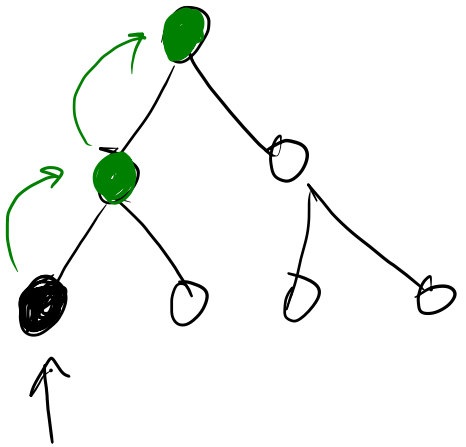
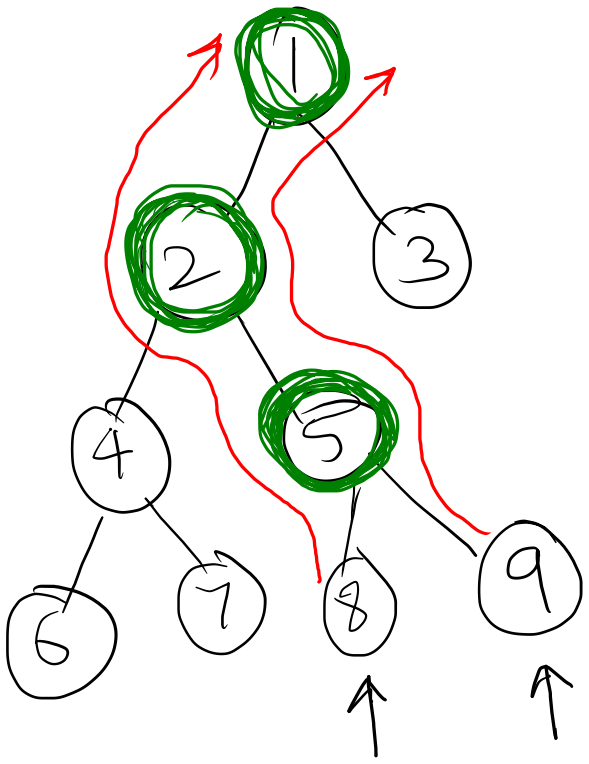
TREES

① Lowest Common Ancestor

Ancestor → poorvaj



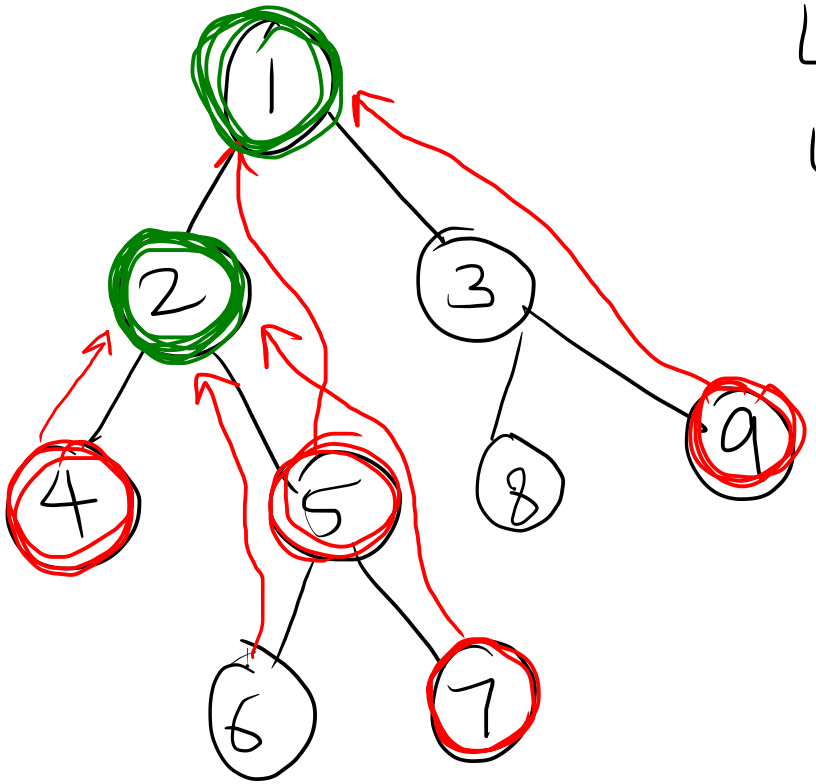


Ancestors (8,9)

