/\* Java program for Merge Sort \*/

class MergeSort

{

    // Merges two subarrays of arr[].

    // First subarray is arr[l..m]

    // Second subarray is arr[m+1..r]

    void merge(int arr[], int l, int m, int r)

    {

        // Find sizes of two subarrays to be merged

        int n1 = m - l + 1;

        int n2 = r - m;

        /\* Create temp arrays \*/

        int L[] = new int [n1];

        int R[] = new int [n2];

        /\*Copy data to temp arrays\*/

        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];

        /\* Merge the temp arrays \*/

        // Initial indexes of first and second subarrays

        int i = 0, j = 0;

        // Initial index of merged subarry array

        int k = l;

        while (i < n1 && j < n2)

        {

            if (L[i] <= R[j])

            {

                arr[k] = L[i];

                i++;

            }

            else

            {

                arr[k] = R[j];

                j++;

            }

            k++;

        }

        /\* Copy remaining elements of L[] if any \*/

        while (i < n1)

        {

            arr[k] = L[i];

            i++;

            k++;

        }

        /\* Copy remaining elements of R[] if any \*/

        while (j < n2)

        {

            arr[k] = R[j];

            j++;

            k++;

        }

    }

    // Main function that sorts arr[l..r] using

    // merge()

    void sort(int arr[], int l, int r)

    {

        if (l < r)

        {

            // Find the middle point

            int m = (l+r)/2;

            // Sort first and second halves

            sort(arr, l, m);

            sort(arr , m+1, r);

            // Merge the sorted halves

            merge(arr, l, m, r);

        }

    }

    /\* A utility function to print array of size n \*/

    static void printArray(int arr[])

    {

        int n = arr.length;

        for (int i=0; i<n; ++i)

            System.out.print(arr[i] + " ");

        System.out.println();

    }

    // Driver method

    public static void main(String args[])

    {

        int arr[] = {12, 11, 13, 5, 6, 7};

        System.out.println("Given Array");

        printArray(arr);

        MergeSort ob = new MergeSort();

        ob.sort(arr, 0, arr.length-1);

        System.out.println("\nSorted array");

        printArray(arr);

    }

}

/\* This code is contributed by Rajat Mishra \*/