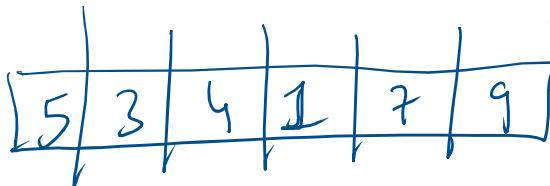


$\rightarrow$  Algorithms

# Linear search

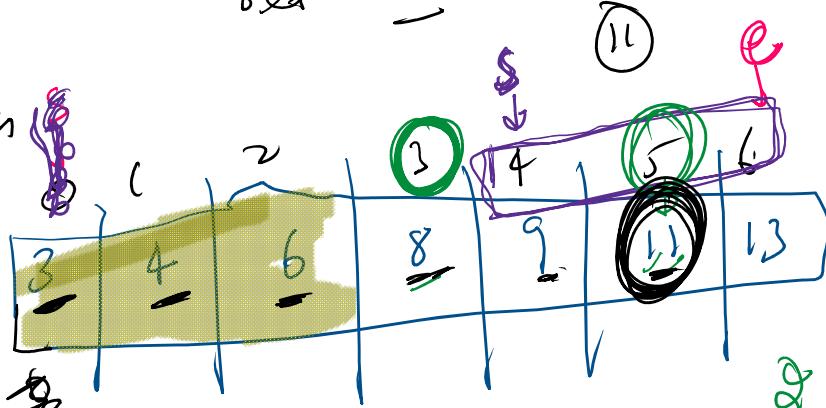
 $\rightarrow O(n)$  $t=7$ 

(-1)

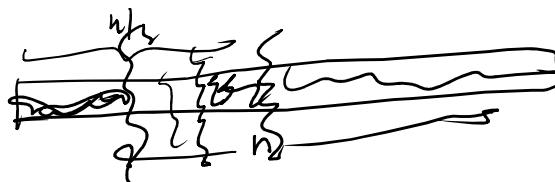
$\rightarrow$  find position of the target element in the given array. If the element is not present set  $-1$ .

# Binary Search

lower limit  
upper limit



$$\text{mid} = \left( \frac{l+r}{2} \right)$$

 $\rightarrow O(\log n)$  $t=11$  $O(\log n)$  $\log n$ 

$$n \rightarrow n/2 \rightarrow n/4 \rightarrow \dots \rightarrow 1$$

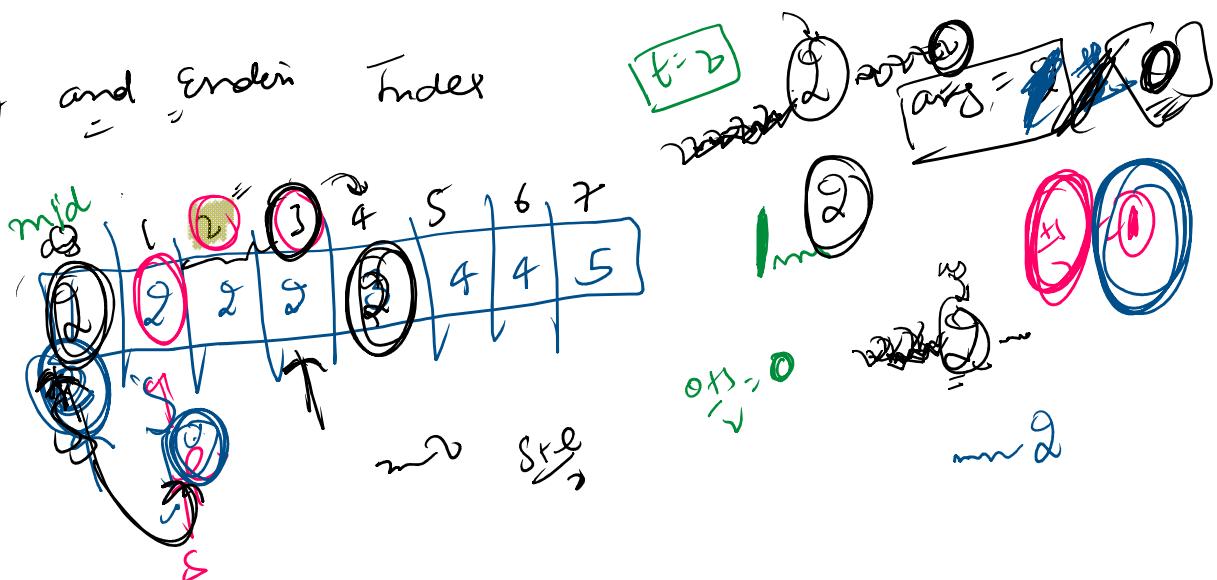
$$\rightarrow \text{for } i = n, i \geq 1, i \leftarrow i/2$$

$$O(n) \rightarrow O(\log n)$$

③ whenever question is on array and expected T.C is log<sup>n</sup>  
 think binary search.

