CSE 332 Summer 18
Exercise 02

Searching in Heaps

Due Date: July 6
Submit as a pdf to gradescope

a) (10 points) Write pseudocode for an **efficient** algorithm that will print all values less than a provided value in a binary min heap. The provided value may not be in the heap.

   Your solution should not examine every element in the heap on all inputs (though it may on some inputs). You should assume the minheap is stored in an array, with the root stored at index 0. You may access the array directly in your pseudocode, but you may not alter the state of the heap.

   The handouts page has guidance on writing pseudocode. Please read it before starting this part.

b) (5 points) What is the worst case situation for your algorithm? What is the running time in that worst case (and why)?

c) (5 points) In lecture, we said `decreaseKey` and `increaseKey` operations could run in $O(\log n)$ time if given a pointer to the element whose priority we were updating. Based on the previous parts, what do you think the running time would be if you're not given a pointer to the element? Why?