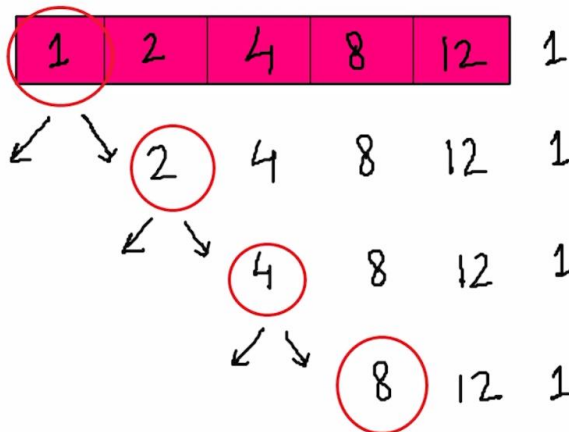


1. Time Complexity in worst case = $O(n^2)$
2. Time Complexity in best case = $O(n * \log(n))$ = Time Complexity in average case
3. Quick Sort is not a stable algorithm
4. Quick Sort is an inplace algorithm \rightarrow take no extra space

QuickSort Analysis



Worst Case!
 \rightarrow Already Sorted Elements

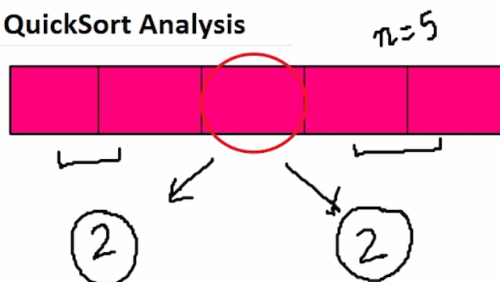


No of Partition = Some linear function of n
 Comparisons Algo
 $= R_1 n + R_2 \checkmark$

$(n-1)$ times!

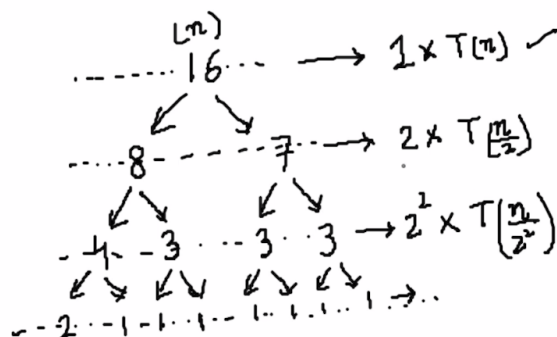
$$T = (n-1) \times R_1 n + R_2 \rightarrow O(n^2)$$

QuickSort Analysis



1. Best Case Analysis!
 $\rightarrow O(n \log n)$

2. Partition time
 $T(n) = R_1 n + R_2$



$$\begin{aligned} \text{Total time} &= (R_1 n) \\ &+ 2 \left(R_1 \frac{n}{2} \right) + 2^2 \times R_1 \frac{n}{2^2} \\ &+ \dots + R_1 \text{ times} \\ &= n \times R_1 n + K \approx O(n \log n) \end{aligned}$$

Height of the tree = $\log(n)$