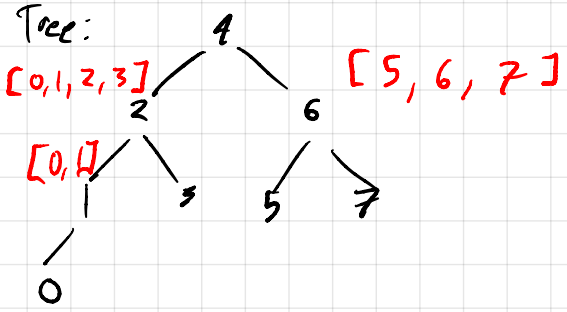
A Recursive Algorithm to Find the Root of a Complete and Balanced Binary Tree from a Sorted List

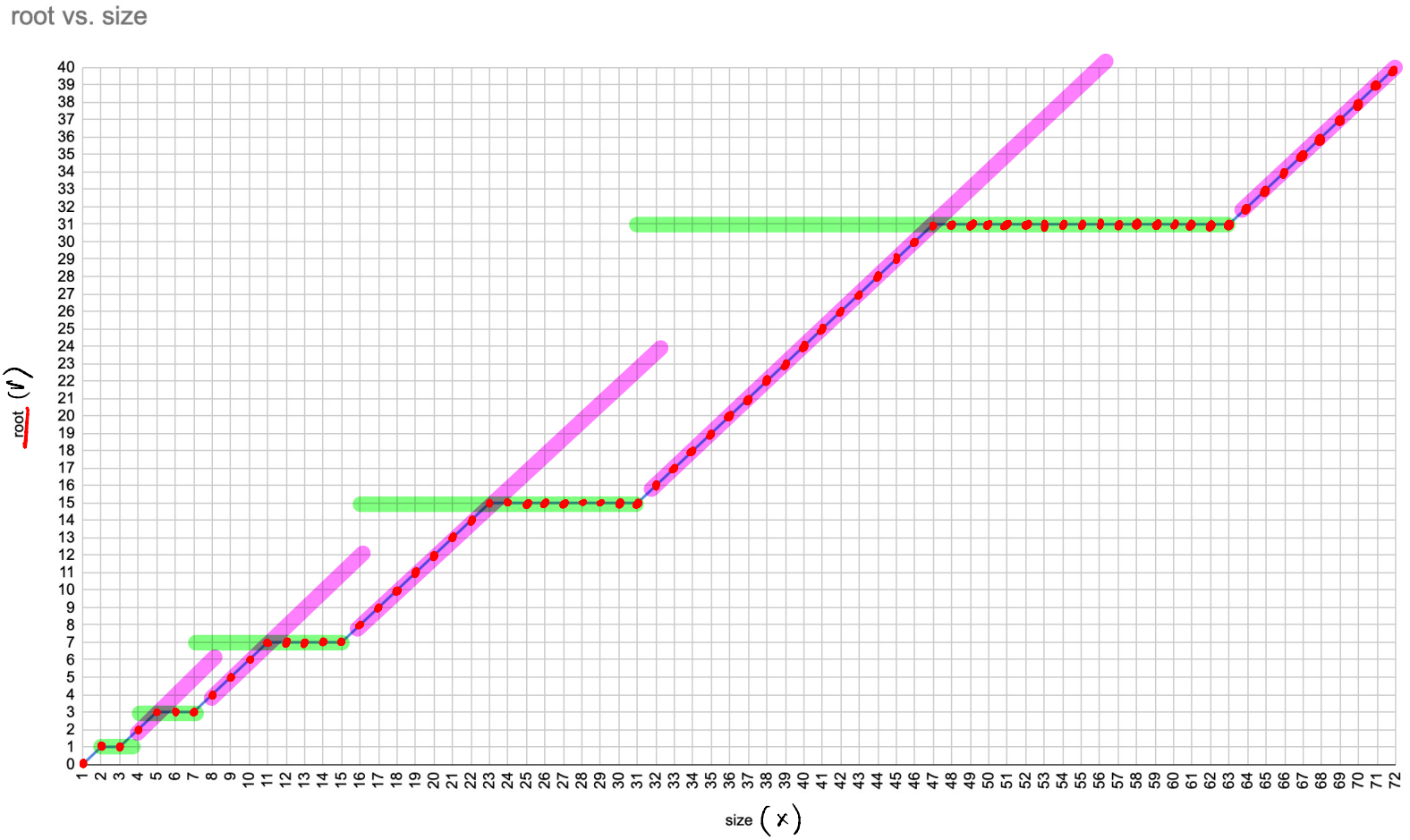
Say:

List 1: [0, 1, 2, 3, 4, 5, 6, 7]

So, $f(8) = 4$
$f(4) = 2$
$f(2) = 1$

Tree:





Function:

$$r = min(a, b)$$

$$a = x - 2^{\lfloor (log_2 x) \rfloor - 1}$$

$$b = 2^{\lfloor (log_2 x) \rfloor} - 1$$

Recursively Partition Left and Right side of Root until There are no items in the list.