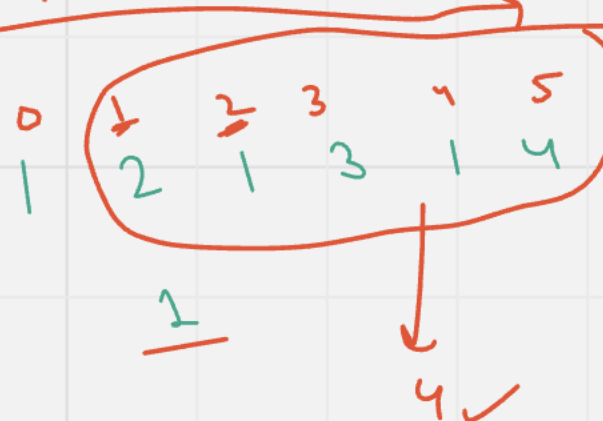


si to end



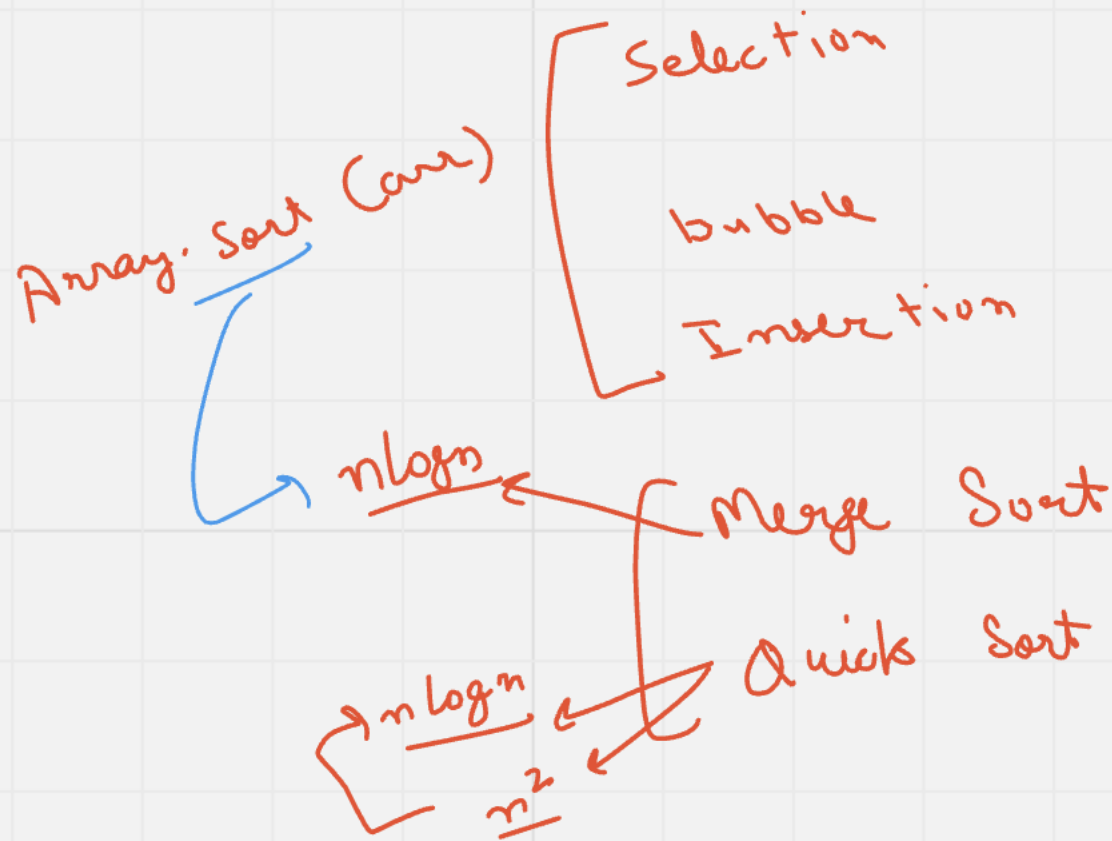
```

if(si==A.length)
    return -1;
int recAns=lastIndex(A,T,si+1);
if(recAns!=-1)
    return recAns;
if(A[si]==T)
    return si;
return -1;

```

Diagram illustrating the recursive function logic:

- If $si == A.length$, return -1.
- Calculate $recAns = lastIndex(A, T, si+1)$.
- If $recAns \neq -1$, return $recAns$.
- If $A[si] == T$, return si .
- Return -1.

