

# Binary search Interview problems



# Ques: Peak index in mountain array

```
arrli-1] < arrli] > arrli1)
               mid = 10 + (hi-lo)/2;
              if (arr[mid] > arr[mid+1] Le arr[mid] carr[mil-i])
                      return mid;
               else if (arr[mid] > arr[mid+1]) hi = mid-1;
                elle 20 = midt
```



# Ques: Search in Rotated Sorted Array

## Ques: Search in Rotated Sorted Array

```
0 1 2 3 4 5 6 7
6 8 20 28 33 1 3 4
Lo mid hi
```

```
if (arr[mid] < arr[mid-1] & arr[mid] < arr[mid+1]

if (arr[mid] > arr[mid-1] & arr[mid] > arr[mid+1]

if (arr[mid] > arr[hi]) & = mid+1

if (arr[mid] < arr[hi]) hi = mid-1
```



# Ques: Search in Rotated Sorted Array

```
0 1 2 3 4 5 6 7
6 8 20 28 33 1 3 4
pivot
```

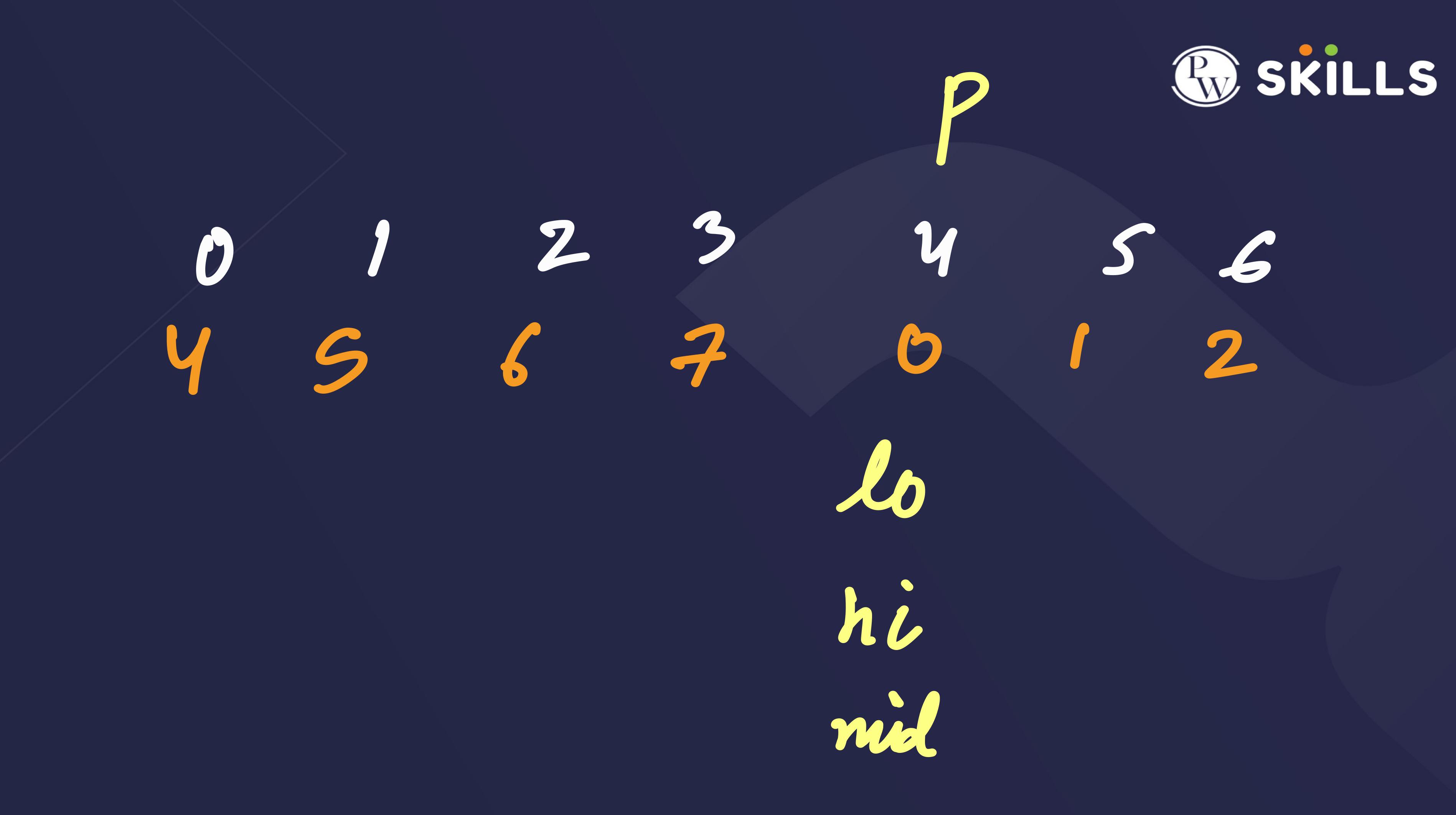
```
// 4 5 6 7 0 1 2
int n = nums.size();
int lo = 0;
int hi = n-1;
// finding pivot element / index
int pivot = -1; // smallest element
while(lo<=hi){
    int mid = lo + (hi-lo)/2;
    if(nums[mid]<nums[mid+1] && nums[mid]<nums[mid-1]){
        pivot = mid;
        break;
    else if(nums[mid]>nums[mid+1] && nums[mid]>nums[mid-1]){
        pivot = mid + 1;
        break;
    else if(nums[mid]>nums[hi]) lo = mid + 1;
    else hi = mid - 1;
```





