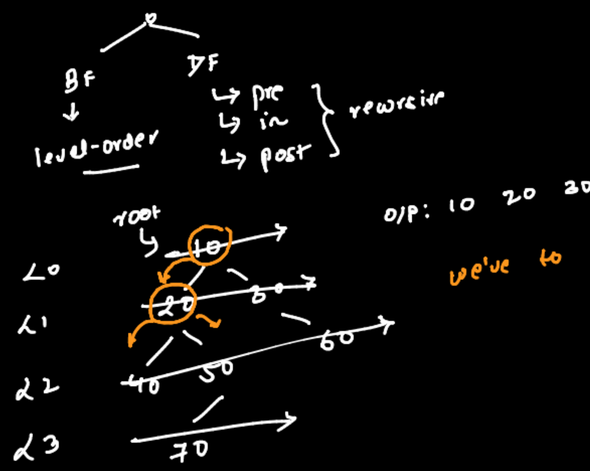
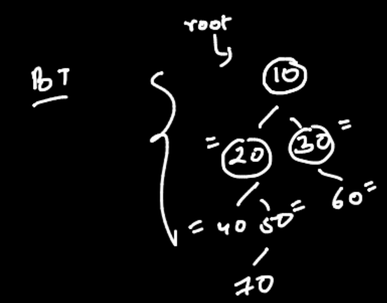


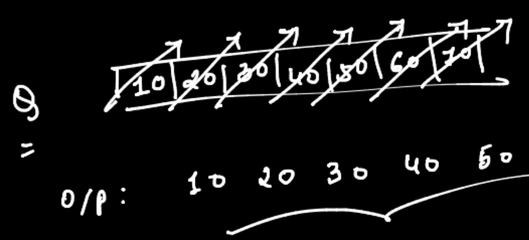

O/P: 10 20 30 40 50 60 70

we've to design an iterative algo.

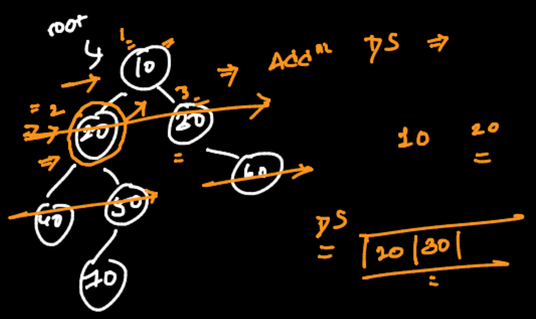



Q: seen

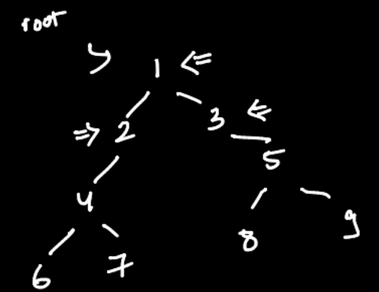
seen → visit → printed, also seen its children




O/P: 10 20 30 40 50 60 70

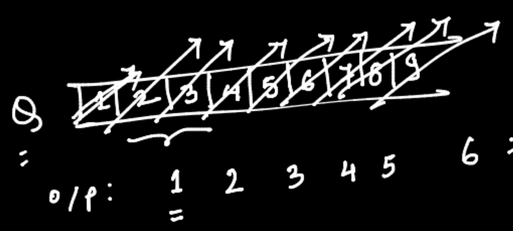



Queue



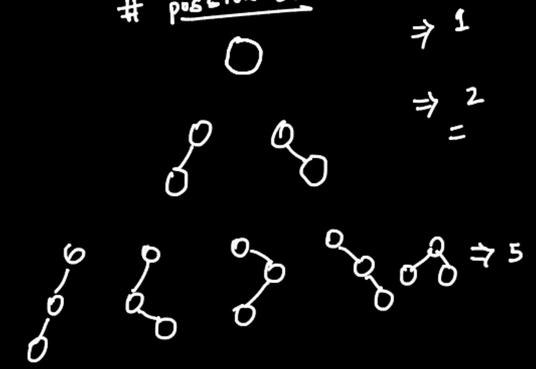

Q ?

