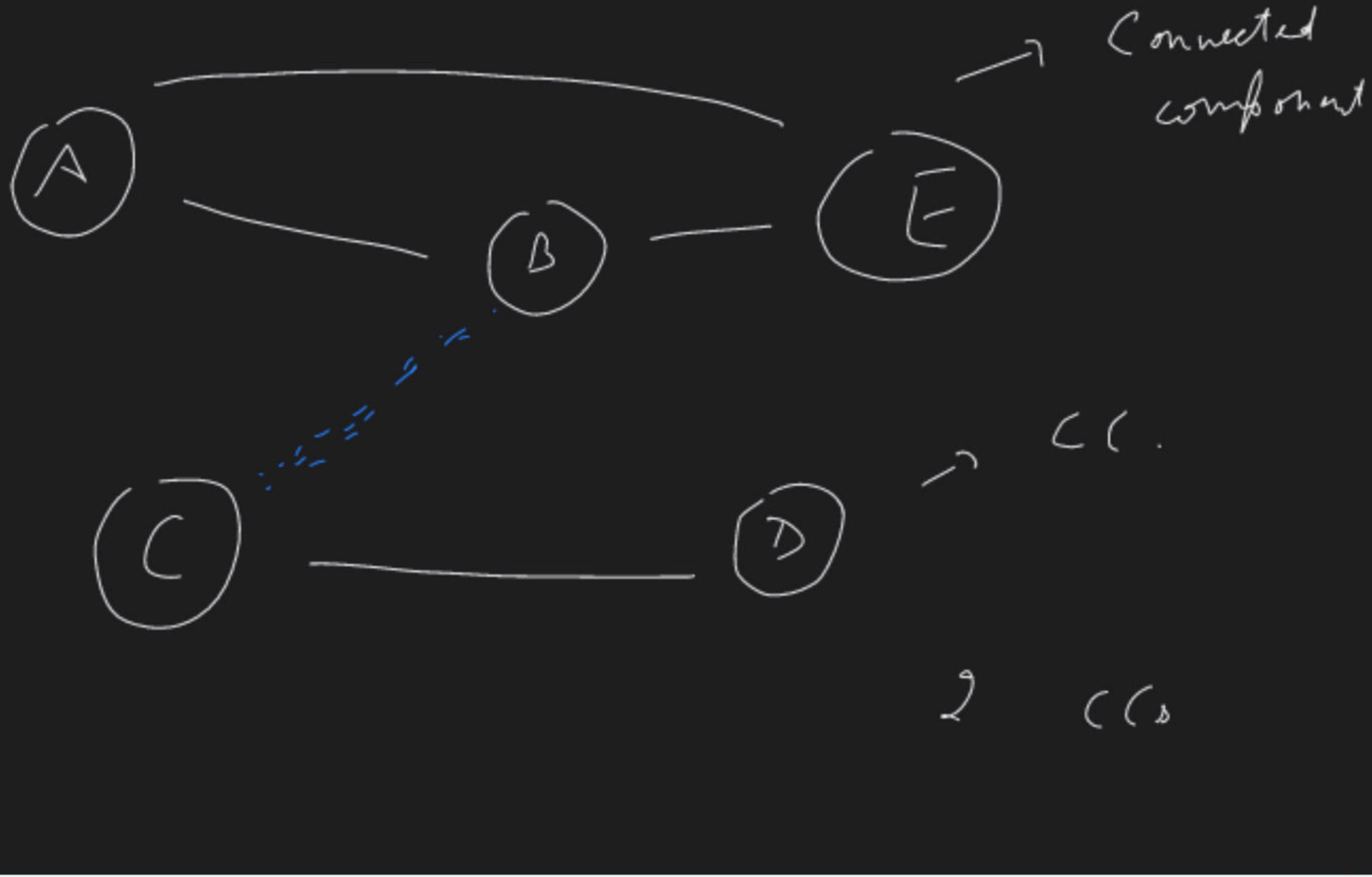

Introduction to Trees
Special class
Pulkit Chhabra • Nov 20, 2020


Connected component
A
B
C
D
E