= (5, 2, 1)

Lowest common Ancestor

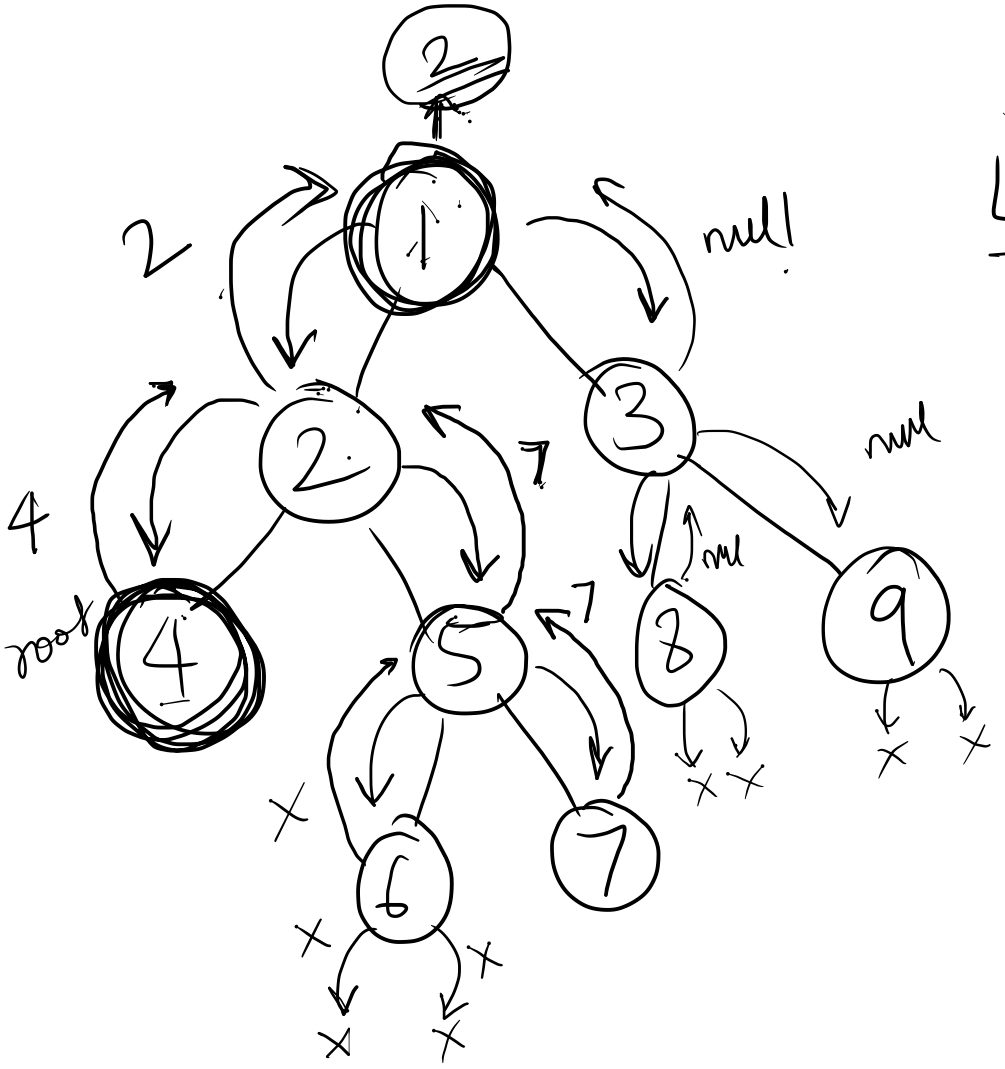
= 5



LCA(4,7) = 2

LCA(5,9) = 1

LCA(2,6) = 2



p q

$L(4, 7) = 2$

