# Rajalakshmi Engineering College

Name: ARJUN K
Email: 241501021@rajalakshmi.edu.in
Roll no: 241501021
Phone: 9944506466
Branch: REC
Department: I AI & ML FA
Batch: 2028
Degree: B.E - AI & ML

## 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) {
    if (a < b) return -1;
    else if (a > b) return 1;
    else return 0;
}

void merge(double arr[], int left, int mid, int right) {
    int n1 = mid - left + 1;
    int n2 = right - mid;
    double L[n1], R[n2];
    for (int i = 0; i < n1; i++)
        L[i] = arr[left + i];
    for (int j = 0; j < n2; j++)
        R[j] = arr[mid + 1 + j];

    int i = 0, j = 0, k = left;
    while (i < n1 && j < n2) {
        if (compare(L[i], R[j]) <= 0)
            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 left, int right) {
    if (left < right) {
        int mid = left + (right - left) / 2;
        mergeSort(arr, left, mid);
        mergeSort(arr, mid + 1, right);
        merge(arr, left, mid, right);
    }
}

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*