1 Co

```
if(target>=nums[0] && target<=nums[pivot-1]){</pre>
    lo = 0;
   hi = pivot-1;
   // normal binary search
   while(lo<=hi){
        int mid = lo + (hi-lo)/2;
        if(nums[mid] == target) return mid;
        else if(nums[mid]>target) hi = mid - 1;
        else lo = mid + 1;
                              taraet = 0
else{
    lo = pivot;
   hi = n-1;
   // normal binary search
   while(lo<=hi){
        int mid = lo + (hi-lo)/2;
        if(nums[mid] == target) return mid;
        else if(nums[mid]>target) hi = mid - 1;
       else lo = mid + 1;
```



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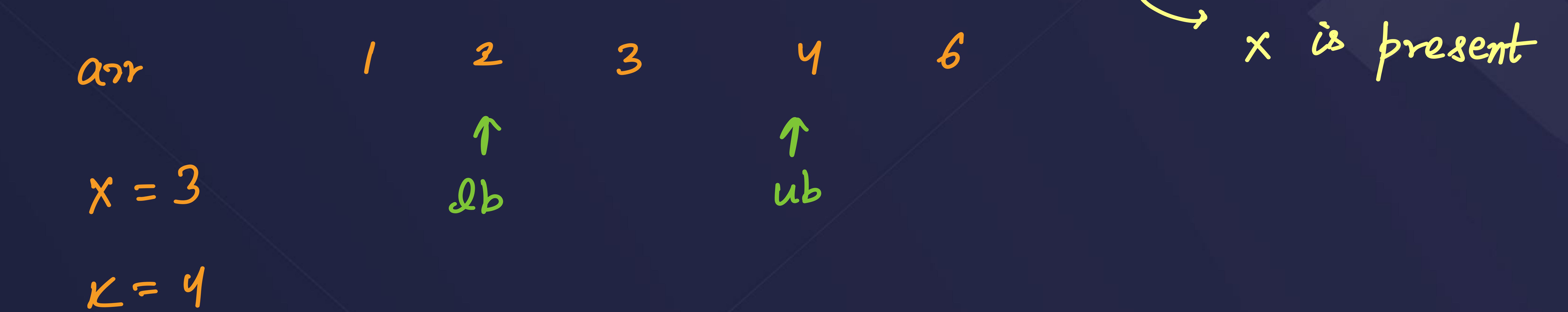
If array was already Sorted, then you wont find the pivot Dement



