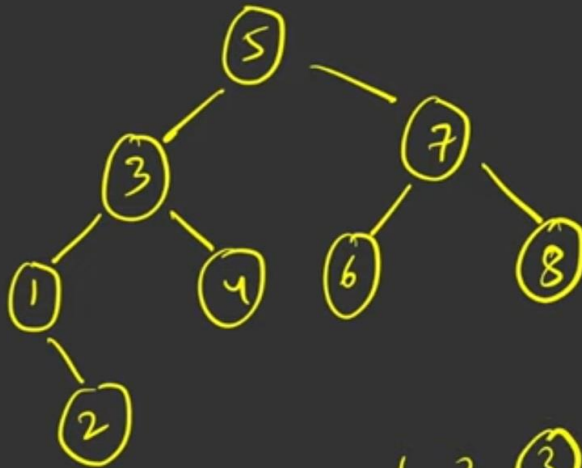


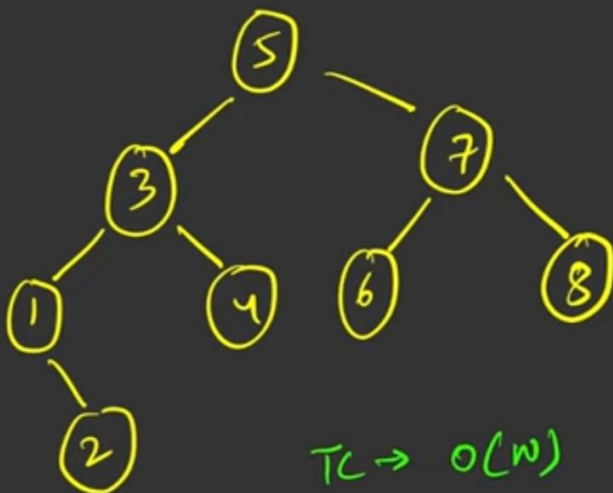
$K^{\text{th}}$  smallest element in BST



$K = 3$

1 2 3 4 5 6 7 8  
↑

$K^{\text{th}}$  smallest element in BST



$K = 3$

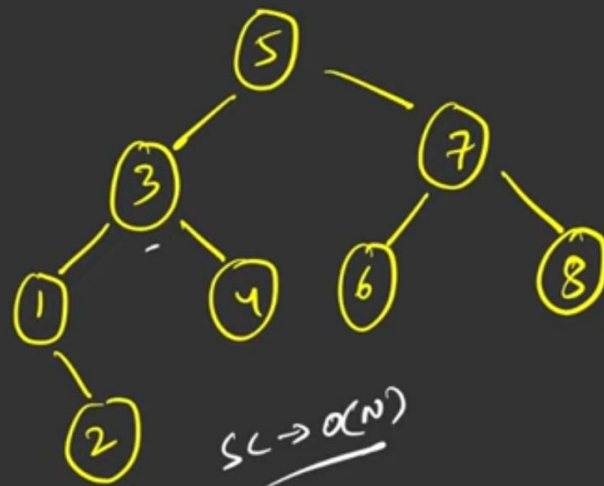
DFS

nodes

→ Vector / List

TC →  $O(N)$   
+  $O(N \log N)$   
SC →  $O(N)$  Sort

$k^{\text{th}}$  smallest element in BST



$SC \rightarrow O(N)$

~~$(N \log N)$~~

$k = 3$

[Inorder]

$\rightarrow$  left Node Right

sorted

1 2 3 4 5 6 7 8  
 $\uparrow$

cnt = 0

node

left Node Right

cnt ++

if (cnt == k)  
ans = node

Recursion  $\rightarrow$  TC  $\rightarrow O(n)$   
 $\nearrow$  SC  $\rightarrow O(n)$

Heuristics  $\rightarrow O(N)$

Morris's  $\rightarrow$   $O(N)$   
 $O(1)$

One traversal  $\rightarrow$   $\underbrace{(N)}$

km largest =  $(n - k + 1)$  smallest