

### C - Points in Segments

1 4 5 7 7 8 9 10 12 7 4 20  
0 1 2 3 4 5 6 7 8 9 10 11

F F F F T T T T T T T

1 4 4 5 7 7 7 8 9 10 12 20  
0 1 2 3 4 5 6 7 8 9 10 11

F T T T  
5 9 10 17  
0 1 2 3

lb(7) → 9

10 - 4 = 6

$[L, R]$   
 $[7, 15]$

Step 1: Do a sort on the array  $O(N \log N)$

Step 2: Lower Bound  $O(\log N)$

Step 3: Upper Bound  $O(\log N)$

Step 4: Difference  $O(1)$

$$[-2^{31} - 2^{31}]$$

$$(2^{31} + 1) \ll$$

Integer Overflow →

$\downarrow$

F T T

7 9 10

0 1 2

$$3/2 = 1$$

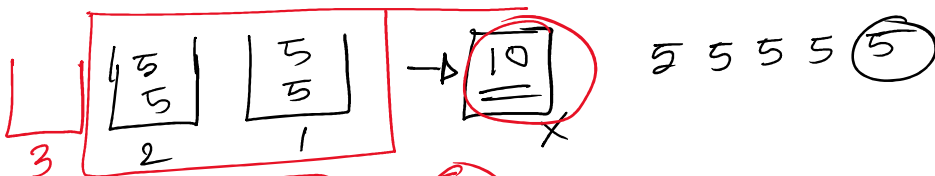
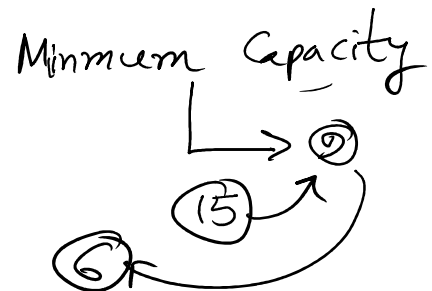
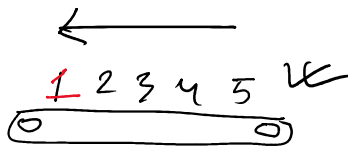
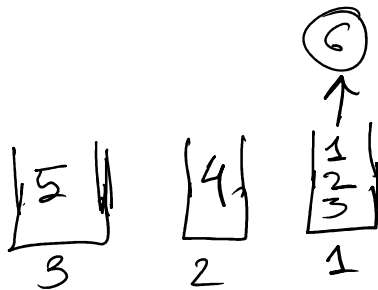
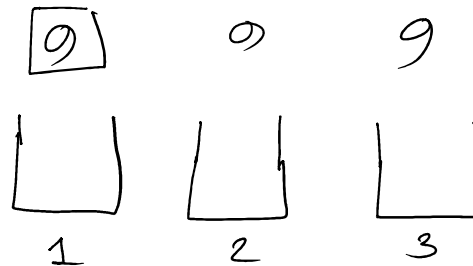
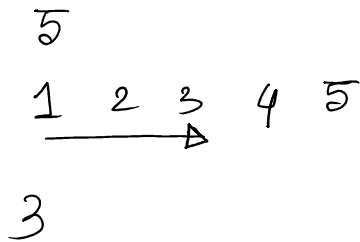
F	F	F	F	F	F	F	T	T	T	T	T	
1	4	4	5	7	7	7	8	9	10	12	20	
0	1	2	3	4	5	6	7	8	9	10	11	

↑

$$ub(7) = \begin{pmatrix} 8 \\ 7 \end{pmatrix}$$

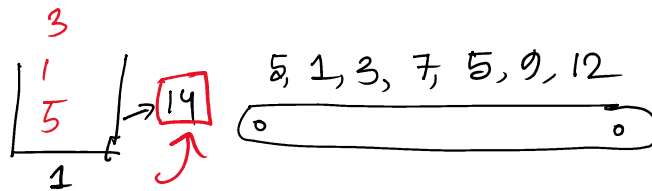
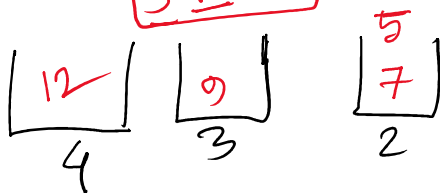
## Binary Search on a Range

E - Get the Containers

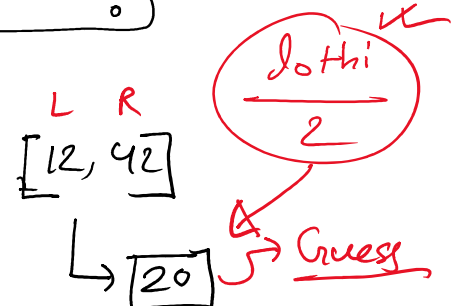


Min. Capa. =  

$$3 \geq 2 \rightarrow \text{F}$$



$$19 - 16$$

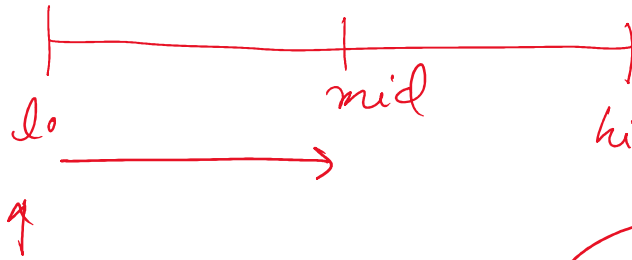


[12-16]



↳ [20] <sup>14</sup> → Guess  
14

✓  
[5 5 5 5 5]



$\begin{array}{c} 5 \\ |5| \end{array}$ 
 $\begin{array}{c} 5 \\ |5| \end{array}$ 
 $\begin{array}{c} 5 \\ |5| \end{array}$ 
 $\rightarrow 10$   
 3      1      2

(hi) ✗

$$\text{mid} = \frac{(lo + hi)}{2}$$

$$\text{mid} \leftarrow lo + \frac{(hi - lo)}{2}$$