

Arrays - 1

In This Lecture

1. Multiple Left Rotation of the Array
2. Wave Array

Multiple Left Rotation of the Array

Given an array of integers A and multiple values in B, which represents the number of times array A needs to be left rotated.

Find the rotated array for each value and return the result in the form of a matrix where ith row represents the rotated array for the ith value in B.

Input:

✓ A = [1, 2, 3, 4, 5]

B = [2, 3]



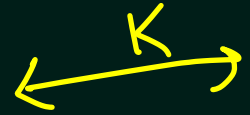
Output:

✓ [[3, 4, 5, 1, 2]

[4, 5, 1, 2, 3]]

Multiple Left Rotation of the Array

Input:



$A = [1, 2, 3, 4, 5]$

→ $B = [2, 3]$

Output:

→ $[3, 4, 5, 1, 2]$ ✓

✓ $[4, 5, 1, 2, 3]$

$[k-1]$
x

$$a[0] = a[k+0]$$

$$a[1] = a[k+1]$$

$$a[j] = a[k+j]$$

$$[O((k * n) * m)]$$

✓ $[3, 4, 5, 4, 5]$

$k = 3$



✓ $int\ temp = a[0];$

$a[n-1] = temp$

→ $[3$

→ $[4$

2

3

4

5

3

4

5

1

4 5

5

1

2

5

1 → 1

2] ← 2

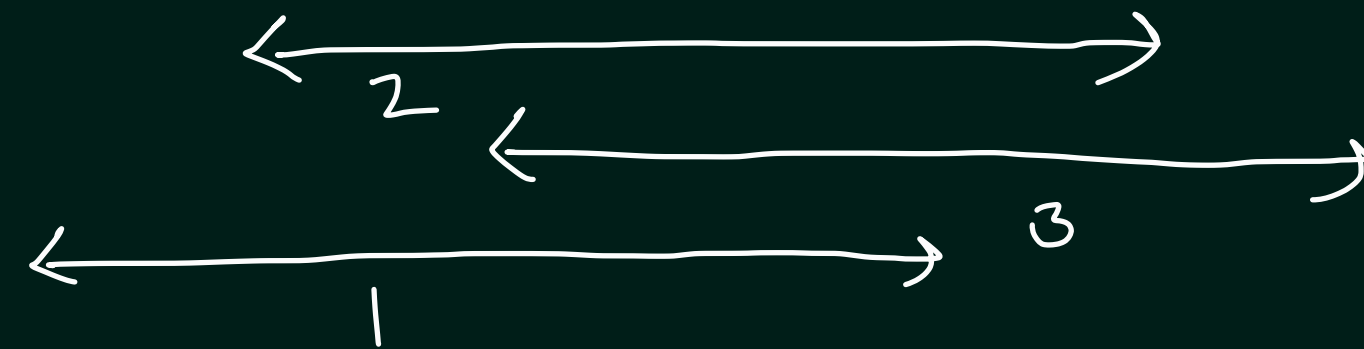
3] → 3

Multiple Left Rotation of the Array

$$[12 \times n = 2]$$

int a[] = {1, 2, 3, 4, 5}

✓ int temp[] = {1, 2, 3, 4, 5, 1, 2, 3, 4, 5}



$$= O(2 \times n) \rightarrow O(n)$$

LR [2] [3 4 5 1 2]

[3 4 5 1 2 3]

RR → 2 [4, 5, 1, 2, 3]

3 → [3 4 5 1, 2]

Multiple Left Rotation of the Array

$$[LR \rightarrow d] \rightarrow (n-r)$$

$$RR \rightarrow r$$

Wave Array

Given an array of integers A , sort the array into a wave-like array and return it.
In other words, arrange the elements into a sequence such that
 $a_1 \geq a_2 \leq a_3 \geq a_4 \leq a_5 \dots$

