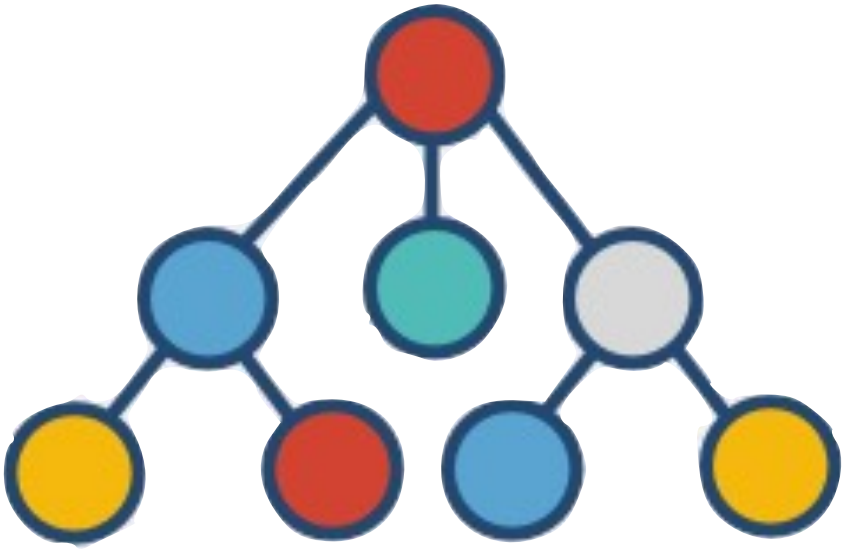
DATA STRUCTURE & ALGORITHMS



(By Prince Agarwal)

(“HELLO WORLD”)

INTERVIEW PREPARATION

- **Median of Two sorted arrays**

arr[] = [1, 2, 3, 4, 5] **N = 5**

brr[] = [3, 4, 5, 6, 7, 8] **M = 6**

Merge : [1, 2, 3, 3, 4, 4, 5, 5, 6, 7, 8] **Total : 11**

Median: **If Odd Number of Element**

Then MIDDLE element is MEDIAN

If Even Number of Element

Then Average of Both MIDDLE element is MEDIAN

Hello world

INTERVIEW PREPARATION

Median of Two sorted arrays

arr[] = [10, 20, 30, 40, 50] N = 5

brr[] = [5, 15, 25, 35, 45] M = 5

Merge : [5, 10, 15, 20, 25, 30, 35, 40, 45, 50] Total : 10

Median: (25 + 30) / 2 = 27.5

Hello world

INTERVIEW PREPARATION

- **Median of Two sorted arrays**

arr[] = [10, 20, 30, 40, 50] N = 5

brr[] = [5, 15, 25, 35, 45] M = 5

NAIVE SOLUTION:

1) Create an Array Temp[] of size (n+m)

2) copy Element of arr[] and brr[] in temp[]

3) sort temp[]

4) if (n+m) is odd then return middle of temp

5) Else return Average of middle two elements

temp[]

[10, 20, 30, 40, 50, 5, 15, 25, 35, 45]

[5, 10, 15, 20, 25, 30, 35, 40, 45, 50]