arr 3

target =





# Leetcode 658]

Case-2 9t 'X is not present in array

$$arr = 12346$$

$$x=5$$

$$k=2$$

### Leetcode 658]

Case-4 arr = 1 3 5 7 9 11
$$X = 3 \qquad 1 \\ K = 5$$



Case-5 of element is < nums [0]

$$am = 1 2 3 4 5$$
 $X = -1$ 
 $V = 1, 2, 3, 4$ 



Case-6 If 
$$x = mim_{1}[n-1]$$
 $an = 12345$ 
 $x = 7$ 
 $x = 3$ 
 $x = 4$ 
 $x$ 

# Dry Run

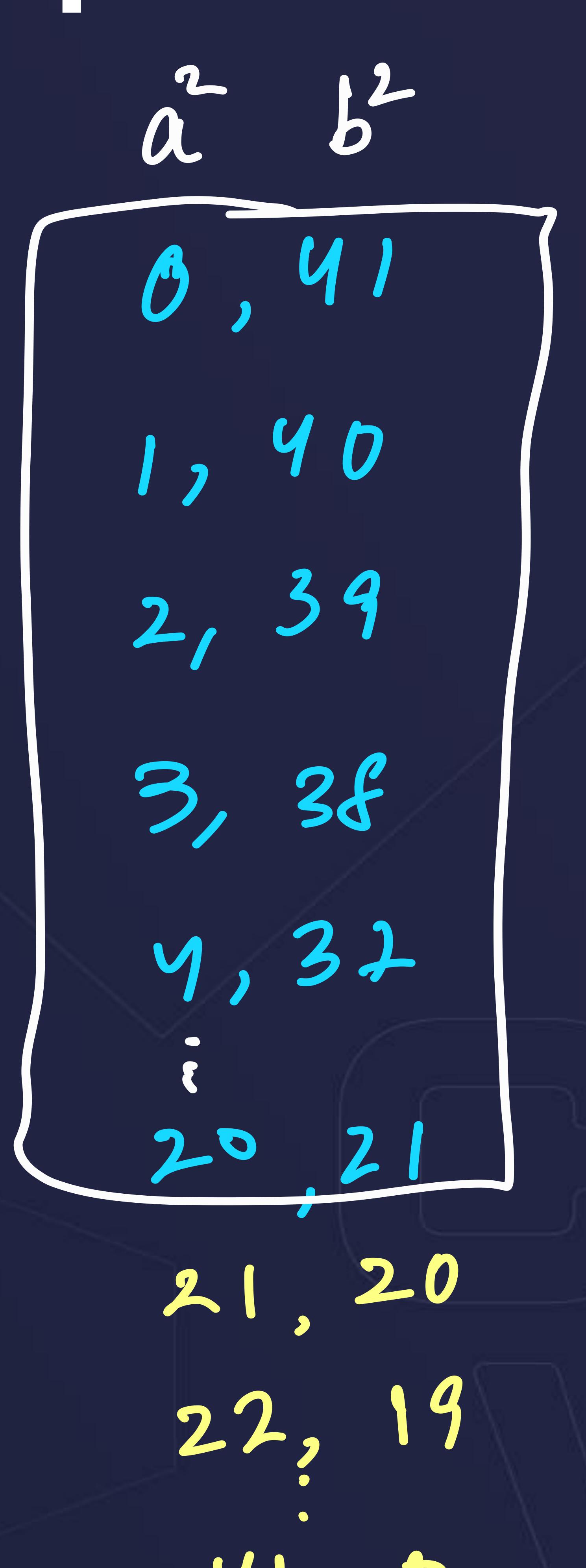
```
THE LU = U;
int hi = n-1;
bool flag = false; // if x is present in arr or not
int t = 0; // representing index of ans
int mid = -1;
// binary search
while(lo<=hi){
    mid = lo + (hi-lo)/2;
    if(arr[mid] ==x){
        flag = true; // present
        ans[t] = arr[mid];
        t++;
        break;
    else if(arr[mid]>x) hi = mid - 1;
    else lo = mid + 1;
int lb = arr[hi];
int ub = arr[lo];
if(flag==true){
    lb = mid-1;
    ub = mid+1;
```

```
10/10/16
  vector <int> ans (1) = 5
```