if both null

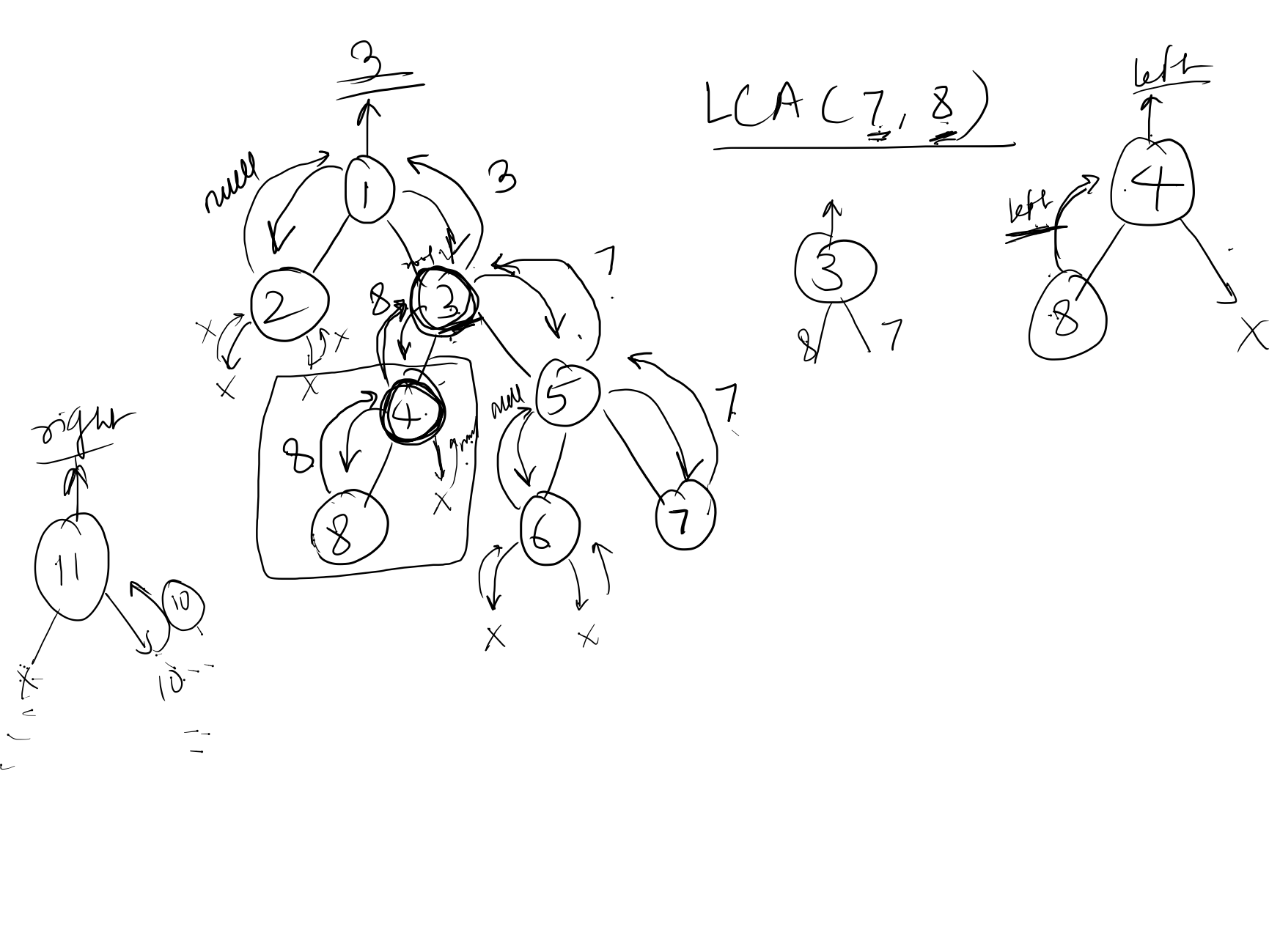
return null

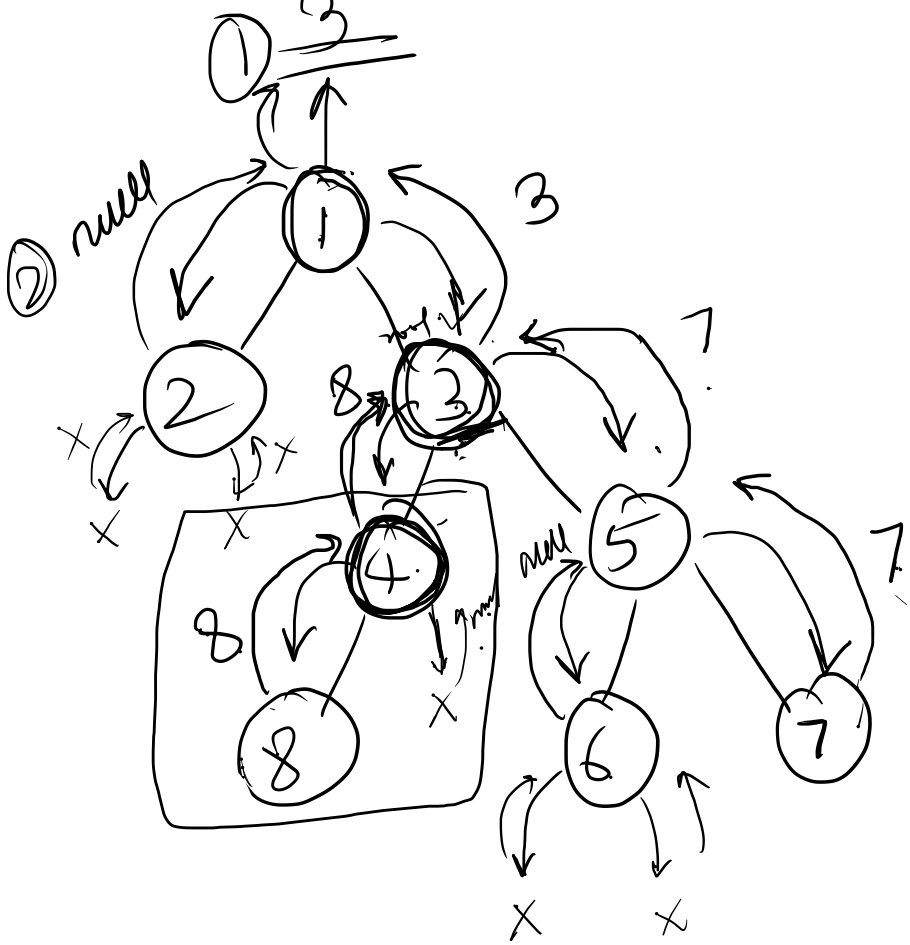
if found (x, y)

return x/y

if left = null & right = val

return right


LCA(7, 8)
3
null
1
3
2
8
3
7
X
X
X
X
4
8
null
5
7
8
X
6
7
X
X
right
11
10
left
4
left
3
8
7
8
X


LCA(1, 4)