(n+ m) = 5 + 5 = 10 Is even

Return —> (25+30)/2 = 27.5

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INTERVIEW PREPARATION

Median of Two sorted arrays

Just Assume: N <= M

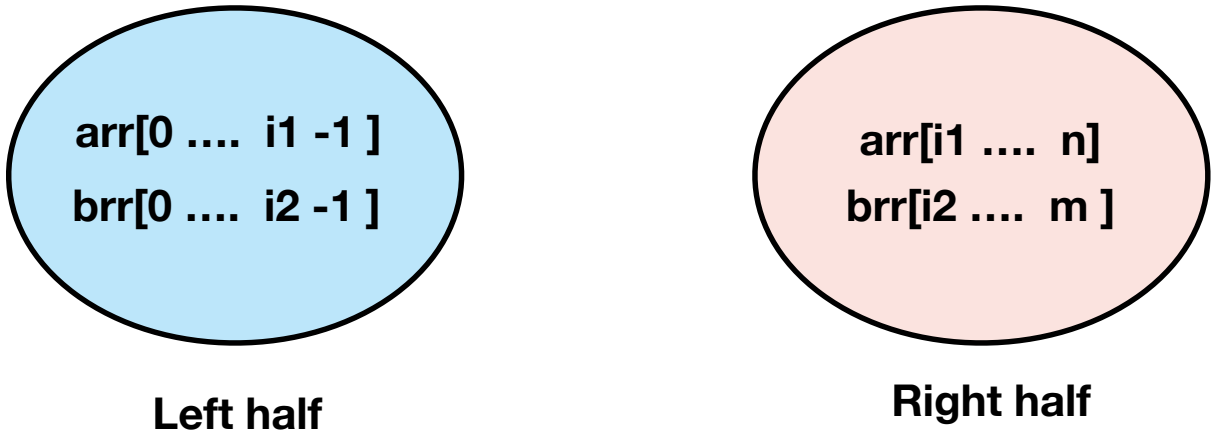
arr[] = [10, 20, 30, 40, 50] N = 5

i1

EFFICIENT SOLUTION:

brr[] = [5, 15, 25, 35, 45, 55, 65, 75, 85] M = 9

i2



$$i2 = (n+m+1) / 2 - i1$$

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INTERVIEW PREPARATION

Median of Two sorted arrays

Just Assume: N <= M

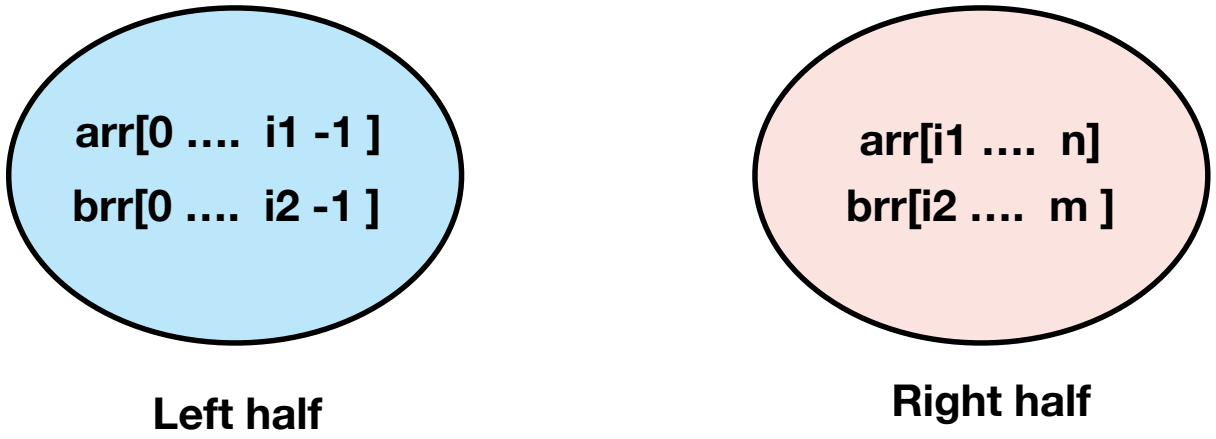
arr[] = [10, 20, 30, 40, 50] N = 5

i1

EFFICIENT SOLUTION:

