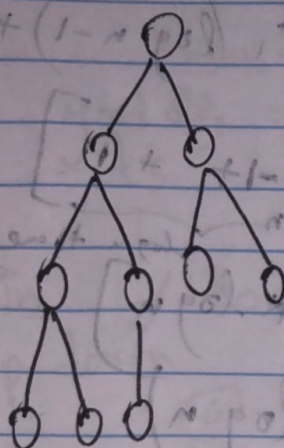


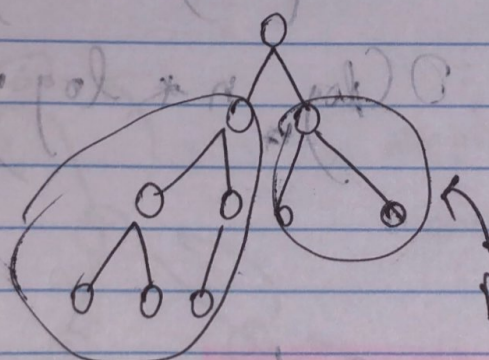
$O(\log n) \rightarrow$ recursive stack

$$O(\log n * \log n)$$

$O(\log n) \rightarrow$ recursive stack

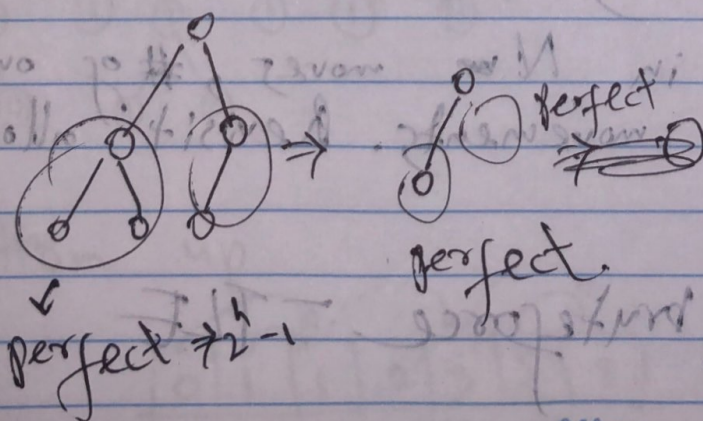


Complete \rightarrow except last level, completely filled & all the nodes in last level are ~~1~~ as left as possible.



complete binary tree can be a perfect binary tree as well

perfect $\Rightarrow O(2^h)$
($2^h - 1$) nodes

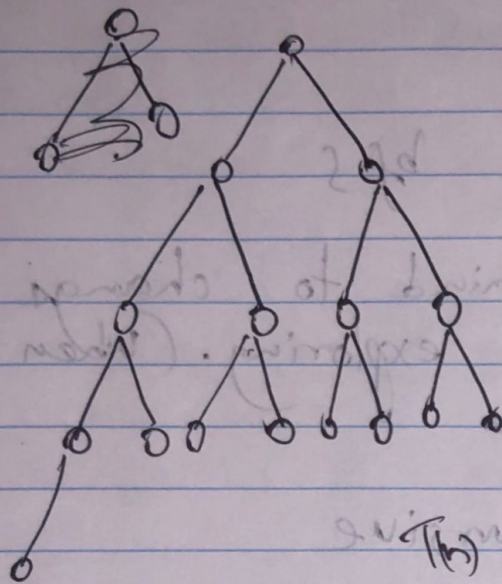


perfect $\rightarrow 2^h - 1$

Atlas

No: _____

Date: ____/____/____



only one subtree is not perfect.
to calculate height

$$T(n) = T\left(\frac{n}{2}\right) + C_1 \log n$$

$$T\left(\frac{n}{2}\right) = T\left(\frac{n}{4}\right) + C_1 (\log n - 1)$$

$$T(n) = T(1) + C_1 \log n + C_1 (\log n - 1) + \dots + C_1$$

$$= 1 + C_1 \left[\log n + \log n - 1 + \dots + 1 \right]$$

$$= 1 + C_1 \left[\log n * \log n \right]$$

$$O(n) = O(\log n * \log n)$$