

DAA

Date: 27/05/2021

Quick Sort :-

3, 44, 38, 5, 47, 15, 36, 26, 27, 2, 46, 4, 19,
50, 48, 43, 33, 34, 25, 1

Solution :-

First choose a pivot element of the array.

- [3] will be the pivot element.

^P
[3], 44, 38, 5, 47, 15, 36, 26, 27, 2, 46, 4, 19,
50, 48, 43, 33, 34, 25, 1

Now search from left side for the first element greater than pivot.

^P ^{LS}
[3], [44], 38, 5, 47, 15, 36, 26, 27, 2, 46,
4, 19; 50, 48, 43, 33, 34, 25, ^{RS}[1]

Also choose from right side the first element less than pivot.

Now swap these two elements.

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P
 [3], [1], 38, 5, 47, 15, 36, 26, 27, 2,
 46, 4, 19, 50, 48, 43, 33, 34,
 25, [44]

∴ Now search again from left and right for the next elements greater and less than pivot.

P. Ls
 [3], [1], [38], 5, 47, 15, 36, 26, 27
 Rs
 [2], 46, 4, 19, 50, 48, 43, 33, 34, 25, [44]

Now Swap these Two elements:

P
 [3], [1], [2], 5, 47, 15, 36, 26, 27, [38]
 46, 4, 19, 50, 48, 43, 33, 34, 25, [44]

Now Swap the pivot with the last element in array that is less than pivot element.

[2], [1], [3], 5, 47, 15, 36, 26, 27, [38]
 46, 4, 19, 50, 48, 43, 33, 34, 25,
 [44]

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Now ~~Sort~~ divide the array into ~~half~~ two sub arrays.

[2], [1], [3], [5, 47, 15, 36, 26, 27, 38, 46, 4, 19, 50, 48, 43, 33, 34, 35, 44]

Considering first sub array:

P Rs Ls
[2] [1] [3]

Swap:

P Rs Ls
[2] [3] [1]

P Rs Ls
[2] [1] [3]

Swap 1st element with second element
(less than) Pivot

P
[1], [2], [3]

Now Consider second Subarray:

Set 46 as Pivot element:

5, 47, 15, 36, 27, 38, 46

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4, 19, 50, 48, 43, 33, 34, 25, 44

∴ Select and swap elements that are greater and less than pivot element from left and right side.

^{Ls}
5, 47, 15, 36, 26, 27, 38, ^p46, 4, 19,

50, 48, 43, 33, 34, ^{RS}25, ^{RS}~~47~~, 44
5, ~~47~~ 25, 15, 36, 26, 27, 38, ^p46,

4, 19, 50, 48, 43, 33, 34, 47, 44

∴ Perform this operation recursively until both left and right side satisfy pivot element property.

^{Ls}
5, 25, 15, 36, 26, 27, 38, ^p46, 4,
19, 50, ~~48~~, 43, 34, 47, 44

5, 25, 15, 36, 26, 27, 38, 34, 4,

19, 50, 48, 43, 33, 46, 47, 44

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Now sort this sub array.

[5], 15, 25, 26, ~~37~~, 36, [34], 4, ~~39~~,
38, 48, 43, ~~33~~, [46], [47], [44], [50]

Again sort :

[5], [4], [15], [19], [25], [26], [27], [33]
[34], [38], [43], [44], [46], [47], [48]
[50]

[4], [5], [15], [19], [25], [26], [27], [33]
[34], [38], [43], [44], [46], [47], [48]
[50]

Now combine two ^{sorted} sub arrays :-
After combining:

[1], [2], [3], [4], [5], [15], [19], [25], [26]
[27], [33], [34], [38], [43], [44], [46]
[47], [48], [50] → array sorted

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