**19I510 Design and Analysis of Algorithms**

**Exercise 2 – Sorting Algorithm**

1. People are standing in a queue. We want to arrange them based on their heights. Use a simple sorting algorithm which is less efficient and STABLE.

**Input Format**The first line of input consists of an integer(N) representing the size of the array.  
The next line consists of N Integers separated by space.  
**Output Format**The output will print the sorted Array.

**Sample Input**

6  
23 -45 67 12 57 13

**Sample Output**  
-45 12 13 23 57 67

1. The teacher wants to arrange the students in roll number order for the meeting (increasing order). The students are almost in the correct order. Help the teacher to identify the minimum length of unsorted subarray and apply sorting algorithm only for the portion which is unsorted. Use a typical sorting algorithm that gives the best performance when the array is almost sorted.

**Input Format**The first line of input consists of an integer(N) representing the size of the array.  
The next line consists of N Integers separated by space.  
**Output Format**The output will contain the minimum length of unsorted array in the first line and the sorted elements in the next line separated by space.

**Sample Input**

5  
5 15 7 35 55

**Sample Output**

2

5 7 15 35 55

1. The cable management wants to sort the tv channels based on the audience viewing time. Use a comparison sorting technique that compares the adjacent elements and swaps them. If two channels have same viewing time, they should be arranged according to their ordering in the input instance.

**Input Format**The first line of input consists of an integer(N) representing the number of channels. The next N lines consist of channel name and their viewing time

**Output Format**The output will print the list of channels in increasing order of the viewing time separated by comma

**Sample Input**

5

SunTV 15

VijayTV 35

HBO 12

StarSports 15

RepublicTV 45

**Sample Output**

HBO,SunTV,StarSports,VijayTV,RepublicTV

1. There is a big queue in the vaccination center. Vaccines are provided to people who received tokens on two dates 23/5/2021 and 24/5/2021.You want to arrange them based on their token number and date. You don't have much time and the swap operation is very costly. Use an in-place sorting algorithm that requires a minimum number of swaps.

**Input Format**The first line of input consists of an integer N representing the queue size.  
The next N lines contains date (dd/mm/yyyy) and the token number  
**Output Format**The output prints the new order (index of the person) separated by space.

**Sample Input**

5

23/05/2021 45

24/05/2021 51

23/05/2021 32

24/05/2021 1

24/05/2021 6

**Sample Output**

3 1 4 5 2