Interview Question (Catalan Number)

$n \rightarrow$ # nodes in BST

Possible BST $\Rightarrow$??

$C_0 = C_1 = 1$

$$C_n = C_0 C_{n-1} + C_1 C_{n-2} + \cdots + C_{n-1} C_0$$

$$C_2 = C_0 C_1 + C_1 C_0$$

$$= 1 + 1 = 2$$

C_0 C_1 C_2 C_3

1, 1, 2, 5

$$C_3 = C_0 C_2 + C_1 C_1 + C_2 C_0$$

$$= 1 * 2 + 1 + 2$$

$$= 5$$

$n = 0$ ——— 1 way

$n = 1$ ——— 1 way

$n = 2$ ——— A OR B — 2 ways

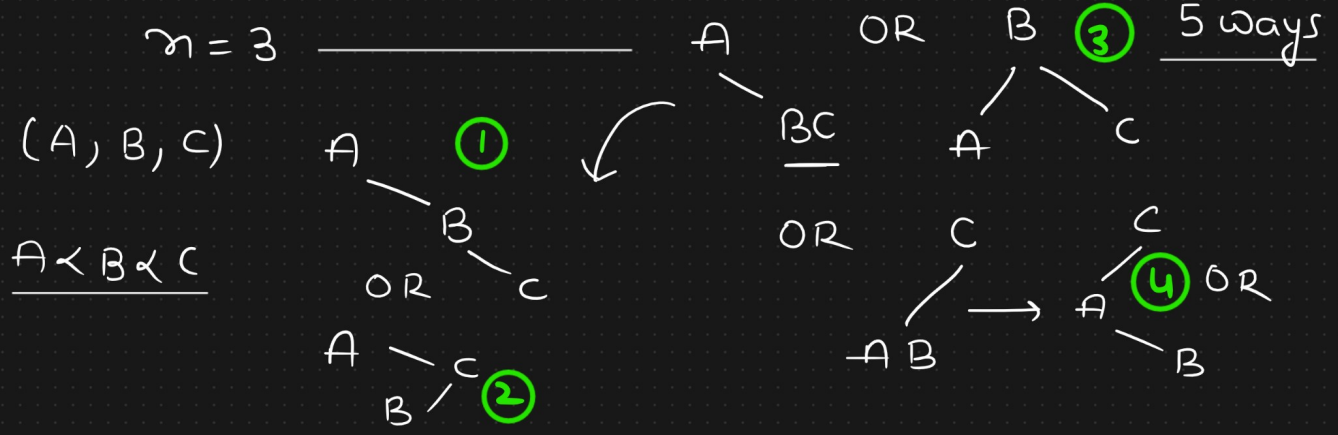
$A < B$

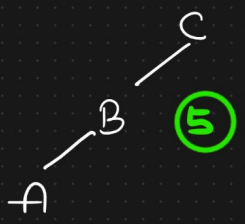
(A, B)

$n = 3$ ——— A OR B (3) — 5 ways

(A, B, C)

$A < B < C$





n ⟶ Possible unique BST

⇓

Catalan Number