$$-3 \quad c = 41$$

$$a^2 + b^2 = c$$

$$1$$



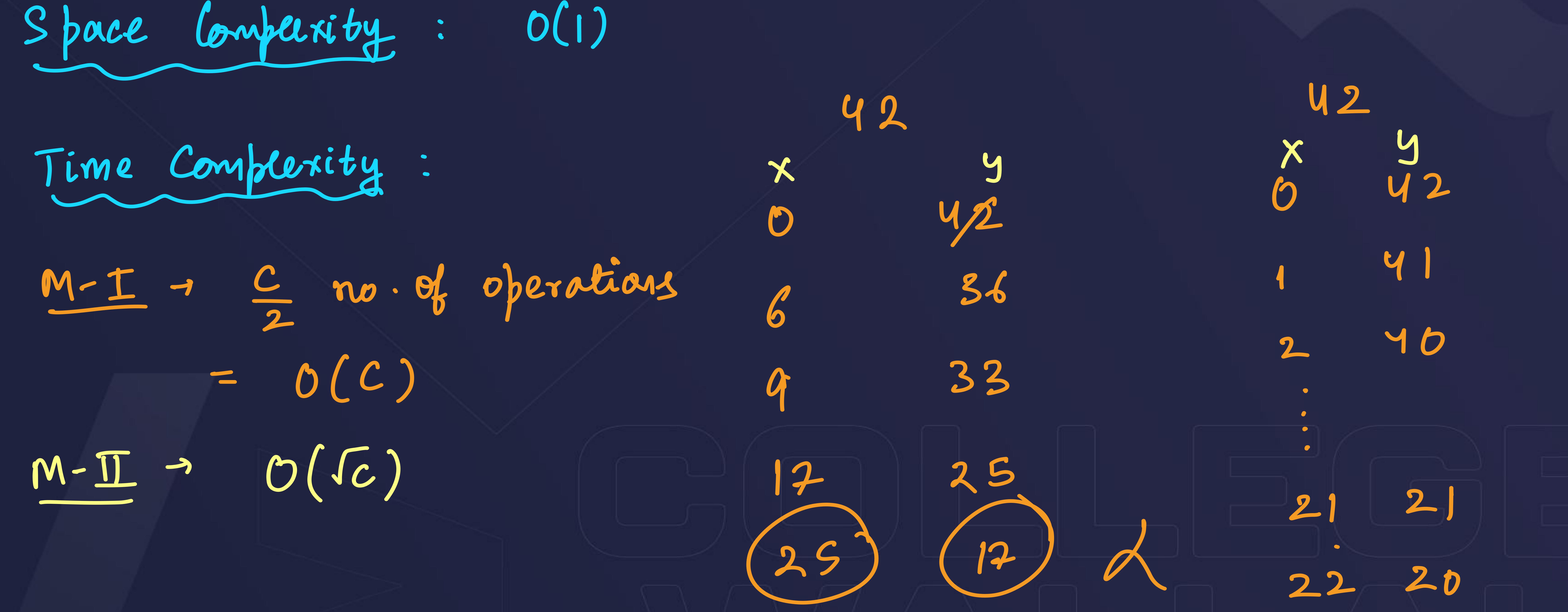
$$a^{2}+b^{2}=c$$

$$x = b, y = c$$

$$T \cdot c \rightarrow O(c) \rightarrow Gandi$$
Shai

$$c = 41$$
  $x = 9$  \$ 9 16  
 $|oop \ y = 41$  36 3/2 25  
if  $(is PS(x))$  & is  $PS(y)$  return true;  
else if  $(is PS(y))$  {  
 $y = sqrt(y)$  \*  $sqrt(y)$ ;  
 $x = c - y$ ;  
 $sqrt(x)$  \*  $sqrt(x)$  \*





