

Heap Exercise - convert an array into a heap array

Given the following array, describe with the aid of text and tree diagrams, how it might be converted into a heap.

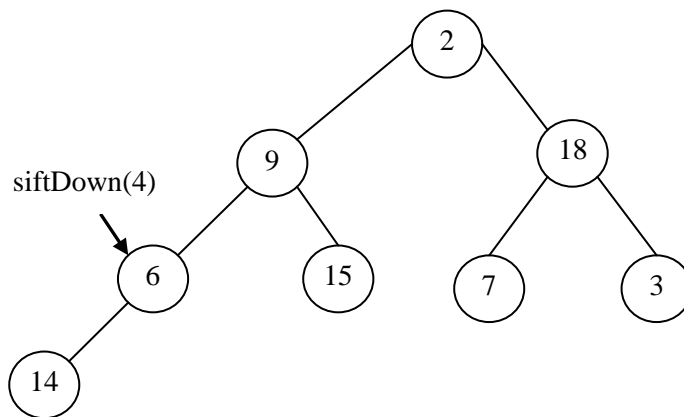
k	0	1	2	3	4	5	6	7	8
a[k]		2	9	18	6	15	7	3	14

Solution

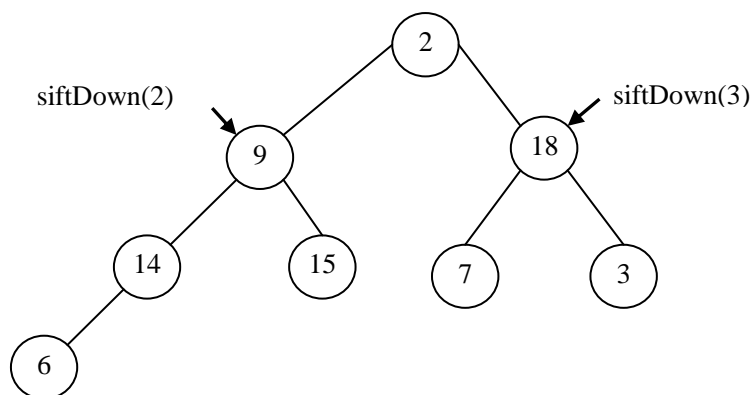
We use the algorithm:

```
for k = N/2 to 1
    siftDown(k, a, N)
```

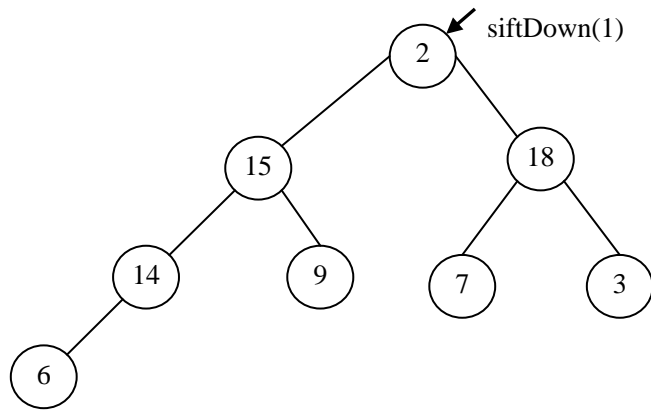
Starting from the last tree node which has a left child (at position $N/2$), $\text{siftDown}(4)$.



This yields the following tree. Then working backwards thru the tree from $N/2$ to 1, do a series of $\text{siftDown}()$. The next two $\text{siftDown}()$ are shown next. $\text{siftDown}(3)$ yields no change.



Result of siftDown(2) is shown next. And last siftDown(1) is started.



We finally arrive at a binary tree which obeys the heap condition.
The resulting heap is:

