Smoothsort [1]

Smoothsort uses Leonardo heaps instead of binary heaps and operates similar to heapsort.

- L(0) = 1
- L(1) = 1
- L(n+2) = L(n) + L(n+1) + 1

L(n) = 1, 1, 3, 5, 9, 15, 25, 41, 67, 109

Smoothsort is worst case O(nlgn) like heapsort but O(n) when the input is sorted

Algorithm with unsorted data:

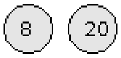
- Start:

20	8	19	13	5	15	1	16	11	18
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Increase Size By One:

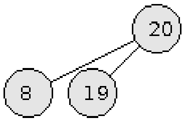
20	8	19	13	5	15	1	16	11	18
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Increase Size By One and Selection Sort the Roots:



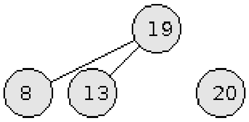
8	20	19	13	5	15	1	16	11	18
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Increase Size By One and Merge:



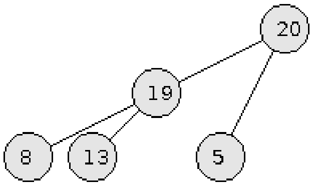
8	19	20	13	5	15	1	16	11	18
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Increase Size By One, Selection Sort and Push Down:



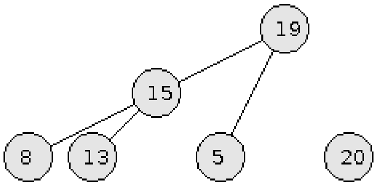
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]
8	13	19	20	5	15	1	16	11	18

- Increase Size By One, Merge and Push Down:



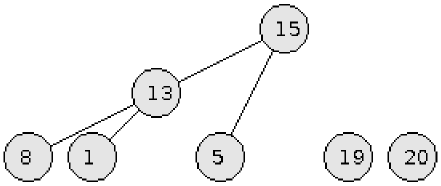
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]
8	13	19	5	20	15	1	16	11	18

- Increase Size By One, Selection Sort the Roots and Push Down:



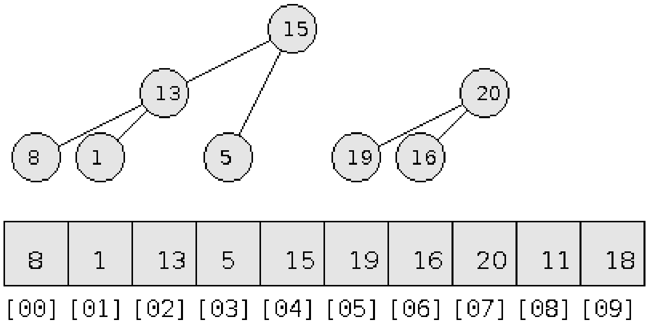
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]
8	13	15	5	19	20	1	16	11	18

- Increase Size By One, Selection Sort the Roots and Push Down:



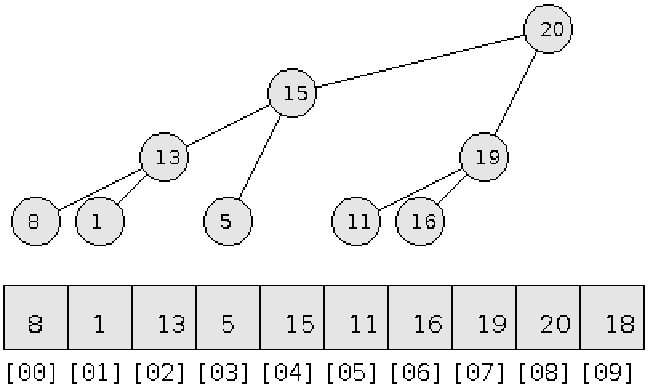
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]
8	1	13	5	15	19	20	16	11	18

- Increase Size By One, Push Down, Selection Sort the Roots and Push Down:



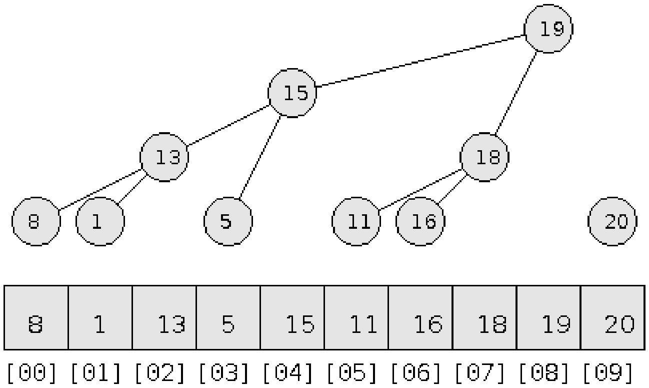
8	1	13	5	15	19	16	20	11	18
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Increase Size By One, Push Down:



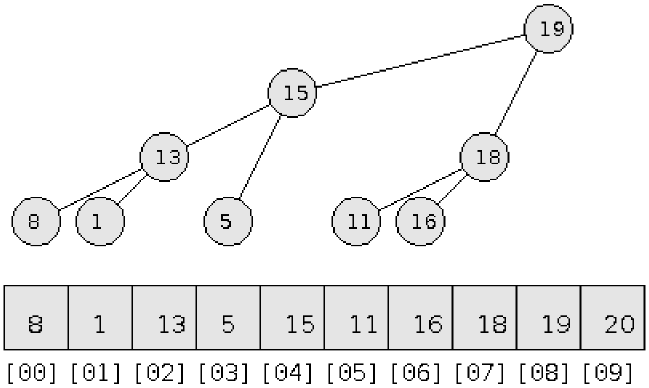
8	1	13	5	15	11	16	19	20	18
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Increase Size By One, Selection Sort the Roots:



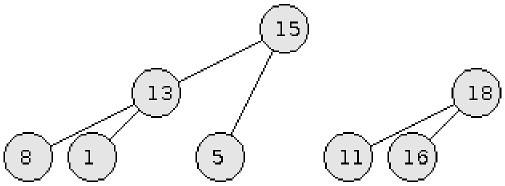
8	1	13	5	15	11	16	18	19	20
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Decrease Size By One:



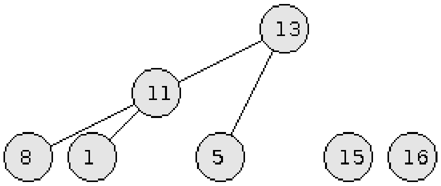
8	1	13	5	15	11	16	18	19	20
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Decrease Size By One:



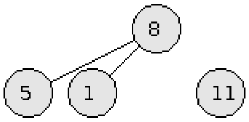
8	1	13	5	15	11	16	18	19	20
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Decrease Size By One, Selection Sort the Roots and Push Down:



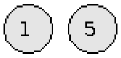
8	1	11	5	13	15	16	18	19	20
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Decrease Size By Three, Selection Sort the Roots and Push Down:



5	1	8	11	13	15	16	18	19	20
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Decrease Size and selection sort the roots:



1	5	8	11	13	15	16	18	19	20
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]

- Sort Complete:

1	5	8	11	13	15	16	18	19	20
[00]	[01]	[02]	[03]	[04]	[05]	[06]	[07]	[08]	[09]