# Rajalakshmi Engineering College

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## NeoColab_REC_CS23231_DATA STRUCTURES

## REC_DS using C_Week 6_COD_Question 5

Attempt : 1
Total Mark : 10
Marks Obtained : 10

## Section 1 : Coding

1.  Problem Statement

Jose has an array of N fractional values, represented as double-point numbers. He needs to sort these fractions in increasing order and seeks your help.

Write a program to help Jose sort the array using the merge sort algorithm.

*Input Format*

The first line of input consists of an integer N, representing the number of fractions to be sorted.

The second line consists of N double-point numbers, separated by spaces, representing the fractions array.

*Output Format*

The output prints N double-point numbers, sorted in increasing order, and rounded to three decimal places.

Refer to the sample output for formatting specifications.

*Sample Test Case*

Input: 4
0.123 0.543 0.321 0.789
Output: 0.123 0.321 0.543 0.789

*Answer*

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

int compare(double a, double b)
{
    return (a < b) ? -1 : (a > b);
}

void merge(double arr[], int l, int m, int r) {
    int n1 = m - l + 1;
    int n2 = r - m;

    double L[n1], R[n2];

    for (int i = 0; i < n1; i++)
        L[i] = arr[l + i];
    for (int j = 0; j < n2; j++)
        R[j] = arr[m + 1 + j];

    int i = 0, j = 0, k = l;

    while (i < n1 && j < n2) {
        if (L[i] <= R[j])
            arr[k++] = L[i++];
        else
            arr[k++] = R[j++];
    }
```

```c
        while (i < n1)
            arr[k++] = L[i++];

        while (j < n2)
            arr[k++] = R[j++];
    }

    void mergeSort(double arr[], int l, int r) {
        if (l < r) {
            int m = l + (r - l) / 2;
            mergeSort(arr, l, m);
            mergeSort(arr, m + 1, r);
            merge(arr, l, m, r);
        }
    }

    int main() {
        int n;
        scanf("%d", &n);
        double fractions[n];
        for (int i = 0; i < n; i++) {
            scanf("%lf", &fractions[i]);
        }
        mergeSort(fractions, 0, n - 1);
        for (int i = 0; i < n; i++) {
            printf("%.3f ", fractions[i]);
        }
        return 0;
    }
```

*Status :* Correct                                         *Marks : 10/10*