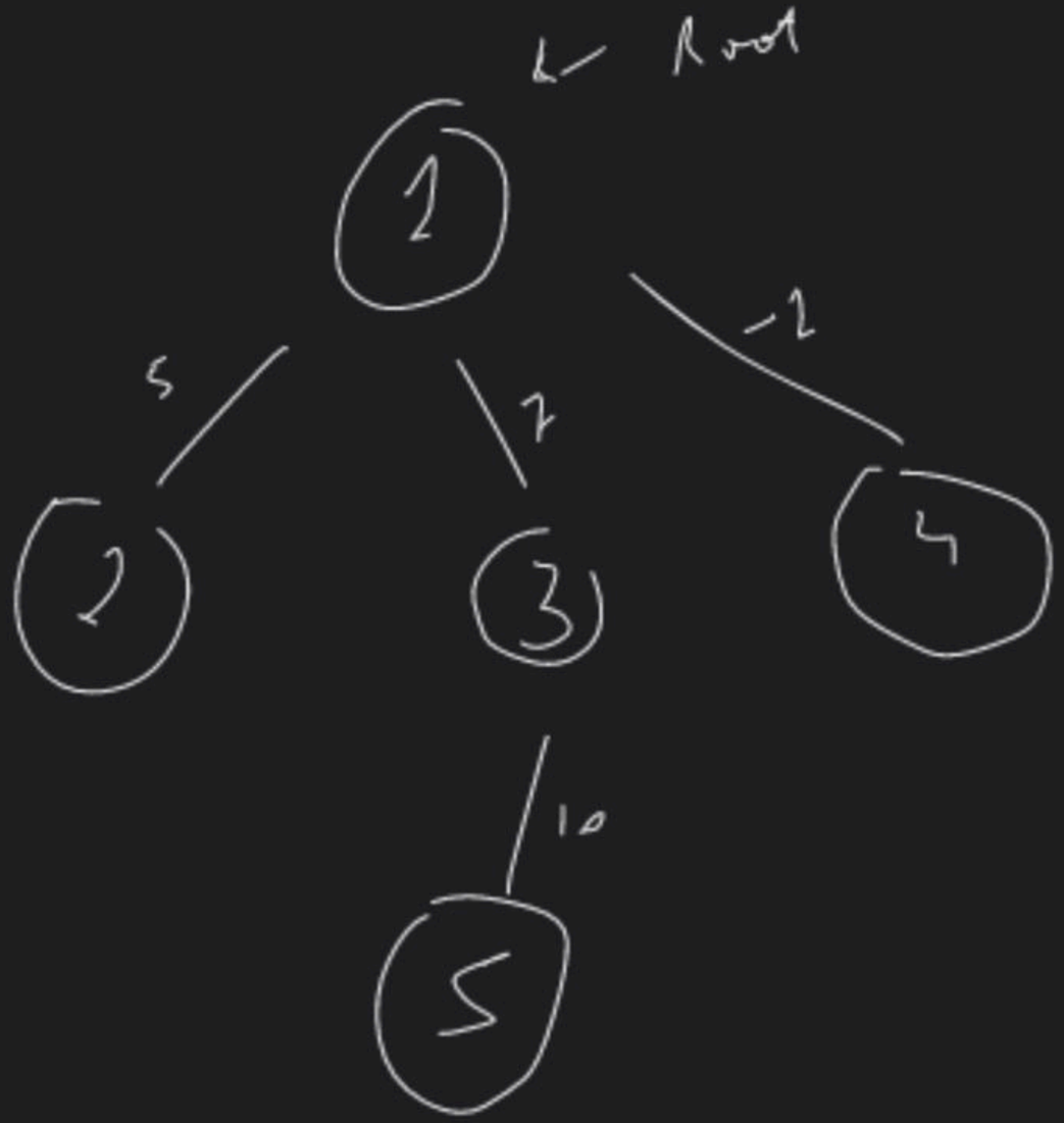
A tree is a connected graph having no cycles.

N Nodes, No. of edges ?

1) N/2 2) N ~~3)~~ N - 1

4) 2(N - 1)

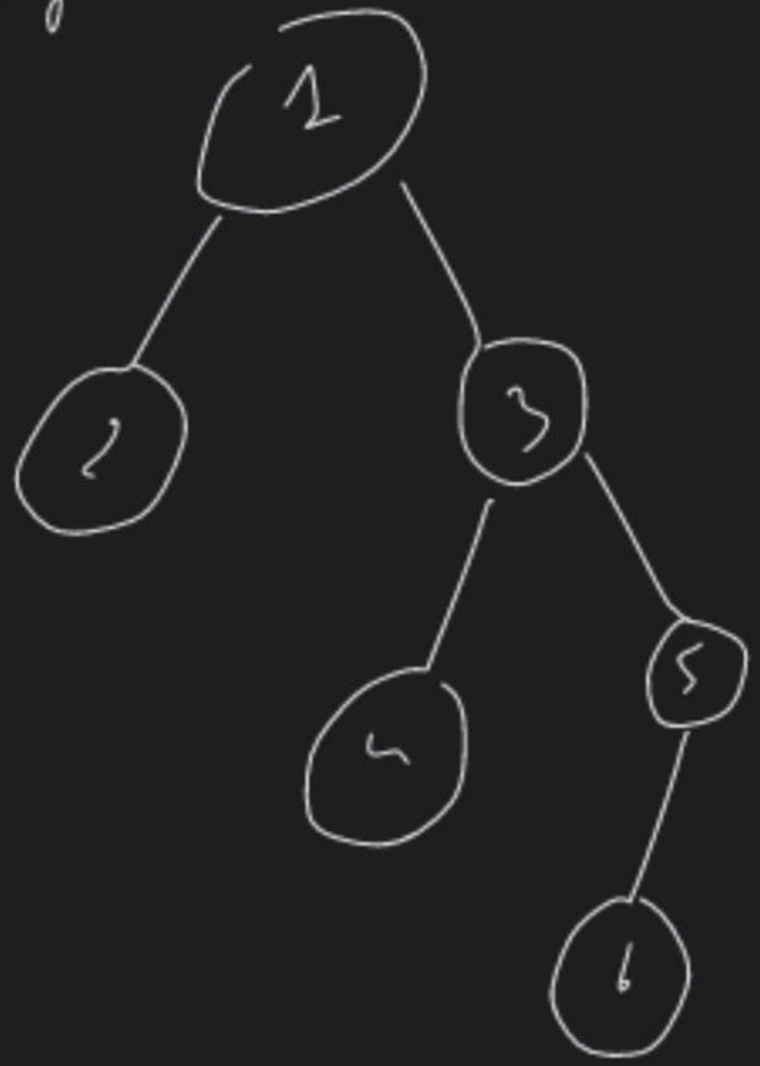
Tree



N Nodes

N - 1 Edges

Binary



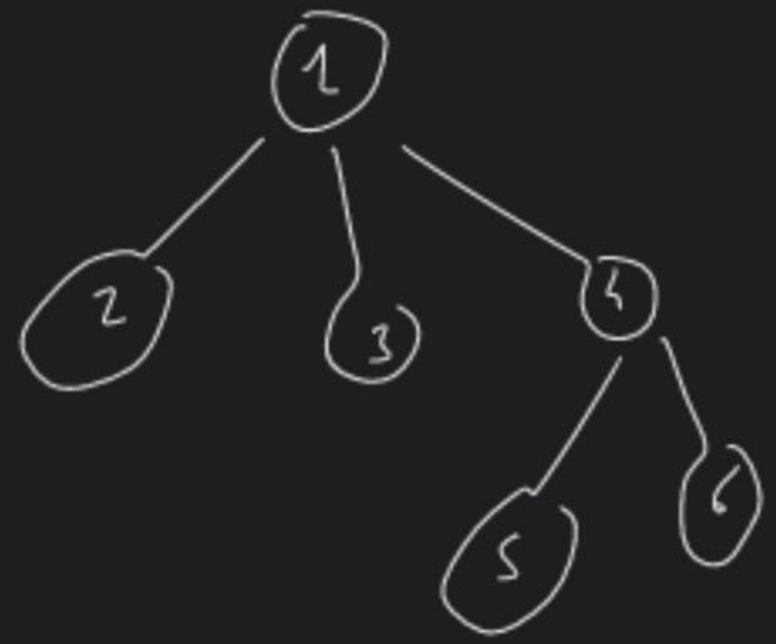
Generic

Root

0

1

2



→ Parent

→ Child

Every graph is a Tree.

True

False ✓

Every Tree is a graph.

a) True b) False

LCA(2, 7) ?

