Divide and Conquer

Assignment Questions

Q1. Given an array where all its elements are sorted in increasing order except two swapped elements, sort it in linear time. Assume there are no duplicates in the array.
Input: arr[] = [3, 8, 6, 7, 5, 9, 10]
Output: arr[] = [3, 5, 6, 7, 8, 9, 10]

Q2. Given an array of positive and negative integers, segregate them in linear time and constant space. The output should print all negative numbers, followed by all positive numbers.
Input: arr[] = {19, -20, 7, -4, -13, 11, -5, 3}
Output: arr[] = {-20 ,-4, -13, -5, 19 ,11 ,3, 7}

Q3. Given an array of positive and negative integers, segregate them in linear time and constant space. The output should print all negative numbers, followed by all positive numbers. The relative order of elements must remain the same.
Input: arr[] = {19, -20, 7, -4, -13, 11, -5, 3}
Output: arr[] = {-20 ,-4, -13, -5, 19 ,7 ,11, 3}

Q4. Given two arrays of equal size n and an integer k. The task is to permute both arrays such that the sum of their corresponding element is greater than or equal to k i.e a[i] + b[i] >= k. The task is to print "Yes" if any such permutation exists, otherwise print "No".
Input : a[] = {2, 1, 3},
       b[] = { 7, 8, 9 },
       k = 10.
Output : Yes
Input : a[] = {1, 2, 2, 1},
       b[] = { 3, 3, 3, 4 },
       k = 5.
Output : No

Q5. An interval is represented as a combination of start time and end time. Given a set of intervals, check if any two intervals intersect.
Input: arr[] = {{1, 3}, {5, 7}, {2, 4}, {6, 8}}
Output: Yes
The intervals {1, 3} and {2, 4} overlap
Input: arr[] = {{1, 3}, {7, 9}, {4, 6}, {10, 13}}
Output: No