

# Data Structures

# Binary Heap



**Binary tree**

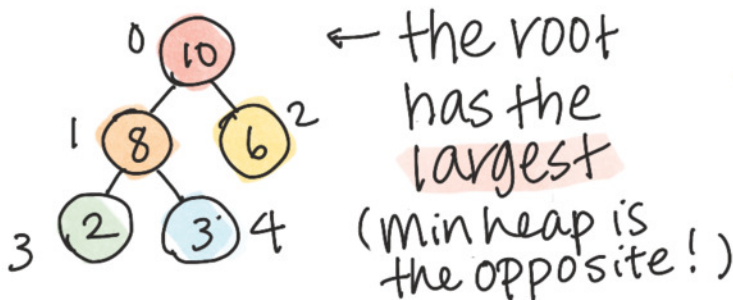
tree data structure  
each node has at most 2 children

Binary search tree

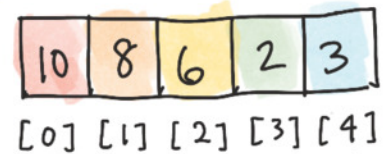
Binary heap

- Complete tree
- Min heap or max heap
- used for priority queue, heap sort etc.

## ★ Max heap



in array



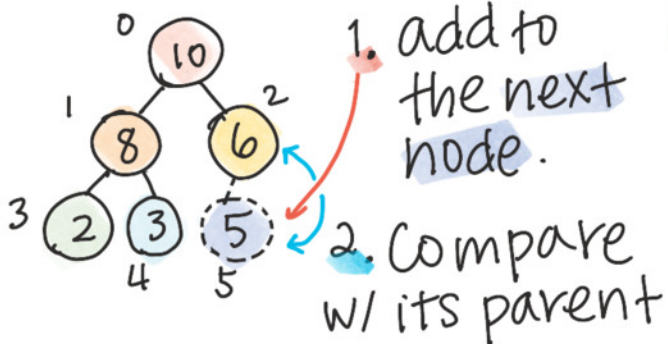
each node has 0 - 2 children

always fill top → bottom, left → right

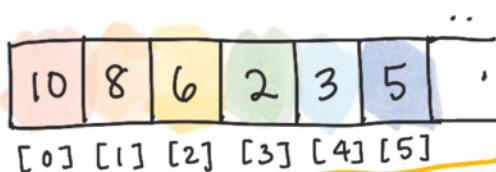


## ★ Insertion

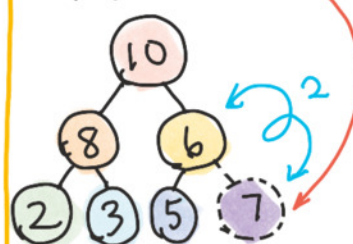
Let's add 5 to the heap!



1. add to the next node.  
2. Compare w/ its parent  
3. the parent is greater.  
Cool, it's done!  
Let's add more!



Add 7

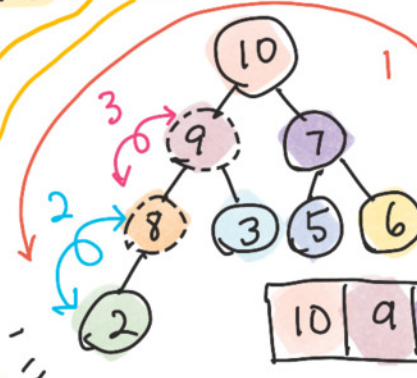
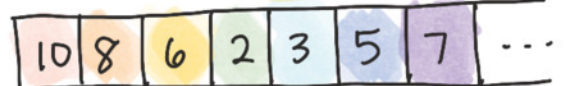


1. Add to the next node

2. Compare w/ parent.

Oh, no!

the parent is smaller than its child! Swap them !!!



Add to the next node & repeat the process!