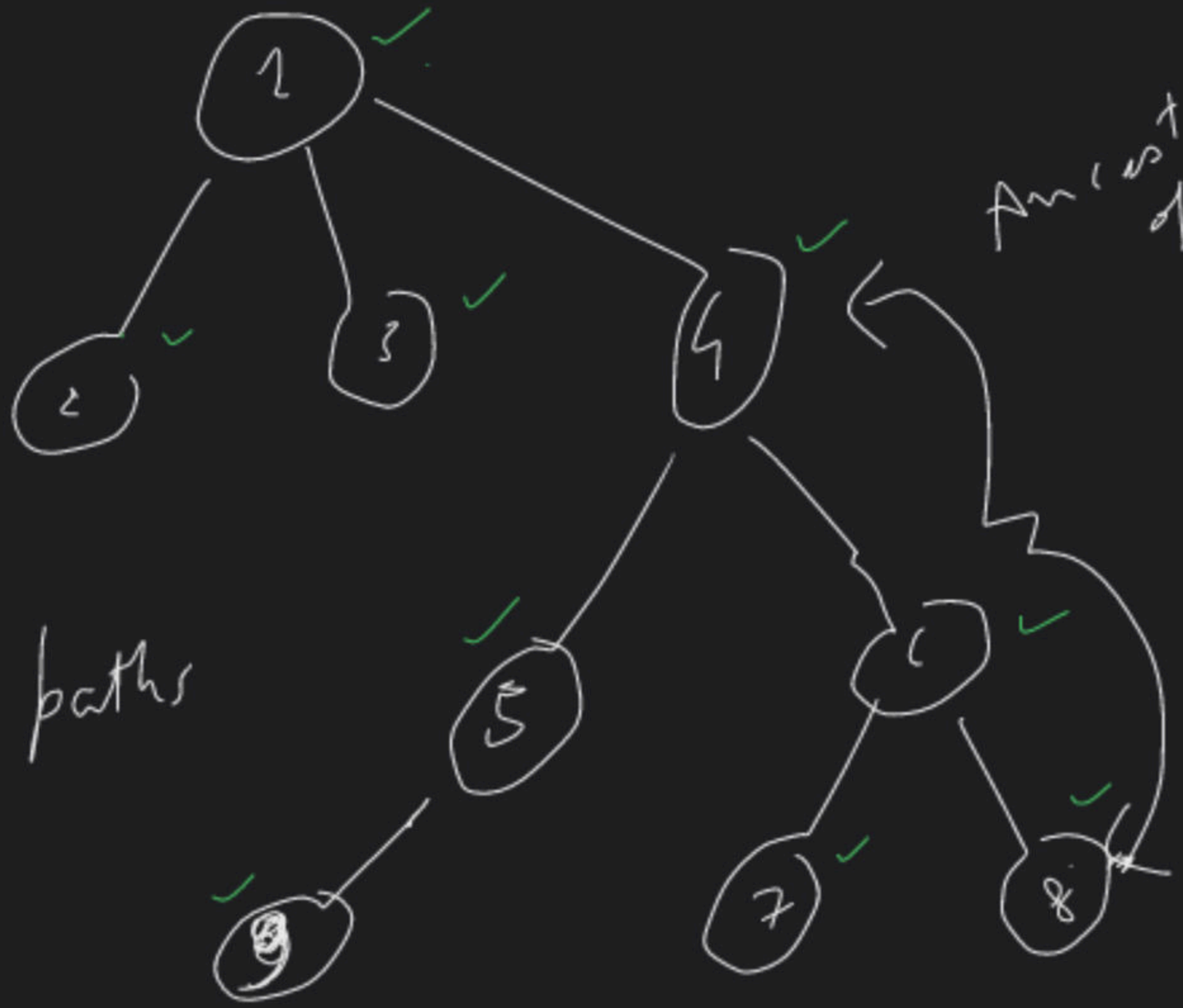
Lowest common ancestor

A) 2

~~B) 1~~

C) 3

D) 4



Ancestor
1 3

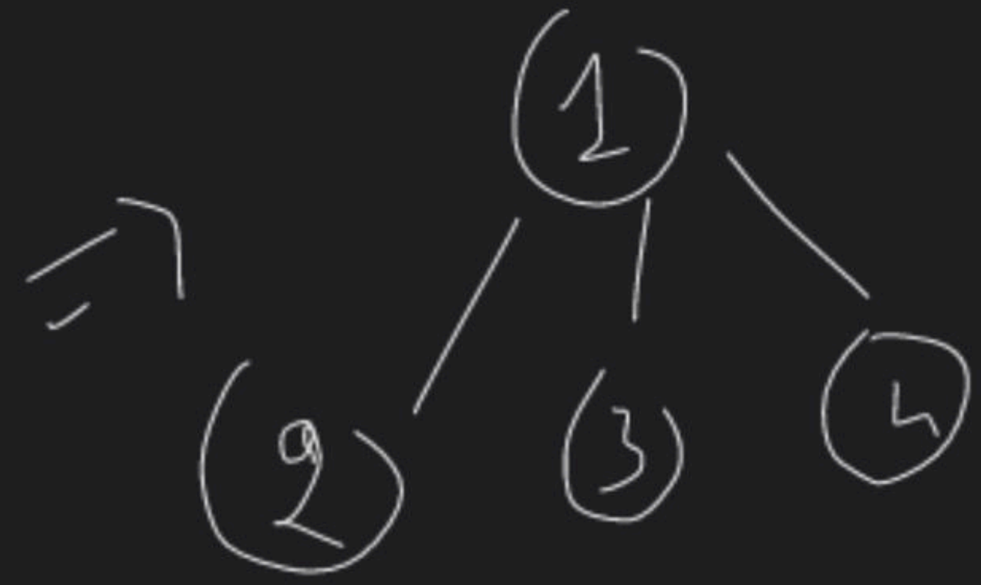