④ When the loop of Binary search ends, 'S' tells the position of the target agar woh array mein present ho ta

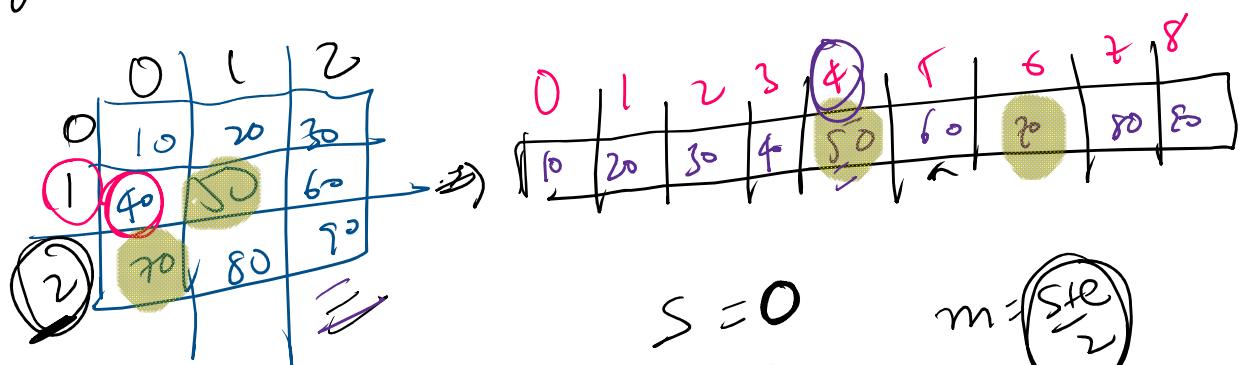
# Starting and Ending Index



# Binary search on 2D matrix

mn

l

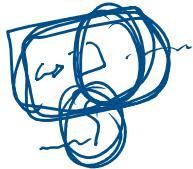
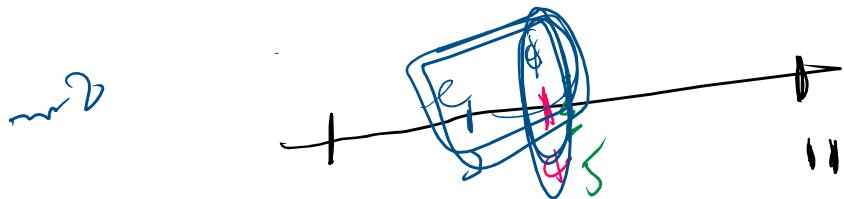


$$\left[ \frac{mid}{m}, \frac{mid+1}{m} \right]$$

1, >

$\leftarrow$   $\frac{4}{3}$   $\Rightarrow$

# Square root of a Number



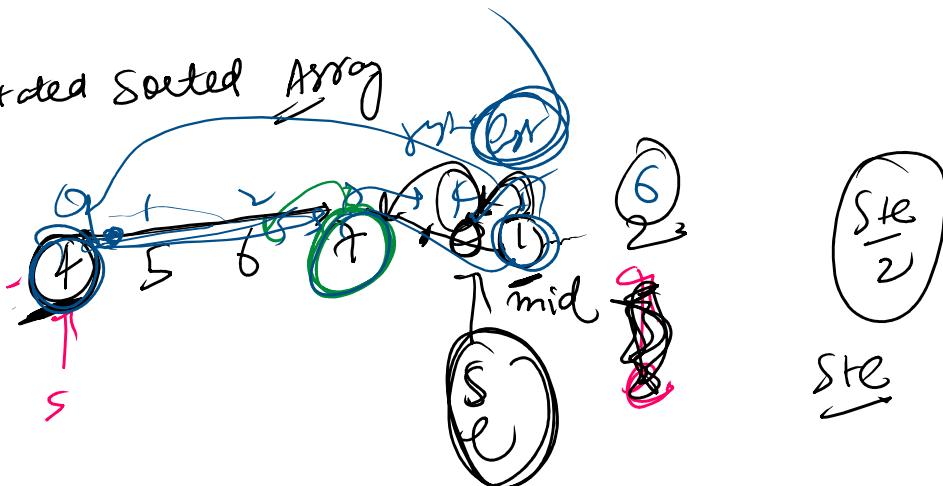
$$\text{int mid} \rightarrow \left\lfloor \frac{s + e}{2} \right\rfloor$$

$\text{int mid} = s + \frac{e - s}{2}$

avoids overflow

$s + e - s = \frac{s + e}{2}$

# Min in Rotated Sorted Array



$\text{mid} \leftarrow \text{mid}$   $\Rightarrow$

↑

↑

