7.Writing a program in Java implementing the merge sort algorithm

```
package javafsd4;

import java.util.Arrays;

public class mergeSort {
	public static int[] sort(int[] arr) {
		if(arr.length==1)
			return arr;
		int mid=arr.length/2;
		int[] left=sort(Arrays.copyOfRange(arr, 0, mid));
		int[] right=sort(Arrays.copyOfRange(arr,mid,arr.length));

		return merge(left,right);


	}

	 public static int[] merge(int[] first, int[] second) {
		int[] joined = new int[first.length+second.length];
		int i=0,j=0,k=0;

		while(i<first.length && j<second.length) {
		 if(first[i]<second[j])
			joined[k++]= first[i++];
		 else
			joined[k++] =second [j++];
		 }

		while(i<first.length)
		joined[k++] = first[i++];
		while(j<second.length)
		joined[k++] = second [j++];

		 return joined;

	}
```

```
public  static void main(String[] args) {
        // TODO Auto-generated method stub
     int[] arr= {9,4,7,1,6,10,2,8,4,};
     System.out.println(".....MERGE SORT.....");
     System.out.println("Before sorting:");
     for(int num:arr) {
          System.out.print(num+" ");
     }

     int[] result= mergeSort.sort(arr);

    System.out.println();
    System.out.println("After  sorting:");
    for(int num:result) {
           System.out.print(num+" ");
     }
}
}
```

OUTPUT