



Algorithm Theory

Sample Solution Exercise Sheet 6

Due: Friday, 1st of December 2023, 10:00 am

Exercise 1: Fibonacci Heap Simulation

(10 Points)

Do a consolidation operation on this heap then a delete-min.

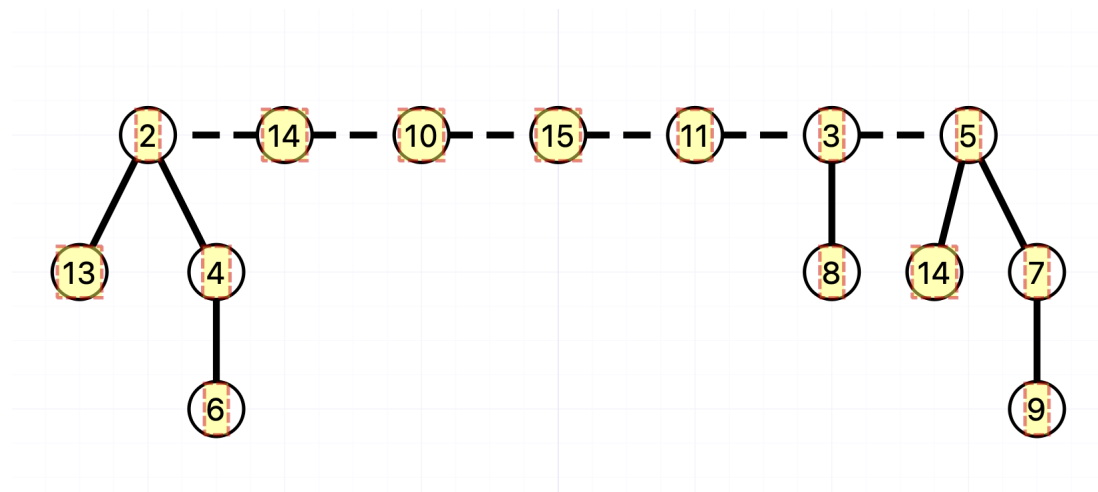


Figure 1: Before consolidation

Give the Fibonacci heap after the operations. Important: Follow the algorithm exactly as described on https://ac.informatik.uni-freiburg.de/teaching/ws23_24/algo_theo/pdf/Chapter5_PartIV.pdf.

Exercise 2: Fibonacci Heap Properties

(3+7 Points)

- Create a new method called Delete-node(v), which deletes node v from the Fibonacci heap in $O(\log n)$ amortized time.
- A crazy person at the bus stop claims that for every tree in a Fibonacci heap, the height is $O(\log n)$ (in other words: at most $c \log n$), where n is the number of nodes in the heap. Show that there is a Fibonacci heap that consists of only one tree, which is a chain (path) of n nodes.