

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

$d = 5$

order of the packages is

imp

Capacity  $\rightarrow$  Max wt the  
ship can carry

Minimum Capacity of the ship

Minimize the max wt. ship can carry

↗ ↘ ↗ ↘  
Ship

start  $\xrightarrow{\hspace{10em}}$  end  
 $\xleftarrow{\hspace{10em}}$   
1 day

tw=10

days left = 0/1/2/3/4

mid = 15

[1, 2, 3, 4, 5, 6, 7, 8, 9, 10]

Can the min capacity be 15 kg??

The bare min capacity should be max (weights)

# reduce it wq  
B.S

max weights

10

mid is the capacity  
we are trying for  
this step

Sum of the wts

↑ hi

mid

Can deliver  
within d day

Cannot deliver  
within  
d day

mid can be an  
go left &  
dec capacity

go right & inc capacity

max  $\xrightarrow{\quad}$  sum of cycles

$O(1)$

$$\log(\text{sum} - \text{max}) \approx \frac{\log \text{sum}}{n}$$

$O(n \log(\text{sum of cycles}))$

Space  $O(1)$

# minimize the maximum diff  $\rightarrow$  B.S

$$p_1 \rightarrow 2$$

$$p_2 \rightarrow 1$$

$$p_3 \rightarrow 6$$

Case 1

$$|x - y|$$

$\rightarrow$  absolute diff

$$|-7| \rightarrow 7$$

$$|7| \rightarrow \underline{7}$$

$$p_1 \rightarrow 3$$

$$p_2 \rightarrow 4$$

$$p_3 \rightarrow 5$$

Case 2

$$|x - y|$$

$\rightarrow$  very high

$$x \leftarrow y$$

$\rightarrow$  very low

$$\frac{x+y}{2} \rightarrow \underline{\underline{5.5}}$$

[10, 1, 2, 7, 1, 3]