Unique shortest paths

Descendant
1 6

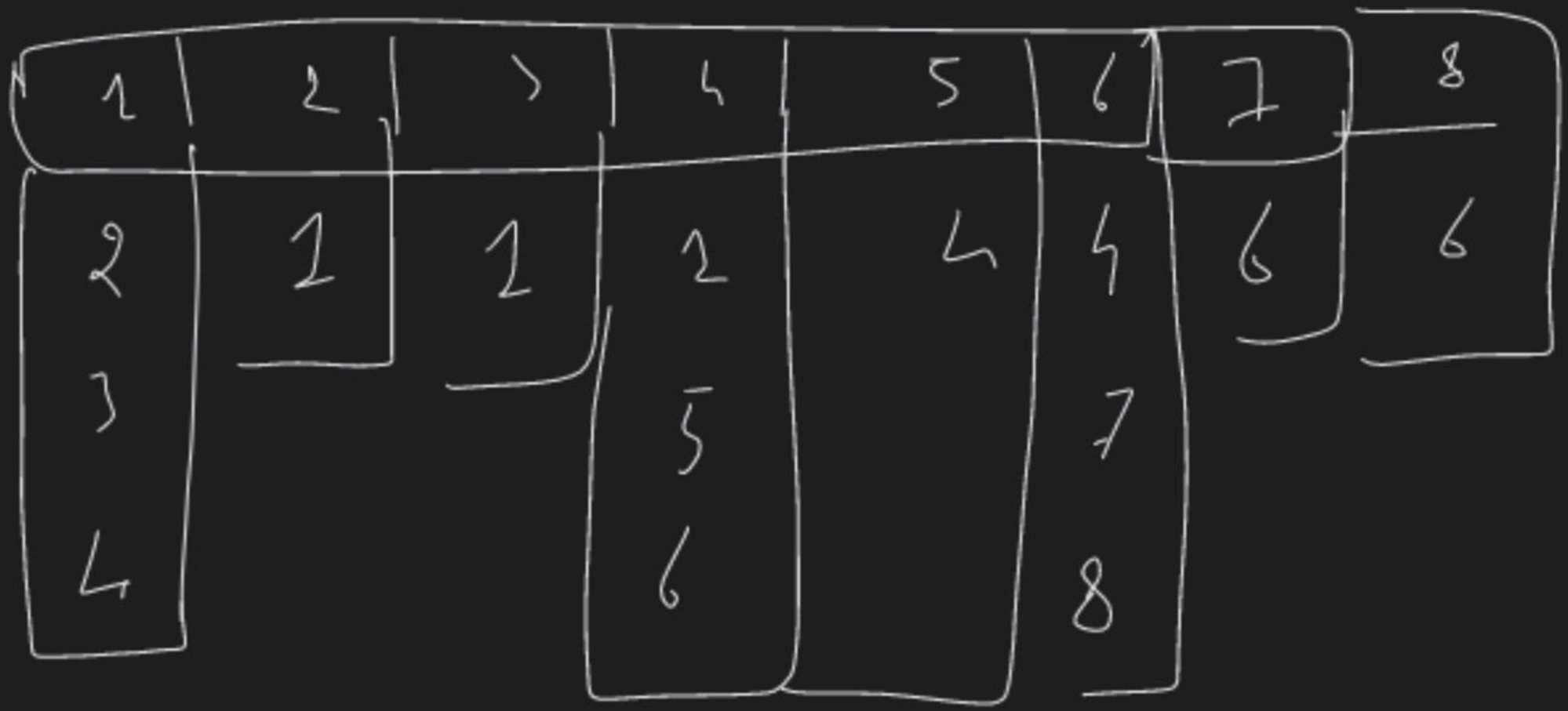
a) Adj Matrix

	1	2	3	4
1	0	1	1	1
2	1	0	0	0
3	1	0	0	0
4	1	0	0	0