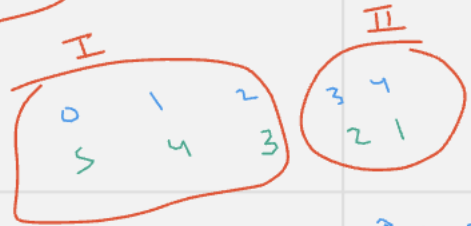
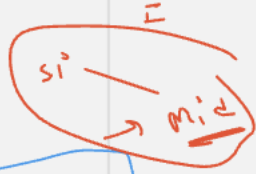


Merge Sort

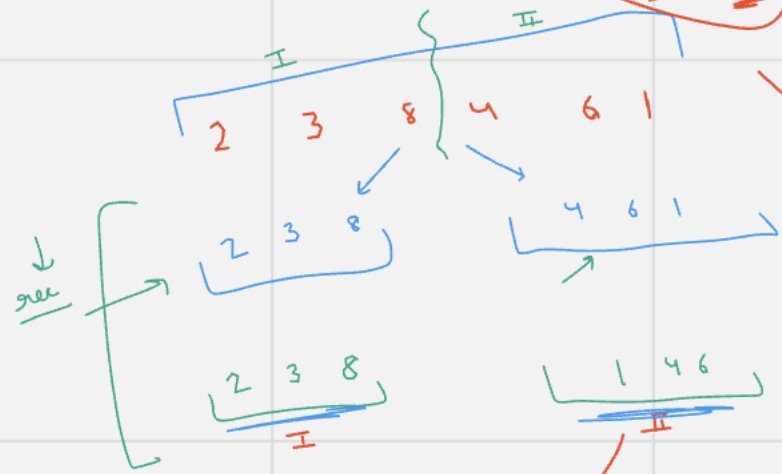
2 Parts

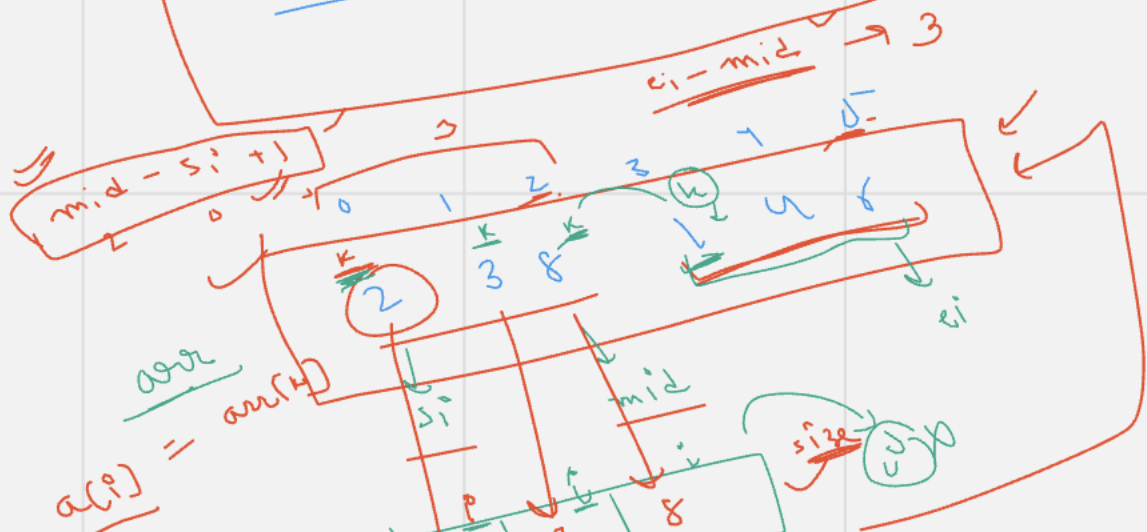
- breaking] rec ✓
- ~~★~~ merging] ns

mid = $\frac{si + ei}{2}$



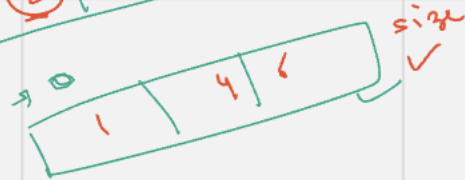
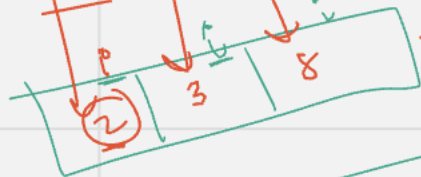
$$mid = \frac{si + ei}{2} = \frac{0 + 4}{2} = 2$$





