

PLAYBOOK NOTES: BINARY HEAP

Description:

A heap is an ordered binary tree

A Min Heap is a binary tree where the smallest number is at the root and every parent is smaller than the children.

A Max Heap is a binary tree where the largest number is at the root and every parent is larger than the children.

Shape of the Tree

When inserting a new node, move down the tree until you find a level that is not full.

Insert a node:

Add the node to the next open spot and then swap with the parent as needed.

Efficiency: $O(\log(n))$

Delete a node:

You can only delete the root node.

Then you fill the root with a node from the bottom (The last position inserted).

Then repair the heap. Swap working from the top down, constantly swapping with the smallest child (Min heap) or largest child (Max heap).

Efficiency: $O(\log(n))$

To know the smallest number (Assuming a Min Heap): $O(1)$