N x N

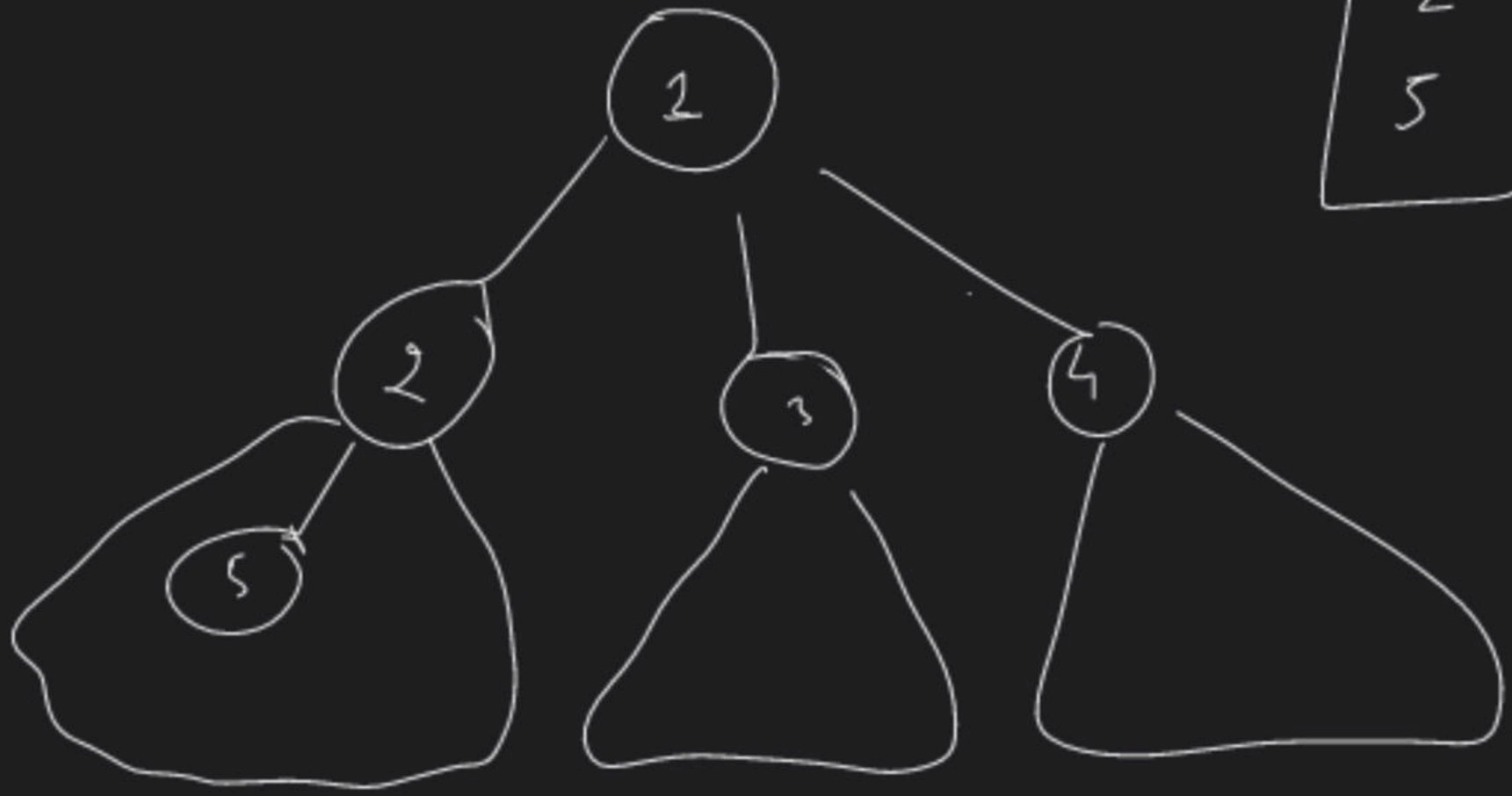


$O(N^2)$ space



vector < vector < int > > adj (N+1);

Depth-first search.



1. 2 2 5 3 4 5