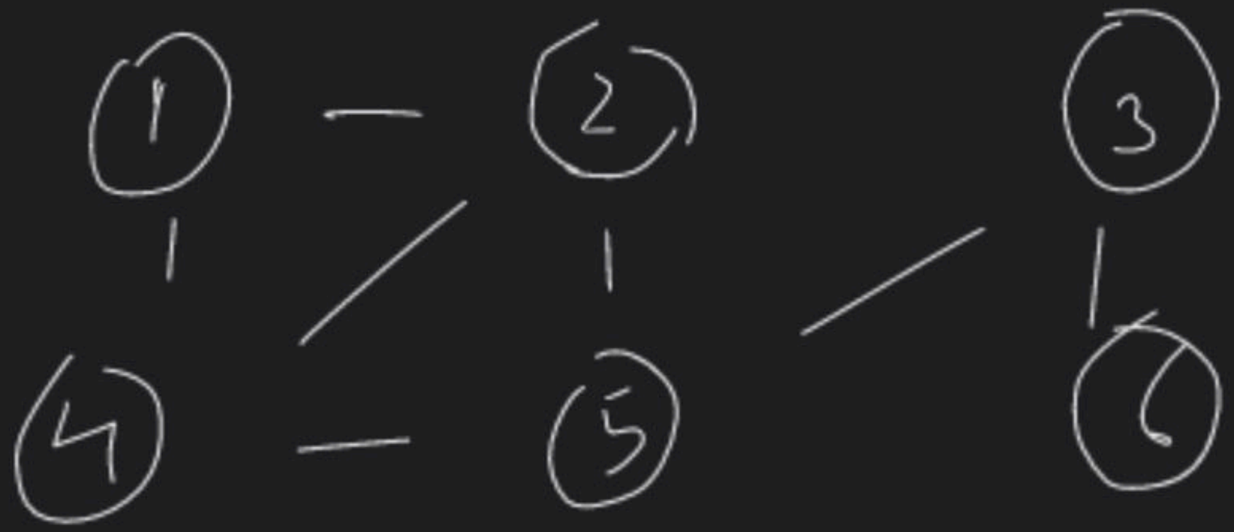
B) $N + M$

C) $N^2 + M$

D) $N + M^2$

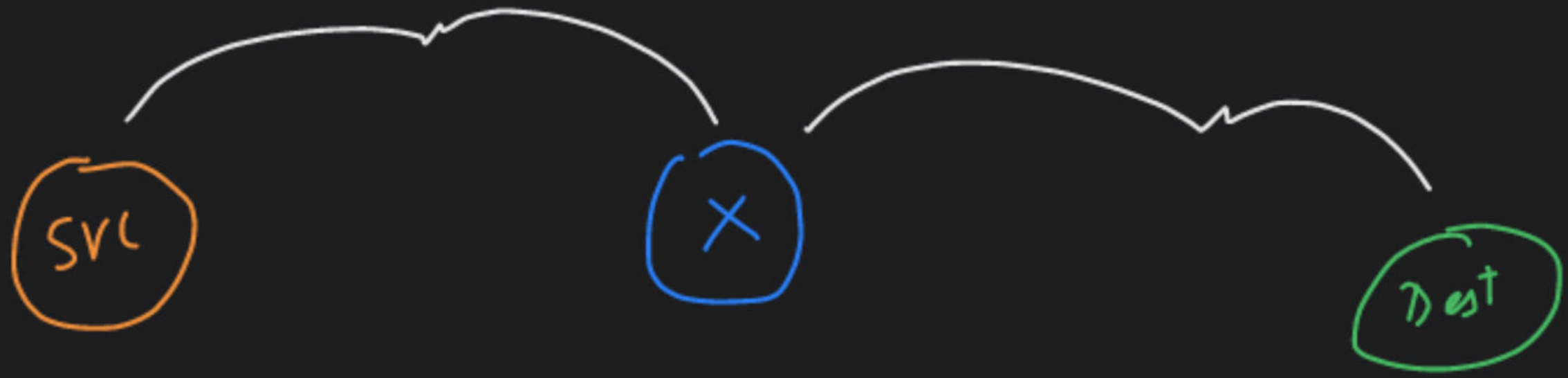
1.) Given an undirected, unweighted graph and a src and a dest; find all the nodes which are part of atleast 1 shortest path from src to dest. ($1 \leq N, M \leq 10^3$)

graph:



src = 1, dest = 5

ANS: 1, 2, 5



x is a part of answer if and only if

$sd[src \to dest] = sd[src \to x] + sd(x \to dest]$

$sd(x \to dest] = sd[dest \to x]$

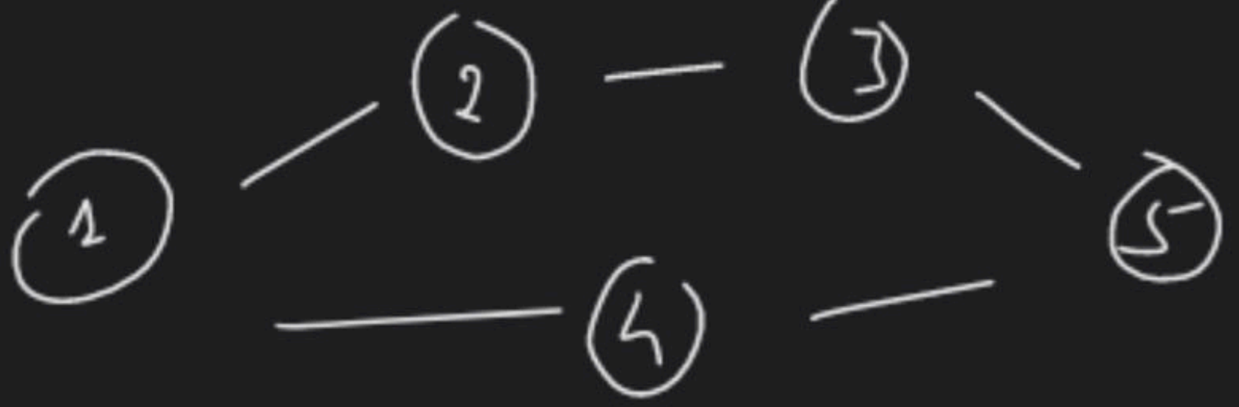
d_1 = bfs(src)

d_2 = bfs(dest)

$d_1[i] + d_2[i] = d_1[dest]$

Find the Lexicographically smallest path b/w src & dest.