$$C=7$$

X

Y

O

T

3

4

4

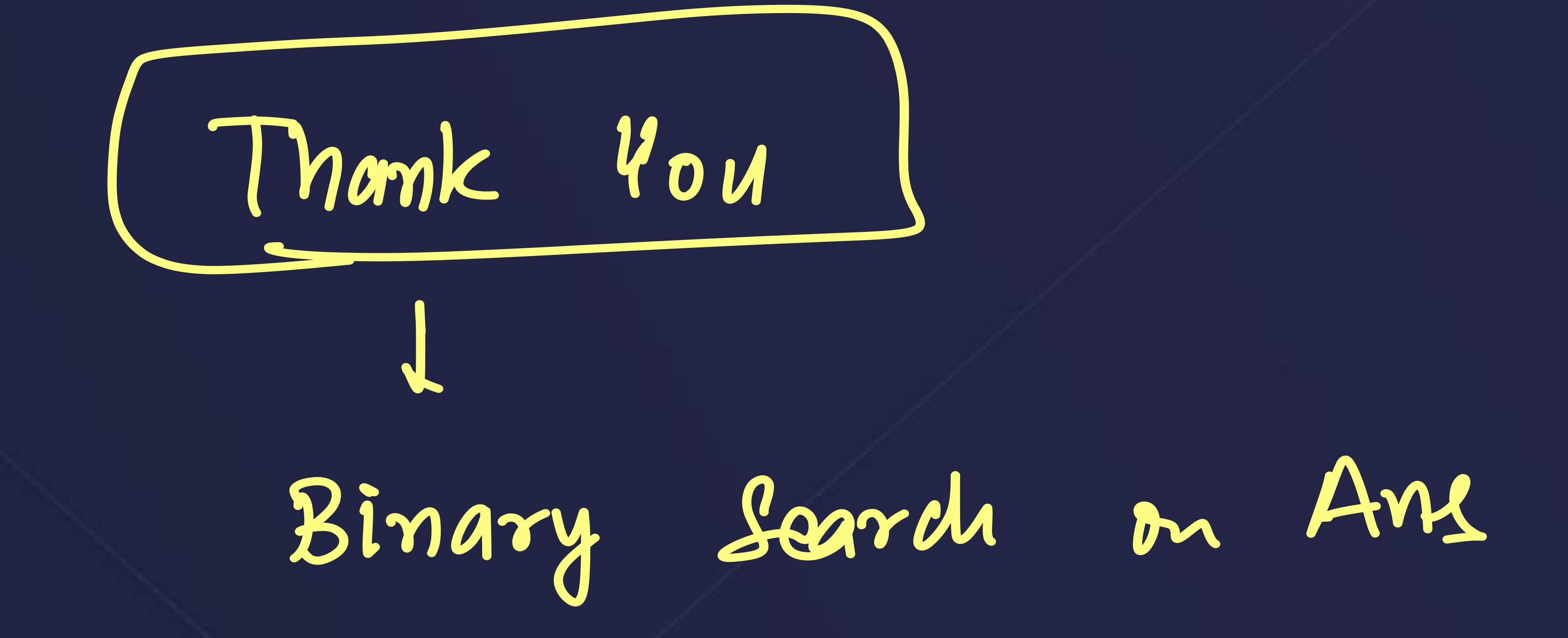
5

C+1 operations



# [Leetcode 633]







$$mid = 2$$

$$m = 2 + 2$$

$$count = 01$$



# THANKYOU