Heap Review

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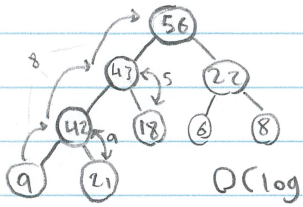
Algo

heap review

0) Stored on arrays b/c of math
1) Largest on top (Parent > Descendents)
2) Complete
3) Binary

Insert

eg. 43, 18, 22, 9, 21, 6, 8, 56, 42



O(log n)

Delete Largest

1) Swap largest (Root) w/ Last inserted node and grab value
2) Start From root (new value)
3) While current node's children > current node, swap Largest child

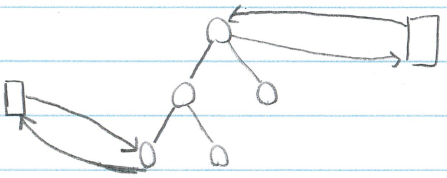
O(log n)

Finding value

O(n) - must search everything

Breaking abstraction

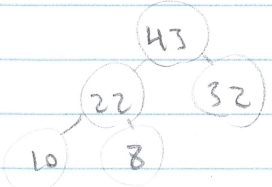
"Specializing data structure" to accomodate bad algorithm



AVL Tree

→ Try to address unbalanced issue of Binary Search Trees

Any Complete Tree as Array



Level-by-Level traversal

0	1	2	3	4	5
43	22	32	10	8	...

$P(i) = \left\lfloor \frac{(i-1)}{2} \right\rfloor$

$LC(i) = 2i+1$

$RC(i) = 2i+2$

} IF result ≥ size, no children

Algo

AVL Tree Theory

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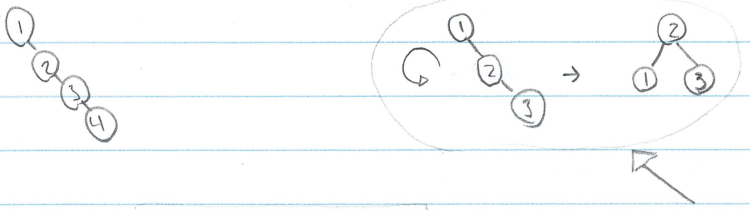
AVL Tree

1) Sorted
2) Binary (0-2 children)
3) R & L subtrees have a height difference ≤ 1 (Look at depth of subtree)

e.g.

BST $<$ (V) $\geq$ AVL



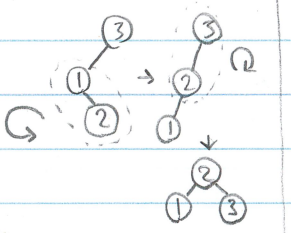
4 Cases

LL

LR

RL

RR



↘ Determined by the two branch directions in path

e.g.