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// link https://www.geeksforgeeks.org/merge-sort/

/* 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 subarray 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++;
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            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-l)/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 code
    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 */
```