

## Task-1

Here the main function is mergeSort, which is used as the divide and conquer part in the code. We divided the array into two different parts then give those to another sorting function. That function returns a sorted merged array. In the merge sort function we used 3 pointers to iterate over the three arrays based on proper condition. The whole thing is processed recursively.

## Task-2

Here we used a recursive function. The unfolding part stays on until the start and end becomes the same. ~~then~~ Then the function returns the number. While <sup>the</sup> folding process stays up, it continuously checks for greater number and returns the number accordingly.

## Task-3

The main topic of the task was to get the expected value using the inversion process. ~~The~~ This process ~~as~~ says that if we are comparing ~~two~~ two numbers of two different array, if a number is greater than that number will also be greater for the rest of that array elements ~~for~~. The array needs to be sorted.

### Task - 4

The formula is dependent on  $A[j]$ . So, we need to find the greatest number possible for  $A[j]$ . Then within that  $j$  index, we need to find the indexed value. ~~however, if the~~ we used two functions, first one to find out the greatest value, then the second max within given condition.

### Task - 5

The main Quicksort function mainly receives the value from Partition function and recursively calls again with the same array without the index found from Partition function. In the partition function we select a pivot and we sort



the elements, so that the smaller elements from the pivot will stay on the left of the pivot and the larger or equals on the right and return the pivot index eventually. The whole thing is an in place sort.

### Task - 6

To find the  $k$ th smallest element we used the partition function. Being the index found from partition function we check the index accordingly. If we don't find the actual index, we recursively call again the function until we finally do. That index value will be our expected output.