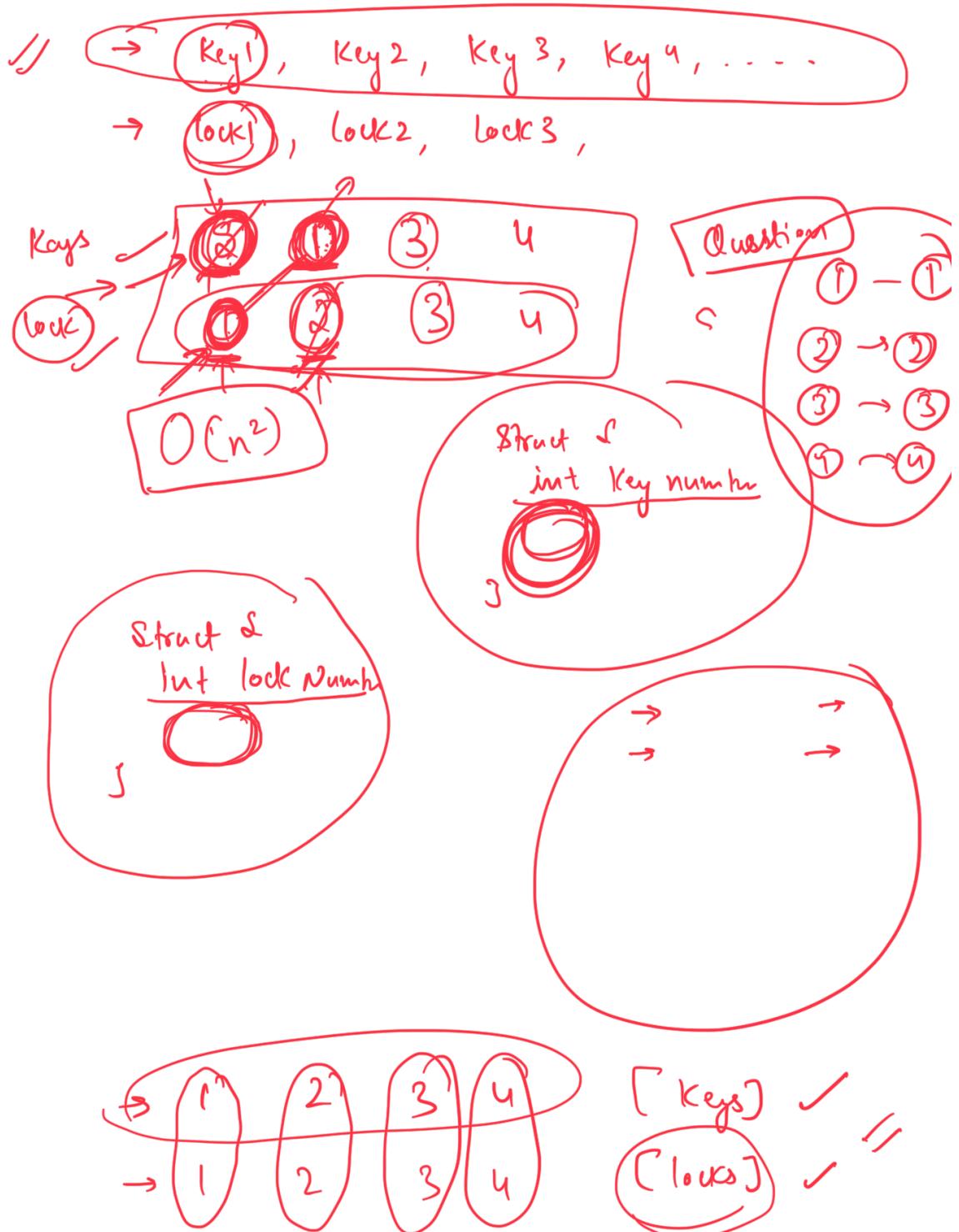


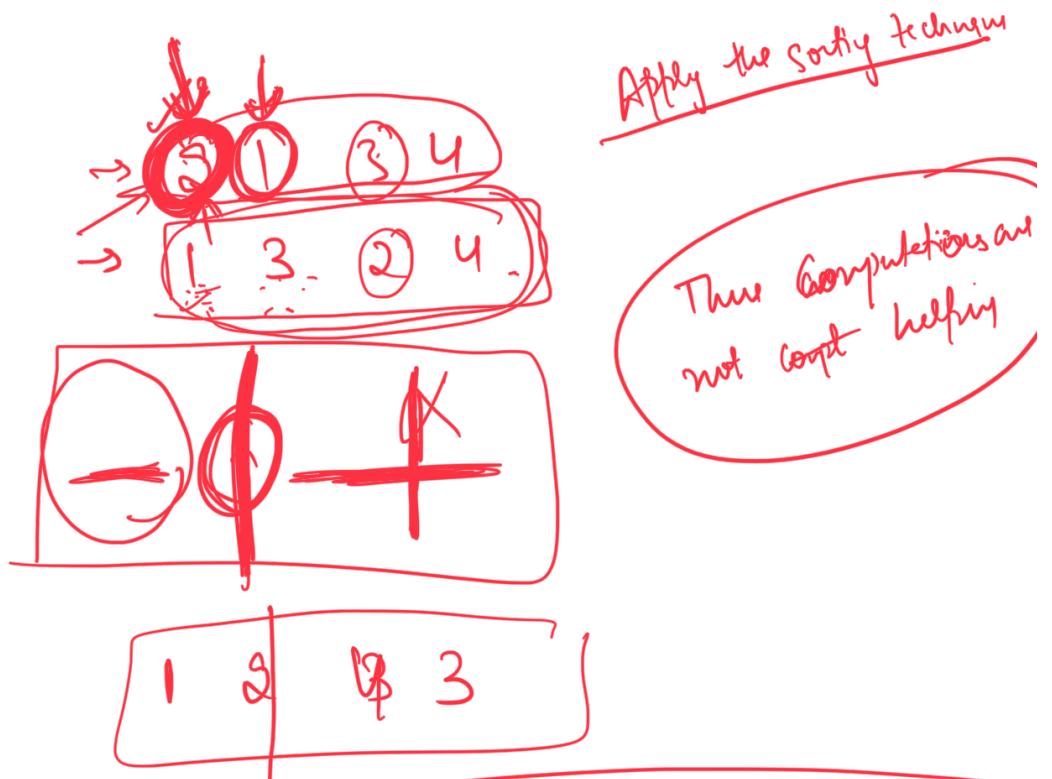
we will start 8:33

Agenda → Quick Sort and we will also appreciate some of the application of the Quick Sort agenda!



Constraint → You cannot compare two keys  
or you also cannot compare two locks.

