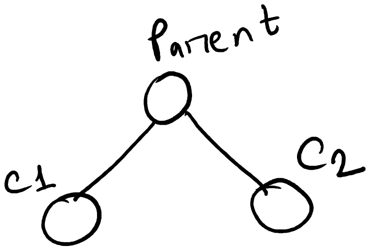
Splay Tree

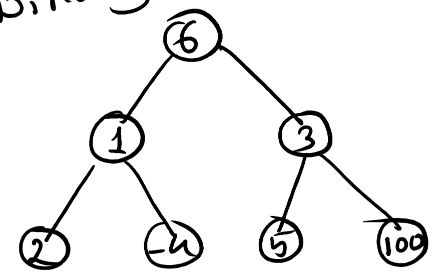
AVL Tree

Red Black Tree

Binary Search Tree

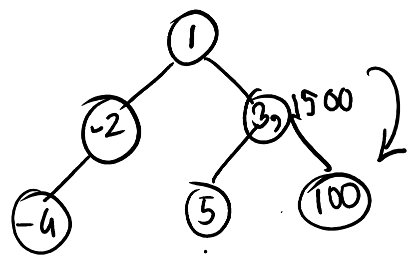


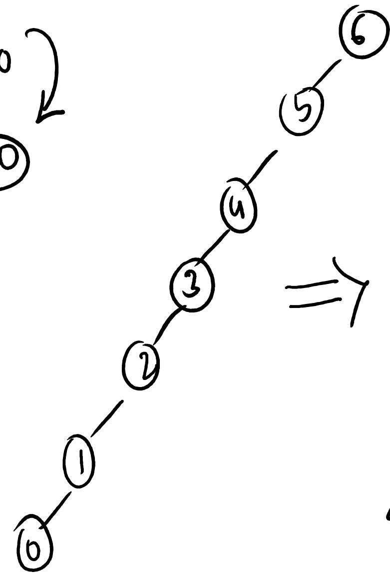
Binary Tree



6	1	2	-4	3	5	100

Root

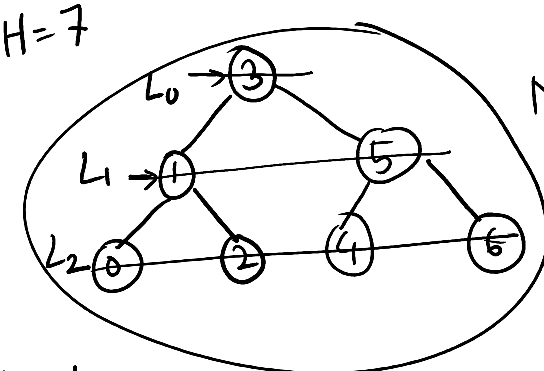




$N = 7$

$H = 7$

$\Rightarrow$



$N = 7$

$H = 3$

$L_0 = 1$

$L_1 = 2$

$L_2 = 4$

$L_3 = 8$

$L_4 = 16$

$L_5 = 32$

$L_6 = 64$

127

$L_k = \boxed{2^k}$

$N = 100$

$$\underbrace{L_0, L_1, L_2, L_3, \ldots, L_k}_{\boxed{2^{k+1}-1}} \geq N$$

$$\underbrace{2^0 + 2^1 + 2^2 + 2^3 + \ldots + 2^k}_{} = 2^{k+1} - 1$$

$$a, r, n \quad = \frac{a(r^{n+1} - 1)}{r - 1}$$

$$= 2^{k+1} - 1$$

$$2^{(k+1)} \geq N + 1$$

$$\Rightarrow \log_2 2^{k+1} \geq \log_2(N+1)$$

$$\Rightarrow (k+1) \log_2 2 \geq \log_2(N+1)$$

$$\Rightarrow k + 1 \geq \log_2(N+1)$$

$$\therefore k \geq \boxed{\log_2(N+1) - 1}$$

$$\boxed{k \geq \log_2(N)} \Leftarrow$$

$$\lim_{N \to \infty} \frac{\log_2(N+1)}{\log_2(N)}$$

$\boxed{k \geq \log_2(N)} \Leftarrow \therefore k \geq \log_2(N \ldots$