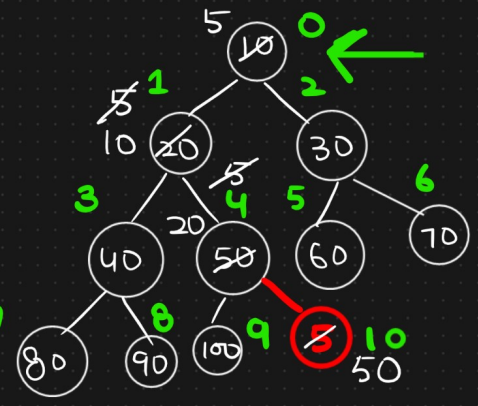
Insertion in Minheap / Maxheap

$n = 10$

Complete Binary Tree



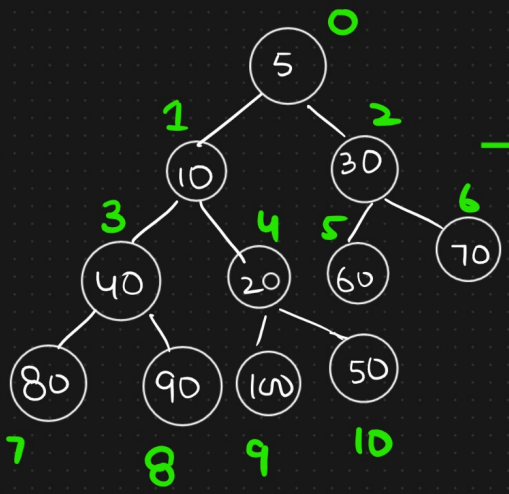
$x = 5$ → New data element

$50 < 5$ → Not true

$50 > 5$
$20 > 5$
$10 > 5$
→ 3 swaps

0	1	2	3	4	5	6	7	8	9	10
10	20	30	40	50	60	70	80	90	100	5

$\log N$



→ Valid minheap Tree

comparisons = $\log N$

swaps = $\log N$

0	1	2	3	4	5	6	7	8	9	10
5	10	30	40	20	60	70	80	90	100	50

$n = 2^k - 1$ → complete binary tree

$(n+1) = 2^k$

$k = O(\log n)$

$\log_2 (n+1) = \log_2 2^k$

$$\log_2 (n+1) = k \log_2 2$$

Time complexity = Number of comparisons + Number of swaps

- Insertion (Minheap / Maxheap)

$= O(\log N)$