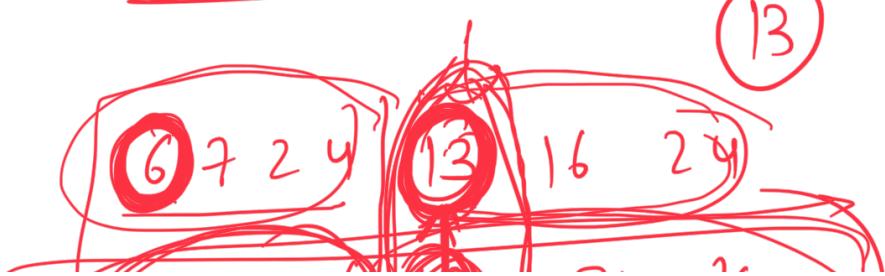
Divide and conquer in b/w two ways



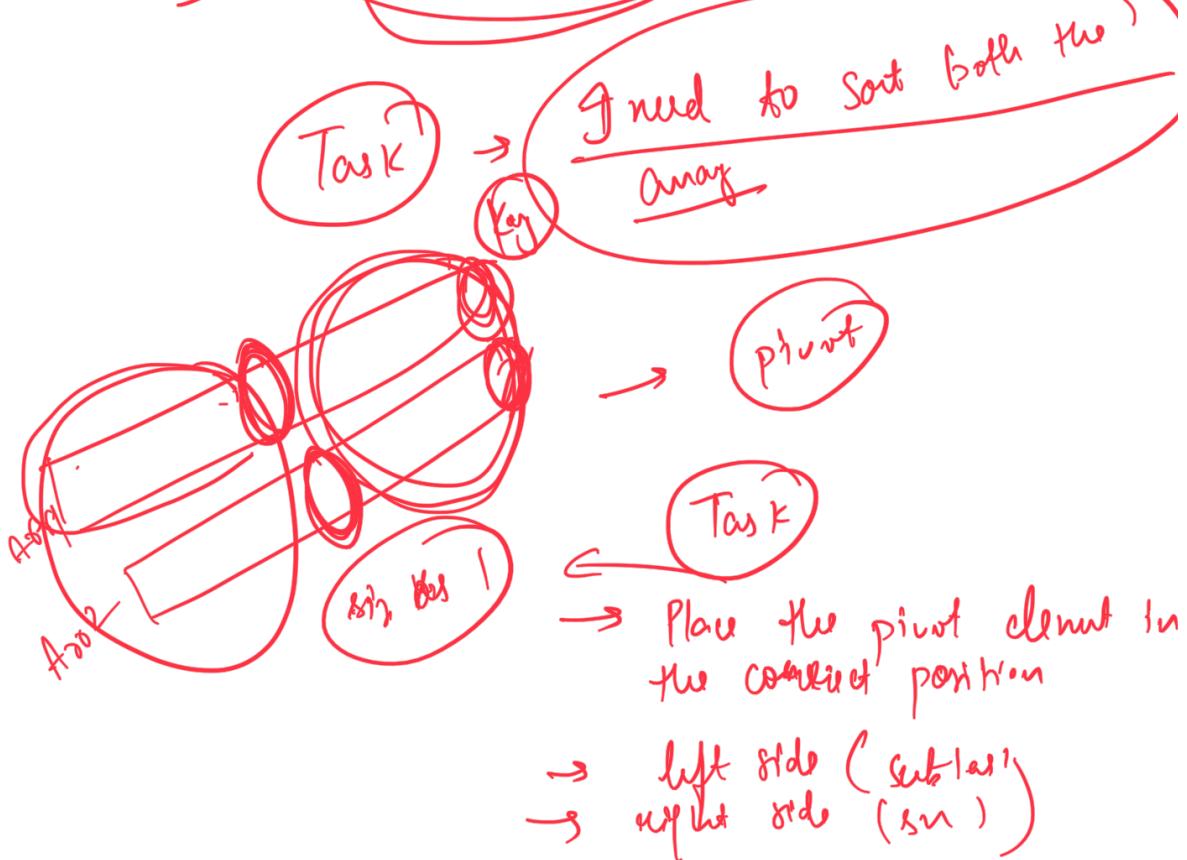
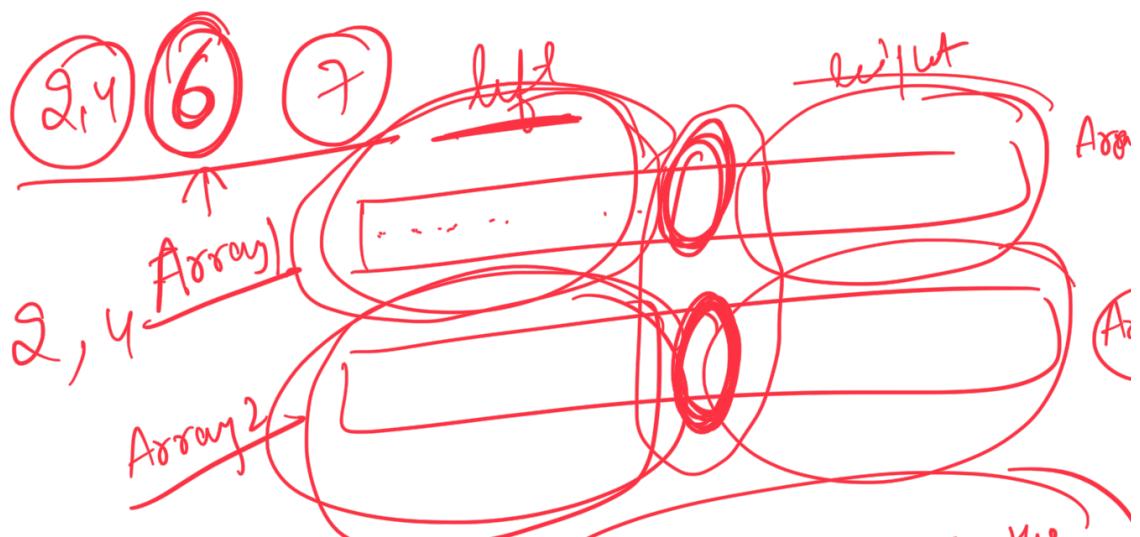
~~(13) 2 7 16 24 4 6~~  
~~6 16 7 13 2 24 4~~

