Lab W3D2

Question 1. Starting with the values 1, 3, 4, 4, 5, 7, 9, 11, 13, 13, 17, do the following:

a. Create a heap H in which these values are the keys by inserting one item at a time. You must show the heap after each insert both as a tree as well as array.
b. Create a heap H in which these values are the keys by the bottom up approach. You must show the heap after each insert each new value is placed in the heap in both as a tree and as an array.
c. Count the number of comparisons made in (a)
d. Count the number of comparisons made in (b)
e. Count the number of swaps made in (a)
f. Count the number of swaps made in (b)

Question 2. Carry out the array-based version of HeapSort on the input array [1, 5, 2, 11, 12, 2, 3]. **You need to first build the heap. You need not show all the steps. You are free to use methods mentioned in (a) or (b) of Question 1.**

Show all the remaining steps and outputs along the way.

Question 3. Given two Heaps H1 and H2 of the same height, give an efficient algorithm to "fuse together" to make one Heap.

(a) What is the best case?
(b) What is the worst case?
(c) What is the worst case time complexity?