

Binary Tree Performance Gains

Unsorted list

64 Items

How long would it take to know if an item
is not present. 64!

what if it is present? ~ 32

N items

NOT present + N time

is present + N/2 time

~ 64 in a binary tree

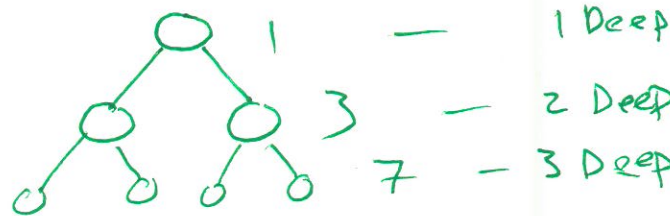
$$\text{Node} = 2^{\text{Depth} - 1}$$

$$\text{Nodes} = 2^{\text{Depth}}$$

$$\log_2 \text{Nodes} \approx \text{Depth}$$

$$\text{Depth} = 6$$

not present = 6 checks
is present = 5 checks



$$X = 2^4$$

$$\log_2 X = \log_2 2^4 = 4$$

$$\log_2 X = 4$$

Binary Tree w/ N nodes

not present = $\log_2 N$ checks

is present = $\log_2 N$ checks

> if it is
Balanced

Self Balancing Tree

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