6 7 2, 4

16, 13

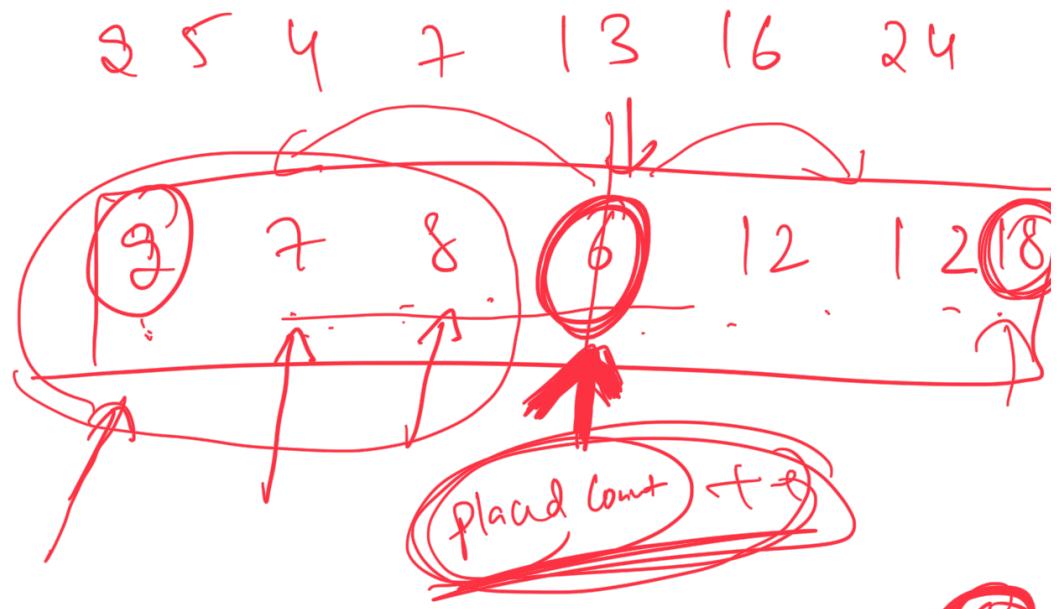
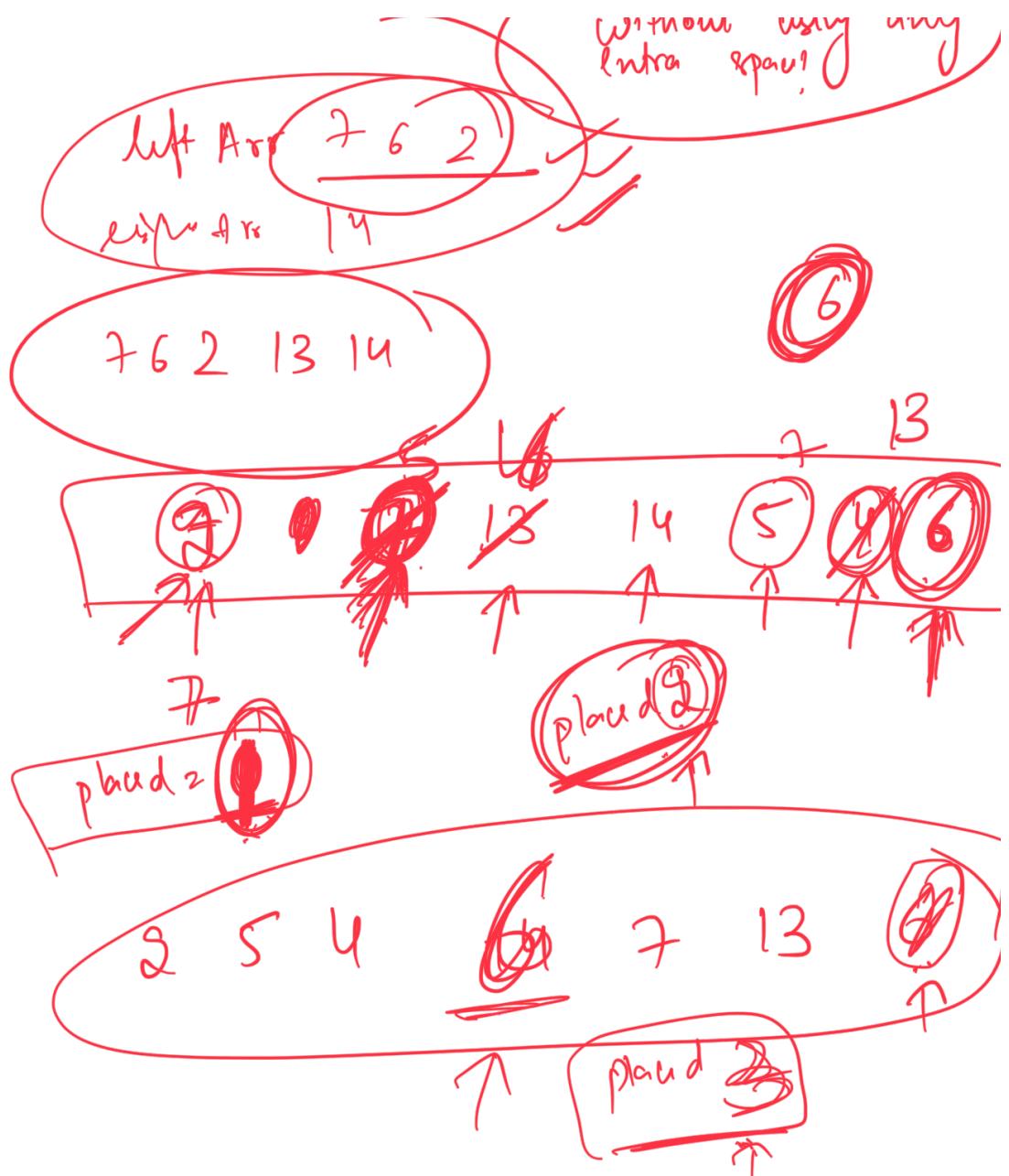


( 2 7 4 6 13 ) 14 16 )



3 14 6 7 13  
14 7 6 13 2

- Can I do it

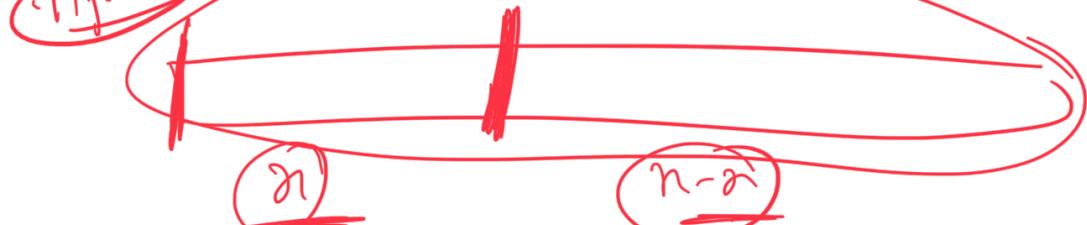


(6)



