



~~int mid = (start + end) / 2;~~      int overflow  
~~int mid = start + (end - start) / 2;~~      overflow  
~~int mid = end + (start - end) / 2;~~      overflow  
~~(Bad habit)~~      merge sort  
~~int = 4 byte = 32 bit~~      start, end  
~~2 bit~~      0  
~~2 bit~~      1  
~~1 1~~      2  
~~1 0~~      3  
~~0 1~~      4  
~~0 0~~      5

Diagram illustrating a vector in a 2D coordinate system. The vector is labeled with a circled '2' and a circled '3'. The start point is labeled 'Start' and the end point is labeled 'end'. The vector is labeled with a circled '2' and a circled '3'.

$$\text{mid} \Rightarrow \left[ \text{start} + \frac{(\text{end} - \text{start})}{2} \right]$$

$1M \rightarrow 4 \text{ bytes} \Rightarrow 32 \text{ bits}$

Star + end  $\rightarrow$  int overflow  
 int  $=$  26if (i)  $\leftarrow$  stop  
 $\Rightarrow$  example  
 mid  $\Rightarrow$  110  $\rightarrow$  3 YES  
 mid  $\Rightarrow$  01  $\rightarrow$  1

0 1 2 3 4 5 6  
 [1, 2, 3, 3, 3, 4, 5]

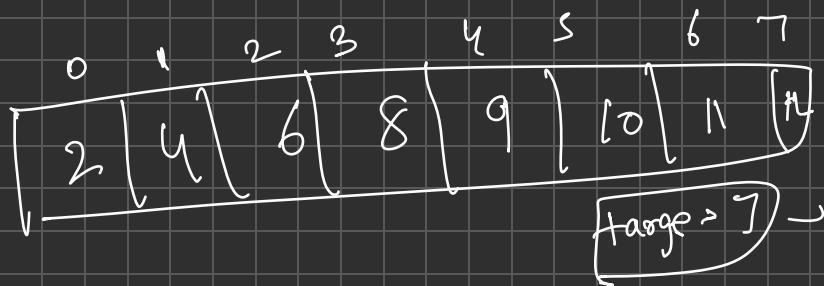
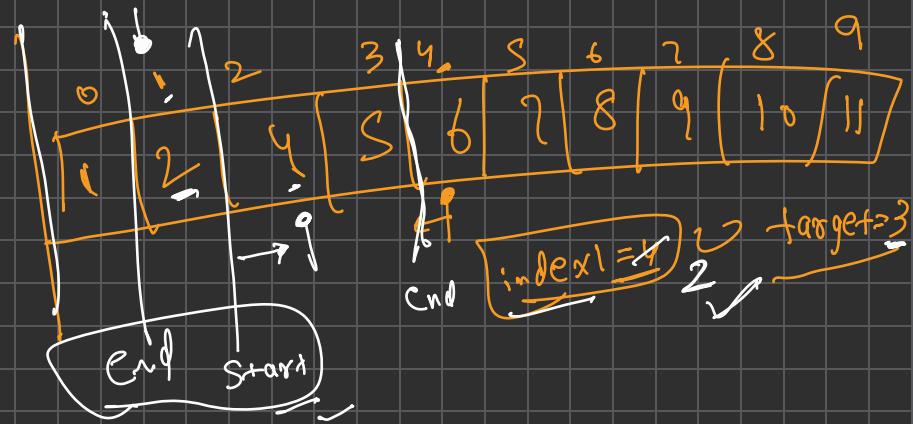
target = 3

start = 0

end = 6

first index  
 mid = [ first index > 2 ]  
 last index = 3.  
 2 times  
 Binary Search

0 1 2 3 4 5 6 7 8  
 [2, 3, 5, 6, 7, 8]  
 target = 4  
 start = 0  
 end = 6  
 mid = 2  
 2 times  
 Binary Search



0	1	2	3	4	5
2	4	6	8	10	

index = 5

ans.size

target = 12