FIFO




O/P: 1 2 3 4 5 6 7 8 9

| # nodes | # possible BT |
|---|---|
| 1 | ⇒ 1 |
| ⇒ 2 | ⇒ 2 |
| ⇒ 3 | ⇒ 5 |
| 4 | |
| ⋮ | |
| n | $\left[\frac{2nC_n}{n+1}\right]$ |



$n \Rightarrow \underbrace{\frac{2nC_n}{n+1} \cdot n!}$

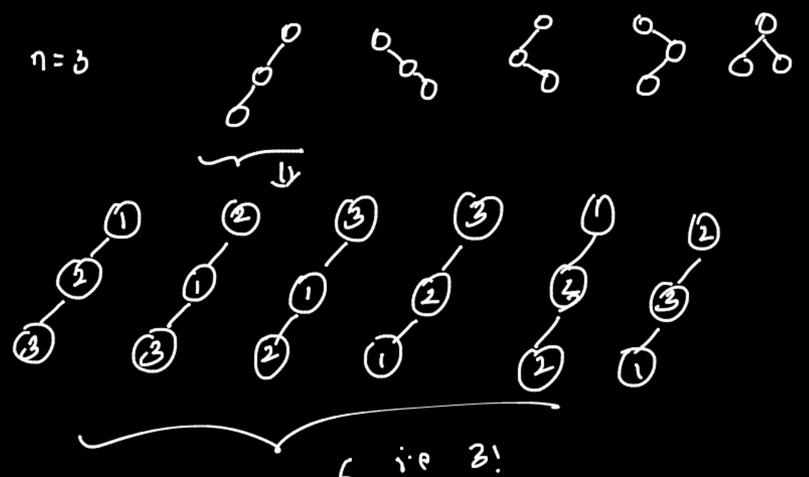
eg: $n = 3$ $\Rightarrow$ $\langle 1,2,3 \rangle$ $\Rightarrow$ pre = 1,2,3

$n \rightarrow \frac{2nC_n}{n+1}$

$\frac{2nC_n}{n+1} \cdot n!$

$\langle 1,2,3 \rangle$

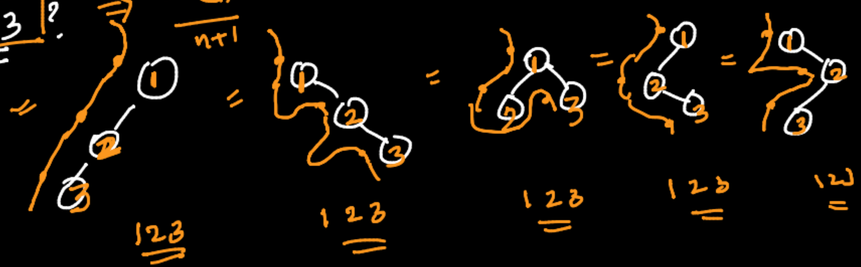
$n = 3$




$n = 3$ $\langle 1,2,3 \rangle$

$\frac{2nC_n}{n+1} \cdot n!$ BTs are possible

How many of them have pre-order traversal as 1, 2, 3?



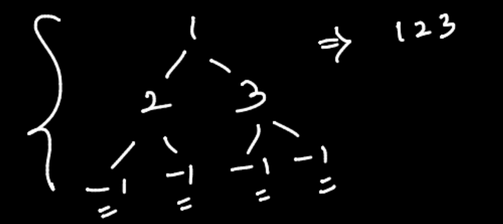
$n \Rightarrow \frac{2nCn}{n+1}$ BTs w/o numbers