$$arr = arr(4)$$

✓
a
✓
b





I

arr1

b

II

arr2

arr

merge sort

a

| |
|----------|
| <u>2</u> |
| <u>3</u> |
| <u>8</u> |
| 9 |
| 12 |

| |
|----------|
| <u>1</u> |
| <u>4</u> |
| <u>6</u> |

| |
|----|
| 1 |
| 2 |
| 3 |
| 4 |
| 6 |
| 8 |
| 9 |
| 12 |

| <u>Si</u> | | <u>mid</u> |
|-----------|----------|------------|
| 0 | 1 | 2 |
| <u>3</u> | <u>4</u> | <u>1</u> |

| <u>mid</u> | <u>pi</u> |
|------------|-----------|
| 3 | 1 |
| <u>3</u> | <u>2</u> |

2
1
0
1
2
3
4
5
6
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```

int mid = (si + ei) / 2;
mergeSort(arr, si, mid);
mergeSort(arr, mid + 1, ei);

```

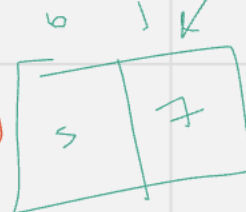
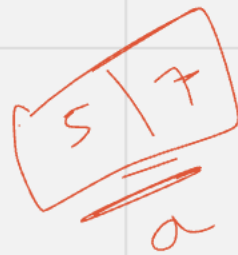
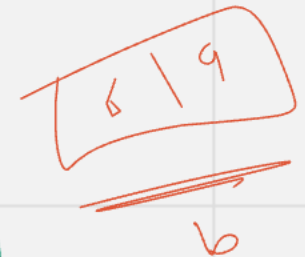
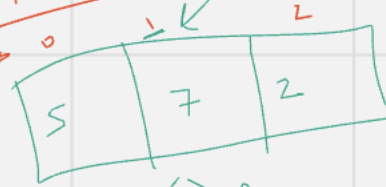


