1. Largest element in an array

→ set first element of array as the largest element (max_element)

→ scan through the array, if the current element is greater than max_element, then set max_element to current element.

→ Upon reaching the end of the array, we will obtain the largest element.

2. Second largest element in the array without sorting

→ Find max element of array

→ calculate differences with all elements & max element

→ create a new array of the differences

→ Find the index of largest non zero element in new array

→ This index corresponds to the second largest element in original array

Multiple passes & extra memory

→ if the current element is the largest then the previous element is the second largest.

→ After finding the largest element check if current element is greater than the second largest element.

→ Take no action if current element = largest element.

optimal solution

O(n)

↑ Just one pass of array

3. Check if array is sorted

Assume by sorted, we mean ascending order

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1. For each element in the array check if the previous element is less than or equal. IF NOT array is not sorted.

4. Rotate Array by 1 place (left rotation)

1 2 3 4 5

↓

2 3 4 5 1

→ keep hold of first element
→ shift second to last element by 1 place   O(n)
→ copy first element to last position.

5. Rotate array by 'D' places (left)

0	1	2	3	4
1	2	3	4	5

Rotate by = D % size of array

D ↓

i =	0	1	2	3	4
e.g. Rotate by 3 elements	1	2	3	4	5

new index = i - D

Time: O(N-D)

Space: O(D)

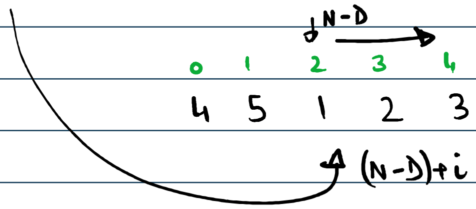
i = 0 1 2

temp[3] = {1,2,3}

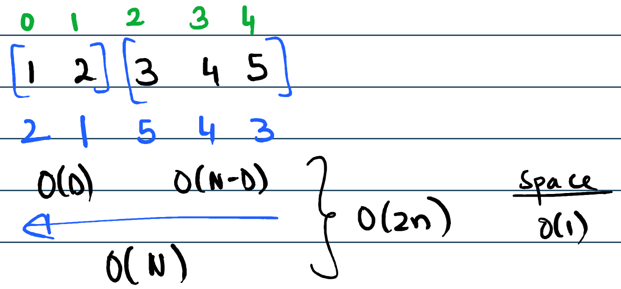
↓N-D →

0	1	2	3	4
4	5	1	2	3

(N-D)+i



e.g. Rotate By 2,



6. Move all zeros to the end of the array

e.g. 1 0 0 3 2 0 0 4 5 1

output: 1 3 2 4 5 1 0 0 0 0

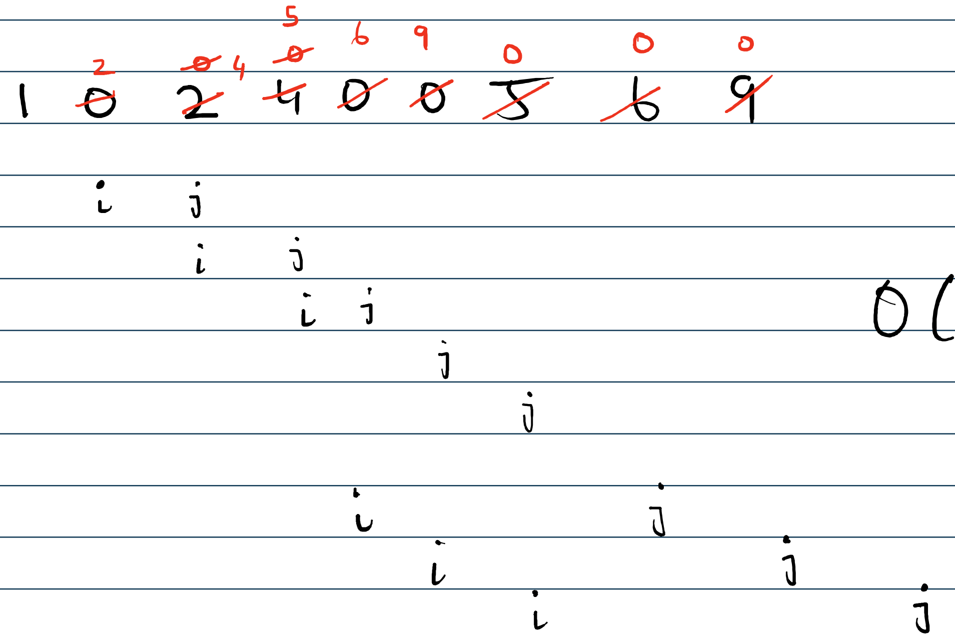
Approach 1:

1. start scanning from the end of the array

2. If we encounter a zero

↳ keep swapping with the next element as long as the next element is not a zero or we reached the end of array $O(n^2)$

Approach 2: Two pointers



O(n)