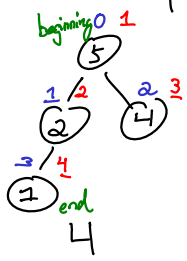
Complete Array Binary Tree

In a complete tree, the number of nodes describes its shape (and vice versa).



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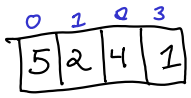

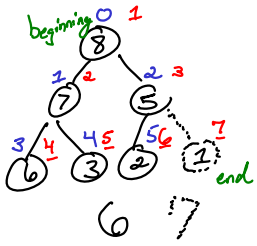

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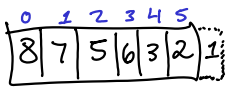

Given the index of a node, what is the index of its parent?

Given the index of a node, what are the indices of its children?

Given the index of a node, is it a leaf?

$parent(n) = \left\lfloor \frac{n-1}{2} \right\rfloor$ $\quad parent(n) = \left\lfloor \frac{n}{2} \right\rfloor$

$leftChild(n) = (n+1)\cdot 2 - 1 = 2n+2-1 = 2n+1$ $\quad leftChild(n) = n \cdot 2$

$rightChild(n) = (n+1)\cdot 2 + 1 - 1 = 2n+2+1-1 = 2n+2$ $\quad rightChild(n) = n \cdot 2 + 1$

$isLeaf(n) = \left\lfloor \frac{size}{2} \right\rfloor < n+1$ $\quad isLeaf(n) = \left\lfloor \frac{size}{2} \right\rfloor < n$