

Lab Task 3

1. Given an array `arr[]`, its starting position `l` and its ending position `r`. Sort the array using merge sort algorithm.

Example 1:

```
Input:  
N = 5  
arr[] = {4 1 3 9 7}  
Output:  
1 3 4 7 9
```

Example 2:

```
Input:  
N = 10  
arr[] = {10 9 8 7 6 5 4 3 2 1}  
Output:  
1 2 3 4 5 6 7 8 9 10
```

Constraints:

$$1 \leq N \leq 10^5$$

$$1 \leq \text{arr}[i] \leq 10^5$$

2. Analyze time complexity and space complexity of the Merge Sort Algorithm.