$$mid \rightarrow \frac{0 + 3}{2} = 1$$



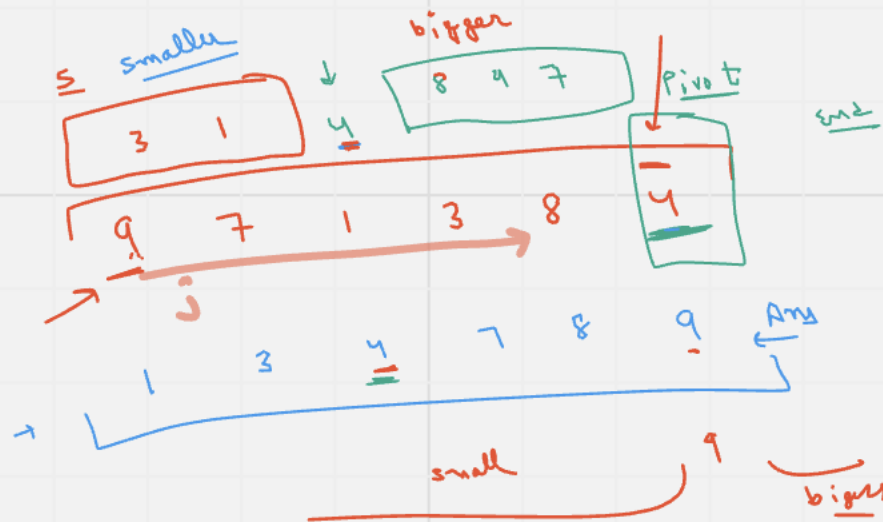
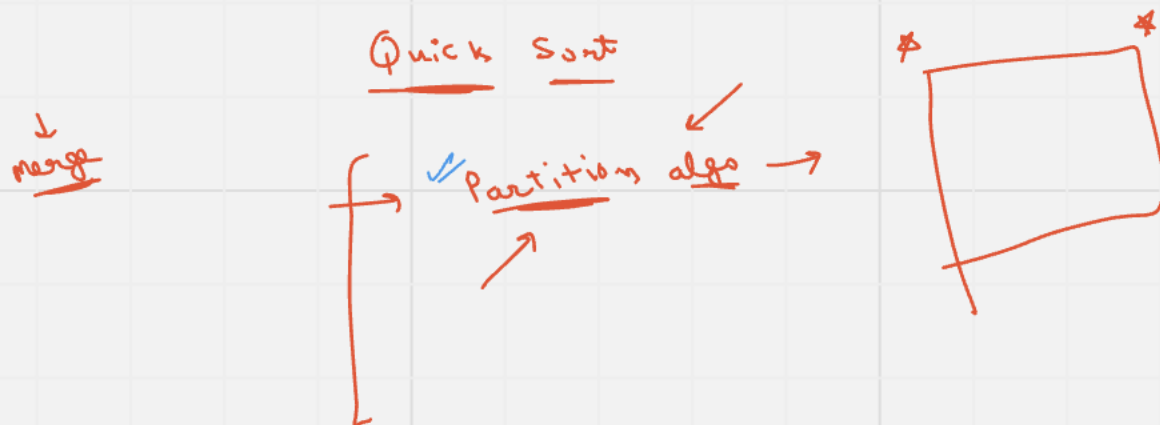
$$mid \rightarrow \frac{si + ei}{2}$$

$$\frac{0 + 4}{2} = 2$$



breaking

$\star \rightarrow$
 $\star \rightarrow$
 $\star \rightarrow$
Quick
 \star
sort
 \star
] ✓ Complex
 →



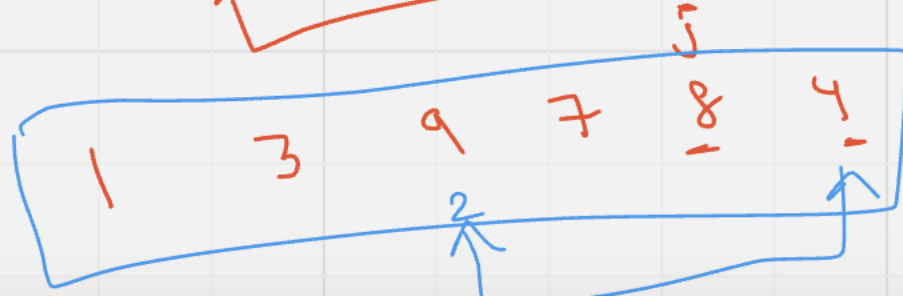
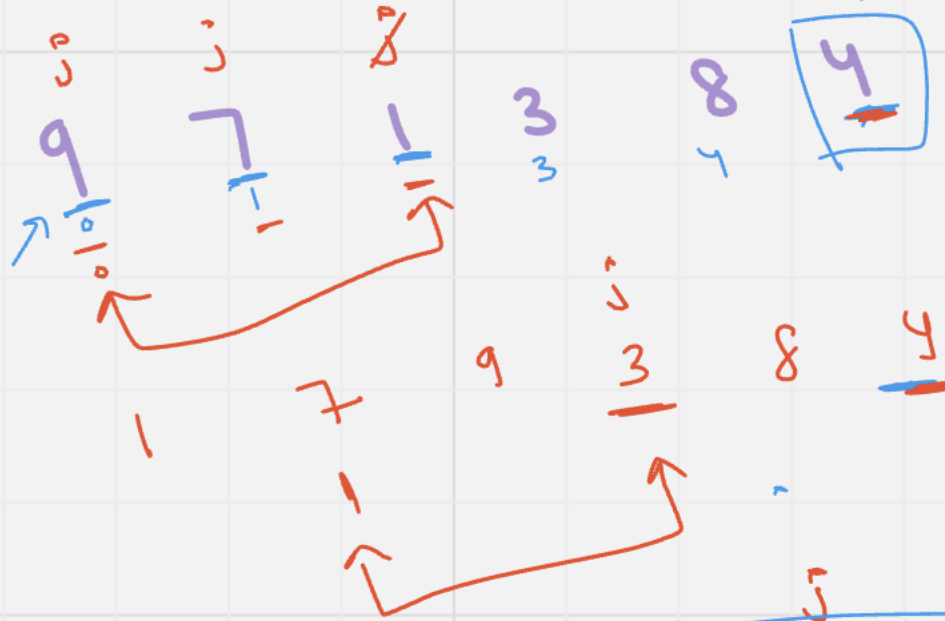