null , null

return null

val , null

return val

val , val

return itself

null , null

return null

val , null

return val

val , val

return itself

null , null

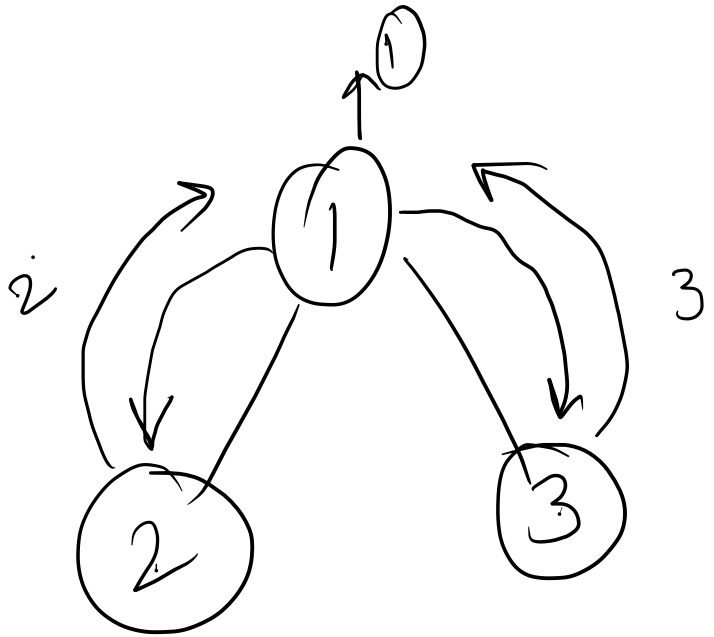
return null

val , null

return val

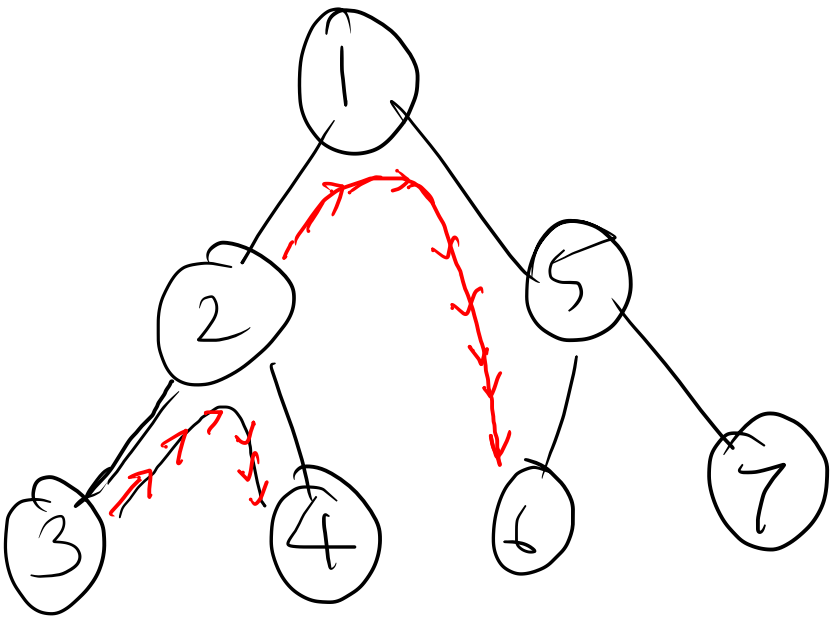
val , val

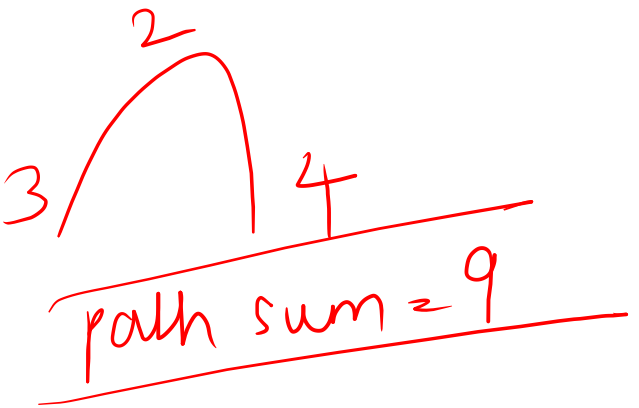
return itself

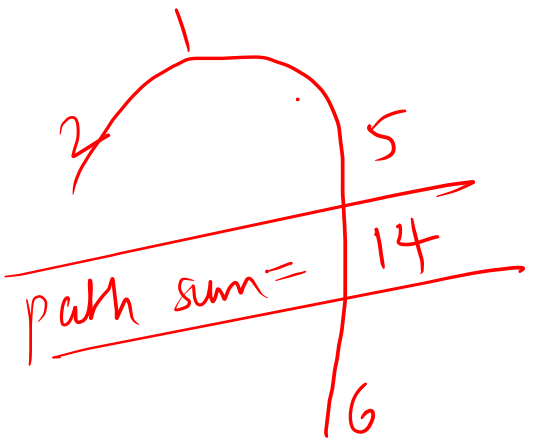


LCA(2,3)

