Next Permutation

What is the next permutation of [2 | 3 | 1]

All permutations of (1) (2) (3) are :—

Brute Force: (Find all permutations)

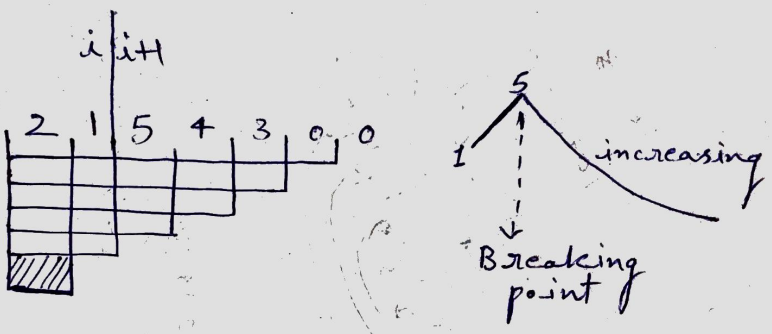
1 2 3
1 3 2
2 1 3
2 3 1
3 1 2
3 2 1

Lexicographic (Dictionary order)

So, next of 2 3 1 is [3 1 2] ⇒ Answer

Optimal

Step 1)



Step 2) ~~swap(a[i])~~

Find the smallest no. which is greater than a[i] (i.e., 1) in the range (i+1) to (n-1)

So, traverse from (n-1) to (i+1) and stop if you find an element greater than a[i] (i.e., 1).

Step 3) swap(a[i], a[j]) . Here a[j]=3
1 , 3

Step 4) reverse the array from index (i+1) to (n-1).

Now, u will get the answer

Note:

if array is in descending order then we will return array in reverse (i.e., ascending order)

$T = O(n)$, $S = O(1)$