1 → 5

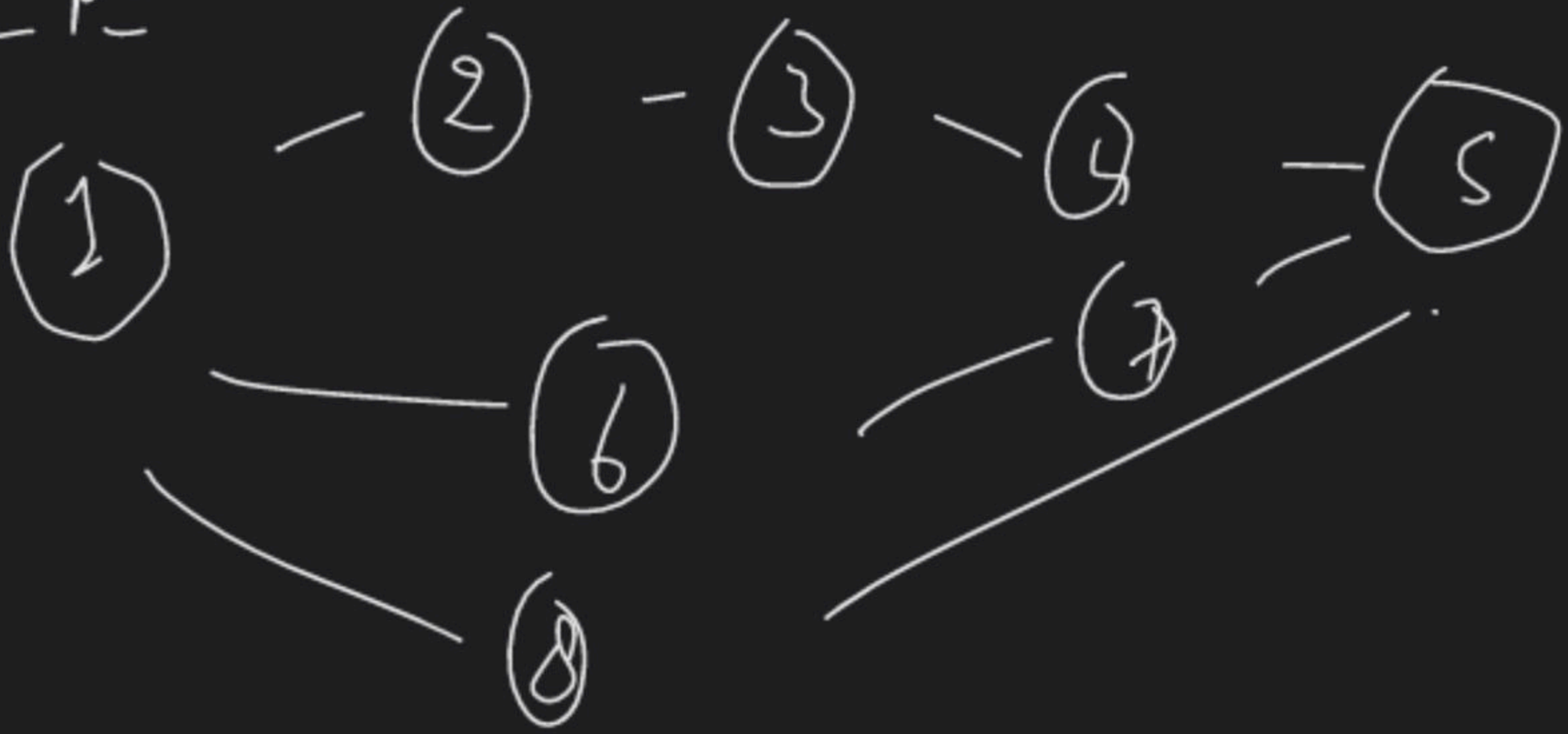


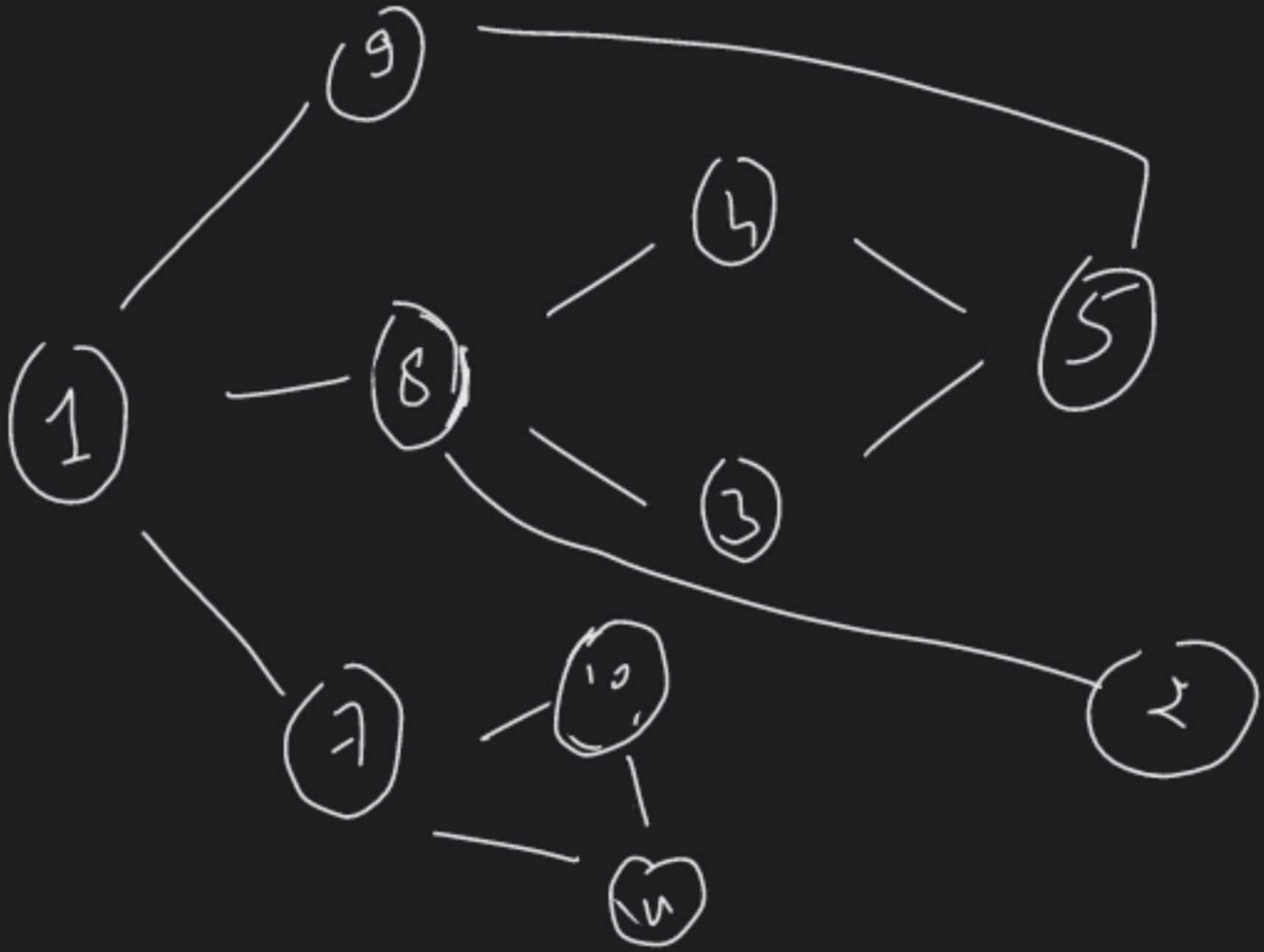
1, 4, 5

1, 2, 3, 5

Example:

src = 1 dest = 5



ANS = 1, 2, 3, 4, 5

1 → 5