L77
Binary Heap and
some problem solving

Join Discord - https://bit.ly/ly-discord

RECAP

What's the requirement?

get the most prior element easily

Largest element in O(1).

What all could we use?

5

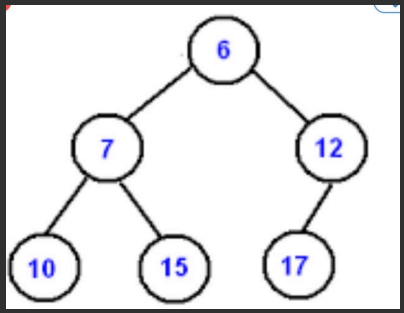
O(n)

insert element

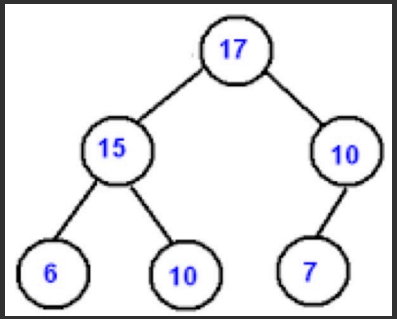
Priority queue

Binary Heap
Properties?

Binary Heap
Examples



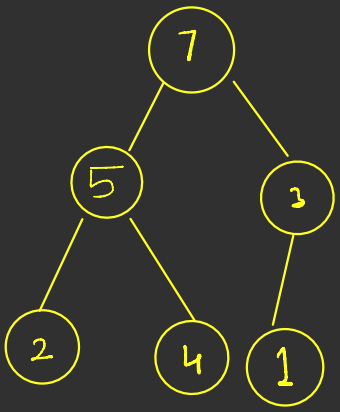
Min Heap



Max Heap

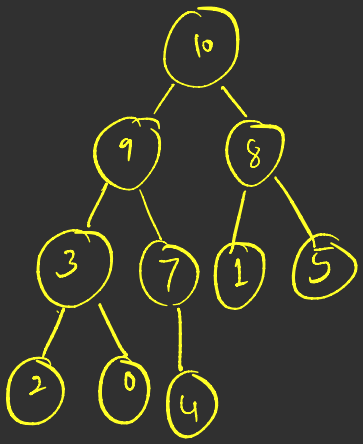
5 2 1 7 4 3

Max heap

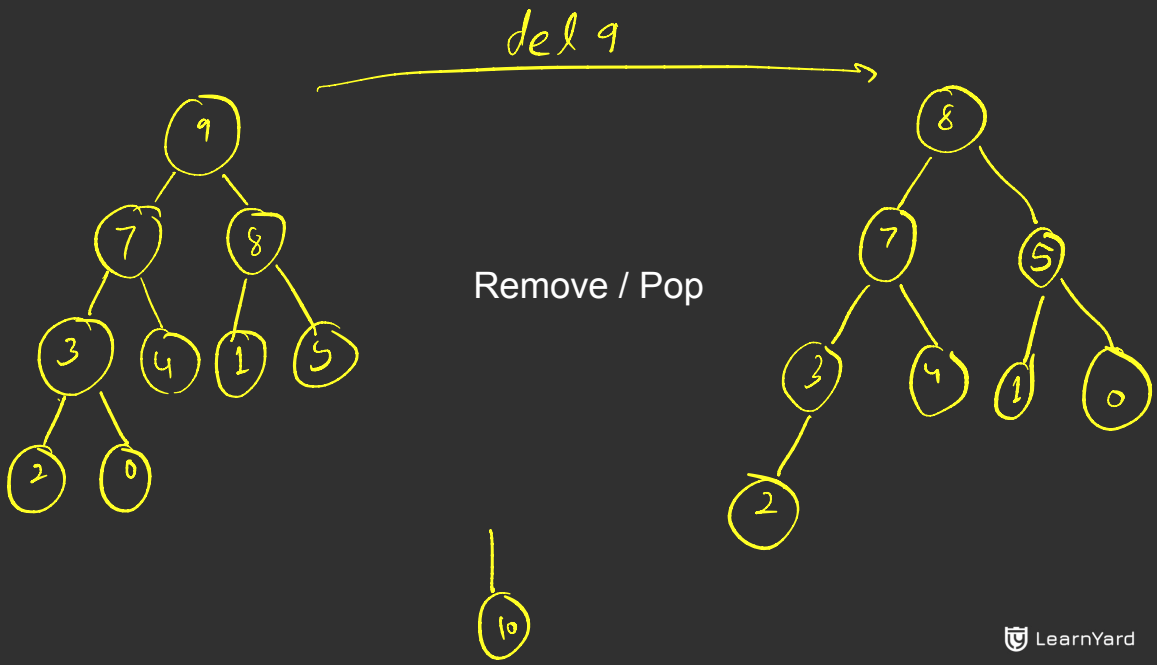


Insert / Add

4, 3, 1, 7, 8, 9, 5, 2, 0, 10



Sift Up



Sift Down

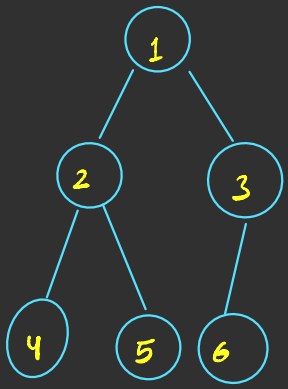
node are n

complete binary tree height $h = \log_2 n$

Insertion $\rightarrow O(\log n)$

deletion $\rightarrow O(\log n)$

How to implement a heap?



left child i = i*2

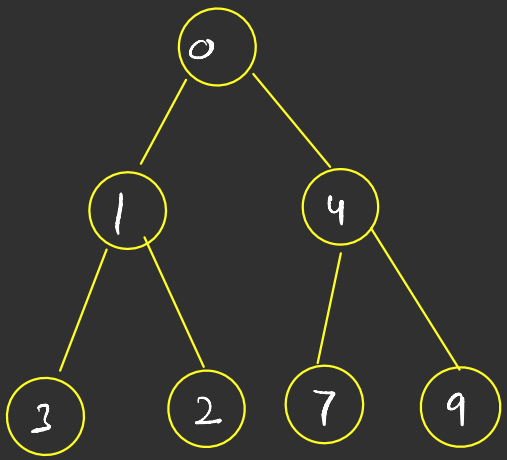
right child i = i*2+1

parent i = i/2

Using Array for a CBT

Let’s implement

An efficient method to build
Heap from an Array



4 3 7 1 2 0 9

4	3	7	1	2	0	9
1	2	3	4	5	6	7

1 $\log n$

2

$\frac{n}{4} \times 2$

$\frac{n}{2} \times 1$

$\frac{n}{2} + \frac{n}{2} + \cdots \sim \log n$

Also, do explore in-built priority queues

Let’s do a problem

1. Kth Largest Element

Intuition

Let’s implement

Thank You!

Reminder: Going to the gym & observing the trainer work out can help you know the right technique, but you'll muscle up only if you lift some weights yourself.

So, PRACTICE, PRACTICE, PRACTICE!