$$T(n) \geq 2T(n/2) + \underline{O(n)}$$

~~Algorithm~~  $T(n) = T(n) + T(n/2) + \underline{O(n)}$



$$T(n) = 2(T(n/2)) + \underline{O(n)}$$

---


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

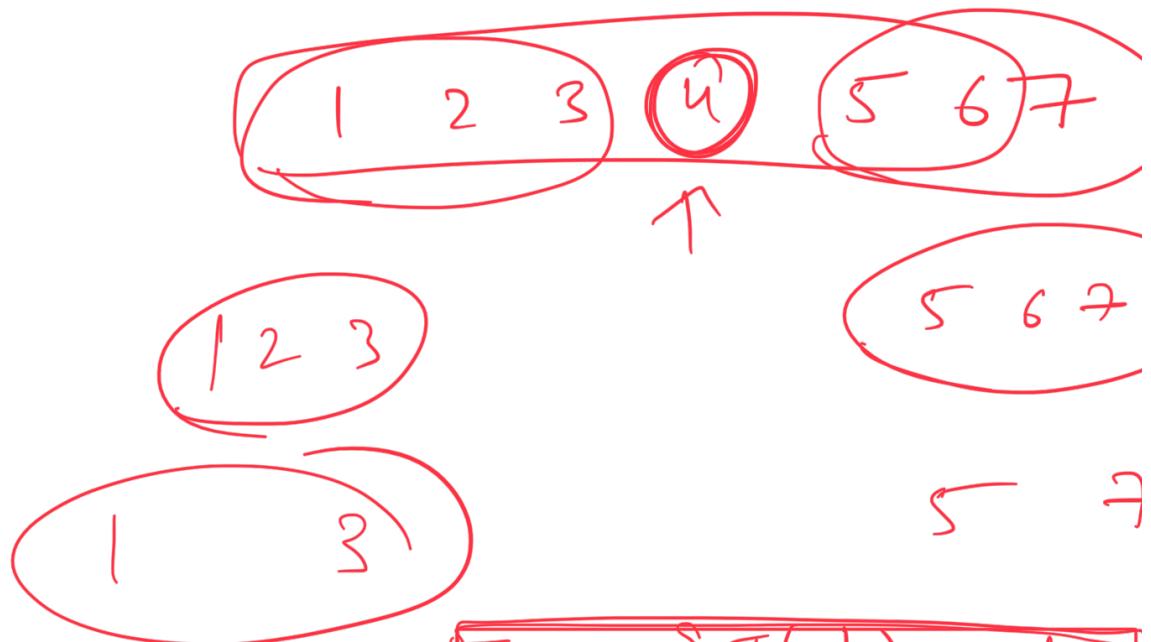

