n 7

Arrange Numbers

0	1	2	3	4	5	6
1	3	5	7	6	4	2

left right counter:

```
left=0 , right = n-1
counter = 1;

while ( left <= right )
{
    if (counter % 2 == 1)
    {
        arr[left] = counter;
        left++; counter += 1;
    }
    else {
        arr[right] = counter
        right--;
        counter ++;
    }
```

Acha Question hai

Important Questions

1. Arrange array // O(n)
2. Duplicate element // O(n)

Unique Element

$0 \wedge 0 = 0$

$1 \wedge 1 = 0$

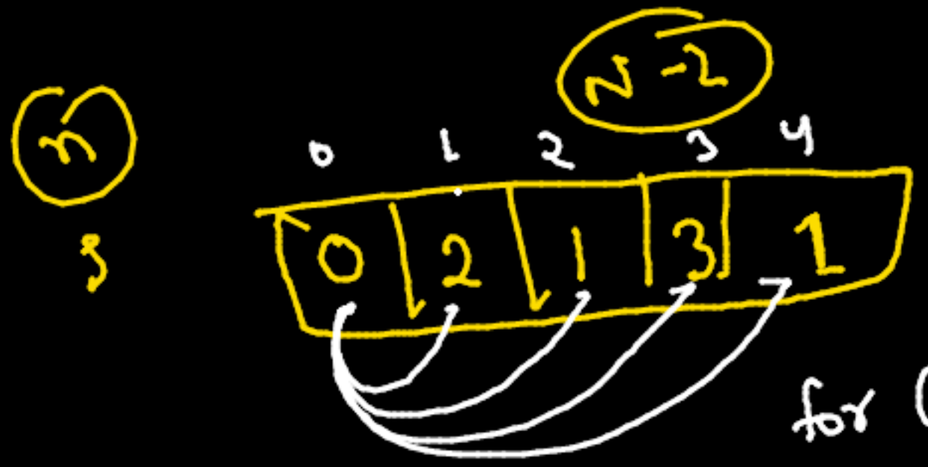
$0 \wedge 1 = 1$

$1 \wedge 0 = 1$

unique element


```
int uni = 0
for(i = 0 → i < n)
    uni ^= arr[i];
return uni;
```

Find Duplicate



$O(n^2)$

```
for (int i=0; i<n; i++)
{   for (int j=0; j<n; j++)
    {   if ( i !=j  &&  arr[i] == arr[j])
            return arr[i]
    }
}
```

find duplicate

N-2

0	1	2	3	4
3	0	1	2	1

N

5 O(n)

```
int temp[n];
for (int i=0; i<n; i++)
{
    temp[arr[i]]++;
}
```

3 0 1 2 1

i = 0 1 2 3 4

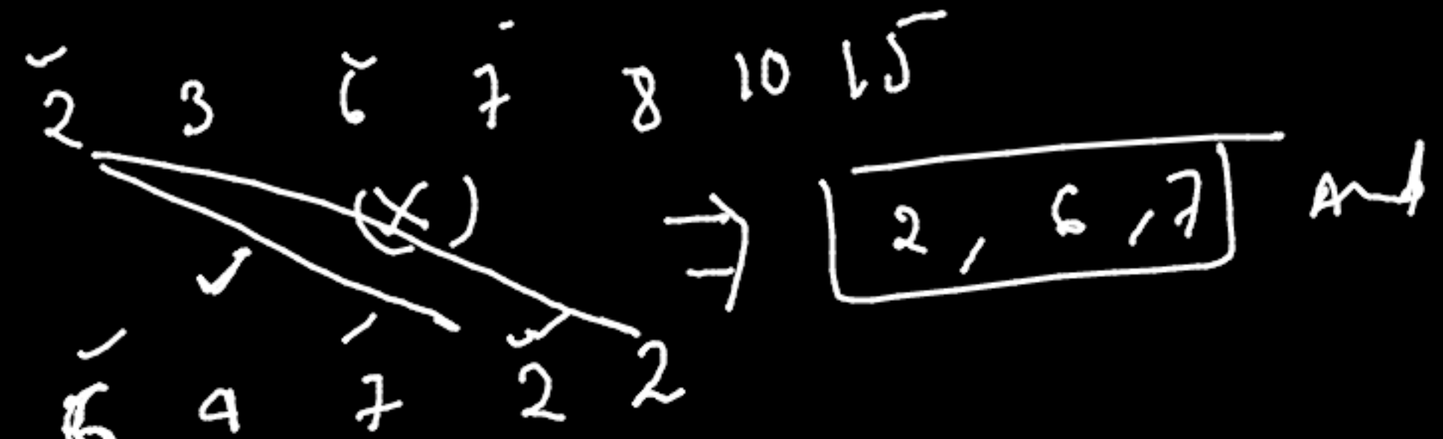
temp

0	1	2	3	4
0	0	0	0	0
1	2	1	1	

```
for(int i=0; i<n; i++)
    if(temp[i]==2)
        return i;
```

Intersection of Two array

Common



Two loop

$O(n^2)$

arr1

2 4 8 5 4 3

arr2

4 3 7 1

∃ sort

(M) 2 3 4 5 6 8 → i = 0

(N) 2 3 4 7 → j = 0

O(n) Solution

```
while (i < M && j < n)
{
    if (arr1[i] == arr2[j])
    {
        cout << arr1[i];
        i++; j++;
    }
    else if (arr1[i] > arr2[j]) {
        j++;
    }
    else {
        i++;
    }
}
```

Pair Sum

target $O(n^2)$

7

(1,6) (3,4) (3,4) (2,5) (5,2) (4,3)

(3,4)

2, 8, 10, 5, -2, 5

(2,8) (5,5)

Two Loop

count = 0;
i = 0; i < n;

j → i + 1; j < b

if (arr[i] + arr[j])
count ++;

Pair Sum $O(n \log n)$

1 2 6 2 8 4 5 2 4

⇓

1 2 2 3 3 4 4 5 6

target = 7

7 - 1 = 6

sort

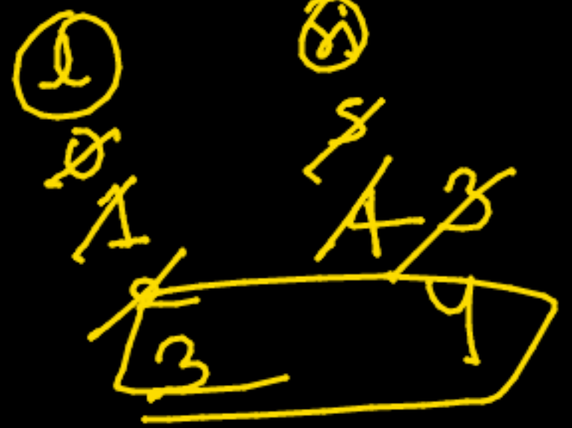
```
int cnt=0
for (int i=0 ; i<n-1 ; i++)
{ int k = target - arr[i];

    auto u = upper_bound (arr+i+1, arr+n, k)
    auto l = lower_bound (arr+i+1, arr+n, k)

    cnt += (u - l);

}
return cnt;
```

Sort 0 _1



left = 0, right = n-1;

while (left <= right)

{ if (arr[l] == 1 && arr[right] == 0)

swap (arr[l], arr[r]; left++, right--

else if (arr[l] != 0)

left++;

else if (arr[right] == 1) right--