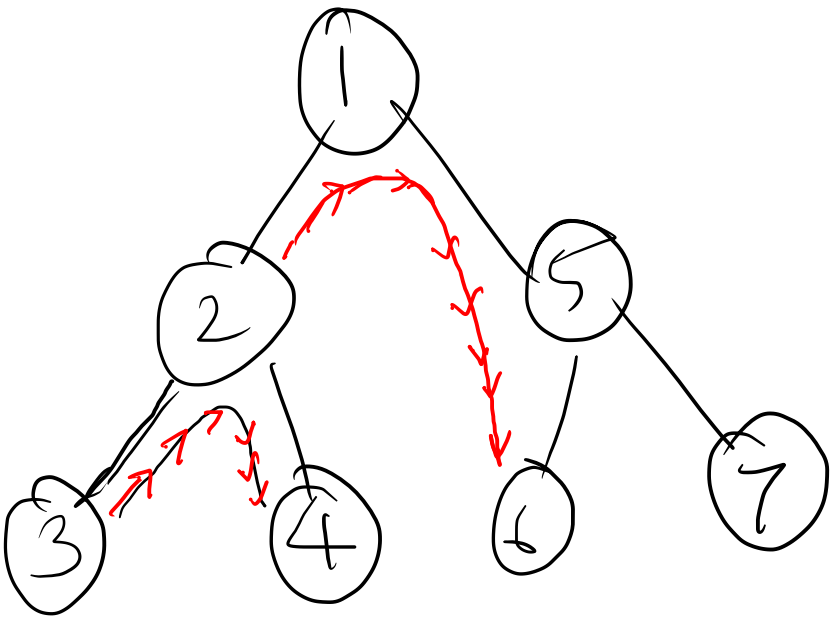
Maximum Path Sum

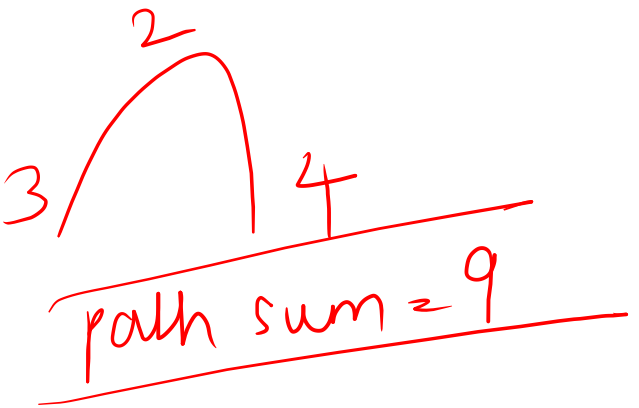


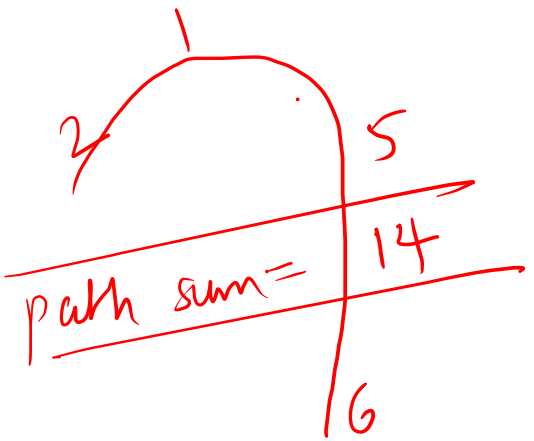




Maximum Path Sum

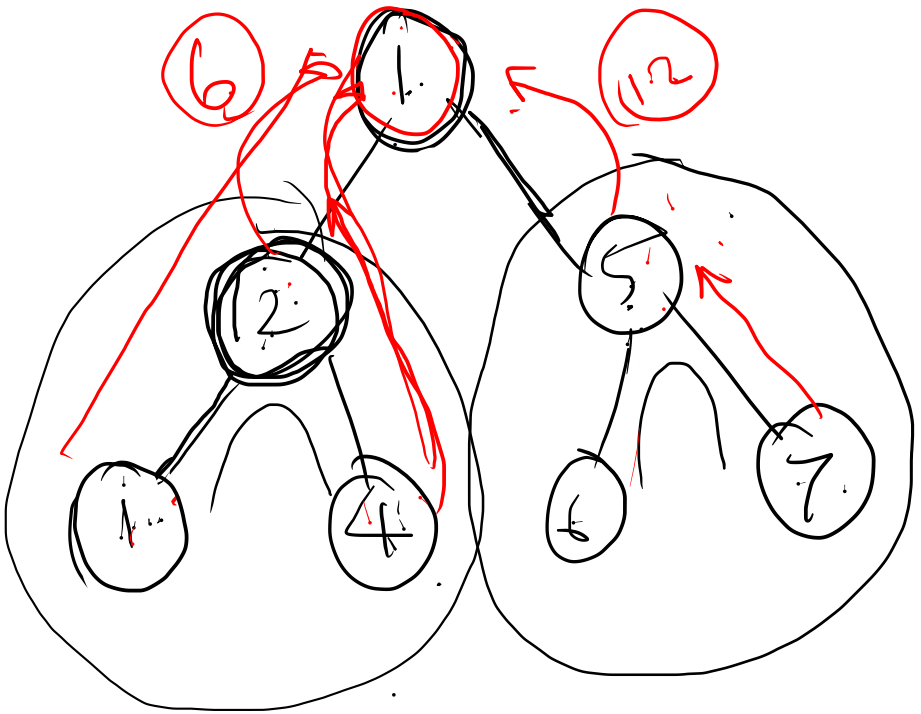






Maximum Path Sum

me + left + right