brr[] = [5, 15, 25, 35, 45, 55, 65, 75, 85] M = 9

i2



AIM : Left HALF IS smaller than RIGHT HALF

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INTERVIEW PREPARATION

Median of Two sorted arrays

Just Assume: N <= M

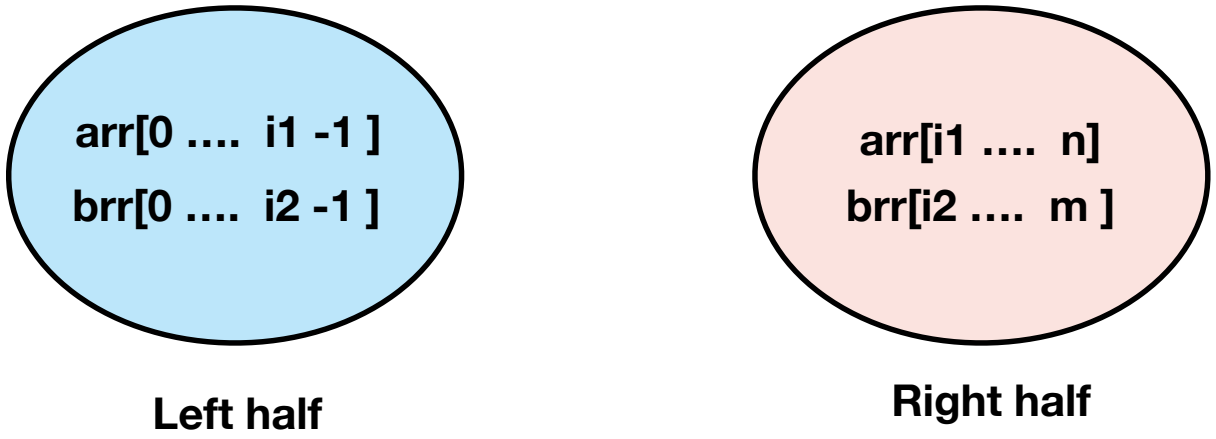
arr[] = [10, 20, 30, 40, 50] N = 5

i1

EFFICIENT SOLUTION:

brr[] = [5, 15, 25, 27, 28, 55, 65, 75, 85] M = 9

i2



AIM : Left HALF IS smaller than RIGHT HALF

Hello world

```
int findMedian(int arr[], int n, int brr[], int m){

    // code here
    int begin1 = 0; int end1 = n;
    while(begin1 <= end1){
        int i1 = (begin1+end1)/2;
        int i2 = (n+m+1)/2 - i1;

        int min1 = (i1==n) ? INT_MAX : arr[i1];
        int max1 = (i1==0) ? INT_MIN : arr[i1-1];

        int min2 = (i2==m) ? INT_MAX : brr[i2];
        int max2 = (i2==0) ? INT_MIN : brr[i2-1];

        if((max1 <= min2) && (max2 <= min1) ){
            if((n+m)%2 == 0){
                return ( (double) ( max(max1, max2) + min(min1, min2) )/2 );
            }else{
                return ( (double) ( max(max1, max2) ) );
            }
        }else if(max1 > min2){
            end1 = i1-1;
        }else{
            begin1 = i1+1;
        }
    }
```

INTERVIEW PREPARATION

Median of Two sorted arrays

Just Assume: N <= M

N = 5

M = 9

Min1

arr[] = [10, 20, 30, 40, 50]

max1 i1

EFFICIENT SOLUTION:

Min2

brr[] = [5, 15, 25, 27, 28, 55, 65, 75, 85]

max2 i2

Min1 : minimum element of right side of arr[]

Max1 : maximum element of left side of arr[]

Min2 : minimum element of right side of brr[]

Max2 : maximum element of left side of brr[]

Hello world

⇒ (max1 <= min2 AND max2 <= min1)

arr[] = [10, 20, 30] n = 3

brr[] = [5, 15, 25, 35, 45] m = 5

$i_1 = 1$ (begin1 = 0, end1 = 3)

(0+3)/2 = 1

$i_2 = (3+5+1)/2 - 1 = 3$.

(min1 = 20 max1 = 10

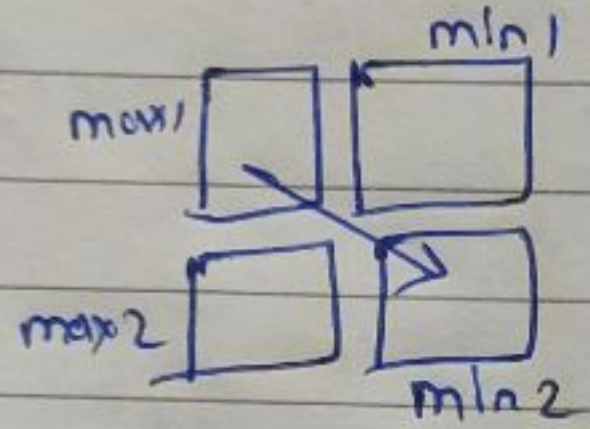
min2 = 35 max2 = 25)

