**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++;

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);

}

}