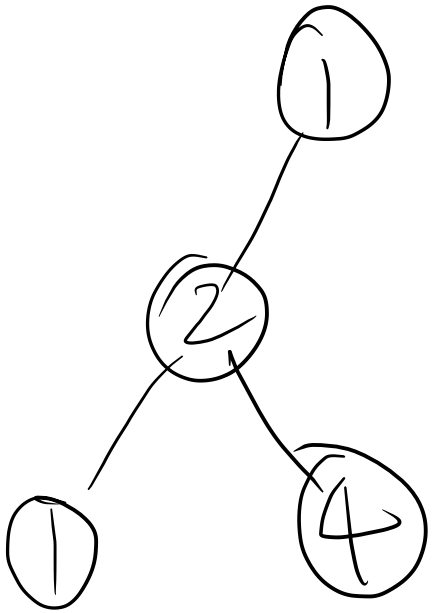
6 + 1 + 12

19

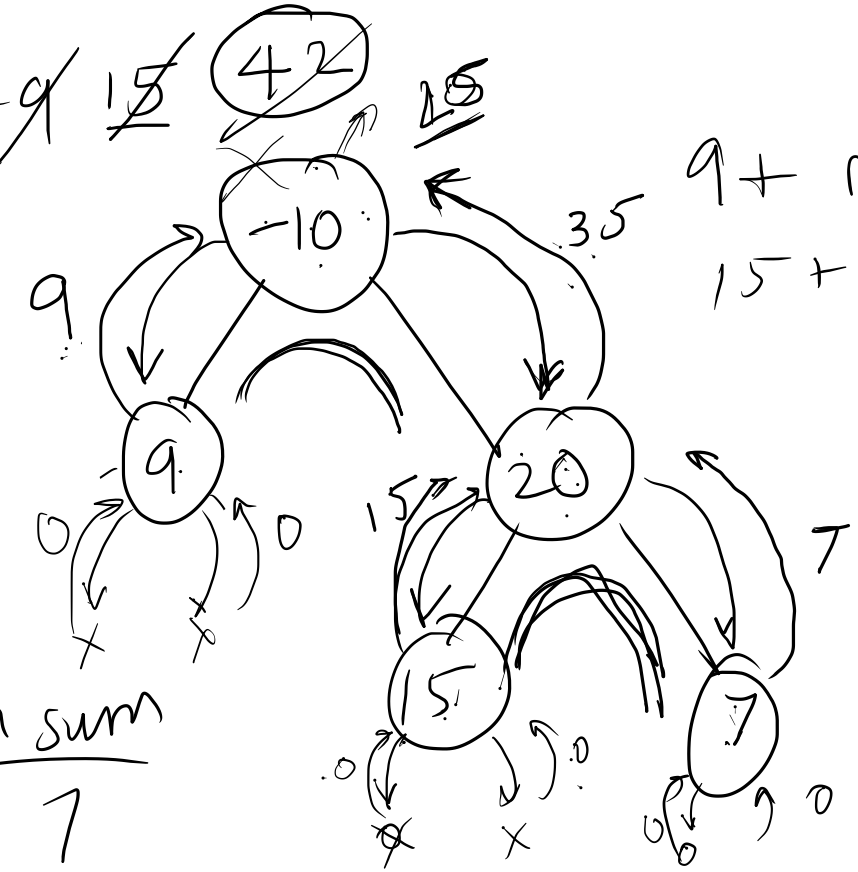
$T.C = O(n)$

Aux space = $O(n)$

recursive stack


1
2
1
4

max = ~~9~~ ~~15~~ 42



9 + max(0,0) = 9

15 + max(0,0) = 15

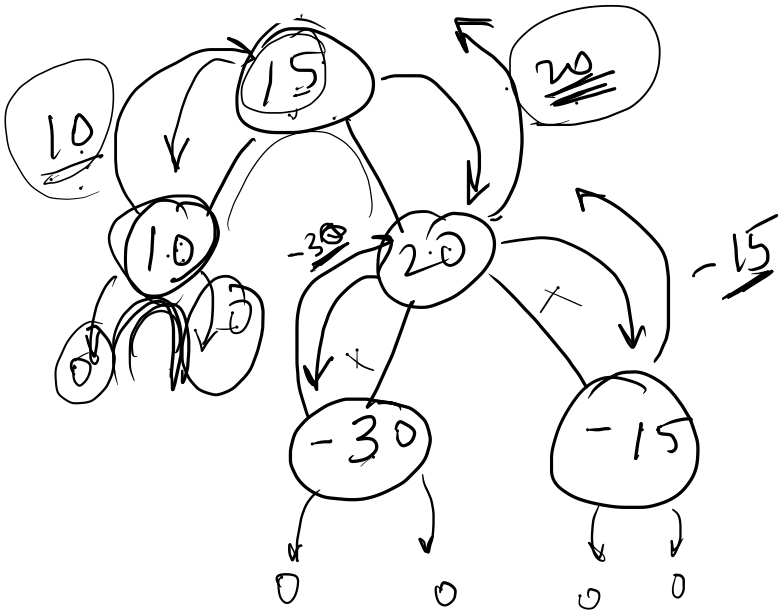