$\frac{2nCn}{n+1} \cdot n!$ BT which are numbered

$\Downarrow$

$\frac{2nCn}{n+1}$

"-1" ←



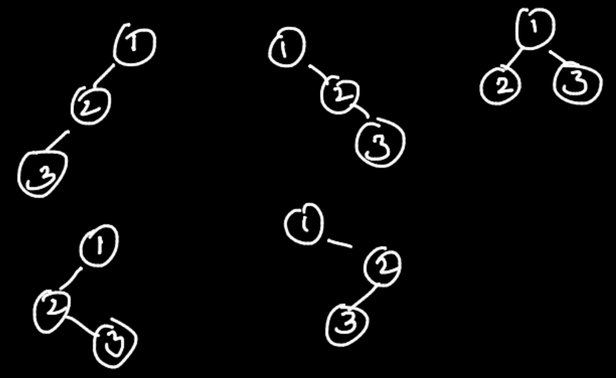

$\Rightarrow$ 123

pre $\Rightarrow$ 1 2 -1 -1 3 -1 -1

$\Downarrow$

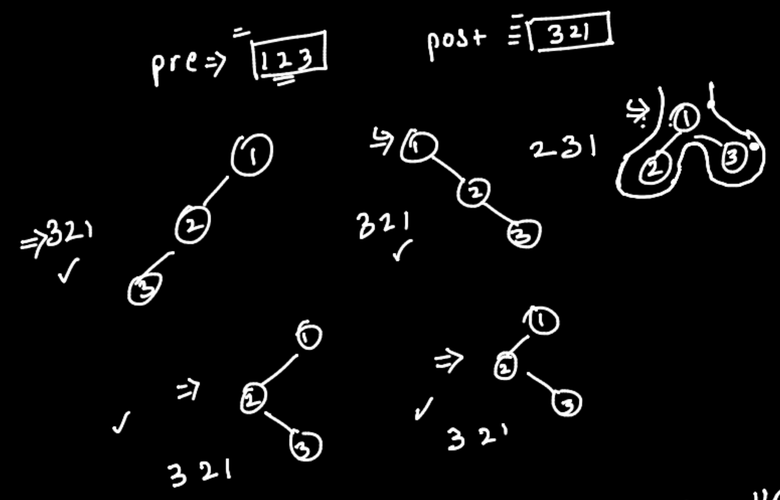
unique

$\exists$ pre $\Rightarrow$ 123 $\Rightarrow \frac{2nCn}{n+1} \Rightarrow 5$




just post or just in $\Rightarrow \frac{2nCn}{n+1}$ BTs

pre or post or in $\Rightarrow \frac{2nCn}{n+1}$ BTs




pre + post ⇒ unique ans. doesn't exist

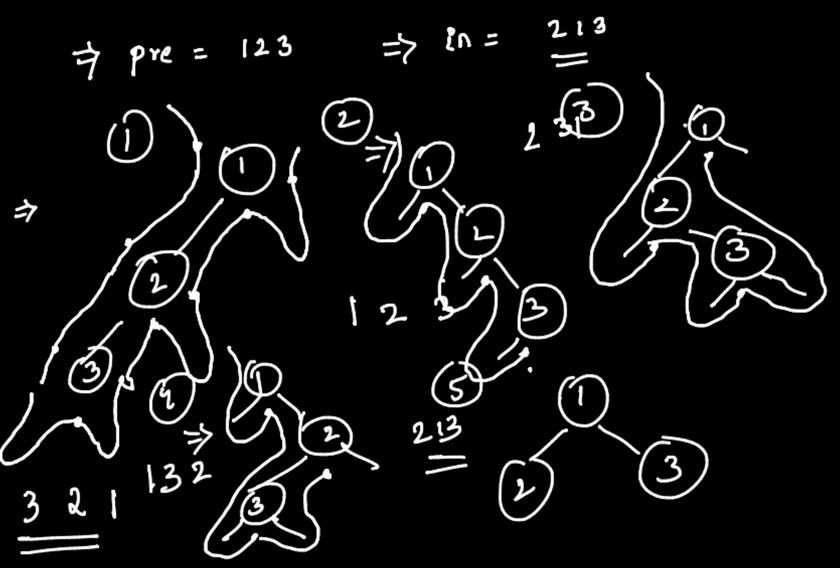
in + pre ⇒ unique BT
in + post ⇒ unique BT
✓

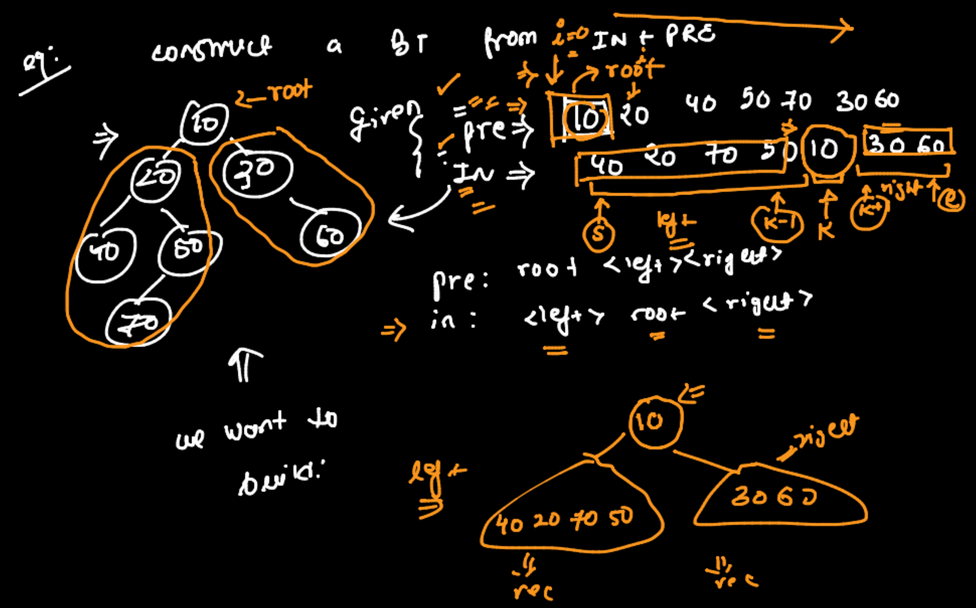
-1 ≡ in / pre / post / pre + post

unique ans is not possible

-1X ⇒ in + pre / in + post (or)

⇒ unique BT is possible



height balanced

$\Rightarrow |h_L - h_R| \leq 1$