

# Rajalakshmi Engineering College

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## NeoColab\_REC\_CS23231\_DATA STRUCTURES

### REC\_DS using C\_Week 6\_COD\_Question 1

Attempt : 1  
Total Mark : 10  
Marks Obtained : 10

#### Section 1 : Coding

##### 1. Problem Statement

John and Mary are collaborating on a project that involves data analysis. They each have a set of age data, one sorted in ascending order and the other in descending order. However, their analysis requires the data to be in ascending order.

Write a program to help them merge the two sets of age data into a single sorted array in ascending order using merge sort.

##### *Input Format*

The first line of input consists of an integer N, representing the number of age values in each dataset.

The second line consists of N space-separated integers, representing the ages of participants in John's dataset (in ascending order).

The third line consists of N space-separated integers, representing the ages of participants in Mary's dataset (in descending order).

### ***Output Format***

The output prints a single line containing space-separated integers, which represents the merged dataset of ages sorted in ascending order.

Refer to the sample output for formatting specifications.

### ***Sample Test Case***

Input: 5

1 3 5 7 9

10 8 6 4 2

Output: 1 2 3 4 5 6 7 8 9 10

### ***Answer***

```
#include <stdio.h>
```

```
#include <stdlib.h>
```

```
void merge(int arr[], int left[], int right[], int left_size, int right_size) {  
    int i = 0, j = 0, k = 0;
```

```
    // Merge left and right arrays into arr  
    while (i < left_size && j < right_size) {  
        if (left[i] <= right[j])  
            arr[k++] = left[i++];  
        else  
            arr[k++] = right[j++];  
    }
```

```
    // Copy remaining elements  
    while (i < left_size)  
        arr[k++] = left[i++];  
    while (j < right_size)  
        arr[k++] = right[j++];  
}
```

```

void mergeSort(int arr[], int size) {
    if (size < 2)
        return;

    int mid = size / 2;

    // Allocate memory for left and right subarrays
    int* left = (int*)malloc(mid * sizeof(int));
    int* right = (int*)malloc((size - mid) * sizeof(int));

    for (int i = 0; i < mid; i++)
        left[i] = arr[i];
    for (int i = mid; i < size; i++)
        right[i - mid] = arr[i];

    // Recursive sort
    mergeSort(left, mid);
    mergeSort(right, size - mid);

    // Merge sorted subarrays
    merge(arr, left, right, mid, size - mid);

    free(left);
    free(right);
}

int main() {
    int n, m;
    scanf("%d", &n);
    int arr1[n], arr2[n];
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr1[i]);
    }
    for (int i = 0; i < n; i++) {
        scanf("%d", &arr2[i]);
    }
    int merged[n + n];
    mergeSort(arr1, n);
    mergeSort(arr2, n);
    merge(merged, arr1, arr2, n, n);
    for (int i = 0; i < n + n; i++) {
        printf("%d ", merged[i]);
    }
}

```

```
    }  
    return 0;  
}
```

**Status :** Correct

**Marks :** 10/10