9/3/23

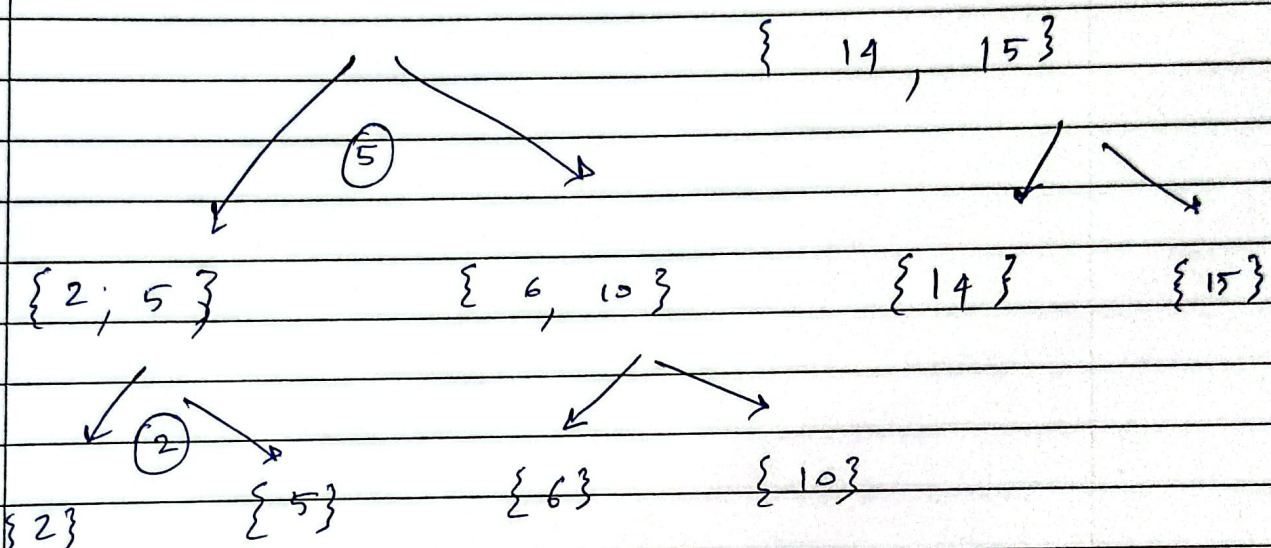
Krishnaraj PT.
PA-20
1032210888
__/__/____

AA - Tut - 2

Q 1. 2, 5, 6, 10, 14, 15 — quicksort

Say 10, being the mid element is a pivot

→ {2, 5, 6, 10} would be one half



No elements would be swapped in this case, as this is the best case, time complexity would be $O(n^2)$

Q.2. $T(n) = 2T(n/2) + n$

$f(n) = n$; $c = 1$

$a = 2$

$b = 2$

$\log_b a = \frac{\log_x a}{\log_x b} = \frac{\log 2}{\log 2} = 1$

as $\log_b a == c$; Time complexity $= O(n \log n)$

Q.3. non-recursive work = $\in f(n)$

$f(n) = 4$; $c = 1$

Recursive relation = $2T(n/3)$

D = base case

$a = 2$
$b = 3$ (from relation provided) (11)

So applying Master theorem on this

$T = \{ d + aT(n/b) + \in f(n)$

$= \{ 2 + 2T(n/3) + 4$

$\log_b a = \frac{\log_x a}{\log_x b} = \frac{\log_b a}{\log_b b} = \frac{0.301}{0.477}$

$= 0.631 < 1$

So Time complexity would be

$O(n^{\frac{1}{4}}) := O(n)$