Ques Partition \rightarrow Last Ele

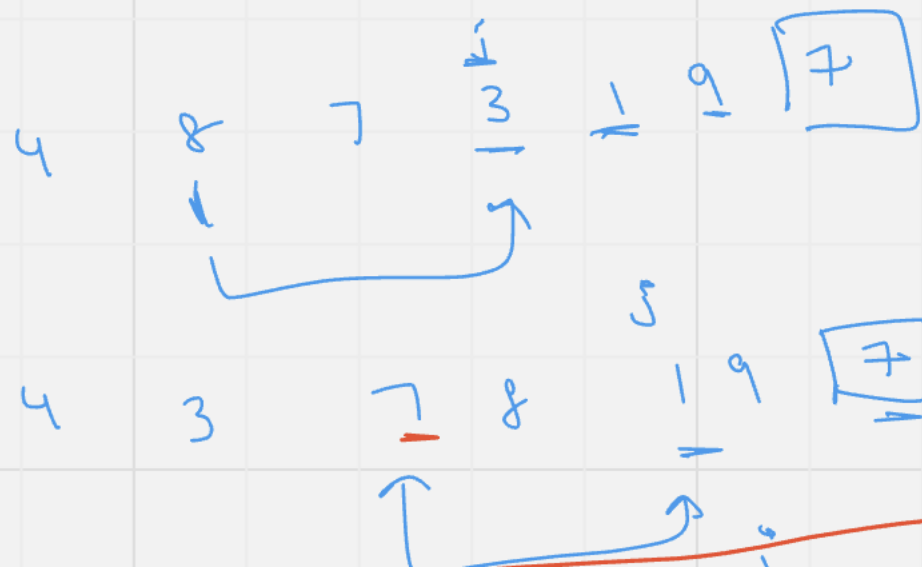
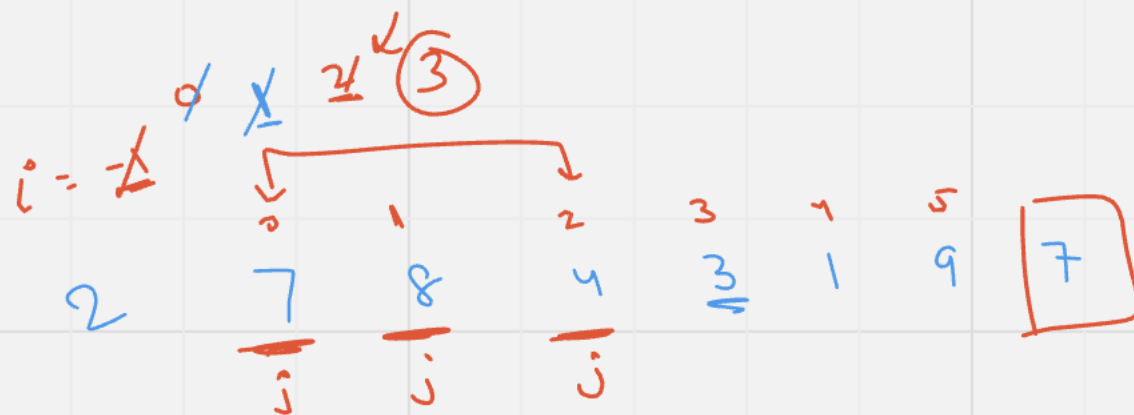
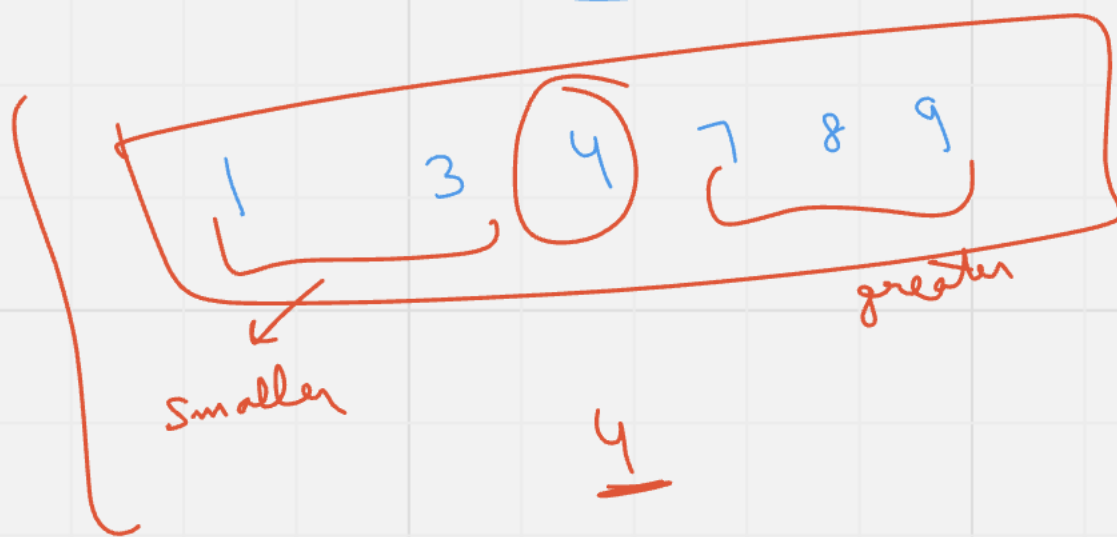
if $arr[i] \leq$ Pivot
[$\rightarrow i++$
 \rightarrow ~~$arr[i]$~~
 $swa arr[i]$]

one last step

$i++$
 $swa arr[i]$ Pivot

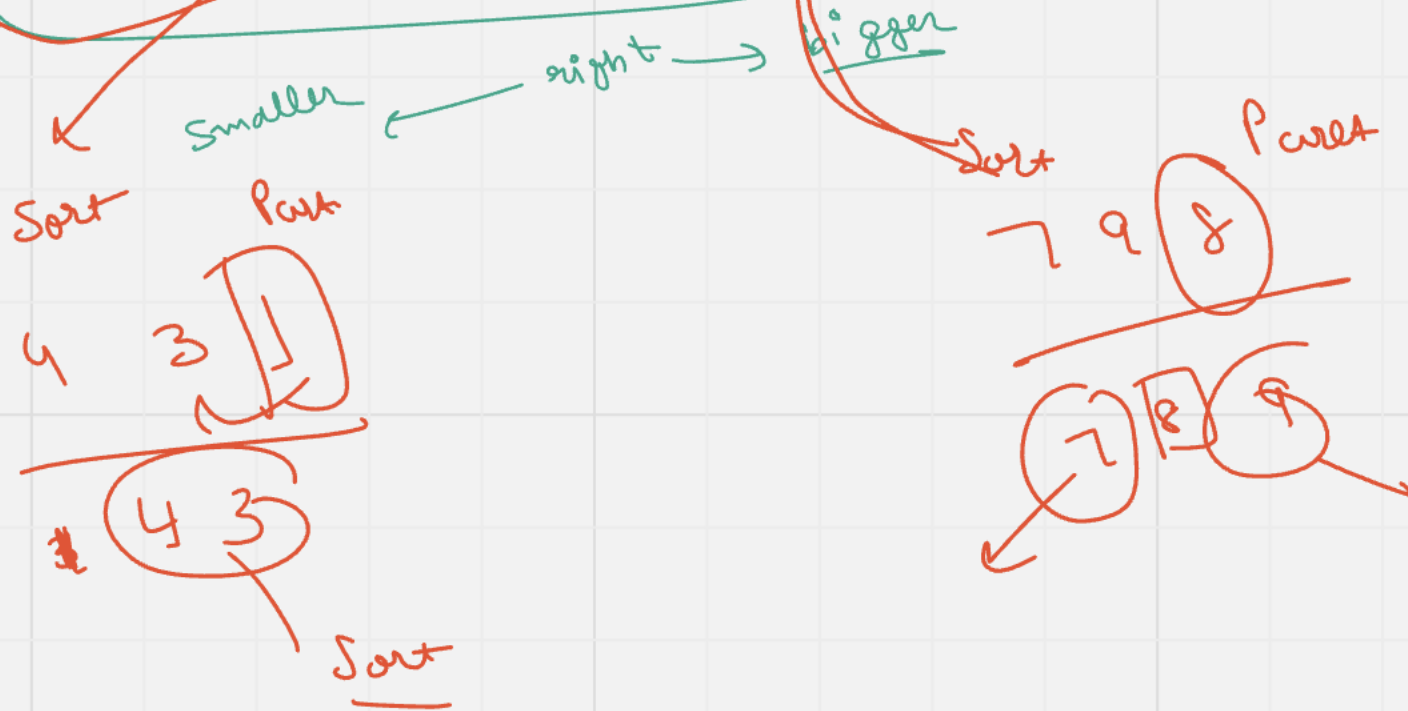
$i = 1$ ~~2~~ ~~3~~ 2







left

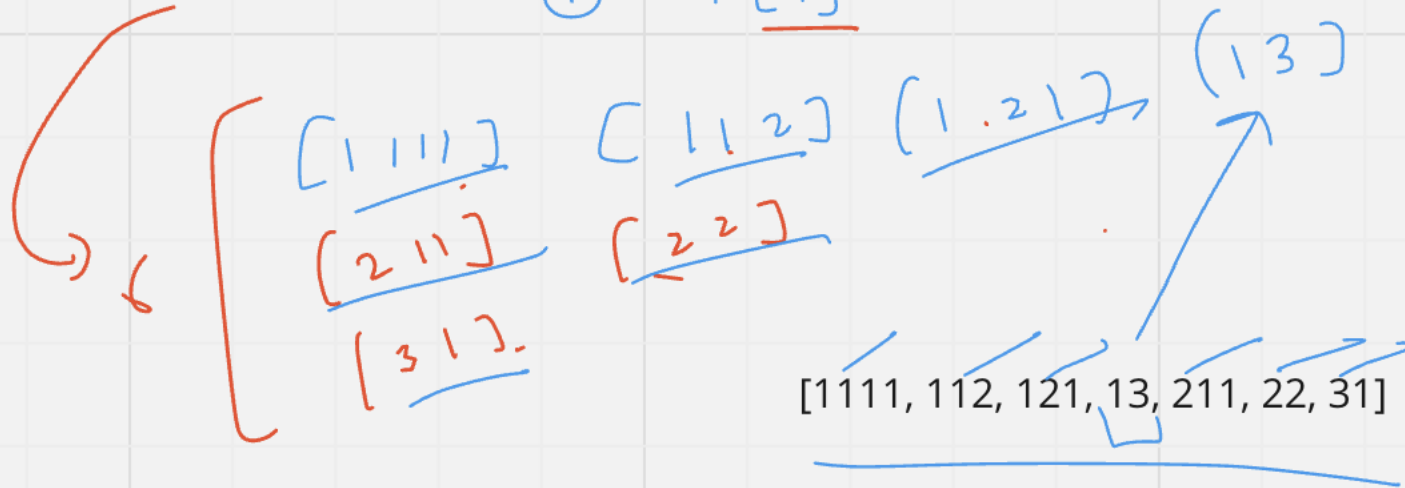
