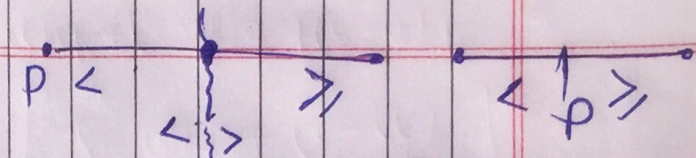
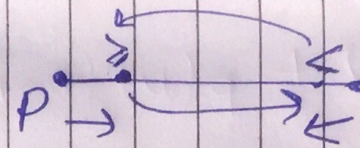
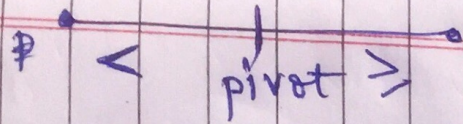


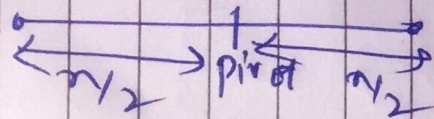
Quick sort



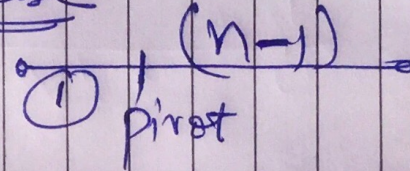
$O(n \log n)$ cases

$O(n^2)$

Average / Best case



Worst case



unsorted
Quicksort
Recursively!

$$T(n) = T(n/2) + T(n/2) + \frac{bn}{2}$$

Partitioning of n
 $= bn$

$$= 2T(n/2) + bn$$

$$= 2 \left[2T(n/4) + \frac{bn}{2} \right] + bn$$

$$= 4T(n/4) + bn + bn$$

$$= 4T(n/4) + 2bn$$

$$\Rightarrow 2^k a + kbn$$

$$\begin{matrix} n=2 \\ k=2 \end{matrix}$$

$$an + \log n \cdot bn$$

$$an + bn \log n = O(n \log n)$$

$$T(n) = T(1) + T(n-1) + bn$$

$$= T(n-1) + bn$$

$$= T(n-2) + b(n-1) + bn$$

$$= T(n-3) + b(n-2) + b(n-1) + bn$$

$$\Rightarrow T(1) + (n-1)bn$$

$$= bn(n-1) \Rightarrow O(n^2)$$

Date _____
Page _____