

# Principles of Computer Science Lab

The goal of this lab is for you to implement (a previously unseen) Heapsort algorithm for sorting an array of integers.

You are provided a single file, HeapSortLab.java, which can generate random int arrays of arbitrary lengths. In this file you are asked to complete the following two methods:

- `public static int[] sortAscendingUsingHeapSort(int[] arr);` and
- `public static int[] sortDescendingUsingHeapSort(int[] arr);`

The first method uses Heapsort to sort the input array into ascending order; whereas, the second method uses Heapsort to sort the input array into descending order. Neither methods modify the input array.

I suggest you create a HeapSort class, which implements the HeapSort algorithm. Then you can use this class as follows:

```
HeapSort heapSortEngine = new HeapSort();  
heapSortEngine.sort(arr, true); // inplace ascending sort
```