min1 = 20 max1 = 10

min2 = 35 max2 = 25

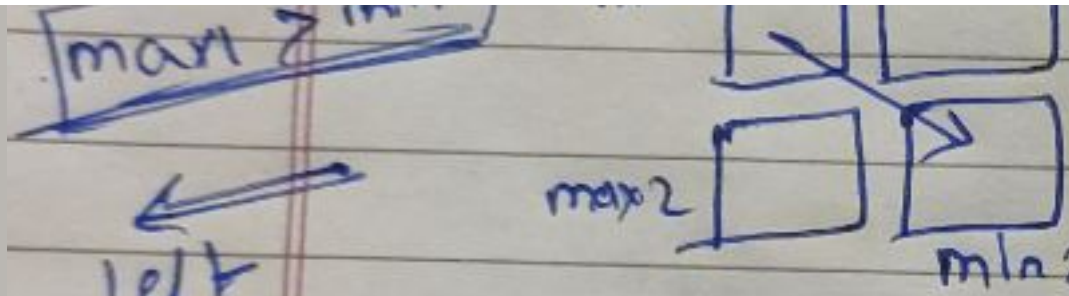
max1 > min2

left



[10 20 30]

[5 15 25 35 45]



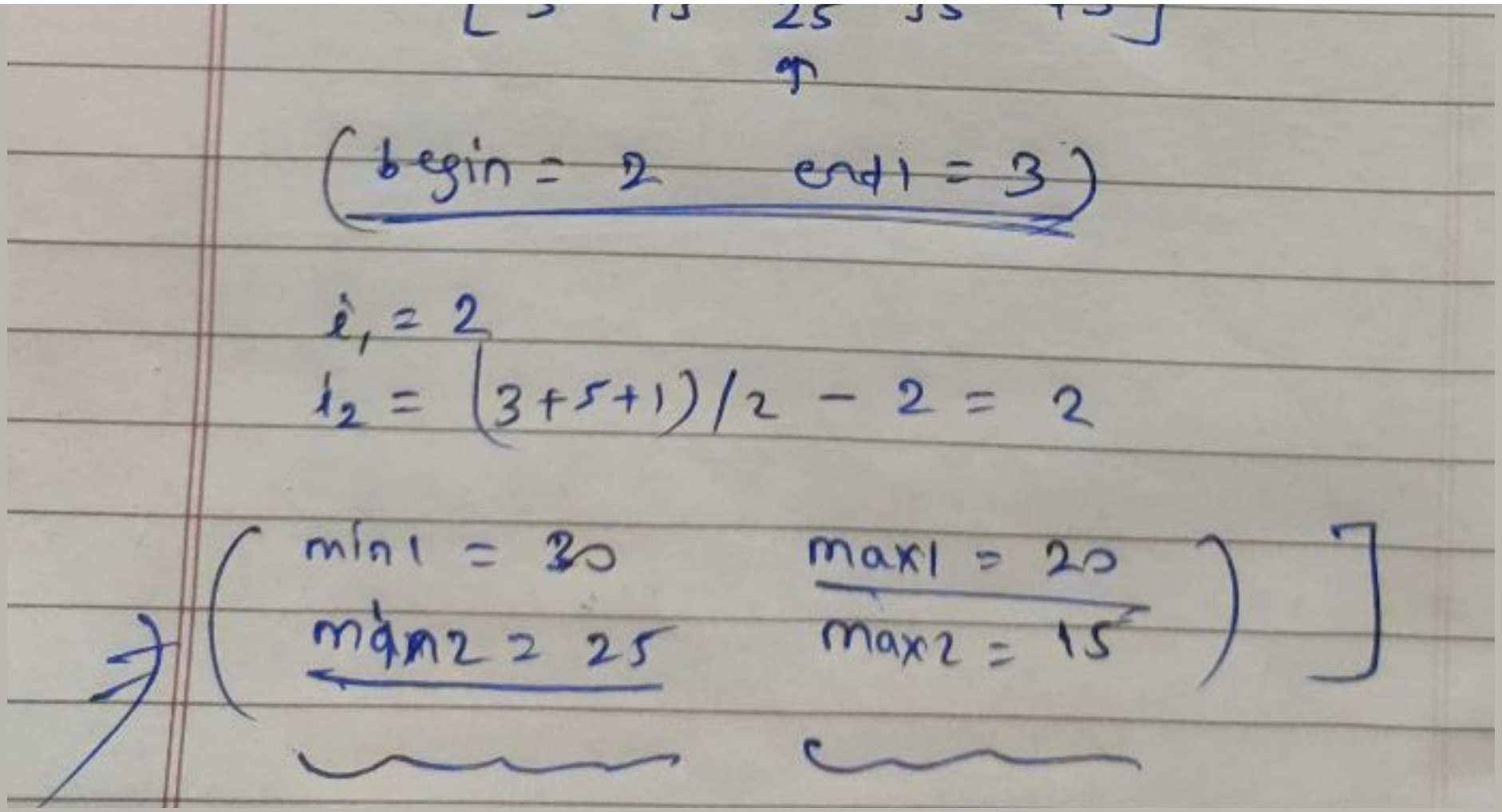
[10 20 30]