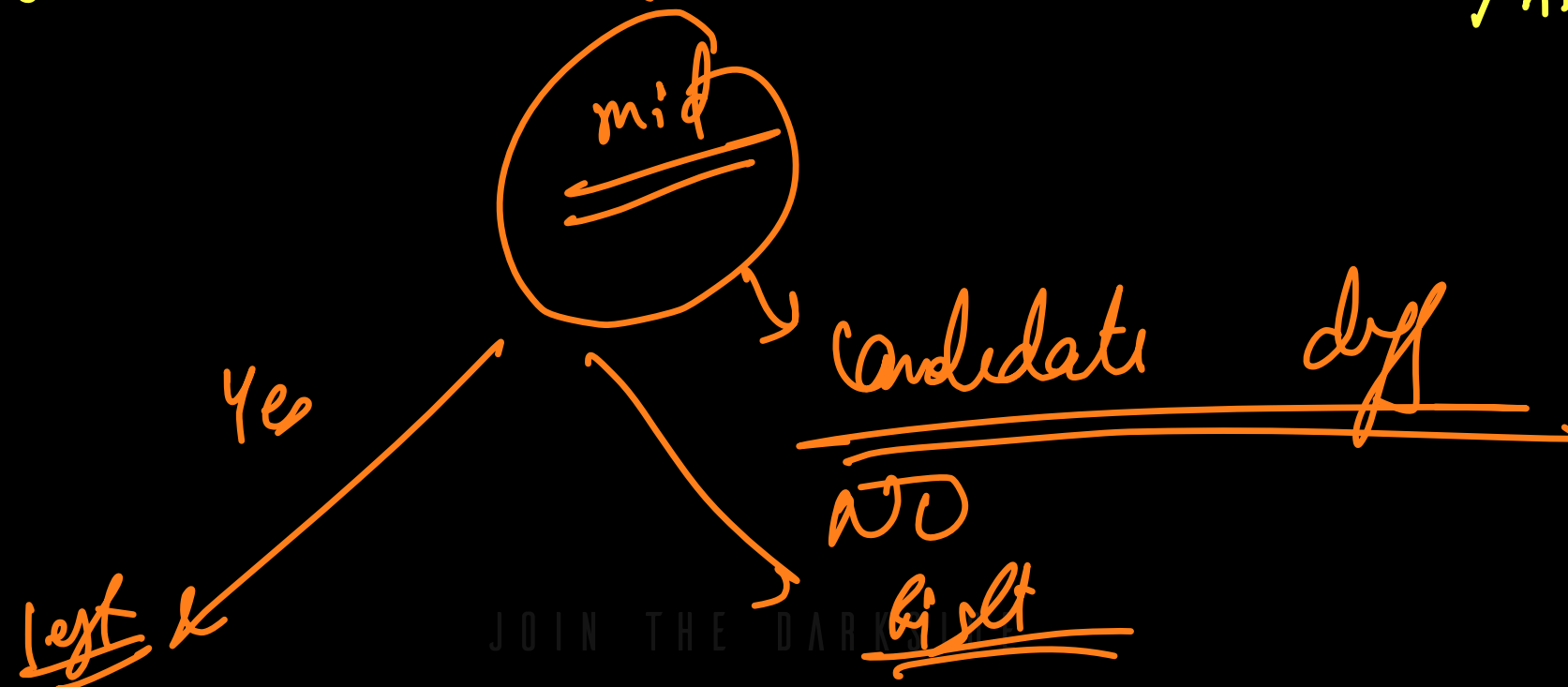
Sort

① ↗ [1, 1, 2, 3, 7, 10]