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$$nxn = O(n^2)$$

(pivot) = defines divide the complexity

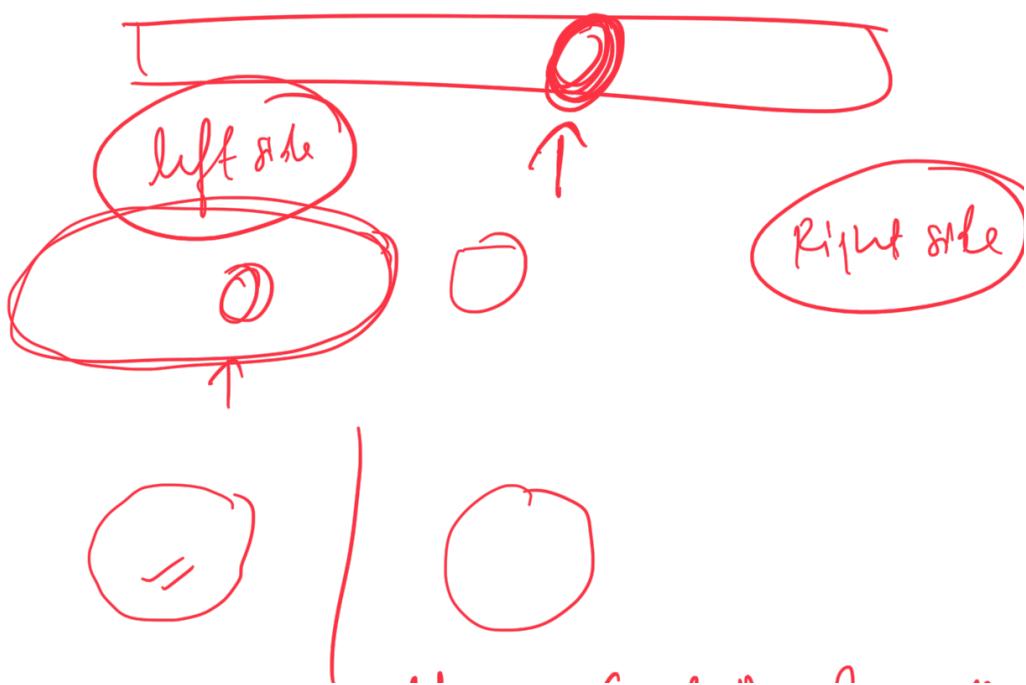
the algorithm



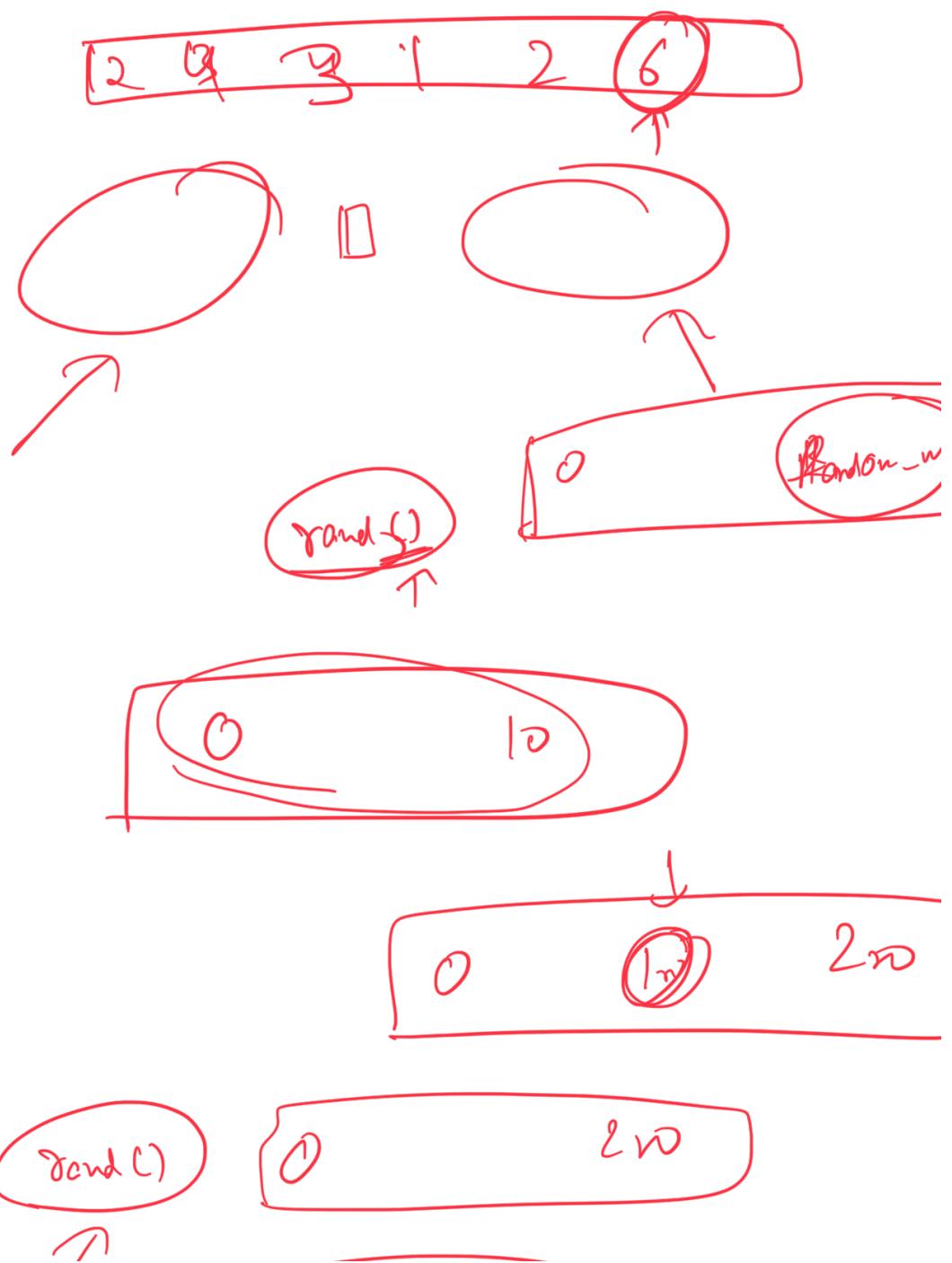
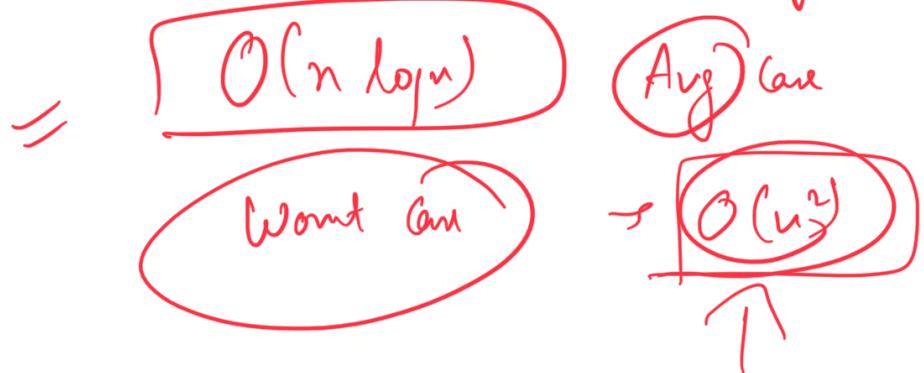
$$T(n) = 2T(n/2) + O(n)$$

