Algorithms Homework 2

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1 Question 6-1

We can build a heap by repeatedly calling MAX-HEAP-INSERT to insert the elements into the heap. Consider the following variation on the BUILD-MAX-HEAP procedure:

1.1 Do the procedures BUILD-MAX-HEAP and BUILD-MAX-HEAP' always create the same heap when run on the same input array? Prove that they do, or provide a counterexample.

1.2 Show that in the worst case, BUILD-MAX-HEAP requires $\Theta(nlg(n))$ time to build an n-element heap

recall that the height of a tree is $\lfloor \log(n) \rfloor$

2 Question 7.2-2

What is the running time of QUICKSORT when all elements of array A have the same value?

3 Question 7.2-3

Show that the running time of QUICKSORT is $\Theta(n^2)$ when the array A contains distinct elements and is sorted in decreasing order.