ECE608, Fall 2013, Quiz 4

First Name: ___________________ Last Name: ____________________

(1) Apply the algorithm $\text{Build-Heap}()$ to the following binary tree. Show every step of the algorithm.

(2) Show the array corresponding to the heap you found.

(3) The array obtained after applying $\text{Build-Heap}()$ may already be sorted. Is it possible to reduce the computational complexity of $\text{Heapsort}()$ by using this fact? Explain in one or two short sentences.

![Binary Tree Diagram]

Solution:
(1) Index 3:

![Updated Binary Tree Diagram]

Index 2:
(2) The array:
16 14 10 7 4 3
(note that it is already sorted; it is possible to reverse it in $O(n)$).

(3) The worst-case occurs when the array is not sorted, and the worst-case computational complexity is not affected by adding the check.
(all yes/no arguments were accepted as correct for this part).