# Heap Soft Algorithm
Pre-Lab #4

By
Eduardo Castro

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## 1. Problem Specification

The goal of this pre-lab assignment is to rearrange elements from a list using the Heap Soft algorithm. The list is {15, 19, 10, 7, 17, 16}.

## 2. Program Design

For a Heap Sort we first need to create a sorted heap and then after the sorting we exclude the first/ bigger element from the heap and insert it into a new array that will represent the sorted array. For the new head node we put the last element from the sorted heap at the beginning at sort it again and do this recursively until last only one element that will be me smallest one.

The following steps were required to develop this algorithm:

a) Create a heap with all the elements
b) Sort the heap
c) Get the biggest/first element and insert it into a new array
d) Replace the first element with the last element from the heap and delete it
e) Sort the heap
f) Get the biggest/first element and insert it into a new array
g) Replace the first element with the last element from the heap and delete it
h) Do this recursively until lasts only one element, the smallest one that will be the last one to be added into the new array

## 2. Results

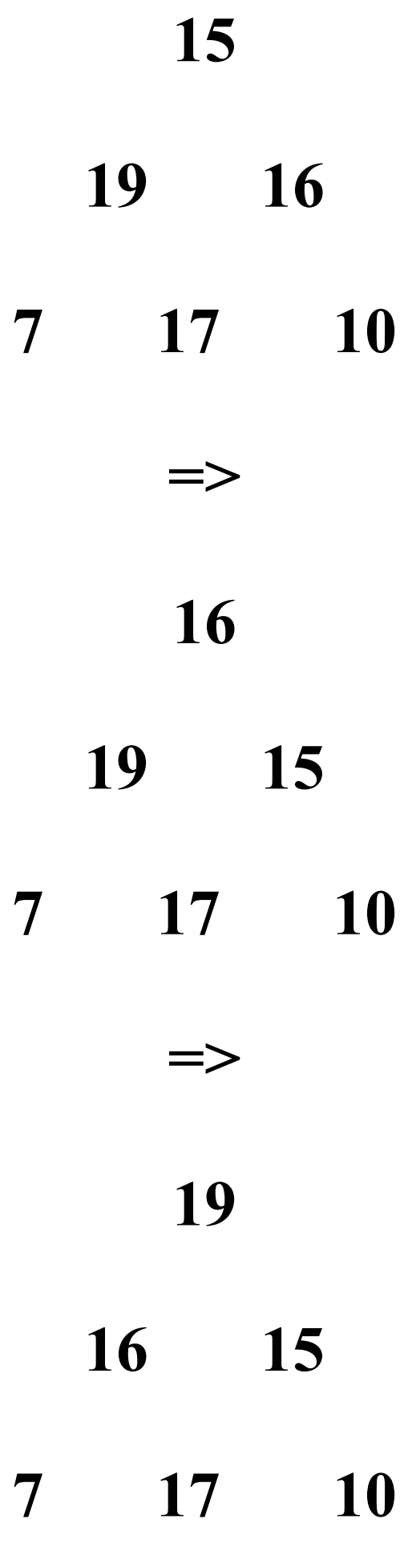
sortedArray = []

**15**

**19 10**

**7 17 16**

**=>**


15
19 16
7 17 10
=>
16
19 15
7 17 10
=>
19
16 15
7 17 10

Now we send the biggest element, 19, to the sortedArray, replace it with the last element, 10, exclude the 19 from the heap and sort it again

sortedArray = [19]

**10**

**16 15**

**7 17**

**=>**

**10**

**17 15**

**7 16**

**=>**

**15**

**17 10**

**7 16**

**=>**

**17**

**15 10**

**7 16**

**=>**

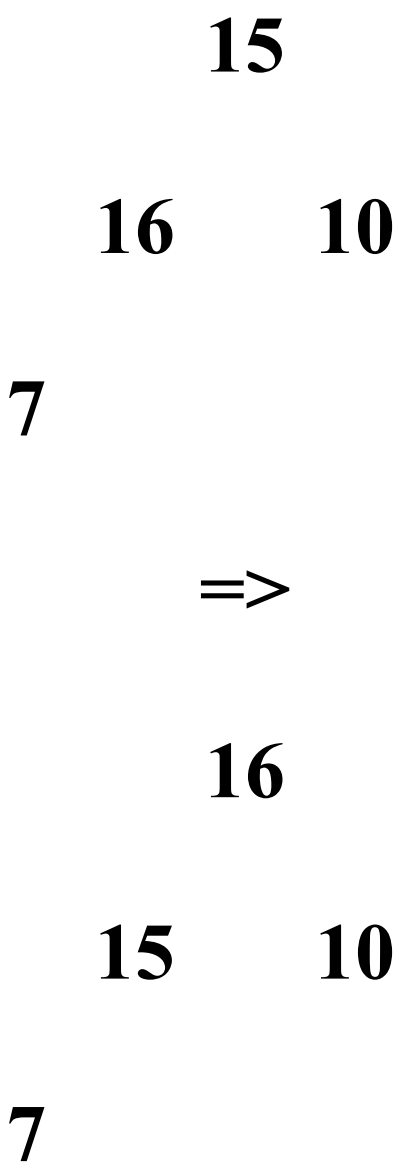
**17**

**16 10**

**7 15**

Now we send the biggest element, 17, to the sortedArray, replace it with the last element, 15, exclude the 17 from the heap and sort it again

sortedArray = [19, 17]




Now we send the biggest element, 16, to the sortedArray, replace it with the last element, 7, exclude the 16 from the heap and sort it again

sortedArray = [19, 17, 16]

**7**

**15 10**

**=>**

**10**

**15 7**

**=>**

**15**

**10 7**

Now we send the biggest element, 15, to the sortedArray, replace it with the last element, 7, exclude the 15 from the heap and sort it again

sortedArray = [19, 17, 16, 15]

# 7

# 10

# =>

# 10

# 7

Now we send the biggest element, 10, to the sortedArray, replace it with the last element, 7, exclude the 10 from the heap and sort it again

sortedArray = [19, 17, 16, 15, 10]

# 7

Now we send the biggest element, 7, to the sortedArray and how it’s the last element we finished the sorting job returning a sorted array.

sortedArray = [19, 17, 16, 15, 10, 7]