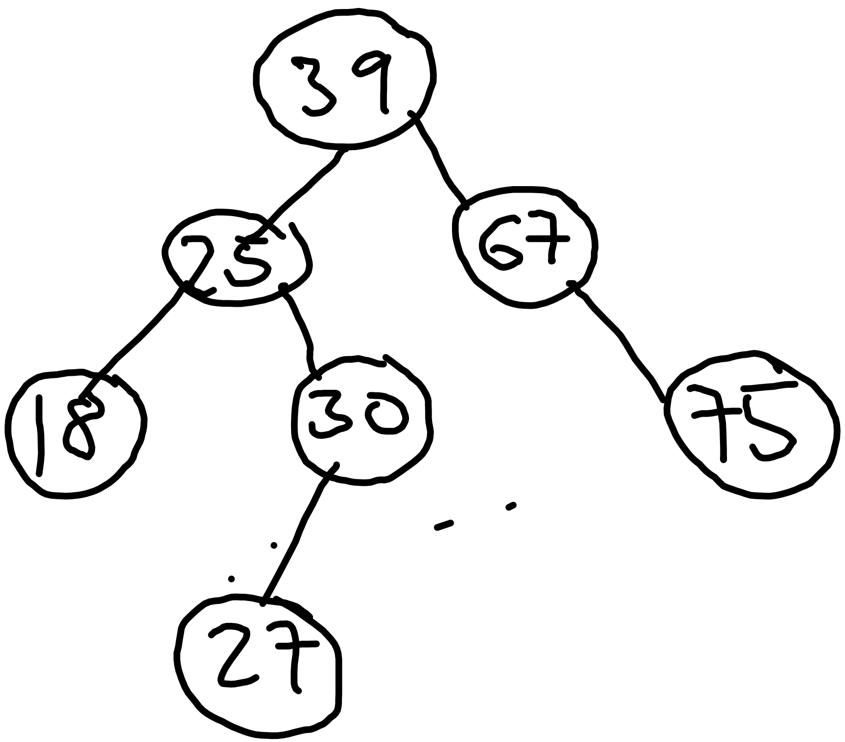
```
w void traversePostorder (TreeNode n)
{
        if (n == null) return;
        traversePostorder(n.left);
        traversePostorder (n.right);
        System.out.println(n.key);
}
```