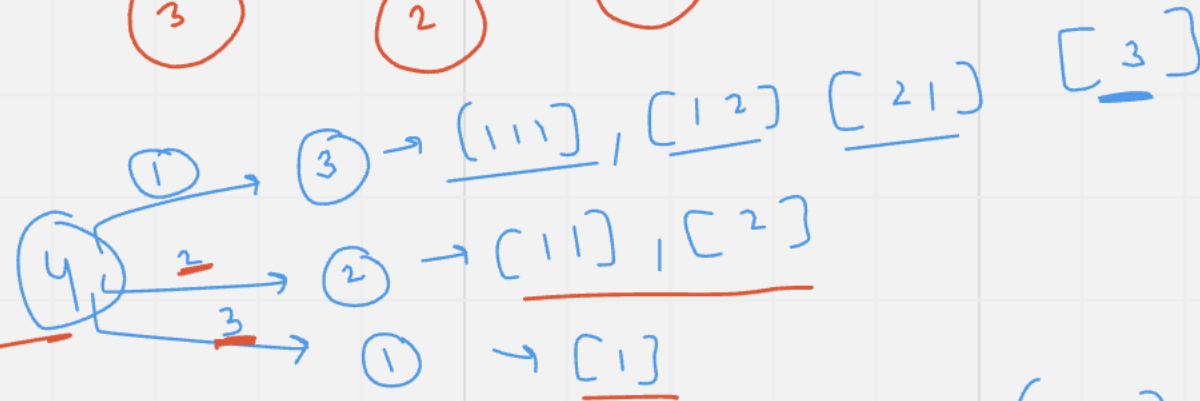
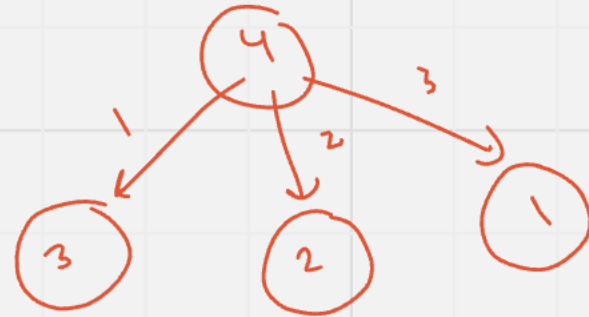


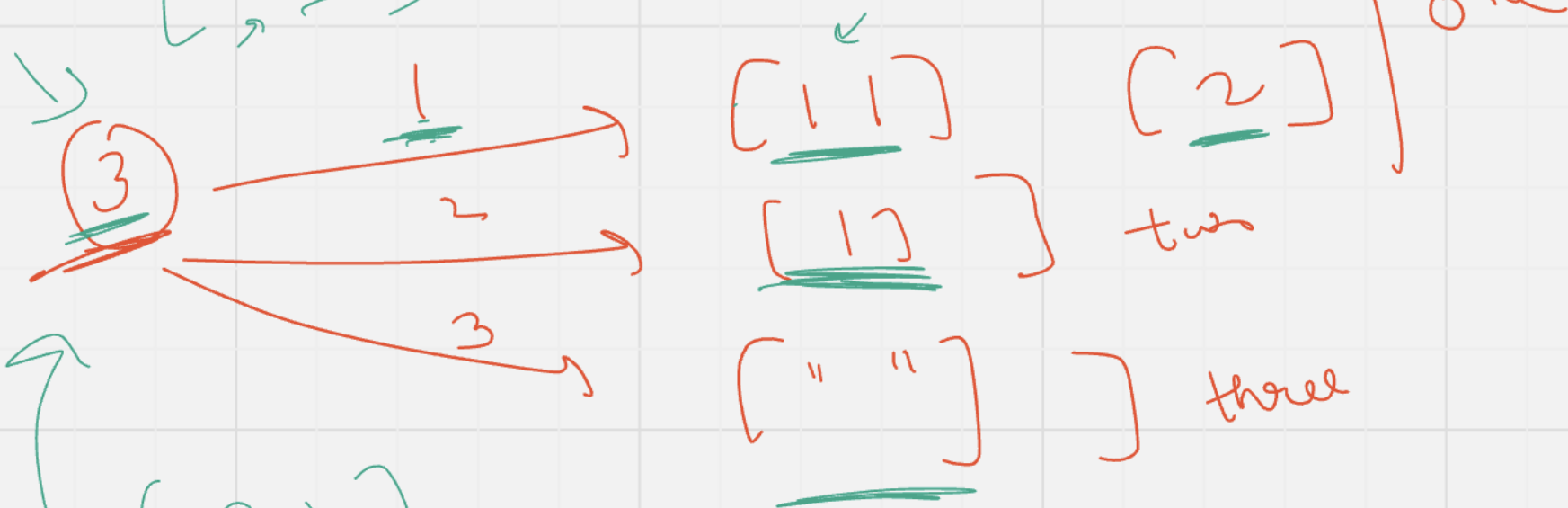
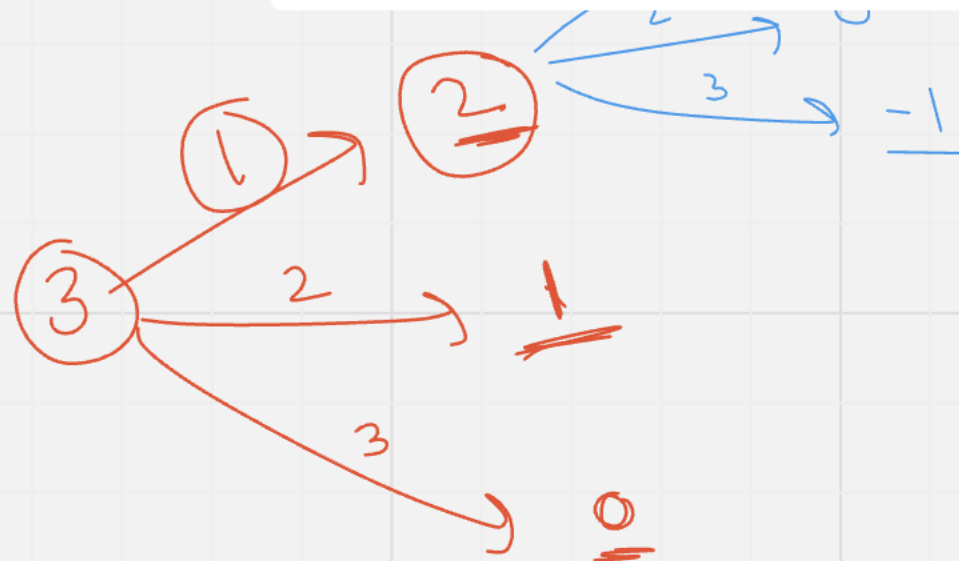
(-1)

→ 20

3 ←

Do ub 6



$\rangle();$ 

→

Out Put

$4 \leftarrow n$
 $1 + 2x^{n-1} + 3x^{n-2} + \dots + 4x^1 + 5x^0$
my

$n \rightarrow 5$ me

$1 + 2x^1 + 3x^2 + 4x^3 + 5x^4$ my

$$N \rightarrow 3 \quad]^{\vee}_{n \geq 1}$$

Handwritten notes on grid paper:

- Top left: $n \geq 1$
- Top right: $n \rightarrow 3$
- Center: A large rectangle containing the expression $1 + \textcircled{2} \times \textcircled{1} + \textcircled{3} \times \textcircled{2}$. The numbers 1, 2, and 3 are circled. The expression is enclosed in a blue box.
- Bottom left: $n \rightarrow 3$
- Bottom right: $n \rightarrow 3$