20 + max(15, 7)

-10 + max(9, 35)

~~24~~

max path sum

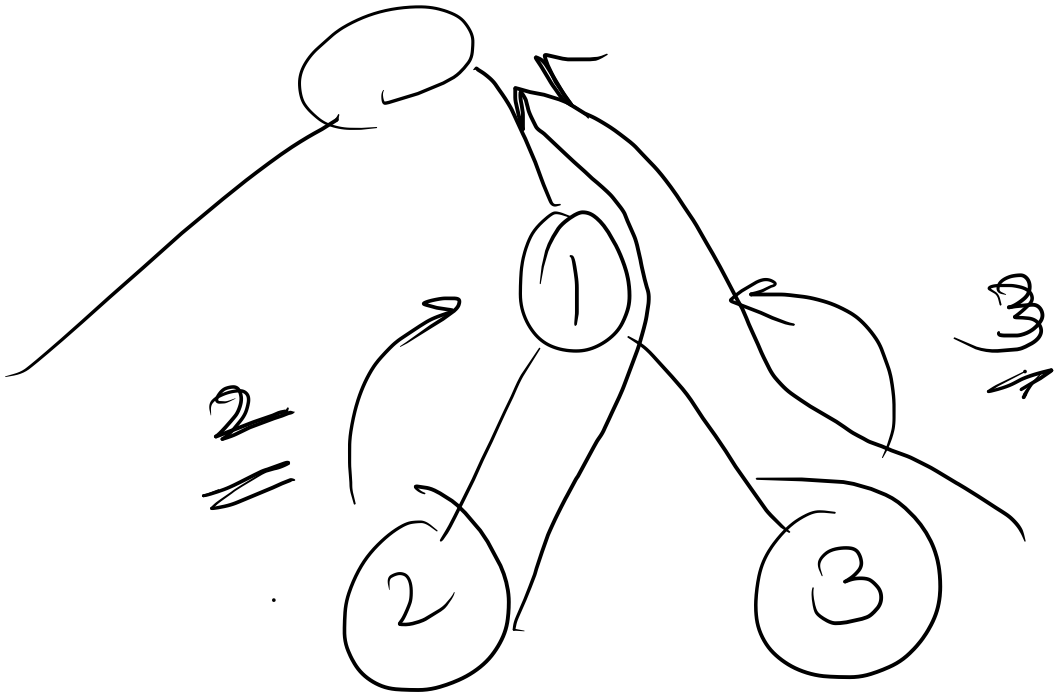
15 20 7



max = ~~-∞~~ ~~10~~ = 45

20 + max(-30, -15)
= 5

20 + max(0, max(-30, -15))


1
2
3
2
3

$$T.C. = O(n)$$

$$\text{Aux } S.C. = \underline{O(n)}$$