[5 15 25 35 45]

(begin = 2 end1 = 3)

$i_1 = 2$

$i_2 = (3+5+1)/2 - 2 = 2$


begin = 2 end1 = 3
i1 = 2
i2 = (3+5+1)/2 - 2 = 2
min1 = 30
max1 = 20
min2 = 25
max2 = 15

$i_1 = 2$

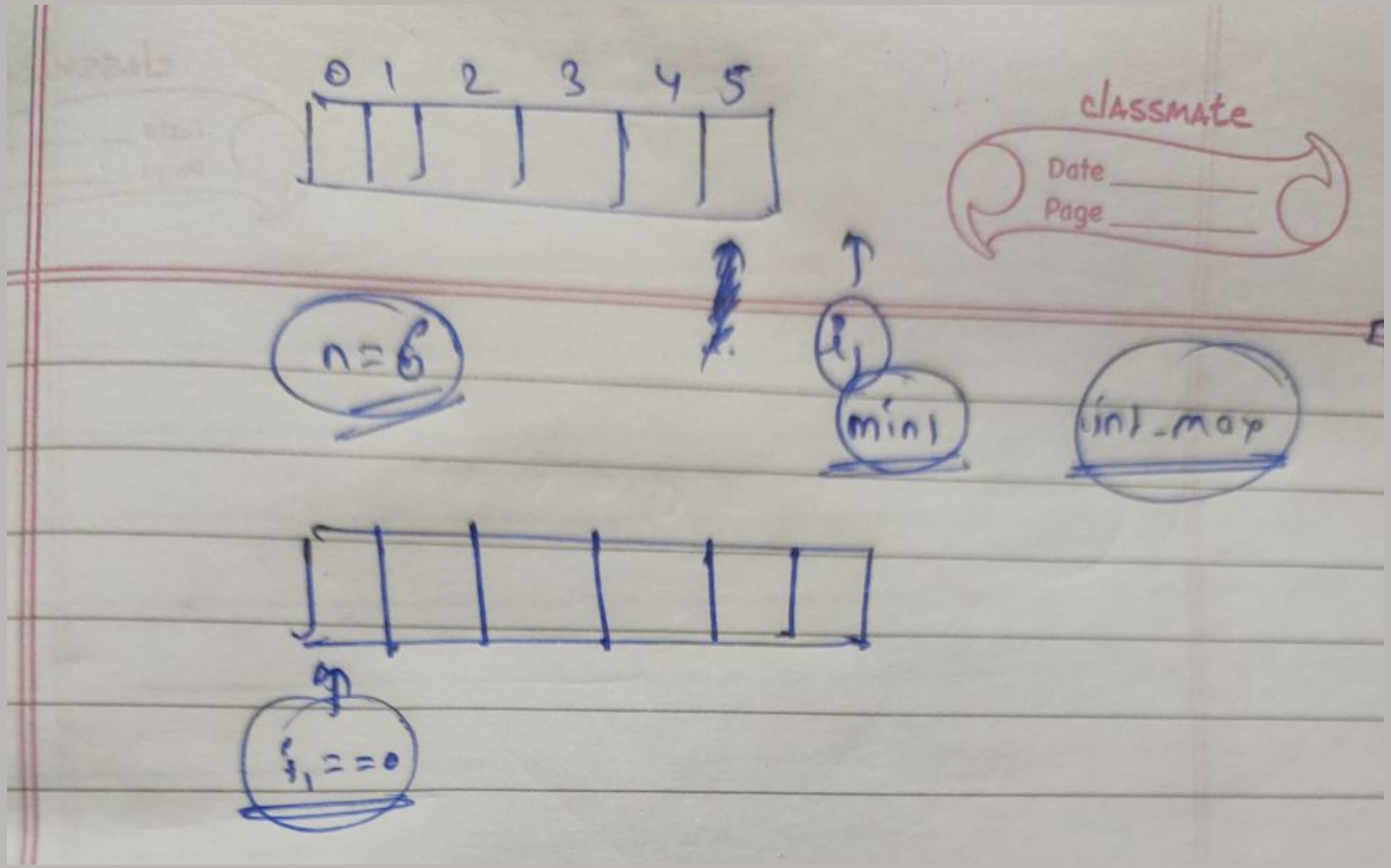
$i_2 = (3+5+1)/2 - 2 = 2$

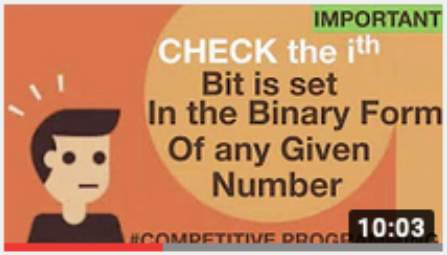
$\left(\min 1 = 20 \quad \max 1 = 20 \right)$

$\left(\min 2 = 25 \quad \max 2 = 15 \right)$

25 20

$\text{median} = \frac{20+25}{2} = 22.5$


0 1 2 3 4 5
classmate
Date
Page
n=6
i
min1
int_max
sp
i == 0



Check the ith bit is set, in the binary form of given numbe...

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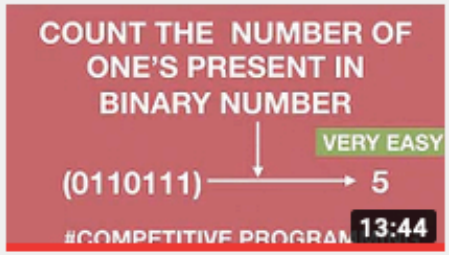

Count the number of one's in binary representation of...