at least  $k$  pairs with  
abs diff  $\leq$  mid

② → 0  
↑<sub>lo</sub>

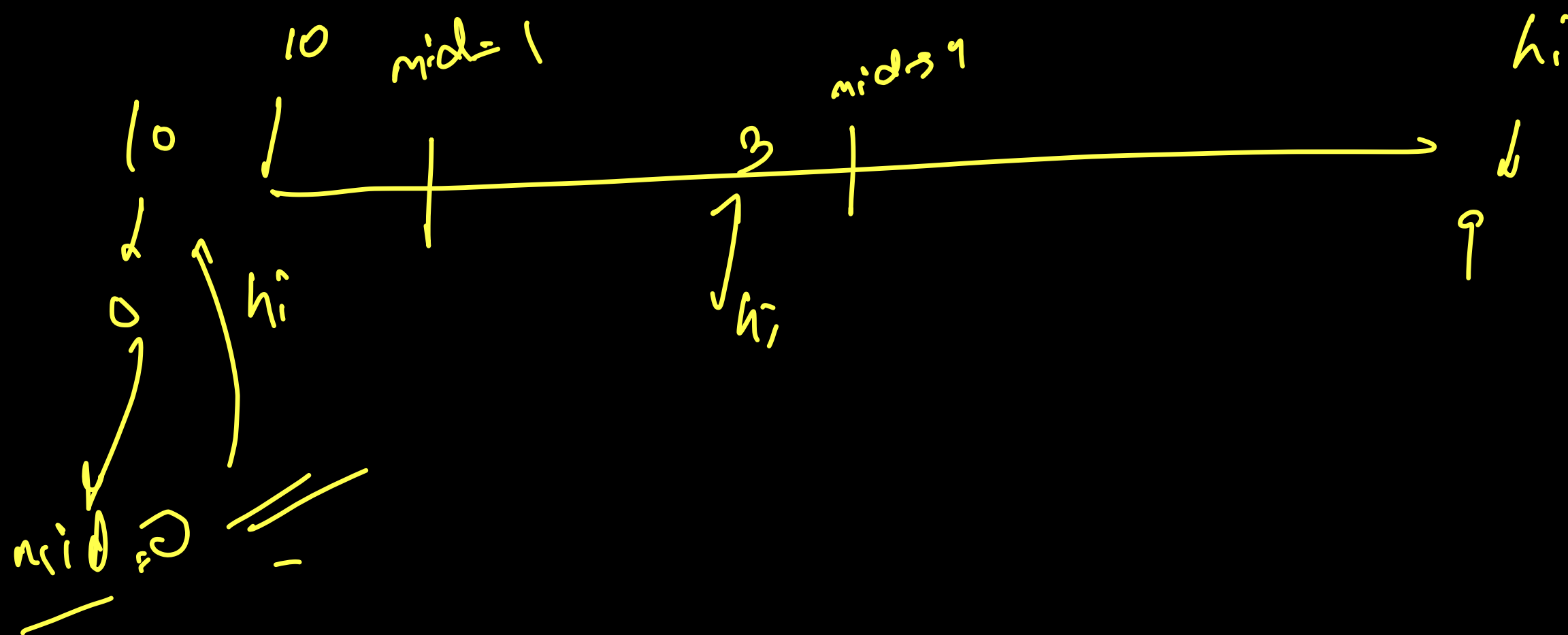
|max el - min el|  
↑<sub>hi</sub>



min the max diff

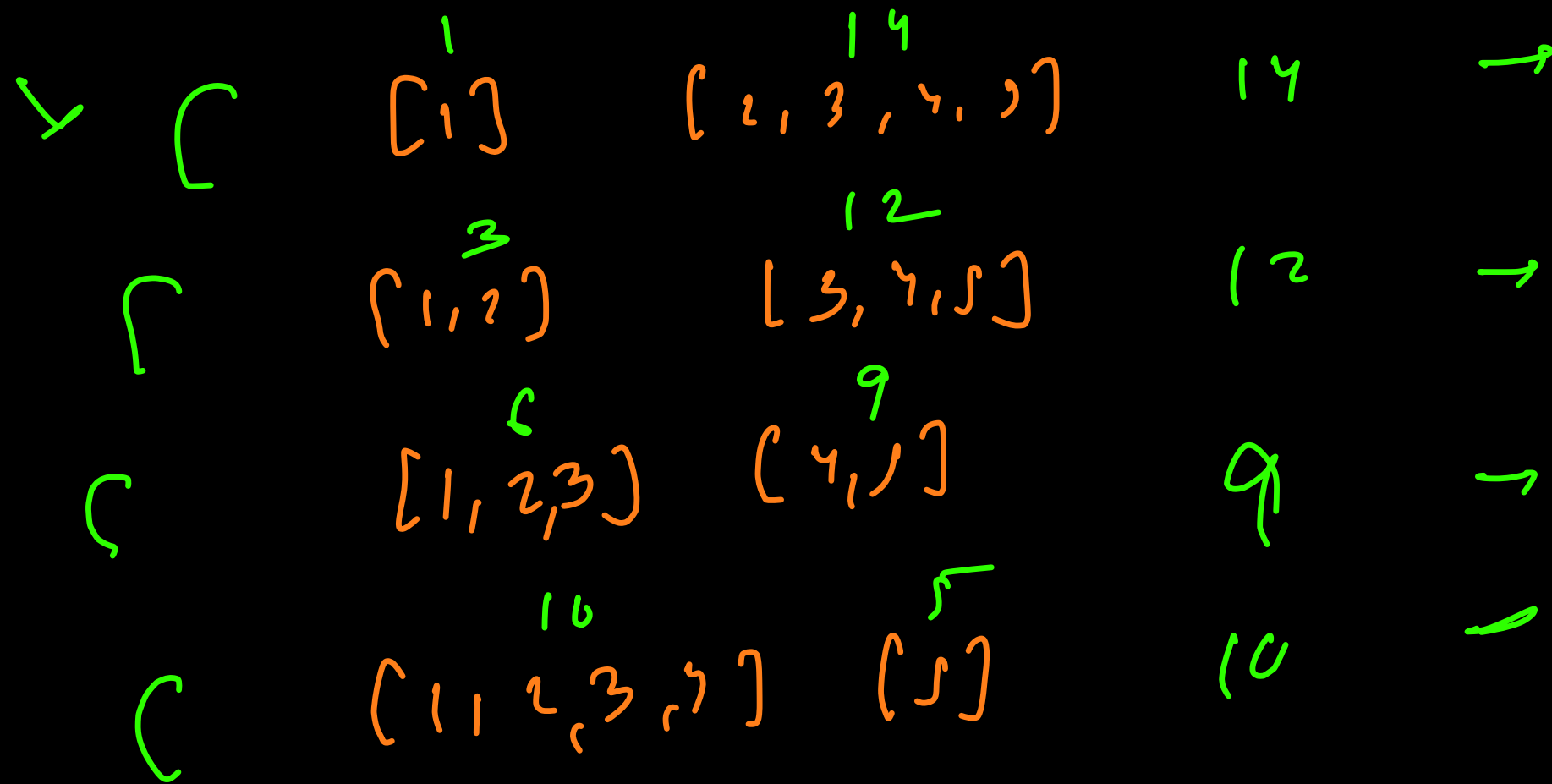
pr2  
array

[1, 1, 2, 3, 7, 10]



[1, 2, 3, 4, 5]

k=2



9 ✓✓

we need to find the least max sum.



max dist

↑  
10

Sum of array

h<sub>i</sub>

↑

←

mid

→

are we able to split the array into 10 subarrays such that largest subarray sum  $\leq$  mid

yes

No

⇒

possible answer

go

left

go right