$\boxed{= O(n \log n)}$

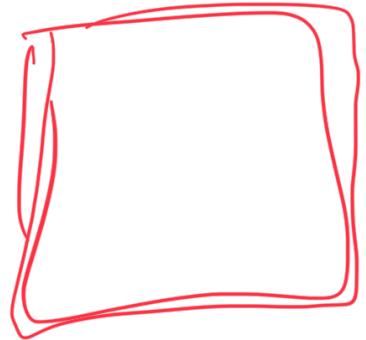
pivot =



deterministic complexity of the algo



1  
0 to



71%, 10

0 1 2 9 2

A hand-drawn red horizontal line with two wavy ends, representing a sequence of numbers. The numbers 0, 1, 2, 9, and 2 are placed at various points along the line.

9 10 10 10 1 2  
sum ↗  
grand

A hand-drawn red oval containing several numbers: 10, 10, 10, 1, and 2. A bracket labeled "sum" with an arrow points to the numbers 10, 10, and 10. Another oval labeled "grand" with an arrow points to the numbers 1 and 2.

random number

→ Quick sort  
→ Complexity  
→ Median of an array =

1 7 6 2 3 4

1 2 (3 4) 6 7      (3 5)

1 2 (3) 4 5      (3)

↑

1 7 6

$O(n \log n)$  for some  
→ It has only odd length

2 (Seed<sup>2</sup>) = (4)  
Random value

SHA

Infinity ↗



