

Homework Assignment #4
Due: April 16, 4:00 p.m.

1. Consider the Fibonacci heap data structure.
 - (a) Prove or disprove the following statement. At any time, the node with the maximum degree in a Fibonacci heap is one of the roots.
 - (b) Show that for all n there is a sequence of $O(n)$ INSERTS and DELETES starting with an empty Fibonacci heap that ends up with a heap containing a tree of height n .
 - (c) Describe how to implement a INCREASE-KEY(x, k) operation on a Fibonacci heap. Given a pointer to a node x , it increases the key of x to k . Your operation should have good amortized time and should not affect the amortized time of any of the other operations that we studied in class.
 - (d) Is there a comparison-based implementation of an INCREASE-KEY operation on Fibonacci heaps that has amortized constant time per operation?