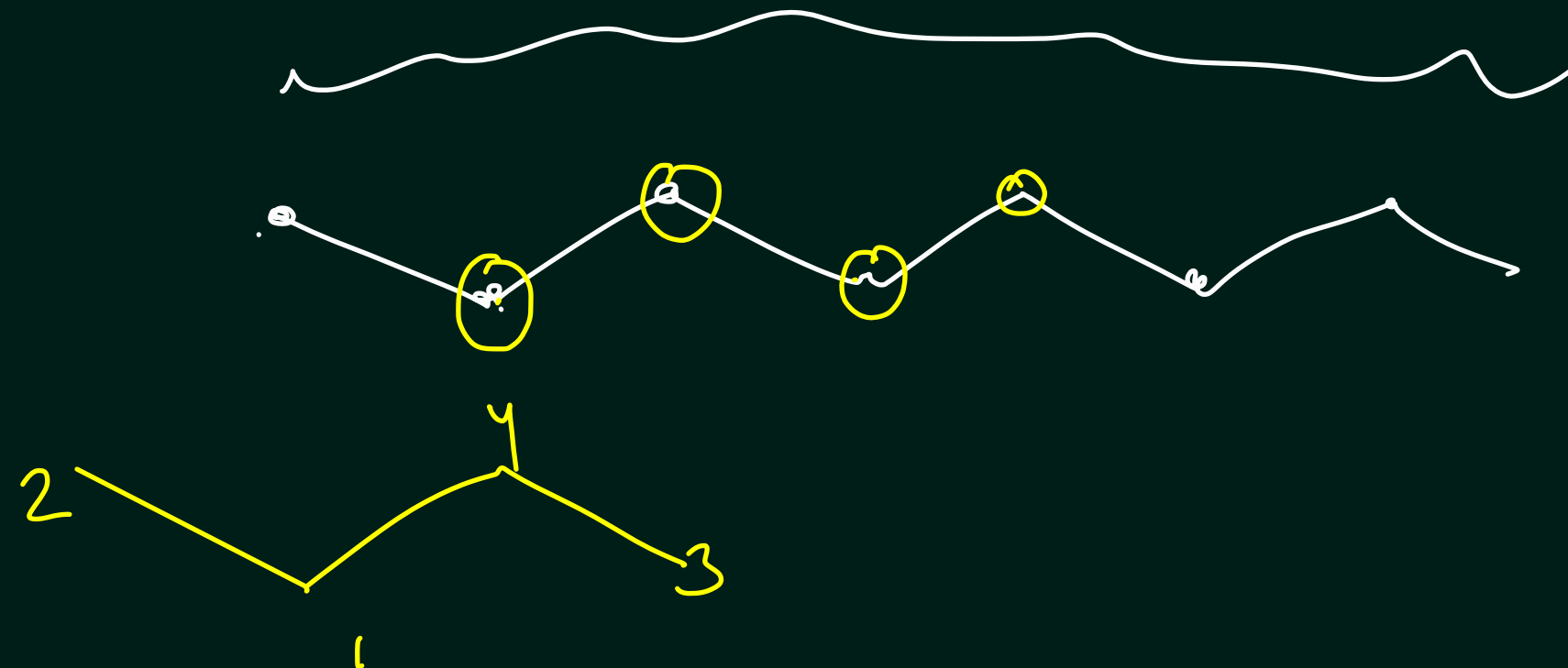
✓ **NOTE:** If multiple answers are possible, return the lexicographically smallest one.

Input:

$A = [1, 2, 3, 4]$

Output:

$[2, 1, 4, 3]$



Wave Array

Input:

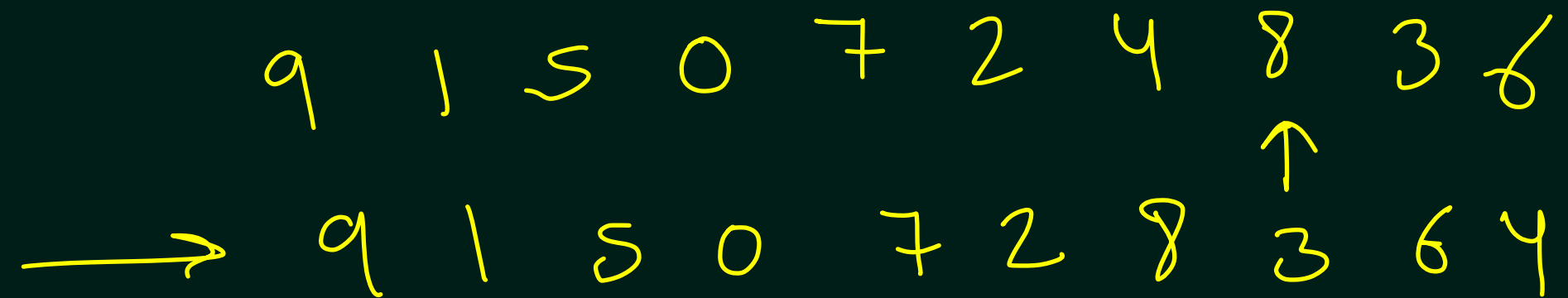
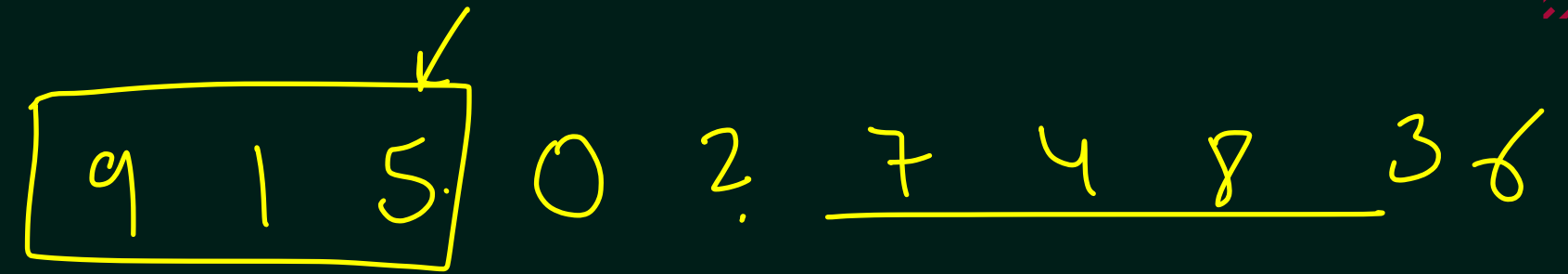
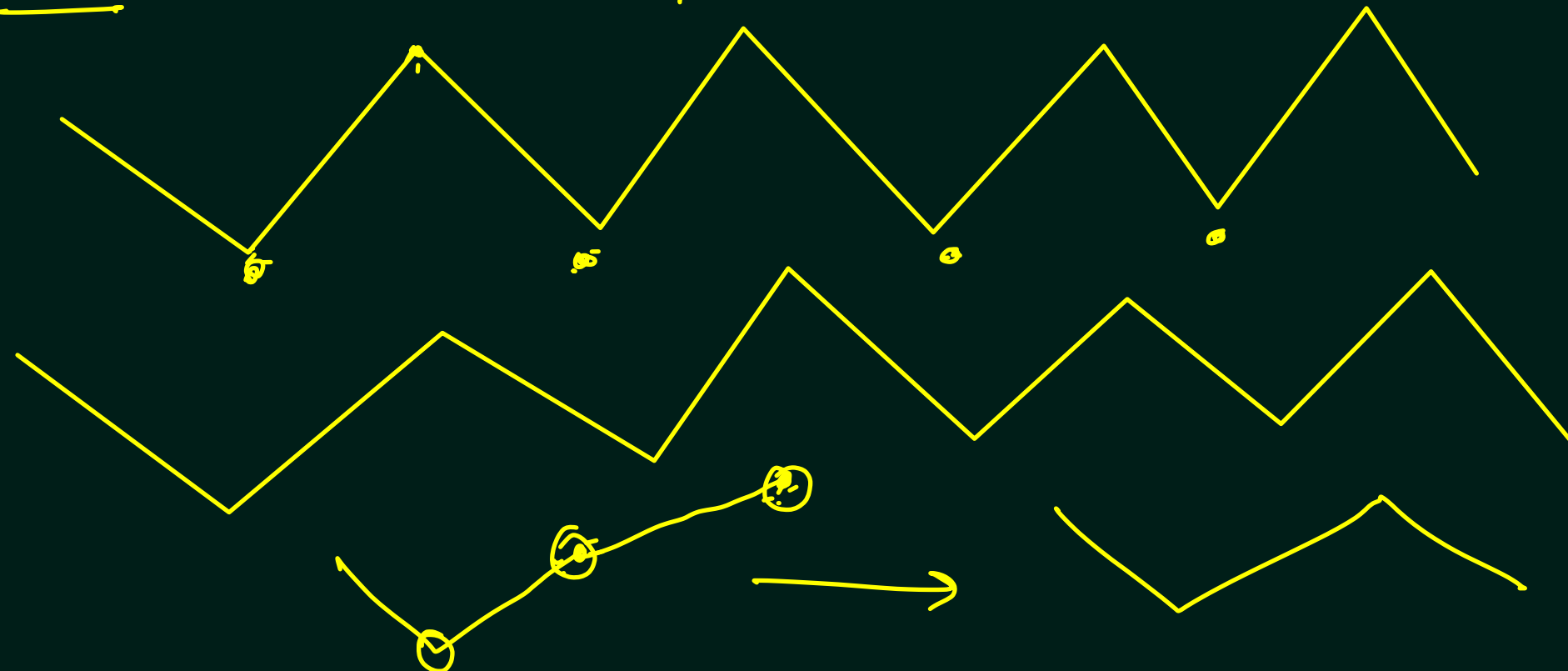
$A = [1, 9, 5, 2, 0, 7, 4, 8, 3, 6]$

Output:

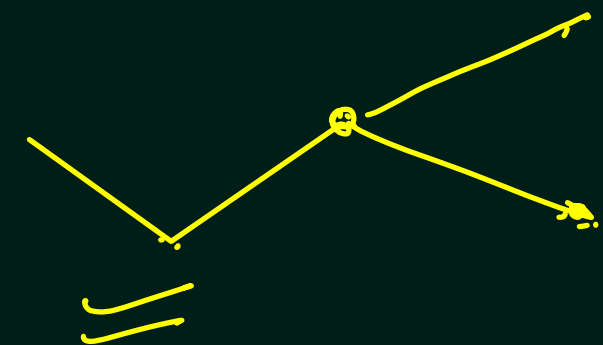
$[9, 1, 5, 0, 7, 2, 8, 3, 6, 4]$ but this is not lexicographically sortest answer

$\llcorner [1, 0, 3, 2, 5, 4, 7, 6, 9, 8] \lrcorner$

$\rightarrow 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9$



$O(n)$



Wave Array



$$\boxed{O(n \log n)} + O(n)$$

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