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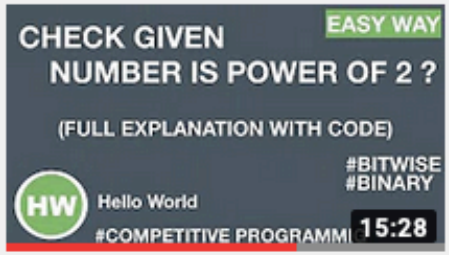

Check a given number is power of 2 | Bitwise operato...

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Left shift and right shift bitwise operator ||...

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Bitwise Operators | AND | NOT | OR | XOR || Competitiv...

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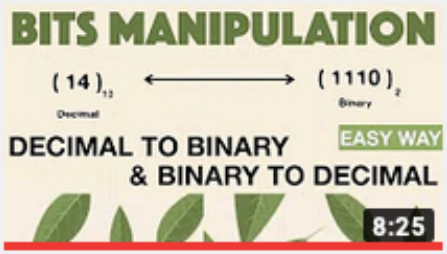

Bits Manipulation | Decimal to Binary | Binary to Decimal...

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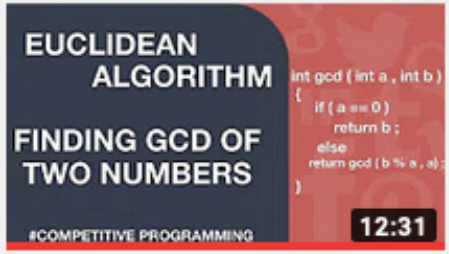

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