**Pre-Order:**

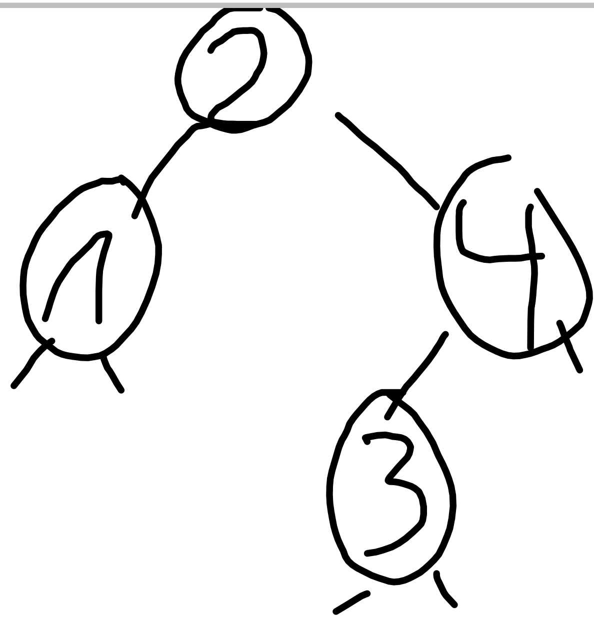
39, 25, 18, 30, 27, 67, 75

**In-Order**

18, 25, 27, 30, 39, 67, 75

**Post-order:**

18, 27, 30, 25, 75, 67, 39

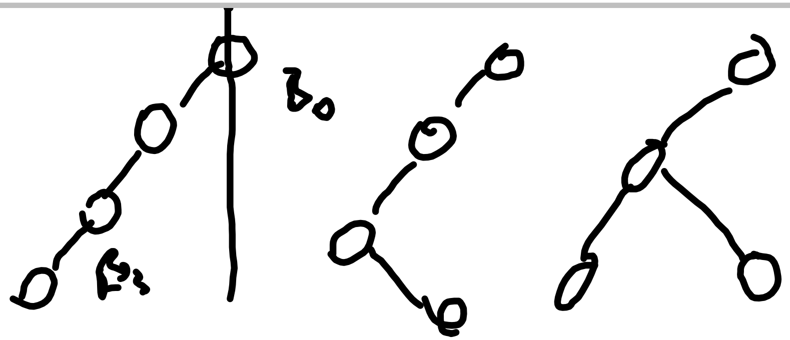


2, 1, 4, 3

2, 4, 1, 3

2, 4, 3, 1

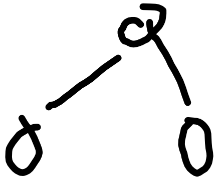
$$\frac{3}{4!} = \frac{1}{8}$$

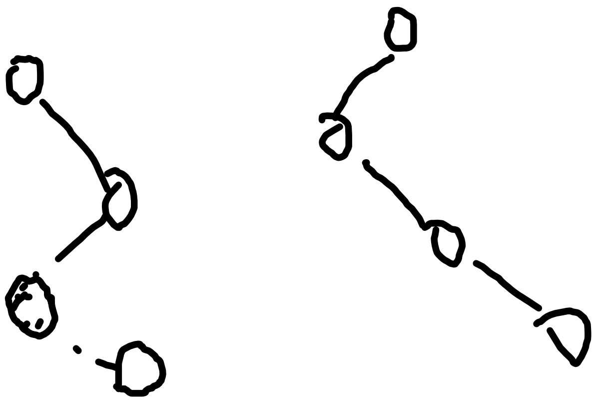



$B_4 = B_3, B_0$ (5)
$B_2, B_1$ (2)
$B_0, B_3$ (5)
$B_1, B_2$ (2)

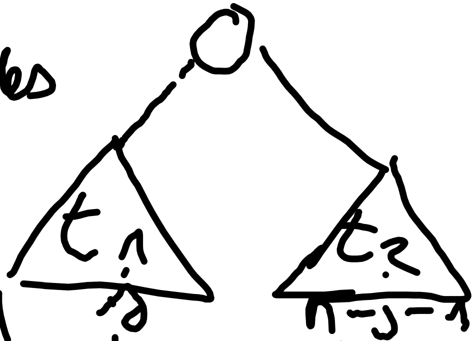
$$B_4 = B_0 \cdot B_3 + B_1 \cdot B_2 + B_2 \cdot B_1 + B_3 \cdot B_0$$

$\underline{\underline{14}}$





t has n nodes



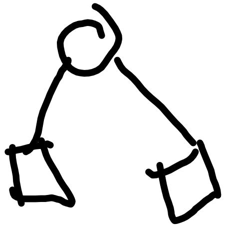

$\Rightarrow$ $t_1$ and $t_2$ together contain $n-1$

$$B_n = \sum_{j=0}^{n-1} B_j \cdot B_{n-j-1}$$

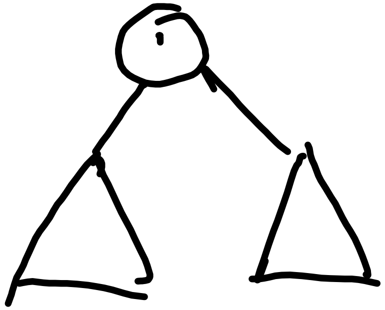
$$= B_0 \cdot B_{n-1} \dots \dots$$

$B_0 = \cancel{0}\ 1$

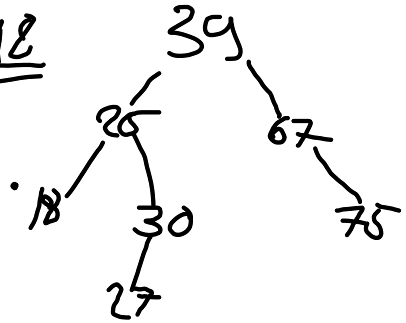
$B_1 = 1$



b)



4 a) <u>18</u>




$$l(t) = size(t) + l(t_1) + l(t_2)$$

$$= \sum_{p \text{ node in } t} depth(p) + 1$$

Base Case $t$ empty $l(t) = 0 = 0$ ✓

Assume equality holds for $t_1$ and $t_2$


$$l(t) = l(t_1) + l(t_2) + size(t)$$

$$= \sum_{p \text{ in } t_1} (depth_{t_1}(p) + 1) + \sum_{p \text{ in } t_2} \ldots\ldots + size(t)$$

\# nodes in $t_1$ and $t_2$ $= size(t) - 1$

$$= \sum_{p \text{ in } t_1} (depth_{t_1}(p) + 2) + \sum \ldots\ldots + 1$$

$$= \sum_{p \text{ in } t_1} (depth_{t}(p) + 1) + \sum_{p \text{ in } t_2} \ldots\ldots + 1$$

$$= \sum_{p \text{ in } t} depth_t(p) + 1$$

$R(\cdot\ ,\ \ +)$

$G(+)$

$((a_1 \cdot a_2) \cdot a_3)$